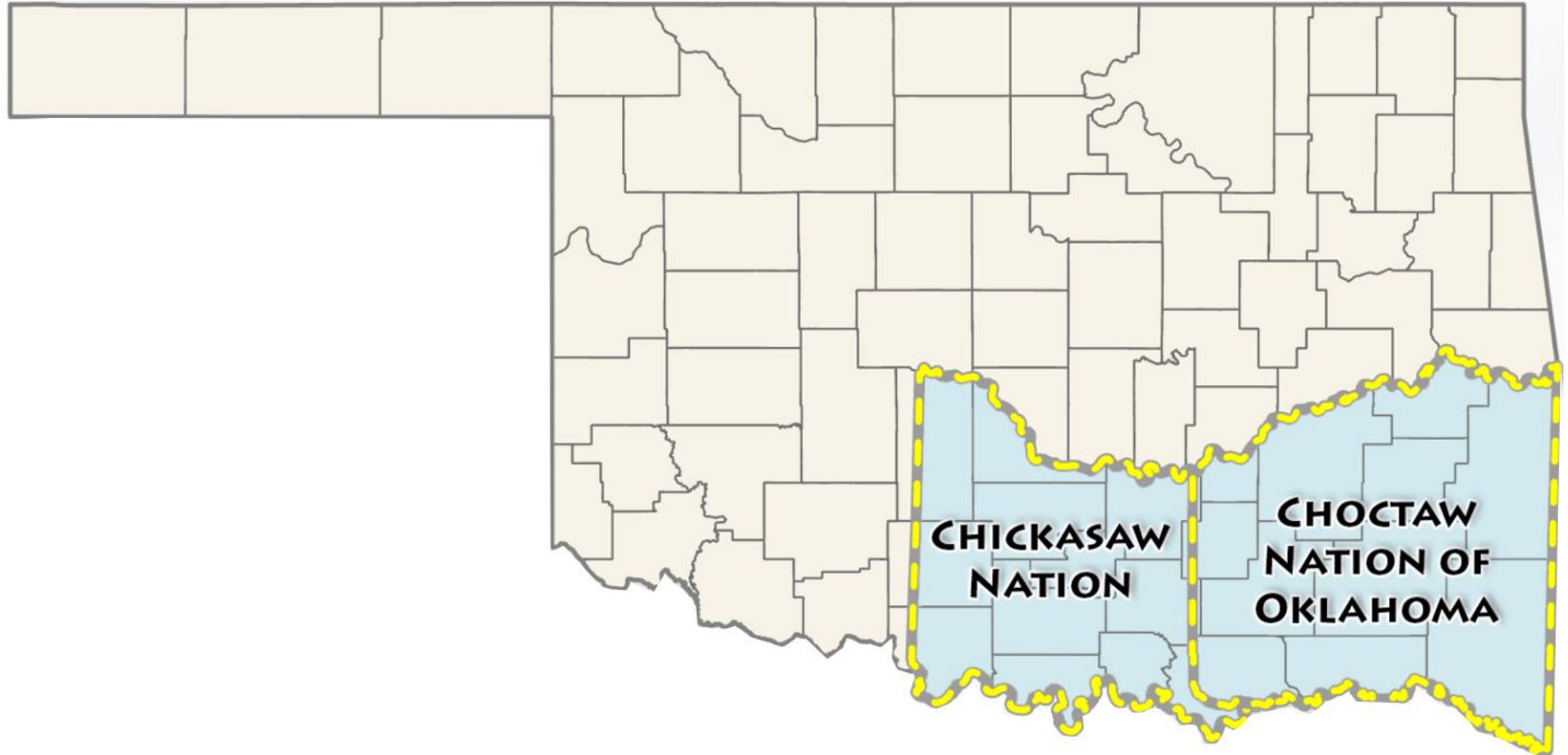


Implementing the Oklahoma Water Settlement with RiverWare

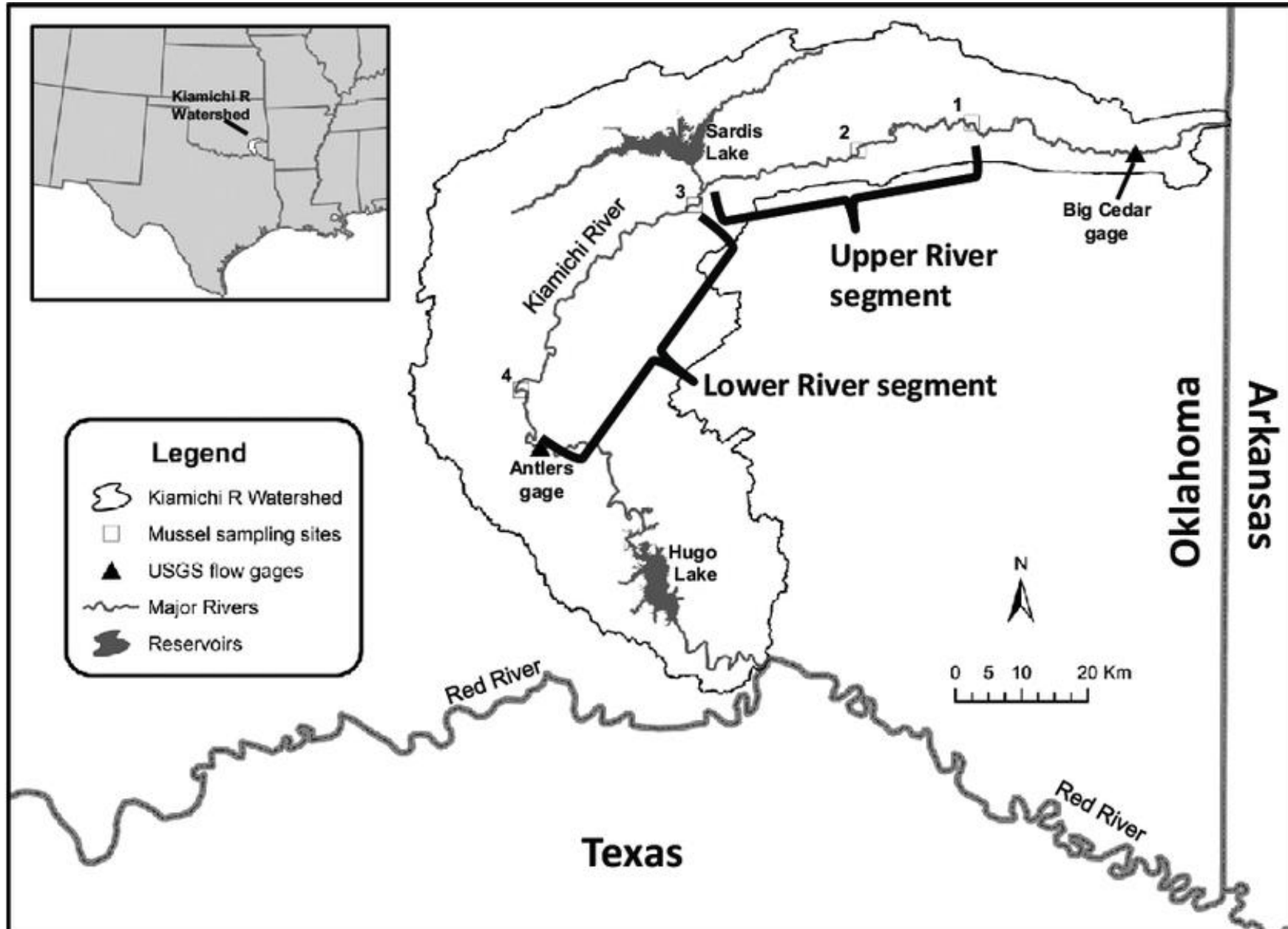
Frank Schalla, PE
Aqua Strategies Inc.

Blue River (Source: Oka Holisso)

Chickasaw Nation & Choctaw Nation



Sardis Lake and the Kiamichi River



Nations' goals in discussions with OKC

An aerial photograph of a large dam and reservoir. The dam is a long, low structure with a central spillway. Behind the dam, a power plant with several buildings is visible. The reservoir is a large body of water, and the surrounding area is green with trees and some buildings. The sky is blue and clear.

Sovereignty – A meaningful voice in the evaluation and conditioning of City's permit application

Protections for

- **Lake levels** – Management of Sardis lake levels to avoid/minimize adverse impacts on recreation and ecological values
- **Stream flows** – Protecting Kiamichi stream flows
- **Future water use needs** – Water needs of the surrounding ten-counties

After 5 years of negotiations...Water Settlement!

- State continues to administer and enforce water rights
- “A seat at the table” for the Choctaw and Chickasaw Nations in decisions about future water right applications in tribal territory
 - “Adequate hydrologic model”
 - “Technical Committee to examine hydrology”

**Opportunities for
collaboration**

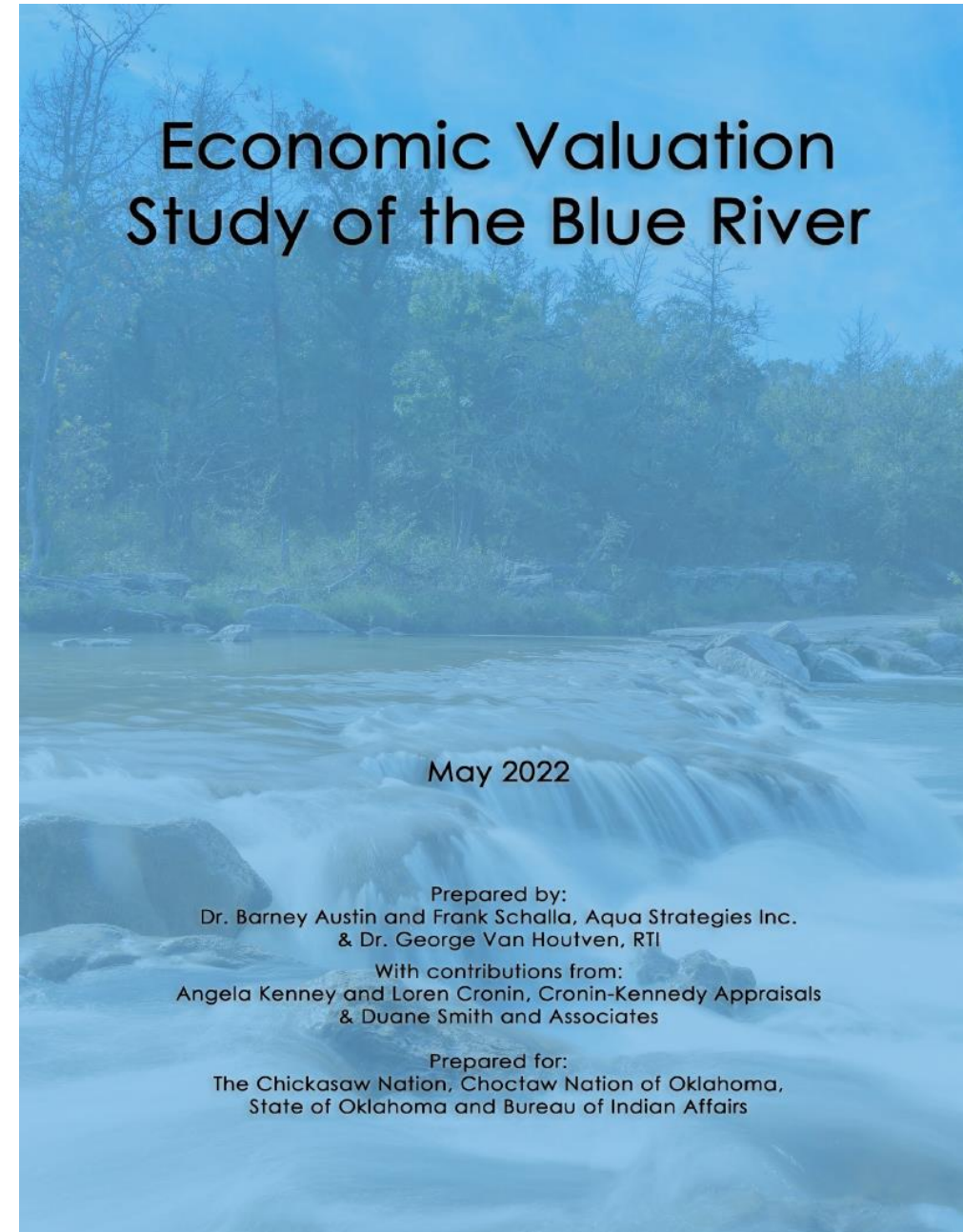
**Adequate Hydrologic
Models**



Committee formed to study the Blue River

- Should the state protect instream flows?
- If so, how would that happen?

- Economic impact of \$1.5 billion, \$144 million in economic value
- Advocates for minimum flow standards



Economic Valuation Study of the Blue River

May 2022

Prepared by:
Dr. Barney Austin and Frank Schalla, Aqua Strategies Inc.
& Dr. George Van Houtven, RTI

With contributions from:
Angela Kenney and Loren Cronin, Cronin-Kennedy Appraisals
& Duane Smith and Associates

Prepared for:
The Chickasaw Nation, Choctaw Nation of Oklahoma,
State of Oklahoma and Bureau of Indian Affairs

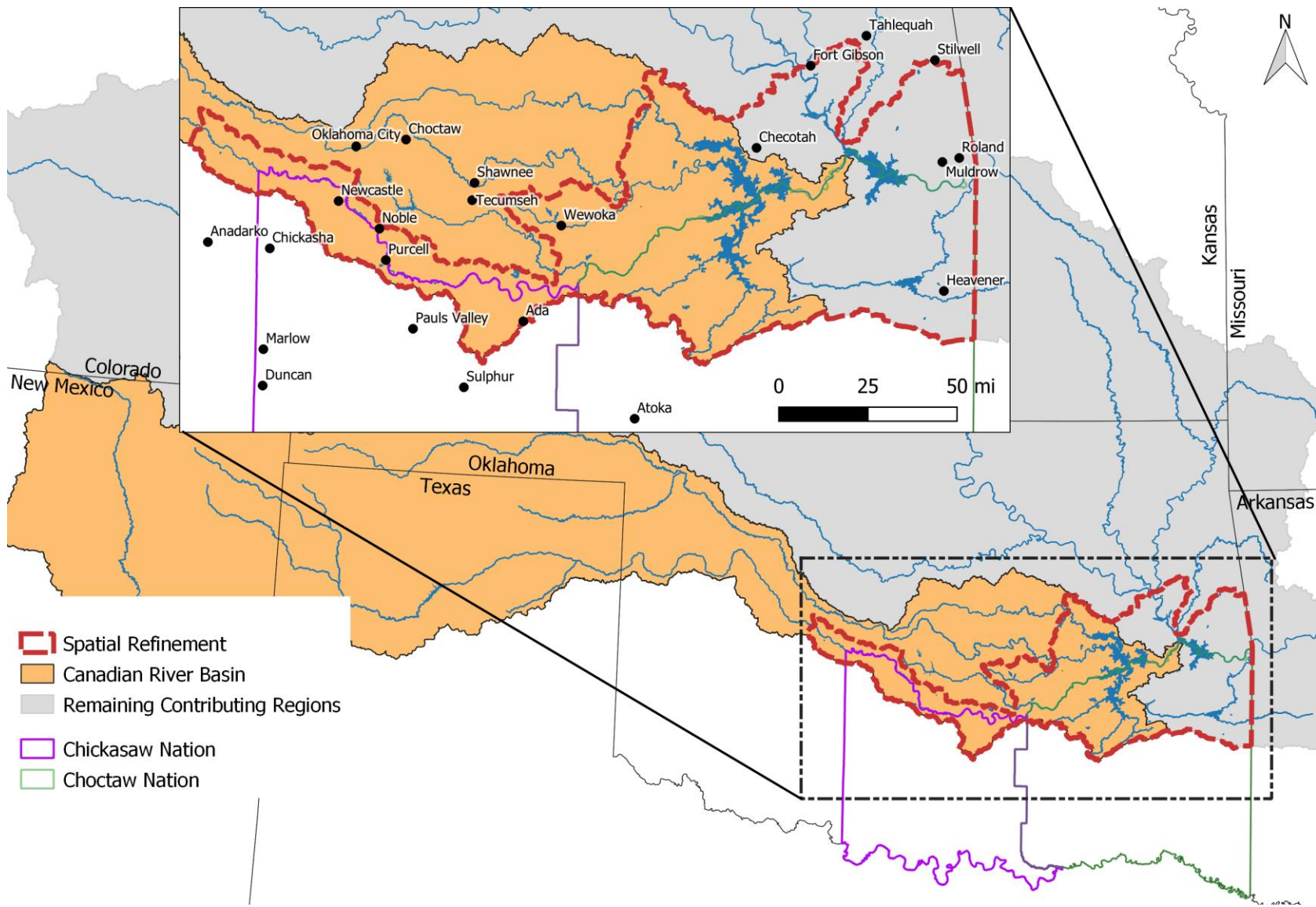
Building Tools to Assess Climate Change Impacts on Water Resources of the Canadian River Basin



SOUTH CENTRAL
CLIMATE ADAPTATION SCIENCE CENTER



OKLAHOMA Water Resources Board



- Study Impacts to:**
- Water rights (*municipal*)
 - Reservoir levels
 - River flows

- Impacts from:**
- Future climate conditions
 - Future water use
 - Reservoir operating policy

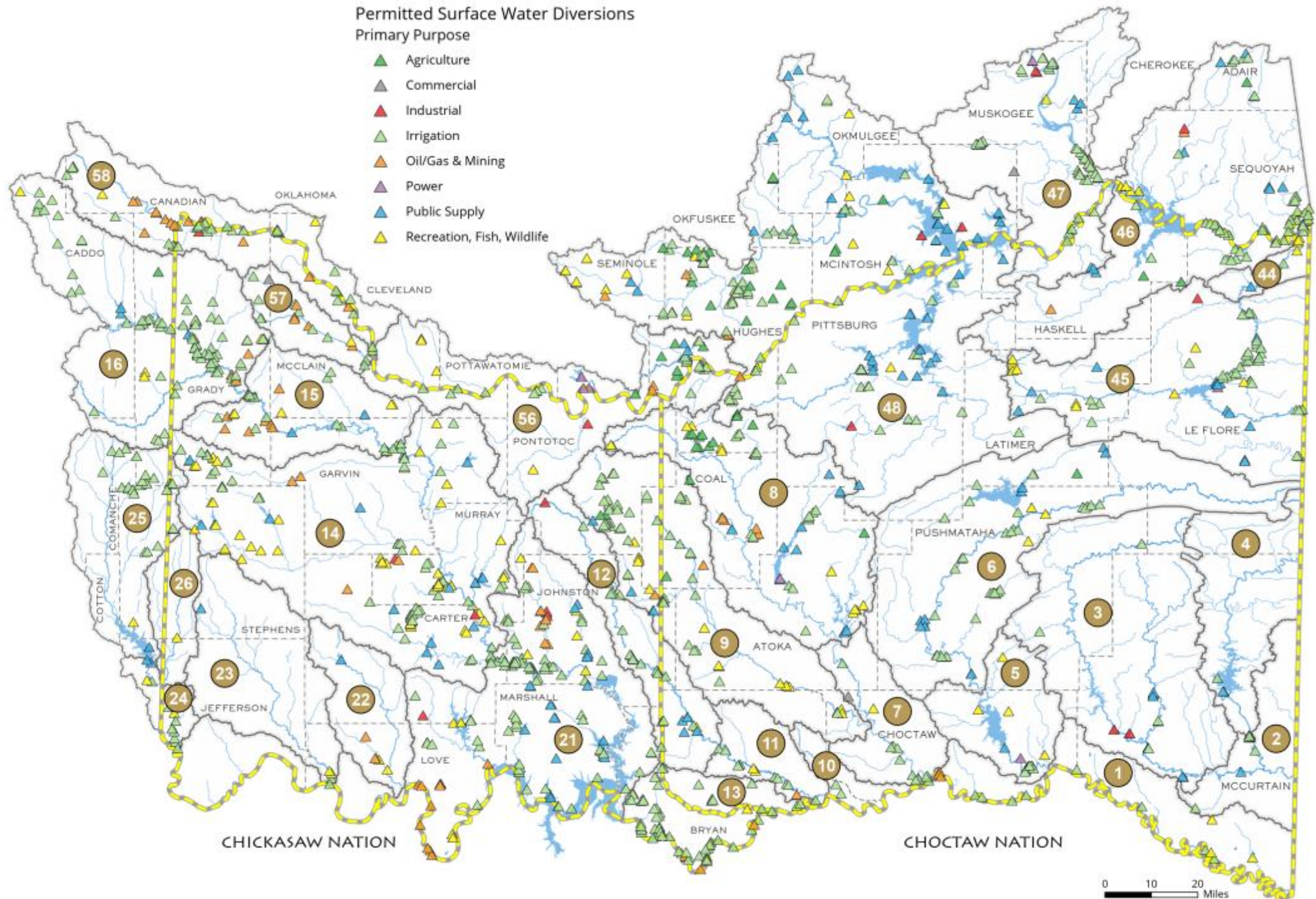
- Tools/Methods:**
- Downscaled climate models
 - VIC rainfall/runoff model
 - *RiverWare accounting model*

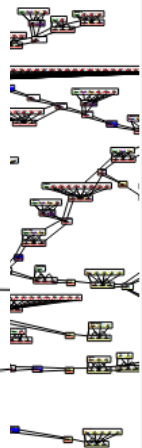
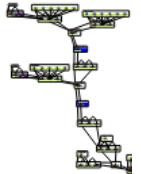
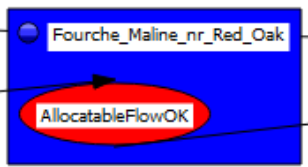
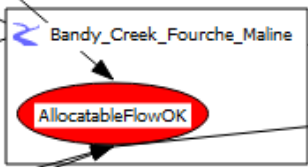
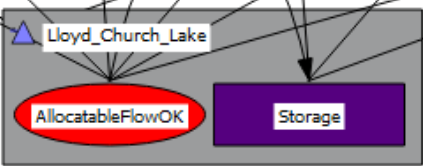
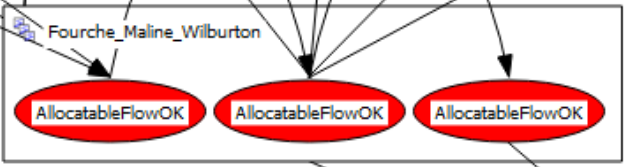
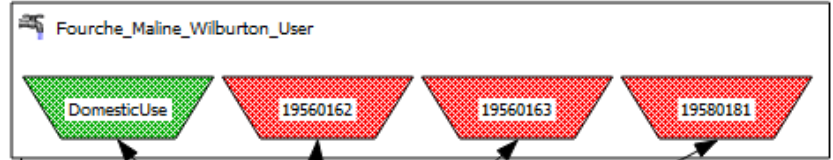
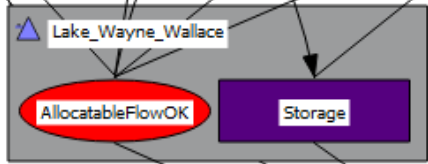
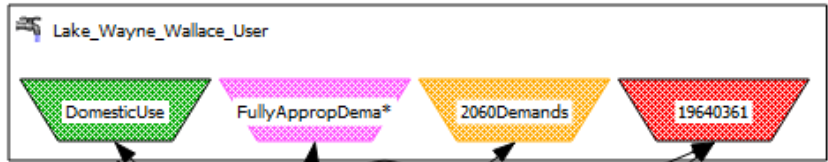


Permitted Surface Water Diversions

Primary Purpose

- ▲ Agriculture
- ▲ Commercial
- ▲ Industrial
- ▲ Irrigation
- ▲ Oil/Gas & Mining
- ▲ Power
- ▲ Public Supply
- ▲ Recreation, Fish, Wildlife

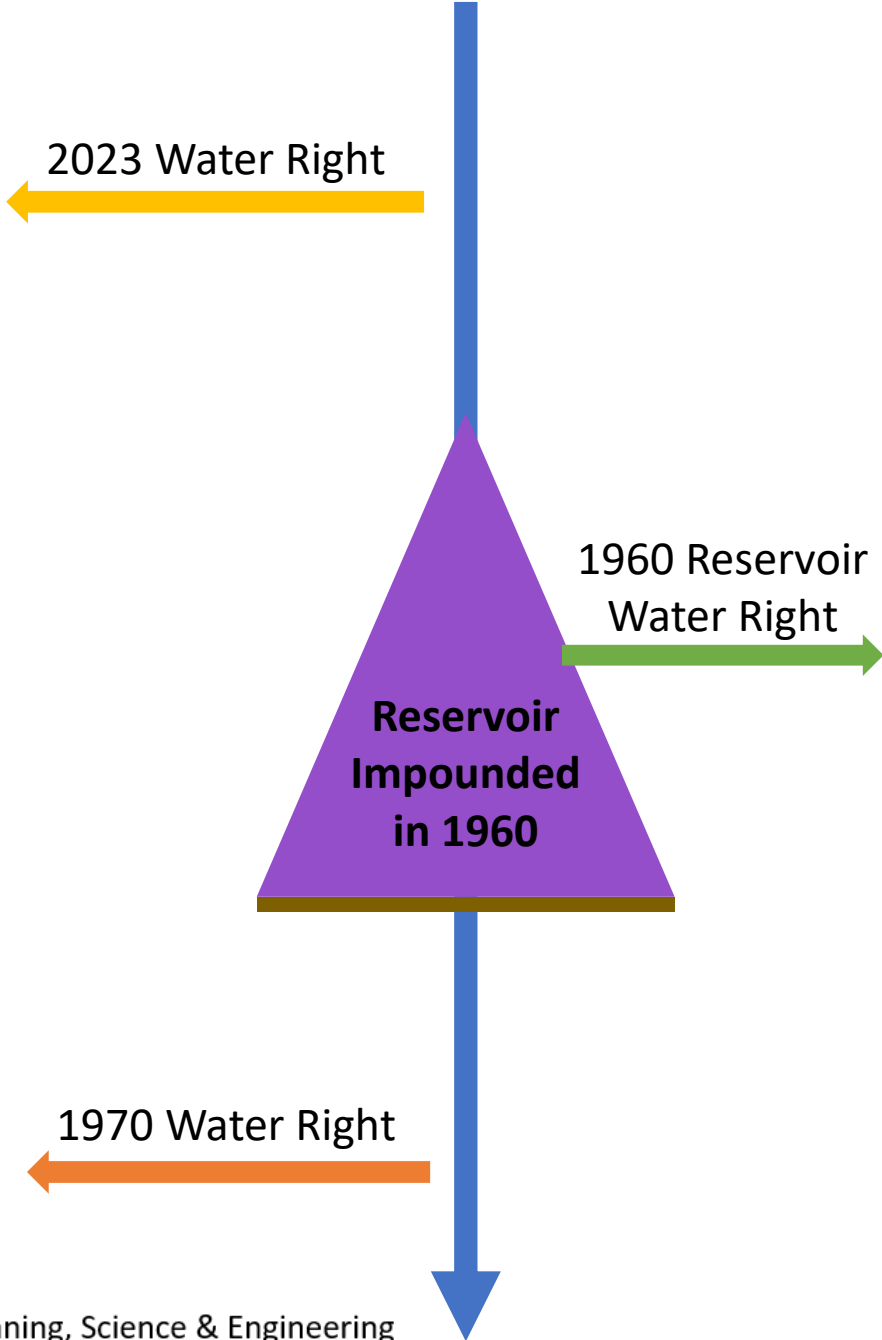




Impacts to Reservoirs



Physical Representation



Accounting Model Representation


Inflow Access Policies:

1. Res WR experiencing shortages
2. Reservoir storage below CPE
3. Reservoir storage below 1 yr of supplies


2023
Water
Right



Refilling Reservoir
(junior priority)




*Access is
controlled by
operating policy*

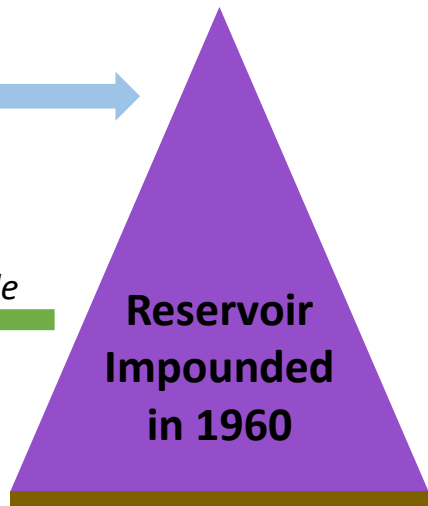


1960 Reservoir
Water Right
Diversion

*Always
accessible*



**Reservoir
Impounded
in 1960**



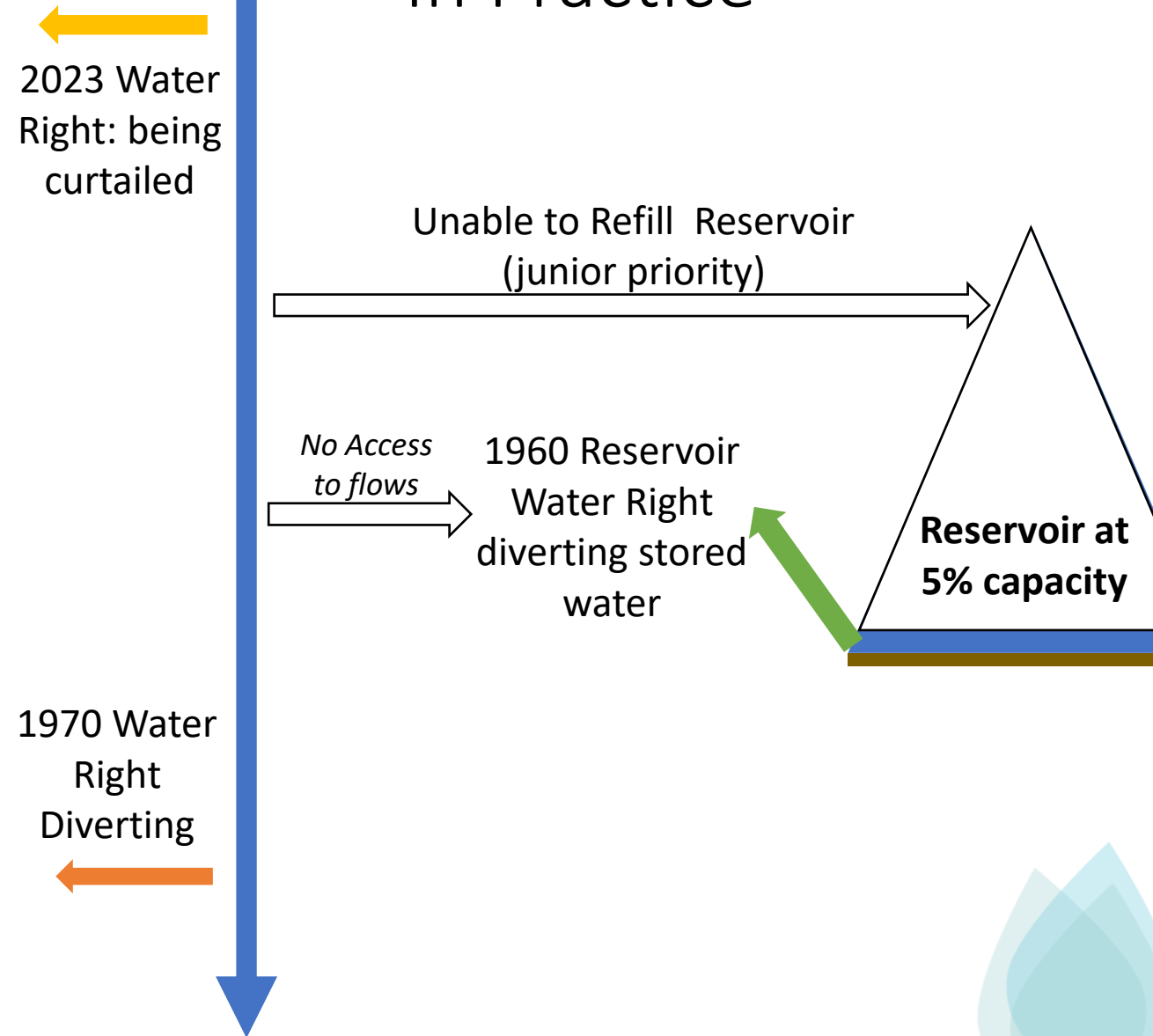
1970
Water
Right



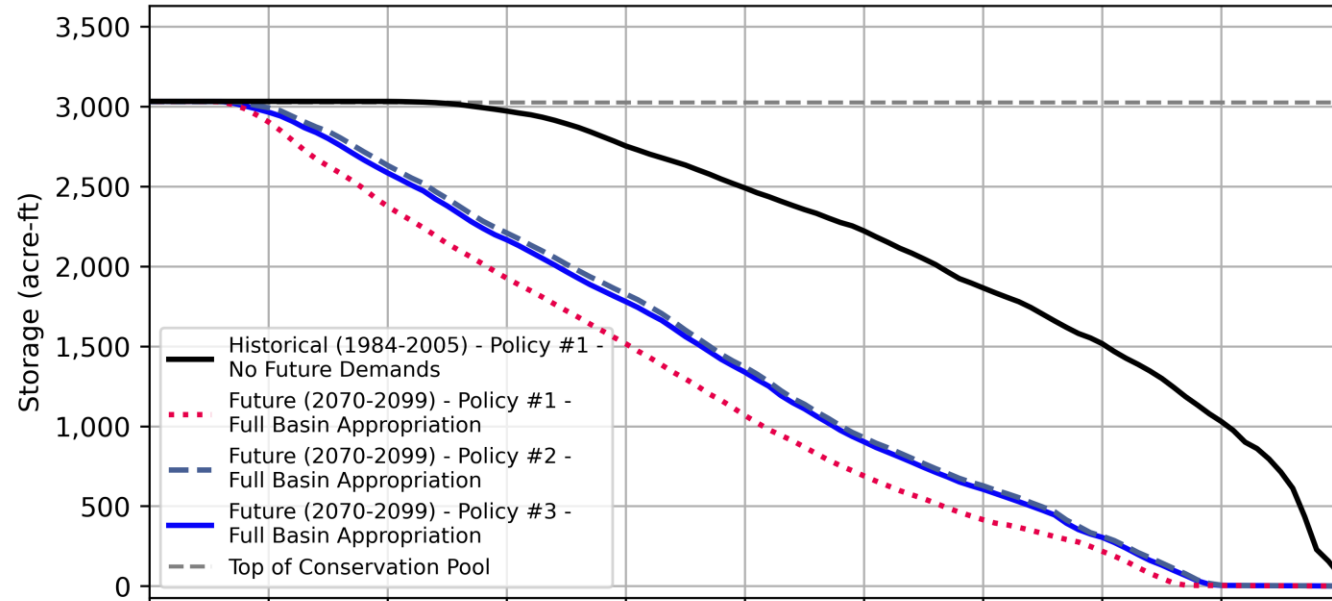
Modeling Assumptions – In Practice

Implementation in RW:

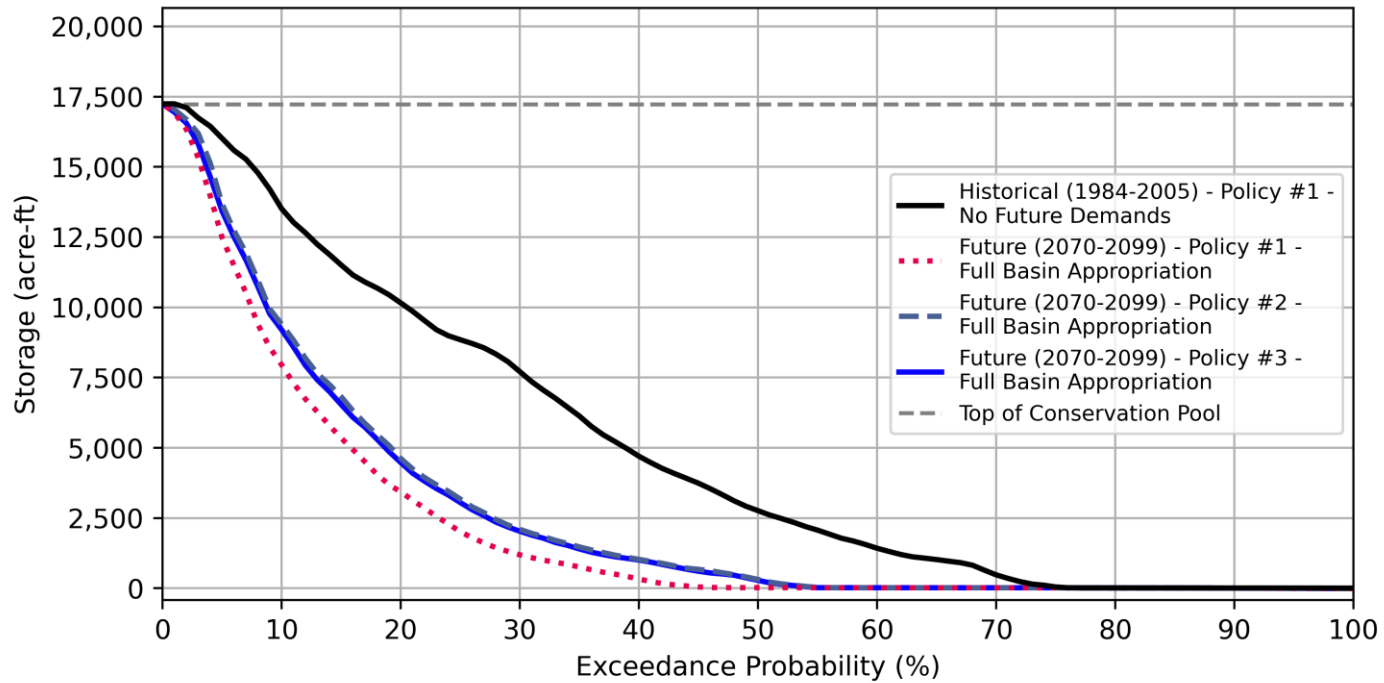
1. Control when res. WR can access inflows in allocatable supply chain
2. By default: res. WR diverting from storage
3. Policy triggered, res WR's initial request is set
 - Can curtail
 - Can divert inflows
4. Any remaining shortages met by storage



Lloyd Church Lake



McAlester Lake



Legend

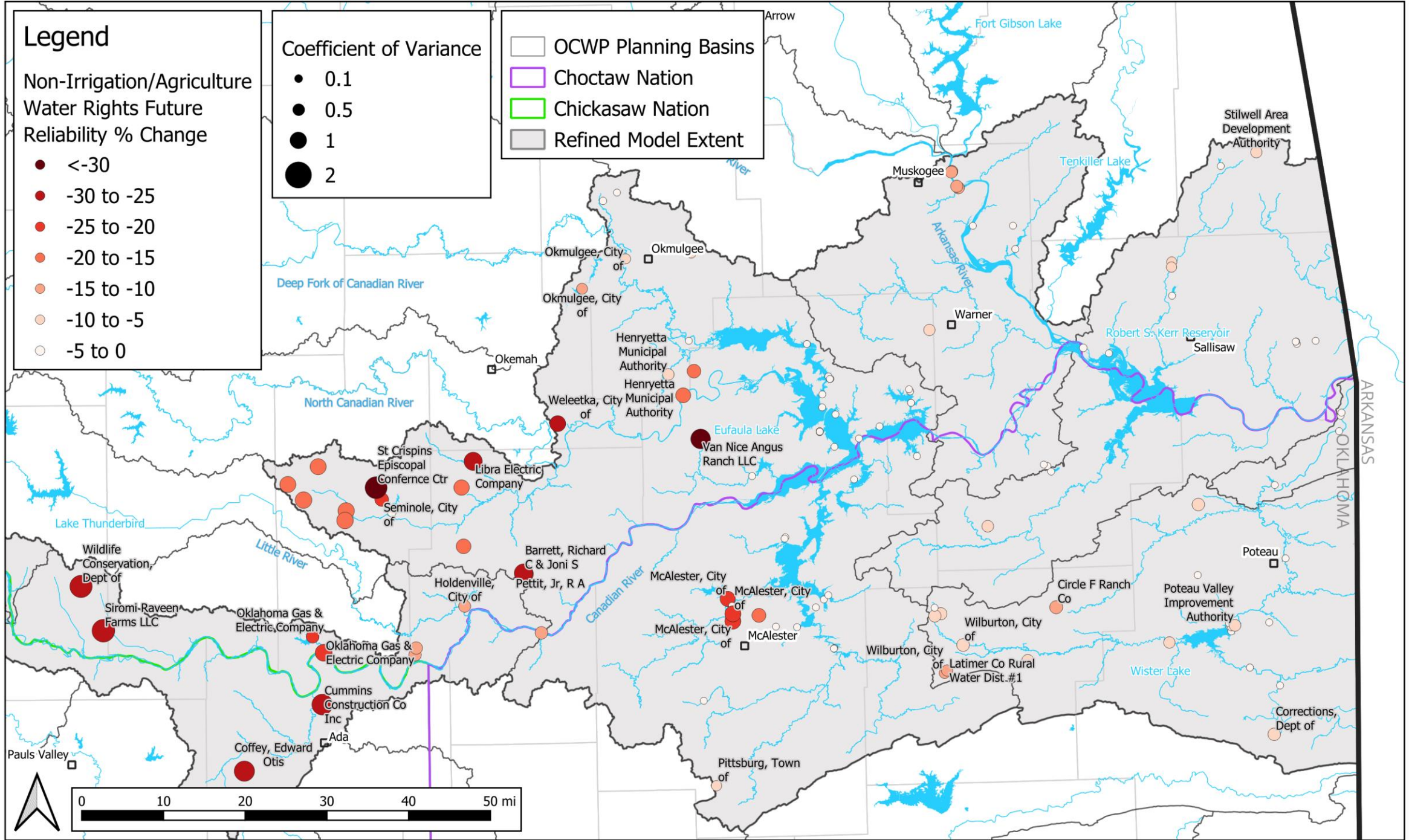
Non-Irrigation/Agriculture
Water Rights Future
Reliability % Change

- <-30
- -30 to -25
- -25 to -20
- -20 to -15
- -15 to -10
- -10 to -5
- -5 to 0

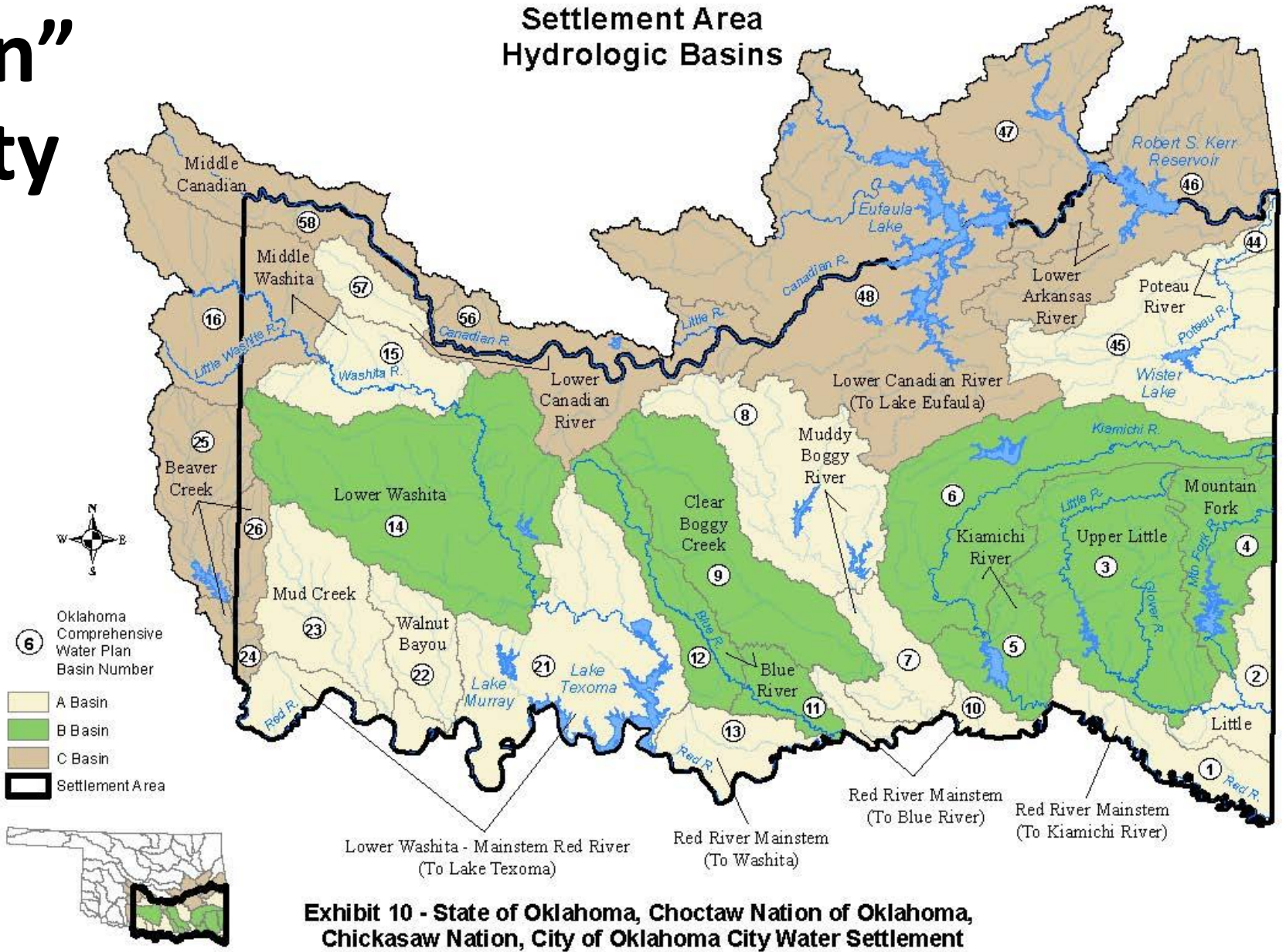
Coefficient of Variance

- 0.1
- 0.5
- 1
- 2

- OCWP Planning Basins
- ▭ Choctaw Nation
- ▭ Chickasaw Nation
- ▭ Refined Model Extent



Building “B-Basin” Water Availability Models



April 2016

Questions?

Frank Schalla
fschalla@aquastrategies.com
Aqua Strategies Inc.

Broken Bow Lake (Oka Holisso: Chickasaw and
Choctaw Water Resource Planning Guide)