



**COLORADO**  
Division of Water Resources  
Department of Natural Resources

# 2021 Annual Report



Sheriff Reservoir, photo by Brian Romig



# Issues from the year 2021

During 2021, three interwoven state water issues were all elevated to an even higher level than before. Those issues are *persistent climatic drought*, *responding to increasing demand during a time of limited water supply*, and *interstate compact matters*. It is because these issues are interwoven that each has been elevated - each one is related to or affects the other two. This became apparent during our work allocating the waters of the state.

These three issues have demanded our attention and impacted our daily efforts. The limited supply that results from drought dominates our conversations with other states on the Colorado River Compact and affects our administration of water rights on some of our other interstate compacts. In turn, compact demands influence our water administration within the state. Even the release of water from Blue Mesa Reservoir for the benefit of water levels in Lake Powell, which did not impact Colorado water rights, had an impact on the local area and its economy. DWR's ability to respond to increasing demand during this time is limited by the availability of water due to drought. All of these issues affect us in terms of how we allocate water, measure stream flow, ensure safe storage of water, and allow use of water through well permits and through administrative approvals.

Some examples of the demands put on Colorado water users and DWR from 2021 include a heightened attention to the 2020 decennial abandonment from water users and the media, designation of a new stream reach as *over-appropriated*, completed and pending rules, and being involved in efforts like the investigation of investment water speculation. In addition, water users' need to respond to these demands leads to a greater number of complex and innovative strategies to manage their water supplies. That in turn demands the attention of the Division, whether that attention is directed to water court efforts, administrative approvals, or daily administration. In addition, all of our work is data-related. We gather data related to diversions, streamflow, aquifer levels and properties, and water rights-related actions - which may be required by administrative approvals or water court decrees. The amount of data that DWR receives and processes is massive. Maintaining complete and accurate data for the work of DWR and to facilitate the work and planning of Colorado water users has become more critical with each passing year.

DWR has had to respond to all of these conditions by adopting or implementing more rules to assist our work on a daily basis. This has included full implementation of the Groundwater Rules in the Rio Grande Basin, bringing Republican River Compact Rules to completion, and initiating rulemaking for Measurement Rules in Water Division 6. Each of these represents a rulemaking effort that is a first of its kind. The Measurement Rules in Division 6 are the first effort to adopt rules to implement DWR's authority to require the measurement of both groundwater and surface water diversions.

The Colorado legislature continues to focus on water supply and water administration issues with new legislative concepts. This creates an important challenge for DWR as we focus on helping the State address issues in an effective way while protecting the need to properly administer solutions according to new laws as they are passed.

I don't expect the intensity of our work to decrease in the coming years. While we may have some good water years ahead of us, the data shows that our climate continues to trend toward conditions of a more limited water supply. This means that the strategies to address Colorado's water needs will continue to increase in number and complexity and making the Division's work more important than ever for the citizens of Colorado.



Kevin Rein  
State Engineer, Executive Director









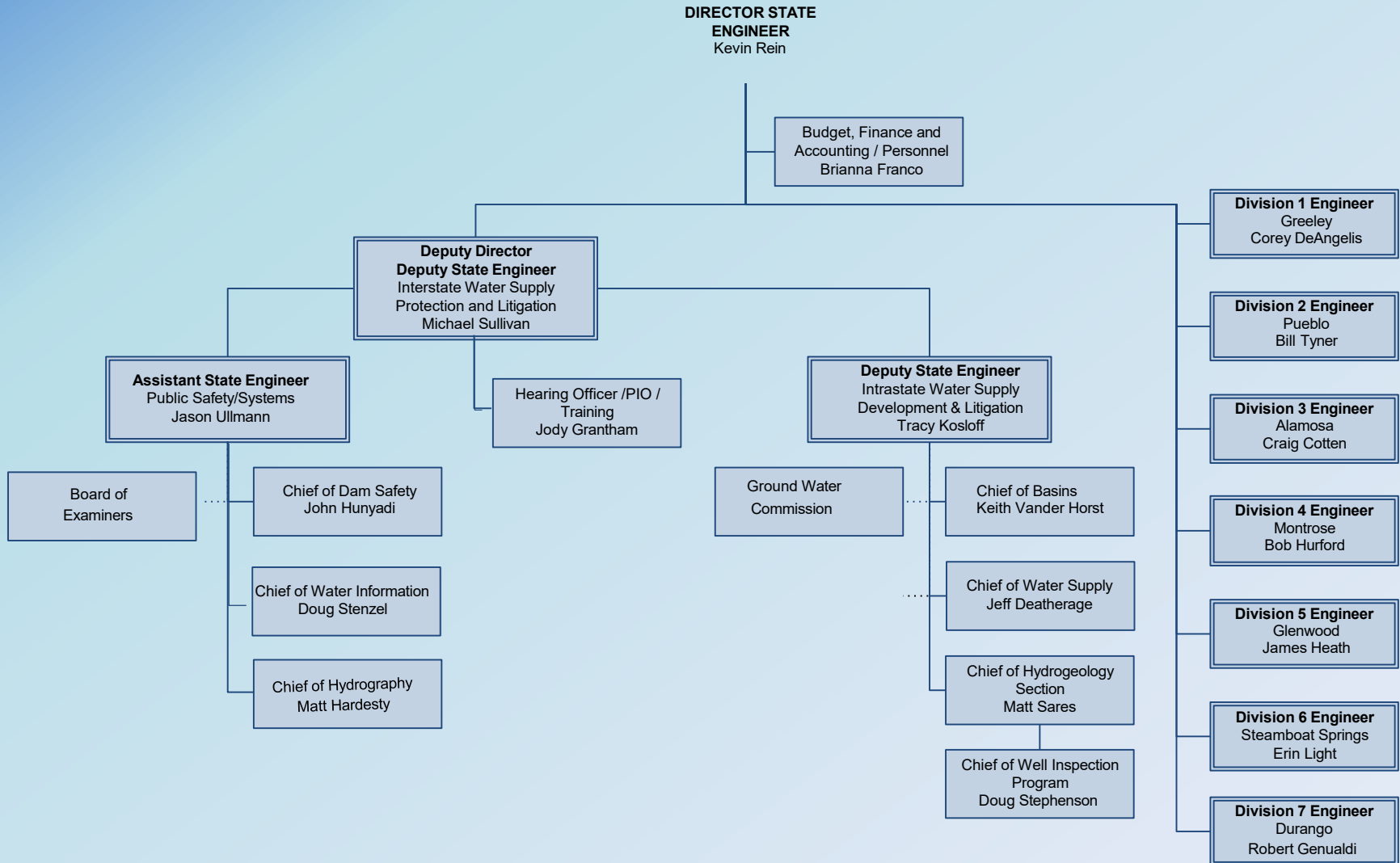
## Our mission is to:

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.

## Our Programs

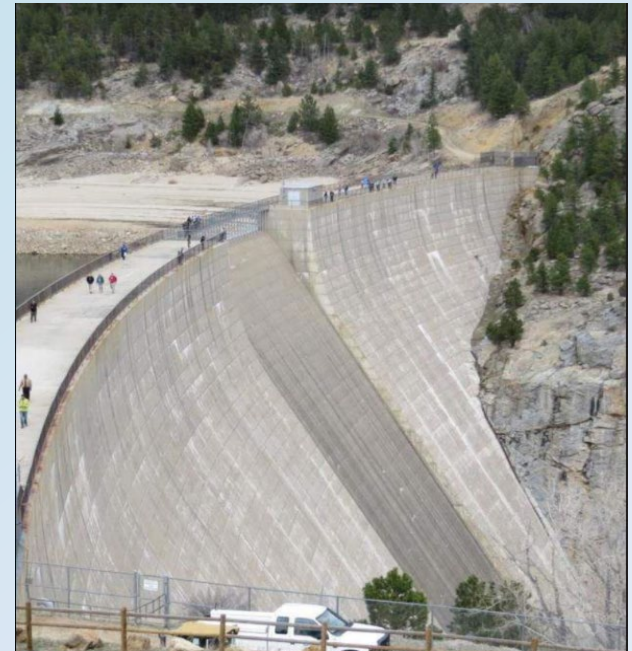
- Water Administration
  - Dam Safety
- Hydrographic & Satellite Monitoring
  - Hydrogeological Services
  - Interstate Compacts
- Modeling & Decision Support Systems
  - Water Supply
- Water Information & Data

# COLORADO DIVISION OF WATER RESOURCES ORGANIZATIONAL CHART



# Dam Safety: Colorado's Inventory of Dams

- High Hazard – 454
- Population at risk = 2.1 million or 36% of Coloradans
- Oldest Dam – 1863. Newest 2020.  
Average age 1945
- 29 are restricted High Hazard Dams
- Significant Hazard Dams – 291
- Low Hazard Dams – 2,266



Gross Reservoir



# Dam Safety: 2021 Review

## as review as reported to National Inventory of Dams

Dam Safety Inspection Completion Percentage for Number Due	Percentage
High Hazard	99%
Significant Hazard	95%
Low Hazard	35%

Dam Safety Percentage of Complete Emergency Action Plans with Inundation Maps	Percentage
High Hazard	96%
Significant Hazard	68%

### Identified Areas of Concern

- Number of dams continues to increase (including very large, complicated structures)
- Population at risk continues to increase below dams
- Risk of hazard creep, Low/Significant becoming High hazard
- Dams & key components continue to age
- Do not have full potential failure modes analysis for majority of high hazard dams
- 12 member team stretched to manage appropriately average of 300 dams per Engineer

# Hydrographic & Satellite Monitoring Program



Jacob Olsen measuring Fountain Creek. Photo by Rachel Zancanella

- Hydrographic staff maintained and operated 700 sites including streamgages, gage infrastructure, and satellite monitoring equipment.
- Hydrographic staff published 235 final streamflow records.
- Hydrographers and water commissioners made 3,637 gage visits and discharge measurements in Water Year 2021.
- The Satellite-linked Monitoring System (SMS) continues to provide the Division and the public with real-time streamflow and storage data from gaging stations across the State of Colorado.
- Approximately 50 Data Collection Platforms are replaced annually assuming the equipment has about a 10-year life. This annual replacement rate represents about 10-12% of the current satellite monitoring network each year

Division								Grand Total
1	2	3	4	5	6	7		
1413	486	1237	102	117	66	216		3637

Streamflow Measurements by Water Division



# Hydrogeology Section Statistics

## The 2021 Numbers

### Staff assistance:

- Aquifer determinations **▶ 744 (-1%)**
  - top/base, saturated ft, hydraulic properties, lag depletions, return flow, etc
- Recharge pond reviews (HB-1013) **▶ 5 apps (-2)**

### Board of Examiners Support:

- Variances to Well Construction Rules **▶ 105 (-6%)**

### Groundwater Monitoring Program:

- 6 Des. Basins, S. Platte, Denver Basin, West Slope, North Park **▶ 1,169 (-5%)**  
(487 by DWR)

### Permit Condition Amendments:

- Geophysical log waivers (190), aquifer depth (42) **▶ 232 (-4%)**



# Hydrogeology Section Statistics cont.

## Well Inspection Program

- Inspections ▶ **1182 (-2%)**
- Complaints/Violations ▶ **15 (-71%)**
- Hearings ▶ **3 (new)**
- Well Inspection Program Audit ▶ **completed!**

## Nontributary Initial Determinations (in process & completed)

- Water Court, Policy 2010-4, Produced Water ▶ **4 (0%)**
  - +2 in preliminary discussion with Hydrogeo

Colo. Oil & Gas Commission Review ▶ **1 (-87%)**

Hydrogeologic Investigations - high groundwater ▶ **1**

Rulemaking - Nontributary Groundwater Rules ▶ **on hold**





Eagle River near Minturn, photo by Jana Miller



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# Interstate Compacts



## Republican River

- Colorado, Nebraska and Kansas continue meetings
- Conservation Reserve Enhancement Program (CREP) continues
- Compact Rules approved by water court

## Colorado River

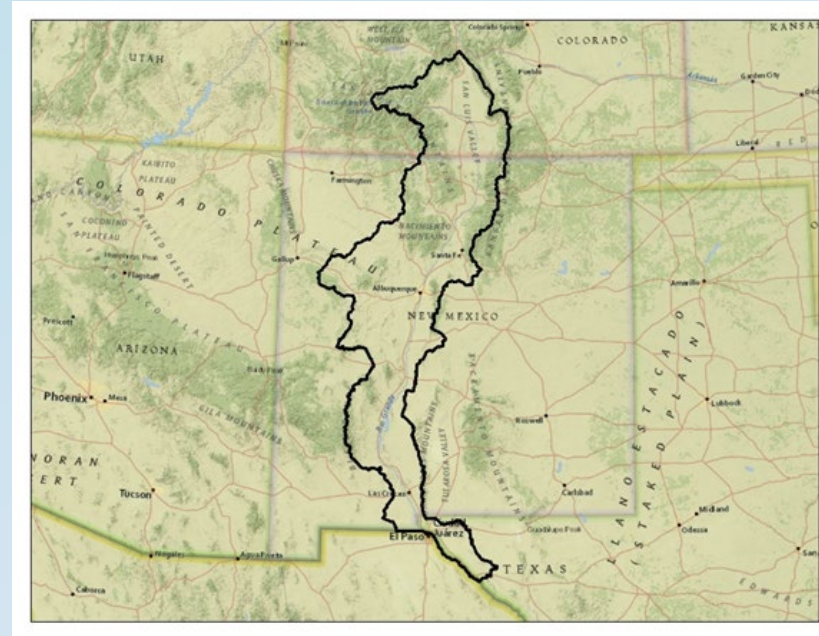
- Basinwide Drought
  - Declining inflows and lake levels
  - Powell drops below 3525 elevation
  - DROA Releases from CRSP units
- SEO starts stakeholder process for measurement rules in Division 6
- Reservoir Release Report complete





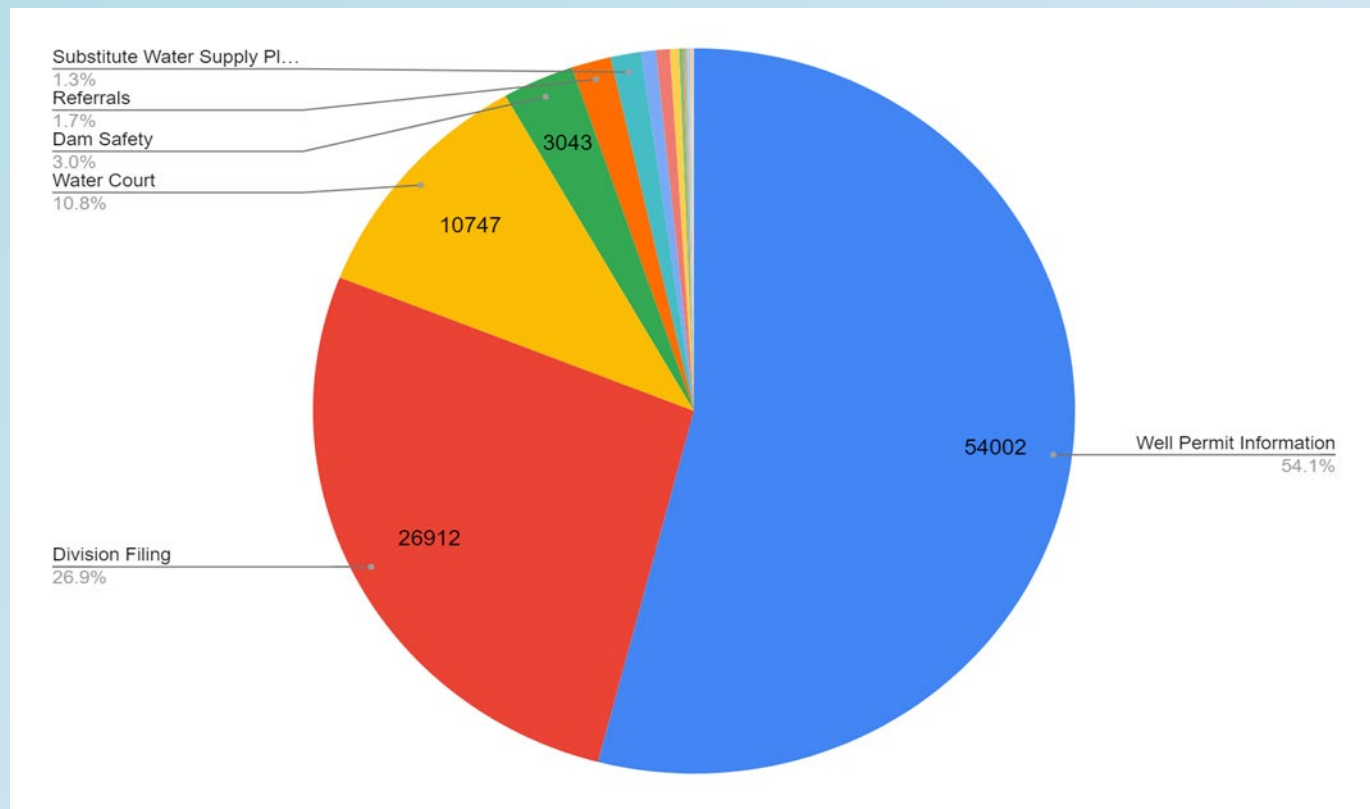
# Interstate Compacts

- Rio Grande Compact
  - Litigation TX V NM & CO Original 141 (Ground water depletions) continues
    - Partial Trial October 2021 (Lay Witnesses)
    - Trial continued
    - Mediation
- South Platte
  - Nebraska initiates discussion of the Perkins County Canal
- Federal
  - Waters of the United States revisions continue



# Laserfiche Files Loaded 2021

	Total New Docs Added	Uploaded w/ HBDMC
2021	100,000	64,000
2020	92,000	46,000





# Modeling Team 2021 Highlights

RGDSS (continuing in 2022)

Updating StateCU and Groundwater model through 2020

Large GIS Data update

Irrigated Lands / Model Grid

Updating RGDSS Response Functions

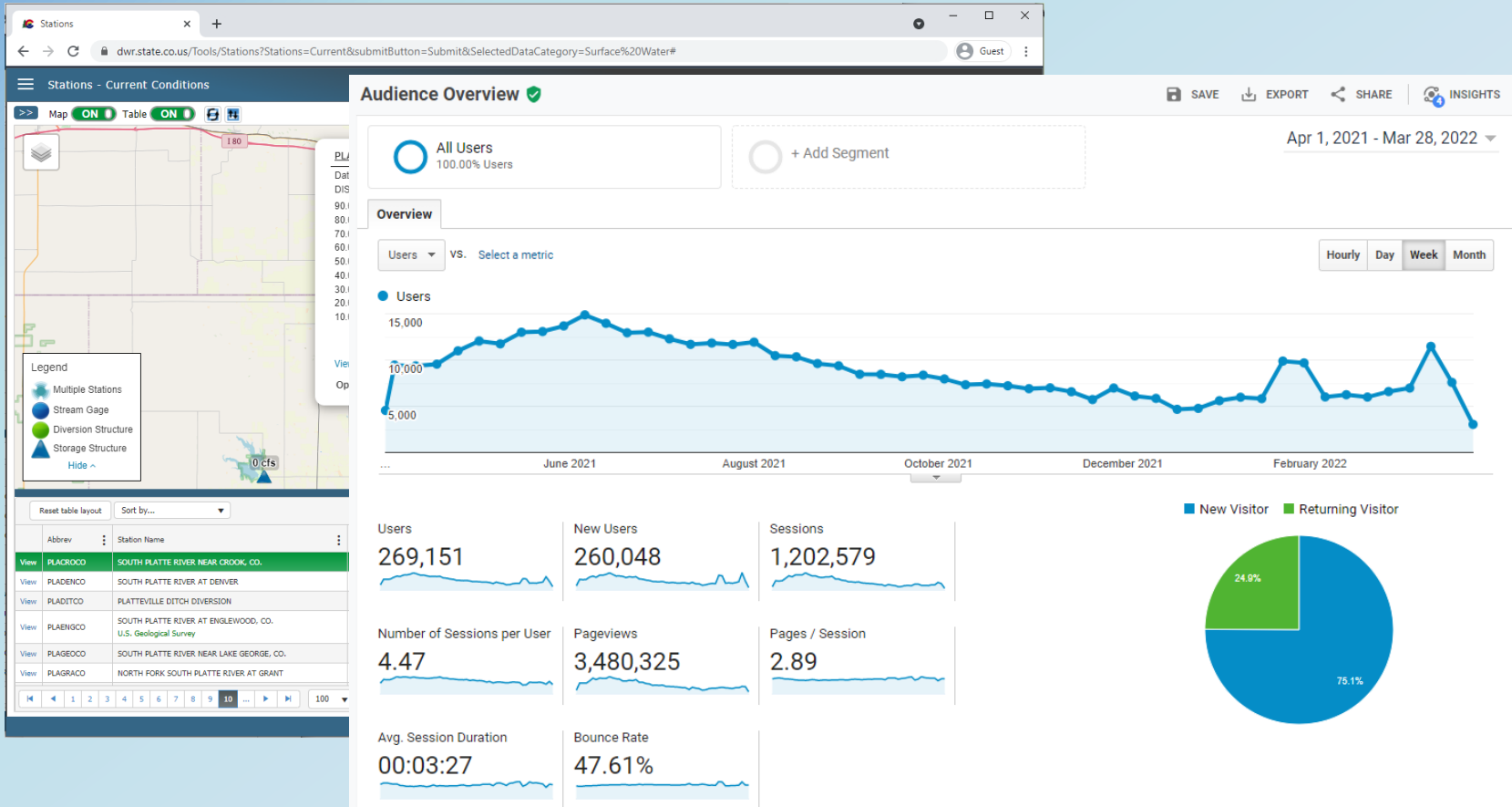
ArkDSS - STATEMOD Surface Water Model under development

Colors of Water - Transit Loss/Timing Model Code/Method refinement for Parameter Calibration with Historical Data

Div2 HI Model - Compact Accounting continued



# Colorado Decision Support System Online Usage

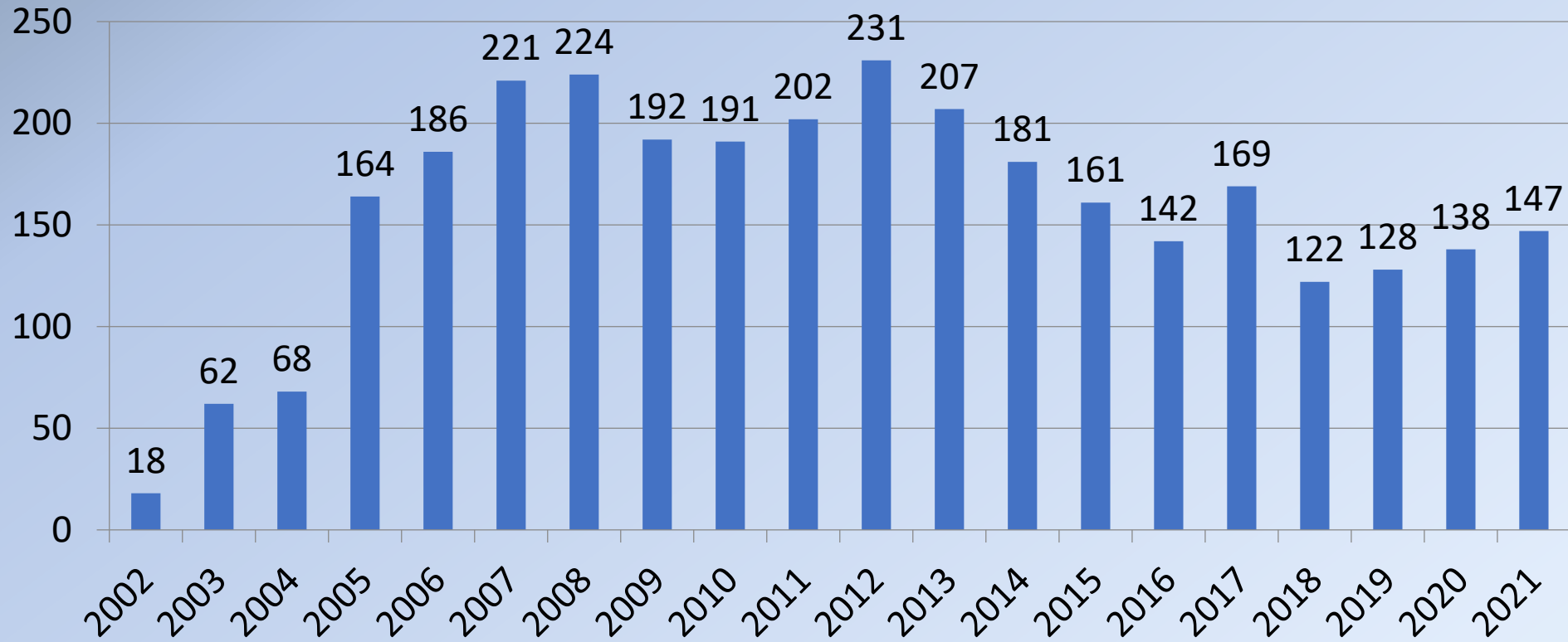




# Water Supply Branch

- Analyzed and approved 147 general Substitute Water Supply Plans (SWSPs) and 70 SWSPs for gravel pits
- Reviewed, analyzed, and provided 542 comments to Colorado counties regarding the water supply for proposed subdivisions and other land use actions
- Received and acted on 8,143 well permit applications and processed 1,098 Monitoring Hole Notices, 12,200 Changes in Ownership/address, 4,952 Well Construction and Test Reports, and 4,416 Pump Installation Reports
- Issued thirteen (13) final permits, 208 determinations of water rights, 32 change application approvals and eighteen (18) replacement plans in designated basins.

# Substitute Water Supply Plan Activity

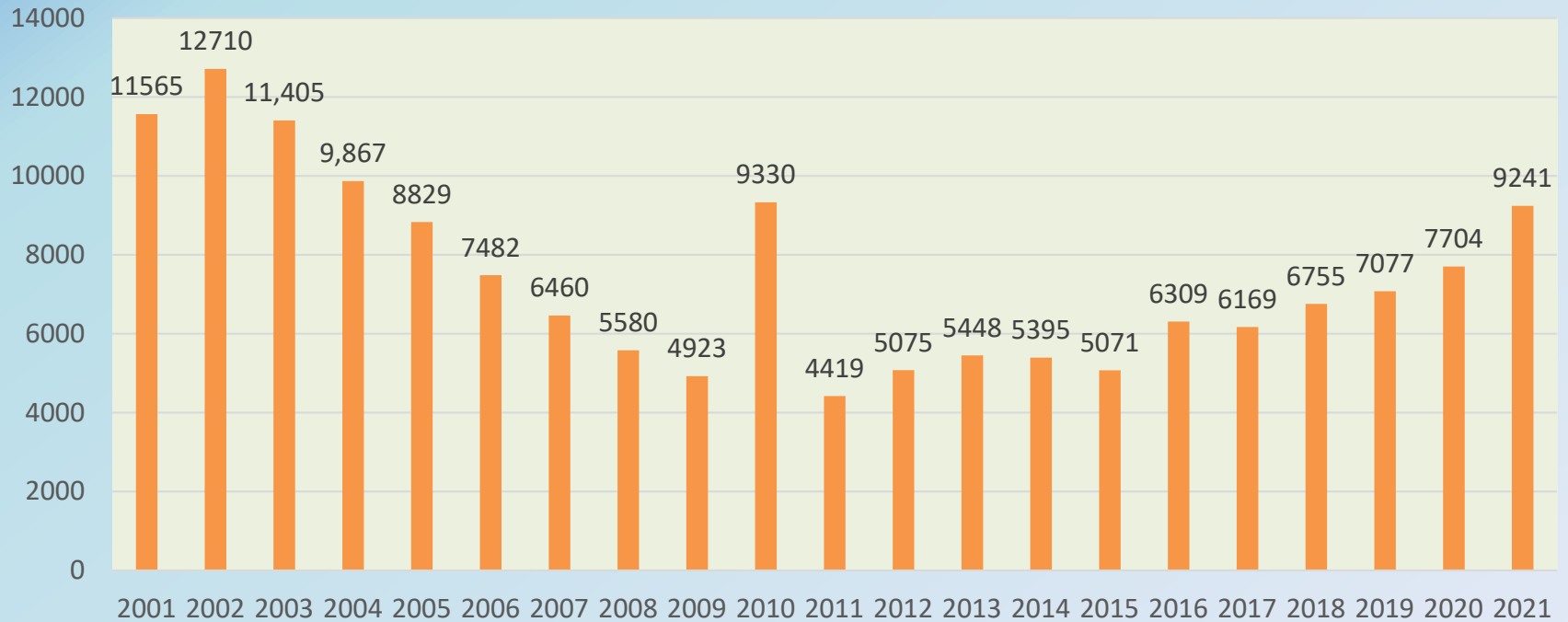


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# Well Permit Activity

## Total Applications



# Statements of Opposition in Water Court

	2014	2015	2016	2017	2018	2019	2020	2021
Div 1	16	7	8	9	16	30	27	17
Div 2	3	1	1	12	3	6	17	12
Div 3	0	1	1	3	1	4	2	4
Div 4	0	0	0	0	0	0	0	0
Div 5	0	0	0	1	0	0	0	0
Div 6	1	2	1	1	2	2	2	0
Div 7	0	0	0	2	1	1	0	1
Total	20	11	11	28	24	43	48	34



# South Platte River Basin Water Division 1



- There were a total of 65 days South Platte Compact Call during water year 2021, down from the 133 days of call during 2020.
- The South Platte Well Team continued its work with approximately 6,500 wells that fall within the scope of the South Platte Measurement Rules. The Team processed approximately 16,000 meter readings and published diversion records for 1,565 wells. The Team also conducted 57 installed flow meter verification field tests, processing over 575 submitted measurement tests into DWR's database. Field inventory of approximately 200 wells and inspection for compliance of 550 wells filed as inactive in accordance with the Measurement Rules were also conducted. Twenty (20) wells were identified as non-existent as efforts of staff field inspections. The well team certified 5 new well meter testers and recertified 14 certified well meter testers.
- The State Engineer's Republican River Compact Use Rules were still pending in the Division One Water Court under Case No. 2019CW3002. The rules would allow the state to administer surface water and groundwater wells for compliance with the 1942 Republican River Compact.
- Republican River Well Team administration:
  - Conducted 262 well measurement device verification field tests
  - Field inventory of 860 wells
  - Field inspections of 243 wells filed as inactive in accordance with the Rules
  - The Republican River Well Team assisted with Well Tester certification training classes, and conducted in-field one-on-one recertification of approximately 25 certified well testers.



Republican River Basin, Water Dist. 1.  
Photo by Brandi Baquera

# Arkansas River Basin Water Division No. 2



Sheep Mtn. Augmentation Station & Fish Ladder,  
photo by Rachel Zancanella

- Water supply conditions in 2021 were below average within the Arkansas River basin and was considered a “Very Dry” year in the year-type calculations used in the basin for the 1950 period forward. In order to compare years for water supply conditions in the larger mainstem irrigation areas along the mainstem from Pueblo to the stateline, a comparative tool has been used that totals the flow through Pueblo Reservoir, the flow to the Arkansas River from Fountain Creek and the flow to the Arkansas River from the Purgatoire River and compares that total to each year from 1950 through 2021. Using this criteria, 2021 ranked as the ninth worst year in that 70 year period.
- The final report for the period November 15, 2020 through March 14, 2021 showed a system grand total of 83,668 acre-feet which was 33,172 acre-feet less than was stored in the previous year and 45,782 acre-feet less than the previous 20-year average.
- During 2021 the irrigation well pumping represented in the H-I Model totaled 59,125 acre-feet. For User Groups 1-14 (above John Martin Reservoir Area) the total pumping was 39,241 acre-feet and for User Groups 15-24 (below John Martin Reservoir) the total pumping was 19,884 acre-feet.

- Fourteen new augmentation plans were decreed during 2022, bringing the total to 778 plans within Div. 2







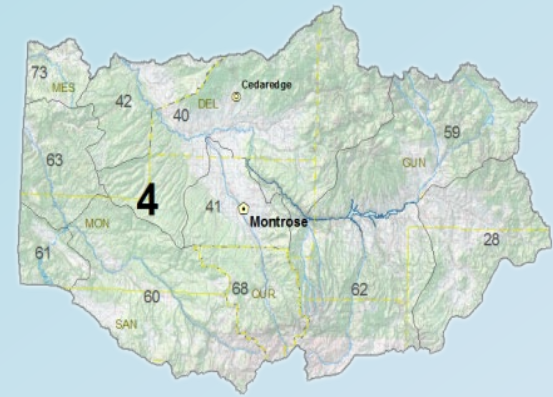
# The Rio Grande Basin Water Division No. 3

- As in 2020, the unconfined aquifer of the Closed Basin lost a significant amount of water. This was due in large part to well below average precipitation and low stream flows seen in the Rio Grande and its tributaries.
- Water year 2021 saw a near average snow pack that peaked at 103% of average.
- Most rivers and streams had annual streamflows ranging from 30-70% of normal due to winds and very low soil moisture.
- Actual water delivery at the state line was very close to compact obligations, resulting in an end of the year debit of 3,800 acre-feet debit for Colorado, compared to the 1,200 acre-feet credit from water year 2020.



A new cross-vane rock control and radar were installed at Goose Creek near Wagon Wheel Gap. Photo by Jesse Jaminet.

# The Gunnison River Basin Water Division No. 4



Blue Mesa Reservoir, 10/31/21 by Bob Hurford

- 2021 snowpack conditions on record peaked at approximately 87% basin-wide, down from 90% in 2020.
- As in 2020, inflow to the Aspinall Unit (Blue Mesa, Morrow Point and Crystal Reservoirs) as of May 1, 2021 was 57% of the 30-year median seasonal average, categorizing the season as a “Moderately Dry” year.
- 373 total permits were issued during 2021 (up from 268 in 2020) with 329 of those permits issued by the Division 4 staff.



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# The Colorado River Basin Water Division No. 5

- The 2021 water year began with storage in the basin's major reservoirs at about 35,000 acre-feet less than median, and ended with significantly below average storage at about 166,000 acre-feet less than median.
- The 2021 water year ended with gaged flow for the Colorado River near Cameo ranking as the 2<sup>nd</sup> driest year in 88 years of record. The flow for the Colorado River near Dotsero ranked as the 4<sup>th</sup> driest in 80 years of record.
- The Shoshone Power Plant was offline in some capacity for one reason or another for a majority of 2021. On April 1, one of the units went down but flows were sufficient to meet the demand and the call was removed, initiating the Shoshone Outage Protocol. Debris from monsoon rains caused further outages at the dam until it was running six months later and the call went back on. Total calls at the plant were 162 days.
- A Cameo Call was placed on April 14, 2021, and extended through April 29, 2021, lasting for 16 days. This was the longest April Cameo Call on record, exceeding the 5 days of April call in 2002.
- Well permitting activity decreased in 2021. 792 applications were received and 717 well permits were approved.



Eagle Park Reservoir, Photo by James Heath



# The Yampa and White River Basins

## Water Division No. 6

- Snowpack was below average for the year as well as runoff, with the basins being at least 2 inches below median snow water equivalent.
- The Yampa River went on call again in 2021 for a short period of time, July 30 through August 2. Fortunately, a rain event and the Colorado River District's request of a release of water from Elkhead Reservoir helped maintain and enhance habitat conditions on the river.
- As of November 2021, records indicate a significant number of structures that are not equipped with an operable measuring device.
- In irrigation year 2021, 334 well permits, including monitoring/observation wells, were issued. This number is up considerably from 2019.
- Measurement Rule development in progress. The purpose of the Rules is to establish consistent and reliable standards to assist the State Engineer and Division Engineer in the administration, distribution, and regulation of the waters of the state in Water Division 6 and are intended to: (1) establish standards for the selection and installation of Measurement Methods and Diversion Structures for the purpose of controlling and measuring Diversions; (2) establish consistent and reliable standards for the recording and reporting of data for water diversions, the storage and release of water, and the means by which the Division Engineer will receive the data; and (3) establish consistent and reliable standards for assessing compliance with the State Engineer's and Division Engineer's authority to implement and enforce the statutory requirement for installation of Measurement Methods and headgates. The rules are anticipated to be submitted to Water Court sometime in the fall of 2022.



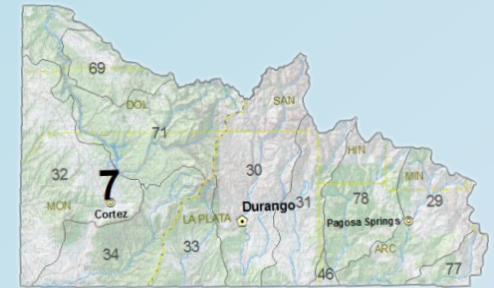
Assistant Attorney General Emily Halvorsen, State Engineer Kevin Rein and Water Commission Scott Hummer, photo by Mike Sullivan.





# Animas and La-Plata River Basins

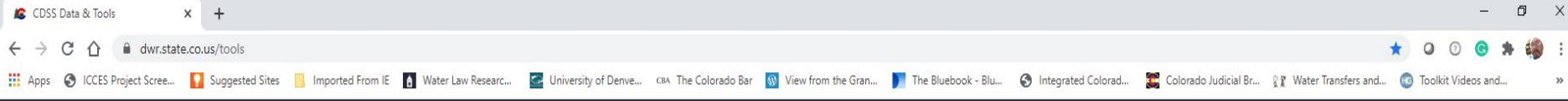
## Water Division No. 7



Hesperus Gage, La Plata River  
Photo by Shannon Manfredi

- Snowpack in the San Juan and Dolores River Basins during the winter of 2020-2021 (Water Year 2021) was slightly below average. Although there have been many years with less snowfall, 2021 proved to be difficult due to reservoirs that started at very low levels. Back to back dry years limited the water supply to many water users.
- Once again, only senior water right holders remained in priority to divert water. There were 146 administrative calls placed on 11 different stream systems during the year.
- There were 280 well permits issued.
- New Mexico placed a call on April 1 for half the flow as measured at the La Plata River at Hesperus gage, up to a maximum of 100 c.f.s.
- Long Hollow Reservoir filed to a capacity of 1,388 a.f. on April 1, 2021.
- Construction of infrastructure to deliver water from Lake Nighthorse to the western part of La Plata County continued. This is a joint project between the La Plata West Water Authority, the Southern Ute and Ute Mountain Ute Tribes and Lake Durango Authority.

# Colorado's Decision Support Systems Site



**Administrative Calls**

Active, Historical & Analysis Tools

**Groundwater**

Water Levels & Geophysical Logs

**Water Rights**

Decree Details, Court Docs, Net Amounts

**Aquifer Determination**

Denver Basin & Dakota/Cheyenne

**Location Tools**

Coordinates & Distance Calculators

**Climate Stations**

Temperature, Precipitation, Snow, Etc

**Stations**

Current Conditions & Historical Data

**Well Permits**

Application History & Well Details

**Call Analysis Tools**

Structure and Water Source Analysis

**My Stations**

Station Lists and Alerts

**Dam Safety**

Dams, Livestock Water, Erosion Control

**Structures**

Diversion Records & Other Details

**Map Viewer**

DWR Online GIS Products

**Information Marketplace**

DWR Data on "CIM" Platform

**REST Web Services**

GET CDSS Data Programmatically





For detailed field office and branch reports please visit imaged documents,  
Publications and Reports  
at: <https://dwr.colorado.gov/>



Stillwater Reservoir, August 10, 2021