

Terra Foundation, Inc.

**Terra Foundation
In-Lieu Fee
Stream & Wetland
Mitigation Program**

**Final
Program Instrument**

August 2015

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I. OBJECTIVES

A. Goals

This document outlines the establishment of an In-Lieu Fee Stream & Wetland Mitigation Program (hereinafter, In-Lieu Fee Program) to be administered by the non-profit organization Terra Foundation, Inc. (Sponsor). The goal of the In-Lieu Fee Program is to satisfy the compensatory mitigation requirements of permits issued under Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899 by creating centralized in-lieu fee mitigation project sites throughout the State of Oklahoma. The natural resources goal of the program will be to restore, establish, enhance and preserve jurisdictional streams, wetlands, riparian areas, lakes and ponds. These activities will improve and maintain the chemical, physical and biological integrity of Oklahoma's aquatic resources. In many arid areas of Oklahoma in-stream man-made ponds and lakes are the only perennial aquatic habitat and these resources would not be removed as part of this program, except when their enhancement or conversion to another aquatic resource would be of greater benefit to the state's aquatic resources, as agreed by the Tulsa District of the U.S. Army Corps of Engineers (Corps).

As a part of this In-Lieu Fee Program, the Sponsor will be responsible for the implementation, performance and long-term management of in-lieu fee compensatory mitigation project sites as described in this instrument. Additionally, the Sponsor will assume responsibility for a permittee's compensatory mitigation requirements once that permittee has secured the appropriate number and resource type of credits from the Sponsor and the Corps has received sufficient documentation.

This In-Lieu Fee Program proposal does not in any manner affect statutory authorities and responsibilities of the signatory parties.

II. ESTABLISHMENT & OPERATION

A. Establishment of In-Lieu Fee Program

Upon the issuance of Department of the Army permit authorization, the Terra Foundation In-Lieu Fee Stream & Wetland Mitigation Program will be established. Program operations will be carried out by the board, staff and contractors of Terra Foundation, Inc.

Corps' approval of this Program Instrument constitutes the regulatory approval required for the Terra Foundation In-Lieu Fee Stream & Wetland Mitigation Program to be used to provide compensatory mitigation for Department of the Army permits pursuant to 33 CFR 332.8(a)(1). This Program Instrument is not a contract between the Sponsor or Property Owner and the Corps or any other agency of the federal government. Any

dispute arising under this Program Instrument will not give rise to any claim by the Sponsor or Property Owner for monetary damages. This provision is controlling notwithstanding any other provision or statement in the Program Instrument to the contrary.

B. Members of the Interagency Review Team

The IRT shall consist of the Corps [chair], the U.S. Environmental Protection Agency Region 6 (EPA), the U.S. Fish and Wildlife Service Oklahoma Ecological Services Field Office (FWS), the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), the Oklahoma Department of Environmental Quality (ODEQ), the Oklahoma Department of Wildlife Conservation (ODWC) and the Oklahoma Conservation Commission (OCC).

C. General Operation of the In-Lieu Fee Program

The Sponsor will adequately document the Request for Proposal process so that IRT members can receive meaningful review and oversight of the program. The Sponsor will administer the day to day operations of the In-Lieu Fee Program which will include administrative oversight, accounting, permitting, land acquisition functions, quality control and the coordination of projects and contractors. Mitigation activities such as, or related to, site selection, mitigation design, mitigation plan preparation, site maintenance and/or site monitoring can be carried out by contractors experienced in planning and constructing natural resources projects.

The Sponsor will, when required by law and the Final Mitigation Rule, adhere to any requirements to competitive bid consultation services and construction of projects in connection with the In-Lieu Fee Program. Additionally, the Sponsor will ensure financial interest of the In-Lieu Fee Program, by fully disclosing conflicts of interest and, if conflict is present, the sponsor will recuse himself or herself from voting on the matter such as the bid selection processes. The IRT members will be included in the competitive bid consultation services and construction of projects process, if requested by the IRT Chair. The competitive bid process will be adequately documented by the Sponsor and will include contractor eligibility criteria, the solicitation process, proposal evaluating criteria, and proposal reviewers and review process.

In such instances, mitigation consultants and construction companies will need to demonstrate sufficient experience of successful completion of Clean Water Act Section 404/401 mitigation projects or their equivalent as determined by the Sponsor to the IRT for review and will be chosen considering both their qualifications and their bid price by the Sponsor. Maintenance of in-lieu fee project sites will be the sole responsibility of the Sponsor although specific maintenance tasks may be contracted to other organizations. The day to day general operation of the In-Lieu Fee Program will be the sole responsibility of the Sponsor.

D. *In-Lieu Fee Project Site Approval*

For each proposed in-lieu fee project site, the Sponsor will submit to the Corps and the IRT a description of the proposed activity, including a mitigation plan describing the location and nature of the planned compensatory mitigation activities. In-lieu fee project site selection and mitigation plans are subject to review and approval by the Corps and IRT. The mitigation plan shall include the following items:

- Objectives
- Site Selection
- Site Protection Instrument
- Baseline Information
- Determination of Credits
- Credit Release Schedule
- Mitigation Work Plan
- Maintenance Plan
- Performance Standards
- Monitoring Requirements
- Long-term Management Plan
- Adaptive Management Plan
- Financial Assurances
- Other Information

The credit release schedule shall be tied to the achievement of performance-based milestones such as site grading, planting, the establishment of specified plant and/or animal communities, and site-specific performance standards for wetlands and/or streams as described in the mitigation plan. The credit release schedule will be determined based on several factors such as, but not limited to, the method of compensatory mitigation (restoration, establishment, enhancement or preservation), the likelihood of success, the amount of work needed to generate the credits and the aquatic resource types and function(s) to be provided by the project. The credit release schedule for each in-lieu fee project site shall include the following requirements as a necessary activity for the release of any credits: the completion and filing of the site protection instrument; approval of the in-lieu fee project, including its mitigation plan; and the establishment of the appropriate financial assurances.

The review and approval of in-lieu fee project sites will be conducted in accordance with the procedures described in the 2008 Mitigation Rule at 33 CFR 332.8(g)(1). Specifically, each mitigation plan will be treated as a modification (*i.e.*, attachment) of this Program Instrument, including any mitigation plans conducted by another party on behalf of the Sponsor through requests for proposals and awarding of contracts. The mitigation plan review process will follow the same approval process as was used for the Program Instrument which includes a prospectus mitigation plan that goes on public

notice, a subsequent draft mitigation plan and then a final mitigation plan all with designated Corps and IRT comment periods.

Mitigation activities will not be initiated on an in-lieu fee project site until after the Corps and IRT approve the site-specific mitigation plan and after land acquisition (or agreements with landowners) has been accomplished. If a Section 10 permit under the Rivers & Harbors Act of 1899 and/or a Clean Water Act Section 404 or 401 permit is required to initiate project activities, then the permit should not be issued until all relevant provisions of the mitigation plan have been determined to be substantively in order by the Corps, in consultation with the IRT, in order to ensure that the permit would accurately reflect all relevant project details such as performance standards.

Land acquisition (or agreements with landowners) and initial physical and biological improvements must be completed by the end of the third full growing season after the first advance credit in that geographic service area is secured by a permittee, unless the Corps determines that more time is needed to plan and implement an in-lieu fee project.

E. Initial Assessment of Potential Advance Credits

Initial operations of the In-Lieu Fee Program will be generated by the sale of advance credits. Advance credits are those credits available for sale prior to being fulfilled in accordance with an approved mitigation plan. Advance credit sales require an approved In-Lieu Fee Program Instrument that meets all applicable requirements including a specific allocation of advance credits, by geographic service area where applicable.

Table 1 includes the number of advance credits potentially available to the Sponsor in each of the proposed geographic service areas if and when those service areas become active in the In-Lieu Fee Program, which will be at the discretion of the Corps in consultation with the IRT. Rather than immediately operating a statewide program, when this instrument is approved the In-Lieu Fee Program will be authorized to operate only within the initial active service areas that are listed in Section III.B. The activation of additional service areas in the In-Lieu Fee Program is discussed further in Section III.B.

The primary factor that was considered when calculating the amount of advance credits for each service area was the expected amount of mitigation demand in each service area as predicted by an analysis of the actual amount of mitigation required by the Corps between October 1, 2007 and November 10, 2011 which was then adjusted to represent three years of expected credit sales to match the timeframe given to in-lieu fee programs to initiate mitigation activities (*i.e.*, land acquisition [or agreements with landowners] and initial physical and biological improvements) after the sale of the first advance credit. This historic mitigation demand information is also summarized in Table 1 where the historic wetland mitigation acreage was converted into wetland credit amounts using the ratios proposed for this In-Lieu Fee Program as included in

Table 5. The designation of service area names in each watershed will be explained in full within Section VII. Historic mitigation demand was the primary factor used to determine advance credit amounts because it is likely the most precise method available of predicting the amount of mitigation need in an individual service area. Other important factors taken into consideration included the compensation planning framework/watershed plan; the Sponsor's past performance for implementing aquatic resources restoration, enhancement, establishment and preservation; and the type and extent of proposed aquatic improvements.

Additionally, while some service areas had no mitigation required between October 1, 2007 and November 10, 2011, the Sponsor will still be required to provide mitigation for any advance credit sales in any of these areas where the In-Lieu Fee Program is operating within three years of the sale of the first advance credit. Much of the state had low historic mitigation demand, with 12 service areas (40% of all service areas) having absolutely no mitigation need in the four year period assessed and six more service areas having only an average of one mitigation project per year. In these service areas the determination of advance credits using the historic averages of wetland and stream mitigation across all service areas would be inaccurate. In addition, there was significant variability across service areas so that the amount of wetland mitigation in a service area was not highly correlated with the amount of total stream mitigation linear footage. Similarly, there is no clear pattern associated with the linear footage of mitigation between the different stream types. To account for this variability in mitigation need across the state, the amount of advance wetland credits and advance stream credits were determined separately by grouping the service areas into different tiers according to the amount of wetland or stream mitigation needed during the assessed period. Based on the mitigation demand during the assessed period, there were four tiers of service areas in terms of wetland mitigation demand and three tiers for stream mitigation demand.

The amount of advance wetland credits was then determined by taking the average of wetland mitigation need within each tier (adjusted to represent a three year time period) and rounding up to the nearest whole number of acres. This method was altered within the lowest demand tier where the wetland mitigation need is best described as sporadic but not absent. In these service areas the number of advance wetland credits was determined using the highest amount of wetland mitigation needed for service areas with two or fewer mitigation projects in a three year period and then rounding down to the nearest whole number. The results of this technique ensure that each service area with low wetland mitigation demand will have enough advance credits available to satisfy the compensatory mitigation requirements for one to two projects within a three year period.

The amount of advance stream credits was calculated using a technique generally similar to that described for advance wetland credits, although stream credit totals are rounded up to the nearest hundred linear feet. However, two observations from the analysis of the recent mitigation data are important to note. First, there was a large

amount of variability between perennial, intermittent and ephemeral mitigation needs between service areas and between the different tiers of mitigation demand. Second, there were relatively few stream mitigation projects in each service area (only three service areas had more than three projects in four years). As a result, in order to be able to meet the demand for stream mitigation across the state, in each service area this In-Lieu Fee Program needs to be able to satisfy the compensatory mitigation requirements for a small number of mitigation projects that may have a large number of linear feet of streams where that stream length is highly variable between perennial, intermittent and ephemeral stream types.

In order to meet this mitigation need and minimize the amount of out-of-kind stream mitigation, the amount of advance stream credits for each service area was calculated according to the following methodology. First, the different service areas were grouped into three tiers of mitigation demand according to the historical data provided to the Sponsor. Then the amount of advance credits for each stream type was determined by using the largest number of linear feet needed of that stream type in any one service area within each tier.

Table 1. Advance Credit Amounts by Service Area

Service Area	Advance Stream Credits	Advance Wetland Credits	Historic Stream Mitigation Linear Footage Adjusted for Three Year Period	Historic Wetland Mitigation Credit Need Adjusted for Three Year Period
Cimarron A	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Cimarron B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Cimarron C	1,000 Perennial 6,200 Intermittent 3,900 Ephemeral	8.00	0 Perennial 6,201 Intermittent 219 Ephemeral	1.33
Cimarron D	1,000 Perennial 6,200 Intermittent 3,900 Ephemeral	20.00	915 Perennial 0 Intermittent 3,529 Ephemeral	16.55
Upper Arkansas	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Neosho / Grand A	1,000 Perennial 6,200 Intermittent 3,900 Ephemeral	20.00	0 Perennial 4,378 Intermittent 1,009 Ephemeral	18.14
Neosho / Grand B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	11.00	0 Perennial 0 Intermittent 2,028 Ephemeral	8.46
Neosho / Grand C	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	2.60

Service Area	Advance Stream Credits	Advance Wetland Credits	Historic Stream Mitigation Linear Footage Adjusted for Three Year Period	Historic Wetland Mitigation Credit Need Adjusted for Three Year Period
Canadian A	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Canadian B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	11.00	1,751 Perennial 292 Intermittent 0 Ephemeral	7.13
Canadian C	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	657 Perennial 0 Intermittent 1,022 Ephemeral	2.08
Canadian D	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Beaver / North Canadian A	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Beaver / North Canadian B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Beaver / North Canadian C	8,600 Perennial 2,700 Intermittent 11,000 Ephemeral	8.00	8,507 Perennial 0 Intermittent 0 Ephemeral	0
Beaver / North Canadian D	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	11.00	0 Perennial 3,309 Intermittent 0 Ephemeral	11.33
Beaver / North Canadian E	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	766 Perennial 161 Intermittent 0 Ephemeral	0.33
Lower Arkansas A	1,000 Perennial 6,200 Intermittent 3,900 Ephemeral	11.00	0 Perennial 839 Intermittent 3,828 Ephemeral	13.57
Lower Arkansas B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Lower Arkansas C	8,600 Perennial 2,700 Intermittent 11,000 Ephemeral	20.00	3,899 Perennial 0 Intermittent 4,333 Ephemeral	21.54
North Fork of the Red A	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
North Fork of the Red B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Upper Red A	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0
Upper Red B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 1,241 Ephemeral	0.58

Service Area	Advance Stream Credits	Advance Wetland Credits	Historic Stream Mitigation Linear Footage Adjusted for Three Year Period	Historic Wetland Mitigation Credit Need Adjusted for Three Year Period
Upper Red C	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	2.92
Upper Red D	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	40.00	923 Perennial 0 Intermittent 0 Ephemeral	37.37
Upper Red E	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	20.00	949 Perennial 0 Intermittent 219 Ephemeral	20.70
Upper Red F	8,600 Perennial 2,700 Intermittent 11,000 Ephemeral	8.00	766 Perennial 2,642 Intermittent 10,904 Ephemeral	0.53
Lower Red A	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	40.00	288 Perennial 1,310 Intermittent 1,004 Ephemeral	41.73
Lower Red B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0

If, after approval of this Program Instrument, the number of advance credits presented in Table 1 is determined by the Corps and IRT and the Sponsor to be inadequate, the number of advance credits granted to the Sponsor can be increased through an amendment to this Program Instrument. Similarly, if the method of wetland and/or stream credit assessment in Oklahoma changes significantly after the approval of this in-lieu fee program, the amount of advance credits granted to the Sponsor (and any other aspects of the Program Instrument that would be affected by the change in crediting methodology such as credit prices) may be altered to better match the new method(s), after review and approval by the Corps in consultation with the IRT. The Sponsor shall be able to collect additional advance credits in a service area beyond what is included in Table 1 on a case by case basis as determined by the Corps, in consultation with the IRT, if a large development, such as a sizable energy or transportation project, is planned in that service area which would result in a level of impacts to waters of the U.S. that would exceed the amount of advance and/or released credits already available to the Sponsor.

Three years after the first sales of advance credits under this program, the Sponsor, Corps and IRT shall revisit the allocation of advance credits in each service area. This will allow the program to provide an appropriate amount of advance credits based on the history of advance credit sales and other pertinent factors.

The Sponsor's Compensation Planning Framework for each watershed details the aquatic needs for each of the watersheds. The allotted advanced credits are based upon several factors that are specific to each watershed. Watershed factors include but are

not limited to the past demand for mitigation projects; size of the watershed; population density; precipitation trends; water uses; commercial, residential and agricultural trends; historic aquatic communities; and chemical, physical and biological impairments to aquatic resources.

As released credits are generated by in-lieu fee project sites through the successful achievement of performance-based milestones in accordance with the credit release schedule included in each in-lieu fee project site's approved mitigation plan, the first portion of released credits must be used to fulfill the amount of advance credits already sold in that geographic service area. Before the Corps, in consultation with the IRT, can convert advance credits into released credits, the real estate instrument and/or the long-term management plan for the site must be approved by the IRT. Only after any advance credit sales within a geographic service area have been fulfilled through the application of released credits from an in-lieu fee project, in accordance with the credit release schedule in an approved in-lieu fee project site mitigation plan, may additional released credits from that project be sold or transferred to permittees. The relationship between advance credits and released credits is further described in the definition of "Fulfillment of advance credit sales of an in-lieu fee program" in the 2008 Mitigation Rule at 33 CFR 332.2.

F. Draft Fee Schedule for Potential Advance Credits

As directed by the 2008 Final Compensatory Mitigation Rule at 33 CFR 332.8(o)(5)(ii), the draft fee schedule for advance credits has been determined based on several factors, including the expected costs associated with restoration, establishment, enhancement and/or preservation activities. These costs have been determined using full cost accounting and include, as appropriate expenses, such items as land acquisition, project planning and design, construction, plant materials, labor, legal fees, monitoring and remediation as well as administration, contingency costs and long term management. Because these costs are based on policies described in current Corps' mitigation guidance, all credit prices are subject to change should that guidance be altered at some future date. If a change in Corps' mitigation policy occurs, the Sponsor will provide modified credit fee schedules to the IRT through the Corps for review.

The credit prices in all service areas have been calculated to ensure that prices are sufficiently high to guarantee successful and timely mitigation in all areas. These credit prices will ensure sufficient revenue to create small in-lieu fee project sites even with relatively low credit sale amounts. As is described in Section II.I, the sale of advance credits roughly equal to a minimum of 2.00 acres of mitigation area is needed to initiate a mitigation project in these service areas. It is anticipated that five acres is the minimum possible land area available for purchase for an in-lieu fee project site.

The fee schedule for each service area was determined by adding the anticipated costs of mitigation activities (planning, construction, monitoring, *etc.*) to the cost of real estate (which was adjusted by taking into account inflation, the price premium

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necessary to purchase small parcels and the fact that portions of the land purchased will not be able to produce mitigation credit). The sum of the mitigation and real estate costs was then increased by an additional 5% for financial assurances and 10% for administration. The resulting number is the estimated cost to produce one acre of mitigation in each service area. This is equal to the price of one wetland credit (which represents one acre of wetlands) but had to be adjusted to calculate the price of perennial, intermittent and ephemeral stream credits based on the amount of land needed to produce mitigation along one linear foot of each of these stream types. Each of these steps in this fee schedule calculation process is described in more detail in the following paragraphs.

The anticipated costs of mitigation activities associated with the restoration, establishment, enhancement and/or preservation of aquatic resources using full cost accounting are expected to be roughly equal across the state. The approximate costs are summarized below in Table 2 and totaled to produce an estimated cost of mitigation activities of \$38,650 per acre which does not include the cost of any land purchase.

Table 2. Estimated Price Per Acre of Mitigation Costs (Excluding Land Purchase)

Mitigation Cost Item	Examples	Approximate Cost Per Acre
Site Selection	Map review, real estate listing assessments, correspondence with Corps & IRT	\$2,850
Project Planning & Design	Mitigation plan, surveying, cultural resource assessment, permitting	\$5,050
Construction	Earthwork, planting, seeding, labor	\$18,000
Legal Fees	Easements, title work	\$1,750
Monitoring	Site visits, report writing	\$1,000
Remediation or Adaptive Management Activities	Earthwork, planting, seeding, labor	\$5,500
Contingency Costs Appropriate to the Stage of Project Planning	Construction and real estate expense uncertainties	\$3,300
Long-Term Management & Protection	Maintenance tasks, site visits	\$1,200
TOTAL:		\$38,650

In contrast to the cost of mitigation activities, the price of agricultural real estate varies significantly across Oklahoma. The estimation of the cost of real estate necessary to produce one acre of mitigation is calculated as described in the following paragraphs.

The current price of agricultural real estate in each service area was estimated by using the per acre price for the 2009-2011 three-year weighted average for each county as provided by the Oklahoma State University Department of Agricultural Economics Extension Service (OSU, n.d.(a)). The current real estate price in each service area was then calculated by selecting the highest county per acre price within each service area although counties that only had a very small portion of their area within the service area were excluded from consideration. The highest per acre price in each service area was chosen to help ensure that the In-Lieu Fee Program generates enough revenue to successfully provide in-lieu fee project sites and is not priced out of the real estate

market of significant portions of each service area as would happen if the average price per acre for each service area was used.

The resulting current real estate cost per acre for each service area then had to be adjusted for three reasons. First, because the land values from Oklahoma State University were based solely on information from tracts of land greater than 40 acres in size, a factor of safety of 10% was added to each service area's real estate cost estimate. This was done to take into account the fact that most in-lieu fee project sites will be smaller than 40 acres which will result in the In-Lieu Fee Program paying higher per acre land prices than those indicated by Oklahoma State University. Second, the real estate price for each service area was multiplied by a factor of four because it is assumed that the Sponsor will only be able to create an in-lieu fee project site on 25% of the land that is necessary to purchase. This is because of the arid nature of Oklahoma and the infeasibility of buying very small parcels capable of existing in their entirety as a mitigation parcel. Put another way, this multiplier is necessary because the In-Lieu Fee Program will only receive income proportionate to the amount of land able to produce wetland or stream credits but will have to purchase entire parcels, not all of which will be suitable to produce those credits. Because the In-Lieu Fee Program will have to purchase extra land that cannot be used to produce wetland or stream credits, the relative price per acre of mitigation land has to be increased using a multiplier. Third, because land prices in Oklahoma have been steadily increasing for the last fifteen years it was necessary to take land price inflation into account. This was done by first determining that between 2001 and 2011 there was an average annual price increase of 6% based on the data provided by the Oklahoma State University Department of Agricultural Economics Extension Service's annual statewide average per acre price for parcels 40 to 100 acres in size (the smallest parcel size available) (OSU, n.d.). As a result, the estimated real estate cost per acre in each service area was also subjected to a multiplier of 1.50 which represents seven years of 6% price increases so that advance credit sales will take into account real estate prices in 2018 which is near the end of the three year period between the anticipated first advance credit sale and when land acquisition and initial physical and biological improvements must be initiated on an in-lieu fee project site.

The following is an example of how the cost of real estate necessary to produce one acre of mitigation was calculated in one service area. In the Neosho / Grand A service area the 2011 price of agricultural real estate was determined by taking the highest county per acre weighted average price (\$2,138/acre). That number was then adjusted by multiplying it by 1.1 to take into account the 10% price premium resulting from having to purchase small properties, then multiplying the result by a factor of 4 to account for the cost of unusable land and then again by a factor of 1.50 to account for price inflation to get a result of \$14,111/acre [(((\$2,138 x 1.1) x 4) x 1.50) = \$14,111].

Table 3 summarizes all mitigation costs for each service area, including the real estate necessary to produce one acre of mitigation, the mitigation activities themselves, financial assurances and program administration. The wetland credit prices, which are

based on the cost to produce one acre of wetland mitigation, are simply the per acre total of all in-lieu fee mitigation costs rounded up to the nearest \$100.

**Table 3. Wetland Credit Fee Schedule Per Service Area
& Calculation of Total Mitigation Cost Per Acre**

Service Area	Adjusted Real Estate Price Necessary to Produce One Acre of Mitigation	Price Per Acre of Mitigation Costs	Financial Assurances (+5%)	Program Administration (+10%)	Total Mitigation Cost Per Acre	Wetland Credit Price
Cimarron A	\$4,567	\$38,650	\$2,161	\$4,322	\$49,700	\$49,700
Cimarron B	\$8,930	\$38,650	\$2,379	\$4,758	\$54,717	\$54,800
Cimarron C	\$10,897	\$38,650	\$2,477	\$4,955	\$56,979	\$57,000
Cimarron D	\$10,897	\$38,650	\$2,477	\$4,955	\$56,979	\$57,000
Upper Arkansas	\$8,930	\$38,650	\$2,379	\$4,758	\$54,717	\$54,800
Neosho/Grand A	\$14,111	\$38,650	\$2,638	\$5,276	\$60,675	\$60,700
Neosho/Grand B	\$13,121	\$38,650	\$2,589	\$5,177	\$59,536	\$59,600
Neosho/Grand C	\$14,111	\$38,650	\$2,638	\$5,276	\$60,675	\$60,700
Canadian A	\$7,280	\$38,650	\$2,296	\$4,593	\$52,819	\$52,900
Canadian B	\$11,827	\$38,650	\$2,524	\$5,048	\$58,049	\$58,100
Canadian C	\$11,009	\$38,650	\$2,483	\$4,966	\$57,108	\$57,200
Canadian D	\$9,108	\$38,650	\$2,388	\$4,776	\$54,922	\$55,000
Beaver/N. Canadian A	\$4,250	\$38,650	\$2,145	\$4,290	\$49,335	\$49,400
Beaver/N. Canadian B	\$7,458	\$38,650	\$2,305	\$4,611	\$53,024	\$53,100
Beaver/N. Canadian C	\$11,827	\$38,650	\$2,524	\$5,048	\$58,049	\$58,100
Beaver/N. Canadian D	\$14,375	\$38,650	\$2,651	\$5,302	\$60,979	\$61,000
Beaver/N. Canadian E	\$14,375	\$38,650	\$2,651	\$5,302	\$60,979	\$61,000
Lower Arkansas A	\$14,111	\$38,650	\$2,638	\$5,276	\$60,675	\$60,700
Lower Arkansas B	\$11,306	\$38,650	\$2,498	\$4,996	\$57,449	\$57,500
Lower Arkansas C	\$12,395	\$38,650	\$2,552	\$5,105	\$58,702	\$58,800
North Fork of the Red A	\$6,884	\$38,650	\$2,277	\$4,553	\$52,364	\$52,400
North Fork of the Red B	\$7,768	\$38,650	\$2,321	\$4,642	\$53,381	\$53,400
Upper Red A	\$6,884	\$38,650	\$2,277	\$4,553	\$52,364	\$52,400
Upper Red B	\$8,514	\$38,650	\$2,358	\$4,716	\$54,239	\$54,300
Upper Red C	\$7,438	\$38,650	\$2,304	\$4,609	\$53,001	\$53,100
Upper Red D	\$12,916	\$38,650	\$2,578	\$5,157	\$59,301	\$59,400
Upper Red E	\$8,514	\$38,650	\$2,358	\$4,716	\$54,239	\$54,300
Upper Red F	\$12,005	\$38,650	\$2,533	\$5,066	\$58,254	\$58,300
Lower Red A	\$10,692	\$38,650	\$2,467	\$4,934	\$56,743	\$56,800
Lower Red B	\$10,157	\$38,650	\$2,440	\$4,881	\$56,129	\$56,200

In order to determine credit prices for the three types of stream credits in a way that would meet the requirements in the Corps' *Aquatic Resource Mitigation and*

Monitoring Guidelines and as described in this document, the Total Mitigation Cost Per Acre for each service area as included in Table 3 was then multiplied by the acreage needed to provide mitigation on a length of one linear foot of each stream type plus a riparian area equivalent to 100 feet per side for perennial streams, 75 feet per side for intermittent streams and 50 feet per side for ephemeral streams. For the purposes of these calculations, perennial streams are assumed to be 40 feet wide, intermittent streams to be 15 feet wide and ephemeral streams to be five feet wide, which results in the acreages for each one linear foot of mitigation for these stream types to be 0.006, 0.004 and 0.002 respectively, which corresponds to the area within the stream channel plus both sides of the riparian corridor. Finally, as described in Section II.G, if there is not a sufficient amount of one type of stream credits at an in-lieu fee project site to satisfy the mitigation need of a credit purchase, the Sponsor shall be able to convert stream credit types in order to meet the need of the potential permittee although this will be avoided as much as possible. As examples of stream credit conversion, ephemeral stream impacts can be mitigated for at an in-lieu fee project site on intermittent or perennial streams and intermittent stream impacts can be mitigated for on perennial streams. Because these conversions to stream types of greater flow duration and greater mitigation cost would occur at a point in time after the credit sale but before in-lieu fee project site approval, it is impossible to know how many advance stream credits will need to be converted at the future in-lieu fee project site at the time of advance credit sale. As a result, the uncertainty about this issue is priced into the cost for ephemeral and intermittent stream credits. This was done by adding an additional 20% to the ephemeral stream credit prices and an additional 5% to the intermittent stream credit prices, which are factors based on the additional real estate and mitigation cost of the conversions and the likelihood of these conversions occurring. The resulting value was then rounded up to the nearest five dollars to produce the stream credit values shown in Table 4. As an example, the cost of one intermittent stream credit in the Cimarron D service area was calculated by multiplying the Total Mitigation Cost Per Acre (\$56,979) by the mitigation acreage represented by one linear foot of intermittent stream (0.004 acre) and then applying the additional 5% cost due to the chance of mitigating for this credit purchase on a perennial stream instead of an intermittent one $[(\$56,979 \times 0.004) \times 1.05] = \239.31 which rounds up to \$240].

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Table 4. Stream Credit Fee Schedule Per Service Area

Service Area	Total Mitigation Cost Per Acre	Perennial Stream Credit Price	Intermittent Stream Credit Price	Ephemeral Stream Credit Price
Cimarron A	\$49,700	\$300	\$210	\$120
Cimarron B	\$54,717	\$330	\$230	\$135
Cimarron C	\$56,979	\$345	\$240	\$140
Cimarron D	\$56,979	\$345	\$240	\$140
Upper Arkansas	\$54,717	\$330	\$230	\$135
Neosho/Grand A	\$60,675	\$365	\$255	\$150
Neosho/Grand B	\$59,536	\$360	\$255	\$145
Neosho/Grand C	\$60,675	\$365	\$255	\$150
Canadian A	\$52,819	\$320	\$225	\$130
Canadian B	\$58,049	\$350	\$245	\$140
Canadian C	\$57,108	\$345	\$240	\$140
Canadian D	\$54,922	\$330	\$235	\$135
Beaver/N. Canadian A	\$49,335	\$300	\$210	\$120
Beaver/N. Canadian B	\$53,024	\$320	\$225	\$130
Beaver/N. Canadian C	\$58,049	\$350	\$245	\$140
Beaver/N. Canadian D	\$60,979	\$370	\$260	\$150
Beaver/N. Canadian E	\$60,979	\$370	\$260	\$150
Lower Arkansas A	\$60,675	\$365	\$255	\$150
Lower Arkansas B	\$57,449	\$345	\$245	\$140
Lower Arkansas C	\$58,702	\$355	\$250	\$145
North Fork of the Red A	\$52,364	\$315	\$220	\$130
North Fork of the Red B	\$53,381	\$325	\$225	\$130
Upper Red A	\$52,364	\$315	\$220	\$130
Upper Red B	\$54,239	\$330	\$230	\$135
Upper Red C	\$53,001	\$320	\$225	\$130
Upper Red D	\$59,301	\$360	\$250	\$145
Upper Red E	\$54,239	\$330	\$230	\$135
Upper Red F	\$58,254	\$350	\$245	\$140
Lower Red A	\$56,743	\$345	\$240	\$140
Lower Red B	\$56,129	\$340	\$240	\$135

These credit prices will be allowed to change once a year or more often if the need arises at the discretion of the Sponsor subject to the review of the Corps. While it is the responsibility of the Sponsor to set credit prices and the Corps is not allowed to approve or disallow the prices set by the Sponsor, the Corps is able to review the fee structure to determine whether the Sponsor is complying with the full cost accounting provisions as described earlier to ensure that a sufficient amount of money is being collected to allow for the creation of successful and timely mitigation projects that can offset the impacts mitigated through the In-Lieu Fee Program.

G. *Methodology for Determining Project-Specific Credits and Fees*

The credit purchase requirement for any project that impacts jurisdictional wetlands and/or streams shall be determined by the Corps. One factor that may be taken into consideration when determining the amount of credits to be purchased from this In-Lieu Fee Program is the anticipated time lag between impacts and an in-lieu fee project site in service areas anticipated to have credit sales below the minimum sales required to initiate mitigation activities as described in Section II.I.

The number of wetland credits granted to the Sponsor that result from compensatory mitigation activities at an in-lieu fee project site will be determined by the Corps, in consultation with the IRT, using the Tulsa District's 2004 *Aquatic Resource Mitigation and Monitoring Guidelines* and taking into account several factors, including the amount of mitigation required; the past performance of the Sponsor; the likelihood of success; and the expected increase in aquatic ecosystem functioning resulting from the proposed wetland mitigation area or areas. Wetland credits will be quantified using acreage as units with the amount of wetland credits determined. At the discretion of the Corps, in consultation with the IRT, mitigation for open water areas which lack emergent vegetation at all times of year during a year of normal precipitation and which are less than two meters deep will be in-kind unless the replacement of open water impacts with wetlands would meet the needs of a service area. The mitigation of open water habitats will follow the same requirements described in this document for wetland areas. It will not be possible to mitigate for wetland impacts through restoring, establishing, enhancing or preserving open water habitats. Impacts to deepwater habitats, which are open water habitats greater than two meters in depth as defined by Cowardin et al. (1979), will be quantified on a case by case basis by the Corps. Table 5 will be used to determine the amount of wetland credits generated at an in-lieu fee project site based upon the acreage of each mitigation activity on the site.

Table 5. In-Lieu Fee Project Site Wetland Credit Ratios

Mitigation Activity	Credit Ratio (Credits Granted: Acres)
Wetland Restoration/Rehabilitation	1:1
Wetland Establishment/Creation	1:1
Wetland Enhancement	1:2
Upland Buffer Creation/Enhancement	1:4
Wetland Preservation	1:10

The amount of stream mitigation credit granted to any in-lieu fee project site will also be determined using the *Aquatic Resource Mitigation and Monitoring Guidelines* with

some modifications as described below or any subsequent stream credit calculation method that the State of Oklahoma or the Corps implements. The amount of stream mitigation credit granted will be quantified using separate units of linear feet of perennial, intermittent and ephemeral streams as described below. The establishment, restoration, enhancement, or preservation of non-aquatic resources such as buffers, riparian areas and uplands shall be granted credits only when those resources are essential to maintaining the ecological viability of adjoining aquatic resources. If the methodology of wetland and/or stream credit calculation changes, the Sponsor will recalculate the amount of remaining credits in any in-lieu fee project site using the new method(s) and will provide the results to the Corps for their review and approval.

Furthermore, a small amount of additional stream credit accounting standardization is necessary so that the calculation of the amount of stream mitigation required by potential permittees and the amount of stream credits provided by in-lieu fee project sites is consistent with the procedures associated with centralized mitigation such as an in-lieu fee program. Specifically, it is important that the Sponsor has a reasonable level of certainty about the amount of stream credits that can be generated by a potential in-lieu fee site property during the site review process. As a result, the Sponsor proposes the following guidelines to assist with the crediting of individual in-lieu fee project sites which are designed to be consistent with the *Aquatic Resource Mitigation and Monitoring Guidelines*.

- One perennial stream credit shall equal one linear foot of perennial stream channel surrounded by 100 feet of protected riparian buffer on both sides (equal to 0.0046 acre of riparian buffer).
- One intermittent stream credit shall equal one linear foot of intermittent stream channel surrounded by 75 feet of protected riparian buffer on both sides (equal to 0.0034 acre of riparian buffer).
- One ephemeral stream credit shall equal one linear foot of ephemeral stream channel surrounded by 50 feet of protected riparian buffer on both sides (equal to 0.0023 acre of riparian buffer).
- In order to satisfy the number of advance stream credit sales in a service area solely through stream protection and buffer improvements, an in-lieu fee project site shall contain at least the number of linear feet of streams represented by the advance stream credit sales. Should the acreage of riparian buffer associated with that linear footage not be sufficient according to the acreages described above, the in-lieu fee project site will contain additional linear footage necessary to encompass a sufficient amount of riparian buffer to satisfy the applicable acreage requirement as described above.
- Protection of a riparian buffer is defined as the creation (greater than 50% plantings), enhancement (10-50% plantings), or preservation (less than 10% plantings) of a riparian corridor adjacent to a stream.
- Enhancement of riparian buffers will be given only half the amount of credit granted to riparian buffer creation. As an example, a perennial stream that has

more than 100 feet of existing riparian buffer on one side that requires enhancement through selective planting and removal of exotic species and only 25 feet of existing riparian buffer on the other side would be granted 0.75 credit per linear foot for the enhancement of the first side and the creation of the riparian buffer on the opposite side.

- Preservation of riparian buffers will be given only one quarter the amount of credit granted to riparian buffer creation. By using the same scenario described above, the preservation of the 100 feet of existing buffer and the creation of 100 feet of riparian buffer on the opposite bank would generate 0.625 credit per linear foot.
- Similarly, if mitigation is possible on only one side of a stream channel, then the amount of credit associated with riparian buffers is divided in two.
- Compensatory mitigation for adversely impacted streams should ideally include a combination of in-stream and riparian mitigation. Because in-stream mitigation techniques often provide a greater benefit to the stream than riparian buffer mitigation and because the benefits of in-stream mitigation often extend beyond the actual footprint of the in-stream work, they shall be calculated separately from riparian buffer mitigation and be granted a greater number of stream credits per linear foot than riparian buffer mitigation. If the expected benefit from the in-stream work extends beyond the boundary of the in-lieu fee project site, the in-lieu fee project site shall receive those credits that extend onto adjacent properties on a case-by-case basis at the discretion of the Corps in consultation with the IRT. Areas subject to both riparian buffer mitigation and in-stream mitigation shall be granted the cumulative result of both types of stream credit generation. The stream credits generated from in-stream mitigation will be based upon the general amount of ecosystem improvement provided by the specific in-stream mitigation technique. This amount of ecosystem improvement is quantified into three tiers of stream benefit as described below:
 - Substantial stream mitigation addresses multiple key functions on a large scale. Activities that would constitute Substantial improvements would include, but are not limited to, such activities as removing stream impoundments and restoring natural features; culvert replacements with expansion bridges; restoring a degraded or eradicated stream to appropriate stream geometry; restoring floodplain connectivity in incised or leveed stream channels; and removal of hard armoring with restoration of stream banks to appropriate dimensions and incorporation soft stabilization methods. Substantial stream mitigation improvements will receive 3.5 stream credits for each linear foot of stream improved by the mitigation action.
 - Moderate stream mitigation addresses multiple or single functions on a smaller, reach-specific scale. Activities that would constitute Moderate improvements would include, but are not limited to, such activities as slope stabilization in highly erodible areas with soft stabilization methods; restoration of natural pool and riffle habitat; modifying an

existing unstable and incised channel and floodplain at their current elevations to create a stable channel but without an active floodplain; routing streams around impoundments with morphologically stable channels; construction of fish ladders; and culvert replacement with bottomless culverts or low water crossings. Moderate stream mitigation improvements will receive 2.5 stream credits for each linear foot of stream improved by the mitigation action.

- Minimal stream mitigation addresses single or no functional objectives on a small, reach-specific scale. Activities that would constitute minimal improvements would include, but are not limited to, such activities as restoring stream bank stability using hard armoring techniques (only allowed when other mitigation techniques are infeasible as may be the case in urban settings); incorporating bankfull planting benches in hard armored areas; removal without any additional measures of check dams, weirs and other artificial in-stream structures that negatively impact stream functions such as erosion or creating a minor impediment to stream function and/or aquatic organism movement; and excluding livestock from stream areas per National Resources Conservation Service (NRCS) standards. Minimal stream mitigation improvements will receive 2.0 stream credits for each linear foot of stream improved by the mitigation action.

In order to ensure consistent accounting of impacts and mitigation improvements, the *Aquatic Resource Mitigation and Monitoring Guidelines* shall also be used in determination of credits needed by authorized project impacts by third parties. However, the *Aquatic Resource Mitigation and Monitoring Guidelines* were written when on-site permittee-responsible projects were the highest mitigation priority, which is no longer the case and this Program Instrument follows the current priority of centralized mitigation set forth in the Final Mitigation Rule.

So that crediting to and debiting from in-lieu fee project sites is consistent with the 2008 Final Mitigation Rule's preference for centralized mitigation options such as this In-Lieu Fee Program, mitigation factors a, e, f, g, h, i, j, k, l, m, n and o listed on pages eight and nine of the *Aquatic Resource Mitigation and Monitoring Guidelines* will not apply when determining the amount of advance or released wetland credits owed by a permittee for their project's impacts. This is because these factors are either attributes of a mitigation site that will be unknown at the time of advance credit sales (before a mitigation site has been selected) or are intended to penalize off-site mitigation in favor of on-site permittee-responsible mitigation, which is not consistent with the Final Mitigation Rule. Even though some of these factors will be known when released credits are available from an established in-lieu fee project site, they still should not be taken into account when determining the number of credits that a potential permittee may need because that would penalize or reward different potential permittees arbitrarily depending on whether released credits are available or not, which is a factor totally unrelated to their projects. Instead, these factors (e, i, j, k, l, m, n and o) will

only be taken into account when calculating the amount of credits created by each in-lieu fee project site. However, the mitigation factors that penalize centralized mitigation (a, f, g and h) will not be used when calculating the amount of wetland credits generated by an in-lieu fee project site.

In the last paragraph on Page 7 of the *Aquatic Resource Mitigation and Monitoring Guidelines* it states “Where stream type does not match, or stream channel size differs by more than 100 percent, the minimum acceptable mitigation ratio is increased to 2:1 or higher.” This provision of the *Aquatic Resource Mitigation and Monitoring Guidelines* pertains to permittee-responsible mitigation and is not appropriate for in-lieu fee programs. This is due to the fact that the determination of the amount of credits required by a permittee will occur before the necessary information is known about the corresponding in-lieu fee mitigation site. Specifically, information about the types of streams and the stream widths at an in-lieu fee project site will be unknown at the time of advance credit sales (before a mitigation site has been selected). Therefore it would be impossible to adjust the mitigation ratios in the manner suggested for differences in stream width between impact and mitigation sites. However, if there are not a sufficient amount of one type of stream credits to satisfy the mitigation need of a credit purchase, the Sponsor shall be able to convert stream credit types in order to meet the need of the potential permittee. This shall be done only as necessary and as allowed by the Corps, in consultation with the IRT, on a case by case basis. Additionally, following the existing policy of the Corps, the conversion of stream credit types can only occur from a stream type of lesser flow duration to one of greater duration. As examples, ephemeral stream credits can be converted to intermittent or perennial stream credits, intermittent stream credits can be converted to perennial stream credits but not ephemeral stream credits, and perennial streams cannot be converted into any other kind of stream credits.

Based upon the analysis of the Corps’ data of mitigation need within Oklahoma between October 2007 and mid-November 2011, approximately 43% of all mitigated stream linear footage is from ephemeral streams. Because impacts to ephemeral streams occur at a level disproportionate to the density of ephemeral streams on the landscape as a whole, it may be impractical for this In-Lieu Fee Program to mitigate in-kind for more than 3,000 linear feet of ephemeral streams in one service area, as was the need in 25% of all service areas that had stream mitigation needs over the last four years. This would require multiple sites and an exceedingly large amount of additional land purchased outside of any potential riparian buffer areas that would serve no mitigation purpose, resulting in unnecessarily high credit prices. The other option would be to convert to other stream types. If this is done, the 2:1 ratio used to convert ephemeral linear footage to that of other stream types would result in very large amounts of additional intermittent or perennial stream mitigation required which would not be able to be predicted at the time of credit sales. In order to remedy these problems, the Sponsor shall not have to use a mitigation ratio when converting between stream types when matching the credit generation of an in-lieu fee project site to the stream credit sales in the service area. However, stream credit types will still only be

able to be converted from a stream type of lesser flow duration to one of greater duration as described earlier in this section. Mitigating out-of-kind is not desirable, but the conversion of stream types to ones of greater flow duration at a 1:1 ratio still results in an increase in aquatic ecosystem functions and habitat. Moreover, this exemption is consistent with the Final Mitigation Rule and the goal of In-Lieu Fee Programs to study and then address the needs of each service area rather than be strictly tied to always providing in-kind mitigation.

If any portion of any established in-lieu fee project site received stream or wetland credits under the *Aquatic Resource Mitigation and Monitoring Guidelines*, but would not under any new wetland or stream crediting method, the Sponsor would still receive credits for the area or areas in question at a rate acceptable to both the Sponsor and the Corps because the Sponsor purchased and/or restored the area in good faith according to the agreed upon method at the time of mitigation plan approval. An established in-lieu fee project site is defined as one that has a mitigation plan approved by the IRT and for which land has been purchased. Fees to permittees will be determined by the Sponsor based on market rates.

H. *Monitoring Reports*

The Sponsor will provide the Corps with monitoring reports for each in-lieu fee project site. These reports will describe the progress of aquatic resource improvement at each site and will be in accordance with the monitoring requirements of each site's approved mitigation plan and with Regulatory Guidance Letter 08-03 or any future relevant guidance. Monitoring reports will be based on information gathered during site inspections, will help determine the level of success achieved at each project site and will identify any problems that should be addressed through adaptive management. The Corps will distribute copies of all monitoring reports to the IRT.

Monitoring of each project site will be conducted until the Corps, in consultation with the IRT, determines that each project site has met the performance standards as described in each project site's mitigation plan. This period will not be less than five years from the completion of site construction. During this time the Corps and/or IRT may schedule progress inspections of the project site. At the request of the Sponsor, the Corps, in consultation with the IRT, will perform a final compliance visit to determine whether all success criteria have been satisfied, unless the Corps, in consultation with the IRT, determines that a site visit is unnecessary to document the achievement of the specified success criteria.

I. *Contingency Plans / Remedial Actions*

If the Corps, in consultation with the IRT, decides that, as a result of their review of a site visit or monitoring report, an in-lieu fee project site is not meeting its performance standards as described in the site's mitigation plan, then the Sponsor shall be responsible for the creation and implementation of remedial actions necessary to

address the stated concern(s). If the necessary remedial actions are of greater significance than relatively routine maintenance, then the Corps shall receive a copy of a remedial action plan for review and approval. When approved, the remedial action plan will be considered an addendum to the site's mitigation plan. If the project failure continues, then the Sponsor, the Corps and the IRT will consider whether additional maintenance or longer monitoring timeframes are necessary or if default proceeds as described in Section II.N shall be initiated.

Additionally, as is described in Table 1, 12 of the 30 service areas (40% of all service areas) had absolutely no mitigation need in the four year period assessed. The data also show that 18 service areas (which includes the 12 previously mentioned service areas) had less than one mitigation project per year. Because so many service areas have a very small mitigation need, this In-Lieu Fee Program is designed to be able to centralize the mitigation provided for several small projects and create viable mitigation sites. However, for practical purposes there is a need for some minimum level of credit sales that is needed to initiate mitigation activities. As a result, if after two years' time from the first advance credit purchase in a service area, the amount of credit sales within the service area are less than an approximate minimum mitigation area of 2.00 acres (specifically credit sales less than 2,000 stream credits of any type or less than 2.00 wetland credits) after review and approval by the Corps in consultation with the IRT the Sponsor may satisfy the mitigation obligation through the use of released credits from a mitigation bank in good standing or an in-lieu fee project site from a different service area within the same watershed, perform mitigation activities in a neighboring service area that is within the same watershed (potentially grouping credits from multiple service areas that are each separately insufficient to fund an in-lieu fee project site), or defer the mitigation obligation into the future. These minimum sales numbers would have resulted in only two service areas that had mitigation need within the last four years relying on some contingency plan to satisfy their mitigation requirements. If either one of the minimum advance total stream credit or advance wetland credit amounts described above is exceeded, then the Sponsor shall be responsible for implementing an in-lieu fee project site. Additionally, if both wetland and stream advance credit sales have occurred in a service area but neither one exceeds the minimums set in this paragraph, then the Sponsor shall need to implement an in-lieu fee project site only if both credit amounts are greater than half of each minimum.

J. Financial Assurances

The amount of short-term financial assurances for each in-lieu fee project site will be determined by the Corps in consultation with the Sponsor. This amount will take into consideration the cost of providing replacement mitigation, including costs for land acquisition, planning and engineering, legal fees, mobilization, construction and monitoring. Additionally, the amount will be influenced by the size and complexity of each project, the degree of project completion at the time of project approval, the past performance of the Sponsor and any other factors deemed appropriate by the Corps, in

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consultation with the Sponsor. The Corps holds the sole authority to enforce the provisions of both short-term and long-term financial assurances.

Short-term financial assurances will be used for contingencies during the operational life of any in-lieu fee project site and will be in the form of an irrevocable Letter of Credit to the Conservation Easement Holder for the site. The Conservation Easement Holder for each site will be an organization that meets any and all requirements necessary to hold conservation easements in the state of Oklahoma. The institution granting the irrevocable Letter of Credit shall be a member of the Federal Deposit Insurance Corporation and the irrevocable Letter of Credit shall be secured by a cash account to be filled with revenues generated from the sale of advance credits. The irrevocable Letters of Credit shall be termed Contingency Funds and shall be used by a third party designated by the Conservation Easement Holder and approved by the Corps and IRT in the event that the Sponsor fails to comply with the terms of this document or with any requirements of specific in-lieu fee project site mitigation plans or to rectify any unforeseen events as determined by the Corps, in consultation with the IRT as described in Section II.N. The Contingency Funds shall be paid by the lending institution at the direction of the Corps into a standby trust to be used by the Conservation Easement Holder in a manner consistent with directions received by the Corps. The said sum shall be reduced by 75% after the Corps, in consultation with the IRT, has agreed that the in-lieu fee project site has completed all construction and planting activities as described in the project site's mitigation plan. The outstanding 25% of the contingency funds shall remain until the Sponsor receives a letter from the Corps stating that they are satisfied that the in-lieu fee project site has met all of its success criteria.

The mechanism to ensure suitable performance by each in-lieu fee project site will be contained within the financial assurance document(s) for each proposed project site. The financial assurance will include a provision that ensures that the Corps will receive notification at least 120 days in advance of any termination or revocation.

Long-term management financial assurances will be established for each service area. These long-term financial assurances would be used by a third party for long-term management should the Sponsor be unable to perform those duties. The long-term management financial assurances will be used to ensure the long-term management of any in-lieu fee project site within a service area and will be funded by an allocation of 10 percent of credit sales in that service area to a separate designated long-term financial assurances account at a financial institution that is a member of the Federal Deposit Insurance Corporation. These funds will be used as collateral for Letters of Credit for the long-term financial assurances for each in-lieu fee project site within that service area. Extra funds that collect in each such account would be used to pay for items such as property tax and unbudgeted or unexpected expenditures related to long-term management.

K. Annual Reports

The Sponsor will provide annual reports to the Corps for distribution to the IRT for each watershed. The watershed reports will include the following information for each service area within the watershed:

- All income received, disbursements, and interest earned by the program account
- A modified disbursement budget for Corps approval (if Sponsor so desires)
- A list of all permits for which In-Lieu Fee Program funds were accepted, including the Corps permit number (or state permit number if there is no Corps permit number), the geographic service area in which the authorized impacts are located, the amount of authorized impacts, the amount of required compensatory mitigation, the amount paid to the In-Lieu Fee Program and the date the funds were received from the permittee
- A description of In-Lieu Fee Program expenditures from the account, including costs of land acquisition, planning, construction, monitoring, maintenance, contingencies, adaptive management and administration
- The balance of advance credits and released credits at the end of the report period for each geographic service area
- Any additional information requested by the Corps

The information described above will be kept by the Sponsor in ledgers for each individual geographic service area according to each credit type as well as individual ledgers for each in-lieu fee project site.

L. IRT Review Schedule for In-Lieu Fee Project Site Mitigation Plans

The IRT will review and respond to complete submissions of in-lieu fee project mitigation plan proposals within the timeframes described in Section 332.8 of the April 10, 2008 Final Rule describing Compensatory Mitigation for Losses of Aquatic Resources (Final Mitigation Rule) issued by the Corps and the EPA.

M. Actions Under Multiple Authorities

Per 33 CFR 332.3(j)(1)(ii), proposed restoration activities may address requirements of multiple regulatory programs and authorities for the same activity; however, a single credit may only address the mitigation requirements of a single permitted activity.

N. Default & Closure

If the Corps determines that a substantial failure to meet performance standards has occurred at an in-lieu fee project site or that this In-Lieu Fee Program is not complying with the terms of this Instrument, appropriate action will be taken.

If the Corps, in consultation with the IRT, determines that an in-lieu fee project site, or a specific portion of an in-lieu fee project site, experiences a significant failure in meeting its performance standards, the Corps shall give written notice to the Sponsor of such violation and demand corrective action sufficient to cure the violation and, where the violation involves injury to the in-lieu fee project site resulting from any use or activity inconsistent with the purpose of the in-lieu fee project site's mitigation plan to restore the portion of the in-lieu fee project site to its prior condition in accordance with a plan approved by Corps. If the Corps determines that the In-Lieu Fee Program is operating at a credit deficit within a specified geographic service area, the Sponsor will be notified that debiting of credits from that service area should immediately cease. The Sponsor shall cure the violation and notify the Corps of the remedial site activities within 60 days after receipt of notice thereof from the Corps, or under circumstances where the violation cannot reasonably be cured within a 60 day period, update the Corps of the situation and begin curing such violation within the 60 day period and diligently pursue such cure to completion.

In the event the Sponsor defaults and fails to implement remedial actions necessary to address a significant failure in meeting success criteria or a credit deficit within 60 calendar days, the Corps has several options to address the situation. Actions that may be deemed appropriate by the Corps include mandating adaptive management, decreasing available credits or the total amount of credits to be granted to an in-lieu fee project site, ceasing credit sales in the service area that contains the necessary remedial actions, utilizing financial assurances, purchasing mitigation credits from a different approved mitigation provider and terminating the In-Lieu Fee Program Instrument. Should the Corps determine that it is necessary to draw upon financial assurances, they will notify the Sponsor that debiting from the specified geographic service area is indefinitely suspended and then authorize the Conservation Easement Holder to draw on the contingency funds to implement the necessary remedial actions.

In the event that a natural disaster destroys all or part of any in-lieu fee project site, all debiting from the in-lieu fee project site shall cease immediately. Such natural disasters include floods, tornados, fires, earthquakes, droughts, disease, regional pest infestation, *etc.*, which the Corps, in consultation with the IRT, determines is beyond the control of the Sponsor to prevent or mitigate. The Sponsor shall not be responsible for restoring acreage for credits which were sold prior to any such natural disaster. However, the Sponsor shall be responsible for restoring acreage for which credits have been released to the Sponsor if those credits are unsold at the time of the natural disaster. If the damage is so severe that the Sponsor and the Corps, in consultation with the IRT, determine that project success is unattainable, then the Sponsor will not be obligated to restore any portion of the in-lieu fee project site. If adaptive management strategies are unsuccessful and performance standards are unattainable, the Sponsor may request early closure of an in-lieu fee project site and forfeiture of the remaining anticipated credits.

Closure of the In-Lieu Fee Program will require sixty (60) days written notice to the Corps and IRT. Within sixty (60) days of written notification the Sponsor will meet with the Corps and the IRT to facilitate the closure terms. The Sponsor will provide an accounting of uncompleted projects and dispersed and remaining fees. Outstanding projects will be completed as feasible, and the remaining fees will be transferred to another mitigation entity of the Corps' choosing.

O. Need & Feasibility

1. Need for In-Lieu Fee Program

Between 2000 and 2009 Oklahoma's population grew by 6.9% (USCB, 2011), a trend that is very likely to continue. The necessity of building additional housing, commercial properties and public infrastructure to meet the needs of an increasing population will undoubtedly result in unavoidable impacts to jurisdictional waters of the U.S. Consequently, there is a need for a comprehensive statewide program to make compensatory mitigation in Oklahoma uniform, efficient, predictable and successful.

While permittee-responsible mitigation thus far has been the dominant method of compensating for impacts to aquatic resources, there is now a need for compensatory mitigation alternatives throughout Oklahoma. In 2008 the Corps and EPA issued their Final Mitigation Rule in order to increase the effectiveness of compensatory mitigation and the efficiency and uniformity of the mitigation process. The benefits of in-lieu fee programs over permittee-responsible mitigation was acknowledged by the Corps and EPA in the Final Mitigation Rule which states in 33 CFR, Chapter II, Section 332.3 (b)(3),

“...In-lieu fee projects typically involve larger, more ecologically valuable parcels, and more rigorous scientific and technical analysis, planning and implementation than permittee-responsible mitigation. They also devote significant resources to identifying and addressing high-priority resource needs on a watershed scale, as reflected in their compensation planning framework. For these reasons, the district engineer should give preference to In-Lieu Fee Program credits over permittee-responsible mitigation, where these considerations are applicable.”

The Final Mitigation Rule formally established a mitigation hierarchy with mitigation banks being the highest priority, In-Lieu Fee Programs being second priority and permittee-responsible mitigation being the lowest priority. Currently in Oklahoma there are only one centralized mitigation option in the middle of the state. This In-Lieu Fee Program would create a centralized mitigation option that would serve the mitigation needs of a larger portion of the state and would ensure the success of more ecologically valuable parcels and enhance the chemical, physical and biological integrity of the aquatic resources within Oklahoma. While mitigation banks are generally preferable over in-lieu fee project sites, they are unlikely to become

established in the rural areas that dominate the vast majority of Oklahoma while an in-lieu fee program is well suited to those conditions.

This In-Lieu Fee Program will provide a way to offset impacts to aquatic resources throughout the state in a manner that complies with current mitigation regulations. This mitigation option will be available to permittees that do not have access to approved mitigation and will help offset some of the current and future threats to aquatic resources by increasing the size of riparian corridors which will reduce sediment loading, nutrient loading, stream bank erosion and increased storm water runoff. Stream bank stabilization activities will limit stream instability, sediment-loading and stream bank erosion. In-stream habitat enhancement will remove invasive species and improve habitat for fish and aquatic macroinvertebrates. Wetland restoration, enhancement and creation will improve water quality, reduce sediment loads and flood levels, and increase wildlife habitat

2. Technical Feasibility

The qualifications of the Sponsor are discussed in greater detail in Section V (Sponsor Qualifications). However, the team of professionals organized by the Sponsor has a long and proven track record of successful compensatory mitigation projects, from small permittee-responsible projects to the largest number of approved and prospective mitigation banks in the area, encompassing several thousand acres across Missouri and Kansas. This level of experience is sufficient evidence of the feasibility of this In-Lieu Fee Program.

III. SERVICE AREAS

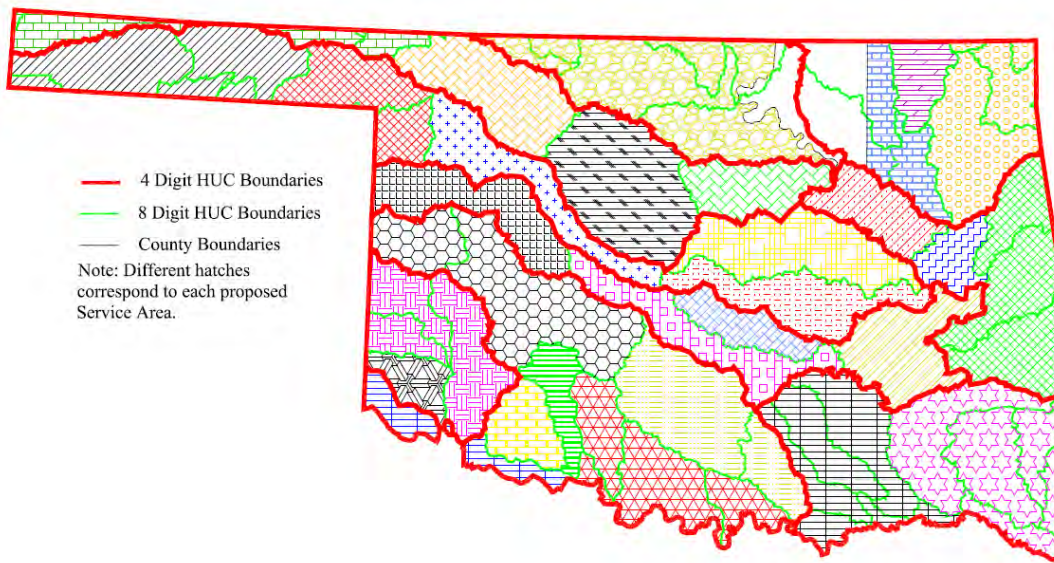
A. Overall Approach for Service Area Definition

The In-Lieu Fee Program shall be established with the purpose of providing compensatory mitigation for impacts to the waters of the U.S., including wetlands, within the State of Oklahoma. Impacts to waters of the U.S., including wetlands, mitigated through this program will be administered within distinct service areas based on the drainage area boundaries within the state. This will help to ensure this In-Lieu Fee Program's compliance with the watershed approach to compensatory mitigation defined in the April 10, 2008 Final Mitigation Rule issued by the Corps and the EPA.

In order to ensure that in-lieu fee compensatory mitigation sites will be located as close as is practicable to the source of impacts, the service area boundaries are based on Hydrologic Unit Code (HUC) boundaries with 6-digit HUC service areas for rural areas and 8-digit HUC service areas for areas that contain all or part of an urban area. Impacts to waters of the U.S. must be mitigated within the same service area unless otherwise approved on a case by case basis by the Corps in consultation with the IRT as discussed in Section II.I. This will result in 30 separate service areas within the state

grouped according to the watershed in which they reside. A watershed is defined as a 4-digit HUC watershed within Oklahoma with the combination of the Upper Cimarron and Cimarron 4-digit HUCs into one watershed because of the small size of the Upper Cimarron HUC within Oklahoma. Figure 1 shows the service area boundaries within Oklahoma. Please note that this In-Lieu Fee Program cannot locate in-lieu fee project sites on tribal lands without being requested to by the tribe in cooperation with the Corps. As a result, while tribal lands are included in this in-lieu fee program on a case by case basis, they are not shown in any service area figures because of the anticipated improbability of siting projects on tribal lands.

Figure 1. Service Area and HUC Boundaries Within Oklahoma



As a result of this approach, the Oklahoma City metropolitan area within Oklahoma and Cleveland Counties is covered by six different service areas. Consequently, multiple in-lieu fee project sites will eventually surround the Oklahoma City metropolitan area as opposed to one or two very large in-lieu fee project sites that serve the whole region. Similarly, the Tulsa metropolitan area contained within Tulsa, Creek, Rogers and Wagoner Counties would be split among three service areas based on 8-digit HUC watersheds. Likewise, the City of Lawton would be covered by two separate 8-digit HUC service areas within the same watershed. Figure 2 shows the service area for an example impact site in southern Oklahoma County.

Figure 2. Example 8-Digit HUC Service Area

The Sponsor took great care balancing the desire to minimize the distance between impact and mitigation sites with the necessity of establishing service area boundaries of sufficient size to make centralized mitigation viable. As part of this process, several different watershed sizes were considered as the basis for service areas. The Sponsor considered 10-digit HUC service area boundaries but these were found to be impracticable because an average 10-digit HUC is only the size of one third or one half of a county. The exact total number of 10-digit HUC service areas in Oklahoma was not able to be determined, but with 77 counties in Oklahoma and an assumed average of 2.5 10-digit watersheds per county there would be more than 190 throughout the state. This small service area size would make an in-lieu fee program infeasible because of the impossibility of acquiring and restoring parcels of land in the most urbanized areas where most impacts will likely occur. Additionally, the number of project sites would increase dramatically and most of the sites would need to be smaller in size as a result of the lesser amount of credit sales per watershed. That would make land acquisition impractical in many instances. With more numerous and smaller project sites as described, in practice an In-Lieu Fee program based on 10-digit HUC service area boundaries would more closely resemble permittee-responsible off-site mitigation which would not provide the ecological benefits, administrative efficiency and ease of compliance monitoring associated with larger centralized mitigation parcels. The Sponsor also considered using 12-digit HUC service areas for service area boundaries but these were also determined to be impracticable for the same reasons as the 10-digit HUCs were. This is because these service areas were very small, with each county containing approximately fifteen to twenty-five 12-digit HUC service areas. Additional information about the individual service areas is contained within Section VII (Compensation Planning Framework).

Because mitigation banks are the preferred method of compensatory mitigation over in-lieu fee project sites, in-lieu fee advance credits will not be allowed to be sold under this agreement within a service area that contains an approved and constructed mitigation bank in good standing, unless specifically approved by the Corps. However, in-lieu fee released credits will be able to be sold to permittees even if a constructed mitigation bank in good standing is present in the same service area. This is because both forms of mitigation represent on-the-ground mitigation completed ahead of future impacts. The Corps will determine which in-lieu fee project sites are eligible to sell credits to permittees in need of compensatory mitigation on a case by case basis. Decisions authorizing the use of credits from an in-lieu fee project site for authorized impacts outside the in-lieu fee project site's designated geographic service area will be made by the Corps on a case-by-case basis in accordance with applicable requirements.

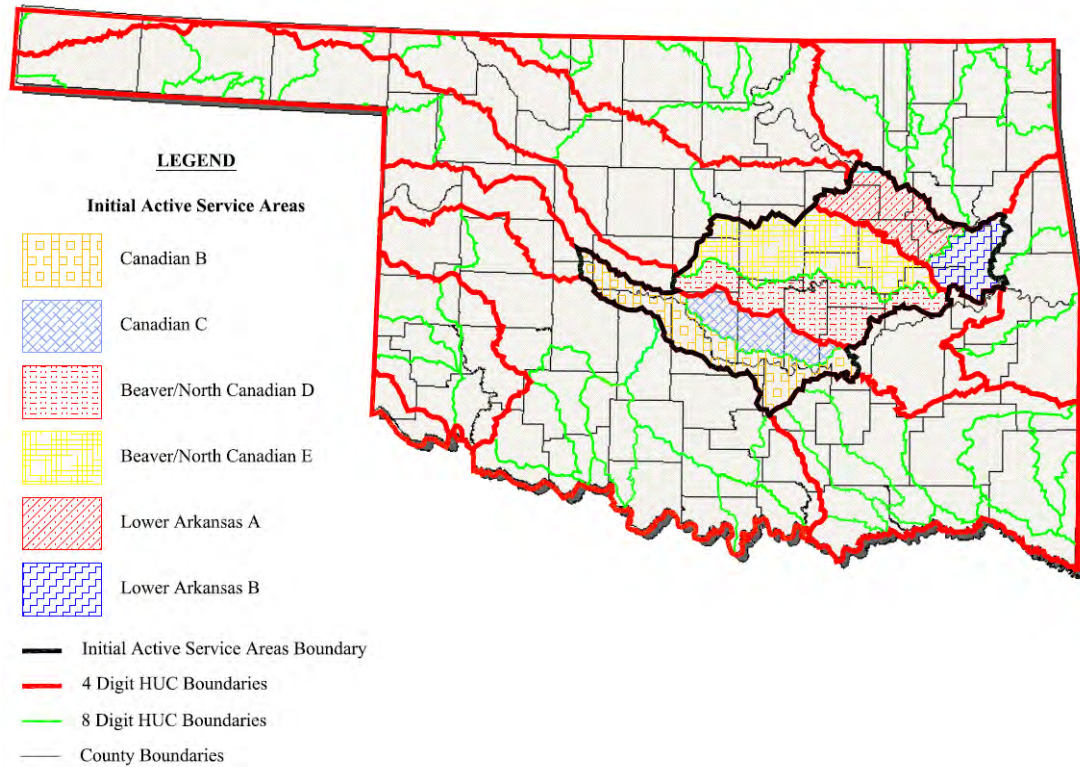
B. Initial Active Service Areas

Rather than immediately operating a statewide program, when this instrument is approved the In-Lieu Fee Program will be authorized to operate within the initial active service areas that are listed in this subsection. These initial active service areas are the areas of Oklahoma that are anticipated to have the highest future mitigation need. The initial active service areas include the following service areas: Canadian B, Canadian C, Beaver/North Canadian D, Beaver/North Canadian E, Lower Arkansas A, and Lower Arkansas B. These service areas encompass most of the Oklahoma City and Tulsa metropolitan areas. This In-Lieu Fee Program will not be authorized to operate in any other service areas unless and until the Sponsor is provided written approval to do so by the Corps and IRT. The approval of additional service areas would be at the discretion of the Corps, in consultation with the IRT, and would be based upon the Sponsor's adequate fulfillment of the requirements of the Program Instrument within the initial approved service areas. Specifically, the Sponsor will be able to request the approval of additional service areas no sooner than five years after the date of approval of this Program Instrument which will provide enough time to allow for a meaningful amount of advance credit sales and for a number of in-lieu fee project sites to have been constructed. These in-lieu fee project sites will likely provide some initial monitoring data by that point as well. After that point, the Corps and IRT can approve the expansion of this In-Lieu Fee Program into additional service areas if the In-Lieu Fee Program has remained in good standing with no default proceedings or other significant indication of a systemic problem with the In-Lieu Fee Program.

Terra Foundation, Inc.

Terra Foundation, Inc.

Figure 3. Initial Active Service Areas



C. Initial Allocation of Advanced Credits

Upon the approval of this instrument the advanced credits allocated to the initial active service areas listed in Section III.B will be available to the Sponsor. These advance credits are shown in Table 6. The initial allocations of advanced credits shown in Table 6 are identical to the advanced credit amounts for the initial active service areas determined in Section II.E and listed in Table 1.

Table 6. Initial Allocation of Advanced Credits

Service Area	Advance Stream Credits	Advance Wetland Credits	Historic Stream Mitigation Linear Footage Adjusted for Three Year Period	Historic Wetland Mitigation Credit Need Adjusted for Three Year Period
Canadian B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	11.00	1,751 Perennial 292 Intermittent 0 Ephemeral	7.13
Canadian C	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	657 Perennial 0 Intermittent 1,022 Ephemeral	2.08
Beaver / North Canadian D	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	11.00	0 Perennial 3,309 Intermittent 0 Ephemeral	11.33
Beaver / North Canadian E	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	766 Perennial 161 Intermittent 0 Ephemeral	0.33
Lower Arkansas A	1,000 Perennial 6,200 Intermittent 3,900 Ephemeral	11.00	0 Perennial 839 Intermittent 3,828 Ephemeral	13.57
Lower Arkansas B	1,800 Perennial 3,400 Intermittent 2,100 Ephemeral	8.00	0 Perennial 0 Intermittent 0 Ephemeral	0

IV. OWNERSHIP & LONG-TERM MANAGEMENT

A. *Long-Term Protection and Management Strategies*

The long-term management plan shall contain the legal mechanism of site protection, the description of long-term management needs and the funding mechanism to be used, as well as the party responsible for the long-term management and protection of each site. The responsible party shall make adequate provisions for the operation, maintenance and long-term management of the compensatory mitigation project site.

The management plan will include a provision requiring a 60-day advance notification to the Corps before any action is taken to void or modify the instrument, management plan, or long-term protection mechanism, including transfer of title, to or establishment of any other legal claims over, the in-lieu fee project site.

Each in-lieu fee project site will be protected in perpetuity by a conservation easement held by an organization that meets any and all requirements necessary to hold conservation easements in the state of Oklahoma (Conservation Easement Holder) and recorded at the appropriate county office unless a different legal protection arrangement is desirable on lands owned by other parties as approved on a case by case basis by the Corps in consultation with the IRT. The Sponsor will select the Conservation Easement Holder for each in-lieu fee project site, subject to the approval of the Corps,

in consultation with the IRT. The Sponsor is allowed, but not obligated, to use different Conservation Easement Holders for the in-lieu fee project sites established under this program. Each easement will protect the project sites from land use activities that would diminish the level of physical, chemical and biological ecosystem functions that each site provides to the watershed. Additionally, the conservation easement shall stay with the property in the instance that the title to the property is transferred to another party. A sample conservation easement is provided in Appendix B. Additionally, all property restrictions (liens, easements, etc.) that may affect an in-lieu fee project site's viability will be identified and resolved prior to approval if necessary.

Water rights in Oklahoma are regulated by the Oklahoma Water Resources Board. In the Final Mitigation Rule it states in Section 332.8(u)(4), "Where needed, the acquisition and protection of water rights should be secured and documented in the instrument or, in the case of umbrella mitigation banking instruments and in-lieu fee programs, the approved mitigation site plan." The acquisition of the water rights for each mitigation site are of prime concern to the Sponsor and during the due diligence period of property acquisition, the Sponsor will consult with the Oklahoma Water Resources Board in compliance with state law to determine existing public and private rights of use. The Sponsor will seek permit authorization to use stream water (public property) for wetland inundation and will also ensure groundwater rights (private property) exist for the subject parcel and seek permit authorization to use such water for wetland inundation or saturation.

It is the intention of the Sponsor to maintain ownership of properties in perpetuity as highly functioning habitat in accordance with the terms of a long-term management plan and conservation easement. If in-lieu fee project sites are located on properties owned by other entities, those entities will be responsible for site maintenance after the Corps has determined that the in-lieu fee project site has met all of its success criteria.

V. SPONSOR QUALIFICATIONS

The Sponsor of the In-Lieu Fee Program is the Terra Foundation, Inc., a registered not-for-profit corporation in the State of Oklahoma that was first incorporated in 1999 with the purpose of educating the public on the importance of native vegetation and proliferating its use in engineering, water resources and landscape projects. The Sponsor's mission is the restoration, creation, rehabilitation, enhancement and preservation of aquatic resources and wildlife habitat necessary to enhance the chemical, physical and biological health of the state's aquatic natural resources.

The board of directors of the Terra Foundation consists of horticulturists and natural resource managers with expertise in the fields of horticulture, soils science, real estate acquisition and environmental permit compliance. The Board of Directors includes the

following individuals: David Flick, James Drake and Daryl Weidner. A brief summary of each individual's natural resource experience is included below.

The president of the Terra Foundation is David Flick. Mr. Flick holds college degrees in agriculture, biochemistry and engineering and has over 20 years of professional experience related to the site selection, design, construction, maintenance and adaptive management of thousands of acres of successful wetland and stream mitigation projects. Since the 1970's, Mr. Flick has gained extensive technical and practical experience in the restoration of approximately 20,000 acres of agricultural properties to native ecosystems including wetlands, riparian buffers, prairies, savannahs, upland forests, bottomland forests and glades.

James Drake has devoted his professional career to native habitat restoration. He has a strong personal interest in wetland restoration and preservation as well as more than 20 years of experience managing and coordinating not-for-profit organizations at the local and regional levels. Mr. Drake began his professional career as a wetland scientist with a Kansas City area environmental consultant and has spent most of the last 15 years as the managing principal of the largest agricultural producer of containerized native wildflowers, grasses, trees and shrubs in the Midwest where approximately 1,500 local professionals, homeowners, and students attend classes each year to learn about natural resource protection, creation, restoration and management. Mr. Drake also has extensive experience related to mitigation site maintenance and planting.

Daryl Weidner is a Certified Public Accountant with 30 years of experience in state and federal regulations governing the financial operation of non-profit corporations. He is knowledgeable in the public solicitation and review of complex goods and services packages required for such corporations and will oversee all financial aspects of the program. Additionally, he is an avid conservationist and maintains numerous Conservation Reserve Program parcels in north-central Missouri.

Mr. Flick has demonstrated proven leadership related to project planning, design, construction oversight, monitoring and maintenance of mitigation sites as he is the founder and managing member of a company that operates five existing approved wetland and stream mitigation banks within the Kansas City District of the Corps. Project descriptions of these mitigation banks, as well as one mitigation bank in the signature stage of approval, are included in Appendix A. These five approved wetland and stream mitigation banks together encompass roughly 474 acres and include more than 150 acres of floodplain wetland establishment, restoration and enhancement as well as many acres of wetlands established within riparian buffers that function solely as stream mitigation. These approved mitigation banks have also legally protected both sides of almost 4.7 miles of streams and more than 3.25 miles of streams on one side and have expanded riparian buffers on these streams with more than 223 acres of new riparian buffer plantings. There are also four proposed wetland and stream mitigation banks in the Corps' Kansas City District and two proposed wetland and stream mitigation banks in the Corps' Little Rock District under current review that are either

entirely or partially constructed. The design, construction, management and monitoring of these proposed mitigation banks further demonstrates the Sponsor's qualifications to perform mitigation related to wetland, riparian, stream and upland habitats.

Specific to the design and construction of stream channel restoration projects, the approved Stranger Creek Wetland & Stream Mitigation Bank included the restoration of more than a half mile of two highly degraded farm ditches to their natural condition as intermittent stream channels with appropriate channel morphology and riparian buffers. Also as part of that project, a longitudinal peak stone toe bank stabilization was engineered and constructed along about 300 feet of Stranger Creek to address an area experiencing extreme erosion. In addition, willow plantings along perennial stream banks have been utilized at two approved mitigation banks in order to stabilize eroding stream banks utilizing natural methods.

As another notable example of the Sponsor's experience with in-stream mitigation, more than two miles of ephemeral streams were restored to an appropriate cross section and alignment as part of the mitigation activities at the Smith Creek Wetland & Stream Mitigation Bank. Farming activities had channelized several ephemeral streams on this property and had completely eliminated several others. These streams now meander through newly planted riparian buffers adjacent to more than 60 acres of established or restored wetlands. A levee along Smith Creek has been breached as part of this project which protects a valuable mussel bed within Smith Creek. A Stream Restoration Design & Geomorphic Assessment was completed which describes the design of these streams following the requirements of the Natural Channel Design Review Checklist, a document commissioned by the U.S. Environmental Protection Agency and the U.S. Fish & Wildlife Service (Harman & Starr, 2011).

Additionally, Mr. Flick has significant experience in stream design, restoration, stabilization and enhancement as he has supervised the design of stream improvements for many waterways throughout Missouri and Kansas including projects for the City of Leawood, Kansas; the City of Overland Park, Kansas; the City of Merriam, Kansas; the City of Shawnee, Kansas; the City of Lawrence, Kansas; the City of Independence, Missouri; the City of Blue Springs, Missouri; the City of St. Charles, Missouri; the Metropolitan St. Louis Sewer District and; the U.S. Army Corps of Engineers Kansas City District among many others. In addition, Mr. Flick's company was awarded the Conservation Award from the Kansas Department of Wildlife and Parks Environmental Services Section in 1999 for work with municipalities and private entities.

The Terra Foundation as an organization has been involved with two stream mitigation projects as owner of mitigation sites in western Missouri which together protect almost a half mile of perennial streams. These projects involved riparian restoration and enhancement and the use of in-stream mitigation techniques of cross vanes and J-hook rock vanes to reduce stream bank erosion and increase bedform diversity and consequently improve aquatic habitat. Cross vanes are grade control structures that reduce water flow speeds and shear stress along stream banks while directing the

stream energy toward the center of the stream channel. These structures provide grade control, minimize bank erosion and allow for a stable width to depth ratio while maintaining sediment transport capacity, sediment competence and channel capacity. Cross vanes are also beneficial for stream habitat because spawning habitat is produced in the glide portion of the downstream pool and because cross vanes increase the water surface elevation in the near-bank region which leads to a greater amount of vegetative bank cover. In addition, cross vanes establish holding and refuge cover in the resulting downstream deep pool under both high and low flow conditions and create feeding lanes at the interfaces of fast and slow water created because of downwelling and upwelling forces in the middle of the stream. J-hook rock vanes are structures consisting of an upstream-pointing vane with a hook on the upstream end that spans across the middle of the channel. They are installed along outer stream bends in order to reduce bank erosion. J-hooks redirect flows towards the center of the channel and minimize near-bank velocity, velocity gradient, shear stress, stream power and bank slope and do not result in erosive back-eddies. J-hooks maintain sediment transport capacity and competence and dissipate stream energy through the creation of a scour pool in the center of the channel which is used as fish and macroinvertebrate habitat (Rosgen, 2006).

VI. PROGRAM ACCOUNT

A. In-Lieu Fee Program Account

After this instrument is approved but prior to accepting any fees from permittees, the Sponsor will establish a program account. Funds accepted from entities other than permittees will be kept in one or more accounts separate from the program account. The program account will be kept in a financial institution that is a member of the Federal Deposit Insurance Corporation.

All earnings and interests being added to and accumulating within the program account will remain in the account and will only be used by the Sponsor for the creation and maintenance of compensatory mitigation projects approved by the Corps, or other IRT member, as appropriate. Monies may be withdrawn from the program account only as related to the selection, design, acquisition, implementation, construction, monitoring and management of in-lieu fee compensatory mitigation project sites. In addition, reasonable and allocable indirect costs actually incurred may be used for administrative fees. Such costs include costs associated with the establishment and operation of the in-lieu fee program, staff time for carrying out program responsibilities, expenses for day-to-day management of the program, such as bookkeeping, mailing expenses, printing, office supplies, computer hardware or software, training, travel, professional fees and hiring private contractors or consultants. These allowable administrative fees shall be determined in accordance with Office of Management and Budget Circular A-122. Permittee contributions to the in-lieu fee program account will be nonrefundable because some permits actions are never executed by the applicant.

The Corps may audit the records pertaining to the program account. All books, accounts, reports, files and other records relating to the In-Lieu Fee Program account shall be available at reasonable times for inspection and audit by the Corps.

The Sponsor must submit proposed in-lieu fee projects to the Corps for approval of a site budget. Disbursements from the program account may only be made upon receipt of written confirmation from the Corps, after the Corps has consulted with the IRT. All expected disbursements for the selection, design, acquisition, implementation, permitting, construction, monitoring and management of an in-lieu fee project site will be presented by the Sponsor to the Corps for budgetary confirmation during the approval process for each in-lieu fee project site. Additionally, the Sponsor's annual report for each watershed will include a modified disbursement budget for Corps approval so that the Sponsor's budget for each in-lieu fee project site can adapt to the changing conditions and needs of each location. As part of the authorization of each project site, the Corps will provide written confirmation of all anticipated program expenses related to the project site. Should the Sponsor encounter additional unexpected costs related to the project site, the Sponsor shall submit a request to the Corps for written approval of the use of the additional funds from the program account. The Corps will consult with the IRT on this matter before responding to the Sponsor. The terms of each program account must specify that the Corps has the authority to direct those funds to alternative compensatory mitigation projects in cases where the Sponsor does not provide compensatory mitigation by initiating construction of an in-lieu fee project site within three years of the first advance credit sale in a service area and the Corps, in consultation with the IRT, does not approve a contingency plan should a service area's advance credit sales be too low to support an in-lieu fee project site as described in Section II.I.

VII. COMPENSATION PLANNING FRAMEWORK

The In-Lieu Fee Program shall be established to provide compensatory mitigation for impacts to the waters of the United States, including wetlands, within the State of Oklahoma. The Sponsor has utilized a watershed approach for the siting and design of all in-lieu fee project sites. This includes, to the extent possible, research on pre-settlement and existing aquatic resources, including degraded aquatic habitats. Additionally, the Sponsor has identified short-term and long-term aquatic resource needs within each watershed.

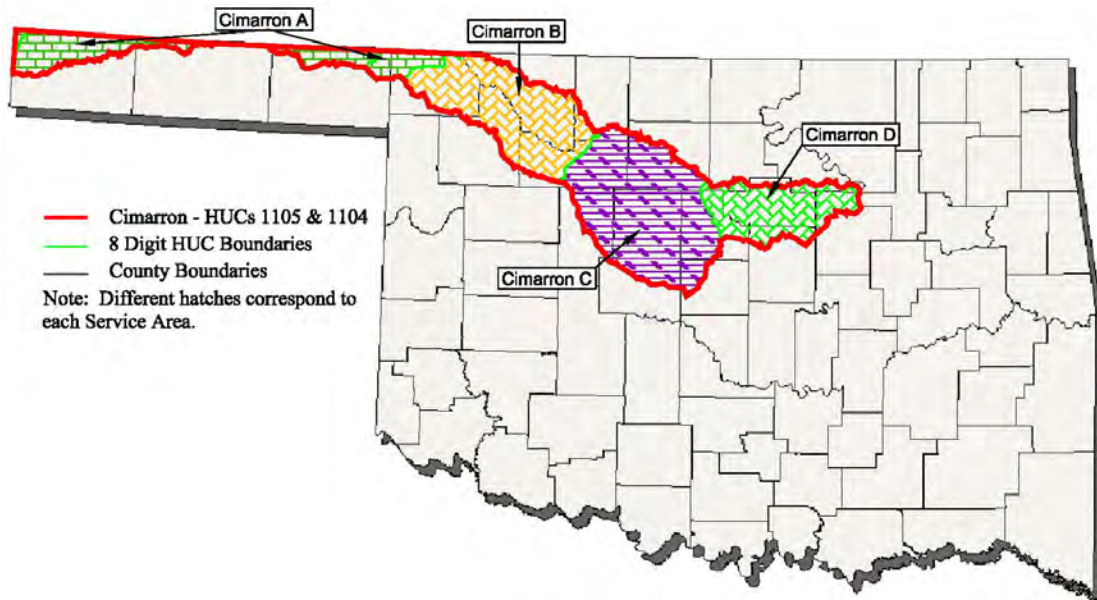
As described in Section III, for the purposes of this In-Lieu Fee Program a watershed is defined as one of the 4-digit HUC watersheds within the state which correspond to the major drainage basins. Because of its small size within Oklahoma, the Upper Cimarron 4-digit HUC is combined with the Cimarron 4-digit HUC into one watershed. The use of these watershed boundaries will ensure that compensatory mitigation activities will replace impacted aquatic resources within the same watershed and under similar aquatic

conditions. To ensure that this takes place at an appropriate scale, each watershed is further broken down into smaller service areas, which are either based on 6-digit HUCs in rural areas or 8-digit HUCs in areas that include all or part of an urban area. The only exceptions to this methodology are the following: that even though the Cimarron B and D service areas are in the same 6-digit HUC, they not combined because they are separated by the Cimarron C service area which includes part of the Oklahoma City metropolitan area; the Neosho / Grand A service area which combines three 8-digit HUCs surrounding the Tulsa metropolitan area in order to create a viable service area to compensate for the likely exclusion of Osage County from the 8-digit HUC that includes central Tulsa County and; the separation of the 111303 6-digit HUC into the Upper Red E and F service areas and the separation of the 111401 6-digit HUC into the Lower Red A and B service areas because of the ecological and climatic differences across these sprawling areas. Impacts to waters of the U.S. must be mitigated within the same service area unless otherwise approved on a case by case basis by the Corps in consultation with the IRT as discussed in Section II.I. This will result in 30 separate service areas located in nine watersheds. A discussion of each watershed and its compensation planning framework follows, including specifics related to each service area.

A. *Cimarron Watershed (HUCs 1104 & 1105)*

1. Geographic Watershed:
Cimarron Watershed (HUCs 1104 & 1105)

This watershed consists of the Cimarron River watershed in central and northwest Oklahoma. Within the two 4-digit HUCs that make up this watershed there are eight 8-digit HUCs. The boundaries of this watershed are shown below in Figure 4 along with different hatching patterns to illustrate the extents of the four service areas within the watershed. The service areas within this watershed are the Cimarron A which consists of the 110400 6-digit HUC, the Cimarron B which consists of the 11050001 8-digit HUC, the Cimarron C which consists of the 11050002 8-digit HUC, and the Cimarron D which consists of the 11050003 8-digit HUC. While the Cimarron B, C and D service areas are all within the same 6-digit HUC, they are separate service areas because the Cimarron C service area contains the part of the Oklahoma City and Enid urban areas and the Cimarron D service area contains the Stillwater urban area.

Figure 4. Boundaries of the Cimarron Watershed (HUCs 1104 & 1105)

As shown in Appendix D, this watershed sprawls across four Level III ecoregions. Two of which, the High Plains and Southwestern Tablelands, are found in the Cimarron A service area. The High Plains ecoregion is characterized by gently undulating flatlands dominated by row crops. Shortgrass prairies were previously the dominant natural vegetation. The Southwestern Tablelands ecoregion consists mostly of rangeland with red soils, mesas, canyons and badlands. Within Oklahoma, this ecoregion would also have been dominated by shortgrass prairies with some areas of scrub-shrub and midgrass on the bluffs of ridges and along major rivers. Virtually all of the Cimarron B and Cimarron C service areas are within the Central Great Plains ecoregion which is now largely dominated by row crops but was previously mixed height prairie with occasional small trees and shrubs. Some streams in this ecoregion have high salinity because of the area's underground salt deposits. The Cimarron D service area is also largely within the Central Great Plains ecoregion but some portions are within the Cross Timbers ecoregion. This ecoregion was formerly dominated by prairies dense with little bluestem that contained occasional post oaks and blackjack oaks. Today, this area is mostly pastures and rangeland with oil extraction as a common practice (EPA, 2010a).

2. Threats to Existing Aquatic Resources:
Cimarron Watershed (HUCs 1104 & 1105)

Rangeland and agricultural production are the primary current land uses in this mostly rural watershed. The agricultural land development within the watershed has undoubtedly had an impact on the extent and quality of wetlands and wildlife habitat. Additionally, in developed areas, such as the Oklahoma City metropolitan area, Stillwater, Gunthrie, Kingfisher, Enid, Fairview and Buffalo, aquatic resources are

impacted by land development, an increase in surface water flows and erosion because of the increase in impermeable surfaces and by water pollution from point and nonpoint sources. Aquatic resources are endangered in rural areas by threats such as agricultural conversion; nutrient and sediment runoff; oil, gas and mineral extraction; and livestock damage. The spread of invasive species such as salt cedar (*Tamarix* spp.) has also deteriorated stream and wetland habitats in this watershed. Additionally, oil and gas are extracted throughout this service area with major gas fields in the western portion of the service area (Boyd, 2008). While the safety and reliability of oil and gas extraction and transportation technologies is always improving, these activities pose a risk of contamination to wetlands and streams and the development of these mineral resources often leads to impacts to waters of the U.S. which requires compensatory mitigation.

In order to compensate for unavoidable impacts to waters of the U.S. within this service area, the In-Lieu Fee Program will seek out in-lieu fee project site locations to maximize the program's overall impact on the chemical, physical and biological integrity of the watershed. The In-Lieu Fee Program will seek to remove invasive species where feasible and to return natural stream morphology and stream flow when appropriate. Efforts will also focus on converting agricultural ground near streams into riparian corridors with native vegetation and enhancing adjacent riparian corridors to remove pollutants from the watershed. Also, farmed wetlands indicated by the NRCS will be restored and enhanced with native plantings of trees, shrubs and herbaceous vegetation.

3. Historic Loss of Aquatic Resources:
Cimarron Watershed (HUCs 1104 & 1105)

Since European and American settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats throughout Oklahoma. Approximately 67% of Oklahoma's original wetlands have been lost since the 1780s as a result of conversion to agriculture, levee construction, river management and navigation programs, land development activities and other actions (Dahl, 1990). The creation of Lake Carl Etling, Lake Carl Blackwell and Lake McMurtry (OWRB, n.d.(b)) which together cover approximately 4,700 acres (OWRB, n.d.(a)) have undoubtedly inundated and changed the hydrology of many wetlands and streams. Additionally, land development associated with the cities of the Oklahoma City metropolitan area, Stillwater, Gunthrie, Kingfisher, Enid, Fairview and Buffalo has undoubtedly impacted streams and wetlands.

4. Current Aquatic Resource Conditions:
Cimarron Watershed (HUCs 1104 & 1105)

The Cimarron River has a drainage basin of approximately 8,382 square miles (OWRS n.d.(c)) within Oklahoma. It originates in northeast New Mexico before entering Oklahoma then flowing into Colorado, Kansas and finally back into Oklahoma where it merges with the Arkansas River and contributes to Keystone Lake. The Cimarron

River flows freely without impoundment for its entire length until it enters Keystone Lake in Creek County, Oklahoma and merges with the Arkansas River.

The Arkansas River shiner (*Notropis girardi*) is a federally threatened species in the HUC 1105 Watershed and would benefit from the chemical and physical improvements in water quality associated with an in-lieu fee project site. Many streams and lakes in this watershed have been impaired by water quality issues. The waterbodies on the 2012 Clean Water Act Section 303(d) list of impaired waters include the following (EPA, 2014):

Table 7. Cimarron Watershed Section 303(d) List

Waterbody	Impairment
Beaver Creek, West	E. Coli and Enterococcus Bacteria
Bluff Creek	E. Coli
Boomer Lake	Color, Dissolved Oxygen, Turbidity, Mercury
Buckeye Creek	Fecal Coliform
Buffalo Creek	Dissolved Oxygen
Carl Blackwell Lake	Chlorophyll A, Color, and Turbidity
Carl Etling Lake	pH, Sulfates, and Turbidity
Carrizo Creek, South	Dissolved Oxygen
Chisholm Creek	Enterococcus Bacteria and Nitrates
Cimarron River	Benthic macroinvertebrates bioassessments, E. Coli, Chloride, Lead, Dissolved Oxygen, Fish Bioassessments, Sedimentation/Siltation, and Sulfates
Clear Creek	Turbidity
Cold Springs Creek	Dissolved Oxygen
Cooper Creek	Sulfates
Cottonwood Creek	Dissolved Oxygen, E. Coli, Enterococcus Bacteria, and pH
Crooked Creek	Benthic Macroinvertebrate Assessment
Cushing Lake	Color, Turbidity
Dear Creek	Chlorpyrifos
Deep Creek	Sulfates
Elm Creek	Sulfates
Griever Creek	E. Coli and Benthic macroinvertebrates bioassessments
Griever Creek, East	Sulfates and Enterococcus Bacteria
Guthrie Lake	Enterococcus Bacteria and Turbidity
Hefner Lake	Dissolved Oxygen
Keystone Lake	Turbidity
Kingfisher Creek	Sulfates

Waterbody	Impairment
Liberty Lake	Enterococcus Bacteria
Little Eagle Chief Creek	Chloride
Little Stillwater Creek	Nitrates
Main Creek	Fish Bioassessments and Sulfates
McMurtry Lake	Turbidity
Sand Creek	Dissolved Oxygen, Sulfates
Stillwater Creek	Dissolved Oxygen, Turbidity
Traders Creek	Enterococcus Bacteria
Turkey Creek	E. Coli
Winter Camp Creek	Sulfates

Within this watershed, likely sources of nonpoint source pollution include: runoff from row crop agriculture, livestock grazing and confined animal feeding operations, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage from faulty septic systems, and urban runoff. Additionally, riparian degradation caused directly or indirectly by agricultural practices and land development within the watershed has contributed to streambank instability and bank erosion. As part of the planning of each in-lieu fee project site, an assessment of stream stability will be conducted, including field verification. A geomorphic assessment will be conducted at potential project sites to evaluate the morphology of the stream and assess bank stability, stream incision, floodplain connectivity and other physical characteristics.

5. Aquatic Resource Goals & Objectives:
Cimarron Watershed (HUCs 1104 & 1105)

The primary goal within the watershed is to restore, create and enhance aquatic resources such as streams and wetlands that are lost under activities authorized by Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. All restoration goals are subject to change based upon watershed and Section 10, Section 404 and Section 401 permitting needs.

Other aquatic resources goals within this watershed are to:

- Increase the amount of wetland and riparian acreage compared to the amount of impacts mitigated through this In-Lieu Fee Program
- Acquire, restore, enhance and preserve important aquatic resources that improve local and regional water quality and wildlife habitat
- Restore, create and enhance wetlands with an emphasis on closed depressions, playa lakes, oxbow lakes and riparian corridor wetlands
- Restore in-stream habitat impacted by such impairments as bank erosion, channel incision and inappropriately designed in-stream structures such as low water crossings and culverts

- Restore and enhance ecologically impaired and/or undersized riparian corridors

The primary objective of the Sponsor is to create fully functional high quality in-lieu fee project sites appropriate in habitat composition and size so that the combined result of all in-lieu fee project sites within the watershed accomplishes the goals stated above. NRCS and National Wetlands Inventory (NWI) wetlands maps will be used to identify potential in-lieu fee project sites that may contain existing wetlands that could be enhanced or expanded or converted wetlands appropriate for restoration efforts. NRCS soil survey maps will be used to identify locations containing the appropriate hydric soil types for wetland restoration or creation. Other objectives include the following:

- Emphasize the restoration, enhancement and creation of playa lakes within the portion of the Cimarron A service area in the panhandle of Oklahoma as appropriate depending on the amount and type of impacted wetlands within this service area. This objective is important because of the high value of playa lakes to the biotic community and because of the large amount of playa lakes that have been modified due to agricultural disturbances.
- Focus on restoring, creating and enhancing closed depressions, oxbow lakes and riparian corridor wetlands in the Cimarron B, C and D service areas within this watershed
- Restore wetlands impacted by agriculture
- Provide in-lieu fee project sites that filter pollutants from adjacent land uses before they enter any stream systems
- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site that includes stream mitigation
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats if those buffers would enhance or protect the adjacent aquatic resources
- Establish successful in-lieu fee project sites in the best situated locations based on the aquatic resource goals and prioritization strategy for this watershed. Based on our research to date, the following stream drainage basins and counties would be the most likely locations of future mitigation parcels although the Sponsor is not limited to these areas:
 - Cimarron River
 - Stillwater Creek
 - Little Stillwater Creek
 - Chisholm Creek
 - Oklahoma County
 - Canadian County
 - Logan County
 - Kingfisher County
 - Cimarron County

6. Prioritization Strategy:
Cimarron Watershed (HUCs 1104 & 1105)

Mitigation activities within the watershed will be sited in locations that will provide the most chemical, physical and biological benefits. The primary priority will be to site projects in the most beneficial locations to the watershed. Establishing project sites in as close proximity to the impacts as feasible will also be important. Additionally, this In-Lieu Fee Program will prioritize the creation of project sites with land uses, hydrology, topography, ecological factors and geomorphology similar to the impacted aquatic resources. The location of the following items, among others, will be used to identify priority sites for restoration activities.

- Streams listed on Nationwide Rivers Inventory
- Outstanding National Resource Waters
- Outstanding Resource and High Quality State Waters
- Special Aquatic Life Use Waters
- Waters within Federal/State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc.)
- Stream Reference Reach Sites
- Waters with listed Federal or State Endangered or Threatened species (as determined on a case by case basis in coordination with FWS and ODWC)
- Designated Fish Spawning Habitat / Native Freshwater Mussel Refuges (as determined on a case by case basis in coordination with FWS and ODWC)
- Waters on the 303(d) list, impaired by sediment, dissolved oxygen and nutrients or has impaired biology
- Streams adjacent to an approved mitigation bank or mitigation site
- Waters with federal and state listed Endangered and Threatened species
- Postings on the Oklahoma Conservation Commission's Wetlands Registry
- Hydric soils if wetland improvements are planned
- Sufficient surface or groundwater hydrology for the development of wetland conditions or the possibility of restoring hydrology that was previously removed from the project site
- Compatible surrounding land uses

In addition to aspects of site selection, the Aquatic Goals and Objectives for this watershed will guide the In-Lieu Fee Program through the process of selecting and implementing compensatory mitigation activities. Of all the possible compensatory mitigation activities, the following will be prioritized:

- In the Cimarron A service area, the restoration, enhancement and creation of playa lakes will be prioritized over work involving other wetland types although riparian corridor wetlands will be emphasized if it is not practicable to establish an in-lieu fee project site that involves playa lakes or if the Corps decides that it

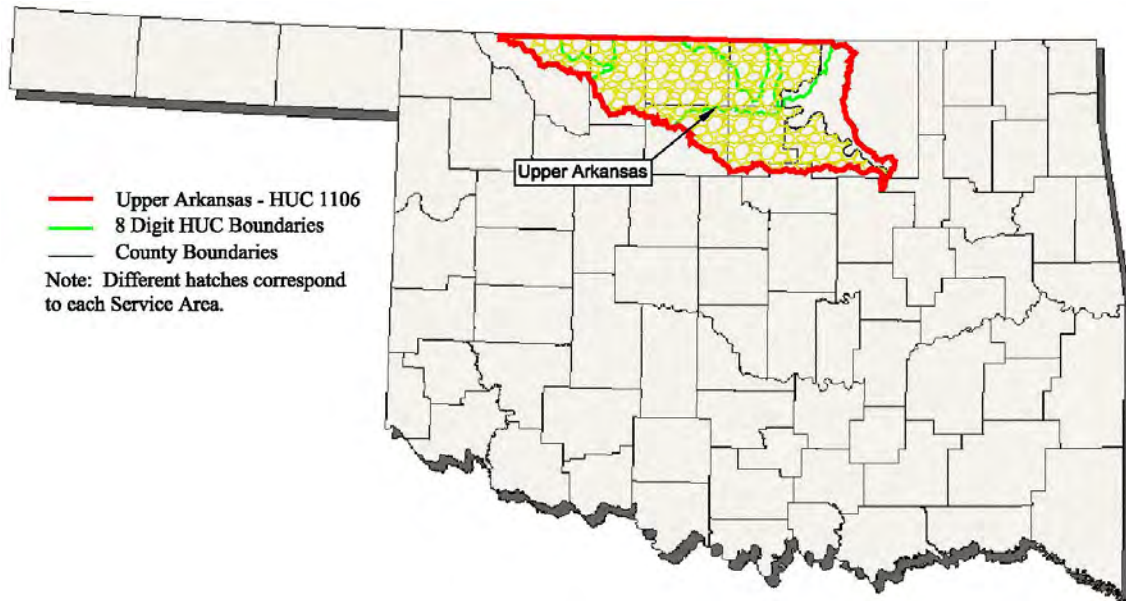
is better to mitigate in-kind for specific project impacts. Appropriate upland buffers and / or fencing shall help to protect and enhance any playa lake.

- In the Cimarron B, C and D service areas, sites that allow for the restoration of riparian corridor wetlands and/or closed depressions and oxbow lakes that have a clear surface water connection to adjacent streams will be emphasized because those wetlands will offer the most significant water quality benefits.
- In-stream mitigation opportunities will be prioritized over riparian buffer mitigation.
- Potential in-lieu fee project sites that combine wetland and stream mitigation opportunities will be prioritized as those sites offer the best opportunities for water quality and wildlife benefits.

B. Upper Arkansas Watershed (HUC 1106)

1. Geographic Watershed:
Upper Arkansas Watershed (HUC 1106)

This watershed consists of the Upper Arkansas drainage area (HUC 1106) in Oklahoma. The boundaries of this watershed are shown in Figure 5. Because of the rural nature of this watershed and the fact that it exists within Oklahoma as a single 6-digit HUC (HUC 110600) without any urban areas, this watershed will have only one service area. Additionally, the portion of Osage County that is within this service area has been excluded from Figure 5 because of the Corps' determination that mitigation activities cannot take place on tribal lands unless specifically requested by the tribe in cooperation with the Corps. As a result, while tribal lands are included in this watershed on a case by case basis, they are not shown in Figure 5 because of the anticipated improbability of siting projects on tribal lands.

Figure 5. Boundaries of the Upper Arkansas Subregion Service Area (HUC 1106)

This watershed is largely dominated by the Central Great Plains ecoregion which was mixed height prairie with occasional small trees and shrubs before settlement but is now largely dominated by row crops. Common underground salt deposits in this ecoregion have led to high salinity levels in some streams in this ecoregion. However, the watershed includes portions of three other Level III ecoregions. The very northwestern tip of the watershed is part of the Southwestern Tablelands ecoregion which is mostly rangeland with red soils, mesas, canyons and badlands that are dominated in Oklahoma by shortgrass prairies with some areas of scrub-shrub and midgrass on the bluffs of ridges and along major rivers. The very northeastern portion of this watershed is within the Flint Hills ecoregion which contains the western limit of tallgrass prairies. This ecoregion is differentiated from neighboring areas because of its rocky soils and hilly topography which has resulted in cattle grazing being the dominant land use in comparison to the row crops so common in surrounding ecoregions. The very southeastern part of the watershed is within the Cross Timbers ecoregion which used to consist of prairies dominated by little bluestem that contained occasional post oaks and blackjack oaks. Today, this area is mostly pastures and rangeland with oil extraction being a common practice (EPA, 2010a).

2. Threats to Existing Aquatic Resources:
Upper Arkansas Watershed (HUC 1106)

The dominant land use in this watershed is agricultural production although there is some rangeland, forestlands and some smaller developed areas within this watershed. The impact of agriculture and concentrated feeding operations on basin streams is significant. In developed areas, such as Alva, Cherokee, Medford, Newkirk, Perry and

Pawnee, aquatic resources are impacted by fill activities associated with land development, by water pollution from point and nonpoint sources and by an increase in surface water flows and subsequent erosion caused by the proliferation of impermeable surfaces. Aquatic resources are endangered in rural areas by threats such as agricultural conversion; nutrient and sediment runoff; oil, gas and mineral extraction; and livestock damage. The spread of invasive species such as salt cedar (*Tamarix* spp.) has also deteriorated stream and wetland habitats in this watershed.

In order to compensate for unavoidable impacts to waters of the U.S. within this watershed, the In-Lieu Fee Program will seek out project site locations that will maximize the program's overall impact on the chemical, physical and biological integrity of the watershed. The In-Lieu Fee Program will seek to remove invasive species where feasible and to return natural stream morphology and stream flow when appropriate. Efforts will also focus on converting agricultural ground near streams into riparian corridors with native vegetation and enhancing adjacent riparian corridors to decrease the amount of pollutants such as fertilizers and pesticides from reaching downstream waters. Also, farmed wetlands indicated by the NRCS will be restored and enhanced with native plantings of trees, shrubs and herbaceous vegetation.

3. Historic Loss of Aquatic Resources:
Upper Arkansas Watershed (HUC 1106)

Since European and American settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats throughout Oklahoma. Approximately 67% of Oklahoma's original wetlands have been lost since the 1780s as a result of conversion to agriculture, levee construction, river management and navigation programs, land development activities and other actions (Dahl, 1990). Additionally, the creation of the Great Salt Plains Lake, Kaw Lake and Sooner Lake (OWRB, n.d.(b)) which cover approximately 31,100 acres (OWRB, n.d.(a)) undoubtedly inundated and changed the hydrology of many wetlands and streams. Additionally, land development associated with the establishment and growth of Alva, Cherokee, Medford, Newkirk, Perry and Pawnee undoubtedly impacted streams and wetlands.

4. Current Aquatic Resource Conditions
Upper Arkansas Watershed (HUC 1106)

The Upper Arkansas Watershed (HUC 1106) includes approximately 6,998 square miles within Oklahoma (OWRB n.d. (c)). This watershed includes major waterways such as the Arkansas River, the Salt Fork of the Arkansas River, the Chikaskia River and Black Bear Creek which all drain into Keystone Lake. Notable wetland areas within this watershed are the Salt Plains National Wildlife Refuge which encompasses roughly 32,000 acres of open water, wetlands, prairies, woodlands and farm fields (FWS, 2010) and the Byron Fish Hatchery which includes the watchable wildlife area containing different wetland areas and a prairie area (ODWC, n.d.). The whooping

crane (*Grus americana*) is a federally endangered species that could potentially benefit from in-lieu fee project sites within this watershed. Whooping cranes migrate through this watershed and utilize wetland mosaics as habitat during their journey (FWS, 2011). This in-lieu fee program may be beneficial to this imperiled species because wetlands created on in-lieu fee project sites would restore some of its feeding and resting habitat.

Many streams and lakes in this watershed have been impaired by water quality issues. The waterbodies on the 2012 Clean Water Act Section 303(d) list of impaired waters within this watershed include the following (EPA, 2014):

Table 8. Upper Arkansas Watershed Section 303(d) List

Waterbody	Impairment
Arkansas River	Enterococcus Bacteria, Sulfates, Total Dissolved Solids, and Turbidity
Arkansas River, Salt Fork	Chloride, Total Dissolved Solids, Lead, Fish Bioassessments, and Sedimentation/Siltation,
Bitter Creek	Chloride, Sulfates, Total Dissolved Solids
Black Bear Creek	Lead
Boggy Creek	Sulfates
Camp Creek	Fish Bioassessments
Capron Creek, North	Sulfates
Cattle Creek, West	Sulfates
Chikaskia River	Enterococcus Bacteria and Lead
Clay Creek	Chloride, Enterococcus Bacteria, E. Coli, Sulfates, and Total Dissolved Solids
Cleveland Lake	Color and Turbidity
Cow Creek	E. Coli and Enterococcus Bacteria
Crooked Creek	E. Coli
Deer Creek	Benthic Macroinvertebrates Bioassessments
Duck Creek	E. Coli and Enterococcus Bacteria
Duel Creek	Sulfates
Garber Creek	Chloride
Grainville Creek	Sulfates
Great Salt Plains Lake	Enterococcus Bacteria and Turbidity
Kaw Lake	Mercury and Turbidity
Keystone Lake	Turbidity and Dissolved Oxygen
Lake Ponca	Chlorophyll A and Dissolved Oxygen
Lone Chimney Lake	Turbidity
Lucien Creek	Chloride
Pawnee Lake	Chlorophyll A, Color, and Turbidity
Peckham Creek	Sulfates
Perry Lake	Color and Turbidity
Red Rock Creek	Enterococcus Bacteria and Sulfates

Waterbody	Impairment
Scatter Creek	Chloride and Sulfates
Spring Creek	E. Coli and Enterococcus Bacteria
Turkey Creek	Sulfates and Total Dissolved Solids
Wild Horse Creek	Chloride
Yellowstone Creek	Sulfates and Total Dissolved Solids

Within this watershed, likely sources of nonpoint source pollution include: runoff from row crop agriculture, livestock grazing and confined animal feeding operations, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage faulty septic systems, and urban runoff. Additionally, riparian degradation caused directly or indirectly by agricultural and rangeland practices and land development within the watershed has contributed to streambank instability and bank erosion. As part of the planning of each in-lieu fee project site, an assessment of stream stability will be conducted, including field verification. A geomorphic assessment will be conducted at potential project sites to evaluate the morphology of the stream and assess bank stability, stream incision, floodplain connectivity, and other physical characteristics.

5. Aquatic Resource Goals & Objectives:
Upper Arkansas Watershed (HUC 1106)

The primary goal within the watershed is to restore, create and enhance aquatic resources such as streams and wetlands that are lost under activities authorized by Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. All restoration goals are subject to change based upon watershed and Section 10, Section 404 and Section 401 permitting needs.

Other aquatic resources goals within the watershed are to:

- Increase the amount of wetland and riparian acreage compared to the amount of impacts mitigated through this In-Lieu Fee Program
- Acquire, restore, enhance and preserve important aquatic resources that improve local and regional water quality and wildlife habitat
- Restore in-stream habitat impacted by such impairments as bank erosion, channel incision and inappropriately designed in-stream structures such as low water crossings and culverts
- Restore and enhance ecologically impaired and/or undersized riparian corridors
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats

The primary objective of the Sponsor is to create fully functional high quality in-lieu fee project sites appropriate in habitat composition and size so that the combined result of all in-lieu fee project sites within the watershed accomplishes the goals stated above.

NRCS and National Wetlands Inventory (NWI) wetlands maps will be used to identify potential in-lieu fee project sites that may contain existing wetlands that could be enhanced or expanded or converted wetlands appropriate for restoration efforts. NRCS soil survey maps will be used to identify locations containing the appropriate hydric soil types for wetland restoration or creation. Other objectives include the following:

- Focus on restoring, creating and enhancing closed depressions, oxbow lakes and riparian corridor wetlands
- Restore wetlands impacted by agriculture
- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site that includes stream mitigation
- Restore, create or enhance habitat for the whooping crane if possible
- Provide in-lieu fee project sites that filter pollutants from adjacent land uses before they enter any stream systems
- Remove or limit the presence of invasive species such as *Tamarix* spp. from aquatic habitats
- Establish successful in-lieu fee project sites in the best situated locations based on the aquatic resource goals and prioritization strategy for this watershed. Based on our research to date, the following stream drainage basins would be the most likely locations of future mitigation parcels although the Sponsor is not limited to these areas:
 - Arkansas River
 - Arkansas River, North Salt Fork
 - Chikaskia River

6. Prioritization Strategy:
Upper Arkansas Watershed (HUC 1106)

Mitigation activities within the watershed will be sited in locations that will provide the most chemical, physical and biological benefit to the watershed. The primary priority will be to site projects in the most beneficial locations to the watershed. Locating project sites in as close proximity to the impacts as feasible will also be important. Additionally, this In-Lieu Fee Program will prioritize the creation of project sites with land uses, hydrology, topography, ecological factors and geomorphology similar to the impacted aquatic resources. The location of the following items, among others, will be used to identify priority sites for restoration activities.

- Streams listed on Nationwide Rivers Inventory
- Outstanding National Resource Waters
- Outstanding Resource and High Quality State Waters
- Special Aquatic Life Use Waters
- Waters within Federal/State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc.)
- Stream Reference Reach Sites

- Waters with listed Federal or State Endangered or Threatened species (as determined on a case by case basis in coordination with FWS and ODWC)
- Designated Fish Spawning Habitat / Native Freshwater Mussel Refuges (as determined on a case by case basis in coordination with FWS and ODWC)
- Waters on the 303(d) list, impaired by sediment, dissolved oxygen and nutrients or has impaired biology
- Streams adjacent to an approved mitigation bank or mitigation site
- Waters with federal and state listed Endangered and Threatened species
- Postings on the Oklahoma Conservation Commission's Wetlands Registry
- Hydric soils if wetland improvements are planned
- Sufficient surface or groundwater hydrology for the development of wetland conditions or the possibility of restoring hydrology that was previously removed from the project site
- Compatible surrounding land uses

In addition to aspects of site selection, the Aquatic Goals and Objectives for this watershed will guide the In-Lieu Fee Program through the process of selecting and implementing compensatory mitigation activities. Of all the possible compensatory mitigation activities, the following will be prioritized:

- Restore, create and enhance wetlands with an emphasis on closed depressions, riparian corridor wetlands and oxbow lakes.
- Sites that allow for the restoration of riparian corridor wetlands and / or closed depressions and oxbow lakes that have a clear surface water connection to adjacent streams will be emphasized because those wetlands will offer the most significant water quality benefits.
- In-stream mitigation opportunities will be prioritized over riparian buffer mitigation.
- Potential in-lieu fee project sites that combine wetland and stream mitigation opportunities will be prioritized as those sites offer the best opportunities for water quality and wildlife benefits, especially when compared to separate wetland and stream mitigation sites.

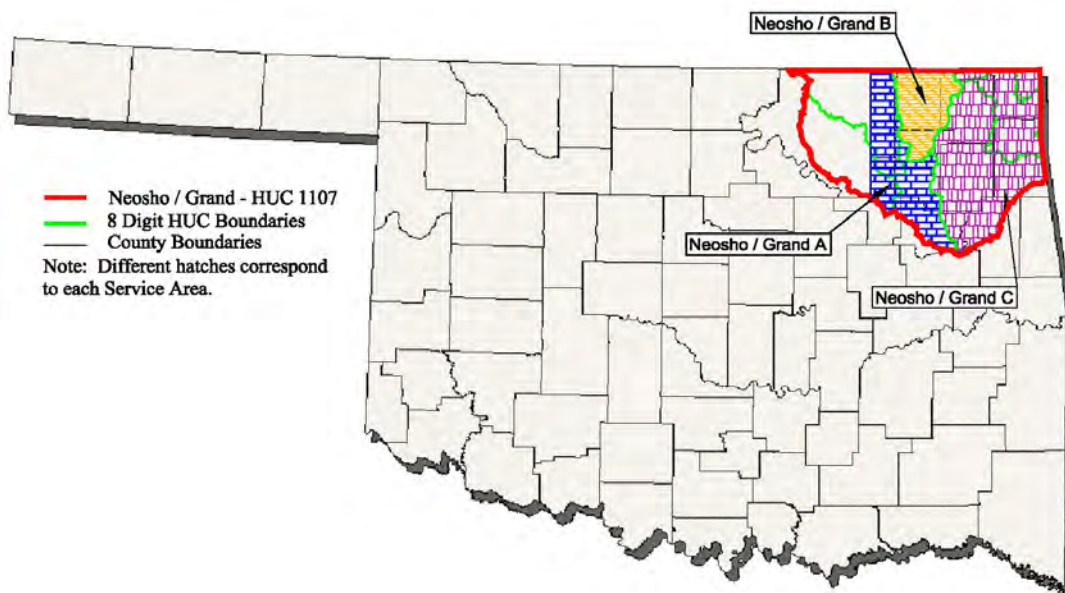
C. *Neosho / Grand Watershed (HUC 1107)*

1. Geographic Watershed:
Neosho / Grand Watershed (HUC 1107)

This watershed consists of the drainage areas of the Neosho and Grand Rivers in Oklahoma. The boundaries of this watershed are shown in Figure 6 along with different hatching patterns to illustrate the extents of the various service areas. This watershed is divided into three separate service areas. The Neosho / Grand A service area consists of several 8-digit HUCs despite including some of the Tulsa metropolitan area. This is because the 8-digit HUC that includes most of urban Tulsa County mostly

consists of Osage County which is tribal land and is therefore not anticipated to be able to have mitigation projects sited there. As a result, the remaining portion of the 8-digit HUC was determined to not be of sufficient size for a functional service area. Therefore, the non-tribal land remaining in the 11070106 and 11070107 HUCs was combined with the 11070105 HUC to create the Neosho / Grand A service area. The Neosho / Grand B service area consists of the 11070103 HUC which does not have any portion of the Tulsa metropolitan area within it. The Neosho / Grand C service area includes the remaining 8-digit HUCs in the watershed (11070205, 11070206, 11070207, 11070208 and 11070209).

Figure 6. Boundaries of the Neosho / Grand Watershed (HUC 1107)



This watershed encompasses portions of five Level III ecoregions. The Flint Hills ecoregion includes western and central Osage County in the very western portion of the watershed. This ecoregion includes the western limit of tallgrass prairies and is unique when compared to adjacent ecoregions because of its rocky soils and hilly topography which has led to cattle grazing being the dominant land use instead of row crops. The western part of this watershed also includes the Cross Timbers ecoregion which was historically prairies dominated by little bluestem along with occasional post oaks and blackjack oaks but is now primarily associated with pastures, rangeland and oil extraction. The Central Irregular Plains ecoregion is the largest in this watershed. Located in the central part of the watershed, it includes all of the Neosho / Grand A and Neosho / Grand B service areas as well as the western part of the Neosho / Grand C service area. This ecoregion has a greater diversity of topography and land uses than most surrounding ecoregions and is characterized by a mixture of grasslands and forests. One of the land uses in this ecoregion is coal extraction. Most of the remainder of the Neosho / Grand C service area is within the Ozark Highlands ecoregion with parts of the very southern portion of the service area in the Boston Mountains ecoregion. The Ozark Highlands ecoregion features a high amount of topographic

relief and forested land cover dominated by oak and oak-pine tree communities. It includes many karst geologic features, including springs and caves. As a result, there are many spring-fed streams in this ecoregion as well as a higher concentration of groundwater-fed wetlands than in other portions of the state. The Boston Mountains ecoregion is also heavily forested with oak-hickory communities although eastern red cedar and shortleaf pine are also common species. Although geologically different than the Ozark Highlands, this ecoregion also has a low population density and features recreation as a primary land use (EPA, 2010a).

2. Threats to Existing Aquatic Resources:
Neosho / Grand Watershed (HUC 1107)

Current land use trends include significant urbanization, development and agricultural uses. The watershed contains one large urban area along with several small towns. The land development activities within the northern portion of the Tulsa metropolitan area, as well as Pawhuska, Nowata, Vinita, Miami, Jay, Pryor and Wagoner have undoubtedly had an impact on the extent and quality of wetlands and wildlife habitat within this watershed. Additionally, in developed areas, aquatic resources are impacted by an increase in surface water flows and erosion because of the increase in impermeable surfaces and by water pollution from point and nonpoint sources. Aquatic resources are endangered in rural areas by such threats as agricultural conversion; nutrient and sediment runoff; oil, gas and mineral extraction; and livestock damage. Old chat piles and abandoned mines created from lead and zinc mining could potentially impact the chemical, physical and biological integrity of the streams and wetlands. Impacts from left over chat piles can come from their erosion, allowing the chat into the streams and wetlands. When abandoned mines flood they could potentially allow contaminants to enter the water table, impacting drinking water and cave ecosystems. Additionally, the commercial coal belt runs through this watershed (Oklahoma Department of Mines, 2008). Coal mining activities can have major impacts to streams and wetlands especially when using open mine practices.

In order to compensate for unavoidable impacts to waters of the U.S. within this watershed, the In-Lieu Fee Program will seek out project site locations that will maximize the program's overall impact on the chemical, physical and biological integrity of the watershed. The In-Lieu Fee Program will seek to remove invasive species where feasible and to return natural stream morphology and stream flow when appropriate. Efforts will also focus on converting agricultural ground near streams into riparian corridors with native vegetation and enhancing adjacent riparian corridors to remove pollutants from the watershed. Also, NRCS farmed wetlands will be restored and enhanced by planting native trees, shrubs and herbaceous vegetation.

3. Historic Loss of Aquatic Resources:
Neosho / Grand Watershed (HUC 1107)

Since European and American settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats throughout Oklahoma. Approximately 67% of Oklahoma's original wetlands have been lost since the 1780s as a result of conversion to agriculture, levee construction, river management and navigation programs, land development activities and other actions (Dahl, 1990). Additionally the creation of Hulah Lake, Copan Lake, Bluestem Lake, Skiatook Lake, Oologah Lake, Grand Lake, Lake Eucha and Spavinaw Lake (OWRB, n.d.(b)) which together cover approximately 55,000 acres (OWRB, n.d.(a)) has undoubtedly inundated or changed the hydrology of many wetlands and streams. Additionally, the Neosho / Grand Watershed is located within the Tri-State Lead and Zinc District. This mining district includes northeast Oklahoma, southeast Kansas and southwest Missouri and was mined for lead and zinc for approximately one hundred years. The mining activities and the chat piles that were produced allowed lead to seep into streams and drinking water supplies (Goins *et al.*, 2006). Additionally, land development associated with the establishment and growth of Tulsa, Pawhuska, Nowata Vinita, Miami, Jay, Pryor and Wagoner has undoubtedly impacted streams and wetlands.

4. Current Aquatic Resource Conditions:
Neosho / Grand Watershed (HUC 1107)

The Neosho / Grand Watershed is located in northeast Oklahoma within both the Central Mountains Region (Land Resource Region N) and the Midwest Region (Land Resource Region M) (NRCS, 2006) and covers about 6,815 square miles within Oklahoma (OWRS n.d. (c)). This watershed generally has a humid temperate climate which receives an average yearly rainfall of 40-59 inches in the Central Mountains Region and 32-39 inches in the Midwest Region (USACE, 2010 and USACE, 2010(a)).

Within this watershed is the Rogers State University Conservation Education Reserve, which is a 120 acre site with a notable concentration of marshes and bottomland forests along with prairie and cross timber habitats (Rogers County Conservation District, n.d.). Additionally, the past mining activities within the Tri-State Lead and Zinc District piles are still negatively affecting water quality in certain areas.

Currently, there are six federally endangered or threatened species in the Neosho / Grand Watershed that would benefit from the chemical and physical improvements of an in-lieu fee project site. The gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*) would benefit from the increase of feeding habitat near streams and in open water areas in wetlands, the Oklahoma cave crayfish (*Cambarus tartarus*) and Ozark cavefish (*Amblyopsis rosae*) would benefit from improved water quality entering the cave systems where they live and the Neosho madtom (*Noturus placidus*) and Neosho mucket (*Lampsilis rafinesqueana*) would benefit from the reduction of nutrients and sediment in the streams downstream of an in-lieu fee project site.

Many streams and lakes in this watershed have been impaired by water quality issues. The waterbodies on the 2012 Clean Water Act Section 303(d) list of impaired waters include the following (EPA, 2014):

Table 9. Neosho / Grand Watershed Section 303(d) List

Waterbody	Impairment
Adams Creek	E. Coli
Beaty Creek	Enterococcus Bacteria
Big Cabin Creek	Sulfates, Total Dissolved Solids, and Oil and Grease
Big Creek	Dissolved Oxygen
Birch Lake	Color, Dissolved Oxygen, and Turbidity
Bird Creek	E. Coli, Enterococcus Bacteria, , Oil and Grease, Turbidity
Bluestem Lake	Color and Turbidity
Buck Creek	Dissolved Oxygen, E. Coli, and Enterococcus Bacteria
Bull Creek	Chloride, Dissolved Oxygen, E. Coli, Sulfates, and Total Dissolved Solids
Bull Creek	Dissolved Oxygen
California Creek	Dissolved Oxygen and Enterococcus Bacteria
Campbell Creek	Sulfates and Total Dissolved Solids
Caney Creek	Enterococcus Bacteria
Cat Creek	E. Coli, Enterococcus Bacteria, Fish Bioassessments, Sulfates
Chimney Rock Lake	Dissolved Oxygen
Chouteau Creek	Dissolved Oxygen
Claremore Lake	Chlorophyll A
Cloud Creek	Enterococcus Bacteria
Coal Creek	Benthic Macroinvertebrates Bioassessments
Copan Lake	Chlorophyll A, Color, and Turbidity
Cow Creek	Dissolved Oxygen and Turbidity
Curl Creek	Dissolved Oxygen
Delaware Creek	Benthic Macroinvertebrates Bioassessments, Chloride, Dissolved Oxygen, Enterococcus Bacteria
Dog Creek	Benthic Macroinvertebrates Bioassessments and Dissolved Oxygen
Eucha Lake	Chlorophyll A and Dissolved Oxygen
Fivemile Creek	Benthic Macroinvertebrates Bioassessments
Flat Rock Creek	Benthic Macroinvertebrates Bioassessments
Fort Gibson Lake	Dissolved Oxygen and Turbidity

Waterbody	Impairment
Fourmile Creek	Dissolved Oxygen
Grand Lake O' the Cherokees, Lower	Dissolved Oxygen and Lead
Grand Lake O' the Cherokees, Middle	Lead and Turbidity
Grand Lake O' the Cherokees, Upper	Lead and Turbidity
Hogshooter Creek	Dissolved Oxygen and Fish Bioassessments
Hominy Creek	Chloride, E. Coli, and Total Dissolved Solids
Hominy Lake	Dissolved Oxygen
Honey Creek	Enterococcus Bacteria
Horse Creek	Ammonia, Chloride, Dissolved Oxygen, and pH
Hudson Creek	Dissolved Oxygen and Turbidity
Hulah Lake	Color and Turbidity
Lightning Creek	E. Coli, Sulfates, and Total Dissolved Solids
Little Cabin Creek	Dissolved Oxygen, E. Coli, Enterococcus Bacteria, and Total Dissolved Solids
Little Horse Creek	Dissolved Oxygen
Little Saline Creek	Enterococcus Bacteria
Lost Creek	E. Coli
Mill Creek	Benthic Macroinvertebrates Bioassessments and Fish Bioassessments
Mission Creek	Dissolved Oxygen and E. Coli
Neosho River	Benthic Macroinvertebrates Bioassessments, Fish Bioassessments, Lead, Sedimentation/Siltation, Turbidity, and Dissolved Oxygen
Oologah Lake	Dissolved Oxygen and Turbidity
Panther Creek	Sulfates and Total Dissolved Solids
Pawhuska Lake	Sulfates
Pawpaw Creek	Dissolved Oxygen, E. Coli, Sulfates and Total Dissolved Solids
Plumb Creek	Chloride, Sulfates, and Total Dissolved Solids
Pryor Creek	Enterococcus Bacteria, Dissolved Oxygen, Turbidity, and E. Coli
Ranger Creek	Dissolved Oxygen and E. Coli
Russell Creek	Dissolved Oxygen and Sulfates
Saline Creek	Benthic Macroinvertebrates Bioassessments and Enterococcus Bacteria

Waterbody	Impairment
Spavinaw Creek	Enterococcus Bacteria
Spavinaw Lake	Chlorophyll A and Dissolved Oxygen
Spencer Creek	Sulfates and Total Dissolved Solids
Spring River	Lead and Turbidity
Tar Creek	Benthic Macroinvertebrates Bioassessments and Lead
Verdigris River	Lead
Waxhoma Lake	Color

Within this watershed, likely sources of nonpoint source pollution include: runoff from row crop agriculture and mining waste, livestock grazing and confined animal feeding operations, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage from faulty septic systems, and urban runoff. Additionally, riparian degradation caused directly or indirectly by agricultural practices and land development within the watershed has contributed to streambank instability and bank erosion. As part of the planning of each in-lieu fee project site, an assessment of stream stability will be conducted, including field verification. A geomorphic assessment will be conducted at potential project sites to evaluate the morphology of the stream and assess bank stability, stream incision, floodplain connectivity and other physical characteristics. Within the urban portions of the watershed, particularly in the Tulsa metropolitan area, most streams have been radically altered by channelization, piping, loss of riparian corridors and substantial invasive plant cover.

5. Aquatic Resource Goals & Objectives:
Neosho / Grand Watershed (HUC 1107)

The primary goal within the watershed is to restore, create and enhance aquatic resources such as streams and wetlands that are lost under activities authorized by Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. All restoration goals are subject to change based upon watershed and Section 10, Section 404 and Section 401 permitting needs.

Other aquatic resources goals are to:

- Increase the amount of wetland and riparian acreage compared to the amount of impacts mitigated through this In-Lieu Fee Program
- Acquire, restore, enhance and preserve important aquatic resources that improve local and regional water quality and wildlife habitat
- Restore, create and enhance wetlands with an emphasis on forested wetlands and closed depressions

- Restore in-stream habitat impacted by such impairments as bank erosion, channel incision and inappropriately designed in-stream structures such as low water crossings and culverts
- Restore and enhance ecologically impaired and/or undersized riparian corridors
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats

The primary objective of the Sponsor is to create fully functional high quality in-lieu fee project sites appropriate in habitat composition and size so that the combined result of all in-lieu fee project sites within the watershed accomplishes the goals stated above. NRCS and National Wetlands Inventory (NWI) wetlands maps will be used to identify potential in-lieu fee project sites that may contain existing wetlands that could be enhanced or expanded or converted wetlands appropriate for restoration efforts. NRCS soil survey maps will be used to identify locations containing the appropriate hydric soil types for wetland restoration or creation. Other objectives include the following:

- Restore wetlands impacted by agriculture
- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site that includes stream mitigation
- When site conditions permit, enhance oxbow lakes
- Site in-lieu fee project sites where they can benefit listed species such as the Ozark cavefish, Neosho madtom and the Neosho mucket
- Improve watersheds impacted by past mining activities
- Provide in-lieu fee project sites that filter pollutants from adjacent land uses before they enter any stream systems
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats if those buffers would enhance or protect the adjacent aquatic resources
- Establish successful in-lieu fee project sites in the best situated locations based on the aquatic resource goals and prioritization strategy for this watershed. Based on our research to date, the following stream drainage basins and counties would be the most likely locations of future mitigation parcels although the Sponsor is not limited to these areas:
 - Spring River
 - Neosho River
 - Grand River
 - Tulsa County
 - Wagoner County
 - Rogers County

6. Prioritization Strategy:
Neosho / Grand Watershed (HUC 1107)

Mitigation activities within the watershed will be sited in locations that will provide the most chemical, physical and biological benefit to the watershed. The primary priority will be to site projects in the most beneficial locations to the watershed. Locating project sites in as close proximity to the impacts as feasible will also be important. Additionally, this In-Lieu Fee Program will prioritize the creation of project sites with land uses, hydrology, topography, ecological factors and geomorphology similar to the impacted aquatic resources. The location of the following items, among others, will be used to identify priority sites for restoration activities.

- Streams listed on Nationwide Rivers Inventory
- Outstanding National Resource Waters
- Outstanding Resource and High Quality State Waters
- Special Aquatic Life Use Waters
- Waters within Federal/State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc.)
- Stream Reference Reach Sites
- Waters with listed Federal or State Endangered or Threatened species (as determined on a case by case basis in coordination with FWS and ODWC)
- Designated Fish Spawning Habitat / Native Freshwater Mussel Refuges (as determined on a case by case basis in coordination with FWS and ODWC)
- Waters on the 303(d) list, impaired by sediment, dissolved oxygen and nutrients or has impaired biology
- Streams adjacent to an approved mitigation bank or mitigation site
- Waters with federal and state listed Endangered and Threatened species
- Postings on the Oklahoma Conservation Commission's Wetlands Registry
- Hydric soils if wetland improvements are planned
- Sufficient surface or groundwater hydrology for the development of wetland conditions or the possibility of restoring hydrology that was previously removed from the project site
- Compatible surrounding land uses

In addition to aspects of site selection, the Aquatic Goals and Objectives for this watershed will guide the In-Lieu Fee Program through the process of selecting and implementing compensatory mitigation activities. Of all the possible compensatory mitigation activities, the following will be prioritized:

- Emphasize the restoration, enhancement and creation of closed depressions within the Neosho / Grand A and Neosho / Grand B service areas. Both services areas are located within the Irregular Plains ecoregion which is a relatively flat land and can be distinguished by its claypan soils (Woods *et al.*,

2005) which is why closed depressions and oxbow lakes will be emphasized when appropriate

- Focus on restoring, creating and enhancing forested wetlands within the portion of the Neosho / Grand C service area within the Ozark Highlands ecoregion and closed depressions within the portion of the Neosho / Grand C service area within the Irregular Plains ecoregion
- Locate in-lieu fee project sites where they can be most effective at removing pollutants caused by past mining activities if possible. The mitigation plans of any site designed to ameliorate water pollution from mining activities will focus on water quality improvements and pollutant trapping rather than wildlife benefits.
- Locate in-lieu fee project sites where they can benefit listed species if possible. These in-lieu fee project sites should be designed to maximize the removal of nutrients and sediment one primary design objective.
- In-stream mitigation opportunities will be prioritized over riparian buffer mitigation.
- Potential in-lieu fee project sites that combine wetland and stream mitigation opportunities will be prioritized as those sites offer the best opportunities for water quality and wildlife benefits, especially when compared to separate wetland and stream mitigation sites.

D. *Canadian Watershed (HUC 1109)*

1. Geographic Watershed:
Canadian Watershed (HUC 1109)

This watershed consists of the drainage basin of the Canadian River (HUC 1109) within Oklahoma. The boundaries of this watershed are shown in Figure 7 along with different hatching patterns to illustrate the extents of the four service areas within this watershed. Because of the presence of the Oklahoma City metropolitan area in this watershed, its service areas will be based on 8-digit HUCs. The Canadian A service area (HUC 11090201) is rural in nature. The Canadian B service area (HUC 11010202) and Canadian C service area (HUC 11090203) both have a portion of the Oklahoma City metropolitan area within their boundaries. The city of McAlester is completely within HUC 11090204, the Canadian D service area.

Figure 7. Boundaries of the Canadian Watershed (HUC 1109)

This watershed stretches across much of the state and includes portions of five different Level III ecoregions. The very western end of the Canadian A service area is part of the Southwestern Tablelands ecoregion which is mostly rangeland with red soils, mesas, canyons and badlands that are dominated in Oklahoma by shortgrass prairies with some areas of scrub-shrub and midgrass on the bluffs of ridges and along major rivers. The rest of the Canadian A service area is within the Central Great Plains ecoregion which is now dominated by row crops but was formerly mixed height prairie with occasional small trees and shrubs before settlement occurred. Common underground salt deposits in this ecoregion have led to high salinity levels in some streams. The Canadian B service area includes both the Central Great Plains and the Cross Timbers ecoregions. The Cross Timbers ecoregion is now associated with such land uses as pasture, rangeland and oil extraction but was historically prairies dominated by little bluestem along with occasional post oaks and blackjack oaks. The very western part of the Canadian C service area is within the Central Great Plains ecoregion but the remainder is part of the Cross Timbers ecoregion. The Canadian D service area is almost entirely within the Arkansas Valley ecoregion but the very southern end of this service area is part of the Ouachita Mountains ecoregion. The Arkansas Valley ecoregion is largely forested with many hills and valleys although there is much less topographic variation than in the nearby Ouachita Mountains, Boston Mountains and Ozark Highlands ecoregions. Row crops encompass approximately 10% of this ecoregion with grazing lands comprising roughly 25% of this area. Streams in this ecoregion have significantly lower dissolved oxygen levels than most surrounding ecoregions which makes the aquatic communities unique. The Ouachita Mountains ecoregion consists of pronounced ridges with an east-west orientation which are the result of the erosion of compacted sedimentary rocks that feature a geology that is unique when compared to that of surrounding ecoregions. While oak-hickory-pine

climax communities used to cover this area before settlement, loblolly and shortleaf pine now dominate and commercial forestry is the main land use (EPA, 2010a).

2. Threats to Existing Aquatic Resources:
Canadian Watershed (HUC 1109)

The dominant current land use in most of this HUC is rangeland, rural and agricultural in nature. The agricultural land development within the watershed has undoubtedly had an impact on the extent and quality of wetlands and wildlife habitat. Additionally, this watershed contains some of the Oklahoma City metropolitan area which has grown in population by 6.2% between 2000 and 2006 compared to the average growth in the state of 3.7% (USCB, 2010). The continued development of Oklahoma City, Arnett, Taloga, Norman, Purcell, Ada, McAlester, Stigler and Holdenville continues to impact the aquatic resources by direct impacts, by erosion caused by the increased amount of impermeable surfaces and by water pollution from point and nonpoint sources. Aquatic resources are endangered in rural areas by threats such as agricultural conversion; nutrient and sediment runoff; oil, gas and mineral extraction; and livestock damage. The spread of invasive species such as salt cedar (*Tamarix* spp.) has also deteriorated stream and wetland habitats in this watershed. Additionally, significant coal and natural gas deposits have been found in the eastern portion of this watershed (Oklahoma Department of Mines, 2008 and Boyd, 2008). The extraction of these natural resources, whether through drilling or mining, will result in impacts to the chemical, physical and biological integrity of the wetlands and streams which will require compensatory mitigation.

In order to compensate for unavoidable impacts to waters of the U.S. within this watershed, the In-Lieu Fee Program will seek out project site locations that will maximize the program's overall impact on the chemical, physical and biological integrity of the watershed. The In-Lieu Fee Program will seek to remove invasive species where feasible and to return natural stream morphology and stream flow when appropriate. Efforts will also focus on converting agricultural ground near streams into riparian corridors with native vegetation and enhancing adjacent riparian corridors to remove pollutants from the watershed. Also, farmed wetlands indicated by the NRCS will be restored and enhanced with native plantings of trees, shrubs and herbaceous vegetation.

3. Historic Loss of Aquatic Resources:
Canadian Watershed (HUC 1109)

Since European and American settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats throughout Oklahoma. Approximately 67% of Oklahoma's original wetlands have been lost since the 1780s as a result of conversion to agriculture, levee construction, river management and navigation programs, land development activities and other actions (Dahl, 1990). The creation of Stanley Draper Lake, Lake Thunderbird, Lake Konawa, Lake McAlester

and Eufaula Lake (OWRB, n.d.(b)) which together cover over approximately 50,000 acres (OWRB, n.d.(a)) has undoubtedly inundated or changed the hydrology of many wetlands and streams. Additionally, the development of Oklahoma City, Arnett, Taloga, Norman, Purcell, Ada, McAlester, Stigler and Holdenville undoubtedly has impacted streams and wetlands within those jurisdictions.

4. Current Aquatic Resource Conditions:
Canadian Watershed (HUC 1109)

The Canadian Watershed encompasses approximately 6,795 square miles within Oklahoma. In much of Oklahoma the extent of riparian forests surrounding the Canadian River has been greatly diminished. While cottonwoods (*Populus deltoides*), American elm (*Ulmus americana*), pecan (*Carya illinoensis*), western soapberry (*Sapindus drummondii*), black walnut (*Juglans nigra*) and black willow (*Salix nigra*) once dominated, overgrazing and deforestation by agriculture interests have reduced the amount of riparian forests which has resulted in stream bank erosion, invasive species encroachment and the loss of wildlife habitat and other ecosystem services (ODAFF, n.d.). Currently, the Arkansas River shiner (*Notropis girardi*) is a federally threatened species in the watershed and would benefit from the chemical and physical improvements in water quality associated with an in-lieu fee project site.

Many streams and lakes in this watershed have been impaired by water quality issues. The waterbodies on the 2012 Clean Water Act Section 303(d) list of impaired waters include the following (EPA, 2014):

Table 10. Canadian Watershed Section 303(d) List

Waterbody	Impairment
Bear Cub Creek	pH
Beaver Creek	Dissolved Oxygen, Oil and Grease, pH, and Turbidity
Bird Creek	Ammonia, Chloride, Total Dissolved Solids
Bishop Creek	Chlorpyrifos
Blacksmith Creek	Chloride and Total Dissolved Solids
Bruno Creek	Chloride and Total Dissolved Solids
Brushy Creek	Dissolved Oxygen, Lead, Turbidity and Oil and Grease
Bull Creek	Copper, Lead, and Zinc
Canadian River	Enterococcus Bacteria, Chloride, Lead, pH, Sulfates, and Turbidity
Canadian Sandy Creek	Enterococcus Bacteria and E. Coli
Cow Creek	Dissolved Oxygen and Selenium
Cudjo Creek	Total Dissolved Solids, Chloride, and pH

Waterbody	Impairment
Dry Creek	Dissolved Oxygen and Oil and Grease
Elm Creek	E. Coli, Total Dissolved Solids, and Turbidity
Elm Creek, East	Dissolved Oxygen
Elm Creek, West	Enterococcus Bacteria and E. Coli
Eufaula Lake, Canadian River Arm	Color and Turbidity
Eufaula Lake, Gaines Creek Arm	Color, Dissolved Oxygen, and Turbidity
Fiddlers Creek	Sulfates
Flanders Creek	Sulfates
Foreman Creek	Dissolved Oxygen
Gaines Creek	Dissolved Oxygen, Oil and Grease, and pH
Hackberry Creek	Sulfates and Total Dissolved Solids
Hay Creek	Oil and Grease
Hog Creek	Dissolved Oxygen, Enterococcus Bacteria, E. Coli, and Turbidity
Hog Creek, West Branch	Dissolved Oxygen
Holdenville Lake	Chlorophyll A, Dissolved Oxygen, and Turbidity
Julian Creek	E. Coli
Kight Creek	Chloride and Total Dissolved Solids
Lariat Creek	Fish Bioassessment
Little River	Chloride, Dissolved Oxygen, Enterococcus Bacteria, E. Coli, Fish Bioassessment, Total Dissolved Solids
Lloyd Vincent Lake	Dissolved Oxygen
Lone Creek	Sulfates and Total Dissolved Solids
Little Sandy Creek	Benthic Macroinvertebrates Bioassessments
Longtown Creek	Dissolved Oxygen
McAlester Lake	Color, Mercury, and Turbidity
Mill Creek	Benthic Macroinvertebrates Bioassessments
Moore Creek	Total Dissolved Solids
Peaceable Creek	Dissolved Oxygen and Sulfates
Pecan Creek	Oil and Grease
Pit Creek	Dissolved Oxygen, pH, Sulfates, and Total Dissolved Solids
Popshego Creek	Barium, Chloride, and Total Dissolved Solids

Waterbody	Impairment
Red Creek	Sulfates
Red Springs Creek	Total Dissolved Solids
Red Trail Creek	Sulfates
Rock Creek	Enterococcus Bacteria and E. Coli
Salt Creek	Chloride, Enterococcus Bacteria, E. Coli, Fish Bioassessments, and Total Dissolved Solids
Squirrel Creek	Sulfates
Stanley Draper Lake	Mercury and Turbidity
Talawanda 1 Lake	pH
Thunderbird Lake	Chlorophyll A, Dissolved Oxygen, and Turbidity
Trail Creek	Sulfates and Total Dissolved Solids
Tributary 8	Arsenic and Chromium
Walnut Creek	E. Coli and Enterococcus Bacteria
Walnut Creek, North Fork	Turbidity
Willow Creek	Chlorpyrifos and Turbidity

Within this watershed, likely sources of nonpoint source pollution include: runoff from row crop agriculture, livestock grazing, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage from faulty septic systems and urban runoff. Additionally, riparian degradation caused directly or indirectly by agricultural practices and land development within the watershed has contributed to streambank instability and bank erosion. As part of the planning of each in-lieu fee project site, an assessment of stream stability will be conducted, including field verification. A geomorphic assessment will be conducted at potential project sites to evaluate the morphology of the stream and assess bank stability, stream incision, floodplain connectivity and other physical characteristics.

5. Aquatic Resource Goals & Objectives:
Canadian Watershed (HUC 1109)

The primary goal within the watershed is to restore, create and enhance aquatic resources such as streams and wetlands that are lost under activities authorized by Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. All restoration goals are subject to change based upon watershed and Section 10, Section 404 and Section 401 permitting needs.

Other aquatic resources goals in this watershed are to:

- Increase the amount of wetland and riparian acreage compared to the amount of impacts mitigated through this In-Lieu Fee Program

- Acquire, restore, enhance and preserve important aquatic resources that improve local and regional water quality and wildlife habitat
- Restore, create and enhance wetlands with an emphasis on forested wetlands, closed depressions and riparian corridor wetlands
- Restore in-stream habitat impacted by such impairments as bank erosion, channel incision and inappropriately designed in-stream structures such as low water crossings and culverts
- Restore and enhance ecologically impaired and/or undersized riparian corridors

The primary objective of the Sponsor is to create fully functional high quality in-lieu fee project sites appropriate in habitat composition and size so that the combined result of all in-lieu fee project sites within the watershed accomplishes the goals stated above. NRCS and National Wetlands Inventory (NWI) wetlands maps will be used to identify potential in-lieu fee project sites that may contain existing wetlands that could be enhanced or expanded or converted wetlands appropriate for restoration efforts. NRCS soil survey maps will be used to identify locations containing the appropriate hydric soil types for wetland restoration or creation. Other objectives include the following:

- Restore wetlands impacted by agriculture
- Provide in-lieu fee project sites that filter pollutants from adjacent land uses before they enter any stream systems
- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site that includes stream mitigation
- Site in-lieu fee project sites where they can benefit listed species such as the Arkansas River shiner
- Remove or limit the presence of invasive species such as *Tamarix* spp. from aquatic habitats
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats if those buffers would enhance or protect the adjacent aquatic resources
- Establish successful in-lieu fee project sites in the best situated locations based on the aquatic resource goals and prioritization strategy for this watershed. Based on our research to date, the following stream drainage basins and counties would be the most likely locations of future mitigation parcels although the Sponsor is not limited to these areas:
 - Salt Creek
 - Canadian River
 - Lake Thunderbird
 - Oklahoma County
 - Canadian County
 - Cleveland County
 - McClain County
 - Grady County

6. Prioritization Strategy:
Canadian Watershed (HUC 1109)

Mitigation activities within the watershed will be sited in locations that will provide the most chemical, physical and biological benefit to the watershed. The primary priority will be to site projects in the most beneficial locations to the watershed. Locating project sites in as close proximity to the impacts as feasible will also be important. Additionally, this In-Lieu Fee Program will prioritize the creation of project sites with land uses, hydrology, topography, ecological factors and geomorphology similar to the impacted aquatic resources. The location of the following items, among others, will be used to identify priority sites for restoration activities.

- Streams listed on Nationwide Rivers Inventory
- Outstanding National Resource Waters
- Outstanding Resource and High Quality State Waters
- Special Aquatic Life Use Waters
- Waters within Federal/State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc.)
- Stream Reference Reach Sites
- Waters with listed Federal or State Endangered or Threatened species (as determined on a case by case basis in coordination with FWS and ODWC)
- Designated Fish Spawning Habitat / Native Freshwater Mussel Refuges (as determined on a case by case basis in coordination with FWS and ODWC)
- Waters on the 303(d) list, impaired by sediment, dissolved oxygen and nutrients or has impaired biology
- Streams adjacent to an approved mitigation bank or mitigation site
- Waters with federal and state listed Endangered and Threatened species
- Postings on the Oklahoma Conservation Commission's Wetlands Registry
- Hydric soils if wetland improvements are planned
- Sufficient surface or groundwater hydrology for the development of wetland conditions or the possibility of restoring hydrology that was previously removed from the project site
- Compatible surrounding land uses

In addition to aspects of site selection, the Aquatic Goals and Objectives for this watershed will guide the In-Lieu Fee Program through the process of selecting and implementing compensatory mitigation activities. Of all the possible compensatory mitigation activities, the following will be prioritized:

- Emphasize the restoration, enhancement and creation of riparian corridor wetlands and closed depressions in the Canadian A, B and C service areas
- Focus on restoring, creating and enhancing closed depressions and forested wetlands within the Canadian D service area
- Sites that provide endangered species habitat

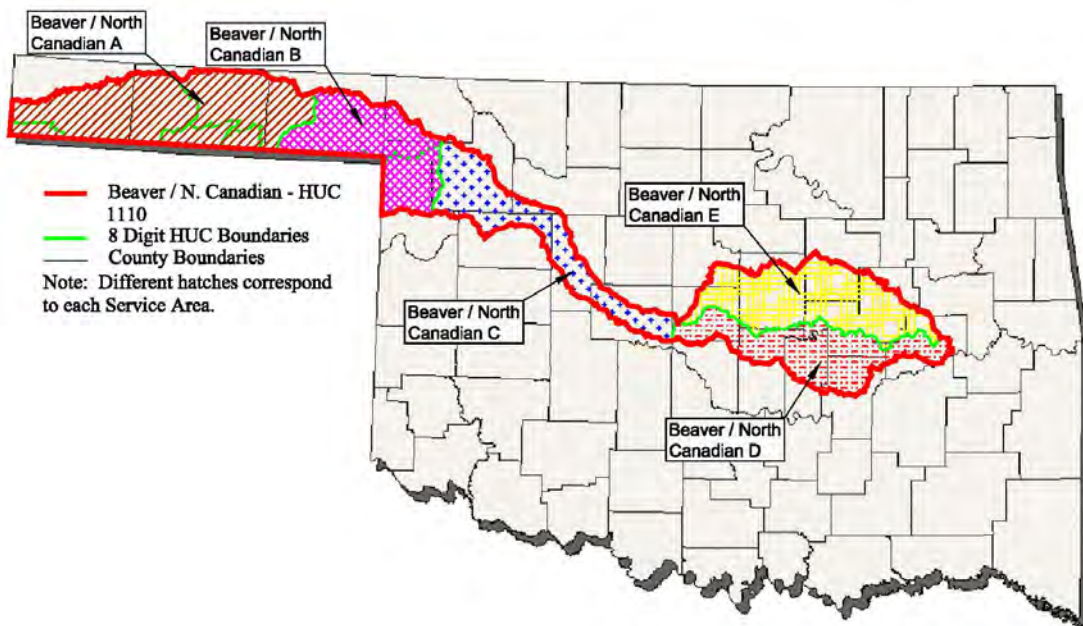
- In-stream mitigation opportunities will be prioritized over riparian buffer mitigation
- Potential in-lieu fee project sites that combine wetland and stream mitigation opportunities will be prioritized as those sites offer the best opportunities for water quality and wildlife benefits, especially when compared to separate wetland and stream mitigation sites.

E. *Beaver / North Canadian Watershed (HUC 1110)*

1. Geographic Watershed:
Beaver / North Canadian Watershed (HUC 1110)

This watershed consists of the combined drainage area of the Beaver River and North Canadian River which is located in central and northwestern Oklahoma. The boundaries of this watershed are shown in Figure 8 along with different hatching patterns to illustrate the extents of the various service areas within the watershed. The Beaver / North Canadian A service area is rural in nature and is defined by the boundaries of the 111001 6-digit HUC which is found in the panhandle of the state. The Beaver / North Canadian B service area is also rural and extends into the panhandle. It consists of the 111002 6-digit HUC within Oklahoma. The three remaining service areas in this watershed are defined by 8-digit HUC boundaries as they contain portions of the Oklahoma City metropolitan area. The Beaver / North Canadian C, Beaver / North Canadian D and Beaver / North Canadian E service areas consist of the 11100301, 11100302 and 11100303 HUCs respectively.

Figure 8. Boundaries of the Beaver / North Canadian Watershed (HUC 1110)



Terra Foundation, Inc.

Encompassing portions of Oklahoma from the panhandle to the eastern center of the state, this watershed features a high level of ecological diversity as it includes parts of six Level III ecoregions. The Beaver / North Canadian A service area includes both the High Plains and Southwestern Tablelands ecoregions. The High Plains consist of gently undulating flatlands dominated by row crops that were historically shortgrass prairies. The Southwestern Tablelands are characterized as rangeland with red soils, mesas, canyons and badlands. Within Oklahoma, this ecoregion would also have been dominated by shortgrass prairies with some areas of scrub-shrub and mixed height grasses on the tops of ridges and alongside major rivers. The very western tips of the Beaver / North Canadian B service area are within the High Plains ecoregion and most of this service area is part of the Southwestern Tablelands ecoregion. However, the very eastern edge of this service area is within the Central Great Plains ecoregion which now largely consists of row crops but which was previously mixed height prairie with occasional small trees and shrubs. The presence of underground salt deposits in this ecoregion has led to high salinity levels in some streams. This ecoregion also includes the entirety of the Beaver / North Canadian C service area. The vast majority of the Beaver / North Canadian D service area is within the Cross Timbers ecoregion although the service area includes part of the Central Great Plains ecoregion in its very western tip and part of the Arkansas Valley ecoregion in its very eastern end. The Cross Timbers ecoregion was historically prairies dominated by little bluestem that contained scattered post oaks and blackjack oaks. Current land uses consist of pastures and rangeland along with oil extraction. The Arkansas Valley ecoregion is primarily forest land with many hills and valleys. However, there is much less topographic variation than in the nearby Ouachita Mountains, Boston Mountains and Ozark Highlands ecoregions. About one tenth of this ecoregion is cropland and about a quarter is grazing lands. Streams in this ecoregion have significantly lower dissolved oxygen levels than most surrounding ecoregions which makes their aquatic communities unique. Similar to the Beaver / North Canadian D service area, most of the Beaver / North Canadian E service area is within the Cross Timbers ecoregion with the Central Great Plains ecoregion within its western portion. However, a small amount of the northern portion of the Beaver / North Canadian E service area is also within the Central Great Plains ecoregion and parts of the eastern end are within the Central Irregular Plains ecoregion which is characterized by a mixture of grasslands and forests with coal extraction as another common land use (EPA, 2010a).

2. Threats to Existing Aquatic Resources:
Beaver / North Canadian Watershed (HUC 1110)

Current land use in most of this watershed is rangeland, rural and agricultural in nature. The exception to this is the portion of the Oklahoma City metropolitan area that is located within this watershed. The land use changes in this watershed related to livestock and agricultural conversion has undoubtedly had an impact on the extent and quality of wetlands and wildlife habitat. Additionally, Oklahoma City has seen a population growth rate of 6.2% from 2000 to 2006 compared to the overall state's growth rate of 3.7% (USCB, 2010). The land development activities associated with

this population growth impacts aquatic resources through direct impacts such as the filling and piping of wetlands and streams. Other urban impacts to aquatic resources include increasing the amount of impermeable surfaces which leads to greater surface water flows and stream bank erosion, water pollution from point and nonpoint sources and channelization. Aquatic resources are endangered in rural areas by threats such as agricultural conversion; nutrient and sediment runoff; oil, gas and mineral extraction; and livestock damage. The spread of invasive species such as salt cedar (*Tamarix* spp.) has also deteriorated stream and wetland habitats in this watershed. Additionally, the fossil fuels oil, coal and natural gas are found in this watershed in high enough concentrations that they are commercially extracted, especially in the commercial coal fields in the eastern portion of the watershed (Department of Mines, 2008) and in the major natural gas fields in the central and western portions of the watershed (Boyd, 2008). The extraction of these fossil fuels can impact the chemical, physical and biological integrity of wetlands and streams through direct impacts which would require compensatory mitigation.

In order to compensate for unavoidable impacts to waters of the U.S. within this watershed, the In-Lieu Fee Program will seek out project site locations that will maximize the program's overall impact on the chemical, physical and biological integrity of the watershed. The In-Lieu Fee Program will seek to remove invasive species where feasible and to return natural stream morphology and stream flow when appropriate. Efforts will also focus on converting agricultural ground near streams into riparian corridors with native vegetation and enhancing adjacent riparian corridors to remove pollutants from the watershed. Also, farmed wetlands indicated by the NRCS will be restored and enhanced with native plantings of trees, shrubs and herbaceous vegetation.

3. Historic Loss of Aquatic Resources:
Beaver / North Canadian Watershed (HUC 1110)

Since European and American settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats throughout Oklahoma. Approximately 67% of Oklahoma's original wetlands have been lost since the 1780s as a result of conversion to agriculture, levee construction, river management and navigation programs, land development activities and other actions (Dahl, 1990). The creation of Optima Lake, Fort Supply Lake, Canton Lake, Lake Overholser, Lake Hefner, Lake Arcadia, Wes Watkins Lake, Shawnee Twin Lakes, Bell Cow Lake (OWRB, n.d.(b)) which together cover over approximately 20,000 acres (OWRB, n.d.(a)) has undoubtedly inundated or changed the hydrology of many wetlands and streams. The growth of the Oklahoma City metropolitan area since its establishment in 1889 has undoubtedly impacted local rivers, streams and wetlands. As one example, a seven mile stretch of the North Canadian River through Oklahoma City was impounded and was renamed as the Oklahoma River. The area around the Oklahoma River was constructed into a park area for public use. While parks provide substantial recreational opportunities, they provide little pollutant filtration function.

4. Current Aquatic Resource Conditions:
Beaver / North Canadian Watershed (HUC 1110)

The Beaver / North Canadian watershed (HUC 1110) comprises roughly 11,874 square miles within Oklahoma (ORWB n.d.(c)). One notable existing wetland resource in the western portion of this watershed is the Optima National Wildlife Refuge which is comprised of 4,333 acres of prairies and bottomland forests (FWS, n.d.(c)). Another prominent wetland area is the significant amount of bottomland hardwood forests within the 9,600-acre Deep Fork National Wildlife Refuge in Okmulgee County (FWS, n.d.(a)). Currently, the Beaver and North Canadian Rivers and their tributaries in western Oklahoma are primary sources of public water supply. Ninety-two percent of the total withdrawals of surface water in the basin upstream of Oklahoma City are for public supply (calculated from Lurry and Tortorelli, 1996). Additionally, the western portion of the watershed is located above the High Plains Aquifer which is used for many purposes, but mainly for agricultural irrigation.

Many streams and lakes in this watershed have been impaired by water quality issues. The waterbodies on the 2012 Clean Water Act Section 303(d) list of impaired waters include the following (EPA, 2014):

Table 11. Beaver / North Canadian Watershed Section 303(d) List

Waterbody	Impairment
Adams Creek	Dissolved Oxygen
Airport Heights Creek	Dissolved Oxygen and Turbidity
Alabama Creek	Chloride, Enterococcus Bacteria, and E. Coli
Arcadia Lake	Chlorophyll A and Turbidity
Beaver River (North Canadian)	Benthic Macroinvertebrates Bioassessments, Chloride, Dissolved Oxygen, E. Coli, Enterococcus Bacteria, Fish Bioassessments, Lead, Sedimentation/Siltation, Sulfates, and Total Dissolved Solids
Begger Creek	Chloride and Total Dissolved Solids
Bellcow Lake	Turbidity
Bellcow Creek, North	Oil and Grease
Bent Creek	E. Coli, Enterococcus Bacteria, and Sulfates
Browns Creek	Dissolved Oxygen
Buzzard Creek	E. Coli
Campbell Creek	Dissolved Oxygen and Sulfates
Canadian River, Deep Fork	Benthic Macroinvertebrates Bioassessments, E. Coli, Enterococcus Bacteria, Fish Bioassessments, and Lead

Waterbody	Impairment
Canadian River, North	Dieldrin, Dissolved Oxygen, E. Coli, Enterococcus Bacteria, Cadmium, Lead, pH, Total Dissolved Solids, Oil and Grease and Turbidity
Canton Lake	Turbidity
Captain Creek	E. Coli
Carter Creek	Chloride and Total Dissolved Solids
Catfish Creek	Chloride and Total Dissolved Solids
Chandler Lake	Chlorophyll-A and Turbidity
Chandler Lake, NW Trib	Oil and Grease
Cherry Creek	Cadmium, Dissolved Oxygen, and Selenium
Cheyarha Creek, East	Chloride
Choctaw Creek	Dissolved Oxygen
Clear Creek	Benthic Macroinvertebrates Bioassessments,
Clearview Creek	Chloride and Total Dissolved Solids
Coal Creek	Turbidity
Coon Creek	Chlorpyrifos
Corrumpa Creek	Ammonia, Dissolved Oxygen, E. Coli, and Enterococcus Bacteria
Crooked Oak Creek	Chloride, Dissolved Oxygen, Enterococcus Bacteria, Oil and Grease, and Total Dissolved Solids
Crutch Creek	Dissolved Oxygen, E. Coli, Enterococcus Bacteria, and Oil and Grease
Deer Creek, South	Dissolved Oxygen and Oil and Grease
Dripping Springs Lake	Color, Dissolved Oxygen, and Turbidity
Earlsboro Creek	Chloride
El Reno Lake	Turbidity
Eufaula Lake	Turbidity
Fort Supply Lake	Chlorophyll-A and Turbidity
Gentry Creek	Dissolved Oxygen, Enterococcus Bacteria, and E. Coli
Grave Creek	Chloride
Greasy Creek	Dissolved Oxygen, pH, and Turbidity
Henryetta Lake	Color, Lead, and Turbidity
Hilliby Creek	Fish Bioassessments
Indian Creek	Enterococcus bacteria and E. Coli
Kiowa Creek	E. Coli
Little Deep Fork Creek	E. Coli and Enterococcus Bacteria
Little Wewoka Creek	E. Coli and Enterococcus Bacteria
Magnolia Creek	Chloride
Meeker Lake	Color and Turbidity

Waterbody	Impairment
Minnehaha Creek	Fish Bioassessments
Montezuma Creek	Fish Bioassessments
Mustang Creek	Dissolved Oxygen
Nuyaka Creek	Dissolved Oxygen and Turbidity
Oakwood Cemetery Creek	Chloride
Okemah Lake	Color
Okmulgee Lake	Color and Dissolved Oxygen
Otter Creek	Benthic Macroinvertebrates Bioassessments
Overholser Lake	Color, Sulfates, and Turbidity
Palo Duro Creek	Dissolved Oxygen, E. Coli, Enterococcus Bacteria, Selenium, Sulfates, and Total Dissolved Solids
Persimmon Creek	E. Coli, Enterococcus Bacteria and Oil and Grease
Salt Cedar Creek	Chloride and Total Dissolved Solids
Salt Creek	Dissolved Oxygen and Chloride
Shawnee Twin Lake #2 (North)	Turbidity
Shell Creek	Dissolved Oxygen
Sportsman Lake	Color and Turbidity
Spring Creek	Benthic Macroinvertebrates Bioassessments and E. Coli
Spring Creek	Fish Bioassessments
Spring Creek, West	Chloride and Total Dissolved Solids
Stroud Lake	Dissolved Oxygen
Tecumseh Lake	Color and Turbidity
Turkey Creek	Chloride, Total Dissolved Solids, and pH
Turkey Creek, Trib A	Chloride
Walnut Creek	Turbidity
Wetumka City Lake	Enterococcus Bacteria,
Wewoka Lake	Chlorophyll-A, Color, and Turbidity
Wewoka Creek	Chloride, E. Coli, Nitrates, Sulfates, Cadmium, and Total Dissolved Solids
Wewoka Creek, Trib. A	Total Dissolved Solids
Wolf Creek	Fish Bioassessments
Wolf Creek	Enterococcus Bacteria

Within this watershed, likely sources of nonpoint source pollution include: runoff from row crop agriculture, livestock grazing, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage from faulty septic systems and urban runoff. Additionally, riparian degradation caused directly or indirectly by agricultural practices and land development within the watershed has contributed to streambank instability and bank erosion. As part of the

planning of each in-lieu fee project site, an assessment of stream stability will be conducted, including field verification. A geomorphic assessment will be conducted at potential project sites to evaluate the morphology of the stream and assess bank stability, stream incision, floodplain connectivity and other physical characteristics.

5. Aquatic Resource Goals & Objectives:
Beaver / North Canadian Watershed (HUC 1110)

The primary goal within the watershed is to restore, create and enhance aquatic resources such as streams and wetlands that are lost under activities authorized by Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. All restoration goals are subject to change based upon watershed and Section 10, Section 404 and Section 401 permitting needs.

Other aquatic resources goals within this watershed are to:

- Increase the amount of wetland and riparian acreage compared to the amount of impacts mitigated through this In-Lieu Fee Program
- Acquire, restore, enhance and preserve important aquatic resources that improve local and regional water quality and wildlife habitat
- Restore, create and enhance wetlands with an emphasis on closed depressions, playa lakes, forested wetlands and riparian corridor wetlands
- Restore in-stream habitat impacted by such impairments as bank erosion, channel incision and inappropriately designed in-stream structures such as low water crossings and culverts
- Restore and enhance ecologically impaired and/or undersized riparian corridors

The primary objective of the Sponsor is to create fully functional high quality in-lieu fee project sites appropriate in habitat composition and size so that the combined result of all in-lieu fee project sites within the watershed accomplishes the goals stated above. NRCS and National Wetlands Inventory (NWI) wetlands maps will be used to identify potential in-lieu fee project sites that may contain existing wetlands that could be enhanced or expanded or converted wetlands appropriate for restoration efforts. NRCS soil survey maps will be used to identify locations containing the appropriate hydric soil types for wetland restoration or creation. Other objectives include the following:

- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site that includes stream mitigation
- Provide in-lieu fee project sites that filter pollutants from adjacent land uses before they enter any stream systems
- When site conditions are appropriate, enhance oxbow lakes
- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site

- Remove or limit the presence of invasive species such as *Tamarix* spp. from aquatic habitats
- Restore wetlands impacted by agriculture
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats if those buffers would enhance or protect the adjacent aquatic resources
- Establish successful in-lieu fee project sites in the best situated locations based on the aquatic resource goals and prioritization strategy for this watershed. Based on our research to date, the following stream drainage basins and counties would be the most likely locations of future mitigation parcels although the Sponsor is not limited to these areas:
 - Wewoka Creek
 - Oklahoma County
 - Canadian County
 - Lincoln County
 - Pottawatomie County
 - Cimarron County
 - Texas County
 - Beaver County

6. Prioritization Strategy:
Beaver / North Canadian Watershed (HUC 1110)

Mitigation activities within the watershed will be in locations that will provide the most chemical, physical and biological benefit to the watershed. The primary priority will be to site projects in the most beneficial locations to the watershed. Locating project sites in as close proximity to the impacts as feasible will also be important. Additionally, this In-Lieu Fee Program will prioritize the creation of project sites with land uses, hydrology, topography, ecological factors and geomorphology similar to the impacted aquatic resources. The location of the following items, among others, will be used to identify priority sites for restoration activities.

- Streams listed on Nationwide Rivers Inventory
- Outstanding National Resource Waters
- Outstanding Resource and High Quality State Waters
- Special Aquatic Life Use Waters
- Waters within Federal/State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc.)
- Stream Reference Reach Sites
- Waters with listed Federal or State Endangered or Threatened species (as determined on a case by case basis in coordination with FWS and ODWC)
- Designated Fish Spawning Habitat / Native Freshwater Mussel Refuges (as determined on a case by case basis in coordination with FWS and ODWC)

- Waters on the 303(d) list, impaired by sediment, dissolved oxygen and nutrients or has impaired biology
- Streams adjacent to an approved mitigation bank or mitigation site
- Waters with federal and state listed Endangered and Threatened species
- Postings on the Oklahoma Conservation Commission's Wetlands Registry
- Hydric soils if wetland improvements are planned
- Sufficient surface or groundwater hydrology for the development of wetland conditions or the possibility of restoring hydrology that was previously removed from the project site
- Compatible surrounding land uses

In addition to aspects of site selection, the Aquatic Goals and Objectives for this watershed will guide the In-Lieu Fee Program through the process of selecting and implementing compensatory mitigation activities. Of all the possible compensatory mitigation activities, the following will be prioritized:

- Emphasize the restoration, enhancement and creation of playa lakes within the Beaver / North Canadian A and Beaver / North Canadian B service areas. This objective is important because of the high value of playa lakes to the biotic community and because of the large amount of playa lakes that have been modified due to agricultural disturbances.
- Focus on restoring, creating and enhancing closed depressions and riparian corridor wetlands in the Beaver / North Canadian C service area
- Focus on restoring, creating and enhancing closed depressions, riparian corridor wetlands and forested wetlands in the Beaver / North Canadian D and E service areas
- In-stream mitigation opportunities will be prioritized over riparian buffer mitigation
- Potential in-lieu fee project sites that combine wetland and stream mitigation opportunities will be prioritized as those sites offer the best opportunities for water quality and wildlife benefits, especially when compared to separate wetland and stream mitigation sites.

F. Lower Arkansas Watershed (HUC 1111)

1. Geographic Watershed:
Lower Arkansas Watershed (HUC 1111)

This watershed consists of the Lower Arkansas drainage area (HUC 1111) which is found in eastern Oklahoma. The main rivers in this watershed are the Arkansas River, Illinois River and Poteau River. The boundaries of this watershed are shown below in Figure 9 along with different hatching patterns to illustrate the extents of the various service areas within the watershed. The Lower Arkansas A service area (HUC 11110101) contains a portion of the Tulsa metropolitan area. The Lower Arkansas B

service area (HUC 11110102) contains the section of Muskogee not included in the Lower Arkansas A service area. The remaining area within this watershed is rural in nature, is all within the same 6-digit HUC, and will comprise the Lower Arkansas C service area.

Figure 9. Boundaries of the Lower Arkansas Watershed (HUC 1111)



This watershed includes portions of six Level III ecoregions. A little less than half of the Lower Arkansas A service area is within the Cross Timbers ecoregion with the remainder in the Central Irregular Plains ecoregion. The Cross Timbers ecoregion was historically prairies dense with little bluestem that included occasional post oaks and blackjack oaks. Current dominant land uses include pasture, rangeland and oil extraction. The Central Irregular Plains ecoregion contains a mixture of grasslands and forests with coal extraction being a common land use. The Lower Arkansas B service area is predominately within the Central Irregular Plains ecoregion, although small portions of this service area are in the Cross Timbers, Boston Mountains, and Arkansas Valley ecoregions. The Lower Arkansas C service area contains a significant amount of ecosystem diversity as it includes the Central Irregular Plains, Ozark Highlands, and Boston Mountains ecoregions in the north and a large area of the Arkansas Valley ecoregion with a small amount of the Ouachita Mountains ecoregion to the south. The Ozark Highlands ecoregion is characterized by a large amount of topographic relief and forested land cover dominated by oak and oak-pine tree communities. Karst geologic features such as springs and caves are common. As a result, there are many spring-fed streams in this ecoregion as well as a higher concentration of groundwater-fed wetlands than in other portions of the state. The Boston Mountains ecoregion is also largely forested with oak-hickory communities but eastern red cedar and shortleaf pine are also common species. This ecoregion shares a low population density with the Ozark Highlands ecoregion and also features recreation as a primary land use although there

are significant geological differences between these two ecoregions. The primary land use in the Arkansas Valley ecoregion is forest containing many hills and valleys. However, there is much less variation in elevation than in the nearby Ouachita Mountains, Boston Mountains and Ozark Highlands ecoregions. About 10% of this ecoregion is cropland and about 25% is pasture. Streams in this ecoregion have dramatically lower dissolved oxygen levels than most adjacent ecoregions which makes their aquatic communities somewhat unique. The Ouachita Mountains ecoregion consists of pronounced ridges of an east-west orientation that resulted from the erosion of compacted sedimentary rocks that feature geology distinct from that of surrounding ecoregions. While oak-hickory-pine climax communities used to dominate this area before settlement, loblolly and shortleaf pine now cover most of the area and commercial forestry is the primary land use (EPA, 2010a).

2. Threats to Existing Aquatic Resources:
Lower Arkansas Watershed (HUC 1111)

The dominant land use in most of this watershed is agricultural production although a portion of the Tulsa metropolitan area and some smaller urban areas such as Sapulpa, Muskogee, Stilwell, Tellequah and Sallisaw are within this watershed. The impact of agriculture and concentrated feeding operations on basin streams is significant. In urban areas, aquatic resources are impacted by piping and filling activities associated with land development and are also affected by water pollution from point and nonpoint sources and an increase in surface water flows and erosion because of the increase in impermeable surfaces. Aquatic resources are endangered in rural areas by threats such as agricultural conversion; nutrient and sediment runoff; oil, gas and mineral extraction; and livestock damage. The spread of invasive species such as salt cedar (*Tamarix* spp.) has also deteriorated stream and wetland habitats in this watershed. Additionally, the western and southern portions of the watershed are within the commercial coal belt (Department of Mines, 2008). There are major natural gas fields in the southwestern portion of this watershed (Boyd, 2008). The extraction of these mineral resources could directly impact the chemical, physical and biological integrity of the wetlands and streams which would require compensatory mitigation.

In order to compensate for unavoidable impacts to waters of the U.S. within this watershed, the In-Lieu Fee Program will seek out project site locations that will maximize the program's overall impact on the chemical, physical and biological integrity of the watershed. The In-Lieu Fee Program will seek to remove invasive species where feasible and to return natural stream morphology and stream flow when appropriate. Efforts will also focus on converting agricultural ground near streams into riparian corridors with native vegetation and enhancing adjacent riparian corridors to decrease the amount of pollutants such as fertilizers and pesticides from reaching downstream waters. Also, farmed wetlands indicated by the NRCS will be restored and enhanced with native plantings of trees, shrubs and herbaceous vegetation.

3. Historic Loss of Aquatic Resources:
Lower Arkansas Watershed (HUC 1111)

Since European and American settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats throughout Oklahoma. Approximately 67% of Oklahoma's original wetlands have been lost since the 1780s as a result of conversion to agriculture, levee construction, river management and navigation programs, land development activities and other actions (Dahl, 1990). The creation of Heyburn Lake, Webbers Falls Reservoir, Tenkiller Ferry, Robert S. Kerr Reservoir and Wister Lake (OWRB, n.d.(b)) which total over 75,000 acres (OWRB, n.d.(a)) has undoubtedly inundated or changed the hydrology of many acres of wetlands and numerous streams. As the Tulsa metropolitan area and smaller urban areas such as Sapulpa, Muskogee, Stilwell, Tellequah and Sallisaw have grown throughout the years, many wetlands and stream have been impacted from piping streams, draining or filling wetlands and by an increase in impervious surfaces.

4. Current Aquatic Resource Conditions
Lower Arkansas Watershed (HUC 1111)

The Lower Arkansas Watershed encompasses approximately 5,797 square miles within Oklahoma and comprises the lower portion of the Arkansas River drainage basin in Oklahoma. Notable reference wetlands within this watershed are found in the Sequoyah National Wildlife Refuge which consists of 20,800 acres of open water, wetlands, scrub-shrub grasslands, woodlands and farm fields (FWS, n.d.(d)).

The gray and Indiana bats, two federally listed endangered or threatened species in the Lower Arkansas Watershed (HUC 1111), would benefit from the increase in wildlife habitat from the creation of in-lieu fee project sites as they feed in areas surrounding streams and open water.

Many streams and lakes in this watershed have been impaired by water quality issues. The waterbodies on the 2012 Clean Water Act Section 303(d) list of impaired waters include the following (EPA, 2014):

Table 12. Lower Arkansas Watershed Section 303(d) List

Waterbody	Impairment
Arkansas River	Cadmium, Enterococcus Bacteria, Total Dissolved Solids, Oil and Grease, and Turbidity
Ballard Creek	Enterococcus Bacteria
Bandy Creek	Benthic Macroinvertebrates Bioassessments, Fish Bioassessments, Turbidity
Battle Creek (Battle Branch)	Enterococcus Bacteria

Waterbody	Impairment
Bigheart Creek	E. Coli and Fish Bioassessments
Bixhoma Lake	pH
Brazil Creek	Enterococcus Bacteria
Bushy Creek Lake	Chlorophyll-A and pH
Butler Creek	Dissolved Oxygen
Cache Creek	Benthic Macroinvertebrates Bioassessments
Caston Creek	Benthic Macroinvertebrates Bioassessments
Cedar Lake	Dissolved Oxygen and pH
Chicken Creek	Fish Bioassessments
Childres Creek	Chloride
Coody Creek	Dissolved Oxygen
Crow Creek	Benthic Macroinvertebrates Bioassessments, Dissolved Oxygen, E. Coli, and Fish Bioassessments
Dirty Creek	Dissolved Oxygen
Dirty Creek (Georges Fork)	Dissolved Oxygen and Fish Bioassessments
Dirty Creek, South Fork	Dissolved Oxygen and Sulfates
Elk Creek	Dissolved Oxygen and Sulfates
Flint Creek	Dissolved Oxygen and Total Phosphorus
Fred Creek	Benthic Macroinvertebrates Bioassessments and E. Coli
Fourche Maline Creek	Dissolved Oxygen and Lead
Greenleaf Lake	Turbidity
Haikey Creek	Benthic Macroinvertebrates Bioassessment and Diazinon
Harlow Creek	E. Coli and Fish Bioassessments
Heyburn Lake	Color, Dissolved Oxygen, Mercury, and Turbidity
Illinois River	E. Coli, Lead, Enterococcus Bacteria, Turbidity, and Total Phosphorus
Illinois River (Baron Fork)	Enterococcus Bacteria and Total Phosphorus
John Wells Lake	Dissolved Oxygen
Lee Creek	Copper, Enterococcus Bacteria, and Lead
Little Lee Creek	Enterococcus Bacteria
Lloyd Church Lake	pH and Turbidity
Mooser Creek	E. Coli
New Spiro Lake	Color, Chlorophyll A, and Dissolved Oxygen
Nickel Creek	E. Coli
Peacheater Creek	Enterococcus Bacteria
Polecat Creek	Oil and Grease

Waterbody	Impairment
Poteau River	Cadmium, Copper, Lead, Selenium, Silver, and Turbidity
Poteau River, Black Fork	pH
Red Oak Creek	Dissolved Oxygen and pH
Robert S. Kerr Lake	Color and Turbidity
Rock Creek	Benthic Macroinvertebrates Bioassessments
Sager Creek	Enterococcus Bacteria, and Nitrates
Sahoma Lake	Color, Dissolved Oxygen, and Turbidity
Sallisaw Creek	Enterococcus Bacteria
San Bois Creek	Dissolved Oxygen, Enterococcus Bacteria, Sulfates, and Turbidity
San Bois Creek, Mountain Fork	pH
Shell Lake	Dissolved Oxygen
Stilwell City Lake	Dissolved Oxygen
Shady Grove Creek	pH, Sulfates, and Total Dissolved Solids
Tahlequah Creek (Town Branch)	E. Coli
Tenkiller Ferry Lake	Chlorophyll A, Dissolved Oxygen, and Total Phosphorus
Tyner Creek	Enterococcus Bacteria
Wayne Wallace Lake	Color, Dissolved Oxygen, and pH
Webbers Falls Lake	Enterococcus Bacteria and Turbidity
Wister Lake	Chlorophyll A, Color, Mercury, pH, Total Phosphorus, and Turbidity

Within this watershed, likely sources of nonpoint source pollution include: runoff from row crop agriculture, livestock grazing and concentrated feeding operations, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage from faulty septic systems, and urban runoff. Additionally, riparian degradation caused directly or indirectly by agricultural practices and land development within the watershed has contributed to streambank instability and bank erosion. As part of the planning of each in-lieu fee project site, an assessment of stream stability will be conducted, including field verification. A geomorphic assessment will be conducted at potential project sites to evaluate the morphology of the stream and assess bank stability, stream incision, floodplain connectivity, and other physical characteristics.

Within the urban portions of the watershed, particularly in the Tulsa area, most streams have been radically altered by channelization, piping, and loss of riparian corridors. Most wetlands in these areas have been filled or impacted by invasive species or significant changes in hydrology.

5. Aquatic Resource Goals & Objectives
Lower Arkansas Watershed (HUC 1111)

The primary goal within the watershed is to restore, create, and enhance aquatic resources such as streams and wetlands that are lost under activities authorized by Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. All restoration goals are subject to change based upon watershed and Section 10, Section 404, and Section 401 permitting needs.

Other aquatic resources goals within this watershed are to:

- Increase the amount of wetland and riparian acreage compared to the amount of impacts mitigated through this In-Lieu Fee Program
- Acquire, restore, enhance and preserve important aquatic resources that improve local and regional water quality and wildlife habitat
- Restore, create, and enhance wetlands with an emphasis on forested wetlands and closed depressions
- Restore in-stream habitat impacted by such impairments as bank erosion, channel incision and inappropriately designed in-stream structures such as low water crossings and culverts
- Restore and enhance ecologically impaired and/or undersized riparian corridors

The primary objective of the Sponsor is to create fully functional high quality in-lieu fee project sites appropriate in habitat composition and size so that the combined result of all in-lieu fee project sites within the watershed accomplishes the goals stated above. NRCS and National Wetlands Inventory (NWI) wetlands maps will be used to identify potential in-lieu fee project sites that may contain existing wetlands that could be enhanced or expanded or converted wetlands appropriate for restoration efforts. NRCS soil survey maps will be used to identify locations containing the appropriate hydric soil types for wetland restoration or creation. Other objectives include the following:

- Provide in-lieu fee project sites that filter pollutants from adjacent land uses before they enter any stream systems
- Restore wetlands impacted by agriculture
- Remove or limit the presence of invasive species such as *Tamarix* spp. from aquatic habitats
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats if those buffers would enhance or protect the adjacent aquatic resources
- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site that includes stream mitigation
- Establish successful in-lieu fee project sites in the best situated locations based on the aquatic resource goals and prioritization strategy for this watershed. Based on our research to date, the following stream drainage basins and

counties would be the most likely locations of future mitigation parcels although the Sponsor is not limited to these areas:

- Canadian River
- Sager Creek
- Illinois River
- Flint Creek
- Lee Creek
- Little Lee Creek
- Tulsa County
- Creek County
- Okmulgee County
- Wagoner County
- Muskogee County

6. Prioritization Strategy:
Lower Arkansas Watershed (HUC 1111)

Mitigation activities within the watershed will be sited in locations that will provide the most chemical, physical, and biological benefit to the watershed. The primary priority will be to site projects in the most beneficial locations to the watershed. Locating project sites in as close proximity to the impacts as feasible will also be important. Additionally, this In-Lieu Fee Program will prioritize the creation of project sites with land uses, hydrology, topography, ecological factors, and geomorphology similar to the impacted aquatic resources. The location of the following items, among others, will be used to identify priority sites for restoration activities.

- Streams listed on Nationwide Rivers Inventory
- Outstanding National Resource Waters
- Outstanding Resource and High Quality State Waters
- Special Aquatic Life Use Waters
- Waters within Federal/State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc.)
- Stream Reference Reach Sites
- Waters with listed Federal or State Endangered or Threatened species (as determined on a case by case basis in coordination with FWS and ODWC)
- Designated Fish Spawning Habitat / Native Freshwater Mussel Refuges (as determined on a case by case basis in coordination with FWS and ODWC)
- Waters on the 303(d) list, impaired by sediment, dissolved oxygen and nutrients or has impaired biology
- Streams adjacent to an approved mitigation bank or mitigation site
- Waters with federal and state listed Endangered and Threatened species
- Postings on the Oklahoma Conservation Commission's Wetlands Registry
- Hydric soils if wetland improvements are planned

- Sufficient surface or groundwater hydrology for the development of wetland conditions or the possibility of restoring hydrology that was previously removed from the project site
- Compatible surrounding land uses

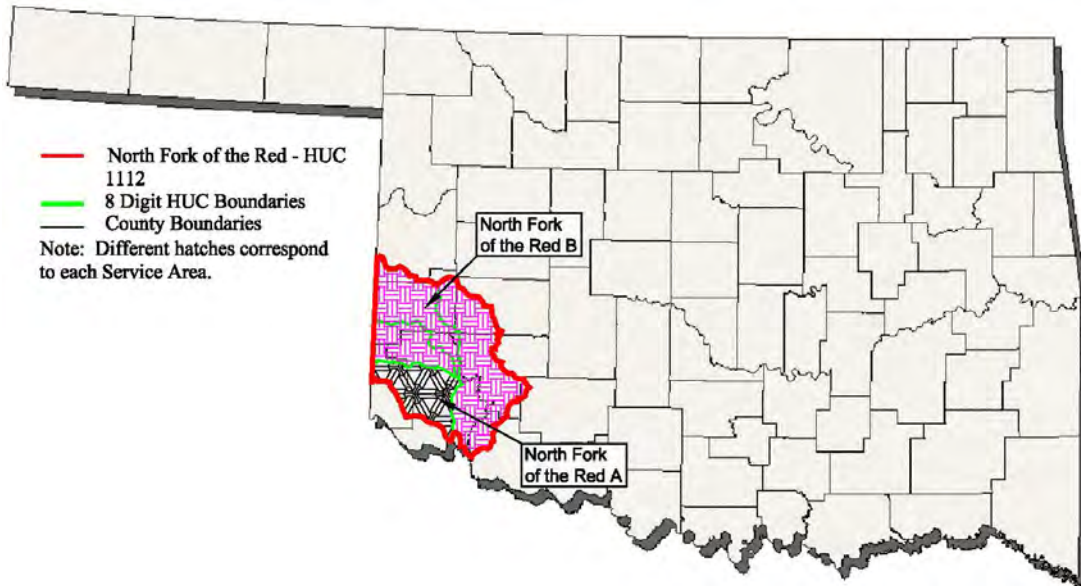
In addition to aspects of site selection, the Aquatic Goals and Objectives for this watershed will guide the In-Lieu Fee Program through the process of selecting and implementing compensatory mitigation activities. Of all the possible compensatory mitigation activities, the following will be prioritized:

- Emphasize the restoration, enhancement, and creation of forested wetlands and closed depressions within the two service areas
- In-stream mitigation opportunities will be prioritized over riparian buffer mitigation
- Potential in-lieu fee project sites that combine wetland and stream mitigation opportunities will be prioritized as those sites offer the best opportunities for water quality and wildlife benefits, especially when compared to separate wetland and stream mitigation sites.

G. *North Fork of the Red Watershed (HUC 1112)*

1. Geographic Watershed:
North Fork of the Red Watershed (HUC 1112)

This watershed consists of the North Fork of the Red drainage basin (HUC 1112) which is found in the southwestern portion of the state. The boundaries of this watershed are shown in Figure 10 along with different hatching patterns to illustrate the extents of the various service areas. This watershed is rural in nature and the service areas will therefore consist of 6-digit HUCs. The North Fork of the Red A service area is the 111202 HUC and the North Fork of the Red B service area is the 111203 HUC.

Figure 10. Boundaries of the North Fork of the Red Watershed (HUC 1112)

This small watershed includes only two Level III ecoregions. Both service areas mostly consist of the Central Great Plains ecoregion but contain some of the Southwestern Tablelands ecoregion in their western portions. The Central Great Plains ecoregion now largely consists of row crops but was previously mixed height prairie with scattered small trees and shrubs. The presence of underground salt deposits in this ecoregion has led to high salinity levels in some streams. The Southwestern Tablelands ecoregion consists largely of rangeland with red soils, mesas, canyons, and badlands. Within Oklahoma, this ecoregion would also have been dominated by shortgrass prairies with some areas of scrub-shrub and mixed height grasses on the tops of ridges and near major rivers (EPA, 2010a).

2. Threats to Existing Aquatic Resources:
North Fork of the Red Watershed (HUC 1112)

Current land use in most of this watershed is agricultural and rangeland in nature. The agricultural land development within the watershed has undoubtedly had an impact on the extent and quality of wetlands and wildlife habitat. Additionally, in developed areas such as Sayre, Hobart, Mangum and Altus, aquatic resources are impacted by an increase in surface water flows and erosion because of the increase in impermeable surfaces, and by water pollution from point and nonpoint sources. Aquatic resources are endangered in rural areas by threats such as agricultural conversion; nutrient and sediment runoff; oil, gas and mineral extraction; and livestock damage. The spread of invasive species such as salt cedar (*Tamarix* spp.) has also deteriorated stream and wetland habitats in this watershed.

In order to compensate for unavoidable impacts to waters of the U.S. within this watershed, the In-Lieu Fee Program will seek out project site locations that will maximize the program's overall impact on the chemical, physical, and biological integrity of the watershed. The In-Lieu Fee Program will seek to remove invasive species where feasible and to return natural stream morphology and stream flow when appropriate. Efforts will also focus on converting agricultural ground near streams into riparian corridors with native vegetation and enhancing adjacent riparian corridors to remove pollutants from the watershed. Also, farmed wetlands indicated by the NRCS will be restored and enhanced with native plantings of trees, shrubs, and herbaceous vegetation.

3. Historic Loss of Aquatic Resources:
North Fork of the Red Watershed (HUC 1112)

Since European and American settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats throughout Oklahoma. Approximately 67% of Oklahoma's original wetlands have been lost since the 1780s as a result of conversion to agriculture, levee construction, river management and navigation programs, land development activities and other actions (Dahl, 1990). Additionally, the creation of the Altus Reservoir and Tom Steed Reservoir (OWRB, n.d.(b)) which together cover approximately 12,600 acres (OWRB, n.d.(a)) has undoubtedly inundated or changed the hydrology of many wetlands and streams. Additionally, land development associated with the establishment and growth of Sayre, Hobart, Mangum and Altus has undoubtedly impacted local streams and wetlands.

4. Current Aquatic Resource Conditions:
North Fork of the Red Watershed (HUC 1112)

Currently, agriculture crop and cattle production are the main uses of land in this area. Both farming and cattle production impact streams and wetlands through pesticide and fertilizer runoff, cattle grazing and cattle waste.

Many streams and lakes in this watershed have been impaired by water quality issues. The waterbodies on the 2012 Clean Water Act Section 303(d) list of impaired waters include the following (EPA, 2014):

Table 13. North Fork of the Red Watershed Section 303(d) List

Waterbody	Impairment
Altus Lake	Turbidity
Bitter Creek	Chloride, DDT, Fish Bioassessments, Toxaphene
Buffalo Creek	Total Dissolved Solid
Deer Creek	Sulfates
Elk City Lake	Turbidity

Waterbody	Impairment
Elk Creek	Fish Bioassessments, Lead, Selenium
Elm Creek, West	Enterococcus Bacteria
Fish Creek	Chloride, Sulfates, and Total Dissolved Solids
Haystack Creek	Sulfates
Little Elk Creek	Enterococcus Bacteria
Otter Creek	Chloride, Dissolved Oxygen, and Turbidity
Otter Creek, West	Dissolved Oxygen,
Red River, Elm Fork	Chloride, Fish Bioassessments, Lead, Selenium, and Total Dissolved Solids
Red River, North Fork	Chloride, E. Coli, Fish Bioassessments, Sulfates, Selenium, and Total Dissolved Solids
Red River, Salt Fork	Chloride, Lead, Selenium, and Thallium
Rocky Lake	Color and Turbidity
Station Creek	Sulfates
Stinking Creek	Chloride, Nitrates, and Sulfates
Sweetwater Creek	Total Dissolved Solids
Tepee Creek	Chloride, Sulfates, and Total Dissolved Solids
Timber Creek	Dissolved Oxygen
Tom Steed Lake	Turbidity
Trail Creek	Enterococcus Bacteria and Sulfates
Turkey Creek	Benthic Macroinvertebrates Bioassessments, Chloride, Dissolved Oxygen, Fish Bioassessments, Sulfates, Total Dissolved Solids

Within this watershed, likely sources of nonpoint source pollution include: runoff from row crop agriculture, livestock grazing, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage from faulty septic systems, and urban runoff. Additionally, riparian degradation caused directly or indirectly by agricultural practices and land development within the watershed has contributed to streambank instability and bank erosion. As part of the planning of each in-lieu fee project site, an assessment of stream stability will be conducted, including field verification. A geomorphic assessment will be conducted at potential project sites to evaluate the morphology of the stream and assess bank stability, stream incision, floodplain connectivity and other physical characteristics.

5. Aquatic Resource Goals & Objectives:
North Fork of the Red Watershed (HUC 1112)

The primary goal within the watershed is to restore, create and enhance aquatic resources such as streams and wetlands that are lost under activities authorized by Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and

Harbors Act of 1899. All restoration goals are subject to change based upon watershed and Section 10, Section 404 and Section 401 permitting needs.

Other aquatic resources goals within this watershed are to:

- Increase the amount of wetland and riparian acreage compared to the amount of impacts mitigated through this In-Lieu Fee Program
- Acquire, restore, enhance and preserve important aquatic resources that improve local and regional water quality and wildlife habitat
- Restore, create and enhance wetlands with an emphasis on closed depressions and riparian corridor wetlands
- Restore in-stream habitat impacted by such impairments as bank erosion, channel incision and inappropriately designed in-stream structures such as low water crossings and culverts
- Restore and enhance ecologically impaired and/or undersized riparian corridors

The primary objective of the Sponsor is to create fully functional high quality in-lieu fee project sites appropriate in habitat composition and size so that the combined result of all in-lieu fee project sites within the watershed accomplishes the goals stated above. NRCS and National Wetlands Inventory (NWI) wetlands maps will be used to identify potential in-lieu fee project sites that may contain existing wetlands that could be enhanced or expanded or converted wetlands appropriate for restoration efforts. NRCS soil survey maps will be used to identify locations containing the appropriate hydric soil types for wetland restoration or creation. Other objectives include the following:

- Restore wetlands impacted by agriculture
- Provide in-lieu fee project sites that filter pollutants from adjacent land uses before they enter any stream systems
- When site conditions are appropriate, enhance oxbow lakes
- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site that includes stream mitigation
- Remove or limit the presence of invasive species such as *Tamarix* spp. from aquatic habitats
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats if those buffers would enhance or protect the adjacent aquatic resources
- Establish successful in-lieu fee project sites in the best situated locations based on the aquatic resource goals and prioritization strategy for this watershed. Based on our research to date, the following stream drainage basins and counties would be the most likely locations of future mitigation parcels although the Sponsor is not limited to these areas:
 - Buffalo Creek
 - Stinking Creek
 - Tepee Creek

6. Prioritization Strategy:
North Fork of the Red Watershed (HUC 1112)

Mitigation activities within the watershed will be sited in locations that will provide the most chemical, physical and biological benefit to the watershed. The primary priority will be to site projects in the most beneficial locations to the watershed. Locating project sites in as close proximity to the impacts as feasible will also be important. Additionally, this In-Lieu Fee Program will prioritize the creation of project sites with land uses, hydrology, topography, ecological factors and geomorphology similar to the impacted aquatic resources. The location of the following items, among others, will be used to identify priority sites for restoration activities.

- Streams listed on Nationwide Rivers Inventory
- Outstanding National Resource Waters
- Outstanding Resource and High Quality State Waters
- Special Aquatic Life Use Waters
- Waters within Federal/State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc.)
- Stream Reference Reach Sites
- Waters with listed Federal or State Endangered or Threatened species (as determined on a case by case basis in coordination with FWS and ODWC)
- Designated Fish Spawning Habitat / Native Freshwater Mussel Refuges (as determined on a case by case basis in coordination with FWS and ODWC)
- Waters on the 303(d) list, impaired by sediment, dissolved oxygen and nutrients or has impaired biology
- Streams adjacent to an approved mitigation bank or mitigation site
- Waters with federal and state listed Endangered and Threatened species
- Postings on the Oklahoma Conservation Commission's Wetlands Registry
- Hydric soils if wetland improvements are planned
- Sufficient surface or groundwater hydrology for the development of wetland conditions or the possibility of restoring hydrology that was previously removed from the project site
- Compatible surrounding land uses

In addition to aspects of site selection, the Aquatic Goals and Objectives for this watershed will guide the In-Lieu Fee Program through the process of selecting and implementing compensatory mitigation activities. Of all the possible compensatory mitigation activities, the following will be prioritized:

- Focus on restoring, creating and enhancing closed depressions and riparian corridor wetlands in both service areas within this watershed
- In-stream mitigation opportunities will be prioritized over riparian buffer mitigation

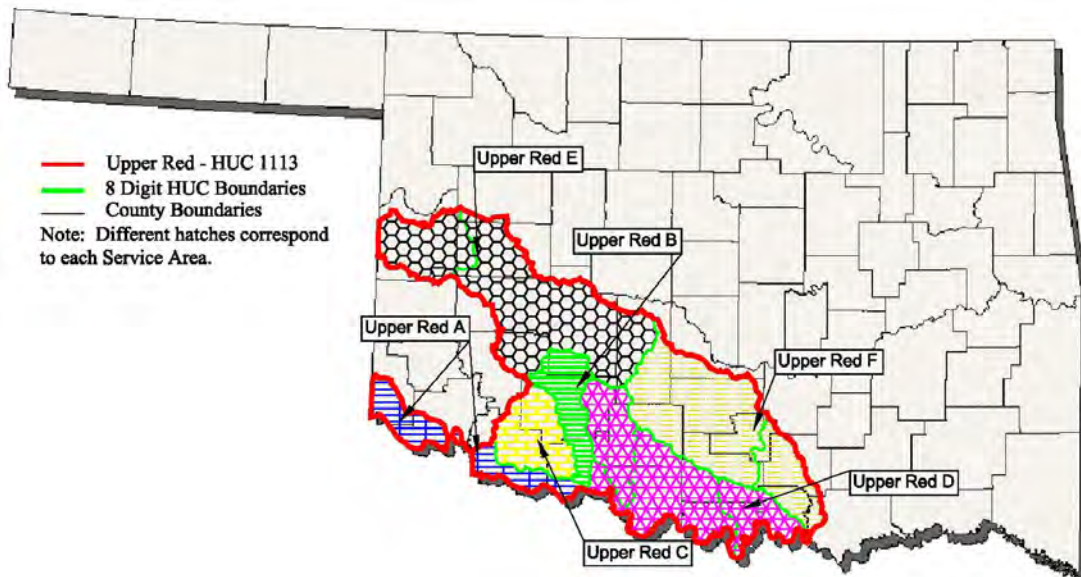
- Potential in-lieu fee project sites that combine wetland and stream mitigation opportunities will be prioritized as those sites offer the best opportunities for water quality and wildlife benefits, especially when compared to separate wetland and stream mitigation sites.

H. *Upper Red Watershed (HUC 1113)*

1. Geographic Watershed:
Upper Red Watershed (HUC 1113)

The area considered by the Sponsor in the location and establishment of this watershed is the Upper Red drainage basin (HUC 1113) in Oklahoma. The boundaries of this watershed are shown in Figure 11 along with various hatching patterns that illustrate the extents of the different service areas within the watershed. The Upper Red A service area consists of the 6-digit HUC 111301 along the Red River. The Upper Red B and Upper Red C service areas are the 8-digit HUCs (11130202 and 11130203, respectively) that include the City of Lawton. The remaining portion of the 6-digit HUC 111302 that does not contain any portion of the Lawton metropolitan area is the Upper Red D service area. The 6-digit HUC 111303 varies ecologically from its eastern and western extents. For this reason, it was broken into two service areas. HUCs 11130301 and 11130302 are the Upper Red E service area and HUCs 11130303 and 11130304 are the Upper Red F service area.

Figure 11. Boundaries of the Upper Red Watershed (HUC 1113)



Virtually this entire watershed is within either the Central Great Plains or Cross Timbers Level III ecoregions. However, the very southeastern corner is within the East

Central Texas Plains ecoregion. The Central Great Plains dominates the western part of this watershed and covers the entirety of the Upper Red A, Upper Red B and Upper Red C service areas. The Upper Red E service area is also almost completely within this ecoregion although some of the eastern parts of the service area are in the Cross Timbers ecoregion which comprises most of the eastern part of the watershed. The Upper Red D service area contains part of the Central Great Plains ecoregion in its western half while its eastern half is within the Cross Timbers ecoregion and its eastern limit includes part of the East Central Texas Plains. While the Upper Red F service area is largely within the Cross Timbers ecoregion, some of its western and northern portions are within the Central Great Plains and its very southeastern tip is within the East Central Texas Plains ecoregion. The Central Great Plains ecoregion is currently mostly row crops but it was historically mixed height prairie grasslands with scattered small trees and shrubs. Some streams in this ecoregion have high salinity levels because of the presence of underground salt deposits. The Cross Timbers ecoregion was formerly covered by prairies dominated by little bluestem that contained occasional post oaks and blackjack oaks. Currently, this area consists mostly of pastures and rangeland land uses along with some oil extraction. The East Central Texas Plains contains a topography of irregular plains and is also referred to as the Post Oak Savanna or the Claypan Area. In contrast to other surrounding ecoregions, this area was historically characterized by a post oak savanna plant community rather than by prairies or pine forests. A clay pan soil layer is common in many areas which restricts the downward movement of water. At present, the primary land uses in this ecoregion are pasture and range (EPA, 2010a).

2. Threats to Existing Aquatic Resources:
Upper Red Watershed (HUC 1113)

Current land use in most of this watershed is rangeland, rural and agricultural in nature. The agricultural activities within the watershed have undoubtedly had an impact on the extent and quality of streams, wetlands and wildlife habitat. Additionally, in urban areas such as the Lawton metropolitan area, aquatic resources are impacted by an increase in surface water flows and erosion because of the increase in impermeable surfaces and by water pollution from point and nonpoint sources. Aquatic resources are endangered in rural areas by threats such as agricultural conversion; nutrient and sediment runoff; oil, gas and mineral extraction; and livestock damage. The spread of invasive species such as salt cedar (*Tamarix* spp.) has also deteriorated stream and wetland habitats in this watershed.

In order to compensate for unavoidable impacts to waters of the U.S. within this watershed, the In-Lieu Fee Program will seek out project site locations that will maximize the program's overall impact on the chemical, physical and biological integrity of the watershed. The In-Lieu Fee Program will seek to remove invasive species where feasible and to return natural stream morphology and stream flow when appropriate. Efforts will also focus on converting agricultural ground near streams into riparian corridors with native vegetation and enhancing adjacent riparian corridors to

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remove pollutants from the watershed. Also, farmed wetlands indicated by the NRCS will be restored and enhanced with native plantings of trees, shrubs and herbaceous vegetation.

3. Historic Loss of Aquatic Resources:
Upper Red Watershed (HUC 1113)

Since European and American settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats throughout Oklahoma. Approximately 67% of Oklahoma’s original wetlands have been lost since the 1780s as a result of conversion to agriculture, levee construction, river management and navigation programs, land development activities and other actions (Dahl, 1990). The creation of the Foss Reservoir, Fort Cobb Reservoir, Lake Elsworth, Lake Lawtonka, Waurika Lake, Lake of the Arbuckles, Lake Murray and Lake Texoma (OWRB, n.d.(b)) which together cover approximately 127,000 acres (OWRB, n.d.(a)) has undoubtedly inundated or changed the hydrology of many wetlands and streams. The land development associated with the establishment and growth of Lawton, Cheyenne, Arapaho, New Cordell, Anadarko, Chickasha, Pauls Valley, Sulphur, Duncan, Walters, Waurika, Ardmore, Marietta and Madill unquestionably led to impacts to the local stream and wetlands of the Upper Red Watershed. Additionally, in the early 1900s the Hackberry Flat playa wetland area was drained for agriculture (ODWC, n.d.(a)). While much of the flat has been restored today, the draining has undoubtedly had a major impact in the waters of the area.

4. Current Aquatic Resource Conditions:
Upper Red Watershed (HUC 1113)

The Upper Red Watershed (HUC 1114) encompasses approximately 13,196 square miles in southwest Oklahoma. A notable wetland area within this service is the Hackberry Flat Wildlife Management Area which consists of more than 3,000 acres of restored playa wetlands (ODWC, n.d.(a)).

Many streams and lakes in this watershed have been impaired by water quality issues. The waterbodies on the 2012 Clean Water Act Section 303(d) list of impaired waters include the following (EPA, 2014):

Table 14. Upper Red Watershed Section 303(d) List

Waterbody	Impairment
Allen’s Lake	Chloride
Arbuckle Lake	Dissolved Oxygen
Barnitz Creek	E. Coli, Enterococcus Bacteria, Fish Bioassessments, Sulfates and Total Dissolved Solids

Waterbody	Impairment
Barnitz Creek, East	E. Coli, Sulfates, and Total Dissolved Solids
Barnitz Creek, West	Fish Bioassessments, Sulfates, and Total Dissolved Solids
Beaver Creek	Dissolved Oxygen,
Beaver Creek	Sulfates and Total Dissolved Solids
Big Sandy Creek	Dissolved Oxygen and Enterococcus Bacteria
Bills Creek	Enterococcus Bacteria
Bills Creek, West	Sulfates
Black Bear Creek	Chloride
Blue Beaver Creek	Enterococcus Bacteria
Briar Branch	Chloride
Brush Creek	Chloride, Dissolved Oxygen, Oil and Grease, Sulfates, and Total Dissolved Solids
Cache Creek, East	Dissolved Oxygen, Enterococcus Bacteria, and Sulfates
Cache Creek, West	Chloride, Enterococcus Bacteria, pH, Total Dissolved Solids, and Turbidity
Caddo Creek	Chloride and Total Dissolved Solids
Cavalry Creek	Enterococcus Bacteria and E. Coli
Claridy Creek	Oil and Grease
Clear Creek Lake	Sulfates
Clinton Lake	Chlorophyll A, Color, and Turbidity
Cottonwood Creek	Sulfates
Countyline Creek	Chloride
Crowder Lake	Chlorophyll A and Turbidity
Deep Red Creek	Chloride, Dissolved Oxygen, Sulfates, Total Dissolved Solids
Delaware Creek	Chloride
Dry Creek	Ammonia, Chloride, Dissolved Oxygen, E. Coli, and Enterococcus Bacteria
Ellsworth Lake	Chlorophyll-A and Turbidity
Elmer Thomas Lake	Dissolved Oxygen and Mercury
Finn Creek	Dissolved Oxygen
Fleetwood Creek	Dissolved Oxygen, Enterococcus Bacteria, and E. Coli
Frederick Lake	Color and Turbidity
Fuqua Lake	Turbidity
Gypsum Creek	Chloride, Fish Bioassessments, Sulfates, and Total Dissolved Solids
Healdton Municipal Lake	Color and Turbidity
Hound Creek	Chloride and Sulfates
Humphrey's Lake	Chlorophyll A

Waterbody	Impairment
Ionine Creek	Enterococcus Bacteria, Sulfates, and Total Dissolved Solids
Jack Hollow Creek	Sulfates
Laflin Creek	Fish Bioassessments
Lake Murray	Dissolved Oxygen
Lawtonka Lake	Chlorophyll A
Little Deep Red Creek	Chloride, Dissolved Oxygen, Enterococcus Bacteria, E. Coli, Fish Bioassessments, Sulfates, and Total Dissolved Solids
Maysville Lake	Color and Turbidity
McCarty Creek	Chloride, Sulfates, Total Dissolved Solids
Medicine Creek	Enterococcus Bacteria
Mill Creek	Enterococcus Bacteria
Mud Creek	Dissolved Oxygen, Lead, Fish Bioassessments, and Sedimentation/Siltation
Mud Creek, Lower West	Dissolved Oxygen
N. Pernell Creek, North	Chloride
Oak Creek	Total Dissolved Solids
Oil Creek	Enterococcus Bacteria
Old Channel (Of Whashita)	Chloride
Panther Creek	Chloride and Fish Bioassessments
Pauls Valley Lake	Color and Turbidity
Pernell Creek	Chloride
Post Oak Creek	Chloride and Fish Bioassessments
Pruitt Branch	Chloride
Quanah Parker lake	Mercury
Quartermaster Creek	Sulfates and Total Dissolved Solids
Rainy Mountain Creek	Chloride
Red Creek	Dissolved Oxygen
Red River	Chloride, Lead, Selenium, Sulfates, Total Dissolved Solids, and Turbidity
Rush Creek	E. Coli and Enterococcus Bacteria
Russel Pretty Branch	Chloride
Russel Pretty Branch, Trib A	Chloride and Total Dissolved Solids
Salt Creek	Chloride and E. Coli
Sandstone Creek	Sulfates
Sandy Creek	Chloride, Fish Bioassessments, Selenium, Sulfates, and Total Dissolved Solids
Spring Creek	Enterococcus Bacteria, Fish Bioassessments, Sulfates, and Total Dissolved Solids
Stealy Creek	Chloride

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Waterbody	Impairment
Stinking Creek	Chloride, Fish Bioassessments, Sulfates, Enterococcus Bacteria, and Total Dissolved Solids
Sugar Creek	Fish Bioassessments, Sulfates, and Total Dissolved Solids
Suttle Creek	Chloride, Sulfates, and Total Dissolved Solids
Tahoe Creek	Oil and Grease and Sulfates
Taylor Lake	Turbidity
Texoma Lake	Chloride, Dissolved Oxygen, and Turbidity
Walker Creek	Chloride
Walnut Bayou	Enterococcus Bacteria
Walters Lake	Color and Turbidity
Washington Creek	Dissolved Oxygen, Enterococcus Bacteria, and E. Coli
Washita River	Sulfates, Fish Bioassessments, Lead, and Sedimentation/Siltation,
Waurika Lake	Chlorophyll A and Turbidity
West County Line Creek	Chloride
Wildhorse Creek	Enterococcus Bacteria and Chloride
Willow Creek	Oil and Grease

Within this watershed, likely sources of nonpoint source pollution include: runoff from row crop agriculture, livestock grazing, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage from faulty septic systems, and urban runoff. Additionally, riparian degradation caused directly or indirectly by agricultural practices and land development within the watershed has contributed to streambank instability and bank erosion. As part of the planning of each in-lieu fee project site, an assessment of stream stability will be conducted, including field verification. A geomorphic assessment will be conducted at potential project sites to evaluate the morphology of the stream and assess bank stability, stream incision, floodplain connectivity and other physical characteristics.

5. Aquatic Resource Goals & Objectives:
Upper Red Watershed (HUC 1113)

The primary goal within the watershed is to restore, create and enhance aquatic resources such as streams and wetlands that are lost under activities authorized by Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. All restoration goals are subject to change based upon watershed and Section 10, Section 404 and Section 401 permitting needs.

Other aquatic resources goals within this watershed are to:

- Increase the amount of wetland and riparian acreage compared to the amount of impacts mitigated through this In-Lieu Fee Program
- Acquire, restore, enhance and preserve important aquatic resources that improve local and regional water quality and wildlife habitat
- Restore, create and enhance wetlands with an emphasis on closed depressions and riparian corridor wetlands
- Restore in-stream habitat impacted by such impairments as bank erosion, channel incision and inappropriately designed in-stream structures such as low water crossings and culverts
- Restore and enhance ecologically impaired and/or undersized riparian corridors

The primary objective of the Sponsor is to create fully functional high quality in-lieu fee project sites appropriate in habitat composition and size so that the combined result of all in-lieu fee project sites within the watershed accomplishes the goals stated above. NRCS and National Wetlands Inventory (NWI) wetlands maps will be used to identify potential in-lieu fee project sites that may contain existing wetlands that could be enhanced or expanded or converted wetlands appropriate for restoration efforts. NRCS soil survey maps will be used to identify locations containing the appropriate hydric soil types for wetland restoration or creation. Other objectives include the following:

- Restore wetlands impacted by agriculture
- Provide in-lieu fee project sites that filter pollutants from adjacent land uses before they enter any stream systems
- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site that includes stream mitigation
- Remove or limit the presence of invasive species such as *Tamarix* spp. from aquatic habitats
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats if those buffers would enhance or protect the adjacent aquatic resources
- Establish successful in-lieu fee project sites in the best situated locations based on the aquatic resource goals and prioritization strategy for this watershed. Based on our research to date, the following stream drainage basins and counties would be the most likely locations of future mitigation parcels although the Sponsor is not limited to these areas:
 - Washita River
 - Little Deep Red Creek (Includes Hackberry Flats)
 - Barnitz Creek, West
 - Comanche County

6. Prioritization Strategy:
Upper Red Watershed (HUC 1113)

Mitigation activities within the watershed will be sited in locations that will provide the most chemical, physical and biological benefit to the watershed. The primary priority will be to site projects in the most beneficial locations to the watershed. Locating project sites in as close proximity to the impacts as feasible will also be important. Additionally, this In-Lieu Fee Program will prioritize the creation of project sites with land uses, hydrology, topography, ecological factors and geomorphology similar to the impacted aquatic resources. The location of the following items, among others, will be used to identify priority sites for restoration activities.

- Streams listed on Nationwide Rivers Inventory
- Outstanding National Resource Waters
- Outstanding Resource and High Quality State Waters
- Special Aquatic Life Use Waters
- Waters within Federal/State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc.)
- Stream Reference Reach Sites
- Waters with listed Federal or State Endangered or Threatened species (as determined on a case by case basis in coordination with FWS and ODWC)
- Designated Fish Spawning Habitat / Native Freshwater Mussel Refuges (as determined on a case by case basis in coordination with FWS and ODWC)
- Waters on the 303(d) list, impaired by sediment, dissolved oxygen and nutrients or has impaired biology
- Streams adjacent to an approved mitigation bank or mitigation site
- Waters with federal and state listed Endangered and Threatened species
- Postings on the Oklahoma Conservation Commission's Wetlands Registry
- Hydric soils if wetland improvements are planned
- Sufficient surface or groundwater hydrology for the development of wetland conditions or the possibility of restoring hydrology that was previously removed from the project site
- Compatible surrounding land uses

In addition to aspects of site selection, the Aquatic Goals and Objectives for this watershed will guide the In-Lieu Fee Program through the process of selecting and implementing compensatory mitigation activities. Of all the possible compensatory mitigation activities, the following will be prioritized:

- Emphasize the restoration, enhancement and creation of closed depressions and riparian corridors within the watershed
- In-stream mitigation opportunities will be prioritized over riparian buffer mitigation

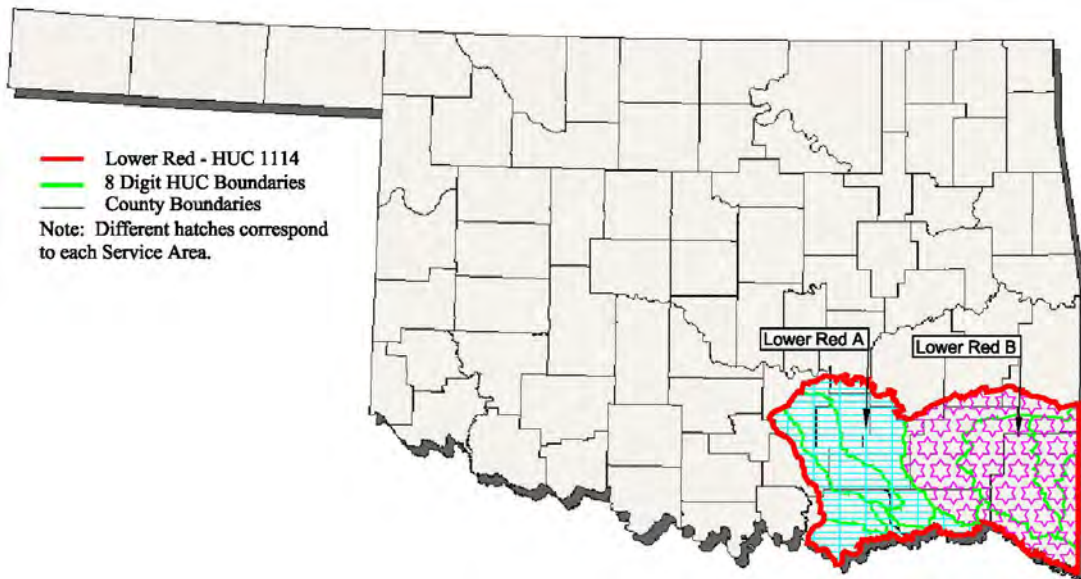
- Potential in-lieu fee project sites that combine wetland and stream mitigation opportunities will be prioritized as those sites offer the best opportunities for water quality and wildlife benefits, especially when compared to separate wetland and stream mitigation sites.

I. Lower Red Watershed (HUC 1114)

1. Geographic Watershed:
Lower Red Watershed (HUC 1114)

This watershed is the Lower Red drainage area (HUC 1114) in Oklahoma. The boundaries of this watershed are shown in Figure 12 along with different hatching patterns to illustrate the extents of the various service areas. This watershed is rural in nature and is all within the same 6-digit HUC, but because of the variance of ecology and climate from east to west, the watershed was split into two service areas at the boundaries of HUCs 11140105 and 11140103.

Figure 12. Boundaries of the Lower Red Watershed (HUC 1114)



This watershed contains five different Level III ecoregions. All five are present within the Lower Red A service area as this service area contains the Cross Timbers ecoregion in its western portion, the East Central Texas Plains ecoregion in its southwestern corner, the Arkansas Valley ecoregion in its northern extent, the Ouachita Mountains ecoregion in its northeastern portion and the South Central Plains ecoregion in its southeastern part. In contrast, the Lower Red B service area has only two ecoregions with the northern two thirds of the service area within the Ouachita Mountains ecoregion and the southern third within the South Central Plains ecoregion. The Cross Timbers ecoregion was historically dominated by prairies dense with little bluestem

that also contained scattered post oaks and blackjack oaks. Currently, this area consists primarily of pastures and rangeland along with some oil extraction. The East Central Texas Plains contains irregular plains land formations and is also referred to as the Post Oak Savanna or the Claypan Area. This area was historically characterized by a post oak savanna plant community rather than by the prairies or pine forests of surrounding ecoregions. A clay pan soil layer is common in many areas which restricts the downward movement of water. Today, the primary land uses in this ecoregion are pasture and range. The primary land use in the Arkansas Valley ecoregion is forests with many hills and valleys. However, there is much less topographic variation than in the nearby Ouachita Mountains, Boston Mountains and Ozark Highlands ecoregions. About 10% of this ecoregion is cropland and about 25% is pasture. Streams in this ecoregion have dramatically lower dissolved oxygen levels than most surrounding ecoregions which makes their aquatic communities somewhat unique. The Ouachita Mountains ecoregion consists of pronounced ridges in an east-west orientation that resulted from the erosion of compacted sedimentary rocks of a geology distinct from that of surrounding ecoregions. While oak-hickory-pine climax communities historically dominated this ecoregion before settlement, loblolly and shortleaf pine now cover most of the area and commercial forestry is the primary land use. The South Central Plains ecoregion is known locally as the “piney woods” because of its location at the western end of the southern pine forests. While most of this area is now in loblolly and shortleaf pine plantations with about one sixth of the ecoregion in crops, especially in the Red River floodplain, the area was historically pine and hardwood forests. The primary economic land uses are commercial forestry and oil and gas extraction (EPA, 2010a).

2. Threats to Existing Aquatic Resources:
Lower Red Watershed (HUC 1114)

The dominant current land uses in this watershed are forestland, rural and agricultural in nature. Despite the dominant rural nature of this watershed, the land development in towns such as Durant, Coalgate, Atoka, Antlers, Hugo and Idabel has had an impact on the extent and quality of wetlands and wildlife habitat through an increase in surface water flows and erosion because of the increase in impermeable surfaces and by water pollution from point and nonpoint sources. Aquatic resources are endangered in rural areas by threats such as agricultural conversion; nutrient and sediment runoff; oil, gas and mineral extraction; and livestock damage. Additionally, the northwestern portions of the Lower Red watershed have concentrations of natural gas and coal (Boyd, 2008 and Department of Mines, 2008). The mining of these natural resources will undoubtedly threaten and impact the wetland and streams.

In order to compensate for unavoidable impacts to waters of the U.S. within this watershed, the In-Lieu Fee Program will seek out project site locations that will maximize the program’s overall impact on the chemical, physical and biological integrity of the watershed. The In-Lieu Fee Program will seek to remove invasive species where feasible and to return natural stream morphology and stream flow when

appropriate. Efforts will also focus on converting agricultural ground near streams into riparian corridors with native vegetation and enhancing adjacent riparian corridors to remove pollutants from the watershed. Also, farmed wetlands indicated by the NRCS will be restored and enhanced with native plantings of trees, shrubs and herbaceous vegetation.

3. Historic Loss of Aquatic Resources:
Lower Red Watershed (HUC 1114)

Since European and American settlement, there has been significant and widespread alteration and destruction of wetland and stream habitats throughout Oklahoma. Approximately 67% of Oklahoma's original wetlands have been lost since the 1780s as a result of conversion to agriculture, levee construction, river management and navigation programs, land development activities and other actions (Dahl, 1990). The creation of the Atoka Reservoir, McGee Creek Reservoir, Sardis Lake, Hugo Lake, Pine Creek Lake and Broken Bow Lake (OWRB, n.d.(b)) which together cover approximately 54,000 acres (OWRB, n.d.(a)) has undoubtedly inundated or changed the hydrology of many wetlands and streams. Historic logging of the cypress swamps that were found in this watershed dramatically decreased their distribution. Additionally, the creation of the previously mentioned lakes along with smaller impoundments within the watershed has prevented many wetlands and streams from flooding as they naturally would, which has undoubtedly impacted the water quality of the streams and wetlands as well the floristic quality of the area.

4. Current Aquatic Resource Conditions:
Lower Red Watershed (HUC 1114)

The Lower Red watershed is approximately 8,107 square miles in area (OWRB (c)). This watershed is the only part of Oklahoma that supports alligators and their natural habitat. The roughly 15,000-acre Little River National Wildlife Refuge is located within the watershed. Its primary purpose is to preserve bottomland hardwood forests for migratory waterfowl on the Central Flyway (FWS, n.d. (b)).

Currently, there are five federally listed endangered or threatened species in the Lower Red Watershed (HUC 1114) that would see a positive benefit from the chemical and physical improvements of an in-lieu fee project site. The Indiana bat would benefit from the increase of open water feeding habitat in wetlands, and the Ouachita rock pocketbook (*Arkansia wheeleri*), scaleshell (*Leptodea leptodon*), winged mapleleaf (*Quadrula fragosa*), and the leopard darter (*Percina pantherina*) would benefit from the improved water quality in the streams that they inhabit.

Many streams and lakes in this watershed have been impaired by water quality issues. The waterbodies on the 2012 Clean Water Act Section 303(d) list of impaired waters include the following (EPA, 2014):

Table 15. Lower Red Watershed Section 303(d) List

Waterbody	Impairment
Allen's Lake	Chloride
Atoka Lake	Color, Mercury, and Turbidity
Beech Creek	pH
Big Cedar Creek	pH
Big Eagle Creek	Dissolved Oxygen and pH
Billy Creek	Dissolved Oxygen and pH
Bird Creek	Oil and Grease and Turbidity
Bluff Creek	pH
Boggy Creek, North	Dissolved Oxygen, Enterococcus Bacteria, Sulfates, and Total Dissolved Solids
Bolen Creek	pH, Sulfates, and Total Dissolved Solids
Broken Bow Lake	Dissolved Oxygen, Mercury, and pH
Buck Creek	Dissolved Oxygen and pH
Buffalo Creek	pH
Caddo Creek	Dissolved Oxygen
Caney Boggy Creek	Dissolved Oxygen
Caney Creek	Dissolved Oxygen and pH
Carl Albert Lake	pH
Cedar Creek	Dissolved Oxygen and pH
Clear Boggy Creek	Benthic Macroinvertebrates Bioassessments, Fish Bioassessments, Lead, and Sedimentation/Siltation
Cloudy Creek	Dissolved Oxygen and pH
Coalgate Municipal Lake	Color, Dissolved Oxygen, Mercury, and Turbidity
Cow Creek	Dissolved Oxygen and pH
Cypress Creek	Dissolved Oxygen and pH
Delaware Creek	Enterococcus Bacteria
Dumpling Creek	pH
Gates Creek	Dissolved Oxygen
Glover River	Dissolved Oxygen, Lead, and Turbidity
Goose Creek	Dissolved Oxygen
Horse Creek	Dissolved Oxygen
Hugo Lake	Color, Mercury, pH, and Turbidity
Island Bayou	Total Dissolved Solids
Kiamichi River	Copper, Lead, pH, Silver, and Zinc
Lake Creek	Chloride
Leader Creek	Dissolved Oxygen
Lick Creek	Dissolved Oxygen and pH
Little River	Dissolved Oxygen, Lead, and Turbidity
Little River, Black Fork	Dissolved Oxygen and pH

Waterbody	Impairment
Little River, Mountain Fork	Copper, Lead, Silver, and Zinc
Lukfata Creek	Dissolved Oxygen
McGee Creek	pH
McGee Creek Lake	Dissolved Oxygen, Mercury, and pH
Mineral Bayou	Turbidity
Mud Creek	Benthic Macroinvertebrates Bioassessments, Lead, and Zinc
Muddy Boggy Creek	Lead, Chloride, and pH,
Norwood Creek	Dissolved Oxygen and pH
One Creek	Dissolved Oxygen
Ozzie Cobb Lake	Color, pH, and Turbidity
Pine Creek	pH
Pine Creek Lake	Dissolved Oxygen, Mercury, and pH
Red River	Lead, Oil and Grease, and Turbidity
Rock Creek	Dissolved Oxygen and pH
Rock Creek Lake	Turbidity
Sandy Creek	Enterococcus Bacteria
Sardis Lake	Mercury and Turbidity
Sulphur Creek	Dissolved Oxygen
Talihina Lake	Turbidity
Tenmile Creek	Dissolved Oxygen and pH
Terrapin Creek	pH
Waterhole Creek	Dissolved Oxygen
Whitegrass Creek	Dissolved Oxygen

Within this watershed, likely sources of nonpoint source pollution include: runoff from row crop agriculture, livestock grazing and concentrated animal feeding operations, sedimentation from erosion in disturbed watersheds, sludge application from waste water treatment facilities, seepage from faulty septic systems, and urban runoff. Additionally, riparian degradation caused directly or indirectly by agricultural practices and land development within the watershed has contributed to streambank instability and bank erosion. As part of the planning of each in-lieu fee project site, an assessment of stream stability will be conducted, including field verification. A geomorphic assessment will be conducted at potential project sites to evaluate the morphology of the stream and assess bank stability, stream incision, floodplain connectivity and other physical characteristics.

5. Aquatic Resource Goals & Objectives:
Lower Red Watershed (HUC 1114)

The primary goal within the watershed is to restore, create, enhance and preserve aquatic resources such as streams and wetlands that are lost under activities authorized by Section 404 and/or 401 of the Clean Water Act and/or Section 10 of the Rivers and

Harbors Act of 1899. All restoration goals are subject to change based upon watershed and Section 10, Section 404 and Section 401 permitting needs.

Other aquatic resources goals are to:

- Increase the amount of wetland and riparian acreage compared to the amount of impacts mitigated through this In-Lieu Fee Program
- Acquire, restore, enhance and preserve important aquatic resources that improve local and regional water quality and wildlife habitat
- Restore, create and enhance wetlands with an emphasis on closed depressions, forested wetlands, swamps, bogs and marshes
- Restore in-stream habitat impacted by such impairments as bank erosion, channel incision and inappropriately designed in-stream structures such as low water crossings and culverts
- Restore and enhance ecologically impaired and/or undersized riparian corridors
- Expand, restore, enhance or preserve or existing swamps dominated by bald cypress (*Taxodium distichum*)

The primary objective of the Sponsor is to create fully functional high quality in-lieu fee project sites appropriate in habitat composition and size so that the combined result of all in-lieu fee project sites within the watershed accomplishes the goals stated above. NRCS and National Wetlands Inventory (NWI) wetlands maps will be used to identify potential in-lieu fee project sites that may contain existing wetlands that could be enhanced or expanded or converted wetlands appropriate for restoration efforts. NRCS soil survey maps will be used to identify locations containing the appropriate hydric soil types for wetland restoration or creation. Other objectives include the following:

- Emphasize the restoration, enhancement and creation of closed depressions, forested wetlands, swamps, bogs and marshes within the watershed
- Provide in-lieu fee project sites that filter pollutants from adjacent land uses before they enter any stream systems
- Restore wetlands impacted by agriculture
- When site conditions are appropriate, enhance oxbow lakes
- Perform in-stream improvements and riparian buffer creation as a part of every in-lieu fee project site that includes stream mitigation
- Restore, enhance or, when applicable preserve existing bald cypress swamps. The value existing bald cypress swamps is great because of the high level of value to the biotic community and because of the lengthy amount of time it takes for a bald cypress swamp to mature.
- Site or design projects that will benefit listed species
- Restore, create, or enhance upland buffers adjacent to existing or restored riparian corridor and wetland habitats if those buffers would enhance or protect the adjacent aquatic resources

- Remove or limit the presence of invasive species such as *Tamarix* spp. from aquatic habitats
- Establish successful in-lieu fee project sites in the best situated locations based on the aquatic resource goals and prioritization strategy for this watershed. Based on our research to date, the following stream drainage basins and counties would be the most likely locations of future mitigation parcels although the Sponsor is not limited to these areas:
 - Blue River
 - Little River, Mountain Fork
 - Little River
 - Kiamichi River
 - Glover River

6. Prioritization Strategy:
Lower Red Watershed (HUC 1114)

Mitigation activities within the watershed will be sited in locations that will provide the most chemical, physical and biological benefit to the watershed. The primary priority will be to site projects in the most beneficial locations to the watershed. Locating project sites in as close proximity to the impacts as feasible will also be important. Additionally, this In-Lieu Fee Program will prioritize the creation of project sites with land uses, hydrology, topography, ecological factors and geomorphology similar to the impacted aquatic resources. The location of the following items, among others, will be used to identify priority sites for restoration activities.

- Streams listed on Nationwide Rivers Inventory
- Outstanding National Resource Waters
- Outstanding Resource and High Quality State Waters
- Special Aquatic Life Use Waters
- Waters within Federal/State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc.)
- Stream Reference Reach Sites
- Waters with listed Federal or State Endangered or Threatened species (as determined on a case by case basis in coordination with FWS and ODWC)
- Designated Fish Spawning Habitat / Native Freshwater Mussel Refuges (as determined on a case by case basis in coordination with FWS and ODWC)
- Waters on the 303(d) list, impaired by sediment, dissolved oxygen and nutrients or has impaired biology
- Streams adjacent to an approved mitigation bank or mitigation site
- Waters with federal and state listed Endangered and Threatened species
- Postings on the Oklahoma Conservation Commission's Wetlands Registry
- Hydric soils if wetland improvements are planned

- Sufficient surface or groundwater hydrology for the development of wetland conditions or the possibility of restoring hydrology that was previously removed from the project site
- Compatible surrounding land uses

In addition to aspects of site selection, the Aquatic Goals and Objectives for this watershed will guide the In-Lieu Fee Program through the process of selecting and implementing compensatory mitigation activities. Of all the possible compensatory mitigation activities, the following will be prioritized:

- Emphasize the restoration, enhancement and creation of closed depressions, forested wetlands, swamps, bogs and marshes within the two service areas
- Restoration, enhancement and/or preservation of bald cypress swamps
- In-lieu fee project sites that can benefit listed species such as the Ouachita rock pocketbook, scaleshell, winged mapleleaf and the leopard darter
- In-stream mitigation opportunities will be prioritized over riparian buffer mitigation
- Potential in-lieu fee project sites that combine wetland and stream mitigation opportunities will be prioritized as those sites offer the best opportunities for water quality and wildlife benefits, especially when compared to separate wetland and stream mitigation sites.

J. Throughout the State

1. Explanation of Preservation Goals

The preservation of existing wetlands, riparian corridors and stream systems is the lowest priority of all potential mitigation activities. Throughout the state with the exception of the Lower Red Watershed, in order for areas of preservation to be included in any in-lieu fee project site mitigation plan, the proposed preservation areas must 1) provide an important level of ecosystem function that influences the watershed's physical, chemical and biological health; 2) contribute significantly to the ecological sustainability of the watershed, as determined by the Corps; 3) be determined to be appropriate and practicable by the Corps; 4) be under threat of destruction or adverse modification; and 5) be permanently protected by the appropriate real estate provision or legal instrument as part of the in-lieu fee project site mitigation plan.

However, the value of existing mature swamps which are only found in the southeast portion of the state is greater than other wetland types throughout the state. Because of this, preservation of these habitats will be given a slightly higher priority in the Lower Red watershed only. In this watershed, it is not necessary for any areas proposed for preservation to be under threat of destruction or adverse modification. Preservation activities at any one in-lieu fee project site may be combined with associated efforts to restore, establish or enhance other aquatic habitats as is practicable and appropriate.

Stream and riparian corridor preservation will receive credits per the methods described in Section II.G unless the Corps decides that a greater amount of credits should be granted to the Sponsor because of the importance of preserving the proposed area. Wetland preservation will only be proposed for high quality wetlands and credits will be released at a higher ratio as approved by the Corps, in consultation with the IRT.

2. Public & Private Stakeholder Interest

As part of the siting of in-lieu fee project sites, the Sponsor will seek out local input from municipalities, land owners, natural resource management groups and advisory groups as the Sponsor deems appropriate. The In-Lieu Fee Program will work with any willing public agencies to prioritize specific drainage areas for in-lieu fee projects. When in-lieu fee project sites will be situated on public lands, the Sponsor will coordinate with the appropriate agency, including federal, state and local aquatic resource management and regulatory agencies.

3. Long-Term Protection & Management

Each in-lieu fee project site will be protected in perpetuity by a conservation easement held by an organization that meets any and all requirements necessary to hold conservation easements in the state of Oklahoma (Conservation Easement Holder). The Sponsor will select the Conservation Easement Holder for each in-lieu fee project site, subject to approval of the Corps in consultation with the IRT. The Sponsor is allowed, but not obligated, to use different Conservation Easement Holders for the in-lieu fee project sites established under this program. These easements will ensure that there will be no development or other land use change on the project sites which could diminish the level of physical, chemical and biological ecosystem functions that each site provides to the watershed. Additionally, the conservation easement shall stay with the property in the unforeseen instance that the title to the property is transferred to another party. It is the intention of the Sponsor to maintain ownership of properties in perpetuity as highly functioning habitat in accordance with the terms of a long-term management plan and conservation easement. If in-lieu fee project sites are located on properties owned by other entities, those entities will be responsible for site maintenance after the Corps has determined that the in-lieu fee project site has met all of its success criteria.

4. Periodic Evaluation & Reporting

At a regular interval to be determined by the Corps, in consultation with the IRT, the Sponsor will submit the necessary documentation evaluating the progress of the In-Lieu Fee Program in meeting the goals and objectives for each watershed. This documentation will include an accounting of the acreage and type of all mitigation activities within each watershed and how the combined ecological benefit of all in-lieu fee project sites is performing to achieve the goals set forth in the watershed's Aquatic Resource Goals & Objectives. Periodic evaluation will also include special site

inspections of individual project locations at the request of the Corps, in consultation with the IRT, in addition to regular monitoring of project sites.

The periodic evaluation will assess the effectiveness of the In-Lieu Fee Program in achieving the goals set forth for the program in Section I.A in each watershed. The compensation planning framework for each watershed can be revised as necessary based upon changes within the watershed, including but not limited to: natural disasters, land use changes, development activity, permitting requirements, mitigation needs, environmental changes, ecological needs and governmental policy. If during periodic evaluation, it is determined that the compensation planning framework for each watershed must be revised to maintain the program goals outlined in Section I.A., then the Sponsor must submit the requested changes to the Corps, who will distribute the correspondence to the IRT for review and approval.

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Terra Foundation, Inc.

IX. TERRA FOUNDATION IN-LIEU FEE STREAM & WETLAND MITIGATION PROGRAM INTERAGENCY REVIEW TEAM CONSENSUS SIGNATURE PAGE

The undersigned representatives of the Terra Foundation and the Interagency Review Team (IRT) by signatures shown below, document consensus with the following statements. This consensus signature page is not binding and does not constitute a guarantee, approval, authorization, or promise of any kind. The purpose of consensus signature is to document the progress from Draft Program Instrument to Final Program Instrument. Final approval and establishment of this in-lieu fee mitigation program shall be done by issuance of a Department of the Army permit. No agency is required to sign this instrument; however, signature denotes agency agreement with the following.

The IRT has considered the document titled "Terra Foundation In-Lieu Fee Stream & Wetland Mitigation Program Final Program Instrument" (Instrument) dated August 2015, and the IRT finds it to be an acceptable plan for the establishment, operation, management and maintenance by Terra Foundation, Inc. (Sponsor) of the Terra Foundation In-Lieu Fee Stream & Wetland Mitigation Program.

The IRT has considered the guidance contained in the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (33 CFR Parts 325 and 332, and 40 CFR Part 230) (Final Mitigation Rule) in the review process for this in-lieu fee mitigation program. The IRT finds that the establishment and operation of this in-lieu fee mitigation program in accordance with the Final Program Instrument will be consistent with the principles contained in the Final Mitigation Rule.

The IRT agrees that any signatory to this consensus may terminate or withdraw their consensus and participation at any time upon written notice to the other signatories. Only if the Sponsor or the U.S. Army Corps of Engineers terminate their participation is the Instrument terminated or nullified. Notwithstanding any future termination, revocation or modification of this Final Program Instrument, the conservation easements that have been filed as part of this In-Lieu Fee Program are perpetual.

David L. Flick

Mr. David Flick, President
For Terra Foundation, Inc. (Sponsor)

8-7-2015

Date

Terra Foundation, Inc.

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Richard A. Pratt

Richard A. Pratt
Colonel, U.S. Army
District Commander

25 Sep 15
Date

Terra Foundation, Inc.

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Jonna E. Polk
Ms. Jonna Polk, Field Supervisor
For U.S. Fish and Wildlife Service

8/5/15
Date

Terra Foundation, Inc.

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The IRT has considered the document titled "Terra Foundation In-Lieu Fee Stream & Wetland Mitigation Program Final Program Instrument" (Instrument) dated August 2015, and the IRT finds it to be an acceptable plan for the establishment, operation, management and maintenance by Terra Foundation, Inc. (Sponsor) of the Terra Foundation In-Lieu Fee Stream & Wetland Mitigation Program.

The IRT has considered the guidance contained in the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (33 CFR Parts 325 and 332, and 40 CFR Part 230) (Final Mitigation Rule) in the review process for this in-lieu fee mitigation program. The IRT finds that the establishment and operation of this in-lieu fee mitigation program in accordance with the Final Program Instrument will be consistent with the principles contained in the Final Mitigation Rule.

The IRT agrees that any signatory to this consensus may terminate or withdraw their consensus and participation at any time upon written notice to the other signatories. Only if the Sponsor or the U.S. Army Corps of Engineers terminate their participation is the Instrument terminated or nullified. Notwithstanding any future termination, revocation or modification of this Final Program Instrument, the conservation easements that have been filed as part of this In-Lieu Fee Program are perpetual.



Ms. Shanon Phillips, Water Quality Division Director
For Oklahoma Conservation Commission

8-4-15
Date

APPENDIX A

SPONSOR QUALIFICATIONS AND EXPERIENCE

Terra Foundation, Inc.

Stranger Creek Wetland & Stream Mitigation Bank Leavenworth County, Kansas

Terra Foundation board members have been intimately involved in the establishment and operation of the 65-acre Stranger Creek Wetland & Stream Mitigation Bank which has been approved as the first stream mitigation bank in Kansas and the first wetland mitigation bank outside of Johnson County. In particular, site selection, site design and maintenance duties were performed by Terra Foundation members.

This property contains one side of a half mile of Stranger Creek, the largest tributary to the Lower Kansas River. Although it is listed by the State of Kansas as a High-Priority Fishery Resource, Stranger Creek is heavily impacted by agriculture in the vicinity of this property. Before the initiation of mitigation activities, this parcel was a row crop farm field with relatively thin riparian buffers along Stranger Creek and an intermittent tributary. The Stranger Creek stream bank was highly eroded along a portion of this property and two small intermittent streams that carry runoff from the adjacent agricultural properties across the site had been previously channelized into functionally impaired drainage ditches. As a result of these factors and the presence of similar conditions throughout its watershed, Stranger Creek is listed as being impaired biologically by excess nutrients and/or sediments downstream of this restoration site.

Terra Foundation board members recognized the restoration potential of this site and designed several important ecological improvements. These included reducing stream bank erosion along Stranger Creek by constructing a 300-foot long longitudinal peaked stone toe bank stabilization project and planting willow cuttings along 1,800 feet of the Stranger Creek bank, widening the Stranger Creek riparian buffer to 300 feet, creating or restoring more than 18 acres of floodplain wetlands and restoring more than 3,000 linear feet of the channelized intermittent streams to natural stream channels in their likely historic alignment with 200-foot wide riparian buffers.

As a result of these restoration activities, this mitigation bank is reducing the amount of nutrients and sediment flowing to Stranger Creek across the property, is providing additional flood storage capacity and is acting as valuable habitat for wildlife.

Four years into its monitoring period, this mitigation site is meeting all of its performance standards.



Terra Foundation, Inc.

Sni-A-Bar Creek Wetland & Stream Mitigation Bank Jackson County, Missouri

Terra Foundation board members played a critical part in the establishment and operation of this roughly 70-acre mitigation bank adjacent to Sni-A-Bar Creek, a primary tributary of the Missouri River. Specifically, Terra Foundation members performed site selection, design and maintenance tasks for this fully successful mitigation site.

This location previously consisted of two row crop fields and a moderately thin existing riparian buffer along the stream. Some of the attributes of this property that made it a good candidate for restoration included its position in the floodplain, the long length of perennial streams along the periphery of the site and the presence of poorly drained hydric soils. In addition, the observation of several small degraded wetlands existing in shallow depressions was a sign of the potential of this site to support a much greater amount of wetlands under the right conditions.

In order to improve water quality and wildlife habitat on the property, several activities were undertaken to restore the mitigation bank to its likely pre-settlement state. The riparian buffer of Sni-A-Bar Creek was widened to 300 feet on one side for more than a mile and the same was done to roughly 750 linear feet of an unnamed perennial tributary. Additionally, the connection between the stream and its floodplain was enhanced by creating multiple holes in two agricultural levees that regularly protected the farm fields from flooding. Roughly 27.5 acres of forested and herbaceous wetlands were established on the floodplain in order to provide water quality, wildlife habitat and flood abatement benefits.

Approved in 2009, this site is continuing to mature and progress through the appropriate stages of ecological succession that have been accelerated by Swallow Tail's planting of a diversity of early, mid- and late successional herbaceous and woody species throughout the site.

After five years of monitoring this mitigation bank was determined to have met all of its performance standards and was declared fully successful.



Terra Foundation, Inc.

Osage Plains Wetland & Stream Mitigation Bank Cass County, Missouri

Terra Foundation board members were instrumental in the establishment of this wetland and stream mitigation bank, performing site selection, design, construction oversight, monitoring and maintenance for the project. The primary mitigation activities on this roughly 40-acre property included the widening of the riparian buffer of the East Branch of the South Grand River to 300 feet on one side for more than a half mile and the restoration and enhancement of about 20 acres of wetlands in a diversity of habitats and landscape positions.

The site selection process recognized that the property, which had been in row crop production for decades, had a favorable position in the landscape for wetland development as well as a significant amount of minor floodplain topographic variability, which would allow for a variety of habitats to be developed.

The site receives almost 400 acres of local runoff from adjacent agricultural properties via several small streams that flow across the property into the East Branch of the South Grand River. By detaining much of that runoff in the site's restored and enhanced floodplain wetlands, the mitigation site decreases the amount of nutrients, sediment and agricultural pollution that flows into the East Branch of the South Grand River and downstream waters, including Truman Lake and Lake of the Ozarks. In addition, the East Branch of the South Grand River floods the site at least annually so the development of a significant amount of floodplain wetlands on the site also provides some level of water quality improvement of those flood waters. Moreover, the excavation of the eastern floodplain areas and the creation of floodplain pools in the western half of the site has significantly increased the flood storage capacity of the property.

Wildlife has responded very favorably to the restoration of the site's riparian, wetland and upland buffer habitats. A variety of frogs and salamanders now inhabit the site along with a diversity of waterfowl, wading birds, turtles and other species adapted to the shallow marsh habitat that is the site's dominant feature.

The Bank has completed its final year of formal monitoring having met all of its performance standards successfully.



Terra Foundation, Inc.

Camp Branch Wetland & Stream Mitigation Bank Cass County, Missouri

Terra Foundation board members performed site selection, mitigation design and maintenance for this 87-acre wetland and stream mitigation bank located along more than a mile of the Camp Branch of Big Creek south of the Kansas City metropolitan area.

Before the initiation of mitigation activities much of this property existed as a mixture of farm fields, stream corridors and bottomland woods. The landscape position of this site within the floodplain has resulted in the presence of hydric soils throughout almost all of the property and a large number of small wetlands continued to exist despite many years of agricultural activity. All of these qualities along with relatively thin riparian corridors made this site very suitable for wetland and stream restoration and enhancement.

Camp Branch is listed as potentially impaired by habitat degradation because of rural non-point source pollution, which means that there is some indication of impairment but there is not enough data to properly list the stream as officially impaired. The upper Osage River watershed which includes Camp Branch has been largely converted to agricultural land uses and stream channelization, levee construction, impoundment and the clearing of riparian corridors have been common practices. These activities have resulted in stream incision, loss of floodplain connectivity, loss of stream and wetland habitats and excess sediment and nutrient levels in waterways.

In response to the needs of the watershed, this mitigation bank includes more than ten acres of floodplain wetlands and in excess of forty acres of newly planted riparian buffer. Existing riparian buffers have been enhanced and almost two miles of streams have been protected on both sides with another third of a mile protected on one side. These additional riparian buffers and wetlands will help to absorb and filter sediment and agricultural pollution from more than 350 acres of adjacent agricultural land that drains across the site and from flood flows from Camp Branch. Additionally, the restored habitats which were constructed in 2009 provide high quality habitat to a number of wildlife species.

After its fourth year of monitoring in 2013, this mitigation site is meeting all of its performance standards.



Terra Foundation, Inc.

Clear Fork Wetland & Stream Mitigation Bank Johnson County, Missouri

Terra Foundation board members have been responsible for the site selection, design, and maintenance for the 212-acre Clear Fork Wetland & Stream Mitigation Bank which will serve as compensatory mitigation for impacts to wetlands and streams across most of the Missouri portion of the Kansas City metropolitan area as well as much of the west-central part of that state.

This former agricultural property includes over a mile of both sides of the Clear Fork of the Blackwater River and more than a mile and a third of tributary streams. Almost all of these streams were surrounded by row crop fields with only narrow riparian buffers and a stretch of Clear Fork more than 1,000 feet in length was entirely devoid of riparian vegetation along one side. The mitigation activities completed on the site have addressed the needs of the property and the watershed through the planting of 98 acres of new riparian buffers and the establishment of about 60 acres of herbaceous wetlands, 18 acres of forested wetlands and 5 acres of scrub-shrub wetlands. In addition, roughly 19 acres of existing riparian buffers were enhanced and about 10 acres of upland buffers were established or preserved.

These habitat improvements will provide important water quality and wildlife habitat benefits. In particular, agricultural runoff from approximately 570 acres of surrounding farmland is diverted into the roughly 60 acres of contiguous wetlands in the southern portion of the mitigation bank which allows for significant pollutant removal, flood abatement and wildlife habitat creation. Additionally, because this mitigation bank is situated along Clear Fork between Knob Noster State Park and the Ralph and Martha Perry Memorial Conservation Area, it will serve as a valuable stopover point for wildlife traveling between these two important protected areas.

This mitigation site was approved in 2014.



APPENDIX B

EXAMPLE CONSERVATION EASEMENT

CONSERVATION EASEMENT

THIS DEED OF CONSERVATION EASEMENT is given this ____ day of _____, 201__, by _____, having an address of _____ ("Grantor") to _____, having an address of _____ ("Grantee"). As used herein, the term "Grantor" shall include any and all heirs, successors, or assigns of the Grantor, and all subsequent owners of the Property (as hereinafter defined), and the term "Grantee" shall include any successor or assignee of Grantee.

WITNESSETH

WHEREAS, Grantor is the sole owner in fee simple title of certain lands situated in _____ County, OKLAHOMA, more particularly described in Exhibit(s) , [(LEGAL DESCRIPTION(S) OF PROPERTY AND EXHIBIT(S)] attached hereto and incorporated herein ("Property"), and

WHEREAS, Department Permit No. _____ of the U.S. Army Corps of Engineers ("Corps") (hereinafter referred to as the "Permit") authorizes certain activities which affect waters of the United States; and

WHEREAS, the permits require that Grantor preserve, enhance, restore, or mitigate wetlands or uplands located on the Property and under the jurisdiction of the Corps; and

WHEREAS, Grantor, in consideration of the issuance of the permits to construct and operate the permitted activity, and as an inducement to Grantee and the Corps to issue the Permits, is willing to grant a perpetual Conservation Easement over the Property; and

NOW THEREFORE, in consideration of the above and mutual covenants, terms conditions, and restrictions contained herein, together with other good and valuable consideration, the adequacy and receipt of which is hereby acknowledged, Grantor hereby voluntarily grants and conveys a perpetual Conservation Easement for and in favor of Grantee upon the property, which shall run with the land and be binding upon the Grantor, and shall remain in full force and effect forever.

The scope, nature, and character of this Conservation Easement shall be as follows:

1. **Purpose:** The purpose of this Conservation Easement is to retain and maintain land or water areas on the Property in their natural, vegetative, hydrologic, scenic, open, agricultural, or wooded condition and to retain such areas as suitable habitat for fish, plants, or wildlife. Those wetland or upland areas that are to be restored, enhanced, or created pursuant to the Permit shall be retained and maintained in the restored, enhanced, or created condition required by the Permit.

2. **Rights of Grantee:** The following rights are conveyed to Grantee and the Corps by this easement:

a. The right to take action to preserve and protect the environmental value of the Property; and

b. The right to prevent any activity on or use of the Property that is inconsistent with the purpose of this Conservation Easement, and to require the restoration of areas or features of the Property that may be damaged by any inconsistent activity or use;

c. The right to enter upon and inspect the Property in a reasonable manner and at reasonable times to determine if Grantor is complying with the covenants and prohibitions contained in this Conservation Easement; and

d. The right to proceed at law or in equity to enforce the provisions of this Conservation Easement, and to prevent the occurrence of any of the prohibited activities hereinafter set forth.

3. **Prohibited Uses:** Except for restoration, creation, enhancement, maintenance, and monitoring activities, or surface water management improvements, which are permitted or required by the Permit, the following activities are prohibited on the Property:

a. Construction of any structure or object (i.e., buildings, roads, above or below ground utilities, signs, billboards etc.) without written approval from the Corps of Engineers prior to construction;

b. Dumping or placing of soil or other substance or material as landfill, or dumping or placing of trash, waste, or unsightly or offensive materials;

c. Removal or destruction of trees, shrubs, or other vegetation, except as may be permitted by the Permit, and except for the removal of nuisance, exotic, or non-native vegetation in accordance with a maintenance plan approved by Grantee;

d. Planting of nuisance, exotic, or non-native plants as listed by the State of OKLAHOMA;

e. Exploration for, or extraction of, oil or gas in such a manner as to affect the surface, or excavation, dredging, or removal of coal, loam, peat, gravel, soil, rock, or other material substance, except as may be permitted or required by the Permit;

f. Use of motorized and non-motorized vehicles, the keeping or riding of horses, grazing, livestock confinement, or other surface use that may affect the natural condition of the Property, except for vehicle use for purposes of maintenance and upkeep, or as otherwise may be permitted or required by the Permit;

g. Tilling, plowing, planting of crops, digging, mining, or other activities that are or may be detrimental to drainage, flood control, water conservation, water quality, erosion

control, soil conservation, or fish and wildlife habitat preservation, including but not limited to ditching, diking, and fencing, except as permitted or required by the Permit;

h. The extraction of water from the Property or adjacent properties owned by Grantor, or the impoundment of water on the Property or on adjacent properties owned by Grantor, so as to affect the hydrology of the Property;

i. Acts or uses detrimental to the aforementioned retention and maintenance of land or water areas;

j. Acts or uses detrimental to the preservation of the structural integrity or physical appearance of sites or properties of historical, architectural, archaeological, or cultural significance.

4. **Reserved Rights:** Grantor reserves all rights as owner of the Property, including the right to engage in uses of the Property that are not prohibited herein and that are not inconsistent with any Corps rule, criteria, permit, or the intent and purposes of this Conservation Easement.

5. **Taxes:** Grantor shall pay any and all applicable real property taxes and assessments levied by competent taxing authority on the Property.

6. **Maintenance:** Grantor [Grantee] shall, at Grantor's [Grantee's] sole expense, operate, maintain and keep up the Property consistent with the purpose of this Conservation Easement. Grantor [Grantee] shall remove from the Property any nuisance, exotic, or non-native plants as listed by the State of OKLAHOMA and shall maintain the hydrology of the Property as it currently exists or as otherwise required by the Permit.

7. **Hazardous Waste:** Grantor covenants that if any hazardous substances or toxic waste exist or has been generated, treated, stored, used, disposed of, or deposited in or on the Property, or there are or have been any underground storage tanks on the Property, Grantor shall be responsible for any and all necessary costs of remediation.

8. **Public Access:** No right of access by the general public to any portion of the Property is conveyed by this Conservation Easement, and Grantor further covenants not to hold any portion of the Property open to general use by the public except with the written permission of the Corps[and Grantee].

9. **Liability:** Grantor shall continue to retain all liability for any injury or damage to the person or property of third parties that may occur on the Property arising from ownership of the Property. Neither Grantor, nor any person claiming by or through Grantor, shall hold Grantee or the Corps liable for any damage or injury that may occur on the Property.

10. **Recording Requirements:** Grantor shall record this Conservation Easement in the official records of _____ County, OKLAHOMA, and shall re-record it at any time Grantee or the Corps may require to preserve their rights. Grantor shall pay all recording costs, fees and taxes necessary at any time to record this Conservation Easement in the public records.

Grantor shall thereafter insert the terms and restrictions of this Conservation Easement in any subsequent deed or other legal instrument by which Grantor divests himself/herself/itself of any interest in the Property, and shall provide a photocopy of the recorded Conservation Easement to the new owner(s).

11. **Enforcement:** The terms and conditions of this Conservation Easement may be enforced in an action at law or equity by the Grantee or the Corps against the Grantor or any other party violating or attempting to violate these Restrictions. Venue for any such action shall be in _____ County, OKLAHOMA. Enforcement of this Conservation Easement shall be at the reasonable discretion of the Grantee or the Corps, and any forbearance on behalf of Grantee or the Corps to exercise its or their rights hereunder in the event of any breach by Grantor shall not be deemed or construed to be a waiver of rights. Any costs incurred in enforcing, judicially or otherwise, the terms, provisions, and restrictions of this Conservation Easement, including without limitation, the costs of suit, and attorney's fees, shall be borne by and recoverable against the non-prevailing party in such proceedings, except that such costs shall not be recoverable against the Corps. In addition, if the Grantee or the Corps shall prevail in an enforcement action, such party shall also be entitled to recover that party's cost of restoring the land to the natural vegetative and hydrologic condition existing at the time of execution of these Restrictions or to the vegetative and hydrologic condition required by the Permits.

12. **Assignment of Rights:** Grantee shall hold this Conservation Easement exclusively for conservation purposes. Grantee will not assign its rights and obligations under this Conservation Easement, except to another legal entity qualified to hold such interests under applicable state and federal laws and committed to holding this Conservation Easement exclusively for the purposes stated herein. Grantee shall notify the Corps in writing of any intention to reassign this Conservation Easement to a new grantee at least sixty (60) days in advance thereof, and the Corps must accept the assignment in writing. The new grantee shall then deliver a written acceptance to the Corps. The assignment instrument must then be recorded and indexed in the same manner as any other instrument affecting title to real property and a copy of the assignment instrument shall be furnished to the Corps. Failure to comply with the assignment procedure herein stated shall result in invalidity of the assignment. In the event of dissolution of the Grantee or any successor, or failure for 60 days or more to execute the obligations of this Conservation Easement, the Grantee shall transfer this Conservation Easement to a qualified and willing grantee. Upon failure of the Grantee or any successor to so transfer the Conservation Easement, the Corps shall have the right to sue to force such an assignment to a grantee to be identified by the Court.

13. **Successors:** The covenants, terms, conditions, and restrictions of this Conservation Easement shall be binding upon, and inure to the benefit of the parties hereto and their respective personal representatives, heirs, successors, and assigns, and shall continue as a servitude running in perpetuity with the Property.

14. **Notices:** All notices, consents, approvals, or other communications hereunder shall be in writing and shall be deemed properly given if sent by United States certified mail, return receipt requested, addressed to the appropriate party or successor-in-interest.

15. **Severability:** If any provision of this Conservation Easement or the application thereof to any person or circumstances is found to be invalid, the remainder of the provisions of this Conservation Easement shall not be affected thereby, as long as the purpose of the Conservation Easement is preserved.

16. **Alteration or Revocation:** This Conservation Easement may be amended, altered, released, canceled, or revoked only by written agreement between the parties hereto or their heirs, assigns, or successors in interest, which shall be filed in the public records of _____ County, OKLAHOMA. No action shall be taken, however, without advance written approval thereof by the Corps. Corps approval shall be by letter attached as an exhibit to the document amending, altering, canceling, or revoking the Conservation Easement, and said letter shall be informal and shall not require notarization. It is understood and agreed that Corps approval requires a minimum of sixty (60) days written notice, and that the Corps may require substitute or additional mitigation, a separate conservation easement or alternate deed restrictions, or other requirements as a condition of approval. Any amendment, alteration, release, cancellation, or revocation together with written Corps approval thereof shall then be filed in the public records of _____ County, OKLAHOMA, within 30 days thereafter.

17. **Controlling Law:** The interpretation and performance of this Conservation Easement shall be governed by the laws of the State of OKLAHOMA.

TO HAVE AND TO HOLD unto Grantee forever. The covenants, terms, conditions, restrictions, and purpose imposed with this Conservation Easement shall be binding upon Grantor, and shall continue as a servitude running in perpetuity with the property.

GRANTOR FURTHER COVENANTS that Grantor is lawfully seised of said Property in fee simple; that the Property is free and clear of all encumbrances that are inconsistent with the terms of this Conservation Easement and that no mortgages or other liens exist; that Grantor has good right and lawful authority to convey this Conservation Easement, and that it hereby fully warrants and defends the title to the Conservation Easement hereby conveyed against the lawful claims of all persons whomsoever.

IN WITNESS WHEREOF, the Grantor has executed this Conservation Easement this _____ day of _____, 20____.

Signed in the presence of:

GRANTOR:

Print Witness Name: _____

By: _____

Print: _____

Title: _____

Print Witness Name: _____

STATE OF OKLAHOMA
COUNTY OF _____

The foregoing Conservation Easement was acknowledged before me this _____ day of _____, 20____, by _____ as _____ of _____ who is personally known to me or has produced _____ as identification.

My Commission Expires:

NOTARY PUBLIC

APPENDIX C

SPONSOR'S NOT FOR PROFIT
CERTIFICATE OF AUTHORITY

OFFICE OF THE SECRETARY OF STATE



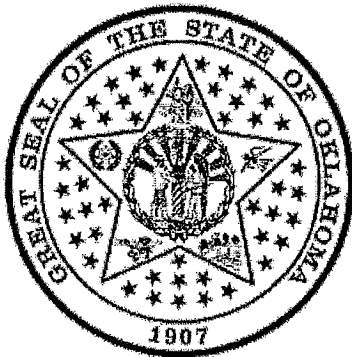
**NOT FOR PROFIT
CERTIFICATE OF AUTHORITY**

WHEREAS, TERRA FOUNDATION, INC.

incorporated under the laws of the State of MISSOURI has filed in the office of the Secretary of State duly authenticated evidence of its incorporation and an application for Certificate of Authority to transact business in this State, as provided by the laws of the State of Oklahoma.

NOW THEREFORE, I, the undersigned, Secretary of State of the State of Oklahoma, by virtue of the powers vested in me by law, do hereby issue this Not for Profit Certificate of Authority authorizing said Corporation to transact business in this state.

IN TESTIMONY WHEREOF, I hereunto set my hand and cause to be affixed the Great Seal of the State of Oklahoma.



*Filed in the city of Oklahoma City this
24th day of February, 2015.*

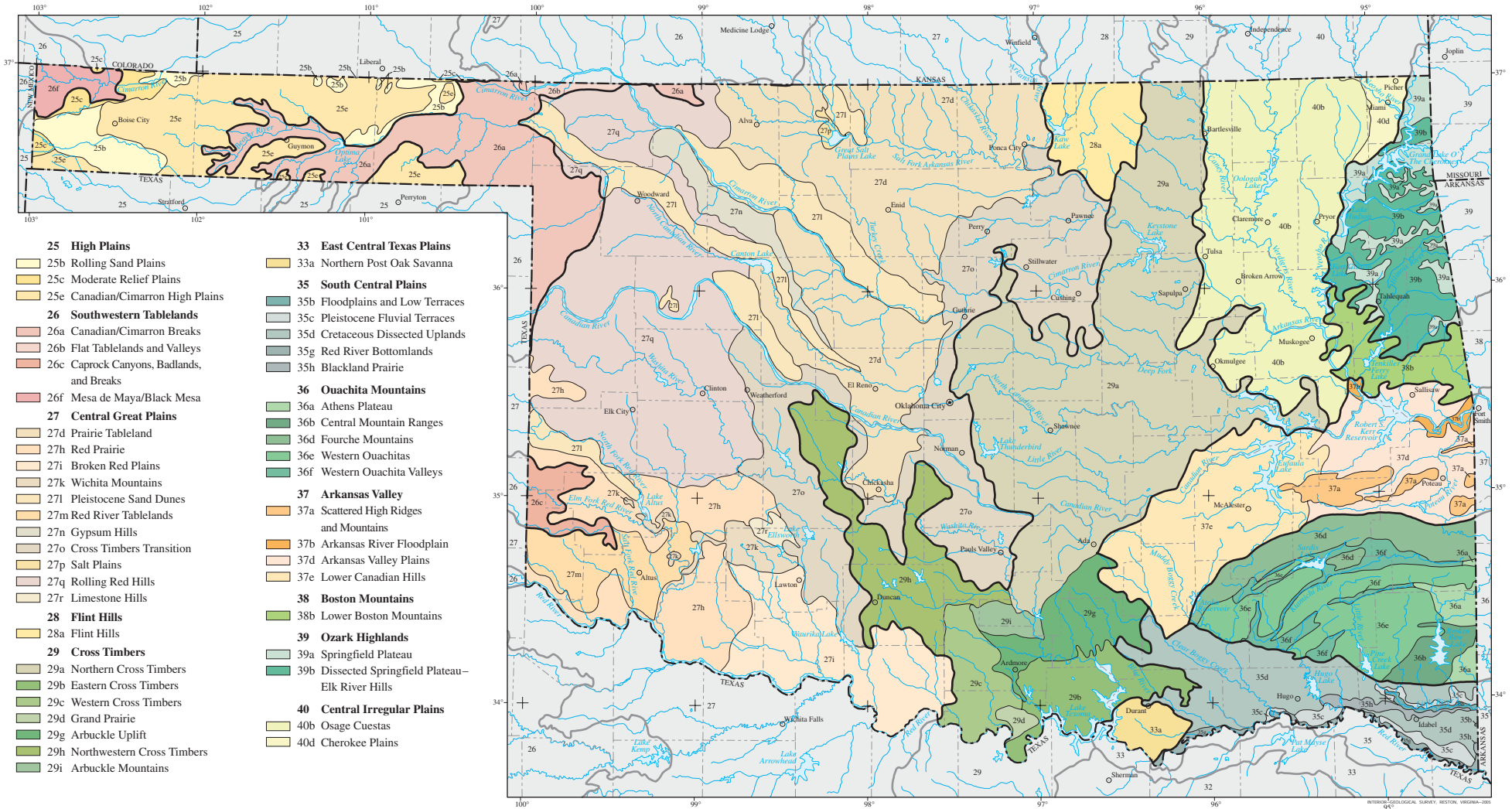
A handwritten signature in cursive script, appearing to read "Chris Benge".

Secretary of State

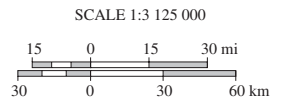
APPENDIX D

ECOREGIONS OF OKLAHOMA FIGURE

Ecoregions of Oklahoma



— Level III ecoregion boundary
 — Level IV ecoregion boundary
 - - - State boundary
 - - - - County boundary



Albers Equal Area Projection
Standard Parallels 34° 30' N and 36° 00' N

PRINCIPAL AUTHORS: Alan J. Woods (Oregon State University), James M. Omernik (U.S. Geological Survey), Daniel R. Butler (Oklahoma Conservation Commission–Water Quality Division), Jimmy G. Ford (U.S. Department of Agriculture–Natural Resources Conservation Service), James E. Henley (U.S. Department of Agriculture–Natural Resources Conservation Service), Bruce W. Hoagland (Oklahoma Biological Survey), Derek S. Arndt (Oklahoma Climatological Survey), and Brian C. Moran (Indus Corporation).

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CITING THIS POSTER: Woods, A.J., Omernik, J.M., Butler, D.R., Ford, J.G., Henley, J.E., Hoagland, B.W., Arndt, D.S., and Moran, B.C., 2005. Ecoregions of Oklahoma (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,250,000).

This project was supported in part by funds from USEPA Region 6, Water Quality Cooperative Agreement under the provisions of Section 104(b) (3) of the Clean Water Act to the Oklahoma Water Resources Board (through the Office of the Secretary of Environment, State of Oklahoma). Assistance from the private sector is acknowledged in the form of Ron Jarman, Ph.D., on loan from Apex Environmental, Inc.

Electronic versions of ecoregion maps and posters as well as other ecoregion resources are available at <http://www.epa.gov/wed/pages/ecoregions.htm>