

I-70 REAP  
WATER DISCUSSION  
FROM THE DEPUTY STATE ENGINEER'S PERSPECTIVE

October 2023





**COLORADO**

Department of  
Natural Resources

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[Forestry](#)



[Mining](#)



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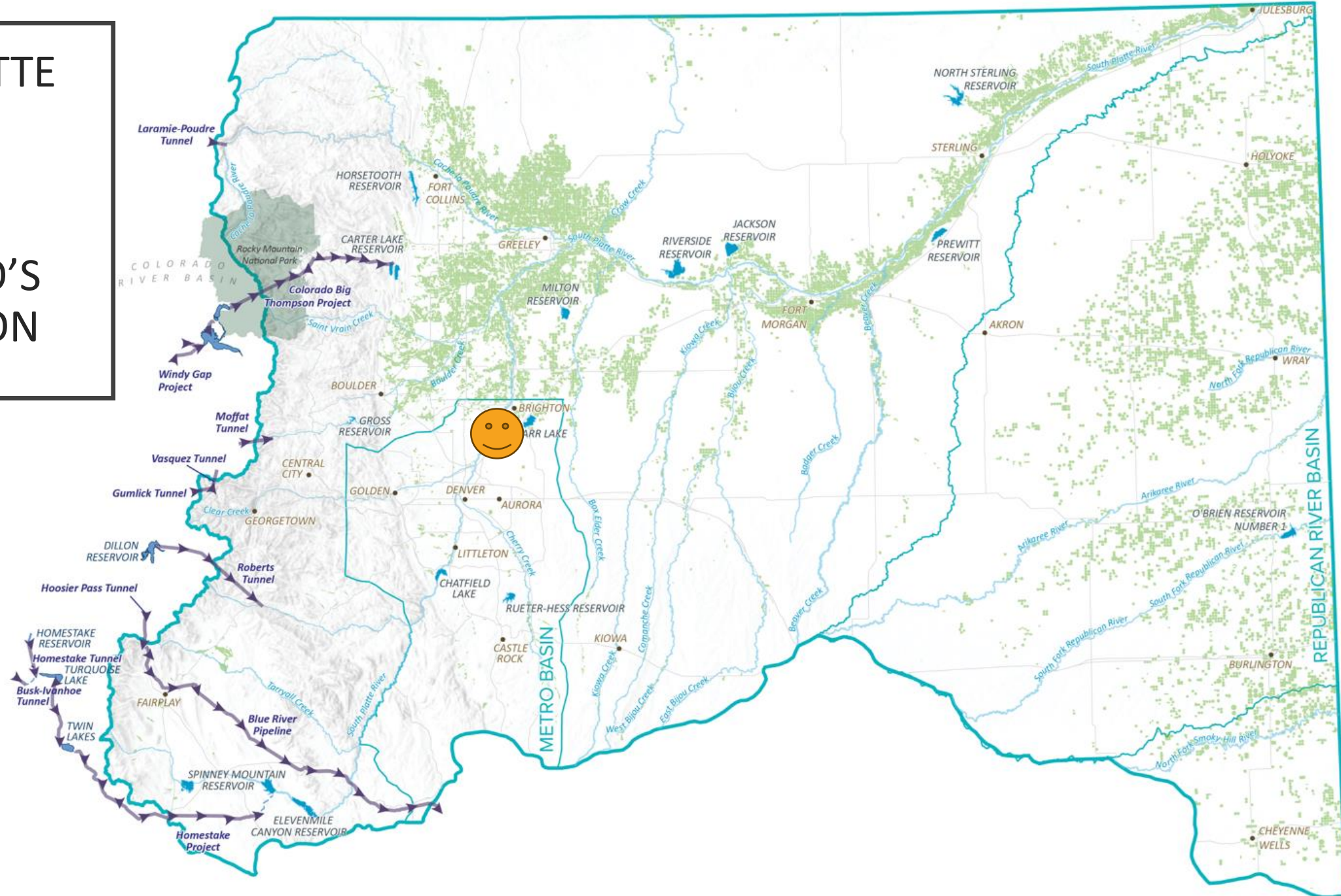
## MISSION

The Division of Water Resources will **administer the waters** of the State to maximize lawful beneficial use, ensure that **dams and water wells** are properly constructed and safe, and **provide information** about water resources to the public.



# SOUTH PLATTE BASIN

70% OF COLORADO'S POPULATION



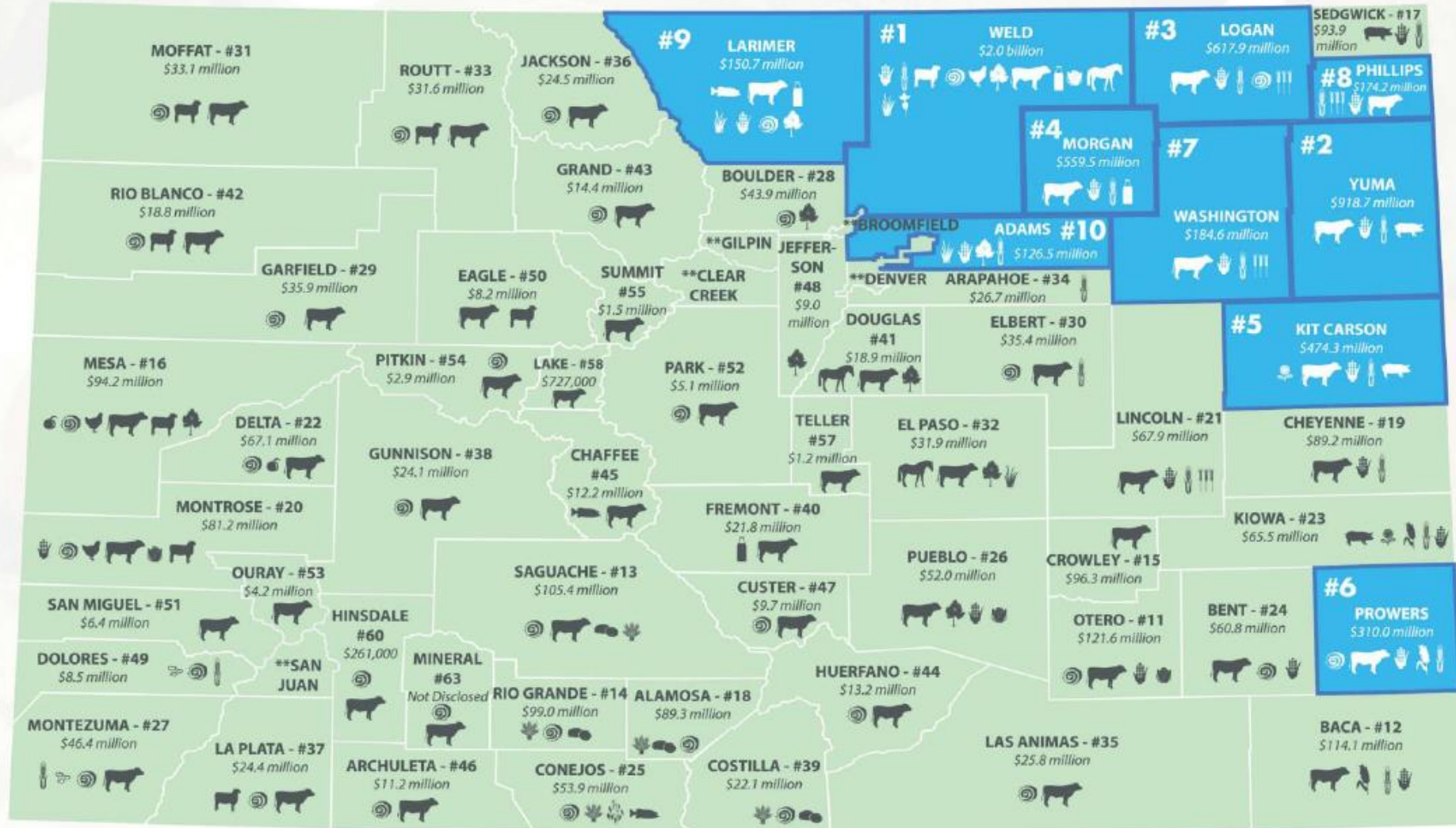
Credit: CWCB  
Colorado Water Plan 2023



# A GLIMPSE OF COLORADO AGRICULTURE\*



**COLORADO**  
Department of Agriculture



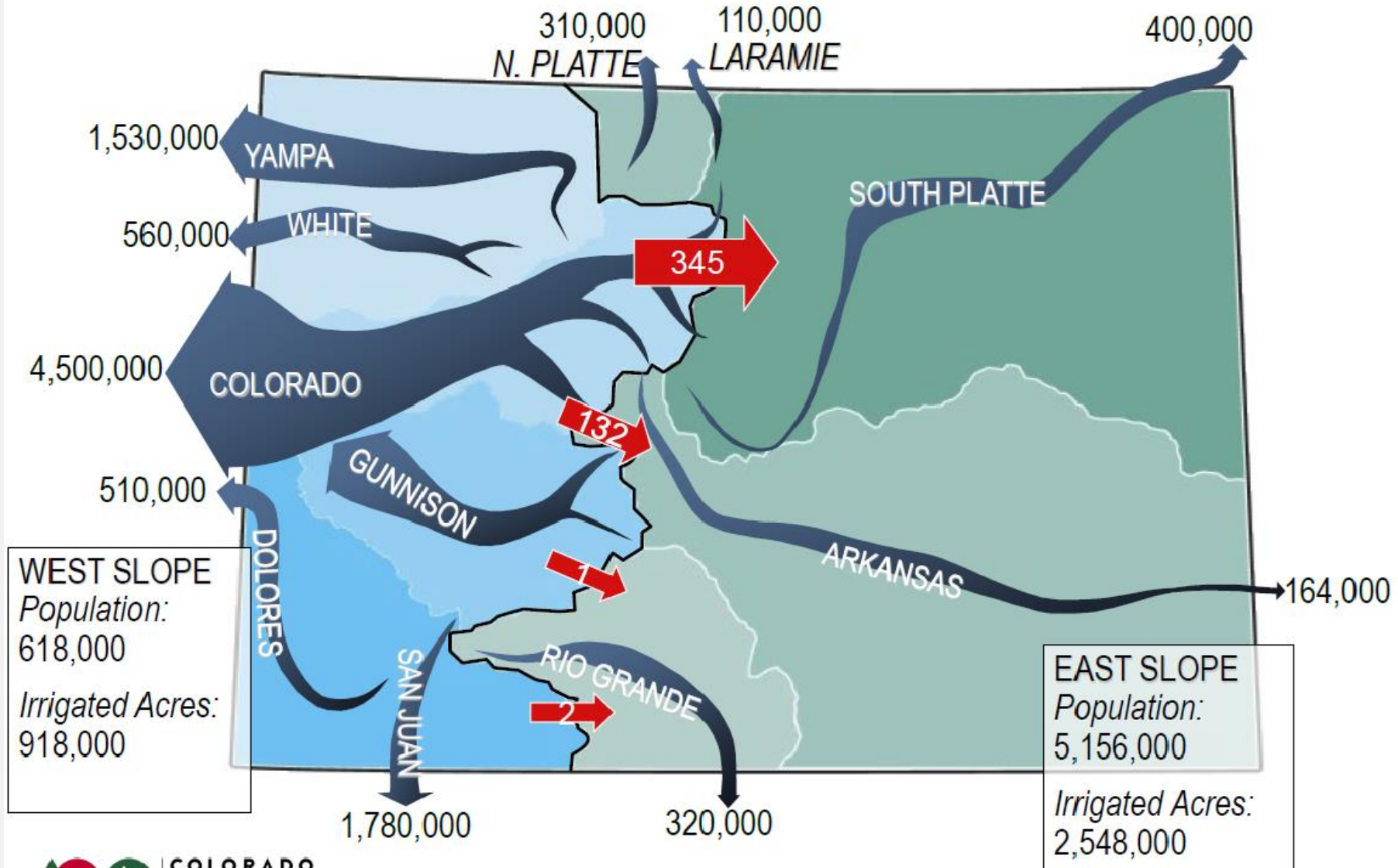
- KEY**
- 🐟 Aquaculture
  - 🌾 Barley
  - 🐄 Cattle
  - 🌽 Corn
  - 🥛 Dairy
  - 🌱 Dry Beans
  - 🍎 Fruits
  - 🐷 Hogs
  - 🐎 Horses
  - 🌾 Millet
  - 🌳 Nursery
  - 🌾 Oats
  - 🐔 Poultry & Eggs
  - 🥔 Potatoes
  - 🐑 Sheep
  - 🌾 Sod
  - 🌾 Sorghum
  - 🍷 Sugarbeets
  - 🌻 Sunflowers
  - 🌱 Vegetables
  - 🌾 Wheat

\*\* #56 DENVER Not Disclosed  
 #59 BROOMFIELD \$613,000  
 #61 GILPIN \$216,000  
 #62 CLEAR CREEK \$174,000  
 SAN JUAN Not Available

**BLUE AREAS**  
 are top ten agricultural  
 counties in Colorado.

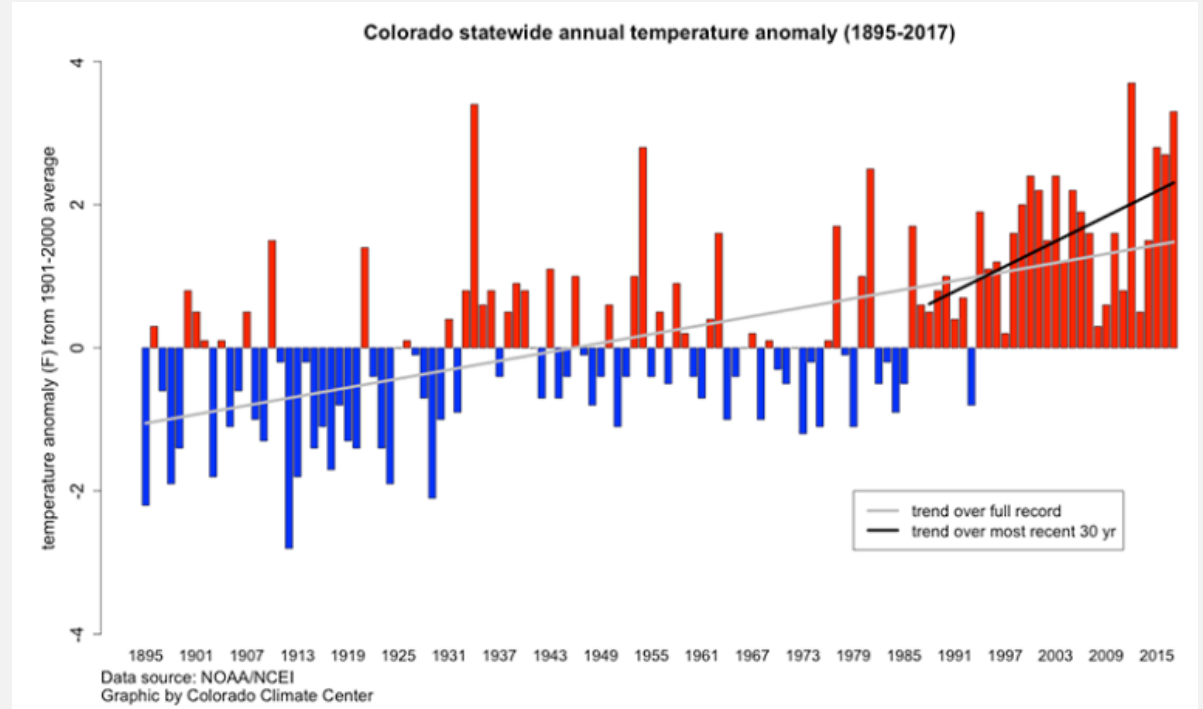
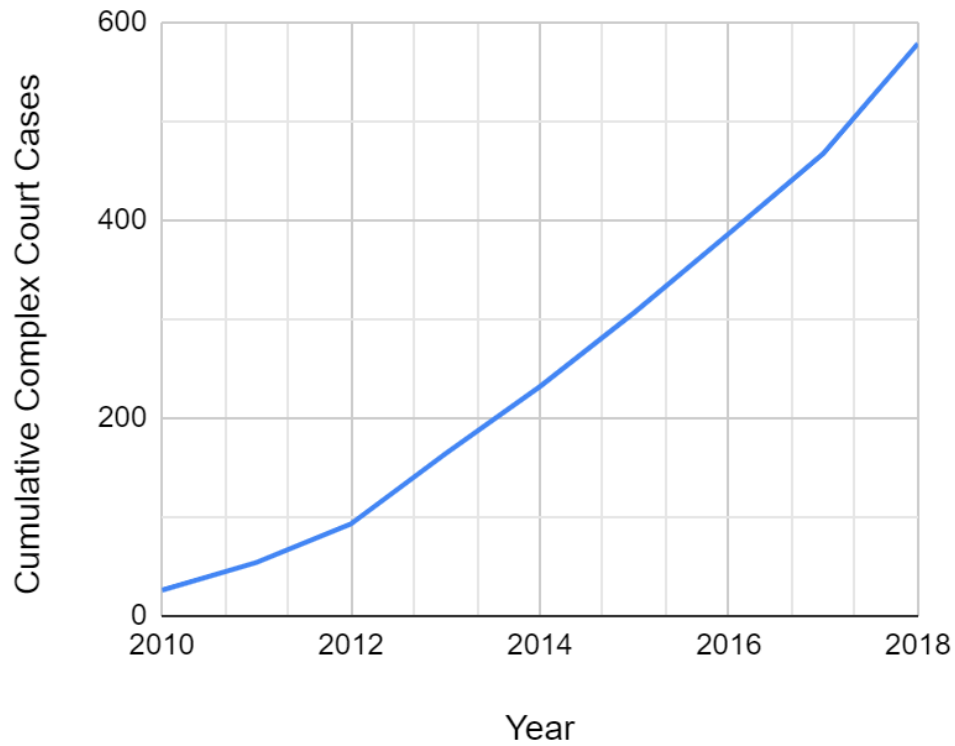


## 2020 Population, Irrigated Acres, Average Annual Flows Leaving Colorado and West Slope to East Slope Diversions



Credit: CWCB  
Colorado Water Plan 2023

# CHANGE AND COMPLEXITY IN OUR WATER SYSTEM



## Colorado Water Consumption:

- Agricultural – 4,844,000 acre-feet (~90%)
- Municipal – 380,000 acre-feet (~7%)
- Industrial – 116,000 acre-feet (~3%)
- Streamflows support environmental and recreational uses

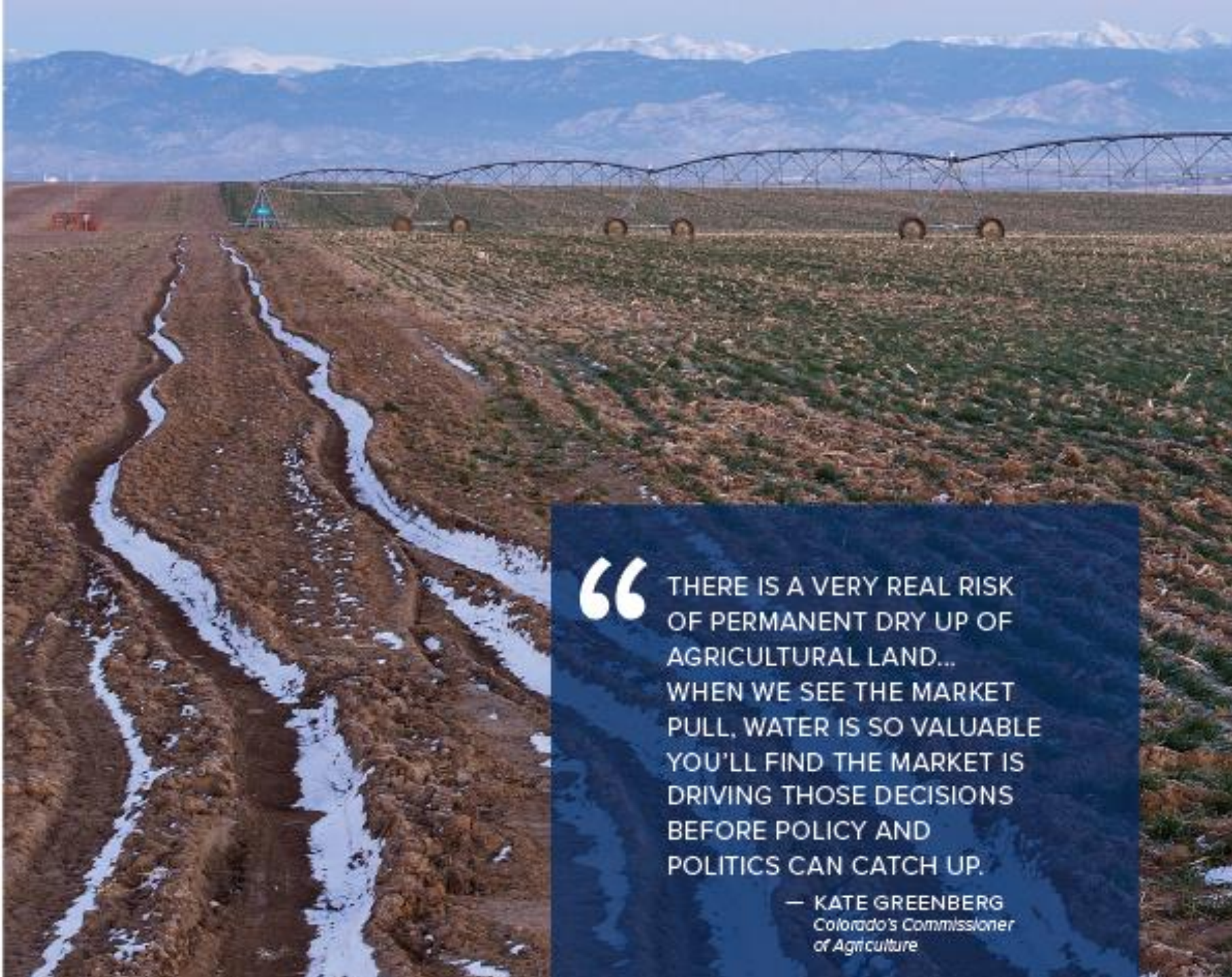


irrigation ditch. Photo credit: Rio de la Vista

Credit: CWCB  
Colorado Water Plan 2023







“ THERE IS A VERY REAL RISK OF PERMANENT DRY UP OF AGRICULTURAL LAND... WHEN WE SEE THE MARKET PULL, WATER IS SO VALUABLE YOU’LL FIND THE MARKET IS DRIVING THOSE DECISIONS BEFORE POLICY AND POLITICS CAN CATCH UP.

— KATE GREENBERG  
Colorado’s Commissioner  
of Agriculture

Credit: CWCB  
Colorado Water Plan 2023





“

THE 21<sup>ST</sup> CENTURY IS THE ERA OF LIMITS MADE APPLICABLE TO WATER DECISION MAKING. DUE TO NATURAL WESTERN WATER SCARCITY, WE ARE NO LONGER DEVELOPING A RESOURCE. INSTEAD, WE ARE LEARNING HOW TO SHARE A DEVELOPED RESOURCE.

— GREGORY J. HOBBS  
*Former Colorado Supreme  
Court Justice*

Credit: CWCB  
Colorado Water Plan 2023



SHARE

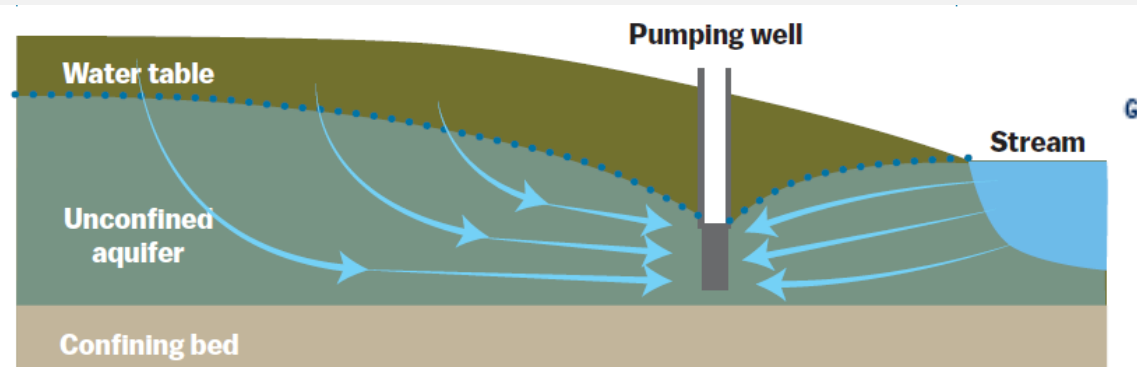
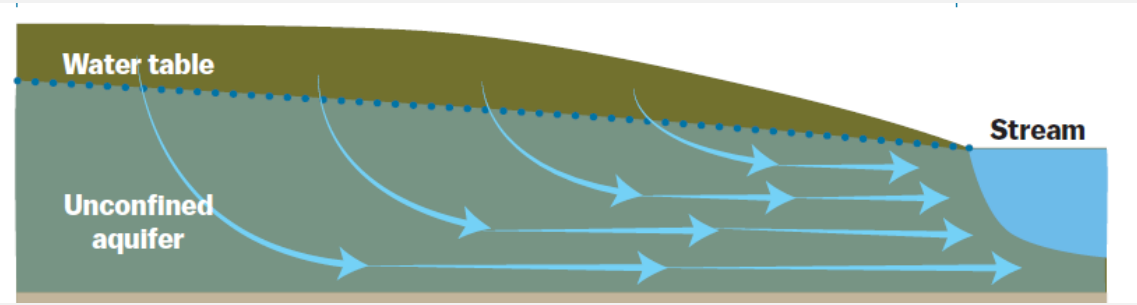


# GROUNDWATER ADAMS & ARAPAHOE COUNTIES



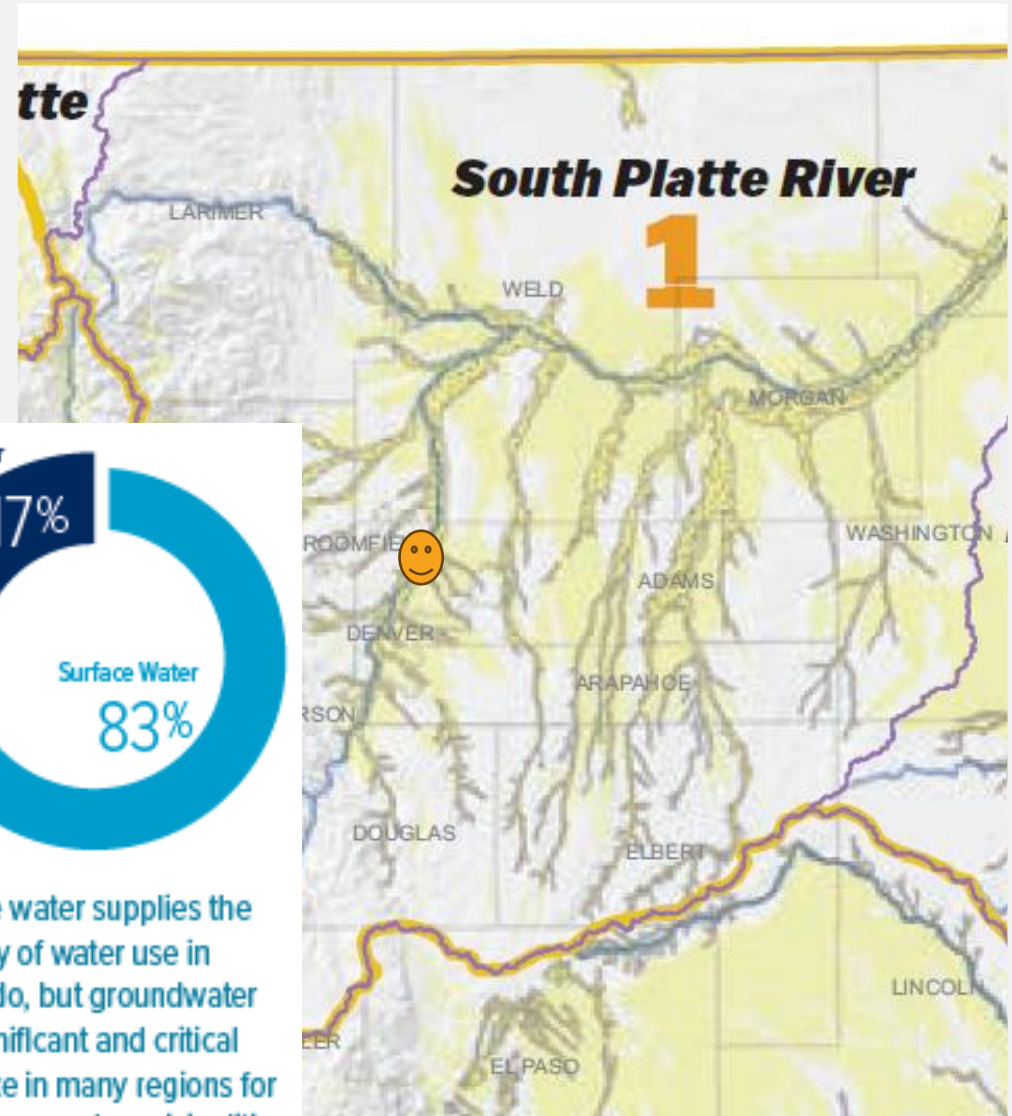
# Tributary Groundwater

Source: Water Education Colorado – Citizens Guide to Colorado Groundwater



Pumping well intercepting discharge to a stream

Source: Winter and others, 1999



Surface water supplies the majority of water use in Colorado, but groundwater is a significant and critical resource in many regions for agriculture and municipalities



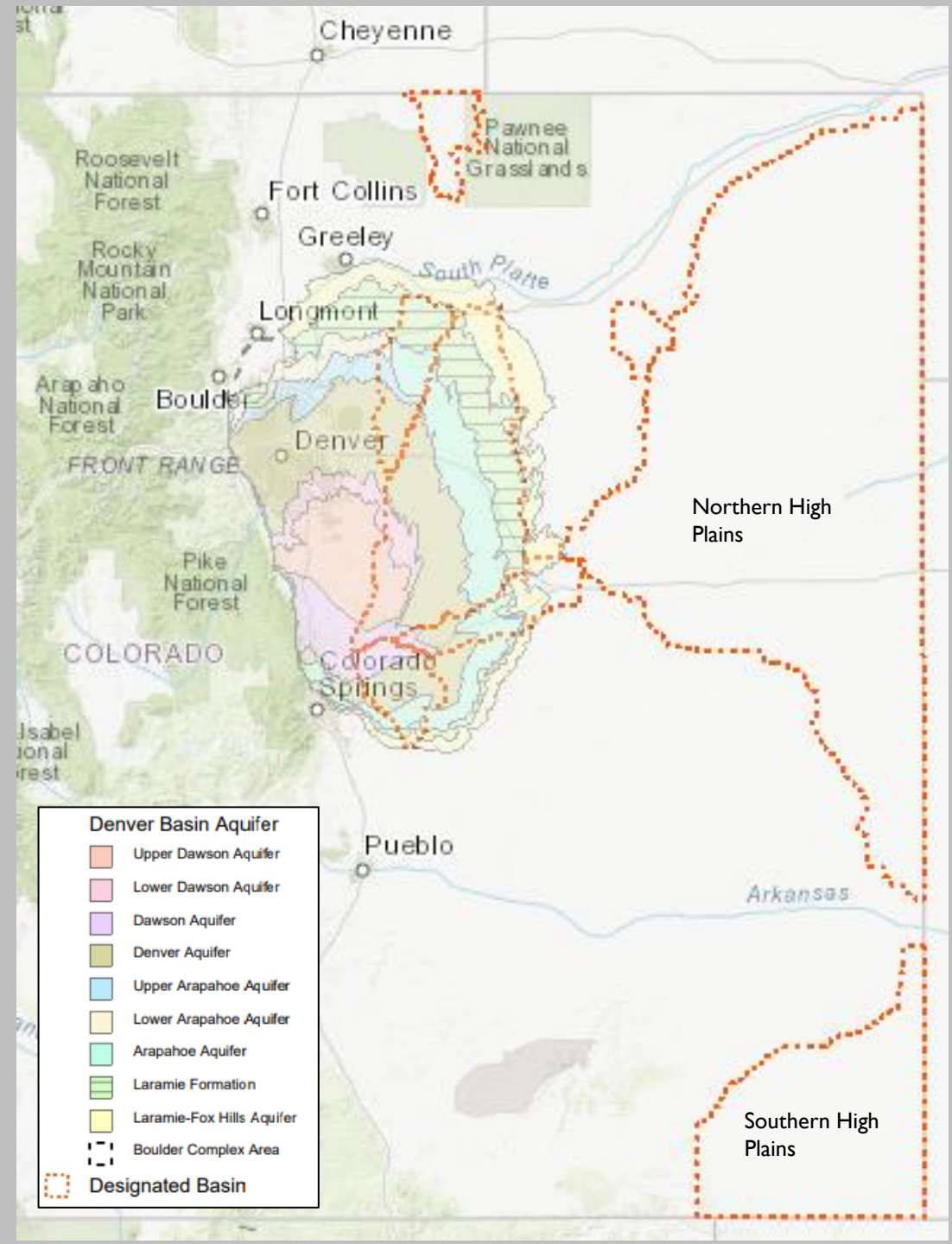
# UNIQUE AREAS WITH LITTLE SURFACE WATER CONNECTION

Designated Basins

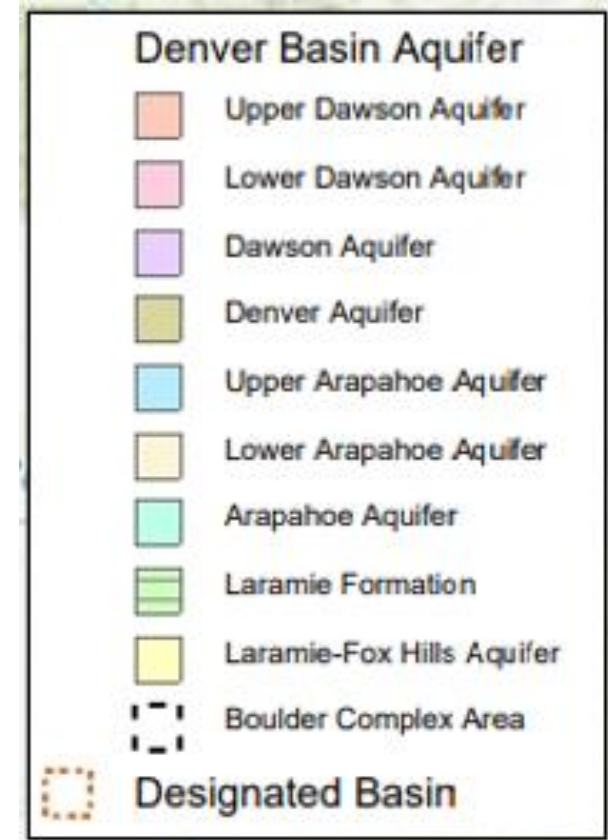
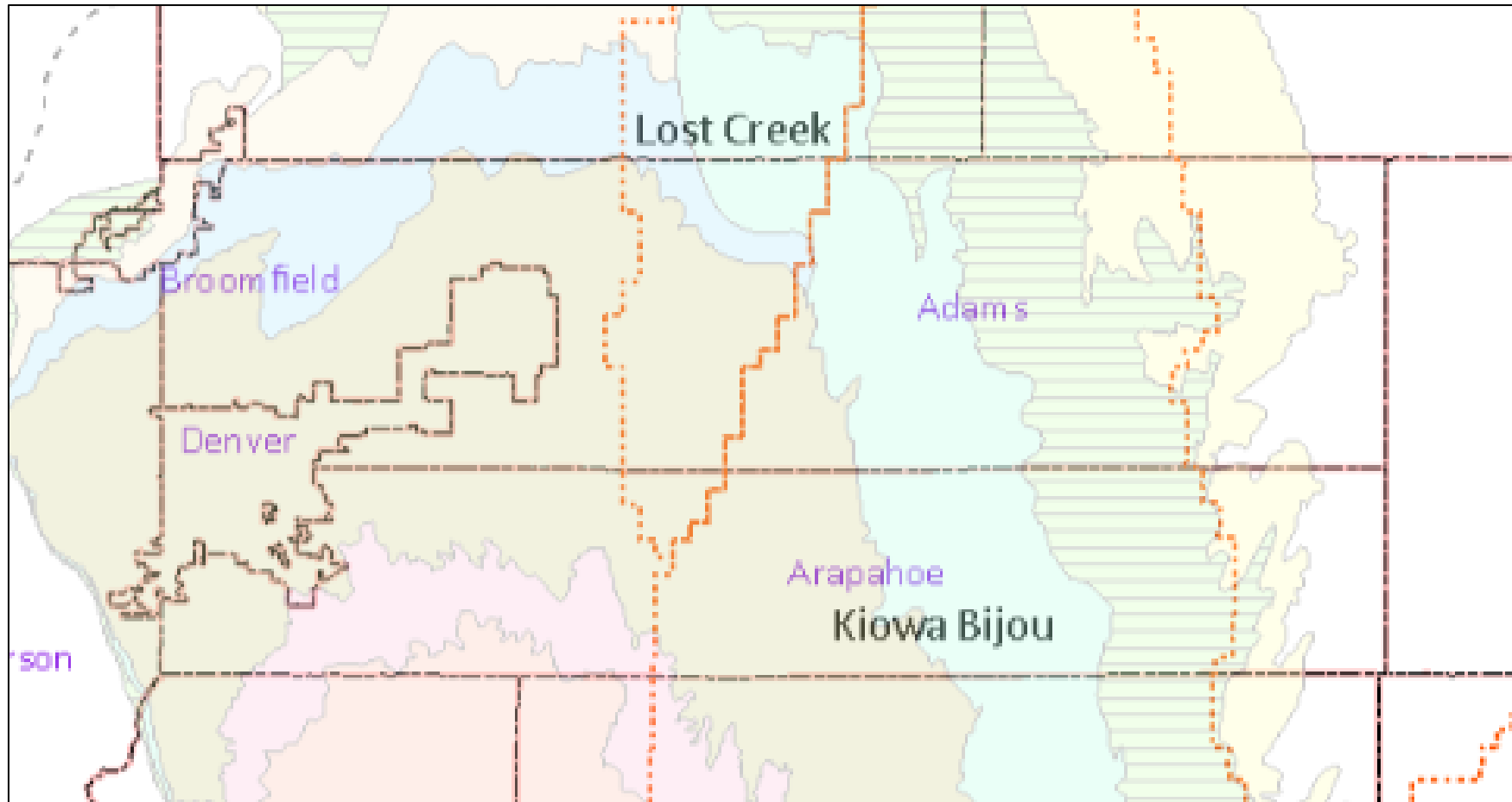
> areas with little surface water

Denver Basin

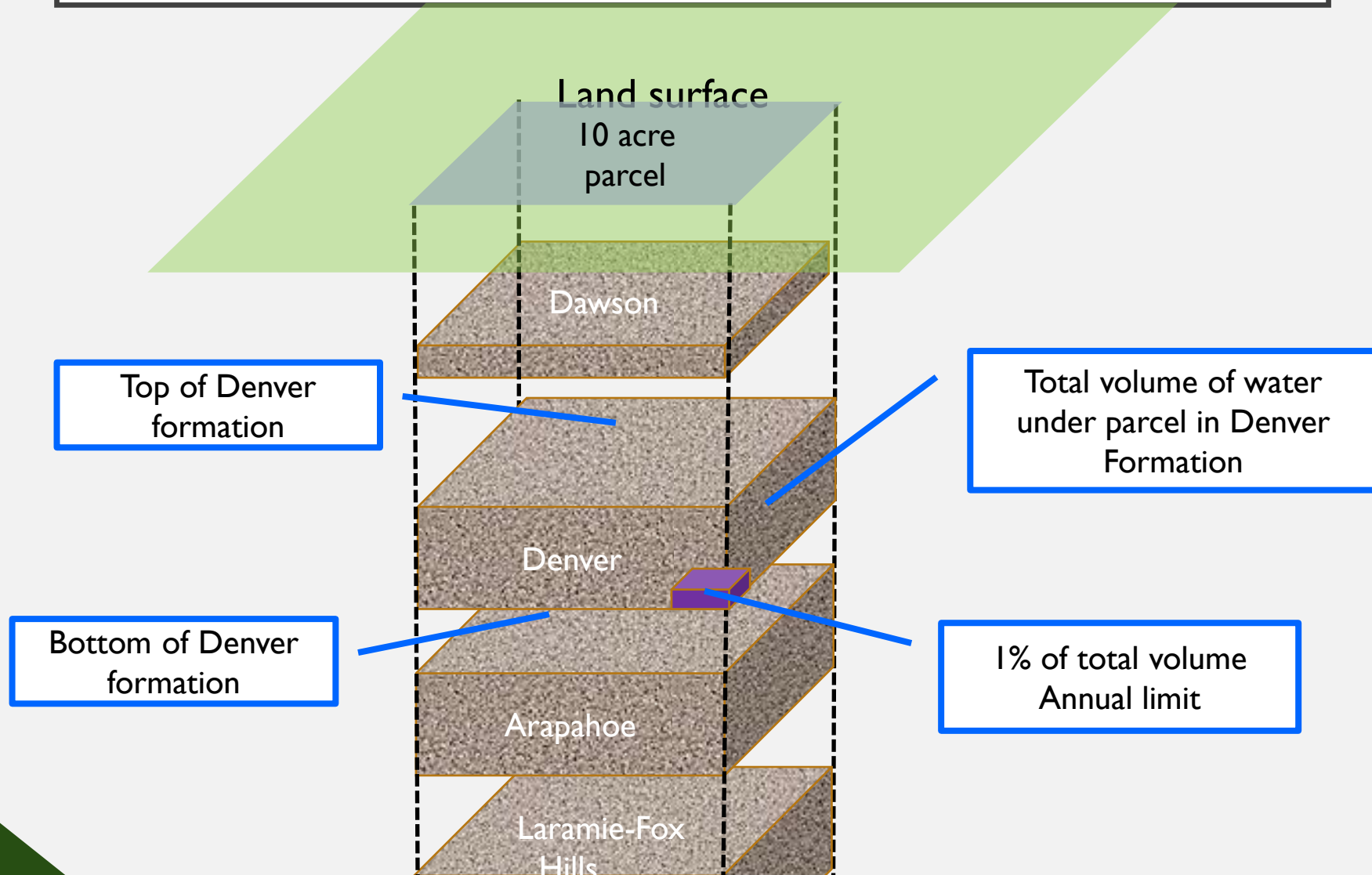
> Nontributary or Not Nontributary



# DESIGNATED BASINS AND DENVER BASIN



# EXAMPLE QUANTIFICATION OF UNDERLYING WATER DENVER BASIN & NONTRIBUTARY



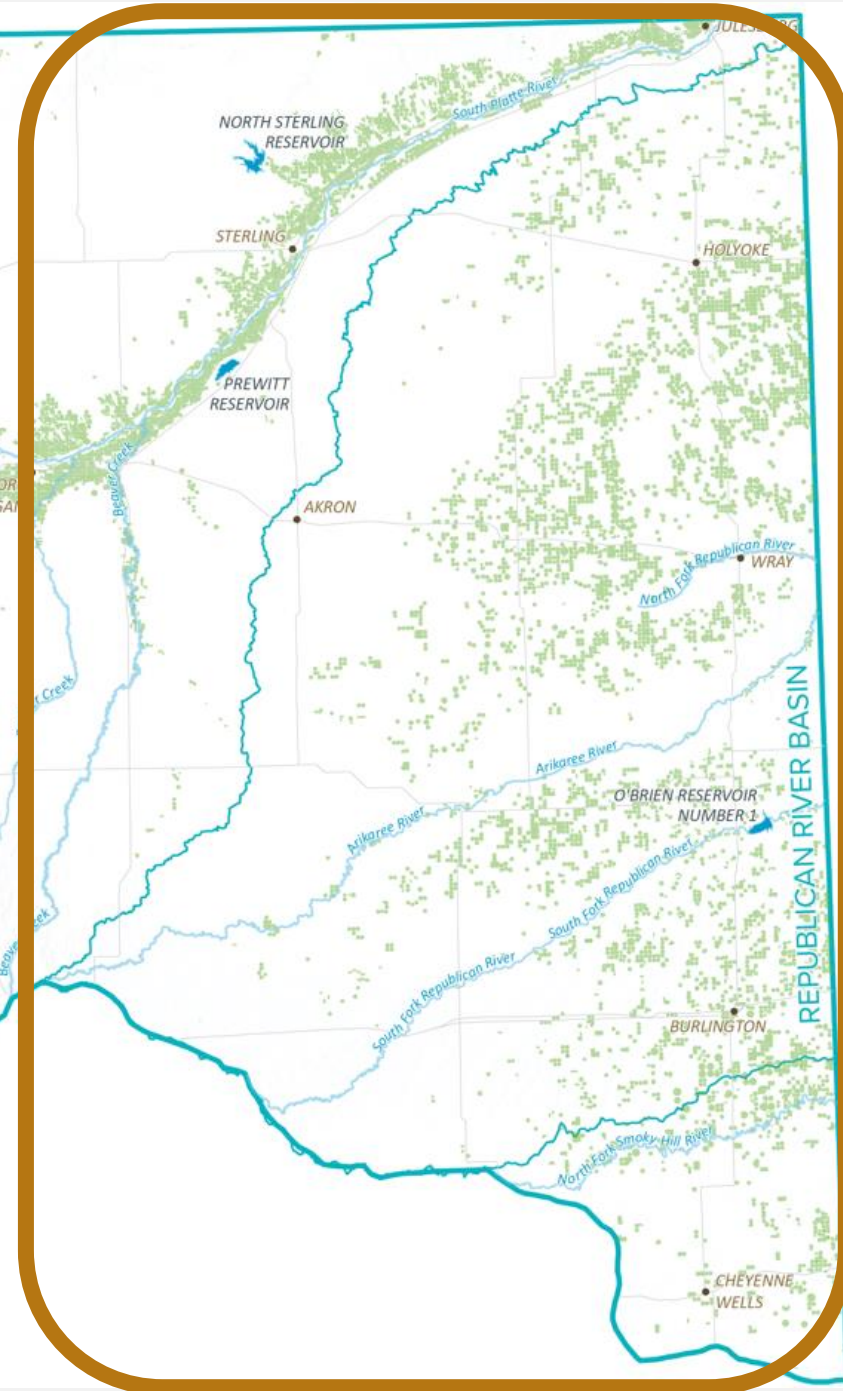


DENVER  
BASIN  
WATER  
LEVELS

AQUIFER	# of Wells in Statistics	2021 Range of Water Levels (ft)	Δ 1 year 2020-2021	Δ 5 year 2016-2021	Δ 10 year 2011-2021
UPPER DAWSON	8	25 - 214	-0.11	-3.31	-6.12
LOWER DAWSON	4	295 - 568	-5.18	1.40	-15.75
DAWSON	11	23 - 454	2.03	-8.46	-3.53
DENVER	23	12 - 1167	-13.50	-28.20	-46.96
UPPER ARAPAHOE	2	111 - 165	-4.88	-12.38	--
LOWER ARAPAHOE	2	170 - 189	10.83	-16.27	6.29
ARAPAHOE	54	40 - 1770	4.14	-15.59	-13.24
LARAMIE-FOX HILLS	16	34 - 1185	13.65	54.97	-10.74

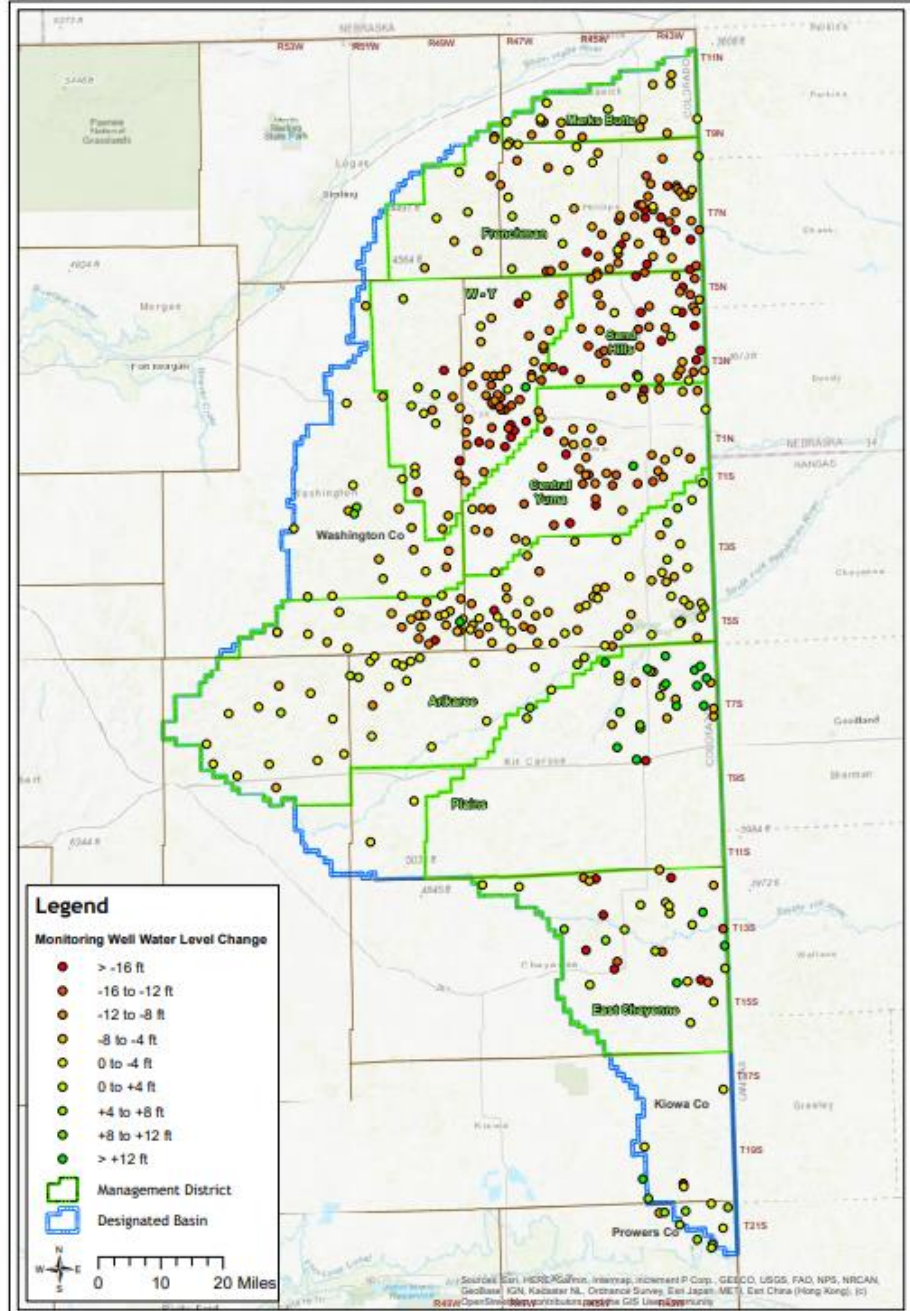


# REPUBLICAN RIVER / NORTHERN HIGH PLAINS



Credit: CWCB  
Colorado Water Plan 2023





**Legend**

**Monitoring Well Water Level Change**

- > -16 ft
- -16 to -12 ft
- -12 to -8 ft
- -8 to -4 ft
- 0 to -4 ft
- 0 to +4 ft
- +4 to +8 ft
- +8 to +12 ft
- > +12 ft

▭ Management District

▭ Designated Basin

N  
S  
E  
W

0 10 20 Miles



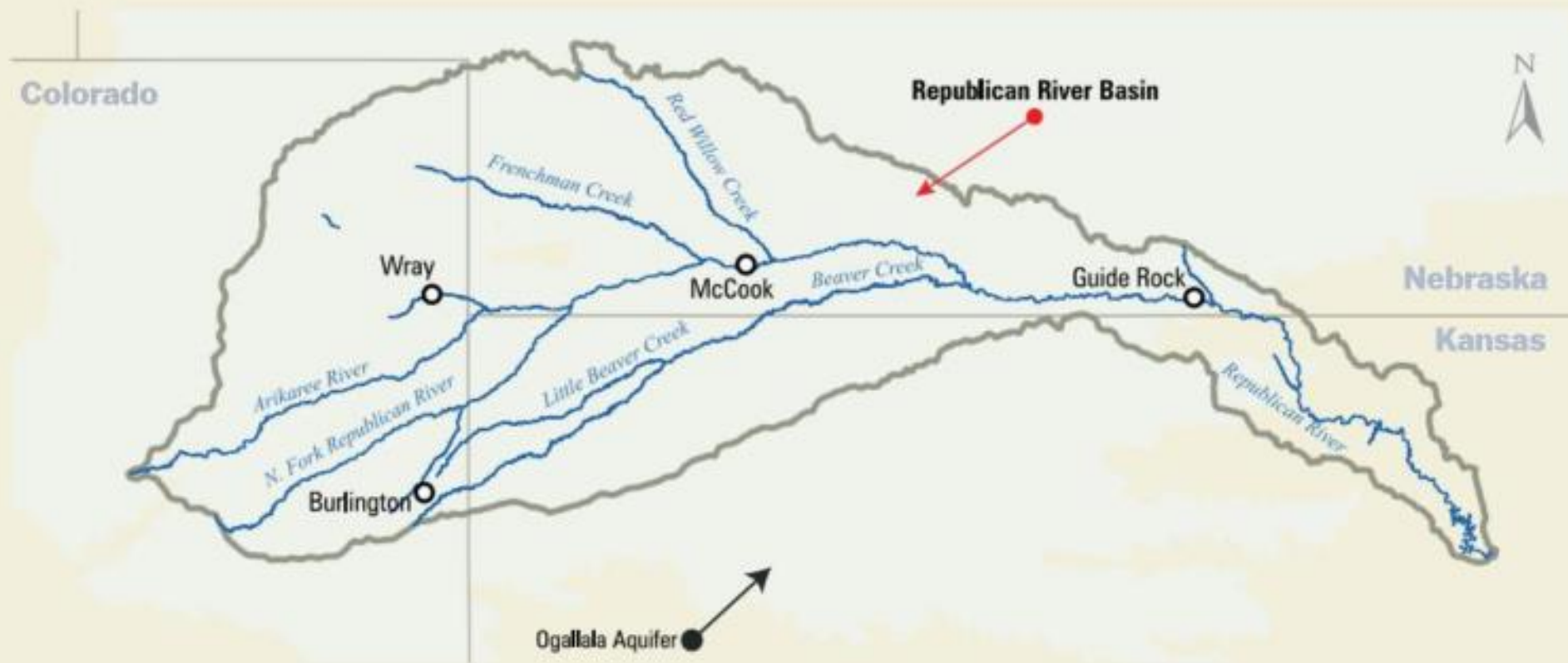


Credit: Water Education Colorado  
Citizen's Guide to Colorado Interstate  
Water Compacts,  
Third Edition, 2021



# REPUBLICAN RIVER COMPACT

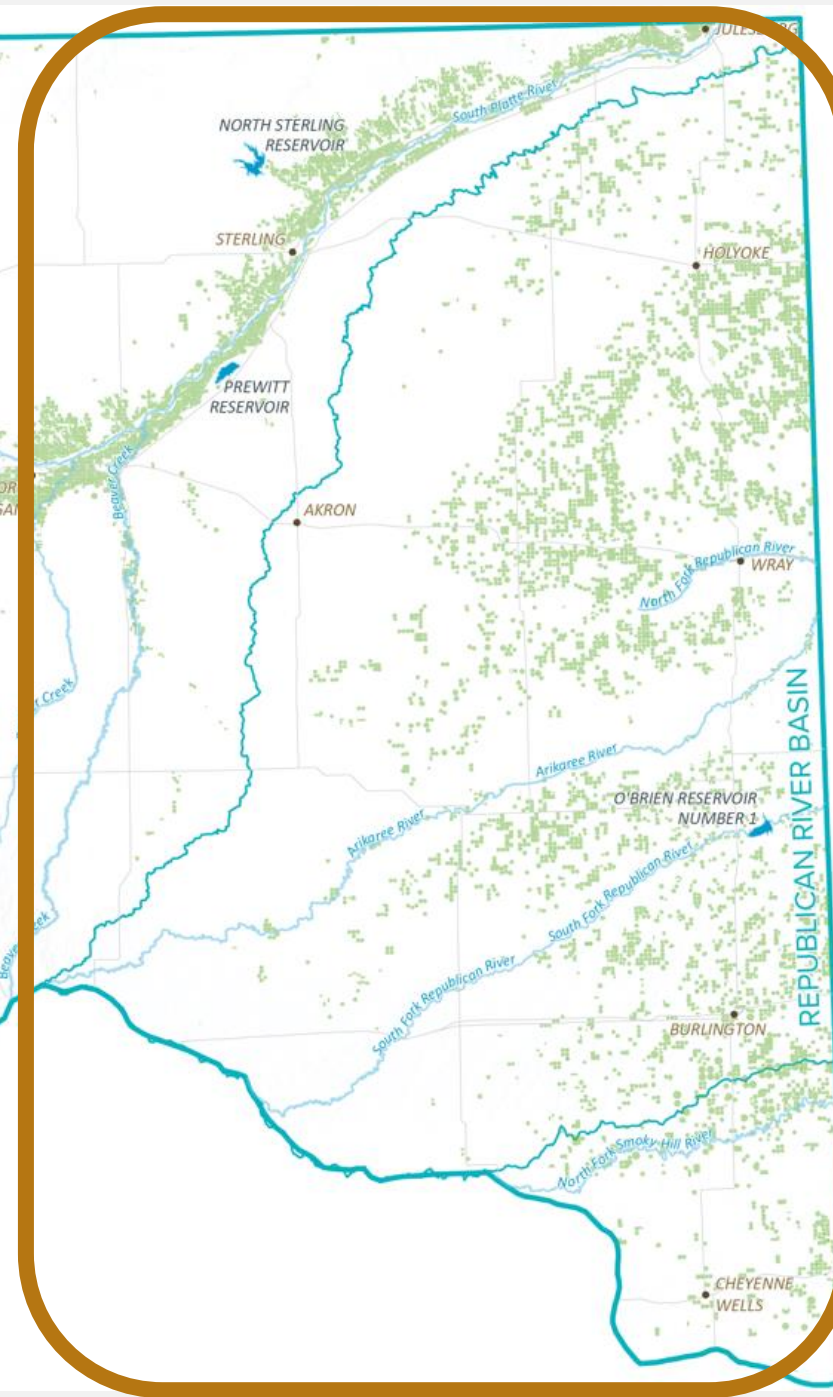
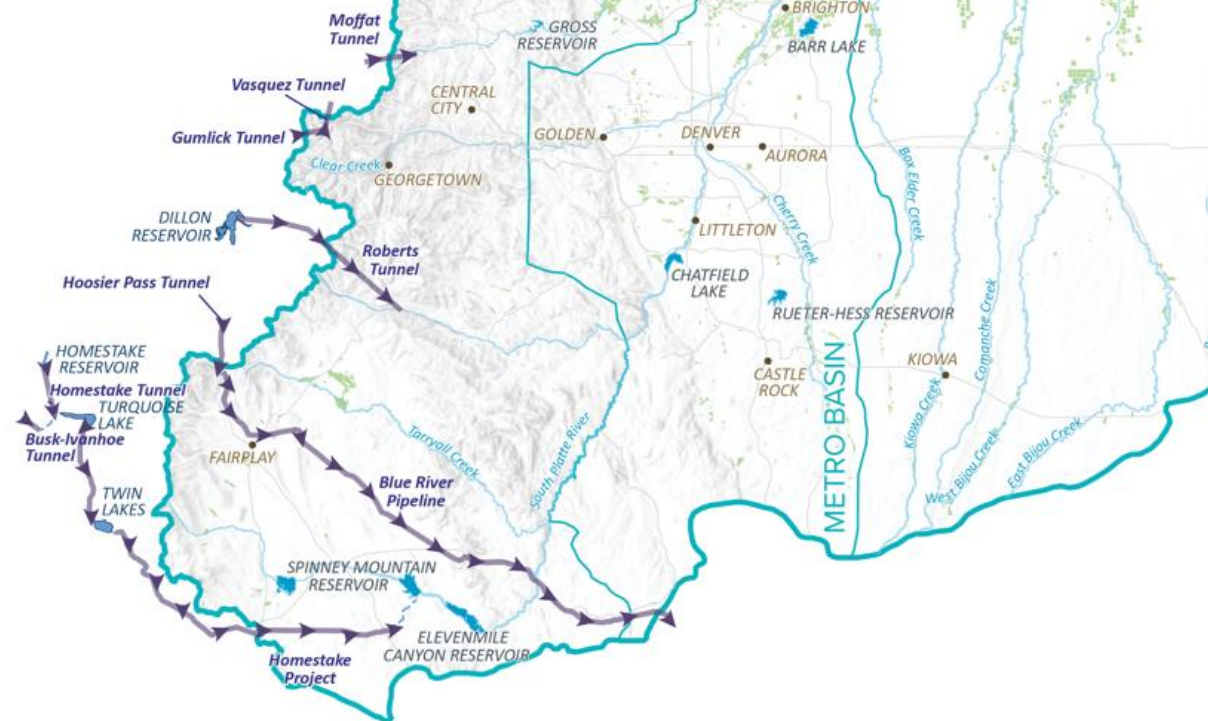
## The Republican River Basin



# REPUBLICAN RIVER COMPACT

## RETIRE 25,000 ACRES OF IRRIGATED LAND BY 2029

### SO FAR, 11,000+ ACRES RETIRED



Credit: CWCB  
Colorado Water Plan 2023



# DELIVERIES FOR COMPACT COMPLIANCE



The Republican River Water Conservation District started delivering water for compact compliance in January 2014.

The State of Colorado and the RRWCD wanted 100% credit for the water augmented to the stream.

Colorado negotiated with Kansas and Nebraska through the Republican River Compact Administration.

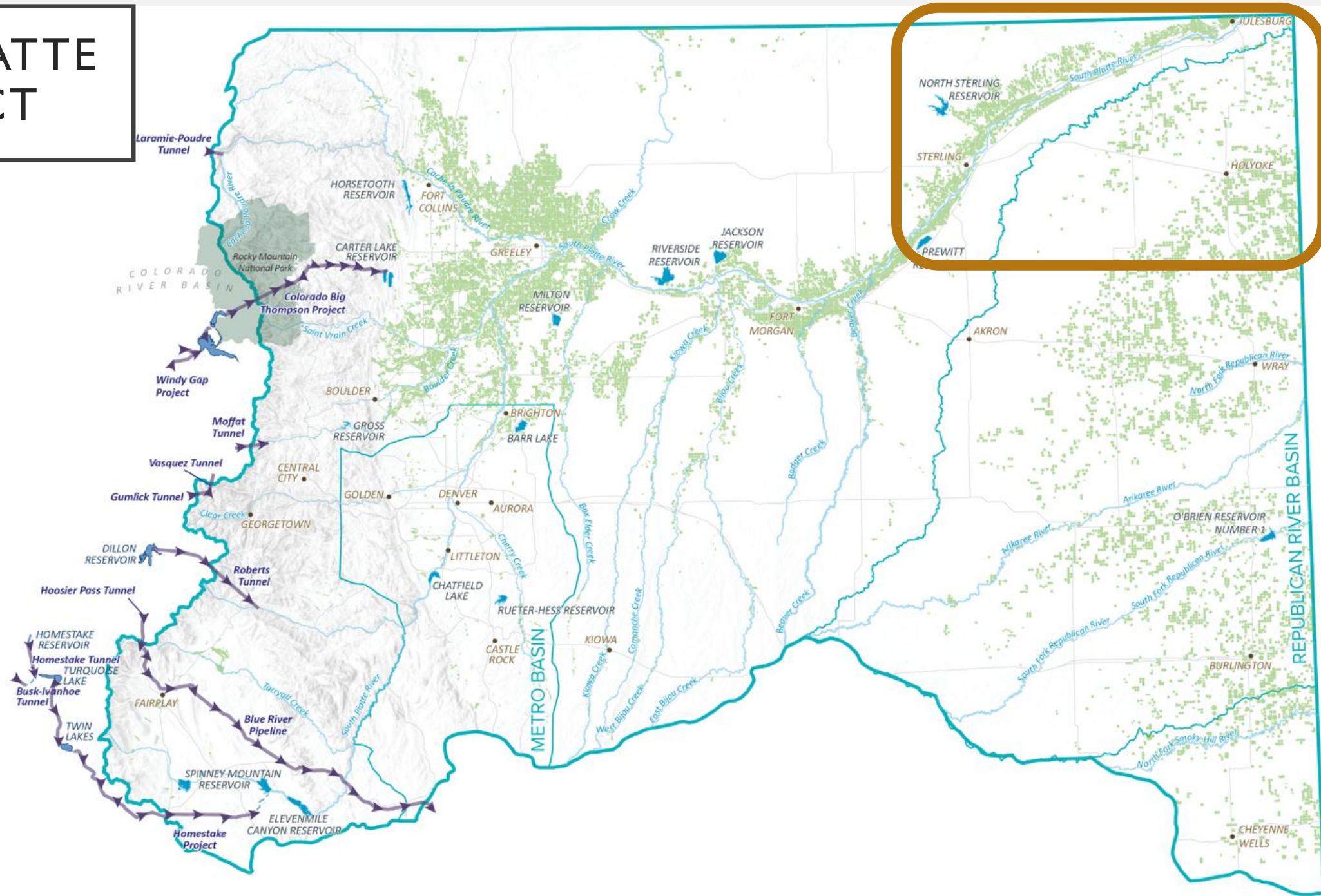
On August 24, 2016, they approved a Resolution giving Colorado 100% credit for deliveries from the Compact Compliance Pipeline... and



Source Credit: RRWCD 2023



# SOUTH PLATTE COMPACT

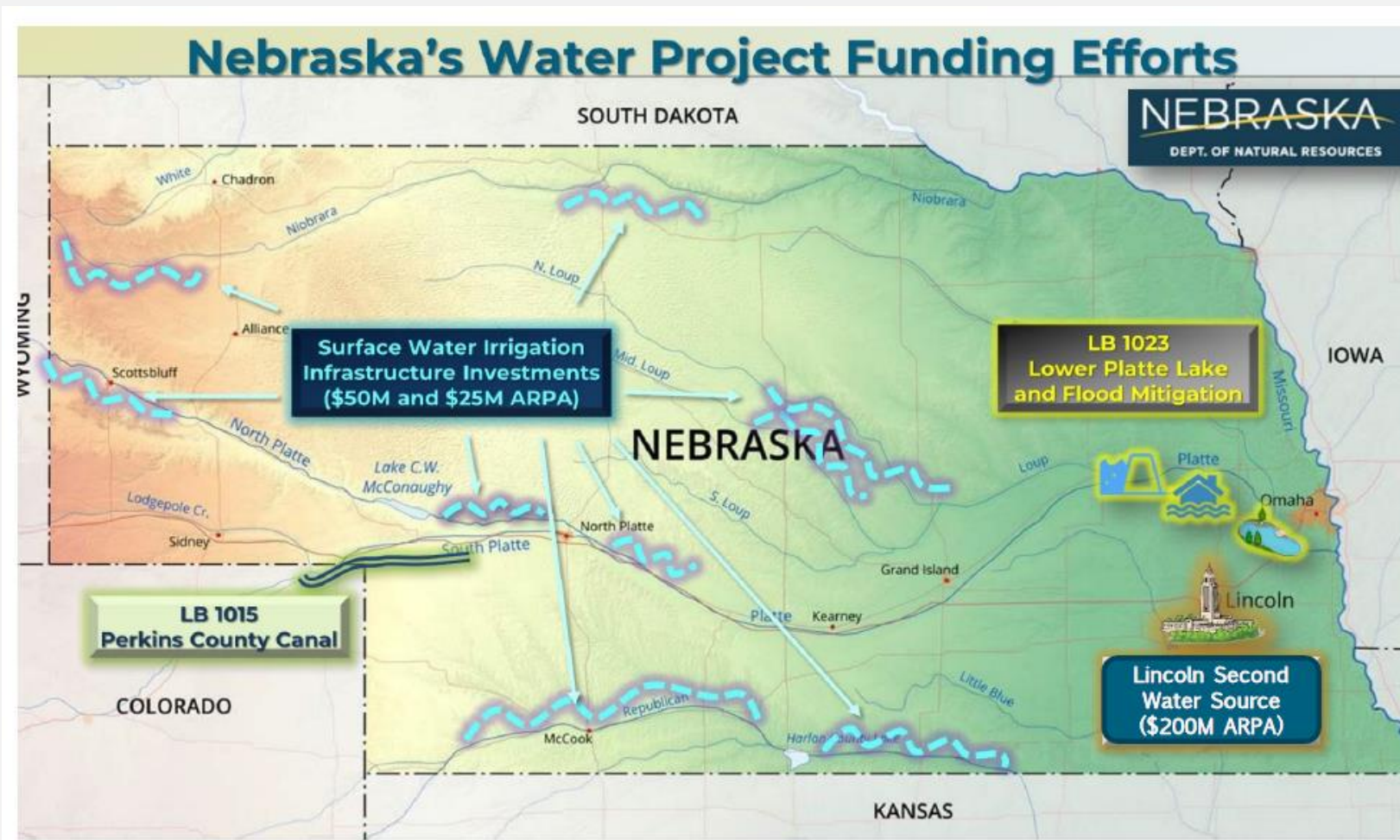


Credit: CWCB  
Colorado Water Plan 2023



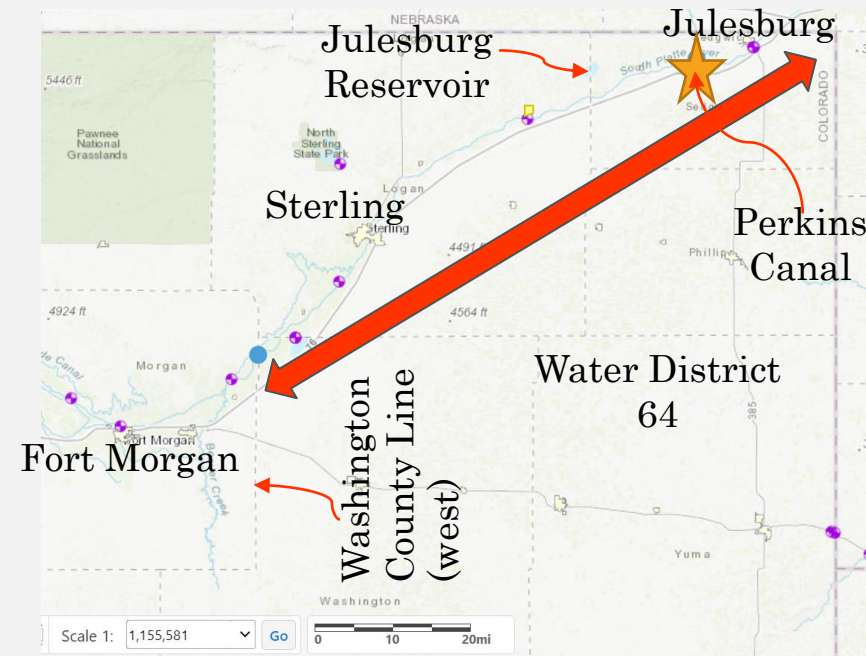


# SOUTH PLATTE COMPACT PERKINS COUNTY CANAL

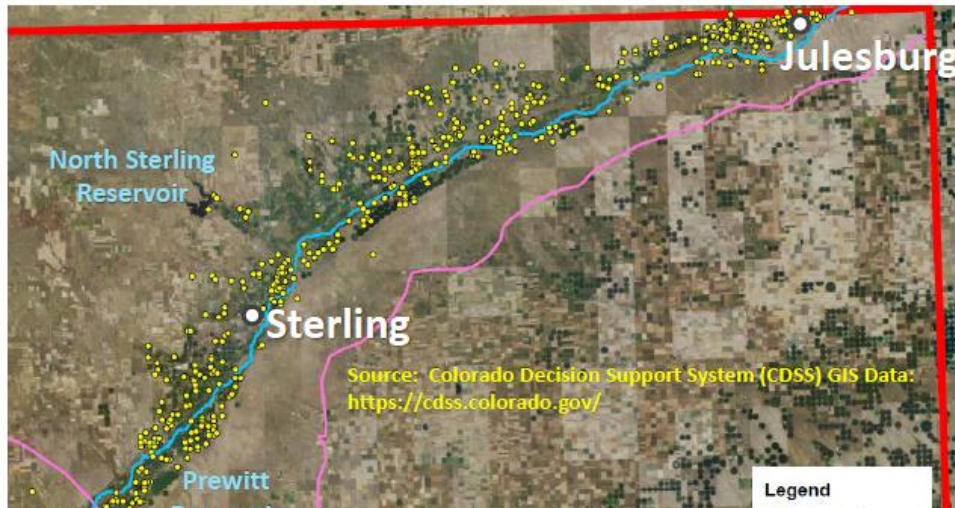


# SOUTH PLATTE COMPACT PERKINS COUNTY CANAL

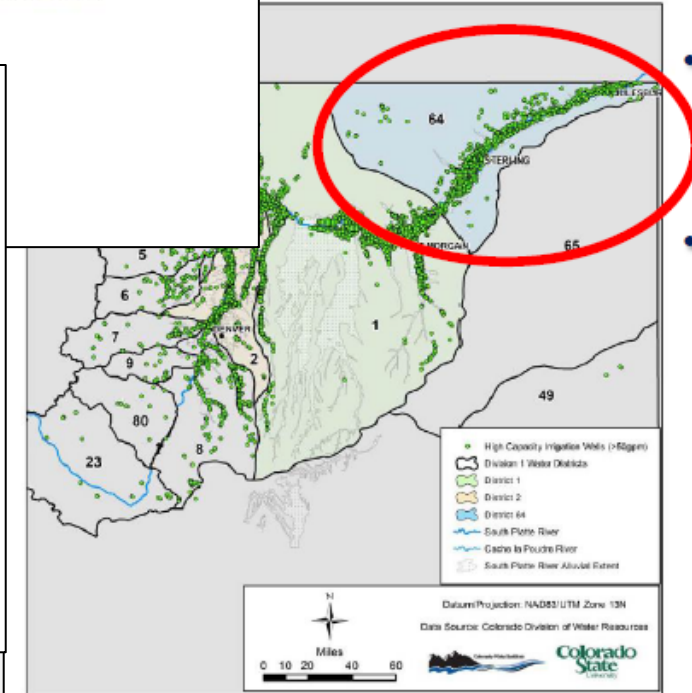
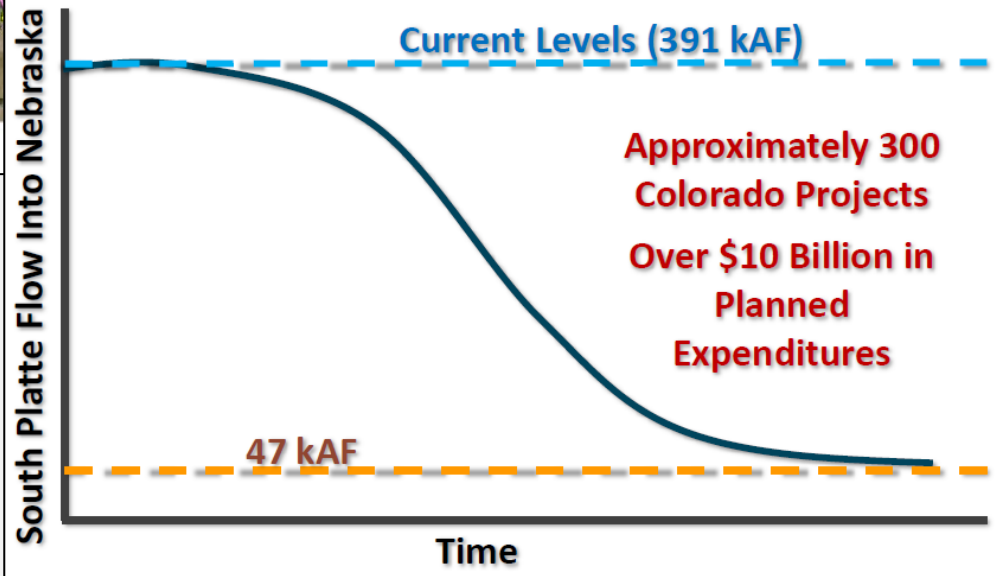
- Planned construction
- Winter diversions of 500 cfs
- Irrigation use in Nebraska
- Senior to water uses **ONLY** in Water District 64 (western boundary of Washington County to state line)



# Recharge Areas in Lower Section (Water District 64)



- Around 500 recharge projects currently (Source Colorado CDSS, 2022)
- Recharge augmentation about 92,000 acre-feet/year 2008-2012 (HB12-1278 Report to Colorado Legislature 2013)



Map 3. High Capacity Wells in the S. Platte Alluvial Aquifer. Data Source: CO DWR HydroBase Version 20130710

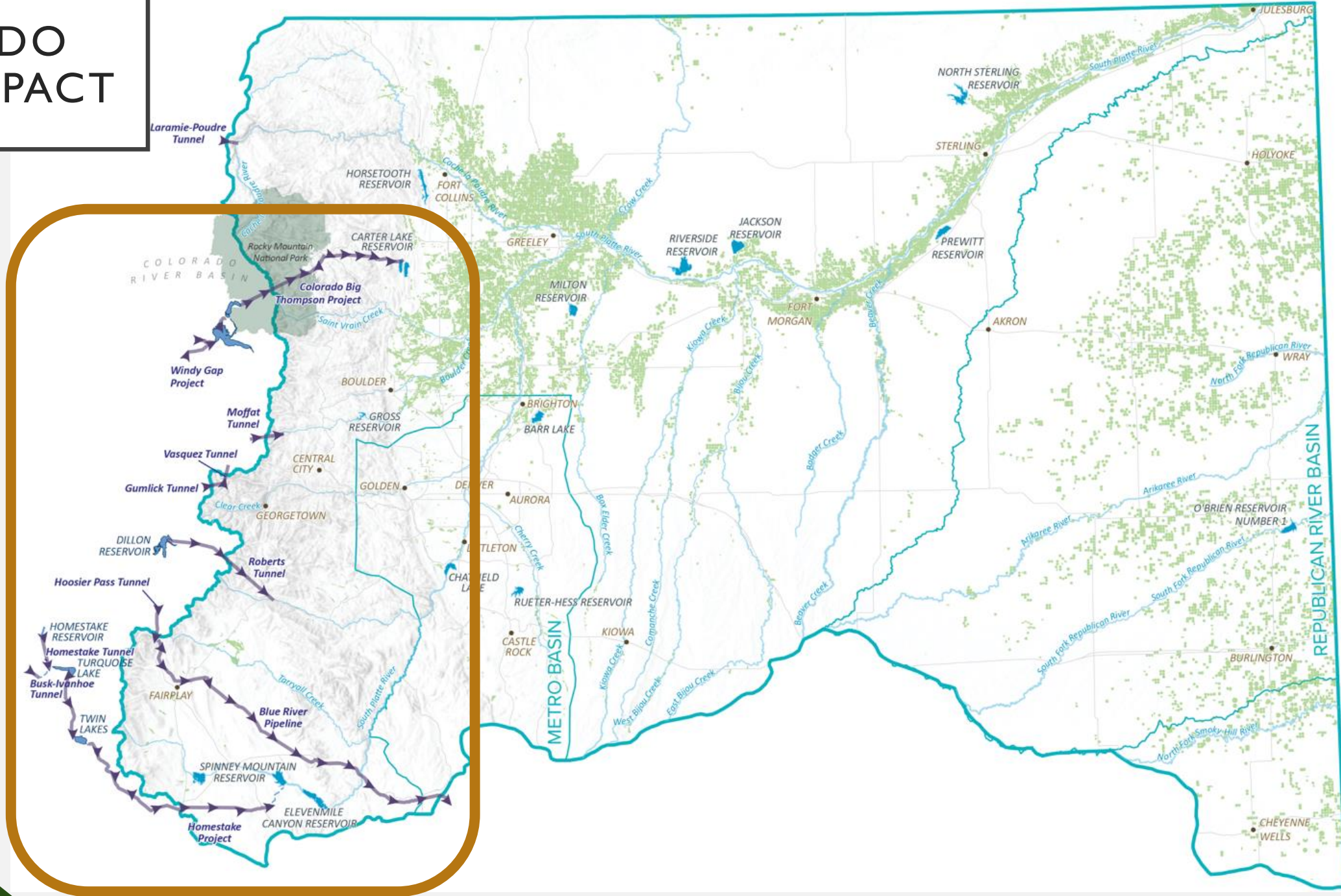
# NEBRASKA'S WHY?

- Around 944 High Capacity Irrigation Wells in Lower Section (Water District 64) as of 2010
- Over 110,000 acre-feet/year of Groundwater Pumping in Lower section

Source of Map and Data: Report to the Colorado Legislature, HB12-1278 Study of the South Platte River Alluvial Aquifer, December 31, 2013



# COLORADO RIVER COMPACT



Credit: CWCB  
Colorado Water Plan 2023



# COLORADO RIVER COMPACT



- |                   |                            |                               |
|-------------------|----------------------------|-------------------------------|
| 1 Denver          | 11 White River             | 21 Lake Powell                |
| 2 Moab            | 12 Colorado River          | 22 Navajo Reservoir           |
| 3 Las Vegas, Nev. | 13 Gunnison River          | 23 Lake Mead                  |
| 4 Las Vegas, N.M. | 14 Dolores River           | 24 Imperial Dam               |
| 5 Phoenix         | 15 San Juan River          | 25 All American Canal         |
| 6 San Diego       | 16 Little Colorado River   | 26 Navajo Reservation         |
| 7 Tucson          | 17 Gila River              | 27 Hopi Reservation           |
| 8 Green River     | 18 Flaming Gorge Reservoir | 28 Ute Mountain Reservation   |
| 9 Pot Creek       | 19 Aspinall Unit           | 29 Southern Ute Reservation   |
| 10 Yampa River    | 20 Lee Ferry               | 30 Uintah & Ouray Reservation |



# THANK YOU & DISCUSSION

Tracy Kosloff, Deputy State Engineer

