

## IBCC Colorado River Basin

### 1. November 27, 2023 CBRT Roundtable Minutes. Phase 3 Report on High Altitude Reduced Irrigation Yield Study in Kremmling; Colorado River Risk Study Phase IV indicating heightened risk that Lake Powell drops below Full Power Pool and that Front Range Trans Mountain Diversions could be called out.

#### 1. Upcoming Meetings & Deadlines.

- a. December 1, 2023, WSRF and Water Plan WPG grant application to the CWCB
- b. There is no December CBRT Roundtable Next Steps meeting
- c. January 22, 2024, CBRT Roundtable meeting.
- d. Colorado Water congress 1/31 to 2/2/2024

2. Recorder: These minutes were prepared by Ken Ransford, Esq., CPA, 970-927-1200, [ken@kenransford.com](mailto:ken@kenransford.com).

3. Today's November 27, 2023, meeting was conducted by Zoom and held in person at the Colorado River District Office.

4. **CBRT Roundtable Members Present:** Paul Bruchez, Stan Cazier, Carlyle Currier, Kelly McNicholas Curry, Randi Kim Grand Junction, Kirsten Kurath, Ken Ransford, Charlie Spickert, Jason Turner, Greg Williams

5. **Guests:** Taylor Adams, Jeff Bandy Denver Water, Nate Bell, Ashley Brubaker, Summit County, Abby Burke Audubon Society, Perry Cabot CSU Extension, Austin Corona, Jason Cowles Eagle River Water & San District, Alex Davis Aurora Water, Anna Drexler Driess PEPO Coordinator, Jackie Fisher OMID, Kayli Foulk Grand County, Ashley Garrison CWCB Water Plan Grants, Luke Gingerich JUB Engineers, Mike Goscha TYBAR Ranch, Hannah Holm American Rivers, Kathy Kitzmann Aurora Water, Brendon Langenhuizen Colorado River District, Heather Lewin Roaring Fork Conservancy, Lorra Nichols CWCB, Amy Ostdiek Colorado Atty General, Maria Pastore, Dave Payne Ute Water Conservancy District, Jeff Rodriguez CWCB, Robert Sakata CWCB Board, Russ Sands Denver Water, Jo Stanko Colorado Dept. of Agriculture, Emily Zmak CWCB Interstate, Federal, and Water Information Section

6. **River Forecast.** The Colorado River at Dotsero gage is at 668 cfs, dropping from 887 cfs the day before on November 26, below the 907 median cfs for this date.<sup>1</sup> The Colorado River is flowing **1,510 cfs at Cameo**, dropping from 1,650 cfs the day before, **below the median flow** of 1,670 cfs on this date.<sup>2</sup>

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<sup>1</sup> Dotsero forecast: [https://waterdata.usgs.gov/usa/nwis/uv?site\\_no=09070500](https://waterdata.usgs.gov/usa/nwis/uv?site_no=09070500).

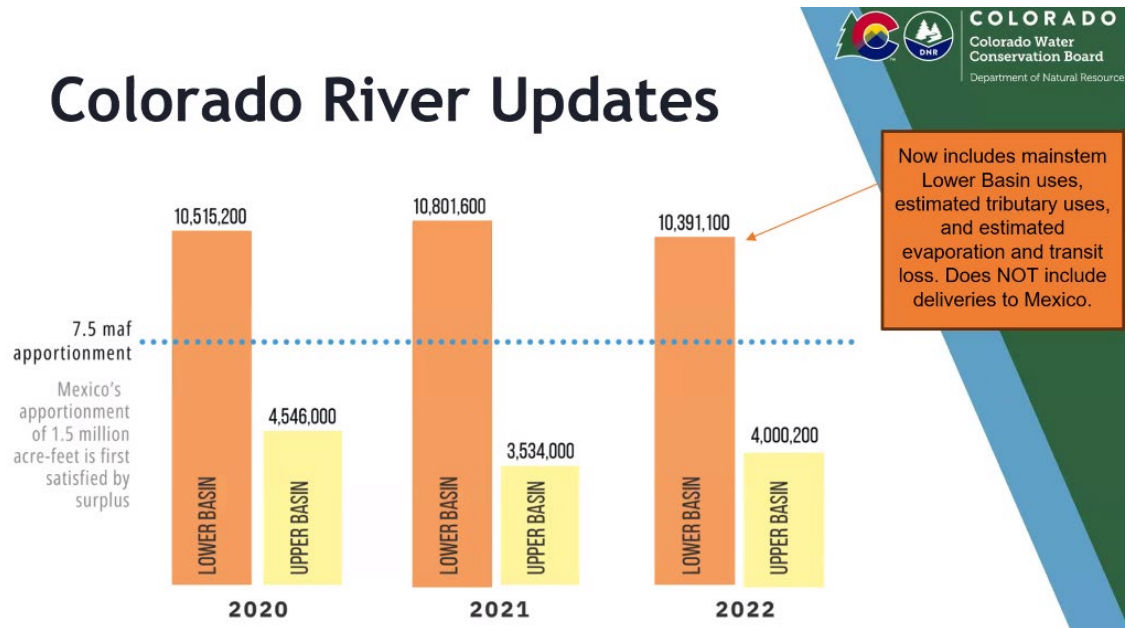
<sup>2</sup> Cameo forecast: [https://waterdata.usgs.gov/co/nwis/uv/?site\\_no=09095500&PARAMeter\\_cd=00065.00060](https://waterdata.usgs.gov/co/nwis/uv/?site_no=09095500&PARAMeter_cd=00065.00060)

7. **CBRT May 2023 Minutes were approved** unanimously without amendment.
8. **November CWCB Update, Jeff Rodriguez**
  - a. SCPP System Conservation Pilot Program Webinar—see the YouTube recording on the CWCB website. The CWCB Interstate and Federal team hosted a webinar on November 13, 2023. It is an overview of SCPP and a good discussion of information needed to make the application.
  - b. **The C-9 Summit** of roundtables on November 14 was well attended. The CWCB is considering **making this an annual meeting**. Jason Turner agreed that this should happen annually.
  - c. There was a robust discussion about the **offer to purchase the Shoshone power plant water right** at the recent CWCB meeting on November 15, 2023, starting about 11:30 on the taped recording at the CWCB website. The CWCB staff together with the Division Engineer provided a history of the 1905 water right. A **\$93m offer** to purchase the water right from Xcel Energy has been made. The **Colorado River District** intends to commit **\$20m**, another **\$20m** has been requested from **CWCB**, **\$10m from users on the Mainstem Colorado**, and **\$40m from the federal government**.
  - d. CWCB Stakeholder Guide will be available to update Roundtable members about the Roundtable process. This supplements any basin-specific materials.
  - e. WSRF and Colorado Water Plan (WPG) grant application deadlines to the CWCB are December 1.
  - f. **The Wildfire Ready Watershed money must be allocated by December 2024** and fully spent by December 2025.
  - g. Technical Assistance & Local Capacity grant programs have funds as well.
  - h. Climate Change in Colorado update will be released in late December.
9. Jason Turner thanked CWCB Board and South Platte Roundtable member **Robert Sakata of the for attending the CBRT Roundtable meetings**. He operates Sakata Farms in Brighton, recently featured in a Water Education Colorado article by Allen Best.<sup>3</sup>

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<sup>3</sup>Water, farm veteran Sakata moves to transform his iconic Front Range produce empire, Allen Best | May 24, 2023, <https://www.watereducationcolorado.org/fresh-water-news/water-farm-veteran-sakata-moves-to-transform-his-ionic-front-range-produce-empire/>

- 10. **CBRT Member terms are 5 years; there is no term limit.** Member terms need to be re-established every 5 years.
- 11. **CWCB Update, Amy Ostdiek**
  - a. **New update infographic:**



- b. This shows the 7.5maf allotment to each of the Lower and Upper Basins. The orange bars that show that the Lower Basin’s share does not reflect Mexico’s 1.5 maf apportionment, but they do include evaporation losses and tributary uses by the Lower Basin. Tributary uses are estimated at about 2 maf and they are based on 2005 use, the last figure available from the BuRec.
  - i. What are the tributary uses? The 1922 Colorado River Compact includes all tributaries including the Gila; Article III(b) of the Colorado River Compact states, “In addition to the apportionment in paragraph (a) [i.e., 7.5 maf], the Lower Basin is hereby given the right to increase its beneficial consumptive use of the such waters by one million acre feet per annum.”
- c. SCPP System Conservation Pilot Program. **To receive copies of Colorado SCPP applications, email DNR at: [dnr\\_ColoradoSCPP@state.co.us](mailto:dnr_ColoradoSCPP@state.co.us).**
- d. Colorado compensation for reduced irrigation starts at \$509 per acre feet. The other Upper Basin states are paying less than this to irrigators who voluntarily reduce irrigation in order to reduce water consumption.

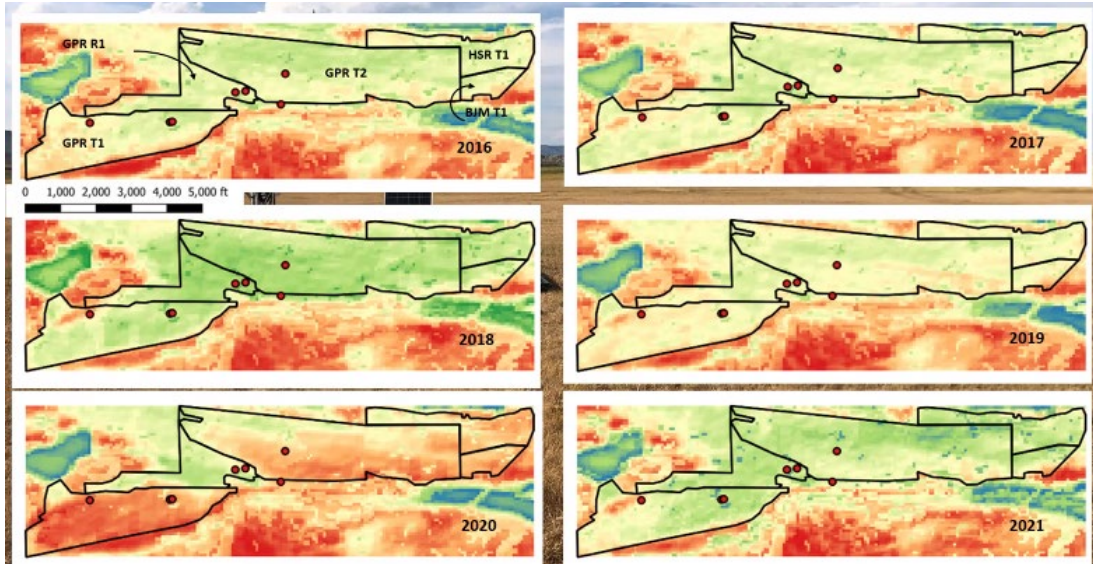
- e. **The Upper Colorado River Commission is requesting proposals for SCPP applications** to reduce Colorado River consumption by 2-4 maf.<sup>4</sup>
  - f. **A Draft SEIS released October 25, 2023**, addresses the 2007 Interim Guidelines which are in place through 2025. A SEIS is a Supplemental Environmental Impact Statement that reviews the findings of an existing Environmental Impact Statement. The SEIS recognized improved hydrology data and includes analysis of the **Lower division States' proposed alternative** which includes a conservation proposal **to produce 3 maf savings**; up to 2.3 maf will be compensated by federal funds in the Inflation Reduction Act, with 1.5 maf savings anticipated by the end of 2024. **Comments on this are due December 11, 2023**. Amy is reviewing this 700-page document.
  - g. **At \$506 per acre foot, it would cost \$1.16 billion to conserve 2.3 maf**. For comparison, the total value of the Colorado River to the Southwestern United States was estimated by Arizona State University to be **\$1.4 trillion**.<sup>5</sup> \$1.16 billion is 0.09% of \$1.4 trillion.
  - h. Commissioner's corner: Send comments to [dnr\\_ColoradoSCPP@state.co.us](mailto:dnr_ColoradoSCPP@state.co.us) or [Amy.Ostdiek@state.co.us](mailto:Amy.Ostdiek@state.co.us).
12. New Members
- a. Summit County Commissioner
13. **WSRF Grant Guidelines** were presented to the Roundtable, Ken Ransford drafted these guidelines and they have been vetted by the Next Steps Committee. This will enable the CBRT chair to **direct applicants with threshold questions** about their grant applications. The guidelines also adopt a **twice-a-year grant cycle, with spring and fall applications**.
- a. Many questions involved whether the applicant fit within the WSRF guidelines, so the summary will help answer these questions.
  - b. **Bailey Leppak suggested that we add a link to the BIP page that discusses the Basin goals** so applicants can immediately see whether the application fits the Basin goals.
  - c. Greg Williams said these are a great start, and made a motion to adopt them, Carlyle Currier seconded it, and it passed unanimously.

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<sup>4</sup> <http://www.ucrcommission.com/system-conservation-pilot-program-for-2023/>

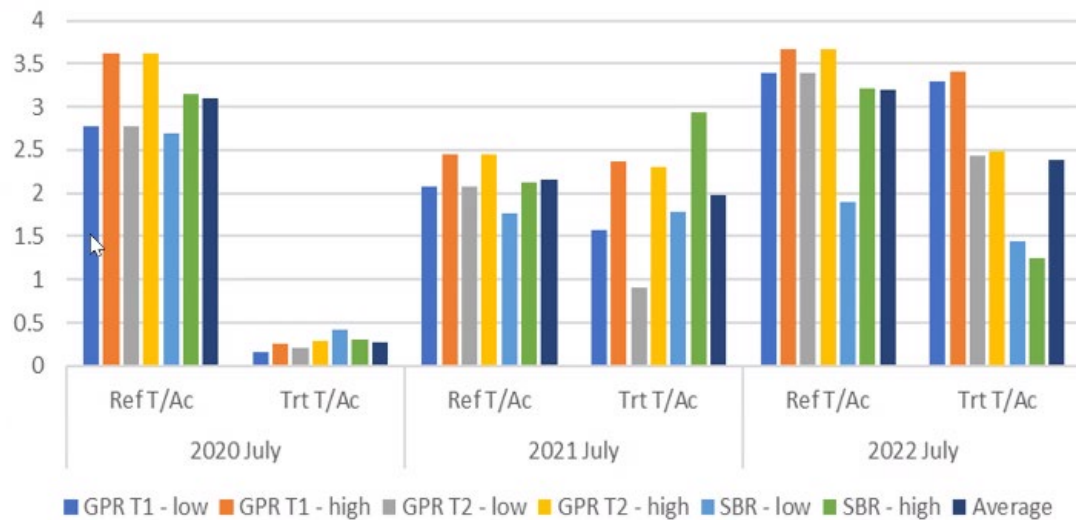
<sup>5</sup> James T., et al, "The Economic Importance of the Colorado River to the Basin Region," Arizona State Univ., Dec 18, 2014, pg. iii.

14. **Grants committee.** The Next Steps committee will operate in this capacity until a formal grants committee is formed with members and a chair.
  - a. Jason requested members to contact him if they are willing to be members, and whether they would like to be a chair.
  - b. Bailey Leppak asked if non-voting CBRT members can be on the grants committee, and no members voiced any objection to this. Jeff Rodriguez said other roundtables permit non-voting members to join their grants committees.
  - c. Jeff recommended that the **grants committee summarize the proposals in 2-3 minute presentations to present to the CBRT Roundtable.** He reminded that the CBRT roundtable must vote on all applications.
  
15. **Upper Colorado Conserved Consumptive Use report, Perry Cabot CSU, and Hannah Holms, American Rivers.**
  - a. This was **started in 2020**, where they did a large-scale study in Grand County that tried to simulate what would happen if there was a **full season of no irrigation** water in high altitude hay pastures, **and a partial season irrigation reduction where irrigation was suspended on July 15.**
  - b. The study was funded by the CWCB with support from the CBRT, Colorado Trout Unlimited CTU, The Nature Conservancy TNC, and American Rivers.
  - c. A final report is due in 2024. The study addresses how to estimate water use and water conservation, the impacts of reduced irrigation on perennial grass fields and how they recover, how this affects rancher income, and water flows.
  - d. **Remote sensing and eddy covariance** are used to estimate water use. Remote sensing is satellite based, while eddy covariance is an on-the-ground instrument placed on selected fields to measure wind speed, humidity, temperature, and other factors to estimate consumption. **Eddy covariance data is more expensive, but it is very accurate in estimating local water use.** It can be used to calibrate **remote sensing data which is less accurate** since it is taken from satellites.
  - e. Some consumption results from irrigation ditches and the ponds even if the field is being fallowed, so **consumption is not reduced 100% when fields are fallowed.**



- f. The graph above shows that conservation is a multi-year approach. 2020 consumptive use savings, as measured by reductions in water use, **ranged from 53.4% to 57.5% by eliminating all irrigation, and 14.7% to 20.9% at sites with partial irrigation reduction.**
- g. Grass forage impact and recovery evaluations. Irrigation was withheld in 2020, but **there was significant recovery in the fields in 2021 even as drought continued into 2021.** There were dramatic reductions in 2020 as indicated by the lowest bars below, but there was **significant improvement in 2021 and 2022 when irrigation was returned to normal.** The dark blue bar is the average.

July Tons/acre Compared by Year



- h. **Both 2020 and 2021 were below-average precipitation years.** It matters what year you do this. **2020 was a very dry year, especially late in the season.** They may have recovered better in 2021 if there was more monsoonal rain later in the summer of 2020. 2020 had less precipitation than 2021, but both were extremely low. Other producers had problems in both years. A producer that has irrigated for 43 years could not fully irrigate in **2020 and 2021—these were the only years out of 43 that the rancher could not fully irrigate.**
- i. **Carlyle Currier said he raised under half of his normal hay crop in 2021** because water was not available. He did not participate in the reduced irrigation study.
- j. **Hay producers** that did not use the hay to feed their own cattle **received additional net income of \$221.18 per acre.** However, **cattle producers lost \$349.66 per acre since they had to purchase hay at higher 2020 and 2021 prices** which resulted from the low supply of hay. Since less hay was produced in the dryer 2020 and 2021 years, it cost more, and this contributed to the cost. **Cattle producers would need to be compensated \$970 per acre to be fully compensated.**
- k. **In the 2020 full-season cutoff, hay producers were paid \$621/acre** and they earned \$393 net income. **In the 2021 partial season cutoff, they were paid \$281 per acre** and netted \$150 per acre.
- l. There is significant recovery when you return to full irrigation, but there is still some loss.
- m. Carlyle Currier asked how much acre feet was saved: about 55% savings. **Water use decreased 55%, but hay production declined about 90%.**
- n. **Under full irrigation, the fields consume about 20” of water,** after receiving 3-4” of precipitation. Soil moisture carries over. **About 18” of water is conserved if there is a full reduction.**
- o. Paul Bruchez, whose ranch participated in the study, provided additional details.
  - i. **On average over all meadows there was 50-60% reduction in water consumption.** A **bench pasture** that had no irrigation ditches or ponds or riparian acreage **had about 85% reduction in water consumption,** but fields adjacent to the river with irrigation ditches coursing through them had lower consumption savings.
  - ii. **Everyone suffered in 2020 and 2021.** In 2020, everyone thought if they did not irrigate there would be forage but precipitation was so low this expectation proved false.

- iii. **In 2023** they did a smaller project, but precipitation was so great and **grass was so high they could not get tillage equipment onto the field.** So there is **a lot of annual variation.**
- iv. Randi Kim asked if they took into account the lack of depreciation on equipment that wasn't being used. Paul said depreciation was not factored into the calculation.
- v. Kirsten Kurath commented that **farmers say they will dump more water on the field in the next year because the field is so much dryer** due to carryover moisture. They had soil moisture sensors, but the grasses are more deeply rooted than they thought and that interfered with water balance calculations.
- vi. Perry Cabot commented, **“Unless there is good winter moisture, there will be more water needed in the next year and reduced return flows to the river.”**
- vii. Hannah – big takeaway was considering all the moving parts was important. **There is a lag from year to year, and annual precipitation is so variable that any water conservation program must be viewed as a multi-year project.**
- viii. Full season reduction is more profitable than split-season reduction (i.e., irrigating until July 15 and then ceasing irrigation). **More compensation is needed for cattle producers than hay producers.**
- ix. It's hard to apply a spatial average to diverse fields. What is the right approach to assign a single number to a field: It's better to consider a range. Some fields were devastated by the lack of water.
- x. There was less consumptive use in subsequent years, due to damage to grasses—they're still in recovery mode.
- xi. The full report is at <https://www.coloradobasinroundtable.org/agriculture/upper-colorado-study/>
- p. All of these fields were flood irrigated; there were no sprinklered fields.
  - i. **Consumptive use would probably not vary between sprinkler vs. flood irrigated fields** If you have complete cessation of all irrigation, there would be the same consumptive use reduction for both flood and sprinklered fields.



- ii. **When they did not use irrigation water in the ditch, the stream had a more normal high runoff hydrology. Riparian corridors were improved.**
    - iii. **Sprinklers deliver the water more efficiently** and spread use out over a longer period of time **so consumption increases and return flows decrease.**
16. Hannah Holmes requested a letter of support for **Alternative Forages Phase 2 Project** to investigate forage crops other than alfalfa.
- a. There is an ongoing study of deep-rooted perennials in Kansas that could reduce consumptive use, such as replacing alfalfa with Sanfoin, since they may be able to handle dry years better. Paul Bruchez has planted 10 acres in Sanfoin. They hope to take several research sites ranging from Fruita at 4,500', Yellowjacket at 6,500', and Paul's ranch at 7,400' in Kremmling to do controlled research studies on forage production with full-year irrigation, partial-year irrigation, and no irrigation at all.
  - b. Kernza as strictly a forage crop, it is not cut. Paul has planted 10 acres of this as well.
  - c. Silphium. Paul has about ¼ acre planted in this. It is both a forage and hay cut crop. It is a sunflower that has never been domesticated but was used in ancient Greece. It has tremendous feed value for livestock, and also for oil seed. See the Land Institute website for more information.
    - i. Paul joked that it has both birth control and aphrodisiac properties.
  - d. They also want to determine how much consumptive use is saved.
  - e. They are requesting a Colorado Water Plant Grant WPG. They expect the total project will cost \$750,000, and they will ask the CWCB for \$500,000.
  - f. Paul recused himself from voting on this. There was no objection to the CBRT providing a letter of support.
17. **Taylor Adams, Hydros Consulting, Colorado River Risk Study Phase IV**
- a. **There is increasing risk of Colorado Rivers shortages, largely due to changing hydrology—i.e., the annual change in the movement and distribution of water on earth, most noticeably in annual precipitation. If Lake Powell's elevation is held to 3,500', the minimum level to provide full power, the entire risk of shortfall is borne by the Upper Basin.**

- b. The hydrology is changing, with **average flows since 2000 averaging 17% less than average flows from 1906 through 2000**.<sup>6</sup> The stress test period now being used is 1988-2013, when the average annual flow was about 13 maf.

Average annual river flow at Lees Ferry

1906-2000	15,175,100
2001-2020	<u>12,657,667</u>
Decline	2,517,433
% decline	17%

Below is the average flow during the lowest 4, 7, and 10-year periods since 2000:

Lowest 4-year average Lees Ferry flow:	9,274,654	2001-2004
Lowest 7-year average Lees Ferry flow	11,308,687	2001-2007
Lowest 10-year average Lees Ferry Flow	12,195,687	2001-2010

- c. **Trans Mountain Diversions represent about 50% of post-Compact diversions, and they bear nearly all the risk under prior appropriation in Colorado** since nearly all TMD consumption was developed after the 1922 Colorado River Compact.

	Colorado River Basin Consumption	Trans Mountain Divrsions	Total
Total annual consumption	535,000	539,000	1,074,000
Percent	50%	50%	100%

Pre-1922 Compact	390,000	19,000	409,000
Percent	95%	5%	100%

- d. The **2026 Interim Guidelines permit the Upper Basin to address the concern that all risk is borne by the Upper Basin.**
- e. Phase IV of the Colorado River Risk Study corrects two Phase III conclusions which overestimated total consumptive use in Colorado, and pre-1922 Compact use.

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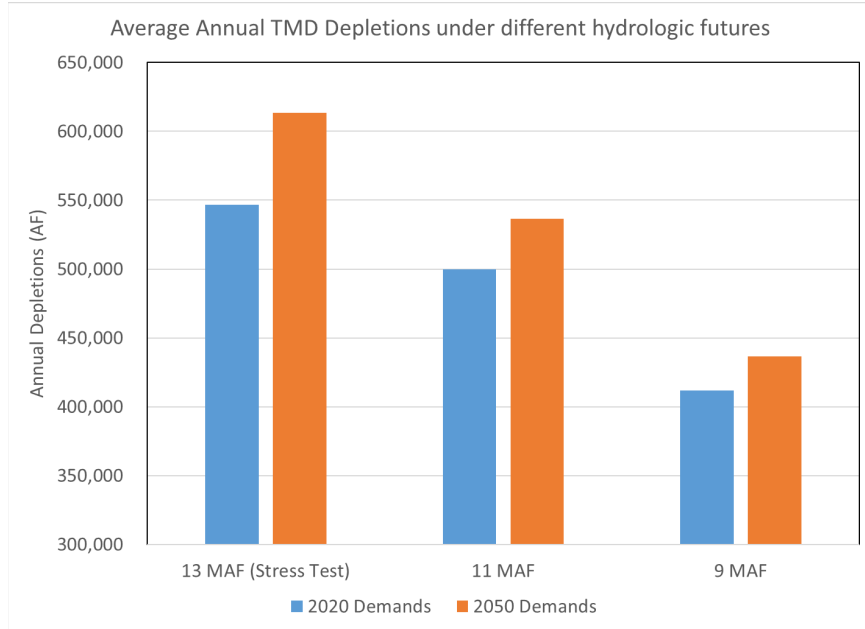
<sup>6</sup> Source: BuRec Colorado River Basin Natural Flow and Salt Data, spreadsheet tab AnnualWYTotalNaturalFlow, column W which considers inflow above Lees Ferry, from [CURRENT natural flow data 1906-2020 \(Excel file, 1.5 MB\) - Updated 12/15/22](https://www.usbr.gov/lc/region/g4000/NaturalFlow/current.html), <https://www.usbr.gov/lc/region/g4000/NaturalFlow/current.html>.

Consumptive Use (AF/year)	Phase III	Phase IV	Change
Pre-Compact	1,600,000	1,300,000	-300,000
Post-Compact	<u>932,000</u>	<u>1,070,000</u>	<u>138,000</u>
Total consumptive use	2,532,000	2,370,000	-162,000

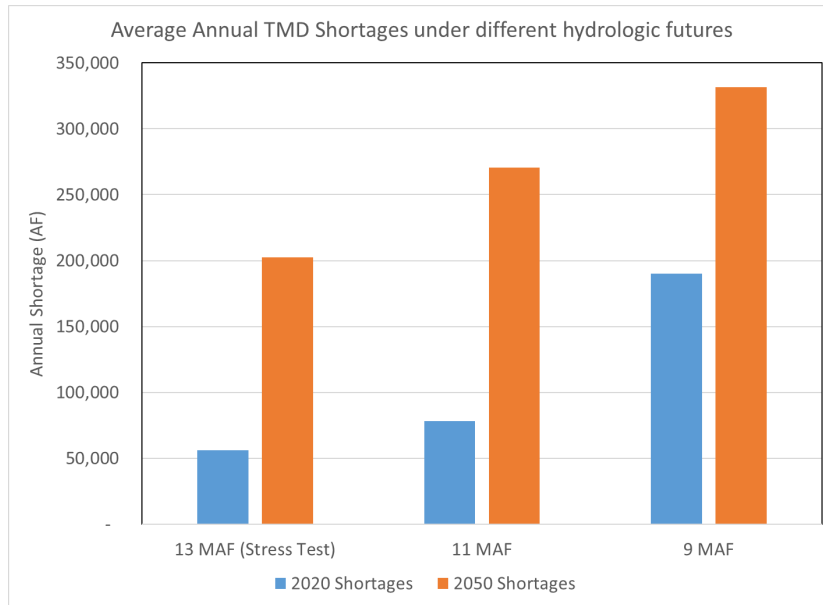
- f. State Mod attempts to consider all West Slope water uses, which requires some to be aggregated such as multiple diversion structures on single tributaries. They **simulated a Compact Call that calls out all appropriations following the appropriation date input into the model.**
- g. Phase IV shows that all TMDs including Post-Compact Depletions total 1,069,573 af, and that nearly half are in the Colorado River Basin (519,535 af):

Basin	Pre-Compact Depletions				Post-Compact Depletions			
	Average Volume (AF)		As % Total		Average Volume (AF)		As % Total	
	Phase III	Phase IV	Phase III	Phase IV	Phase III	Phase IV	Phase III	Phase IV
Yampa	138,544	120,037	8.7%	9.2%	58,438	76,799	6.3%	7.2%
White	50,173	41,609	3.1%	3.2%	11,887	20,328	1.3%	1.9%
Upper Colorado: In-Basin	574,997	390,900	35.9%	30.0%	94,400	143,614	10.1%	13.4%
Upper Colorado: TMD	19,173	19,368	1.2%	1.5%	531,816	519,535	57.1%	48.6%
Gunnison	495,147	438,290	30.9%	33.7%	57,271	101,377	6.1%	9.5%
Southwest	322,561	292,187	20.2%	22.4%	178,157	207,920	19.1%	19.4%
<b>Total</b>	<b>1,600,594</b>	<b>1,302,391</b>	<b>100%</b>	<b>100%</b>	<b>931,969</b>	<b>1,069,573</b>	<b>100%</b>	<b>100%</b>

- h. **Trans Mountain Diversions are likely to increase another 100,000 af per year as the Windy Gap, Moffat Firming, and the Eagle River MOU projects come on line.** Total TMD demand is rising from 740,000 to 850,000 af.
- i. Phase IV tested how much Upper Basin consumption would have to decrease if average inflow to Lake Powell decreased to 9, 11 or 13 maf; these flows are very similar to the lowest 4-year, 7-year and average 10-year flows since 2000 as shown above. Trans Mountain Diversions,



j. This equates to the following reductions in annual Trans Mountain Diversions:



Total Trans Mountain Depletions and Shortages in the graphs above are:

Average (AF/yr)	PCST (~13 MAF)		11 MAF		9 MAF	
	TMD Depletions	TMD Shortage	TMD Depletions	TMD Shortage	TMD Depletions	TMD Shortage
2020 Avg	546,613	56,297	499,860	78,055	412,012	190,292
2050 Avg	613,629	202,340	536,447	270,416	436,423	331,579

- k. To keep Lake Powell above 3,500', **ranchers will either need to reduce consumption by irrigating less alfalfa or Front Range cities will lose 50%** or more of their annual Trans Mountain Diversions.
- l. Ken Ransford asked Taylor Adams how he defines the Upper Basin's "**non-depletion obligation.**" Adams responded that this means **the Upper Basin will not deplete the river below 75maf every 10 years.** The Lower Basin says the **Upper Basin has a "delivery obligation"**, which means that every 10 years the Upper Basin states must deliver 75maf (or 82.3 maf including the Mexican Treaty obligation after accounting for 20,000 af annual Paria Flow).

Adams said that we could run simulations that reflect hydrology of 11 maf at Lees Ferry around 1922, and if it shows a shortfall compared to the average inflow of 16 maf assumed when the Compact was signed, then the Upper Basin can argue the 11 maf flow causes the shortfall, and not Upper Basin use.

- i. The Lower Basin would disagree that the delivery obligation is 75maf, and instead claim that 82.3 maf is the delivery obligation.
- m. Increasing demand from the **Windy Gap, Moffat Firming, and the Eagle River MOU projects increases the risk of curtailment.** All users bear this risk, not just the most recent diversions.
- n. Kirsten Kurath asked if the bleak scenarios are based on the 2007 Interim Guidelines. Would Adams' conclusions have changed if he considered the **Upper Basin Drought Conservation Planning agreements and the Lower Basin curtailment agreements?** Adams said he **included these in the simulations** he ran under version 6 of CRSS, and these existing drought planning agreements along with the Interim Guidelines are insufficient.
- o. Carlyle Currier asked what BuRec is thinking. Adams said that **BuRec is setting up an online tool where people can design operational policies** use after 2026. However, **reducing Upper Basin use is not an option permitted by the tool.** You can choose tradeoffs such as, "I want a policy that maximizes Lake Powell's elevation and minimizes depletions below 7.5 maf," and see how the simulation performs. This will lead to a wide variety of policies that will be considered.
- p. The Upper Basin should not have forced curtailment in order to satisfy Lower Basin demands.
- q. This will be in a detailed narrative report soon.

#### Discussion on finding a replacement chair for Jason Turner

- 18. Kirsten asked **who is the replacement for the chair position?** The Colorado River District will permit the meetings to continue to be held at the River District office. **Jason**

**encourages the CBRT to find another entity to step up to be the voice of the Basin.** The Colorado River District recommends it's time for another entity to step up and take charge of the meetings. The Roundtable needs more voices. If members are interested in the chair position, contact Jason Turner.

19. Jeff Rodriguez was asked if there is any funding to support the Roundtable chair. He said, "No, all executive positions are volunteer-based."
20. Greg Williams asked **if any other roundtables paid their chair**; Rodriguez said **all were volunteer**.
21. Caley (?) from Grand County says that a **Co-chair option, where each person commits for a year**. Jason said he is willing to work with the next chair.