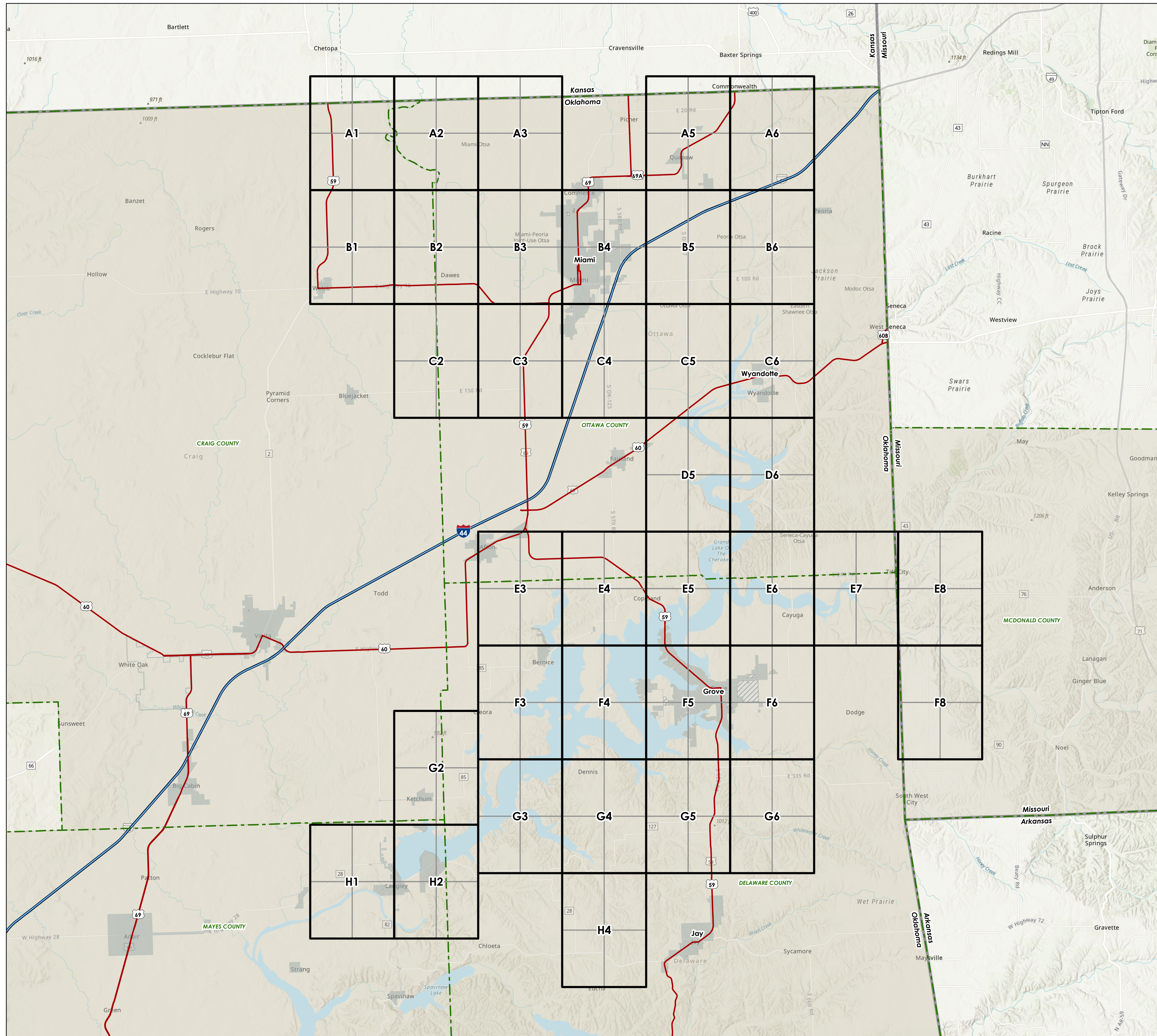

APPENDIX F.7:
HISTORICAL STARTING STAGE INUNDATION MAPS

Upstream Model Results Overview Map

Pensacola Dam
GRAND RIVER DAM AUTHORITY
September 2021

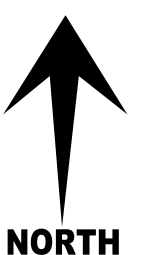
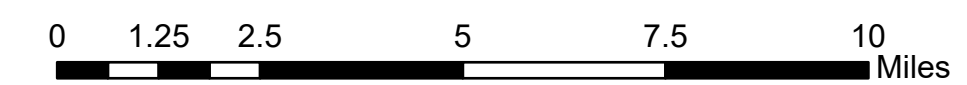
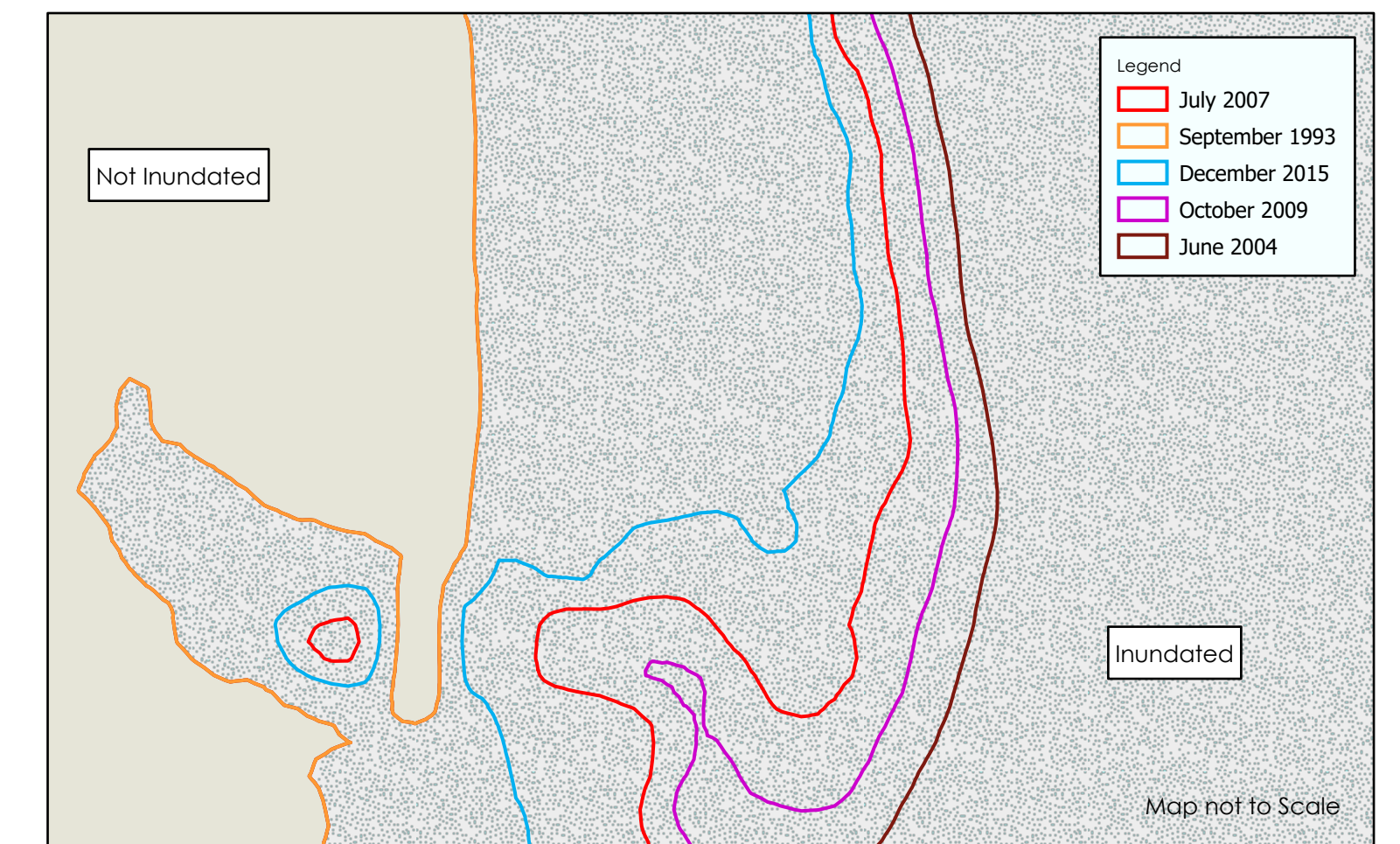


Overview Map Legend

- 1:24,000-scale Map Sheet
- State Boundary
- County Boundary
- Municipality
- Unincorporated
- Road Class**
- Interstate
- US Highway

Inundation Scenario Mapping

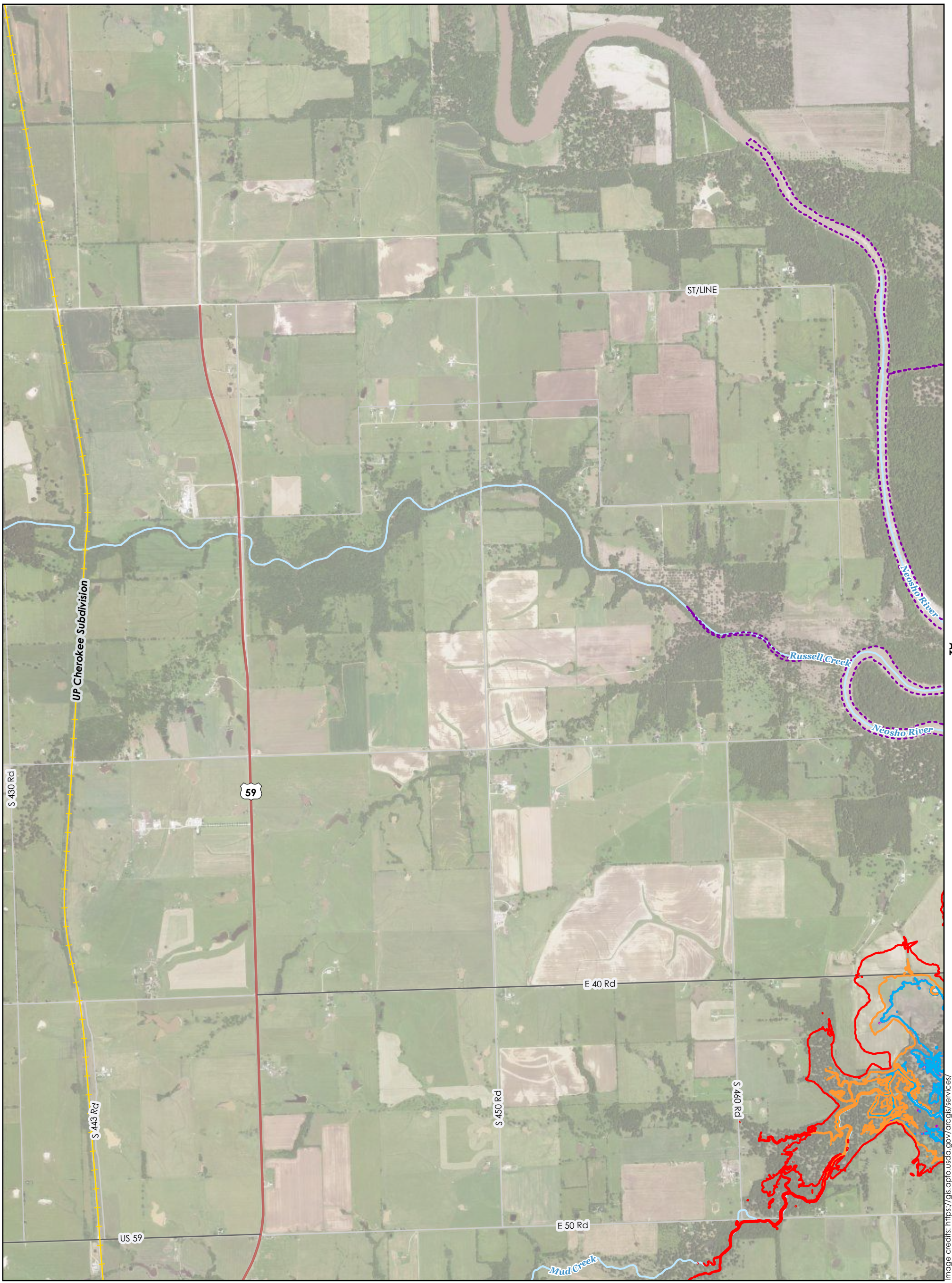
Mapping shows the extent of inundation for historical flow events, using the historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.



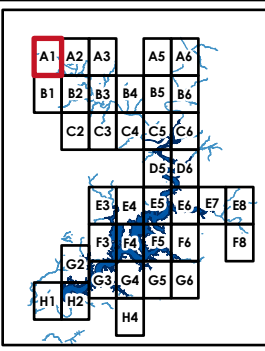
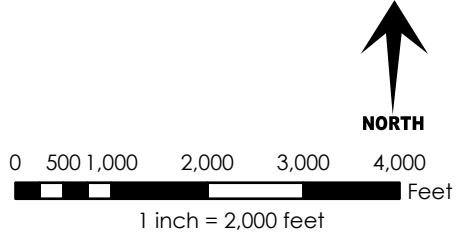
Map Notes

Data Sources for Maps:

1. Base map images from https://gis.apfo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019
2. Transportation network (major roads, local roads, and railroads) and county boundaries obtained from the Oklahoma Office of Geographic Information (<http://okmaps.org/cgi/search.aspx>).
3. Parcels owned by GRDA are from GIS parcel data provided by County Assessor's Offices (2020).
4. The displayed Flowage Easement is equal to the 760-foot NGVD29 elevation contour, extracted from 2011 Dewberry LIDAR.



HISTORICAL INUNDATION SCENARIOS



- MAX INUNDATION**
- █ July 2007
 - █ September 1993
 - █ December 2015
 - █ October 2009
 - █ June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- Railroad
 - Stream
 - - - Flowage Easements
 - - - Project Boundary
 - █ GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

PENSACOLA DAM GRAND RIVER DAM AUTHORITY

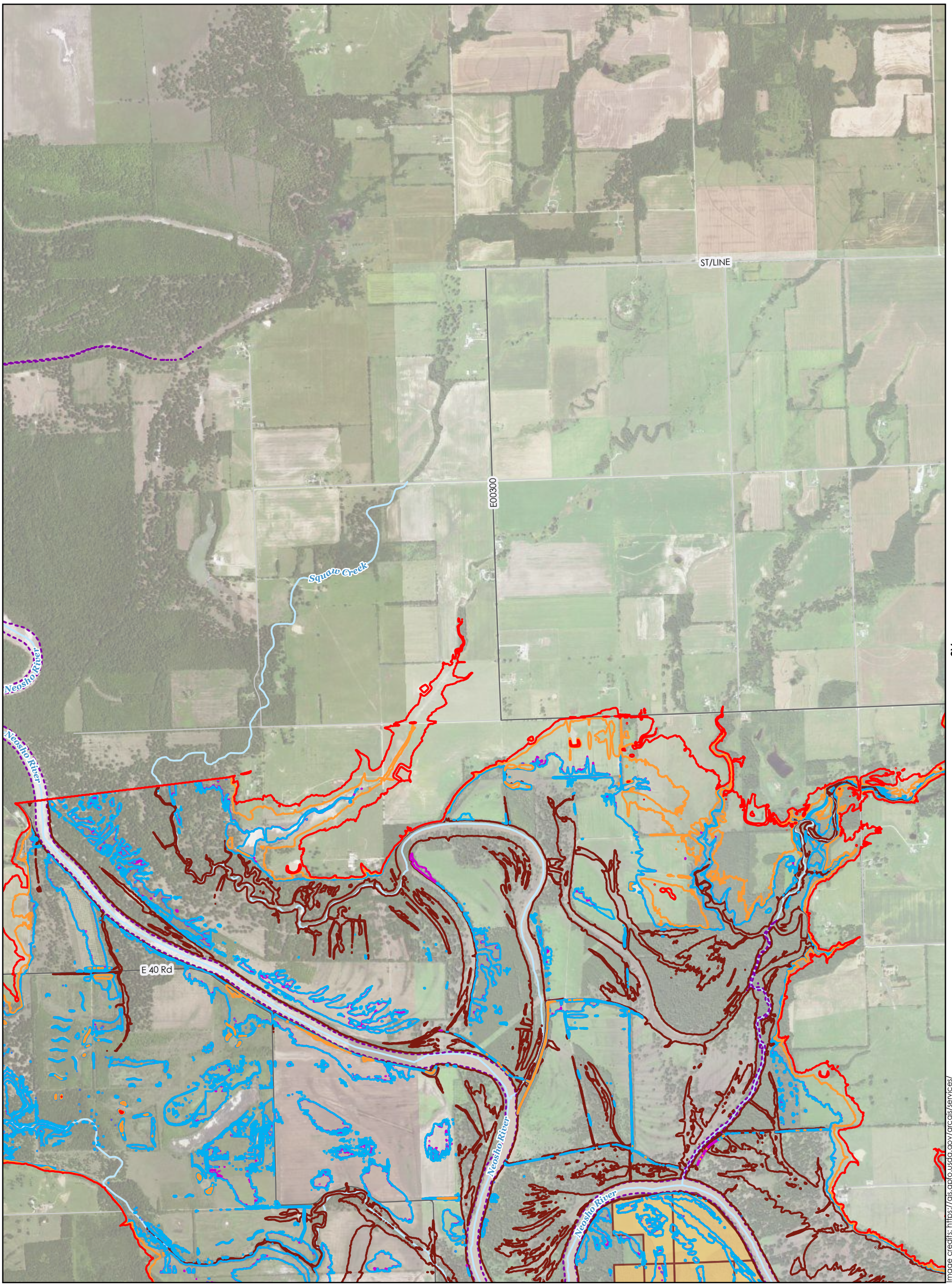
MAP: A1

CRAIG, DELAWARE, MAYES, AND
OTTAWA COUNTIES, OKLAHOMA

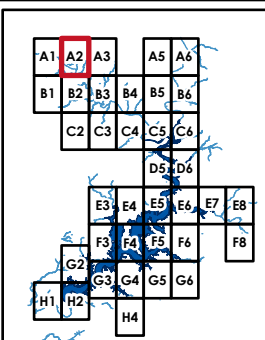
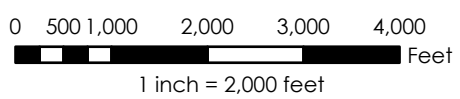
FERC No. 1494
September 2021

A2

Image credits: https://gis.dplp.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019



HISTORICAL INUNDATION SCENARIOS



- MAX INUNDATION**
- █ July 2007
 - █ September 1993
 - █ December 2015
 - █ October 2009
 - █ June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
 - Railroad
 - Stream
 - Flowage Easements
 - - - Project Boundary
 - █ GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

PENSACOLA DAM GRAND RIVER DAM AUTHORITY

MAP: A2

CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

Image credits: https://gis.dpl.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019

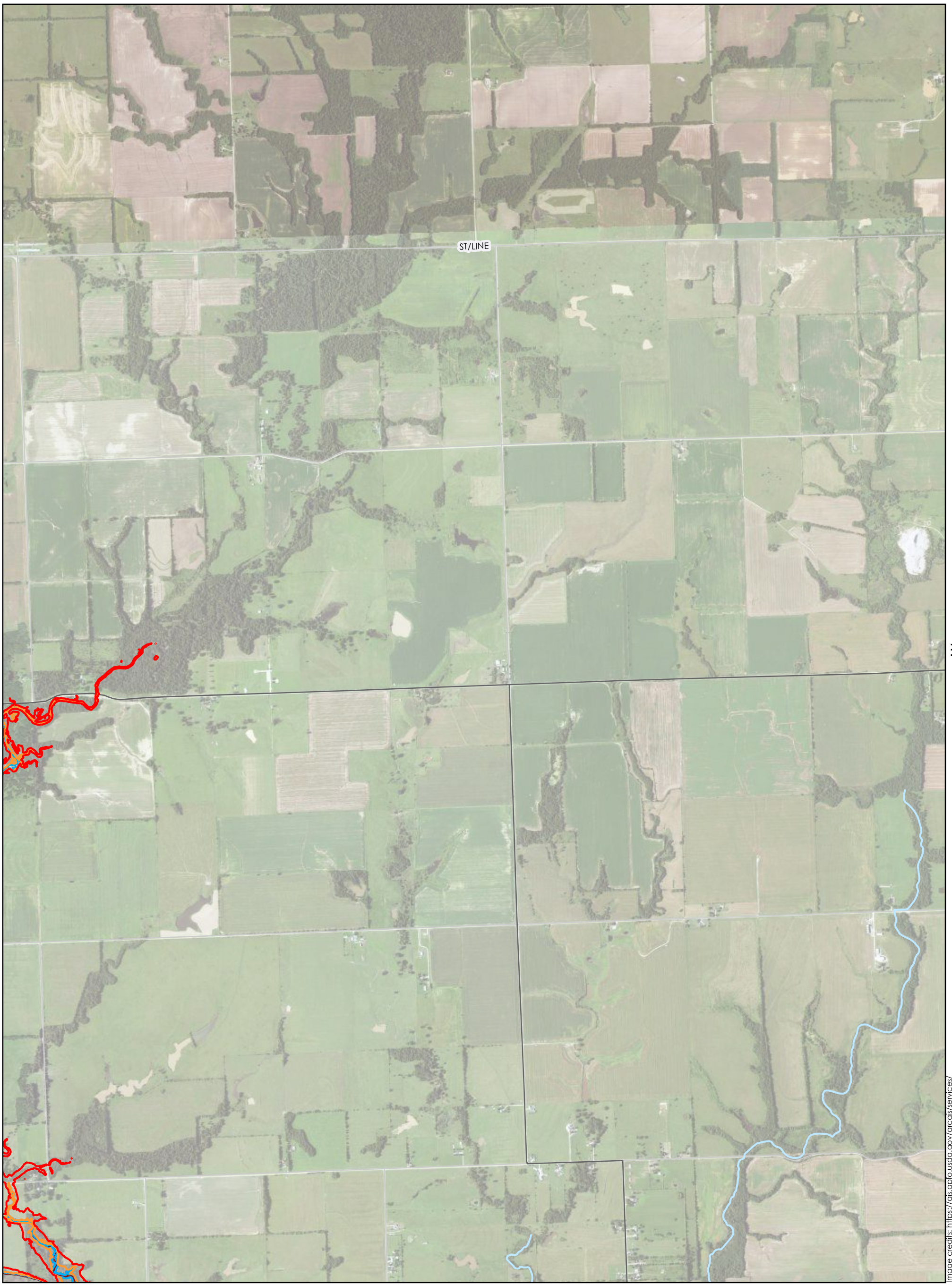
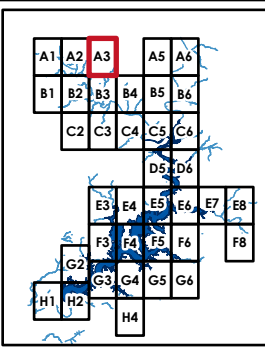
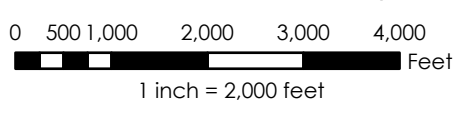


Image credits: https://gis.dplbo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019

HISTORICAL INUNDATION SCENARIOS



- MAX INUNDATION**
- █ July 2007
 - █ September 1993
 - █ December 2015
 - █ October 2009
 - █ June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- Railroad
 - Stream
 - - - Flowage Easements
 - - - Project Boundary
 - █ GRDA Ownership

MAP NOTES

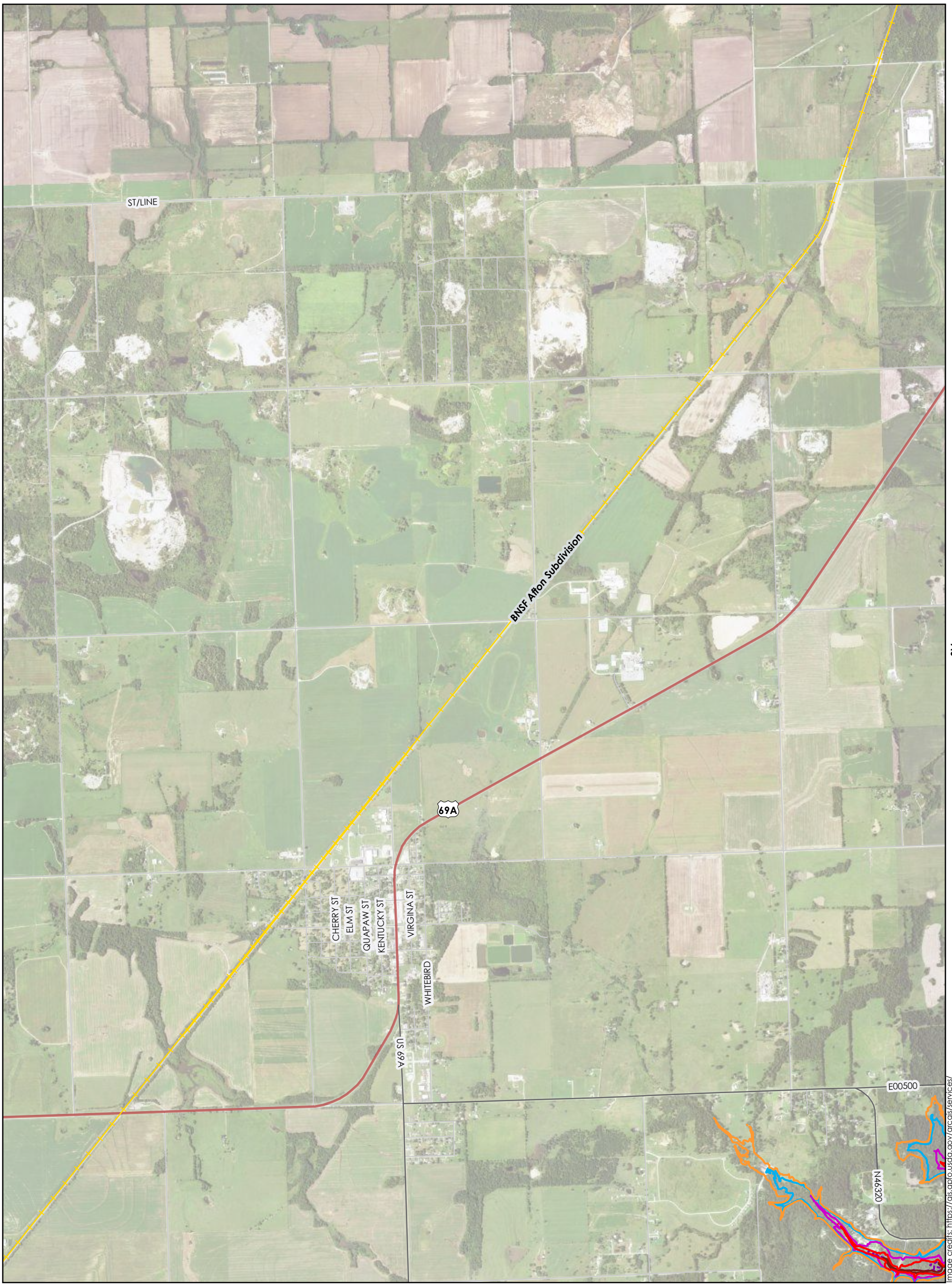
1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

PENSACOLA DAM GRAND RIVER DAM AUTHORITY

MAP: A3

CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

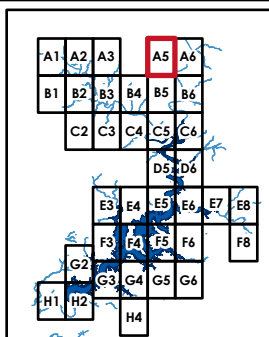
FERC No. 1494
September 2021



HISTORICAL INUNDATION SCENARIOS



0 500 1,000 2,000 3,000 4,000 Feet
1 inch = 2,000 feet



MAX INUNDATION

- █ July 2007
- █ September 1993
- █ December 2015
- █ October 2009
- █ June 2004

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

Legend

- | | | |
|---|--|---|
| — Interstate | — Railroad | — Stream |
| — State Highway | — US Highway | - - - Flowage Easements |
| — Major Collector | - - - Local Road | - - - Project Boundary |
| | | █ GRDA Ownership |

PENSACOLA DAM GRAND RIVER DAM AUTHORITY

MAP: A5

CRAIG, DELAWARE, MAYES, AND
OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

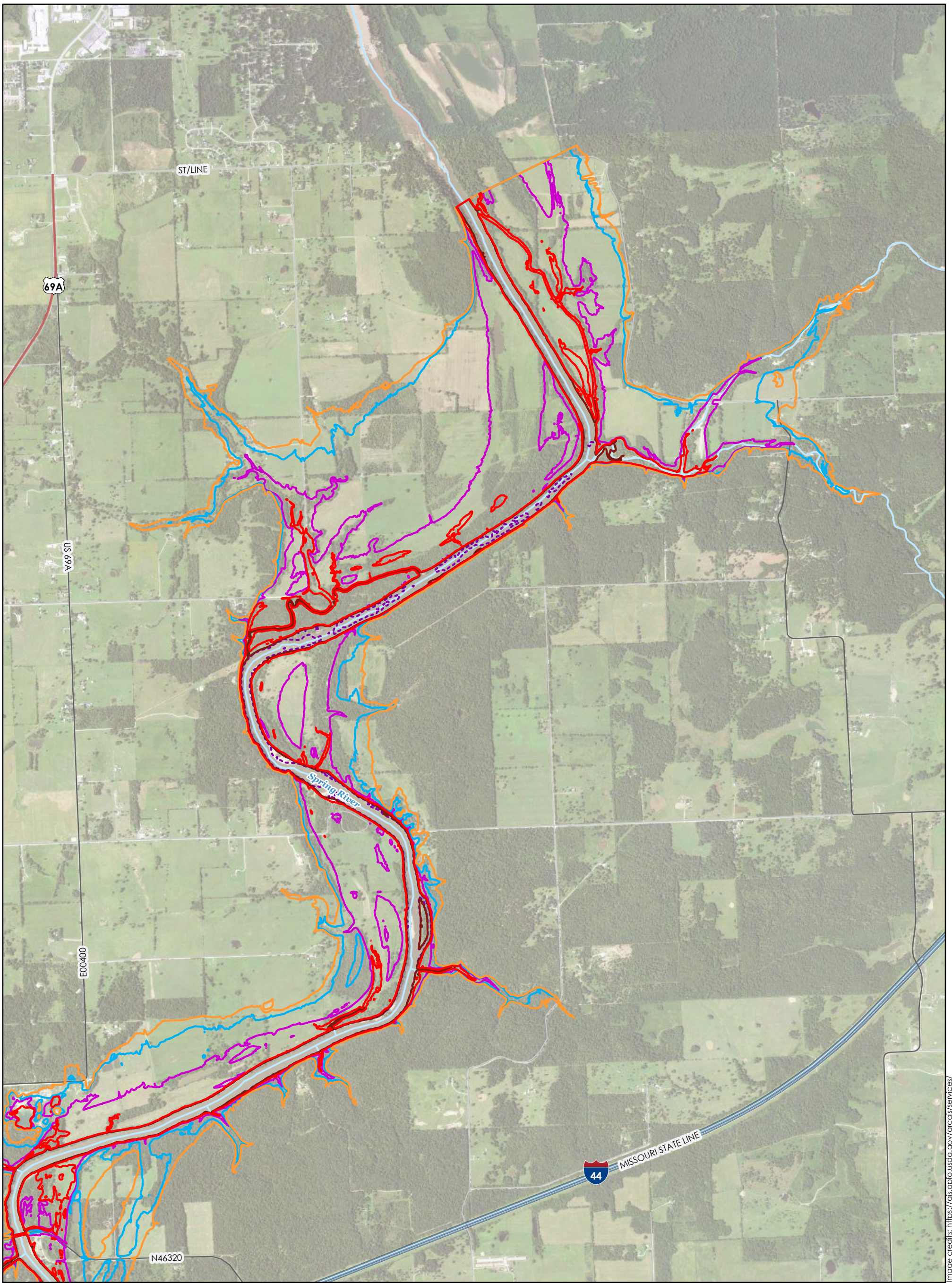


Image credits: https://gis.apfo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019

HISTORICAL INUNDATION SCENARIOS

NORTH

0 500 1,000 2,000 3,000 4,000 Feet

1 inch = 2,000 feet

A1	A2	A3	A4	A5	A6
B1	B2	B3	B4	B5	B6
C2	C3	C4	C5	C6	
			D5	D6	
		E3	E4	E5	E6
		F3	F4	F5	F6
		G2	G3	G4	G5
		H1	H2	H3	H4

MAX INUNDATION

- █ July 2007
- █ September 1993
- █ December 2015
- █ October 2009
- █ June 2004

ROAD CLASS

- Interstate
- State Highway
- US Highway
- Major Collector
- Local Road

Legend

- + Railroad
- Stream
- - - Flowage Easements
- - - Project Boundary
- █ GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

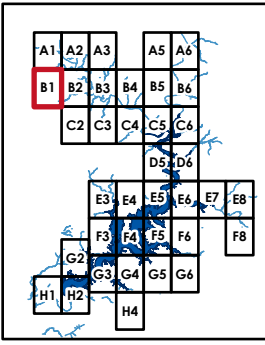
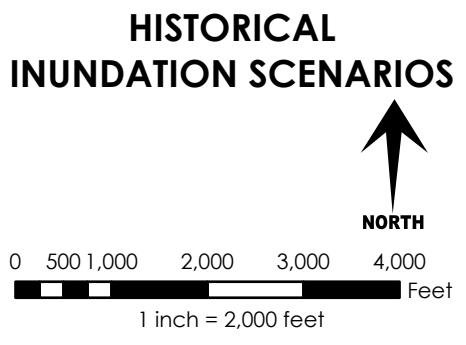
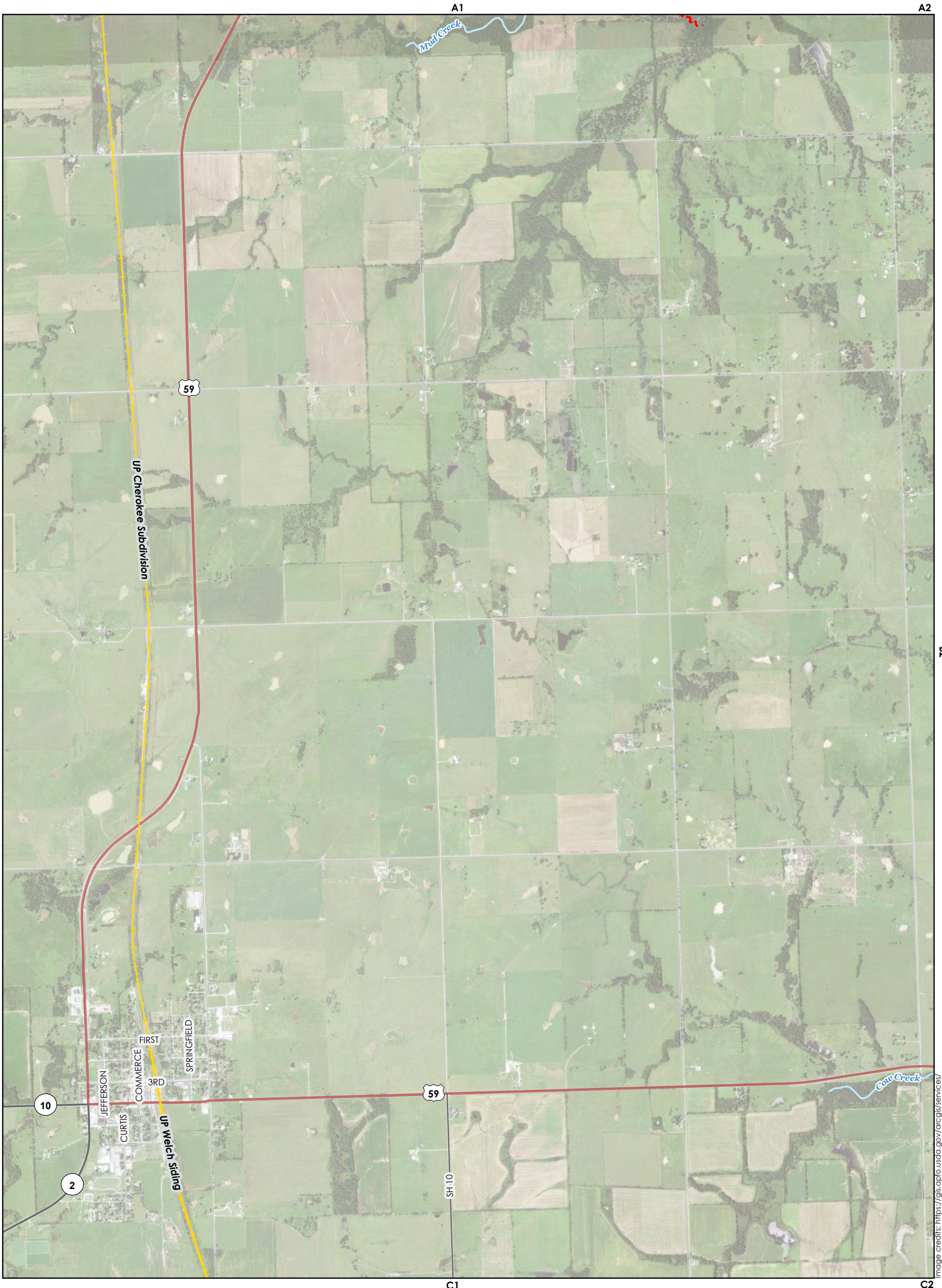
PENSACOLA DAM

GRAND RIVER DAM AUTHORITY

MAP: A6

CRAIG, DELAWARE, MAYES, AND
OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021



- MAX INUNDATION**
- July 2007
 - September 1993
 - December 2015
 - October 2009
 - June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
 - Railroad
 - Stream
 - Flowage Easements
 - Project Boundary
 - GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

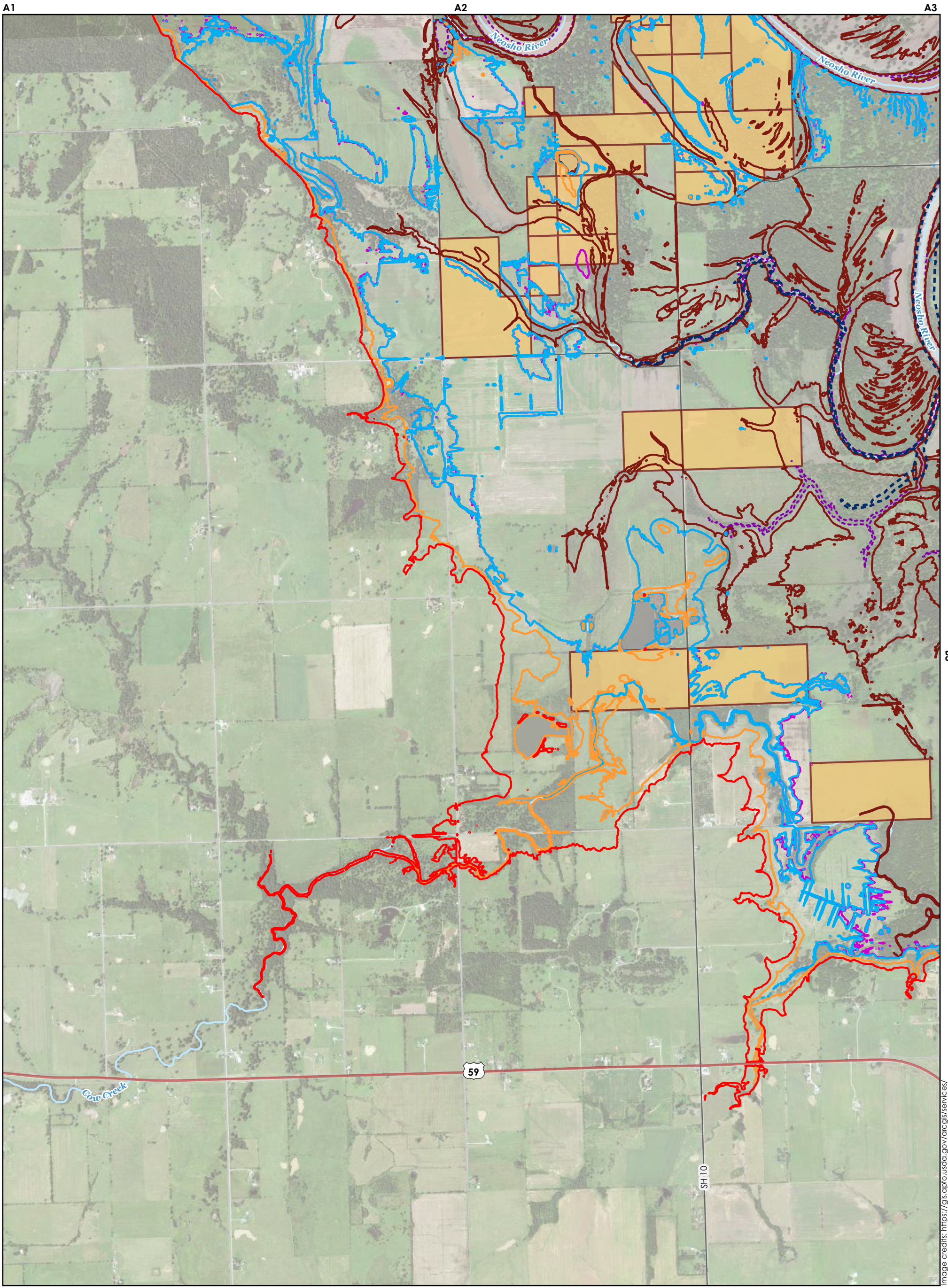
PENSACOLA DAM
GRAND RIVER DAM AUTHORITY

MAP: B1

CRAIG, DELAWARE, MAYES, AND
OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

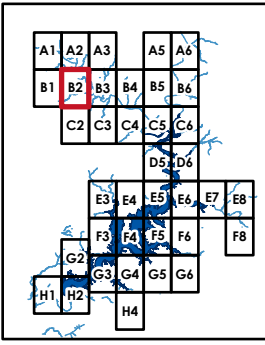
A1 A2 B2 C1 C2
Image credits: https://gis.dplbo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019



HISTORICAL INUNDATION SCENARIOS

0 500 1,000 2,000 3,000 4,000 Feet
1 inch = 2,000 feet

NORTH



- MAX INUNDATION**
- █ July 2007
 - █ September 1993
 - █ December 2015
 - █ October 2009
 - █ June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- + Railroad
 - Stream
 - - - Flowage Easements
 - - - Project Boundary
 - █ GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

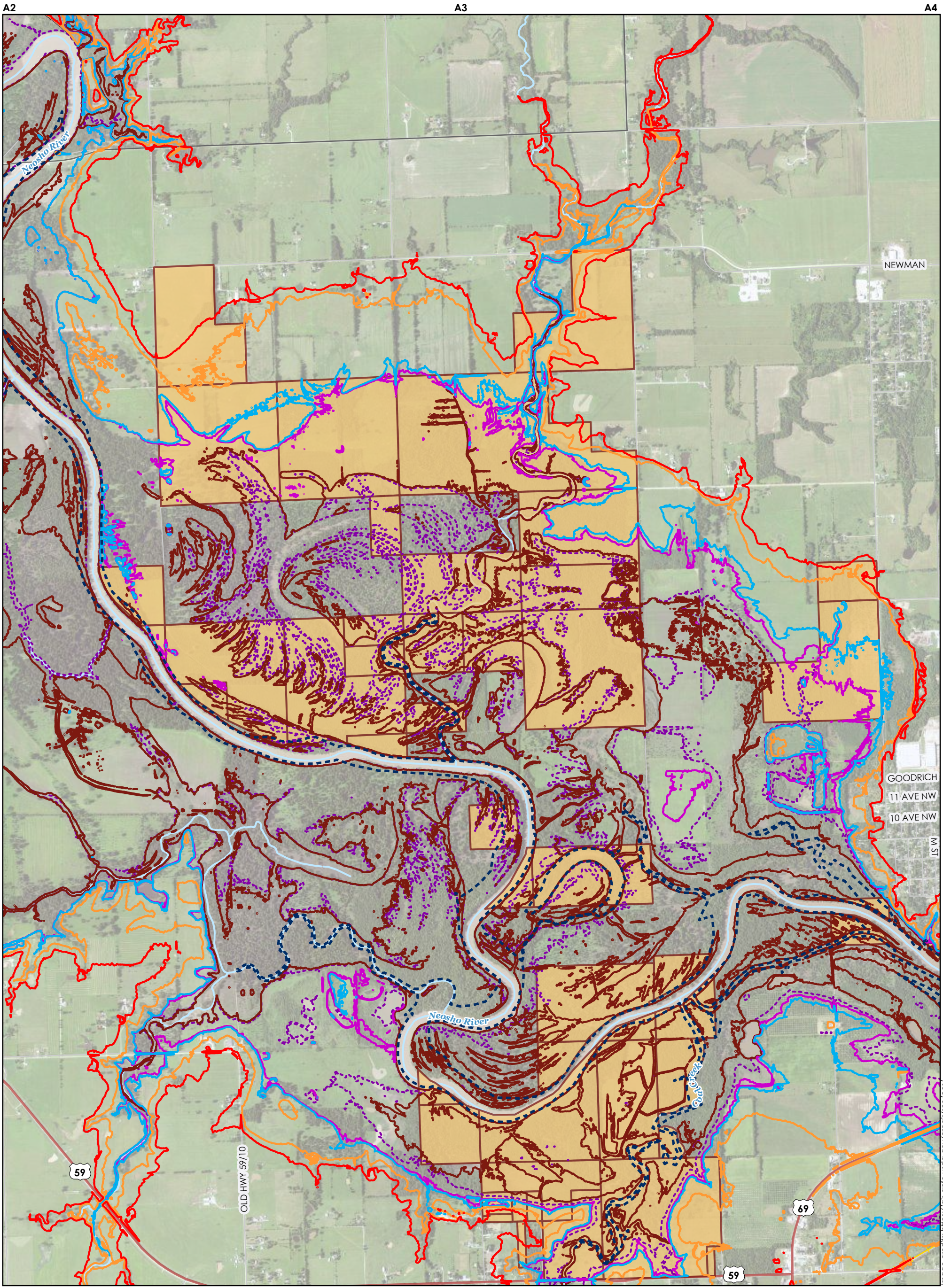
PENSACOLA DAM
GRAND RIVER DAM AUTHORITY

MAP: B2

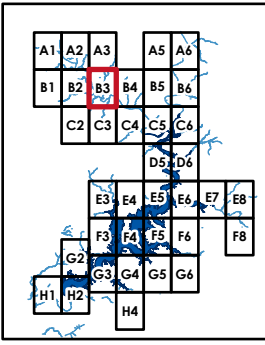
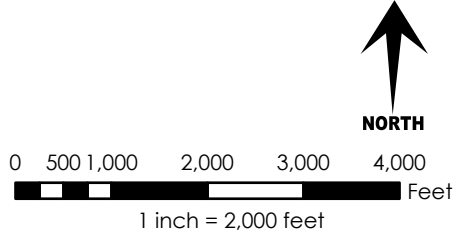
CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

Image credits: https://gis.dplp.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019



HISTORICAL INUNDATION SCENARIOS



- MAX INUNDATION**
- July 2007
 - September 1993
 - December 2015
 - October 2009
 - June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- Railroad
 - Stream
 - Flowage Easements
 - - - Project Boundary
 - GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

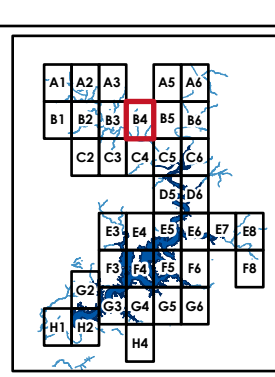
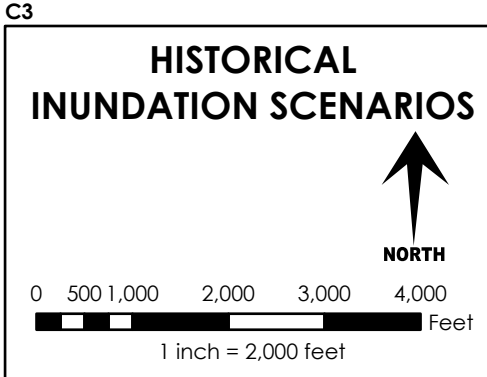
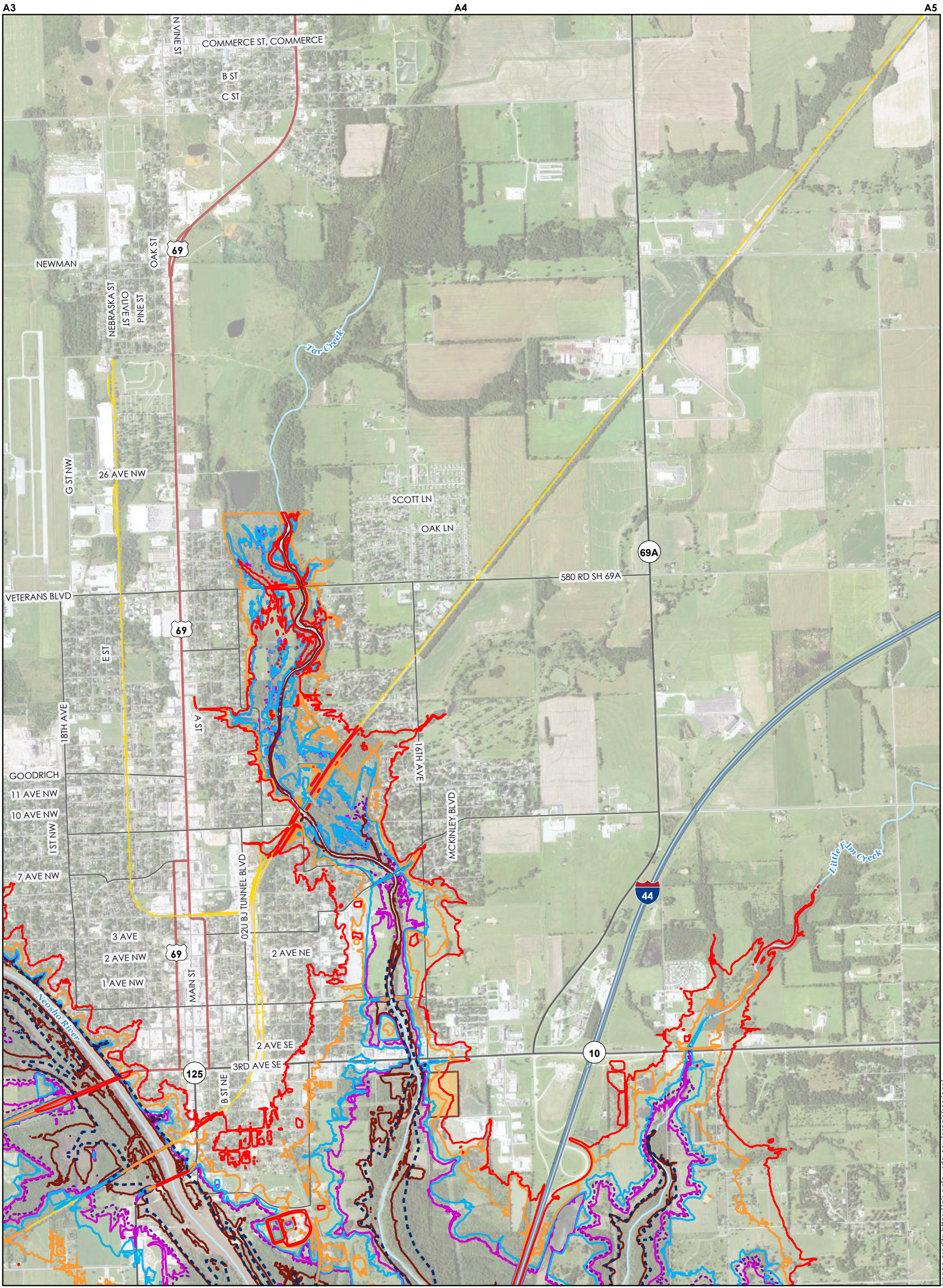
PENSACOLA DAM GRAND RIVER DAM AUTHORITY

MAP: B3

CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

Image credits: https://gis.dplbo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019



- MAX INUNDATION**
- █ July 2007
 - █ September 1993
 - █ December 2015
 - █ October 2009
 - █ June 2004
- ROAD CLASS**
- █ Interstate
 - █ State Highway
 - █ US Highway
 - █ Major Collector
 - █ Local Road
- MAP NOTES**
1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
 2. See Overview Map for notes on data sources.

- Legend**
- █ Railroad
 - █ Stream
 - █ Flowage Easements
 - █ Project Boundary
 - █ GRDA Ownership

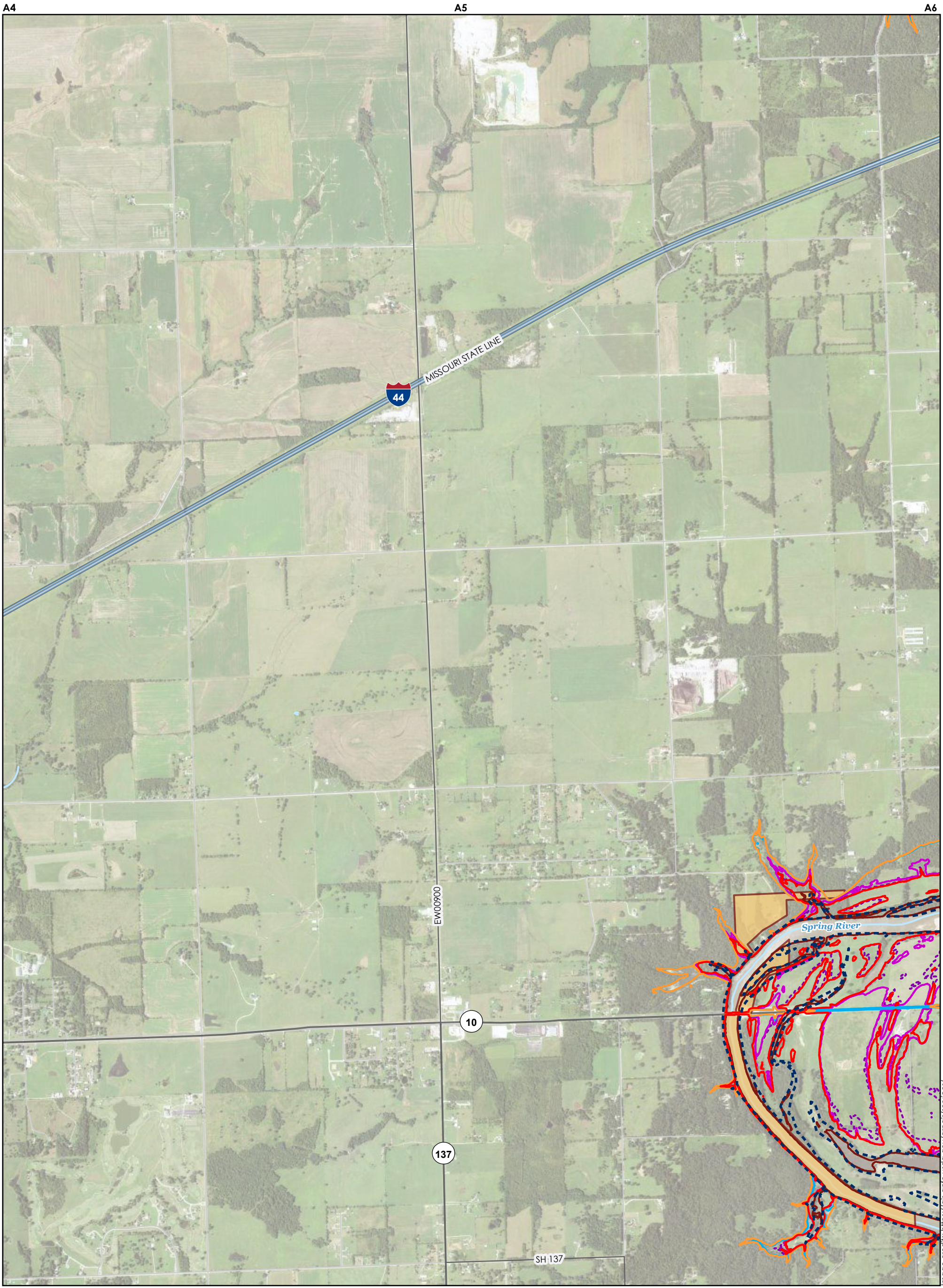
PENSACOLA DAM
GRAND RIVER DAM AUTHORITY

MAP: B4

CRAIG, DELAWARE, MAYES, AND
OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

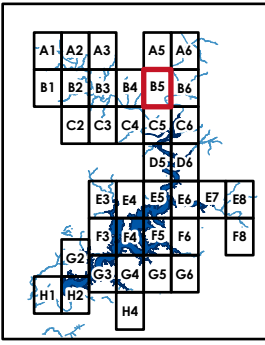
Image credits: https://gis.apfo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019



HISTORICAL INUNDATION SCENARIOS

0 500 1,000 2,000 3,000 4,000 Feet
1 inch = 2,000 feet

NORTH



- MAX INUNDATION**
- █ July 2007
 - █ September 1993
 - █ December 2015
 - █ October 2009
 - █ June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- Railroad
 - Stream
 - Flowage Easements
 - - - Project Boundary
 - GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

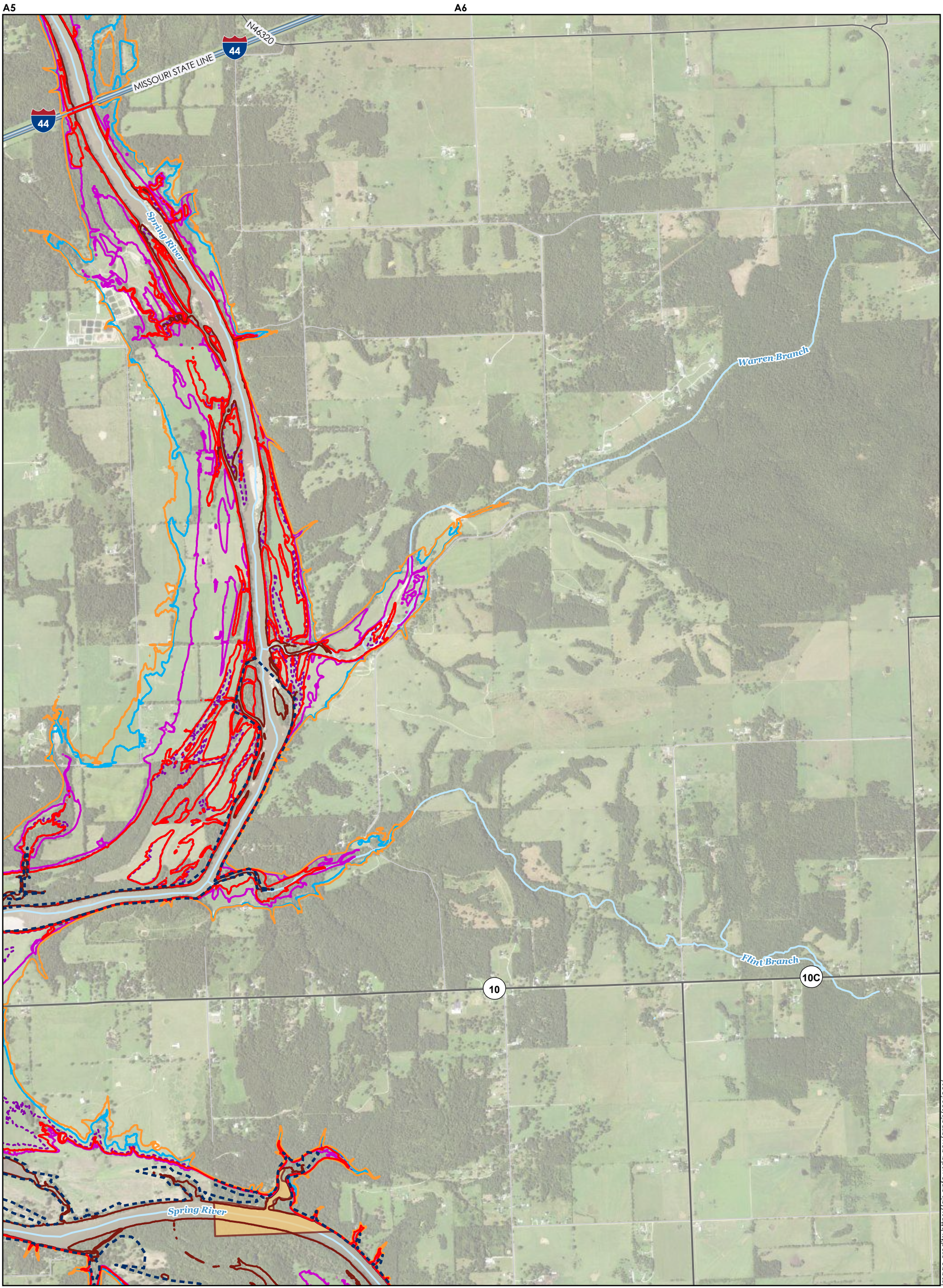
PENSACOLA DAM
GRAND RIVER DAM AUTHORITY

MAP: B5

CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

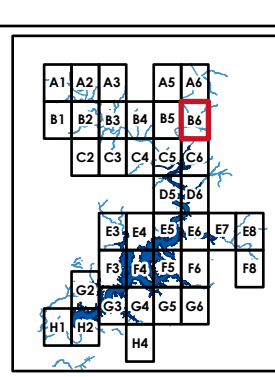
Image credits: https://gis.apfo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019



HISTORICAL INUNDATION SCENARIOS

0 500 1,000 2,000 3,000 4,000 Feet
1 inch = 2,000 feet

NORTH



MAX INUNDATION

- July 2007
- September 1993
- December 2015
- October 2009
- June 2004

ROAD CLASS

- Interstate
- State Highway
- US Highway
- Major Collector
- Local Road

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

Legend

- Railroad
- Stream
- Flowage Easements
- Project Boundary
- GRDA Ownership

PENSACOLA DAM
GRAND RIVER DAM AUTHORITY

MAP: B6

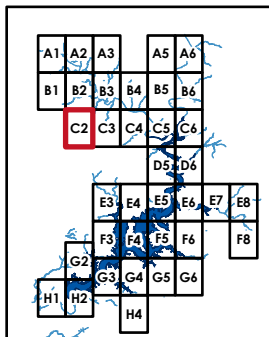
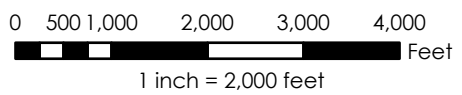
CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

Image credits: https://gis.dplbo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019



HISTORICAL INUNDATION SCENARIOS



MAX INUNDATION

- █ July 2007
- █ September 1993
- █ December 2015
- █ October 2009
- █ June 2004

Legend

- | | |
|---|---|
| — Interstate | + Railroad |
| — State Highway | — Stream |
| — US Highway | - - - Flowage Easements |
| — Major Collector | - - - Project Boundary |
| — Local Road | █ GRDA Ownership |

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

PENSACOLA DAM GRAND RIVER DAM AUTHORITY

MAP: C2

CRAIG, DELAWARE, MAYES, AND
OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

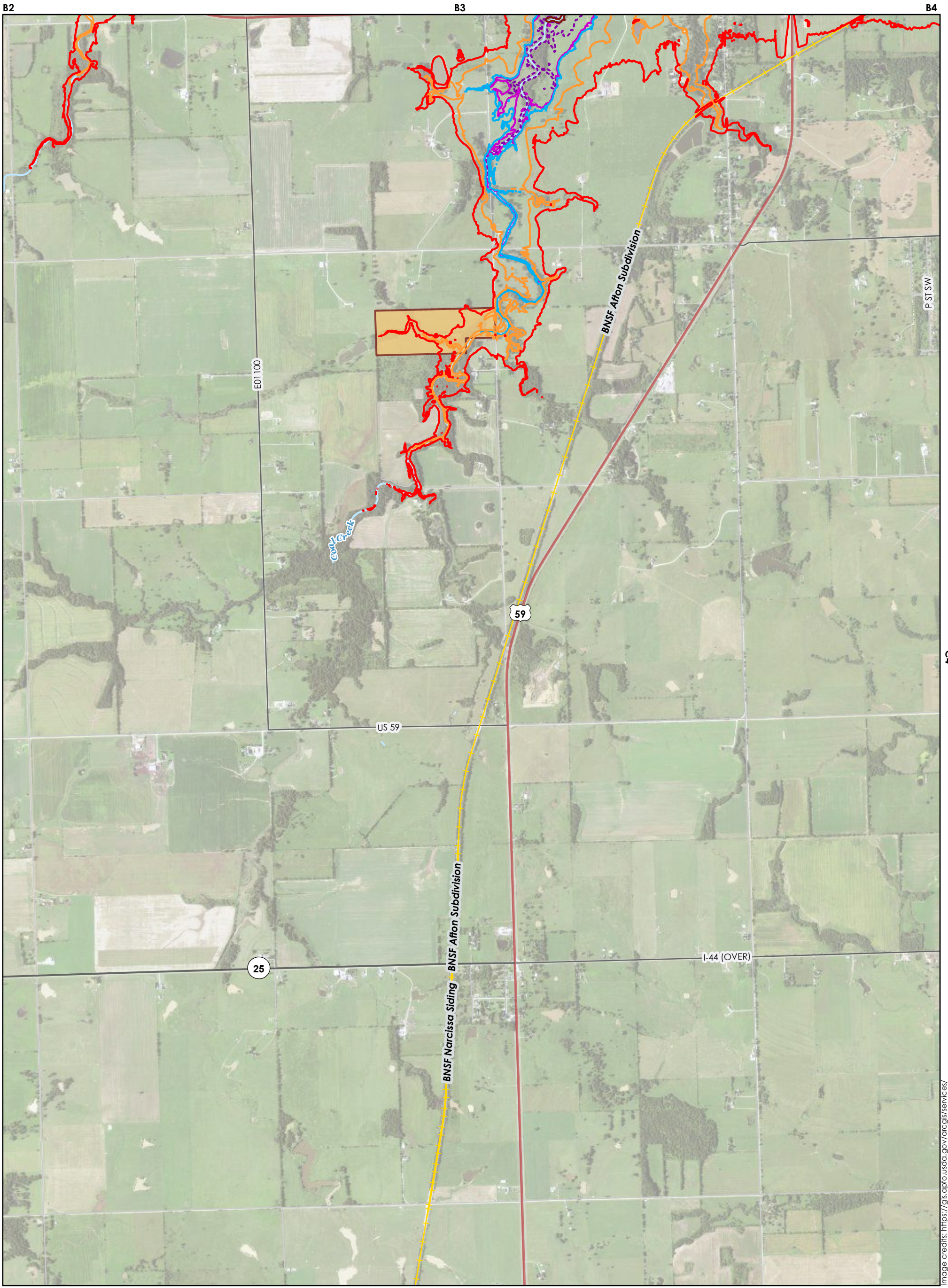
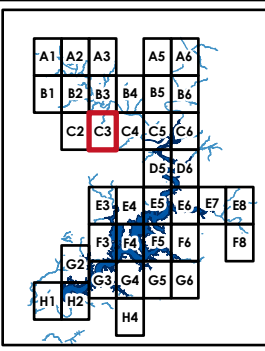
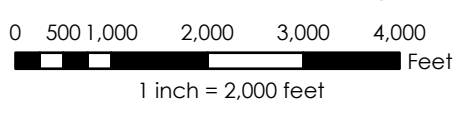


Image credits: https://gis.dplb.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019

HISTORICAL INUNDATION SCENARIOS



- MAX INUNDATION**
- █ July 2007
 - █ September 1993
 - █ December 2015
 - █ October 2009
 - █ June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- Railroad
 - Stream
 - - - Flowage Easements
 - - - Project Boundary
 - █ GRDA Ownership

MAP NOTES

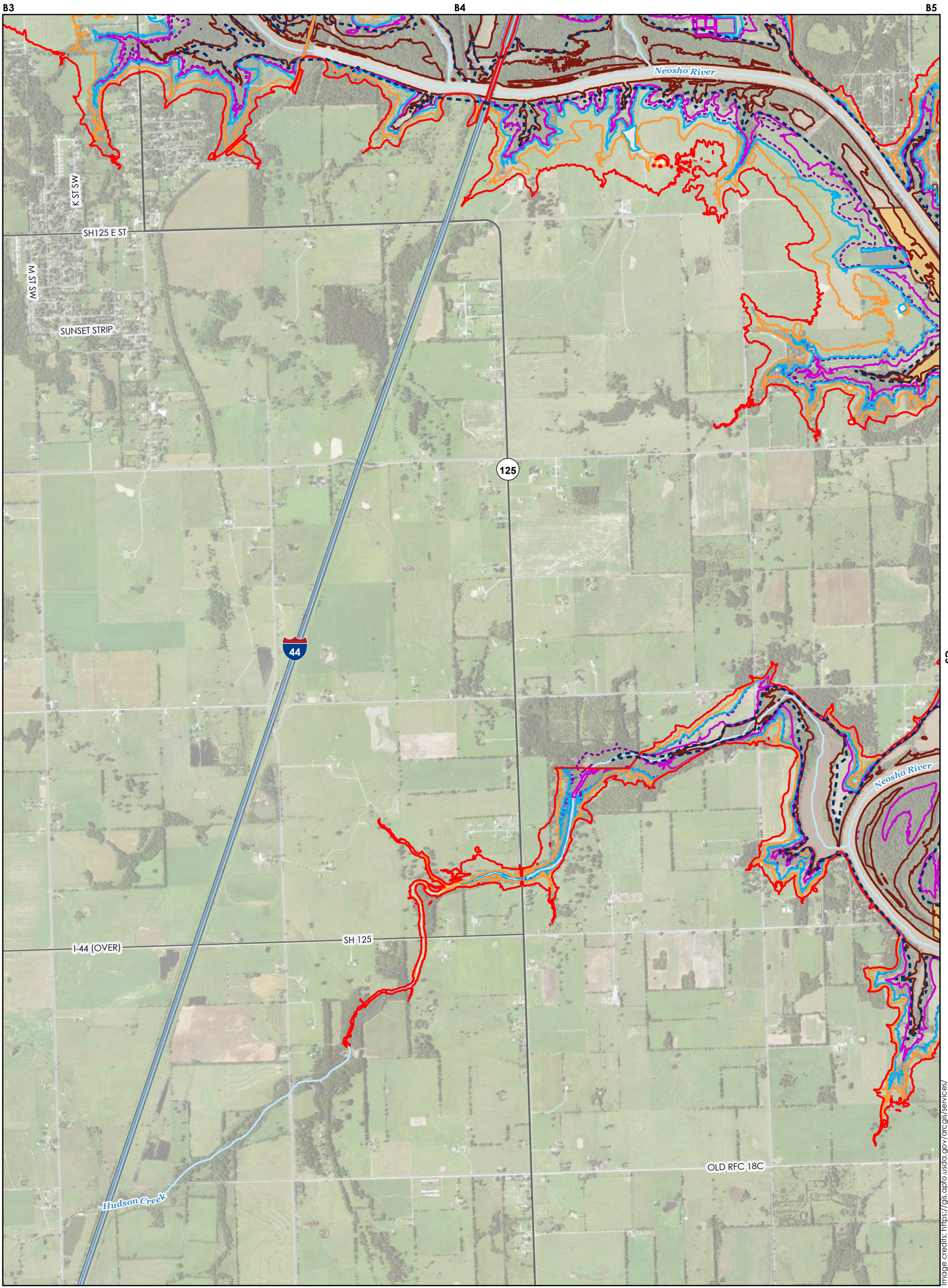
1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

PENSACOLA DAM GRAND RIVER DAM AUTHORITY

MAP: C3

CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

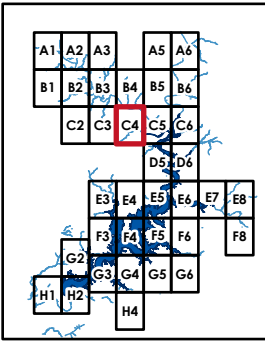
FERC No. 1494
September 2021



HISTORICAL INUNDATION SCENARIOS

0 500 1,000 2,000 3,000 4,000 Feet

1 inch = 2,000 feet



- MAX INUNDATION**
- █ July 2007
 - █ September 1993
 - █ December 2015
 - █ October 2009
 - █ June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- Railroad
 - Stream
 - Flowage Easements
 - - - Project Boundary
 - GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

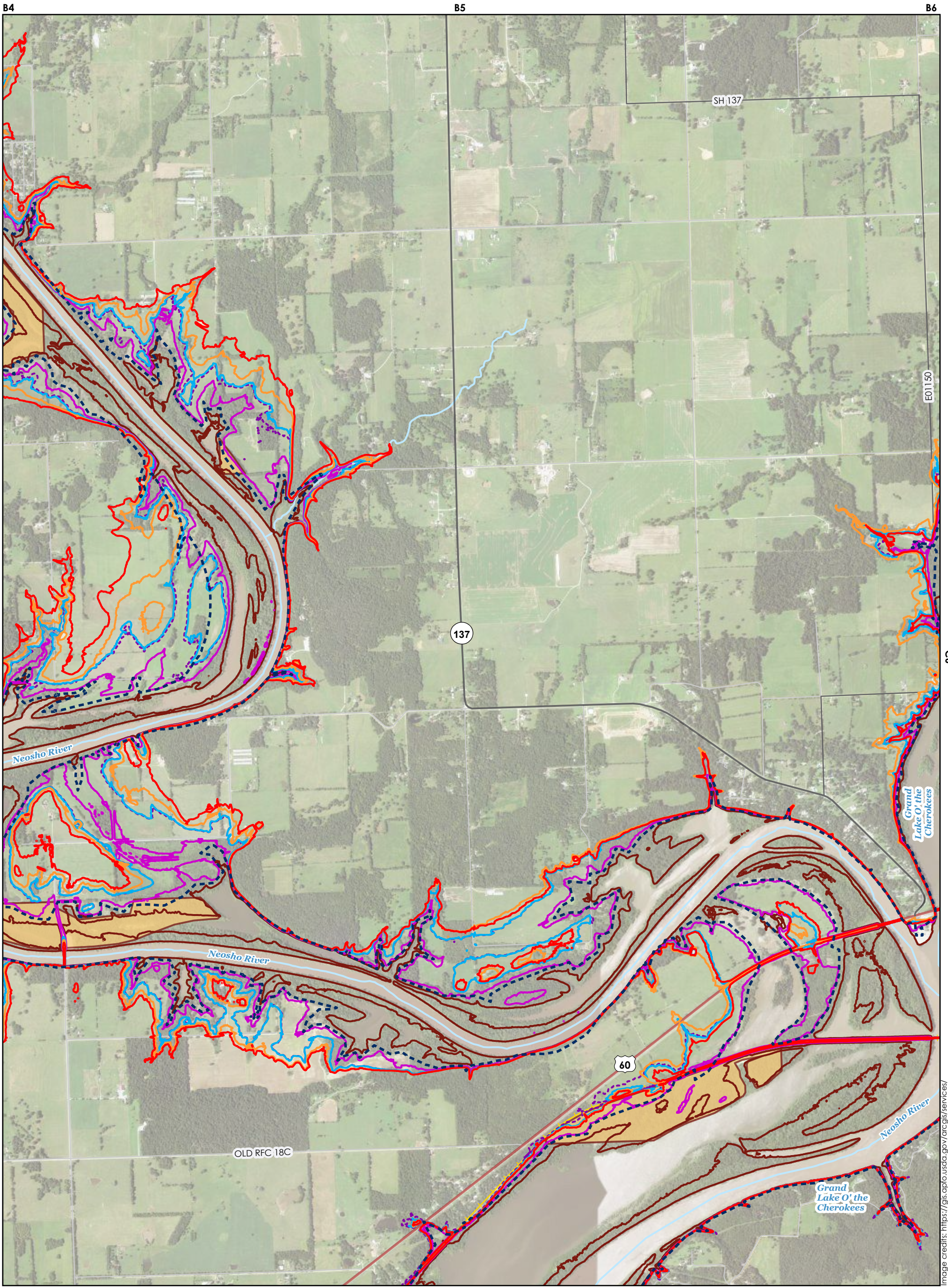
PENSACOLA DAM
GRAND RIVER DAM AUTHORITY

MAP: C4

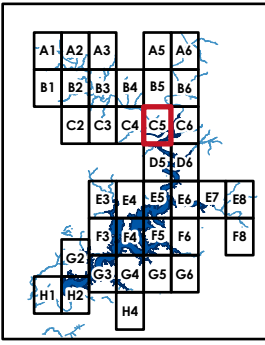
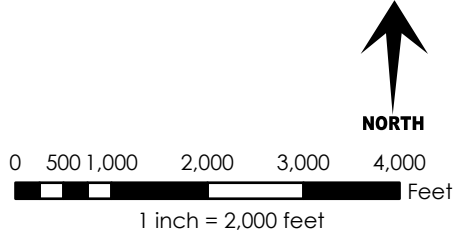
CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

Image credits: https://gis.dplp.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019



HISTORICAL INUNDATION SCENARIOS



- MAX INUNDATION**
- July 2007
 - September 1993
 - December 2015
 - October 2009
 - June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- Railroad
 - Stream
 - Flowage Easements
 - - - Project Boundary
 - GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

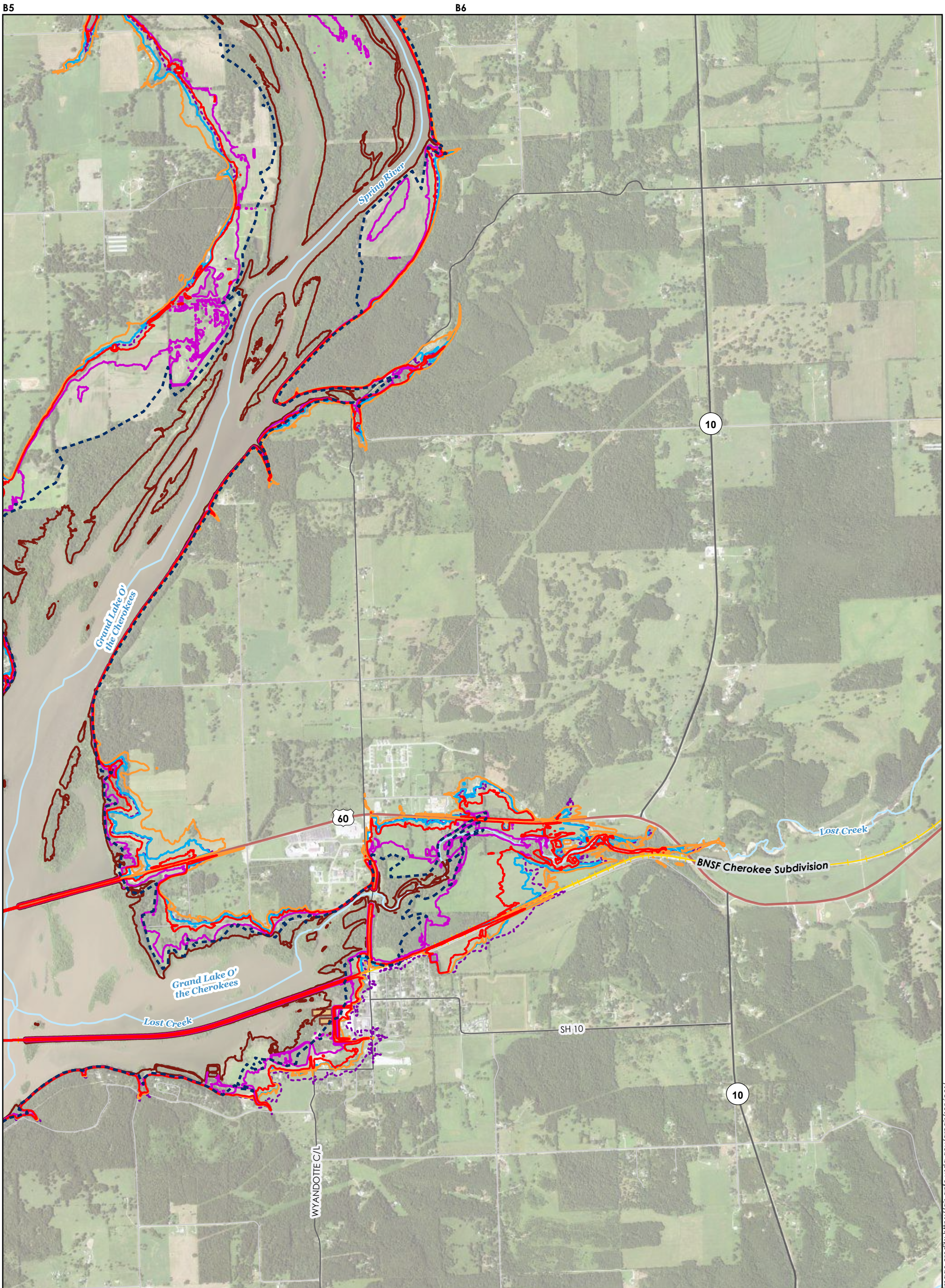
PENSACOLA DAM GRAND RIVER DAM AUTHORITY

MAP: C5

CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

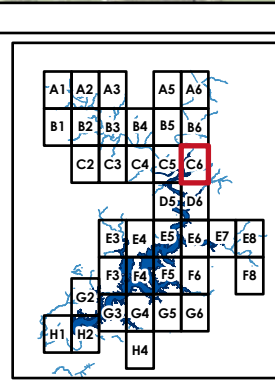
Image credits: https://gis.dplbo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019



HISTORICAL INUNDATION SCENARIOS

0 500 1,000 2,000 3,000 4,000 Feet
1 inch = 2,000 feet

NORTH



MAX INUNDATION

- July 2007
- September 1993
- December 2015
- October 2009
- June 2004

ROAD CLASS

- Interstate
- State Highway
- US Highway
- Major Collector
- Local Road

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

Legend

- Railroad
- Stream
- Flowage Easements
- Project Boundary
- GRDA Ownership

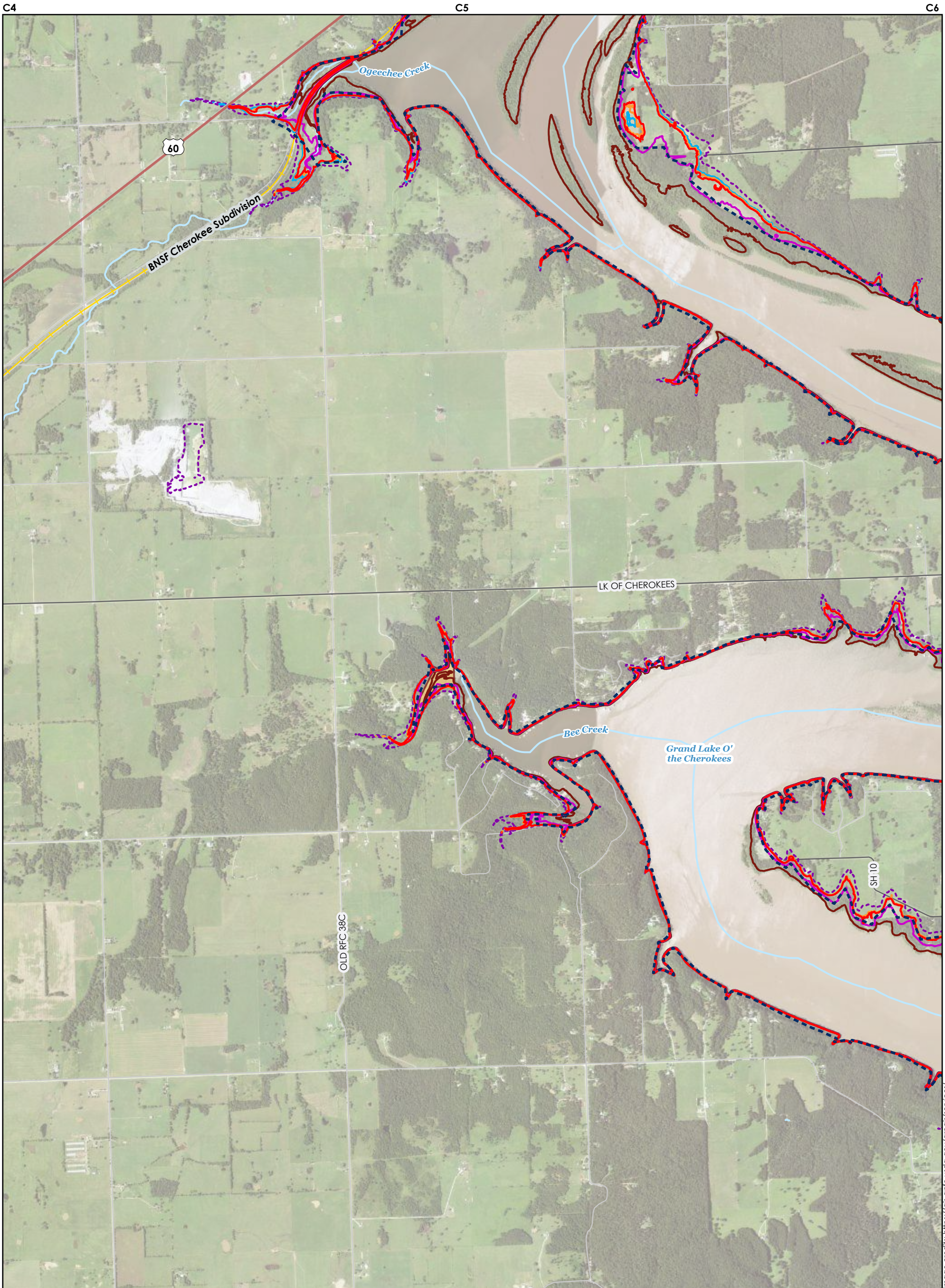
PENSACOLA DAM
GRAND RIVER DAM AUTHORITY

MAP: C6

CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

Image credits: https://gis.dplbo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019

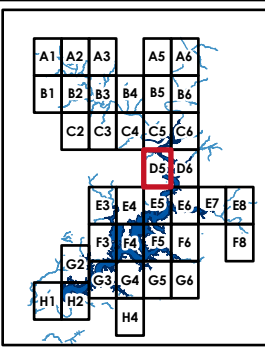


HISTORICAL INUNDATION SCENARIOS

NORTH

0 500 1,000 2,000 3,000 4,000 Feet

1 inch = 2,000 feet



- MAX INUNDATION**
- █ July 2007
 - █ September 1993
 - █ December 2015
 - █ October 2009
 - █ June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- Railroad
 - Stream
 - - - Flowage Easements
 - - - Project Boundary
 - GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
2. See Overview Map for notes on data sources.

PENSACOLA DAM
GRAND RIVER DAM AUTHORITY

MAP: D5

CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021

Image credits: https://gis.dplp.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019

C5

C6



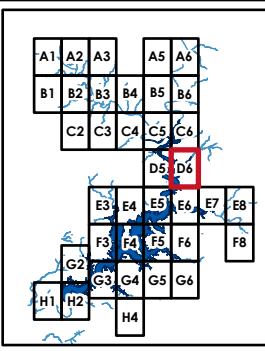
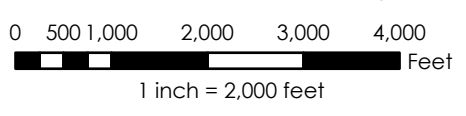
Image credits: https://gis.dplbo.usda.gov/arcgis/services/NAIP/USDA_CONUS_PRIME/ImageServer, 2019

E5

E6

E7

HISTORICAL INUNDATION SCENARIOS



- MAX INUNDATION**
- July 2007
 - September 1993
 - December 2015
 - October 2009
 - June 2004

- Legend**
- ROAD CLASS**
- Interstate
 - State Highway
 - US Highway
 - Major Collector
 - Local Road
- + Railroad
 - Stream
 - - - Flowage Easements
 - - - Project Boundary
 - GRDA Ownership

MAP NOTES

1. Simulations of historical inflow events use historical starting stage at Pensacola Dam. Pensacola Dam stage during the inflow event is calculated by the Operations Model.
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PENSACOLA DAM

GRAND RIVER DAM AUTHORITY

MAP: D6

CRAIG, DELAWARE, MAYES, AND OTTAWA COUNTIES, OKLAHOMA

FERC No. 1494
September 2021