South Fork Republican River water users meeting

April 2015 Update
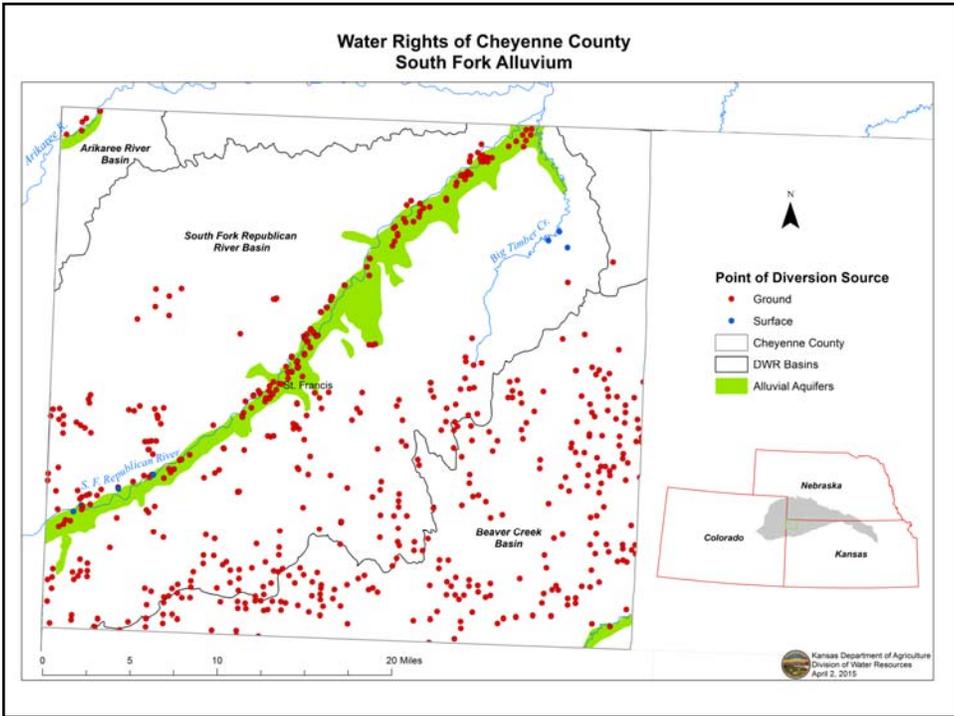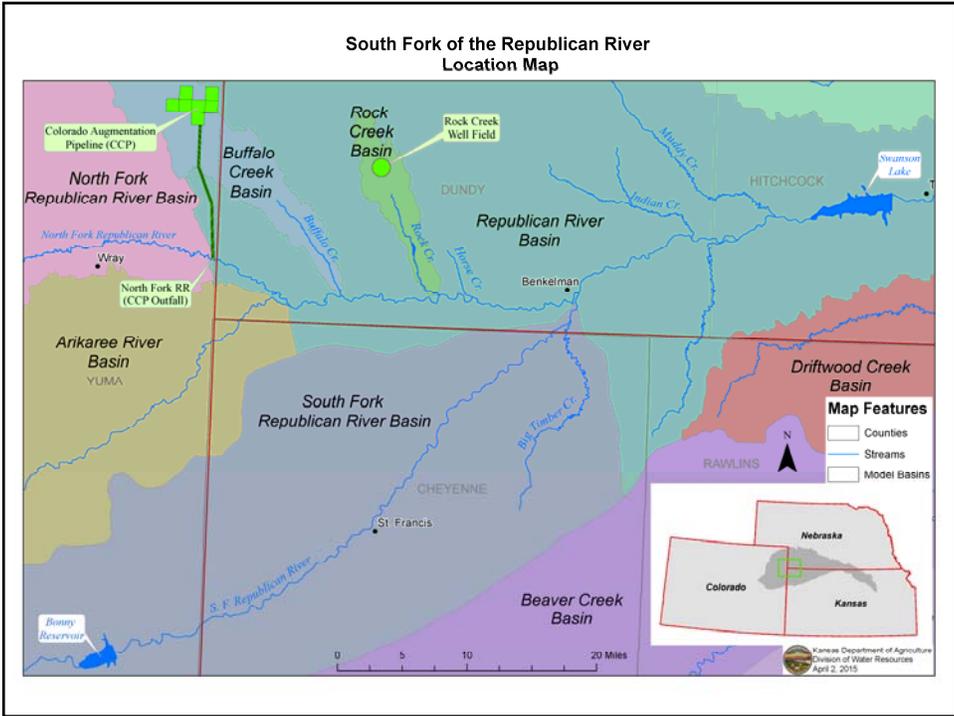
David Barfield, Chief Engineer
Division of Water Resources
Kansas Department of Agriculture

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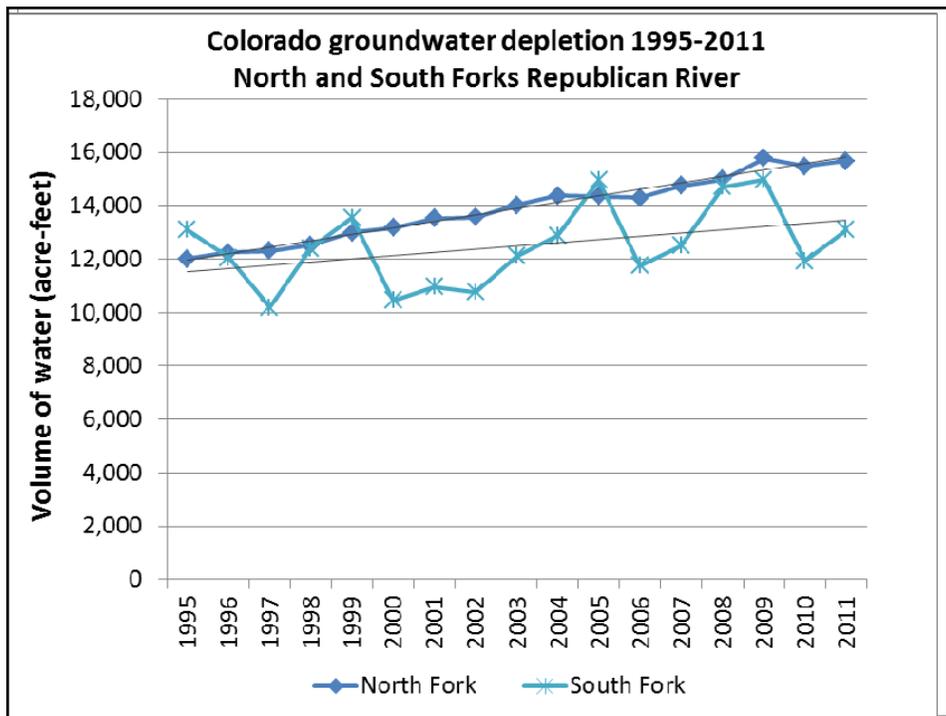*Division of Water Resources*

Presentation overview

- **Republican River Compact** implications to the region, both Colorado and the South Fork
- **Colorado's Augmentation project**: what it is, why they built it
- **Bonny Reservoir** – why Colorado drained it, what do we know of its future viability
- Current status of **discussions** with Colorado

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South Fork of the Republican River
Location Map

Water Rights of Cheyenne County
South Fork Alluvium

Republican River Compact (1943) and 2002 Final Settlement Stipulation

- Compact defines each state's share of the basin's water supply – total and by tributary
- 2002 FSS:
  - Provides clear, agreed-upon tests of compliance
  - Augmentation allowed, but plans must be approved by States, prior to implementation
  - Jointly developed groundwater model determines groundwater pumping impacts to streamflow, including pumping from the Ogallala aquifer

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Colorado groundwater depletion 1995-2011
North and South Forks Republican River

Colorado non-compliance

- Colorado overused its **statewide** allocation more than 50,000 acre-feet for the 5-year period 2003-2007 and continues to overuse

- In addition, over the same period, Colorado consistently overused its South Fork Republican River allocation, depriving Kansas of its share

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Colorado actions toward statewide compliance

- Colorado retired most of its surface water projects
- Colorado used voluntary incentive-based programs (CREP, EQIP) to retire approx. 35,000 acres of groundwater pumping
- These actions proved insufficient. In 2008, rather than cut groundwater pumping further, Colorado proposed to built an "augmentation pipeline" to offset depletions.

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Colorado's total groundwater
irrigated acres in the Republican
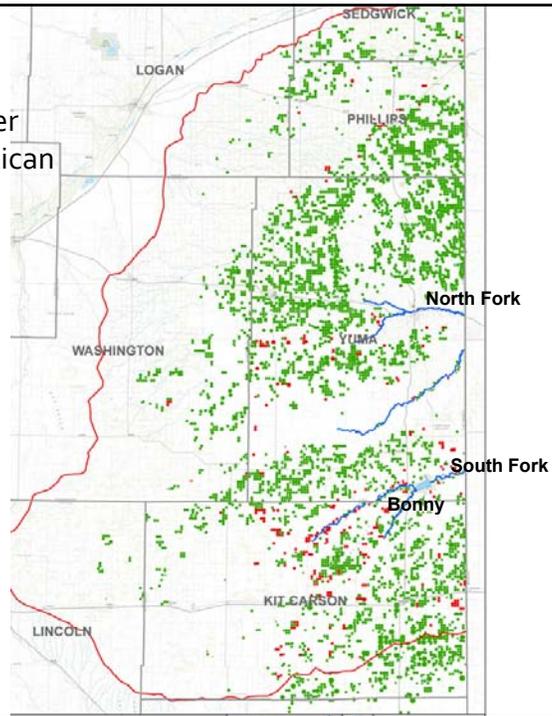River Basin:
     500,000 acres

Groundwater retired under
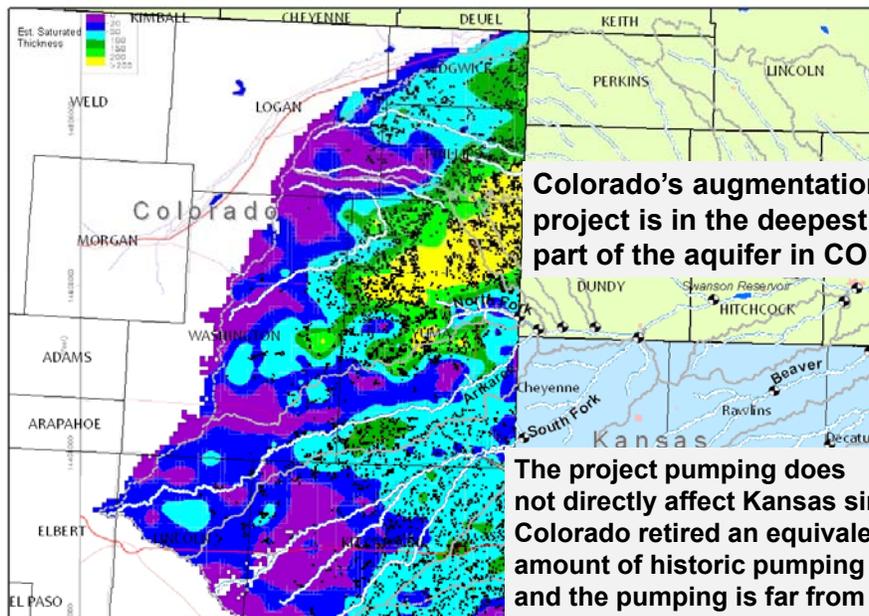voluntary programs (in red):
     35,000 acres

Groundwater acres retired
for their augmentation
pipeline:
     12,000 acres

Colorado "Estimated Regional Saturated Thickness 25 years after 2006 map"
Super-imposed over Basin Boundary and Streams Map

Colorado's augmentation project is in the deepest part of the aquifer in CO

The project pumping does not directly affect Kansas since Colorado retired an equivalent amount of historic pumping and the pumping is far from KS
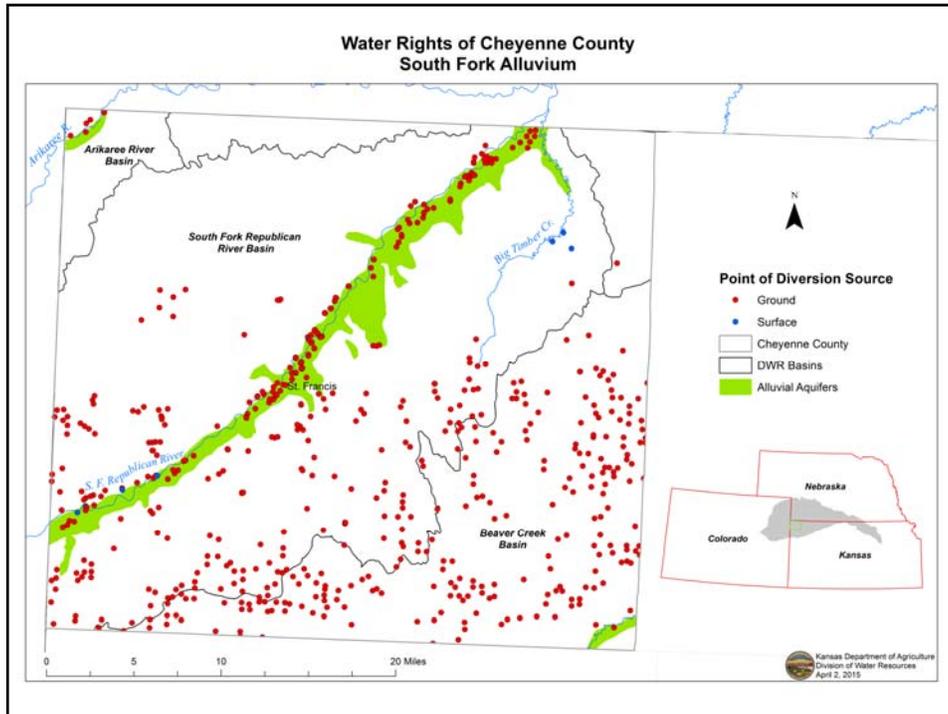
Status of Augmentation Project

- Kansas has not given final or long-term approval to the augmentation project principally as it allows the replacing Colorado's South Fork overuse on the North Fork
- Colorado dedicated the project during August 2012. First deliveries were in 2014.
- Kansas has approved temporary use of the augmentation project while we work on a solution.

South Fork allocations and use

- South Fork allocations
  - Colorado allocation: 44.4%
  - Kansas allocation: 40.2%
  - Nebraska allocation: 1.4%
  - "Unallocated" (reserved for mainstem): 14%
- Colorado has been using its share, the unallocated supply, and a portion of Kansas allocation.
- Most of Kansas use is alluvial pumping

Water Rights of Cheyenne County
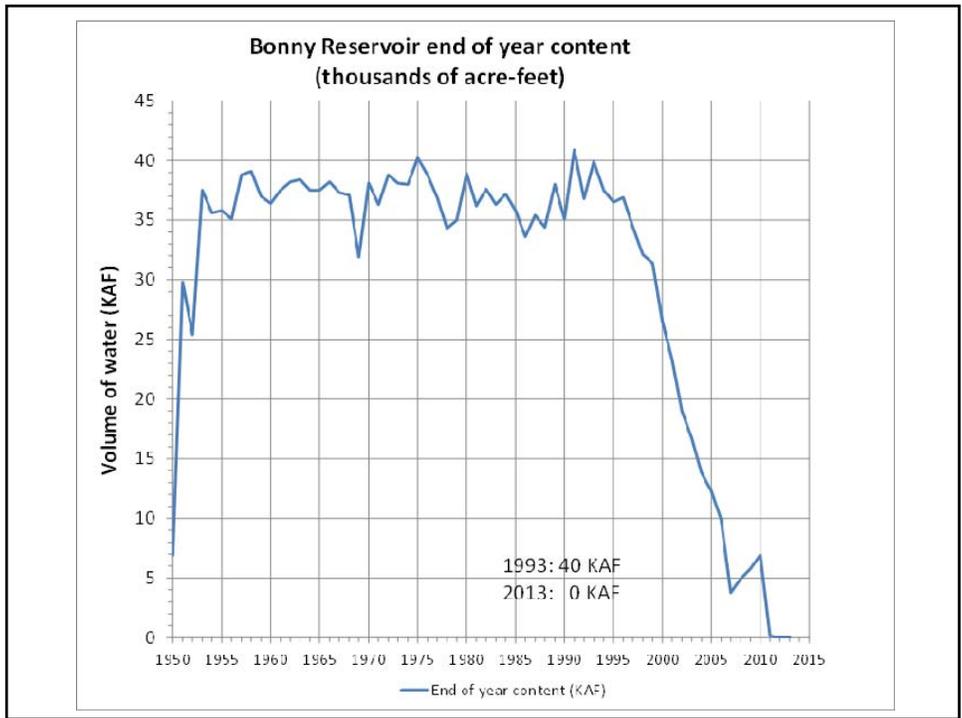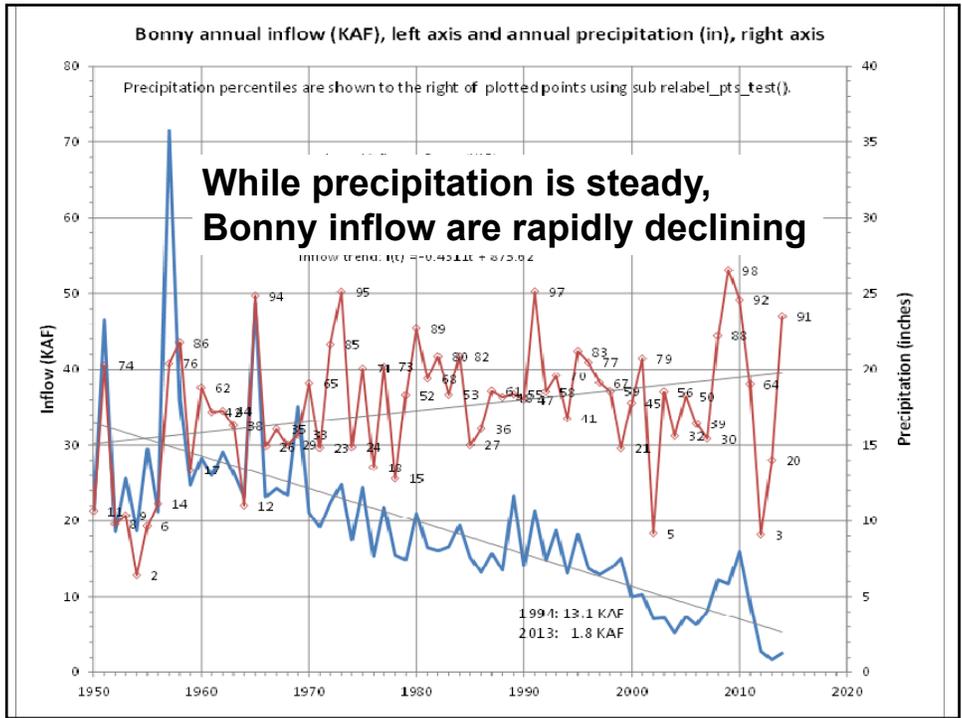South Fork Alluvium

Bonny Reservoir issues

- To address its non-compliance on the South Fork, Colorado drained Bonny Reservoir.
  - This reduces Colorado's use on the South Fork by approx. 3000 AF/year (evaporation)
  - Inflows into Bonny Reservoir have been in long-term decline, reducing its use and long-term viability.

Bonny annual inflow (KAF), left axis and annual precipitation (in), right axis

Precipitation percentiles are shown to the right of plotted points using sub relabel_pts_test().

While precipitation is steady,
Bonny inflow are rapidly declining

1994: 13.1 KAF
2013: 1.8 KAF

Bonny Reservoir end of year content
(thousands of acre-feet)

1993: 40 KAF
2013: 0 KAF

South Fork flows into Kansas

- As Bonny inflows have declined, so have South Fork flows into Kansas
  - [KS-CO Stateline gage data only available since 2002]
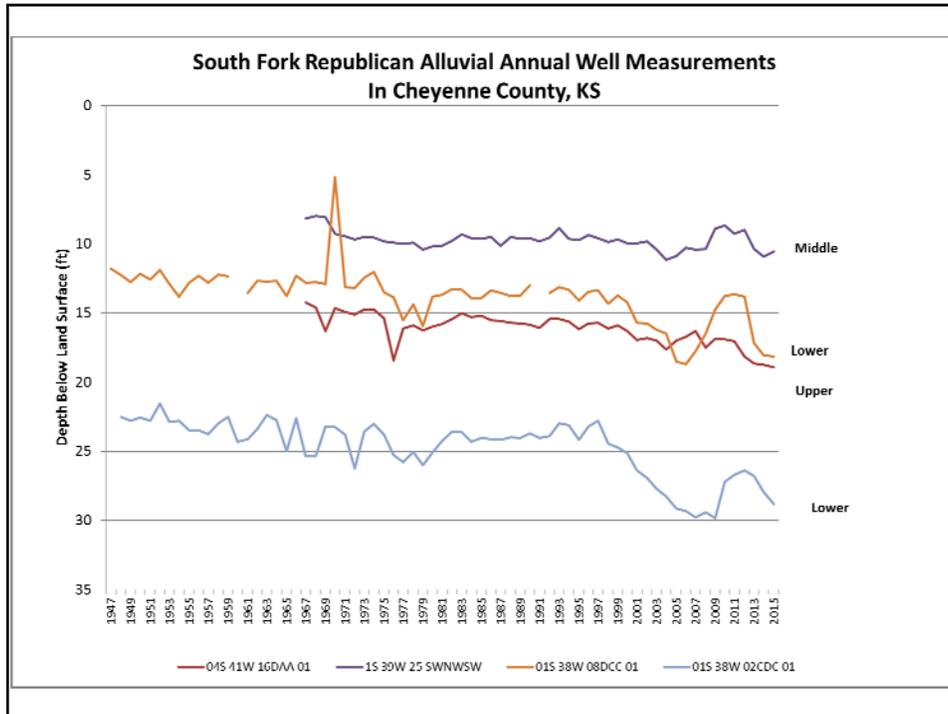- Declining flows into Kansas have reduced our surface water use and recharge of the South Fork alluvial valley

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CO-KS South Fork stateline flow, mean, cfs

South Fork Republican Alluvial Annual Well Measurements In Cheyenne County, KS

Current discussions with Colorado

Colorado and Kansas agree in good faith to discuss the following items with the goal of reaching agreement by November 1, 2015:

1. Identify options to increase streamflow on the South Fork at the stateline.
2. RRCA modeling and accounting for Bonny Reservoir.
3. Access to the unallocated portion of the South Fork Republican River.
4. An action plan to resolve the above issues.

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Questions ?

**Average Depth to Water, South Fork Republican River Alluvial Wells
versus
Average CO-KS South Fork Stateline Flow (preceding year)**

Recent higher flows years temporarily benefitted water levels in the alluvial valley

Depth Below Land Surface (feet)

Stateline flow (cfs)

3/23/1999 3/22/2001 3/13/2002 3/26/2003 4/8/2004 3/16/2005 4/4/2006 3/28/2007 3/12/2008 3/11/2009 3/18/2010 3/24/2011 3/15/2012 4/4/2013 3/8/2014 3/11/2015

— Average Depth to Water   — CO_KS stateline flow