

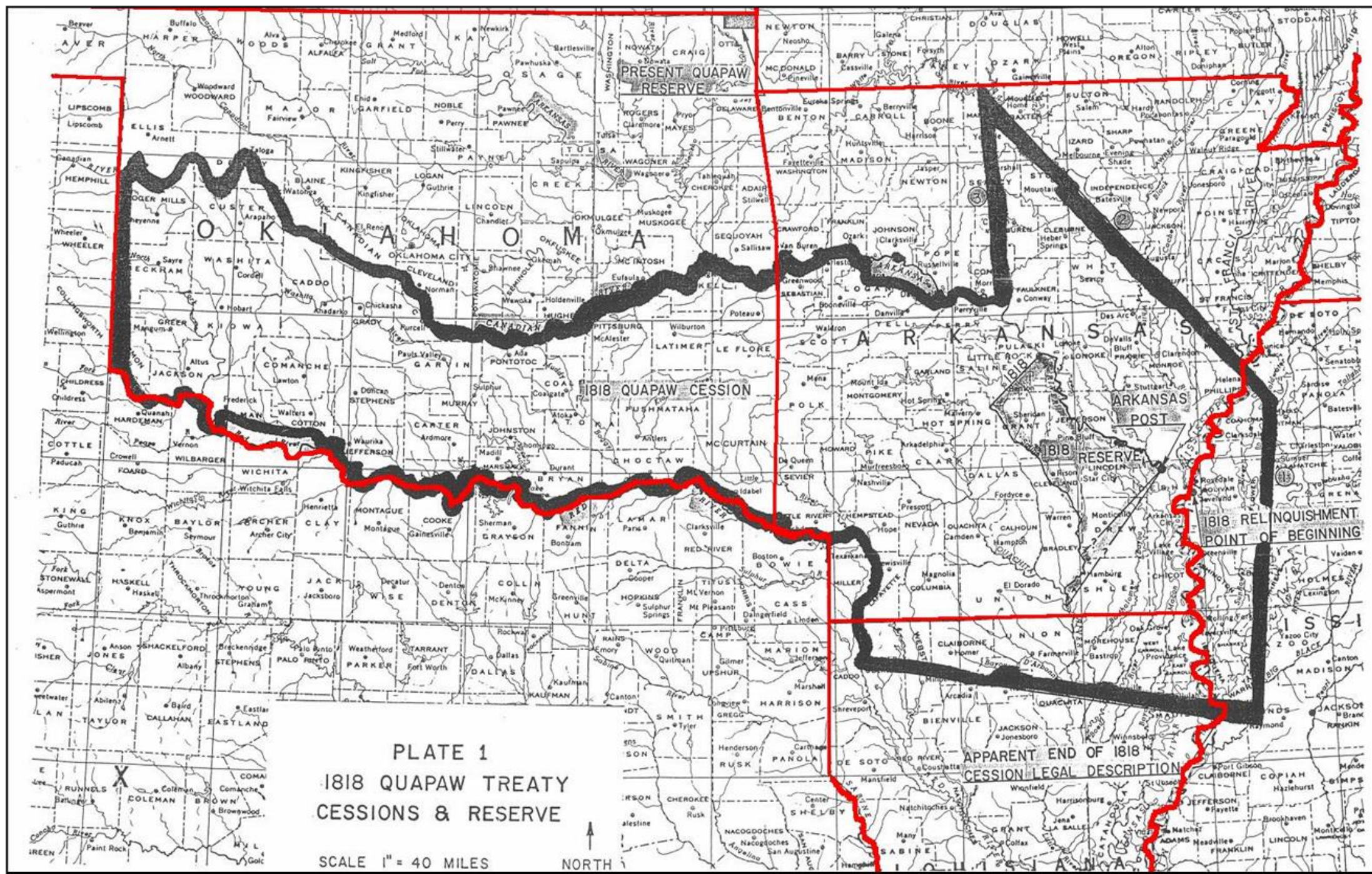


American Society of Reclamation Sciences
2024 Meeting
June 4, 2023
Knoxville, TN

From Remediation to Restoration: A Tar Creek Story

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.

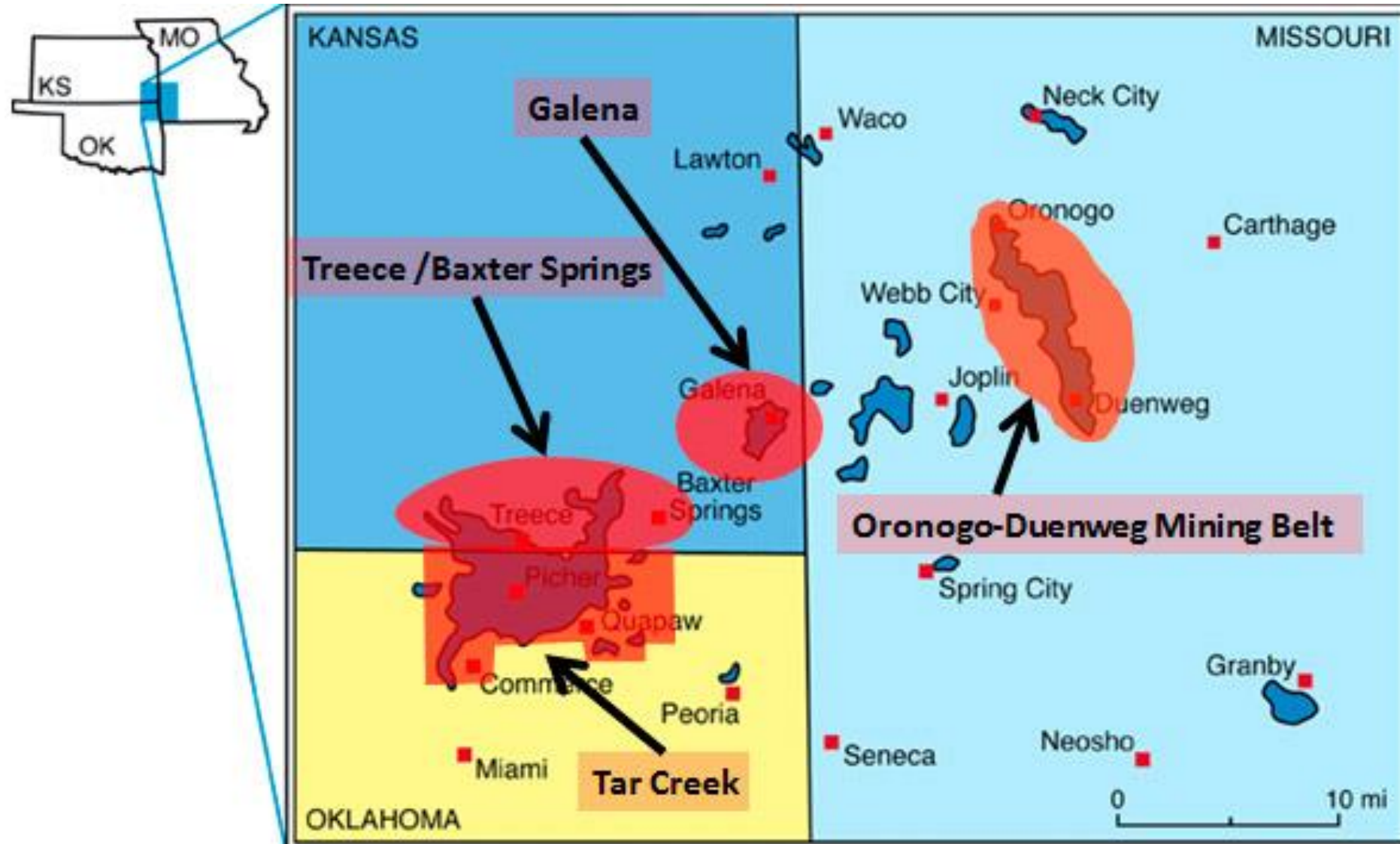


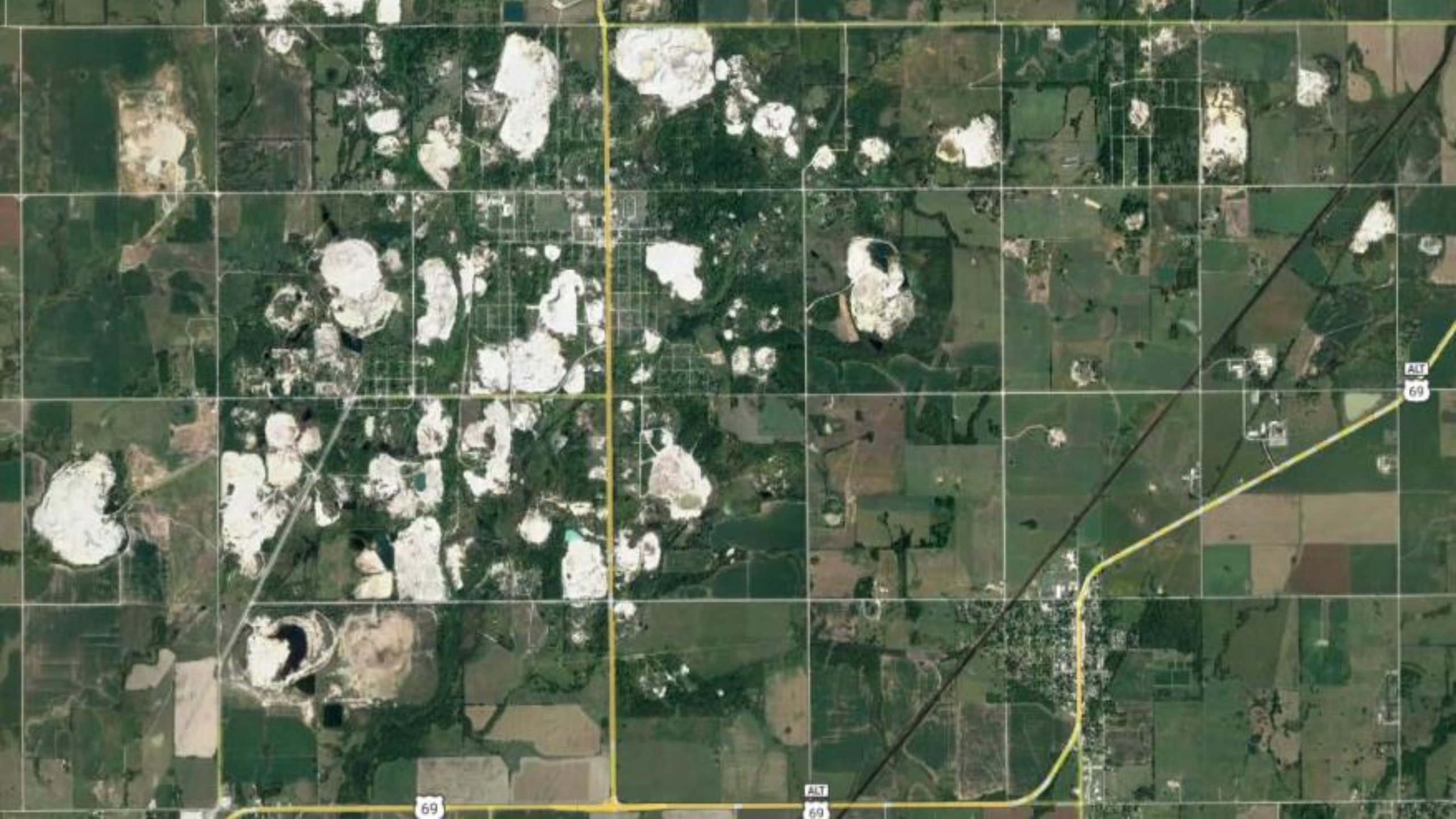
TAR CREEK SUPERFUND SITE

- 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





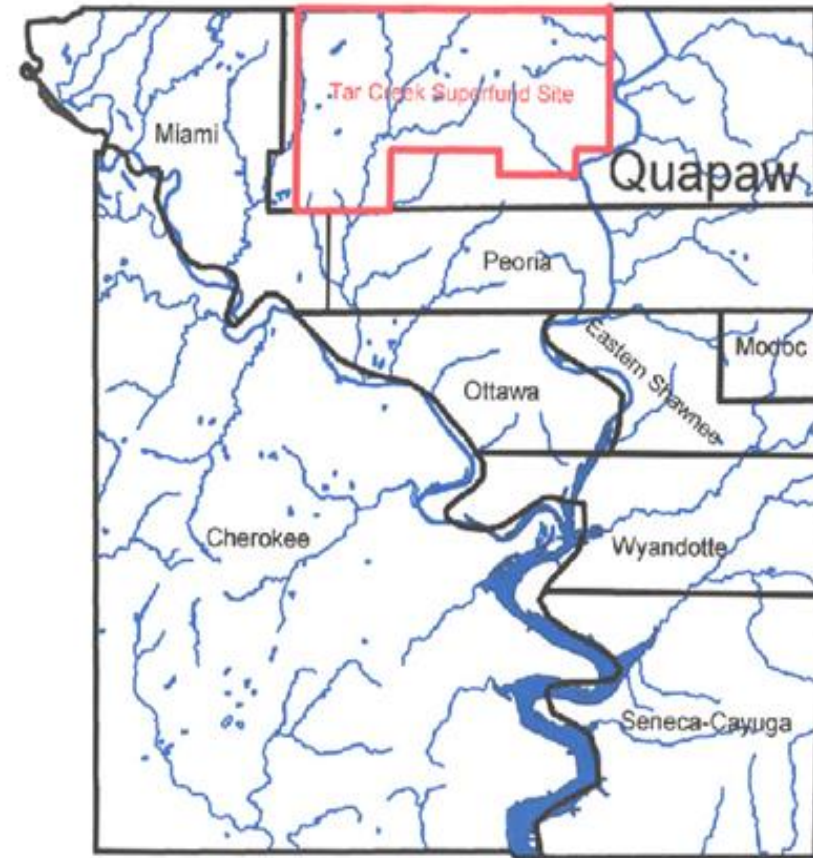
CERCLA and Superfund

- 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

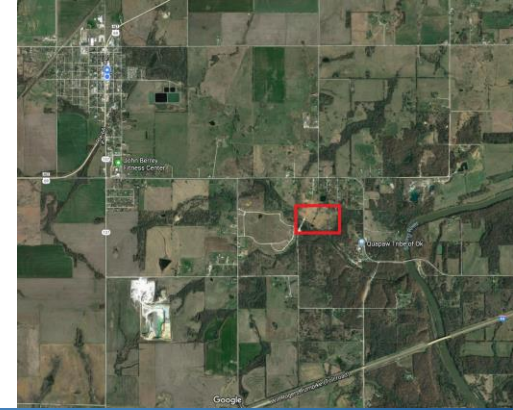
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Catholic 40

- The Quapaw Nation's Quapaw Services Authority completed remedial action at Catholic 40 in 2014.
- 107,000 tons of source material was removed.
- Two mineshafts were capped.
- The project was such a success, EPA encouraged the Nation to conduct further work.



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 7.35 million tons of source material
 - Capped 48 mineshafts
 - Filled 7 subsidences
 - Remediated 694 acres
 - 350 acres in progress
 - Four projects that are not full remediations, accounting for another 400 acres.
- *Bipartisan Infrastructure Law
 - Boost in funding
 - Allowing to try new types of projects

Distal 13 – Before and After





Howe Interim Measures



Howe Interim Measures



Howe Pile

- Within Tar Creek streambed and 100-year floodplain
- Marketable material removed
 - 271,000 tons
- Unmarketable material removed
 - 300,000 tons
- Installed two sediment traps
- Installed two sediment canals
- Installed one acre constructed wetland
- Planted 3,800 plants
 - Black Willow
 - Buttonbush
 - Cattail (transplants)
 - Horsetail Reed
 - Coontail
- Seeded with 30kg native seed
- Partner with OU CREW for monitoring
- Site will be fully remediated in 10-15 years
- All plants/wetland will be removed during remediation



Howe Interim Measures



Willow and Cattail



Willow at mine water seep



Native seed in floodplain



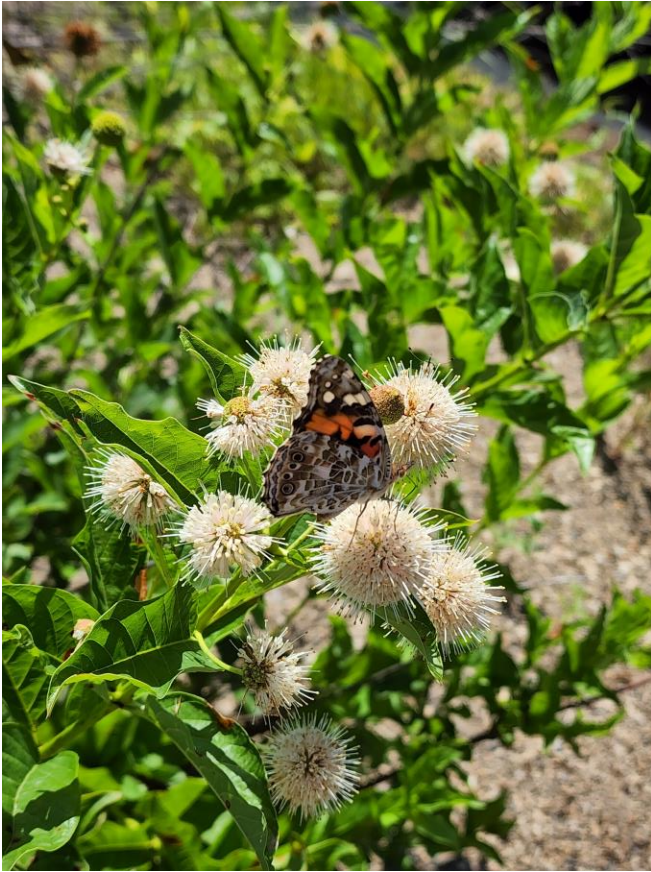
Willow at South Howe intact wetland



Buttonbush



Wildlife at Tar Creek



Elm Creek Restoration

1.5 miles of Superfund Remediation in Elm Creek

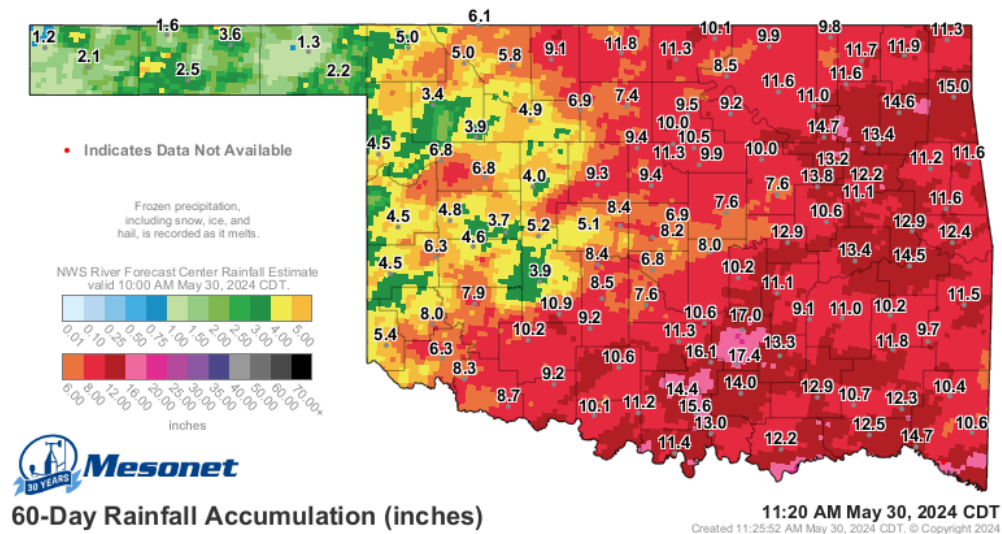
- Two separate superfund projects
 - Bird Dog (north, 1 mile)
 - Distal 10A (south, 0.5 mile)
- Received BIA funding
 - Created Riparian Restoration Plan
 - Target: 45,992 native plants
 - Trees, shrubs, native grasses
 - Bald Cypress, Sycamore, Rough Leaf Dogwood, Willow, Cottonwood
 - Rushes, sedges, rivercane
 - Tallgrass Prairie, Tallgrass Wildflowers
 - Pollinator habitat
 - Plant entire project Fall 2024





Elm Creek Restoration

60-day Rainfall Accumulation



Missed spring planting season by two weeks



1,100 pounds native seeds stockpiled for
Fall 2024 planting

Tar Creek Trustee Council (NRDAR)



SUMMER 2024 TAR CREEK APPRENTICESHIP PROGRAM (TCAP)

Program Recruitment

Seeking students who are interested in earning money in northeast Oklahoma while connecting with nature on a cultural level and gaining firsthand experience in natural resources restoration. High school, Vo-Tech, and college students (ages 16-21) are being sought from the following tribes: Cherokee, Eastern Shawnee, Miami, Ottawa, Peoria, Seneca-Cayuga, and Wyandotte.



6-week Program
starting Wednesday,
May 29, 2024

Participants earn
income & an
Oklahoma Lifetime
Hunting & Fishing
License.

Reconnect with
nature on a cultural
level while helping
the environment.
Join the adventure!

APPLY NOW.
Space is limited.



TRIBAL SPONSORS:

Cherokee, Eastern Shawnee,
Miami, Ottawa, Peoria,
Seneca-Cayuga, &
Wyandotte

For more information, call or text:

TeNona Kuhn (918) 325-9207

Tami Lowery (918) 541-8305

Restoration Module 5: Quapaw Remedy & Restoration

Friday, June 28 | 9 AM – 3 PM

Purpose: Experience remedial and restoration activities with hands-on streamside restoration and project monitoring.



LOCATION: Quapaw Nation Lands

PRESENTER: Summer King (Quapaw
Environmental Dept.)



Class Outline: Quapaw Remedy & Restoration

General Comments by TCAP Staff:

Students will need to dress for a full day in the field where you will participate in a restoration project. You will also tour various sites to see a range of cleanup and restoration projects. You will be able to participate in the actual restoration process where you will intimately engage with your natural surroundings while planting vegetation that will enhance and help restore a riverside floodplain.

Although some of the concepts presented may have been discussed at other projects, each site offers its unique characteristics. Also, the reinforcement of restoration principles and techniques are important as we move closer to the final week of class when you will be involved in developing your own restoration proposal for another site during our "Restoration Capstone" day.

Goals:

Expose students to a wide range of projects that address both "remedy" and "restoration". Engage students in hands on restoration of a stream riparian zone. Teach students some environmental monitoring techniques.

Objectives:

Take students on a "whirlwind" field trip to numerous sites being worked on by the Quapaw Tribe. Have students participate in the planting of a stream floodplain. Expose students to soil chemistry sampling techniques.

Activities:

- 9:00-9:25 am - Load bus and travel to the first site
- 9:25-10:00 am - Tour 2 sites
- 10:10-12:00 pm - Participate in riparian planting project.
- 12:00-12:45 pm - Lunch
- 12:45-2:30 pm - Travel and stop at additional sites, end up at restoration site.
- 2:30-3:00 pm - Travel back to NEO

Outcomes:

- Conduct hands on restoration of a streamside floodplain.
- View a wide range of projects addressing mining pollution problems in the Tar Creek area.
- Learn about the Superfund remediation [process](#)
- Learn how restoration can be incorporated into the remediation [process](#)
- Learn about soil sampling and various [techniques](#)
- Learn about mine water discharge and passive [treatment](#)

Restoration Details: Quapaw Remediation

Restoration Project Name:

Quapaw Nation Superfund Remediation and Restoration Activities

Date of Trip: June 7, 2024 (9am-3pm)

Trip Logistics:

The Quapaw Nation's field trip representatives will meet the TCAP students at NEO at 8:45 am. Buses will be provided to transport students, TCAP staff, and all Quapaw representatives to the sites. Since the trip is a full day, lunch will be brought along.

Project Location: Various sites

- Ritz- a "pre-existing conditions" site where no remediation has [occurred](#)
- Blue Goose - active remediation site
- Distal 1 0a - in-stream and floodplain remediation and restoration, soil sampling demonstration, tree planting
- Picher - lunch and restroom break
- Howe Interim Measure - chat pile removed from floodplain, constructed [wetlands](#)
- Douthat Bridge - mine water discharges and future remediation activities
- Smelter - fully restored property
- Potential stop if time allows - Meyer Ranch Passive Treatment System

Project Goals:

- Varies by [site](#)

Project Objectives:

- Varies by site.

Cultural Uses to Restore:

- Hunting, fishing, and gathering.
- Ceremonial
- Recreation
- Habitat

Restoration Designs Considered:

Preliminary final grade designs are provided by EPA prior to the beginning of work. However, we inevitably find more contamination than was anticipated. Therefore, we let the site "show" how it needs to be graded to drain. Revegetation after Superfund remediation is to provide 70% cover for stormwater erosion purposes.

Questions?



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Quapaw Nation
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