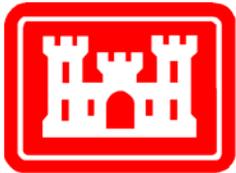


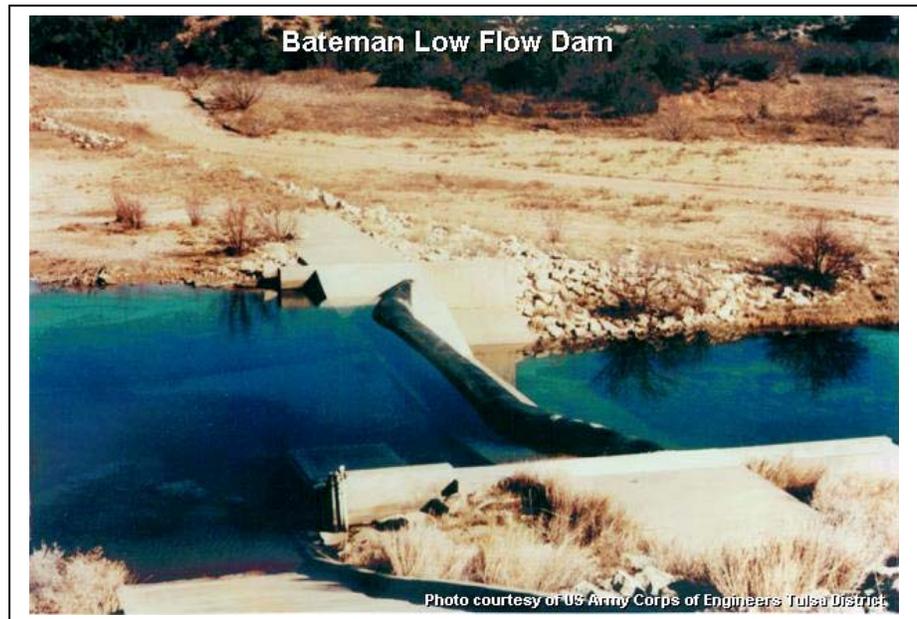
FINAL

**SUPPLEMENT TO
FINAL ENVIRONMENTAL STATEMENT
FOR THE AUTHORIZED
RED RIVER CHLORIDE CONTROL PROJECT
WICHITA RIVER ONLY PORTION**

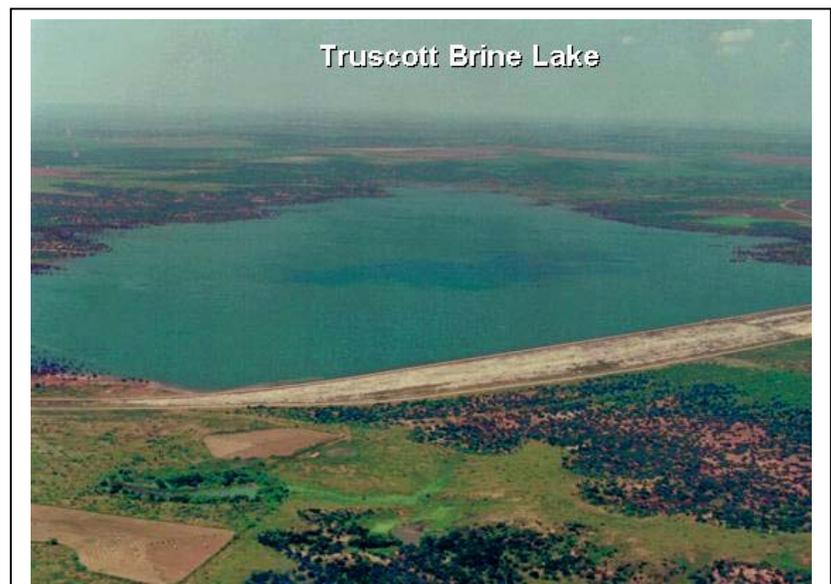
VOLUME I



**US Army Corps
of Engineers®**
Tulsa District



April 2003



FINAL

**SUPPLEMENT TO THE FINAL ENVIRONMENTAL STATEMENT
FOR THE AUTHORIZED RED RIVER CHLORIDE CONTROL PROJECT
WICHITA RIVER ONLY PORTION**

The responsible lead agency is the U.S. Army Corps of Engineers, Tulsa District.

ABSTRACT

The U.S. Public Health Service initiated a study in 1957 to locate the natural chloride sources and determine the contribution of chlorides from individual areas to the Wichita River. The U.S. Army Corps of Engineers (USACE), entered the study in 1959 and recommended measures to control the natural chloride sources. Plans for chloride control on the Wichita River were known as Part I and were authorized by Congress in 1966. Eight years later, in 1974, funds were allotted by the Water Resources Development Act (Public Law 93-251) to construct portions of Part I. Construction began in 1977 and Area VIII brine collection facility and its associated disposal site, Truscott Brine Disposal Reservoir, became operational in 1987.

A Final Environmental Statement (FES) for the Red River Chloride Control Project (RRCCP), dated July 1976 and of which the Wichita River was a portion, was filed with the Environmental Protection Agency on May 18, 1977, and published in the Federal Register on May 27, 1977. Economic reevaluations have been completed several times since 1976 and have confirmed the proposed project's effectiveness. An environmental reevaluation was approved in 1997 and in 1998, the National Environmental Policy Act (NEPA) scoping process was initiated.

Facilities already constructed include a ring dike at Estelline Springs (Area V); the low-flow collection dam on the South Fork of the Wichita River (Area VIII); and Truscott Brine Disposal Reservoir on Bluff Creek, a tributary of the North Fork of the Wichita River near Truscott, Texas. The Area X (Lowrance) low-flow collection dam and pump station, which would use Truscott Brine Disposal Reservoir as a disposal site for the brines, has been completed. However, this facility is not operational as construction of the necessary pipeline, pumps, and controls has not been started. Funds have been appropriated to complete design and begin construction of the remaining authorized facilities at Areas VII, X, and the Truscott Brine Disposal Reservoir in Texas.

The authority to construct the proposed project is contained in the following:

- Section 203, Flood Control Act of 1966, Public Law 89-789, November 7, 1966, Arkansas-Red River Basins, Texas, Oklahoma and Kansas, Part 1.
- Section 201, Flood Control Act of 1970, Public Law 91-611, November 31, 1970, Arkansas-Red River Basins Water Quality Control Study, Texas, Oklahoma and Kansas, Part II.
- Section 74, Water Resources Development Act of 1974, Public Law 93-251, March 7, 1974.
- Section 153, Water Resources Development Act of 1976, Public Law 94-587, October 22 1976.
- Section 1107, Water Resources Development Act of 1986, Public Law 99-662, November 17, 1986, General Design Phase I Plan Formulation, Volumes I and II (DM 25, November 1980).

This supplement was prepared to address significant environmental issues and project design changes, including:

- deletion of brine collection at Areas VI, IX, XIII, and XIV,
- changes in brine disposal locations for Area VII,
- changes in the pool size at Truscott Brine Disposal Reservoir,
- changes in proposed land use at Crowell Mitigation Area, and
- changes in methods of collection and disposal at Areas VII and X.

This supplement addresses potential environmental impacts of implementation and operation of chloride control measures on the hydrological, biological, and water quality components of the North, Middle and South Forks of the Wichita River; the lower Wichita River; the upper Red River downstream of its confluence with the Wichita River to Lake Texoma and Lakes Kemp, Diversion, and Texoma. This supplement also addresses the potential environmental impacts associated with increased selenium concentrations at Truscott Brine Disposal Reservoir, impacts on Federally-listed threatened and/or endangered species, fish and wildlife mitigation, and unquantifiable/undefined impacts.

A number of related documents along with background information on this supplement is available at:

<http://www.swt.usace.army.mil/LIBRARY/Library.CFM>.

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SUMMARY

GENERAL

In 1957, The U.S. Public Health Service initiated a study to locate natural chloride seeps and springs and to determine the contribution of these chloride sources to the Red River, to which the Wichita River is a tributary. In 1959, the USACE recommended measures to control identified natural chloride sources. Plans for chloride control were authorized by Congress in 1966. This project was known as the Red River Chloride Control Project (RRCCP). A FES for the RRCCP, dated July 1976 and of which the Wichita River was a portion, was filed with the Environmental Protection Agency on May 18, 1977, and published in the Federal Register on May 27, 1977. Since the 1976 FES, proposed project outputs have changed. Target chloride concentrations of 250 mg/l or less 94% of the time at Lake Texoma and 98% of the time at Lake Kemp were originally established for the proposed project. However, project modifications described in this supplement would affect design effectiveness of the plan evaluated in the 1976 FES. As such, an environmental reevaluation was approved in 1997 and the NEPA scoping process was initiated in 1998. The proposed plan is expected to meet the Texas Natural Resources Conservation Commission (TNRCC) secondary drinking water standard of 300 mg/l chloride 40% of the time at Lake Kemp.

Effectiveness of constructed portions of the project were evaluated by a Congressionally authorized panel, in accordance with Public Law 99-662, to assess the improvement in water quality assumed in the economic reanalysis of the proposed project. The panel submitted a favorable report to the Federal Public Works Committees of the House and Senate in August 1988 indicating that Area VIII was performing as designed. As noted above, design changes have been developed for the proposed project that would lessen impacts on stream flow, water quality, and chloride removal compared to the proposed project evaluated in the 1976 FES. In addition, potential direct and indirect impacts have been identified that were not addressed in the FES.

During the NEPA process for the Supplement to the Final Environmental Statement (SFES), several issues were identified as concerns by the public and commenting natural resource agencies. Major issues addressed in this document include:

- 1) Hydrological, biological, and water quality issues concerning fish, aquatic invertebrates, aquatic macrophytes, and the wetland/riparian ecosystem of the Wichita River, Lake Kemp, and Red River above Lake Texoma to the confluence of the Wichita River;
- 2) Lakes Kemp, Diversion, and Texoma components, including chloride/turbidity relationships, chloride/fish reproduction issues, chloride/plankton community issues, chloride/nutrient dynamics issues, and impacts on recreational values;
- 3) Water quality and quantity impacts on Dundee Fish Hatchery below Lake Diversion;
- 4) Selenium (Se) concentrations and impacts on biota;
- 5) Man-made brines and associated reduction;
- 6) Section 401 water quality issues;
- 7) Mitigation as it relates to habitat losses from construction of proposed project components;
- 8) Federally-listed threatened and endangered species; and
- 9) Unquantifiable/undefined impacts.

Changes in the project base condition have also occurred since the 1976 FES. Due to growing concern in the Wichita River Basin about the availability of water and its effect on economic growth and development, the Red River Authority of Texas (RRA) in cooperation with the Texas State Soil and

Water Conservation Board (TSSWCB) initiated a study to determine the feasibility of implementing a brush control and management program to increase water yield. The goal is to restore large areas of brush to native grasses, but leave brush buffers and habitat corridors composed of mesquite and juniper. The results of the study revealed that implementation of the proposed brush control program may provide a net increase in watershed yield at Lake Kemp ranging from 27.6% to 38.9%. However, brush control would not improve water quality in the Wichita River Basin.

The brush control program has currently been included in Texas Senate Bill 1 and the Region B Water Plan. Implementation is expected to occur regardless of implementation of chloride control measures. This supplement has assumed a brush management factor of 50% implementation as its future condition – with or without chloride control.

FINDINGS

The USACE completed a formal Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) to address Federally-listed threatened and/or endangered species that occur in the project area. By letter dated March 5, 1999, the USFWS identified the Federally listed species likely to be affected by the proposed project. A Biological Assessment (BA) was prepared by the USACE and submitted to the USFWS in July 2001. The USFWS subsequently issued their Biological Opinion (BO) later the same month. At that time, the USFWS stated that the proposed project should have no effect on threatened and endangered species. In addition, the USFWS has completed a Final Coordination Act Report dated May 8, 2002.

Federal species identified include the whooping crane (*Grus americana*), the bald eagle (*Haliaeetus leucocephalus*), and the interior least tern (*Sterna antillarum*). The whooping crane is a migrant through central Oklahoma and Texas during the fall and spring. Recorded sightings confirm this species' presence during migration in the general area. Additional bird surveys conducted during the fall and/or spring of 1997-1999 at Truscott Brine Disposal Reservoir and the Area VIII collection facility resulted in no sightings of whooping cranes. The interior least tern occurs along major rivers in Oklahoma and Texas as a summer, breeding resident (S2B: 6 to 20 occurrences within the State, very vulnerable to extinction throughout its range) and migrant. Several least terns were sighted at Truscott Brine Disposal Reservoir, though most of these areas appeared to be void of habitat typically suited for this species. The bald eagle is a winter migrant throughout the State of Oklahoma and a winter resident along major rivers and impoundments. No bald eagles were sighted during the intensive bird count surveys completed from 1997-1999 at Truscott Brine Disposal Reservoir and the Area VIII collection facilities.

Flow in a portion of two upper Wichita River basin tributaries would be reduced as a result of diversion of brines at two proposed brine collection facilities. Evaluation of the hydrology with brush management indicates that the proposed project would increase the number of zero flow days in the main stem of the Wichita River by less than 0.05%. Upstream, the project would increase the number of zero flow days 2.3% in the North and Middle Forks of the Wichita River and would increase the number of zero flow days in the South Fork 0.2%. Overall, when the combined effects of the brush management program and the chloride control measures are considered, it would be expected that there would be little effect (adverse or beneficial) on fish communities in the main stem or South Fork of the Wichita River. Within the North and Middle Forks, reduced flows expected as a result of the project should not affect medium and high stream flow, thus the greatest potential for adverse impacts of flow reduction on fish species in the river would be during extreme low flow or zero flow periods.

Salinity reductions in the upper Wichita River may affect salt tolerant fish communities. However, changes in species composition would most likely occur in short-term pulses rather than long-term shifts.

Increases in less salt tolerant species in these areas would most likely be limited to short term pulses resulting from above average rainfall events and associated flow increases. As flows returned to base flow rates of discharge, salinity concentrations would become less favorable for the less salt tolerant species. Evidence of a similar pulse of less salt tolerant fishes into Oscar Creek (Jefferson County, Oklahoma) has been observed (Pezold and Clyde, unpublished data). The fish community in Oscar Creek is very similar to the salt tolerant communities of the Wichita River Basin and is primarily comprised of Red River pupfish, plains killifish, and mosquitofish. Field observations and collections made in May 1994 indicate that fish species more commonly found in less salt tolerant communities can and do move into Oscar Creek for brief periods, as a function of temporal conductivity variations. Subsequent field collections in May 1996 and May 1997 indicate that these movements of less salt tolerant fish species into Oscar Creek occur infrequently, and impacts to the salt tolerant community appear to be minimal. Similar patterns would be expected in the upper Wichita River Basin.

Studies indicate that changes in turbidity and recreation associated with the chloride control measures in Lake Kemp should be minor. Results of studies aimed at estimating interactions of these impacts do not suggest that major adverse effects would occur. Conversely, elevation fluctuations at Lake Kemp would significantly impact primary productivity and fisheries in that lake. Similar concerns have been raised for Lake Texoma. However, total dissolved solids (TDS) reduction at Lake Texoma would be minor and impacts to turbidity, productivity, fish communities, and recreation would be expected to be unnoticeable.

Concerns have also been voiced by the Texas Parks and Wildlife Department (TPWD) regarding impacts of chloride reduction on toxic algal blooms. The TPWD Dundee Fish Hatchery gets its water supply from Lake Kemp through Lake Diversion. In recent years, it has been significantly impacted by blooms of a toxic alga which has entered the hatchery system. The golden alga, *Prymnesium parvum*, is a flagellated yellow-green alga and is one of the toxic algae. *P. parvum* blooms, however, have had no documented effect on aquatic insects, animals drinking affected waters, or humans. Chloride changes would probably not have a direct effect on blooms of *P. parvum* (as shown by Larson and Bryant, 1998). However, chloride decreases may favor native non-toxic algal species.

Additional concerns at the Dundee Fish Hatchery are related to potential water supply impacts. Under the Lake Kemp Drought Contingency Plan, the TPWD Dundee Fish Hatchery below Lake Diversion would not receive water from Lake Diversion when Lake Kemp is below elevation 1123 feet National Geodetic Vertical Datum (NGVD). Under with-project conditions, the probability of increased contractual water supply loss increases from 0% to between 11.7 and 14.8%. Supply limitations for hatchery water supply did not exist until development of Senate Bill 1 in 1999 and is not based upon actual water availability. This is a contractual issue established with the Wichita County Water Improvement District No. 2, the City of Wichita Falls, and the TPWD and is documented in legislation. During drought contingency conditions, water continues to be available from Lake Diversion for municipal and industrial use for a fee. Contracts for fee payment or waiver could be developed to allow the Dundee Fish Hatchery to utilize water from Lake Diversion under drought contingency conditions.

The potential for Se accumulation and impacts to biota associated with project areas has also been identified. Selenium occurs naturally in soils and waters of Wichita River Basin and is an extremely complex element in terms of cycling in aquatic systems and impacts on aquatic organisms. Studies conducted by the USACE indicate that there would be at least the potential for Se-related impacts to sensitive or moderately sensitive semi-aquatic bird species breeding at Truscott Brine Disposal Reservoir though risks are not believed to be excessive. Evaluations do not indicate anticipated adverse Se-related impacts on young or adult birds temporarily residing at Truscott Brine Disposal Reservoir. Predicted total Se concentrations over the anticipated 100-year project life are below estimated thresholds for impacts on young or adult birds in the absence of reproductive concerns. Due to the documented ability

of birds to rapidly lose Se upon leaving contaminated areas, embryotoxicity for birds overwintering at the reservoir but breeding elsewhere is not anticipated. Modeled Se concentrations for the proposed plan are below estimated threshold values for non-reproductive impacts.

CONCLUSION

Owing to design changes in the original RRCCP, changes in existing project conditions for the study area, amendments to the Endangered Species Act, and the presence of additional species since filing of the FES, it was determined that a supplement to the FES would be required. This study was again coordinated with the resource agencies in accordance with the Fish and Wildlife Coordination Act, and the USFWS issued a Final Fish and Wildlife CAR for the proposed project dated May 8, 2002.

According to the CAR, the USFWS and the TPWD are unable to support the proposed plan in its present form and recommend that it not go forward as formulated. A summary of concerns from the CAR include:

- Alterations in stream hydrology resulting in changes to vegetative species composition, and vegetative encroachment within the stream channel.
- Changes to water chemistry coupled with increased water withdrawals resulting in reduced aquatic species diversity and abundance.
- Changes to chloride levels resulting in reduced productivity at Lakes Kemp, Diversion and Texoma.
- Decreases in chloride levels resulting in losses to recreational fisheries at Lakes Kemp, Diversion and Texoma.
- Construction of chloride control structures resulting in destruction of mesquite-cedar upland habitat.
- Accumulation of Se in Truscott Brine Disposal Reservoir resulting in detrimental impacts to resident and migratory wildlife populations.
- Alterations in stream flow and chemistry resulting in elevation changes and chloride reductions at Lake Diversion and consequent impacts to the TPWD Dundee Fish Hatchery.

The CAR also recommended that alternatives, in addition to the 12 TPWD/USFWS alternatives already evaluated, be reviewed for the proposed project including:

- Deletion of Areas VII or X;
- Collection and reintroduction of brines below Lake Diversion;
- Closure of the existing chloride control measures; or
- Creation of a “hybrid” proposed project which could include blending waters from freshwater sources, reclaimed wastewater, or water from new reservoirs.

According to the CAR, the mitigation of predicted project impacts may be nearly impossible to accomplish in-kind. These impacts included reduced productivity of streams and reservoirs due to reduced chloride levels and increased turbidity. These impacts are unacceptable to the USFWS even with adequate mitigation. The USFWS, TPWD, and Oklahoma Department of Wildlife Conservation (ODWC) are opposed to any reduction in productivity and fisheries at Lake Texoma. However, analysis shows that such impacts should not occur with the proposed plan. The USFWS would not support any alternative until the USACE has developed mitigation measures for impacts to Lake Texoma that satisfy both the TPWD and ODWC.

Since 1991, the USACE has conducted additional environmental studies to address reasonable foreseeable impacts. Based on this technical information, the USACE disagrees with the USFWS as to the severity of impacts attributable to the chloride control measures. The USACE's position with respect to the proposed project remains unchanged for the following reasons:

(1) Project outputs have changed since the proposed project was originally formulated. The proposed project would be operated for target chloride concentrations of 300 mg/l or less 40% of the time at Lake Kemp with minimal reductions in chlorides (10% decrease from existing) at Lake Texoma.

(2) Technical data do not substantiate that the proposed plan would have a significant impact on turbidity and primary productivity in Lake Diversion or Lake Texoma. In fact, turbidity impacts at Lake Texoma approach zero. No impacts to turbidity, primary productivity, fisheries or recreation are predicted to occur at Lake Texoma with only minimal, if any, predicted impacts at Lake Diversion. Significant impacts to primary productivity and fisheries, as well as mitigation for those impacts, could occur in Lake Kemp as a result of elevation fluctuation. However, no significant impacts on turbidity or recreation are anticipated at Lake Kemp.

(3) Additional environmental studies conducted by the USACE during preparation of this DSES indicate some short-term changes to aquatic communities of the upper Wichita River may likely occur, but not with the severity predicted by the USFWS and other natural resource agencies.

(4) The Environmental Operations Plan (EOP) developed for the proposed project establishes comprehensive and scientifically valid methodologies for establishing existing baseline conditions, establishes environmental thresholds and safeguards for many system components, provides long-term monitoring for impacts attributable to the chloride control measures, and protects against unacceptable changes in the Wichita and Red River ecosystems as well as in Lakes Kemp and Diversion. More importantly, it provides a commitment by the USACE to balance authorized project goals with the need to maintain the biological resources throughout the life of the proposed project. The commitments agreed upon in the EOP are summarized in Section 4 of this document.

(5) The fully developed project, as proposed, provides the operational flexibility to meet target chloride concentrations while minimizing impacts to the ecosystem. As part of the EOP, chloride concentrations would be continuously measured at target locations and numerous gaging stations throughout the proposed project area to monitor performance. Results of chloride measurements from this monitoring network would be used to adjust operations at control sites (including elimination of some control sites, if warranted) to balance authorized project goals with the need to maintain biological resources.

(6) The USACE and project sponsor, the RRA, recognize the potential for change to occur within the proposed project area ecosystem with construction and operation of the chloride control measures. However, the USACE believes that the proposed project could be constructed and operated to meet project goals while assuring the continued function and integrity of the ecosystem and as such, under the intent of NEPA and other appropriate environmental laws and regulations, the USACE would: (a) fund and implement the baseline studies and monitoring activities developed and proposed in the EOP, (b) review and act on the recommendations of a peer review committee, and (c) suspend operation of chloride control measures if unacceptable environmental impacts result from construction and operation of the proposed project.

The USACE believes that by implementing appropriate and reasonable mitigation measures as presented in this document and by developing and implementing the EOP, the proposed project should not be discontinued or reformulated.

RELATIONSHIP TO ENVIRONMENTAL PROTECTION STATUTES

The relationship of the proposed action to environmental protection statutes and other requirements is shown in Table S-1.

TABLE S-1
RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION STATUTES AND
OTHER ENVIRONMENTAL REQUIREMENTS

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

NOTE: Full Compliance - Having met all requirements of the statutes, Executive Orders, or other environmental requirements for the current stage of planning.

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Appendices

Appendix A: Environmental Operational Plan

Appendix B: Mitigation Plan

Appendix C: USFWS Mitigation Recommendations and Responses and Coordination Act Report

Appendix D: Public Information Workshops and Scoping Process

GLOSSARY OF ACRONYMS

Benefit-to-cost ratio (BCR)
Biological Assessment (BA)
Biological Opinion (BO)
Clean Air Act (CAA)
Coordination Act Report (CAR)
cubic feet per second (cfs)
Draft SFES (DSFES)
Environmental Protection Agency (EPA)
Executive Order (E.O.)
Final Environmental Statement (FES)
Kesterson National Wildlife Refuge (KNWR)
Limited Reevaluation Report (LRR)
micrograms per liter ($\mu\text{g/l}$)
milligrams/liter (mg/l)
National Agricultural Statistics Service (NASS)
National Ambient Air Quality Standards (NAAQS)
National Economic Development (NED)
National Environmental Policy Act (NEPA)
National Geodetic Vertical Datum (NGVD)
National Register of Historic Places (NRHP)
Natural Resources Conservation Service (NRCS)
Nephelometric turbidity units (NTUs)
Oklahoma Resource Management Plan (OK-RMP).
Oklahoma Statewide Comprehensive Outdoor Recreation Plan (SCORP)
Operation and maintenance (O&M)
Parts per billion (ppb)
Programmatic Memorandum of Agreement (PA)
Red River Chloride Control Project (RRCCP)
Regional Economic Development (RED)
Selenium (Se)
Statement of Findings (SOF)
Texas Natural Resources Conservation Commission (TNRCC)
Texas Outdoor Recreation Plan (TORP)
Texas Parks and Wildlife Department (TPWD)
Texas State Soil and Water Conservation Board (TSSWCB)
Texas Water Development Board (TWDB)
Total Dissolved Solids (TDS)
U.S. Army Corps of Engineers, Tulsa District (USACE)
U.S. Geological Survey (USGS)
US Fish and Wildlife Service (USFWS)
W.T. Waggoner Estate (Waggoner Ranch)
West Texas State University (WTSU)

UNITS OF MEASURE

Units of measure used in this document include:

Unit	Acronym	Application
acres	acres	area
acre-feet	acre-feet	volume
cubic feet per second	cfs	flow
feet	ft	length
meters	m	length
micrograms per liter	µg/l	concentration
mile	mile	distance
milligrams/liter	mg/l	concentration
million gallons per day	mgd	flow
nephelometric turbidity units	NTU	turbidity
parts per billion	ppb	concentration
percent	%	portion
Secchi Disk Depth	m or ft	light penetration in water
surface acres	acres	area