Colorado River Basin meeting minutes

1. **March 29, 2021 CBRT Minutes –**

2. **Next Meetings:**

   a. April 7: 8AM to 12:30 PM webinar for Environmental and Recreational Attributes, Register here: https://co-water-plan-env-rec-workshop.eventbrite.com
   b. April 8 10-12:30 Forest Health Webinar: https://www.eventbrite.com/e/colorado-water-plan-forest-health-workshop-tickets-146507496867
   c. **April 26**, **CBRT Next Steps meeting**, 12:00-2:00
   d. **May 24, 2021, CBRT Roundtable Committee, 12:00 – 2:00.**

3. Reporter: These minutes were prepared by Ken Ransford, Esq., CPA, 970-927-1200, ken@kenransford.com.

4. **CBRT Members Present**: Kim Albertson, Nathan Bell, Paul Bruchez, Stan Cazier, Karl Hanlon, Diane Johnson, Merritt Linke, Holly Loff, April Long, Ed Moyer, Ken Ransford, Jason Turner, Richard Vangytenbeek, Greg Williams, Peggy Bailey, Jeff Bandy, David Graf, Randi Kim, Maria Pastore, Kathy Kitzmann, Jim Pearce, Zach Margolis

5. **Guests:** Beth Albrecht, Tyler Benton, Matt Bromley OpenET, Dan Brown, Shawn Bruckman Eagle County Conservation District, Abby Burk Audubon Society, Perry Cabot CSU, Jason Cowles Eagle River Water & San District, Aaron Derwington The Nature Conservancy, Chip Fischer, Angie Fowler SGM, Ginny Harrington, Hannah Holm, Dawn Jewell, , Aurora Water, Jojo La CWCB, Brendon Langenhuizen, Bailey Leppek SGM, Matt Lindburg PE Brown & Caldwell, Seth Mason Lotic, Ed Millard, Mikhaela Mullins, Ken Neubecker, Christina Pearson, Katie Randall, Wendy Ryan, Heather Sackett Aspen Journalism, Robert Sakata CWCB, Russ Sands CWCB, Jo Seavy, Sam Stein CWCB, Paula Stepp, Wendy Thompson, Emily VanBuskirk, A Webb, Kat Weismiller CWCB, Ted White, Mely Whiting, Cory Williams USGS, Len Wright, Eagle River Water & Sanitation District.

6. **JoJo La, Endangered Species Policy Specialist, CWCB, gave an update on the Colorado Water Plan's Focus Area Mapping Project.** The Colorado Water Plan update's goal is to map and prioritize 80% of all endangered streams and watersheds. In order to track this, each basin has a Focus Area Map which identified the areas that are most important.

   a. Purpose: Serve as a guide to avoid future Environmental & Recreation conflicts. The CWCB hopes to develop a common statewide platform for non-consumptive needs.

   b. The CWCB has developed a new decisions support system with interactive GIS maps. See: https://www.arcgis.com/apps/MapSeries/index.html?appid=880753ceb13d43e3bc89e2259247aafa

c. Colorado tab: We identified Environmental & Recreation attributes at a streamwide level. IWMPs are identified in blue.

   i. Blue dots denote flow tools at river nodes.

   ii. April 7: 8AM to 12:30 PM webinar for Environmental and Recreational Attributes. Register for the Environmental & Recreation workshop here: https://co-water-plan-env-rec-workshop.eventbrite.com

7. **Abby Burk, PEPO update**. How to engage the public more in the Roundtable BIP update. Governor Polis and DNR Director Dan Gibbs have created the Water Equity Task Force to increase diversity and racial equity in Colorado water planning. The Task Force hopes to increase diversity and racial equity. The CWCB regularly talks with 400 stakeholders, but that is a tiny portion of the 5.7 million people living in the state. How do we increase racial, gender, and socio-economic diversity, particularly in disadvantaged communities? Abby has been appointed to this task force through March 2022.

   a. Abby recommends that PEPO create a short video to describe the Colorado River Basin issues.

   b. Also create "water stories" to ask Colorado Basin stakeholders to describe their stories.

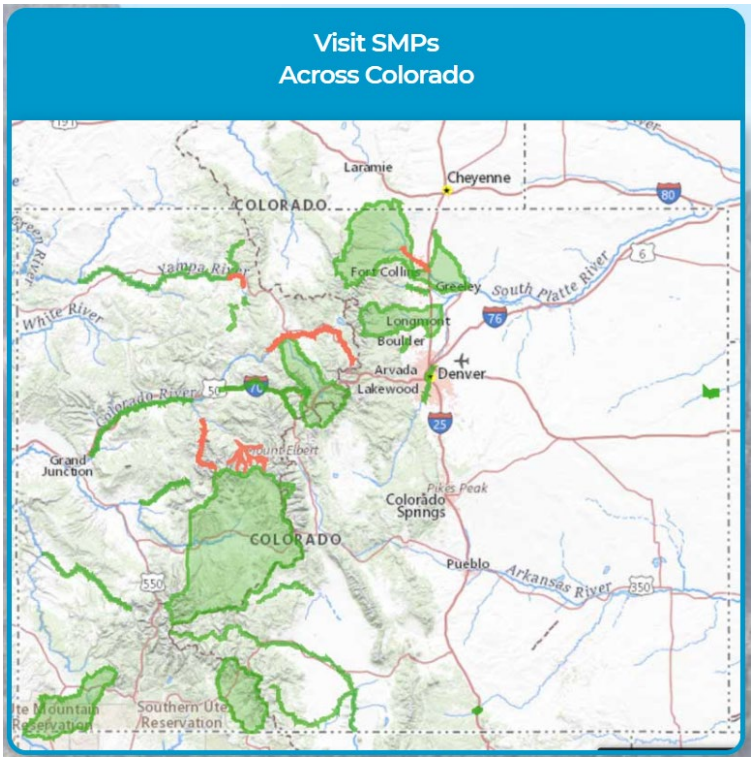
   c. Also reach out to stakeholders to tell their stories.

   d. The Yampa-Green basin just did a video that Abby reccoemnds.

   e. We have $3,600 in the Basin PEPO account, which must be spent by June 30, and another $6,500 will be available in July 2021.

   f. To have input on PEPO opportunities, contact Abby Burk, abby.burk@audubon.org, https://vimeo.com/showcase/yourwatertable

8. The state now has a centralized website on Integrated Water Management Plan (IWMPs) across the state. All IWMPs are available at https://www.coloradosmp.org/

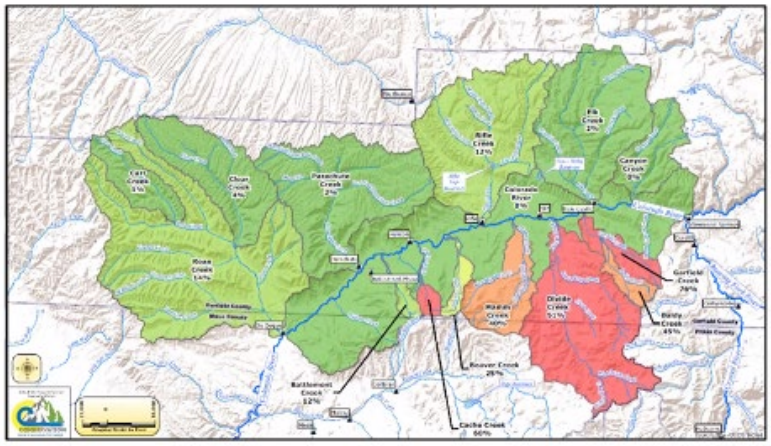


9. **Middle Colorado IWMP, Paula Stepp,** pstepp@midcowatershed.org

   a. See: https://coloradosmp.org/wp-content/uploads/2019/02/MiddleColorado_Summary_web.pdf

   b. Over 125 public participants including regular CBRT attendees Wendy Ryan, Sarah Dunn, Seth Mason, Abby Burk, and Laurie Rink met at 35 public meetings. After volunteer participants devoted 2,500 hours, they came up with 55 action plans.

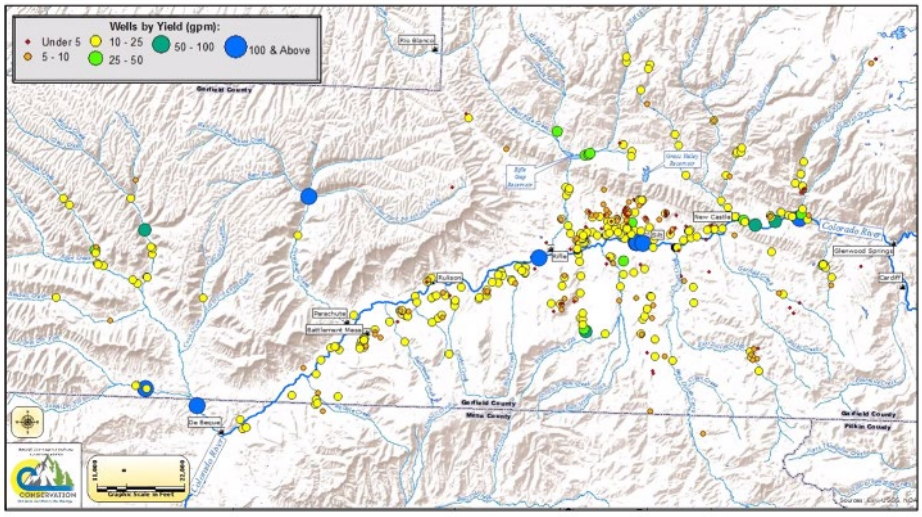
   c. Consumptive Use Needs Assessment: Wendy Ryan. There are 55 structures and 200+ miles of ditches already inventoried, and this process is not yet complete. Consumptive use shortages were cataloged, particularly south of the Colorado River in the southeast part of the watershed, shown in red below.



i. Kendig Reservoir was modeled as a 16,500 AF reservoir. This could help re-time the runoff and reduce the agricultural irrigation water shortages by 5,000 to 7,000 af.

ii. No shortages were found with municipal supplies.

iii. Many wells constructed since 2000 are today producing under 5 GPM.



d. Environmental and Recreation Needs Assessment, Seth Mason, Lotic Hydologic, Carbondale. They looked at hydrology—river flows—based on gauge data at Dotsero and Cameo.

i. They modeled the different scenarios—i.e., Business as Usual, Hot Growth, etc.—and see a deterioration in yields with warmer and dryer conditions in the future. The anticipated efficiencies in water consumption do not counteract the reduced river flows. There will be lower flows, earlier runoff in April, and lower late season flows, as shown in the red patches in the following table.

Regime Behavior Relative to Natural Flow	Baseline	Scenario 1: Business as Usual	Scenario 2: Weak Economy	Scenario 3: Cooperative Growth	Scenario 4: Adaptive Innovation	Scenario 5: Hot Growth
Change in Average January Flow	27%	26%	27%	25%	8%	8%
Change in Average February Flow	20%	19%	20%	24%	10%	11%
Change in Average March Flow	12%	12%	12%	34%	22%	22%
Change in Average April Flow	-25%	-25%	-25%	8%	1%	0%
Change in Average May Flow	-39%	-38%	-38%	-20%	-29%	-31%
Change in Average June Flow	-34%	-33%	-33%	-48%	-58%	-60%
Change in Average July Flow	-29%	-28%	-28%	-59%	-67%	-68%
Change in Average August Flow	-17%	-17%	-17%	-42%	-48%	-47%
Change in Average September Flow	-1%	-1%	-1%	-20%	-28%	-28%
Change in Average October Flow	17%	16%	16%	3%	-14%	-10%
Change in Average November Flow	24%	23%	23%	14%	-5%	-2%
Change in Average December Flow	27%	26%	26%	20%	2%	3%

Regime Behavior Relative to Baseline	Baseline	Scenario 1: Business as Usual	Scenario 2: Weak Economy	Scenario 3: Cooperative Growth	Scenario 4: Adaptive Innovation	Scenario 5: Hot Growth
Change in Average January Flow	-	-1%	0%	-2%	-19%	-19%
Change in Average February Flow	-	-1%	0%	4%	-10%	-9%
Change in Average March Flow	-	0%	0%	22%	10%	10%
Change in Average April Flow	-	0%	0%	33%	26%	25%
Change in Average May Flow	-	1%	1%	19%	10%	8%
Change in Average June Flow	-	1%	1%	-14%	-24%	-26%
Change in Average July Flow	-	1%	1%	-30%	-38%	-39%
Change in Average August Flow	-	0%	0%	-25%	-31%	-30%
Change in Average September Flow	-	0%	0%	-19%	-27%	-27%
Change in Average October Flow	-	-1%	-1%	-14%	-31%	-27%
Change in Average November Flow	-	-1%	-1%	-10%	-29%	-26%
Change in Average December Flow	-	-1%	-1%	-7%	-25%	-24%

ii. This stretch of the Colorado River achieves high flows of 22,000 af every 7 years or so; this will likely decline to a comparable flow only once every 20 years.

iii. They modeled how the changing flow regime affects sediment transport from Rulison down through Utah. This has implications for habitat diversity and quality.

iv. They mapped fluvial hazard zones, and developed a tool that cities and counties can use for flood control.

v. They created a rapid assessment of riparian health from Glenwood Springs to Grand Junction, and targeted areas in need of Endangered Species management.

vi. They identified stream reaches and their importance to sport fish, and barriers like low-head dams that prevent fish from reaching important habitat, and the relationship of flow to habitat.

vii. Current and projected recreation use was modeled. The river through Glenwood Springs is very busy, but there is little use by Debeque, although communities are hoping for more recreational use in the future.

viii. They produced a River Guide for this stretch of the river, now in print.

e. More detail is available at Midcowatershed.org/IWMP

f. A 2 1/2 hour video is also available.

g. Action plan

i. Protect existing and future water uses.

ii. Each of the 55 projects are included on the Roundtable's IPP list, and each is described on the website in 1-page Cut-Sheets, describing the action item, principal partners and stakeholders, opportunities, constraints, and challenges, a time frame, costs, and implementation steps. Items in blue are underway, and items in green have received funding. There are 4 categories:

1) Water Quality/Riparian
2) Aquatics
3) Consumptive
4) Recreation

iii. High priorities include:

1) The Shoshone water right

2) Best Management Practices for floodplain management.

3) Best Management Practices for gravel pit reclamation—how to reclaim gravel pits to reduce evaporative losses, and to integrate them into river floodplain management.

4) Reconfigure barriers for fish passage. The upper half of the reach is very important for fishing, and from Rifle downstream, the warmer water is important for endangered fish. They historically used tributaries to spawn. Many tributaries have barriers to fish passage from irrigation structures such as low head dams that divert water into irrigation ditches.

5) Post Fire Watershed Management.

6) Renewal of the Upper Colorado River Recovery Program, now scheduled to sunset in 2023. This is very important to water users,

7) The Recreational River Guide covers the river from the Shoshone dam to the Roller Dam at Cameo. It's main goal is to educate users to use the river in a safe and responsible manner.

8) RICDs by the City of Rifle.

9) Consumptive use action items include coordinating upgrades to agricultural diversion structures with fish passage improvements.

10) Another consumptive use action plan is to build Kendig Reservoi**r** to help ameliorate agricultural irrigation water shortages on the south side of the Colorado River.

iv. The CWCB has provided grants to help fund 9 projects; 3 projects include fish passage, and the river access map. The Colorado River District has provided a grant for water quality monitoring after the 2020 Grizzly Creek fire in Glenwood Canyon and the Pine Gulch fire west of Debeque. They are also studying how to use the Weather Alert System to predict sudden water events.

v. This is a living document, and it will be continually updated. Angie Fowler touted the IWMP as a model for future IWMP efforts.

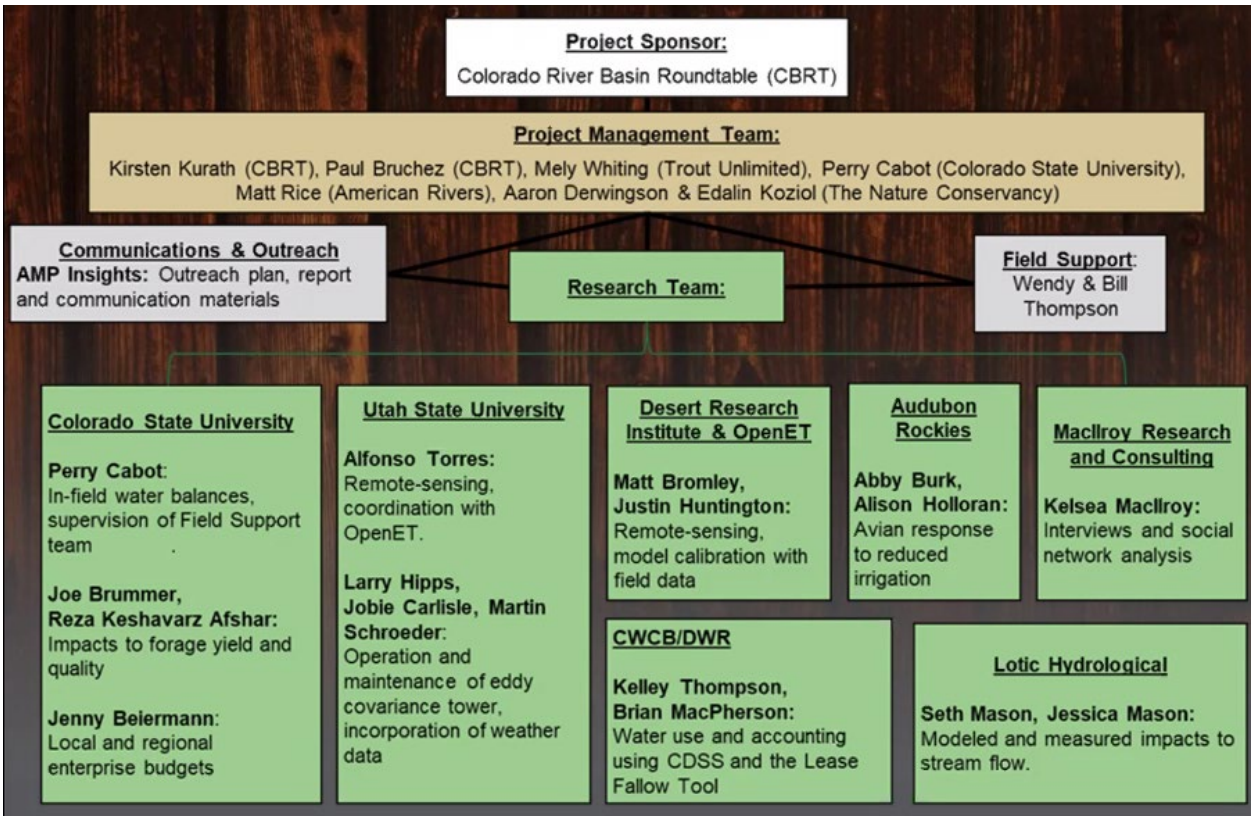
vi. The 2015 BIP included an action item for LOTIC and Colorado Mesa University to compile existing reports in the Middle Colorado Region onto a website for public access. This has been done, and there is also an interactive data dashboard that has detailed information about particular water reaches. Angie recommends that the Colorado Basin adopt a project

for the 2021 BIP update to add new information garnered in the IWMP into the data dashboard.

vii. You can find these data dashboards here: http://uppercoloradoriver.org/co-river-headwaters/data-dashboards/

10. **Evaluating Conserved Consumptive Use in the Upper Colorado River, Paul Bruchez, Matt Bromley of the Desert Research Institute, Aaron Derwingson of the Nature Conservancy, and Perry Cabot of CSU.**

a. The targeted area includes hay meadows between 7,300 and 8,000 feet above sea level, totaling 1,200. Partners are listed below.



b. Remote sensing equipment tracked soil moisture.

c. 2020 was unusually dry and cold—there were 4 freezing nights in June, 3 in July, and 12 in August, resulting in only 80 freeze-free days; by comparison, there were 120 total freeze-free days in 2017. There was three times more precipitation in 2017 than 2020. It's freezing earlier in the fall now; this highlights the importance of yearly variation.

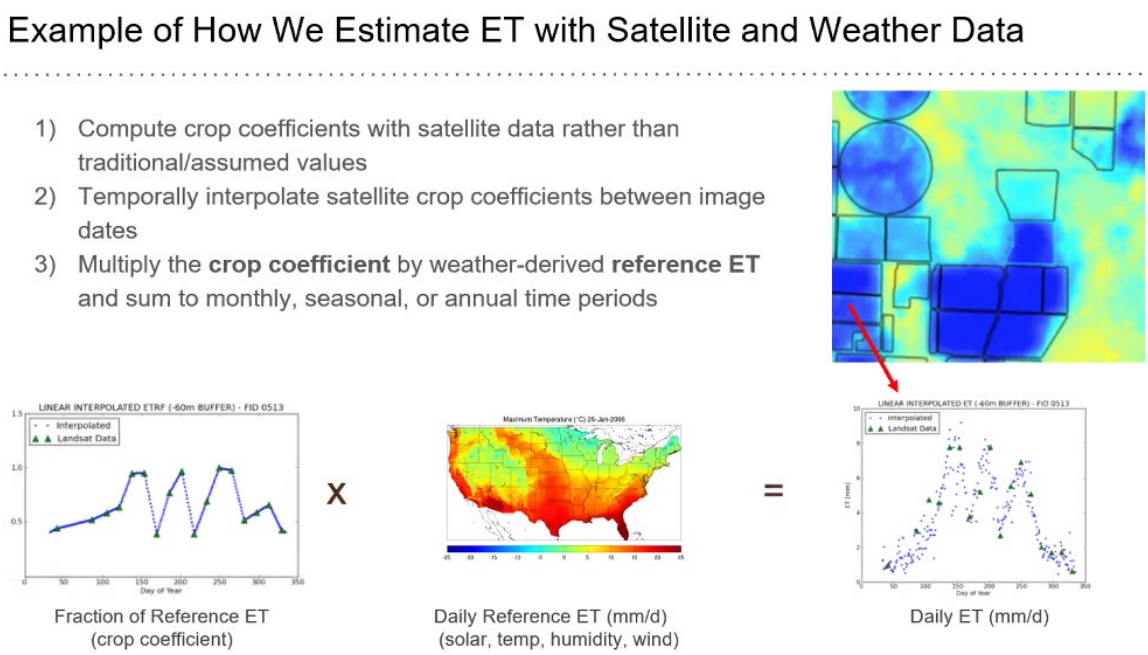
11. **Matt Bromley, Desert Research Institute, Reno NV, is with the OpenET Project**, a partnership of 12 institutions focused on water management and water use, including NASA, EDF, Google, the USDA and USGS, and the Universities of Idaho, Maryland,

Nebraska, and Wisconsin. It uses a web-based platform to show evapo-transpiration; see https://openetdata.org/. OpenET's goal is to accurately and cheaply indicate evapo-transpiration compared to previous time intensive methods like lysimeters.

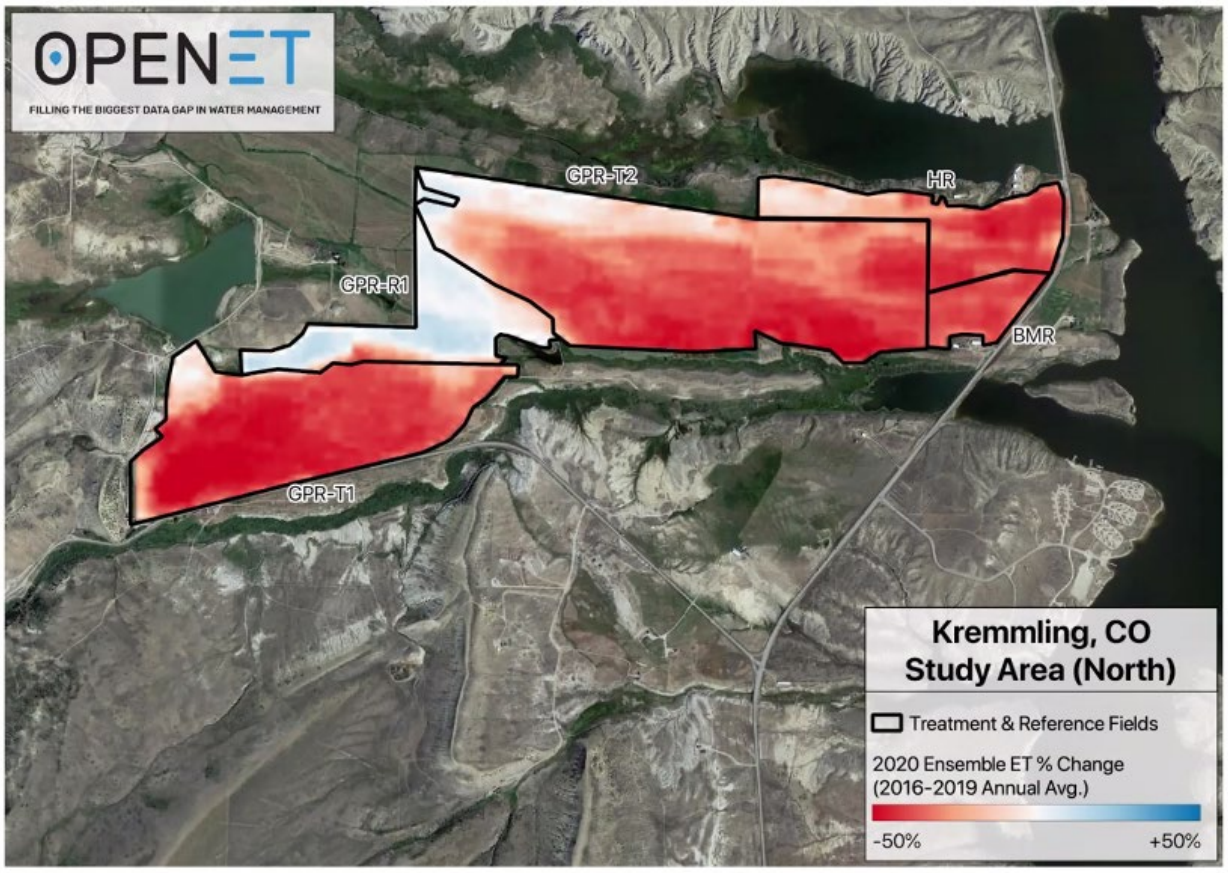
a. Consumptive use and evapo-transpiration are often used interchangeably. Irrigation water can be either consumed by plants, recharge the groundwater, or runoff into streams. OpenET uses several different models to measure evapo-transpiration constructed by EEMetric of the Univ of NE and ID, SIMS developed by NASA, and PT-JPL developed by the Jet Propulsion Laboratory.

b. They combine data from satellites with monitoring stations on the ground. Landsat satellites fly over each part of the earth every 16 days, providing updated readings where each pixel represents a quarter acre.

c. They calculate a crop coefficient for every pixel, i.e., for each quarter acre. They interpolate daily data between the 16-day flyover intervals by measuring temperature and wind each day to derive daily evapo-transpiration. The blue colored pixels below indicate irrigated fields.



d. They separated the Kremmling data into 3 different regions, including both treatment fields and reference fields. The deep red indicates a 50% decline in evapo-transpiration.



Summary

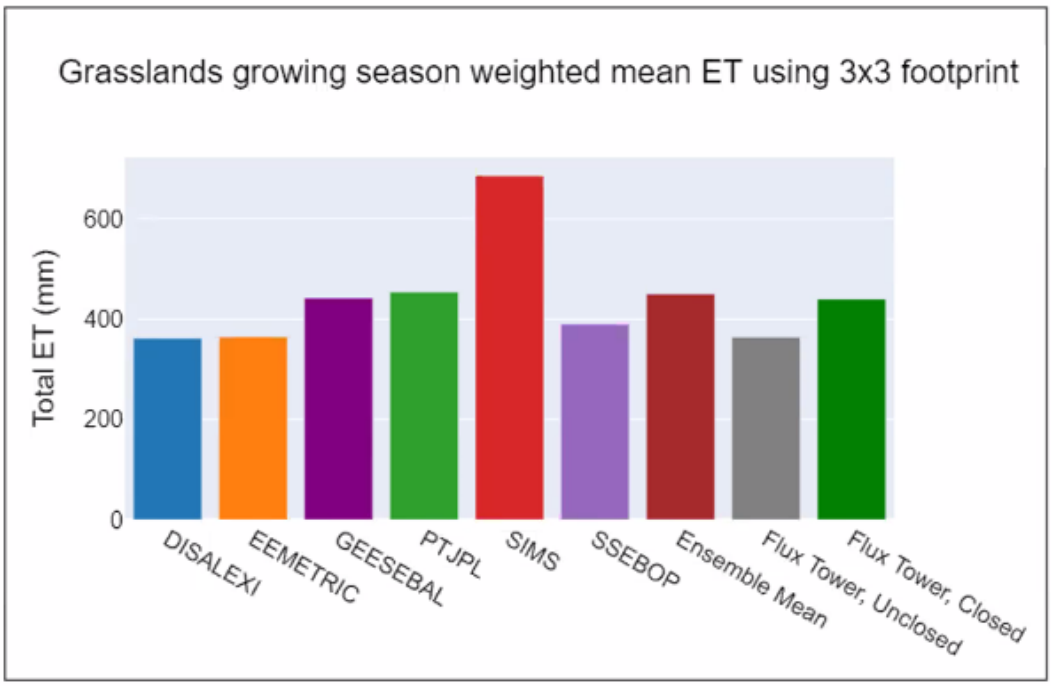
- Treatment fields showed a reduction in ET ranging from -44% to -18%
  (includes full and split-season treatment)
- Reference fields maintained ET rates similar to the 2016-2019 annual average (-6% to +2%)

Site	Field Type	Percent Change in 2020 (compared to 2016-2019)
BMR	Treatment	-44.11%
BSR	Treatment	-20.33%
GPR-R1	Reference	-5.85%
GPR-T1	Treatment	-49.29%
GPR-T2	Treatment	-38.24%
HR	Treatment	-37.21%
RSR-R1	Reference	1.55%
RSR-T1	Treatment	-18.37%
SBR-R1	Reference	-0.47%
SBR-T1	Treatment	-34.67%
SPR-R1	Reference	-0.53%
SPR-T1	Treatment	-30.76%

e. The significance of this is that they have developed a method of determining evapo-transpiration on every field. It is sensitive to wind readings. They develop

a "wind rose" which shows the prevailing wind direction and speed. They develop a evapo-transpiration reading that is comparable to other fields.

f. They show that different fields have different evapo-transpiration rates as shown in the bars below; most readings closely resemble the model, and when they do not, they re-calibrate the model.



g. Effect of 2020 being an outlier year: They can see through year-to-year variations. This does not really affect the value of the study. Perry Cabot says they are as interested in monthly variation as well as annual variation. 2020 was such a dry year it provides a bottom line reading of consumptive use in a dry year.

h. Smoke in the air: This can be adjusted when images are processed.

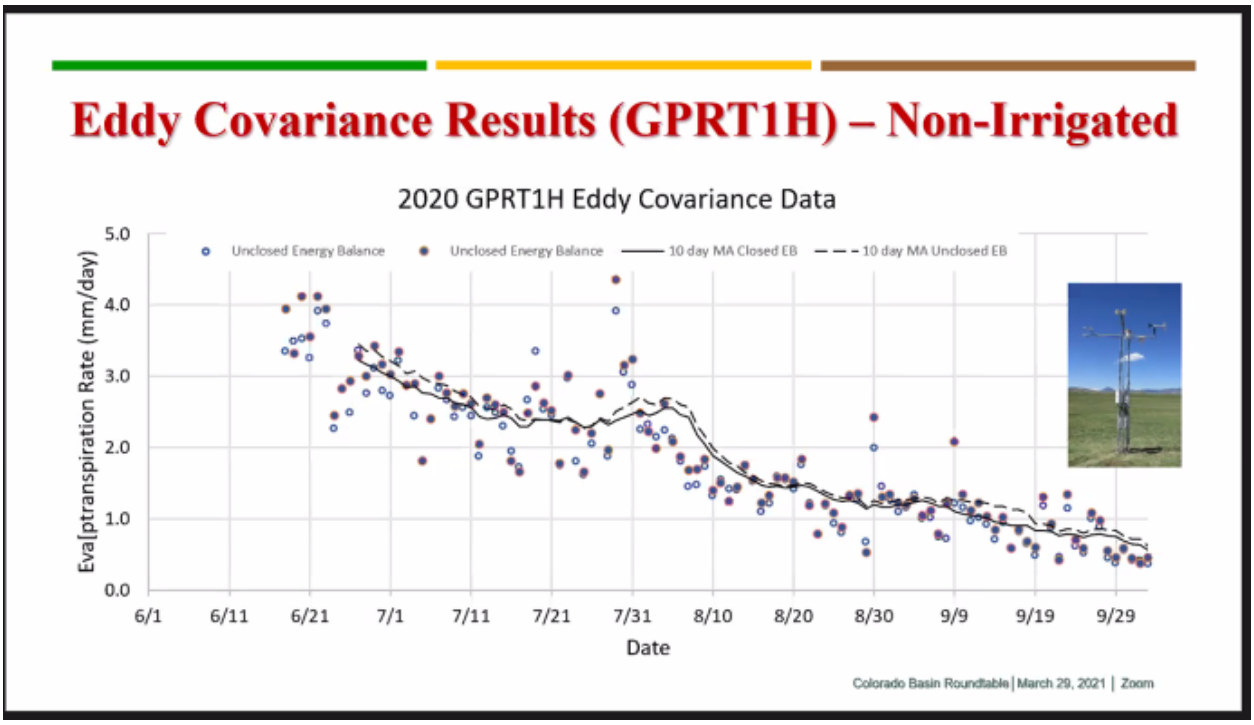
i. Other stakeholders: Usually there's been a single evapo-transpiration model to use. OpenET provides an additional model, and makes all the models better. Various models can be compared. Its mutually beneficial for all parties.

12. **Perry Cabot, PhD, CSU Fort Collins**.

a. The Upper Colorado River Consumptive Use Project is having a national impact on the research that OpenET is doing.

b. The prior data gap really has to do with the size of projects. This is scalable. We know that irrigated pastures are a heavy user of water; the size of this project will help advance the science, and how to use Landsat to estimate consumption on larger fields.

c. July evapo-transpiration provides a good snapshot of what is happening on the pastures. On average, the Upper Colorado Basin near Kremmling experiences 5.4mm per day water consumption during the irrigation season. In the Upper Gunnison it is 4.36 mm per day. There are considerable differences in evapo-transpiration between regions.



d. This shows that evapo-transpiration drops as the season progresses. The spike in the middle is from a rainfall event.

e. Evapo-transpiration declined from 4.0 mm per day on 6-18-20 to 0.5 mm/day on 10-22-20; the July average was 2.4 mm/day. About half of the evapo-transpiration is provided by stored soil moisture or precipitation. The soil moisture sensors permit us to determine how much water credit should result from rainfall.

f. We need to compare these evapo-transpiration numbers with other evapo-transpiration readings. Perry Cabot manages the soil moisture sensors, and Matt estimated evapo-transpiration based on satellite data. They use 3 tools: a pixel they can see from space, a covariance tower to measure temperature and wind speed, and moisture sensors on the ground.

g. They see a good correspondence with moisture sensors in the 0-24cm depth (0-10”); less from 24 to 48cm. The root zone reaches into this latter depth.

h. Forage data: Wendy Thompson measured hay growth regularly.

i. Every field is different, and the data confirmed where the rancher pinpointed the high production areas of his field.

j. The 2021 season will show the impact of the study. They'll have a solid data set, and every sample taken inside an enclosure was accompanied by 5 readings outside and adjacent to the enclosure. This will enable the researchers to compare the money received from conserved consumption with the money lost from decreased hay production.

13. Aaron Derwingson, The Nature Conservancy, discussed a budget request. The overall project cost is $1.5m; phase 1 occurred in 2020, and it involved paying producers to curtail water use and to purchase equipment. The phase 2 budget is $498,000, which will cover the next 3 seasons.

a. The last funding need is to hire two field technicians to work the next 3 seasons for a fee of $27,400 per year ($82,200 total). They are asking $35,000 from the statewide account, $19,800 from the CBRT Basin WSRA Reserve Account, and the balance from NGOs.

14. **Bailey Leppak, Angie Fowler, Matt Lindburg BIP update.**

a. Ken Ransford recommended changing the Themes & Goals slide on Safe Drinking Water to add "emerging contaminants," but SGM stated that it did not want to call out any single threat to water quality since there are many.

b. Hannah Holm recommended scheduling periodic meetings to discuss funding and IPP progress.

c. Peggy Bailey: Replace the term "reduce the risks" with "'to inform and plan" in the strategy "Use the Integrated Water Management Planning (IWMP) process to reduce the risks to environmental and recreational values and water supply for all sectors."

d. Richard Vangytenbeek: IWMPs are ongoing processes, and he recommends that we have a schedule and continued funding to update the IWMPs. Without continued funding, the IWMP plans will get dated and lose their importance.

e. Stan Cazier suggested changing the following strategy in Addressing the "Gap:" "New**:** Model impacts from *present and new* transmountain diversions"

i. Neither the Windy Gap nor the Fraser River diversions are being modeled. One planned transmountain diversions is the Gross Reservoir expansion; The reservoir expansion has not been approved yet, so this diversion is not being modeled. Merritt Linke asked if it can be included in the future.

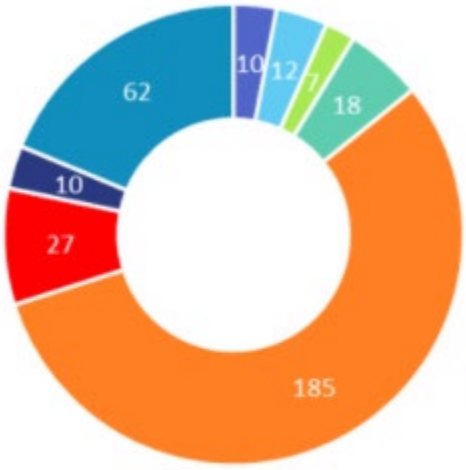
f. Baseline gap—the gap right now.

i. Incremental gap—the gap when future transmountain diversions are brought online.

ii. Matt Lindburg recommends that we phrase our BIP report so the existing gap does not get worse.

iii. Jojo La of the CWCB said the CWCB must model the impacts of transmountain diversions every 5 years. This could help quantify depletions from transmountain diversions.

15. Proposed projects. The term "IPP list" has been replaced with "Project Database." Below is a breakdown of the proposed projects.



DRAFT NUMBERS	Total	Total with Yield	% with Yield
Ag Efficiency	10	6	60%
Ag Rehab	12	4	33%
Ag Supply	7	6	86%
Compact/ DM/ Xmtn/ Shoshone	18	3	17%
E&R/Studies	185	-	-
M&I Supply	27	7	26%
Muni Reuse / Conservation	10	3	30%
Reservoirs	62	51	82%

- Environment and Recreational (E&R) Projects & Studies dominate
- Most projects with yield are reservoir projects (enlarged and new)
- Most of reservoirs identified are multi-benefit reservoirs (Ag, M&I, E&R)

16. Proposed Agricultural projects include the following. The Middle Colorado Region has the highest agricultural gap and the highest percent of reservoirs dedicated to agriculture. The need for Kendig Reservoir is representative of this.

IPP Stories and Observations and Highlights Agriculture

	Eagle	Grand County	Grand Valley	Middle	Roaring Fork	State Bridge	Summit	Total
Ag Efficiency	-	-	4	5	1	-	-	10
Ag Rehab	-	1	7	4	-	-	-	12
Ag Supply	-	2	-	2	3	-	-	7
Reservoirs	4	24	6	7	14	2	4	62
% Ag Need	19%	34%	27%	38%	30%	33%	15%	-

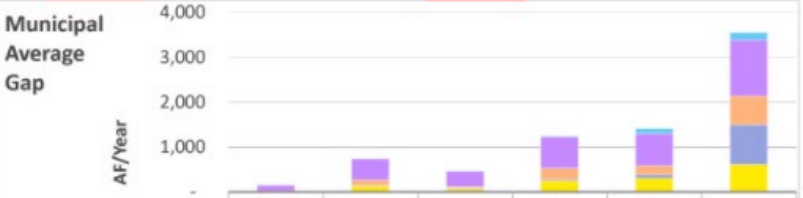
	Baseline	A	B	C	D	E
Summit Region	21	21	21	186	145	482
State Bridge Region	3,343	3,343	3,343	7,996	6,879	10,771
Roaring Fork Region	3,188	3,181	3,181	6,583	5,558	9,591
Middle Colorado Region	26,096	26,108	26,108	37,081	31,356	45,488
Grand Valley Region	6,077	5,440	5,433	10,675	5,821	17,047
Grand County Region	6,563	5,900	5,899	13,685	11,738	20,395
Eagle Region	0	0	0	2	1	8

17. Grand County is focused on new reservoirs, while the Grand Valley is focused on Ag efficiency and rehabilitation—not storing additional supplies, but getting the most use out of existing water supplies.

18. M&I gap: The Roaring Fork has the highest M&I gap; it is rapidly urbanizing, and is at high risk of ag transfers as development occurs. Reservoirs and Alternative Transfer Methods (ATMs) could be part of the solution. Eagle and Summit Counties are anticipating more snowmaking. This fits in will with climate projections.

IPP Stories and Observations and Highlights M&I

	Eagle	Grand County	Grand Valley	Middle	Roaring Fork	State Bridge	Summit	Total
M&I Supply	11	7	-	1	3	-	5	27
Muni Reuse Conservation	3	-	-	-	4	-	2	10
Reservoirs	4	24	6	7	14	2	4	62
% M&I Need	61%	34%	57%	31%	47%	33%	40%	-



	Baseline	A	B	C	D	E
Summit Region	7	9	8	19	120	171
State Bridge Region	-	-	-	-	-	-
Roaring Fork Region	122	482	348	704	710	1,248
Middle Colorado Region	14	116	29	248	199	635
Grand Valley Region	7	15	11	35	82	892
Grand County Region	-	125	73	237	300	605
Eagle Region	-	-	-	2	-	-