CADDO NATION AND USGS: COOPERATIVE PARTNERSHIP FOR WATER RESOURCES

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TESNAR-Tribal Water Resources

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ISSUE

- The Caddo Nation is concerned about sustainability, preservation of streamflows, springs, and wetlands, and water transfers outside of their jurisdictional area.

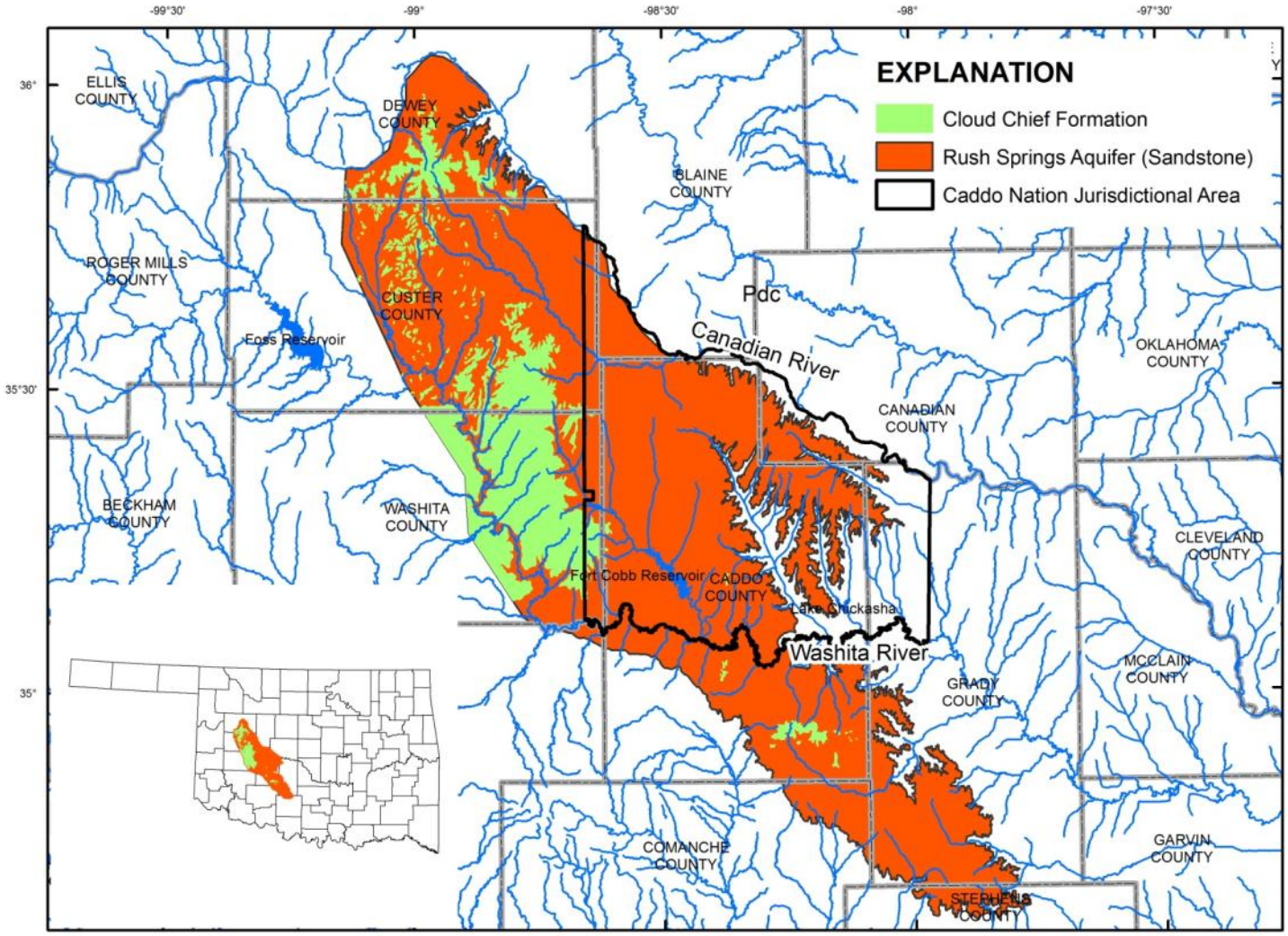
RESPONSE

- The Caddo Nation plans to develop a comprehensive water plan.

APPROACH

- Perform hydrogeologic study of the Caddo Nation jurisdictional area (focus - Rush Springs aquifer)
- Compile existing data to better understand historical hydrologic conditions
- Fill data gaps as needed to understand current hydrologic conditions
- Construct a groundwater-flow model and run scenarios that answer questions about water resources for the Caddo Nation

RUSH SPRINGS AQUIFER



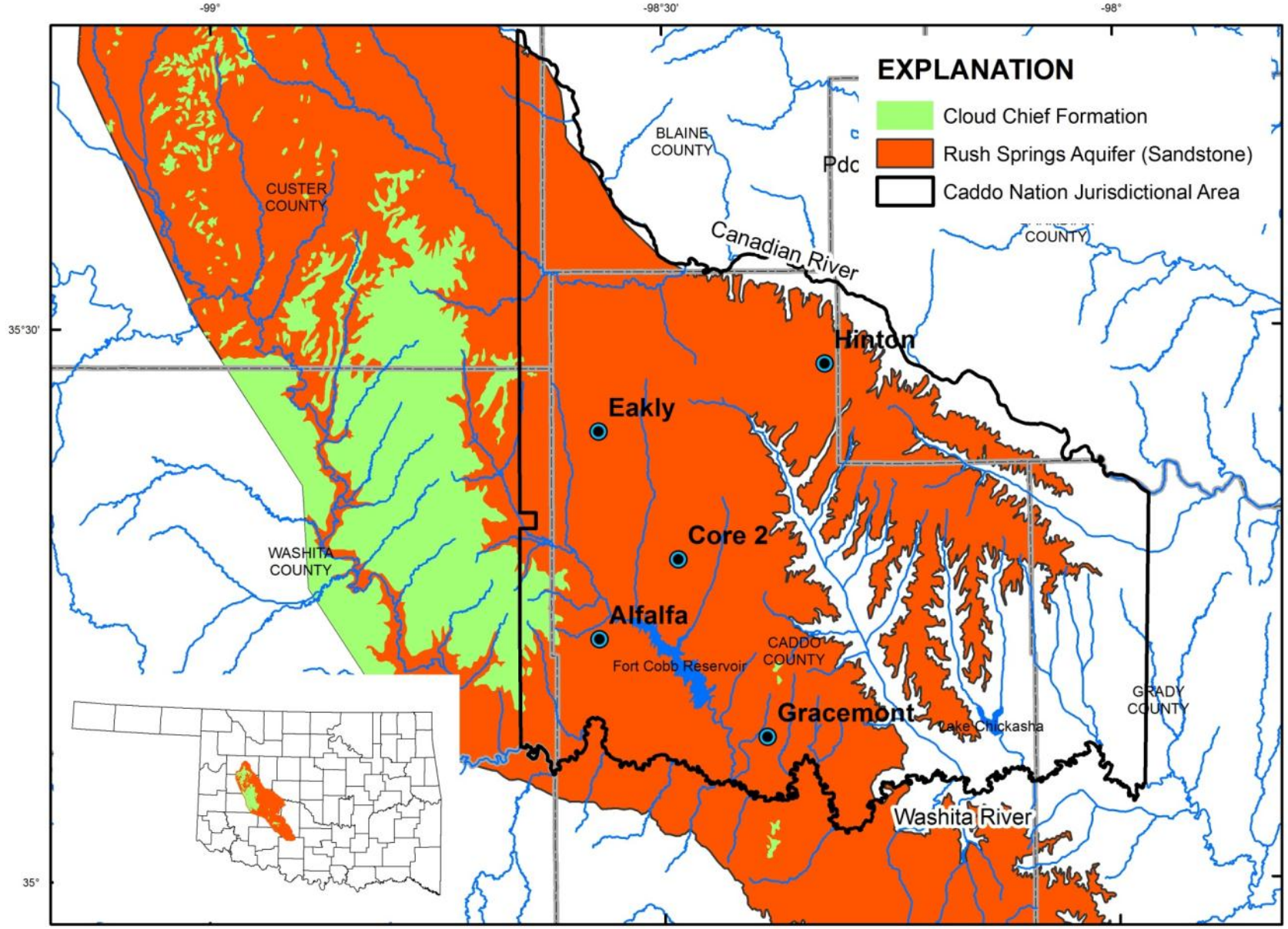
FUNDING

- Multiphased approach – started in 2008
- Applied for funding each year from the BIA
  - $50,000-$100,000/yr
- Applied for funding last 2 years from Bureau of Reclamation-Native American Affairs Technical Assistance Program (NAA-TAP)
  - $30,000-$50,000/yr
- USGS can provide matching funds.

WORK DONE TO DATE

- FY2009: Data-gap analysis
- FY2010: Water-level network installed (and continues to present)
- FY2010: Synoptic groundwater-level measurements
- FY2011: Springs inventory and wetlands location map
- FY2011: Groundwater/surface-water interaction assessment
- FY2012: Streambed conductance assessment
- FY2013: Mid-project report

REAL-TIME GROUNDWATER LEVELS



*Data have not been peer reviewed and are provisional

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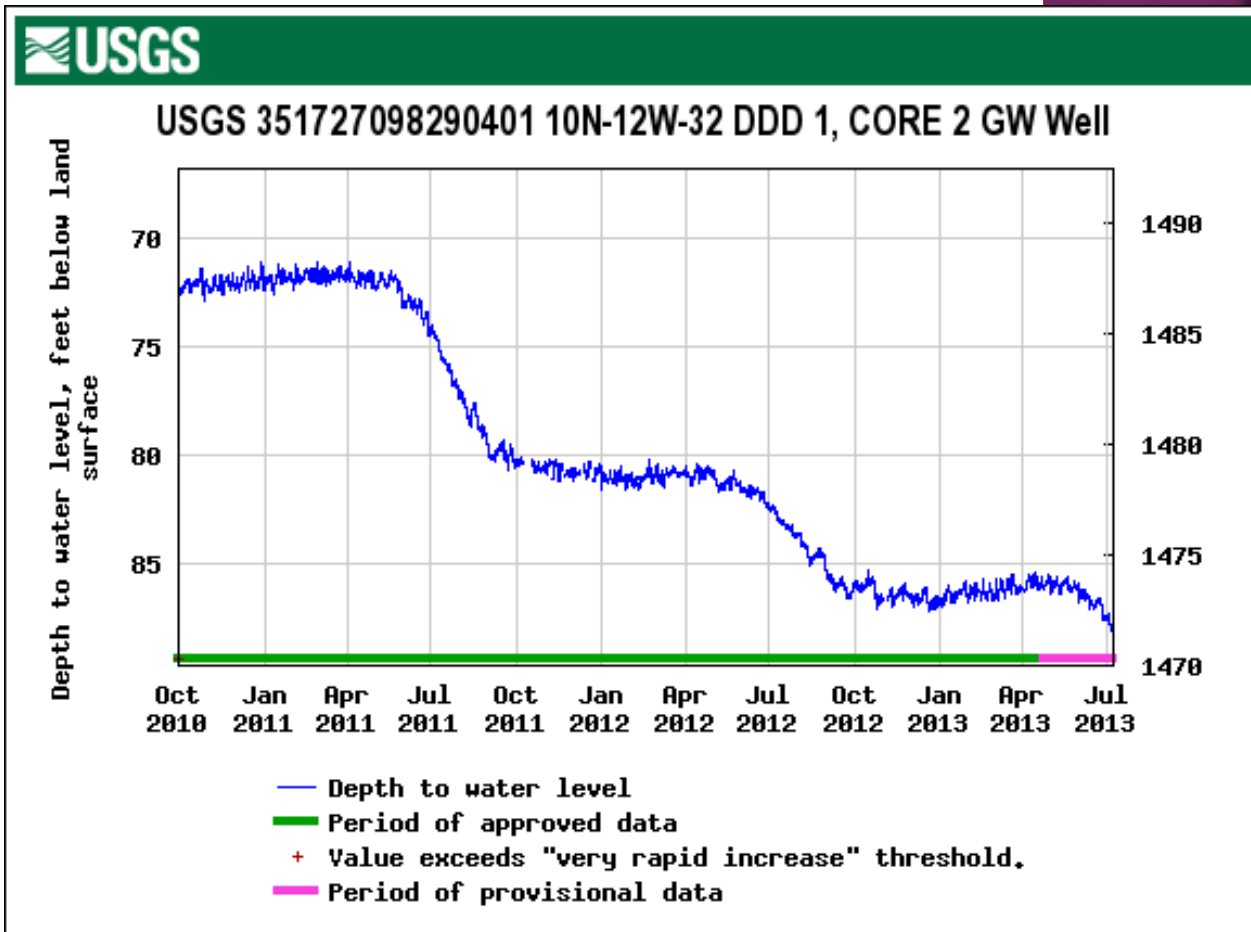

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SPRINGS INVENTORY

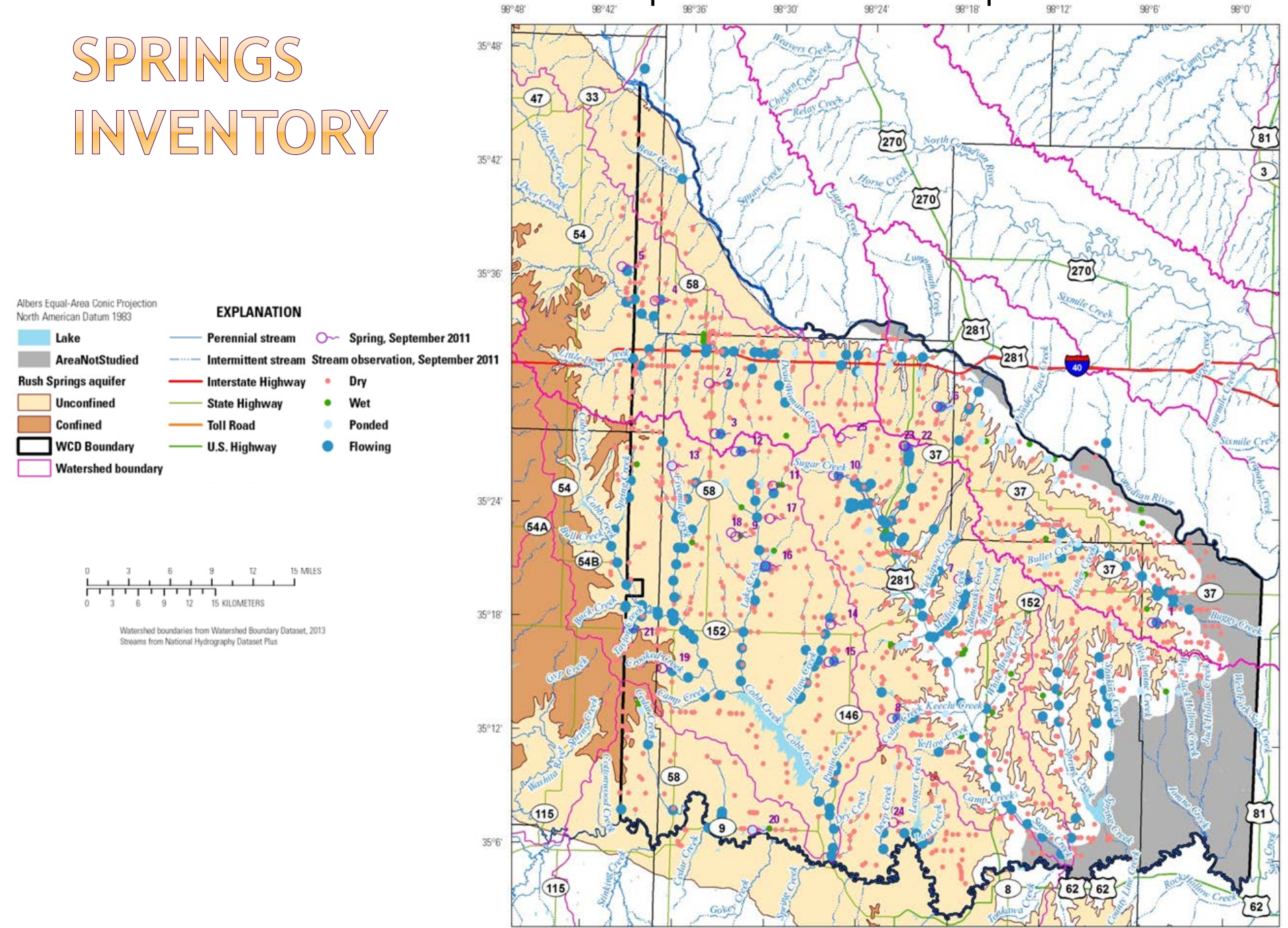

Figure X. Groundwater, surface-water, and atmospheric data collection stations at Cobb Creek near Eakly, OK, on Oklahoma state highway 152.

GW/SW INTERACTION CROSS-SECTION

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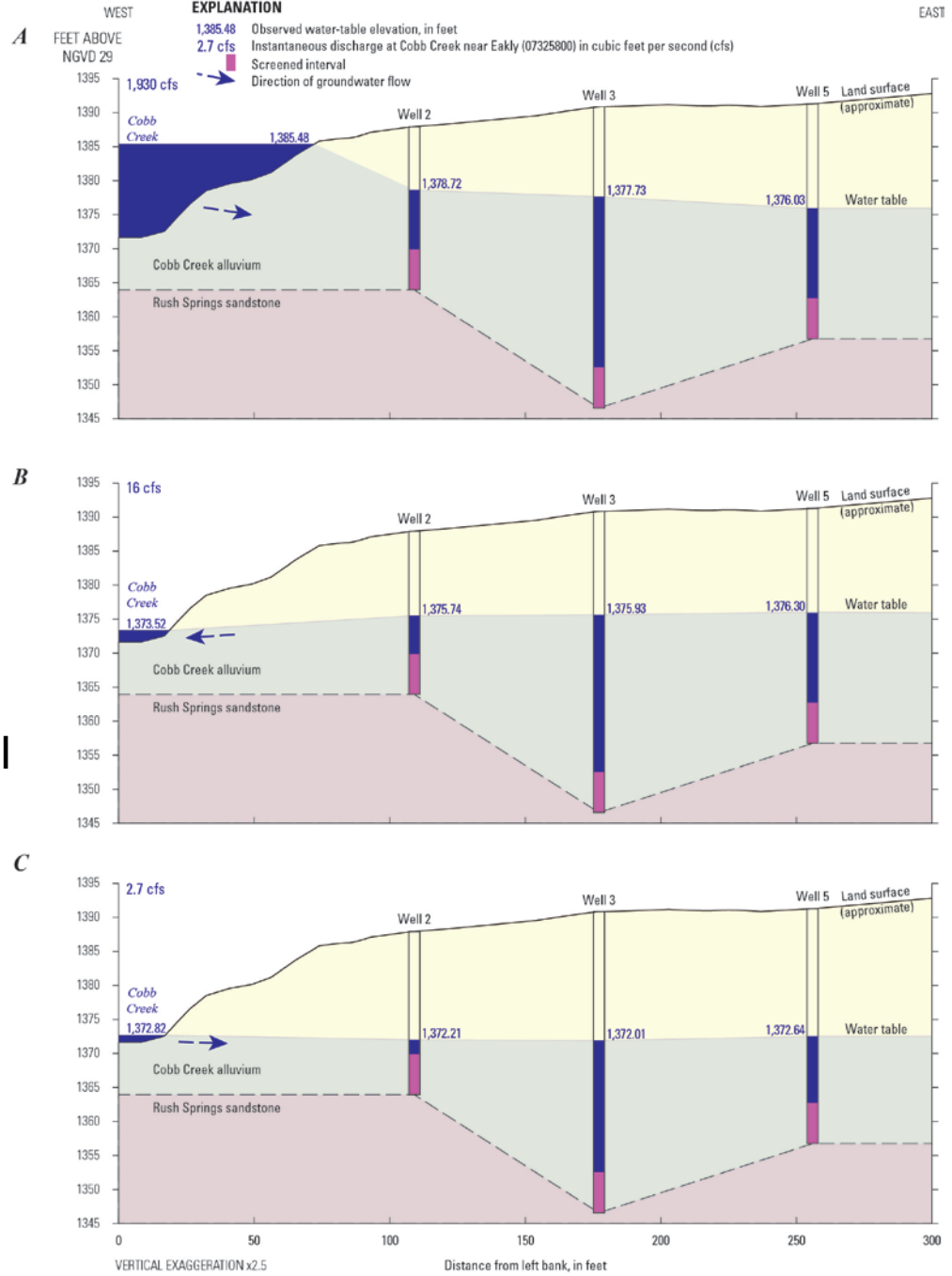

Figure X. Cross sections of a piezometer transect in the Cobb Creek alluvium showing elevations of Cobb Creek and the alluvial aquifer water table during (A) flooding-stream conditions on November 8, 2011, 2:30 am, (B) normal, gaining-stream conditions on March 1, 2012, 8:30 am, and (C) losing-stream conditions on July 29, 2012, 8:30 am.

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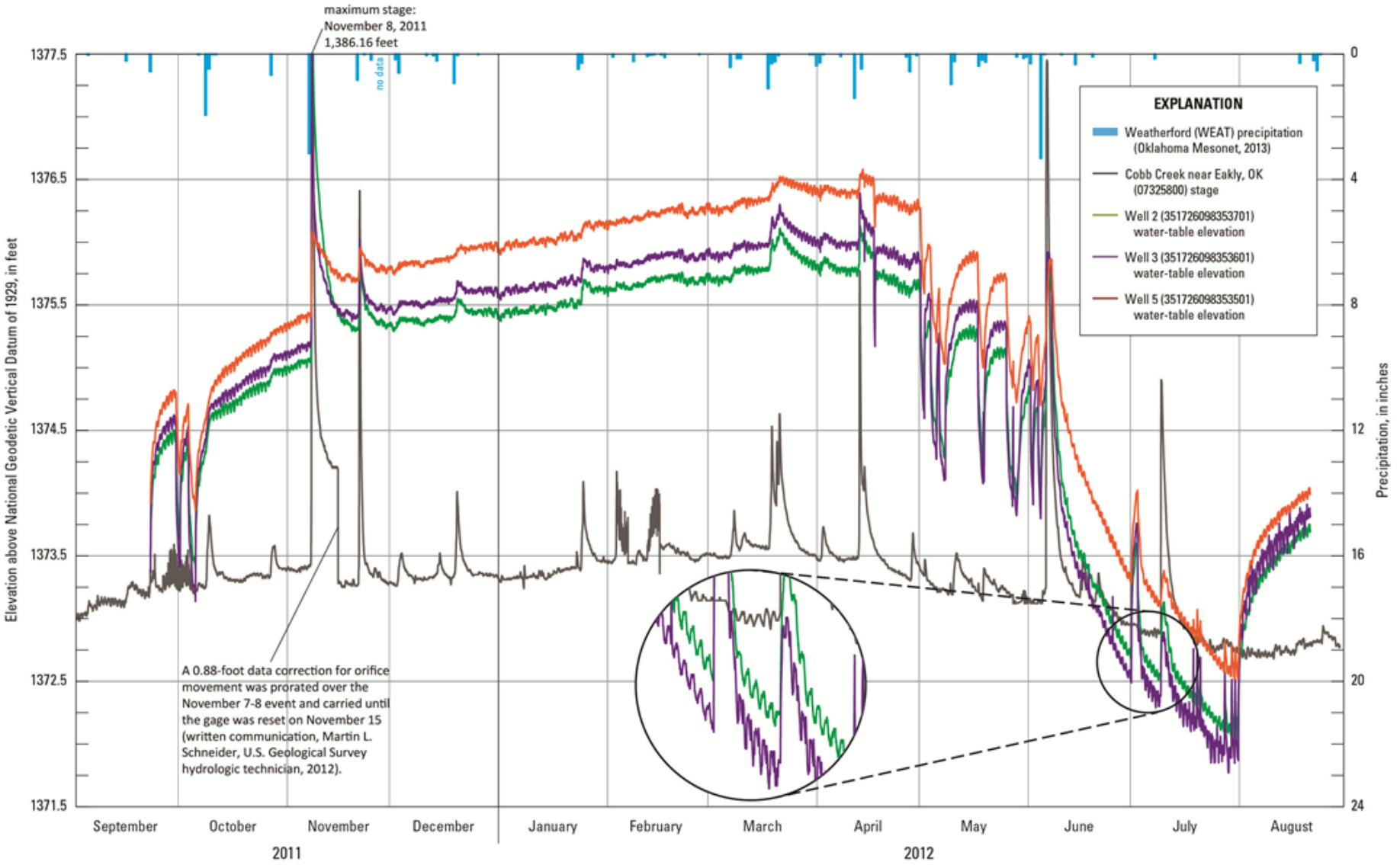
GW/SW INTERACTION



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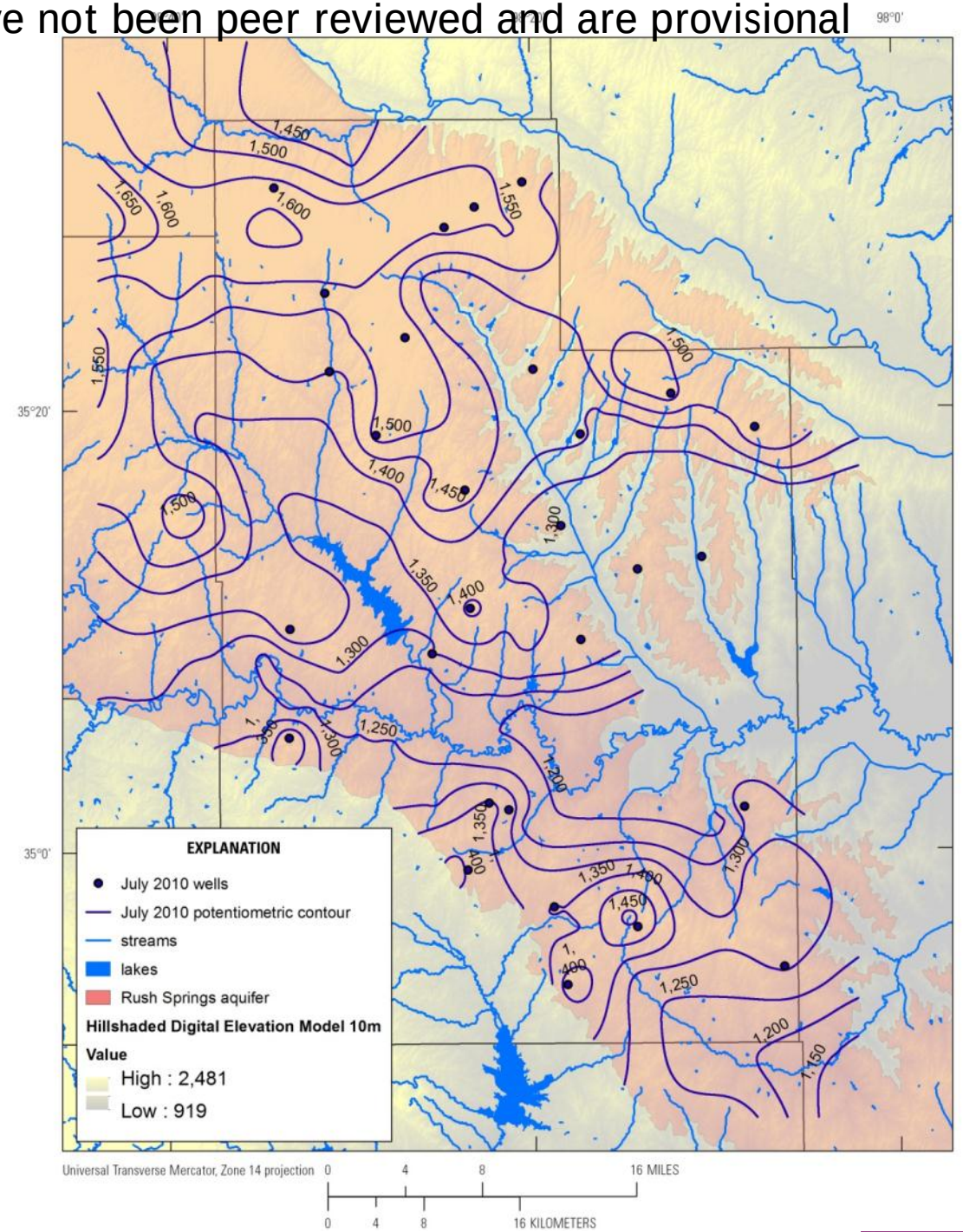
DIRECTIONS OF GW FLOW



FINAL PRODUCTS

- Data stored in long-term USGS quality-controlled database that is public and retrievable.
- Peer reviewed and bureau-approved reports will be published to summarize data and provide information on water resources.
- Reports can be referenced and information useful for water planning.

FUTURE PLANS

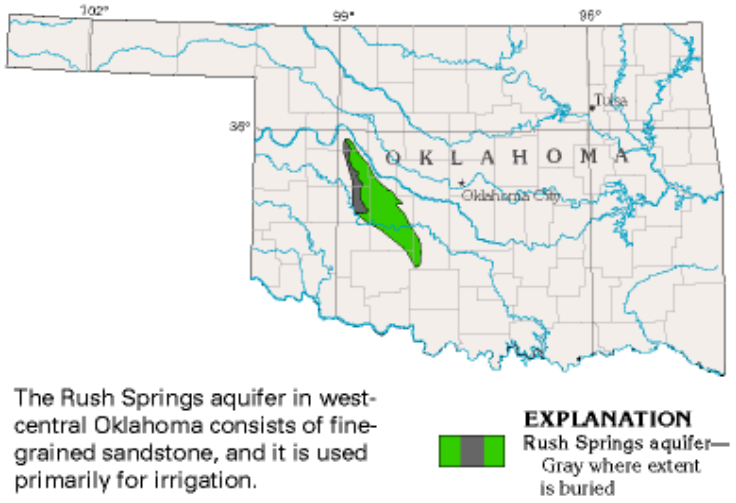
- Groundwater-quality assessment
- Construct hydrogeologic framework
- Construct groundwater-flow model
  - Compile water-use data
  - Calculate recharge
- Calibrate groundwater-flow model
  - Calibrate to streams
  - Calibrate to groundwater levels
- Run scenarios on calibrated model to answer questions for Caddo Nation about water resources

BENEFITS TO CADDO NATION

- Integrated Water Management Plan Began with Questions to Define the Rush Springs Aquifer and Its Nature.
  - The availability of water is one the biggest challenges facing Caddo Nation and surrounding jurisdictions in southwestern Oklahoma.
  - A predicted 10+ year drought and increase number of rural water districts "mining" water for neighboring counties that questions were formulated:
    1. How limited is the water resource?
    2. How much can be used before it is no longer available or nature is unable to replenish/recharge the supply?
    3. What is the nature of the aquifer?
    4. How does it replenish?
    5. What is the interaction between the ground water and the surface water, and are those interactions balanced to where decrease in one results in the lack of recharge of another?
  - What are the known parameters needed to create a comprehensive management plan that looks into conservation and sustainability?

CADDO NATION AREA

- Water Usage
  - Farming/Irrigation
  - Livestock
  - Oil & Gas industry
  - Public water supply
  - Rural homestead water usage
  - Recreation
  - Other



The Rush Springs aquifer in west-central Oklahoma consists of fine-grained sandstone, and it is used primarily for irrigation.

PURPOSE AND INTENT

- Design living document to manage water resources in the Caddo Nation jurisdiction to the benefit of community.
- Create sustainable conservation methods and practices to protect and manage resources to a changing environment
- Implement drought strategies and adaptation planning for stressed resources in regards to climate change
- Work with regulatory guidance and efforts for pollution control
- Look into protection of watershed areas, wetlands and springs that are fed from the aquifer
- Design potential projects for flood control and soil and water conservation
- Inventory and preserve wildlife habitat
- Preserve pristine water supplies for the communities dependent on the limited resource, whether used domestically or industrial

POTENTIAL CONSERVATION PRACTICES

- Irrigation water management
- Planning grazing systems
- Windbreaks
- Terrace systems & underground outlets
- Water impoundment dams
- Grade stabilization structures
- Irrigation tailwater recovery pits
- Water & sediment control basins
- Grassed waterways
- Diversions
- Livestock water runoff dugouts
- Range seeding or pasture planting
- Critical area planting
- Underground irrigation water return pipe
- Livestock water facilities
- Streambank stabilization

GENERAL BENEFITS TO CADDO NATION

- Capture scientific data over time that can be used to define and model our water resources with better knowledge.
- Capture water usage data and correlate to climate change and understand how these changes affect and change the nature of the resources so we can adapt and modify to those changes to preserve a valuable limited resource.
- Capture Traditional Ecological Knowledge from our elders and community, but also begin recording our thoughts and processes we use to attend to an ever-changing environment for the future.