FINAL

PARTIAL RESTORATION PLAN AND ENVIRONMENTAL ASSESSMENT

ADDRESSING INJURIES TO MIGRATORY BIRDS AND THREATENED AND ENDANGERED SPECIES AT THE

TAR CREEK SUPERFUND SITE OTTAWA COUNTY, OKLAHOMA

Prepared by:

Tulsa, Oklahoma Ecological Services Field Office
U.S. Department of the Interior
Fish and Wildlife Service

July 2000

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June 2000

FINDING OF NO SIGNIFICANT IMPACT

Partial Restoration Plan Addressing Injuries to
Migratory Birds and Threatened and Endangered Species
at the Tar Creek Superfund Site, Ottawa County, Oklahoma

The U.S. Fish and Wildlife (FWS) proposes to protect habitat for the endangered gray bat, and threatened Ozark cavefish and bald eagle, and migratory birds through acquisition of land in fee, easement, and/or management agreements with land owners. This action will provide partial compensation to the public for injuries to these trust resources from releases of hazardous chemicals from mining activities at the Tar Creek Superfund Site, Ottawa County, Oklahoma. The FWS has analyzed a number of alternatives to the proposal, including the following:

- allowing the site to naturally restore itself through time (no action, Alternative A);
- acquisition and protection of an Ottawa County endangered bat maternity cave (Alternative B);
- protecting high quality bottomland forest along the Neosho River (Alternative C); and
- acquisition and protection of a large continuous stand of Ozark forest and federally endangered bat caves in Adair County, Oklahoma (Alternative D).

The attached Environmental Assessment provides an analysis of potential environmental impacts associated with each of the alternatives.

To avoid actions that would attract fish and wildlife to hazardous areas remaining on-site and the concern that restoration projects located within the site could be disturbed or destroyed by future remedial activities, no on-site restoration projects were considered. All alternatives considered, other than the no action alternative, offer beneficial impacts to resources injured from releases of hazardous materials and may be a worthy part of any site-wide restoration plan prepared in future restoration efforts.

The cost of implementing each alternative will not be known until negotiations with private landowners begin. The proposed action is to phase implementation of the proposed alternatives, as funding allows, in the following order: Alternative B, C, and D. Alternative B will benefit a gray bat maternity cave that provides habitat for about 10,000 gray bats during the summer and could possible be used by Ozark cavefish. Alternatives C and D also offer benefits to impacted endangered gray bats and migratory birds, and are also viable restoration projects.

Implementation of Alternatives B, C, and D, would generally result in beneficial environmental impacts. The removal of threats to habitat recognized by Alternatives B, C, and D would result in a slight negative socioeconomic impact. Implementation of alternative D would result in important habitat being protected outside Ottawa County and would necessitate slightly further travel during visits by the residents of the county, where injuries are occurring. The proposal is not expected to have adverse impacts to wetlands and floodplains, pursuant to Executive Orders 11990 and 11988 because no such resources are present on Alternative B

and D lands, and Alternative C is designed to protect and enhance wetlands and floodplains. The proposal is not expected to have significant impacts on the human environment because it provides for little to no disturbance to land and offers significant beneficial impacts through protection of watersheds.

The proposal has been coordinated with all interested and or affected parties. Parties contacted include the following:

Eastern Shawnee Tribe of Oklahoma
Quapaw Tribe of Oklahoma;
Miami Tribe of Oklahoma;
Modoc Tribe of Oklahoma;
Osage Tribe of Oklahoma;
Ottawa Tribe of Oklahoma;
Seneca-Cayuga Tribe of Oklahoma; and
Wyandotte Tribe of Oklahoma;
Inter-Tribal Environmental Council.
State of Oklahoma;
Bureau of Indian Affairs;
Bureau of Land Management;
Corps of Engineers;

The Draft Restoration Plan and Environmental Assessment was published in the Federal Register on October 15, 1999 for public review and comments. In summary, the comments were supportive of the alternatives in Ottawa County, but opposed to alternatives outside of Ottawa County. In response to the comments, two of the three existing alternatives are in Ottawa County and emphasis will be placed on spending the majority of the restoration money in Ottawa County, if appropriate projects can be identified.

When the alternatives were developed, an effort was made to identify projects that would provide the most efficient use of the restoration settlement money to protect the largest area of the highest quality habitat for FWS trust resources impacted by the mining. An effort was made to protect areas in the same ecoregion, suffering the greatest threat of loss, and with the best potential for long term protection. Political boundaries were not given as much priority. Tar Creek is in the Neosho River basin that serves as an ecotonal boundary between the oak-hickory forest of the Ozarks to the east and prairie parkland to the west (Bailey[1]). The FWS trust resources of the bald eagle and migratory birds use both prairie and the Ozark forest, but the federally-listed cave species (gray bat and Ozark cavefish) use mainly the Ozark forest portion of the area. Protecting bottomland forest along the Neosho or Spring Rivers and the gray bat maternity and potential cavefish cave in Ottawa County will benefit these species. However, a larger area of high quality gray bat habitat can be acquired in Adair County at lower cost and, being adjacent to a the Ozark Plateau National Wildlife Refuge, it is assured long term protection. Therefore, Alternative D is still considered a viable alternative.

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[1] Bailey, R. G. 1981. Ecoregions of North America. U.S. Department of Interior, Fish and Wildlife Service, Office of Biological Services. Washington, D.C.

It is my determination that the proposal does not constitute a major federal action significantly affecting the quality of the human environment under the meaning of section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). As such an environmental impact statement is not required. An environmental assessment has been prepared in support of this finding and is available from the Internet at http:\\ifw2es.fws.gov\library, or may requested from the FWS at:

U.S. Fish and Wildlife Service
222 South Houston, Suite A
Tulsa, Oklahoma 74127
918/581-7458.

The final document will be posted on the Internet site by July 31, 2000.

Nancy M. Kaufman — Regional Director

July 11, 2000 — Date

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Prepared by

Tulsa, Oklahoma Ecological Services Field Office
U.S. Department of the Interior
Fish and Wildlife Service

June 2000

SUMMARY

The Tar Creek Superfund Site (Site), located in Ottawa County, Oklahoma, is one of three superfund sites located within the Tri-State Mining District of Kansas, Missouri, and Oklahoma. The district contained multiple lead and zinc mines after the early 1900s which operated until deposits were depleted in the 1970's. Acidic ground water surfacing through old air shafts and other openings contaminated the Tar Creek drainage and its associated wetlands and bottomland hardwoods. The bankruptcy of two major mining companies in the 1990's led the Department of Interior to collect partial damages for injuries to trust resources, specifically migratory birds and federally-listed endangered and threatened species(gray bat, Ozark cavefish, and bald eagle). Alternatives for expenditure of the funds collected through these bankruptcies center on allowing the Site to naturally restore itself through time (no action, Alternative A), or protection of habitat through acquisition in fee or easement, or management agreements with land owners. Specifically Alternative B provides for the acquisition and protection of an Ottawa County endangered gray bat maternity cave and potential Ozark cavefish habitat, Alternative C protects high quality bottomland forest along the Neosho River to benefit migratory birds and bald eagles, and Alternative D acquires and protects a large continuous stand of Ozark forest, including migratory bird habitat and endangered gray bat caves in Adair County, Oklahoma.

The no action alternative is not a preferred alternative because it accepts that there will be continued injuries at the Site over a long period of time, yet provides no alternative benefit to compensate the public for injured resources or lost use. Since other alternatives provide some mix of protection to trust resources, and implementation of none offers significant impacts to the environment, all are viable candidates for implementation. Because costs of implementation for each alternative will be achieved through negotiation with landowners, implementation of more than one alternative may be attainable as available funds are depleted. Although Alternatives B and C are closest to the Site, Alternative D provides the greatest return for the restoration money because it protects a larger area of higher quality forest and cave habitat suffering from a greater threat of development, with assurance of long term management. However, there is greater distance between the Alternative D location and the impact Site. Therefore, the FWS's proposed action is a mix of Alternatives B, C, and D in the following priority order.

B Acquisition and protection of Ottawa County gray bat maternity cave;
C Protect high quality bottomland forest and migratory bird habitat in Ottawa County along the Neosho River through acquisition, easement, or management agreements;
D Acquisition and protection of a large continuous stand of Ozark forest with migratory bird habitat and a portion of a large gray bat and Ozark big-eared bat cave adjoining the Ozark Plateau National Wildlife Refuge in Adair County;

All three alternatives (B, C, and D) satisfy the regulatory requirement that the settlement monies be used for injured trust resources similar to those at the Site. These alternatives provide the greatest benefit to FWS trust resources (migratory birds and federally-listed endangered and threatened species) for future generations. Implementation of the proposed action will commence upon signature of the final Partial Restoration Plan, and associated Finding of No Significant Impact.

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DRAFT

PARTIAL RESTORATION PLAN AND ENVIRONMENTAL ASSESSMENT ADDRESSING INJURIES TO MIGRATORY BIRDS AND THREATENED AND ENDANGERED SPECIES AT THE TAR CREEK SUPERFUND Site, OTTAWA COUNTY, OKLAHOMA

1.0 Background

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, through its Natural Resource Damage Assessment and Restoration (NRDAR) provisions, allows natural resource trustees to seek compensation for "damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss"[1] caused by releases of hazardous substances into the environment. This Restoration Plan (Plan)is in partial fulfillment of the responsibilities of the U.S. Department of the Interior (DOI), Fish and Wildlife Service (FWS) as a natural resource trustee. These responsibilities include restoration, rehabilitation, and/or replacement of injured trust resources including but not limited to migratory birds, federally-listed species and their habitats. This document also serves as an Environmental Assessment as required under the National Environmental Policy Act (NEPA).

This document addresses only partial compensation for injuries to aquatic natural resources caused by releases of hazardous materials at the Tar Creek Superfund Site (Site), Ottawa County, Oklahoma. The funding source for the Alternatives specified in this document is the result of two bankruptcy settlements with Eagle-Picher Mining Company and LTV Steel. These were companies that had mining operations on the Site. The FWS prepared a Draft Restoration and Replacement Plan in 1990 and used the Habitat Evaluation Procedures (HEP)[2] to quantify losses to trust resources. The evaluation determined that 813 acres of wetland and 49.2 miles of stream had been impacted in the Tar Creek Basin. Because remedial actions were not successful, the FWS developed an off site plan to mitigate for trust resource damages to avoid attracting wildlife to a contaminated area. The plan consisted of protecting and managing a stream corridor 50 miles long with a 300-foot buffer on each side of the stream. These figures, along with a cost estimate of over $2.5 million were presented during the bankruptcy hearings in 1992. However, bankruptcy procedures often result in payments lower than the actual accounting and the final settlement for trust natural resources was only about 15 percent of this amount.

There are three factors that need to be considered regarding the proposed action. The first is that there is ongoing contamination at the Site (See section 3.0 for discussion). Next, because the bankruptcy claims were for injuries to protected migratory birds and threatened and endangered

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[1]CERCLA: Code of federal Regulations 42 § 9607

[2]U.S. Fish and Wildlife Service. 1980. Habitat Evaluation Procedures (HEP), ESM 102. Division of Ecological Services. Washington, D.C.

species, constraints on use of the funds exist. Finally, because the 1992 bankruptcy claim (compiled before EPA's conclusion that the surface water contamination was irreversible) assessed only potential injuries to aquatic resources (i.e., potential injuries to terrestrial resources were not assessed), the alternatives proposed in this document only partially compensates for injuries specifically from releases of acid mine drainage into Tar Creek to trust resources associated with aquatic ecosystems at the Site. Thus, while contaminants related to ground water and their discharges to Tar Creek are discussed, further impacts related to surface water, soil and terrestrial resources may be addressed in future claims and associated restoration.

Additional NRDAR actions which could supply funding for additional restoration actions are under consideration. However, the action may or may not result in additional restoration funding. Consequently, the FWS has elected to immediately pursue the restoration actions detailed in this document. Should further NRDAR actions be determined appropriate, an Assessment Plan will be prepared that will be available for public review.

1.1 Purpose and Need for the Action

The purpose of the NRDAR procedure is to return injured resources to the condition (physical, chemical, biological) that would have existed had releases of the hazardous materials not occurred. Another purpose is to compensate the public for loss of trust resource services caused by the release of hazardous materials. Services in this case would be those uses of the Site by fish and wildlife that have been precluded due to contamination. The alternatives proposed in this plan will provide partial compensation for injuries to FWS trust resources (i.e., migratory birds and threatened and endangered species) in a cost-effective and beneficial manner.

Chapter 43, Section 11, Subsections 61-64 of the Code of Federal Regulations directs the DOI to follow an injury determination procedure for each resource potentially, as follows: 1) identification of the source of contamination; 2) nature of contaminants; 3) pathway(s) of movement; and 4) measurable effects on the resource involved. The nature and extent of contamination from acid mine drainage at the Site have been documented in investigations conducted and reports prepared for the EPA (such as the Five-Year Review and the 1995 Remedial Investigation / Feasibility Study[3]), including the specific contaminants of concern, their migration pathways, and known extent of migration.

1.2 Site Description and History

The Site is part of a 40-square mile section of the Tri-State Mining Region, which covers a 500-square mile area of Kansas, Missouri, and Oklahoma. The Site is located in northeastern Oklahoma, the main body of which is situated north and east of the town of Miami, Oklahoma. Tar Creek, which runs through the Site, subsequently flows through Miami before discharging into the Neosho River. Several other creeks, including Lytle Creek, flow through the Site, and there are numerous wetlands and ponds scattered throughout the area.

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[3] Brown & Root Environmental. 1995. Mining Waste RI/FS: Tar Creek Superfund Site, Ottawa County, Oklahoma, Vols. I & II. 1995. Prepared for the Tulsa Corps of Engineers, and the U.S. EPA, Region 6, Dallas, Texas.

The Site was mined for lead and zinc from the early 1900s to the mid 1970s, when the deposits were depleted. The metallic sulfide minerals in the mines lowered the pH of the ground water that filled the abandoned mine excavations, and in 1979 the ground water surfaced through old air shafts and other openings. The acidic effluent then entered the Tar Creek drainage and spread downstream along the creek and into its associated wetlands and bottomland hardwoods. This water generally contains elevated concentrations of dissolved metals, including lead, zinc, and cadmium. The aquatic life in Tar Creek downstream of the discharge points was destroyed, prompting a series of investigations by various State and federal agencies.

Mechanical deposition of large piles of crushed mine excavations ("chat piles", though they also contain fine tailings and slag) probably began in the early 1900's. The chat piles, laced with heavy metals, are now scattered throughout the Site, and are suspected as a source of localized contamination of surface water and ground water underlying the piles[2]. Sediment pond, and water-filled depressions caused by mine collapses, are also scattered around the Site and are potentially contaminated with ground water and surface runoff seeping from the mines and chat piles.

The U.S. Environmental Protection Agency (EPA), in accordance with the CERCLA, included the Site on its National Priorities List in 1981. Two other associated Superfund sites, located in Kansas and Missouri, are also listed on the National Priorities List. Under CERCLA, natural resource trustees may evaluate the injuries to any natural resources caused by the release of hazardous materials into the environment, and assess damages resulting from these injuries.
The DOI conducted a Preliminary Natural Resources Survey (PNRS) at the Site in 1984 and concluded that the potential existed for injuries to trust resources. A follow-up PNRS, prepared in 1988 after EPA cleanup operations had begun, confirmed the potential for continuing injuries to trust resources. In response to bankruptcy actions filed by the LTV Corporation (also known as LTV Steel) and Eagle-Picher Industries, Inc., the FWS in 1992 prepared a bankruptcy case claim[3] to seek compensation for trust resource injuries at the Site. Trust resources affected at the Site include several threatened and endangered species and migratory birds, as well as loss of their habitat.

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[2] U.S. EPA. 1994. Five Year Review: Tar Creek Superfund Site, Ottawa County, Oklahoma. US EPA, Region 6, Dallas, Texas.

[3] U.S. FWS. 1992. USFWS Natural Resources Damage Claim Information, September 21, 1992. USFWS, Tulsa, Oklahoma Ecological Services Field Office.

The EPA and the State of Oklahoma diverted Tar Creek around certain mine collapses in Kansas and channelized a portion of the creek in Oklahoma in the late 1980's, as part of their ecological remedial actions. Dozens of wells were also plugged in an effort to control the migration of contaminated ground water into the underlying Boone and Roubidoux Aquifers. In the 5-year review[4], EPA concluded that the volume of discharge had not been significantly reduced and that there was some reduction in the contaminant concentrations in the discharge. Generally, the report conceded that the remedial actions had not achieved the desired effect, and that contaminated ground water continued to be discharged from the mines into Tar Creek and its tributaries. The report further stated that both the State of Oklahoma and EPA agreed that the contamination was irreversible, and EPA recommended no further actions under Superfund to address the surface water issue.

2.0 Injury Assessment and Description of Affected Area

This section reviews the injury assessment process at the Tar Creek Site. This assessment is very preliminary and was done for the purposes of the settlement under strict time constraints. It is not the complete and final injury assessment envisioned by the NRDAR regulations. Further evaluation of more recent data regarding acid mine drainage and/or impacts from chat pile leachate is likely to increase estimates of injuries and subsequent estimates of compensation for losses. This section also serves as a description of the affected area as set out in the NEPA regulation.

2.1 Description of the Releases of Hazardous Materials

Hazardous materials released from the Site include lead, zinc, iron, and cadmium, as well as acidic water. These materials are present in the surface water, soil, and ground water around and underneath the Site. Releases specifically addressed in the claim during bankruptcy proceedings, and in this partial restoration plan, include impacts from acid mine drainage into Tar Creek and its tributaries.

2.2 Pathways

Contaminants may be taken up by organisms via direct ingestion or absorption through skin. Pathways for direct ingestion include eating, drinking, or inhaling contaminated materials. Absorption through skin can be caused by exposure during immersion in contaminated water (for example, a fish swimming in stream water), or direct contact with soil (invertebrate larvae living in soil). Potential pathways for movement of contaminants include surface and ground water, or soil.

2.3 Water Resources

The background pH of ground water in northeastern Oklahoma ranges between 7.59 and 7.94, with a median of 7.83[5]. Before acid mine water began discharging into Tar Creek in 1979,

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[4] U.S. EPA. 1994.

[5] Christenson, S. 1995. Contamination of Wells completed in the Roubidoux Aquifer by Abandoned Zinc

and Lead Mines, Ottawa County, Oklahoma. U.S. Geological Survey, Water-Resources Investigations Report 95-4150.

surface water pH in Ottawa County was about 7.6 to 7.9[6]. The pH of the ground water seeping out of the mine excavations at the Tar Creek Site has been measured at less than 6.0, and as low as 2.5, in several studies conducted by the State of Oklahoma[7, 8], U.S. Geological Survey[9,10], and contractors[11]. Water with pH levels between 4 and 5 will cause avoidance by or adverse reactions in fish. The ground water at the Tar Creek Site also contains levels of heavy metals high enough to cause continued severe impact to stream water quality in the area[12]. The Boone Aquifer, the uppermost aquifer in most of the area, is contaminated by a variety of metals.

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[6]Stoner, J.D. 1981. Water Type and Suitability of Oklahoma Surface Waters for Public Supply and Irrigation; Part 1: Arkansas River, Mainstream and Verdigris, Neosho, and Illinois River Basins through 1978. U.S. Geological Survey, Water-Resources Investigation Report 81-33.

[7]Adams, J.C. 1980. Tar Creek Water Quality Reconnaissance regarding Ground Water Discharge from Abandoned Lead and Zinc Mines of Picher Field, Ottawa County, Oklahoma. Oklahoma Water Resources Board, Publication Number 10.

[8]Oklahoma Water Resources Board, Water Quality Division. 1983. Effects of Acid Mine Discharge on the Surface Water Resources in the Tar Creek Area, Ottawa County, Oklahoma. Tar Creek Field Investigation Task I.1.

[9]Parkhurst, D.L. 1987. Chemical Analyses of Water Samples from the Picher Mining Area, Northeast Oklahoma and Southeast Kansas. U.S. Geological Survey Open-File Report 87-453.

[10]_____, M. Doughten, and P.P. Hearn. 1988. Chemical Analyses of Stream Sediment in the Tar Creek Basin of the Picher Mining Area, Northeast Oklahoma. U.S. Geological Survey Open-File Report 88-469.

[11]Aggus, L.R., L.E. Vogele, W.C. Rainwater, and D.I. Morais. 1983. Effects of Acid Mine Drainages from Tar Creek on Fishes and Benthic Macroinvertebrates in Grand Lake, Oklahoma. Prepared for the Tar Creek Environmental Effects Subcommittee. National Reservoir Research Program, U.S. FWS, Arkansas.

[12]U.S. EPA. 1994.

2.4 Effects on Trust Natural Resources

Trust natural resources potentially affected by contaminants generated at the Site include migratory birds and federally-listed threatened and endangered species. The FWS's 1992 bankruptcy case claim noted a significant reduction in quality and quantity of populations of fish and aquatic invertebrates below the discharge points in Tar Creek. The loss of aquatic insects was also considered a potential threat to habitat for the federally- listed endangered gray bat (*Myotis grisescens*), resulting in lost use of the contaminated habitat. The federally-listed threatened Ozark cavefish (*Amblyopsis rosae*) also may have been directly affected by degraded water quality at the Site. This fish was previously reported in a nearby cave, which is in the Boone aquifer and has been contaminated by the mining residue in the Tar Creek basin. The bankruptcy case claim also noted the potential of injuries to trust resources such as the federally-listed threatened bald eagle (*Haliiaetus leucocephalus*) resulting from the elimination of the prey base (fish) in the Tar Creek area.

The reduction in biomass and diversity of aquatic biota in streams and wetlands at the Site has also potentially affected other migratory birds. The FWS's 1992 bankruptcy case claim listed several species including the belted kingfisher (*Ceryle alcyon*), prothonotary warbler (*Protonaria citrea*), and the green heron (*Butorides striatus*) as species potentially affected by the reduction in food base at the Site. Nesting waterfowl, such as wood ducks (*Aix sponsa*), and piscivorous ducks such as mergansers (*Mergus merganser*) also may have been affected by the loss of food sources at the Site, resulting in lost use and services.

3.0 Restoration Alternatives

In accordance with the NRDAR Regulations (43 CFR Part 11) and the NEPA Regulations (40 CFR Parts 1500-1508), the FWS evaluated several alternatives before choosing a proposed action. In 1990, the FWS prepared a Draft Restoration and Replacement Plan for the Tar Creek Superfund Site, which was used to determine compensation for trust resources injured by releases. Use of the FWS's Habitat Evaluation Procedures (HEP) during this planning effort quantified losses to trust resources as 813 acres of wetlands and 49.2 miles of stream that had been impacted in the Tar Creek Basin. Original estimates for restoration alternatives related to injuries to aquatic resources in 1990, were based on protecting and managing a stream corridor 50 miles long with a 300-foot buffer on each side of the stream, totaling 3,636 acres.

Because the remedial actions undertaken by EPA have not been successful in controlling the sources of contaminants, exposure to contaminants and the associated injuries persist. Ongoing contamination of soil, vegetation, and surface and ground water render on-site restoration, rehabilitation or replacement technically and economically infeasible. Actions that would attract fish and wildlife to such a potentially hazardous area would likely increase injuries; therefore, any proposed actions should be undertaken off-site. Thus in this document only off-site restoration alternatives in non-contaminated areas are explored.

3.1 The Process of Developing the Proposed Action and Alternatives

The FWS used several guidelines to formulate alternatives. They are that 1) the restoration sites be in as close proximity to the Tar Creek Site as possible; 2) the specific trust resources from the claim (i.e., migratory birds and threatened and endangered species) benefit from the restoration;

and 3) the restoration provides partial compensation for loss of habitat and services incurred at the Site. The restoration alternatives which were proposed in the Federal Register (October 15, 1999) consist of no action at the Site (Alternative A), and multiple projects (Alternatives B, C and D) in which habitat for specific trust species would be acquired, enhanced, and/or protected in perpetuity.

Further restoration options may be identified by investigations which will identify appropriateness of a restoration option, or availability of additional restoration or enhancement opportunities. Certain activities which will provide information on further restoration should be conducted, as funding allows. For example, investigations which would update water quality and mine discharge data from Tar Creek Site in Ottawa County would add to knowledge valuable in restoration planning. Updated data on metal concentrations, pH, and flow is needed to determine restoration potential for FWS trust resources and locations where restoration can take place without unduly exposing fish and wildlife resources to mine contamination.
Additional consideration should be given to opportunities to examine other caves having potential for occurrence of threatened Ozark cavefish or endangered gray bats found in Ottawa County. Most of these caves are located in areas of Ozark forest important to other FWS trust resources and threatened by similar development as the areas mentioned above. If surveys determine these caves to be important to trust species, future planning efforts should consider protection for the caves and their recharge areas.

Finally, other sites along Spring River in Ottawa County with high quality stream, spring, wetland, ground water, forest, and/or cave resources that are in need of protection and enhancement should be investigated. This area and its associated resources is affected by ongoing commercial and residential development. The Spring River is an extremely high quality Ozark stream that drains portions of southwest Missouri, southeast Kansas, and northeast Oklahoma. Areas along the Spring River used by federally-listed endangered gray bats, eagles, and threatened Ozark cavefish as well as migratory songbirds and waterfowl should be identified for further restoration efforts.

3.2 Alternative A: No Action at the Tar Creek Site or Alternative Sites

No restoration actions would be undertaken in Alternative A. Natural resources and services would be restored through natural recovery. In the Five-Year Review EPA concluded that the discharges of acidified mine water have not been arrested, and that the discharges continue to impact stream water quality. The Five-Year Review also indicates that State studies show a decrease in concentrations of most constituents in the acid mine water discharges, possibly due to natural remediation. However, EPA concluded that surface water quality was "not significantly improved" by remediation actions.[13] There is no way to accurately provide an estimate of how long it would take for natural remediation to bring stream water quality back to baseline conditions. EPA has stated its belief that no feasible solution to this problem exists at the present time, and recommends no further action be taken to address surface water contamination in Tar Creek.

3.3 Alternatives B-D: Protection of Habitat Through Acquisition in Fee or Easement or Management Agreements with Land Owners

To assure the continuing existence of the unique and high quality Ozark fish and wildlife resources, it is necessary to maintain large continuous unbroken tracts of Ozark forest. This will protect

[13]U.S. EPA. 1994.

streams, ground water, springs, caves, migratory songbird habitat, federally-listed species, and overall biodiversity. Therefore, the FWS has concluded that protecting existing important areas of upland and bottomland forest likely to be lost in the future is an appropriate means of offsetting past damages to FWS trust resources.

Alternatives B-D involve identifying areas that are similar to or used by trust natural resources similar to those lost due to contamination. These areas would then be protected and managed for the benefit of the trust natural resources and the public. Such resources include Ozark and bottomland forest, stream, spring, and cave habitat. Protecting some of the cave systems will fulfill recovery tasks contained in the gray bat, Ozark big-eared bat, and Ozark cavefish recovery plans.

3.3.1 Alternative B: Acquire a continuous mature Ozark oak/hickory forest area in Ottawa County with a known federally-listed endangered gray bat maternity cave, that supports a population of about 10,000 bats. Occurrences of the federally-listed threatened Ozark cavefish have not been reported from this particular cave, but it does occur in the area and further investigation may find that gray bats use the cave. There is a stream in the lower reaches of this cave that could provide suitable habitat and should be surveyed for the cavefish, as well as a federal species of concern, cave crayfish, that occur in the area. Fencing the area and constructing a bat accessible gate on the cave entrance to control inappropriate human access will provide, and enhance, habitat for gray bats and additional FWS trust resources, such as neotropical migratory songbirds. The targeted 60 to 80 acre area borders Grand Lake, providing riparian and waterfowl habitat. Also, it adjoins a Boy Scout camp and the Scouts have indicated a willingness to enter into a cooperative agreement to assist in managing the area and developing a plan to use it for an educational resource.

3.3.2 Alternative C: Protect an area of bottomland forest in Ottawa County along the Neosho River west of Miami, Oklahoma, from future loss to development by acquiring in fee or easement, or developing management agreements with landowners. While most of the bottomland forest around Grand Lake is relatively immature, with few mast (i.e., nuts that accumulate on the ground) producing tree species, an area near Miami consists of 350-400 acres of mature forest, including numerous mature mast producing trees. This area is probably indicative of conditions in the Grand River Basin before construction of Grand Lake. The target area was identified as one of the thirteen highest quality bottomland forest areas in eastern Oklahoma in a joint study by the FWS and Oklahoma Department of Wildlife Conservation.[14]
Protection and management of the area would provide habitat in perpetuity for a number of FWS trust resources, particularly those species preferring or needing mature forest resources such as some woodpeckers that prefer trees having heartrot, nuthatches that prefer heavily scaled bark, or certain owl species that prefer forests having high canopies. The Neosho River and adjoining wetlands are habitat for numerous waterfowl and shore-birds, with wood ducks nesting in the riparian forest. The large stand of bottomland forest also provides habitat for more forest species preferring large blocks of undisturbed habitat, such as certain neotropical migratory songbirds which will not nest in or near open areas. There is a good wintering federally-listed threatened bald eagle population using this section of the Neosho River, with a large roost located not far to the south, near Twin Bridges. Also, the federally-listed threatened Neosho madtom is found in this section of the Neosho River. The Grand Lake region is rapidly developing, with bottomland forest areas continually being lost to both commercial and residential development. Management agreements

[14]Brabander et al. 1985.

that will protect and enhance these bottomlands will be actively pursued with landowners, local Native American tribes, and/or the Oklahoma Department of Wildlife Conservation.

3.3.3 Alternative D: Acquire a large continuous stand of Ozark forest adjoining the Ozark Plateau National Wildlife Refuge in Adair County, including one of the largest caves in Oklahoma. This continuous block of mature oak-hickory forest consists of 500-550 acres, located on the southwest edge of the Ozark plateau. Much of the drainage is underground, resulting in a number of springs and caves. The tract encompasses a portion of Little Lee Creek's upper drainage area, a tributary of Lee Creek, a State scenic river. The streams in this basin are high gradient, rocky bottomed, and spring fed. The cave is used by both federally-listed endangered gray bats and Ozark big-eared bats, with some of the streams in the basin providing habitat for the longnose darter, a federal species of concern. Other federal species of concern found in the area are the Ozark chinquapin, eastern small-footed bat, southeastern big-eared bat, Oklahoma cave amphipod, and Ozark cave amphipod. Active clearcutting of timber within a mile of the caves threatens the recharge area of the stream and caves, as well as direct loss of migratory bird habitat and bat foraging areas. Pending development of the forest for residential home sites is also an immediate threat to the forest stand. The Ozark forest's proximity to an existing National Wildlife Refuge could provide a management base to assure the area is protected and enhanced in the future to offset lost resources and benefit trust species. Should the refuge be selected as the management option for this tract, the proposed action would include bringing the tract into the National Wildlife Refuge System. Following inclusion into the system, the tract would be managed according to purposes, goals, and objectives of the Ozark Plateau National Wildlife Refuge.

3.4 Alternative Eliminated from Further Analysis: Fence Candy Reservoir Land

In the late 1970's, the Corps of Engineers acquired 3,657 acres in Osage County, Oklahoma for the Candy Lake Project. Because of inability to acquire mineral rights from the Osage Indian Nation, the project was deauthorized in 1995. The Corps of Engineers has indicated that it would like to transfer the land to the Bureau of Land Management. The property is presently used as a Wildlife Management/Public Hunting Area under a cooperative Wildlife Management Agreement with the Oklahoma Department of Wildlife Conservation. Because of the uncertainty of the property's future, little money has been spent on management. Improper grazing practices and unauthorized trash disposal have limited the area's habitat quality. The boundary was surveyed and monumented; however, it has not been fenced. Proposed management includes:

<u>Administrative</u>

1 Renegotiate the cooperative management agreement with the Oklahoma Department of Wildlife Conservation,
2 Negotiate a cooperative agreement with the Corps of Engineers, Bureau of Land Management, and/or the Oklahoma Department of Wildlife Conservation to share the expense of a managers salary,
3 Work with the Osage Tribe to improve relationship between oil and gas production and wildlife management,
4 Amend Oklahoma land use plan to address management,

Management

5 Construct twenty-four miles of fencing to control ingress and egress and place boundary signs,
6 Remove old fence and oil field trash,

Enhancement

7 Modify existing grazing leases and agricultural permits to address resource concerns.

While the Bureau of Land Management proposes to use this land to partially mitigate fish and wildlife resource losses resulting from the lead and zinc mining at Tar Creek, the FWS does not believe that it is a viable proposal. Because the Candy Reservoir land was to be used to mitigate impacts to fish and wildlife resources from several Corps of Engineers reservoirs, using it again to mitigate Tar Creek mining impacts would not be appropriate. In addition, there are political interests who propose that the land be sold back to the original landowners, so its future is uncertain.

4.0 Analysis of Environmental Consequences: Each alternative has been examined for the probable impacts on biological resources, including water quality, and fish and wildlife and their habitat, particularly threatened and endangered species and their habitat. Scoping indicated evaluation of socioeconomic impacts should focus on effects related to whether the site would become accessible by the public, and location of the restoration site as compared to the impact area (e.g., within traveling distance from public at the superfund Site).

4.1 Consequences not Further Discussed

Because all the alternatives would involve protection of land with little to no ground disturbance, effects to historic, cultural, and aesthetic resources would be no effect or beneficial due to protection of the resource from threatening development. However, should the FWS acquire property for inclusion in the National Wildlife Refuge System, cultural resources will be fully described. No further discussion of these impact areas is contained in this document.

4.2 No Action Alternative

The no action alternative relies on natural remediation to restore water quality to that found before mining. The effect of this alternative is that water quality would remain injurious to fish and wildlife possibly for decades to come, and there would be no water quality resource protected elsewhere for the benefit of fish and wildlife. Under the no action alternative, injuries to fish and wildlife resources would continue at the Site and no alternative site would be protected for their benefit; injuries to endangered and threatened species and their habitats would continue and there would be no management protection elsewhere. There would be no change in public accessibility from that currently witnessed at the Site. Implementation of this alternative would present no significant impacts to the environment, beyond those attributed to past mining activities.

4.3 Alternatives B-D: Protection of Habitat Through Acquisition in Fee or Easement or Management Agreements with Land Owners.

Each of the proposed alternatives was evaluated regarding the alternative's impacts to biological resources, specifically fish and wildlife species, particularly those fish and wildlife species listed under the Endangered Species Act. Because surface and ground water are pathways for contamination from the Site, impacts of the alternatives to surface and ground water resources were specifically discussed. In addition, socioeconomic impacts regarding public access to the sites were evaluated. None of the proposed alternatives are expected to result in significant impacts to the environment.

4.3.1 Alternative B: Acquire a continuous high quality mature Ozark oak/hickory forest area in Ottawa County.

Alternative B would protect FWS trust resources that use the oak/hickory forest and associated caves and underground streams. This includes a federally-listed endangered gray bat maternity cave; an underground stream that could provide potential habitat for federally-listed threatened Ozark cavefish and species of concern cave crayfish; and a continuous stand of oak/hickory forest, as well as providing habitat for neotropical migratory birds and foraging habitat for the gray bats using the maternity cave. Beneficial impacts to endangered bat habitat would occur as the result of fencing and construction of a bat accessible gate on the cave entrance to control inappropriate human. Because the property identified by Alternative B would be guarantee the availability of habitat for a federally-listed species, with little to no ground disturbance occurring, impacts to biological resources, including surface and groundwater, would be beneficial.

The forest discussed in Alternative B is very near the impact Site, and access to the site would be provided for Boy Scouts using the nearby camp. Other public access to the site would be negotiated through the management agreement for the site. Because current access to the site for identified youth groups would likely continue, and access by other public could would be negotiated through management agreements, implementation of this alternative would present no significant impacts to the socioeconomic resources.

Implementation of this alternative would present no significant impacts to the environment.

4.3.2 Alternative C: Protect an area of bottomland forest in Ottawa County along the Neosho River west of Miami, Oklahoma.

Implementation of Alternative C would provide beneficial impacts through protection, in perpetuity, and management of an area providing habitat in perpetuity for a number of FWS trust resources, particularly those species preferring or needing mature forest resources. Beneficial impacts to water quality associated with bottomland hardwood and other wetland areas and a portion of the Neosho River would also be guaranteed through protection of this area. Thus, overall impacts to biological resources would be beneficial

Because this site is very near the impacted area, travel time by the affected public would be minimal and offer no adverse impacts. In addition, beneficial impacts could be witnessed as public access to the restoration site is negotiated through management agreements. Thus overall, implementation of this alternative would present no significant adverse impacts to socioeconomic resources.

Implementation of this alternative would present no significant impacts to the environment.

4.3.3 Alternative D: Acquire a large continuous stand of Ozark forest adjoining the Ozark Plateau National Wildlife Refuge in Adair County.

Alternative D would provide beneficial impacts to biological resources by protecting the area around caves representing habitat for federally-listed bats, through removal of timber and pending development. Habitat for species that use oak-hickory forests and associated habitats, including a federal species of concern, the longnose darter, and a number of neotropical migratory songbirds would also be protected, providing additional beneficial impact. Other habitats of sensitive animal habitat that would be beneficially impacted would include that of multiple federal species of concern,

including the Ozark chinquapin, eastern small-footed bat, southeastern big eared bat, Oklahoma cave amphipod, and Ozark cave amphipod, would provide additional beneficial impacts. Thus, implementation of this alternative would have only beneficial impacts to biological resources.

The property identified in this alternative is the farthest of the three land protection/enhancement alternatives presented in this plan from the impact area. Distance from the restoration location identified in Alternative D is approximately 80 miles. Thus, mild adverse impacts to the public living in the impacted area would be witnessed, due to need to travel the distance to the restoration location. However, because the site is still well within day-trip distance, and because the site could be managed as part of the National Wildlife Refuge system and public access would be likely be allowed, implementation of this alternative would present no significant impacts to the socioeconomic resources.

Implementation of Alternative D would provide no significant impacts to the environment.

4.4 Potential for Cumulative Impacts From the Proposed Alternatives

With the exception of the No Action Alternative, each of the proposed alternatives focuses on protection of natural resources associated with differing habitat types. Protection of large contiguous blocks of land will provide cumulative beneficial impacts, not only fish and wildlife, but the public as well, with relation to open space desires. Thus, phased implementation of the proposed action would result in beneficial cumulative impacts.

4.5 Summary of Analysis of Effects

Table 1 provides a summary of environmental impacts.

Table 1. Summary of Analysis of Effects.

	Alternative A	Alternative B	Alternative C	Alternative D
Water Quality	Natural remediation over time. No benefit in the near term to water quality.	Protects water quality.	Protects water quality in the river and wetlands.	Protects water quality in the face of pending development.
Socioeconomic	Not applicable.	In the same county.	In the same county.	Within day-trip of the Site.
Fish & Wildlife T&E Species	Continued injury to F&W including endangered and threatened species with	Protects habitat for F&W using oak/hickory forests, including neotropical birds. Protects	Habitat for F&W, including endangered and threatened species, using bottomland	Habitat for F&W using oak/hickory forests, including neotropical birds

	no alternate compensation.	endangered gray bat, maternity cave and potential Ozark cavefish habitat.	forests and wetlands.	and other species of concern. Protects endangered gray and Ozark big-eared bats habitat.

5.0 Conclusion and Selection of Preferred Alternatives

The no-action alternative is not a preferred alternative because it accepts that there will be continued injuries at the Site over a long time period, but provides no alternative offsetting benefits to trust natural resources.

Alternatives B, C, and D all provide some mix of protection to FWS trust natural resources. The only major difference is that Alternative D is not in close proximity to the Site as are Alternatives B and C.

The FWS's proposed action is a phased implementation of Alternatives B, C, and D in the following priority order:

B Acquisition and protection of Ottawa County gray bat maternity cave;
C Protect high quality bottomland forest in Ottawa County along the Neosho River through acquisition, easement, or management agreements;
D Acquisition and protection of a large continuous stand of Ozark forest with a portion of a large gray bat and Ozark big-eared bat cave adjoining the Ozark Plateau National Wildlife Refuge in Adair County;

All of these alternatives (B, C, and D) satisfy the requirement that the settlement monies be used for injured trust resources similar to those at the Site. These alternatives provide the greatest benefit to FWS trust resources (migratory birds and endangered species) for future generations.

The proposed action consists of acquisition of land in fee, easement and/or developing management agreements with landowners, as appropriate. The cost will depend on the amount of land available, contemporary land prices, availability of willing sellers, and whether the land is protected in fee, easement, or management agreement.

6.0 List of Preparers

Todd Adornato
Steven L. Hensley
Dan B. Martin
Karen Cathey

7.0 Public Notification and Plan Availability

The FWS is providing the public with a notice of availability of the final Plan. The FWS will place notices in the Tulsa World, a newspaper of general circulation in the state, the Daily Oklahoman, a

newspaper circulated in the State Capitol and central and western Oklahoma, and the Miami Daily Herald, a newspaper circulated in the general area of the Site, and will make copies available at the Miami, Oklahoma Public Library. Copies can also be obtained from the Internet at http:\\ifw2es.fws.gov\library, or requested from the FWS at:

U.S. Fish and Wildlife Service
222 South Houston, Suite A
Tulsa, Oklahoma 74127
918/581-7458

8.0 Comments on the Draft Restoration Plan/Environmental Assessment

The Draft Restoration Plan and Environmental Assessment were published in the Federal Register on October 15, 1999 for public review and comments. Copies of the comment letters received are presented in Appendix A and the following is a summary of public comments:

Eastern Shawnee

- Prefer Alternatives B and C
- Would like to see bottomland hardwood areas along Spring River protected as well as areas along the Neosho River.
- Disagree with Alternative D
- Believe all money should be spent in Ottawa County.

Miami Tribe

- Prefer Alternatives B and C
- Disagree with Alternative D.

Ottawa Tribe

- Agree with Alternative B.
- Disagree with Alternative D.
- Believe all money should be spent in Ottawa County.
- Willing to work with the FWS to locate and protect caves and other gray bat habitat and eagle use areas along the Spring River in Ottawa County.

Quapaw Tribe

- Take exception to the choice of alternatives the FWS proposes as preferred alternatives in the plan.
- Agree with Alternative B
- Disagree with Alternative D
- Believe all funds should be spent in Ottawa County.
- Willing to work with the FWS to locate and protect caves and other gray bat habitat and eagle use areas along the Spring River in Ottawa County.

Wyandotte Tribe

- Take exception to the preferred Alternatives (Alternative D).
- Prefer that all restoration money be spent in Ottawa County because that is where the damage occurred.
- Willing to help the FWS locate appropriate restoration areas in Ottawa County.

In summary, the comments were supportive of the alternatives in Ottawa County, but opposed to alternatives outside of Ottawa County. In response to the comments, two of the three existing alternatives are in Ottawa County and emphasis will be placed on spending the majority of the restoration money in Ottawa County, if appropriate projects can be identified.
When the alternatives were developed, an effort was made to identify projects that would provide the most efficient use of the restoration settlement money to protect the largest area of the highest quality habitat for FWS trust resources impacted by the mining. An effort was made to protect areas in the same ecoregion, suffering the greatest threat of loss, and with the best potential for long term protection. Political boundaries were not given as much priority. Tar Creek is in the Neosho River basin that serve as an ecotonal boundary between the oak-hickory forest of the Ozarks to the east and prairie parkland to the west (Bailey[15]). The FWS trust resources of the bald eagle and migratory birds use both prairie and the Ozark forest, but the federally-listed cave species (gray bat and Ozark cavefish) use mainly the Ozark forest portion of the area. Protecting bottomland forest along the Neosho or Spring Rivers and the gray bat maternity and potential cavefish cave in Ottawa County will benefit these species. However, a larger area of high quality gray bat habitat can be acquired in Adair County at lower cost and being adjacent to a the Ozark Plateau National Wildlife Refuge, it is assured long term protection. Therefore, Alternative D is still considered a viable alternative. The final document will be posted on the Internet site by July 30, 2000.

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[15] Bailey, R. G. 1981. Ecoregions of North America. U.S. Department of Interior, Fish and Wildlife Service, Office of Biological Services. Washington, D.C.