DRAFT Supplemental Watershed Plan No. 2 and Environmental Assessment

For Multipurpose Structure No. 5 of the Oak Creek Watershed

Washita County, Oklahoma

PREPARED BY
USDA Natural Resources Conservation Service

IN COOPERATION WITH
Washita County Conservation District
Oklahoma Wildlife Conservation Department

Preliminary – Subject to Revision – February 2025

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Authority

Oak Creek Multipurpose Structure No. 5 was constructed in 1968 under Authority of the Flood Control Act of 1944 under Public Law 78-534. The supplemental watershed plan and environmental assessment was prepared under the authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566), as amended (16 U.S.C. Section 1001 et seq.), 1954.

Abstract

The original watershed plan was completed in 1963 and supplemented in 1966. The watershed plan provided for land treatment measures, 11 floodwater retarding structures and 1 multipurpose structure. The 11 floodwater retarding structures and the multipurpose structure have been constructed. Oak Creek Multipurpose Site (MPS) 5 was constructed in Washita County in 1968 as a significant hazard dam. A breach of Oak Creek MPS 5 would impact two houses and four county roads. Due to the potential for loss of life during a failure of the dam, the dam is currently classified as high hazard by the State of Oklahoma and NRCS. The existing structure does not meet the current safety and performance standards for a high hazard dam. A supplement to the original watershed plan is needed due to the change in hazard classification. This supplemental Plan-EA documents the NRCS planning process, compliance with the requirements of the National Environmental Policy Act, and requirements of the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G). The proposed action would consist of slip-lining the existing 30-inch principal spillway with a 28-inch OD HDPE conduit, installing a new principal spillway consisting of a 30-inch RCP conduit with a hooded inlet, installing an impact basin, and constructing a 300-foot-wide auxiliary spillway RCC chute over the exiting embankment. The hooded inlet crest would be set at the same elevation as the existing principal spillway elevation of 1448.9 feet. The AS crest would store the 100-year frequency storm at El. 1461.8. The existing embankment crest has an average crest elevation of 1468.0 feet that would be raised to elevation 1470.1 feet. The embankment would be modified to flatten the upstream and downstream slopes to 3 horizontal to 1 vertical, shifting the centerline downstream to allow for a crossing berm on the US slope, adding rock to the existing rock for wave protection and installing a trench drain under the downstream toe. Project installation cost for this alternative is estimated to be $6,951,000 of which $6,325,000 would be paid from the NRCS Watershed Program funds and $626,000 from local funds.

Comments and Inquiries:

Comments and inquiries must be received by (DATE). Submit comments and inquiries to Jeanne Jasper, State Conservationist, USDA – Natural Resources Conservation Service, 100 USDA, Suite 206, Stillwater, Oklahoma 74074-2655. Phone: 405-742-1204.

Non-Discrimination Statement:

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.
To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at Filing a Program Discrimination Complaint (https://www.usda.gov/about-usda/general-information/staff-offices/office-assistant-secretary-civil-rights/how-file-program-discrimination-complaint) and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by:

(1) mail: U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;
(2) fax: (202) 690-7442; or
(3) email: program.intake@usda.gov.

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Ancestral Land Acknowledgement:

The precontact Agricultural Villagers period (roughly 750 and 1000 years ago) of the Southern Plains—including Washita County, Oklahoma—marks a first time when prehistoric groups can be linked to historically known Native societies (or "tribes"). Based on a continuity of dwelling architecture, habitation patterns, and ceramic styles and varieties, the Agricultural Villagers became those known today as the Caddo Nation and the Wichita and Affiliated Tribes. Eventually, the Osage Nation, Quapaw Nation, Cheyenne and Arapahoe Tribes, Comanche Nation, Kiowa Indian Tribe of Oklahoma, and Apache Tribe of Oklahoma made their way into Oklahoma through direct or indirect contact with Europeans. The first documented land cessions in what is now Oklahoma was by the Quapaw Nation in 1818; the Quapaw Nation cessions included those areas between the Canadian River and the Red River ending at the 100th Meridian. This land was later assigned to the Chickasaw Nation and Choctaw Nation in joint holdings; the western portion of this land, between the 98th Meridian and the 100th Meridian, was ceded in 1855 to the Comanche Nation and Kiowa Indian Tribe of Oklahoma. Some ten years later, the land was ceded by the Comanche Nation and Kiowa Indian Tribe of Oklahoma to the Cheyenne and Arapahoe Tribes in 1865. Finally, these ceded lands, containing Washita County, were relinquished to the United States government in 1869.

Oak Creek Watershed

Supplemental Watershed Plan Agreement No. 2

between the
Washita County Conservation District
(Referred to herein as Sponsors)

and the

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
(Referred to herein as NRCS)

Whereas, the watershed plan for Oak Creek Watershed, State of Oklahoma, executed by the sponsors named therein and the NRCS, became effective on the 26th day of June 1963; and

Whereas, a supplemental agreement for said watershed, executed by the sponsors named therein and NRCS became effective on February, 1966; and

Whereas, in order to carry out the watershed plan for said watershed, it has become necessary to modify said watershed agreement; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, has been assigned by the Secretary of Agriculture to NRCS; and

Whereas, there has been developed through the cooperative efforts of the sponsors and NRCS a supplemental watershed project plan and environmental assessment for works of improvement for Oak Creek Multipurpose Structure (MPS) 5 in the Oak Creek Watershed, State of Oklahoma, hereinafter referred to as the watershed project plan or plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the Sponsors hereby agree on this watershed project plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this plan and including the following:

1. **Term.** The term of this agreement is for the installation period and evaluated life of the project (103 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life.

2. **Costs.** The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto will be the actual costs incurred in the installation of works of improvement.

3. **Real property.** The sponsor will acquire such real property as will be needed in connection with the works of improvement. The amounts and percentages of the real property acquisition costs to be borne by the Sponsor and NRCS are as shown in the Cost-share table in item 5 hereof.

   The sponsor agrees that all land acquired for measures, other than land treatment practices, with financial or credit assistance under this agreement will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement

4. **Uniform Relocation Assistance and Real Property Acquisition Policies Act.** The sponsor hereby agrees to comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. Section 4601 et seq. as further implemented through regulations in 49 CFR

Part 24 and 7 CFR Part 21) when acquiring real property interests for this federally assisted project. If the sponsors are legally unable to comply with the real property acquisition.

5. **Cost-share for Supplemental Watershed Work Plan No. 2:** The following table shows cost-share percentages and amounts for Supplemental Watershed Work Plan No. 2 implementation.

Cost-share Table for Watershed Operation or Rehabilitation Projects					
Works of Improvement	**NRCS**		**Sponsors**		**Total**
Cost-Shareable Items	Percent	Cost	Percent	Cost	Cost
Oak Creek MPS No. 5	67%	$5,664,000	33%	$2,796,000	$8,460,000
Sponsors Project Administration	0%	$0	100%	$253,900	$253,900
Subtotal: Cost-Sharable Costs	65%	$5,664,000	35%	$3,049,900	$8,713,900
Non-Cost-Sharable Items [1/]					
NRCS Technical Assistance/Engineering	100%	$677,000			$677,000
Project Administration [2/]	100%	$423,100			$423,100
Non-Project Costs			100%	$2,000	$2,000
Subtotal: Non-Cost-Share Costs	99.8%	$1,100,100	0.2%	$2,000	$1,102,100
Total:		$6,764,100		$3,051,900	$9,816,000

1/ If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change.
2/ The sponsors and NRCS will each bear the costs of project administration that each incurs. Sponsor costs for project administration include relocation assistance advisory service.

6. **Land treatment agreements.** The sponsors will obtain agreements from owners of not less than 50 percent of the land above Oak Creek multiple-purpose structure 5. These agreements must provide that the owners will carry out farm or ranch conservation plans on their land. The sponsors will ensure that 50 percent of the land upstream of any retention reservoir site is adequately protected before construction of the dam. The sponsors will provide assistance to landowners and operators to ensure the installation of the land treatment measures shown in the watershed project plan. The sponsors will encourage landowners and operators to continue to operate and maintain the land treatment measures after the long-term contracts expire, for the protection and improvement of the watershed.

7. **Floodplain Management.** Before construction of any project for flood prevention, the sponsors must agree to participate in and comply with applicable Federal floodplain management and flood insurance programs. The sponsor is required to have development controls in place below low and significant hazard dams prior to NRCS or the sponsor entering into a construction contract.

8. **Water and mineral rights.** The sponsors will acquire or provide assurance that landowners or resource users have acquired such water, mineral, or other natural resources rights pursuant to State law as may be needed in the installation and operation of the works of improvement. Any costs incurred must be borne by the sponsors and these costs are not eligible as part of the sponsor's cost-share.

9. **Permits.** The sponsors will obtain and bear the cost for all necessary Federal, State, and local permits required by law, ordinance, or regulation for installation of the works of improvement. These costs are not eligible as part of the sponsors' cost-share.

10. **NRCS assistance.** This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

11. **Additional agreements**. A separate agreement will be entered into between NRCS and the sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

12. **Amendments.** This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the sponsors have failed to comply with the conditions of this agreement or when the program funding or authority expires. In this case, NRCS must promptly notify the sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsors or recoveries by NRCS must be in accordance with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the sponsors having specific responsibilities for the measure involved.

13. **Prohibitions.** No member of or delegate to Congress, or resident commissioner, may be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision may not be construed to extend to this agreement if made with a corporation for its general benefit.

14. **Operation and Maintenance (O&M).** The sponsors will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M Agreement. An O&M agreement will be entered into before Federal funds are obligated and will continue for the project life (100 years). Although the sponsors' responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.

15. **Emergency Action Plan.** Prior to construction, the sponsors must prepare an Emergency Action Plan (EAP) for Oak Creek Multipurpose Site 5where failure may cause loss of life or as required by state and local regulations. The EAP must meet the minimum content specified in the NRCS Title 180, National Operation and Maintenance Manual (NOMM), Part 500, Subpart F, Section 500.52, and meet applicable State agency dam safety requirements. The NRCS will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure. EAPs must be reviewed and updated by the sponsors annually.

16. **Nondiscrimination Provisions**. In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

    Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

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    (1) mail: U.S. Department of Agriculture
    Office of the Assistant Secretary for Civil Rights
    1400 Independence Avenue, SW

Washington, D.C. 20250-9410;
(2) fax: (202) 690-7442; or
(3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender. By signing this agreement the recipient assures the Department of Agriculture that the program or activities provided for under this agreement will be conducted in compliance with all applicable Federal civil rights laws, rules, regulations, and policies.

17. **Certification Regarding Drug-Free Workplace Requirements** (7 CFR Part 3021). By signing this Watershed Agreement, the sponsors are providing the certification set out below. If it is later determined that the sponsors knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. Section 812) and as further defined by regulation (21 CFR Sections 1308.11 through 1308.15);

Conviction means a finding of guilt (including a plea of *nolo contendere*) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of subrecipients or subcontractors in covered workplaces).

Certification:

A. The sponsors certify that they will or will continue to provide a drug-free workplace by—

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition.

(2) Establishing an ongoing drug-free awareness program to inform employees about—
(a) The danger of drug abuse in the workplace;
(b) The grantee's policy of maintaining a drug-free workplace;
(c) Any available drug counseling, rehabilitation, and employee assistance programs; and
(d) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1).

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee must—
(a) Abide by the terms of the statement; and
(b) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction.

(5) Notifying the NRCS in writing, within 10 calendar days after receiving notice under paragraph (4)(b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice must include the identification numbers of each affected grant.

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4)(b), with respect to any employee who is so convicted—

(a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
(b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).

B. The sponsors may provide a list of the sites for the performance of work done in connection with a specific project or other agreement.

C. Agencies will keep the original of all disclosure reports in the official files of the agency.

18. **Certification Regarding Lobbying** (7 CFR Part 3018) (for projects > $100,000)

A. The sponsors certify to the best of their knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned must complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The sponsors must require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients must certify and disclose accordingly.

B. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by U.S. Code, Title 31, Section 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

19. **Certification Regarding Debarment, Suspension, and Other Responsibility Matters—Primary Covered Transactions (7 CFR Part 3017).**

A. The sponsors certify to the best of their knowledge and belief, that they and their principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(2) Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph A(2) of this certification; and

(4) (4) Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

B. Where the primary sponsors is unable to certify to any of the statements in this certification, such prospective participant must attach an explanation to this agreement.

20. **Clean Air and Water Certification.**

A. The project sponsoring organizations signatory to this agreement certify as follows:

(1) Any facility to be utilized in the performance of this proposed agreement is (____), is not (X) listed on the Environmental Protection Agency List of Violating Facilities.

(2) To promptly notify the NRCS-State administrative officer prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.

(3) To include substantially this certification, including this subparagraph, in every nonexempt sub-agreement.

B. The project sponsoring organizations signatory to this agreement agrees as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. Section 7414) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, issued there under before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the EPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use their best efforts to comply with clean air standards and clean water standards at the facilities in which the agreement is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt subagreement.

C. The terms used in this clause have the following meanings:

(1) The term “Air Act” means the Clean Air Act, as amended (42 U.S.C. Section 7401 et seq.).

(2) The term “Water Act” means Federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et seq.).

(3) The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 of the Air Act (42 U.S.C. Section 7414) or an approved implementation procedure under section 112 of the Air Act (42 U.S.C. Section 7412).

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standards, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. Section 1342), or by a local government to assure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. Section 1317).

(5) The term "facility" means any building, plant, installation, structure, mine, vessel, or other floating craft, location or site of operations, owned, leased, or supervised by a sponsor, to be utilized in the performance of an agreement or subagreement. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location will be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

21. Assurances and Compliance. As a condition of the grant or cooperative agreement, the sponsors assures and certifies that it is in compliance with and will comply in the course of the agreement with all applicable laws, regulations, Executive orders and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as a specifically set forth herein.

State, Local, and Indian Tribal Governments: OMB Circular Nos. A-87, A-102, A-129, and A-133; and 7 CFR Parts 3015, 3016, 3017, 3018, 3021, and 3052.

Nonprofit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7 CFR Parts 3015, 3017, 3018, 3019, 3021 and 3052.

22. Examination of Records. The sponsors must give the NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement, and retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

23. Signatures.

Washita County Conservation District
1505 N. Glenn English
Cordell, OK 73632-1405

The signing of this plan was authorized by a resolution by the Washita County Conservation District governing body and adopted at an official meeting held on _____, 2025 at Cordell, Oklahoma

By:
_____ Date: _____

Insert Name
Chairman

Oklahoma Wildlife Conservation Department
1801 N. Lincoln Blvd.
Oklahoma City 73152

The signing of this plan was authorized by _____ on _____, 2025.

By:
_____ Date: _____

Insert Name
Insert Title

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Approved by: Date: _____

_____
Jeanne Jasper, State Conservationist
Natural Resources Conservation Service
100 USDA Ste 206
Stillwater, OK 74074-2651

Table of Contents

Summary (Office of Management and Budget Fact Sheet)

DRAFT Supplemental Watershed Plan No. 2 and Environmental Assessment
For Multipurpose Structure No. 5 of the Oak Creek Watershed
Washita County, Oklahoma
3rd Congressional District

Prepared by: United States Department of Agriculture, Natural Resources Conservation Service (NRCS).

Authorization: Oak Creek Multipurpose Structure (MPS) 5 was constructed in 1968 under Authority of the Flood Control Act of 1944 under Public Law 78-534. The supplemental watershed plan and environmental assessment was prepared under the authority of the Watershed Protection and Flood Prevention Act (Public Law 83-566), as amended (16 U.S.C. Section 1001 et seq.), 1954.

Sponsors: Washita County Conservation District
Oklahoma Wildlife Conservation Department

Proposed Action: Rehabilitate Oak Creek Multipurpose Site 5 to meet current NRCS high hazard dam safety and performance standards.

Federal Objective: Investments in this proposed action reflect national priorities, encourage economic development, and protect the environment by:

(1) seeking to maximize sustainable economic development;
(2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and
(3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.

Purpose and Need for Action: The purposes of the project are to continue providing flood damage reduction in the area downstream of Oak Creek MPS 5 and public fish and wildlife benefits (water-based recreation) while minimizing environmental, economic, and social impacts, and comply with applicable dam safety and performance standards to reduce the potential for flood damages and loss of life from a catastrophic breach. The Public Law 83-566 purposes for Oak Creek MPS 5 are Flood Prevention (Flood Damage Reduction) and Public Fish and Wildlife. The needs are to maintain flood protection downstream and to address dam safety and performance deficiencies of the existing high-hazard dam that are not in compliance with NRCS and the Oklahoma Dam Safety Agency standards. There is a potential for loss of life due to the existence of two residences downstream of this structure within the breach inundation zone. There are four county roadways downstream of this structure within the breach inundation zone. The population-at-risk (PAR) is 6.

Description of the Preferred Alternative: The alternative is the Agency's Preferred Alternative and the Locally Preferred Alternative. The proposed action would consist of slip-lining the

existing 30-inch principal spillway with a 28-inch outside diameter High Density Polyethylene (HDPE) conduit, installing a new principal spillway consisting of a 30-inch Reinforced Concrete Pipe (RCP) conduit with a hooded inlet, installing an impact basin, and constructing a 300-foot-wide auxiliary spillway Roller Compacted Concrete (RCC) chute over the exiting embankment. The hooded inlet crest would be set at the same elevation as the existing principal spillway elevation of 1448.9 feet. The AS crest would store the 100-year frequency storm at elevation 1461.8. The existing embankment crest has an average crest elevation of 1468.0 feet that would be raised to elevation 1470.1 feet. The embankment be modified to flatten the upstream and downstream slopes to 3 horizontal to 1 vertical (3H:1V), shifting the centerline downstream to allow for a crossing berm on the US slope, adding rock to the existing rock for wave protection and installing a trench drain under the downstream toe.

Resource Information:
Location: Latitude: 35.16259 degrees; Longitude: -98.82387 degrees
8-Digit Hydrologic Unit Number: 11130302
Watershed Size: Drainage Area = 6,535 acre (10.2 square miles)
Land Ownership: State = 6%; Private= 94%; Federal = NA

Climate and Topography: Elevation in the project area around the dam and lake ranges from approximately 1400 to 1500 feet NAVD88. The Oak Creek Watershed is located in the southwest region of Oklahoma characterized by a humid subtropical climate. The average annual temperature is 60°F. The average annual precipitation is approximately 29.6 inches.

Land Use: The land surrounding the dam and lake is undeveloped and comprised of rangeland, pasture, and cropland. The area has gently rolling grass covered hills, as well as small patches of riparian forest and woodland. Land Cover classifications from the 2019 National Land Cover Database are included in following table.

NLCD Land Cover categories in the Oak Creek MPS 5 drainage and breach areas

NLCD 2019 Land Cover Database		Contributing Drainage Area (acres)	Breach Area (acres)
ID	Land Use/Land Cover		
11	Open Water	113	5
21	Developed, Open Space	224	42
22	Developed, Low Intensity	28	4
23	Developed, Medium Intensity	11	
41	Deciduous Forest	84	34
43	Mixed Forest	22	65
52	Shrub/Scrub	350	71
71	Grassland/Herbaceous	2530	289
81	Pasture/Hay	68	
82	Cultivated Crops	3092	706
90	Woody Wetlands		9
95	Emergent Herbaceous Wetlands	13	
Total		6535	1225

Population and Demographics: The population of Washita County in 2020 was 10,924. The total estimated population of the affected areas {drainage area of the lake (6535 acres) and breach zone (1132 acres)} is 19 and the number of households is about 7. The minority population in the affected areas (comprised of non-whites and Hispanic or Latino) is nearly 15%. The affected area's per capita income was $34,509. The population living below the poverty level in the affected area is 10.1%.

Summary of Relevant Resource Concerns:

Item/Concern	Relevant to the Proposed Action		Rationale
	Yes	No	
Air Quality	X		Oak Creek MPS 5 is located in an air attainment area (meets current EPA air quality standards). Machinery emissions and airborne dust would slightly degrade air quality during construction and maintenance of the alternatives.
Cultural Resources and Historic Properties	X		Consultation with the Oklahoma Archaeological Survey, Oklahoma State Historic Preservation Office, Caddo Nation, Cheyenne and Arapaho Tribes, Comanche Nation, Osage Nation, Quapaw Nation, and the Wichita and Affiliated Tribes was performed as stipulated in the National Historic Preservation Act. No documented NRHP sites, no Determination of Eligibility sites, no recorded archaeological sites, no Traditional Cultural Places, no culturally significant resources, no ethnographic data are around the project. Oak Creek MPS 5 was built in 1968, as of 2025 this dam is 62 years old. Generally, many structures over 50-years old can be considered Historic Properties if they meet certain National Register of Historic Properties conditions (i.e., Criteria A-D). As a result of this survey, one previously recorded archaeological site was revisited and evaluated for NRHP eligibility, one new historic resource was recorded and evaluated for NRHP eligibility, and the dam itself was evaluated for NRHP eligibility. The archaeological site was revisited, and shovel tests were excavated at the site. The site was determined ineligible for inclusion in the NRHP by NRCS. One additional historic resource, a stone ford or weir located in the bed of Trail Elk Creek, was recorded using a SHPO Historic Preservation Resource Identification (HPRI) form. This resource was determined ineligible for inclusion in the NRHP. Oak Creek MPS 5 was evaluated and determined ineligible for inclusion in the NRHP. A single isolated find was recorded and determined ineligible for inclusion in the NRHP. Even though Oak Creek MPS 5 was determined not eligible for the NRHP, an Oklahoma SHPO Historic Property Resource Identification form was completed for the dam to document it as part of the built landscape. The Oklahoma SHPO has not designated the Oak Creek Watershed as a Historic District,

Item/Concern	Relevant to the Proposed Action		Rationale
	Yes	No	
			therefore MPS 5 is not part of a larger Historic District. Per 36CFR800.4(d)(1), no historic properties (will be) affected by the NRCS undertaking. Concurrence with the NRCS determination was received from the OAS, the SHPO, the Caddo Nation, the Comanche Nation, and from the Quapaw Nation. The remainder of the identified parties did not respond after three invitations to be consulting parties.
Environmental Justice and Civil Rights	X		Upon review, no environmental justice groups adversely impacted by the project.
Fish & Wildlife Resources (Section 12 Coordination)	X		Section 12 coordination with USFWS is required for all PL 83-566 projects. Temporary impacts (displacement) to fish and wildlife resources in the lake area during construction of the alternatives are anticipated.
Floodplain Management	X		Alternatives may affect the regulatory floodplain and required permits from Washita County.
Forest Resources	X		The project area has forestland. Potential impacts to downstream forest areas associated with various alternatives.
Invasive Species	X		Brome grass, an invasive plant species was noted in the project area. Introduction or spread of invasive species not anticipated.
Land Use	X		No change in Land Use is anticipated from the project. However, downstream land use restrictions may be part of an alternative.
Migratory Birds	X		Migratory birds likely utilize the project area. Temporary impacts from construction.
National Economic Efficiency Plan (NEE)	X		Federally assisted plan would provide greatest public benefits.
Prime Farmland (Farmland Protection Policy Act)	X		4866 acres of prime farmland occur in the watershed and 1160 acres of prime farmland occur in the breach inundation area. Potential impacts associated with various action alternatives.
Public Health and Safety	X		Increased potential for injuries during project construction and maintenance. Concern for breach of dam damages to two residences and four county roads downstream (PAR 6).
Recreation	X		Public fish and wildlife (water-based recreation) is a project purpose. The Oklahoma Department of Wildlife Conservation identified the lake as an important public resource/decision making factor.
Riparian Areas	X		Potential impacts to upstream and downstream riparian areas associated with various alternatives.
Scenic Beauty	X		Lake Vanderwork is managed by the Oklahoma Department of Wildlife Conservation for public use.
Social issues	X		Project construction would provide a temporary positive impact on the local economy.
Soil Resources	X		Potential impacts to upstream and downstream areas associated with various action alternatives.

Item/Concern	Relevant to the Proposed Action		Rationale
	Yes	No	
Threatened and Endangered Species	X		Threatened and Endangered Species may have the potential to occur within the vicinity of the proposed project.
Water Quality	X		Temporary adverse impacts associated with construction. Storm Water Pollution Prevention Plan would be developed. Best management practices in use.
Water Resources	X		Potential impacts to upstream and downstream streams associated with various action alternatives.
Waters of the U.S. (WOTUS)	X		The creek and lake and adjacent wetlands are considered WOTUS. A Clean Water Act 404 permit would likely be required for any action alternative involving a discharge of fill material.
Wetlands	X		Wetlands occur within the project area.

Summary of Relevant PR&G Ecosystem Services:

Ecosystem Services	Relevant to the proposed action?		Rationale
	YES	**NO**	
Regulating (maintain world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe)			
Flood Control	X		Flood protection provided by the structure being studied.
Supporting (underlying processes maintaining conditions for life on Earth)			
Nutrient Cycling	X		Construction would include ground disturbing activities.
Cultural (make the world a place in which people want to live)			
Recreational Use	X		Public fish and wildlife is a project purpose. Oak Creek MPS 5 (Lake Vanderwork) is used by the public for water-based recreation (boating, fishing, hunting) and is managed by the Oklahoma Department of Wildlife Conservation. The lake, the retention of the pool, and continued use of the lake during construction period is an important factor in the development of alternatives,
Aesthetic Viewsheds	X		Project features may alter the appearance of the landscape. Oak Creek MPS 5 is used for public recreation.

Description of Alternative Plans:

Alternative 1: No Action/Future Without Federal Investment
Under the No Action alternative, the dam would remain in the existing unsafe condition with no action to improve the dam from its original design or to correct safety deficiencies beyond maintenance or replacements performed in accordance with its operation and maintenance plan. Under the No Action Alternative, the dam is assumed to fail and not be rebuilt or rehabilitated. The potential impacts of a dam failure would include adverse effects on human life, property, and the environment. The No Action alternative documents baseline conditions against which all other alternatives are analyzed. The estimated PAR in the case of a breach is currently 6.

Alternative 2: Rehabilitation to High Hazard Dam
This alternative would modify the existing structure to meet current NRCS high hazard dam design criteria. This alternative would consist of slip-lining the existing 30-inch principal spillway, installing a new principal spillway consisting of a 30-inch RCP conduit with a hooded inlet, installing an impact basin, and constructing a 300-foot-wide auxiliary spillway RCC chute over the exiting embankment. The existing principal spillway 336 feet conduit would be slip lined with a 28-inch OD HDPE conduit. The existing principal spillway trash rack would be removed and replaced with a new trash rack and a new gate would be installed on the inside of the inlet tower for dewatering the reservoir. An impact basin would be installed to dissipate the energy at the principal spillway outlet. The 30-inch hooded inlet would be installed at the same elevation as the existing principal spillway which is 1448.9 feet. This installation would require a partial dewatering of the reservoir. The two conduits would be discharged into a standard impact basin. The auxiliary spillway crest to store the 100-year frequency storm is 1461.8 feet. The auxiliary spillway would consist of a 300-foot-wide RCC chute spillway over the existing embankment with a rock lined outlet basin. The existing embankment would be extended across the existing vegetative auxiliary spillway. This alternative would require raising the embankment crest an average of 2.1 feet. The embankment would be modified to flatten the upstream and downstream slopes to 3H:1V, adding rock to the existing rock for wave protection and installing a trench drain under the downstream toe. This alternative would not require additional land rights for the construction of the improvements. The total estimated cost for this alternative is $9.82 million.

Alternative 3: Rehabilitation to Significant Hazard Dam with Flood Proofing and Floodplain Easements
This alternative would modify the existing structure to meet current NRCS significant hazard dam design criteria. This alternative would consist of slip-lining the existing 30-inch principal spillway, installing a new principal spillway consisting of a 30-inch RCP conduit with a hooded inlet, installing an impact basin, constructing an 80-foot-wide auxiliary spillway RCC chute over the exiting embankment, floodproofing two residences and floodplain easement in the breach inundation area. The existing principal spillway 336-foot conduit would be slip lined with a 28-inch OD HDPE conduit. The existing principal spillway trash rack would be removed and replaced with a new trash rack and a new gate would be installed on the inside of the inlet tower for dewatering the reservoir. An impact basin would be installed to dissipate the energy at the principal spillway outlet. The 30-inch hooded inlet would be installed at the same elevation as the existing principal spillway which is 1448.9 feet. This installation would only require a partial

dewatering of the reservoir. The two conduits would be discharged into a standard impact basin. The auxiliary spillway crest to store the 50-year frequency storm is 1459.8 feet. The auxiliary spillway would consist of an 80-foot-wide RCC chute spillway over the existing embankment with a rock lined outlet basin. The existing embankment would be extended across the existing vegetative auxiliary spillway.

The bulk of the existing embankment crest ranges from elevation 1467.2 to elevation 1468 with an average elevation of 1468.0. The right abutment from Station 16+40 to Station 17+70 ranges from elevation 1465.9 to elevation 1466.3. The embankment crest would be raised to a minimum elevation of 1468.0. The embankment slopes would be modified to flatten the upstream and downstream slopes to 3H:1V, adding rock to the existing rock for wave protection and installing a trench drain under the downstream toe.

An earthen berm would be installed to floodproof two residences in the breach inundation area. The earthen berm would have an 8-foot top width with 4H:1V side slopes. The berm elevation would be 1370.0 elevation. This alternative would not require additional land rights for the construction of the improvements on the embankment. The earthen berm would require 3.4 acres of landrights/easements. Since this alternative does not meet high hazard criteria, approximately 1132 acres of easements would be required in the breach area to prevent future development. The total estimated cost for this alternative is $6.66 million.

Project Costs Locally Preferred Alternative (Alternative 2):

	PL-83-566 Funds		**Other Funds**		**Total**	
Category	**Dollars**	**%**	**Dollars**	**%**	**Dollars**	**%**
Construction	$5,664,000	67%	$2,796,000	33%	$5,185,000	100%
Engineering	$677,000	100%	$0	0%	$677,000	100%
Real Property Rights	$0	0%	$0	100%	$0	100%
Permits	$0	0%	$2,000	100%	$2,000	100%
Project Administration	$423,100	62%	$253,900	38%	$135,000	100%
TOTAL COSTS	**$6,764,100**	**69%**	**$3,051,900**	**31%**	**$9,816,000**	**100%**
Annual O&M (non-Federal)	n/a	n/a	$15,000	100%	$15,000	100%

Number of Direct Beneficiaries/Population at Risk (PAR): 94/6
Benefit to Cost Ratio (current rate): 0.01 to 1.0
Net monetary beneficial effects (National Economic Efficiency (NEE)) effects): -$336,800.

Funding Schedule: The most likely scenario is for the project to be implemented over three years including the design and construction.

Federal funds:

Year	Engineering Services		Project Admin.	Construction	Totals
	Design	Inspection			
1	$225,700		$141,000		$366,700
2		$225,700	$141,000	$2,832,000	$3,198,700
3		$225,600	$141,100	$2,832,000	$3,198,700
Totals	**$225,700**	**$451,300**	**$423,100**	**$5,664,000**	**$6,764,100**

Non-Federal funds:

Year	Non-Project Costs (Permits)	Project Admin.	Construction	Totals
1	$2,000	$84,600		$86,600
2		$84,600	$1,398,000	$1,482,600
3		$84,700	$1,398,000	$1,482,700
Totals	**$2,000**	**$253,900**	**$2,796,000**	**$3,051,900**

Period of Analysis: 100 years
Project Life: 100 years

Ecosystem Services and Environmental Effects/Impacts:

Oak Creek MPS 5	
Soil Resources	The area of soil disturbance is estimated to be approximately 18 acres. The short-term effects to soils in the limits of disturbance (LOD) may include temporary disruption from heavy construction equipment and vehicles, staging/stockpiling of materials, and general construction work. Prior to construction, topsoil would be removed and stockpiled, and would be used for site restoration post-construction. Long-term impacts to soils, including prime farmland, are anticipated to be minor. The permanent conversion of prime farmland to non-agricultural uses is not anticipated from the preferred alternative.
Water Resources	Construction work may temporarily impact water quality by increasing the total suspended solid loads and turbidity during construction related activities. A Stormwater Pollution Prevention Plan would be developed prior to the beginning of construction utilizing best management practices. The construction of the stability berm on the downstream slope is anticipated to impact the riverine wetlands on the downstream side of the embankment. The extension of the principal spillway is expected to cause negligible long-term adverse effects to the stream channel and associated wetlands (impacts to .025 acre of wetland and 0.1 acre of streambed). The existing wetlands upstream of the dam would have short-term impacts by the partial drawdown of the lake for

	construction. Rehabilitating the dam is unlikely to impact the flood hazard zone delineations within the project study area.
Climate and Air Quality	Machinery emissions and airborne dust would slightly degrade air quality during construction and maintenance. However, project induced impacts to air quality would be minor and of short duration. Climate change would not impact the design of the dam.
Vegetation	Short-term impacts to vegetation (approximately 18 acres) are anticipated. Long-term impacts to vegetation are anticipated to be direct, negligible, and adverse. The existing vegetation on the dam embankment and vegetated spillway would be removed to construct the RCC auxiliary spillway, raise the dam, flatten the embankment slopes, and install the toe drain. All disturbed areas would be mulched and seeded post-construction, minimizing long-term impacts to vegetation. Invasive plant species are present and best management practices would be used during construction to prevent the spread of the invasive species.
Fish and Wildlife	The existing fishery habitat upstream of the dam would have short-term impacts by the partial drawdown of the lake for construction. Short-term, minor, adverse impacts to wildlife associated with disruption of habitat during construction. Construction could deter the bird species from using land in the limits of disturbance, but it is anticipated that the species would utilize the area once again after construction is complete. No long-term or cumulative impacts to wildlife, migratory birds or threatened and endangered species are anticipated. USFWS IPaC species lists are valid for 90 days. As the construction period nears, an updated list of species would be obtained. If at that time any listed species are determined to be present, further consultation with USFWS would be conducted by NRCS prior to construction.
Human Environment	Dam construction would comply with current safety and performance standards. Rehabilitation reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5. Flood damage reduction would continue. The dam would continue to decrease flooding and property damage downstream of the dam. There would be no adverse impacts to any minority populations or low-income populations downstream. There are no environmental justice communities within the project area. Section 106 consultation is concluded. No impacts to cultural resources or historic properties are anticipated ("no historic properties affected"). Potential construction safety and noise concerns would be addressed during construction. Construction would create temporary jobs and improve the local economy in the short term.

	Short-term minor adverse impacts to land use during construction sequencing. Rehabilitating the dam is unlikely to impact the flood hazard zone delineations within the project study area.
Ecosystem Services	The preferred alternative is not anticipated to impact flood control because the existing level of protection would be maintained. Rehabilitation reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5. The short-term effects to vegetation may include temporary impacts from construction work. The disturbed area to rehabilitate the embankment is estimated to be 18 acres. The construction of the RCC spillway would convert 1.1 acres of vegetation to impervious surfaces. Recreation and the aesthetic view would be impacted slightly during the construction period due to lowering of the lake, equipment activities, and noise. The 4,450 annual visitor days would be maintained.

Major Conclusions: The preferred alternative would continue water-based recreation and flood damage reduction in floodplain areas downstream of Oak Creek MPS 5. Unavoidable adverse effects would result from implementation of the proposed action. These effects would be short-term and minor overall. The adverse impacts identified in the supplemental plan-environmental assessment are not considered significant and can be mitigated with the use of best management practices during the construction process. There are no other known past or future actions in the watershed, if added to this action that would contribute to cumulative impacts of any consequence. The preferred alternative maximizes public benefit.

In order to reflect the monetary beneficial attributes of Oak Creek MPS No. 5, efforts were made to estimate average annual benefits associated with the federally preferred alternative. Floodwater damage reduction benefits are estimated to be $35,100 annually and water-based recreation benefits $347,000 annually, and $3,300 damages avoided (dam failure) for a total of $385,400. Benefits are derived from assuring the continued performance of MPS No. 5 by meeting current safety and performance standards, ensuring future water-based recreational needs and continuing downstream flood protection (damage reduction benefits).

Although Alternative No. 3 produced the greatest net monetary benefits ($149,900) as compared to Alternative No. 2 ($45,300), Alternative No. 2 is the federally preferred alternative because of the environmental and social benefits it provides. Installation of Alternative No. 3 would disturb about 3.4 acres of additional grassland and woodland at the 2 houses (adverse environmental impacts) and 2 families would be impacted by the berm construction and the changed homestead aesthetics (adverse social impacts). Alternative 3 would require procuring floodplain easements on 1,132 acres in the breach zone impacting landowners and potential future land use (adverse social impacts). Alternative No. 2 would not result in any social impacts and less environmental impacts. Therefore, based on these trade-offs, Alternative No. 2 would maximize net public benefits and be the federally preferred alternative.

Areas of Controversy: No areas of scientific controversy were identified during the planning process.

Issues to be Resolved: None.

Evidence of Unusual Congressional or Local Interest: No

Is this report in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects? Yes X No ___

Chapter 1 – Purpose and Need

1.1 Changes Requiring the Preparation of a Supplement:

Oak Creek Multipurpose Site (MPS) 5 was constructed in Washita County in 1968 under Authority of the Flood Control Act of 1944 under Public Law 78-534 as a significant hazard dam. A breach of Oak Creek MPS 5 would impact two houses and four county roads. Due to the potential for loss of life during a failure of the dam, the dam is currently classified as high hazard by the State of Oklahoma and NRCS. The existing structure does not meet the current safety and performance standards for a high hazard dam. Current performance criteria require Oak Creek MPS 5 to safely pass the Probable Maximum Precipitation (PMP) storm without overtopping the embankment. A supplement to the original watershed plan is needed due to the change in hazard classification. This supplemental Plan-EA documents the NRCS planning process, compliance with the requirements of the National Environmental Policy Act, and requirements of the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G).

1.2 Background:

The original watershed plan was completed in 1963 and supplemented in 1966. The watershed plan provided for land treatment measures, 11 floodwater retarding structures and 1 multipurpose structure. See Appendix B Figure B-1 for the Oak Creek Watershed Map. The 11 floodwater retarding structures and multipurpose structure have been constructed. Oak Creek MPS 5 (National Inventory of Dams OK01038) is located in a rural agricultural area in south-east Washita County. The dam is located approximately four and one-half miles north and four miles west of Mountain View, Oklahoma in Section 18-T8N-R15W (Latitude 35.16259, Longitude -98.82387). See Appendix B Figure B-2 for the location of Oak Creek MPS 5. The dam controls the drainage of 6,535 acres. The structure known locally as Lake Vanderwork is a multipurpose structure providing public fish and wildlife benefits as well as flood control.

This supplemental Plan-EA documents the NRCS planning process, compliance with the requirements of the National Environmental Policy Act, and requirements of the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G).

1.3 Purpose of the Project:

The purposes of the project are to continue providing flood damage reduction in the area downstream of Oak Creek MPS 5 and public fish and wildlife benefits (water-based recreation) while minimizing environmental, economic, and social impacts, and comply with applicable dam safety and performance standards to reduce the potential for flood damages and loss of life from a catastrophic breach. The Public Law 83-566 purposes for Oak Creek MPS 5 are Flood Prevention (Flood Damage Reduction) and Public Fish and Wildlife.

1.4 Need for the Project:

The sponsor objectives include maintaining flood damage reduction and water-based recreation. The current structure does not meet current safety and performance standards for a high hazard dam. To reduce the risk of flood damages to homes, agricultural lands, and an expanded infrastructure as well as to reduce the risk of loss of life due to a dam failure, action is necessary.

There is a need to maintain flood protection downstream and to address dam safety and performance deficiencies of the existing high-hazard dam that are not in compliance with NRCS and the Oklahoma Dam Safety Agency standards. There is a potential for loss of life due to the existence of four county roadways downstream of this structure within the breach inundation zone. In addition, people living and working in two residences would be at risk from a catastrophic dam failure. The population-at-risk (PAR) is 6.

Water-based recreation opportunities are very limited in the project area. Oak Creek MPS 5 is a 135-acre lake operated by the Oklahoma Wildlife Conservation Department. Oak Creek MPS 5 is enjoyed by many visitors for fishing and bird watching. A boat launching ramp is located on Oak Creek MPS 5 for fishing. Oak Creek MPS 5 provides recreation for many people in the area as well as the State with 4,450 annual sportfishing trips valued at $347,000. The sponsor and Oklahoma Wildlife Conservation Department need to continue providing this recreational resource for the public.

1.5 Opportunities:

At a minimum, the following opportunities would be recognized by implementing an alternative that addresses the project purpose and need. Quantification of these opportunities would be provided in other sections of this report as necessary.

- Comply with dam design and safety criteria established by the NRCS and State of Oklahoma.
- Minimize the potential for loss of life associated with a dam failure.
- Reduce Sponsor liability associated with operation of a noncompliant dam.
- Retain public fish and wildlife (water-based recreation) benefits.
- Retain downstream water quality by continuing to trap watershed sediment.
- Maintain current downstream flood damage reduction.

Chapter 2 – Scope of the Environmental Assessment

A scoping process was used to determine the issues significant in defining the problems and formulating and evaluating alternatives. A scoping meeting was held on May 15, 2023, at the USDA Washita County Field Service Center in Cordell, Oklahoma. The legal notices were published in the local newspapers. NRCS sent letters inviting Federal, State, Tribal, and local agencies to the meeting and soliciting input in the scoping process. Watershed concerns of the Sponsor, technical agencies, and local citizens were addressed in the scoping process. Factors that would affect soil, water, air, plant, animals, human resources, and ecosystem services were identified by an interdisciplinary planning team, which reviewed the actions of the alternatives being evaluated. Resource concerns determined to not be relevant have been eliminated from detailed study, and those resource concerns determined to be relevant have been carried forward for analysis. Table 2-1 below lists specific concerns that have been identified and their relevance to the proposed action to the decision-making process.

Table 2-1: Summary of Scoping Resource Concerns

Item/Concern	Relevant to the Proposed Action		Rationale
	Yes	No	
Air Quality	X		Oak Creek MPS 5 is located in an air attainment area (meets current EPA air quality standards). Machinery emissions and airborne dust would slightly degrade air quality during construction and maintenance of the alternatives. However, project induced impacts to air quality would be minor and of short duration. Best management practices would be used during construction.
Coral Reefs		X	Upon review, none in Oklahoma and no impact to coral reefs.
Cultural Resources and Historic Properties	X		Consultation with the Oklahoma Archaeological Survey, Oklahoma State Historic Preservation Office, Caddo Nation, Cheyenne and Arapaho Tribes, Comanche Nation, Osage Nation, Quapaw Nation, and the Wichita and Affiliated Tribes was performed as stipulated in the National Historic Preservation Act. No documented NRHP sites, no Determination of Eligibility sites, no recorded archaeological sites, no Traditional Cultural Places, no culturally significant resources, no ethnographic data are around the project. Oak Creek MPS 5 was built in 1968, as of 2025 this dam is 62 years old. Generally, many structures over 50-years old can be considered Historic Properties if they meet certain National Register of Historic Properties conditions (i.e., Criteria A-D). As a result of this survey, one previously recorded archaeological site was revisited and evaluated for NRHP eligibility, one new historic resource was recorded and evaluated for NRHP eligibility, and the dam itself was evaluated for NRHP eligibility. The archaeological site was revisited, and shovel tests were excavated at the site. The site

Item/Concern	Relevant to the Proposed Action		Rationale
	Yes	No	
			was determined ineligible for inclusion in the NRHP by NRCS. One additional historic resource, a stone ford or weir located in the bed of Trail Elk Creek, was recorded using a SHPO Historic Preservation Resource Identification (HPRI) form. This resource was determined ineligible for inclusion in the NRHP. Oak Creek MPS 5 was evaluated and determined ineligible for inclusion in the NRHP. A single isolated find was recorded and determined ineligible for inclusion in the NRHP. Even though Oak Creek MPS 5 was determined not eligible for the NRHP, an Oklahoma SHPO Historic Property Resource Identification form was completed for the dam to document it as part of the built landscape. The Oklahoma SHPO has not designated the Oak Creek Watershed as a Historic District, therefore MPS 5 is not part of a larger Historic District. Per 36CFR800.4(d)(1), no historic properties (will be) affected by the NRCS undertaking. Concurrence with the NRCS determination was received from the OAS, the SHPO, the Caddo Nation, the Comanche Nation, and from the Quapaw Nation. The remainder of the identified parties did not respond after three invitations to be consulting parties.
Ecologically Critical Areas		X	Upon review, no ecologically critical areas in the project area.
Environmental Justice and Civil Rights	X		Upon review, no environmental justice groups adversely impacted by the project.
Essential Fish Habitat		X	Upon review, no essential fish habitat in the project area.
Fish & Wildlife Resources (Section 12 Coordination)	X		Section 12 coordination with USFWS is required for all PL 83-566 projects. Temporary impacts (displacements) to fish and wildlife resources in the lake area during construction of the alternatives are anticipated.
Floodplain Management	X		Alternatives may affect the regulatory floodplain and required permits from Washita County.
Forest Resources	X		The project area has forestland. Potential impacts to downstream forest areas associated with various alternatives.
Invasive Species	X		Brome grass, an invasive plant species was noted in the project area. Introduction or spread of invasive species not anticipated.
Land Use	X		No change in Land Use is anticipated from the project. However, upstream or downstream land use restrictions may be part of an alternative.
Migratory Birds	X		Migratory birds likely utilize the project area. Construction could have temporary impacts on migratory birds.
National Economic Efficiency Plan (NEE)	X		Federally assisted plan would provide greatest net monetary benefits.
Natural Areas		X	The Oklahoma Department of Wildlife Conservation manages the lake as a public fish and wildlife area. The area is not a designated “natural area”. Impacts to fish and wildlife and recreation will be analyzed in the appropriate sections.

Item/Concern	Relevant to the Proposed Action		Rationale
	Yes	No	
Parklands		X	The area is not a designated "parkland". However, Oklahoma Department of Wildlife Conservation manages the lake as a public fish and wildlife area. Minimal public facilities are provided. Impacts to fish and wildlife and recreation will be analyzed in the appropriate sections.
Prime Farmland (Farmland Protection Policy Act)	X		4866 acres of prime farmland occur in the watershed and 1160 acres of prime farmland occur in the breach inundation area. Prime farmland could be impacted by various action alternatives.
Public Health and Safety	X		Increased potential for injuries during project construction and maintenance. Concern for breach of dam damages to two residences and four county roads downstream (PAR 6).
Recreation	X		Public fish and wildlife (water-based recreation) is a project purpose. The Oklahoma Department of Wildlife Conservation identified the lake as an important public resource/decision making factor.
Regional Water Resource Plans (including coastal zone plans)		X	Upon review, the project does not appear to be inconsistent with the Oklahoma Comprehensive Water Plan and the project would not impact the plan. Watershed is not in a coastal management zone.
Riparian Areas	X		Potential impacts to upstream and downstream riparian areas associated with various alternatives.
Scenic Beauty	X		Oak Creek MPS 5 (Lake Vanderwork) is managed by the Oklahoma Department of Wildlife Conservation for public use.
Scientific Resources		X	There are no geologic resources or paleontological deposits of scientific interests in the APE. The upper end of the APE does possess gorges approximately 40 feet deep, however these canyons are ubiquitous in western Oklahoma's Red Bed Plains (Permian Period).
Social issues	X		Project construction would provide a temporary positive impact on the local economy and potentially impact recreation.
Soil Resources	X		Potential impacts to upstream and downstream areas associated with various action alternatives.
Sole Source Aquifers		X	No sole source aquifers occur with-in or near the project area. The project area is not with-in the recharge areas of the Arbuckle-Simpson Sole Source Aquifer.
Threatened and Endangered Species	X		Threatened and Endangered Species may have the potential to occur within the vicinity of the proposed project.

Water Quality	X		Temporary adverse impacts associated with construction. The work would not be expected to violate any state water quality standards. Storm Water Pollution Prevention Plan would be developed And best management practices would be used during construction. There are no 303(d) streams located in the area of the proposed work that would be impacted.
Water Resources	X		Potential impacts to upstream and downstream streams associated with various action alternatives.
Waters of the U.S. (WOTUS)	X		The creek and lake and adjacent wetlands are considered WOTUS. A Clean Water Act 404 permit would likely be required for any action alternative involving a discharge of fill material.
Wetlands	X		Wetlands occur within the project area.
Wild and Scenic Rivers		X	The State of Oklahoma does not have any designated wild and scenic rivers. There are no other protected stream segments of the Nationwide Rivers Inventory that would be impacted by the proposed work. (National Wild and Scenic River System)

USDA planning policy [*Guidance for Conducting Analyses Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments*, DM 9500-013 (PR&G) (USDA-NRCS 2017a)] requires the use of an ecosystem services framework. The concept of ecosystem services is a way of framing and describing the comprehensive set of benefits that people receive from nature. They are characterized as the ecological goods and services provided by a healthy, functioning environment. Ecosystem services (either tangible or intangible) are the critical link between ecological function and social well-being. By analyzing and monitoring the ecosystem services produced from a given federal investment, natural resource managers can also ensure that the detrimental ecological impacts of that decision are minimized to the extent possible.

For the purposes of the PR&G, the ecosystem services framework provides an integrated approach that articulates the relevant costs and benefits inherent in the decision-making process, to complement any economic and ecological assessment of magnitude. The framework identifies, describes, and quantifies environmental impacts through the flows of ecosystem services that result, both directly and indirectly, from a federal investment. Such values are elicited through stakeholder engagement, and tradeoffs are weighed in a transparent, systematic and inclusive process. Ecosystem Services are organized into four service categories: Provisioning, Regulating, Supporting, and Cultural (MEA 2005).

Table 2-2 presents a summary of the scoping process. Ecosystem services determined to not be relevant have been eliminated from detailed study, and those ecosystem services determined to be relevant have been carried forward for analysis.

Table 2-2: PR&G Ecosystem Services.

ECOSYSTEM SERVICES	Relevant to the proposed action?		RATIONALE
	YES	**NO**	
Provisioning (tangible goods provided for direct human use and consumption)			
Food		X	This includes the vast range of food products derived from plants, animals, and microbes. Oak Creek MPS 5 is not a significant food production area.
Fuel		X	Wood, dung, and other biological materials serve as sources of energy. Oak Creek MPS 5 is not significant fuel production area.
Fiber		X	Materials included here are wood, jute, cotton, hemp, silk, and wool. Oak Creek MPS 5 is not a significant fiber production area.
Water		X	People obtain fresh water from ecosystems and thus the supply of fresh water can be considered a provisioning service. Oak Creek MPS 5 is not a water supply reservoir.
Regulating (maintain world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe)			
Flood Control	X		Flood protection provided by the structure being studied.
Disease Control		X	Changes in ecosystems can directly change the abundance of human pathogens, such as cholera, and can alter the abundance of disease vectors. Upon review, no impaired streams occur in Oak Creek MPS 5 drainage area.
Water Purification and Filtration		X	Ecosystems can be a source of impurities but also can help filter out and decompose organic wastes introduced into inland waters. Not a groundwater aquifer recharge area.
Climate Stabilization		X	Ecosystems play an important role in climate by either sequestering or emitting green-house gases. Not a significant green-house gas production area. Project not anticipated to have any impacts on climate.
Crop Pollination		X	Ecosystem changes affect the distribution, abundance, and effectiveness of pollinators. No impact to pollinators is anticipated from the rehabilitation of Oak Creek MPS 5.
Supporting (underlying processes maintaining conditions for life on Earth)			
Nutrient Cycling	X		Construction would include ground disturbing activities which could impact nutrient cycling because of compaction and removal of vegetation.
Soil Formation		X	Because many provisioning services depend on soil fertility, the rate of soil formation influences human well-being in many ways. Upon review, soil fertility in the watershed is not impacted.
Primary Production		X	Primary production is the assimilation or accumulation of energy and nutrients by organisms.

			No impact to primary production is anticipated from the rehabilitation of Oak Creek MPS 5.
Cultural (make the world a place in which people want to live)			
Recreational Use	X		Public fish and wildlife is a project purpose. Oak Creek MPS 5 (Lake Vanderwork) is used by the public for water-based recreation (boating, fishing) and is managed by the Oklahoma Department of Wildlife Conservation. The lake, the retention of the pool, and continued use of the lake during construction period is an important factor in the development of alternatives.
Spiritual		X	No known resources of spiritual value were noted by the six tribes (Caddo Nation, Cheyenne and Arapahoe Tribes, Comanche Nation, Osage Nation, Quapaw Nation, Wichita and Affiliated Tribes) contacted about the proposed project. No publicly documented Indian or non-Indian cemeteries, community buildings, cultural centers, ecumenical facilities, ceremonial (Powwow) grounds, national parks, or scenic overlooks were observed in the field or mapped by various entities, in the vicinity of the APE.
Aesthetic Viewsheds	X		Project features may alter the appearance of the landscape. Oak Creek MPS 5 is used for public recreation.
Tribal Values		X	None of the six tribes (Caddo Nation, Cheyenne and Arapahoe Tribes, Comanche Nation, Osage Nation, Quapaw Nation, Wichita and Affiliated Tribes) contacted about the proposed project noted Traditional Cultural Properties, Properties of Religious and Cultural Significance, Indian Sacred Sites, Culturally Significant Plants, or cultural landscapes in the project area or vicinity. NRCS understands that tribal values are critical to ensuring environmental, cultural, and historical principles are preserved for future generations.

Chapter 3 – Affected Environment

3.1 Original Project

Oak Creek Multipurpose Site 5 is one of twelve floodwater retarding structures in the Oak Creek watershed, Oak Creek Multipurpose Site 5 was built in Washita County in 1968 as a significant hazard dam. The dam was constructed as a multipurpose dam to provide flood damage reduction and public fish and wildlife development. The structure is located on Trail Elk Creek (aka Gyp Creek) in the Oak Creek Watershed in Washita County, Oklahoma (Appendix B Figure B-1). The structure consists of a 61-foot-tall earthen embankment, a principal spillway, and earthen auxiliary spillway. The dam creates a 135-acre lake known as Lake Vanderwork. The dam has a 6,535-acre (10.2 square miles) drainage area. Elevation in the project area around the dam and lake ranges from approximately 1400 to 1500 feet NAVD88.

3.2 Status of Operation and Maintenance (O&M)

The sponsor has maintained the structure adequately through regular O&M, as well as regular inspections. The sponsor is responsible for keeping the structure free of brush and trees, burrowing animals, and recreational vehicle traffic. The embankment is in good condition with a good Bermuda grass cover. The auxiliary spillway is in good condition with a good Bermuda grass cover.

3.3 Sedimentation Rates

The Oak Creek MPS 5 original design took sedimentation loading into account to establish the submerged sediment capacity and principal spillway crest elevation. Oak Creek MPS 5 was planned with a submerged sediment capacity of 915 acre-feet and aerated sediment capacity of 194 acre-feet for a total sediment volume of 1,109 acre-feet for the 50 years of evaluated life (Table 3 Supplement No. 1). This equates to a planned sediment accumulation rate of 22.18 acre-feet per year. The as-builts for Oak Creek MPS 5 show a sediment storage of 1,109 acre-feet.

The historical sedimentation rate was determined by comparing current LiDAR and bathymetric surveys with the as-built data for Oak Creek MPS 5. The bathymetric survey conducted by NRCS in January of 2023 showed Oak Creek MPS 5 has accumulated 173 acre-feet of submerged sediment in 56 years. The bathymetric survey for Oak Creek MPS 5 equates to a historical submerged sedimentation rate of 3.09 acre-feet per year. The as-builts for Oak Creek MPS 5 show a floodwater detention pool of 1,836 acre-feet. The current LiDAR topographical survey has 1,820 acre-feet in the floodwater detention pool. The calculated aerated sediment equals 0.29 acre-feet per year. The future sedimentation rate for Oak Creek MPS 5 is 3.38 acre-feet per year.

The available storage below the fish and wildlife storage pool is 936 ac-ft which is greater than the 309 acre-feet required for the submerged sediment storage for the next 100 years. The aerated sediment is anticipated to be 29 acre-feet for the next 100 years.

3.4 Breach Analysis and Hazard Classification

Current NRCS TR-60 criteria require evaluation of dam failure with the reservoir water surface elevation at the dam crest or the peak reservoir storage resulting from the probable maximum flood (USDA-NRCS 2019). For this evaluation, the water level was set at the dam crest for computing the peak breach discharge. A sunny-day (non-storm) condition was used for the downstream routing. The peak discharge of the breach hydrograph was computed using a series of empirical equations from NRCS TR-60. Based on this procedure, the peak discharge for Oak Creek MPS 5 was computed as 54,900 cfs.

The breach inundation study indicates that a catastrophic failure at Oak Creek MPS 5 would impact two houses and four local road crossings resulting in the potential for loss of life. Oak Creek MPS 5 is currently classified as a high hazard dam. See Appendix C Figure C-1 for the breach inundation map.

3.5 Potential modes of Dam Failure

Several potential modes of Oak Creek MPS 5 failure were examined: sedimentation, hydrologic capacity, seepage, seismic and material deterioration.

3.5.1 Sedimentation

The sedimentation survey shows Oak Creek MPS 5 has accumulated 173 acre-feet of submerged sediment in 56 years. The sedimentation survey for Oak Creek MPS 5 equates to a historical submerged sedimentation rate of 3.09 acre-feet per year. The available storage below the fish and wildlife storage pool is 936 ac-ft. Based on the historical sedimentation rate of 3.09 acre-feet per year, Oak Creek MPS 5 has 303 years of submerged sediment storage before the sediment encroaches on the fish and wildlife pool. The overall potential for failure due to sedimentation in Oak Creek MPS 5 is considered to be low.

3.5.2 Hydrologic Capacity

Hydrologic failure of a dam can occur by breaching the auxiliary spillway or overtopping the dam during a storm event. The integrity and stability of the auxiliary spillway is dependent on the depth, velocity, and duration of flow, the vegetative cover, and the soil's resistance to erosion. The current criteria for sizing the auxiliary and principal spillways are found in NRCS TR-60. The regional precipitation study was used to determine the probable maximum precipitation (PMP).

The principal spillway system consists of a 30-inch diameter reinforced concrete pressure pipe with a 2.5-foot by 7.5-foot concrete riser 27 feet tall. The riser is reinforced concrete with a weir inlet at elevation 1,448.9 feet. The SITES modeling of the proposed riser uses a principal spillway discharge table developed with the hydraulics of the riser entered in the SITES software to route the storms through the principal spillway. Current high hazard potential criteria require the principal spillway to pass a composite hydrograph resulting from 100-year, 1-day (8.0

inches) and 10-day (12.2 inches) precipitation events without engaging the auxiliary spillway. The minimum AS crest to store the required 100-year frequency storm is El. 1461.8 and the existing AS crest is El. 1460.7. The AS crest does not meet the 100-yr storage requirements.

NRCS TR-60 criteria also require an analysis of the auxiliary spillway stability. Current high hazard potential criteria require the auxiliary spillway stability to be analyzed based on the stress resulting from a flood produced by a 6-hour precipitation event between a 100-year and PMP event such that the precipitation is equal to P100 + 0.26(PMP – P100), or 11.9 inches.

NRCS TR-60 criteria also require the auxiliary spillway to be evaluated for headcut development and advancement during passage of the freeboard hydrograph (FBH). The spillway design for high hazard potential structures must be such that the spillway would not breach (i.e., headcut would not advance beyond the upstream edge of the crest level section) or the dam would not overtop during passage of the PMP rainfall for storm durations of 6 hours and 24 hours. The soil mechanics report (SMR) was provided by the NRCS soil mechanics lab in Lincoln, Nebraska. The SMR did not calculate the head-cut erodibility index (Kh). Kh values of 0.02 and 0.05 were used in the SITES analysis. These Kh values are based on similar soils from past projects. The 24-hour PMP storm breached the auxiliary spillway. A series of rainfalls were run in SITES to determine the maximum rainfall that would create a breach of the existing auxiliary spillway. A 16.5-inch, 24-hour duration storm event breached the auxiliary spillway crest with a flow depth of 4 feet. This is an approximate 7,500-year frequency storm. The embankment crest is 3.6 feet higher than the auxiliary spillway breach storm.

The overall potential for failure due to hydrologic capacity in Oak Creek MPS 5 is considered to be high.

3.5.3 Seepage

For earthen dams such as Oak Creek MPS 5, seepage is the primary geotechnical concern. Embankment and foundation seepage can contribute to failure of an embankment by removing (piping) soil material through the embankment or foundation. As the soil material is removed, voids can be created, allowing ever-increasing amounts of water to flow through the embankment or foundation until the dam collapses due to the internal erosion. Seepage that increases with an increase in pool elevation is an indication of a potential problem, as is cloudy or muddy seepage water. Foundation and embankment drainage systems can alleviate a seepage problem by removing the water without allowing soil particles to be transported away from the dam.

In general, Oak Creek MPS 5 appears to be in very good condition, but its foundation drainage system needs to be replaced with a two-stage foundation drain to meet the current NRCS drain design criteria and to prevent plugging and improper filtering of seepage water. To replace the existing foundation drain, the existing foundation drain would need to be excavated and removed. Despite the current state of the foundation drain deficiencies, there are no signs of seepage flow, sloughing or any other noticeable indications of instability on the embankment. The overall potential for failure of this structure due to seepage is low to moderate.

3.5.4 Seismic

One fault system (the Meers Fault; segments 1031a and 1031b) are within 100 km of the project site (Appendix C Figure C-2). The detailed fault characterization for the northwest fault segment, 1031a, indicates that 1031a is an 18km-long subsection of a total fault length of 54 km. The closest distance of this fault to the project site is 27 km, and the age of the faulting is suggested to be on the order of "possibly late Holocene", but importantly, the same information indicates that there is no geomorphic expression of this fault segment. Meers fault segment 1031a is inactive.

The second fault segment, Meers 1031b, is approximately 35 km in length. The closest distance of this fault to the project site is 38 km. The capability of this fault is documented by several scarps within Holocene alluvium. The two scarps are believed to represent separate events, the youngest which is believed to have occurred 800-1600 years ago, and the older of which is believed to have occurred between 2000 and 2900 years ago. Individual event movements indicate individual scarp offsets of between 1.5 and 1.8m. The total offset including both events and some degree of folding indicate a total movement on the order of 3.6m for these two events. Per the USGS Quaternary Fault and Fold Database of the United States, the rate of movement has been set at <0.2mm/year, which is the lowest slip rate used in fault characterization. The likelihood of this fault segment producing any damaging ground shaking at the subject dam site is nominal. Meers fault segment 1031b is inactive.

A seismic breach of Oak Creek MPS 5 was model with HEC-RAS. The breach discharge is determined with the water height at the normal pool water elevation of Oak Creek MPS 5. The results of the seismic breach indicate two houses in the breach inundation zone. The seismic breach has the potential to cause loss of life (high consequence). The TR-60 minimum Peak Ground Acceleration (PGA) for seismic evaluation of dams and appurtenances has a return period of 10,000 years (0.5% probability of exceedance in 50 years). With regard to potential bedrock ground motions at the project site, we queried several ground motion databases that are based on USGS mapping products. Referring specifically to the American Society of Civil Engineers (ASCEs) hazard tool, and in reference to the document ASCE/SEI 7-22 (2022), the free-field Peak Ground Acceleration (PGA) for outcropping bedrock at the site of 0.17g. In addition, referring to the USGS Unified Hazard Tool, using the 2018 Dynamic model for the U.S., and performing deaggregation of the ground shaking potential, that data indicates that the PGA for the site would be on the order of 0.15g which is slightly less than the 0.17g noted above from the 2022 database and models. The deaggregation data indicates that the 0.15g ground shaking is based on the assumed full-length rupture of the southeastern Meers fault (1031b)

Although the PGA values varies between 0.15 and 0.17g for bedrock at the dam site, we recommend the use of the more conservative 0.17g for any seismic evaluations performed for the site, and that the deaggregation distances and magnitude shown above be used in any calculation of liquefaction for the site.

The overall potential for failure of this structure due to seismic is low.

3.5.5 Material Deterioration

The 30-inch interior reinforced concrete conduit was videoed. The conduit has a crack at approximate Station 1+25. The crack appears to be at the location of the concrete anti-seep collar. Based on the video, no sediment or water appeared to be entering the conduit through the crack. The overall potential for failure of this structure due to material deterioration is low to moderate.

3.6 Consequences of Dam Failure

The breach inundation study indicates that a catastrophic failure at Oak Creek MPS 5 would currently result in the potential for loss of life. The estimated number of people at risk in the case of a breach is currently 6. The population-at-risk (PAR) value was based on the two houses impacted by a breach.

3.7 Soil Resources

3.7.1 Soils

Geology, topography, plant community, and hydrology affect regional soil types and characteristics. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) maintains the information and online databases that identify the soil types across the U.S. Soil information presented in this section is summarized from USDA NRCS Web Soil Survey (WSS) data (USDA-NRCS 2017b). The soil types present in the watershed are well-drained and comprised of fine sandy loams and silt loams with a few rock outcrops. Soils in the watershed and the breach inundation area are depicted on Appendix C Figures C-3 and C-4 and listed in Table 3-1.

Table 3-1: Soils in Project Area

Map Unit	Name	Landform	Comment	Watershed Area (acres)	Breach Area (acres)
1	Abilene silt loam, 0 to 1 percent slopes	Paleoterraces	Well drained. Hydrologic Soil Group C. Prime Farmland.	5	
4	Amber very fine sandy loam, 3 to 8 percent slopes, rarely flooded	Flood plains	Well drained. Hydrologic Soil Group B. Not prime farmland.		19
5	Binger fine sandy loam, 1 to 3 percent slopes	Hillslopes	Well drained. Hydrologic Soil Group C. Prime Farmland.	196	
6	Binger fine sandy loam, 3 to 5 percent slopes	Hillslopes	Well drained. Hydrologic Soil Group C. Prime Farmland.	19	
7	Carey silt loam, 1 to 3 percent slopes	Hillslopes on hills	Well drained. Hydrologic Soil Group B. Prime Farmland.	1146	
8	Carey silt loam, 3 to 5 percent slopes	Hillslopes on hills	Well drained. Hydrologic Soil Group B. Prime Farmland.	980	
9	Clairemont silt loam, 0 to 1 percent slopes, occasionally flooded	Flood plains	Well drained. Hydrologic Soil Group B. Prime Farmland.		38
10	Clairemont silt loam, 0 to 1 percent slopes, frequently flooded	Flood plains	Well drained. Hydrologic Soil Group B. Not prime farmland.	11	30
13	Cornick-Rock outcrop complex, 1 to 12 percent slopes	Hillslopes on hills	Well drained. Hydrologic Soil Group D. Not prime farmland.	574	
27	Hardeman fine sandy loam, 1 to 3 percent slopes	Stream terraces	Well drained. Hydrologic Soil Group A. Prime Farmland.		54
28	Hardeman fine sandy loam, 3 to 5 percent slopes	Stream terraces	Well drained. Hydrologic Soil Group A. Prime Farmland.	47	187
29	Hardeman fine sandy loam, 5 to 8 percent slopes, cool	Stream terraces	Well drained. Hydrologic Soil Group A. Prime Farmland.		13
35	Port silt loam, 0 to 1 percent slopes, occasionally flooded	Flood plains	Well drained. Hydrologic Soil Group B. Prime Farmland.		561
38	Quinlan-Rock outcrop complex, 8 to 20 percent slopes	Hillslopes on hills	Well drained. Hydrologic Soil Group D. Not prime farmland.	39	
39	Quinlan-Woodward complex, 3 to 5 percent slopes, eroded	Hillslopes on hills	Well drained. Hydrologic Soil Group D. Not prime farmland.	148	
40	Quinlan-Woodward complex, 5 to 12 percent slopes	Hillslopes on hills	Well drained. Hydrologic Soil Group D. Not prime Farmland.	621	6
42	Reinach silt loam, 0 to 1 percent slopes, rarely flooded	Flood plains	Well drained. Hydrologic Soil Group B. Prime Farmland.		210
44	Lovedale fine sandy loam, 1 to 3 percent slopes	Paleoterraces	Well drained. Hydrologic Soil Group B. Prime Farmland.	26	

Map Unit	Name	Landform	Comment	Watershed Area (acres)	Breach Area (acres)
45	Lovedale fine sandy loam, 3 to 5 percent slopes	Paleoterraces	Well drained. Hydrologic Soil Group B. Prime Farmland.	35	
46	St. Paul silt loam, 0 to 1 percent slopes	Paleoterraces	Well drained. Hydrologic Soil Group C. Prime Farmland.	600	
47	St. Paul silt loam, 1 to 3 percent slopes	Paleoterraces	Well drained. Hydrologic Soil Group C. Prime Farmland.	1074	
48	St. Paul silt loam, 3 to 5 percent slopes	Paleoterraces	Well drained. Hydrologic Soil Group C. Prime Farmland.	142	
51	Woodward silt loam, 3 to 5 percent slopes	Hillslopes on hills	Well drained. Hydrologic Soil Group C. Prime Farmland.	18	
52	Woodward silt loam, 5 to 8 percent slopes	Hillslopes	Well drained. Hydrologic Soil Group C. Not prime farmland.	86	
53	Woodward-Clairemont complex, 0 to 12 percent slopes	Hillslopes on hills	Well drained. Hydrologic Soil Group C. Not prime farmland.	39	
54	Woodward-Quinlan complex, 1 to 3 percent slopes	Hillslopes on hills	Well drained. Hydrologic Soil Group C. Prime Farmland.	38	
55	Woodward-Quinlan complex, 3 to 5 percent slopes	Hillslopes on hills	Well drained. Hydrologic Soil Group C. Prime Farmland.	560	6
56	Westola fine sandy loam, 0 to 1 percent slopes, occasionally flooded	Flood plains	Well drained. Hydrologic Soil Group A. Prime Farmland.		3
	Water	Valleys	Hydrologic Soil Group D.	131	5
	Total			6535	1132

3.7.2 Prime Farmland

The goal of the Farmland Protection Policy Act is to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Within the Oak Creek MPS 5 drainage area, there are 4886 acres of soil classified as prime farmland. Within the Oak Creek MPS 5 breach inundation, there are 1072 acres of soil classified as prime farmland.

3.7.3 Geology

Oak Creek is located on the southern edge of the great Syncline of the Anadarko basin. On the southern boundary of the watershed the strike is east-west with north dip, while along the east boundary in the central and northern part the strike generally is north-south with west dip toward the axis of the Anadarko basin (USDA-SCS, 1963).

The Oak Creek MPS 5 Dam is situated within the Cloud Chief (Pcc) and Rush Springs (Prs) Geological Units. The Cloud Chief Unit consists of a heterogeneous mixture of gypsum, sandstone, reddish-orange shale, and dolomite. The unit overlies the Rush Springs Unit and underlies the red shales and siltstones of the Doxy Unit (Pdy). A one to nine feet thick bed of gypsum or dolomite of greenish-gray color called the Mocassin Creek bed marks the base of the

unit. Gypsums are prominent near the base and thin rapidly from a maximum thickness of 118 feet in central Washita County to less than 9 feet in Custer County, 7 feet in Roger Mills County, and 6 feet in Beckham County. The sandstones are soft, thin-bedded to massive, fine-grained and reddish orange in color.

The upper limits of the Cloud Chief Unit is defined primarily on the basis of a color change. Reddish-orange is the characteristic color of the Cloud Chief whereas a darker reddish-brown is characteristic of the overlying Doxy Unit. A 6-inch greenish gray siltstone (Alibates) bed forms the boundary of much of the area. Resistant ledge forming siltstones of the Doxy Unit also help distinguish the boundary between the Units.

Topographically, the unit is usually gently rolling. It supports grass vegetation and cultivation. Buttes, mesas, and highly dissected canyons are common locally near the base of the unit in the thicker gypsum areas and near drainage systems.

The Rush Springs Unit consists dominantly of soft, reddish-brown, massive, cross-bedded to regular-bedded silty sandstone which weathers rapidly, producing a sandy soil which is often blown about by wind and at some localities is piled into sand dunes. A few dolomite and gypsum beds occur in the upper portions. These beds are generally less than 2 feet thick. The total thickness of the unit varies from 186 to 430 feet with the unit generally thinning northwestward from the Custer-Washita Counties area.

The Rush Springs unit forms broad gently rolling topography dissected locally by rugged canyons throughout most of its outcrop. Rolling hills are prominent near its base with massive bluffs to rounded hills overlooking the underlying Marlow Unit. Geology in the project area is depicted on Appendix C Figure C-5 (USGS, 2024).

Meers Fault (segments 1031a and 1031b) exists south of Oak Creek MPS 5 (Appendix C Figure C-2). The fault line runs from southern Kiowa county southeasterly into Comanche county. The National Database classifies the fault line as Undifferentiated Quaternary, well constrained location. See Section 3.5.4 for additional information on the Meers Fault.

3.8 Water Resources

3.8.1 Water Quality

Section 303(d) of the Clean Water Act requires states to develop lists of waterbodies that do not meet water quality standards and to submit updated lists to the U. S. Environmental Protection Agency (EPA) every two years. Water quality standards, as defined in the Code of Federal Regulations, include beneficial uses, water quality objectives (narrative and numerical) and antidegradation requirements.

According to the Oklahoma Department of Environmental Quality, Trail Elm Creek (aka Gyp Creek) and Oak Creek are not listed as CWA Section 303(d) impaired waters for the State of Oklahoma. No water quality issues have been identified at the site and it appears that state water

quality standards are being met.

3.8.2 Waters of the U.S.

The dam is on Trail Elk Creek (aka Gyp Creek), an intermittent stream with a channel that varies from approximately 10-30 feet wide. The stream along with the impoundment itself, as well as any associated wetlands would meet the current regulatory definition of "Waters of the U.S." definition and be subject to Clean Water Act jurisdiction. All of the waters described below in the "Wetlands" section meet the definition of "Waters of the US".

3.8.3 Wetlands

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) integrates digital map data along with other resource information to produce information on the approximate extent, and characteristics of wetlands, riparian, and deepwater habitats (USFWS, 2023b). The NWI map for project indicates that there are approximately 136 acres of lake habitat classified as a L1UBHh, which is lacustrine (lake) habitat. This classification includes areas over 20 acres in size that lack trees and have water depths in the deepest part over 8.2 feet at low water. The NWI map classifies the Trail Elk Creek channel below the dam as a Freshwater Forested/Shrub Wetland habitat (PFO1A), as well as a 2.25-acre area in the northwest arm of the lake. However, based on site visits, it appears that the Trail Elk Creek channel in this area is well defined and would be better defined as stream (riverine) habitat. The stream is approximately 10 feet wide. with an approximately 200-foot-wide wooded riparian area immediately downstream of the dam. Trail Elk Creek empties into Oak Creek approximately 1.75 miles downstream of the dam. Approximately 7.5 acres of the eastern bank of the lake just north of the dam is classified by the NWI as freshwater pond shallow water habitat with little emergent vegetation (PUSAh). Approximately 4 acres near the northwest arm of lake are also mapped as freshwater pond. Both areas appear to be shallow water areas within the normal pool of the lake. Potential wetland areas that may be impacted by the work were investigated in the field. NWI identified wetlands extents are listed in Table 3-2.

Table 3-2: NWI Wetlands in the Study Area

Wetlands Type	Cowardin Description	General Description	NWI estimated acres
Lake	Lacustrine	Permanently flooded, deepwater habitat greater than 20 acres in size that is created by an impoundment.	136
Freshwater Forested /Shrub	Palustrine Forested	Temporarily flooded Broad-leaved deciduous	2.3
Freshwater Pond	Palustrine unconsolidated bottom, Palustrine aquatic bed	Pond. Temporarily flooded depressions and floodplains with little vegetation and created by the construction of an impoundment.	11.5
Riverine	Riverine deepwater and associated wetlands.	River or stream channel.	2.1
NWI identified areas of potential lake/streams/wetlands			151.9

3.9 Air Quality and Climate

3.9.1 Air Quality

There are six criteria pollutants that act as indicators of air quality in the United States: carbon monoxide, lead, ozone, nitrogen dioxide, particulate matter, and sulfur dioxide. The National Ambient Air Quality Standards (NAAQS) are the concentrations of these criteria pollutants, above which, adverse effects on human health may occur. Areas where air pollution levels consistently stay below these standards are designated "attainment." According to the Oklahoma Department of Environmental Quality the state is currently in attainment for all six criteria pollutants.

3.9.2 Climate

The Oak Creek Watershed is located in the southwest region of Oklahoma characterized by a humid subtropical climate. The watershed is within the Central Rolling Red Plains major land resource area (MLRA).

Maximum precipitation is in spring, and the minimum is in winter. The Table 3-3 summarizes average annual precipitation and temperature and length of the growing season for Washita County according to Oklahoma Climatological Survey data.

Table 3-3: Climate (Washita County):

Average annual precipitation:	29.6 inches
Average annual snowfall:	7.4 inches
Average annual temperature:	60°F
Growing season:	208 days

Moderate precipitation supplies water for range and crops. Small ponds on individual farms provide water for livestock. Some larger ponds on individual farms are used for recreation, irrigation water, or water for livestock. A few large ponds and reservoirs are a source of irrigation water. Rivers in the MLRA are a potential source of water for irrigation. Water in some of the larger rivers is highly mineralized. The deep sand and gravel in valleys yield some ground water. In sloping areas where the underlying sandstone and shale are near the surface, ground water is scarce.

3.10 Vegetation

The project location lies within the Central Great Plains-Rolling Red Hills ecoregion. Upland natural vegetation is mostly mixed grass prairie in the ecoregion. Brome grass (*Bromus sp.*) Spanish Gold (*Grindelia ciliata*), Indian Blanket (*Gaillardia pulchella*), and Silverleaf nightshade (*Solanum elaeagnifolium*) were observed in the herbaceous layer in the vicinity of the dam. No threatened or endangered plants are reported to occur within the area.

3.10.1 Forest Resources

Common tree and shrub species observed surrounding the lake and downstream include American Elm (*Ulmus americana*), Soapberry (*Sapindus drummondii*), Black Walnut (*Juglans nigra*), Cottonwood (*Populus detoides*) , Hackberry (*Celtis occidentalis*) , Sumac (*Rhus s*p), Rough Dogwood (*Cornus drummondii*), Chickasaw Plum, (*Prunus angustifolia*), Coralberry (*Symphoricarpos orbiculatus*) and Black Willow (*Salix nigra*). The watershed drainage area has 106 acres and the breach inundation area has 99 acres classified as forest.

3.10.2 Invasive Plant Species

The Oklahoma Invasive Plant Council lists 52 invasive plant species that are present in the Southwest region of the state in which the dam is located. Eight species of the genus *Bromus* appear on the list. Seven of these species reportedly occur within the Southwest region. There was at least one species of the genus *Bromus* observed at the dam site and it is widespread and common in the area. The species was likely planted in the area for forage or erosion control, but is also easily spread by vehicles, livestock, and wildlife. No other invasive species were observed.

3.10.3 Riparian Areas

Riparian areas are present along the tributaries and shoreline of the lake, as well as the creek channel downstream of the dam. The riparian areas associated with the streams are primarily wooded. Trail Elk Creek channel immediately downstream of the dam has an approximately 200-foot-wide wooded riparian area which extends approximately 2200 feet downstream. Tree species in the riparian areas include but are not limited to: Black Walnut (*Juglans nigra*), American Elm (*Ulmus americana*), Cottonwood (*Populus deltoides*), and Hackberry (*Celtis occidentalis*). A large portion of the riparian area surrounding the lake has herbaceous and woody vegetation such as Switchgrass (*Panicum virgatum*) and Buttonbush (*Cephalanthus occidentalis*). The wooded riparian area around the lake constitutes approximately 1.5 miles of the 4 miles of shoreline.

3.11 Fish and Wildlife Resources

The project is in a rural area that provides habitat for wildlife species such as whitetailed-deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), rabbit (*Sylvilagus floridanus*), coyote (*Canis latrans*), and other species. Many species of songbirds and migratory waterfowl also utilize the lake. Waterbodies in the area support a typical warm-water fishery including centrarchids (bass, bluegill, and crappie), and ictaluridae (catfish) species. The lake is managed by the Oklahoma Department of Wildlife Conservation (ODWC). The project was constructed with public fishing and recreation facilities, and fish and wildlife enhancements such as fish habitat structure within the pool and construction of a “duck marsh” area immediately downstream of the dam. According to ODWC personnel, this area which originally included berms and water control structures to provide duck habitat, is no longer actively maintained or managed for that purpose

and the area is not inundated. Areas immediately adjacent to, and downstream of the lake provide wooded riparian habitat.

3.11.1 Threatened and Endangered Species

According to the United States Fish and Wildlife Service (USFWS), there are three bird species federally listed as threatened and one bird species listed as endangered under the Endangered Species Act (ESA) that may have the potential to occur within the vicinity of the proposed project. This information was obtained through the USFWS Information for Planning and Consultation (IPaC) system (USFWS, 2023a). According to the Oklahoma Natural Heritage Inventory, there are no state-listed threatened or endangered plant or animal species currently listed for Washita County.

The Monarch Butterfly (*Danaus plexippus*) is a "candidate" to be listed. According to the USFWS ECOS Environmental Conservation Online System profile for the species, during the breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily *Asclepias spp.*). Milkweed plant species may be present but were not observed at the time of inspection in the area of the dam or areas to be impacted. The dam itself is heavily managed grass with limited forbs. Monarchs may occur in the area, however the area of disturbance will be minimal and is not known for substantial amounts of milkweed

The three federally listed threatened bird species include the Lesser Prairie-chicken (*Tympanuchus pallidicinctus)*, (https://ecos.fws.gov/ecp/species/1924), the Piping Plover (*Charadrius melodus)* (https://ecos.fws.gov/ecp/species/6039), and the Red Knot Calidris (*Canutus rufa)*, (https://ecos.fws.gov/ecp/species/1864). The federally listed endangered bird species that has the potential to occur in the area is the Whooping Crane (*Grus americana)*, (https://ecos.fws.gov/ecp/species/758 1 09/13/2023). The habitat requirements for these listed species follow:

Lesser Prairie-Chicken

According to the USFWS species profile for the Lesser Prairie-Chicken, populations require large, ecologically functioning native grasslands and shrublands with a diversity of grass and shrub species and limited anthropogenic structures and trees. Lesser Prairie-Chickens tend to avoid using areas with trees, vertical structures, and other disturbances in areas with otherwise adequate habitat conditions. The areas of the proposed work include wooded areas around the lake, activity grazed pastureland, and manmade structures such as the dam, and appearances. There is also a significant amount of fishing and other human activity within the area of the affected environment. Based on these factors the species is not expected to occur in this area.

Piping Plover

The Piping Plover prefers broad open expanses along major rivers that provide foraging and/or stopover habitat. No habitat of this type occurs within project area. According to the Oklahoma Department of Wildlife Conservation (ODWC), "many reservoirs throughout the state have harbored piping plovers for brief periods and single birds are usually documented at stopover

sites. As with other plovers, piping plovers often select mudflats and sandbars to forage for invertebrates. The birds seen in Oklahoma are all part of the Northern Great Plains population and typically occur in the state from March to May, and July to September." The project area to be impacted does not include large mudflats or sandbars. Piping plovers have not been reported utilizing the lake.

Red Knot Calidris

Information from the ODWC states that the Red Knot prefers to forage on mudflats, and that this type of foraging habitat is limited within the state, and that Oklahoma is not a critical breeding or staging area for the species. Further, fewer than five birds are reported in Oklahoma annually. Of those, 85 percent have been reported during fall migration. No habitat of this type occurs within project area. Red Knots have not been reported utilizing the lake.

Whooping Crane

The Whooping Crane inhabits shallow wetlands characterized by cattails, bulrushes, and sedges, and can also be found in upland areas during migration. They feed on crabs, crayfish, frogs, and other small aquatic life as well as plants. The Whooping Crane typically breeds in Canada in late April, laying two eggs with an incubation period of around 29 days. The species migrate to their wintering grounds beginning in mid-September and return to Canada in early April (USDA-NRCS 2011).

Whooping cranes can be disturbed by abnormal sights and sounds, especially those caused by construction projects. Although appropriate migratory habitat exists in the project area, there are no known sightings of whooping cranes in the area of the lake. Surveys will be conducted daily during project work during the species' two migration periods in the spring and fall within .5 miles of construction. If whooping cranes are observed, construction work should not start and USFWS should be contacted.

3.11.2 Migratory Birds

Migratory bird pathways, stopover habitats, wintering areas, and breeding areas may be associated with the lake, riparian areas, and woodlands within the project area for several species of migratory birds. The USFWS Information for Planning and Consultation Resource (IPaC) report for the project lists two species that may occur in the area warrant special consideration (USFWS, 2023a), the Bald Eagle (*Haliaeetus leucocephalus*) and Red-headed woodpecker (*Melanerpes erythrocephalus*). Both species likely occur in the area of the lake.

3.12 Human Environment

3.12.1 Social and Economic Conditions

The following presents the social and economic conditions within the vicinity of MPS 5. Data on social and economic conditions were compiled for comparative purposes and social and

economic conditions are presented for the breach zones of the dam, the city of New Cordell, Washita County, and the State of Oklahoma using 2017-2021 American Community Survey 5-year estimates, the most recent data available. The project area consists of the drainage area of the lake (6535 acres) and breach zone (1132 acres) which is approximately 7667 acres.

Social and economic data for the breach zone was extracted using the USEPA's environmental justice mapping and screening tool called EJSCREEN (USEPA, 2023). EJSCREEN does not provide data for all the social and economic conditions assessed at the city, county, and state level. The breach zone was hand-sketched in the EJSCREEN tool and resultantly, is not a precise reflection of the breach zone that was delineated using hydrology and hydraulics (H&H) analysis.

Environmental Justice and Civil Rights: Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations directs federal agencies to identify and address the disproportionally high and adverse human health or environmental effects of their actions on minority and low-income populations (USEPA, 2023). Table 3-4 depicts the results of utilizing EPA's EJSCREEN regarding the demographics and socio-economics of the affected populations compared to the City of New Cordell, Washita County, and the State of Oklahoma.

Table 3-4: Demographics and Socio-Economics of Breach Inundation Zone, City of New Cordell, Washita County, and Oklahoma [1/]

Category	FRS 5 Affected Population [2/]	City of New Cordell	Washita County	Oklahoma
Total Persons	19	2,785	11,104	3,948,136
Population Below Poverty Level	10.1%	5.0%	12.0%	15.2%
Households in Area (#)	7	1,326	5,170	1,741,721
Race				
White	88.2%	94.9%	86.2%	69.7%
African American	4.6%	1.6%	1.5%	7.2%
American Indian and Alaska Native	4.9%	1.0%	2.0%	7.7%
Asian	0.0%	0.0%	0.1%	2.2%
Native Hawaiian and Other Pacific Islander	0.0%	0.0%	0.0%	0.2%
Other Race	0.0%	1.4%	2.8%	3.0%
Multiracial	2.3%	1.1%	7.4%	10.0%
Ethnicity				
Hispanic or Latino	3.1%	6.5%	10.1%	11.2%
Not Hispanic or Latino	96.9%	93.5%	89.9%	88.8%
Age Breakdown				
Age 0 - 18 years old	30.6%	28.0%	25.1%	24.3%
Age 18+	69.4%	72.0%	74.9%	75.7%
Age 65 years and older	13.8%	15.8%	18.2%	15.6%
Males	61.4%	52.2%	49.8%	49.8%
Females	38.6%	47.8%	50.2%	50.2%

Category	FRS 5 Affected Population 2/	City of New Cordell	Washita County	Oklahoma
Education Level (age 25 and over)				
Less than 9th grade	13.3%	1.2%	2.1%	3.8%
9th - 12th grade	21.3%	12.1%	8.3%	7.4%
High School Diploma	33.9%	42.3%	41.2%	30.8%
Some College, no degree	26.2%	24.5%	23.6%	22.9%
Associate Degree	1.0%	1.3%	5.5%	8.2%
Percent High School Graduate or Higher	65.4%	86.7%	89.6%	88.7%
Percent Bachelor's Degree or Higher	27.4%	18.6%	19.2%	26.8%
Language Spoken at Home				
English Only	99.5%	99.8%	99.3%	96.2%
Language Other Than English	0.5%	0.2%	0.7%	3.8%
Income Breakdown (Households)				
Less than $15,000	10.7%	8.1%	9.3%	10.8%
$15,000 - $25,000	10.1%	16.9%	11.2%	9.4%
$25,000 - $50,000	22.6%	16.8%	21.2%	23.7%
$50,000 - $75,000	18.2%	22.5%	22.9%	18.7%
$75,000+	38.4%	35.7%	35.4%	37.4%
Median Household Income	$58,927	$63,125	$55,750	$56,956
% of New Cordell	93.3%	-	-	-
% of Washita County	105.7%	-	-	-
% of Oklahoma	103.5%	-	-	-
Per Capita Income				
Total Population	$34,509	$25,358	$29,259	$30,976
% of New Cordell	136.1%	-	-	-
% of Washita County	117.9%	-	-	-
% of Oklahoma	111.4%	-	-	-
Occupied Housing Units by Tenure				
Owner Occupied	93.0%	73.8%	75.1%	66.1%
Renter Occupied	7.0%	26.2%	24.9%	33.9%
Employed Population Age 16+ Years				
In Labor Force	56.0%	58.9%	57.0%	57.7%
Civilian Unemployed in Labor Force	15.3%	3.5%	4.3%	3.1%

For the purposes of this report, the estimated population of the area downstream of MPS 5 within the breach inundation zone floodplain is referred to as the affected areas. Unless stated otherwise, data projections are from the U.S. Census Bureau.

Population and Race: The population of Washita County in 2020 was 10,924. Over the next 47 years, the population is forecast to decrease somewhat. Following are some population projections: for the year 2025 – 10,677; for 2030 – 10,510; for 2040 – 9,974; for 2050 – 9,231; and for 2060 – 8,628; and for year 2070 – 8,038 (Source: Oklahoma Commerce, Oklahoma

Population Projection 2020 - 2070). The total estimated population of the affected areas is 19 and the number of households is about 7. Between 2019 and 2021 the population of New Cordell declined from 2,813 to 2,768, a 1.6% decrease. However, in 2023 the population of New Cordell was 2,772, a slight increase of 4 people between 2021 and 2023.
The minority population in the affected areas (comprised of non-whites and Hispanic or Latino) is nearly 15%, which is higher than the City of New Cordell (11.6%) but lower than Washita County (23.9%) and much lower than Oklahoma (41.5%).

Employment/Unemployment: Using the Census data available at the time of the study (American Community Survey 5-year Estimates for 2017-2021), 56.0% of the population in the affected area of MPS 5 were in the labor force. The percentage of civilian unemployed in the labor force was 15.3%. Figures for the other entities were 58.9% in the labor force and 3.5% unemployed for New Cordell, 57.0% in the labor force and 4.3% unemployment for Washita County, and 57.7% and 3.1% for the State of Oklahoma, respectively. According to the U.S. Bureau of Labor Statistics, recent unemployment rates are as follows: New Cordell (May 2023 – 4.9%), Washita County (July 2023 - 3.0%) and State of Oklahoma (August 2023 - 2.8%). Unemployment data was not available for the affected areas but given that the recent figures for the other three entities are within the range of 2.8 – 5.0%, it is within reason that the affected area's unemployment rate is comparable.

Income/Education: The affected area's per capita income was $34,509, about 36% higher than New Cordell, about 18% higher than Washita County, and about 11% higher than the State of Oklahoma. When looking at median household income, the trend is just the opposite for the affected area compared to New Cordell - $58,927 vs. $63,125. However, median household income for the affected area is about 6% higher than that of Washita County and 3.5% higher than the State of Oklahoma.

Fifty-six percent of the households below FRS 5 have incomes greater than $50,000. For the income category of $25,000 and less, the affected area's household income (20.8%) is lower than New Cordell (25.0%), but about the same as Washita County (20.5%) and the State of Oklahoma (20.2%).

The percentage of high school graduates or higher in the affected area (65.4%) is much lower than New Cordell (86.7%), Washita County (89.6%), and the State of Oklahoma (88.7%). However, about 27% of residents in the affected area have a bachelor's degree or higher, which is higher than New Cordell (18.6%), Washita County (19.2%), and the State of Oklahoma (26.8%).

Age: About 69% of the people living within the affected area are 18 years old and above, which is less than the other three entities. The percentage of those age 65 years and older (13.8%) is less than the other three entities (15.8%, 18.2%, and 15.6%), indicating a younger population within the affected area.

Poverty: Statistics in Table 3-4 show that population living below the poverty level for the affected area (10.1%) is higher than New Cordell (5.0%) but lower than the other two entities: Washita County (12.0%) and the State of Oklahoma (15.2%).

Housing: As Table 3-4 reflects, about 93% of the population downstream of FRS 5 are homeowners, much higher than New Cordell (73.8%), Washita County (75.1%), and the State of Oklahoma (66.1%).

Summary: In summary, the demographics of the affected area downstream of MPS 5 as compared to New Cordell, Washita County, and the State of Oklahoma reflect evidence of higher per capita income and comparable median household income. Also, the affected area has a higher percentage of people below the poverty level when compared to New Cordell but lower than Washita County and the State of Oklahoma. The minority population in the affected area exhibits the same trend as does the poverty level – higher than New Cordell but lower than the other two. Based on these results, it is conceivable that disadvantaged communities could be present within the project area. However, a search of the internet for such resulted in no evidence of disadvantaged communities. Regardless, efforts were made to involve all interested parties in the planning process.

Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations directs federal agencies to identify and address the disproportionally high and adverse human health or environmental effects of their actions on minority and low-income populations (USEPA, 2020). If present, the project is not anticipated to impact Environmental Justice populations.

3.12.2 Human Health and Safety/Public Health and Safety

Public health and safety is a concern of the sponsor. The project will continue to provide flood protection to landowners downstream, reduce property damage and public and health safety risks. Oak Creek MPS 5 was constructed as a significant hazard dam. Currently, the dam is classified by the NRCS and the State of Oklahoma as a high hazard dam that does not meet current safety and performance standards. A dam failure could damage two residences and four county roads located downstream. Oak Creek 5 is also more than 50-years old and has reached the end of its service life. The population at risk is estimated to be 6.

3.12.3 Land Use/Land Cover

The project location lies within the Central Rolling Red Plains major land resource area (MLRA). The MLRA is characterized by dissected plains with broad divides that are nearly level to gently sloping. The valleys are bordered by a rolling to steep irregular dune topography in some areas. About 60 percent of the MLRA is rangeland, and 35 percent is cropland. The rest of the MLRA is urban land, woodland, or pasture. Nearly all the area is in farms or ranches. Most rangeland is in the west, but some is throughout the MLRA. Ranges and pastures are grazed mainly by beef cattle. Winter wheat and grain sorghum are the major cash crops grown throughout the MLRA. Soil erosion is a major concern of management if the soils are cultivated or if range and pasture are overgrazed.

The land surrounding the dam and lake is undeveloped and comprised of rangeland, pasture, and cropland. The area has gently rolling grass covered hills, as well as small patches of riparian

forest and woodland. The region is characterized by dendritic drainage patterns. Land Cover classifications from the 2019 National Land Cover Database are included in Appendix C - Figures C-6 and C-7 and Table 3.5 (NLCD 2023).

Table 3-5: NLCD Land Cover categories in the Oak Creek drainage and breach areas

NLCD 2019 Land Cover Database		Contributing Drainage Area (acres)	Breach Area (acres)
ID	Land Use/Land Cover		
11	Open Water	113	5
21	Developed, Open Space	224	39
22	Developed, Low Intensity	28	3
23	Developed, Medium Intensity	11	1
41	Deciduous Forest	84	31
43	Mixed Forest	22	60
52	Shrub/Scrub	350	66
71	Grassland/Herbaceous	2530	266
81	Pasture/Hay	68	1
82	Cultivated Crops	3092	651
90	Woody Wetlands		9
95	Emergent Herbaceous Wetlands	13	
Total		6535	1132

3.12.4 Cultural Resources and Historic Properties

The APE was negotiated between the NRCS, Oklahoma Archaeological Survey (OAS), Oklahoma State Historic Preservation Office (SHPO) on June 9, 2023, and again on September 28, 2023, and six tribes (Caddo Nation, Cheyenne and Arapahoe Tribes, Comanche Nation, Osage Nation, Quapaw Nation, Wichita and Affiliated Tribes) with ancestral lands in Oklahoma on July 24, 2023, and again on October 6, 2023. The Area of Potential Effect (APE) was defined by the top-of-dam elevation upstream as well as below to the extent of the state/federal easement. The NRCS recommended conducting two transects around the boundary of the lake, using visual examination of the ground surface and shovel testing. During negotiations, OAS and SHPO recommended that the top of dam elevation, or 1465.5 feet AMSL, be used as the upper limit of the APE around the existing lake. Although no response about the proposed APE and survey strategy was received from any of the tribes after two attempts requesting input, verbal conversations (GM 420 Part 601.23(B)(2)(ii), Title 190 Part 315.5(E)(2)), and past consultation on other watershed rehabilitation projects, the top-of-dam elevation upstream and downstream methodology was implemented.

Although a shovel test interval of thirty meters had initially been proposed, subsequent discussions with OAS determined that this interval could be lengthened or shortened in the field as conditions required. Although in many areas the APE would be less than thirty meters wide, SHPO and OAS both concurred that two transects around the existing pool of the lake would be sufficient to locate any cultural resources present within these areas. The initial plan was to

conduct one transect near the lake shore itself, and one transect near the APE boundary, i.e. near the 1465.5-foot contour. Field conditions led to the modification of these locations, as discussed below. During negotiations over the APE, the OAS recommended that an area immediately below the dam be investigated as part of the APE. This was to locate any cultural materials in this area that could potentially be impacted by a breach of the dam. NRCS agreed and a Breach Zone of approximately 31.7 acres (12.8 hectares) in size was surveyed as a part of the APE. Survey methods in this area were different, and consisted of shovel testing along linear parallel transects. According to GIS measurements, the APE resulting from these negotiations was approximately 167.2 acres (67.7 hectares) in size, that consisting of a breach zone below the dam of 31.7 acres (12.8 hectares) and a lakeshore survey area of 135.5 acres (54.8 hectares). The shoreline of the lake at normal pool is approximately 9,742 meters (6.51 miles) in length, and the 1465.5-foot contour around the lake would be approximately 14,652 meters (9.1 miles) in length.

An intensive cultural resources survey of the area of potential effect (APE) of a proposed rehabilitation of an existing earthen dam and associated lake was performed. See Appendix C Figure C-15.

The survey involved traversing a transect around the lakeshore to examine the exposed surface for the presence of cultural materials, and traversing of transects and excavation of shovel tests in the uplands adjacent to the site. All soil excavated from shovel tests was screened through 6mm (1/4 inch) steel mesh. All shovel tests were recorded and backfilled after completion.

One previously recorded archaeological site, 34WA178, was located within the APE. This site was revisited and evaluated. This evaluation consisted of surface examination of the remains, excavation of eighteen shovel tests, drawing of a sketch map, and photographing the site. Site 34WA178 is determined as ineligible for inclusion in the National Register of Historic Places (NRHP) and no additional work is recommended at the site.

A historic ford or weir was recorded in the APE. This site consists of a load or loads of rock dumped in the creek channel presumably to make a crossing for vehicular or cattle traffic. The rocks also act as a weir backing water upstream slightly. The exact date of construction is unknown, but the location is near a property line. The historic ford or weir is determined as ineligible for inclusion in the NRHP, and no additional work is recommended at the site.

A single wire nail was recovered from a shovel test near the southern boundary fence of the breach zone. Subsequent shovel tests failed to locate additional cultural materials, and this item was recorded as an isolated find. This find is considered ineligible for inclusion in the NRHP and no additional work is determined at this site.

The dam that forms Oak Creek MPS 5 was evaluated for NRHP eligibility. The dam is a common type constructed according to standard plans. Hundreds of examples are extant within Oklahoma and nearby states. The dam is determined as ineligible for inclusion in the NRHP, and no additional work is recommended at the dam. The Oklahoma SHPO has not designated the Oak Creek Watershed as a Historic District, therefore Oak Creek MPS 5 is not part of a larger Historic District. Per 36CFR800.4(d)(1), no historic properties (will be) affected by the NRCS undertaking.

The completed archaeological and architectural survey report, with a determination of no historic properties affected, was submitted to the Oklahoma Archaeological Survey and Oklahoma State Historic Preservation Office on July 11, 2024, and the Caddo Nation, Cheyenne and Arapahoe Tribes, Comanche Nation, Osage Nation, Quapaw Nation, Wichita and Affiliated Tribes on July 12, 2024. Concurrence with the results and determination of the archaeological and architectural survey report was received on July 17, 2024, from the Quapaw Nation, July 26, 2024, from the SHPO, on August 9, 2024, from the Caddo Nation, August 12, 2024, from the Comanche Nation, and September 3, 2024, from the OAS.

3.12.5 Floodplain Management

Based on review of the Federal Emergency Management Agency (FEMA) flood insurance rate map for the project (Panel 40149C0475E) effective April 3, 2012, the dam is located in Zone X, an area of minimal flood hazard. The surrounding areas are also located in Zone X (FEMA 2024). See Appendix C - Figures C-8 through C-12. The U.S. Army Corps of Engineers HEC-HMS and HEC-RAS computer models were used to determine the downstream flood elevations for various storm events for Oak Creek MPS 5 with and without the dam. Steady state flow was used in the analysis. The hydrologic model indicates the existing 100-year 24-hour floodplain downstream of Oak Creek MPS 5 is 784 acres. See Appendix C - Figure C-13.

3.12.6 Recreation

Oak Creek MPS 5 (Lake Vanderwork) is a 135-acre lake located seven miles north of Gotebo on State Highway 54, two miles east on county road 1280 in Washita County. Oak Creek MPS 5 is enjoyed by many visitors for fishing and bird watching. A boat launching ramp is located on Oak Creek MPS 5 for fishing. Oak Creek MPS 5 provides recreation for many people in the area as well as the State with 4,450 annual sportfishing trips valued at $347,000 (OKCES, 2014).

3.12.7 Scenic Beauty

Oak Creek MPS 5 is a 135-acre lake. Oak Creek MPS 5 is enjoyed by many visitors for fishing and bird watching. Oak Creek MPS 5 provides an aesthetic view for the visitors.

3.13 Ecosystem Services

For the purposes of PR&G, the ecosystem services framework provides an integrated approach that articulates the relevant costs and benefits inherent in the decision-making process, to complement any economic and ecological assessment of magnitude. Such values are elicited through stakeholder engagement, and tradeoffs are weighed in a transparent, systematic and inclusive process.

3.13.1 Regulating – Flood Control

Regulating ecosystem services are services that help maintain a world in which it is possible for people to live, providing critical benefits that buffer against environmental catastrophe. These benefits are obtained through moderation or control of ecosystem processes, including regulation of local climate, air, or soil quality; carbon sequestration; flood, erosion, or disease control; water filtration; and pollination. There is inherent uncertainty when trying to predict impacts on regulating ecosystem services, given that our ideas of climate change and potential environmental catastrophes are based on models and simulations.

Oak Creek MPS 5 was constructed for the purpose of flood control to protect downstream residents, homes, and roads from flooding events, and for fish and wildlife. The construction of the dam has limited the frequency and extent of flooding events. The continuing functionality of dams ensures public health and safety to residents.

The key metric that will be used as the surrogate measure of the flood control service is the change in the 100-year 24-hour floodplain area downstream of Oak Creek MPS. Reducing flood damages and the potential loss of life is a critical ecosystem service for this project.

3.13.2 Supporting – Nutrient Cycling

Supporting services refer to the underlying processes maintaining conditions for life on Earth, including nutrient cycling, soil formation, and primary production. There is inherent uncertainty when trying to determine impacts of the project on supporting ecosystem services since there are many other factors unrelated to the project that can affect such processes. Impacts to nutrient cycling for this project will be evaluated because vegetation will likely be impacted during the project.

Nutrient cycling in ecosystems is the exchange of organic and inorganic material back into the production of energy and matter. An adequate and balanced supply of elements necessary for life, provided through the ecological processes of nutrient cycling, underpins all other ecosystem services. Nutrients are mineral elements such as nitrogen, phosphorus, and potassium that are essential as raw materials for organism growth and development. Ecosystems regulate the flows and concentrations of nutrients through a number of complex processes that allow these elements to be extracted from their mineral sources or recycled from dead organisms. The nutrient cycle involves animals, plants, bacteria, fungi, as well as mineral components of the soil.

The key surrogate metric used to represent nutrient cycling will be vegetation and lake size. The addition or removal of vegetation would have an impact on nutrient cycling. Land use in the watershed is predominantly well-established vegetation in forest and pasture. The change in the extent of vegetation for each alternative will be analyzed. The lake provides aquatic nutrient cycling. The change in impoundment area (lake size) for each alternative will be analyzed.

3.13.3 Cultural – Recreational Use

Cultural services make the world a place in which people want to live. These services are the non-material benefits that ecosystems provide to human societies and culture, including opportunities for recreation, tourism, aesthetic or artistic appreciation, and spirituality. Uncertainty within cultural ecosystem services lies within society's restructuring of what is deemed culturally important as well as future management actions outside the realm of this project.

Oak Creek MPS 5 (Lake Vanderwork) is a 135-acre lake. Oak Creek MPS 5 is enjoyed by many visitors for fishing and bird watching. Oak Creek MPS 5 provides recreation for many people in the area as well as the State with 4,450 annual sportfishing trips valued at $347,000.

Surrogate Metric for Recreational Use: The key surrogate metric to represent recreational use will be the annual sportfishing trips.

3.13.4 Cultural – Aesthetic Viewsheds

Oak Creek MPS 5 (Lake Vanderwork) is a 135-acre lake. Oak Creek MPS 5 is enjoyed by many visitors for fishing and bird watching. Oak Creek MPS 5 provides an aesthetic view for the visitors.

Surrogate Metric for Aesthetic Viewsheds: The key surrogate metric to represent Aesthetic Viewsheds will be the impoundment size.

Chapter 4 – Alternatives

4.1 Formulation Process

During the planning process a combination of measures were evaluated to maximize the benefits to the public. Coordination with the sponsors were part of the planning process to obtain information and concurrence in the alternatives considered. No reasonable alternatives that would be carried out by other agencies or organizations were identified during the formulation process or during scoping. Alternatives eligible for financial assistance under The Watershed Protection and Flood Prevention Act (PL 83-566) were developed. To be eligible for federal assistance, an alternative must meet the project purpose and need. All alternatives were planned to function for the same project life with proper maintenance. Alternatives that were not reasonable were eliminated from detail study.

The No Action/Future Without Federal Investment alternative serves as a baseline to evaluate the other alternatives. It depicts the most probable future conditions in the absence of a federally assisted project. Although Oak Creek MPS 5 is an unsafe dam and "do nothing" is not an option for the sponsor, the No Action Alternative has been defined as allowing the dam to fail.

A video inspection of the principal spillway (PS) conduit revealed a crack at approximate Sta. 1+25 near an anti-seep collar. It may be possible to repair this crack but there is no assurance that other cracks would not develop in the PS. Alternatives were formulated to include slip-lining the existing PS and adding a hooded inlet PS to provide capacity for the PS design storm. This approach would require a partial drawdown of the existing lake and reduce impacts to the existing environmental resources.

4.2 Alternatives Considered but Eliminated from Detailed Study:

Decommissioning Oak Creek MPS 5 (removing the dam) would not meet the project purposes of continuing to provide public water-based recreation. Therefore, decommissioning Lake Vanderwork was not considered to be a reasonable alternative and eliminated from detailed study. The decommissioning alternative for Oak Creek MPS 5 was considered but eliminated from detailed study. Simply removing the dam would not meet the project purposes of continuing to provide public lake-based recreation, therefore, to meet the purpose and need, the decommissioning alternative would include the construction of a new lake in the area. The cost alone for the construction of a new lake would be exorbitant, and the environmental impacts and cost of mitigation associated with such a proposal clearly rendered the alternative unreasonable. Therefore, the alternative was eliminated from detailed study. The cost of a new structure and mitigation would likely exceed $15.000,000.

Alternatives were formulated to replace the existing PS with a larger PS which would include draining the existing lake. The Oklahoma Department of Wildlife Conservation (ODWC) manages the lake as a public fish and wildlife area. ODWC, the sponsor and the public expressed concerns about draining Oak Creek MPS 5 for rehabilitation. Alternatives replacing the existing PS by dewatering the lake were eliminated from detail study.

4.3 Description of Alternative Plans

The purposes of the Oak Creek MPS 5 project is to provide the current level of flood protection and public fish and wildlife for the next 100 years while minimizing environmental, economic, and social impacts, and comply with applicable dam safety and performance standards to reduce the potential for flood damages and loss of life from a catastrophic breach.

4.3.1 Alternative 1: No Action/Future Without Federal Investment

Under the No Action/Future Without Federal Investment alternative, the dam would remain in the existing unsafe condition with no action to improve the dam from its original design or to correct safety deficiencies beyond maintenance or replacements performed in accordance with its operation and maintenance plan. Under the No Action Alternative, the dam is assumed to fail and not be rebuilt or rehabilitated. The potential impacts of a dam failure would include adverse effects on human life, property, and the environment. The No Action alternative documents baseline conditions against which all other alternatives are analyzed.

Under the no action alternative, Oak Creek MPS 5 would not be rehabilitated to meet current high hazard criteria, and the current downstream flood damage reduction would continue until the dam fails. The structure would not control the potential amount of rainfall for the 100-year storm event. The minimum auxiliary spillway crest to store the required 100-year frequency storm is El. 1461.8 and the existing auxiliary spillway crest is El. 1460.7. The auxiliary spillway would not meet the discharge capacity requirements for a high hazard dam commensurate with its current hazard classification.

The estimated population at risk (PAR) in the case of a breach is currently 6. The PAR value was based on the number of houses impacted by a breach. Fences, roads, bridges, and farm equipment may be damaged or destroyed by a dam breach. Sediment upstream of the dam would be released into the stream system. Sediment deposited could damage downstream farmland. The flood wave from the breach could damage downstream riparian areas and riverine wetlands.

The highest potential for dam failure is an auxiliary spillway breach. Hydrologic analyses concluded that the auxiliary spillway breach would occur with the 7500-year 24-hour duration storm event of 16.5 inches.

4.3.2 Alternative 2: Rehabilitation to High Hazard Dam (Preferred Alternative)

Oak Creek MPS 5 would meet the safety and performance standards for a high hazard dam. This alternative would consist of slip-lining the existing 30-inch principal spillway, installing a new principal spillway consisting of a 30-inch RCP conduit with a hooded inlet, installing an impact basin, and constructing a 300-foot-wide auxiliary spillway RCC chute over the exiting embankment.

The current normal pool elevation provides greater sediment storage than the 100-year evaluated life. Reducing the normal pool elevation to only include 100 years of sediment storage would decrease the lake size about 40 acres which would have significant impacts to recreation facilities, recreation usage, wetlands and fish habitat. Therefore, the alternative was developed to maintain the current normal pool elevation.

The existing principal spillway 336 feet conduit would be slip lined with a 28-inch OD HDPE conduit and serve as the conduit to partially dewater the site. The existing principal spillway trash rack would be removed and replaced with a new trash rack and a new knife gate would be installed on the inside of the inlet tower for dewatering the reservoir. An impact basin would be installed to dissipate the energy at the principal spillway outlet. The hooded inlet crest would be set at the same elevation as the existing principal spillway, El. 1448.9, and would serve as the primary principal spillway and could be installed by open cut or bore and jacking. The new principal spillway system would consist of a concrete hooded inlet structure that has been used on previous floodwater retarding structures, 245-foot 30-inch conduit and an impact basin. This installation would only require a partial dewatering of the reservoir. The two conduits would be discharged into a standard impact basin with a 15.0 feet width and constructed according to Standard Drawing ES-4150. The baffle wall in the standard impact basin would be modified to dissipate the energy of the two conduits.

The auxiliary spillway crest to store the 100-year recurrence flood event is El. 1461.8. The auxiliary spillway would consist of a 300-foot wide RCC chute spillway over the existing embankment with a rock lined outlet basin. The configuration of the structure would consist of an approach apron that stair steps up 7 feet at 1-foot intervals, a 23-foot-long crest, a stair step chute with fifty (50) 1-foot steps, a 50 feet long stilling basin and a 4 feet high end still. The existing embankment would be extended across the existing vegetative auxiliary spillway.

The bulk of the existing embankment crest ranges from El. 1467.2 to El. 1468 with an average of El. 1468.0. The right abutment from Sta. 16+40 to Sta. 17+70 ranges from El. 1465.9 to El. 1466.3. This alternative would require raising the embankment crest to El. 1470.1. The embankment would be modified to flatten the upstream and downstream slopes to 3 horizontal to 1 vertical (3H:1V), shifting the centerline downstream to allow for a crossing berm on the US slope, adding rock to the existing rock for wave protection and installing a trench drain under the downstream toe.

This alternative would not require additional land rights for the construction of the improvements. The estimated construction cost for this alternative is $8.46 million. The total estimated cost for this alternative is $9.82 million.

4.3.3 Alternative 3: Rehabilitation to Significant Hazard Dam with Flood Proofing and Floodplain Easements

Oak Creek MPS 5 would meet the safety and performance standards for a significant hazard dam. This alternative would consist of slip-lining the existing 30-inch principal spillway, installing a new principal spillway consisting of a 30-inch RCP conduit with a hooded inlet,

installing an impact basin, constructing an 80-foot-wide auxiliary spillway RCC chute over the exiting embankment, floodproofing two residences, and procuring floodplain easements in the breach inundation area.

The current normal pool elevation provides greater sediment storage than the 100-year evaluated life. Reducing the normal pool elevation to only include 100 years of sediment storage would decrease the lake size about 40 acres which would have significant impacts to recreation facilities, recreation usage, wetlands and fish habitat. Therefore, the alternative was developed to maintain the current normal pool elevation.

The existing principal spillway 336-foot conduit would be slip lined with a 28-inch OD HDPE conduit and serve as the conduit to partially dewater the site. The existing principal spillway trash rack would be removed and replaced with a new trash rack and a new knife gate would be installed on the inside of the inlet tower for dewatering the reservoir. An impact basin would be installed to dissipate the energy at the principal spillway outlet. The hooded inlet crest would be set at the same elevation as the existing principal spillway, El. 1448.9, and would serve as the primary principal spillway and could be installed by open cut or bore and jacking. The new principal spillway system would consist of a 236-foot 30-inch RCP hooded inlet structure, 336-foot 28-inch OD HDPE and an impact basin. This installation would only require a partial dewatering of the reservoir. The two conduits would be discharged into a standard impact basin with a 15.0 feet width and constructed according to Standard Drawing ES-4150. The baffle wall in the standard impact basin would be modified to dissipate the energy of the two conduits.

The auxiliary spillway crest to store the 50-year recurrence flood event is El. 1459.8. The auxiliary spillway would consist of an 80-foot wide RCC chute spillway over the existing embankment with a rock lined outlet basin. The configuration of the structure would consist of an approach apron that stair steps up 5 feet at 1-foot intervals, a 22-foot-long crest, a stair step chute with forty-eight (48) 1-foot steps, a 50-foot-long stilling basin and a 4-foot-high end sill. The existing embankment would be extended across the existing vegetative auxiliary spillway.

The bulk of the existing embankment crest ranges from elevation 1467.2 to elevation 1468 with an average elevation of 1468.0. The right abutment from Station 16+40 to Station 17+70 ranges from elevation 1465.9 to elevation 1466.3. The embankment crest would be raised to a minimum elevation of 1468.0. The embankment slopes would be modified to flatten the upstream and downstream slopes to 3H:1V, shifting the centerline downstream to allow for a crossing berm on the upstream slope, adding rock to the existing rock for wave protection and installing a trench drain under the downstream toe. The estimated construction cost for this alternative is $5.73 million.

An earthen berm would be installed to floodproof two residences in the breach inundation area. The earthen berm would have an 8-foot top width with 4H:1V side slopes. The berm elevation would be 1370.0 elevation.

This alternative would not require additional land rights for the construction of the improvements on the embankment. The earthen berm would require 3.4 acres of landrights/easements. Since this alternative does not meet high hazard criteria, approximately 1132 acres of easements would

be required in the breach area to prevent future development, and two residences would need to be floodproofed. The total estimated cost for this alternative is $6.66 million.

4.4 Comparison of Alternatives:

Table 4-1 summarizes the effects of each alternative considered. Refer to Chapter 5 – Environmental Consequences section for additional information.

Table 4-1: Summary and Comparison of Alternative Plans.

Item or Concern	Alternative 1: No Action/FWOFI	Alternative 2: Rehabilitate to High Hazard Dam (Preferred Alternative)	Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements
Total Investment	$0	$9,816,000	$6,659,200
Average Annual Benefits	$0	$3,300	$3,300
Average Annual Costs	$0	$340,100	$235,500
Net Benefits	$0	-$336,800	-$232,200
Benefit/Cost Ratio	NA	0.01:1.0	0.01:1.0
Average Annual OM&R Costs	$15,000	$15,000	$15,000
Soils/Prime Farmlands	The erosion at the principal spillway discharge would continue. Soil, including prime farmland, could be scoured along the stream from the dam failure. Soil materials from the failed dam could be deposited on downstream land affecting soil fertility and land use.	The short-term effects to soils, including prime farmland, may include temporary disruption from heavy construction equipment and vehicles, staging/stockpiling of materials, and general construction work. Prior to construction, topsoil would be removed and stockpiled and would be used for site restoration post-construction. The soil disturbed area is estimated to be 18 acres.	Same as Alternative 2 except the soil disturbed area is estimated to be 20 acres.

Item or Concern	Alternative 1: No Action/FWOFI	Alternative 2: Rehabilitate to High Hazard Dam (Preferred Alternative)	Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements
Water Quality	The dam would trap sediment and other water particulates until it fails. The dam failure would impact water quality by transporting large amounts of sediment and debris downstream. Additional sediment would be carried downstream because the dam would no longer be in place to trap sediment. Absent the dam, natural flow and natural stream conditions, (stream habitat and water quality conditions), could potentially eventually be restored.	Construction work may temporarily impact water quality by increasing total suspended solid loads and turbidity. A Stormwater Pollution Prevention Plan would be developed. BMP's would be utilized during construction. The dam would trap sediment and other water particulates for the service life of the rehabilitated structure. This alternative reduces the potential for large sediment transport events from uncontrolled breaches but does not eliminate it.	Same as Alternative 2.
Water Resources	See Water Quality, Waters of the US and Wetlands narratives. If the dam failed there would no longer by a 135-acre lake.	See Water Quality, Waters of the US and Wetlands narratives. Rehabilitation of the dam extends the life of the dam and lake.	See Water Quality, Waters of the US and Wetlands narratives. Same as Alternative 2.
Waters of the U.S. and Wetlands	The existing wetlands created by the dam would not be impacted until the dam fails. The dam failure would eliminate the 135-acre open water and surrounding wetlands and allow the intermittent stream, wetlands, and riparian corridors to return to their natural condition, which existed prior to the construction of the dam. A total of approximately 1.8 miles of intermittent and ephemeral stream would return to riverine conditions.	The existing wetlands upstream of the dam associated with the lake could be temporarily impacted during the partial drawdown of the lake for construction. The construction would impact approximately 0.025 acres of mostly herbaceous wetlands downstream, and a total of approximately 0.1 of an acre of stream bed for the construction of the new outlet and RCC. The 135 acres of open water and wetlands would remain in place. Construction would require a Section 404 permit from USACE.	Same as Alternative 2.
Air Quality	No impacts to air quality are anticipated.	Dust and exhaust would increase slightly during construction. No long-term effects. Best Management Practices (BMP) would be utilized during construction.	Same as Alternative 2.

Item or Concern	Alternative 1: No Action/FWOFI	Alternative 2: Rehabilitate to High Hazard Dam (Preferred Alternative)	Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements
Forest Resources/ Riparian Areas	Site conditions would remain the same as existing conditions until the dam fails. The dam failure would transport large amounts of sediment and debris downstream which could impact forest resources. Existing riparian areas surrounding the lake would cease to be riparian in nature (influencing and being influenced by the presence of the lake) and return to pasture or simply remain wooded. Riparian areas could eventually reestablish along the newly reformed stream channel (approximately 1.8 miles)	Dam construction would convert 0.4 acres of forest resources to grass and the dam structures which includes the 0.1-acre riparian area along the stream below the existing dam.	Dam and earthen berm construction would convert 1.6 acres of forest resources which includes the 0.4-acre riparian area along the stream below the existing dam.
Invasive Plant Species	Site conditions would remain the same as existing conditions until the dam fails. The dam failure could create conditions (bare ground) downstream that could provide conditions suitable for the spread of brome grass or other T&E species.	Brome grass is present and best management practices would be used during construction to prevent the spread of the invasive species. Native grass and or desirable adapted species would be established on disturbed areas.	Same as Alternative 2.
Fish and Wildlife Resources	Existing conditions are expected to remain the same until the dam fails. Following the dam failure, the 135 acres of warm-water fishery lake habitat would be lost. as the existing lake would no longer exist. The stream habitat could eventually be re-established. The dam failure would result in short-term, adverse impacts to all types of wildlife in the area associated with disruption and possible destruction of habitat.	The partial drawdown of the lake during construction period would result in short-term impacts to fish and wildlife habitat. Short-term, minor, adverse impacts to all types of wildlife associated with disruption of 18 acres of habitat during construction. The long-term impact would be 0.4 acres of woodland converted to grassland and the RCC spillway would convert 1.1 acres of grassland to impervious surfaces. No long-term or cumulative impacts to fish and wildlife are anticipated.	The existing fishery habitat upstream of the dam would have short-term impacts by the partial drawdown of the lake for construction. Short-term, minor, adverse impacts to wildlife associated with disruption of 20 acres of habitat during construction. The long-term impact would be 1.6 acres of woodland converted to berm/grassland and the RCC spillway would convert 0.4 acres of grassland to impervious surfaces. No cumulative impacts to fish and wildlife are anticipated.

Item or Concern	Alternative 1: No Action/FWOFI	Alternative 2: Rehabilitate to High Hazard Dam (Preferred Alternative)	Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements
Threatened and Endangered Species	In the short term, prior to dam failure, no effect on listed species would be anticipated. If any of the listed species utilize the lake or surrounding areas, adverse impacts associated with disruption and possible destruction of habitat from a dam failure which would eliminate the lake and wetland habitats and potentially impact downstream habitat could result in minor impacts to species	Construction could temporarily disrupt threatened and endangered species that have the potential to be present in the project area. No long-term or cumulative impacts to threatened and endangered species are anticipated. A "may affect/not likely to adversely affect" determination is anticipated	Same as Alternative 2.
Migratory Birds	Short-term, adverse impacts may occur to migratory birds associated with disruption and possible destruction of habitat from a dam failure. The lake habitat would no longer exist. No long-term or cumulative impacts to migratory birds would likely result from dam failure as the birds would likely utilize different areas.	Construction activities could deter the bird species from using the lake and surrounding land in the project construction area, but it is anticipated that the species would utilize the area again after construction is complete. No long-term or cumulative impacts to migratory birds are anticipated.	Same as Alternative 2.
Social Issues/ Local and Regional Economy	The demographics of the affected area downstream of Oak Creek MPS 5 would not change. The dam failure could damage two homes and four county roads located downstream along with the potential for loss of life (PAR = 6) and have short term adverse impacts to the local economy. Flood damages would increase downstream after the dam failure.	Rehabilitation reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5. Flood damage reduction would continue. Construction would create temporary jobs and improve the local economy in the short term.	Same as Alternative 2. In addition, the public is reluctant to accept the floodproofing and procuring downstream easements in the breach inundation area.
Environmental Justice and Civil Rights	Not anticipated to impact Environmental Justice populations.	Not anticipated to impact Environmental Justice populations. No disparate treatment of Environmental Justice populations.	Same as Alternative 2.

Item or Concern	Alternative 1: No Action/FWOFI	Alternative 2: Rehabilitate to High Hazard Dam (Preferred Alternative)	Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements
Public Health and Safety	The dam failure could damage two homes and four county roads located downstream along with the potential for loss of life (PAR = 6) and have short term adverse impacts to the local economy. Flood damages would increase downstream after the dam failure.	Reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5. Flood damage reduction would continue. Potential construction safety and noise concerns would be addressed during construction.	Same as Alternative 2.
Land Use	Dam failure would have short-term adverse land use impacts downstream of the dam to riparian areas and pasture. The dam breach could impact 1,132 acres downstream of the dam. The majority of the land use/land cover impacted by the dam breach would be cropland and grassland. Sediment would be released and impact the stream and adjacent areas. Flood damages to properties downstream of the dam would increase after dam failure.	Short-term minor adverse impacts to land use during construction. The dam would remain in place and thus no long-term or cumulative impacts to land use are anticipated. Flood damage reduction would continue.	Same as Alternative 2. In addition, approximately 1132 acres of easements would be required in the breach area to prevent future development, and two residences would need to be floodproofed.

Item or Concern	Alternative 1: No Action/FWOFI	Alternative 2: Rehabilitate to High Hazard Dam (Preferred Alternative)	Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements
Cultural Resources and Historic Properties	Existing conditions are expected to remain the same until the dam fails. Though not anticipated, the dam failure could affect unknown cultural resources downstream of Oak Creek MPS 5, as well as altering the built environment (cultural landscape) with catastrophic failure.	Upon review, no impacts to cultural or historic resources are anticipated. A pre-field search of Oklahoma Archeological Survey and State Historic Preservation Office records and maps was conducted. Consultation with tribes did not reveal any resources, properties, or landscapes either. A field investigation did not identify any resources, properties, or landscapes determined to be eligible for the National Register. The dam and accessories were also determined not eligible. NRCS determined that the undertaking would not affect any resources, properties, or landscapes. Tribes and state agencies concurred with NRCS' determination.	Same as Alternative 2. In addition, floodproofed structures will need to be assessed for historic significance.
Floodplain Management	The existing dam attenuates between the 50-year and 100-year 10-day storm event. Dam failure would increase the existing 100-year floodplain by 113 acres. The regulatory floodplain downstream of Oak Creek MPS 5 designated as Zone X.	The rehabilitated dam would attenuate the 100-year 10-day storm event which would slightly decrease the 100-year floodplain when compared to the floodplain with the existing dam. Rehabilitating Oak Creek MPS 5 is unlikely to impact the flood hazard zone delineations within the project study area.	The rehabilitated dam would attenuate the 50-year 10-day storm event which would slightly increase the 100-year floodplain when compared to the floodplain with the existing dam. In addition, approximately 1132 acres of easements would be required in the breach area to prevent future development, and two residences would need to be floodproofed.
Recreation	Oak Creek MPS 5 would continue to provide recreation opportunities until the dam fails. After the dam fails, the embankment would be scoured, and the lake would be drained. 4,450 annual sportfishing trips would be lost.	Recreation would be impacted slightly during the construction period. The 4,450 annual sportfishing trips would be maintained.	Same as Alternative 2..

Item or Concern	Alternative 1: No Action/FWOFI	Alternative 2: Rehabilitate to High Hazard Dam (Preferred Alternative)	Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements
Scenic Beauty	Oak creek MPS 5 would continue to be enjoyed by many visitors for fishing and bird watching until the dam fails. After the dam fails, the embankment would be scoured, the lake would be drained impacting the scenic beauty.	Scenic beauty would be impacted slightly during the construction period due to lowering of the lake, equipment activities, and noise. The scenic vista would change from continuous grassed embankment to include a RCC spillway over the embankment. The aesthetic view of the 135-acre lake would be maintained.	Same as Alternative 2. In addition, construction of the floodproofing dikes would impact the viewscape at the two downstream residences.
Provisioning Services	NA	NA	NA
Regulating Services – Flood Control	Flood damage reduction would remain the same as existing conditions until the dam fails. The existing dam attenuates between the 50-year and 100-year 10-day storm event. The dam failure could damage two homes and four county roads located downstream along with the potential for loss of life. The 100-year 24-hour floodplain downstream of Oak Creek MPS 5 would increase 113 acres after the dam failure.	Flood damage reduction would continue with the rehabilitation of Oak Creek MPS 5. The rehabilitated dam would attenuate the 100-year 10-day storm event which would slightly decrease the 100-year floodplain when compared to the floodplain with the existing dam.. Rehabilitation reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5.	The rehabilitated dam would attenuate the 50-year 10-day storm event which would slightly increase the 100-year floodplain when compared to the floodplain with the existing dam. Rehabilitation reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5.
Supporting Services - Nutrient Cycling	Site conditions would remain the same as existing conditions until the dam fails. The dam failure would impact vegetation on the embankment and transport large amounts of sediment and debris downstream which could impact vegetation. The 135-acre lake would be lost with a dam failure.	The short-term effects to vegetation may include temporary impacts from construction work. The disturbed area to rehabilitate of the embankment is estimated to be 18 acres. The construction of the RCC spillway would convert 1.1 acres of vegetation to impervious surfaces.	The short-term effects to vegetation may include temporary impacts from construction work. The disturbed area to rehabilitate of the embankment and flood proofing the two residences is estimated to be 20 acres. The construction of the RCC spillway would convert 0.4 acres of vegetation.

Item or Concern	Alternative 1: No Action/FWOFI	Alternative 2: Rehabilitate to High Hazard Dam (Preferred Alternative)	Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements
Cultural Services - Recreational Use	MPS 5 would continue to provide recreation opportunities until the dam fails. After the dam fails, 4,450 annual sportfishing trips would be lost.	Recreation would be impacted slightly during the construction period due to lowering of the lake, equipment activities, and noise. The 4,450 annual sportfishing trips would be maintained.	Same as Alternative 2.
Cultural Services - Aesthetic Viewsheds	Oak Creek MPS 5 would continue to provide be enjoyed by many visitors for fishing and bird watching until the dam fails. After dam failure, the 135-acre lake would be lost.	The aesthetic view would be impacted slightly during the construction period due to lowering of the lake, equipment activities, and noise. The scenic vista would change from continuous grassed embankment to include a RCC spillway over the embankment. The aesthetic view of the 135-acre lake would be maintained.	Same as Alternative 2. In addition, construction of the floodproofing dikes would impact the viewscape at the two downstream residences.

Table 4-2 summarizes the consideration of the PR&G guiding principles on each alternative. An "X" indicates the criteria is met to the greatest extent.

Table 4-2: Consideration of PR&G Guiding Principles

PR&G Guiding Principles	Alternative 1: No Action/FWOFI	Alternative 2: Rehabilitate to High Hazard Dam	Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements
Healthy and Resilient Ecosystem	X	X	X
Sustainable Economic Development		X	X
Floodplains	X	X	X
Public Safety		X	X
Environmental Justice	X	X	X
Watershed Approach		X	X

Chapter 5 - Environmental Consequences

Alternative plans of action can result in a multitude of potential effects on resources upstream and downstream of the dam. This section describes anticipated effects on resource and ecosystem services concerns identified by the Sponsors, the public, and agency personnel in the Scoping meeting and the public meetings. Topics are listed in the same categories as listed in **Tables 2-1 and 2-2**. The six Guiding Principles of the Principles and Requirements were used in the alternative evaluations.

Three alternative plans were considered and evaluated in detail.

- Alternative 1: No Action/Future Without Federal Investment (FWOFI)
- Alternative 2: Rehabilitation to High Hazard Dam
- Alternative 3: Rehabilitation to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

The Sponsors have indicated that without federal assistance, they would rehabilitate Oak Creek MPS 5 to meet high hazard safety and performance standards (Alternative 2).

5.1 Soil Resources

5.1.1 Soil Resources (Including Prime Farmland)

5.1.1.1 Existing Conditions

The soil types present in the watershed are well-drained and comprised of fine sandy loams and silt loams with a few rock outcrops. Seventy-five percent of the soils in the drainage area and 95% of the soil in the breach inundation area are classified as prime farmland.

5.1.1.2 Alternative 1: No Action/FWOFI

Site conditions would remain the same as existing conditions until the dam fails. The erosion at the principal spillway discharge would continue. Soils, including prime farmland, could be scoured along the stream from the dam failure. Soil materials from the failed dam could be deposited on downstream land affecting soil fertility and land use. The alternative would not affect the geology in the area.

5.1.1.3 Alternative 2: Rehabilitate to High Hazard Dam

The short-term effects to soils, including prime farmland, may include temporary disruption from heavy construction equipment and vehicles, staging/stockpiling of materials, and general construction work. Prior to construction, topsoil would be removed and stockpiled, and would be used for site restoration post-construction. The soil disturbed area is estimated to be 18 acres. The alternative would not affect the geology in the area.

5.1.1.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

The short-term effects to soils may include temporary disruption from heavy construction equipment and vehicles, staging/stockpiling of materials, and general construction work. Prior to construction, topsoil would be removed and stockpiled, and would be used for site restoration

post-construction. The soil disturbed area is estimated to be 20 acres. The alternative would not affect the geology in the area.

5.2 Water Resources

5.2.1 Water Quality

5.2.1.1 Existing Conditions

According to the Oklahoma Department of Environmental Quality, Trail Elm Creek (aka Gyp Creek) and Oak Creek are not listed as CWA Section 303(d) impaired waters for the State of Oklahoma.

5.2.1.2 Alternative 1: No Action/FWOFI

Site conditions would remain the same as existing conditions until the dam fails. The dam would trap sediment and other water particulates until it fails. Adverse impacts to water quality are anticipated from a dam failure. The dam failure would impact water quality by transporting large amounts of sediment and debris downstream. The dam was built for sediment storage, and thus the dam failure would result in additional sediment being carried downstream because the dam would no longer be in place to trap sediment. Absent the dam, natural flow and natural stream conditions, (stream habitat and water quality conditions), could potentially eventually be restored.

5.2.1.3 Alternative 2: Rehabilitate to High Hazard Dam

Construction work may temporarily impact water quality by increasing the total suspended solid loads/turbidity of the intermittent stream during construction related activities. BMPs (e.g., turbidity curtain, silt fence, straw bales, etc.) would be utilized during construction to mitigate the release of material to the stream. A Stormwater Pollution Prevention Plan would be developed prior to the beginning of construction. Alternative 2 is anticipated to result in long-term, direct, negligible, and beneficial impacts to water quality because the dam would continue to trap sediment and other water particulates for the service life of the rehabilitated structure. The submerged sediment storage life of the dam is approximately 300 years. Once the normal pool is filled with sediment, the sediment would begin to encroach the fish and wildlife pool. This alternative reduces the potential for large sediment and nutrient transport events from uncontrolled breaches but does not eliminate it.

5.2.1.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

This alternative would affect water quality the same as Alternative 2.

5.2.2 Waters of the U.S./Wetlands

5.2.2.1 Existing Conditions

The dam creates a 135-acre lake known as Lake Vanderwork. The acreages of waters of the US are based on aerial photography, the,National Wetlands Inventory (NWI) and on-site investigations. The NWI data identified 151.9 acres of potential lake/streams/wetlands The dam

is on an intermittent stream with a channel that varies from approximately 10-20 feet wide. The stream along with the impoundment itself, as well as any associated wetlands would meet the current regulatory definition of "Waters of the U.S." definition and be subject to Clean Water Act jurisdiction. Minor variations from the NWI habitat type estimations are noted.

5.2.2.2 Alternative 1: No Action/FWOFI

The existing wetlands created by the dam would not be impacted until the dam fails. The dam failure would eliminate the 135-acre open water and surrounding wetlands and could potentially allow the intermittent stream, wetlands, and riparian corridors to return to their natural condition, which existed prior to the construction of the dam, and/or the lake area could be converted back to cropland or pasture. A total of approximately 1.8 miles of intermittent and ephemeral streambed could potentially eventually return to riverine conditions.

5.2.2.3 Alternative 2: Rehabilitate to High Hazard Dam

The existing wetlands upstream of the dam would have short-term impacts resulting from the partial drawdown of the lake for construction. No permanent fill would be placed in upstream areas and the permanent pool elevation of the lake would remain the same following the construction of the dam.

Because of the valuable fishery and extensive public use, during scoping, the ODWC requested that rather than draining the lake, that a temporary cofferdam be constructed in order to maintain a pool. The construction of the cofferdam would displace some fish but the impacts would be minor and temporary. The 135 acres of open water and wetlands would remain in place.

The construction would permanently impact (fill) 0.025 acres of mostly herbaceous wetlands downstream of the dam for the construction of the RCC chute. A total of approximately 0.1 acre of streambed would be converted for the RCC chute and outlet structure. Construction would require a Section 404 permit from USACE

5.2.2.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

This alternative would affect Waters of the U.S./Wetlands the same as Alternative 2.

5.2.3 Air Quality

5.2.3.1 Existing Conditions

According to the Oklahoma Department of Environmental Quality the state is currently in attainment for all six criteria pollutants.

5.2.3.2 Alternative 1: No Action/FWOFI

No impacts to air quality are anticipated.

5.2.3.3 Alternative 2: Rehabilitate to High Hazard Dam

Short-term, direct, negligible, adverse impacts to air quality are anticipated from Alternative 3. This Alternative would involve the use of heavy diesel and gasoline machinery, as well as trucking of project equipment and materials during construction. This would result in a

temporary increase in GHG emissions, which have the potential to adversely impact air quality on site. Transportation of materials and equipment to and from the site would also result in the temporary generation of particulate matter associated with driving trucks on construction access roads. BMPs would be utilized during construction for dust prevention and control, which may include surface watering to minimize emissions. As no permanent sources of emissions would be created, Alternative 3 is not anticipated to have long-term effects on ambient air quality or local GHG emissions. There are no other known ongoing or planned large scale construction projects in the vicinity of the dam that could contribute to cumulative effects on ambient air quality or local GHG emissions.

5.2.3.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

This alternative would affect the air quality the same as Alternative 2.

5.3 Vegetation

5.3.1 Forest Resources/Riparian Areas

5.3.1.1 Existing Conditions

The watershed drainage area has 106 acres and the breach inundation area has 99 acres classified as forest. Scattered wooded areas occur around the lake and the riparian area downstream of the dam is wooded.

5.3.1.2 Alternative 1: No Action/FWOFI

Site conditions would remain the same as existing conditions until the dam fails. The dam failure would transport large amounts of sediment and debris downstream which could impact forest resources. Existing riparian areas surrounding the lake would cease to be riparian in nature (influencing and being influenced by the presence of the lake) and return to pasture or simply remain wooded. Riparian areas could eventually reestablish along the newly reformed stream channel (approximately 1.8 miles). The species composition would likely eventually be similar to the composition of the existing upstream and downstream riparian areas.

5.3.1.3 Alternative 2: Rehabilitate to High Hazard Dam

Dam construction would convert 0.4 acres of forest resources to grass and the dam structures which includes approximately 0.1 acre of forested riparian area along the side channel below the existing dam for the construction of the RCC chute.

5.3.1.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Dam construction would convert 0.1 acres of forest resources which includes the riparian areas along the stream below the existing dam for the construction of the outlet. The earthen berm construction to floodproof the two residences would concert 1.5 acres of forest resources to vegetated berm.

5.3.2 Invasive Plant Species

5.3.2.1 Existing Conditions

At least one species of brome grass was observed at the dam site. It is widespread and common in the area. The species was likely planted in the area for forage or erosion control, but is also easily spread by vehicles, livestock, and wildlife. No other invasive species were observed.

5.3.2.2 Alternative 1: No Action/FWOFI

Site conditions would remain the same as existing conditions until the dam fails. The dam failure could create conditions (bare ground) downstream that could provide conditions suitable for the spread of brome grass or other T&E species.

5.3.2.3 Alternative 2: Rehabilitate to High Hazard Dam

Brome grass is present and best management practices (e.g. cleaning equipment, seed certification) would be used during construction to prevent the spread of the invasive species. Native grass and or desirable adapted species would be established on disturbed areas.

5.3.2.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2.

5.4 Fish and Wildlife Resources

5.4.1 Fish and Wildlife Resources

5.4.1.1 Existing Conditions

The project is in a rural area that provides habitat for many common wildlife species. MPS 5 provides approximately 135 acres of warm-water fishery habitat. The project was constructed with public fishing and recreation facilities. The lake is managed by the Oklahoma Department of Wildlife Conservation.

5.4.1.2 Alternative 1: No Action/FWOFI

Existing conditions are expected to remain the same until the dam fails. Following the dam failure, the 135 acres of warm-water fishery lake habitat would be lost as the existing lake would no longer exist. The stream habitat could eventually reestablish. The dam failure would result in short-term, adverse impacts to all types of wildlife in the area associated with disruption and possible destruction of habitat downstream.

5.4.1.3 Alternative 2: Rehabilitate to High Hazard Dam

The partial drawdown of the lake during construction period would result in short-term impacts to fish and wildlife habitat. Short-term, minor, adverse impacts to all types of wildlife would be associated with construction activities as they would likely be temporarily displaced. Approximately 18 acres of habitat would be impacted during construction. Most wildlife types will flee equipment however other less mobile species may be killed. The mortality of less mobile species such as possibly some reptiles would not be significant. A total of approximately

0.4 acres of woodland would be converted to grassland and the RCC spillway would convert 1.1 acres of grassland to impervious surfaces. Approximately 0.1 acre of riparian forest would be converted for the construction of the RCC chute. The long-term beneficial impact would be to continue to provide 135 acres of lake fishery and wildlife habitat. No adverse long-term or cumulative impacts to wildlife are anticipated.

5.4.1.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

The existing fishery habitat upstream of the dam would have short-term impacts by the partial drawdown of the lake for construction which could impact spawning areas. Short-term, minor, adverse impacts to wildlife (wildlife would be displaced) associated with disruption of 20 acres of habitat during construction. The long-term impact would be 1.6 acres of woodland converted to grassland and the RCC spillway would convert 0.4 acres of grassland to impervious surfaces. No cumulative impacts to fish and wildlife are anticipated.

5.4.2 Threatened and Endangered Species

5.4.2.1 Existing Conditions

According to the USFWS, there are three bird species federally listed as threatened and one species listed as endangered under the ESA that may have the potential to occur within the vicinity of the proposed project. The listed species include Lesser Prairie-Chicken, Piping Plover, Red Knot Calidris, and Whooping Crane. In addition to the listed species, the Monarch Butterfly is a "candidate" to be listed. According to the Oklahoma Natural Heritage Inventory, there are no state-listed threatened or endangered plant or animal species currently listed for Washita County.

5.4.2.2 Alternative 1: No Action/FWOFI

In the short term, prior to dam failure, no effect to listed species would be anticipated. If any of the listed species utilize the lake or surrounding areas, adverse impacts associated with disruption and possible destruction of habitat from a dam failure which would eliminate the lake and wetland habitats and potentially impact downstream habitat could result in minor impacts to species.

5.4.2.3 Alternative 2: Rehabilitate to High Hazard Dam

Construction activities could temporarily disrupt threatened and endangered species that have the potential to be present in the project area. There is a very limited amount of preferred habitat for any listed species having the potential to be present in the Lake Vanderwork area. The partial drawdown of the lake would reduce or potentially temporarily increase potential resting/feeding areas (mudflats) during the construction period for listed bird species with exception of the prairie chicken which would not be impacted by a downdrawn. If present and disturbed, any of the species would likely flee unharmed to find other suitable feeding/resting habitat in the area.

Surveys would be conducted daily during project work during the whooping crane's two migration periods in the spring and fall within .5 miles of construction. If whooping cranes are observed, construction work should not start and USFWS should be contacted.

No long-term or cumulative impacts to threatened and endangered species are anticipated. Coordination with USFWS is on-going. A "may affect/not likely to adversely affect" determination is anticipated

5.4.2.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2.

5.4.3 Migratory Birds

5.4.3.1 Existing Conditions

Many species of songbirds and migratory waterfowl utilize the lake. USFWS information indicates that two species that may occur in the area warrant special consideration, the Bald Eagle (*Haliaeetus leucocephalus*) and Red-headed woodpecker (*Melanerpes erythrocephalus*).

5.4.3.2 Alternative 1: No Action/FWOFI

Short-term, adverse impacts may occur to migratory birds associated with disruption and possible destruction of habitat caused from a dam failure. The lake habitat would no longer exist. No long-term or cumulative impacts to migratory birds would likely result from dam failure as the birds would likely utilize different areas.

5.4.3.3 Alternative 2: Rehabilitate to High Hazard Dam

Construction activities could deter the migratory bird species from using the lake and surrounding land in the project construction area, however it is anticipated that the species would utilize the area again following construction. Therefore, the impacts would likely be temporary and minor. The species would likely return when construction was over. A limited amount of trees (0.4 acre) would be impacted by the project construction which could potentially displace migratory birds or eagles. No long-term or cumulative impacts to migratory birds, including the Bald Eagle and Red-headed woodpecker are anticipated.

5.4.3.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2.

5.5 Human Environment

5.5.1 Social and Economic Conditions

5.5.1.1 Existing Conditions

The demographics of the affected area downstream of MPS 5 as compared to New Cordell, Washita County, and the State of Oklahoma reflect evidence of higher per capita income and comparable median household income. Also, the affected area has a higher percentage of people below the poverty level when compared to New Cordell but lower than Washita County and the State of Oklahoma.

5.5.1.2 Alternative 1: No Action/FWOFI

The alternative would not affect the demographics of the affected area downstream of Oak Creek MPS 5. The dam failure could damage two homes and four county roads located downstream along with the potential for loss of life (PAR = 6) and have short term adverse impacts to the local economy. Flood damages would increase downstream after the dam failure.

5.5.1.3 Alternative 2: Rehabilitate to High Hazard Dam

Rehabilitation reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5. Flood damage reduction would continue. Construction would create temporary jobs and improve the local economy in the short term.

5.5.1.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2. In addition, the public is reluctant to accept the floodproofing of two residences and procuring downstream easements in the breach inundation area.

5.5.2 Environmental Justice and Civil Rights

5.5.2.1 Existing Conditions

The minority population in the affected area is higher than New Cordell but lower than Washita County, and the State of Oklahoma. Based on these results, it is conceivable that disadvantaged communities could be present within the project area. However, the results of utilizing EPA's EJSCREEN regarding the demographics and socio-economics of the affected population resulted in no evidence of disadvantaged communities.

5.5.2.2 Alternative 1: No Action/FWOFI

The alternative is not anticipated to impact Environmental Justice populations.

5.5.2.3 Alternative 2: Rehabilitate to High Hazard Dam

The alternative is not anticipated to impact Environmental Justice populations. No disparate treatment of Environmental Justice populations.

5.5.2.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2.

5.5.3 Human Health and Safety/Public Health and Safety

5.5.3.1 Existing Conditions

The project will continue to provide flood protection to landowners downstream, reduce property damage and public and health safety risks. Currently, the dam is classified by the NRCS and the State of Oklahoma as a high hazard dam that does not meet current safety and performance standards. A dam failure could damage two residences and four county roads located downstream. The PAR is estimated to be 6.

5.5.3.2 Alternative 1: No Action/FWOFI

Existing conditions are expected to remain the same until the dam fails. The dam failure could damage two homes and four county roads located downstream along with the potential for loss of life (PAR = 6) and have short term adverse impacts to the local economy. Flood damages would increase downstream after the dam failure.

5.5.3.3 Alternative 2: Rehabilitate to High Hazard Dam

Alternative 2 reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5. Flood damage reduction would continue. Potential construction safety and noise concerns would be addressed during construction.

5.5.3.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2.

5.5.4 Land Use/Land Cover

5.5.4.1 Existing Conditions

The project location lies within the Central Rolling Red Plains MLRA. The MLRA is characterized by dissected plains with broad divides that are nearly level to gently sloping. About 60 percent of the MLRA is rangeland, and 35 percent is cropland. The rest of the MLRA is urban land, woodland, or pasture. Winter wheat and grain sorghum are the major cash crops grown throughout the MLRA. The land surrounding the dam and lake is undeveloped and comprised of rangeland, pasture, and cropland. The area has gently rolling grass covered hills, as well as small patches of riparian forest and woodland. The region is characterized by dendritic drainage patterns.

5.5.4.2 Alternative 1: No Action/FWOFI

Existing conditions are expected to remain the same until the dam fails. The dam failure would have short-term adverse land use impacts downstream of the dam to riparian areas and pasture. The dam breach could impact 1,132 acres downstream of the dam. The majority of the land use/land cover impacted by the dam breach would be cropland and grassland as shown in Table 3-5. Sediment would be released and impact the stream and adjacent areas. Flood damages to properties downstream of the dam would increase after dam failure.

5.5.4.3 Alternative 2: Rehabilitate to High Hazard Dam

Short-term adverse impacts to land use during construction. The dam would remain in place and thus no long-term or cumulative impacts to land use are anticipated. Flood damage reduction would continue.

5.5.4.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2. In addition, approximately 1132 acres of easements would be required in the breach area to prevent future development and two residences would need to be floodproofed.

5.5.5 Cultural Resources and Historic Properties

5.5.5.1 Existing Conditions

An intensive cultural resources survey of the APE was performed. One previously recorded archaeological site was located within the APE which was tested for integrity and significance as part of the cultural resources survey. A historic ford or weir was recorded in the APE as part of the cultural resources survey. A single wire nail was recovered from a shovel test near the southern boundary fence of the breach zone. Further subsurface testing, not originally part of the survey methodology, was performed. The dam is determined as ineligible for inclusion in the NRHP, as is the previously recorded site, the weir, or the wire nail. Per 36CFR800.4(d)(1), no historic properties (will be) affected by the NRCS undertaking. The Oklahoma SHPO has not designated the Oak Creek Watershed as a Historic District, therefore MPS 5 or the other resources are not part of a larger Historic District.

5.5.5.2 Alternative 1: No Action/FWOFI

Existing conditions are expected to remain the same until the dam fails. Though not anticipated, the dam failure could affect unknown cultural resources downstream of MPS 5, as well as altering the built environment (cultural landscape) with catastrophic failure.

5.5.5.3 Alternative 2: Rehabilitate to High Hazard Dam

A pre-field search of Oklahoma Archeological Survey and State Historic Preservation Office records and maps was conducted. One resource was previously recorded in the APE, an archaeological site dating to the Historic Period (post-contact). Consultation with tribes did not reveal any resources, properties, or landscapes either. The previously recorded archaeological site was tested for integrity and significance. The field investigation identified a historic ford or weir in the APE. A single wire nail was recovered from a shovel test near the southern boundary fence of the breach zone. Further subsurface testing, not originally part of the survey methodology, was performed. No cultural landscapes were identified during the survey. The dam is determined as ineligible for inclusion in the NRHP, as is the previously recorded site, the weir, or the wire nail, no historic properties (will be) affected by the NRCS. The dam and accessories were determined not eligible. NRCS determined that the undertaking would not affect any resources, properties, or landscapes per 36CFR800.4(d)(1). Consultation with the Oklahoma Archaeological Survey, Oklahoma State Historic Preservation Office, Caddo Nation, Cheyenne and Arapaho Tribes, Comanche Nation, Osage Nation, Quapaw Nation, and the Wichita and Affiliated Tribes was initiated. Concurrence with the NRCS determination of no properties affected was received from the OAS, the SHPO, the Caddo Nation, the Comanche Nation, and from the Quapaw Nation. The remainder of the identified parties did not respond after three invitations to be consulting parties.

5.5.5.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2. In addition, floodproofed structures will need to be assessed for historic significance.

5.5.6 Floodplain Management

5.5.6.1 Existing Conditions

The existing dam attenuates between the 50-year and 100-year 10-day storm event. Based on review of the FEMA flood insurance rate map for the project, the dam is located in Zone X, an area of minimal flood hazard. Surrounding areas are also located in Zone X (See Appendix C Figure C-8). The hydrologic model indicates the existing 100-year 24-hour floodplain downstream of Oak Creek MPS 5 is 784 acres.

5.5.6.2 Alternative 1: No Action/FWOFI

Existing conditions are expected to remain the same until the dam fails. The hydrologic model indicates the 100-year 24-hour floodplain downstream would increase 113 acres after the dam fails.

5.5.6.3 Alternative 2: Rehabilitate to High Hazard Dam

The rehabilitated dam would attenuate the 100-year 10-day storm event which would slightly decrease the 100-year floodplain (784 acres) when compared to the floodplain with the existing dam. Rehabilitating Oak Creek MPS 5 is unlikely to impact the flood hazard zone delineations (Zone X) within the project study area. Rehabilitation reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5.

5.5.6.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

The rehabilitated dam would attenuate the 50-year 10-day storm event which would slightly increase the 100-year floodplain when compared to the floodplain with the existing dam. In addition, approximately 1132 acres of easements would be required in the breach area to prevent future development and two residences would need to be floodproofed.

5.5.7 Recreation

5.5.7.1 Existing Conditions

Oak Creek MPS 5 forms a 135-acre lake. A boat launching ramp is located on MPS 5 for fishing. MPS 5 provides recreation for many people in the area as well as the State with 4,450 annual sportfishing trips valued at $347,000.

5.5.7.2 Alternative 1: No Action/FWOFI

Oak creek MPS 5 would continue to provide recreation opportunities until the dam fails. After the dam fails, the embankment would be scoured, and the lake would be drained.4,450 annual sportfishing trips would be lost.

5.5.7.3 Alternative 2: Rehabilitate to High Hazard Dam

Recreation would be impacted slightly during the construction period due to lowering of the lake, equipment activities, and noise. The 4,450 annual sportfishing trips would be maintained.

5.5.7.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2.

5.5.8 Scenic Beauty

5.5.8.1 Existing Conditions

Oak Creek MPS 5 forms a 135-acre lake. Oak Creek MPS 5 is enjoyed by many visitors for fishing and bird watching. Oak Creek MPS 5 provides an aesthetic view for the visitors.

5.5.8.2 Alternative 1: No Action/FWOFI

Oak creek MPS 5 would continue to be enjoyed by many visitors for fishing and bird watching until the dam fails. After the dam fails, the embankment would be scoured, the lake would be drained impacting the scenic beauty.

5.5.8.3 Alternative 2: Rehabilitate to High Hazard Dam

Scenic beauty would be impacted slightly during the construction period due to lowering of the lake, equipment activities, and noise. The scenic vista would change from continuous grassed embankment to include a RCC spillway over the embankment. The aesthetic view of the 135-acre lake would be maintained.

5.5.8.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2. In addition, construction of the floodproofing dikes would impact the viewscape at the two downstream residences.

5.6 Ecosystem Services

5.6.1 Regulating – Flood Control

5.6.1.1 Existing Conditions

Oak Creek MPS 5 was constructed for the purpose of flood control to protect downstream residents, homes, and roads from flooding events, and for fish and wildlife. The construction of the dam has limited the frequency and extent of flooding events. The continuing functionality of dams ensures public health and safety to residents. The hydrologic model indicates the existing 100-year 24-hour floodplain downstream of MPS 5 is 784 acres.

5.6.1.2 Alternative 1: No Action/FWOFI

Flood damage reduction would remain the same as existing conditions until the dam fails. The existing dam attenuates between the 50-year and 100-year 10-day storm event. The dam failure could damage two homes and four county roads located downstream along with the potential for loss of life. Flood damages would increase downstream after the dam failure. The hydrologic model indicates the 100-year 24-hour floodplain downstream of Oak Creek MPS 5 would increase 113 acres after the dam failure.

5.6.1.3 Alternative 2: Rehabilitate to High Hazard Dam

Flood damage reduction would continue with the rehabilitation of Oak Creek MPS 5. The rehabilitated dam would attenuate the 100-year 10-day storm event which would slightly decrease the 100-year floodplain when compared to the floodplain with the existing dam. Rehabilitation reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5.

5.6.1.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

The rehabilitated dam would attenuate the 50-year 10-day storm event which would slightly increase the 100-year floodplain when compared to the floodplain with the existing dam. Rehabilitation reduces but does not eliminate the risk of an uncontrolled breach of Oak Creek MPS 5.

5.6.2 Supporting – Nutrient Cycling

5.6.2.1 Existing Conditions

Vegetation is well established on the dam embankment and around the downstream residences. MPS 5 is a 135-acre lake.

5.6.2.2 Alternative 1: No Action/FWOFI

Site conditions would remain the same as existing conditions until the dam fails. The dam failure would impact vegetation on the embankment and transport large amounts of sediment and debris downstream which could impact vegetation. The 135-acre lake would be lost with a dam failure.

5.6.2.3 Alternative 2: Rehabilitate to High Hazard Dam

The short-term effects to vegetation may include temporary impacts from heavy construction equipment and vehicles, staging/stockpiling of materials, and general construction work. The disturbed area to rehabilitate of the embankment is estimated to be 18 acres. The construction of the RCC spillway would convert 1.1 acres of vegetation to impervious surfaces.

5.6.2.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

The short-term effects to vegetation may include temporary impacts from heavy construction equipment and vehicles, staging/stockpiling of materials, and general construction work. The disturbed area to rehabilitate of the embankment and flood proofing the two residences is estimated to be 20 acres. The construction of the RCC spillway would convert 0.4 acres of vegetation.

5.6.3 Cultural – Recreational Use

5.6.3.1 Existing Conditions

Oak Creek MPS 5 (Lake Vanderwork) is a 135-acre lake. Oak Creek MPS 5 provides recreation for many people in the area as well as the State with 4,450 annual sportfishing trips valued at $347,000.

5.6.3.2 Alternative 1: No Action/FWOFI

Oak Creek MPS 5 would continue to provide recreation opportunities until the dam fails. After dam failure, 4,450 annual sportfishing trips would be lost.

5.6.3.3 Alternative 2: Rehabilitate to High Hazard Dam

Recreation would be impacted slightly during the construction period due to lowering of the lake, equipment activities, and noise. The 4,450 annual sportfishing trips would be maintained.

5.6.3.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2.

5.6.4 Cultural – Aesthetic Viewsheds

5.6.4.1 Existing Conditions

Oak Creek MPS 5 is a 135-acre lake. Oak Creek MPS 5 is enjoyed by many visitors for fishing and bird watching. Oak Creek MPS 5 provides an aesthetic view for the visitors.

5.6.4.2 Alternative 1: No Action/FWOFI

Oak Creek MPS 5 would continue to be enjoyed by many visitors for fishing and bird watching until the dam fails. After dam failure, the 135-acre lake would be lost.

5.6.4.3 Alternative 2: Rehabilitate to High Hazard Dam

The aesthetic view would be impacted slightly during the construction period due to lowering of the lake, equipment activities, and noise. The scenic vista would change from continuous grassed embankment to include a RCC spillway over the embankment. The aesthetic view of the 135-acre lake would be maintained.

5.6.4.4 Alternative 3: Rehabilitate to Significant Hazard Dam with Home Floodproofing and Floodplain Easements

Same as Alternative 2. In addition, construction of the floodproofing dikes would impact the viewscape at the two downstream residences.

5.7 Cumulative Impacts

Under the National Environmental Policy Act, cumulative impacts are defined as the effects on the environment resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. Actions by federal, non-federal agencies, and private parties must be considered.

The proposed action of rehabilitating the dam would not contribute to measurable cumulative impacts. The watershed is rural and no major land use/land cover changes are anticipated in the future. Further development (housing/roadways) can be expected to occur, however no reasonably foreseeable actions by other federal or non-federal agencies have been identified that

would contribute to cumulative impacts. Impacts of rehabilitating other NRCS structures in the Oak Creek watershed would likely be very similar to this project. The adverse impacts of the other rehabilitation projects in Oklahoma and across the nation have been minor. When those impacts are added to the impacts of this project, and to reasonably foreseeable actions, it has been determined that the impacts would likely not reach the level of significance.

5.8 Risk and Uncertainty

National averages were used to identify the value of potential damages. The Sponsor would restrict future construction of habitable dwellings upstream of the dam and below the elevation of their flowage easement. Construction activities should be sequenced to reduce risks associated with potential flood events during construction. Construction equipment and materials should be stored in areas to reduce the risks associated with flood events during construction. Detailed engineering surveys are recommended to determine exact quantities for construction.

Actual damages occurring from each storm event could realistically be higher or lower, depending on soil moisture conditions at the time of a given event, associated debris flows, future development, and other factors such as changes in precipitation from various storm events.

Although potential climatic changes are not expected to alter calculation of the design storm events, climatic change could increase the occurrence of low frequency, high intensity storm events and associated flood damages (Bonnin *et al*., 2011). NOAA Atlas 14 (Volume 8, Version 2) was used for the lower frequency storms. Furthermore, the probable maximum precipitation (PMP) values have not been updated using the latest state-of-the-science tools and methods to incorporate data from storms that occurred since the studies were published. The PMP was determined using the August 2019 report "Regional Probable Maximum Precipitation Study for Oklahoma, Arkansas, Louisiana, and Mississippi". Future hydrologic studies could recommend different rainfall amounts. Additional uncertainty associated with hydrologic analyses is due to the use of input parameters that are the best approximation of hydrologic conditions in the watershed. The uncertainty and risk could be limited by calibration of the watershed response to rainfall events of the same magnitude; however, the lack of stream gage data limits the potential for calibration.

Very large storm events or deforestation by fire could cause an increased rate of erosion, sedimentation, and deposition.

Geotechnical explorations were conducted on the embankment, auxiliary spillway and potential borrow source areas. Subsurface conditions between boring and test pit locations may vary, and the adequacy of the design should be confirmed if unanticipated conditions are encountered during construction.

Future performance of concrete structures is expected to perform as intended during design-level hydraulic and seismic loadings for the design life of the structures. Risk and uncertainty can be reduced by regular inspection and maintenance, as well as monitoring during and after major flood and seismic events, in accordance with NRCS and Oklahoma dam safety requirements.

Chapter 6 – Consultation, Coordination and Public Participation

6.1 Public Participation

The project sponsor for the development of the Supplemental Watershed Plan — Environmental Assessment (Plan-EA) for the Oak Creek MPS No. 5 is the Washita County Conservation District. Input and involvement of the public have been solicited throughout the planning of the project. A Public Participation Plan was developed and approved for the project and has been followed during the planning process.

A scoping process was used to determine the issues relevant to the proposed action and formulating and evaluating alternatives. Scoping meetings for Oak Creek MPS 5 was held on May 15, 2023, to identify issues of economic, environmental, cultural, and social concerns in the watershed, and to explain the Watershed Program. The meetings were held at the USDA Washita County Field Service Center located at 1505 N Glen L English Street, Cordell, Oklahoma. NRCS sent out invitations to federal and state elected officials, state and federal environmental agencies, and interested environmental organizations that were listed in the Public Participation Plan.

The public meeting started at 1:00 PM. The legal notices were published in the local newspapers. An informal "come and go" format was followed for the meeting. Displays include the project location, planning process and comment forms and contact information. The meeting was attended by personnel from NRCS and the consultants. No individuals from the public attended. The meeting was adjourned at 3:00 PM.

Since this project is being planned using the new Principles, Requirements and Guidelines (PR&G) planning policy, the four Ecosystem Services Categories, (Provisioning, Regulating, Supporting, and Cultural) were explained on one of the boards and included in the scoping process. Specific Services under these categories were listed to determine their relevance to project decision making.

A public meeting was held on June 24, 2024, to review the proposed alternatives to rehabilitate MPS 5. A summary of the findings, alternatives considered, and the preferred alternative were presented. News articles were placed in local newspapers to solicit comments from the public during the comment period.

A Draft Plan was distributed for interagency and public review on (DATE). Letters of comments received on the Draft Plan-EA and NRCS responses to the comments will be included in Appendix A of the Final Plan-EA.

6.2 Agency Coordination

As the lead agency, the NRCS engaged appropriate Federal, state, and local agencies during the implementation of the Plan-EA process. Through agency consultation and coordination, the

NRCS solicited comments regarding the sponsor's project from Federal, state, and local agencies having jurisdiction or special expertise with respect to a pertinent environmental issue.

NRCS invited the following agencies with jurisdiction, elected officials and organizations to participate in the NEPA process by providing assistance and advice that would facilitate the development of the Plan-EA and expedite the review process:

- U.S. Army Corps of Engineers, Tulsa District
- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Forest Service
- U.S. Environmental Protection Agency, Region 6
- Bureau of Reclamation
- Federal Emergency Management Agency, Region 6
- Oklahoma Archaeological Survey
- Oklahoma Conservation Commission
- Oklahoma Department of Wildlife Conservation
- Oklahoma Water Resources Board
- Oklahoma Department of Environmental Quality
- Oklahoma Department of Transportation
- Oklahoma Department of Emergency Management
- Oklahoma State Historic Preservation Office
- Washita County Emergency Management

The agency meeting started at 10:00 AM. Two landowner representatives inquired about the project while the team was at the field office. The attendees traveled from the field office to Oak Creek MPS 5. There were 23 attendees consisting of landowners, sponsors, agencies, NRCS and consultants at the field site.

Coordination with the Tulsa District Corps of Engineers regarding Clean Water Act Section 404 permitting requirements for the project is on-going. Corps personnel has indicated that the proposed action likely can be authorized by Nationwide Permit 3 (NWP) for the maintenance and repair of existing structures. Authorization under the NWP would depend on the final design. The NRCS and the project sponsors will continue to coordinate with the Corps as design of the rehabilitated structures progresses. No work will commence without Corps authorization.

Through agency consultation and coordination, the NRCS solicited comments regarding the sponsor's project from Federal, state, and local agencies having jurisdiction or special expertise with respect to a pertinent environmental issue.

In accordance with the Council on Environmental Quality, regulations implementing the National Environmental Policy Act (NEPA), Endangered Species Act (ESA) Section 7 consultation, and regulations in part of the Watershed Protection and Flood Prevention Act (PL-83-566). Public Law 83-566 requires NRCS to notify USFWS, requesting agency consultation for dam rehabilitation projects. A formal letter of request was sent to USFWS to provide agency input and/or consultation on the rehabilitation of Oak Creek No. 5.

Regarding National Historic Preservation Act consultation the APE was negotiated between the NRCS, Oklahoma Archaeological Survey (OAS), Oklahoma State Historic Preservation Office (SHPO) on June 9, 2023, and again on September 28, 2023, and six tribes (Caddo Nation, Cheyenne and Arapahoe Tribes, Comanche Nation, Osage Nation, Quapaw Nation, Wichita and Affiliated Tribes) with ancestral lands in Oklahoma on July 24, 2023, and again on October 6, 2023. The Area of Potential Effect (APE) was defined by the top-of-dam elevation upstream as well as below to the extent of the state/federal easement. Maps of the APE were provided to all consulting partners. Although no response about the proposed APE and survey strategy was received from any of the tribes after two attempts requesting input, verbal conversations (GM 420 Part 601.23(B)(2)(ii), Title 190 Part 315.5(E)(2)), and past consultation on other watershed rehabilitation projects, the top-of-dam elevation upstream and downstream methodology was implemented.

An intensive cultural resources survey of the area of potential effect (APE) of a proposed rehabilitation of an existing earthen dam and associated lake was performed. One previously recorded archaeological site, 34WA178, was located within the APE. This site was revisited and evaluated based on consultation with the Oklahoma Archaeological Survey on September 28, 2023. This evaluation consisted of surface examination of the remains, excavation of eighteen shovel tests, drawing of a sketch map, and photographing the site. Site 34WA178 is determined as ineligible for inclusion in the National Register of Historic Places (NRHP). A historic ford or weir was recorded in the APE. This site consists of a load or loads of rock dumped in the creek channel presumably to make a crossing for vehicular or cattle traffic. The rocks also act as a weir backing water upstream slightly. The historic ford or weir is determined as ineligible for inclusion in the NRHP. A single wire nail was recovered from a shovel test near the southern boundary fence. This find is considered ineligible for inclusion in the NRHP. The dam that forms MPS 5 was evaluated for NRHP eligibility. The dam is determined as ineligible for inclusion in the NRHP. The Oklahoma SHPO has not designated the Oak Creek Watershed as a Historic District, therefore MPS 5 is not part of a larger Historic District. Per 36CFR800.4(d)(1), no historic properties (will be) affected by the NRCS undertaking.

The completed archaeological and architectural survey report, with a determination of no historic properties affected, was submitted to the Oklahoma Archaeological Survey and Oklahoma State Historic Preservation Office on July 11, 2024, and the Caddo Nation, Cheyenne and Arapahoe Tribes, Comanche Nation, Osage Nation, Quapaw Nation, Wichita and Affiliated Tribes on July 12, 2024. Concurrence with the results and determination of the archaeological and architectural survey report was received on July 17, 2024, from the Quapaw Nation, July 26, 2024, from the SHPO, on August 9, 2024, from the Caddo Nation, August 12, 2024, from the Comanche Nation, and September 3, 2024, from the OAS.

(TBD – Agency comments and responses draft Plan-.EA)

6.3 Tribal Coordination

In accordance with Section 106 implementing regulations promulgated by the Advisory Council on Historic Preservation (36 CFR Part 800), federal agencies are required to consult on undertakings with the potential to affect historic properties of cultural or religious significance to a tribe or tribes. NRCS sent letters to the following Federally- recognized Indian Tribes regarding the scoping meeting and the availability of the Draft Plan-EA:

- Caddo Nation of Oklahoma
- Comanche Nation, Oklahoma
- Cheyenne-Arapahoe Tribes, Oklahoma
- The Osage Nation
- Quapaw Nation
- Wichita and Affiliated Tribes (Wichita, Keechi, Waco, & Tawakonie)

Six tribes (Caddo Nation of Oklahoma, Cheyenne and Arapahoe Tribes, Oklahoma, Comanche Nation, Oklahoma, The Osage Nation, Quapaw Nation, Wichita and Affiliated Tribes (Wichita, Keechi, Waco, & Tawakonie) with ancestral lands in Oklahoma were invited to be consultation partners on July 24, 2023, and again on October 6, 2023. The Area of Potential Effect (APE) was defined by the top-of-dam elevation upstream as well as below to the extent of the state/federal easement. The completed archaeological and architectural survey report, with a determination of no historic properties affected, was submitted to the Caddo Nation of Oklahoma, Cheyenne and Arapahoe Tribes, Oklahoma, Comanche Nation, Oklahoma, The Osage Nation, Quapaw Nation, Wichita and Affiliated Tribes (Wichita, Keechi, Waco, & Tawakonie) on July 12, 2024. Concurrence with the results and determination of the archaeological and architectural survey report was received on July 17, 2024, from the Quapaw Nation, July 26, 2024, from the Caddo Nation of Oklahoma, and August 12, 2024. from the Comanche Nation, Oklahoma.

Chapter 7 – Preferred Alternative

7.1 Rationale for Alternative Preference

The preferred alternative is Alternative 2. Alternative 2 would meet current Oklahoma and NRCS safety and performance standards for a high hazard potential dam. The preferred alternative meets the identified purposes and needs for the project and reduces the potential risk to human life. The selected plan maximizes net public benefits, maximizes sustainable development, and is the Locally Preferred Alternative. The selected plan is not the National Economic Efficiency (NEE) Alternative. Alternative 2 is the Locally Preferred Alternative. The plan reasonably meets the following four criteria: completeness, effectiveness, efficiency, and acceptability. Alternative 2 has less impact on the environment and downstream landowners. The floodproofing dikes would not be required; therefore, less soil disturbance, less vegetation disturbance (grass and trees), less impacts to the viewscape and acceptability by the downstream landowners. Development easements for 1132 acres in the breach inundation zone would not be required averting potential litigation proceedings. The tradeoff is Alternative 3 costs less ($3,156,800) than Alternative 2.

The preferred alternative would not affect the provisioning ecosystem services. The preferred alternative would maintain the flood damage reduction for the flood control regulating ecosystem service and maintain the annual sportfishing trips and area of the lake for the cultural ecosystem service (recreation use and aesthetic viewshed). The proposed rehabilitation would maintain current cohesion and coherence of the visual landscape maintaining the aesthetic connectedness. The tradeoff to the supporting ecosystem service is Alternative 2 temporary disturbs less vegetation (2.5 acres) but converts more vegetation (0.7 acres) to impervious surfaces compared to Alternative 3. The following table displays the tradeoffs for the alternatives.

Trade-off display		
Category	Alternative 2	Alternative 3
Economic	-	+
Social	+	-
Environmental	+	-
Regulating Services – Flood Control	+	+
Supporting Services - Nutrient Cycling	0	0
Cultural Services - Recreational Use	+	+
Cultural Services - Aesthetic Viewsheds	+	-
Cultural Services - Tribal Values		

NRCS and the Sponsor agree on the selected plan. The following opportunities would be realized:

- Continue recreation water-based opportunities at the lake.
- Reduces the threat of loss of life to approximately 6 people who live and/or work in the breach zone.

- Protects 2 residences within the breach inundation zone.
- Reduces the threat of loss of access and loss of emergency services for downstream properties and property owners.
- Provides downstream flood protection for the residents in the area, as well as those working, recreating, or traversing within the downstream floodplains, for an additional 100 years.
- Eliminates the liability associated with continuing to operate a dam that does not meet current Oklahoma and NRCS safety and performance standards.
- Leverages federal resources to install the planned works of improvement.
- Would meet current Oklahoma and NRCS safety and performance standards for a high hazard potential dam.

7.2 Measures to be Installed

The alternative consists of slip-lining the existing 30-inch principal spillway, installing a new principal spillway consisting of a 30-inch RCP conduit with a hooded inlet, installing an impact basin, and constructing a 300-foot-wide auxiliary spillway RCC chute over the existing embankment. For additional information, see Section 4.3.3 and Appendix C Figure C-14.

7.3 Easements and Landrights

The sponsor would secure all easements and landrights for the rehabilitation of the dam. The sponsor owns the land around the lake and dam location. Additional easements are not required for the rehabilitation of Oak Creek MPS 5.

7.4 Mitigation

Measures to avoid and minimize impacts to soil, air, and water resources would be implemented during construction. During construction, site mitigation measures would include erosion and sediment control, seeding of denuded areas, dust control, and other practices identified during the design process. The specific requirements for the use of Best Management Practices (BMP's) during the construction phase would be identified during the design of this project and consultation with regulators during the permitting process.

Approximately 0.025 acres of wetland and 0.01 acres of intermittent streambed would be filled to rehabilitate the dam. Compensatory mitigation may be required associated with a Clean Water Act Section 404 permit for these impacts. This would be addressed with USACE as well as state and local regulatory authorities during the design and permitting process.

7.5 Permits and Compliance

Prior to construction, the Sponsor would be responsible for obtaining all required permits. A Clean Water Act Section 402 construction stormwater permit from the Oklahoma Department of Environmental Quality would be in place prior to construction. Construction would require permits from Washita County Floodplain Administrator and USACE. The project may be

eligible for authorization under Nationwide Permit 3 (NWP 3) for the replacement of existing structures.

If cultural resources are discovered during installation, work would cease and the State and Tribal Historic Preservation Officers would be notified. In these scenarios, NRCS will protect the resource from further damage to the fullest extent possible and follow procedures for discoveries as described in the ACHP regulations (36 CFR Sec. 800.13 and 190-NCRPH-601).

7.6 Cost and Cost-sharing

As indicated in Table 1, the total installation cost of the selected plan is $9,816,000. Of this amount, PL-83-566 funds would bear $6,764,100 and nonfederal funds would bear $3,051,900. Table 2 shows details of the costs and cost-share amounts by category. Total annualized costs are shown in Table 4 along with the estimated costs for operation and maintenance. Table 5 displays the average annual flood damage reduction benefits by flood damage categories, and Table 6 displays a comparison of annual costs and benefits. A 2024 price base was used and amortized at 3.00 discount rate.

The cost projections for the proposed project measures are estimated costs only for planning. The fact that these costs are included in this plan does not infer that they are final costs. Detailed structural designs and construction cost estimates would be prepared prior to contracting for the work to be performed. Final construction costs would be those costs incurred by the contractor performing the work, including the cost of any necessary contract modifications.

7.7 Installation and Financing

The installation of the project would be completed within three years following appropriation of construction funds. The Washita County Conservation District has taxing authority to raise project funding and the power of eminent domain to acquire any necessary land rights. Actual construction would occur over about 24 months. All required easements and permits would be secured before the solicitation of construction bids for the project. During construction, equipment would not be allowed to operate when conditions are such that soil erosion and water, air, and noise pollution cannot be satisfactorily controlled.

NRCS would assist the Sponsors with the construction of Oak Creek MPS 5. NRCS would be responsible for the following:

- Execute a project agreement with Washita County Conservation District (Sponsor) before either party initiates work involving funds of the other party. Such agreements set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
- Execute a Memorandum of Understanding with the Sponsor to provide a framework within which cost-share funds are accredited.
- Execute an Operation and Maintenance (O&M) Agreement with the Sponsor describing the O&M responsibilities for the 100-year project life following

construction. This agreement would be based on the NRCS National Operation and Maintenance Manual (NOMM).
- Provide financial assistance for actual construction costs as described in Table 2.
- Verify that a current Emergency Action Plan is developed before construction is initiated.
- Provide consultative engineering support, technical assistance, and approval during the design and construction of the project.
- Provide contract administration technical assistance during construction of the project.
- Provide construction management technical assistance.
- Certify completion of all installed measures.

The Sponsors would be responsible for the following:
- Secure all needed environmental permits, easements, and rights for the installation, operation, and maintenance of Oak Creek MPS 5.
- Prepare an Emergency Action Plan for Oak Creek MPS 5 prior to the initiation of construction. The breach inundation area is shown in Appendix C – Figure C-1.
- Execute a Memorandum of Understanding with the NRCS to provide a framework for crediting in-kind services.
- Execute an Operation and Maintenance Agreement with NRCS for the dam. This agreement would be based on the NRCS NOMM.
- As needed provide engineering services for the design, construction, and certification of the project.
- Provide local administrative and contract services necessary for the installation of the project.
- Provide nonfederal funds for cost-sharing of the project as described in Table 2.
- Participate in and comply with applicable Federal floodplain management and flood insurance programs.
- Restrict future construction of habitable dwellings upstream to the top of dam elevation 1470.1 feet (NAVD 88).
- Enforce all associated easements and rights-of-way for the safe operation of the dam.

7.8 Operation, Maintenance and Replacement

Measures installed as part of this plan will be operated and maintained by the Sponsor with technical assistance from federal, state, and local agencies in accordance with their delegated authority. A new Operation and Maintenance (O&M) agreement would be developed for Oak Creek MPS 5 and would be executed between Sponsor and the NRCS prior to construction of the project. The term of the new O&M agreement would be for 100 years following the completion of construction. The agreement would specify responsibilities of the Sponsor and include detailed provisions for retention, use, and disposal of property acquired or improved with PL 83-566 cost sharing. Provisions would be made for free access of state and federal representatives to inspect all structural measures and their appurtenances at any time for the life of the project, if deemed necessary.

7.9 Economic and Structural Tables

Table 1: Estimated Installation Cost
Oak Creek MPS 5, Washita County, Oklahoma

Works of Improvement	Estimated Costs (Dollars)[1/]		
	PL-83-566 Funds	Other Funds	Total
Rehabilitate MPS 5 to High Hazard Dam	$6,764,100	$3,051,900	$9,816,000
Total Project:	**$6,764,100**	**$3,051,900**	**$9,816,000**

[1/]Price base: 2024 Prepared: December 2024

Table 2: Estimated Cost Distribution – Water Resource Project Measures
Oak Creek MPS 5, Washita County, Oklahoma
(Dollars)[1/]

Works of Improvement	Installation Cost: PL-83-566 Funds					
	Construction Costs	Engineering Technical Assistance Costs	Floodplain Easements	Mitigation Costs	Project Administration Costs	Total PL-83-566 Costs
Rehabilitate MPS 5 to High Hazard Dam	$5,664,000	$677,000	$0	$0	$423,100	$6,764,100
Totals:	**$5,664,000**	**$677,000**	**$0**	**$0**	**$423,100**	**$6,764,100**

Works of Improvement	Installation Cost: Other Funds						Total Project Cost
	Construction Costs	Mitigation Costs	Real Property Landrights/ Floodplain Easements	Permits	Project Admin. Costs	Total Other Funds	
Rehabilitate MPS 5 to High Hazard Dam	$2,796,000	$0	$0	$2,000	$253,900	$3,051,900	$9,816,000
Totals:	**$2,796,000**	**$0**	**$0**	**$2,000**	**$253,900**	**$3,051,900**	**$9,816,000**

[1/]Price base: 2024 Prepared: December 2024

Table 3: Structural Data – Dams with Planned Storage Capacity
Oak Creek MPS 5, Washita County, Oklahoma

Item	Unit	Structure Data
Class of structure		High Hazard
Seismic Zone / Peak Ground Acceleration (PGA)	gravity (g)	Low / 0.17g
Uncontrolled drainage area	mi^2	10.2
Controlled drainage area	mi^2	0.0
Total drainage area		10.2
Runoff curve number (AMC II)		77
Time of concentration (T_c); uncontrolled drainage area	hours	5.2
Top of dam elevation	feet	1,470.1
Elevation crest auxiliary spillway	feet	1,461.8
Elevation crest high stage inlet	feet	1,448.9
Elevation crest low stage inlet	feet	NA
Auxiliary spillway type		RCC
Auxiliary spillway crest width	feet	300
Auxiliary spillway exit slope	percent	33.3
Maximum height of dam	feet	63
Volume of fill	yd^3	303,850
Total capacity[1/]	acre-feet	4,016
Sediment submerged	acre-feet	936
Sediment aerated	acre-feet	29
Beneficial use (F&W)	acre-feet	711
Floodwater retarding	acre-feet	2,340
Surcharge[2/]	acre-feet	2,531
Surface area		
Sediment pool	acres	21
Beneficial use pool (F&W)	acres	135
Floodwater retarding pool	acres	237
Principal spillway design		
Rainfall volume (1-day)	inches	8.0
Rainfall volume (10-day)	inches	12.2
Runoff volume (1-day)	inches	4.6
Runoff volume (10-day)	inches	5.9
Capacity	ft^3/s	237
Dimensions of conduit [3/]	inches	28 & 30
Type of conduit [3/]		HDPE and RCP
Frequency of operation-auxiliary spillway	percent chance	1%
Auxiliary spillway hydrograph		
Rainfall volume	inches	11.9
Runoff volume	inches	8.9
Storm duration	hours	6
Velocity of flow (V_e)[4/]	feet/sec.	33.4
Max. reservoir water surface elev.	feet	1,465.1
Freeboard hydrograph		
Rainfall volume	inches	25.0
Runoff volume	inches	21.6
Storm duration	hours	6
Max. reservoir water surface elev.	feet	1,470.1
Capacity equivalents		
Sediment volume	inches	1.77
Floodwater retarding volume	inches	4.30
Beneficial volume (F&W)	inches	1.31

Prepared: December 2024

[1/] Crest of auxiliary spillway.
[2/] Crest of auxiliary spillway to top of dam.
[3/] Existing PS conduit is slip-lined w/28 ID HDPE plus new 30" ID RCP conduit.
[4/] RCC structural spillway with 3:1 slope

Table 4: Estimated Average Annual Costs
Oak Creek MPS 5, Washita County, Oklahoma
(Dollars)[1/]

Works of Improvement	Average Annual Equivalent Cost	Average Annual Equivalent O&M Costs	Total Average Annual Equivalent Cost[2/]
Rehabilitate MPS 5 to High Hazard Dam	$325,100	$15,000	$340,100
Totals:	**$325,100**	**$15,000**	**$340,100**

[1/] Price base: 2024 Prepared: December 2024
[2/] The average annual equivalents are based on a 3.00% discount rate and a 100-year period of analysis.

Table 5: Estimated Average Annual Flood Damage Reduction Benefits
Oak Creek MPS 5, Washita County, Oklahoma
(Dollars)[1/]

Flood Damage Category	Estimated Average Annual Equivalent Damages [2/]		Damage Reduction Benefits
	Without Federal Project	With Federal Project	Average Annual Equivalents
Floodwater			
Agriculture[2/] – Crop and Pasture	$6,600	$6,600	$0
Non-Agricultural – Urban	$2,900	$2,900	$0
Non-Agricultural – Road and Bridge	$7,800	$7,800	$0
Totals	**$17,300**	**$17,300**	**$0**

[1/] Price base: 2024 Prepared: December 2024
[2/] Because the FWOFI alternative is the same as the No Action alternative, average annual floodwater reduction damages would remain constant until the dam fails. In order to reflect the monetary beneficial attributes of Oak Creek MPS No. 5, efforts were made to estimate average annual flood damage reduction benefits associated with the preferred alternative. Flood damage reduction benefits are estimated to be $35,100 annually. Benefits are derived from assuring the continued performance of Oak Creek MPS No. 5 by meeting current safety and performance standards, ensuring recreational benefits, and continuing downstream flood protection (damage reduction benefits). See Appendix D for a more thorough description of benefits.

Table 6: Comparison of Benefits and Costs
Oak Creek MPS 5, Washita County, Oklahoma
(Dollars)[1/]

Evaluation Unit	Average Annual Equivalents[2/]						
	Damage Reduction Benefits [3/]	Other Benefits – Public Recreation	Other Benefits – FWOFI Damages Avoided	Total Average Annual Benefits	Average Annual Costs[4/]	Net Average Annual Benefits [5/]	Benefit/ Cost Ratio
Rehabilitate MPS 5 to High Hazard Dam	$0	$0	$3,300	$3,300	$340,100	-$336,800	0.01:1.0
Totals	**$0**	**$0**	**$3,300**	**$3,300**	**$340,100**	**-$336,800**	**0.01:1.0**

[1/] Price base: 2024 Prepared: December 2024

[2/] The average annual equivalents are based on a 3.00% discount rate and a 100-year period of analysis.

[3/] From Table 5.

[4/] From Table 4.

[5/] Average annual benefits associated for the preferred alternative are $35,100 for floodwater damage reduction and $347,000 for recreation, and $3,300 damages avoided for a total of $385,400.

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Chapter 9 – List of Preparers

Name	Present Title	Education	Experience	Other
NRCS				
Roderick Dukes	Assistant to State Conservationist for Water Resources	BS Natural Resource Management	19 years	
Valerie Glasgow	Planning Engineer	BS Bioenvironmental Science MS Agricultural Engineering	23 years	
Richard Lane	Planning Engineer	BS Agricultural Engineering	41 years	
KC Kraft	Archaeologist	BA Anthropology MA Anthropology PhD Anthropology	32 years	
Ted Kersten	Civil Engineer	BS Agricultural Engineering MS Agricultural Engineering	19 years	
Melissa Jones	Biologist	BS Zoology MS Wildlife Ecology PhD Aquatic Resources	18 years	
Jessica Nichols	Geologist	BS Geology MS Geology	6 years	
Paige Hauk	Economist	BS Agricultural Economics	6 years	
M&E				
Trent Street	Senior Design Engineer	BS Agricultural Engineering	Current Position – 10 yrs NRCS Civil Engineer – 34 yrs	**PE (TX)**
James Moore	Civil/Planning Engineer	BS Agricultural Engineering	Current Position – 9 yrs NRCS Civil Engineer – 32 yrs	**PE (AR and LA)**
James Featherston	Economist	MS Agricultural Economics BS Agricultural Economics	Current Position – 10 yrs NRCS Agricultural Economist – 36 yrs	
David Heffington	Biologist – Senior Planner	BS Biology BS Geography	Current Position – 3 yrs USACE Biologist – 18 yrs NRCS Ecologist – 18 yrs	
Eric Gilliland	Cultural Resources Specialist	MS Anthropology BA Anthropology	Current Position – 3 yrs Archaeologist – 24 yrs	**RPA**
Joe Mathis	Agricultural Engineer	BS Agricultural Engineering	Current Position - 3 yrs	**EIT**
Glenn Ketcham	Civil Engineer Technician	Associate of Applied Science	Current Position - 21 yrs	

Guernsey				
Brett Biesemeyer	Sr. Civil Engineer	MS Civil Engineering BS Civil Engineering	Civil Engineer – 40 years	**PE PLS PMP**
Ellen Stevens		PhD MS BS	Civil Engineer – 27 years	**PE**

Chapter 10 – Distribution List

- U.S. Army Corps of Engineers, Tulsa District
- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Forest Service
- U.S. Environmental Protection Agency, Region 6
- Bureau of Reclamation
- Federal Emergency Management Agency, Region 6
- Oklahoma Archaeological Survey
- Oklahoma State Historic Preservation Office
- Oklahoma Conservation Commission
- Oklahoma Department of Wildlife Conservation
- Oklahoma Water Resources Board
- Oklahoma Department of Environmental Quality
- Oklahoma Department of Transportation
- Oklahoma Department of Emergency Management
- Washita County Emergency Management

- Caddo Nation of Oklahoma
- Cheyenne-Arapahoe Tribes, Oklahoma
- Comanche Nation, Oklahoma
- The Osage Nation
- Quapaw Nation
- Wichita and Affiliated Tribes (Wichita, Keechi, Waco, & Tawakonie)

Chapter 11 – Index (To be completed later)

Appendix A – Comments and Responses

(To be included in the Final Plan-EA)

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Oklahoma State Office
100 USDA
Suite 206
Stillwater, Oklahoma 74074

July 03, 2024

U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428

RE: Formal request for U.S. Fish and Wildlife Service (USFWS) to provide agency input and/or consultation on the Oak Creek Watershed for the Rehabilitation Watershed Plan and Environmental Evaluation (Plan-EE) of Floodwater Retarding Structure (FWRS) Oak Creek No. 5, located in Washita County, Oklahoma.

In accordance with the Council on Environmental Quality, regulations implementing the National Environmental Policy Act (NEPA), Endangered Species Act (ESA) Section 7 consultation, and regulations in part of the Watershed Protection and Flood Prevention Act (PL 83-566), Section 12, the Natural Resources Conservation Service (NRCS) is formally requesting your agency to provide input and/or consultation related to the dam rehabilitation project of FWRS Oak Creek No. 5.

This request is being made because your agency has been identified as having special expertise or jurisdiction related to this project. A Supplemental Watershed Plan-EE is being prepared to fulfill NRCS' NEPA compliance responsibilities pertaining to our potential federal financial assistance through PL 83-566. Public Law 83-566 requires NRCS to notify USFWS to make recommendations concerning the conservation and development of wildlife resources related to the proposed dam rehabilitation project plan.

FWRS Oak Creek No. 5 was constructed in 1968 as a low-hazard potential dam. It is currently classified as a high-hazard potential dam due to population at risk downstream. Currently, FWRS Oak Creek No. 5 does not meet NRCS or Oklahoma Water Resources Board dam safety program standards. Therefore, the project sponsors and NRCS are preparing a Plan-EE to evaluate alternatives to meet the current performance and safety criteria for a high hazard potential dam.

Thank you for your timely response and cooperation with this project. If you have any questions or comments, please contact Melissa Jones (Water Resources Biologist) at melissa.jones@usda.gov or 405-742-1232.

Respectfully,

JEANNE HAMILTON
Oklahoma State Conservationist

enclosures

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Ecological Services Program

Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, Oklahoma 74129
(918) 581-7458 (Office) / (918) 581-7467 (Fax)

Date:

April 4, 2025

To:

Jeanne Jasper - Oklahoma State Conservationist
Natural Resources Conservation Service
100 USDA, Suite 206
Stillwater, OK 74074

Project Name:

Flood Water Retarding Structure (FWRS) Oak Creek Site No. 5 Dam Rehabilitation Project, Washita County, Oklahoma

Consultation Code:

2023-0038567

Dear Project Proponent:

Thank you for using the U.S. Fish and Wildlife Service (Service) Oklahoma Ecological Services Field Office (ESFO) online project review process. By providing this letter in conjunction with your complete project review package, you are certifying that you have accurately completed the USFWS Online Project Review Process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. Concurrence with "not likely to adversely affect" determinations does not provide any exemption for violations of section 9 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA) or "take" of federally-listed species. The Federal action agency is ultimately responsible for ensuring compliance with the ESA and any take that occurs due to your proposed action would be considered a violation under section 9 of the ESA.

This letter and the enclosed project review package complete the review of your project in accordance with the ESA. This letter also provides information for your project review under the National Environmental Policy Act (National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C.4321-4347, 83 Stat. 852), as amended.

A copy of this letter, with all forms completed, and the project review package must be emailed to **okprojectreview@fws.gov** for this certification to be valid. This letter and the project review package will be maintained in Service records. **Please allow the Oklahoma ESFO 45 days to review your information. If the Oklahoma ESFO determines that the package is not complete, or that additional coordination is necessary, we will contact you. If, after 45 days from the date of your email submittal of your project review package, the Oklahoma ESFO has not contacted you, consider your section 7 consultation complete.**

The proposed action consists of:

Latitude: 35.1645 Longitude: -98.8243
Oak Creek Multipurpose Site (MPS) 5 was constructed in Washita County in 1968 as a significant hazard dam. A breach of Oak Creek MPS 5 would impact two houses and four county roads. Due to the potential for loss of life during a failure of the dam, the dam is currently classified as high hazard by the State of Oklahoma and NRCS. The existing structure does not meet the current safety and performance standards for a high hazard dam. A supplement to the original watershed plan is needed due to the change in hazard classification. This supplemental Plan-EA documents the NRCS planning process, compliance with the requirements of the National Environmental Policy Act, and requirements of the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G). The proposed action would consist of slip-lining the existing 30-inch principal spillway with a 28-inch OD HDPE conduit, installing a new principal spillway consisting of a 30-inch RCP conduit with a hooded inlet, installing an impact basin, and constructing a 300-foot-wide auxiliary spillway RCC chute over the exiting embankment. The hooded inlet crest would be set at the same elevation as the existing principal spillway elevation of 1448.9 feet. The AS crest would store the 100-year frequency storm at El. 1461.8. The existing embankment crest has an average crest elevation of 1468.0 feet that would be raised to elevation 1470.1 feet. The embankment would be modified to flatten the upstream and downstream slopes to 3 horizontal to 1 vertical, shifting the centerline downstream to allow for a crossing berm on the US slope, adding rock to the existing rock for wave protection and installing a trench drain under the downstream toe.

Project start and completion dates:

Planning 2023 - 2025
Construction 2027 - 2028 (estimate)

Federal agency or federal program providing a permit, grant, authorization, loan, etc. associated with the proposed project and how that agency is associated with your project:

NRCS is the lead agency for the proposed project authorized by Public Law 83-566 as amended by Section 313 of Public Law 106-472.

Federal Agency/Program Point of Contact (name, phone, and email address):

Melissa Jones - State Water Resources Biologist
405-742-1232
melissa.jones@usda.gov

The species conclusions table in the enclosed project review package summarizes your ESA conclusions. These conclusions resulted in "not likely to adversely affect/modify" determinations for listed species and critical habitat in relation to potential effects of your proposed project. We certify that the use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with determinations of "not likely to adversely affect" for listed species and critical habitat reached by proper use of this process. For projects where this particular determination is reached, additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages efforts to avoid or minimize adverse impacts to them from project effects. Some federal agencies have standing policies that grant limited protections to candidate species. Conservation of candidate species now may preclude future needs to federally list them as endangered or threatened, at which point their legal protection would become required. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered. You should re-visit the Service's Information, Planning, and Conservation (IPaC) website at http:/ecos/fws.gov/ipac/ within 90 days of project initiation to ensure species information is correct. If new species or critical habitat is identified, this letter is no longer valid and a new project package should be submitted to the Oklahoma ESFO.

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Oklahoma is available at our website: http://www.fws.gov/southwest/es/oklahoma/ . If you have any questions, please call 918-581-7458 or send an email message to OKProjectReview@fws.gov.

Sincerely,
/s/ Kenneth Collins
Field Supervisor

Enclosures:

1) ENTIRE PROJECT REVIEW PACKAGE (check those you are including):
- ☑ Species Conclusion Table (required)
- ☑ IPaC Species List and Action Area map (required)
- ☑ This letter (Online Concurrence Letter) (required)
- ☑ Additional maps (recommended for adequate review)

2) Other relevant project data/documents

Action Area Map

NRCS
Natural Resources Conservation Service

Multi-purpose Structure Oak Creek No. 5
Washita County, Oklahoma
Action Area

Map Date: 21 Jan 2025
M. Jones - NRCS Stillwater

2025

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

N

0 0.07 0.15 Mi

0 0.15 0.3 Km

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oklahoma Ecological Services Field Office
9014 East 21st Street
Tulsa, OK 74129-1428
Phone: (918) 581-7458 Fax: (918) 581-7467

In Reply Refer To: 03/31/2025 21:01:30 UTC
Project Code: 2023-0038567
Project Name: Oak Creek 5 FWRS Dam Rehabilitation

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

PROJECT SUMMARY

Project Code: 2023-0038567
Project Name: Oak Creek 5 FWRS Dam Rehabilitation
Project Type: Dam - Maintenance/Modification
Project Description: Latitude: 35.164562 Longitude: -98.824346

Oak Creek Multipurpose Site (MPS) 5 was constructed in Washita County in 1968 as a significant hazard dam. A breach of Oak Creek MPS 5 would impact two houses and four county roads. Due to the potential for loss of life during a failure of the dam, the dam is currently classified as high hazard by the State of Oklahoma and NRCS. The existing structure does not meet the current safety and performance standards for a high hazard dam. A supplement to the original watershed plan is needed due to the change in hazard classification. This supplemental Plan-EA documents the NRCS planning process, compliance with the requirements of the National Environmental Policy Act, and requirements of the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G). The proposed action would consist of slip-lining the existing 30-inch principal spillway with a 28-inch OD HDPE conduit, installing a new principal spillway consisting of a 30-inch RCP conduit with a hooded inlet, installing an impact basin, and constructing a 300-foot-wide auxiliary spillway RCC chute over the exiting embankment. The hooded inlet crest would be set at the same elevation as the existing principal spillway elevation of 1448.9 feet. The AS crest would store the 100-year frequency storm at El. 1461.8. The existing embankment crest has an average crest elevation of 1468.0 feet that would be raised to elevation 1470.1 feet. The embankment would be modified to flatten the upstream and downstream slopes to 3 horizontal to 1 vertical, shifting the centerline downstream to allow for a crossing berm on the US slope, adding rock to the existing rock for wave protection and installing a trench drain under the downstream toe.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.1708433,-98.82889345258928,14z

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

BIRDS

NAME	STATUS
Lesser Prairie-chicken *Tympanuchus pallidicinctus* Population: Northern DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1924	Threatened
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane *Grus americana* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

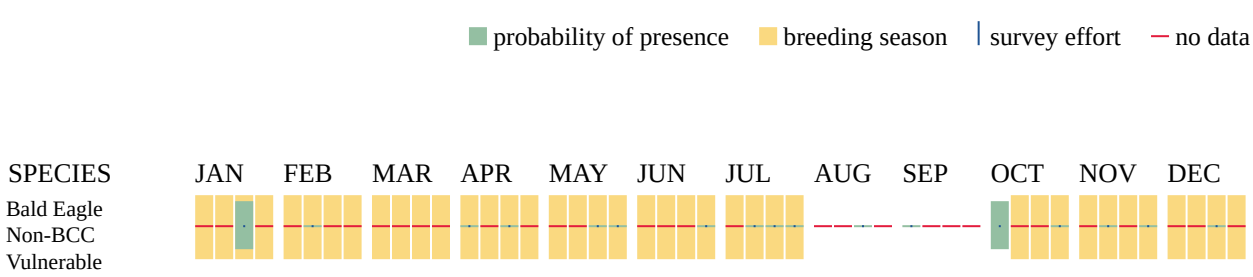
Probability of Presence (▪)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (▪)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds

- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

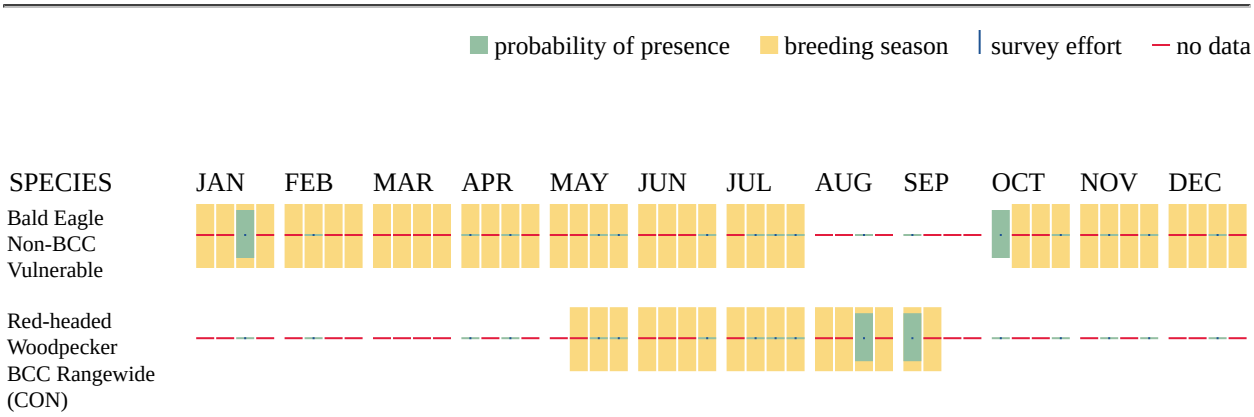
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (▪)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER POND

- PUSAh
- PUBHh
- PUBFx

LAKE

- L1UBHh

FRESHWATER EMERGENT WETLAND

- PEM1Ch

RIVERINE

- R4SBC
- R5UBF

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1A

Species Conclusion Table – Multi-purpose Structure (MPS) Oak Creek No. 5 Dam Rehabilitation Project

Table 1: Listed Species on Official Species List (03/31/2025)

Species/ Critical Habitat	**Habitat Determination**	**Notes/ Documentation**	**ESA Determination**
Lesser Prairie Chicken	No habitat present	No open grasslands within project area.	No effect
Piping Plover	No bare shoreline or mudflat present.	No long-term impacts to populations. Project area does not overlap critical habitat.	May affect, not likely to adversely affect
Red Knot	No bare shoreline or mudflat present	Potential habitat present after dam rehabilitation. No long-term impacts to populations	May affect, not likely to adversely affect
Whooping Crane	No bare shoreline or mudflat present.	Potential habitat present after construction. No long-term impacts to populations. Project area does not overlap critical habitat.	May affect, not likely to adversely affect.
Monarch Butterfly	Potential habitat present	Milkweed and nectar sources are presumed present but scarce in the area of impact. Construction activities will be initiated outside of the prime reproductive period (April 1- July1) to minimize potential impacts to eggs and caterpillar.	May affect, not likely to adversely affect

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Oklahoma State Office
100 USDA
Suite 206
Stillwater, OK 74074

July 11, 2024

Kary Stackelbeck
Oklahoma State Archaeologist
Oklahoma Archaeological Survey
111 East Chesapeake, Building 134
University of Oklahoma
Norman, OK 73019

Re: OAS FY23-1897 NRCS Undertaking Section 106 Report for Rehabilitation of Oak Creek Watershed, Site #5, Washita County

Dear Dr. Stackelbeck,

This letter is a continuation of Section 106 consultation per 36CFR800.2(c) as codified in of the National Historic Preservation Act of 1966 (NHPA), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The project entails the possible rehabilitation of an existing NRCS floodwater control structure (dam), Oak Creek Watershed, Site #5.

The APE for Oak Creek Watershed, Site #5 is in portions of sections 32 and 33, Township 8 North, Range 10 East, Indian Meridian and Section 5, Township 7 North, Range 10 East, Indian Meridian on an unnamed tributary of Graves Creek. A Section 106 report for the APE using 30-meter interval transects as well as 30-meter intervals for shovel testing was produced. This survey strategy, and definition of the APE were proposed in our initial consultation letter of June 20, 2023 and concurred with by your office on July 18, 2023 and by the State Historic Preservation Officer on July 6, 2023. A survey and report were executed by M & E Consultants. One archaeological site was revisited and tested (34WA-178) and one historic resource (weir/ford) was documented as was an isolated find (nail) within the APE during the pedestrian survey and subsurface probing. Therefore, an updated Oklahoma Archeological Site Survey Form for 34WA-178 and an Oklahoma Archeological Isolated Find Form complement the Section 106 report included with this correspondence.

During the APE pedestrian survey, 34WA-187 was relocated through finding the cellar depression and structural remains. A cruciform pattern of shovel tests was excavated across the site. As a result of the

testing, the site boundary was expanded. No midden was noted in any of the shovel tests, and artifact density was low and artifact diversity was also low. A very small whiteware sherd with a fragment of a maker's mark, and two clear pressed glass container fragments with embossed letters were recovered from three separate shovel tests. Shovel tests revealed a soil profile of dark reddish brown (2.5YR3/4) loam. All elements of a former structure are in ruins. Site integrity is poor and archaeological information contained within the site appears to be minimal. Deed research revealed no intriguing data. NRCS has determined that the site does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. The isolated find (nail) found in a shovel test within the greater APE was unremarkable and unassociated with any archaeological site. Therefore, the find does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. In addition to 34WA-178 and the isolated find, an historic resource was identified. The resource is best described as a weir or ford, most likely the latter. The ford was created by dumping rocks in a streambed and does not exhibit any significant features. NRCS has determined that the resource does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D.

As a result of the pedestrian survey, subsurface probes, and site assessment, NRCS has determined that no historic properties will be affected by the undertaking [36CFR800.4(d)(1)] as defined in 36CFR800.16(i). Please send your comments regarding NRCS' determination to the address above marked to the attention of NRCS Cultural Resources Coordinator K.C. Kraft, or by electronic mail at kc.kraft@usda.gov.

Respectfully,

K.C. KRAFT

Kenneth C. Kraft, PhD, RPA

Encls. (3)

cc: Roderick Dukes, NRCS Assistant State Conservationist (Water Resources)

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Oklahoma State Office
100 USDA
Suite 206
Stillwater, OK 74074

July 11, 2024

Ms. Lynda Ozan
Deputy State Historic Preservation Officer
Oklahoma State Historic Preservation Office
800 Nazih Zuhdi Drive
Oklahoma City, Oklahoma 73105-7917

Re: File #1850-23; NRCS Undertaking Section 106 Report for Rehabilitation of Oak Creek Watershed, Site #5, Washita County

Dear Ms. Ozan,

This letter is a continuation of Section 106 consultation per 36CFR800.2(c) as codified in of the National Historic Preservation Act of 1966 (NHPA), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The project entails the possible rehabilitation of an existing NRCS floodwater control structure (dam), Oak Creek Watershed, Site #5.

The APE for Oak Creek Watershed, Site #5 is in portions of sections 32 and 33, Township 8 North, Range 10 East, Indian Meridian and Section 5, Township 7 North, Range 10 East, Indian Meridian on an unnamed tributary of Graves Creek. A Section 106 report for the APE using 30-meter interval transects as well as 30-meter intervals for shovel testing was produced. This survey strategy, and definition of the APE were proposed in our initial consultation letter of June 20, 2023 and concurred with by your office on July 6, 2023 and by the Oklahoma Archeological Survey on July 18, 2023. A survey and report were executed by M & E Consultants. One archaeological site was revisited and tested (34WA-178) and two historic resources (weir/ford and dam) were documented as was an isolated find (nail) within the APE during the pedestrian survey and subsurface probing. Therefore, an updated Oklahoma Archeological Site Survey Form for 34WA-178 and an Oklahoma Archeological Isolated Find Form complement the Section 106 report included with this

correspondence. Additionally, two Historic Preservation Resource Identification forms are included, one for the weir/ford and one for the dam itself.

During the APE pedestrian survey, 34WA-187 was relocated through finding the cellar depression and structural remains. A cruciform pattern of shovel tests was excavated across the site. As a result of the testing, the site boundary was expanded. No midden was noted in any of the shovel tests, and artifact density was low and artifact diversity was also low. A very small whiteware sherd with a fragment of a maker's mark, and two clear pressed glass container fragments with embossed letters were recovered from three separate shovel tests. Shovel tests revealed a soil profile of dark reddish brown (2.5YR3/4) loam. All elements of a former structure are in ruins. Site integrity is poor and archaeological information contained within the site appears to be minimal. Deed research revealed no intriguing data. NRCS has determined that the site does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D.

The isolated find (nail) found in a shovel test within the greater APE was unremarkable and unassociated with any archaeological site. Therefore, the isolated find does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. In addition to 34WA-178 and the isolated find, two historic resources were identified as above noted. The first resource is best described as a weir or ford, most likely the latter. The ford was created by dumping rocks in a streambed and does not exhibit any significant features. NRCS has determined that the resource does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. The earthen dam itself, and associated operational accoutrements, are of historic-age (45 years of age or older) having been built in 1968. The resource was evaluated for its historic significance (36CFR800.4(c)) as part of the Section 106 survey. Applying National Register criteria to Oak Creek Watershed, Site 5, association with significant events is nominal—1 dam out of 2,104 in Oklahoma (Criterion A), Oak Creek Watershed, Site 5 was not designed by a significant person—cadre of engineers (Criterion B), Oak Creek Watershed, Site 5 does not represent distinctive characteristics—standard design drawings using standard construction materials and equipment (Criterion C), and Oak Creek Watershed, Site 5 is unlikely to yield information important to history—based on the above narrative (Criterion D). Therefore, NRCS has determined that Oak Creek Watershed, Site 5, does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D (36 CFR 63.2(a), 36 CFR 60.4, National Register Bulletin 15). NRCS has also determined that the undertaking, structural rehabilitation, is not an adverse effect (36CFR800.4(d)(1)). The no adverse effect determination also incorporated an indirect effects assessment (including the “viewshed” as articulated by the historic preservation community). Any form of structural rehabilitation of Oak Creek Watershed, Site 5 will not change the existing agricultural (cultural) landscape as it currently exists (36 CFR 800.16(d), National

Register Bulletin 18). We determine that the project meets the “Secretary of Interior’s Standards for Rehabilitation” (36CFR68.2(b)).

As a result of the pedestrian survey, subsurface probes, and site assessment, NRCS has determined that no historic properties will be affected by the undertaking (36CFR800.4(d)(1)) as defined in 36CFR800.16(i). Please send your comments regarding NRCS’ determinations to the address above marked to the attention of NRCS Cultural Resources Coordinator K.C. Kraft, or by electronic mail at kc.kraft@usda.gov.

Respectfully,

K.C. KRAFT

Kenneth C. Kraft, PhD, RPA

Encls. (4)

cc: Roderick Dukes, NRCS Assistant State Conservationist (Water Resources)

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Oklahoma State Office
100 USDA
Suite 206
Stillwater, OK 74074

July 12, 2024

Mr. Max Bear
Tribal Historic Preservation Officer
Cheyenne and Arapaho Tribes
P.O. Box 167
Concho, OK 73022

Re: NRCS Undertaking Section 106 Report for Rehabilitation of Oak Creek Watershed, Site #5, Washita County

Dear Mr. Bear,

This letter is a continuation of Section 106 consultation per 36CFR800.2(c) as codified in of the National Historic Preservation Act of 1966 (NHPA), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The project entails the possible rehabilitation of an existing NRCS floodwater control structure (dam), Oak Creek Watershed, Site #5.

The APE for Oak Creek Watershed, Site #5 is in portions of sections 32 and 33, Township 8 North, Range 10 East, Indian Meridian and Section 5, Township 7 North, Range 10 East, Indian Meridian on an unnamed tributary of Graves Creek. A Section 106 report for the APE using 30-meter interval transects as well as 30-meter intervals for shovel testing was produced. This survey strategy, and definition of the APE were proposed in our initial consultation letter of July 24, 2023 and October 6, 2023. The definition of the APE and survey methodology were concurred with the Oklahoma Archaeological Survey on July 18, 2023 and by the State Historic Preservation Officer on July 6, 2023. A survey and report were executed by M & E Consultants. One archaeological site was revisited and tested (34WA-178) and one historic resource (weir/ford) was documented as was an isolated find (nail) within the APE during the pedestrian survey and subsurface probing.

During the APE pedestrian survey, 34WA-187 was relocated through finding the cellar depression and structural remains. A cruciform pattern of shovel tests was excavated across the site. As a result of the testing, the site boundary was expanded. No midden was noted in any of the shovel tests, and artifact density was low and artifact diversity was also low. A very small whiteware sherd with a fragment of a

maker's mark, and two clear pressed glass container fragments with embossed letters were recovered from three separate shovel tests. Shovel tests revealed a soil profile of dark reddish brown (2.5YR3/4) loam. All elements of a former structure are in ruins. Site integrity is poor and archaeological information contained within the site appears to be minimal. Deed research revealed no intriguing data. NRCS has determined that the site does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. The isolated find (nail) found in a shovel test within the greater APE was unremarkable and unassociated with any archaeological site. Therefore, the find does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. In addition to 34WA-178 and the isolated find, an historic resource was identified. The resource is best described as a weir or ford, most likely the latter. The ford was created by dumping rocks in a streambed and does not exhibit any significant features. NRCS has determined that the resource does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D.

As a result of the pedestrian survey, subsurface probes, and site assessment, NRCS has determined that no historic properties will be affected by the undertaking [36CFR800.4(d)(1)] as defined in 36CFR800.16(i). Please send your comments regarding NRCS' determination to the address above marked to the attention of NRCS Cultural Resources Coordinator K.C. Kraft, or by electronic mail at kc.kraft@usda.gov.

Respectfully,

K.C. KRAFT

Kenneth C. Kraft, PhD, RPA

Encl. (1)

cc: Roderick Dukes, NRCS Assistant State Conservationist (Water Resources)

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Oklahoma State Office
100 USDA
Suite 206
Stillwater, OK 74074

July 12, 2024

Mr. Jonathan Rohrer
Tribal Historic Preservation Officer
Caddo Nation of Oklahoma
P.O. Box 487
Binger, OK 73009

Re: NRCS Undertaking Section 106 Report for Rehabilitation of Oak Creek Watershed, Site #5, Washita County

Dear Mr. Rohrer,

This letter is a continuation of Section 106 consultation per 36CFR800.2(c) as codified in of the National Historic Preservation Act of 1966 (NHPA), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The project entails the possible rehabilitation of an existing NRCS floodwater control structure (dam), Oak Creek Watershed, Site #5.

The APE for Oak Creek Watershed, Site #5 is in portions of sections 32 and 33, Township 8 North, Range 10 East, Indian Meridian and Section 5, Township 7 North, Range 10 East, Indian Meridian on an unnamed tributary of Graves Creek. A Section 106 report for the APE using 30-meter interval transects as well as 30-meter intervals for shovel testing was produced. This survey strategy, and definition of the APE were proposed in our initial consultation letter of July 24, 2023; your office responded on July 28, 2023—thank you. The definition of the APE and survey methodology were concurred with the Oklahoma Archaeological Survey on July 18, 2023 and by the State Historic Preservation Officer on July 6, 2023. A survey and report were executed by M & E Consultants. One archaeological site was revisited and tested (34WA-178) and one historic resource (weir/ford) was documented as was an isolated find (nail) within the APE during the pedestrian survey and subsurface probing.

During the APE pedestrian survey, 34WA-187 was relocated through finding the cellar depression and structural remains. A cruciform pattern of shovel tests was excavated across the site. As a result of the testing, the site boundary was expanded. No midden was noted in any of the shovel tests, and artifact density was low and artifact diversity was also low. A very small whiteware sherd with a fragment of a

maker's mark, and two clear pressed glass container fragments with embossed letters were recovered from three separate shovel tests. Shovel tests revealed a soil profile of dark reddish brown (2.5YR3/4) loam. All elements of a former structure are in ruins. Site integrity is poor and archaeological information contained within the site appears to be minimal. Deed research revealed no intriguing data. NRCS has determined that the site does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. The isolated find (nail) found in a shovel test within the greater APE was unremarkable and unassociated with any archaeological site. Therefore, the find does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. In addition to 34WA-178 and the isolated find, an historic resource was identified. The resource is best described as a weir or ford, most likely the latter. The ford was created by dumping rocks in a streambed and does not exhibit any significant features. NRCS has determined that the resource does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D.

As a result of the pedestrian survey, subsurface probes, and site assessment, NRCS has determined that no historic properties will be affected by the undertaking [36CFR800.4(d)(1)] as defined in 36CFR800.16(i). Please send your comments regarding NRCS' determination to the address above marked to the attention of NRCS Cultural Resources Coordinator K.C. Kraft, or by electronic mail at kc.kraft@usda.gov.

Respectfully,

K.C. KRAFT

Kenneth C. Kraft, PhD, RPA

Encl. (1)

cc: Roderick Dukes, NRCS Assistant State Conservationist (Water Resources)

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Oklahoma State Office
100 USDA
Suite 206
Stillwater, OK 74074

July 12, 2024

Ms. Martina Minthorn
Tribal Historic Preservation Officer
Comanche Nation
P.O. Box 908
Lawton, OK 73502

Re: NRCS Undertaking Section 106 Report for Rehabilitation of Oak Creek Watershed, Site #5, Washita County

Dear Ms. Minthorn,

This letter is a continuation of Section 106 consultation per 36CFR800.2(c) as codified in of the National Historic Preservation Act of 1966 (NHPA), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The project entails the possible rehabilitation of an existing NRCS floodwater control structure (dam), Oak Creek Watershed, Site #5.

The APE for Oak Creek Watershed, Site #5 is in portions of sections 32 and 33, Township 8 North, Range 10 East, Indian Meridian and Section 5, Township 7 North, Range 10 East, Indian Meridian on an unnamed tributary of Graves Creek. A Section 106 report for the APE using 30-meter interval transects as well as 30-meter intervals for shovel testing was produced. This survey strategy, and definition of the APE were proposed in our initial consultation letter of July 24, 2023 and October 6, 2023. The definition of the APE and survey methodology were concurred with the Oklahoma Archaeological Survey on July 18, 2023 and by the State Historic Preservation Officer on July 6, 2023. A survey and report were executed by M & E Consultants. One archaeological site was revisited and tested (34WA-178) and one historic resource (weir/ford) was documented as was an isolated find (nail) within the APE during the pedestrian survey and subsurface probing.

During the APE pedestrian survey, 34WA-187 was relocated through finding the cellar depression and structural remains. A cruciform pattern of shovel tests was excavated across the site. As a result of the testing, the site boundary was expanded. No midden was noted in any of the shovel tests, and artifact density was low and artifact diversity was also low. A very small whiteware sherd with a fragment of a

maker's mark, and two clear pressed glass container fragments with embossed letters were recovered from three separate shovel tests. Shovel tests revealed a soil profile of dark reddish brown (2.5YR3/4) loam. All elements of a former structure are in ruins. Site integrity is poor and archaeological information contained within the site appears to be minimal. Deed research revealed no intriguing data. NRCS has determined that the site does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. The isolated find (nail) found in a shovel test within the greater APE was unremarkable and unassociated with any archaeological site. Therefore, the find does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. In addition to 34WA-178 and the isolated find, an historic resource was identified. The resource is best described as a weir or ford, most likely the latter. The ford was created by dumping rocks in a streambed and does not exhibit any significant features. NRCS has determined that the resource does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D.

As a result of the pedestrian survey, subsurface probes, and site assessment, NRCS has determined that no historic properties will be affected by the undertaking [36CFR800.4(d)(1)] as defined in 36CFR800.16(i). Please send your comments regarding NRCS' determination to the address above marked to the attention of NRCS Cultural Resources Coordinator K.C. Kraft, or by electronic mail at kc.kraft@usda.gov.

Respectfully,

K.C. KRAFT

Kenneth C. Kraft, PhD, RPA

Encl. (1)

cc: Roderick Dukes, NRCS Assistant State Conservationist (Water Resources)

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Oklahoma State Office
100 USDA
Suite 206
Stillwater, OK 74074

July 12, 2024

Andrea A. Hunter, Ph.D.
Tribal Historic Preservation Officer
Osage Nation
Historic Preservation Office
627 Grandview
Pawhuska, OK 74056

Re: File:2223-6225OK-4 NRCS Undertaking Section 106 Report for Rehabilitation of Oak Creek Watershed, Site #5, Washita County

Dear Dr. Hunter,

This letter is a continuation of Section 106 consultation per 36CFR800.2(c) as codified in of the National Historic Preservation Act of 1966 (NHPA), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The project entails the possible rehabilitation of an existing NRCS floodwater control structure (dam), Oak Creek Watershed, Site #5.

The APE for Oak Creek Watershed, Site #5 is in portions of sections 32 and 33, Township 8 North, Range 10 East, Indian Meridian and Section 5, Township 7 North, Range 10 East, Indian Meridian on an unnamed tributary of Graves Creek. A Section 106 report for the APE using 30-meter interval transects as well as 30-meter intervals for shovel testing was produced. This survey strategy, and definition of the APE were proposed in our initial consultation letter of July 24, 2023 and October 6, 2023. The definition of the APE and survey methodology were concurred with the Oklahoma Archaeological Survey on July 18, 2023 and by the State Historic Preservation Officer on July 6, 2023. A survey and report were executed by M & E Consultants. One archaeological site was revisited and tested (34WA-178) and one historic resource (weir/ford) was documented as was an isolated find (nail) within the APE during the pedestrian survey and subsurface probing.

During the APE pedestrian survey, 34WA-187 was relocated through finding the cellar depression and structural remains. A cruciform pattern of shovel tests was excavated across the site. As a result of the testing, the site boundary was expanded. No midden was noted in any of the shovel tests, and artifact

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As a result of the pedestrian survey, subsurface probes, and site assessment, NRCS has determined that no historic properties will be affected by the undertaking [36CFR800.4(d)(1)] as defined in 36CFR800.16(i). Please send your comments regarding NRCS' determination to the address above marked to the attention of NRCS Cultural Resources Coordinator K.C. Kraft, or by electronic mail at kc.kraft@usda.gov.

Respectfully,

K.C. KRAFT

Kenneth C. Kraft, PhD, RPA

Encl. (1)

cc: Roderick Dukes, NRCS Assistant State Conservationist (Water Resources)

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Oklahoma State Office
100 USDA
Suite 206
Stillwater, OK 74074

July 12, 2024

Quapaw Nation Historic Preservation Program, Director
Quapaw Nation Historic Preservation Program Office
Quapaw Nation
PO Box 765
Quapaw, Oklahoma 74363-0765

Re: NRCS Undertaking Section 106 Report for Rehabilitation of Oak Creek Watershed, Site #5, Six Miles Northeast of Gotebo, Washita County, Oklahoma

Dear Quapaw Nation Historic Preservation Program Director,

This letter is a continuation of Section 106 consultation per 36CFR800.2(c) as codified in of the National Historic Preservation Act of 1966 (NHPA), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The project entails the possible rehabilitation of an existing NRCS floodwater control structure (dam), Oak Creek Watershed, Site #5.

The APE for Oak Creek Watershed, Site #5 is in portions of sections 32 and 33, Township 8 North, Range 10 East, Indian Meridian and Section 5, Township 7 North, Range 10 East, Indian Meridian on an unnamed tributary of Graves Creek. A Section 106 report for the APE using 30-meter interval transects as well as 30-meter intervals for shovel testing was produced. This survey strategy, and definition of the APE were proposed in our initial consultation letter of August 3, 2023; your office responded on August 10, 2023—thank you. The definition of the APE and survey methodology were concurred with the Oklahoma Archaeological Survey on July 18, 2023 and by the State Historic Preservation Officer on July 6, 2023. A survey and report were executed by M & E Consultants. One archaeological site was revisited and tested (34WA-178) and one historic resource (weir/ford) was documented as was an isolated find (nail) within the APE during the pedestrian survey and subsurface probing.

During the APE pedestrian survey, 34WA-187 was relocated through finding the cellar depression and structural remains. A cruciform pattern of shovel tests was excavated across the site. As a result of the testing, the site boundary was expanded. No midden was noted in any of the shovel tests, and artifact density was low and artifact diversity was also low. A very small whiteware sherd with a fragment of a

maker's mark, and two clear pressed glass container fragments with embossed letters were recovered from three separate shovel tests. Shovel tests revealed a soil profile of dark reddish brown (2.5YR3/4) loam. All elements of a former structure are in ruins. Site integrity is poor and archaeological information contained within the site appears to be minimal. Deed research revealed no intriguing data. NRCS has determined that the site does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. The isolated find (nail) found in a shovel test within the greater APE was unremarkable and unassociated with any archaeological site. Therefore, the find does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. In addition to 34WA-178 and the isolated find, an historic resource was identified. The resource is best described as a weir or ford, most likely the latter. The ford was created by dumping rocks in a streambed and does not exhibit any significant features. NRCS has determined that the resource does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D.

As a result of the pedestrian survey, subsurface probes, and site assessment, NRCS has determined that no historic properties will be affected by the undertaking [36CFR800.4(d)(1)] as defined in 36CFR800.16(i). Please send your comments regarding NRCS' determination to the address above marked to the attention of NRCS Cultural Resources Coordinator K.C. Kraft, or by electronic mail at kc.kraft@usda.gov.

Respectfully,

K.C. KRAFT

Kenneth C. Kraft, PhD, RPA

Encl. (1)

cc: Roderick Dukes, NRCS Assistant State Conservationist (Water Resources)

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Oklahoma State Office
100 USDA
Suite 206
Stillwater, OK 74074

July 12, 2024

Mr. Gary McAdams
Tribal Historic Preservation Officer
Wichita and Affiliated Tribes
P.O. Box 729
Anadarko, OK 73005

Re: NRCS Undertaking Section 106 Report for Rehabilitation of Oak Creek Watershed, Site #5, Washita County

Dear Mr. McAdams,

This letter is a continuation of Section 106 consultation per 36CFR800.2(c) as codified in of the National Historic Preservation Act of 1966 (NHPA), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The project entails the possible rehabilitation of an existing NRCS floodwater control structure (dam), Oak Creek Watershed, Site #5.

The APE for Oak Creek Watershed, Site #5 is in portions of sections 32 and 33, Township 8 North, Range 10 East, Indian Meridian and Section 5, Township 7 North, Range 10 East, Indian Meridian on an unnamed tributary of Graves Creek. A Section 106 report for the APE using 30-meter interval transects as well as 30-meter intervals for shovel testing was produced. This survey strategy, and definition of the APE were proposed in our initial consultation letter of July 24, 2023 and October 6, 2023. The definition of the APE and survey methodology were concurred with the Oklahoma Archaeological Survey on July 18, 2023 and by the State Historic Preservation Officer on July 6, 2023. A survey and report were executed by M & E Consultants. One archaeological site was revisited and tested (34WA-178) and one historic resource (weir/ford) was documented as was an isolated find (nail) within the APE during the pedestrian survey and subsurface probing.

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maker's mark, and two clear pressed glass container fragments with embossed letters were recovered from three separate shovel tests. Shovel tests revealed a soil profile of dark reddish brown (2.5YR3/4) loam. All elements of a former structure are in ruins. Site integrity is poor and archaeological information contained within the site appears to be minimal. Deed research revealed no intriguing data. NRCS has determined that the site does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. The isolated find (nail) found in a shovel test within the greater APE was unremarkable and unassociated with any archaeological site. Therefore, the find does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D. In addition to 34WA-178 and the isolated find, an historic resource was identified. The resource is best described as a weir or ford, most likely the latter. The ford was created by dumping rocks in a streambed and does not exhibit any significant features. NRCS has determined that the resource does not meet National Register of Historic Places-eligibility under criteria A, B, C, or D.

As a result of the pedestrian survey, subsurface probes, and site assessment, NRCS has determined that no historic properties will be affected by the undertaking [36CFR800.4(d)(1)] as defined in 36CFR800.16(i). Please send your comments regarding NRCS' determination to the address above marked to the attention of NRCS Cultural Resources Coordinator K.C. Kraft, or by electronic mail at kc.kraft@usda.gov.

Respectfully,

K.C. KRAFT

Kenneth C. Kraft, PhD, RPA

Encl. (1)

cc: Roderick Dukes, NRCS Assistant State Conservationist (Water Resources)

USDA

United States Department of Agriculture

June 9, 2023

Kary Stackelbeck
Oklahoma State Archaeologist
Oklahoma Archaeological Survey
111 East Chesapeake, Building 134
University of Oklahoma
Norman, OK 73019

Re: Rehabilitation of Oak Creek Watershed Site #5, Washita County, Oklahoma

Dear Dr. Stackelbeck,

This letter initiates Section 106 consultation per 36CFR800.2(c)(1) as codified in of the National Historic Preservation Act of 1966 (NRHP), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The undertaking is authorized and funded by PL 106-472, commonly referred to as the *Small Watershed Rehabilitation Amendment of 2000*. PL 106-472 is an amendment to PL 78-534, the *Flood Control Act of 1944*. The project entails the possible rehabilitation of an existing NRCS floodwater control structure, Oak Creek Watershed, Site #5. Since Site #5 does not meet current Oklahoma Water Resources Board or NRCS standards for its high hazard dam classification, NRCS (and conservation partners) is considering our options regarding the future of the site.

Oak Creek Watershed, Site #5 is approximately six miles north of Gotebo, Oklahoma along Oak Creek. The dam and pool are in portions of sections 12, 13, and 18, Township 8 North, Range 15 West of the Indian Meridian. This coordinate is located on the *Lake Valley* quadrangle of the United States Geological Survey's 7.5-minute series (topographic) map. The geocentric coordinates of Site #5, in degrees, minutes, and seconds, are Latitude 35° 09'47.32"N, Longitude 98°49'20.98"W.

Construction of Site #5 was completed in 1968, hence the dam can be considered a historic property. Structural rehabilitation of the site could be considered an adverse effect. Likewise, a Section 106 assessment and report (36CFR800.4) were not performed before the site was constructed. To address both deficiencies, National Register of Historic Places-eligibility criteria will be applied to the dam itself and a pedestrian survey with shovel testing, bounded by the top-of-dam-elevation (contour), will be completed to determine if any historic properties are present and/or eligible.

Regarding the field survey methodology, the maximum extent of the pool (using the top of dam elevation) and potential breach area (to the easement limits), will be performed using 30 meter transect-spacing with shovel test pits every 30 meters, in open areas. These open areas include the upper reaches of the waterway—to the top of dam elevation (1465 feet amsl)—and the breach area below the dam, from the top of dam elevation to the valley floor (1400 feet amsl).

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Stillwater, OK 74074-2655
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The current pool level is at the 1440 feet above mean sea level (amsl) and as previously stated the top of dam elevation is 1465 feet amsl, hence approximately 25 feet (7.62 meters) outward from the existing pool also will be surveyed. I recommend two loops around the pool even though the 7.62 meters between the pool elevation and top of dam elevation is considerably less than the general 30 meter transect interval that is recommended in open areas. The above survey boundaries, 1465 feet amsl, and the dam are used to define the Area of Potential Effect (APE) as shown on the attached maps.

During background research for the undertaking, it was revealed that a portion of the APE was previously investigated by former State Archaeologist Dr. Robert Brooks. Access road improvements in 1994 were the impetus for the Section 106 survey. Two historic properties (WA-177 and WA-178) were identified during the reconnaissance survey. Both properties were identified as former farmsteads with no standing structures. Dr. Brooks determined that both properties lacked historic integrity based on his preliminary assessment. Historic property WA-178 is within the NRCS-defined APE. Systematic shovel probing will be executed either in a grided pattern or cruciform, based on observable artifacts or features, to determine if the property warrants inclusion on the NRHP.

This is a request for a NRHP-Section 106 review and initial comments about the possible rehabilitation, proposed survey methodology, and definition of the APE for Oak Creek, Site #5 referenced in 36CFR800.4(a). Per usual for NRCS, 36CFR800.16(d) will be used to complete a subsequent report. A copy of the US Geological Survey *Lake View* 7.5-minute topographic map and an aerial photograph, which shows the APE, are attached for your convenience. A vicinity map is also provided as is a map depicting the extent of Dr. Brooks' 1994 survey. Please note that Oak Creek, Site #5 undertaking has yet to be surveyed, thus a Section 106 report is not included nor is there a determination included with this opening consultation correspondence.

Please send your comments to the address above marked to the attention of NRCS Cultural Resources Coordinator K.C. Kraft, or by electronic mail at kc.kraft@usda.gov.

Respectfully,

Roderick Dukes
Assistant State Conservationist (Water Resources)

Encls. (4)

cc: K.C. Kraft, NRCS Oklahoma, Cultural Resources Coordinator

Natural Resources Conservation Service
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USDA

United States Department of Agriculture

June 9, 2023

Ms. Lynda Ozan
Deputy State Historic Preservation Officer
Oklahoma State Historic Preservation Office
800 Nazih Zuhdi Drive
Oklahoma City, Oklahoma 73105-7917

Re: Rehabilitation of Oak Creek Watershed Site #5, Washita County, Oklahoma

Dear Ms. Ozan,

This letter initiates Section 106 consultation per 36CFR800.2(c)(1) as codified in of the National Historic Preservation Act of 1966 (NRHP), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The undertaking is authorized and funded by PL 106-472, commonly referred to as the *Small Watershed Rehabilitation Amendment of 2000*. PL 106-472 is an amendment to PL 78-534, the *Flood Control Act of 1944*. The project entails the possible rehabilitation of an existing NRCS floodwater control structure, Oak Creek Watershed, Site #5. Since Site #5 does not meet current Oklahoma Water Resources Board or NRCS standards for its high hazard dam classification, NRCS (and conservation partners) is considering our options regarding the future of the site.

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Regarding the field survey methodology, the maximum extent of the pool (using the top of dam elevation) and potential breach area (to the easement limits), will be performed using 30 meter transect-spacing with shovel test pits every 30 meters, in open areas. These open areas include the upper reaches of the waterway—to the top of dam elevation (1465 feet amsl)—and the breach area below the dam, from the top of dam elevation to the valley floor (1400 feet amsl). The current pool level is at the 1440 feet above mean sea level (amsl) and as previously stated

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Respectfully,

Roderick Dukes
Assistant State Conservationist (Water Resources)

Encls. (4)

cc: K.C. Kraft, NRCS Oklahoma, Cultural Resources Coordinator

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July 24, 2023

Mr. Max Bear
Tribal Historic Preservation Officer
Cheyenne and Arapaho Tribes
P.O. Box 167
Concho, OK 73022

Re: Rehabilitation of Oak Creek Watershed Site #5, Washita County, Oklahoma

Dear Mr. Bear,

This letter initiates Section 106 consultation per 36CFR800.2(c)(1) as codified in of the National Historic Preservation Act of 1966 (NRHP), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The undertaking is authorized and funded by PL 106-472, commonly referred to as the *Small Watershed Rehabilitation Amendment of 2000*. PL 106-472 is an amendment to PL 78-534, the *Flood Control Act of 1944.* The project entails the possible rehabilitation of an existing NRCS floodwater control structure, Oak Creek Watershed, Site #5 (Site #5). Since Site #5 does not meet current Oklahoma Water Resources Board or NRCS standards for its high hazard dam classification, NRCS (and conservation partners) is considering our options regarding the future of the site.

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Respectfully,

K.C. KRAFT

Kenneth C. Kraft, Ph.D., RPA
NRCS Oklahoma, Cultural Resources Coordinator

Encls. (4)

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July 24, 2023

Mr. Jonathan Rohrer
Tribal Historic Preservation Officer
Caddo Nation of Oklahoma
P.O. Box 487
Binger, OK 73009

Re: Rehabilitation of Oak Creek Watershed Site #5, Washita County, Oklahoma

Dear Mr. Rohrer,

This letter initiates Section 106 consultation per 36CFR800.2(c)(1) as codified in of the National Historic Preservation Act of 1966 (NRHP), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The undertaking is authorized and funded by PL 106-472, commonly referred to as the *Small Watershed Rehabilitation Amendment of 2000*. PL 106-472 is an amendment to PL 78-534, the *Flood Control Act of 1944.* The project entails the possible rehabilitation of an existing NRCS floodwater control structure, Oak Creek Watershed, Site #5 (Site #5). Since Site #5 does not meet current Oklahoma Water Resources Board or NRCS standards for its high hazard dam classification, NRCS (and conservation partners) is considering our options regarding the future of the site.

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Respectfully,

K.C. KRAFT

Kenneth C. Kraft, Ph.D., RPA
NRCS Oklahoma, Cultural Resources Coordinator

Encls. (4)

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July 24, 2023

Ms. Martina Minthorn
Tribal Historic Preservation Officer
P.O. Box 908
Lawton, OK 73502

Re: Rehabilitation of Oak Creek Watershed Site #5, Washita County, Oklahoma

Dear Ms. Minthorn,

This letter initiates Section 106 consultation per 36CFR800.2(c)(1) as codified in of the National Historic Preservation Act of 1966 (NRHP), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The undertaking is authorized and funded by PL 106-472, commonly referred to as the *Small Watershed Rehabilitation Amendment of 2000*. PL 106-472 is an amendment to PL 78-534, the *Flood Control Act of 1944.* The project entails the possible rehabilitation of an existing NRCS floodwater control structure, Oak Creek Watershed, Site #5 (Site #5). Since Site #5 does not meet current Oklahoma Water Resources Board or NRCS standards for its high hazard dam classification, NRCS (and conservation partners) is considering our options regarding the future of the site.

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from the existing pool also will be surveyed. I recommend two loops around the pool even though the 7.62 meters between the pool elevation and top of dam elevation is considerably less than the general 30 meter transect interval that is recommended in open areas. The above survey boundaries, 1465 feet amsl, and the dam are used to define the Area of Potential Effect (APE) as shown on the attached maps.

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K.C. KRAFT

Kenneth C. Kraft, Ph.D., RPA
NRCS Oklahoma, Cultural Resources Coordinator

Encls. (4)

Natural Resources Conservation Service
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July 24, 2023

Andrea A. Hunter, Ph.D.
Tribal Historic Preservation Officer
Osage Nation
Historic Preservation Office
627 Grandview
Pawhuska, OK 74056

Re: Rehabilitation of Oak Creek Watershed Site #5, Washita County, Oklahoma

Dear Dr. Hunter,

This letter initiates Section 106 consultation per 36CFR800.2(c)(1) as codified in of the National Historic Preservation Act of 1966 (NRHP), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The undertaking is authorized and funded by PL 106-472, commonly referred to as the *Small Watershed Rehabilitation Amendment of 2000*. PL 106-472 is an amendment to PL 78-534, the *Flood Control Act of 1944.* The project entails the possible rehabilitation of an existing NRCS floodwater control structure, Oak Creek Watershed, Site #5 (Site #5). Since Site #5 does not meet current Oklahoma Water Resources Board or NRCS standards for its high hazard dam classification, NRCS (and conservation partners) is considering our options regarding the future of the site.

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K.C. KRAFT

Kenneth C. Kraft, Ph.D., RPA
NRCS Oklahoma, Cultural Resources Coordinator

Encls. (4)

Natural Resources Conservation Service
100 USDA, Suite 206
Stillwater, OK 74074-2655
Voice (405) 742-1204 – FAX (855) 421-4639

July 24, 2023

Mr. Gary McAdams
Tribal Historic Preservation Officer
Wichita and Affiliated Tribes
P.O. Box 729
Anadarko, OK 73005

Re: Rehabilitation of Oak Creek Watershed Site #5, Washita County, Oklahoma

Dear Mr. Adams,

This letter initiates Section 106 consultation per 36CFR800.2(c)(1) as codified in of the National Historic Preservation Act of 1966 (NRHP), as amended, for a proposed US Department of Agriculture, Natural Resources Conservation Service (NRCS) project located in Washita County, Oklahoma. The undertaking is authorized and funded by PL 106-472, commonly referred to as the *Small Watershed Rehabilitation Amendment of 2000*. PL 106-472 is an amendment to PL 78-534, the *Flood Control Act of 1944.* The project entails the possible rehabilitation of an existing NRCS floodwater control structure, Oak Creek Watershed, Site #5 (Site #5). Since Site #5 does not meet current Oklahoma Water Resources Board or NRCS standards for its high hazard dam classification, NRCS (and conservation partners) is considering our options regarding the future of the site.

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Voice (405) 742-1204 – FAX (855) 421-4639

the top of dam elevation is 1465 feet amsl, hence approximately 25 feet (7.62 meters) outward from the existing pool also will be surveyed. I recommend two loops around the pool even though the 7.62 meters between the pool elevation and top of dam elevation is considerably less than the general 30 meter transect interval that is recommended in open areas. The above survey boundaries, 1465 feet amsl, and the dam are used to define the Area of Potential Effect (APE) as shown on the attached maps.

During background research for the undertaking, it was revealed that a portion of the APE was previously investigated by former State Archaeologist Dr. Robert Brooks. Access road improvements in 1994 were the impetus for the Section 106 survey. Two historic properties (WA-177 and WA-178) were identified during the reconnaissance survey. Both properties were identified as former farmsteads with no standing structures. Dr. Brooks determined that both properties lacked historic integrity based on his preliminary assessment. Historic property WA-178 is within the NRCS-defined APE. Systematic shovel probing will be executed either in a grided pattern or cruciform, based on observable artifacts or features, to determine if the property warrants inclusion on the NRHP.

This is a request for a NRHP-Section 106 review and initial comments about the possible rehabilitation, proposed survey methodology, and definition of the APE for Oak Creek, Site #5 referenced in 36CFR800.4(a). Per usual for NRCS, 36CFR800.16(d) will be used to complete a subsequent report. A copy of the US Geological Survey *Lake View* 7.5-minute topographic map and an aerial photograph, which shows the APE, are attached for your convenience. A vicinity map is also provided as is a map depicting the extent of Dr. Brooks' 1994 survey. Please note that Oak Creek, Site #5 undertaking has yet to be surveyed, thus a Section 106 report is not included nor is there a determination included with this opening consultation correspondence.

Please send your comments to the address marked above or by electronic mail at kc.kraft@usda.gov.

Respectfully,

K.C. KRAFT

Kenneth C. Kraft, Ph.D., RPA
NRCS Oklahoma, Cultural Resources Coordinator

Encls. (4)

Natural Resources Conservation Service
100 USDA, Suite 206
Stillwater, OK 74074-2655
Voice (405) 742-1204 – FAX (855) 421-4639

Oklahoma Archeological Survey

THE UNIVERSITY OF OKLAHOMA

July 18, 2023

NRCS
Attn: K.C. Kraft
Cultural Resources Coordinator
100 USDA, Suite 206
Stillwater, OK 74074-2655

Re: OAS FY23-1897 Rehabilitation of Oak Creek Watershed Site #5 (Built 1968).
Legal Description: Sections 12-13, 18, T8N, R15W, Washita County, Oklahoma.

Dear Mr. Kraft:

We received the above referenced initial consultation submission from your office on June 20, 2023. Based on the information provided, I understand that NRCS proposes to perform a pedestrian survey with shovel testing within the Area of Potential Effects (APE) to evaluate the National Register eligibility of known cultural resources as well as identify as-yet unknown cultural properties that may be impacted by the undertaking. I concur with the proposed methods for new survey areas; however, I request further coordination with our office to devise a more tailored strategy to assess specific sites that are already identified. If you have any questions in the meantime, please don't hesitate to contact our office at (405) 325-7211.

This environmental review and evaluation are done in cooperation with the State Historic Preservation Office, Oklahoma Historical Society. The responsible federal agency or their official delegate must also have a letter from that office to document consultation pursuant to Section 106 of the National Historic Preservation Act.

In addition to our review comments, under 36CFR Part 800.3 you are reminded of your responsibility to consult with the appropriate Native American tribe/groups to identify any concerns they may have pertaining to this undertaking and potential impacts to properties of traditional and/or ceremonial value.

Sincerely,

Kary L. Stackelbeck, Ph.D.
State Archaeologist

: dkg
cc: SHPO

Start Time: Sep 28, 2023, 9:55:11 AM Download

2	9:55 AM - 10:37 AM	42m 13s	36m 58s
Attended	Start and end time	Meeting duration	Average attendance time

Participants

Name	First join	Last leave	In-meeting duration	Role
Kraft, KC - FPAC-NRCS, OK kc.kraft@usda.gov	9:58 AM	10:37 AM	39m 1s	Organizer
KS Stackelbeck, Kary kstackelbeck@ou.edu	10:02 AM	10:37 AM	34m 55s	Presenter

Oklahoma Historical Society
State Historic Preservation Office

July 6, 2023

Mr. Roderick Dukes, Assistant State Conservationist
USDA/NRCS
100 USDA, Suite 206
Stillwater, OK 74074

RE: File #1850-23; NRCS Proposed Rehabilitation of Oak Creek Watershed Site #5, Washita County

Dear Mr. Dukes:

We have received and reviewed the materials for the referenced undertaking submitted with your letter dated June 9, 2023, which we received June 16, 2023.

We concur with the defined area of potential effect (APE) with respect to both physical and visual impacts for this project and consider it appropriate for the scope of work. We have no objection to your proposed investigation methods, as indicated in your letter of June 9, 2023; however, we request that you also provide the following documentation to facilitate our review:

(1) Please include a detailed description of the proposed rehabilitation if such information is available at this time.

(2) Since the dam is more than 45 years of age, please submit a Historic Preservation Resource Identification (HPRI) form and photographs of Site #5. Please also provide additional context so that our office can evaluate the structure's eligibility for the National Register of Historic Places as an individual resource or as a contributing resource to a collection of functionally related resources. For example, a preliminary review of available newspapers indicates that Site #5 was one of twelve floodwater retaining structures planned for the Oak Creek watershed.

(3) In addition to the dam, please supply completed HPRI forms and photographs for all standing structures that are more than 45 years of age and are within or adjacent to the APE. Please note that forms and photos are not required for structures that are les than 45 years old. However, please include the date (or year) of construction of each structure affected by the project.

You may access the HPRI form online at: https://www.okhistory.org/shpo/docs/idform.pdf, and directions for completing this form are in our *Section 106 Review and Compliance Manual* here: https://www.okhistory.org/shpo/programs/106/rcmanual2015.pdf.

RE: File #1850-23; NRCS Proposed Rehabilitation of Oak Creek Watershed Site #5, Washita County

(4) Regarding the two previously recorded archaeological sites in the project APE (34WA177 and 34WA178), please provide an archaeological site update form for each of these sites. Please ensure that the site forms include a discussion of site features and artifacts, the likely period of occupation, and a discussion of persons associated with the property during that period.

Thank you for the opportunity to review this project. We look forward to continuing to work through the Section 106 process regarding this project.

If you have any questions, please call Kristina Wyckoff, Historical Archaeologist, at 405-521-6381, or Matthew Pearce, Ph.D., National Register Coordinator, at 405-522-4479. Please reference the above underlined file number when responding. Thank you.

Sincerely,

Lynda Ozan
Deputy State Historic
Preservation Officer

LO:pm

cc: Dr. Kary Stackelbeck, State Archaeologist

Oklahoma Archeological Survey

THE UNIVERSITY OF OKLAHOMA

September 3, 2024

Natural Resources Conservation Service
Attn: K. C. Kraft, Ph.D.
Archaeologist
100 USDA, Suite 206
Stillwater, OK 74074-2655

Re: OAS FY24-2375 (FY23-1897) *Report on the Intensive Cultural Resources Survey of the Area of Potential Effect of the Proposed Repair of Oak Creek #5 Flood Control Structure.* Report by J. Eric Gililand (M&E Consultants).
Legal Description: Section 18, T8N, R15W; Section 12-13, T8N, R16W, Washita County, Oklahoma.

Dear Dr. Kraft,

This agency received the above-referenced cultural resources report in association with the proposed Oak Creek #5 Flood Control Structure project in Washita County for review and comment. From the information provided, we understand that M&E Consultants staff surveyed the 176-acre project Area of Potential Effects (APE) on October 9-27, 2023. One previously-identified historic site, 34WA178, was revisited within the APE. NRCS recommends this site as not eligible for listing on the National Register of Historic Places (NRHP). NRCS recommends a finding of *No historic properties affected* for the undertaking.

I concur with the findings and recommendations as they pertain to precontact archaeological resources and defer opinion on 34WA178 and the overall project effects to the Historic Archaeologist with the Oklahoma State Historic Preservation Office.

This review has been conducted in cooperation with the State Historic Preservation Office, Oklahoma Historical Society. You must also have a letter from that office to document your consultation pursuant to Section 106 of the National Historic Preservation Act.

Sincerely,

Kary L. Stackelbeck, Ph.D.
State Archaeologist

cc: SHPO

Oklahoma Historical Society
State Historic Preservation Office

July 26, 2024

Dr. K.C. Kraft, Ph.D.
USDA NRCS
100 USDA, Suite 206
Stillwater, OK 74074

RE: File #2141-24 [Previously #1850-23]; NRCS Proposed Rehabilitation of Oak Creek Watershed Site #5; including Oak Creek Dam #5, Oak Creek Ford/Wier, 34WA178 & IF-01, Washita County

Dear Dr. Kraft:

We have received and reviewed the documentation submitted on the referenced project. Additionally, we have examined the information contained in the Oklahoma Landmarks Inventory (OLI) files and other materials on historic resources available in our office. We find that there are no known historic properties affected within the referenced project's area of potential effect.

In addition to our review, you must contact the Oklahoma Archeological Survey (OAS), 111 East Chesapeake, #102, Norman OK 73019-5111 (#405-325-7211, FAX #405-325-7604), to obtain a determination about the presence of prehistoric resources that may be eligible for the National Register of Historic Places. Should the OAS conclude that there are no prehistoric archaeological sites or other types of "historic properties," as defined in 36 CFR Part 800.16(l), which are eligible for inclusion in the National Register of Historic Places within the project area and that such sites are unlikely to occur, we concur with that opinion.

The OAS may conclude that an on-site investigation of all or part of the project impact area is necessary to determine the presence of archaeological resources. In the event that such an investigation reveals the presence of prehistoric archaeological sites, we will defer to the judgment of the OAS concerning whether or not any of the resources should be considered "historic properties" under the Section 106 review process. If sites dating from the historic period are identified during the survey or are encountered during implementation of the project, additional assessments by the State Historic Preservation Office will be necessary.

Should further correspondence pertaining to this project be necessary, please reference the above underlined file number. If you have any questions, please contact Kristina Wyckoff, Historical Archaeologist, at 405-521-6381. Thank you.

Sincerely,

Lynda Ozan
Deputy State Historic
Preservation Officer

LO:pm

From: Jonathan Rohrer
To: Kraft, KC - FPAC-NRCS, OK
Subject: [External Email]Rehabilitation of Oak Creek Watershed -
Date: Friday, August 9, 2024 10:36:14 AM

Kenneth

Thank you for your request for consultation, received on 07-15-2024. The Caddo Nation appreciates your willingness to conduct proper consultation, pursuant to Section 106 of the National Historic Preservation Act.

Upon review of the project and location I have determined that it does not affect known cultural, traditional or sacred sites of interest to the Caddo Nation. As such, the Caddo Nation has no objection to the project at this time. However, in the event that an inadvertent discovery of potentially relevant cultural sites, funerary objects, or human remains occurs, we request that the project be immediately halted and the proper authorities be contacted. Additionally, The Caddo Nation would need to be notified of an inadvertent discovery with 24 hours.

Should you have any question or concerns regarding this response please feel free to contact our office.

Best regards,

Jonathan

Jonathan M. Rohrer
Tribal Historic Preservation Officer

Caddo Nation
P.O. Box 487
Binger, OK 73009
t: (405)656-0970 Ext. 2070
e: jrohrer@mycaddonation.com

www.mycaddonation.com

COMANCHE NATION

NRCS-USDA Oklahoma State Office
Attn: Mr. Kenneth C. Kraft
100 USDA, Suite 206
Oklahoma 74074

August12, 2024

Re: NRCS Undertaking Section106 Report for Rehabilitation of
Oak Creek Watershed, Site #5, Washita County

Dear Mr. Kraft:

In response to your request, the above reference project has been reviewed by staff of this office to identify areas that may potentially contain prehistoric or historic archeological materials. The location of your project has been cross referenced with the Comanche Nation site files, where an indication of ***"No Properties"*** have been identified. (IAW 36 CFR 800.4(d)(1)).

Please contact this office at (580) 492-1153) if you require additional information on this project.

This review is performed in order to identify and preserve the Comanche Nation and State cultural heritage, in conjunction with the State Historic Preservation Office.

Regards

Comanche Nation Historic Preservation Office
Theodore E. Villicana , Technician
#6 SW "D" Avenue, Suite C
Lawton, OK. 73502

From: Christina Sharp
To: Kraft, KC - FPAC-NRCS, OK
Cc: section 106
Subject: [External Email]Rehabilitation of Oak Creek Watershed Site #5
Date: Wednesday, July 17, 2024 12:26:41 PM

Dear **Mr. Kraft,**

The Quapaw Nation Historic Preservation Program (QNHPP) has received and reviewed the information you have provided. Based upon the information you provided we believe that the **PROPOSED PROJECT Rehabilitation of Oak Creek Watershed Site #5 IN Washita County, Oklahoma** will have no effect on known properties of cultural or sacred significance to the Quapaw Nation.

In accordance with the National Historic Preservation Act, (NHPA) [16 U.S C. 470 §§ 470-470w-6] 1966, undertakings subject to the review process are referred to in S101 (d) (6) (A), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969).

The Quapaw Nation has vital interests in protecting its historic and ancestral cultural resources. We do not anticipate that this project will adversely impact any cultural resources or human remains protected under the NHPA, NEPA, or the Native American Graves Protection and Repatriation Act. If, however, artifacts or human remains are discovered during project construction, we ask that work cease immediately and that you contact the Quapaw Nation Historic Preservation Office.

Should you have any questions or need any additional information, please feel free to contact **Christina Sharp** at **christina.sharp@quapawnation.com** please copy section106@quapawnation.com to ensure additional information requests are reviewed in a timely manner. Thank you for consulting with the Quapaw Nation on this matter.

Sincerely,
Christina Sharp

On behalf of
-Billie Burtrum
Preservation Officer/ QNHPP Director

Quapaw Nation
P.O. Box 765
Quapaw, OK 74363
(w) 918-238-3100
(f) 918-674-2456

Appendix B – Project Maps

Figure B-1: Oak Creek Watershed Map

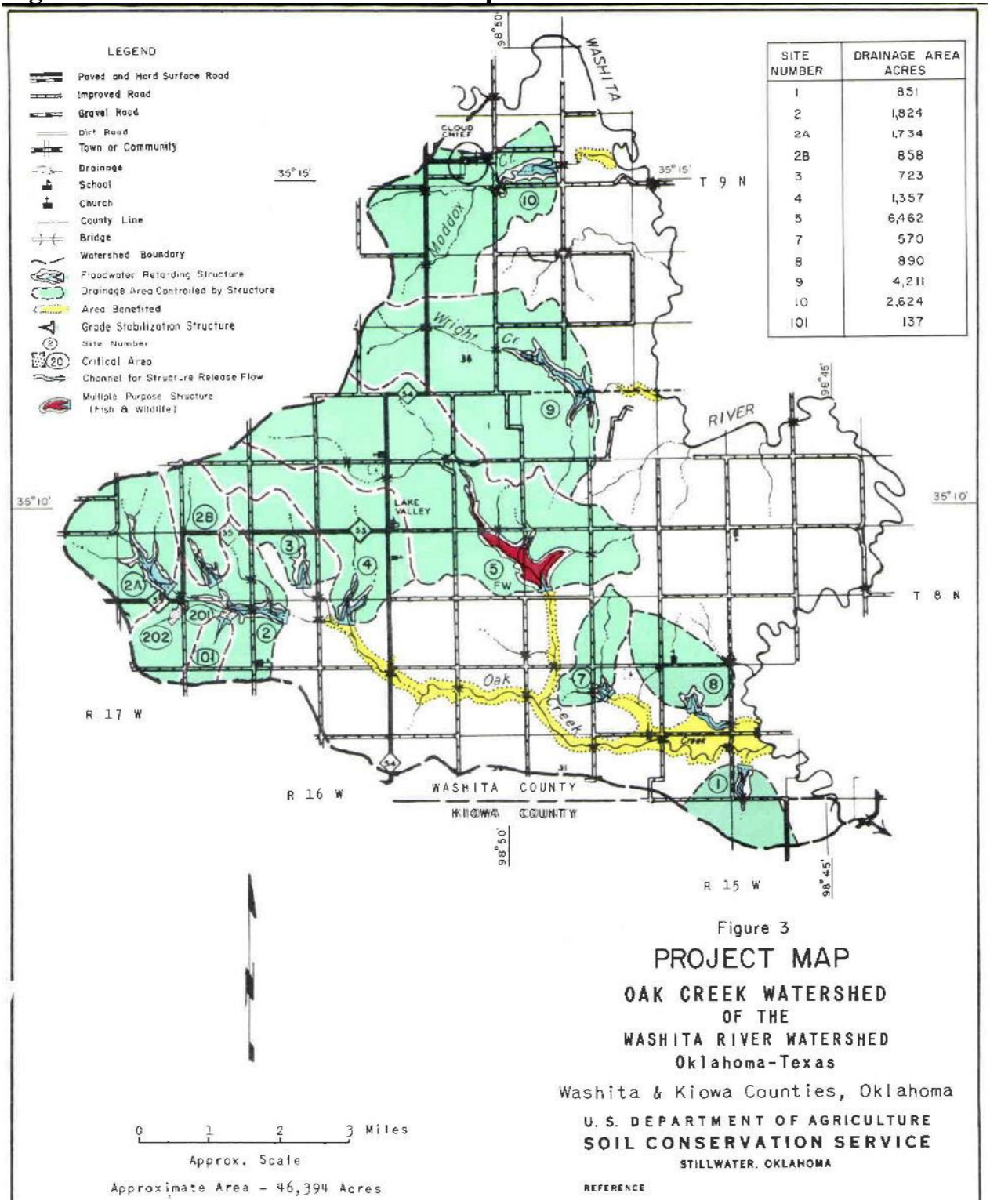
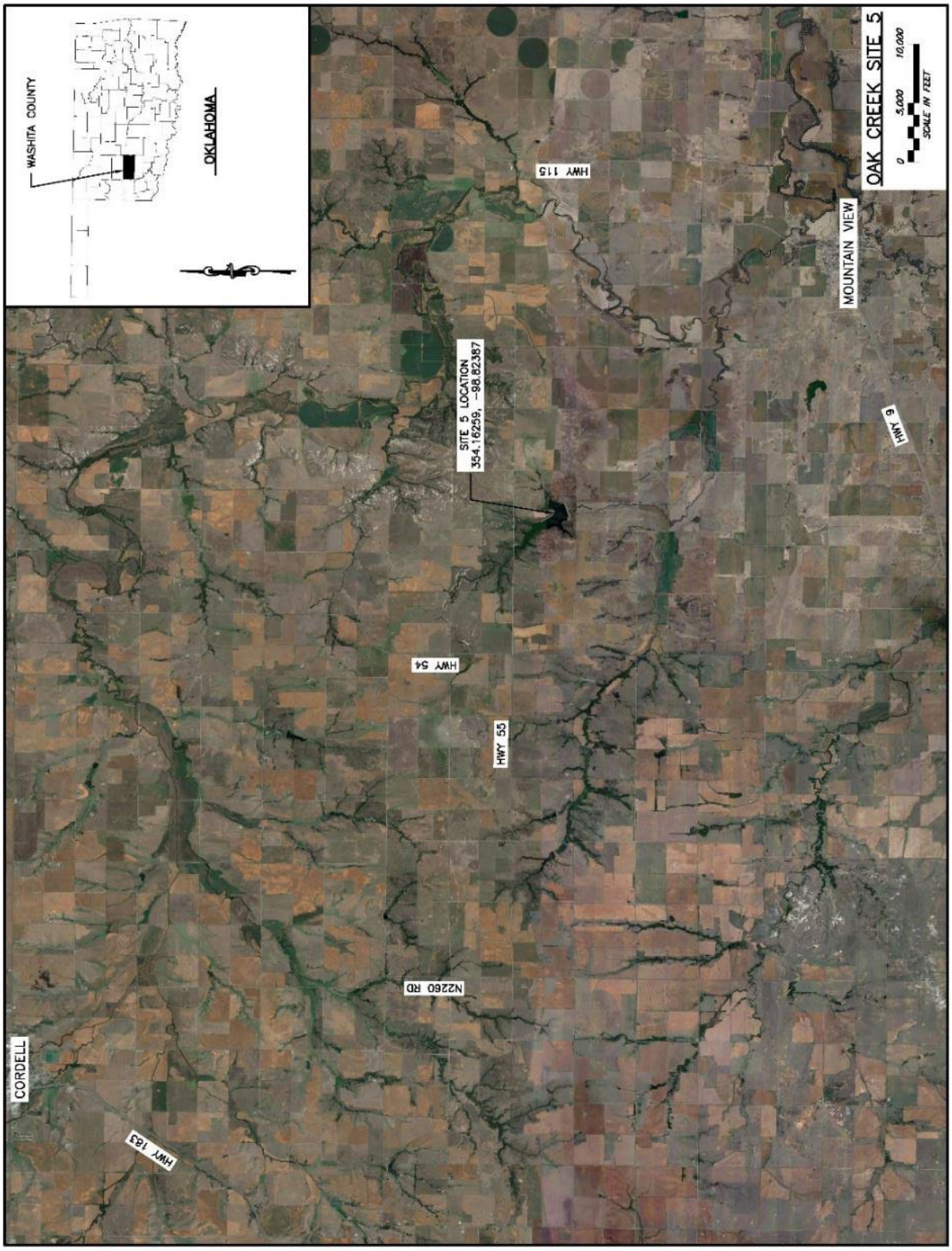


Figure B-2: Oak Creek Location Map



Appendix C – Support Maps

Figure C-1: Oak Creek MPS 5 Breach Inundation Map

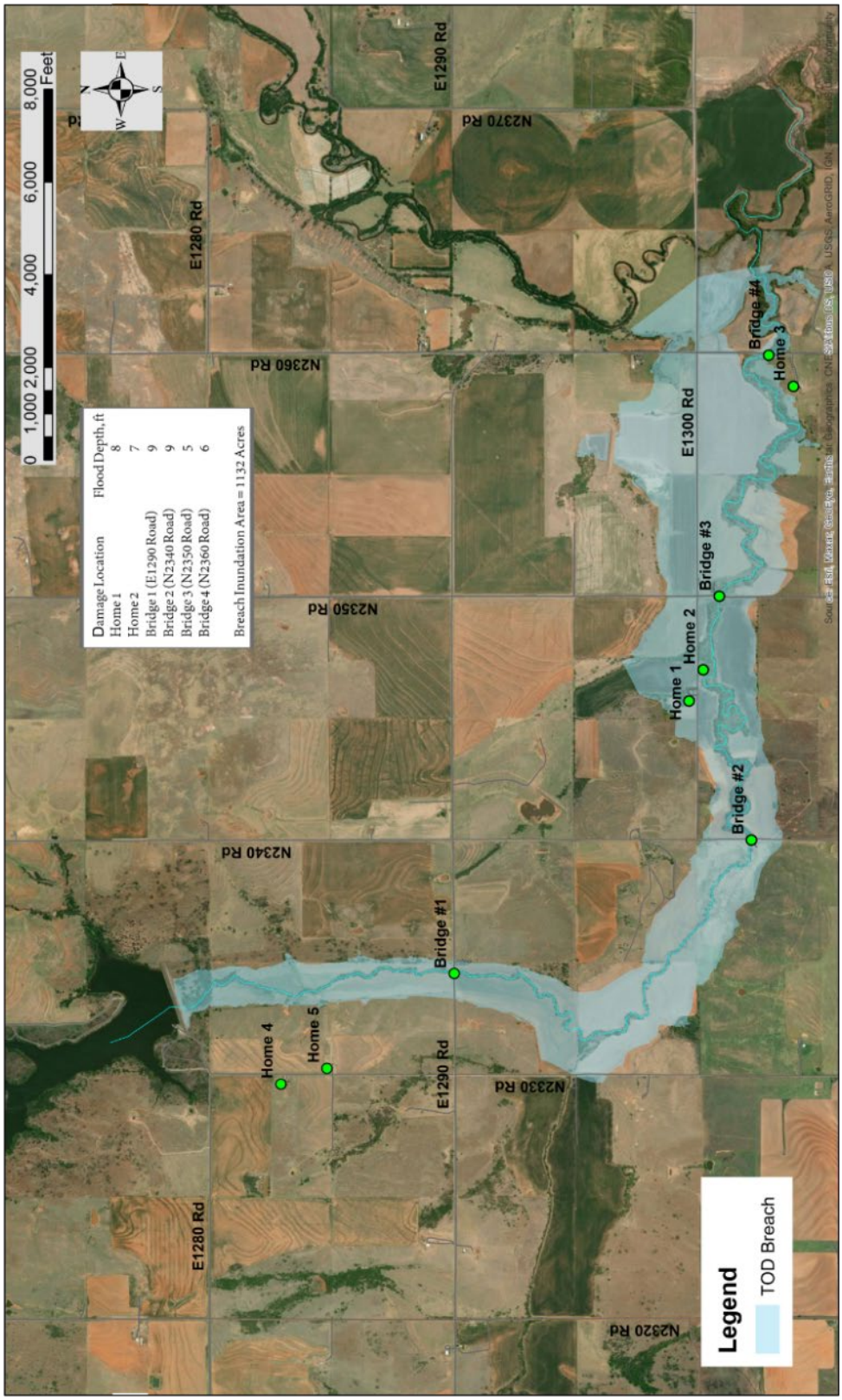


Figure C-2: Oak Creek MPS 5 Fault Map

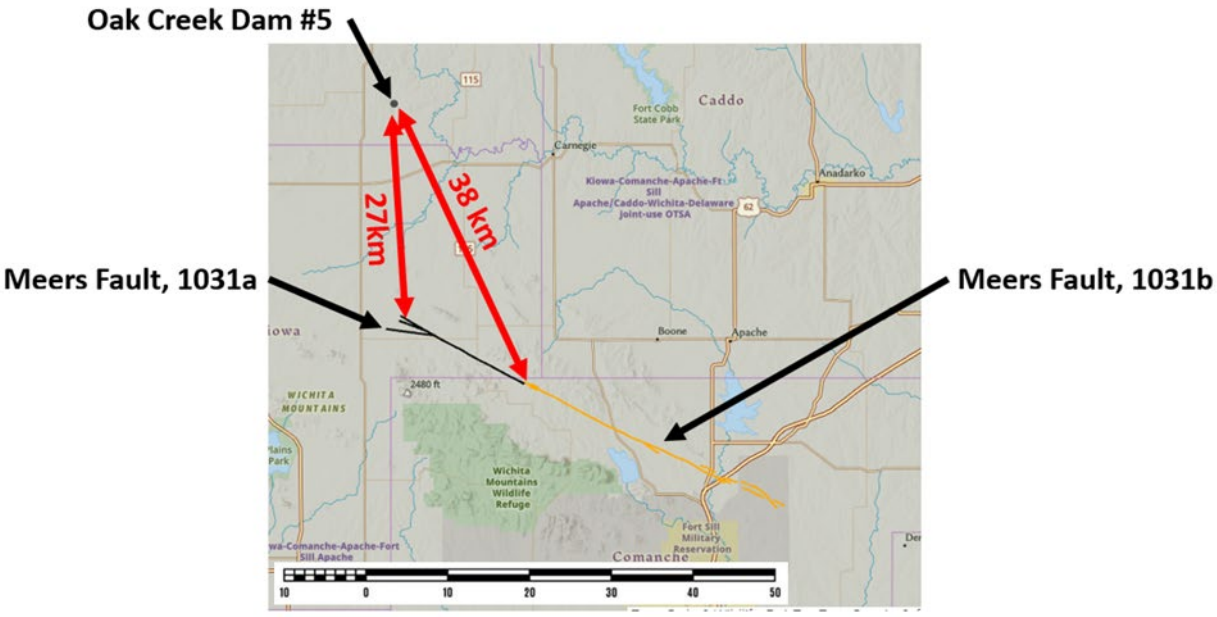


Figure C-3: Oak Creek MPS 5 Soils – Watershed

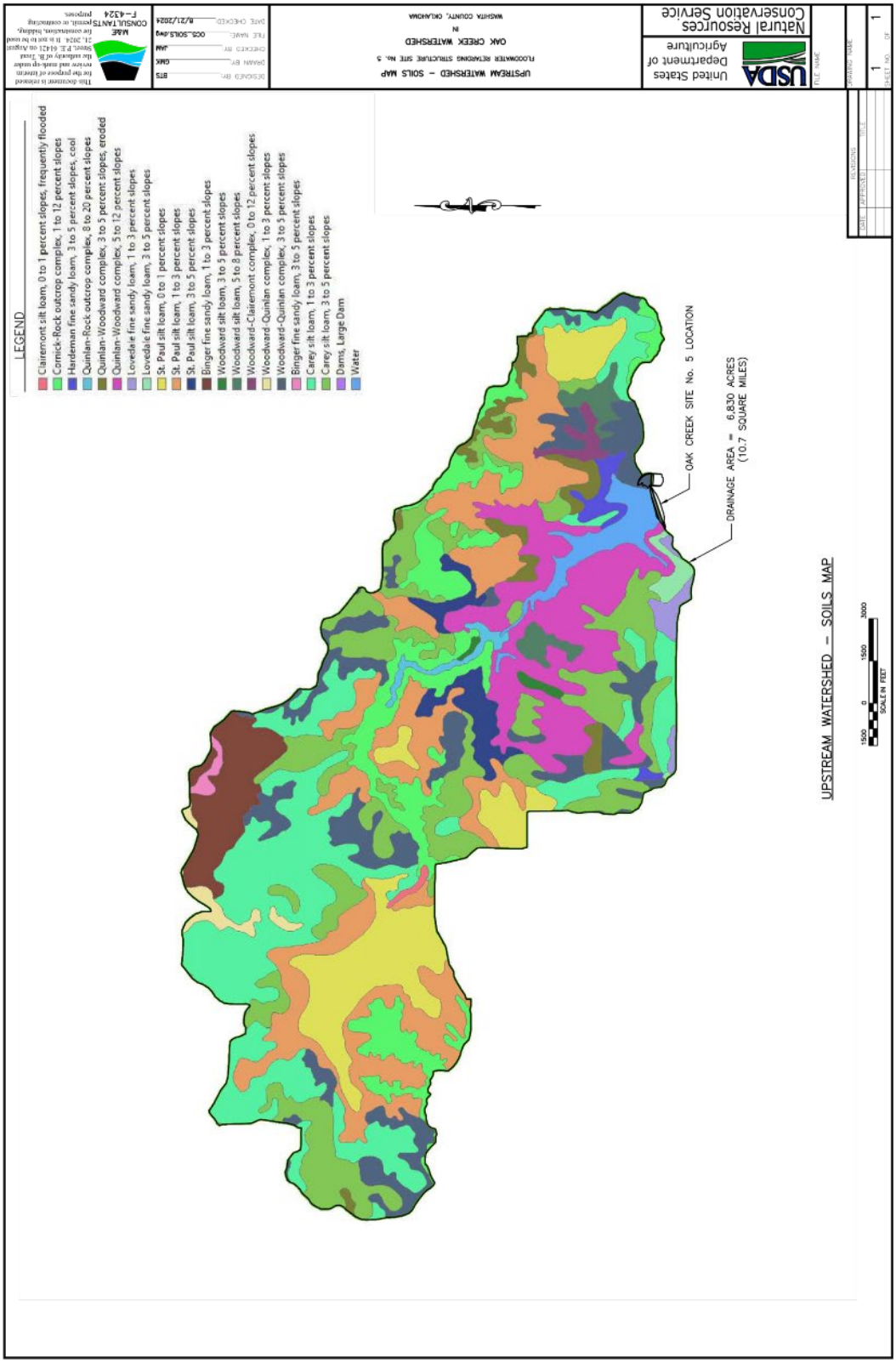


Figure C-4: Oak Creek MPS 5 Soils – Breach Inundation Area

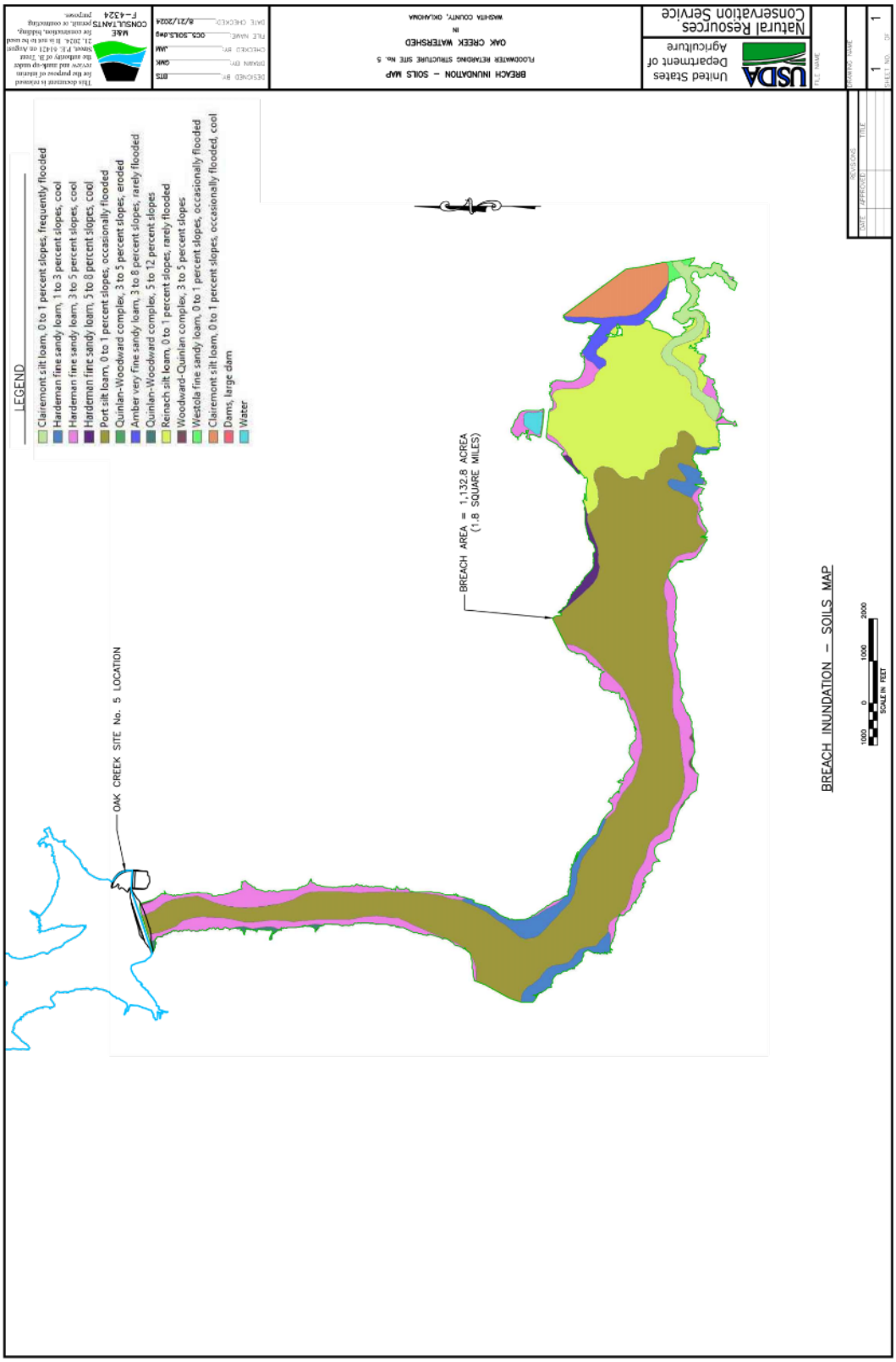
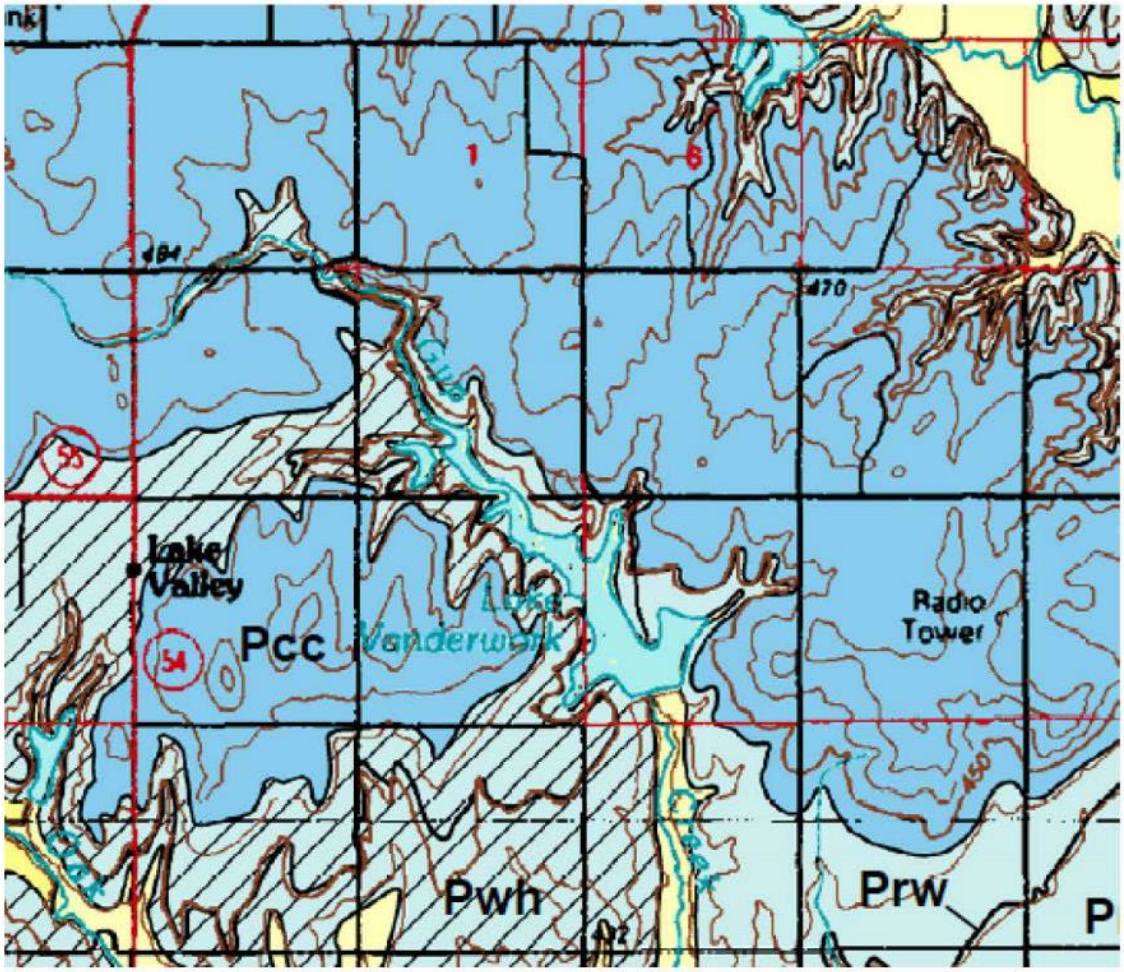


Figure C-5: Oak Creek MPS 5 Geology



Prs — RUSH SPRINGS FORMATION—Reddish-brown locally orange-brown, cross-bedded, fine- to very fine-grained sandstone with local occurrences of dolomite and gypsum. Weatherford Gypsum Bed (Prw) occurring from 9 to 18 m below top of unit. Thickness varies between 60 m in west to 90 m in central and east parts of quad

Pwh — WHITEHORSE GROUP, Undifferentiated—Reddish-brown and orange-brown, fine-grained sandstone and minor siltstone of the Marlow Formation (below) and the Rush Springs Formation (above). Units undifferentiated in southwestern part of map area due to absence of the Emanuel gypsum bed at the top of the Marlow Formation

Figure C-5. An excerpt from the Oklahoma Geologic Quadrangle OGQ–58 by Galen W. Miller and Thomas M. Stanley, 2004.

Figure C-6 – Land Use/Land Cover – Watershed

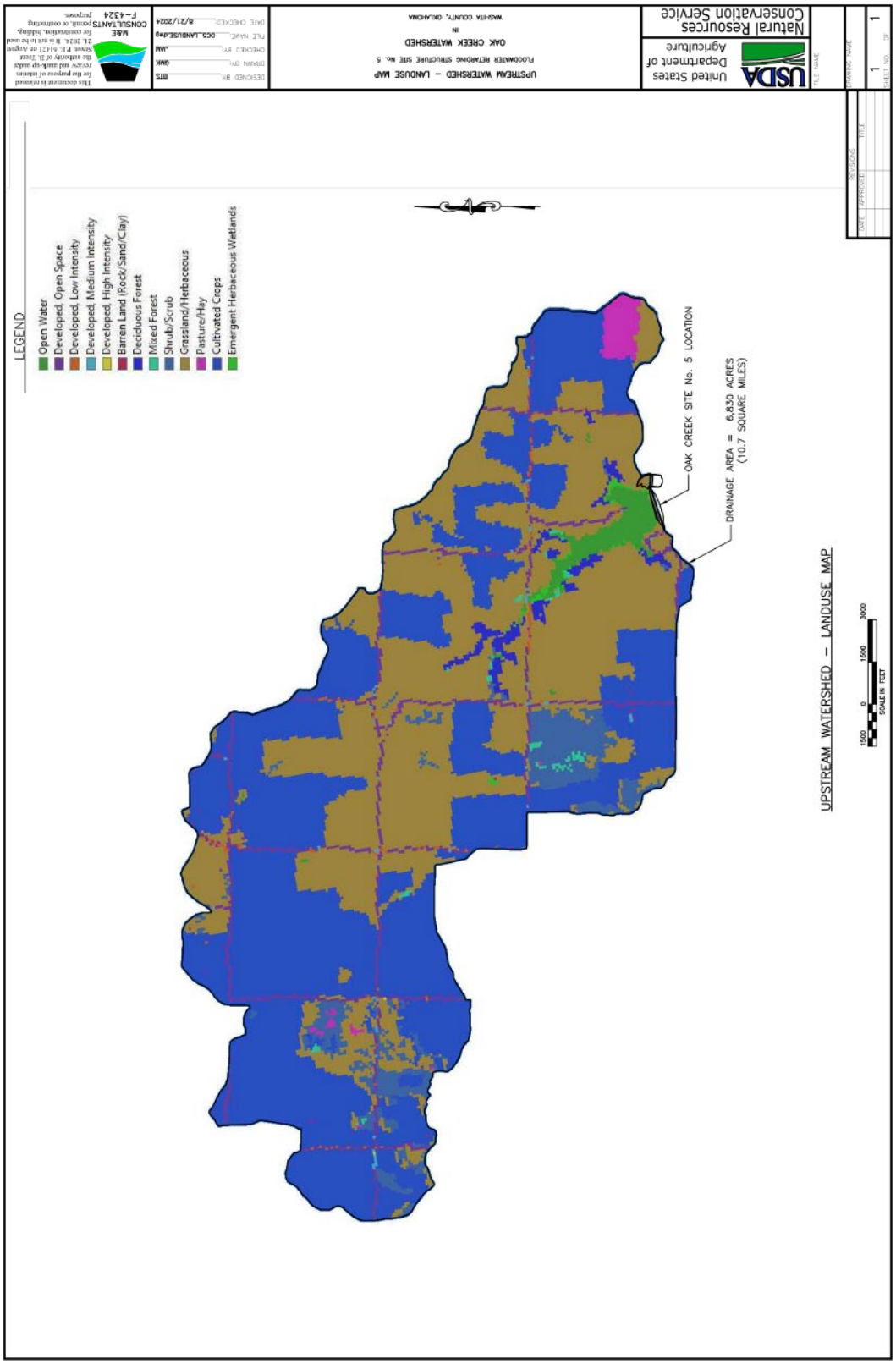


Figure C-7: Land Use/Land Cover – Breach Inundation Area

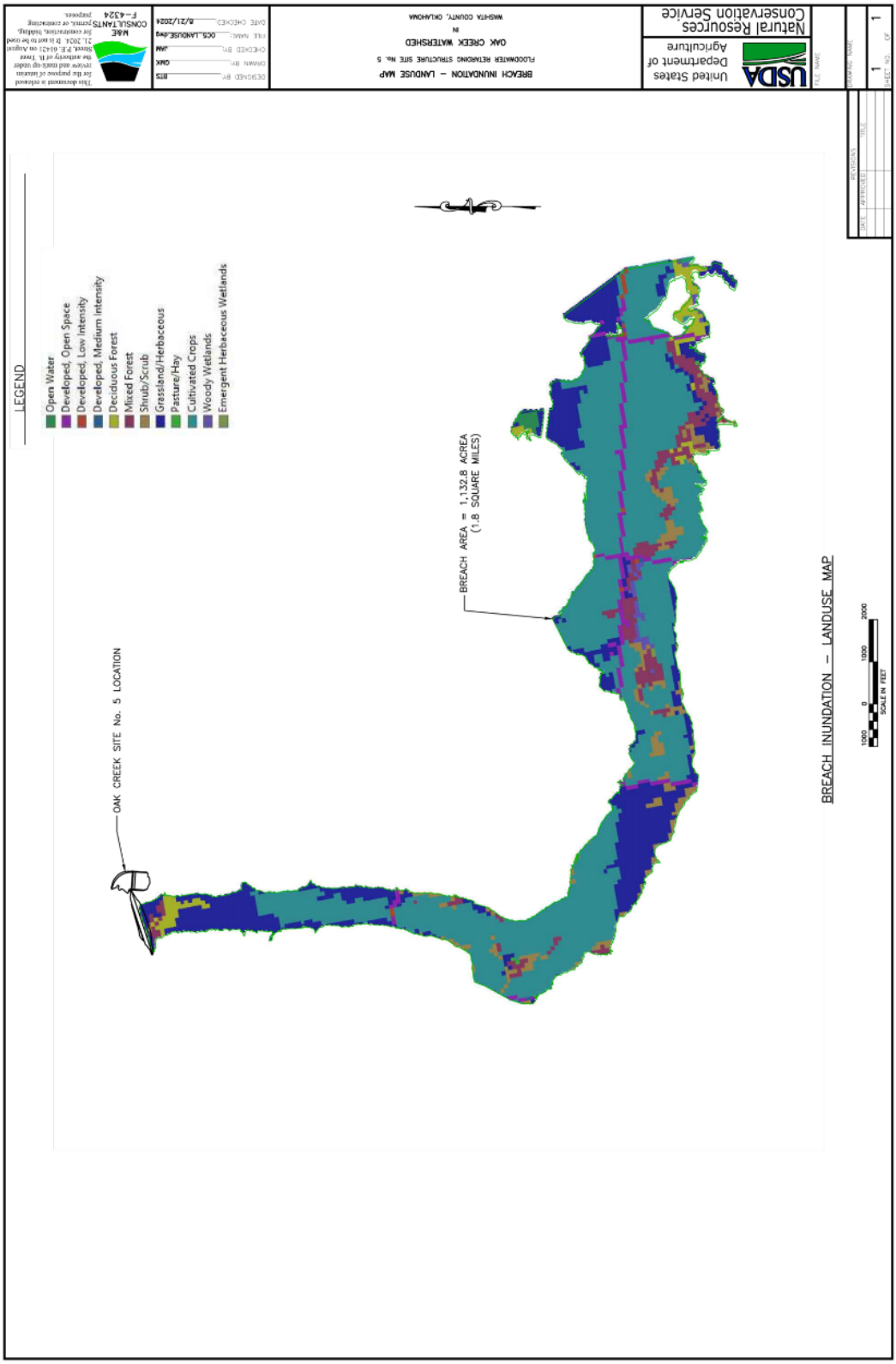


Figure C-8: Oak Creek MPS 5 FEMA Map Sheet 1 of 5

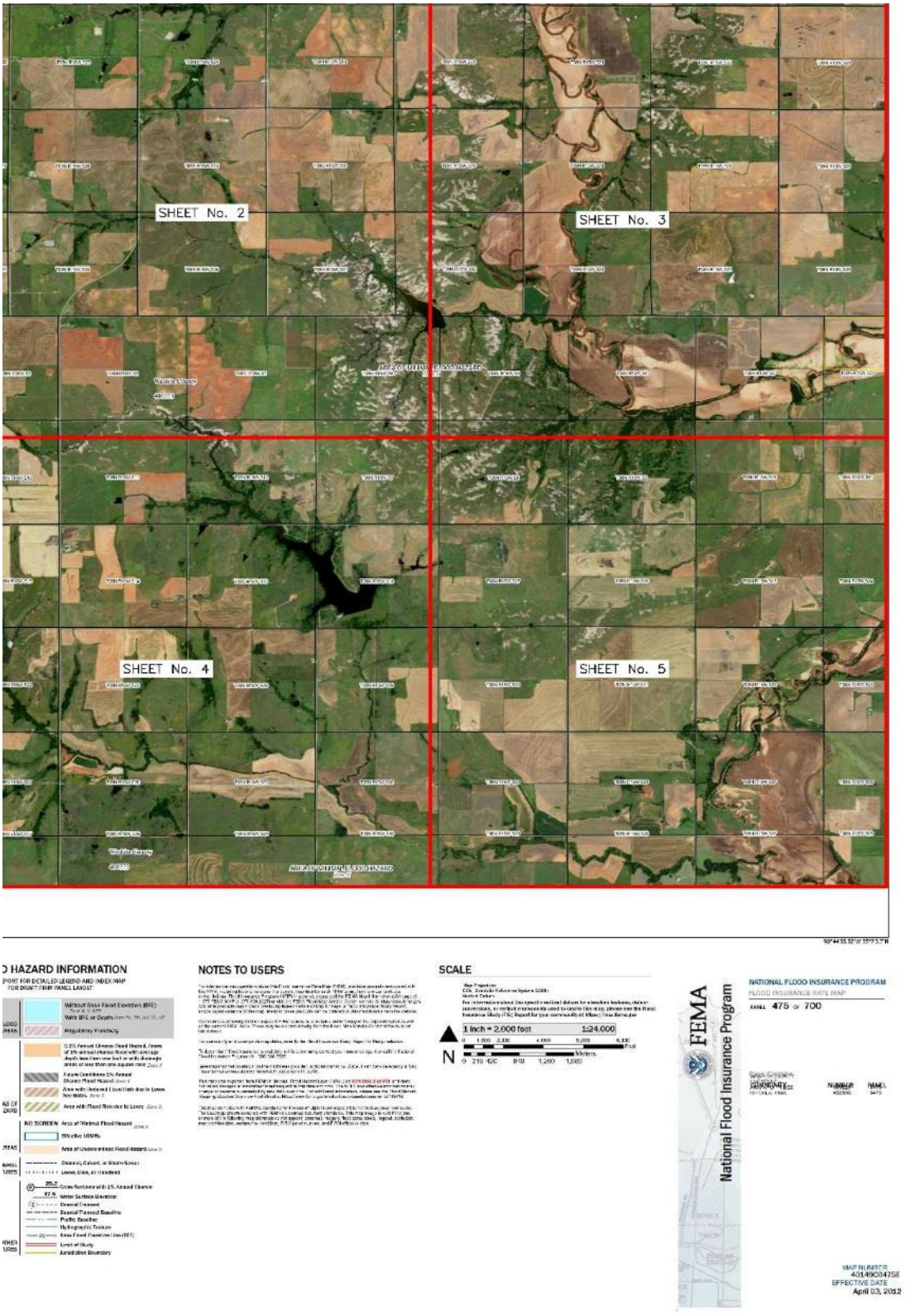


Figure C-9: Oak Creek MPS 5 FEMA Map Sheet 2 of 5

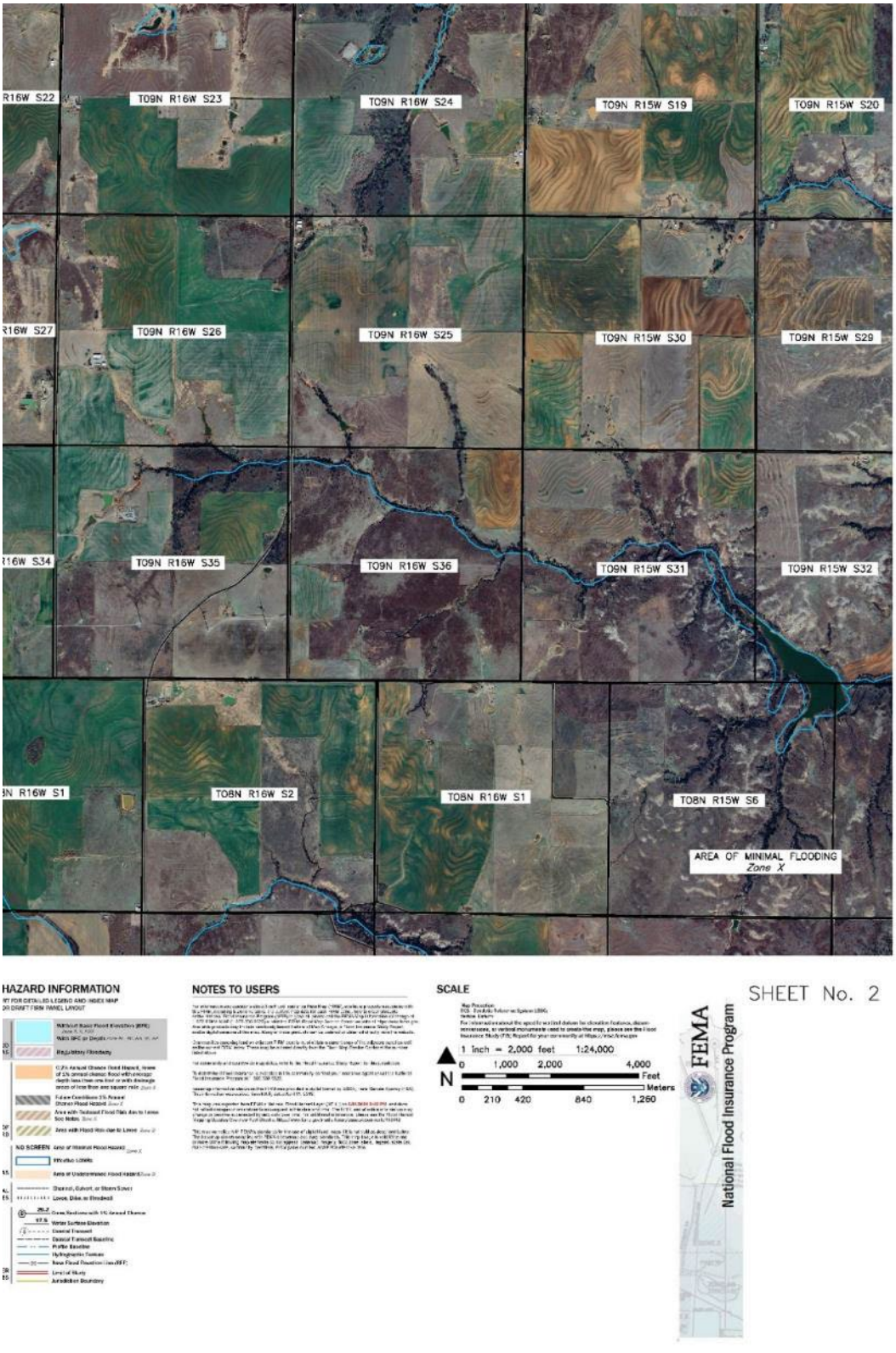
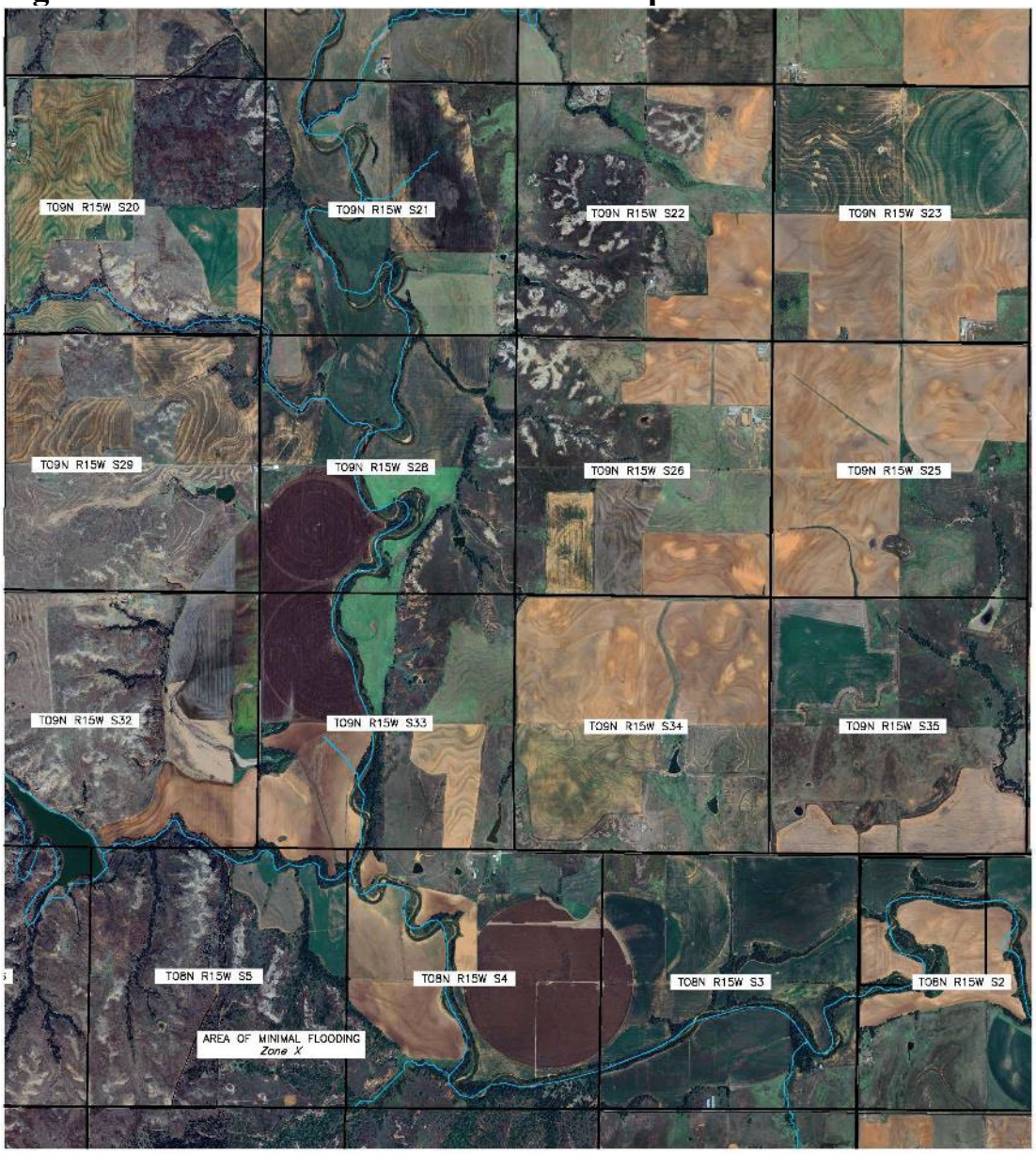
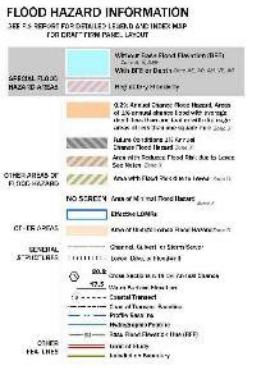


Figure C-10: Oak Creek MPS 5 FEMA Map Sheet 3 of 5





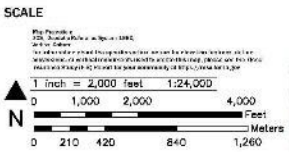
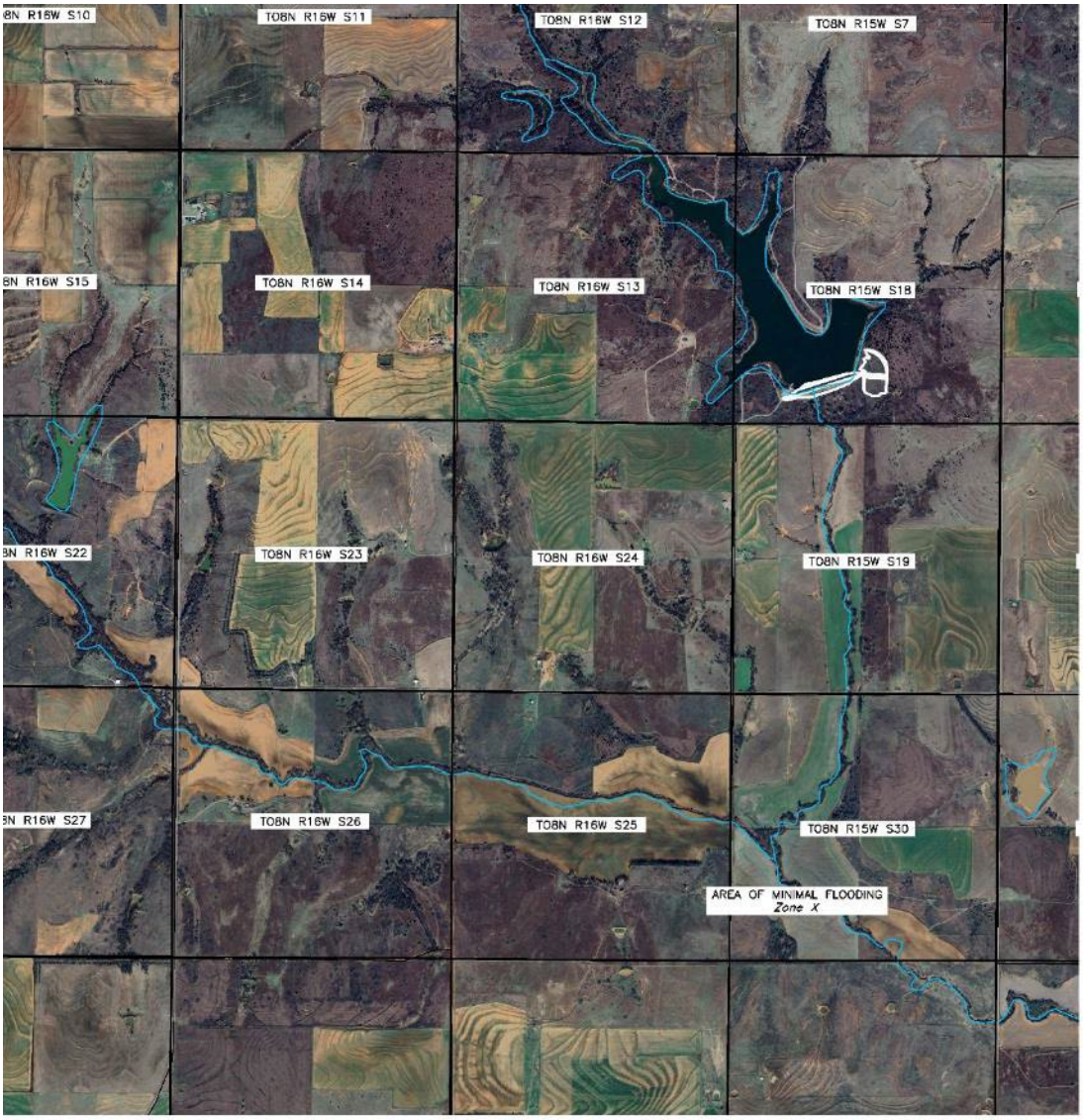
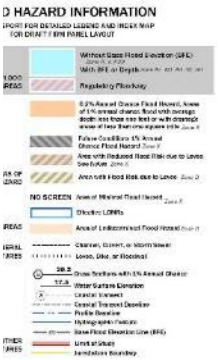
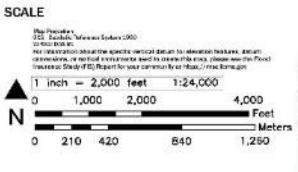


Figure C-11: Oak Creek MPS 5 FEMA Map Sheet 4 of 5







SHEET No. 4

Figure C-12: Oak Creek MPS 5 FEMA Map Sheet 5 of 5

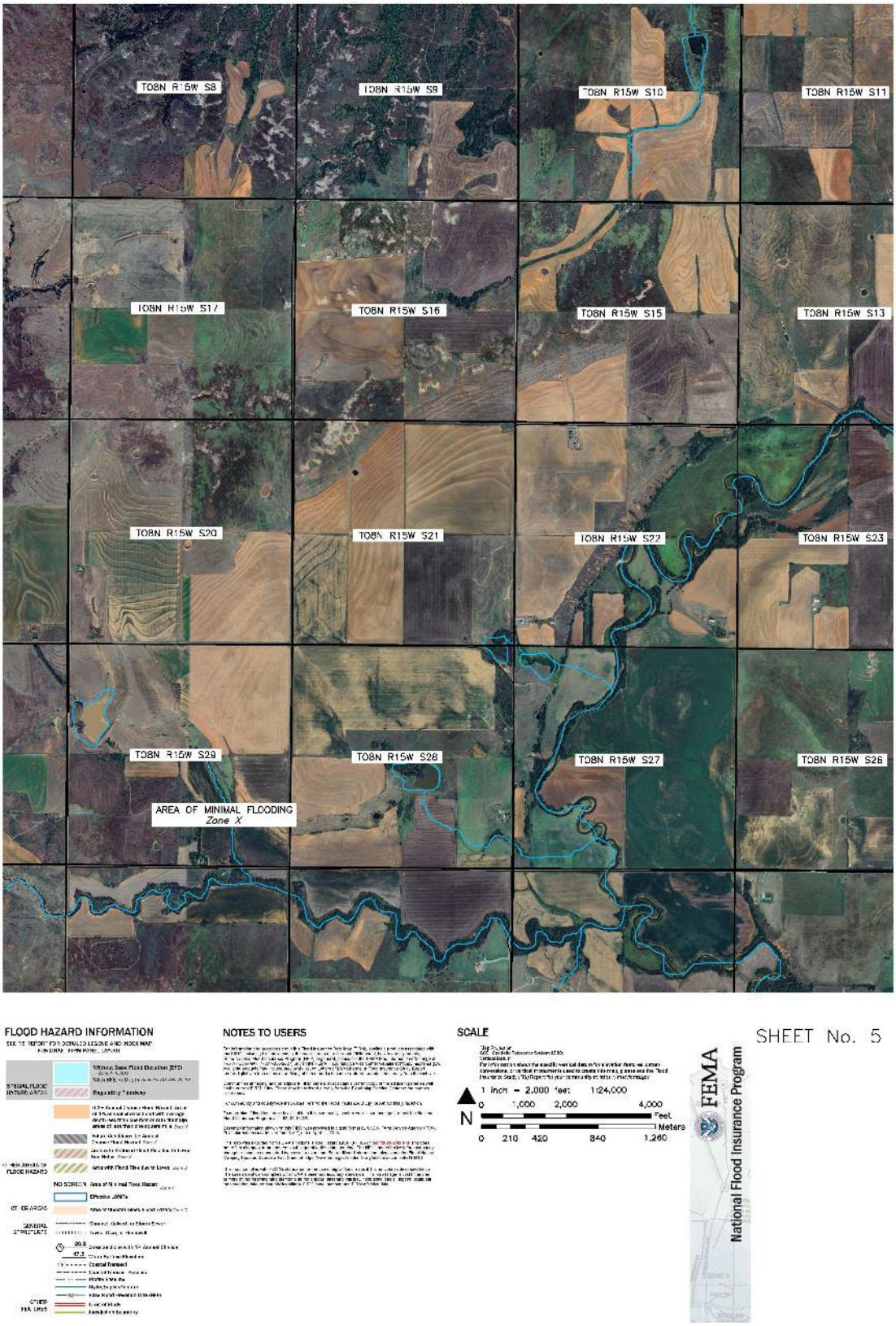
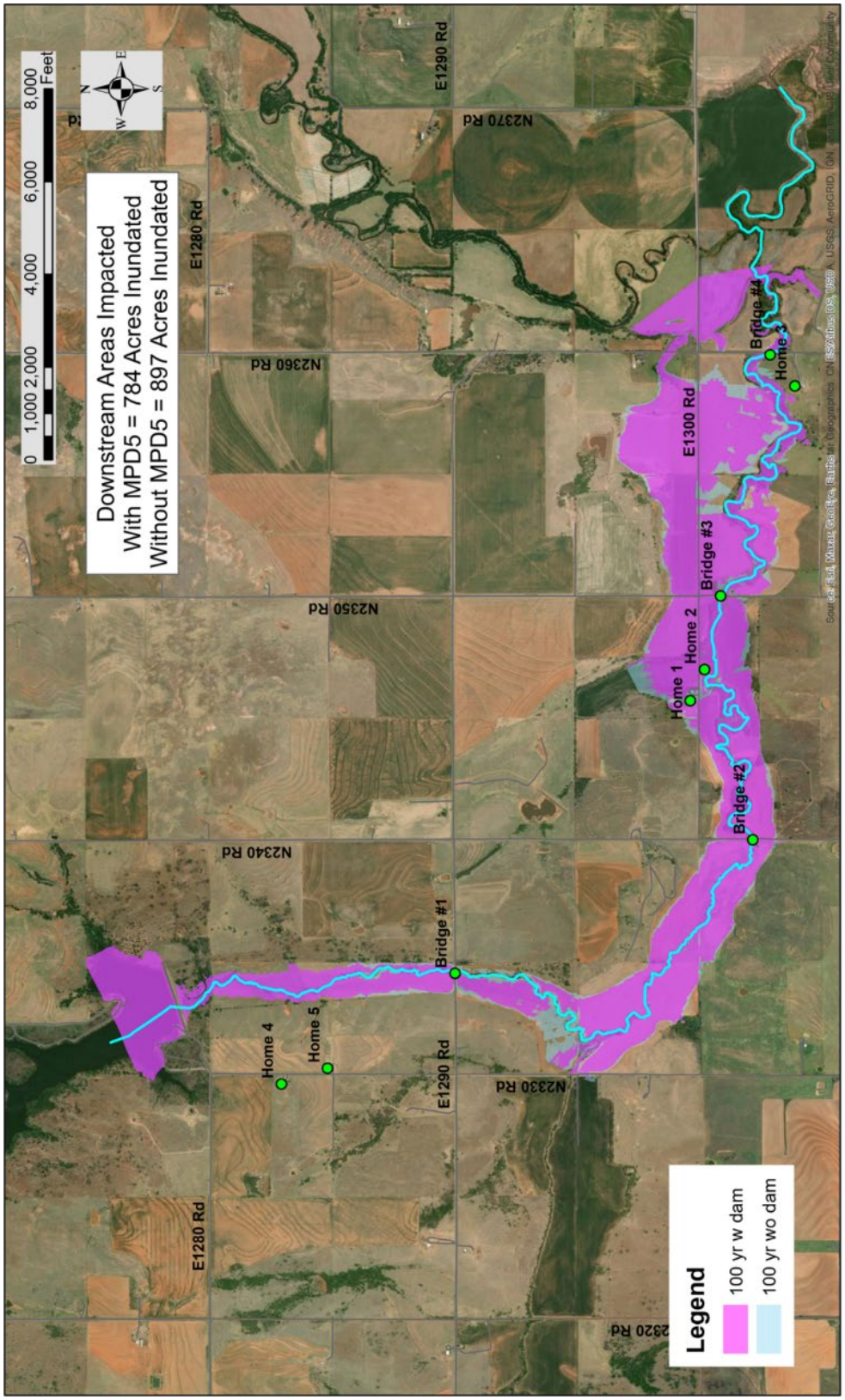


Figure C-13: Oak Creek MPS 5 100-year 24-hour Floodplain



100-year Inundation Map

Figure C-14: Oak Creek MPS 5 – Plan View Preferred Alternative

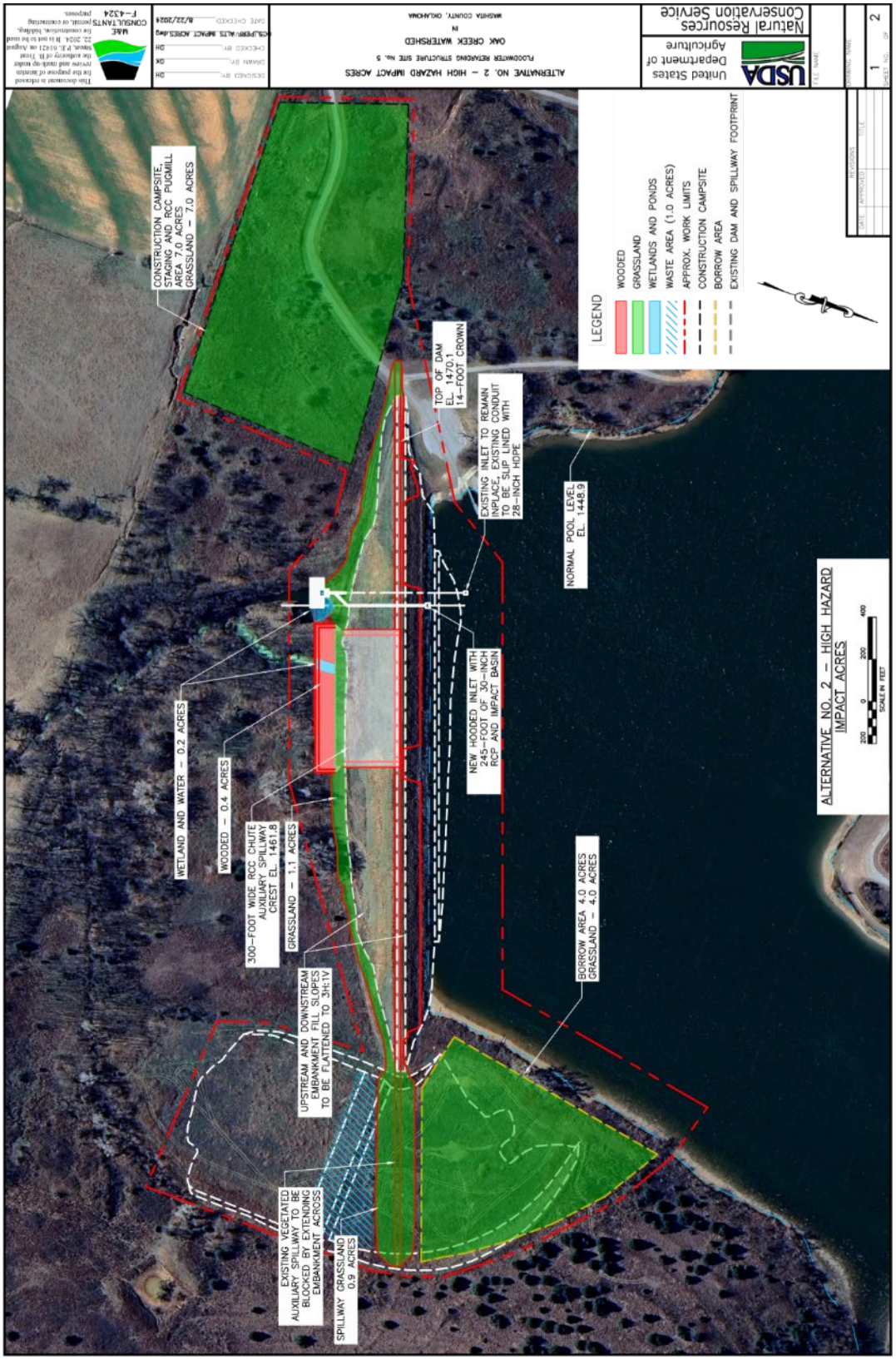
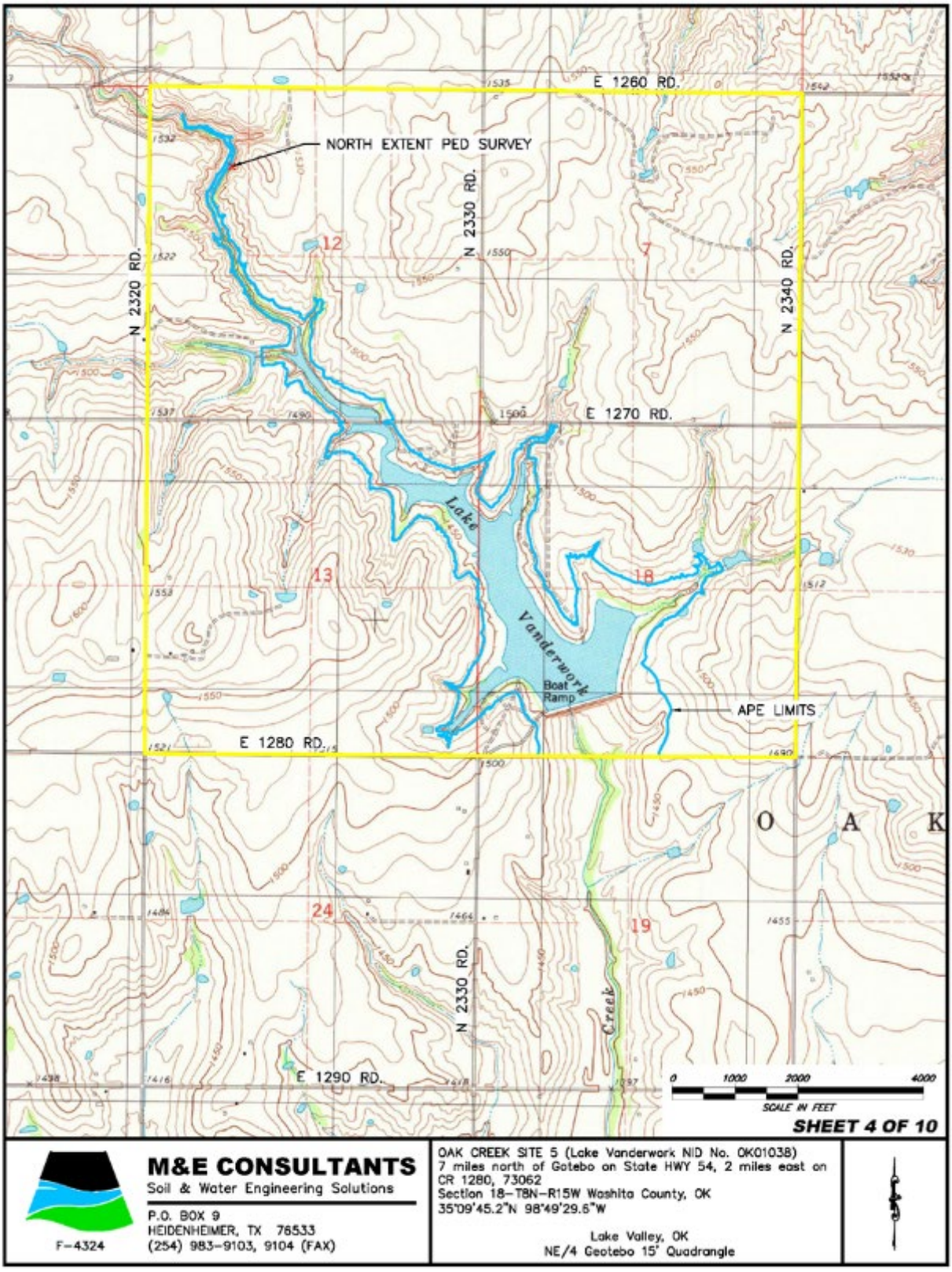


Figure C-15: Oak Creek MPS 5 – Cultural Resource APE



Appendix D – Investigation and Analysis Report

Chapter D.1 – Social and Economic Conditions

D.1.1 Economic Analysis

The NRCS National Watershed Program Manual (NWPM) was used as a reference for the economic analysis along with three other documents: the *National Resource Economics Handbook, Part 611 Water Resources Handbook for Economics*, USDA/Natural Resources Conservation Service, July 1998; *Principles and Guidelines for Water and Land Related Resources Implementation Studies (P&G)*, December 1983; and *Guidance for Conducting Analyses Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments (PR&G), DM 9500-013*. The latter includes requirements set forth in the Council on Environmental Quality (CEQ) *Principles and Requirements for Federal Investments in Water Resources (P&R)* and *Interagency Guidelines (IAG)*. DM 9500-013 provides guidance on completing a PR&G analysis, including steps in the planning and evaluation process, differences between project- and programmatic-level evaluations, direction on incorporating an ecosystem services framework, and techniques for economic analysis.

PR&G requires that public benefits (monetary and non-monetary) be maximized relative to cost. Furthermore, there is not a hierarchal relationship among the economic, social, or environmental goals. In general, the economic, social, and environmental impacts presented in this plan were developed based on PR&G utilizing methods of evaluating rural community flood reduction damages and related impacts, and recreational benefits provided by Oak Creek MPS 5.

In cooperation with local interests that have oversight or implementation authorities and responsibilities, a "locally preferred" alternative was identified. This alternative was fully considered and carried forward into the final array of solutions and given full and equal consideration in the decision-making process.

PR&G allows a wide range of alternatives to illustrate the range of potential tradeoffs among environmental, economic, and social goals. Alternatives considered included No Action, the Future Without Federal Investment (FWOFI) Alternative, the locally preferred alternative, and the National Efficiency Evaluation (NEE) Alternative. Alternatives were compared against the FWOFI Alternative which involved projecting existing resources and conditions into the future to establish a benchmark against which alternatives were evaluated. Tradeoffs between alternatives with respect to environmental, economic, and social goals were identified.

The Federal Objective, as set forth in the Water Resources Development Act of 2007, specifies that Federal water resources investments shall reflect national priorities, encourage economic development, and protect the environment by: (1) seeking to maximize sustainable economic development; (2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.

The Guiding Principles constitute the concepts that should be considered when analyzing Federal investments in water resources and the General Requirements are topics that agencies must consider when analyzing Federal investments in water resources. The following Principles constitute the overarching concepts the Federal government seeks to promote through Federal investments in water resources now and into the foreseeable future.

A. Healthy and Resilient Ecosystems. Federal investments in water resources should protect and restore the functions of ecosystems and mitigate any unavoidable damage to these natural systems.

B. Sustainable Economic Development. Federal investments in water resources should encourage sustainable economic development.

C. Floodplains. Federal investments in water resources should avoid the unwise use of floodplains and flood-prone areas and minimize adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used.

D. Public Safety. Threats to people, including both loss of life and injury, from natural events should be assessed in the determination of existing and future conditions, and ultimately, in the decision-making process.

E. Environmental Justice. Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Agencies should ensure that Federal actions identify any disproportionately high and adverse public safety, human health, or environmental burdens of projects on minority, Tribal, and low-income populations.

F. Watershed Approach. A watershed approach to analysis and decision-making facilitates evaluation of a more complete range of potential solutions and is more likely to identify the best means to achieve multiple goals over the entire watershed.

In general, the National Economic Efficiency (NEE) benefits presented in this supplemental plan were developed based on PR&G utilizing methods of estimating economic benefits (flood reduction benefits associated with the urban area, roadways, bridges, and other infrastructure) as well as social (recreational) and environmental benefits. In order to display annual updated benefits of Oak Creek MPS 5, for the structural scenario (rehabilitation of the dam), depicting average annual floodwater damages and recreational benefits as the result of no dam in place was compared to average annual floodwater damages and recreational benefits with the dam in place.

According to PR&G, after preliminary consideration, agencies may remove from detailed study those alternatives that do not achieve the Federal Objective and Guiding Principles. In addition, alternatives that may at first appear reasonable but clearly become unreasonable because of cost, logistics, existing technology, social, or environmental reasons may also be eliminated from further analysis. These alternatives should be briefly discussed to indicate that they were

considered, and the analysis should document the reason(s) why they were eliminated (e.g., they do not achieve the Federal Objective and Guiding Principles).

D.1.2 Alternatives

For this plan, one alternative was eliminated from detailed study. The following is a summary of this alternative.

Decommissioning the Dam – This alternative removes the storage function of the dam and reconnects, restores, and stabilizes the stream and floodplain functions. Downstream flooding conditions would be similar to those that existed prior to construction of the dam. Although decommissioning would prevent a catastrophic breach of the dam, it would also remove the recreational attributes of the reservoir. This would be socially unacceptable, resulting in an estimated loss of 4,450 annual sportfishing trips (*The Economic Value of Sportfishing Trips to Oklahoma Lakes*, Oklahoma Cooperative Extension Service, AGEC-1054, 2014).

During a meeting held on July 2, 2024, the Washita County Conservation District board of directors voted to select Alternative No. 2 as the locally preferred alternative. For purposes of establishing a "No Federal Action Alternative", in the absence of federal funding, the Sponsors would not implement the Federally preferred alternative according to NRCS standards and specifications. Therefore, the No Action and the Future Without Federal Investment (FWOFI) alternatives are identical.

In general, the National Economic Efficiency (NEE) benefits presented in this supplemental plan were developed based on PR&G utilizing methods of estimating economic benefits (flood reduction benefits associated with the urban area, roadways, bridges, and other infrastructure) as well as social (recreational benefits) and environmental benefits. In order to display annual benefits of Oak Creek MPS 5, average annual floodwater reduction and recreational benefits under the FWOFI alternative were compared to average annual floodwater reduction and recreational benefits for each alternative.

Along with the FWOFI alternative, two rehabilitation alternatives were identified and evaluated in detail:

Alternative No. 2 consists of slip-lining the existing 30-inch principal spillway (PS), installing a new PS consisting of a 30-inch RCP conduit with an impact basin, constructing an auxiliary spillway (ASW) 300-ft roller compacted concrete (RCC) chute over the existing embankment, and flattening the upstream (US) and downstream (DS) slopes. Various structural options associated with this alternative were evaluated, including standard and hooded inlets. This alternative would result in Oak Creek MPS 5 meeting the safety and performance standards for a high hazard dam. Additional landrights would not be required. The option which resulted in this alternative being the Locally Preferred alternative includes the hooded inlet.

One overarching concern associated with dam rehabilitation analyses is the intent of the program to minimize threat to human life. Threat to human life is central to the dam rehabilitation program. Agency policy allows for use of the other social effects goal (account in P&G terms) to

make the case for rehabilitating any given floodwater detention structure, even if the associated B/C ratio is less than 1:1. This is due to a priority placed on protecting lives. Also, trying to monetize the value of life, or in the case of dams, avoidance of loss of life, is fraught with subjective value judgments. Threat to human life can therefore be used to supersede purely economic considerations when deemed appropriate.

Alternative No. 3 consists of slip-lining the existing 30-inch principal spillway (PS), installing a new PS consisting of a 30-inch RCP conduit with an impact basin, constructing an auxiliary spillway (ASW) roller compacted concrete (RCC) chute over the exiting embankment, and flattening the upstream (US) and downstream (DS) slopes. Various structural options associated with this alternative were evaluated, including 80-ft and 100-ft RCC chutes, and standard and hooded inlets.

This alternative would result in Oak Creek MPS 5 meeting the safety and performance standards for a significant hazard dam. Therefore, approximately 1,132 acres of easements would be required in the breach area to prevent future development, and two residences would need to be either relocated or floodproofed. For floodproofing, an earthen berm and a parapet wall were investigated. Additional landrights would not be required.

The options which resulted in this alternative being the National Economic Efficiency alternative include the hooded inlet and floodproofing the two residences with an earthen berm.

D.1.3 Population at Risk (PAR)

For the breach analysis, NRCS policy, "Guidance for Completion of Evaluation of Potential Rehabilitation Projects", updated January 2021, was utilized to estimate population at risk (PAR) for motorists and persons at risk in buildings downstream of the dam. The worksheet used to calculate PAR is separated into three sections: Structures (Elevated) Impacted by Potential Breach (i.e., mobile homes, etc.); Structures (with Foundations) Impacted by Potential Breach (homes, condos, commercial buildings, schools, etc.); and Highways and Railroads.

Two residences would be affected by a breach of Oak Creek MPS 5. Water depth above the first-floor elevation (FFE) in one house would be about 5.5 feet. Water depth above FFE in the other house would be about 6.4 feet. Using the guidance document mentioned above, PAR would be 3 per house for a total of 6.

According to Oklahoma Department of Transportation Annual Average Daily Traffic (AADT) map dated 2018, there are no recorded AADT data for the roads within the breach area of Oak Creek MPS 5 (https://www.odot.org/maps/aadt/2018/75_Washita.pdf). Therefore, PAR for roadways and stream crossings is zero.

Adding the PAR from the residences with the PAR from the roadways and stream crossings results in a total PAR of 6.

D.1.4 Stream Crossings and Roadways Damages

To estimate stream crossings and roadways damage reduction benefits, a customized Excel worksheet (which has been utilized in multiple water resource projects in the past) was used. Floods from the 1-year through the 500-year storms were included in the worksheet to estimate average annual damages to stream crossings and roadways. Damages were based on current construction and/or repair values associated with roadways and bridges. Results were used in the economic analysis. Total damages without the dam are $31,400 and damages with the dam are $7,800, resulting in benefits of $23,600. Tables D.1-1 and D.1-2 include the supporting data for this analysis.

Table D.1-1: Stream Crossing Damages With Dam by Frequency Storm

	500-yr	100-yr	50-yr	25-yr	10-yr	2-yr
CR E1290						
Depth of Water (ft)	1.6	0.3	0	0	0	0
Damages	$20,065	$0	$0	$0	$0	$0
CR N2340						
Depth of Water (ft)	2.1	1.3	0.9	0.6	0	0
Damages	$78,483	$63,898	$56,537	$50,912	$0	$0
CR N2350						
Depth of Water (ft)	1.8	0.9	0.5	0	0	0
Damages	$92,661	$73,536	$64,972	$0	$0	$0
CR N2360						
Depth of Water (ft)	2.2	1.2	0.7	0.3	0	0
Damages	$75,019	$53,387	$45,896	$0	$0	$0
Average Annual Damages	$7,800					

Table D.1-2: Stream Crossing Damages Without Dam by Frequency Storm

	500-yr	100-yr	50-yr	25-yr	10-yr	2-yr
CR E1290						
Depth of Water (ft)	2.6	2.0	1.7	1.4	1.0	0.2
Damages	$25,484	$22,163	$20,558	$19,008	$16,933	$0
CR N2340						
Depth of Water (ft)	3.1	2.1	1.7	1.3	0.6	0
Damages	$97,362	$78,466	$71,268	$63,277	$51,192	$0
CR N2350						
Depth of Water (ft)	2.5	1.6	1.1	0.7	0	0
Damages	$107,354	$88,473	$77,854	$69,141	$0	$0
CR N2360						

Depth of Water (ft)	2.9	1.9	1.4	0.9	0.2	0
Damages	$90,351	$68,260	$56,875	$48,935		$0
Average Annual Damages	$31,400					

Table D.1-3 summarizes average annual floodwater damages and benefits for the crossings and roadways.

Table D.1-3: Summary of Stream Crossings/Roadways Floodwater Average Annual Damages and Benefits

Stream Crossings	ADT (#) [1/]	Average Annual Damages		Average Annual Benefits
		Without Dam	With Dam	
4 Crossings	NA	$31,400	$7,800	$23,600
TOTALS	**NA**	**$31,400**	**$7,800**	**$23,600**

[1/] Average Daily Traffic, ODOT, 2018.

D.1.5 Urban Damages

Current, 2024 local tax appraisal district records were utilized to obtain the structural values of two residences (about $427,000 depreciated value, which includes outbuildings but excluding land values) that would be affected by project activities. Content values were estimated as a percentage (75%) of assessed property values. Estimated floodwater depths for various storms (1-year storm through the 500-year storm) for each structure were based on the results of the hydrology and hydraulics (H&H) simulation modeling. Using photos taken during a field review in May 2023, elevation where damage starts for each property was estimated (e.g., first floor elevation). Floodwater data was then used with water depth-to-damage functions provided by the publication *USACOE Economic Guidance Memorandum (EGM) 04-01, Generic Depth-Damage Relationships for Residential Structures with Basements*, dated 10/10/2003. Even though the title says "with basements", there was a section of data for structures without basements. These factors were used to estimate structural and content damage. These depth-to-damage functions were specific for different types of residences (i.e. one or two story homes with or without basements; split-level homes; mobile homes; apartments; etc.). All estimated values and damages were assessed within a customized Excel template prepared for this purpose. Average annual damages for both houses without the dam are $8,700, and with the dam are $2,900, equating to $5,800 of benefits. NOTE: There were no critical facilities affected by the 500-year frequency storm event without the dam scenario. See Tables D.1-4 and D.1-5 for supporting data.

D.1-4: Urban Damages by Storm Frequency - House #1: Structure Value = $252,700; Contents Value = $189,500; 1 Story, No Basement

With Dam	500-yr	100-yr	50-yr	25-yr	10-yr	2-yr
Depth of Water (ft)	1.27	-1.64	-1.54	-1.84	-3.66	-9.32
Structure Damage Factor	25.94	1.00	1.25	0.50	-	-
Contents Damage Factor	14.68	0.96	1.20	0.48	-	-
Structure Damages	$65,549	$2,527	$3,159	$1,263	$0	$0

Content Damages	$27,822	$1,819	$2,274	$910	$0	$0
Average Annual Damages	$768	-	-	-	-	-
Without Dam						
Depth of Water (ft)	1.96	1.03	0.48	-1.51	-2.06	-7.41
Structure Damage Factor	32.10	23.30	18.35	1.25	-	-
Contents Damage Factor	17.90	13.30	10.70	1.20	-	-
Structure Damages	$81,115	$58,878	$46,369	$3,159	$0	$0
Content Damages	$33,924	$25,206	$20,279	$2,274	$0	$0
Average Annual Damages	$2,664	-	-	-	-	-

D.1-5: Urban Damages by Storm Frequency - House #2: Structure Value = $174,100; Contents Value = $130,600; 1 Story, No Basement

With Dam	500-yr	100-yr	50-yr	25-yr	10-yr	2-yr
Depth of Water (ft)	1.79	0.60	0.05	-0.58	-2.64	-8.64
Structure Damage Factor	30.34	19.34	13.4	6.86	-	-
Contents Damage Factor	16.98	11.22	8.10	4.68	-	-
Structure Damages	$52,825	$33,673	$23,331	$11,944	$0	$0
Content Damages	$22,173	$14,651	$10,577	$6,111	$0	$0
Average Annual Damages	$2,116	-	-	-	-	-
Without Dam						
Depth of Water (ft)	2.75	1.47	0.89	0.27	-0.86	-6.71
Structure Damage Factor	38.50	27.70	22.31	16.37	3.59	-
Contents Damage Factor	21.18	15.60	12.78	9.66	2.97	-
Structure Damages	$67,032	$48,228	$38,844	$28,502	$6,251	$0
Content Damages	$27,657	$20,371	$16,688	$12,614	$3,878	$0
Average Annual Damages	$5,992	-	-	-	-	-

D.1.6 Agricultural Damages – Crop and Pasture

For flood damage reduction crop and pasture benefits, a reconnaissance of the affected area was completed in May 2023. Cropland damage factors by storm frequency and depth of flooding were obtained from historical NRCS watershed studies. Current budget data (i.e. yields, field operations, etc.) were obtained from a combination of local sources and the Oklahoma State University Extension Service website (https://extension.okstate.edu/programs/farm-management-and-finance/budgets/sample-budgets/). Using a spreadsheet tool, composite damageable values (CDV) were calculated using USDA-ERS (Economic Research Service) state-level normalized price received estimates for commodities (ERS report year 2023). By applying the damage factors to the CDV, damages by storm frequency by depth of flooding were estimated and then aggregated to represent annual damages. This resulted in $12,300 damages without the dam and $6,600 with the dam for each alternative. Benefits are realized by the amount damages are

reduced, which would be $5,700 for each alternative. See Tables D.1-6, D.1-7, D.1-8 and D-1.9 for supporting data.

D.1-6: Acres Flooded by Crop Without Dam by Storm Frequency

Crop	100-yr	50-yr	25-yr	10-yr	2-yr
Corn	4.5	4.3	3.8	2.9	1.0
Cotton, Upland	62.0	59.2	52.8	40.4	14.1
Alfalfa	26.3	25.1	22.4	17.1	6.0
Wheat, Winter	493.6	471.0	420.5	321.7	111.9
Hay/Pasture	197.7	186.4	171.1	142.4	43.7
Totals	784.1	746.0	670.6	524.5	176.7

D.1-7: Acres Flooded by Crop With Dam by Storm Frequency

Crop	100-yr	50-yr	25-yr	10-yr	2-yr
Corn	3.9	3.4	2.7	1.4	0.4
Cotton, Upland	53.9	46.8	36.9	19.9	4.9
Alfalfa	22.8	19.8	15.6	8.4	2.1
Wheat, Winter	428.9	372.5	293.6	158.6	38.9
Hay/Pasture	175.5	159.9	140.3	93.2	31.0
Totals	685.0	602.4	489.1	281.5	77.3

D.1-8: Damages by Crop Without Dam by Storm Frequency

Crop	CDV/Ac	100-yr	50-yr	25-yr	10-yr	2-yr
Corn	$134.03	$598	$571	$510	$390	$136
Cotton, Upland	$230.57	$14,298	$13,641	$12,180	$9,319	$3,241
Alfalfa	$219.13	$5,754	$5,490	$4,902	$3,750	$1,304
Wheat, Winter	$52.15	$25,746	$24,564	$21,933	$16,781	$5,836
Hay/Pasture	$5.48	$1,083	$1,021	$938	$780	$240
Totals	-	$47,479	$45,287	$40,463	$31,020	$10,757

D.1-9: Damages by Crop With Dam by Storm Frequency

Crop	CDV/Ac	100-yr	50-yr	25-yr	10-yr	2-yr
Corn	$134.03	$520	$452	$356	$192	$47
Cotton, Upland	$230.57	$12,423	$10,788	$8,503	$4,593	$1,127
Alfalfa	$219.13	$4,999	$4,341	$3,422	$1,848	$453
Wheat, Winter	$52.15	$22,370	$19,426	$15,311	$8,271	$2,029
Hay/Pasture	$5.48	$962	$875	$769	$511	$170
Totals	-	$41,274	$35,882	$28,361	$15,415	$3,826

D.1.7 Summary of Floodwater Damages/Benefits

Table D.1-10 reflects updated floodwater damage reduction average annual benefits of the project.

Table D.1-10: Floodwater Reduction Damages/Benefits summary

Item	Average Annual Values		Average Annual Benefits
	Without the Dam	With the Dam	
Floodwater Reduction			
Non-Agriculture			
Urban Structures	$8,700	$2,900	$5,800
Road and Bridge	$31,400	$7,800	$23,600
Subtotal	$40,100	$10,700	$29,400
Agriculture			
Crop and Pasture	$12,300	$6,600	$5,700
Subtotal	$12,300	$6,600	$5,700
Totals	**$52,400**	**$17,300**	**$35,100**

As reflected in Table D.1-10, current average annual floodwater damages with the dam are $17,300. Floodwater damages without the dam were estimated to be $52,400. The difference of $35,100 reflects the average annual benefits that the dam currently provides to downstream properties.

D.1.8 Future Without Federal Investment (FWOFI) Damages Avoided

In NRCS Title 390 – National Instruction, *Part 303 – Clarification and Instructions for the No-Action Alternative in Supplemental Watershed Rehabilitation Plans*, the following is provided: "For watershed rehabilitation projects, the no-action alternative is the condition of the existing dam remaining in place without any action that would improve the dam from its original design or correct safety deficiencies beyond maintenance or replacements performed in accordance with its operation and maintenance plan. The potential impacts of a dam failure would include adverse effects on human life, property, and the environment. The no-action alternative documents baseline conditions against which all other alternatives are analyzed."

"To annualize flood damages for the no-action alternative, the annual probability of dam failure will need to be estimated and will require judging the most probable failure mechanism by evaluating the potential modes of failure, followed by procedures such as:" NOTE: three cases are then identified in the document.

"Using the above estimated annual probability for dam failure and its associated flood damages, and the annual probabilities for the more frequent floods (2-yr through 1,000-yr) along with their associated damages, the overall annual flood damages can be estimated using HEC-FDA or equivalent method."

For Oak Creek MPS 5 a SITES model was run to determine if a breach of the auxiliary spillway crest or overtopping of the embankment crest would occur first. Based on Atlas 14, a 16.5 inch, 24-hour duration storm event breached the auxiliary spillway crest with a flow depth of 4 feet. This is an approximate 7,500-year frequency storm. Using this storm frequency and corresponding depths, damages to the downstream residences, stream crossings and roadways, and agricultural lands was estimated to be about $3 million. This also included loss of recreational benefits, based on the assumption a 5-yr period would be needed to repair and fill and re-stock the reservoir after a breach.

As per the National Instruction above, the annual probability of dam failure (7,500-yr storm frequency) was included with the more frequent floods (2 yr through 1,000-yr) to estimate overall flood damages. An equivalent method to HEC-FDA was utilized, resulting in average annual damages of $1,400 for floodwater damages and $1,900 for loss of recreational benefits. This is a total of $3,300 average annual. This figure was used as a benefit for future damage avoidance for each of the structural alternatives, and as a negative benefit for the no action/FWOFI alternative.

D.1.9 Recreational Benefits

Oak Creek MPS 5 (also known as Lake Vanderwork) is a popular recreational site, especially for sportfishing. Lake Vanderwork is owned by the Oklahoma Department of Wildlife Conservation. According to the publication *The Economic Value of Sportfishing Trips to Oklahoma Lakes* by the Oklahoma Cooperative Extension Service, AGEC-1054, 2014, there were 4,450 annual sportfishing trips to Lake Vanderwork in 2014. These trips were valued at $59.49 each. Using the Consumer Price Index (CPI-U), the 2014 value was updated to 2024, resulting in a value of $77.98 per trip. This equates to $347,000 in annual recreational benefits to Lake Vanderwork.

D.1.10 Period of Analysis Determination

An analysis was performed to determine the most economical period of analysis for the project. This analysis was based on guidance from P&G 2.1.3, where the benefit stream, deferred installation costs, and OM&R costs were discounted to the beginning of the period of analysis using the applicable project discount rate. Installation expenditures were brought forward to the end of the period of installation by charging compound interest at the project discount rate from the date the costs are incurred.

Fifty-, 75-, and 100-year expected useful (evaluated) lives were evaluated. A net present value analysis was conducted comparing the three alternative periods of analysis. Average annual values were also estimated. All costs of installation, operation, and maintenance were based on 2024 prices. The costs associated with designing and implementing all structural measures were assumed to be implemented over the three-year period. The federal action with a 100-year evaluated life yielded the highest net benefits using the mandated 3.00% discount rate for all federal water resource projects for FY2025 to discount and amortize the anticipated streams of costs and benefits.

Results of the NPV analysis are $35,100 average annual floodwater damage reduction benefits for each alternative, and $347,000 annual recreation benefits for each alternative. Average annual future damages avoided by rehabbing the dam was $3,300. The deferred installation costs and OM&R costs were also discounted for three years, and the installation costs were charged interest over the three-year period based on the year of implementation. Adhering to the guidance from P&G 2.1.3 resulted in the following:

Alternative	Average Annual Benefits				Average Annual Costs	Net Benefits	B/C Ratio
	Floodwater Damages Reduction	Recreation	FWOFI Damages Avoided	Total			
Alt. No. 2	$35,100	$347,000	$3,300	$385,400	$340,100	$45,300	1.13:1.0
Alt. No. 3	$35,100	$347,000	$3,300	$385,400	$235,500	$149,900	1.64:1.0

As reflected above, Alternative No. 3 maximizes net monetary benefits and produces the greatest B/C ratio. This results in Alternative 3 being the National Economic Efficiency alternative. Although Alternative No. 3 produced the greatest net monetary benefits ($149,900) as compared to Alternative No. 2 ($45,300), Alternative No. 2 is the federally preferred alternative because of the environmental and social benefits it provides. Installation of Alternative No. 3 would result in about 5.8 acres of disturbed lands at the 2 houses (adverse environmental impacts) and 2 families would be displaced, or about 6 people (adverse social impacts). Alternative No. 2 would not result in any adverse environmental or social impacts. Therefore, based on these trade-offs, Alternative No. 2 would maximize net public benefits and be the federally preferred alternative.

D.2 – Hydrology and Hydraulics

D.2.1 – Upstream Hydrology

Hydrologic parameters were developed for the Oak Creek Multiple Purpose Dam No. 5 (MPD5) drainage area and entered into the HEC-HMS computer program for determining the peak discharges throughout the study area with and without the dam in place.

D.2.1.1 – Rainfall

The frequency-based storm distribution was used in the HEC-HMS model. The 24-hour rainfall depths from NOAA Atlas 14 for the range of storms at the dam are shown below:

- 2-year, 24-hour rainfall duration = 3.42”
- 10-year, 24-hour rainfall duration = 4.91”
- 25-year, 24-hour rainfall duration = 6.02”
- 50-year, 24-hour rainfall duration = 6.98”
- 100-year, 24-hour rainfall duration = 8.02”
- 500-year, 24-hour rainfall duration = 10.82”

D.2.1.2 – Drainage Area and Hydrologic Properties

The input data for the analyses for existing conditions were developed using Arc Map software and base data layers including LiDAR elevation grids, National Land Cover Database (2019), and hydrologic soil groups.

Geoprocessing tools within Arc Map were used to compute average land slope, hydraulic flow length, and runoff curve numbers for the areas above and downstream of Oak Creek MPS 5, extending to the confluence with the Washita River. Given the disparity in watershed areas and the 8-mile distance to the Washita River, significant impacts from Oak Creek MPS 5 are not expected to propagate into the Washita River.

Watershed lag time was computed using the lag method as described in the USDA-NRCS Part 630 Hydrology, National Engineering Handbook.Curve Numbers were assigned to land use and hydrologic soil groups based on Table D.2-1.

Table D.2-1 -Curve Numbers for NLCD Land Use and Hydrologic Soil Group

NLCD ID	Land Cover Type	Hydrologic Soil Group			
		A	B	C	D
11	Open Water	100	100	100	100
21	Developed, Open Space	52	68	78	84
22	Developed, Low Intensity	81	88	90	93
23	Developed, Medium Intensity	84	89	93	94
24	Developed, High Intensity	88	92	93	94
31	Barren Land (Rock/Sand/Clay)	70	81	88	92
42	Evergreen Forest		55	70	77
43	Mixed Forest		55	70	77
52	Shrub/Scrub		42	55	62
71	Grassland/Herbaceous		63	75	85
81	Pasture/Hay	40	61	73	79
82	Cultivated Crops	62	74	82	86
90	Woody Wetlands	86	86	86	86
95	Emergent Herbaceous Wetlands	80	80	80	80

Note: Curve Numbers based on NEH 630 Draft Chapter 9, Table 9A-1.

Table D.2-2 summarizes the hydrologic properties computed for use in the HEC-HMS model. For comparison, the Dam watershed only and 100-year rainfall were run through the SITES model. Note, the SITES run was completed only to make a check of the HEC-HMS results. The elevation – discharge relationships developed in SITES for the principal and auxiliary spillways were used in the HEC-HMS routing through the impoundment. No other SITES results were used in this analysis.

Table D.2-2 -Summary of Watershed Hydrologic Properties

Watershed Name	Drainage Area (square miles)	Area-Weighted ARC II Curve Number	Average Watershed Slope	Hydraulic Flow Length (feet)	Lag Time (minutes)
Oak	18.0557	67.0	6.24%	50,855	224
Dam	10.2115	76.4	5.00%	36,695	290
Below Dam	1.3058	69.5	5.56%	14,405	104
Downstream	6.0799	65.4	4.98%	30,188	187

The HEC-HMS program was used to determine the inflow and outflow at Oak Creek MPS 5 and at locations downstream. The stage discharge table and spillway elevations were updated based on field surveys done for the project. Design discharges calculated from the HEC-HMS analyses are summarized in Table D.2-3.

Table D.2-3 – Discharges from HEC-HMS

Location	Peak Discharge	2-year (cfs)	10-year (cfs)	25-year (cfs)	50-year (cfs)	100-year (cfs)	500-year (cfs)
Dam	With MPD5	941	2570	3722	4693	5763	8642
Dam	Without MPD5	941	2570	3722	4693	5763	8642
Dam	Net Increase	0	0	0	0	0	0
Below Dam Combined	With MPD5	164	310	420	515	1161	4783
Below Dam Combined	Without MPD5	998	2754	4002	5057	6222	9361
Below Dam Combined	Net Increase	834	2444	3582	4542	5061	4578
Oak Confluence	With MPD5	1064	3698	5730	7512	9526	15118
Oak Confluence	Without MPD5	1936	6129	9280	12005	15056	23441
Oak Confluence	Net Increase	872	2431	3550	4493	5530	8323
Washita River	With MPD5	1315	4747	7398	9728	12374	19761
Washita River	Without MPD5	2181	7041	10733	13934	17529	27419
Washita River	Net Increase	866	2294	3335	4206	5155	7658

D.2.2 – Downstream Hydraulic Model

The U.S. Army Corps of Engineers HEC-RAS version 6.3 hydraulic computer model was used to analyze the study reach of Oak Creek MPD5 down to the Washita River. Steady state flow was used in this analysis for various flood frequency storm events. Additional details on the model inputs and development parameters used for the HEC-RAS models are discussed in detail below. HEC-RAS model discharges for the frequency storms are taken from Table D.2-3. A breach discharge run using unsteady state flow was also completed with the HEC-RAS model. The breach discharge was computed per TR-60.

FEMA Base Level Engineering models for Gyp Creek and Oak Creek were obtained for use with this study. The Oak Creek model cross sections upstream of the confluence with Gyp Creek were removed from the model and the two models were combined into a single reach. The Gyp Creek Model was truncated about 1,300 feet upstream of the dam. The downstream extent of the model is about 7,400 feet upstream of the Oak Creek confluence with the Washita River, at the point where backwater from the Washita River controls the water surface elevation.

Most model cross sections were not long enough to cover the breach flow inundation. Accordingly, the sections were extended and the station – elevation data updated using a 2-meter DEM obtained from the NRCS Data Gateway. Manning's n values were estimated from aerial photography along with HEC-RAS User's Manual. Bank stations were set based on LiDAR data and assuming that the 2-year water surface approximately represented bank-full flows. The channel area was assigned an n value of 0.035 for clean, straight, more stones and weeds. The out-of-bank floodplain areas were assigned an n value of 0.06, representing light brush and trees. There are four bridges in the study reach. Bridge length, low beam, and roadway elevations were entered based on field data collected at each site.

Water surface elevation in the Washita River was used for the downstream boundary condition. Water surfaces were obtained from the FEMA base level engineering data. Based on the TXDOT reference for coincident peaks, the following correspondences were used (event in study reach/event on Washita): 500/50, 100/25, 50/10, 25/10, 10/10, 2/2.

D.2.3 – Mapping

HEC-RAS results for the 2-, 10-, 25-, 50-, 100-, and 500-year flood events were mapped in HEC-RAS RASMapper based on the elevation data from the LiDAR 2-meter DEM.

D.2.4 – Results

Tables D.2-4 through D.2-6 summarize the HEC-RAS modeling results for the 2-, 10-, 25-, 50-, 100-year, and 500-year flood events at selected home and bridge locations. The tables compare the discharges and maximum water surface elevations for both scenarios of the existing dam and removed dam.

Table D.2-4 -HEC-RAS Results for 500- and 100-Year Flood Events

	500-year	100-Year

Location/ RAS Station	Discharge (cfs)		Water Surface Elevation		Discharge (cfs)		Water Surface Elevation	
	With	Without	With	Without	With	Without	With	Without
Bridge 1/41422	4783	9361	1403.64	1404.59	1161	6222	1402.32	1403.99
Bridge 2/29657	15118	23441	1377.14	1378.13	9526	15056	1376.32	1377.13
Home 1/22529	19761	27419	1366.77	1367.46	12374	17529	1363.86	1366.53
Home 2/22039	19761	27419	1366.29	1367.25	12374	17529	1365.10	1365.97
Bridge 3/20323	19761	27419	1364.78	1365.47	12374	17529	1363.92	1364.55
Home 3/12408	19761	27419	1351.52	1352.47	12374	17529	1349.95	1351.21
Bridge 4/10932	19761	27419	1344.15	1344.91	12374	17529	1343.17	1343.89

Table D.2-5 -HEC-RAS Results for 50- and 25-Year Flood Events

Location/ RAS Station	50-Year				25-Year			
	Discharge (cfs)		Water Surface Elevation		Discharge (cfs)		Water Surface Elevation	
	With	Without	With	Without	With	Without	With	Without
Bridge 1/41422	515	5057	1399.54	1403.71	420	4002	1398.90	1403.43
Bridge 2/29657	7512	12005	1375.94	1376.72	5730	9280	1375.59	1376.28
Home 1/22529	9728	13934	1363.96	1365.98	7398	10733	1363.66	1363.99
Home 2/22039	9728	13934	1364.55	1365.39	7398	10733	1363.92	1364.77
Bridge 3/20323	9728	13934	1363.48	1364.13	7398	10733	1362.98	1363.66
Home 3/12408	9728	13934	1349.04	1350.38	7398	10733	1347.94	1349.42
Bridge 4/10932	9728	13934	1342.65	1343.41	7398	10733	1342.33	1342.87

Table D.2-6 -HEC-RAS Results for 10- and 2-Year Flood Events

Location/ RAS Station	10-Year				2-Year			
	Discharge (cfs)		Water Surface Elevation		Discharge (cfs)		Water Surface Elevation	
	With	Without	With	Without	With	Without	With	Without
Bridge 1/41422	310	2754	1398.10	1403.03	164	998	1396.88	1402.21
Bridge 2/29657	3698	6129	1373.75	1375.62	1064	1936	1366.96	1369.77
Home 1/22529	4747	7041	1361.84	1363.44	1315	2181	1356.18	1358.09
Home 2/22039	4747	7041	1361.86	1363.64	1315	2181	1355.86	1357.79
Bridge 3/20323	4747	7041	1360.48	1362.47	1315	2181	1353.06	1355.39
Home 3/12408	4747	7041	1346.05	1347.74	1315	2181	1339.66	1342.08
Bridge 4/10932	4747	7041	1339.56	1342.23	1315	2181	1335.76	1337.15

For the dam breach HEC-RAS runs, Bridges 1 through 4 and Homes 1 and 2 are within the breach inundation area. The depth of water above the roadways is as follows (rounded): Bridge 1 – 9', Bridge 2 – 9', Bridge 3 – 5, Bridge 4 – 6'.

D.3 – Geotechnical Investigation

D.3.1 – General

The geotechnical investigation report was developed in accordance with National Engineering Handbook Section 631.0206. The report contains excerpts from the geotechnical investigation report provided by Terracon. The structure class and exploration methods are shown below. The complete geotechnical report is included in Appendix E.

D.3.2 – Structure Class

Oak Creek Multipurpose Site (MPS) 5 was constructed as a significant hazard dam. A breach of Oak Creek MPS 5 would impact two houses and four county roads. Due to the potential for loss of life during a failure of the dam, the dam is currently classified as high hazard by the State of Oklahoma and NRCS. In accordance with Nation Engineering Handbook 631 section 631.0201, Oak Creek MPS 5 would be categorized in Group A for the geologic investigation criteria.

D.3.2 – Exploration and Personnel:

The geotechnical investigation for Oak Creek MPS 5 consisted of a geophysical survey, field borings, soil samples and seismic cone penetration tests. Terracon was contracted to perform the field work for the geotechnical investigation. Terracon provided personnel to perform geophysical surveys and the drilling, logging and sampling of the field borings.

The geophysical survey was conducted in March 2023. The results of the geophysical survey were used to select twenty-one boring locations along the crest, mid-slope, toe, and spillway area of the dam. An additional eight borings were drilled at potential borrow source locations around the perimeter of the Oak Creek Site 5 Reservoir. The field borings were performed from June 20 through July 7, 2023.

Terracon personnel located the borings in the field by use of GPS. The surface elevations and boring locations were determined by survey from a survey crew employed by the NRCS. The elevations on the boring logs have been rounded to the nearest 1/2 foot. The locations and elevations of the borings should be considered accurate only to the degree implied by the methods used to define them.

Seismic Cone Penetration Tests were also conducted at selected boring locations to provide supplemental information at these specific locations.

Appendix E – Other Supporting Information

Finding of No Significant Impact

for

Rehabilitation of Floodwater Retarding Structure No. 5 of the Oak Creek Watershed

Washita County, Oklahoma

I. AGENCY ROLE AND RESPONSIBILITY – United States Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS).

In accordance with the NRCS regulations (7 CFR Part 650) implementing the National Environmental Policy Act (NEPA), NRCS has completed an Environmental Assessment (EA) of the following proposed action:

Dam rehabilitation of Floodwater Retarding Structure (FWRS) Oak Creek No. 5 in Washita County, Oklahoma.

II. NRCS DECISION TO BE MADE

To determine if the preferred alternative (Alternative 2 – Rehabilitation to High Hazard Criteria) will or will not be a major Federal Action significantly affecting the quality of the human environment. The EA accompanying this finding has provided the analysis needed to assess the significance of the potential impacts from the selected alternative.

III. PURPOSE AND NEED FOR ACTION

To continue providing flood damage reduction in the area downstream of Oak Creek No. 5 and public fish and wildlife benefits (water-based recreation) while minimizing environmental, economic and social impacts, and comply with applicable dam safety and performance standards to reduce the potential for flood damages and loss of life from a catastrophic breach. The Public Law 83-566 purposes for Oak Creek No. 5 are Flood Prevention (Flood Damage Reduction) and Public Fish and Wildlife. The needs are to maintain flood protection downstream and to address dam safety and performance deficiencies of the existing high-hazard dam that are not in compliance with NRCS and the Oklahoma Dam Safety Agency standards. There is a potential for loss of life due to the existence of two residences downstream of this structure within the breach inundation zone. There are four county roadways downstream of this structure within the breach inundation zone. The population-at-risk (PAR) is 6.

IV. ALTERNATIVES CONSIDERED IN THE EA

Three alternatives were analyzed in the EA and are characterized as follows:

Alternative 1 – No Action: Under the No Action Alternative, the dam would remain in the existing unsafe condition with no action to improve the dam from its original design or to correct safety deficiencies beyond maintenance or replacements performed in accordance with its operation and maintenance plan.

Alternative 2 – Rehabilitation to High Hazard Dam (Preferred Alternative): Upgrade the dam to meet current NRCS safety criteria and performance standards for a high hazard dam. Extend the

service life of the dam to 100 years and maintain flood protection. This alternative would consist of slip-lining the existing 30-inch principal spillway, installing a new principal spillway consisting of a 30-inch reinforced concrete pipe (RCP) conduit with a hooded inlet, installing an impact basin, and constructing a 300-foot-wide auxiliary spillway roller compacted concrete (RCC) chute over the existing embankment.

Alternative 3 – Rehabilitate to Significant Hazard Dam with Flood Proofing and Floodplain Easements: This would require installing a new principal spillway 30-inch RCP conduit with a hooded inlet, installing an impact basin, constructing an 80-foot-wide auxiliary spillway RCC chute over the existing embankment, floodproofing two residences, and procuring floodplain easements in the breach inundation area.

V. NRCS' DECISION AND FACTORS CONSIDERED IN THE DECISION

Based on the evaluation in the EA, NRCS and the Sponsor selected Alternative 2 (Rehabilitation to High Hazard Dam) as the preferred alternative. NRCS has taken into consideration all of the potential impacts of the proposed action, incorporated herein by reference from the EA and balanced those impacts with considerations of the agency's purpose and need for action.

NRCS acknowledges that based on the EA, potential impacts to soil, water, air, plants, animals, energy and humans were considered in account of a public need. As a result, the agency's preferred alternative (Alternative 2) would result in benign short-term and long-term negative impacts while addressing the need for rehabilitation to high hazard to reduce risk of loss of life.

VI. FINDING OF NO SIGNIFICANT IMPACT

To determine the significance of the action analyzed in the EA, the agency is required by NEPA regulations at 40 CFR Section 1501 and NRCS regulations at 7 CFR Part 650 to consider the context and intensity of the proposed action. In response to the analysis of the EA, NRCS finds that neither the proposed action nor any of the alternatives is a major Federal Action significantly affecting the quality of the human environment. Therefore, preparation of an Environmental Impact Statement (EIS) on the final action is not required under the NEPA and Council on Environmental Quality (CEQ) implementing regulations (40 CFR Part 1500-1508), or NRCS environmental review procedures (7 CFR Part 650). This finding is based on the following factors:

1) Temporary short-term impacts to streams and conservation pool due to sedimentation may occur during construction activities. Environmental consequences of the construction activities will be insignificant due to proposed mitigation, avoidance, and minimization put in place by a required Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will be in place prior to and during all construction activities.
2) An additional Aquatic Resources Protection Plan, required by 404 permitting due to impacts to jurisdictional waters, will be in place prior to and during all construction activities. This plan will outline strategies to conserve and manage aquatic ecosystem specific areas, including rivers, lakes, streams, wetlands, and marine ecosystems adjacent to the action area of the project.

3) No compensatory mitigation is anticipated with the rehabilitation of the dam. The proposed alternative will keep the permanent conservation pool elevation the same as the existing pool elevation.
4) Consultation with USFWS has resulted in a "no effect" conclusion for the Lesser Prairie Chicken, and "may affect, not likely to adversely affect" conclusion for Piping plover, Red knot, Whooping crane, and Monarch butterfly. Consultation with USFWS will be ongoing.
5) There will be temporary short-term adverse impacts to vegetation (trees/shrubs) within the action area. Trees will be felled prior to construction activities and will occur outside of the primary nesting season for migratory birds, and during local bat species inactive period (Nov 15 – Mar 14). Post construction, vegetation will be allowed to reestablish within the action area.
6) Permanent impacts are associated with the 300-foot-wide permanent roller compacted concrete auxiliary spillway over the embankment. Approximately 1.5 acres will be converted to a concrete spillway. This action will not have long-term negative effects on any threatened or endangered species that may be located within the action area and will not impact critical habitat for any species.
7) Proposed alternative does not significantly impact public health. Dam rehabilitation will reduce the risk associated with a potential catastrophic dam failure, reducing the risk of loss of life.
8) NRCS regulations (7 CFR Part 650) and policy (Title 420, GM Part 401) require that NRCS identify, assess, and avoid effects to historic or cultural resources, park lands, prime farmlands, wetlands, or ecologically critical areas (Title 190 National Compliance Handbook). NRCS made the determination of "no historic properties (including archaeological sites) affected" by the proposed Alternative 2. The Oklahoma Archaeological Survey, the Oklahoma State Historic Preservation Office, the Caddo Nation, Comanche Nation, and Quapaw Nation have concurred with this determination.
9) The proposed action does not violate Federal, State, or local law requirements imposed for protection of the environment. The major laws identified with the selection of Alternative 2 include the Clean Water Act, Clean Air Act, Endangered Species Act, National Historic Preservation Act, and Migratory Bird Treaty Act. Alternative 2 is consistent with the requirements of these laws. Based on the information presented in the attached EA, NRCS finds, in accordance with 40 CFR Section 1508.13, that the selection of the agency preferred alternative (Alternative 2) is not a major Federal Action significantly affecting the quality of the human environment; therefore, not requiring preparation of an EIS.

Jeanne Jasper

JEANNE JASPER
Oklahoma State Conservationist
Natural Resources Conservation Service

4/4/25

Date