

Development of a Jurisdictional County Boundary (GIS) Standard

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September 4, 2026

- **Purpose**: To create a Geographic Information System (GIS) based standard that guides the drafting of authoritative jurisdictional county boundaries in the form of polygons representing each county of the State of Oklahoma. The drafting of these polylines is to be derived from detailed Public land Survey System (PLSS) descriptions, surrounding state boundaries and the center line of certain rivers and creeks based on authoritative sources such as the Oklahoma Constitution, various United States government statutes and proclamations and various county and state proclamations and referendums.

Legislative Authorizations

Office of Geographic Information

Title 82, Section 1501-205.3

D: The Office Shall:

2. Establish a central statewide geographic information clearinghouse to maintain data inventories, information on current and planned Geographic Information System applications, information on grants available for the acquisition or enhancement of geographic information resources, and a directory of geographic information resources available within the state or from the federal government;
4. Coordinate multiagency Geographic Information System projects, including working with state and local agencies in the development and maintenance of statewide data and Geographic Information Systems;
6. Develop, maintain, update, and interpret Geographic Information System standards under the direction of the Council and working with state and local agencies;

Legislative Authorizations

State Geographic Information Council

Title 82, Section 1501-205.1

G. The duties of the Council shall include overseeing the Office of Geographic Information concerning the following:

1. Development, adoption, and recommendation of standards and procedures that may be applied to geographic information and Geographic Information Systems to promote consistency of data elements;

Need for a Standard

- Authoritative Jurisdictional County Boundary data set does not exist.
- Initially digitized from paper maps
- USGS developed Digital Line Graphs (DLGs)
 - Digitized from 100K paper maps
 - Accuracy: 0.02" ~ 167 Feet
- U.S. Census Bureau – TIGER Boundary File
 - Merging of Census data and DLGs
- Digital Atlas of Oklahoma – USGS 1997
 - First formal statewide county boundary dataset
 - Based on DLGs developed from 100K topo maps
 - 100k topo maps created from 24k topo maps of multiple years
 - USGS maps and geospatial products are not authoritative- Nav and Regulatory

Need for a Standard

- No single source of complete descriptions of each county boundary
 - Needs to be researched and compiled from multiple authoritative sources.
- State has not adopted an authoritative source for Public Land Survey System.
- State does not have an authoritative jurisdictional county boundary data set.

Intended Use of the Standard

- Need to replace the county boundary data set U.S. Census is using with an authoritative county boundary data set for the State of Oklahoma.
- Census would populate this authoritative data set with population data and provide to Oklahoma for use in 2030 Census redistricting by the Oklahoma Legislature.
- Although use of the authoritative county boundary data set would not be mandatory, it's use would be best practice since all of the political boundaries and census data would be based on this data set.
- A side benefit of this standard -> Adoption of an authoritative PLSS data set.

Impact of this Standard

- This Standard and the resulting Jurisdictional County Boundary Data Set will **NOT** have any effect on Land Rights and Property Ownership.
- Changes in Jurisdictional County Boundaries may determine which taxing authority has jurisdiction over a specific parcel of land.

Foundations of Jurisdictional County Boundaries

- Surrounding State Boundaries
 - Are they authoritative?
 - Digitized from paper maps?
 - Derived from Census data?
 - Do they intersect U.S. Geodetic Survey monuments?
 - Based on ground-truth surveys?
- Public Land Survey System
 - Bureau of Land Management (BLM) 2018- Authoritative GIS PLSS for Oklahoma
 - Township, First Division (Sections), Second Division (QQ and Lots)
 - Authoritative sources (paper maps) show various boundaries like Cherokee Outlet, 96th, 98th & 100th Meridians, Baseline, Tribal boundaries
- Center line of Rivers and Creeks
 - Defined as the **meandering** center line.

Surrounding State Boundaries

- **Arkansas**
 - Recent high-precision survey of mile posts defining western boundary
 - Probably a good candidate of an authoritative boundary
- **Missouri**
 - Appears to be high quality but does not intersect NGS monuments
- **Kansas**
 - Defined as 37 degree parallel
 - TIGER 2020 state boundary is the official state boundary
 - Line work appears to be hand digitized
 - Does not intersect NGS monuments
- **Colorado**
 - Defined as 37 degree parallel
 - Known surveying errors
 - Line work appears to be hand digitized, not survey errors
 - Does not interest NGS monuments

Surrounding State Boundaries (con't)

- **New Mexico**

- Defined as the 103rd Meridian
- Official state boundary is the Census 2020 state boundary
- Quality of line work appears to be hand digitized
- Does not intersect any NGS monument

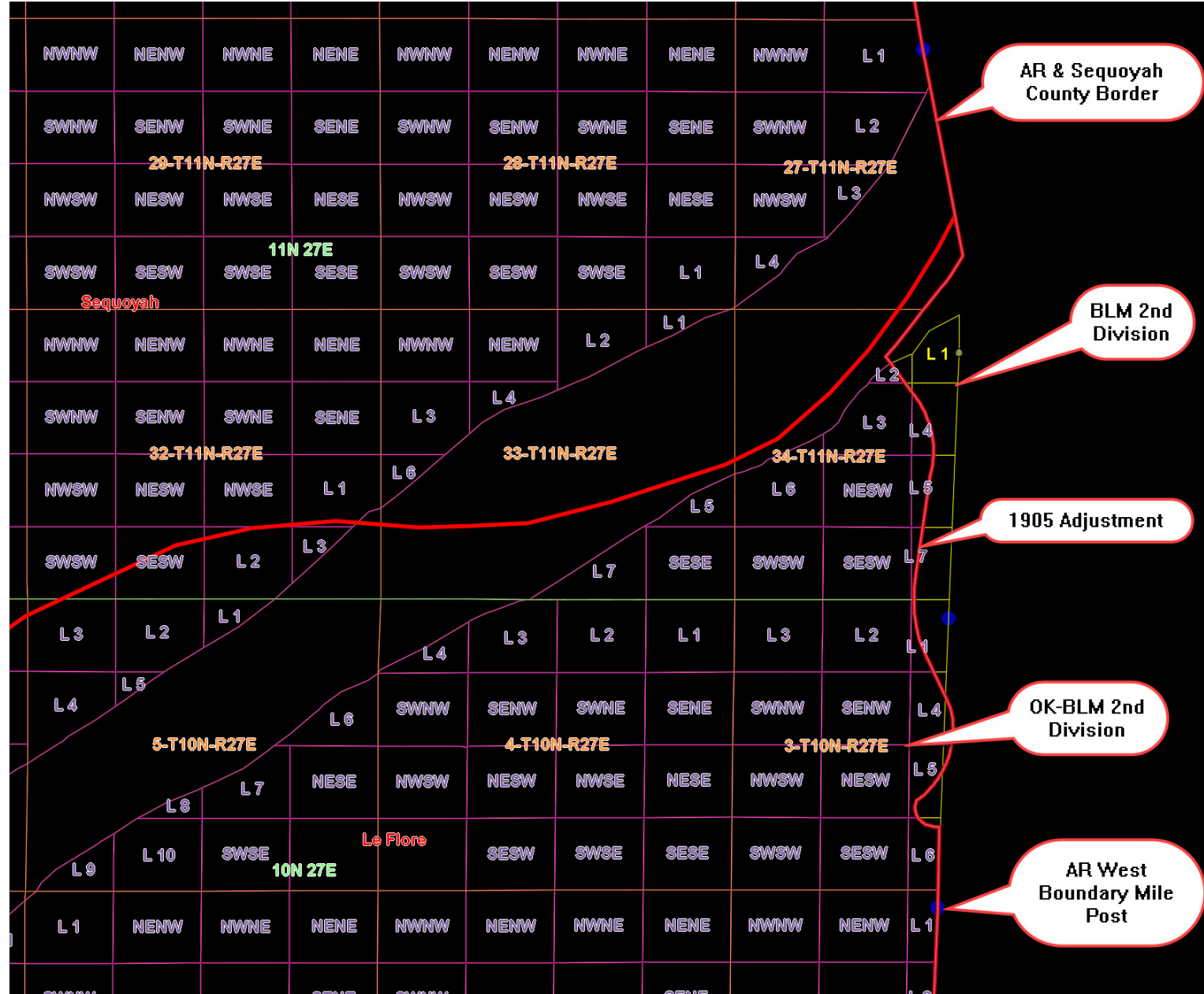
- **Texas**

- Boundary between Oklahoma and Texas Panhandle is 36 degrees, 30 minutes North parallel
 - Surveyed by John Clark, 1860
 - Does not intersect any NGS monuments
 - Line work suggests hand digitization
- Boundary between Oklahoma western boundary and Texas Panhandle is 100th Meridian- Resurveyed 1928 after initial surveys in late 1800's
- Boundary along Red River determined in 2000- Red River Compact
 - Vegetation line except the Texhoma Area.

Public Land Survey System

- 1870-1900: Nearly all of Oklahoma and Indian Territory had been surveyed
 - The survey notes and maps created from those notes are the authoritative source of the PLSS for Oklahoma
- November 2018 BLM released a GIS data set of Township, First Division and Second Division created from these authoritative sources. These data sets were updated in 2023.
 - Created from authoritative sources, these GIS data sets become the authoritative source for digital data sets for the PLSS in Oklahoma.
- To create an up-to-date authoritative PLSS for the State, these data sets need geometric modification to accommodate:
 - Act of Congress February 10, 1905, that adjusted the western boundary of Arkansas in the area of Ft. Smith
 - U.S. Supreme Court Order of March 5, 1928, adjustment to the location of the 100th Meridian

Act of Congress February 10, 1905



TOWNSHIP NO. 1 NORTH RANGE NO. 27 WEST INDIAN MERIDIAN

Sec. 1. Sec. 2. Sec. 3. Sec. 4. Sec. 5. Sec. 6.

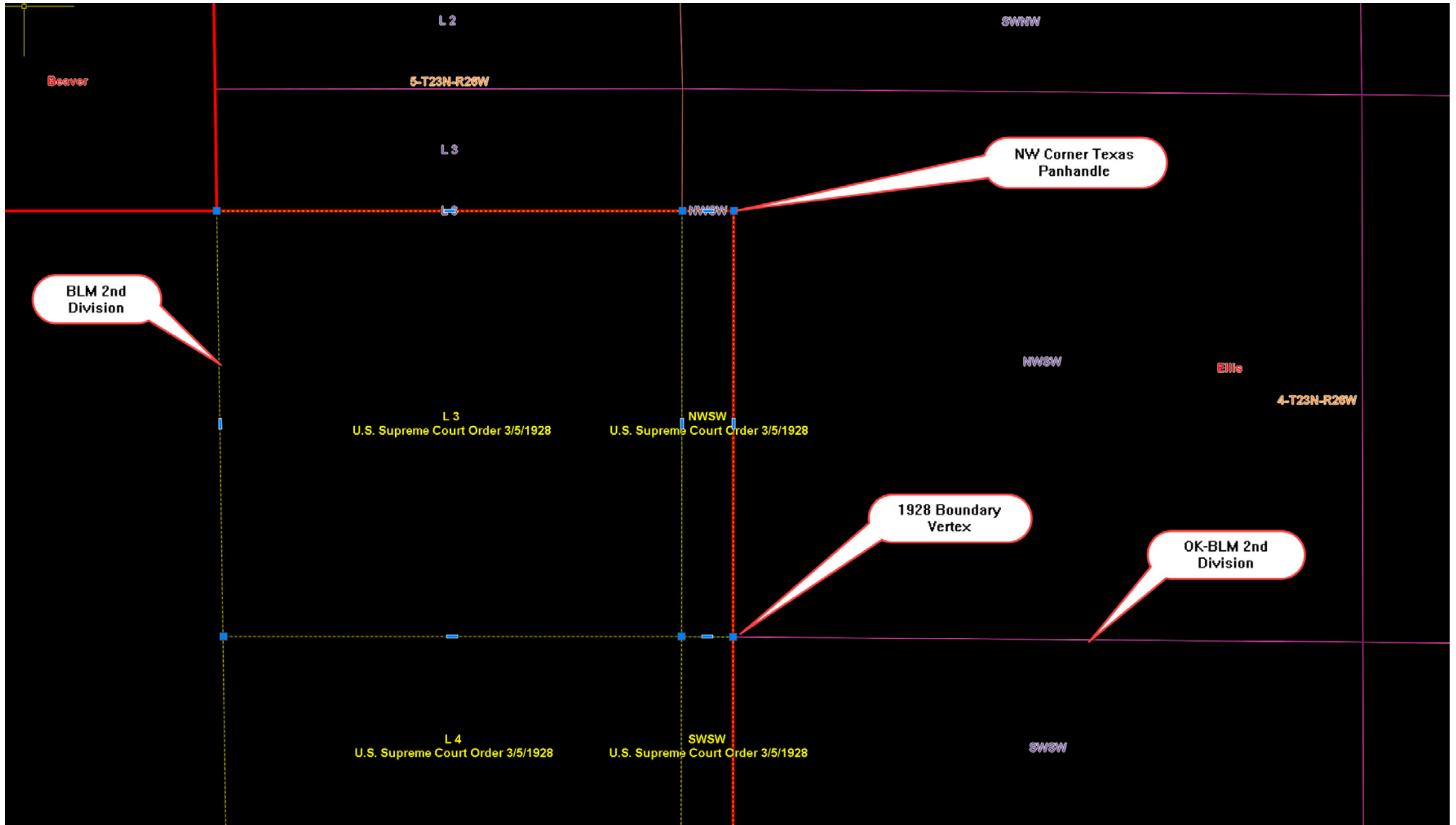
Sec. 7. Sec. 8. Sec. 9. Sec. 10. Sec. 11. Sec. 12.

Sec. 13. Sec. 14. Sec. 15. Sec. 16. Sec. 17. Sec. 18.

RED RIVER

1928 100th Meridian

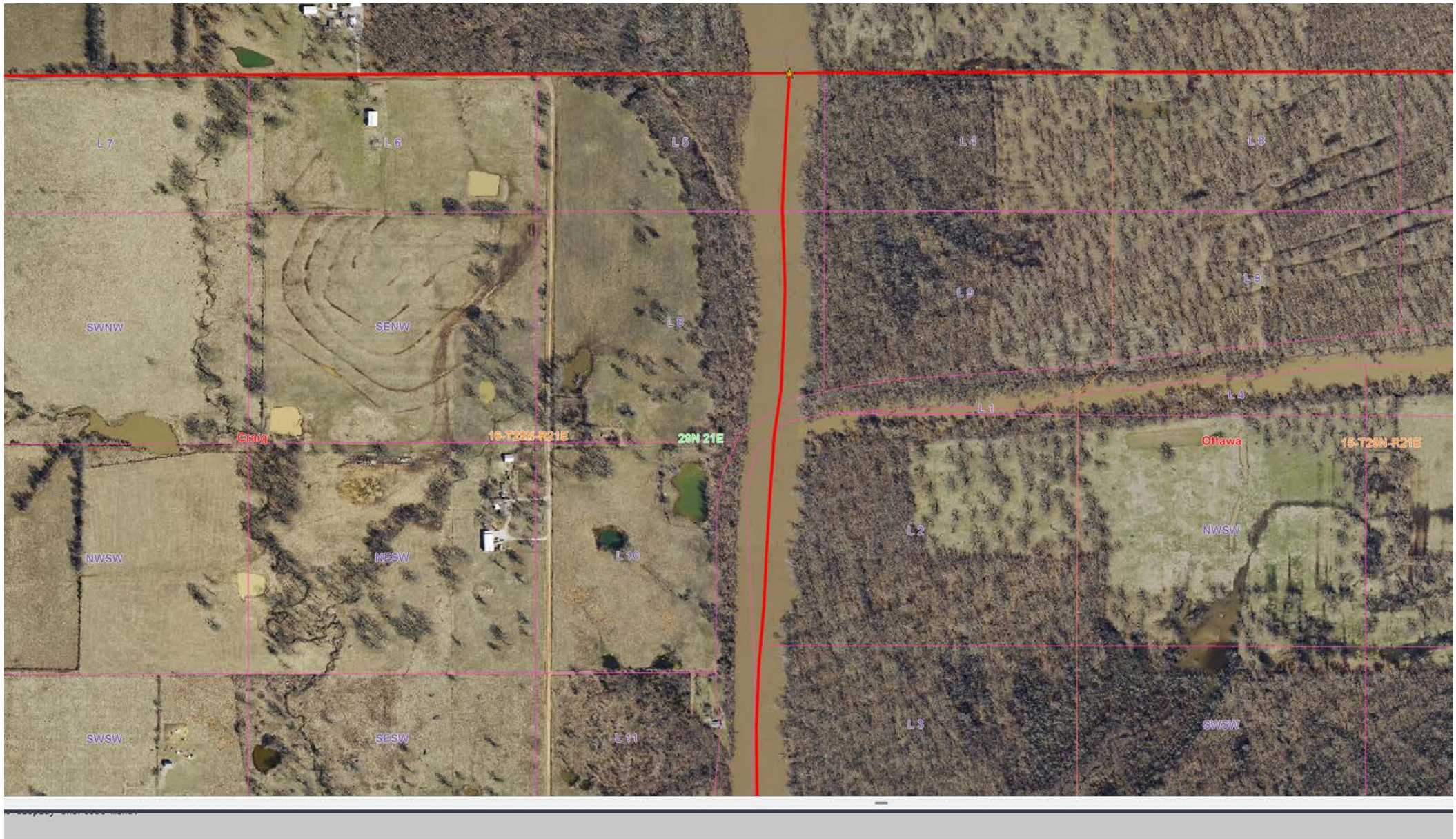
U.S. Supreme Court Order of March 5, 1928



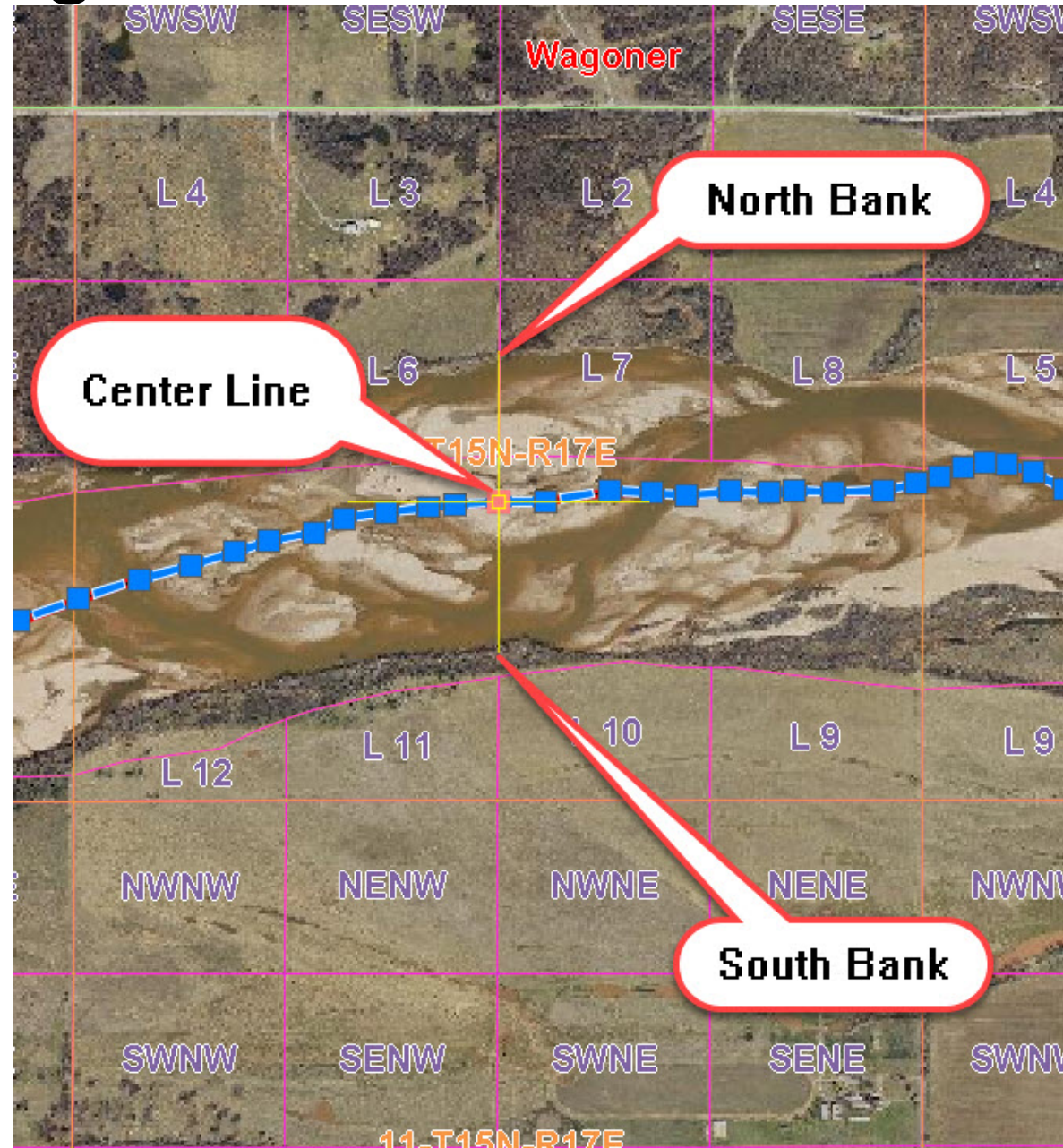
Mapping of County Boundaries

- Draw a polygon for each county based on its detailed description snapped to each intersection of the OK-BLM 2nd Division data set while observing OK-BLM First Division and OK-BLM Township boundary lines.
- River boundaries follow rules for mapping rivers
 - Use latest, high-resolution leaf-off aerial photography
 - Adjoining county – snap to vertices in existing river boundary
- Add attributes according to defined schema

Mapping of Rivers and Creeks- Bank Full

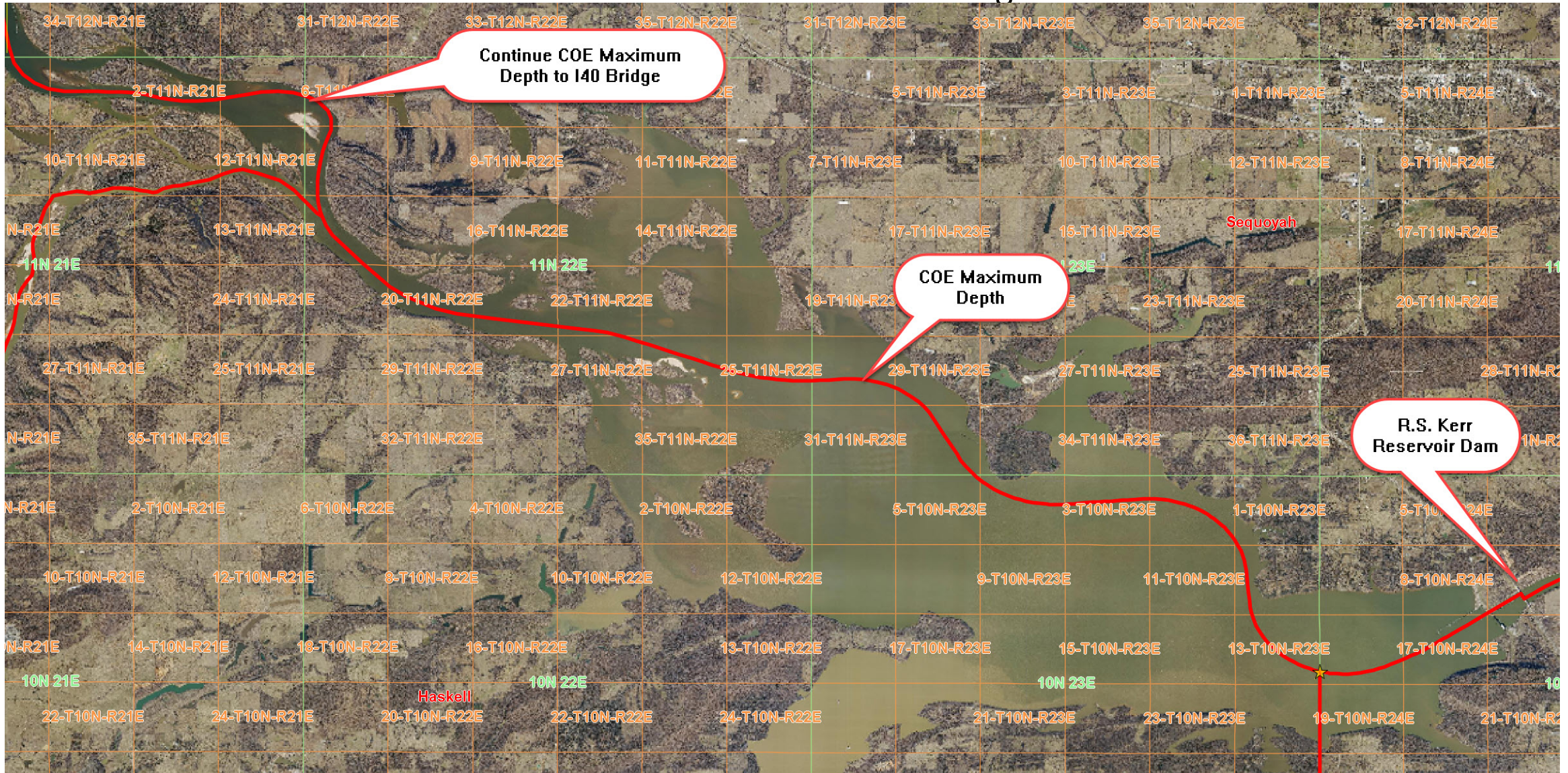


Mapping of Rivers and Creeks- Not Bank Full



Mapping of Rivers and Creeks – Lakes

R.S. Kerr Reservoir and McClellan-Kerr Navigation Channel



Mapping of Rivers and Creeks – Lakes

Red River and Lake Texhoma



Mapping of Rivers and Creeks

Red River and Vegetation Line



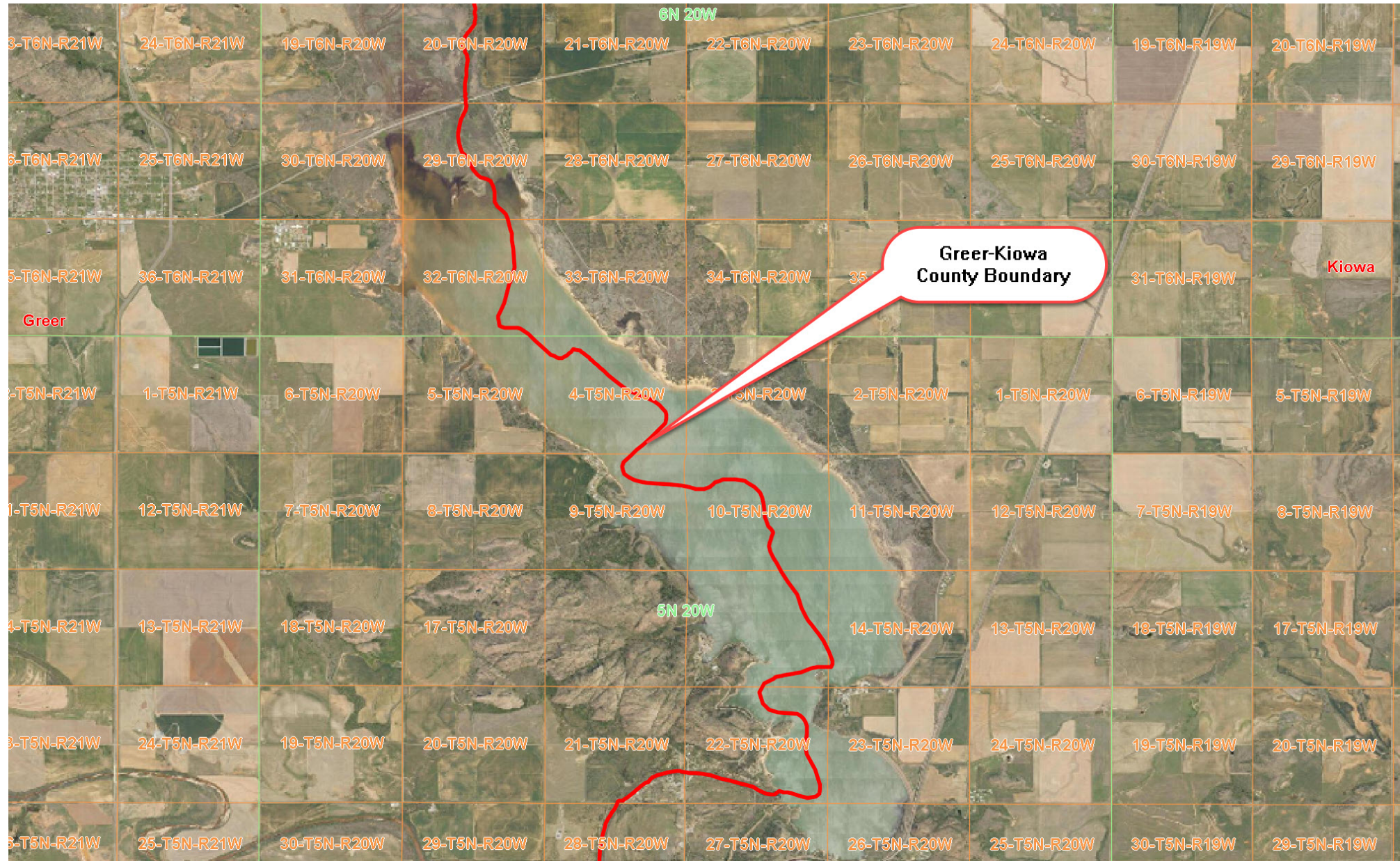
Mapping of Rivers and Creeks – Other Lakes

Lake Altus, Lake Texhoma, Eufaula Lake, Fort Gibson Lake, Kaw Lake

USGS National Map
Greer-Kiowa County
Boundary

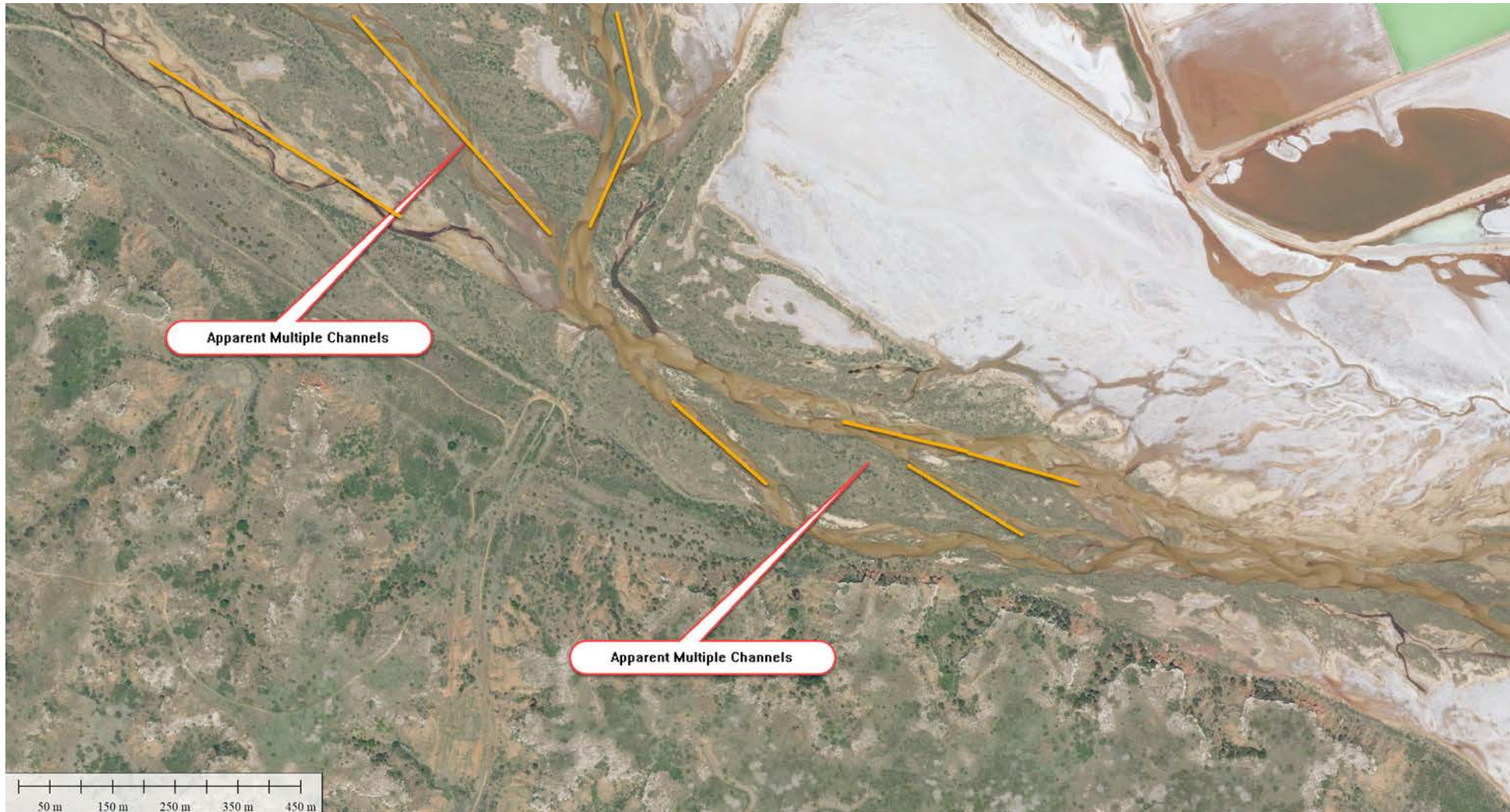
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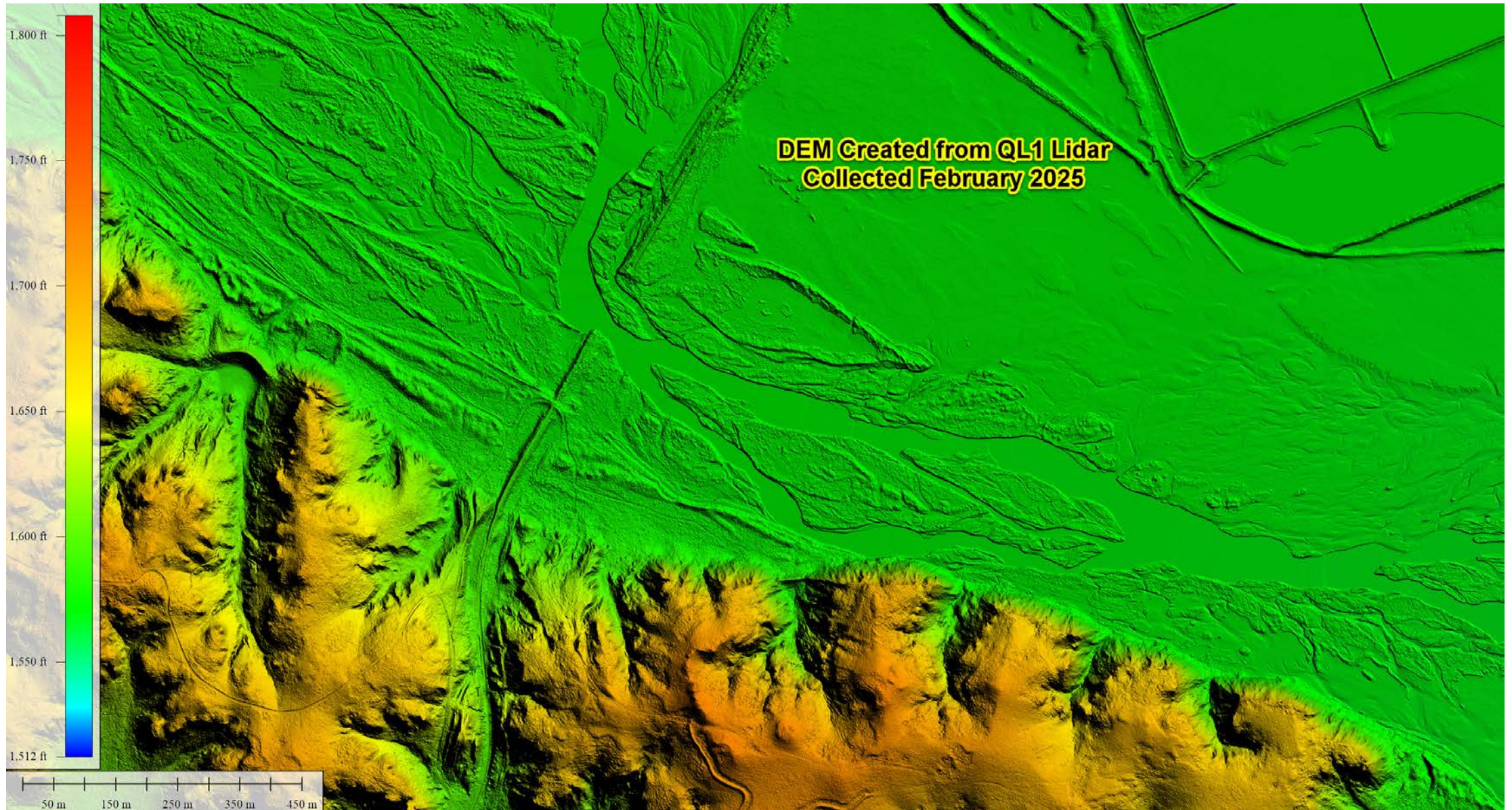
Mapping of Rivers and Creeks – Braided Rivers

- A braided river is made up of a network of channels across a wide area of the riverbed
- Cimarron River – Woods- Harper and Woodward Counties



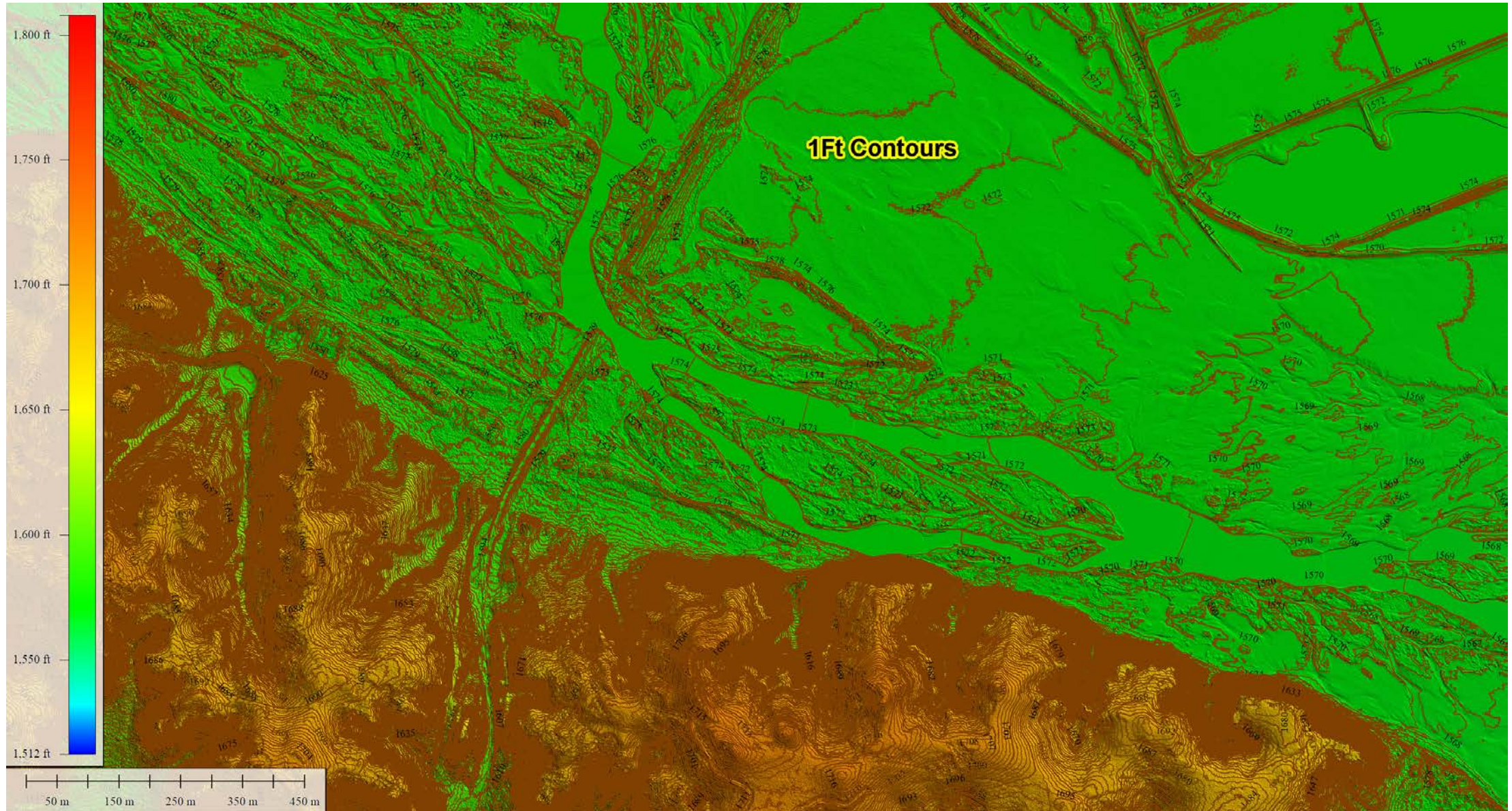
Mapping of Rivers and Creeks – Braided Rivers

Cimarron River – Cargill Salt Mine Area



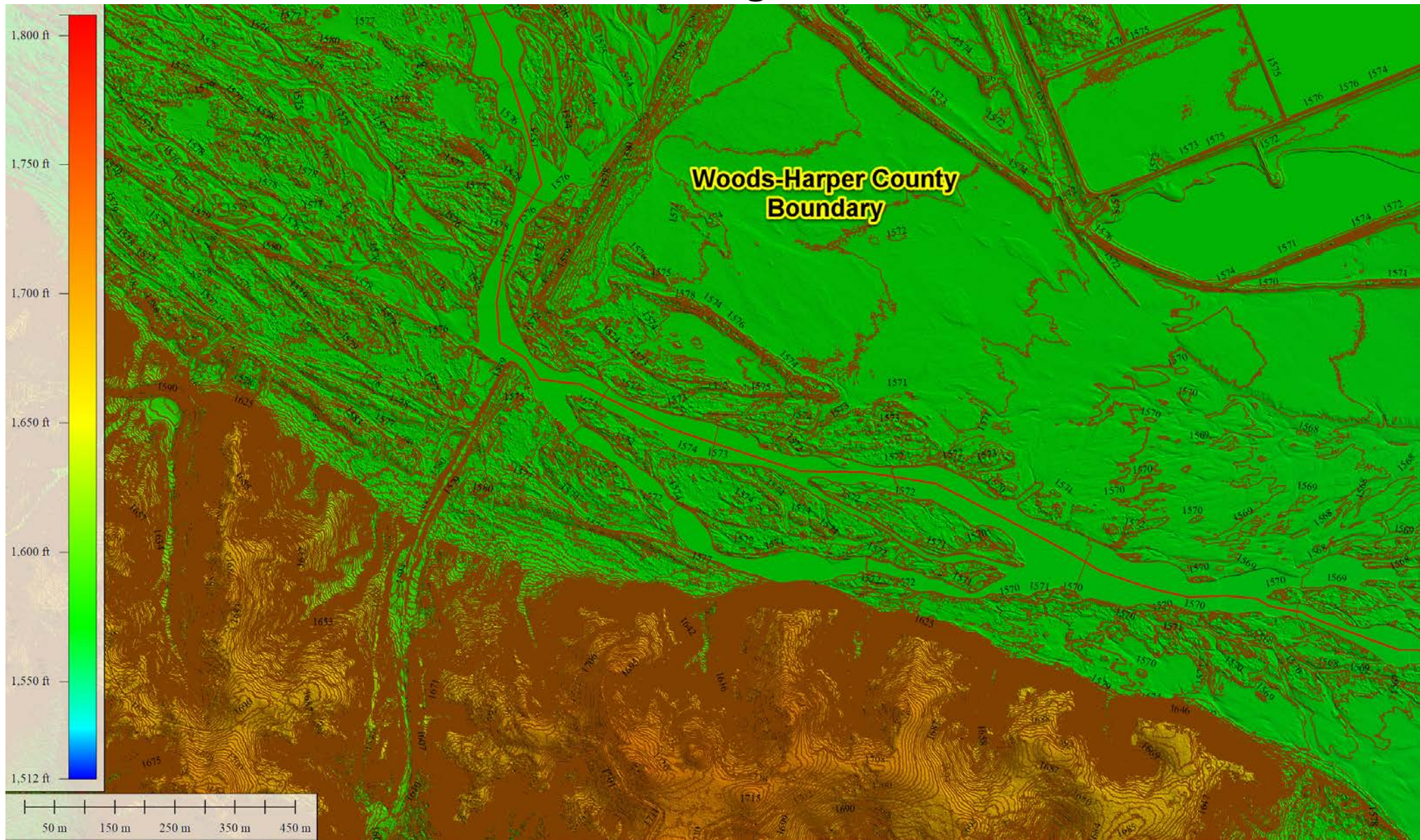
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Mapping of Rivers and Creeks – Braided Rivers

Cimarron River – Cargill Salt Mine Area



County Boundary Polygon Schema

Field Name	Field Description	Field Type	Field Width	Required
Name	County Name	Alphanumeric	15	Y
Full_Name	County Full Name	Alphanumeric	25	Y
State_FIPS	State FIPS Code	Alphanumeric	3	Y
Cnty_FIPS	County FIPS Code	Alphanumeric	4	Y
C_FIPS_ID	County FIPS ID	Alphanumeric	6	Y
C_Lat	Centroid Latitude	Alphanumeric	12	Y
C_Long	Centroid Longitude	Alphanumeric	12	Y
L_Area_m	Land Area in Square Meters	Alphanumeric	12	Y
W_Area_m	Water Area in Square Meters	Alphanumeric	10	Y
L_Area_a	Land Area in Acres	Alphanumeric	8	Y
W_Area_a	Water Area in Acres	Alphanumeric	6	Y
L_Area_mi	Land Area in Square Miles	Alphanumeric	5	Y
W_Area_mi	Water Area in Square Miles	Alphanumeric	3	Y
URL_RFC	URL for ODOT RFC (Rural Functional Classification) Map	Alphanumeric	100	Y
URL_Topo	URL for County History at Exploring Oklahoma History at blogoklahoma.us	Alphanumeric	100	N
URL_Wiki	URL for County Information at Wikipedia.com	Alphanumeric	100	N

County Boundary Metadata

- Meet ISO19115 / ISO19139 Standard
 - ISO19115:2003 XML using the ISO19139 Technical Specification for Geographic Information-Metadata-XML Schema

County Boundaries and PLSS Workgroup

- Established October 7, 2022
- **Task:** *To develop a Standard describing the process of drafting authoritative jurisdictional county boundaries based on authoritative detailed county boundary descriptions.*
- Detailed County Boundary Descriptions needed to be developed.
- Members
 - Office of Geographic Information
 - OK Tax Commission
 - OK Department of Commerce
 - City of Ardmore
 - OK Department of Transportation
 - OK Water Resources Board
 - OK Center for Spatial Analysis
 - OK House of Representatives
 - County Assessor Association of Oklahoma