

2018 Annual Report **Division of Water Resources**



Yampa River, Water Division 6, 2018

COLORADO

Department of Natural Resources

"It was no surprise to find that our employees take pride in being experts at what they do, using their expertise to solve our water users' problems, and ending the day knowing that they helped our agency achieve its mission."

Kevin Rein State Engineer



I can say many things about the events of 2018. However, the prominent event that has dominated our discussions is the drought. Using different measures, such as snowpack, reservoir levels, municipal impacts, priority date of the call in certain perspective on the nature of the work we do in areas, and other factors, the year can be described as one of the worst on record. By many of these measures, we have seen worse, or drier years. However, it is also true that these conditions occurred at a time when Colorado's demands are greater and expectations from our water supplies are helped our agency achieve its mission, to "administer more diverse. As a result, the climate and water supply conditions expose more difficulties. We had a use, ensure that dams and water wells are properly first-ever call on many tributaries but also on the mainstream of one major river in the Colorado River water resources to the public." In other words, our system, the Yampa. We saw photos of reservoir levels, like that of Blue Mesa, that showed reservoirs from this public resource. being as low as many people can remember. I have an observation about those last two statements. Seeing a call on a major river like the Yampa and the depleted state of our reservoirs' storage demonstrate how Colorado is positioned to manage difficult climate conditions. When I note that we placed a call on a major river system for the first time implement its water plan, with attention to ever, I also have to note that Colorado is fortunate to sustaining agriculture, providing for recreation, have a water allocation system, *Prior Appropriation*, to direct our actions when we are short of water, especially in basins that have not experienced that shortage before. Also, when I allude to the depleted use our water in even smarter ways. As Coloradans

depleted because they were designed to be depleted; to provide a continuous water supply in a year like 2018.

Division of Water Resources employees manage this

allocation of water and saw the effects of the 2018 year first hand. During the fall of 2018, our employees allowed me to have an in-person conversation with them to understand their water administration, public safety, and information management. It was no surprise to find that our employees take pride in being experts at what they do, using their expertise to solve our water users' problems, and ending the day knowing that they

the waters of the State to maximize lawful beneficial constructed and safe, and provide information about employees help our water users get the most benefit

The 2019 year has started with a complete turnaround for the water supply picture from 2018. But even with the brighter outlook, we still have plenty to occupy our attention as water administration, public safety, and information experts. As in past years, Colorado will continue to exploring new water storage opportunities including underground storage, funding water projects, and implementing technology to help us reservoirs, I need to point out that the reservoirs are go about that work, the Division of Water Resources will continue to be the agency with willing experts to educate our water users and provide a strong administrative structure to support those efforts.



COLORADO Division of Water Resources

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Programs

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



Mission

The Colorado 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.

Dam Safety Program Statutory Authorities CRS Title 37 Article 87

- 37-87-105-Approval of Plans for Reservoirs
 - Make and Maintain Rules and Regulations
 - Review and Approval Authority for; New Dams, Alteration, Modification, Repair and enlargement of existing dams
- 37-87-107- Safety Inspections-Amount of Water to be Stored
 - Inspections
 - Determination of Safe Storage Level



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Dam Inspections

Engineer Inspection Reports (EIR's)



100% High and Significant Hazard dams

Emergency Action Plan Tracking

EAP Analysis 2018 & 2019								
	4/15/2018	Summary	4/16/2019 Summary					
HH Dams	47	26	429					
EAP - Yes	420	99 %	421	98%				
EAP -No	6	1%	8	2%				
HH Age < 5yrs	310	73%	328	77%				
HH IM Maps	361	85%	377	89%				
HH IM SHP	258	61%	289	61%				
SH Dams	29	99	297					
EAP - Yes	288	96%	286	96%				
EAP -No	11	4%	11	4%				
SH Age < 5 yrs	156	52%	177	60%				
SH IM maps	176	58%	181	6 <mark>1%</mark>				
SH IM SHP	87	2 <mark>9</mark> %	95	32%				



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Dam Design Review



DESIGN REVIEW AND CONSTRUCTION PROJECT ACTIVITY SUMMARY - 2018									
DESIGN REVIEW NO. NO. NO. NO. ESTIMATED									
ACTIVITY (2015) (2016) (2017) (2018) DOLLAR VALUE									
Received	49	44	41	33	\$ 494,634,753				
Approved	45	59	41	37	\$ 69,768,099				
Const. Started	34	41	40	39	\$ 55,787,725				
Const. Completed	34	43	29	32	\$ 31,068,434				
As-Builts Accepted	32	45	52	39	\$ 37,440,749				
Total Projects 116 120 106 89 \$ 589,406,777									

Completed Precipitation Study REPS MetPortal Precipitation Frequency Tool

MetPortal PF web-service: <u>https://conm-reps-gui.shinyapps.io/metportal/</u> (link is in the REPS Interim Use Guide on DWR website)





Colorado - New Mexico



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Hydrographic & Satellite Monitoring Program



Big Thompson River at LaSalle, replacement of control, stilling well and gage shelter

Division							
							Grand
1	2	3	4	5	6	7	Total
1239	583	1243	105	158	100	291	3719
(1266)	(812)	(1501)	(146)	(179)	(103)	(400)	(4407)

Streamflow Measurements by Water Division



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•DWR Hydrographic and Satellite Monitoring Branch main mission is to collect, analyze, and present accurate, high quality 'real time' flow and storage data in Colorado rivers, streams, creeks, canals, ditches and reservoirs to support the water rights administration mission of DWR.

•Hydrographers in each Division office around the State operated and maintained a system of 643 gaging stations on watercourses and diversion structures during 2018.

•Hydrographers in 2018 performed 4,407 gage station visits to assist in support of the historic streamflow record.

•The Satellite-linked Monitoring System (SMS) provides the Division of Water Resources, other State and federal entities, the water user community and the public at large with access to real-time streamflow and storage data from gaging stations across the State of Colorado. Again in 2018, approximately 50 DCPs were replaced to improve the quantity and quality of data used to manage and administer water throughout the State of Colorado.

Colorado Satellite Monitoring Gaging station growth

Table 1. Growth of the number of gaging stations (operated by CO DWR and by other agencies) included in the Satellite Monitoring System since inception.

		USGS and Other Federal,	
Year	CO DWR	State, Local Agencies	Total
1985	52	98	150
1990	57	101	158
1995	229	176	405
2000	324	264	588
2005	462	276	738
2010	518	384	902

2018 Count (Division of Water Resources Only)

Data Source	1	2	3	4	5	6	7	Grand Total
Co. Division of Water Resources-Non Published Stream Gage	112	132	42	30	36	10	45	407
Co. Division of Water Resources-Published Stream Gage	62	45	56	9	14	8	25	219
Co. Division of Water Resources-Published Stream Gage (Non-Telemetered)	7	3	4					14
Grand Total	181	180	102	39	50	18	70	640



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Hydrogeological Services

Staff assistance

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	Aquifer determinations	▶ 829	(+46%)	
	 Aquifer hydraulic properties 	▶ 14	(-86%)	
	Recharge Pond Reviews (HB 1013)	► 2 (12 St	tructures)	
Boa	rd of Examiners Support			
	 Variances to Well Construction Rules 	▶ 155	(+26%)	
Gro	undwater Monitoring Program	► 1,310 wells		
Per	mit Cond. Amendments	▶ 217	(-2%)	
We	l Inspections	▶ 722	(-16%)	
Con	nplaints/Violations	▶ 39	(+34%)	
Nor	tributary Initial Determinations	▶ 1	(-50%)	
Col	orado Oil & Gas Conservation Commission Reviews	▶ 16	(0%)	



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Colorado Decision Support System Website Usage Growth



Before Well Permit Search Release – 2,500 Users/day 30,000 Page views/day After Well Permit Search Release – 8,000 Users/day 110,000 Page views/day

Interstate Compacts

- Upper Colorado
 - Drought Contingency Planning (DCP)
 - Demand Management
 - Consumptive use workgroup
 - Compliance workgroup





Republican (37-67) Final rules filed Jan 11, 2019 CREP contract renegotiation Washington and Lincoln counties + 30,000 acres Increased rental rates Yearly payment schedules. CREP workflow Settlement with KS RRWCD Boundary amendment Hutton cases



Interstate Report

- Rio Grande Compact
 - Texas v. New Mexico & Colorado
 - Ongoing since 2014
 - Court Ruled 3/5/18
 - U.S. allowed to join
 - 4/2/18 new Special Master appt.
 - Hon. Michael J. Melloy
 - Stipulation
 - Discovery ongoing under case management plan
 - Anticipated trial date in March/April 2021





Modeling & Decision Support Systems

• Statewide

- OpenCDSS CWCB and DWR continued work on an open source approach for its CDSS products to provide a transparent, robust and collaborative software platform. This year, CDSS opened their public domain software site, which currently hosts 35 program specific repositories containing licensed and versioned CDSS software code. OpenCDSS leverages the mature CDSS software while providing a plan for maintenance and enhancements into the future.
- Statewide Evapotranspiration (ET) Dataset: To develop new criteria and guidelines for HB13-1248 Lease-Fallow pilot projects that would be usable at higher elevations, staff initiated work to create a statewide ET dataset using the methods and tools developed for the ArkDSS.
- Training: The Team hosted a Fall Technical Forum for CDWR staff to provide training, education and collaboration on the crop evapotranspiration and consumptive use tools.
- Denver Basin Groundwater Model A new version of the model was developed and released including redesigned applications and documentation.

• Arkansas River Basin Support –

- **Compact Modeling:** Modeling/DSS staff supports Division 2 in implementation of the *Kansas v. Colorado* final judgment and decree to ensure continued compliance with the Arkansas River Compact. This includes annually updating the data used in the Hydrologic-Institutional (HI) Model for determination of compact compliance. Major tasks include quality control of CoAgMet station data to estimate crop ET; evaluation of parcel irrigation and crops using satellite imagery, field verification data, and pumping data; and determining how to characterize operations within the HI Model framework using diversion.
- ArkDSS: Work continued on Phase 1 of the ArkDSS project including development of the GIS, consumptive use and surface water modeling components. Staff also developed a daily ASCE Standardized reference and crop ET dataset for climate stations and 2.5-mile grid points across the basin for the 1950-current period for use within the ArkDSS consumptive use and surface water models.

Rio Grande Basin Support

• The water court trial on the Final Rules Governing the Withdrawal of Groundwater in Division 3 was held in early 2018 and the judge's decision to approve was entered on March 2019. The Phase 6 version of the RGDSS groundwater model was a major part of the rules and trial. This year, Phase 7 of the model continues with updates of the datasets, processes and models through 2017 along with new geologic investigations. Additionally, as new subdistricts are formed and their water management plan finalized, staff provided technical support, training, and information to Division 3 staff, individuals/group of well owners, consultants, districts and associations on how to determine injurious stream depletions from groundwater withdrawals using the model tools.



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Department of Natural Resources

Water Supply Branch



- Analyzed and approved 150 general Substitute Water Supply Plans (SWSPs) and 73 SWSPs for gravel pits
- Reviewed, analyzed, and provided 660 comments to Colorado counties regarding the water supply for proposed subdivisions and other land use actions
- Received and acted on 6,971 well permit applications and processed 1,046 Monitoring Hole Notices, 8,575 Changes in Ownership/address, 4,668 Well Construction and Test Reports, and 3,675 Pump Installation Reports
- Issued zero final permits, 179 determinations of water rights, 21 change application approvals and eighteen (18) replacement plans in designated basins.



Well Permit Activity

Total Applications





Substitute Water Supply Plan Activity



South Platte River Basin, Water Division 1



- The South Platte mainstem had an above normal seniority of calls for the April through Nov. 1 2018 period. There were approximately 2 weeks of free river in late May with the lower end of the river having an extended period of call in late July through mid-August due to crop damage. There were a total of 67 days from June 13 through September of South Platte Compact Call.
- 2018 saw continuing implementation of the South Platte Well Measurement Rules and the Ground Water Well Team conducting approximately 70 well measurement device verification field tests, inventory of more than 700 wells, and field inspection of more than 375 wells filed as inactive in accordance with the Rules.
- The Republican River Well Team continued their efforts of administering the Republican River Basin Groundwater Measurement Rules (Rules) in 2018, including conducting approximately 120 well measurement device verification field tests, the inventory of more than 600 wells, and field inspection of approximately 130 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 30 certified well testers.



Tarryall Reservoir - Dist. 23

Division One - Administration Tools

- Addition of Surface Water Conditions to DWR Website
 - Increase # of Sites Available with "real-time" data
 - Currently 465 Sites on "current surface conditions" website Div1.
 - ±20 new sites already planned
 - Telemetry on critical (administration) and remote diversion, storage, and release structures
- Decree / Accounting Reviews and Collaboration
 - DWR Sheets into Accounting (water class coding)
 - Administrative Reservoir Accounting (multiple uses / accounts)
 - Water Commissioner / Decree Administration Support
- Administrative Tools for Water Commissioners (spreadsheets)
 - District and Cross District
- CDSS On-line Tools (Call Tools, Mapping, Diversion Records, etc.)
- Div1 Guidelines & Protocol Updates





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Arkansas River Basin, Water Division No. 2



- Streamflow, as a result of the lack of precipitation, was impaired as would be expected, however the flows through the upper basin still benefited by operation of the Voluntary Flow Management Program wherein the Bureau of Reclamation and Southeastern Colorado Water Conservancy District, Colorado Springs Utilities, Pueblo Water and Aurora all participated to supplement streamflow through portions of the peak rafting season and to support critical fish habitat flows outside that season.
- The final report for the period November 15, 2018 through March 14, 2019 showed a system grand total of 100,072 acre-feet which was 30,889 acre-feet or 23.6% less than was stored in the previous year and 33,104 acre-feet or 24.9% less than the previous 20-year average.
- Overall irrigation well pumping in 2018 was above average for the past ten-year period (Irrigation well pumping in the lower mainstem area was 78,444 acre-feet versus the ten-year average of 72,304 acre-feet).
- Cannabis industry water administration issues continued to be time consuming. Water user complaints related to unlicensed grown operations based on illegal use of exempt wells continues to drain financial an human resources.
- Forty-nine new Augmentation Plans were decreed during 2018, bringing the total to 720 plans within Div. 2
- Colorado remained in compliance with Arkansas River Compact. For the period of 2009 2018 a credit to Colorado of 13,471 acre-feet.





- 2017-18 saw one of its worst snowpack on record. Peak was on March 30 at 53% of normal.
- Fourth lowest annual streamflow on the Rio Grande and the Conejos River.
- Colorado was close on its Rio Grande Compact
 delivery obligations for 2017, with a total of
 approximately 400 acre-feet of debit at the end of
 the year

The Rio Grande, Water Division No. 3

Rio Grand Use Rules

- Trial held in January/February 2018 over the Ground Water Use Rules
 - March 15, 2019 Judge approved Rules.
 - Applies to all non-exempt wells, subdistricts must be operational next year and aug plans must be filed within 2 years, with owners operating under an SWSP.
 - Subdistricts 1 through 3 approved
 - CREP process workflow review with Farm Service Agency
 - RG Decision Support System Phase 7
 - Update model data sets
 - Additional investigations
- RGDSS South Fork Model





The Gunnison River Basin, Water Division No. 4



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•Snowpack conditions were only 55% of average basin-wide.

•Inflow to the Aspinall Unit (Blue Mesa, Morrow Point and Crystal Reservoirs) as of May 1, 2018 was 35% of the 30-year median seasonal peak.

• Paonia Reservoir received just 18,500 acre-feet of April through July inflow, which is only 19% of average.

•402 exempt well permits were issued during the 2018 water year, up again from the 344 permits issued in 2017. This continues an upward trend since 2011 when only 174 permits were issued.

Blue Mesa Res. at Dry Creek Boat Ramp Lowest end of season content at 30% capacity



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- Storage for the basin began the water year at 113% of average. The water year ended at 92% or average storage. This is the first time storage ended the year below average since 2013. Of the major reservoirs Ruedi, Green Mountain, and Granby did not fill.
- The May 1 runoff forecast for the undepleted flow for the Colorado River near Cameo was well below average at 66% of average. Actual gaged flow was 48% of average. The gaged flow for the Colorado River near Cameo was the 5th driest in 85 years of record, while the Colorado River at Dotsero was the 16th driest in 77 years of record.
- Due to dry conditions Coordinated Reservoir Operations to enhance the peak for endangered fish habitat did not occur.
- For endangered fish recovery program summer augmentation in the 15 mile reach a total of 51,481 acre-feet was delivered between July 1st and October 27th.
- The Shoshone Power call was on 195 days in 2018, with the post snowmelt runoff call implemented on June 27th. The Cameo call was on 85 days with the post snowmelt runoff call implemented on July 19th.

The Colorado River Basin, Water Division No. 5

 Well permitting activity was up with 775 applications received and 746 water well permits approved.



Palisade Power Plant and Orchard Mesa Hydraulic Pumps

The Yampa and White River Basins, Water Division No. 6



Yampa River below Lily Park Pumps



- Where water administration in 2017 was a very normal/typical year, 2018 resulted in a call being placed on the Yampa River for the first time in history.
- Snowpack and resultant stream flows were below normal for the year. However, it was good compared to the rest of the state.
- The call on the Yampa resulted from a complete lack of precipitation during the summer months with above average temperatures. (Two months, June and September no precipitation measured). Further, no reservoir releases for the Yampa River Recovery Program exacerbated the situation.
- In the Yampa River basin, not including the Little Snake River, there are 456 active structures with measuring devices and 853 without (65%). Resulted in notice for installation of headgates and measuring devices.

Yampa River flows



Animas and La-Plata River Basins Water Division No. 7

Construction on infrastructure to deliver water from Lake Nighthorse to the western part of La Plata County is continuing. La Plata West Water Authority expects completion of Phase 0 by December 2018. Phase 0 will pump water from Lake Nighthorse to Lake Durango. La Plata West Water Authority also is in the beginning stages of Phase 1, that will deliver water to the west beginning at Blue Hill and then heading South.





2018 Water Year was one of the worst years on record. Only 45% average of precipitation.

Most reservoirs were unable to fill. Carryover storage from 2017 assisted early in the irrigation year to provide water.

There were 203 well permits issued in Division 7 in water year 2018. Of these, 163 were exempt well permits, 12 were non-exempt well permits, one rooftop precipitation collection permit, and 32 monitoring well permits were processed in the Durango office. There were also 36 non-exempt well permits, 6 monitoring well permits, 13 monitoring holes, 4 exempt well permits, 2 geothermal exchange permits and 42 Oil and Gas (Coal Bed Methane) well permits processed in the Denver office. There were no dewatering wells or geothermal wells permitted in Division 7 during the 2018 water year.

Animas River September 2018



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For detailed field office and branch reports please visit "Publications & Reports" located on our website at: water.state.co.us

