

Draft Restoration Plan and Environmental Assessment

NATIONAL ZINC SMELTER SITE, BARTLESVILLE, OK

NATURAL RESOURCE DAMAGE ASSESSMENT AND
RESTORATION



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List of Acronyms

CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CAA	Clean Air Act
CWA	Clean Water Act
DOI	United States Department of the Interior
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
EO	Executive Order
HPO	Historic Preservation Officer
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRD	Natural Resource Damages
NRDAR	Natural Resource Damage Assessment and Restoration
MBTA	Migratory Bird Treaty Act
T&E	Threatened and Endangered
TNC	The Nature Conservancy
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service

Executive Summary

Releases of hazardous substances, including heavy metals, from the National Zinc Corporation Site (Site) located on the western edge of the City of Bartlesville, Oklahoma were sufficient to cause injury to natural resources and associated services under the Trusteeship of the U.S. Department of the Interior, the Cherokee Nation, the Delaware Tribe of Indians, and the Osage Nation (collectively known as the Trustees). The Site began operations in 1907, primarily to recover metals such as zinc, cadmium, and lead for industrial materials. National Zinc Corporation used smelting and chemical processing to recover these metals. In addition to the Site smelter, a vanadium smelter and two other zinc smelters operated on the location that presently encompasses the current National Zinc Corporation facility. During the time the smelting and processing facilities were in operation, metals contained in the airborne emissions from the smelters were deposited over much of the area of Bartlesville which lies west of the Caney River, including residential, commercial, industrial, and natural areas. Contaminants of concern produced from and released to the Site include arsenic, cadmium, copper, lead, mercury, selenium, silver, sulfuric acid and zinc. The natural resources potentially injured by the hazardous substances include surface water, soils, sediments, groundwater, and biotic resources. Some of these resources include threatened and endangered species, migratory birds and their habitats protected by the DOI, and tribal resources and associated services.

Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), through the Natural Resource Damage Assessment and Restoration (NRDAR) process, natural resource trustees are authorized to assess and recover damages resulting from injuries to natural resources attributable to hazardous substance releases. 40 U.S.C. § 9607 (f). The trustees then utilize these recovered damages to plan and implement actions to restore, replace, rehabilitate, and/or acquire the equivalent of injured natural resources and the services they provide pursuant to a restoration plan. 40 U.S.C. § 9611(i). The Trustees developed this Draft RP/EA in accordance with CERCLA Section 111(i) and its implementing regulations (43 C.F.R. § 11.93) to inform the public as to the types and amount of restoration that are expected to compensate for injuries to natural resources and the services they provide associated with the releases of hazardous substances from the facilities at the Site. As explained more fully herein, the proposed restoration actions described in this Draft RP/EA will be implemented by the Trustees in coordination with their restoration partners, including, but necessarily limited to, The Nature Conservancy.

Under the National Environmental Policy Act (NEPA; 42 U.S.C. § 4321 et seq.), federal agencies must identify and evaluate environmental impacts that may result from federal actions. This Draft RP/EA describes the purpose and need for action, identifies potential restoration alternatives, including a No Action alternative, summarizes the affected environment, and describes the potential environmental consequences of the preferred restoration activities. The alternatives described and evaluated in this Draft RP/EA include the Trustees' preferred alternatives: Dry Creek Restoration – Tallgrass Prairie (Alternative B), Bison Preserve Habitat Enhancement (Alternative C), Luttrell Memorial Pond Project (Alternative D), and other restoration alternatives, including the No Action alternative and one non-preferred alternative. The Preferred Alternatives aim to restore a portion of the Dry Creek Watershed to a stable stream geometry, improve floodplain connection, and enhance natural fluvial processes (Alternative B); rehabilitate historical tallgrass prairie habitats to a precolonial state and increase native species diversity (Alternative C); and improve habitat conditions for wildlife and enhance outdoor recreation opportunities for the local community (Alternative D). Collectively, the Preferred Alternatives will restore, enhance, create, or replace the equivalent natural resources and associated services injured by releases from the Site. The Trustees are soliciting comments on this Draft RP/EA and will address any public comments received in preparing a Final RP/EA wherein the Trustees will identify the Selected Restoration Alternatives.

1.0 Introduction

This document is intended to inform the public of natural resource injuries caused by the smelter operations release of hazardous substances at the National Zinc Corporation Site (Site) Bartlesville, OK from 1907 to 1976 and the proposed restoration projects that would compensate for those injuries. The U.S. Department of the Interior (DOI), acting through the U.S. Fish and Wildlife Service (USFWS), the Cherokee Nation, the Delaware Tribe of Indians, and the Osage Nation, collectively known as the Natural Resource Trustees (hereafter, Trustees) or Trustee Council, are undertaking a natural resource damage assessment pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§1906 et seq.

This Draft Restoration Plan (RP) and Environmental Assessment (EA) provides an overview of the natural resource damage assessment and restoration (NRDAR) process; history and background about the Site; summary information concerning the releases of hazardous substances and associated injuries to natural resources and their related services; and brief description of the settlement with the responsible party for natural resource damages, including how the settlement funds are being used for restoration activities. In this Draft RP/EA, the Trustees identify and evaluate the restoration alternatives that may be implemented and are intended to compensate for the injured resources and services lost that have not been addressed to date.

Development of this Draft RP/EA is in accordance with 43 Code of Federal Regulations (C.F.R.) § 11.93 and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 111(i) and is to inform the public as to the types and amount of restoration that are expected to compensate for injuries to natural resources and the services they provide associated with the releases of heavy metals from the Site. The NRDAR process allows for recovered funds to be used to plan and implement actions to restore, replace, rehabilitate, and/or acquire the equivalent of injured natural resources and the services they provide. In this Draft RP/EA, the Trustees describe the purpose and need for action, identify potential restoration alternatives, including a No Action alternative, summarize the affected environment, and describe the potential environmental consequences of proposed restoration activities. The Trustees are soliciting comments on this Draft RP/EA and will address comments in preparing a Final RP/EA wherein the Trustees will identify the Selected Restoration Alternative(s).

1.1 Purpose and Need for Restoration

The purpose of this Draft RP/EA is to consider and evaluate various alternatives available to restore the natural resources injured by the releases of hazardous substances, including arsenic, cadmium, copper, lead, mercury, selenium, silver, zinc, and sulfuric acid. Restoration actions are intended to restore terrestrial and aquatic habitat and their associated services lost due to the release of hazardous substances. Restoration activities will also provide co-benefits in the form of restoring, creating, or enhancing Tribal cultural resources and associated services. The need for these actions arises from the statutory requirement to use recovered NRDAR damages to restore, replace, or acquire the equivalent of natural resources injured by releases of hazardous substances 42 U.S.C. § 9607(f)(1).

1.2 Restoration Goals

The Trustees identified several overarching and specific restoration goals which are being used to guide development of restoration alternatives.

Overarching goals include:

- Restore habitat and natural resource uses and services closely linked to the injuries, in location and/or type;
- Prioritize projects that will supplement restored or enhanced habitat and natural resource services by providing co-benefits, such as projects that will incorporate cultural knowledge transfer or restore lost Tribal cultural services; and
- Select projects in a complementary and coordinated manner that provides synergies across projects.

Specific project goals include:

- Restore or enhance functioning, native terrestrial (e.g., prairie) habitat, resources, and services that were injured as a result of the released hazardous substances from the Site, and
- Supplement native habitat restoration projects by incorporating co-benefits into the project design, such as including project elements that will enhance Tribal/cultural services – such as using seed mixes with culturally important plants -- recreation opportunities, and/or connections to nearby natural areas providing habitat for the same types of resources and services injured by releases of hazardous substances from the Site.

1.3 Overview of the National Zinc Smelter Site

The National Zinc Corporation Site is located on the western edge of the City of Bartlesville, Oklahoma. The Site began operations in 1907, primarily to recover metals such as zinc, cadmium, and lead for industrial materials. National Zinc Corporation used smelting and chemical processing to recover these metals. In addition to the Site smelter, a vanadium smelter and two other zinc smelters operated on the location that presently encompasses the current National Zinc Corporation facility. Historical metal processing operations by three horizontal retort zinc smelters commenced at this location in approximately 1907. Two of the smelters ceased operations in the 1920s. The remaining smelter was converted to an electrolytic zinc refinery in 1976 and has ceased operations. During the time the horizontal retorts were in operation, metals contained in the airborne emissions from the smelters were deposited over much of the area of Bartlesville which lies west of the Caney River, including residential, commercial, industrial, and natural areas. Historical sources of metals at the National Zinc Corporation facility included: ore delivered to the facility by railcar, dust from the transport and storage of ore and solid waste materials at the facility, metals emissions from roasting and smelting processes, airborne particulates from smelting and sintering processes, and various solid waste materials. Contaminants of concern produced from and released to the Site include arsenic, cadmium, copper, lead, mercury, selenium, silver, sulfuric acid and zinc.

1.4 Summary of Injury to Natural Resources

The natural resources potentially affected by the hazardous substances include surface water, soils, sediments, groundwater, and biotic resources. Some of these resources include threatened and endangered species, migratory birds and their habitats protected by the DOI and tribal resources and associated services. These trust resources exist, or formerly existed, within the Site. Potentially affected trust resources include, but are not limited to:

- Surface waters and sediments including, riverine, riparian, and wetland habitats and services, including recreation;
- Riparian, terrestrial, and aquatic plant and animal species, and their habitats;
- Geologic resources (soils) including Tribally-owned Indian lands (or lands held in trust);
- Air resources;
- Migratory and non-migratory birds and their habitats; and
- Plant and animal species that are culturally significant to the Cherokee Nation, Delaware Tribe of Indians, and Osage Nation.

1.5 Settlement

A Consent Decree was lodged with the U.S. District Court for the Northern District of Oklahoma and made available for public comment prior to being approved by the Court on February 25, 2020. Under the Consent Decree, Cyprus Amax paid the Federal and Tribal Trustees \$1,695,500 to compensate the Trustees for natural resource damages. The Consent Decree required that a portion be allocated to reimbursing each Trustee for its assessment costs (\$343,753 for the DOI, \$4,240 for the Cherokee Nation, and \$3,749 for the Osage Nation). Thus, the amount available to implement projects is approximately \$1.3 million.

The Trustee Council retains the ultimate authority and responsibility to use the settlement funds to implement projects that will restore, replace, rehabilitate or acquire the equivalent natural resources and associated services injured as a result of the hazardous substance releases from the

Site. The Trustees will use settlement funds, potentially in combination with non-settlement funds (e.g., federal grants), to further plan, implement, and monitor one or more of the Preferred Alternatives described in this RP/EA.

1.6 Public Participation

Public participation and review are integral parts of the restoration planning process and are specifically required in the CERCLA NRDAR regulations (e.g., 43 C.F.R. §11.81(d)(2)). In addition, NEPA and its implementing regulations require that federal agencies fully consider the environmental impacts of their proposed decisions and that such information is made available to the public.

The Draft RP/EA is open for public comment for 30 days from the date of publication in Tulsa World, Bartlesville Examiner-Enterprise, Cherokee Phoenix, Delaware Indian News, and the Osage News. Interested individuals, organizations, and agencies may submit comments by writing or emailing: OK_Contaminants@fws.gov

Copies of this document are available online at:
https://www.cerc.usgs.gov/orda_docs/CaseDetails?ID=257

Physical copies of the document are also available for review by interested members of the public at the location mentioned in the press release announcing the public comment period. In addition, arrangements can be made in advance to review or obtain copies of the document from the USFWS Oklahoma Ecological Services Field Office by contacting Jonathan Fisher at jonathan_fisher@fws.gov or 918-382-4533.

The Trustees will review and consider all public comments and input on the Draft RP/EA received during the public comment period prior to publishing the Final RP/EA. The Trustees will prepare a responsiveness summary to the comments that will be included as an appendix in the Final RP/EA. Based on the public's comments, or other information, the Trustees may amend the Draft RP/EA if significant changes are made to the type, scope, or impact of the projects. In the event of a significant modification to the Draft RP/EA, the Trustees will provide the public with an opportunity to comment on that particular amendment.

The Trustees have also maintained records documenting the information considered and actions taken during this NRDAR process. These records are available by request and can be viewed at the location identified in the following section.

For joint assessments, trustees must designate a Trustee as the lead administrative trustee (43 C.F.R. 11.32 (a)(1)(ii)(A)). The DOI, acting through USFWS, serves as the lead administrative trustee for the National Zinc Trustee Council and maintains the administrative record.

1.7 Administrative Record

The Trustees have maintained records to document the information considered as they developed this Draft RP/EA. These records may include additional information and documents, such as public comments received on the Draft RP/EA, and other related restoration planning documents. The Administrative Record for this case is available to the public, and will be housed at the following physical location:

U.S. Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 E 21st St, Tulsa, OK 74129

Arrangements should be made in advance to review the record or to obtain copies of documents in the record by contacting Jonathan Fisher at jonathan_fisher@fws.gov or 918-382-4533.

2.0 Restoration Alternatives

To compensate the public for injuries to natural resources and associated lost services resulting from releases of hazardous substances from the Site, the Trustees are required to develop alternatives for the restoration, rehabilitation, replacement, and/or acquisition of the equivalent of the natural resources and the services those resources provide (43 C.F.R. §11.82 (a)). In this

Draft RP/EA, the Trustees present a suite of restoration projects that are being considered for implementation, including, but not limited to: land acquisition and preservation of injured habitat types, habitat restoration and enhancement of native prairie, riparian, pond and/or stream habitat, and cultural and recreation project elements to supplement habitat restoration and enhancement projects. Project cultural elements are intended to support Tribal communities through the teaching and preservation of traditional cultural practices, knowledge, and values. Except for Alternatives A and E, all other alternatives considered for funding and implementation by the Trustees in this Draft RP/EA are consistent with the overarching and specific restoration goals.

Restoration alternatives were developed by the Trustees following a series of internal meetings held by representatives of the Trustee Council, as well as discussions within Trustee groups. Restoration alternatives were prioritized for further evaluation in this Draft RP/EA when they: 1) could be implemented in close proximity (same or adjacent county) to where the natural resource and service injuries occurred; 2) could be implemented in locations where land management could be overseen by the Trustees or a restoration partner organization; and 3) were in alignment with the Trustees’ restoration goals, as stated in Section 1.2.

As described below, the Trustees have proposed restoration alternatives that would be undertaken in Osage County, Oklahoma. Figure 1 depicts the location of proposed restoration project area in relation to the location of the Site.

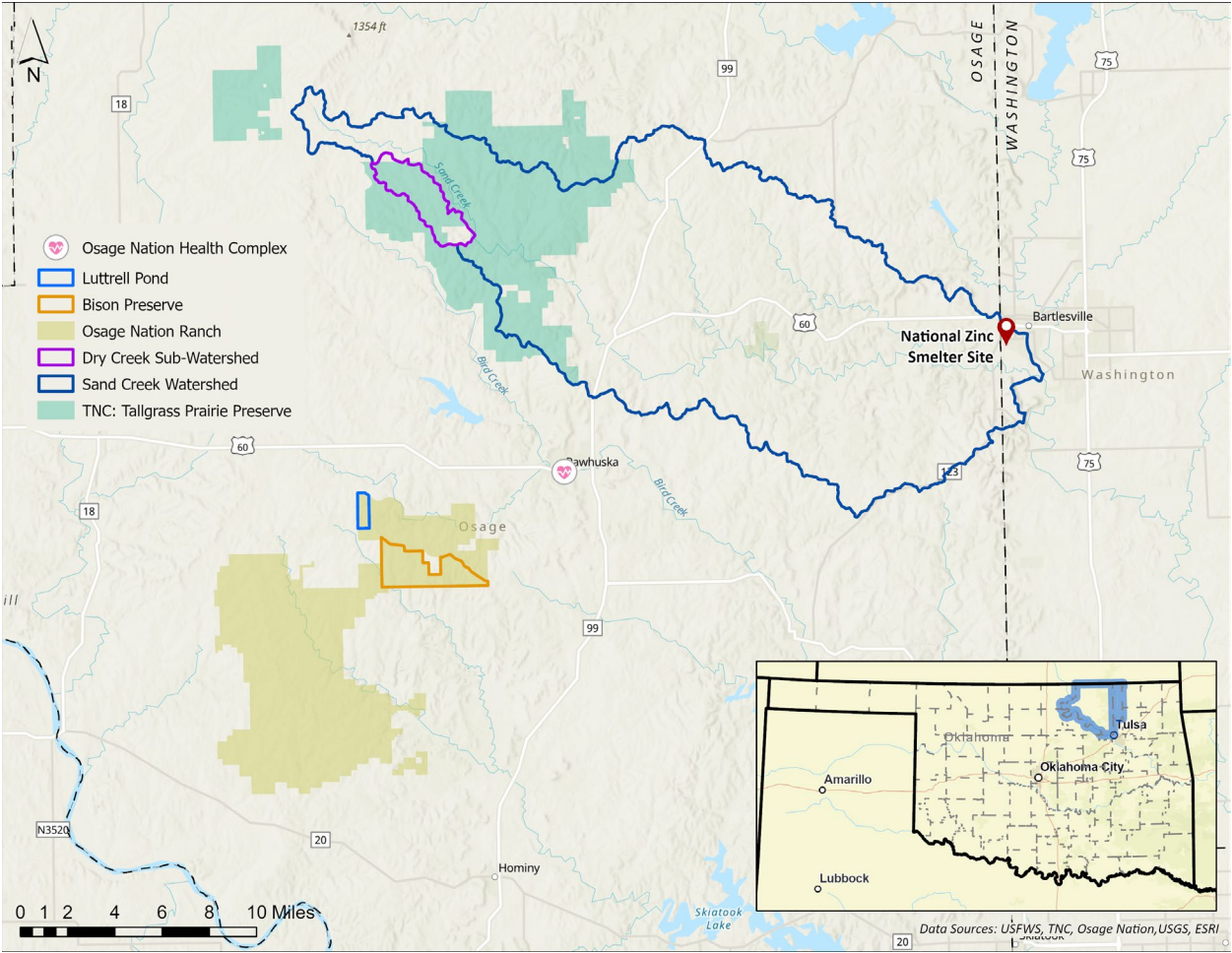


Figure 1. Proposed project areas (Luttrell Pond, Bison Preserve, and Dry Creek Sub-Watershed) in northeastern Oklahoma.

2.1 Restoration Evaluation Criteria

The CERCLA NRDAR Regulations at 43 C.F.R. Part 11 list ten factors for the Trustees to evaluate and consider when selecting a restoration alternative or project to pursue. Thus, these factors must be applied in restoration planning to identify a range of alternatives for consideration as well as to identify the restoration alternative(s) or project(s) that is/are best to pursue. When using settlement funds, compatibility with these factors does not necessarily mean an alternative or project will be funded; it only means that the Trustees may consider the

alternative or project for possible funding. Further, the sums recovered and available for restoration are also a factor to be weighed by Trustees in choosing a restoration alternative or project for implementation.

The Trustees evaluated the alternatives to determine if they provide sufficient type, quality, and quantity of ecological services to compensate for those lost due to contamination in the context of the CERCLA NRDAR (43 C.F.R. §11.82 (d) (see following list of criteria). Each of the ten factors listed in 43 C.F.R. §11.82 (d) are evaluated in Table 2. The Trustees also evaluated whether significant effects may be associated with the preferred alternatives to restore the natural resources and services injured or lost due to the releases hazardous substances as required by NEPA (40 C.F.R. §1508.9(b)).

Technical Feasibility (43 CFR § 11.82(d)(1)):

The selected restoration alternative must be technically sound. The Trustees considered the level of risk or uncertainty involved in implementing a project. A proven record of accomplishment demonstrating the success of projects utilizing similar or identical restoration techniques can be used to satisfy this evaluation criterion.

Cost Benefit (43 C.F.R. § 11.82(d)(2)):

The relationship of the expected costs of the proposed actions to the expected benefits from the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources. Projects with higher benefit to cost ratios are preferred.

Cost Effectiveness (43 C.F.R. § 11.82(d)(3)):

When two or more activities provide the same or similar level of benefits, the least costly activity providing that level of benefits will be selected.

Actual or Planned Response Actions (43 C.F.R. § 11.82(d)(4)):

The Trustees must consider the results of any actual or planned response actions when evaluating restoration alternatives.

Potential for Additional Injury Resulting from the Proposed Actions (43 C.F.R. § 11.82(d)(5)):

Trustees must identify the adverse impacts, both short and/or long term, from the project. Some short-term adverse impacts from implementation are expected, however, projects with large or long-term adverse impacts are not preferred.

Natural Recovery Period and the Ability of Resources to Recover without Restoration (43 C.F.R. § 11.82(d)(6-7)):

Trustees must consider the ability of injured natural resources to recover and the time required for that recovery if no restoration is undertaken to benefit injured natural resources. Trustees should also consider the time required to observe those benefits if the project is implemented.

Public Health and Safety (43 C.F.R. § 11.82(d)(8)):

The preferred alternative(s) should not pose a threat to the health and safety of the public.

Compliance with Laws, Regulations, and Policies (43 CFR § 11.82(d)(9-10)):

Development of this RP/EA requires consideration of a variety of legal authorities and their potentially applicability to the Preferred Alternative. As part of restoration planning process, the Trustees initiated steps to ensure compliance with applicable laws, regulations, and policies. Implementation of the preferred alternative(s) remains subject to complying with all applicable all applicable laws and regulations.

Consistency with the Trustees Restoration Goals:

The preferred alternative(s) should meet the Trustees' intent to directly restore the injured resources or the services those resources provide. Included in this criterion is the potential for success (meeting restoration goals) and the level of expected return of resources and resource services.

Additionally, actions undertaken to restore natural resources are anticipated to meet the Trustees' intent to directly restore the injured resources or services those resources provide. Along with being consistent with the Trustees' restoration goals, the potential for success (meeting restoration goals) and the level of expected return of resources and resource services should be

considered by the Trustees. Proposed restoration actions are anticipated to have long-term beneficial and sometimes short-term adverse impacts to the physical, biological, socio-economic, and/or cultural environments. In the analysis in Section 3, the Trustees examine the likely beneficial and adverse impacts of Alternatives B, C, D, and E, plus the No Action alternative, on the quality of the human environment.

2.2 Compliance with applicable/relevant laws, policies, and regulations

All preferred alternatives must comply with all applicable federal, state, Tribal, and local laws, policies, and regulations. Federal natural resource and environmental laws, orders, and regulations considered during the development of this Draft RP/EA include, but are not limited to, the following acts and their implementing regulations: National Environmental Policy Act; Clean Water Act; Endangered Species Act of 1973; and National Historic Preservation Act of 1966. An explanation of how compliance will be met for the above-mentioned statutes is described below. Additional environmental compliance, including at the state, Tribal, or local level, may be required depending on the specific activities required for a restoration project.

2.2.1 National Environmental Policy Act (NEPA)

Actions undertaken by the Trustees to restore natural resources or services under CERCLA and other federal laws are subject to NEPA and its implementing regulations. These authorities outline the responsibilities of federal agencies in their decision-making process concerning proposed actions, including the federal agencies' responsibility to consider the relevant NEPA documentation. NEPA requires that an agency take a hard look at actions that have the potential to significantly affect the human environment. If an impact is considered significant, then an Environmental Impact Statement (EIS) is prepared. If the impact is considered in an Environmental Assessment (EA) and determined to be not significant then a Finding of No Significant Impact is issued. Certain types of agency actions are categorically excluded from preparation of an EA or EIS if the agency determines the action has no significant individual or cumulative effect on the quality of the human environment (40 C.F.R. § 1508.4) and the action does not meet any of the extraordinary circumstances in section 43 C.F.R. § 46.215. If the action does meet any of the extraordinary circumstances, further analysis and environmental documents must be prepared for the action.

Compliance: In accordance with NEPA and its implementing regulations, this Draft RP/EA summarizes the affected environment for the proposed restoration actions; describes the purpose and need for restoration actions; identifies a reasonable range of alternatives; assesses the environmental consequences of the proposed restoration actions, where necessary, including cumulative impacts; and summarizes the opportunity the Trustees will provide for public participation in the decision-making process. After conducting the NEPA analysis, the Trustees may conclude that the impacts associated with the restoration actions identified herein do not meet the threshold requiring an EIS.

The federal Trustees have preliminarily determined that several activities described as part of Alternatives B, C, and D meet the criteria for categorical exclusions (Table 1) and are thus categorically excluded from inclusion in the environmental assessment (EA) contained herein. These restoration activities have no significant individual or cumulative effect on the quality of the human environment (40 C.F.R. § 1508.4) and do not meet any of the extraordinary circumstances in section 43 C.F.R. § 46.215. Restoration activities not meeting criteria for categorical exclusions are analyzed in the EA contained herein.

Table 1. List of restoration actions and associated categorical exclusions. Restoration actions and associated categorical exclusions apply to Alternatives B, C, and D.

Restoration Action	Categorical Exclusion	Citation
Habitat surveys and restoration monitoring activities	Nondestructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research, and monitoring activities.	43 C.F.R. § 46.210(e)
Fire management activities for the purpose of native habitat restoration and enhancement	Fire management activities, including prevention and restoration measures, when conducted in accordance with Departmental and Service procedures	DM 516 8.5 B.5
Prescribed burning for native habitat enhancement	The use of prescribed burning for habitat improvement purposes, when conducted in accordance with local and State ordinances and laws.	DM 516 8.5 B.4
Inventory and monitoring of plants and animals	Research, inventory, and information collection activities directly related to the conservation of fish and wildlife resources which involve negligible animal mortality or habitat destruction, no introduction of contaminants, or no introduction of organisms not indigenous to the affected ecosystem.	DM 516 8.5 B.1
Fencing, small water control structures, planting of seeds or seedlings, and other minor revegetation	The construction of new, or the addition of, small structures or improvements, including structures and improvements for the restoration of wetland, riparian, instream, or native habitats, which result in no or only minor changes in the use of the affected local area.	DM 516 8.5 B.3

2.2.2 Clean Water Act

The Clean Water Act (33 U.S.C. § 1251, et seq.) is the principal law governing pollution control and water quality of the Nation's waterways. Section 404 of the Clean Water Act authorizes a permit program to regulate the discharge of dredged or fill material in navigable waters. The U.S. Army Corps of Engineers (USACE) administers the program.

Compliance: Alternatives B, C, and D contain ponds, ephemeral or perennial streams, rivers, wetlands, and/or riparian areas. These habitat types within a project footprint will be given consideration for potential impacts from restoration activities. The Trustees do not intend to allow for the filling of or impacts to wetlands and other navigable aquatic habitat on-site.

Therefore, coordination with the USACE is not anticipated prior to implementing the proposed restoration activities but will be pursued when appropriate and necessary.

2.2.3 Endangered Species Act (and other regulations protecting fish, wildlife, and plants)

The federal Endangered Species Act (ESA; 16 U.S.C. § 1531, et seq., 50 C.F.R. Parts 17, 222, 224) directs all federal agencies to conserve threatened and endangered (T&E) species and their habitats and encourages such agencies to utilize their authority to further these purposes. Under the ESA, the National Oceanic and Atmospheric Administration - National Marine Fisheries Service and USFWS publish lists of endangered and threatened species. Section 7 of the ESA requires that federal agencies consult with these agencies to minimize the effects of federal actions on endangered and threatened species.

Compliance: Up to nine federally-listed T&E species and candidates for listing have the potential to occur within the Oklahoma counties of proposed restoration. Information related to federally-listed species can be found in Section 3.4 of this document.

Because of the restoration and enhancement nature of the proposed habitat projects and the best management practices (BMPs) that will be used, the Trustees anticipate only minor and temporary adverse impacts to the biological environment, including fish, wildlife, and their supporting habitats, and cultural resources and services. The Trustees will conduct necessary ESA Section 7 consultations with USFWS prior to implementation of any future restoration projects proposed under this plan. Such consultations would begin before implementation of a specific project but may be completed and/or updated during a project's design phase. The results of the consultation will be documented and added to the administrative record for this NRDAR case.

2.2.4 National Historic Preservation Act (NHPA)

Cultural resources are those parts of the physical environment, natural and built, that have cultural value to some socio-cultural groups and human social institutions. Cultural resources include historic sites, archeological sites and associated artifacts, sacred sites, traditional cultural properties, cultural items, and buildings and structures. Most cultural resource concerns can be identified through the Section 106 process of the NHPA. Absent objections from Historic Preservation Officers or from other interested persons (36 C.F.R. §§ 800.2(c)(3), (4), and (5)), the NHPA has legal standing in land acquisition projects, projects involving ground disturbance, and projects impacting buildings and structures 50 years and older.

The National Historic Preservation Act of 1966 (NHPA) established a process to preserve historical and archaeological sites affected by projects directed or funded by the federal government. Compliance with the NHPA is undertaken through consultation with the Oklahoma State Historic Preservation Office (SHPO), Oklahoma Archeological Survey, Tribal governments, and Tribal Historic Preservation Offices (THPOs). If an eligible historic property or archeological resource is within the area of one of the proposed restoration alternatives, then an analysis should be made to determine whether the alternative would have an adverse effect on historic properties or archaeological resources. For potential impacts to Tribal cultural, historic, or religious resources or properties, NHPA regulations require federal agencies to acknowledge the expertise of Indian tribes in determining which properties are of religious and cultural significance to them. Prior to completion of this RP/EA, the Department of the Interior will provide the SHPO and THPOs opportunities to consult under NHPA about the potential adverse effects of the proposed projects on historic properties or archaeological, religious, and cultural resources. These consultation letters will be added to the administrative record and provided in an appendix of the Final RP/EA.

2.2.5 Other Legal Authorities Requiring Tribal Consultation

In addition to the regulations implementing Section 106 of the NHPA requiring consultation with Indian tribes throughout the historic preservation review process, there are several authorities or policies requiring Tribal consultation or describing procedures for consultation with Indian Tribes.

- Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments (November 6, 2000): In summary, this Executive Order reaffirms the Federal government’s commitment to tribal sovereignty, self-determination, and self-government. Its purpose is to ensure that all Executive departments and agencies consult with Indian tribes and respect tribal sovereignty as they develop policy on issues that impact Indian communities.
- Presidential Memorandum for the Heads of Executive Departments and Agencies on Tribal Consultation and Strengthening Nation-to-Nation Relationships (January 26, 2021): In this Memorandum, President Biden established as a priority of his Administration to make respect for Tribal sovereignty and self-governance, commitment to fulfilling Federal trust and treaty responsibilities to Tribal Nations, and regular, meaningful, and robust consultation with Tribal Nations cornerstones of Federal Indian policy. The Memorandum directs each Federal agency to submit to the Office of Management and Budget a “detailed plan of actions the agency will take to implement the policies and directives of Executive Order 13175,” which addresses consultation and coordination with Indian Tribal governments. Department of the Interior has taken initial steps focusing on lasting, substantive improvements it can make in its implementation of the policies and directives of E.O. 13175. More about DOI’s initial steps towards improving consultation and coordination with Indian Tribal governments can be found at <https://www.doi.gov/priorities/tribal-consultation/consultation-interior-improving-consultation>
- Part 512, Chapter 4 of the Department of the Interior’s Departmental Manual provides the requirements for DOI government-to-government consultation between appropriate tribal officials and DOI officials. It expands and clarifies DOI’s policy on consultation with Indian Tribes and Alaska Native Claims Settlement Act of 1971 and acknowledges the provisions for conducting consultation in compliance with Executive Order 13175, applicable statutes, and administrative actions.
- Part 512, Chapter 5 of the Department of the Interior’s Department Manual provides the procedures and process for DOI government-to-government consultation between appropriate tribal officials and DOI officials.

2.3 Alternative A: No Action Alternative (Natural Recovery)

NEPA requires the Trustees to evaluate an alternative in which no actions are taken by a federal agency. Here, the no-action alternative would mean that the Trustees would take no direct action to restore injured natural resource habitat, create new habitat, enhance existing habitat, or compensate for lost natural resource services. Instead, the Trustees would rely solely on natural recovery for the achievement of restoration goals. While the Trustees believe that natural recovery will occur over varying time scales for the resources exposed to and/or injured by the releases of hazardous substances, the interim losses suffered would not be fully compensated under a no-action alternative.

The principal advantages of this approach are the ease of implementation and lack of costs because natural processes rather than humans determine the trajectory of the system. This approach, more so than any of the others, recognizes the capacity of landscapes and their contained habitats for self-healing over time and does not directly alter existing habitats.

2.4 Alternative B: Dry Creek Restoration – Tallgrass Prairie

The Dry Creek Restoration Project has the overall goal of restoring a portion of the Dry Creek Watershed to a stable stream geometry. Outlined in the Dry Creek Watershed Assessment Report (Bidelsbach 2011), restoration projects within the Dry Creek Watershed are intended to:

- Reduce bank erosion rates
- Improve floodplain connection
- Reduce fine sand substrates to be less than 5% of the reach pebble count
- Achieve 90% vegetative cover
- Eliminate major vertical instability of head cuts greater than one-foot in drop
- Increase side channel habitat to 50% above baseline conditions

Dry Creek is located within The Nature Conservancy's (TNC) Joseph H. Williams Tallgrass Prairie Preserve in Osage County, Oklahoma (Figure 2). The Tallgrass Prairie Preserve protects 39,000 acres of tallgrass prairie and crosstimbers and is one of TNC's premier preserves. Among other things, the preserve is designed to protect the headwaters of Sand Creek and the land area draining into it. Sand Creek is a small prairie stream in Osage County, Oklahoma, and is identified as a priority stream in TNC's Osage Plains/Flint Hills Prairie ecoregional planning process. Sand Creek represents one of the best remaining examples of a prairie stream in the ecoregion. Its protection is crucial to preserving the aquatic biodiversity of Oklahoma.

Dry Creek, a headwater tributary to Sand Creek, is a prairie stream in a rolling alluvial valley. In their most pristine state, streams such as Dry Creek should have small rectangular channels and overhanging banks held together by the thick root mats of dense riparian sedges and grasses. Dry Creek is currently eroding, resulting in a stream with an overly deep, overly wide channel and active head cuts. The increased sediment entering the channel from bank erosion has converted a gravel-bottomed stream into a silty stream, impairing the viability of existing fisheries and aquatic biodiversity adapted to gravel streams. Current conditions of a high percentage of Dry Creek reaches are producing a sediment supply rate from bank erosion that is over an order of magnitude higher than what would be expected from a stable stream supplying sediment to downstream reaches. Erosion problems are likely the result of historical grazing practices and land management activities in the area. Overgrazing by cattle directly impacted the stream by reducing the amount of biomass above and below the soil surface. Reduced root density in the riparian grasses failed to hold the stream in position causing it to incise and widen. A third cause of stream degradation in Dry Creek is incompatible design and construction of road crossings.

To remedy unstable stream channel conditions in Dry Creek, the Trustees are proposing to partner with TNC to identify one or more priority segments of impaired stream – as identified in the Dry Creek Watershed Assessment Report (Bidelsbach 2011) – to a stable condition using a natural channel design approach (Figure 3). Primary stream restoration activities may include anchoring the stream in place with appropriate native vegetation and installing natural grade control structure (native stone weirs). Following restoration implementation, the project area(s) will include effectiveness monitoring activities, which are described in Section 4, to ensure the project is progressing along the desired trajectory.

Stream restoration can be defined as the altering of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former or degraded stream. Natural channel design utilizes existing stable stream channels, or reference reaches, to provide the appropriate dimensions for the stream restoration design. There are several approaches to restoration, including Priority I and Priority II restoration, and Enhancement. The appropriateness of each approach varies by site. The following two paragraphs provide an overview of Priority I and II approaches, as well as several of the techniques that are often associated with stream restoration.

Priority I Restoration: The objective of a Priority I restoration project is to replace an incised stream channel with a new, stable stream at a higher elevation. This is accomplished by excavating a new channel with the appropriate dimension, pattern, and profile appropriate for the existing drainage area, watershed land use, and valley type. The reconnection of a channel to its original floodplain raises the water table at a site and likely restores hydrology to additional wetland areas. On reaches where Priority I restoration is proposed, floodplain wetlands, vernal pools, oxbow ponds, and riparian plantings are often included in the stream design. Priority I stream restoration reaches restore much of the natural hydrology, increase overbank flooding, and raise groundwater levels.

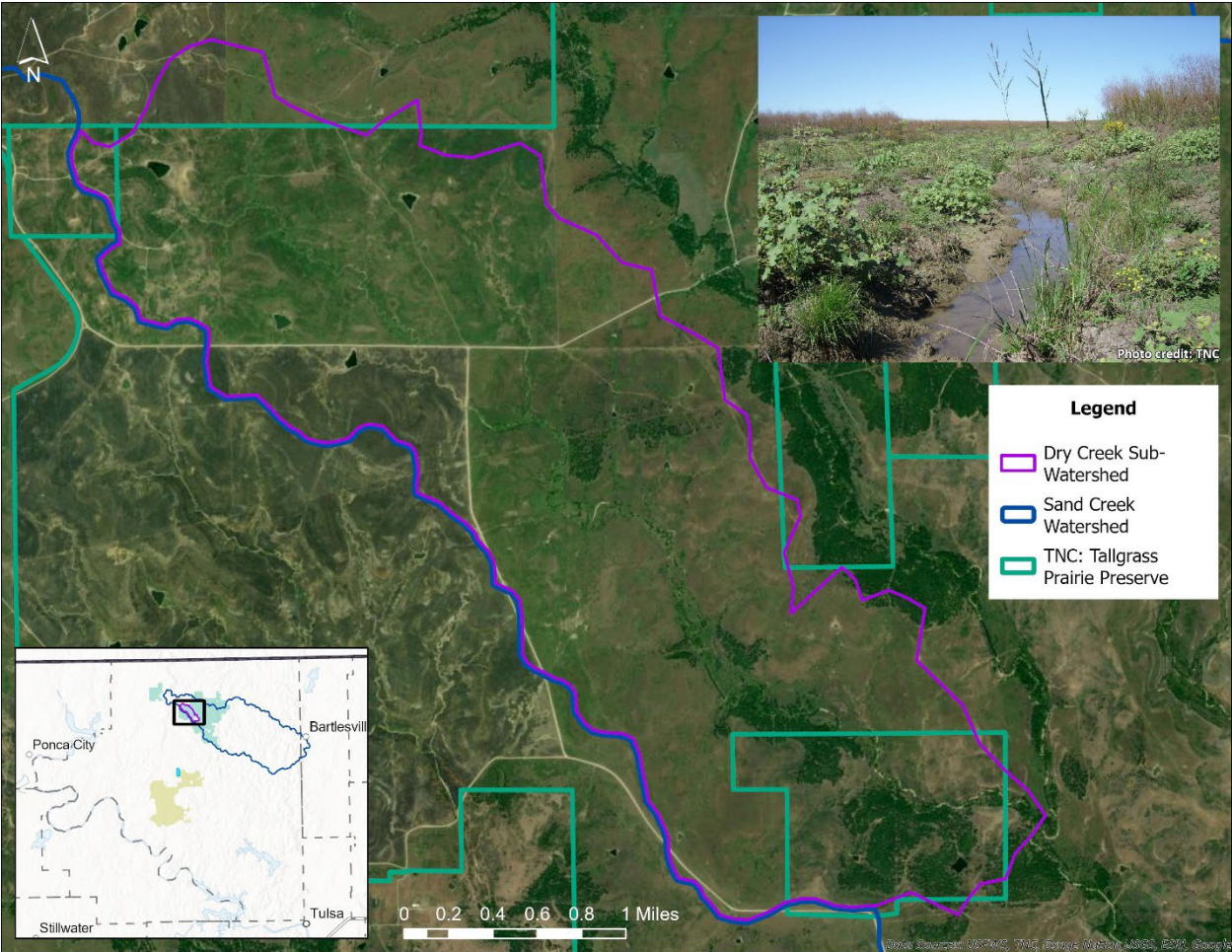


Figure 2. Area under consideration for proposed Dry Creek Restoration project in Osage County, Oklahoma. Inset picture (upper right) shows example of restored segment of Dry Creek in 2010.

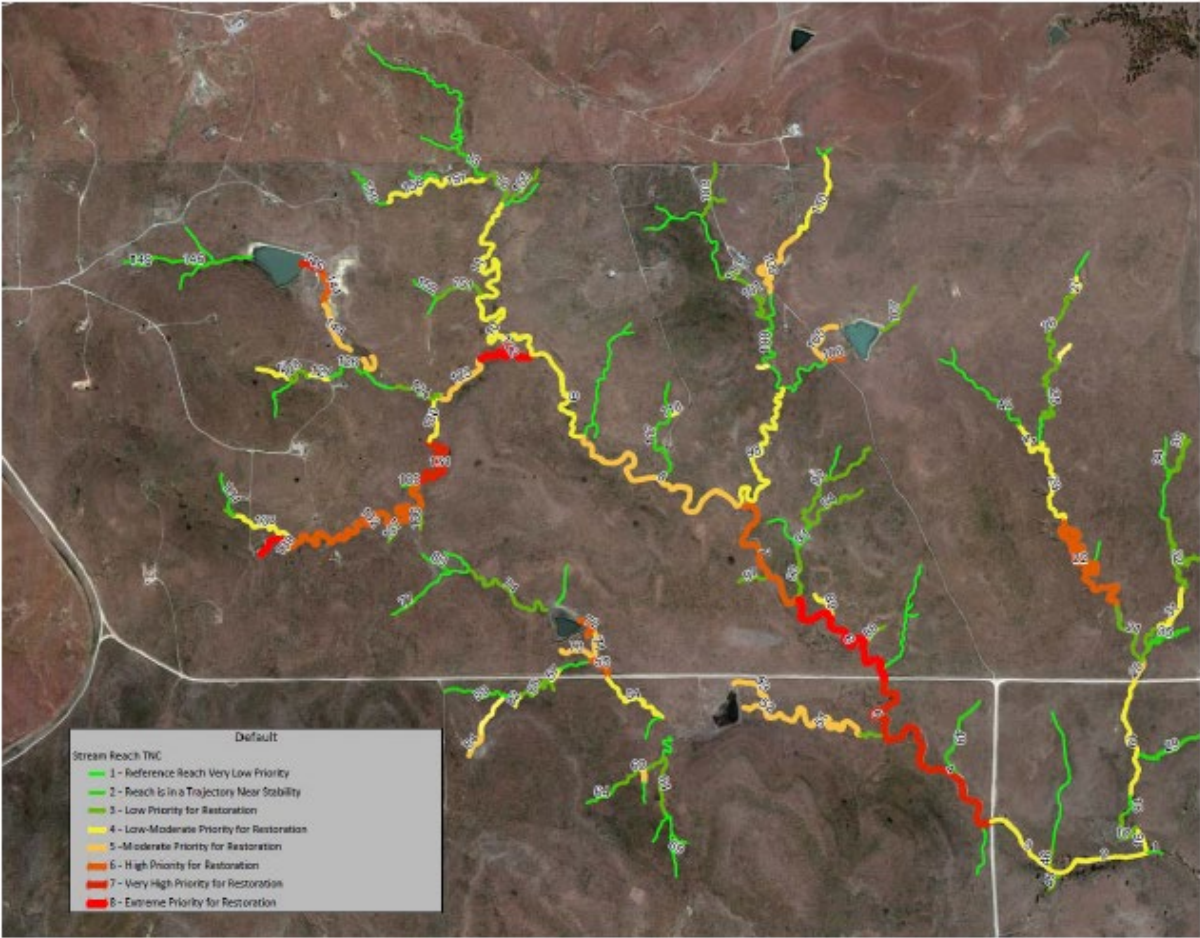


Figure 3. Restoration priorities by stream reach within Dry Creek Watershed. Figure from Bidelsbach 2011.

Priority II Restoration: The objective of Priority II restoration is to create a new, stable stream and floodplain at the existing channel-bed elevation. This is accomplished by excavating a new floodplain and stream channel at the elevation of the existing incised stream. The new channel is designed with the appropriate dimension, pattern, and profile (based on reference reach data) to fit the floodplain. Priority II restoration does not restore natural hydrology to the original floodplain, nor does it raise ground water levels. Priority II restoration is most often used when constraints such as existing development or a confined valley restrict the placement of a new excavated stream channel.

In addition to Priority I and II restoration activities, native tallgrass prairie and wetland habitat may be restored, enhanced, or created in areas where appropriate hydrology, soil, and plant structure exist or can be developed. Streambank stabilization techniques may also be applied in appropriate locations, where natural materials, such as root wads and log and rock structures, are used to stabilize an eroding streambank.

For a similar project completed in 2010 where a segment of over 2,000 linear feet stream was restored, a variety of construction equipment and natural materials, primarily collected from the Tallgrass Prairie Preserve, were used to complete the project. Construction equipment included track-hoes and a skid-steer loader. Native prairie round bales and square bales were imbedded in the stream channel to provide periodic grade control structures, and cuttings of cottonwood and willow were planted along the stream channel to improve channel stability. Topsoil from within the channel was re-distributed to provide a suitable base for permanent vegetation, and all disturbed areas were stabilized with native prairie hay (Figure 4). All hay used on the project was native tallgrass prairie hay that was harvested from the Tallgrass Prairie Preserve (8 large round bales and 180 small square bales). Project staff planted 135 “plugs” (8” x 8” x 4”) of native sod, consisting of prairie cord grass (*Spartina pectinata*), to the project stream channel. Prairie cord grass is a native warm season grass that develops a thick root base and aggressively spreads across suitable habitat. All construction impact was confined to the stream channel area, with no impacts to adjacent native prairie (no “borrowing” or disposal/piling of soil). The project area was not fenced out from the Preserve’s free-ranging herd of 2,700 bison; however, exclusion fencing may be needed for the proposed project depending on location-specific circumstances.



Figure 4. Segment of Dry Creek where stream restoration activities were completed in 2010. Left image shows degraded and eroding streambank and channel; right image shows the same segment shortly after restoration.

2.5 Alternative C: Bison Preserve Habitat Enhancement

The Bison Preserve Habitat Enhancement project, situated with the Osage Nation Ranch, includes two overall goals: 1) rehabilitating the project location to a precolonial state and increasing native species diversity, thus providing a preserve of enhanced habitat for wildlife, including approximately 200 bison already occupying the Osage Nation Ranch; and 2) creating a comprehensive management plan that considers natural and Tribal cultural resources and associated services encompassed within the Bison Preserve.

The Trustees, led by the Osage Nation, are proposing to implement habitat enhancement activities, such as native plantings, seeding, prescribed fire, grazing management, and invasive plant management, to improve the conditions within the managed areas (Figure 5). The Osage Nation Department of Natural Resources will oversee creation of a comprehensive management plan, which will describe appropriate management and monitoring approaches, such as invasive plant spot spraying with herbicides, fence maintenance, grazing and fire management, and collaboration and coordination activities with partner agencies and organizations to prevent and prosecute violations of codes and regulations associated with misuse of the Bison Preserve. Central to the project will be education and outreach focus in Native American knowledge, traditions, and land management practices.

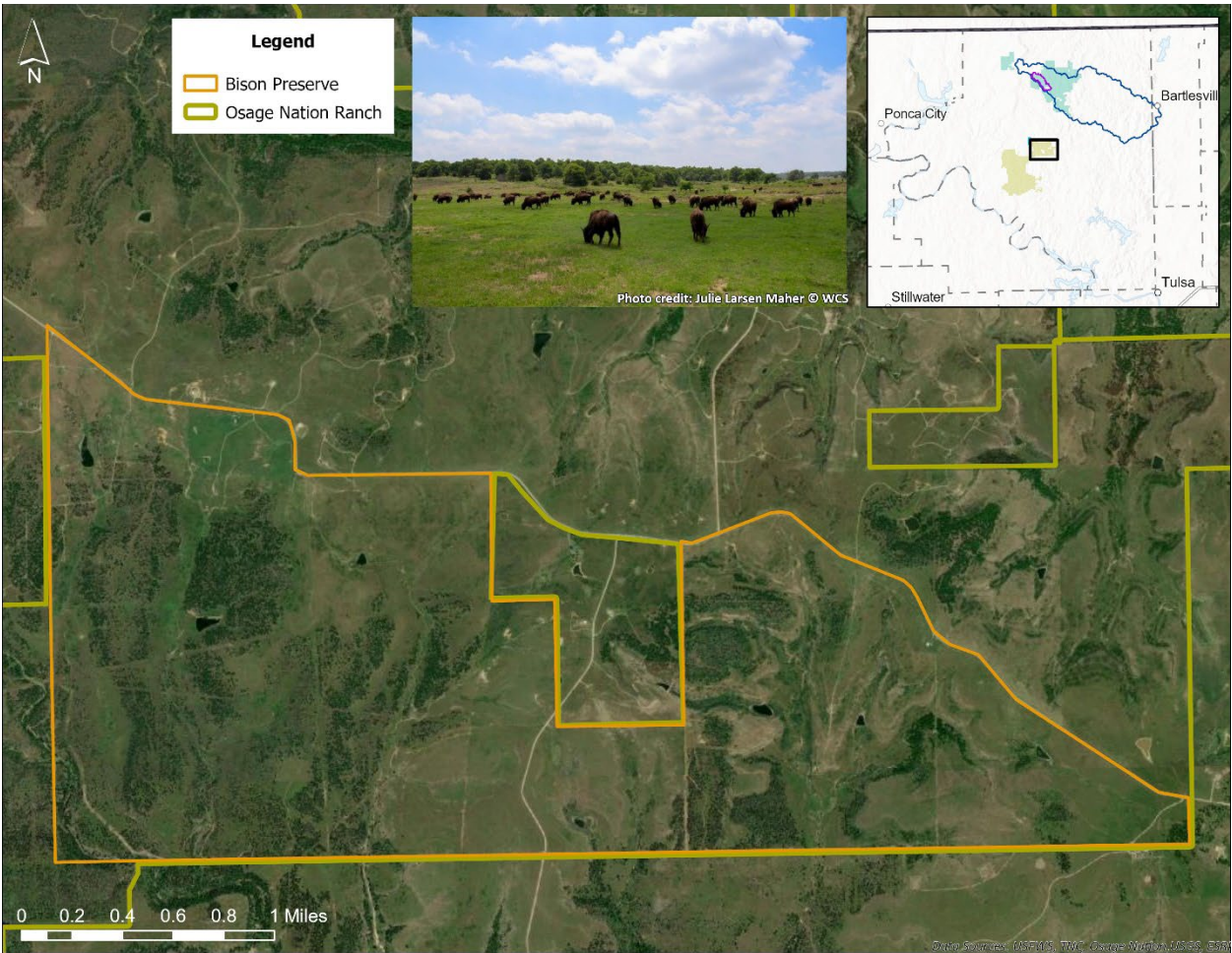


Figure 5. Area under consideration for proposed Bison Preserve Habitat Enhancement project located in Osage County, Oklahoma. Inset picture (upper middle) shows a bison herd grazing within the Osage Nation Ranch.

2.6 Alternative D: Luttrell Memorial Pond Project

The Luttrell Memorial Pond Project, situated within a 500-acre parcel within the boundaries of the Bison Preserve, includes two overall goals: 1) increasing native species diversity, thus improving habitat conditions for wildlife and pollinator species, and 2) enhancing outdoor recreation opportunities, including hiking, fishing, and wildlife viewing, for the local community. The project would include creation of a fishing pier, wildlife viewing platform, public restroom facilities meeting requirements of the Americans with Disabilities Act of 1990 (ADA), and gravel or mowed walking trails with interpretative signage. One or more of the created trails would be ADA accessible. Pond hydrology will be modified through the improvement of existing or addition of new small water control structures with the intent of enhancing waterfowl and shorebird habitat within the pond. At least a portion of the 500 acres may contain cattle. Cattle will be excluded from the pond by using fencing typical for the region, such as T-posts and either barbed wire or slick wire fencing.

Similar to the Bison Preserve Habitat Enhancement project, the Osage Nation is proposing to implement habitat enhancement activities, such as native plantings, seeding, prescribed fire,

grazing management, and invasive plant management, to improve the conditions within the managed areas (Figure 6). The Osage Nation Department of Natural Resources will oversee appropriate management and monitoring approaches, such as invasive plant spot spraying with herbicides, fence maintenance, grazing and fire management, and collaboration and coordination activities with partner agencies and organizations to prevent and prosecute violations of codes and regulations associated with misuse of the area. Project elements, such as interpretive signage on the wildlife viewing platform and along trails, may have an education and outreach focus in Native American knowledge, traditions, and land management practices.

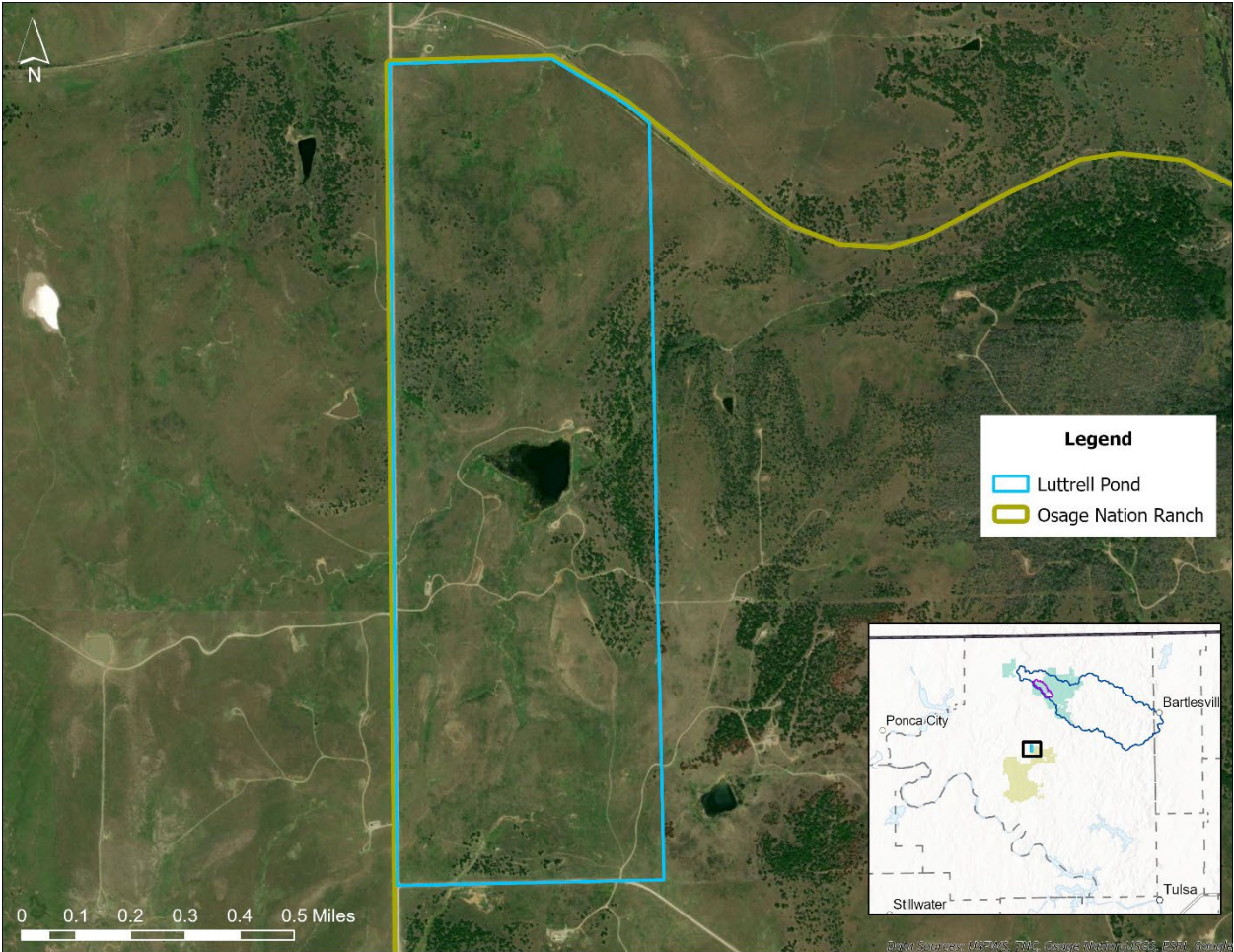


Figure 6. Area under consideration for proposed Luttrell Memorial Pond Project located in Osage County, Oklahoma. Inset picture (upper right) shows example habitat types represented within the project area.

2.7 Alternative E: Osage Nation Health Complex Improvements (Non-Preferred Alternative)

Alternative E involves a proposal to remediate a site near the Osage Nation Health Complex to provide outdoor recreational opportunities. The health complex is an approximate 75-acre area located south of Highway 60 southwest of downtown Pawhuska. This location was an old railroad right-of-way, which is now in title to the Osage Nation. The Osage Nation proceeding with remediating the site and creating an outdoor space allowing outdoor recreation opportunities for Osage Nation citizens and the surrounding community. At this site, a Phase I and Phase II environmental site assessment have been completed and further project planning is needed. The primary goal for Alternative E is to remediate the contaminated soil, which was caused by railroad-related activities, and create an outdoor space that facilitates better physical and mental health for the nearby community.

2.8 CERCLA NRDAR Factor Evaluations

Table 2. Evaluation of alternatives using restoration criteria described in Section 2.1 of this RP/EA.

Restoration Criteria	Alternative A: No Action	Alternative B: Dry Creek Restoration	Alternative C: Bison Preserve Habitat Enhancement	Alternative D: Luttrell Memorial Pond Project	Alternative E: Osage Nation Health Complex Improvements
Technical Feasibility	The No Action alternative is technically feasible.	Activities included in this alternative are technically feasible and likely to result in restoration and conservation of similar resources injured.	Activities included in this alternative are technically feasible and likely to result in restoration and conservation of similar resources injured.	Activities included in this alternative are technically feasible and likely to result in restoration and conservation of similar resources injured.	Activities included in this alternative are technically feasible.
Cost Benefit	The No Action alternative is assumed to be the least costly alternative. However, it also provides less benefits when compared to the Preferred Alternatives over a similar period. Therefore, the No Action alternative does not have a favorable benefit-to-cost ratio.	The Trustees anticipate favorable benefit-to-cost ratios given the success of similar restoration along other segments of Dry Creek, resulting in multiple resource benefits.	The Trustees anticipate favorable benefit-to-cost ratios given the success of similar restoration activities at the Bison Preserve, as well as similar activities performed on the TNC Tallgrass Prairie Preserve, focusing on restoration of multiple resources and services.	The Trustees anticipate favorable benefit-to-cost ratios given the amount of potential recreational uses and cultural services provided, as well as natural resource benefits anticipated, compared to the project costs.	This alternative does not provide favorable benefit-to-costs ratios since the project would not provide natural resource benefits and services. Expenditures for this project would be intended for enhancing recreational uses.

Table 2. Continued.

Restoration Criteria	Alternative A: No Action	Alternative B: Dry Creek Restoration	Alternative C: Bison Preserve Habitat Enhancement	Alternative D: Luttrell Memorial Pond Project	Alternative E: Osage Nation Health Complex Improvements
Cost Effectiveness	The No Action alternative is assumed to be less costly than if the Trustees were to pursue restoration under the Preferred Alternatives; however, the No Action alternative does not address interim losses of natural resources and services, whereas the Preferred Alternatives do, and therefore provides greater benefits.	Project has been developed to be cost-effective, as restoration elements, including stream channel restoration and associated nearby habitat restoration activities and invasive plant management, are actions that have been shown to be relatively inexpensive and supported by best available information.	This project type has been shown to be cost-effective, as restoration elements, including invasive plant management, grazing management, and prescribed fire, are habitat enhancement actions that have been shown to be relatively inexpensive and supported by best available information.	This project type has been shown to be cost-effective at other NRDA restoration sites. Habitat restoration, fishing piers, and trails are common activities and structures, respectively, that have proven to provide benefits to humans and environment. No other restoration alternatives for the National Zinc NRDAR propose a similar combination of activities.	This alternative is not cost-effective in terms of restoring injured natural resources since this project is not intended to accomplish such a goal. Alternative E will provide recreation benefits (for which a NRDAR claim was not submitted), whereas Alternatives B, C, and D provide a combination of natural resource enhancements with cultural and recreation co-benefits.
Actual or Planned Response Actions	There are no actual or planned response activities; therefore, there is no impact on the No Action alternative and vice versa.	There are no remedial response activities proposed that will affect implementation of Alternative B.	There are no remedial response activities proposed that will affect implementation of Alternative C.	There are no remedial response activities proposed that will affect implementation of Alternative D.	There are no remedial response activities proposed that would affect implementation of Alternative E.

Table 2 continued.

Restoration Criteria	Alternative A: No Action	Alternative B: Dry Creek Restoration	Alternative C: Bison Preserve Habitat Enhancement	Alternative D: Luttrell Memorial Pond Project	Alternative E: Osage Nation Health Complex Improvements
Adverse Impacts from Project	Does not cause further injury but provides no benefits to offset interim losses.	Majority of impacts are anticipated to be positive and long-term, although short-term adverse impacts are expected from construction activities and invasive species management. Short-term impacts are expected to be far outweighed by the longer-term benefits.	Majority of impacts are anticipated to be positive and long-term, although short-term adverse impacts are expected from habitat management activities, such as prescribed fire. Short-term impacts are expected to be far outweighed by the longer-term benefits of this Alternative.	Majority of impacts are anticipated to be positive and long-term, although short-term adverse impacts are expected from construction activities and invasive species management. Occasional disturbance to wildlife is possible from recreational and cultural activities, but these impacts are expected to be minimal and inherent due to the desired project uses and associated services.	Majority of impacts are anticipated to be positive and long-term, although short-term adverse impacts are expected from construction activities.
Natural Recovery Period and the Ability of Resources to Recover without Restoration	The natural recovery period would likely be variable and dependent on site-specific factors, especially in areas where there is residual contamination.	The recovery period to restore or enhance stream and adjacent habitat and associated services would be less than recovery period for the No Action alternative.	The recovery period to restore or enhance prairie habitat and provide Tribal cultural services would be less than recovery period for the No Action alternative.	The recovery period to restore or enhance prairie habitat and provide Tribal cultural services would be less than recovery period for the No Action alternative.	This alternative would not restore or recover natural resources and associated services (since it provides recreation opportunities); therefore, the natural recovery period of the No Action and Preferred Alternatives is less than for Alternative E.

Table 2. Continued.

Restoration Criteria	Alternative A: No Action	Alternative B: Dry Creek Restoration	Alternative C: Bison Preserve Habitat Enhancement	Alternative D: Luttrell Memorial Pond Project	Alternative E: Osage Nation Health Complex Improvements
Public Health and Safety	Any potential public health and safety issues or concerns that exist under current and future natural resource management activities would likely remain the same.	The Trustees will follow all applicable best management practices to minimize risk to public health and safety, especially during the construction period.	The Trustees will follow all applicable best management practices, including for prescribed fire activities, to minimize risk to public health and safety.	The Trustees will follow all applicable best management practices, especially for areas of intended public use, to minimize risk to public health and safety.	The Trustees would consider health and safety issues in the planning, design, construction, and maintenance of the project.
Compliance with Laws and Policies	The No Action alternative does not meet the requirements and goals of CERCLA NRDAR process to provide for restoration that compensates the public for the injury and loss of the natural resources and services caused by releases of hazardous substances.	Compliant with applicable/relevant laws, policies, and regulations.	Compliant with applicable/relevant laws, policies, and regulations.	Compliant with applicable/relevant laws, policies, and regulations.	Compliant with applicable/relevant laws, policies, and regulations.

Table 2 continued.

Restoration Criteria	Alternative A: No Action	Alternative B: Dry Creek Restoration	Alternative C: Bison Preserve Habitat Enhancement	Alternative D: Luttrell Memorial Pond Project	Alternative E: Osage Nation Health Complex Improvements
Consistency with the Trustees Restoration Goals and Objectives	The No Action alternative would not provide for restoration, replacement, enhancement or acquisition of injured natural resources, making this alternative inconsistent with Trustee restoration goals.	Consistent with restoration goals listed in Section 1.2 of this RP/EA.	Consistent with restoration goals listed in Section 1.2 of this RP/EA.	Consistent with restoration goals listed in Section 1.2 of this RP/EA.	Inconsistent with restoration goals listed in Section 1.2 of this RP/EA since habitat restoration/enhancement will not occur.

2.9 Evaluation of Restoration Alternatives

The Preferred Alternatives of this Draft RP/EA include Alternatives B, C, and D as they 1) meet the restoration project selection criteria; 2) meet the Trustees' goals and objectives to compensate the public for injuries to natural resources and associated services, as described in Section 1.4; and 3) provide co-benefits, such as enhancing Tribal cultural resources and associated services.

Alternative E does not meet all the CERCLA restoration evaluation criteria and does not meet Trustees' goals because there is low likelihood for the project to provide multiple benefits, particularly for the environment, and the project does not compensate for lost natural resources and their associated services.

3.0 Affected Environment & Environmental Consequences

This section provides additional information, consistent with NEPA requirements, on the physical, biological, socioeconomic, historical, and cultural environments within the proposed project areas in which the selected restoration actions would occur. Where site-specific information for each Alternative is not available, the description of the affected environment is at the county level for Osage County. The affected environment descriptions for individual resources provide a baseline for comparing potential environmental impacts under each alternative.

Additionally, the Trustees assess the environmental consequences to determine whether implementation of any of these alternatives may significantly affect the quality of the human environment.

The following definitions will be used to characterize the nature of the various environmental consequences evaluated in this Draft RP/EA:

- *Short-term or long-term impacts.* In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period. Long-term impacts are those that are more likely to be persistent and chronic.
- *Direct or indirect impacts.* A direct impact is caused by a proposed action and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or farther removed in distance but still be a reasonably foreseeable outcome of the action.
- *Negligible, minor, moderate, or major impacts.* These relative terms are used to characterize the magnitude of an impact. Negligible impacts are generally not quantifiable and do not have perceptible impacts on the human environment. Minor impacts are generally those that might be perceptible but, in their context, are not amenable to measurement because of their relatively inconsequential effect. Moderate impacts are those that are more perceptible and, typically, more amenable to quantification or measurement. Major impacts are those that, in their context and due to their intensity (severity), have the potential to meet the thresholds for significance set forth under NEPA (40 C.F.R. § 1508.27) and, thus, warrant heightened attention and examination for potential means for mitigation to fulfill the requirements of NEPA.
- *Adverse or beneficial impacts.* An adverse impact is one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.
- *Cumulative impacts.* Cumulative impacts are defined as the "impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 C.F.R. § 1508.8). Cumulative

impacts can result from individually minor but collectively significant actions taking place over a period within a geographic area.

3.1 Components Not Analyzed in this Document

The following components have been identified as not being present, affected, or analyzed in the Draft RP/EA. These components are not brought forward for evaluation of environmental consequences in this Draft RP/EA; however, relevant natural resources and associated ecological and Tribal cultural services are considered in the Affected Environment sections as to provide context to the reader:

- Potential impacts of the proposed restoration projects (Alternatives B, C, and D) – with the exception of herbicide applications for Alternatives B – D and infrastructure construction and maintenance for Alternative D – on the physical and biological environment; and
- Potential impacts of Alternatives B and C on recreation since they are not intended to provide recreation benefits; project goals are focused exclusively on ecological and cultural benefits.

3.2 Physical Environment

Osage County is in the Interior Plain division of the Central Lowlands physiographic/geomorphic province. This area is characterized by low-relief plains, punctuated by east-facing escarpments formed by cuestas, with mixed-grass prairie in the west, transitioning to mixed tall grass savannahs and woodlands in the east (USGS 2014).

Osage County's terrain is characterized by gently rolling rocky hills, bisected by the lowlands of the Arkansas River and its major tributaries. The average elevation of the county is about 860 feet and ranges from around 590 feet in the lowlands to a maximum of 1,407 feet northeast of Foraker (BIA 1979). Northwest Osage County has most of the highest elevation areas, at 1,116 feet or higher. This portion of the county stretches along State Highway 18 from north of US Highway 60 and includes the Kaw Wildlife Management Area (WMA), the John Dahl WMA, and the towns of Webb City, Shidler, and Grainola. The range of 985 to 1,115 feet of elevation is commonly found along the ridgelines of the drainage basins of the major creeks that begin in the northwest portion of the county and flow southeasterly (Osage County 2011).

Major watersheds in Osage County include Bird, Black Bear-Red Rock, Caney, Kaw Lake, and Polecat-Snake. Sand Creek is a small prairie stream that has been identified as a priority stream in The Nature Conservancy's Osage Plains/Flint Hills Prairie ecoregional planning process. Sand Creek represents one of the best remaining examples of a prairie stream in the ecoregion.

Sand Creek, located mostly within TNC's Joseph Williams Tallgrass Prairie Preserve, is a small prairie stream in Osage County, Oklahoma, and is identified as a priority stream in TNC's Osage Plains/Flint Hills Prairie ecoregional planning process. Sand Creek represents one of the best remaining examples of a prairie stream in the ecoregion. Dry Creek, a headwater tributary to Sand Creek, is a prairie stream in a rolling alluvial valley. In their most pristine state, streams such as Dry Creek should have small rectangular channels and overhanging banks held together by the thick root mats of dense riparian sedges and grasses. Dry Creek is currently eroding, resulting in a stream with an overly deep, overly wide channel and active head cuts. The increased sediment entering the channel from bank erosion has converted a gravel-bottomed stream into a silty stream, impairing the viability of existing fisheries and aquatic biodiversity adapted to gravel streams. Current conditions of a high percentage of Dry Creek reaches are producing a sediment supply rate from bank erosion that is over an order of magnitude higher than what we would be expected from a stable stream supplying sediment to downstream reaches. Erosion problems are likely the result of historical grazing practices and land management activities in the area.

3.2.1 Environmental Consequences

3.2.1.1 No Action Alternative

The No Action Alternative would not result in any hydrology, soils, or water quality impacts because no restoration actions would be undertaken. Physical environment conditions would retain current status under this alternative.

3.2.1.2 Preferred Alternatives

Invasive Species Management

Burning, thinning, or pesticide use to effect habitat structure and control invasive species may have short-term negative consequences to soil and water. However, the long-term benefits to fish and wildlife species that depend on habitats having a high percentage of native plant species would far outweigh the short-term impacts. The Trustees would ensure that the implementing entity, whether it be a governmental, private, or non-governmental organization, would follow best management practices (BMPs) when implementing habitat management, including proper use of pesticides; and burning or forest thinning would meet health and safety guidelines and habitat enhancement recommendations recommended or approved by the Trustees.

Regarding herbicide usage to control invasive species, such actions could cause direct, short-term, minor to moderate adverse impacts to soil and water. These impacts would result from the potential for lethal effects on soil biota and the short-term loss of shading and habitat for prey species provided by invasive plants. The potential impacts to soil and water will be mitigated by using the least toxic herbicides, surfactants, and spray pattern indicators available, but short-term direct and indirect adverse impacts are possible. Potential impacts to the environment are reduced when proper application methods are prescribed and followed, but rainfall and wind may cause herbicides to leach into the surrounding soil or to be transported to non-invasive plants, causing unintentional damage. BMPs, including use of a certified applicator, using herbicides approved for application within wetlands, and placement of straw wattles or similarly functioning materials to trap sediment, would be employed when herbicides are used. A project area may be treated several times per year, often for multiple years, to control regrowth of invasive plants. Where feasible, the area will be regularly monitored for regrowth of the target or new invasive species. Generally, use of herbicides in project areas would be conducted according to established protocols for the locality, as determined by a licensed herbicide applicator. Such protocols would include information and guidelines regarding the appropriate chemical to be used, as well as the timing, amounts, application methods, and safety procedures relevant to the herbicide application.

Construction Activities

Restoration activities that may have short-term, adverse effects to the physical environment, including soil and water quality, include mechanical clearing, clearing of invasive species, and infrastructure construction activities. Construction equipment anticipated to be used for the types of restoration activities proposed (e.g., grading, clearing, and infrastructure construction) includes diesel backhoe, bulldozer, skid-steer loader, excavator, dump truck and grader. These types of equipment would likely be used for one to several weeks and, in some cases, up to one month at a time, depending on the nature and design of the project.

Best Management Practices would be implemented, as appropriate, to minimize the disturbance and/or local effects. These may include:

1. Halting use of heavy construction equipment during heavy rains;
2. Flagging authorized restoration areas to prevent impacts outside of designated areas;
3. Monitoring of vegetation regrowth to prevent excessive erosion in restored areas and implementation of corrective actions in areas identified as experiencing excessive erosion by installation of straw bale barriers, straw wattles, or silt fence.

3.2.1.3 Non-Preferred Alternative

Implementation of the Osage Nation Health Complex project (Alternative E) would result in short-term, direct, minor to moderate, and adverse impacts to the physical environment due to construction activities. Adverse impacts to the physical environment due to construction activities would likely occur only during the construction period, assumed to be 3 to 6 months, depending on the nature of the project. Impacts are anticipated from mechanical clearing and infrastructure construction activities using equipment described in Section 3.2.1.2.

3.3 Climate and Air Quality

Climate

The proposed projects are located in an area classified as part of the Southern Great Plains. The climate there tends to be characterized by long, hot summers and severe winters (Kloesel et al. 2018). The average temperature in Osage County is about 59 degrees Fahrenheit, with an average high temperature around 93 degrees and an average low temperature around 23 degrees. The annual mean temperature increased by about 1 degree Fahrenheit between 1970 and 2007, as measured at the National Weather Service field station in Pawhuska (USGS 2014).

Annual rainfall in Osage County ranges from about 36 inches in the west and northeast to 45 inches in the southeast, with May and September typically receiving the most precipitation (USGS 2014). The region tends to be susceptible to droughts (Kloesel et al. 2018).

Climate change in the Southern Great Plains is described in the Fourth National Climate Assessment (Kloesel et al. 2018). The beginning of the chapter focused on the Southern Great Plain provides an overview of how climate change is affecting the region in five key topic areas, where two of these topics (Ecosystems and Ecosystem Services; Indigenous Peoples) have relevance to the Preferred Alternatives. Key messages about these topics include:

- Ecosystems and Ecosystem Services: Terrestrial and aquatic ecosystems are being directly and indirectly altered by climate change. Some species can adapt to extreme droughts, unprecedented floods, and wildfires from a changing climate, while others cannot, resulting in significant impacts to both services and people living in these ecosystems. Landscape-scale ecological services will increase the resilience of the most vulnerable species.
- Indigenous Peoples: Tribal and Indigenous communities are particularly vulnerable to climate change due to water resource constraints, extreme weather events, higher temperature, and other likely public health issues. Efforts to build community resilience can be hindered by economic, political, and infrastructure limitations, but traditional knowledge and intertribal organizations provide opportunities to adapt to the potential challenges of climate change.

In the Southern Great Plains, climate projections indicate that droughts, heat waves, and extreme rainfall will occur with greater frequency and intensity. Projections for heat waves in the Southern Great Plains are depicted in Figure 7. Based on the Climate Mapping for Resilience and Adaptation tool (<https://resilience.climate.gov/>), Osage County historically (1976 - 2005) experienced approximately 1.5 days where the maximum temperature exceeded 105°F. Early-century projections (year 2030; low emissions scenario) estimate the number of days with temperatures exceeding 105 °F at approximately 6 days. There is a similar, although less severe, trend for drought – indicator is annual number of dry days -- where the historical average is approximately 203 days and the mid-century projection (year 2050; low emissions scenario) is 208 days.

Projected Increase in Number of Days Above 100°F

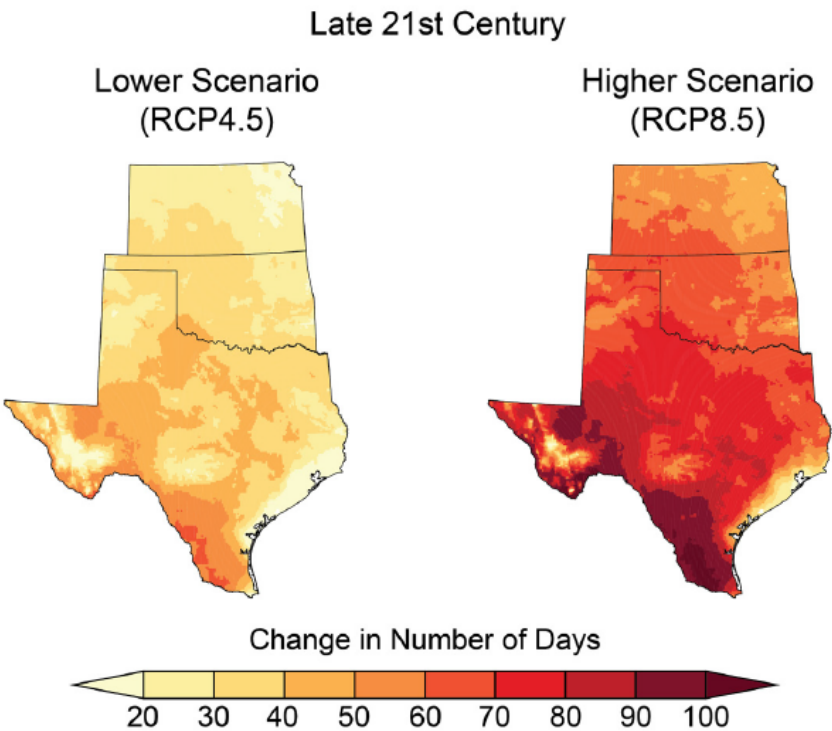


Figure 7. Number of days exceeding 100°F across the Southern Great Plains by the end of the century based on two climate model scenarios. Sources: NOAA National Centers for Environmental Information and North Carolina Institute for Climate Studies

Air Quality

Under the 1990 amendments to the Clean Air Act (CAA), Tribal governments are to be treated as states; however, unlike states, Tribes are not required to implement all CAA requirements. Instead, they are authorized to develop and implement CAA requirements that they deem appropriate. In the event that a Tribe does not have the desire or capability to administer CAA programs, the EPA generally oversees the implementation of the CAA on Tribal lands. In Oklahoma, the EPA has delegated responsibility for implementing the CAA to the Oklahoma Department of Environmental Quality. In parts of Osage County that are not considered Indian country, the Oklahoma Department of Environmental Quality is responsible for most permitting under the CAA.

Air quality standards have been established nationwide for six criteria pollutants that are considered to be key indicators of air quality: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and 2 categories of particulate matter (less than 10 microns in diameter [PM10] and less than 2.5 microns in diameter [PM2.5]). Osage County is in attainment or is unclassified for all National Ambient Air Quality Standards (EPA 2017). Significant contributions of regulated air pollutants in Osage County originate from the greater Tulsa metropolitan area, industrial point sources, and oil and gas development activity. There are no permanent air quality monitoring stations in Osage County.

3.3.1 Environmental Consequences

3.3.1.1. No Action Alternative

The No Action Alternative would not result in any air quality impacts since no restoration actions would be undertaken. Climate variables and air quality would retain current status under this alternative.

3.3.1.2 Preferred Alternatives

Climate

Grasslands, including prairie, have the potential to be net sinks for carbon, although their carbon storage capacity is variable across the landscape. Plants roots provide the primary input of carbon into grassland soils, but litter incorporation into soil provides an additional contribution to soil carbon. Biomass carbon includes carbon stored in above- and below-ground live plant components (such as leaf, branch, stem and root) as well as in standing and down dead woody debris, and fine litter. Although there is uncertainty about how much carbon would be sequestered in soil and biomass as a result of habitat restoration and enhancement actions, we can logically assume that successful habitat restoration, particularly in prairie areas, will result in an increase of plant- and soil-stored carbon above the current amount. Ecological restoration and enhancement activities within project areas contribute to ecological services and increase the likelihood of enhancing resilience for vulnerable species.

In addition to enhancing resilience of project area habitats and associated wildlife, the proposed projects provide a mechanism for the transfer of traditional knowledge, which can help Tribal communities adapt to the potential challenges of climate change. Research and development of land management practices within the project footprints of Alternatives C and D provides an opportunity for the Osage people and other Native Americans to continue transferring knowledge that has been practiced and shared for many generations.

Overall, the Preferred Alternatives are anticipated to have long-term, minor, indirect, and beneficial impacts on climate variables relevant at the county level, particularly Tribal and grassland community resilience.

Air Quality

Temporary and minor increases in emissions, such as smoke, fuel vapors, or herbicide aerosols from construction equipment or habitat management activities would occur during restoration activities. However, no air quality permits are required for these types of projects and no violations of state air quality standards would be expected from a project of this type and scope. All equipment used for restoration activities would be compliant with EPA emission standards. Emissions generated from operation of construction equipment would not generate a noticeable increase in levels of emissions outside of normal environmental conditions or have direct or indirect adverse impacts to humans in the urban and rural areas within or beyond the Action Area. Impacts to air quality would be short-term, direct, adverse, and negligible to minor.

3.3.1.3 Non-Preferred Alternative

Implementation of the Osage Nation Health Complex project would result in short-term, direct, negligible to minor, and adverse impacts to air quality, primarily due emissions from construction equipment. Adverse impacts to air quality due to construction activities would likely occur only during the construction period, assumed to be 3 to 6 months, depending on the nature of the project.

Greenhouse gas emissions from construction equipment would be negligible and have no impact on climate change variables relevant at the county level. Alternative E does not include any project elements contributing to climate resilience.

3.4 Biological Environment

Natural Habitats and Vegetation

According to the Oklahoma Biological Survey (Hoagland 2000), Osage County contains three dominant vegetation types: post oak-blackjack forest, tallgrass prairie, and bottomland forest along the Arkansas River however, none of the Alternatives include bottomland forest habitat. Less than 10 percent of the county is developed or barren. Less than 30% of the land in Osage County is considered natural habitats, whereas approximately 1,000,000 acres (~68% of land) was farmland in 2017, where 90% of that was either pastureland or cropland (USDA National Agricultural Statistics Service 2017).

Post oak-blackjack forest, also locally known as the cross timbers, is characterized by a mix of forest, woodland, and grassland vegetation. Common woody species are post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), black oak (*Q. velutina*), blackhaw (*Viburnum*

prunifolium), black hickory (*Carya texana*), gum bumelia (*Sideroxylon lanuginosum*), Mexican plum (*Prunus mexicana*), redbud (*Cercis* spp.), roughleaf dogwood (*Cornus drummondii*), and sumac (*Rhus* spp.). The understory is made up of little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), and other species, depending on the site (Duck and Fletcher 1943; Hoagland 2000), though understory and regeneration are often limited where there is cattle grazing in this vegetation type. Forest stands may lack sufficient regeneration due in part to the cattle grazing, fire suppression, and lack of forest management.

Tallgrass prairies contain primarily grasses, such as little bluestem, big bluestem, Indiangrass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*). Other herbaceous plants found in the tallgrass prairie are lead plant (*Amorpha canescens*), Indian plantain (*Arnoglossum plantagineum*), prairie clover (*Dalea purpurea*), heath aster (*Aster ericoides*), pallid coneflower (*Echinacea pallida*), ashly sunflower (*Helianthus mollis*), and Missouri goldenrod (*Solidago missouriensis*). Tallgrass prairie has declined in acreage due to agricultural conversion throughout the region; however, large expanses of this vegetation type still occur in Osage and adjacent counties. The largest protected remnant of tallgrass prairie remaining on earth is the TNC's Tallgrass Prairie Preserve, roughly 40,000 acres in total. Prescribed fire, herbicide applications, and cattle or bison grazing management are common approaches used to maintain and improve ecological diversity within prairie habitat.

Freshwater wetlands are classified as river (including streams and creeks), lacustrine (lakes and reservoirs), and palustrine (forested, scrub-shrub, emergent and ponds) (Cowardin et al. 1979). Wetlands associated with the proposed projects areas include river and palustrine.

Oklahoma Invasive Plant Council (2014) has identified the following nonnative, invasive species occur in Osage County: Japanese brome (*Bromus arvensis*), cheatgrass (*Bromus tectorum*), sericea lespedeza (*Lespedeza cuneata*), Johnsongrass (*Sorghum halepense*), beefsteak plant (*Perilla frutescens*), poison hemlock (*Conium maculatum*), field bindweed (*Convolvulus arvensis*), Mexican fireweed (*Bassia scoparia*), sulphur cinquefoil (*Potentilla recta*), and common mullein (*Verbascum thapsus*). In addition to these invasive, non-native plants, at least one noxious weed, musk thistle (*Carduus nutans*), has been documented in Osage County.

Fish and Wildlife

The Cross Timbers and Flint Hills Ecoregions dominate most of Osage County and provide habitat for an array of wildlife and fish species. Among those, nine species are federally-protected under the Endangered Species Act (Table 3) and also protected under Title 29 of Oklahoma state law. No critical habitat has been designated in Osage County for any of the federally-protected species (IPaC 2022). In addition to federally protected species, a wide variety of mammals are present, including five species of bats and a broad diversity of small to large mammals, including white-tailed deer (*Odocoileus virginianus*), armadillos (*Dasypus novemcinctus*), beavers (*Castor canadensis*), gophers (family *Geomyidae*), raccoons (*Procyon lotor*), red foxes (*Vulpes vulpes*), coyotes (*Canis latrans*), bobcats (*Lynx rufus*), and woodchucks (*Marmota monax*). As many as 43 species of mammals have been recorded in the Tallgrass Prairie Preserve (Payne et al. 2001). According eBird data (2017), 236 species of birds have been observed in the Tallgrass Prairie Preserve. Species commonly associated with the preserve are Bell's vireo (*Vireo bellii*), greater prairie-chicken (*Tympanuchus cupido*), Henslow's sparrow (*Ammodramus henslowii*), northern bobwhite (*Colinus virginianus*), painted bunting (*Passerina ciris*), and the red-headed woodpecker (*Melanerpes erythrocephalus*). Larger tracts of natural habitats in Osage County, such as the Tallgrass Prairie Preserve and Osage Nation's Bison Preserve, provide important nesting, wintering, and migratory stopover habitat for many bird species, including migratory Birds of Conservation Concern (Table 4). These areas are also important because grassland bird species are among the most imperiled group of birds in the United States, where total populations have declined more than 40 percent since the mid-1960s (Wilsey et al 2019).

Table 3. List of federally protected species potentially occurring in Osage County, Oklahoma. Data from U.S. Fish and Wildlife Service Information, Planning, and Conservation System (<http://ecos.fws.gov/ipac>) generated on December 7, 2022. Key: E – Federally Endangered, T – Federally Threatened, C - Federal Candidate, PE – Proposed Endangered

Common Name	Scientific Name	Status
American burying beetle	<i>Nicrophorus americanus</i>	T
Monarch butterfly	<i>Danaus plexipus</i>	C
Neosho mucket	<i>Lampsilis rafinesqueana</i>	E
Northern long-eared bat	<i>Myotis septentrionalis</i>	E
Piping plover	<i>Charadrius melodus</i>	T
Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i>	T
Red knot	<i>Calidrius canutus rufa</i>	T
Tricolored bat	<i>Perimyotis subflavus</i>	PE

Table 4. List of migratory Birds of Conservation Concern potentially occurring in Osage County, Oklahoma. Data from IPaC, December 7, 2022.

Common Name	Scientific Name	Seasonal Occurrence
American golden-plover	<i>Pluvialis dominica</i>	Non-breeding seasons
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	Breeding – May 15 to October 10
Bobolink	<i>Dolichonyx oryzivorus</i>	Breeding – May 20 to July 31
Chimney swift	<i>Chaetrua pelagica</i>	Breeding – March 15 to August 25
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	Breeding – May 1 to August 20
Henslow’s sparrow	<i>Ammodramus henslowii</i>	Breeding – May 1 to August 31
Kentucky warbler	<i>Geothlypis formosa</i>	Breeding – April 20 to August 20
Lesser yellowlegs	<i>Tringa flavipes</i>	Non-breeding seasons
Little blue heron	<i>Egretta caerulea</i>	Breeding – March 10 to October 15
Prothonotary warbler	<i>Protonotaria citrea</i>	Breeding – April 1 to July 31
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Breeding – May 10 to September 10
Rusty blackbird	<i>Euphagus carolinus</i>	Non-breeding seasons
Sprague’s pipit	<i>Anthus spragueii</i>	Non-breeding seasons
Upland sandpiper	<i>Bartramia longicauda</i>	Breeding – May 1 to August 31
Wood thrush	<i>Hylocichla mustelina</i>	Breeding – May 10 to August 31

3.4.1 Environmental Consequences

3.4.1.1 Alternative A: No Action

The No Action Alternative would not result in any impacts to the biological environment since no restoration actions would be undertaken. Biological environment conditions would retain current status under this alternative.

3.4.1.2 Preferred Alternatives

Construction activities, such as clearing and earth moving, would directly impact plant communities and soil or sediment-dwelling biota in those areas. Once construction is completed, vegetation would be restored by planting with species native to Osage County, including culturally important plants, followed by management activities to reduce potential occurrence of invasive plant species. Soil and sediment-dwelling biota are anticipated to repopulate disturbed areas, either through assisted reintroduction or natural recolonization. Disturbed areas would be monitored after construction to identify and correct erosion that threatens revegetation.

The analysis from Section 3.2.1.2 concerning herbicide impacts to the environment is carried forward here with the exception that impacts to biological resources are considered. Herbicide applications have the potential to cause direct and indirect, short-term, and minor adverse impacts to the biological environment, with the most severe impacts to targeted non-native invasive plants. Despite initial adverse impacts, beneficial responses are anticipated in the long-term due to suppression or eradication of non-native invasive species and replacement with native plants. Non-native invasive plant can reduce ecological services when compared to native plant species because native species provide the keystone elements for ecosystem functions. Native plants will, in most cases, form self-sustaining plant communities that do not require much maintenance because they are adapted to a local region. There are specific associations of

mycorrhizae with plants, invertebrates with woody debris, pollinators with flowers, and birds with structural habitat that present only with native plants (Dorner 2006). There are also cultural associations between native plants and Cherokee, Delaware, and Osage peoples, such as little bluestem and Cherokee citizens, black cherry (*Prunus cerotina*) and the Delaware peoples, and Maximilian sunflower (*Helianthus maximiliani*) and Osage citizens.

Best management practices for greater prairie chickens, a species which has experienced a severe decline in both range and numbers beginning as far back as the mid-1900s, will be taken into consideration for all proposed restoration areas, where applicable. Required habitat elements for greater prairie chicken are leks nesting cover, brood rearing cover, food, escape cover, and loafing/roosting cover. Best management practices for greater prairie chicken take into consideration these required habitat elements and include the following (OSU 2008):

- Keep livestock grazing patchy to maintain leks (short grass), nesting cover (tall grass – 18 inches), brood cover (tall forbs with sparse grass – 18 inches), food (forbs and sparse grass), and protective cover (thermal and escape – tall forbs and grass – 18 inches). Avoid uniform grazing except on leks.
- Avoid use of electric fencing.
- Implement patch burning to provide the structural, compositional, and spatial diversity.
- Eliminate regular use of broadcast herbicides.
- Introduce or restore native warm season grasses and forbs, converting non-native and invasive species, including trees, where practicable.
- Cut native hay meadows between July 1 and July 10, never cutting twice.
- Remove all trees from the area including field windbreaks and living snow fences, where practicable.
- Muffle all pumpjacks or other sources of noise.

3.4.1.3 Non-Preferred Alternative

Implementation of the Osage Nation Health Complex project (Alternative E) would result in short-term, direct, minor to moderate, and adverse impacts to the biological environment due to construction activities. With the exception of permanent displacement of biological resources in the footprint of the constructed facilities, adverse impacts to the biological environment due to construction activities would likely occur only during the construction period, assumed to be 3 to 6 months, depending on the nature of the project. Impacts are anticipated from mechanical clearing and facilities construction activities using equipment described in Section 3.2.1.2.

3.5 Environmental Justice

Executive Order 12898 (February 11, 1994) requires each federal agency to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. In a memorandum to heads of departments and agencies that accompanied Executive Order 12898, the President specifically recognized the importance of procedures under NEPA for identifying and addressing environmental justice concerns. The memorandum states that “each federal agency shall analyze the environmental effects, including human health, economic and social effects, of federal actions, including effects on minority communities and low-income communities, when such analysis is required by [NEPA]” and emphasizes the importance of NEPA’s public participation process in particular, directing that “each federal agency shall provide opportunities for community input in the NEPA process.” The Council on Environmental Quality has oversight of the federal government’s compliance with Executive Order 12898 and NEPA.

For the purpose of evaluating environmental justice issues associated with implementation of the Preferred Alternatives, demographic data were obtained from the U.S. Census Bureau and the Climate and Economic Justice Screening Tool (CEJST, version 1.0; released November 22, 2022) for census tract 40113940004 in Osage County, which is located adjacent to and west of Bartlesville and contains the town of Osage, among other small towns, and part of the Tallgrass Prairie Preserve. In this analysis, a community is identified as disadvantaged on the CEJST map if it is in a census tract that is (1) at or above the threshold for one or more environmental, climate, or other burdens, and (2) at or above the threshold for an associated socioeconomic

burden. In addition, a census tract that is completely surrounded by disadvantaged communities and is at or above the 50% percentile for low income is also considered disadvantaged.

Based on the census data for the above-mentioned census tract, the area in this tract is considered disadvantaged. It is completely surrounded by tracts that are disadvantaged and meets an adjusted low-income threshold.

3.5.1 Environmental Consequences

3.5.1.1 No Action Alternative

The No Action Alternative would not result in any impacts to environmental justice issues since no restoration actions would be undertaken.

3.5.1.2 Preferred Alternatives

The Preferred Alternatives will not have a disproportionately high and adverse effect on minority or low-income populations. However, the Trustees believe there is a high likelihood of at least one of the projects (Alternative D) benefiting low-income, minority, and Tribal populations living in the vicinity of the proposed project, primarily in the form of increased recreation access (e.g., hiking and wildlife viewing), subsistence fishing, education and knowledge transfer opportunities, and gathering of plants and other natural products.

3.5.1.3 Non-Preferred Alternative

Implementation of the Osage Nation Health Complex project (Alternative E) would result in long-term, direct, minor to moderate, and beneficial impacts to socioeconomic factors and environmental justice, primarily in the form of supported jobs and improved social well-being to nearby communities, including disadvantaged households.

3.6 Recreational Services

Osage County offers a variety of recreation experiences to residents and visitors. Hunting and fishing occur within federally, state, and Tribal-managed lands within Osage County. There are seven wildlife management areas that provide opportunities for hunting, fishing, and camping. Osage Hills State Park includes picnic tables and shelters, recreational vehicle campsites, cabins, and hiking trails. Visitors can fish for bass, crappie, catfish, and perch in Lookout Lake or in Sand Creek, both located within the park. The Hulah Lake Project in northeast Osage County, operated by the U.S. Army Corps of Engineers, provides opportunities for fishing, hunting, camping, boating, and swimming. The Tallgrass Prairie Preserve is open to the general public from dawn to dusk, offering the public opportunities to view free-range bison, hike, and picnic.

3.6.1 Environmental Consequences

3.6.1.1 No Action Alternative

Under the No Action Alternative, recreation access and opportunities would not be altered from their current condition.

3.6.1.2 Preferred Alternatives

Implementation of the Alternative D would result in long-term, direct and indirect, minor to moderate, and beneficial impacts to recreation. Implementation of Alternative D will increase opportunities for recreation and provide economic benefits. In addition to directly providing recreation opportunities, the proposed project will enhance the experience of visitors through restoration or enhancement of ecological and/or cultural resources and associated services, such as increases in prairie habitat bird diversity or abundance of culturally important plants.

3.6.1.3 Non-Preferred Alternative

Implementation of the Osage Nation Health Complex project (Alternative E) would result in long-term, direct, minor to moderate, and beneficial impacts to recreation. Visitors, primarily from nearby communities, would be able to experience an outdoor space providing outdoor recreation opportunities.

3.7 Cultural Resources

Cultural resources are locations of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. Cultural resources include archaeological, historical, or architectural sites and structures, as well as natural features, plants, animals, and locations that have been identified as traditionally important or sacred to a culture, subculture, or community. The significance of these resources is derived from the role they play in a community's cultural identity, as defined by its beliefs, practices, history, and social institutions.

The cultural resources of Osage County reflect a long history of use and occupation dating back possibly 8,000 years or more and continuing to the present day (May 2009). According to Osage oral tradition and research, the ancestors of the Osage migrated from what is now the Ohio River Valley, beginning in AD 400. The historic Osage Reservation was part of the Oklahoma Territory under the Organic Act of 1890 and was made a semiautonomous district by the Enabling Act of 1906. At statehood in 1907, the Osage lands were established as Osage County.

Archaeological site types encountered in Osage County include prehistoric camps and villages, prehistoric lithic or stone tool scatters, prehistoric rock art and rock shelters, prehistoric and historic graves and cemeteries, abandoned farmsteads, structural remains of the earlier periods of oil and gas development, and refuse deposits. Old trail routes, roads, and waterways are frequently associated with archaeological sites.

According to data gathered from the Oklahoma State Historic Preservation Office (SHPO), as of 2016 there were 838 prehistoric and historic archaeological sites recorded in Osage County. Of these, 495 are prehistoric, 273 are historic, and 69 are both prehistoric and historic. The most common prehistoric site type classification is open habitation without mounds (435 sites), followed by rock shelters (30 sites) and prehistoric quarries/workshops (10 sites). The most common historic site type includes structural remains of historic farmsteads, homesteads, and cabins (146 sites), followed by trash dumps (38 sites) and the location of mills or other commercial or industrial activities (32 sites; SRI 2016). However, much of the county has not been surveyed, and it is likely that additional archeological sites exist.

Cultural resources in the county also include historic districts, buildings, bridges, farmsteads, monuments, other standing structures, and groups of buildings. As of April 2017, there were 23 cultural resources formally listed on the National Register of Historic Places; all represent the historic-era built environment. Each of these listed historic-era resources are also included among 31 properties that are designated as Oklahoma State Landmarks.

In addition to the above-mentioned cultural resources, the Osage, Delaware, and Cherokee peoples historically and currently hunt, gather, and provide educational opportunities on cultural practices, and recreate in woodland, prairie, and riparian locations in north central and northeastern Oklahoma. Plant and animal resources continue to be a major contributor to tribal members' daily life. Tribal members continue to utilize biological resources - plant and wildlife species - for subsistence and for tribal cultural practices. Certain plants, herbs, shrubs, and woody plants found in Osage County serve tribal cultural functions in the production of crafts, basket weaving, flutes, hunting accessories, etc. Fruit and nut bearing trees provide for sustenance, crafts, lumber, firewood, etc. Tribal members utilize fish, mussels, crustaceans, amphibians, and turtles as subsistence resources, and the shells of turtles and mussels in tribal ceremonies. Wildlife, such as deer, raccoon, rabbit, squirrel, bobcat, beaver, mink, muskrat, ducks, geese, quail, greater prairie chicken, etc., provide subsistence resources, as well as cultural resources through their hides, hair, feathers, and such. Tribal members also use soils for many traditional and cultural purposes. The soil supports wildlife, plants (including important crops), and is used directly for pottery and cultural purposes. Water resources and associated water quality have cultural significance to the Tribes. In addition to providing recreation, water supplies, and habitat for aquatic biota, the surface water is used for spiritual purposes by tribal members and citizens. Through subsistence, cultural, and religious affiliation, and as tools for teaching upcoming generations, tribal members depend upon a healthy, uncontaminated environment and natural resources to maintain their way of life.

The Osage Nation Historic Preservation Office, Oklahoma SHPO, and Oklahoma Archeological Survey are notified of each project or permit application where there may be ground-disturbing activities.

3.7.1 Environmental Consequences

3.7.1.1 No Action Alternative

Under the No Action Alternative, tribal cultural resources and services would not be altered from their current condition.

3.7.1.2 Preferred Alternatives

Implementation of the Preferred Alternatives would result in long-term, direct and indirect, moderate, and beneficial impacts to cultural resources. The Preferred Alternatives would provide new and/or enhancements to traditional gathering areas and educational opportunities beyond what currently exists in Osage County. Expanded or new use of the proposed restoration areas increases the potential for rehabilitation of cultural resources and traditional lifeways.

3.7.1.3 Non-Preferred Alternative

Implementation of the Osage Nation Health Complex project (Alternative E) may result in long-term, indirect, minor, and beneficial impacts to cultural resources, depending on the constructed project elements. Visitors, primarily from nearby communities, may have access to tribal educational opportunities and community gatherings that would result in enhancement of well-being, appreciation of heritage and culture, and exchange of culturally important information.

3.8 Cumulative Impacts

The CEQ regulations to implement NEPA require the assessment of cumulative impacts in the decision-making process for federal projects, plans, and programs. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 C.F.R. §1508.7). As stated in the CEQ handbook, “Considering Cumulative Effects” (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful.

The cumulative effects analysis of Preferred Alternatives in this Draft RP/EA is commensurate with the nature of proposed project types and the degree of direct and indirect effects anticipated from implementation of the primarily beneficial projects. For the purpose of this analysis, the cumulative impact spatial boundary includes the project areas and areas in close proximity to the projects within Osage County. The Preferred Alternatives include three restoration alternatives, encompassing a range of potential activities intended to conserve and restore habitats within Osage County and provide co-benefits, such as the restoration or enhancement of Tribal cultural resources and services. Collectively, these activities are intended to compensate the public for past injuries and losses to trust resources and services resulting from releases of hazardous substances at or from the National Zinc Smelter Site. The Preferred Alternatives are anticipated to result in predominantly beneficial impacts to those same resources and services, to help return injured natural resources and associated services to baseline conditions, and to compensate for interim losses.

Implementing the alternatives as proposed and analyzed in this Draft RP/EA would have no major adverse impacts Osage County habitats, on adjacent lands and waterways, or on the natural resources within each. As described in previous sections, the proposed projects may result in minor, short-term adverse impacts and both short- and long-term beneficial impacts. When considered with other past, present, and reasonably foreseeable future actions within the project areas and in areas nearby, the proposed projects are not anticipated to have adverse cumulative impacts. Direct and indirect adverse impacts, as discussed previously, are likely to be short-term and, except for periodic activities for invasive species management, to occur only during periods of active construction activities. Periods of active construction will vary (weeks to a few months), but individually and cumulatively, would result in only short-term impacts.

The resources or services that may be temporarily impacted during construction activities include air quality (by increased dust, noise, and exhaust fumes from construction equipment and pollution (smoke) from prescribed burns), soils and sediments (direct disturbance), water quality (from temporary increases in turbidity), and noise (during active restoration implementation).

Some short-term, minor impacts to fish, wildlife, and vegetation in the project areas could occur, but impacts to these and other resources would be minimized by the use of BMPs. Consequently, the minor and short-term impacts of restoration and habitat enhancement activities on air quality, soils and sediments, water quality, and noise have a low potential to result in cumulative significant impacts to these resources.

The Preferred Alternatives are not expected to result in significant cumulative impacts on the human environment since they alone, or in combination with other current and future activities -- such as oil and gas development and production and other similar conservation and restoration projects -- in the vicinity, would not change the larger current hydrological patterns of discharge, recreational use, economic activity, or land-use in Osage County. Activities within the scope of the Preferred Alternatives will enhance habitat that exists naturally in the area.

The Preferred Alternatives are not being undertaken as part of any current comprehensive plan that is providing for the restoration of these habitats in Osage County.

Other activities in proximity to the Preferred Alternatives and in Osage County that may be undertaken by other entities, Tribal governments, and private and public, vary widely. These may include activities on private parcels, such as ranching, other agriculture practices, oil and gas-related activities, maintenance of utilities, and/or development of housing on nearby uplands. In general, these types of activities would be expected to result in short- and long-term adverse impacts within Osage County, with varying severity. For example, historical oil and gas activity within the Bison Preserve has resulted in new roads, well pads, and other physical scars to the landscape commonly associated with this type of resource extraction. Maintenance of public utilities, such as power lines, and pipelines in easements within state-, Tribal-, or federally-owned lands will not be impeded as a result of the Preferred Alternatives. Where these actions occur, they would result in adverse short- and long-term minor adverse impacts within the footprints of the Preferred Alternatives. The Osage Nation, TNC, and/or their land and wildlife management partners and contractors may undertake various management activities on parcels under their control throughout and in the vicinity of the Preferred Alternatives. This may include restoration activities similar to those proposed under this restoration plan and others such as permitted hunting and road and trail maintenance. These activities would result in both short- and long-term adverse and beneficial impacts.

Table 5. Summary of Environmental Consequences for Alternatives A through E.

Resource	A: No Action/ Natural Recovery	B: Dry Creek Restoration – Tallgrass Prairie	C: Bison Preserve Habitat Management	D: Luttrell Memorial Pond Project	Alternative E: Osage Nation Health Complex Improvements
Physical	No change from current conditions.	Direct, short- term, primarily minor adverse impacts to soil and water quality from herbicide applications and during construction. Long-term benefits to soil and water quality following implementation.	Direct, short- term, primarily minor adverse impacts to soil and water quality from herbicide applications. Long-term benefits to soil and water quality following implementation.	Direct, short- term, primarily minor adverse impacts to soil and water quality from herbicide applications and during construction. Long-term benefits to soil and water quality following implementation.	Short-term, direct, minor to moderate, and adverse impacts to the physical environment during construction period.
Biological	No change from current conditions.	Direct, short- term, primarily minor adverse impacts to biota from herbicide applications and during construction. Long-term benefits to biota following implementation.	Direct, short- term, primarily minor adverse impacts to biota from herbicide applications. Long- term benefits to biota following implementation.	Direct, short- term, primarily minor adverse impacts to biota quality from herbicide applications and during construction. Long-term benefits to biota quality following implementation.	Short-term, direct, minor to moderate, and adverse impacts to the biological environment during construction period.
Climate and Air Quality	No change from current conditions.	Long-term, minor, indirect and beneficial impacts on climate variables. Short-term, direct, adverse, and negligible to minor impacts to air quality.	Long-term, minor, indirect and beneficial impacts on climate variables. No impact to air quality.	Long-term, minor, indirect and beneficial impacts on climate variables. Short-term, direct, adverse, and negligible to minor impacts to air quality.	Short-term, direct, adverse, and negligible to minor impacts to air quality.
Environmental Justice	No effect	Long-term, minor, direct, and beneficial impacts.	Long-term, minor to moderate, direct and indirect, and beneficial impacts.	Long-term, minor to moderate, direct and indirect, and beneficial impacts.	Long-term, direct, minor to moderate, and beneficial impacts.

Table 5. Continued.

Resource	A: No Action/ Natural Recovery	B: Dry Creek Restoration – Tallgrass Prairie	C: Bison Preserve Habitat Management	D: Luttrell Memorial Pond Project	Alternative E: Osage Nation Health Complex Improvements
Cultural and Historical	No effect	Long-term, direct and indirect, minor to moderate, and beneficial impacts to cultural resources.	Long-term, direct and indirect, moderate, and beneficial impacts to cultural resources.	Long-term, direct and indirect, moderate, and beneficial impacts to cultural resources.	Long-term, indirect, minor, and beneficial impacts to cultural resources.
Recreation	No effect	Long-term, mostly indirect, minor, and beneficial impacts to recreation, primarily through enhancement of habitat conditions.	Long-term, direct and indirect, minor to moderate, and beneficial impacts to recreation.	Long-term, direct and indirect, minor to moderate, and beneficial impacts to recreation.	Long-term, direct, minor to moderate, and beneficial impacts to recreation.
Cumulative	No change from current conditions.	Long-term, minor to moderate, direct and indirect, and beneficial impacts.	Long-term, minor to moderate, direct and indirect, and beneficial impacts.	Long-term, minor to moderate, direct and indirect, and beneficial impacts.	Long-term, minor to moderate, direct and indirect, and beneficial impacts.

4.0 Restoration Monitoring

Monitoring is an essential component of all phases of habitat restoration for several reasons:

- To gain an understanding of the site's natural resource services, values, and challenges before restoration begins, and also to serve as a point of comparison for subsequent monitoring to determine the extent to which restoration of these values has occurred (pre-project baseline monitoring).
- To determine if the restoration effort was implemented properly, which focuses on the field techniques used and informs contract specifications and management plans (implementation monitoring).
- To determine the performance and effectiveness of restoration measures during and immediately following completion of project activities (3-5 years). This follow-up monitoring documents changes in habitat and wildlife use as the area matures, and also provides early warning of emerging problems that can undermine the success of the project so that they can be addressed effectively and economically (short-term implementation and effectiveness monitoring).
- Over the longer term (5+ years), to determine if the restoration has replaced the natural resource values that were lost due to the injury that initiated the NRDAR process, and to track and document the progress of restoration objectives such as increasing the number of migratory birds nesting on the site. This monitoring also serves to identify emerging management issues so they can be responded to early and effectively (long-term monitoring).

The restoration goals for each of the Preferred Alternatives stem from the overall goals of the restoration, namely to “to restore, rehabilitate, replace, and/or acquire the equivalent of the injured natural resources and their services” at or in the vicinity of the National Zinc Smelter Site. Restoration goals associated with the projects are listed in Section 1.2. The National Zinc Trustee Council intends to develop restoration monitoring approaches and/or plans, primarily focused on implementation and effectiveness monitoring, for each of Alternatives B, C, and D. Effectiveness of one or more projects affiliated with Alternative B will be likely be evaluated using an approach similar to the stream restoration project along Dry Creek completed in 2010 (mentioned in Section 2.4). For that project, the following monitoring techniques were used to track project progress:

- Vegetation monitoring transects (to evaluate percent cover of native and non-native plants) were installed at four permanently located cross-sectional transect sites, along with four permanent photographic monitoring images taken on each transect (Figure 8);
- Sedimentation rates were evaluated by three methods: bank pin installation and monitoring, permanent cross-section surveys, and a Bank Assessment for Non-Point Source Consequences of Sediment (BANCS) geomorphic assessment model.

Restoration monitoring plans for the Preferred Alternatives may be developed between publication of the Draft RP/EA and the expenditure of restoration implementation funds (e.g., funds used for stream restoration). Monitoring plans will build from, and incorporate, pre-restoration monitoring data that have been collected at restoration projects sites. For example, TNC has prior year stream data for Dry Creek that can be used to characterize pre-restoration conditions. Existing site vegetation monitoring data may be used to document extant plant communities and to identify areas where invasive/noxious vegetation needs to be treated to reduce the weed seed bank before restoration starts. Monitoring plans may also be coordinated with other monitoring efforts at restoration sites, such as periodic migratory bird monitoring that may be conducted at the Tallgrass Prairie Preserve or monitoring activities at the Osage Nation Bison Preserve.



Figure 8. Dry Creek restoration project permanent vegetation monitoring transect and photo point used to track progress of plant cover following stream restoration.

5.0 Budget Summary and Timeline

Settlement funds, including accrued interest, may be released and expended for projects in order of preference. Tentatively, the Trustees intend to prioritize fund expenditures for planning and implementation of Alternative D, Luttrell Memorial Pond Project, followed by planning and implementation for Alternative C, and then Alternative B, should funds remain after implementation of Alternative D. The Trustees anticipate using no more than approximately 10% of the total available restoration funds on restoration planning and design costs, and the remainder of funds on restoration implementation, project operations and maintenance, and monitoring.

The timeline for implementing the preferred alternatives is dependent on the partnering opportunities and securing supplemental project funds, necessary environmental compliance and permitting, and other various factors. However, the Trustees tentatively anticipate additional planning, design, and environmental compliance for Alternative D would be ongoing through 2023 and potentially into the second quarter of 2024.

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