



American Society of Reclamation Sciences
2023 Meeting
June 6, 2023
Boise, ID

A Superfund Case Study: 10 Years at Tar Creek

Quapaw Nation

- Originated in the Ohio River valley as part of a larger group known as the Dhegiha Sioux.
- Migrated down the Mississippi River into Arkansas, and settled where the Arkansas and Mississippi Rivers converge.
- Pushed out of Arkansas by the US Government and the Territory of Arkansas in the 1820's.
- Established a reservation in far NE Oklahoma in 1833 after suffering greatly from disease and starvation.
- After allotment in 1895, the Quapaw Nation's reservation was reestablished via Oklahoma Supreme Court decision in 2021 and added to the list of Oklahoma reservations reestablished under the US Supreme Court *McGirt vs Oklahoma* decision in 2020.

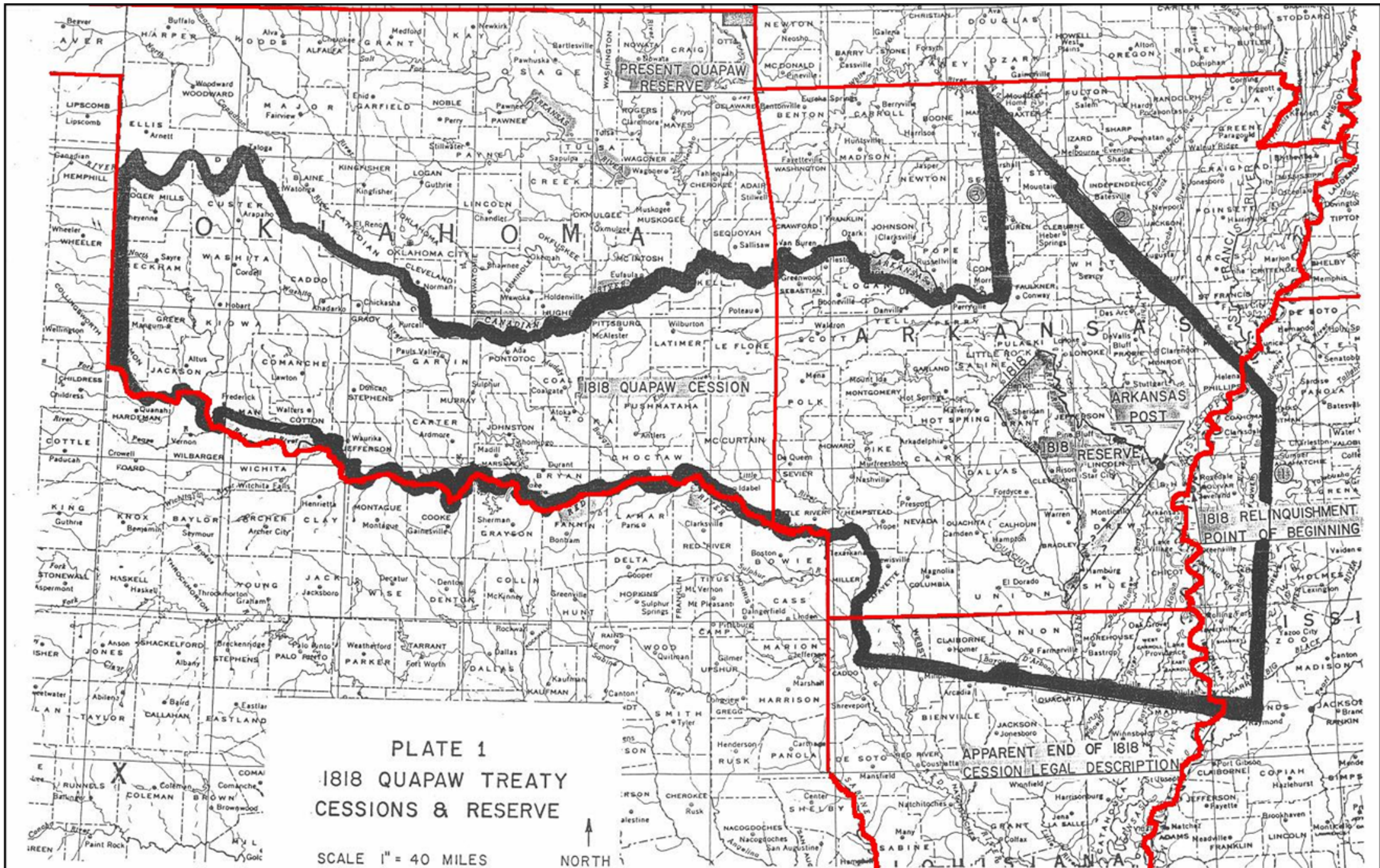


PLATE 1
 1818 QUAPAW TREATY
 CESSIONS & RESERVE

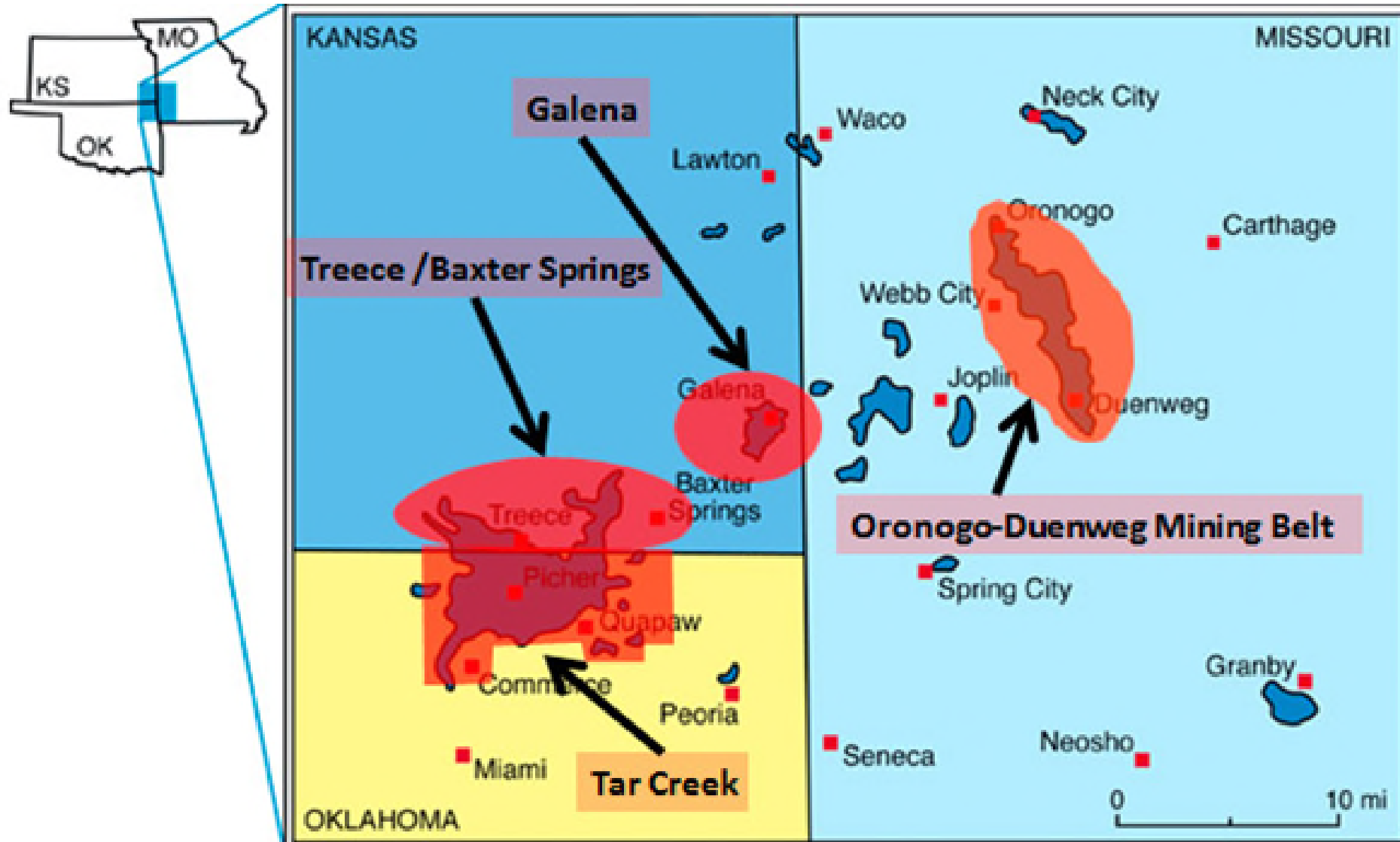
SCALE 1" = 40 MILES NORTH

TAR CREEK SUPERFUND SITE

- Tri-State Mining District
- Mining began in the area during the late 1800's and lasted until approximately 1970
- Mining and milling of ore (primarily lead and zinc) produced more than **500 million tons** of waste.
- Two primary types of wastes from mining processes: chat (course tailings) and fine tailings



Tri-State Mining District





CERCLA and Superfund

- Tar Creek was added to the National Priority List in 1983.
 - Tar Creek is one of four Superfund sites within the former Tri-State Mining District.
- OU4 Remedial Investigation/Feasibility Study (RI/FS) was completed in 2007.
 - Estimated that 46.7 million cubic yards of waste remained (safely double)
- Record of Decision was finalized in 2008.
- Cleanup began in 2010.
 - Cleanup goals
 - Lead 500 mg/kg Zinc 1,100 mg/kg
 - Cadmium 10 mg/kg



Quapaw Nation

- The Tar Creek Superfund site lies within the jurisdiction of the Quapaw Nation (Operable Unit 4).
- The Nation established an Environmental Department in 1998 and has been involved with Superfund since 2001.
- Staff of 10, including engineers and scientists.



Tar Creek Superfund Site

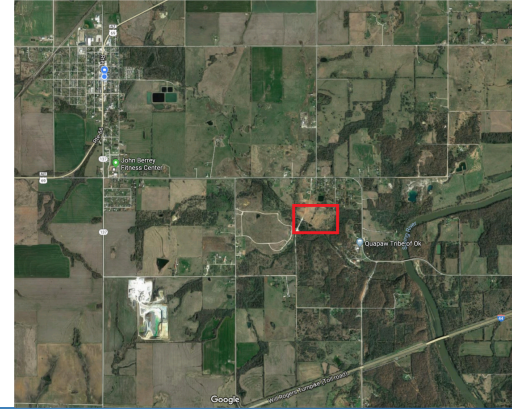
- Operable Unit 1: Surface Water and Groundwater
- Operable Unit 2: Residential Yards
- Operable Unit 3: Eagle-Picher Office Complex
- **Operable Unit 4: Mine and Mill Waste (Chat)**
- Operable Unit 5: Sediment and Surface Water

Catholic 40

- In 2013, the Nation requested to conduct Superfund Remedial Action on a piece of Tribal land near Quapaw – Catholic 40.
- This was a first – no Tribe had ever conducted Remedial Action
- EPA approved the Nation's proposal, and work began on the site in December 2013.
- Small project: 15 acres
- Removed 107,000 tons of source material

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Catholic 40 – Before and During



Catholic 40 - today



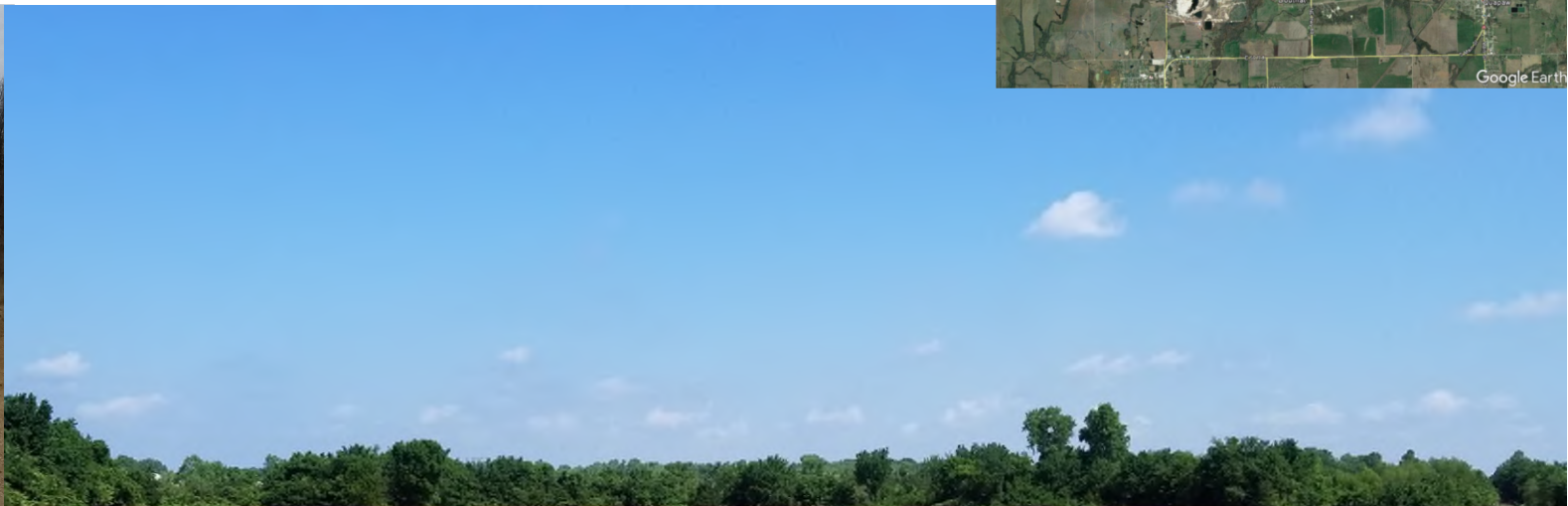
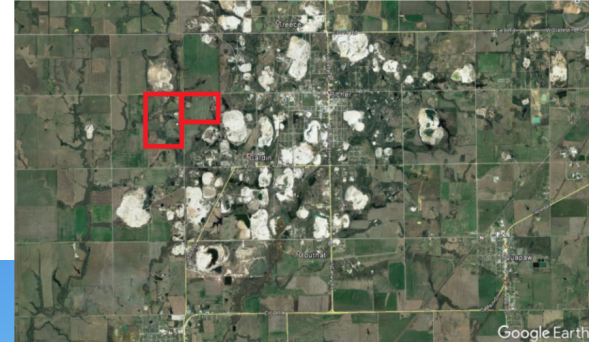
Quapaw Nation Projects

- Catholic 40
 - Beaver Creek North
 - Distal 7 North (drainage)
 - Distal 13
 - Distal 10-12-10b
 - CB199
 - Marketable Piles project
 - Bird Dog - Distal 10a
 - Smelter Site
 - Howe Interim Measures
 - Generic Removal Restricted*
- To date, the Nation has
 - Removed 6.16 million tons of source material
 - Capped 48 mineshafts
 - Filled 7 subsidences
 - Remediated 605 acres
 - 375 acres in progress
 - Four projects that are not full remediation, accounting for another 400 acres.
 - *Bipartisan Infrastructure Law
 - Boost in funding
 - Allowing to try new types of projects
 - Work with Oklahoma Department of Environmental Quality
 - 5 projects

Distal 13 – Before and After



Distal 10 – Before and After



Howe Interim Measures



Howe Interim Measures



Howe Pile

- Within Tar Creek streambed and floodplain
- Began removing marketable material in 2021
 - 250,000 tons to date
- Began pulling unmarketable material from the creek and floodplain in 2022
 - 100,000 tons to date
 - 140,000 tons remaining
- Will berm remaining material and install an engineered wetland at berm outfall to help filter any heavy metals in the runoff.
- Anticipated to complete in 2024.

Smelter Site – A New Approach to Restoration

- Remediated in 2020-2021.
- More than 56,000 tons of source material was removed.
- Remaining Smelter buildings and waste was removed.
- 25-acre property owned by Quapaw Nation.
- Previously remediated – twice
 - Oklahoma Plan 1990's
 - EPA contractor 2010
- Utilized Tallgrass Prairie and Tallgrass Wildflower seeds for revegetation.



Smelter Site – Before Remediation



Smelter Site – During Remediation



Smelter Site – After Remediation



Smelter Site – Native Prairie, Take 1



Smelter Site – Native Prairie, Year 1



Smelter Site – Native Prairie, Year 2



Smelter Site – New Life!

- Awarded a US Fish and Wildlife Service Private Lands Habitat Improvements grant.
 - Outdoor classroom
 - Native vegetation
 - Stocked pond
 - Peoria Nation



Current Status

- Bidding Classroom structure construction.
 - Must be completed by March 2024
- 2nd Stocking Event in pond
 - Utilize Peoria Nation's Aquatic Facility for native species
- Planted and monitoring native vegetation
- Applied for native milkweed plants through Monarch Watch
- Sourcing native tree live stakes for transplant from within the Superfund site (free!)
- Native Vegetation
 - Butterfly weed
 - Downy sunflowers
 - Buttonbush
 - Stiff goldenrod
 - Ozark bluestar
 - Purple coneflower
 - Indian Paintbrush

2023 Native Plantings



Outdoor Classroom



- Outdoor Classroom
 - ADA Compliant
 - Future goal is to end Tar Creek tours at this site to showcase how remediated lands can be restored to native habitat.
 - 715 people since Oct 2019
 - Stocked pond can host Fishing Derbies for Tribal Youth.
 - Working with Tar Creek Trustee Council (NRDA) on creating a Superfund Remediation and Restoration curriculum as part of a Youth Apprenticeship Program in 2024
 - 35 Tribal Young Adults (18-19)

Elm Creek Restoration

1.5 miles of Superfund Remediation in Elm Creek

- Two separate superfund projects
 - Bird Dog (north, 1 mile)
 - Distal 10A (south, 0.5 mile)
- Received BIA funding
 - Created Riparian Restoration Plan
 - Target: 45,992 native plants
 - Trees, shrubs, native grasses
 - Bald Cypress, Sycamore, Rough Leaf Dogwood, Willow, Cottonwood
 - Rushes, sedges, rivercane
 - Tallgrass Prairie, Tallgrass Wildflowers
 - Pollinator habitat
 - Start planting Fall 2023



Questions?



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