

Engineering Committee Report

Republican River Compact Administration

August 28th, 2024

EXECUTIVE SUMMARY

This document reports the activities of the Republican River Compact Administration (RRCA) Engineering Committee (EC) from the August 31st, 2023, RRCA Annual Meeting to the August 28th, 2024, RRCA Annual Meeting. The EC met four times since the August 31st, 2023, RRCA Annual Meeting and completed eight of the nine tasks it was assigned. The following tasks were completed: 1) hold quarterly meetings; 2) exchange information listed in Section V of the RRCA Accounting Procedures and Reporting Requirements, including all required data and documentation; 3) finalize 2023 accounting; 4) continue work on documenting historical changes to the RRCA Accounting Procedures; 5) provide updates on the progress of new and ongoing management strategies for maintaining Compact compliance; 6) continue development and maintenance of the RRCA administrative website that serves as an informational page for the public and provide regular updates to the EC; 7) continue work and provide updates on improving accounting tools developed by the Engineering Committee; and 8) work to prepare the 2022 RRCA annual meeting report.

One task remains before the EC: 9) identify a mutually agreeable verification process with criteria so that the Compact commissioners can verify that Colorado met its obligation of retiring 10,000 acres, and so such verification can take place on or before the date of the 2024 Compact administration meeting.

Attachment 1: Agendas and Minutes of the quarterly meetings of the EC

Attachment 2: Accounting Inputs and Accounting Tables from the RRCA Accounting for 2023 recommended by the EC for approval by the RRCA (Task 3)

COMMITTEE ASSIGNMENTS AND RELATED WORK ACTIVITIES

1. Meet quarterly to review the tasks assigned to the committee.
 - The EC met November 8, 2023; January 18, 2024; April 18, 2024; and July 11, 2024. See Attachment 1 for the approved minutes of these meetings.
2. Exchange by April 15, 2024, the information listed in Section V of the RRCA Accounting Procedures and Reporting Requirements, and other data required by that document, including all necessary documentation. By July 15, 2024, the states will exchange any updates to these data.
 - Nebraska posted its data on April 12, 2024, and provided an update on June 28, 2024.
 - Kansas posted its data on April 12, 2024, and provided an update to the data on July 9, 2024.

- Colorado posted its data on April 12, 2024, along with the Crop Irrigation Requirement (CIR) data. There were no changes to the data posted in April.
3. Finalize the 2023 accounting and recommend it for approval by the RRCA.
 - Colorado, Kansas, and Nebraska accounting data for 2023 are final and the EC hereby recommends approval of the accounting by the RRCA.
 - The applicable summary accounting tables are presented in Attachment 2.
 4. Continue work on creating a document memorializing when RRCA Accounting Procedures (AP) have changed over the years and incorporate it into the AP.
 - The most recent version of the document, as amended by Nebraska with the approved RRCA Groundwater Model 2022 Update from the 2023 RRCA meeting, was posted to the RRCA website.
 5. Provide updates on the progress of new and ongoing management strategies for maintaining compact compliance.
 - Kansas informed the EC that minimum desirable streamflow was being enforced in parts of the basin. The EC heard several updates on the status of automation efforts on the Courtland Canal along with preliminary information on the status of the NRCS-sponsored Regional Conservation Partnership Program in the Upper Republican River Basin, which will focus on phreatophyte removal along the river channel. Kansas received confirmation from Nebraska that the U.S. Bureau of Reclamation had complied with Nebraska's closing notice and added 1,860 acre-feet of Remaining Compact Compliance Volume to the Kansas Account.
 - Nebraska provided updates on the current year forecasting and Compact Compliance Volume estimates and kept the other states informed of the status of Water Short and Compact Call Year determinations. Nebraska discussed anticipated and completed management actions for its 2024 Compact Call Year, including administration of 3,440 acre-feet for the Kansas Bostwick Irrigation District (KBID) account in Harlan County Lake. Nebraska reported on activities regarding the Platte-Republican Diversion project.
 - Colorado provided updates on deliveries by the Colorado Compliance Pipeline (CCP), which was anticipated to be nearly 11,000 acre-feet for the year 2024. Colorado also detailed the efforts by the Republican River Water Conservation District (RRWCD) to retire acres in the South Fork Republican River basin area.
 6. Continue efforts to develop and publish an administrative website that would be an informational page for the public.
 - State staff have maintained and updated the website, which is accessible to the public, and reported back to the EC.

7. Continue work and provide future updates on improving accounting tools developed by the Engineering Committee.
 - The EC continues to use the website accounting tool to validate the accounting spreadsheet results.
8. Prepare the 2023 RRCA annual meeting report for approval by the RRCA at the 2024 annual meeting.
 - The report has been finalized and approved by the EC and is hereby recommended for approval by the RRCA.
9. Identify a mutually agreeable verification process with criteria so that the Compact commissioners can verify that Colorado met its obligation of retiring 10,000 acres, and so such verification can take place on or before the date of the 2024 Compact administration meeting.
 - Kansas requested a GIS coverage of the retired acres to identify location and quantity of acres for verification.
 - The RRWCD provided a list of the retirement contracts along with a GIS shapefile, but Kansas wanted further clarification of the data and GIS shapefile.
 - Nebraska also requested a GIS coverage of the retired acres to identify location and quantity of acres for verification.

ITEMS FOR RRCA DISCUSSION & ACTION

1. The EC recommends the proposed 2023 accounting presented in Attachment 2 and in the spreadsheet titled “RRCA Accounting 2023 Final.xlsx” for approval by the RRCA. Upon approval of the accounting, the above-mentioned spreadsheet file will be placed on the public website.
2. In addition to any other assignments from the Administration, the EC recommends that Principia Mathematica continue in Compact year 2024 to maintain the web-based accounting tool and perform periodic model and accounting updates at the same level of service as in 2023.
3. Identify a mutually agreeable verification process with criteria so that the Compact commissioners can verify that Colorado met its obligation of retiring 10,000 acres, and so such verification can take place on or before the date of the 2024 Compact administration meeting.
4. The EC respectfully offers the following list of recommended assignments to work on in the coming compact year and report on at the 2025 annual meeting of the RRCA.

RECOMMENDED ASSIGNMENTS FOR THE COMING YEAR

1. Meet quarterly to review the tasks assigned to the committee.

2. Complete the 2024 compact accounting:
 - Exchange by April 15, 2025, the information listed in Section V of the RRCA Accounting Procedures and Reporting Requirements, and other data required by that document, including all necessary documentation.
 - Exchange by July 15, 2025, any updates to these data.
 - Finalize the 2024 accounting and recommend it for approval by the RRCA.
3. Continue to develop and maintain:
 - *Summary of Historical Changes to the RRCA's Accounting Procedures and Reporting Requirements* as necessary.
 - the RRCA administrative website that serves as an informational page for the public
 - accounting tools developed by the Engineering Committee.
4. Provide respective state updates on the progress of new and ongoing management strategies for maintaining compact compliance
5. Prepare the 2024 RRCA annual meeting report for approval by the RRCA at the 2025 annual meeting.

The Engineering Committee Report and the exchanged data will be posted on the web at <http://republicanriver.org/>

SUBMITTED TO THE RRCA BY


Christopher Beightel, Chair and Engineering Committee Member for Kansas


Kari Burgert, Engineering Committee Member for Nebraska


Ivan Franco, Engineering Committee Member for Colorado

**MINUTES of the
QUARTERLY MEETING of the
ENGINEERING COMMITTEE of the
REPUBLICAN RIVER COMPACT ADMINISTRATION**

November 8, 2023 2:00 pm Central Time

1. Introductions
 - a. Kansas – Chris Beightel, Chelsea Erickson, Hongsheng Cao, Sam Perkins
 - b. Nebraska – Kari Burgert, Sam Capps, Brian Flynn, Elizabeth Esseks, Stefan Remund
 - c. Colorado – Ivan Franco, Willem Schreuder
2. Review/Modify Agenda
 - a. There were no modifications to the agenda.
3. Review and Update Progress on Engineering Committee Task List (See agenda items below)
4. Summary of Meeting Actions/Assignments
 - a. Chelsea to post the accounting tracking document on the website.
 - b. Ivan to consult with Kevin on concurrence with the Kansas RCCV letter.
 - c. Kansas will start a list of requests for verification of Colorado's retired acres.
 - d. Colorado will check internally and with the District on information that was available to provide for verification of Colorado's retired acres.
 - e. Annual report transcript review is on-going. Nebraska will start the reviewing process and then pass that along to Kansas.
5. Future Meetings
 - a. Request for using Zoom platform as Nebraska and Colorado do not have the Teams software.
 - b. Chris mentioned that Sam Capps had offered to set up the court reporter for the 2024 annual meeting, so Kansas has settled on the meeting date of August 29th in Colby.
 - i. Sam will check that date with the reporter.
 - ii. Elizabeth asked how to coordinate that process.
 - iii. Chris said Kansas would pay for her services if Nebraska can coordinate getting the reporter to the meeting.
 - c. Sam noted that Kari accepted the tech coordinator position in DNR. Her activities with the Engineering Committee will not be impacted by the change. Congratulations were offered to Kari and her new position.
6. Adjourn

ENGINEERING COMMITTEE TASK LIST

1. Meet quarterly to review the tasks assigned to the committee.
 - a The quarterly meetings have been scheduled.
2. Exchange by April 15, 2023, the information listed in Section V of the RRCA Accounting Procedures and Reporting Requirements, and other data required by that document, including all necessary documentation. By July 15, 2023, the states will exchange any updates to these data.
 - a No progress yet.
3. Finalize the 2022 accounting and recommend it for approval by the RRCA.
 - a No progress yet.
4. Maintain and publish updates to Summary of Historical Changes to the RRCA's Accounting Procedures and Reporting Requirement's as necessary.
 - a Chris asked for any updates to the document.
 - b Kari stated the most recent document was drafted by Nebraska, approved at the annual meeting and should be posted to the website.
 - c Chelsea noted that the document had not been published to the website yet, so will add that as an action item.
 - d Ivan agreed to Kari's review of the history of this task.
5. Provide updates on the progress of new and ongoing management strategies for maintaining compact compliance.
 - a Chris announced there were no updates from Kansas at this time.
 - b Kari noted that Nebraska had received Kansas' letter requesting RCCV and Tom (Riley) responded. The letter also requested Colorado concurrence with the issue. Kari mentioned that Nebraska will be making management actions by June 1, 2024.
 - Chris asked Ivan if Colorado has discussed the letter and Ivan responded that he would follow up on that question.
 - c Ivan mentioned the Colorado compliance report from September and asked Willem for an update on the Colorado Compliance Pipeline. Willem reported that the pipeline was turned on at the beginning of October and appeared to be on target to provide 12,500 acre-feet by the end of the year.
6. Continue development and maintenance of the RRCA administrative website that serves as an informational page for the public and provide regular updates to the EC.
 - a Chelsea will get the accounting history document added to the website. She also mentioned that all the annual meeting documents have been posted and the front page of the website has been updated as well.
7. Continue work and provide future updates on improving accounting tools developed

by the Engineering Committee.

- a There were no updates identified.
8. Prepare the 2022 RRCA annual meeting report for approval by the RRCA at the 2023 annual meeting.
- a Elizabeth confirmed that Nebraska will begin review of the meeting transcript after the Basin-Wide Plan Annual Meeting.
9. Identify a mutually agreeable verification process with criteria so that the Compact commissioners can verify that Colorado met its obligation of retiring 10,000 acres, and so such verification can take place on or before the date of the 2024 Compact administration meeting.
- a Chris asked the committee to review the new task of verifying Colorado's 10,000 retired acres. There was a discussion about the specific language for the task.
 - b Chris asked for an informal discussion about the verification process and mentioned that Kansas would like to see a GIS coverage of the acres retired to identify location and quantity of acres for easier verification by the Kansas team. Chris mentioned there may be additional items to add.
 - c Kari mentioned that "when" of the retirement contracts may also be important to show the time period that the acres are retired, or if there is just a start date for the acre retirement.
 - d Chris suggested circulating a bullet-style list of items to discuss before the next committee meeting. He offered to provide a list to Nebraska first and then they pass it along to Colorado for additional review.
 - e Ivan confirmed that the District in Colorado has an internal list of the retirement contracts and a map but was not sure if they were ready for distribution. He offered to follow up with the District and also looked forward to reviewing the list of items to discuss. Ivan also offered to check with Kevin Rein to see if there was any additional information available relating to this task. Ivan mentioned he would send an email with the most up to date information he has available, so the states can review that before offering their list of questions.

**MINUTES of the
QUARTERLY MEETING of the
ENGINEERING COMMITTEE of the
REPUBLICAN RIVER COMPACT ADMINISTRATION**

January 18, 2024 2:00 pm Central Time

1. Introductions
 - a. Kansas – Chris Beightel, Chelsea Erickson, Steven Thurlow
 - b. Colorado – Ivan Franco, Willem Schreüder
 - c. Nebraska – Kari Burgert, Sam Capps, Brian Flynn, Stefan Remund
2. Review/Modify Agenda
 - a. There were no modifications to the agenda.
 - b. Nebraska has made edits to the November draft minutes and will circulate those to Colorado next.
3. Review and Update Progress on Engineering Committee Task List (See agenda items below)
4. Summary of Meeting Actions/Assignments
 - a. Kansas will start a list of requests for verification of Colorado's retired acres.
 - b. Colorado will check with the District on information that is publicly available for verification of Colorado's retired acres.
 - c. Annual report transcript review is on-going.
5. Future Meetings
 - a. April 18 and July 11 next EC meetings.
 - b. Chris will send Zoom meeting links for each meeting.
6. Adjourn

ENGINEERING COMMITTEE TASK LIST

1. Meet quarterly to review the tasks assigned to the committee.
 - a The quarterly meetings have been scheduled.
2. Exchange by April 15, 2024, the information listed in Section V of the RRCA Accounting Procedures and Reporting Requirements, and other data required by that document, including all necessary documentation. By July 15, 2024, the states will exchange any updates to these data.
 - a Kari noted that the US Bureau of Reclamation (Bureau) has sent most of their data.
 - b Willem noted that he tried to enter the reservoir evaporation from the Bureau data and could not get that to line up, so asked if there was an adjustment made. Kari mentioned that the Bureau data are gross evaporation and then the states calculate net evaporation.
3. Finalize the 2023 accounting and recommend it for approval by the RRCA.
 - a No progress yet.
4. Maintain and publish updates to Summary of Historical Changes to the RRCA's Accounting Procedures and Reporting Requirements as necessary.
 - a Chelsea gave an update that the document has been posted to the three-states website.
5. Provide updates on the progress of new and ongoing management strategies for maintaining compact compliance.
 - a Chris mentioned the letter from Kansas to Nebraska for the RCCV. On December 14th, Kansas received confirmation from Nebraska that the Bureau had complied with Nebraska's closing notice and added the 1,860 acre-feet of Remaining Compact Compliance Volume that was requested by the state of Kansas to the Kansas Account. .
 - b Kari noted that Nebraska had sent the 2024 forecast to provide the final CCV, which was zero, and that 2024 is designated as a Compact Call Year. Nebraska DNR will be hearing from the Natural Resource Districts on their plans for compliance. Sam noted that Nebraska will provide Kansas with an update once those plans are reviewed and finalized.
 - Willem asked if 2024 is predicted as water short.
 - Kari noted that the water supply is forecasted at 103,000 acre-feet, so there would need to be quite a turn around to reach 119,000 AF.
 - c Ivan mentioned that Tracy Kosloff is now the acting State Engineer.
 - d Willem noted that the pipeline is running and forecasted to pump around 11,000 or 12,000 acre-feet. That estimate will be re-evaluated in April. The District is planning to deliver around 6,000 to 7,000 AF in spring.

- Chris asked if there were any problems with icing of the pipeline wells.
 - Willem says as long as the volume remains steady then there are no issues, but when the wells stop then there are issues with re-starting.
6. Continue development and maintenance of the RRCA administrative website that serves as an informational page for the public and provide regular updates to the EC.
 - a Chelsea updated that the accounting history document was added. Then she found a few broken links on various pages and got those fixed. Waiting on Nebraska to respond to an email about one of their links.
 - b Chelsea will update the Colorado commissioner information when the time comes.
 7. Continue work and provide future updates on improving accounting tools developed by the Engineering Committee.
 - a There were no updates identified.
 8. Prepare the 2023 RRCA annual meeting report for approval by the RRCA at the 2024 annual meeting.
 - a Kari mentioned that Nebraska has done an extensive review of the annual meeting transcript and will pass that file along once it's finished.
 9. Identify a mutually agreeable verification process with criteria so that the Compact commissioners can verify that Colorado met its obligation of retiring 10,000 acres, and so such verification can take place on or before the date of the 2024 annual meeting.
 - a Chris suggested circulating a bullet-style list of items to discuss before the next committee meeting. He offered to provide a list to Nebraska first and then they pass it along to Colorado for additional review.
 - b Ivan confirmed that the District in Colorado has a list of the retirement contracts and a map but was not sure if they were ready for distribution. He offered to follow up with the District.
 - c Ivan mentioned there is a simple spreadsheet that Kevin Rein sent out with the contact numbers and descriptions.
 - d Ivan noted that the groundwater commission is working with water right owners to update the permits once the wells are retired and the water right canceled. The canceled final permit might be available after that process is complete.
 - Chris asked if the state collects water use data by water right in a database, to do a before and after comparison on the irrigated acres.
 - Ivan replied that there are published diversion records available for the permits.

**MINUTES of the
QUARTERLY MEETING of the
ENGINEERING COMMITTEE of the
REPUBLICAN RIVER COMPACT ADMINISTRATION**

April 18, 2024 2:00 pm Central Time

1. Introductions
 - a. Kansas – Chris Beightel, Chelsea Erickson, Sam Perkins, Hongsheng Cao
 - b. Colorado – Ivan Franco, Willem Schreüder
 - c. Nebraska – Kari Burgert, Sam Capps, Brian Flynn, Stefan Remund, Elizabeth Esseks
2. Review/Modify Agenda
 - a. There were no modifications to the agenda.
 - b. Future meetings – annual meeting date and arrangements
3. Review and Update Progress on Engineering Committee Task List (See agenda items below)
4. Summary of Meeting Actions/Assignments
 - a. Colorado will continue working with the RRWCD on information that is available for verification of Colorado's retired acres and share that with the other states.
 - b. Annual report development continues.
 - c. Nebraska complete irrigated acreage verification with the NRDs and send updated datasets.
 - d. Finalize the January Engineering Committee minutes; Colorado was ok with the Nebraska edits.
5. Future Meetings
 - a. July 11 EC meeting.
 - b. Annual meeting in Colby on August 28th. Chelsea will share information on hotels in the area. Expect the meeting format to remain the same as past meetings.
6. Adjourn

ENGINEERING COMMITTEE TASK LIST

1. Meet quarterly to review the tasks assigned to the committee.
 - a The quarterly meetings have been scheduled.
2. Exchange by April 15, 2024, the information listed in Section V of the RRCA Accounting Procedures and Reporting Requirements, and other data required by that document, including all necessary documentation. By July 15, 2024, the states will exchange any updates to these data.
 - a Chris noted that the majority of Kansas data was posted April 12th and a final post was done April 15th, including the CIR summary and crop distributions.
 - b Nebraska data was posted April 12th as well. Kari noted that the Nebraska NRDs hired a contractor to overhaul the database that stores pumping and acres data. That process is on-going. The pumping data and certified acres are available, but the data are still being reviewed for accuracy. Sam Capps mentioned that the NRDs plan to use the database information to build dashboards for the producers to use for real-time decisions.
 - Willem asked about the format of that database and if Nebraska's pre-processor and RRPP inputs will continue to be in the current formats. Kari stated that once that database updates are finalized, Nebraska would work with Willem and the EC to make any necessary updates to the files for the groundwater model.
 - c Willem noted that Colorado data were included in the model update for the CCP projection on April 12th. All Colorado data provided should be in final form. The only thing that is still outstanding is the CIR spreadsheet.
3. Finalize the 2023 accounting and recommend it for approval by the RRCA.
 - a No update to report.
4. Maintain and publish updates to Summary of Historical Changes to the RRCA's Accounting Procedures and Reporting Requirements as necessary.
 - a No update to report.
5. Provide updates on the progress of new and ongoing management strategies for maintaining compact compliance.
 - a Chelsea gave an update on the Cheyenne County Conservation District's work with the settlement money including new solar pumps and removal of phreatophytes along the South Fork Republican in Kansas.
 - b Willem noted that the Colorado pipeline shut off April 12th with 6,004 AF delivered. The projection total is 11,000 AF, so deliver another 5,000 starting in mid-October depending on how the year goes.
 - c There is no update on Colorado's retirement of South Fork acres.
 - d Kari noted that there is a public hearing for the Platte-Republican Diversion project in late-May. Nebraska DNR has been conducting administration on 3,440 AF of Nebraska management actions from Harry Strunk Reservoir for

the KBID account in Harlan County Lake.

6. Continue development and maintenance of the RRCA administrative website that serves as an informational page for the public and provide regular updates to the EC.
 - a Chelsea updated that the RRCA annual meeting is on the home page and will update as more information is available. Chelsea will also update a link that Stefan provided for the Nebraska page.
7. Continue work and provide future updates on improving accounting tools developed by the Engineering Committee.
 - a No update to report.
8. Prepare the 2022 RRCA annual meeting report for approval by the RRCA at the 2023 annual meeting.
 - a Ivan mentioned that he received all the comments from the states and is working with the stenographer to get a final transcript. The meeting summary is in development as well.
9. Identify a mutually agreeable verification process with criteria so that the Compact commissioners can verify that Colorado met its obligation of retiring 10,000 acres, and so such verification can take place on or before the date of the 2024 Compact administration meeting.
 - a Chris reported that Earl Lewis contacted Deb Daniel with the Republican River Water Conservation District regarding the documentation of the South Fork focus zone retired acres and received a shapefile. The information Deb has provided needed more clarification, so Kansas is waiting to do a final review once additional data are available.
 - b Ivan mentioned that he located a comprehensive spreadsheet with the retirement information and hopes to get the Colorado GIS team to coordinate those documents into a user-friendly version with all the information available.

**MINUTES for the
QUARTERLY MEETING of the
ENGINEERING COMMITTEE of the
REPUBLICAN RIVER COMPACT ADMINISTRATION**

July 11th, 2024

2:00 Central Time

1. Introductions
 - a. Kansas – Chris Beightel, Chelsea Erickson, Sam Perkins, Hongsheng Cao
 - b. Colorado – Ivan Franco, Willem Schreüder
 - c. Nebraska – Sam Capps, Elizabeth Esseks
2. Review/Modify Agenda
 - a. There were no modifications to the agenda.
3. Review and Update Progress on Engineering Committee Task List (See agenda items below.)
4. Summary of Meeting Actions/Assignments
 - a. Nebraska will take the lead to provide a draft accounting spreadsheet for review.
 - b. Kansas and Nebraska will contact the Colorado leadership and also the Republican River Water Conservation District (RRWCD) to follow up on the GIS coverage request for approving the RRWCD's acre retirements.
 - c. The states will review the draft minutes from the April and July meetings.
 - d. Kansas will provide a draft of the annual Engineering Committee report to review.
 - e. The states will review the forthcoming 2023 annual report for approval at the annual meeting on August 28th.
5. Future Meetings
 - a. The next meeting(s) will be in Colby, Kansas, Wednesday August 28th 8:30 AM for the work session and 10:00 AM for the compact annual meeting.
 - b. Kansas will work to provide a livestream of the compact meeting; details will be forthcoming.
6. Adjourn

ENGINEERING COMMITTEE TASK LIST

1. Meet quarterly to review the tasks assigned to the committee.
 - a. This task is complete.
2. Exchange by April 15, 2024, the information listed in Section V of the RRCA Accounting Procedures and Reporting Requirements, and other data required by that document, including all necessary documentation. By July 15, 2024, the states will exchange any updates to these data.
 - a. This task is complete.
3. Finalize the 2023 accounting and recommend it for approval by the RRCA.
 - a. Sam Perkins reported accounting changes for Kansas of 600 acre-feet increase and 3,500 irrigated acre decrease, which specifically was due to corrections to the reported data.
 - b. Ivan Franco noted that the Colorado data was unchanged but questioned if the CIR data had been posted yet. Willem confirmed that the CIR information is available on the website in the Colorado 2024 folder.
 - c. Sam Capps reported that the Nebraska update was provided on June 28th. The state is doing a final review of the groundwater model input files but does not expect any changes.
 - d. Chris asked Sam (Capps) if Nebraska planned to do the first review of the accounting spreadsheet and Sam confirmed that it is being drafted and will share the spreadsheet once it's done.
 - e. Willem Schreüder sent out an accounting update the morning of July 11th and said he was aware of a change in the gage flow on Medicine Creek and reported that all the canal flows are up to date as well. He asked if there were any new updates and Sam (Capps) replied that Nebraska is reviewing their groundwater inputs but does not expect any further changes.
4. Maintain and publish updates to *Summary of Historical Changes to the RRCA's Accounting Procedures and Reporting Requirements* as necessary.
 - a. No update to report.
5. Provide updates on the progress of new and ongoing management strategies for maintaining compact compliance.
 - a. Sam (Capps) noted that it is not in a Water Short Year but is a Compact Call Year, so they will continue providing monthly accounting updates of Compact Compliance Volume to the states.
 - b. Willem noted that the Colorado Compliance Pipeline (CCP) will likely start running again the beginning of November. The RRWCD plans to provide a total of 10,000 acre-feet for the year, so likely another 4,000 acre-feet will be pumped in November and December. The RRWCD will know more by the end of August on the final amount needed to pump.
6. Continue development and maintenance of the RRCA administrative website that serves as an informational page for the public and provide regular updates to the EC.
 - a. No update to report.
7. Continue work and provide future updates on improving accounting tools developed by the Engineering Committee.
 - a. No update to report.

8. Prepare the 2023 RRCA annual meeting report for approval by the RRCA at the 2024 annual meeting.
 - a. Ivan reported that the transcript edits were incorporated by the reporter, so that should be complete. He expects to have the annual report draft ready in a week or two.
 - b. Chris mentioned starting the Engineering Committee report for this year as well.
 - c. Chelsea Erickson confirmed the minutes for April were circulated prior to the EC meeting and awaits comments from NE and CO staff.
9. Identify a mutually agreeable verification process with criteria so that the Compact commissioners can verify that Colorado met its obligation of retiring 10,000 acres, and so such verification can take place on or before the date of the 2024 Compact administration meeting.
 - a. Chris reported that Kansas had obtained a spreadsheet from the RRWCD that included an Excel table, contract numbers and acres, but that Kansas needs a GIS coverage. Kansas was told that there were problems with the GIS file provided by the RRWCD and that the RRWCD was checking with its consultant to correct it. There has been no subsequent update from the RRWCD. Chris questioned if Ivan had an update.
 - b. Ivan mentioned that the GIS map issue was elevated to the Colorado leadership, and he confirmed that the full list of redacted contract files obtained from the RRWCD was all Colorado initially intends to provide. Ivan relayed that a GIS map was not considered necessary, as it was decided the spreadsheet/contracts were a complete record of the retired acres.
 - c. Sam (Capps) reported that Nebraska has not seen the coverage provided to Kansas by the RRWCD, but the state's concerns are similar to Kansas' concerns and Nebraska wants to see a map as well. Nebraska is interested in where the acres are located.
 - d. Chris noted that he will talk to Earl to take this up with the Colorado leadership further to get a GIS coverage of the acres.
 - e. Sam (Capps) mentioned that she would also talk with Tom about the matter of Nebraska approaching the RRWCD and Colorado leadership.

Calendar Year		2023
Groundwater Data		
North Fork Subbasin	GW CBCU Colorado	19,066
	GW CBCU Kansas	0
	GW CBCU Nebraska	1,329
Arikaree Subbasin	GW CBCU Colorado	2,214
	GW CBCU Kansas	236
	GW CBCU Nebraska	157
Buffalo Subbasin	GW CBCU Colorado	435
	GW CBCU Kansas	0
	GW CBCU Nebraska	3,635
Rock Subbasin	GW CBCU Colorado	95
	GW CBCU Kansas	0
	GW CBCU Nebraska	5,161
South Fork Subbasin	GW CBCU Colorado	16,252
	GW CBCU Kansas	7,987
	GW CBCU Nebraska	1,165
Frenchman Subbasin	GW CBCU Colorado	187
	GW CBCU Kansas	0
	GW CBCU Nebraska	88,333
Driftwood Subbasin	GW CBCU Colorado	0
	GW CBCU Kansas	0
	GW CBCU Nebraska	952
Red Willow Subbasin	GW CBCU Colorado	0
	GW CBCU Kansas	0
	GW CBCU Nebraska	9,475
Medicine Creek Subbasin	GW CBCU Colorado	0
	GW CBCU Kansas	0
	GW CBCU Nebraska	23,406
Beaver Subbasin	GW CBCU Colorado	0
	GW CBCU Kansas	4,624
	GW CBCU Nebraska	2,779
Sappa Subbasin	GW CBCU Colorado	0
	GW CBCU Kansas	(49)
	GW CBCU Nebraska	922
Prairie Dog Subbasin	GW CBCU Colorado	0
	GW CBCU Kansas	2,818
	GW CBCU Nebraska	0
Mainstem Subbasin	GW CBCU Colorado	(9)
	GW CBCU Kansas Above Guide Rock	(2,285)
	GW CBCU Kansas Below Guide Rock	69
	GW CBCU Nebraska Above Guide Rock	64,325
	GW CBCU Nebraska Below Guide Rock	2,854

Import Water Data		
North Fork Subbasin	Imported Water Nebraska	0
Arikaree Subbasin	Imported Water Nebraska	0
Buffalo Subbasin	Imported Water Nebraska	0
Rock Subbasin	Imported Water Nebraska	0
South Fork Subbasin	Imported Water Nebraska	0
Frenchman Subbasin	Imported Water Nebraska	0
Driftwood Subbasin	Imported Water Nebraska	0
Red Willow Subbasin	Imported Water Nebraska	43
Medicine Creek Subbasin	Imported Water Nebraska	11,141
Beaver Subbasin	Imported Water Nebraska	0
Sappa Subbasin	Imported Water Nebraska	0
Prairie Dog Subbasin	Imported Water Nebraska	0
Mainstem Subbasin	Imported Water Nebraska Above Guide Rock	5,536
	Imported Water Nebraska Below Guide Rock	(17)
Total		16,703

SW Pumping Data		
North Fork Subbasin	SW Diversions - Irrigation - Non-Federal Canals - Colorado	192
	SW Diversions - Irrigation - Small Pumps - Colorado	0
	SW Diversions - M&I - Colorado	0
Arikaree Subbasin	SW Diversions - Irrigation - Non-Federal Canals - Colorado	0
	SW Diversions - Irrigation - Small Pumps - Colorado	0
	SW Diversions - M&I - Colorado	0
	SW Diversions - Irrigation - Non-Federal Canals - Kansas	0
	SW Diversions - Irrigation - Small Pumps - Kansas	0
	SW Diversions - M&I - Kansas	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska	0
	SW Diversions - Irrigation - Small Pumps - Nebraska	0
	SW Diversions - M&I - Nebraska	0

Calendar Year		2023
Buffalo Subbasin	SW Diversions - Irrigation - Non-Federal Canals- Colorado	0
	SW Diversions - Irrigation - Small Pumps - Colorado	0
	SW Diversions - M&I - Colorado	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska	189
	SW Diversions - Irrigation - Small Pumps - Nebraska	5
	SW Diversions - M&I - Nebraska	0
Rock Subbasin	SW Diversions - Irrigation - Non-Federal Canals - Nebraska	0
	SW Diversions - Irrigation - Small Pumps - Nebraska	0
	SW Diversions - M&I - Nebraska	0
South Fork Subbasin	SW Diversions - Irrigation - Non-Federal Canals- Colorado	0
	SW Diversions - Irrigation - Small Pumps - Colorado	0
	SW Diversions - M&I - Colorado	0
	SW Diversions - Irrigation - Non-Federal Canals- Kansas	0
	SW Diversions - Irrigation - Small Pumps - Kansas	0
	SW Diversions - M&I - Kansas	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska	0
	SW Diversions - Irrigation - Small Pumps - Nebraska	0
	SW Diversions - M&I - Nebraska	0
Frenchman Subbasin	SW Diversions - Irrigation - Non-Federal Canals - Nebraska	0
	SW Diversions - Irrigation - Small Pumps - Nebraska	0
	SW Diversions - M&I - Nebraska	0
Driftwood Subbasin	SW Diversions - Irrigation - Non-Federal Canals- Kansas	0
	SW Diversions - Irrigation - Small Pumps - Kansas	0
	SW Diversions - M&I - Kansas	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska	0
	SW Diversions - Irrigation - Small Pumps - Nebraska	0
	SW Diversions - M&I - Nebraska	0
Red Willow Subbasin	SW Diversions - Irrigation - Non-Federal Canals - Nebraska	0
	SW Diversions - Irrigation - Small Pumps - Nebraska	44
	SW Diversions - M&I - Nebraska	0
Medicine Creek Subbasin	SW Diversions - Irrigation - Non-Federal Canals - Nebraska - Above Gage	0
	SW Diversions - Irrigation - Small Pumps - Nebraska - Above Gage	34
	SW Diversions - M&I - Nebraska - Above Gage	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska -Below Gage	0
	SW Diversions - Irrigation - Small Pumps -Nebraska - Below Gage	36
	SW Diversions - M&I - Nebraska - Below Gage	0
Beaver Subbasin	SW Diversions - Irrigation -Non-Federal Canals- Colorado	0
	SW Diversions - Irrigation - Small Pumps - Colorado	0
	SW Diversions - M&I - Colorado	0
	SW Diversions - Irrigation - Non-Federal Canals- Kansas	0
	SW Diversions - Irrigation - Small Pumps - Kansas	18
	SW Diversions - M&I - Kansas	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska - Above Gage	0
	SW Diversions - Irrigation - Small Pumps - Nebraska - Above Gage	0
	SW Diversions - M&I - Nebraska - Above Gage	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska -Below Gage	0
	SW Diversions - Irrigation - Small Pumps -Nebraska - Below Gage	0
	SW Diversions - M&I - Nebraska - Below Gage	0
Sappa Subbasin	SW Diversions - Irrigation - Non-Federal Canals- Kansas	0
	SW Diversions - Irrigation - Small Pumps - Kansas	0
	SW Diversions - M&I - Kansas	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska - Above Gage	0
	SW Diversions - Irrigation - Small Pumps - Nebraska - Above Gage	0
	SW Diversions - M&I - Nebraska - Above Gage	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska -Below Gage	0
	SW Diversions - Irrigation - Small Pumps -Nebraska - Below Gage	0
	SW Diversions - M&I - Nebraska - Below Gage	0
Prairie Dog Subbasin	SW Diversions - Irrigation - Non-Federal Canals- Kansas	0
	SW Diversions - Irrigation - Small Pumps - Kansas	418
	SW Diversions - M&I - Kansas	361
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska -Below Gage	0
	SW Diversions - Irrigation - Small Pumps -Nebraska - Below Gage	59
Mainstem Subbasin	SW Diversions - M&I - Nebraska - Below Gage	0
	SW Diversions - Irrigation - Non-Federal Canals- Kansas	0
	SW Diversions - Irrigation - Small Pumps - Kansas	1,069
	SW Diversions - M&I - Kansas	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska	2,616
	SW Diversions - Irrigation - Small Pumps - Nebraska	2,137
	SW Diversions - M&I - Nebraska	0
	SW Diversions - Irrigation - Non-Federal Canals - Nebraska Below Guide Rock	0
	SW Diversions - Irrigation - Small Pumps - Nebraska Below Guide Rock	1,026
	SW Diversions - M&I - Nebraska - Below Guide Rock	0

Calendar Year		2023
Non-Federal SW Consumptive Use		
	% Non-Federal Canal Diversion Consumed	60%
	% Small Surface Water Pumps Consumed	75%
	% Municipal And Industrial SW Consumed	50%

Non-Federal Reservoir Evaporation Data		
North Fork Subbasin	Non-Federal Reservoir Evaporation - Colorado	61
Arikaree Subbasin	Non-Federal Reservoir Evaporation - Colorado	0
	Non-Federal Reservoir Evaporation - Kansas	15
	Non-Federal Reservoir Evaporation - Nebraska	0
Buffalo Subbasin	Non-Federal Reservoir Evaporation - Colorado	0
	Non-Federal Reservoir Evaporation - Nebraska	6
Rock Subbasin	Non-Federal Reservoir Evaporation - Nebraska	73
South Fork Subbasin	Non-Federal Reservoir Evaporation - Colorado	0
	Non-Federal Reservoir Evaporation - Kansas	132
	Non-Federal Reservoir Evaporation - Nebraska	0
Frenchman Subbasin	Non-Federal Reservoir Evaporation - Nebraska	56
Driftwood Subbasin	Non-Federal Reservoir Evaporation - Kansas	10
	Non-Federal Reservoir Evaporation - Nebraska	0
Red Willow Subbasin	Non-Federal Reservoir Evaporation - Nebraska	91
Medicine Creek Subbasin	Non-Federal Reservoir Evaporation - Nebraska - Above Gage	119
	Non-Federal Reservoir Evaporation - Nebraska - Below Gage	2
		0
Beaver Subbasin	Non-Federal Reservoir Evaporation - Colorado	0
	Non-Federal Reservoir Evaporation - Kansas	237
	Non-Federal Reservoir Evaporation - Nebraska - Above Gage	90
	Non-Federal Reservoir Evaporation - Nebraska - Below Gage	0
Sappa Subbasin	Non-Federal Reservoir Evaporation - Kansas	254
	Non-Federal Reservoir Evaporation - Nebraska - Above Gage	37
	Non-Federal Reservoir Evaporation - Nebraska - Below Gage	2
Prairie Dog Subbasin	Non-Federal Reservoir Evaporation - Kansas	208
	Non-Federal Reservoir Evaporation - Nebraska	11
Mainstem Subbasin	Non-Federal Reservoir Evaporation - Kansas	61
	Non-Federal Reservoir Evaporation - Nebraska - Above Guide Rock Gage - Whole Basin Value:	757
	Non-Federal Reservoir Evaporation - Nebraska - Below Guide Rock Gage - Whole Basin Value:	78

Stream Gage Data		
North Fork Subbasin	North Fork Republican River At Colorado-Nebraska State Line	28,618
Arikaree Subbasin	Arikaree River At Haigler	1,678
Buffalo Subbasin	Buffalo Creek Near Haigler	1,601
Rock Subbasin	Rock Creek At Parks	3,963
South Fork Subbasin	South Fork Republican River Near Benkelman	48
Frenchman Subbasin	Frenchman Creek At Culbertson	30,628
Driftwood Subbasin	Driftwood Creek Near McCook	7,130
Red Willow Subbasin	Red Willow Creek Near Red Willow	4,653
Medicine Creek Subbasin	Medicine Creek Below Harry Strunk	17,440
Beaver Subbasin	Beaver Creek Near Beaver City	648
Sappa Subbasin	Sappa Creek Near Stamford	4,923
Prairie Dog Subbasin	Prairie Dog Creek Near Woodruff	4,178
Mainstem Subbasin	Republican River At Guide Rock	14,677
	Republican River Near Hardy	34,861

Hardy Gage Data		
USGS Gage 06853500 Republican River Near Hardy, NE		
Mainstem Subbasin	January	2523
	February	2410
	March	7361
	April	4173
	May	2091
	June	3006
	July	2301
	August	2561
	September	1918
	October	1454
	November	1673
	December	3389
	ANNUAL	34,861

Attachment 2 - Accounting Inputs, Tables, and Attachments from the RRCA Accounting for 2023

Calendar Year		2023
Reservoir Data		
South Fork Subbasin	Bonny Reservoir Evaporation	0
	Bonny Reservoir Change In Storage	0
Frenchman Subbasin	Enders Reservoir Evaporation	876
	Enders Reservoir Change In Storage	1,403
Red Willow Subbasin	Hugh Butler Lake Evaporation	850
	Hugh Butler Lake Change In Storage	5,320
Medicine Creek Subbasin	Harry Strunk Lake Evaporation	2,012
	Harry Strunk Lake Change In Storage	8,670
Prairie Dog Subbasin	Keith Sebelius Lake Evaporation	1,875
	Keith Sebelius Lake Change In Storage	4,938
Mainstem Subbasin	Swanson Lake Evaporation	4,093
	Swanson Lake Change In Storage	31,139
	Harlan County Evaporation Subject to Nebraska/Kansas Split	9,211
	Harlan County Evaporation Charged to Kansas	0
	Harlan County Change In Storage	(5,777)
	Lovewell Reservoir Ev charged to the Republican River	3,218

Canal Data		
North Fork Subbasin	Haigler Canal Diversions - Colorado	0
	Haigler Canal Diversions - Nebraska	4,182
	Haigler Canal Diversions	4,182
South Fork Subbasin	Hale Ditch Diversions	0
Frenchman Subbasin	Champion Canal Diversions	0
	Riverside Canal Diversions	0
	Culbertson Canal Diversions	0
	Culbertson Canal Extension Diversions	0
	Culbertson Canal % Return Flow	100%
	Culbertson Canal Extension % Return Flow	100%
Driftwood Subbasin	Meeker-Driftwood Canal Diversions	0
	Meeker-Driftwood Canal % Return Flow	100.0%
Red Willow Subbasin	Red Willow Canal Diversions	0
	Red Willow Canal % Return Flow	100%
Prairie Dog Subbasin	Almena Canal Diversions	0
	Almena Canal % Return Flow	100.0%
Mainstem Subbasin	Bartley Canal Diversion	7,099
	Bartley Canal % Return Flow	67%
	Cambridge Canal Diversion	22,285
	Cambridge Canal % Return Flow	56.9%
	Naponee Canal Diversion	862
	Naponee Canal % Return Flow	66%
	Franklin Canal Diversion	19,810
	Franklin Canal % Return Flow	67%
	Franklin Pump Canal Diversions	1,253
	Franklin Pump Canal % Return Flow	58%
	Superior Canal Diversions	11,708
	Superior Canal % Return Flow	66%
	Courtland Canal Diversions At Headgate	77,296
	Diversions to Nebraska Courtland	867
	Nebraska Courtland % Return Flow	26%
	Courtland Canal, Loss in NE assigned to upper Courtland KS	2,773
	Courtland Canal, Loss in NE assigned to delivery to Lovewell	6,511
	Courtland Canal At Kansas-Nebraska State Line	67,145
	Courtland Canal Diversions to the Upper Courtland District	21,178
	Courtland Canal Above Lovewell % Return Flow	47.4%
	Courtland Canal, Loss assigned to deliveries of water to Lovewell, Stateline to Lovewell	5,119
	Courtland Canal Deliveries To Lovewell Reservoir	43,621
	Diversions of Republican River water from Lovewell Reservoir to the Courtland Canal below Lovewell	38,774
	Courtland Canal Below Lovewell % Return Flow	40.0%
	To allocate Harlan County evaporation:	
	Kansas Bostwick Diversions During Irrigation Season (actual, or 3-year average)	43,964
	Nebraska Bostwick Diversions During Irrigation Season (actual or 3-year average)	34,441

Table 1: Annual Virgin and Computed Water Supply, Allocations, and Computed Beneficial Consumptive Uses by State, Main Stem, and Sub-Basin

2023 Basin	Virgin Water Supply	Computed Water Supply	Allocations				Computed Beneficial Consumptive Use		
			Colorado	Kansas	Nebraska	Unallocated	Colorado	Kansas	Nebraska
North Fork	41,110	41,110	9,210	0	10,110	21,790	19,240	0	3,840
Arikaree	4,300	4,300	3,380	220	720	(20)	2,210	250	160
Buffalo	5,800	5,800	0	0	1,910	3,890	440	0	3,760
Rock	9,290	9,290	0	0	3,720	5,570	100	0	5,230
South Fork	25,590	25,590	11,360	10,290	360	3,580	16,250	8,120	1,170
Frenchman	121,490	120,090	0	0	64,370	55,720	190	0	89,270
Driftwood	8,090	8,090	0	560	1,330	6,200	0	10	950
Red Willow	20,380	15,060	0	0	2,890	12,170	0	0	9,680
Medicine	40,530	31,860	0	0	2,900	28,960	0	0	23,580
Beaver	8,390	8,390	1,680	3,260	3,410	40	0	4,870	2,870
Sappa	5,440	5,440	0	2,240	2,240	960	0	210	960
Prairie Dog	14,520	9,580	0	4,380	730	4,470	0	5,400	60
Main Stem	123,120	98,590	0	50,380	48,210	0	(10)	43,510	106,050
Total All Basins	428,050	383,190	25,630	71,330	142,900	143,330	38,420	62,370	247,580
Main Stem Including Unallocated		241,920	0	123,620	118,300				
Total	428,050	383,190	25,630	144,570	212,990	0	38,420	62,370	247,580

Table 2: Original Compact Virgin Water Supply and Allocations

Basin	Virgin Water Supply	Colorado Allocation	% of Basin Supply	Kansas Allocation	% of Basin Supply	Nebraska Allocation	% of Basin Supply	Unallocated	% of Basin Supply
North Fork	44,700	10,000	22.4%			11,000	24.6%	23,700	53.0%
Arikaree	19,610	15,400	78.5%	1,000	5.1%	3,300	16.8%	(90)	-0.4%
Buffalo	7,890					2,600	33.0%	5,290	67.0%
Rock	11,000					4,400	40.0%	6,600	60.0%
South Fork	57,200	25,400	44.4%	23,000	40.2%	800	1.4%	8,000	14.0%
Frenchman	98,500					52,800	53.6%	45,700	46.4%
Driftwood	7,300			500	6.9%	1,200	16.4%	5,600	76.7%
Red Willow	21,900					4,200	19.2%	17,700	80.8%
Medicine	50,800					4,600	9.1%	46,200	90.9%
Beaver	16,500	3,300	20.0%	6,400	38.8%	6,700	40.6%	100	0.6%
Sappa	21,400			8,800	41.1%	8,800	41.1%	3,800	17.8%
Prairie Dog	27,600			12,600	45.7%	2,100	7.6%	12,900	46.7%
Tributaries Sub-Total	384,000							175,500	
Main Stem	94,500								
Main Stem + Unallocated	270,000			138,000	51.1%	132,000	48.9%		
Total	478,900	54,100		190,300		234,500			

Table 3A: Table to Be Used to Calculate Colorado's Five-Year Running Average Allocation and Computed Beneficial

	Col. 1	Col. 2	Col. 3	Col. 4
Year	Allocation	Computed Beneficial Consumptive	Imported Water Supply Credit and CORWS	Difference between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit and CORWS Credit Col 1 – (Col 2- Col 3)
2019	22,710	32,740	8,905	(1,125)
2020	24,200	26,910	6,218	3,508
2021	22,790	30,200	9,390	1,980
2022	19,270	26,580	8,501	1,191
2023	25,630	38,420	12,259	(531)
Avg 2019-2023	22,920	30,970	9,050	1,000

Table 3B: Table to Be Used to Calculate Kansas's Five-Year Running Average Allocation and Computed Beneficial

	Col. 1	Col. 2	Col. 3	Col. 4
Year	Allocation	Computed Beneficial Consumptive	Imported Water Supply Credit	Difference between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit Col 1 – (Col 2- Col 3)
2019	333,300	47,910	NA	285,390
2020	247,750	53,810	NA	193,940
2021	201,890	57,130	NA	144,760
2022	168,020	67,770	NA	100,250
2023	144,570	62,370	NA	82,200
Avg 2019-2023	219,110	57,800	NA	161,310

Table 3C: Table to Be Used to Calculate Nebraska's Five-Year Running Average Allocation and Computed Beneficial

	Col. 1	Col. 2	Col. 3	Col. 4
Year	Allocation	Computed Beneficial Consumptive	Imported Water Supply Credit and NERWS	Difference between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit and NERWS Credit Col 1 – (Col 2- Col 3)
2019	389,300	262,870	26,541	152,971
2020	303,070	252,400	18,995	69,665
2021	258,180	252,650	21,456	26,986
2022	221,860	249,960	16,157	(11,943)
2023	212,990	247,580	16,721	(17,869)
Avg 2019-2023	277,080	253,090	19,970	43,960

Table 4A: Colorado Compliance with the Sub-basin Non-impairment Requirement

Table 4A is left unpopulated pursuant to the August 24, 2016 “RESOLUTION BY THE REPUBLICAN RIVER COMPACT ADMINISTRATION APPROVING OPERATION AND ACCOUNTING FOR THE COLORADO COMPACT COMPLIANCE PIPELINE AND COLORADO’S COMPLIANCE EFFORTS IN THE SOUTH FORK REPUBLICAN RIVER BASIN”, paragraph E.

2023

	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
Sub-basin	Colorado Sub-basin Allocation (Five-year Running Average)	Unallocated Supply (Five-year Running Average)	Credits from Imported Water Supply and CORWS Credit (Five-year Running Average)	Total Available Supply (Five-year Running Average)	Colorado Computed Beneficial Consumptive Use (Five-year Running Average)	Difference Between Available Supply and Computed Beneficial Consumptive Use (Five-year Running Average)
North Fork						
Arikaree						
South Fork						
Beaver						

Table 4B: Kansas's Sub-Basin Non-impairment Compliance**2023**

	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7
Sub-basin	Kansas Sub-basin Allocation (Five-year Running Average)	Unallocated Supply (Five-year Running Average)	Unused Allocation from Colorado (Five Year Running Average)	Credits from Imported Water Supply (Five-year Running Average)	Total Available Supply Col 1 + Col 2 + Col 3 + Col 4 (Five-year Running Average)	Kansas Computed Beneficial Consumptive Use (Five-year Running Average)	Difference Between Available Supply and Computed Beneficial Consumptive Use Col 5 - Col 6 (Five-year Running Average)
Arikaree	168	(12)	962	N/A	1,118	150	968
South Fork	8,502	2,962	0	N/A	11,464	5,022	6,442
Driftwood	120	1,352	0	N/A	1,472	16	1,456
Beaver	3,744	54	1,930	N/A	5,728	5,478	250
Sappa	6,536	2,824	0	N/A	9,360	1,580	7,780
Prairie Dog	7,526	7,688	0	N/A	15,214	9,022	6,192

Table 5A: Colorado's Compliance During Water-Short Year Administration

	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
Year	Is the year Water Short Pursuant to III.J?* (Yes or No)	Statewide Allocation	Beaver Creek Reduction Pursuant to Table 5F	Allocation - Beaver Creek Reduction (Col. 2 - Col.3)	Computed Beneficial Consumptive (excluding the Beaver Creek Sub-basin)	Imported Water Supply Credit - IWS Beaver Creek + CORWS Credit	Difference between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit and CORWS Credit (Col. 4 - Col. 5 + Col. 6)
2019	No	22,710	0	22,710	32,740	8,905	(1,125)
2020	No	24,200	0	24,200	26,910	6,218	3,508
2021	No	22,790	0	22,790	30,200	9,390	1,980
2022	No	19,270	0	19,270	26,580	8,501	1,191
2023	No	25,630	0	25,630	38,420	12,259	(531)
Avg 2019-2023	No	22,920	0	22,920	30,970	9,050	1,000

Table 5F: Colorado's Beaver Creek Reduction During Water-Short Years

Water Short Year (WSY) Pursuant to III.J	Beaver Creek Allocation	Reduction = Average of last five WSY Beaver Creek Allocations
	Col. 1	Col. 2
2002	770	N/A
2003	260	N/A
2004	360	N/A
2005	910	N/A
2006	1,420	N/A
2007	2,320	744
2013	1,130	1,054
2014	1,250	1,228
2015	2,130	1,406
2016	2,430	1,650
2018	1,940	1,852

Table 5B: Kansas's Compliance During Water-Short Year Administration

Year	Allocation				Computed Beneficial Consumptive Use	Imported Water Supply Credit	Difference Between Allocation and the Computed Beneficial Consumptive Use offset by Imported Water Supply Credit
Column	1	2	3	4	5	6	7
	Sum Sub-basins	Kansas' Share of Unallocated Supply	Kansas' Share of the Unused Colorado Allocation	Total Col 1 + Col 2 + Col 3			Col 4 - (Col 5 - Col 6)
2022	17,050	3,771	1,063	21,884	16,780	N/A	5,104
2023	20,950	7,783	1,456	30,189	18,860	N/A	11,329
Avg 2022-2023	19,000	5,777	1,260	26,036	17,820	N/A	8,216

Table 5E: Nebraska's Tributary Compliance During Water-Short Year Administration

Year	Allocation			Computed Beneficial Consumptive Use	Imported Water Supply Credit and AWS	Allocation - (CBCU - IWS AWS)
	Sub-Basin Total	Share of Unallocated Supply	Total			
2021	89,710	68,225	157,935	133,520	10,822	35,237
2022	77,390	66,054	143,444	127,090	9,442	25,796
2023	94,690	70,088	164,778	141,530	11,242	34,490
Avg 2022-2023	86,040	68,071	154,111	134,310	10,342	30,143

Table 5C: Nebraska's Compliance During Water-Short Year Administration

Year	Allocation				Computed Beneficial Consumptive Use			Imported Water Supply Credit and NERWS Credit	Difference Between Allocation and Computed Beneficial Consumptive Use offset by Imported Water Supply Credit Above Guide Rock and NERWS Credit
Column	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9
	State-Wide Allocation	Allocation Below Guide Rock	Allocation Above Guide Rock	Nebraska's Share of Unused Colorado Allocation	State-Wide CBCU	CBCU Below Guide Rock	CBCU Above Guide Rock	Credits Above Guide Rock	Col 3 + Col 4 - (Col 7 - Col 8)
2022	221,860	9,277	212,583	1,017	249,960	2,870	247,090	16,174	(17,316)
2023	212,990	4,040	208,950	1,394	247,580	3,702	243,879	16,738	(16,797)
Avg 2022-2023	217,430	6,660	210,770	1,210	248,770	3,290	245,480	16,460	(17,060)

Table 5D: Nebraska's Compliance Under a Alternative Water-Short Year Administration Plan

Year	Allocation				Computed Beneficial Consumptive Use			Supply Credit and	and Computed Beneficial
Column	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9
	State-Wide Allocation	Allocation Below Guide Rock	Allocation Above Guide Rock	Share of Unused Colorado Allocation	State-Wide CBCU	CBCU Below Guide Rock	CBCU Above Guide Rock	Credits Above Guide Rock	Col 3 + Col 4 - (Col 7 - Col 8)
2021	258,180	6,503	251,677	1,521	252,650	3,084	249,566	21,485	25,116
2022	221,860	9,277	212,583	1,017	249,960	2,870	247,090	16,174	(17,316)
2023	212,990	4,040	208,950	1,394	247,580	3,702	243,879	16,738	(16,797)
Avg 2021-2023	231,010	6,610	224,400	1,310	250,060	3,220	246,840	18,130	(3,000)

Attachment 1: Sub-basin Flood Flow Thresholds

Sub-basin	Sub-basin Flood Flow Threshold Acre-feet per Year ³
Arikaree River	16,400
North Fork of Republican River	33,900
Buffalo Creek	9,800
Rock Creek	9,800
South Fork of Republican River	30,400
Frenchman Creek	51,900
Driftwood Creek	9,400
Red Willow Creek	15,100
Medicine Creek	55,100
Beaver Creek	13,900
Sappa Creek	26,900
Prairie Dog	15,700

³ Flows considered to be Flood Flows are flows in excess of the 94% flow based on a flood frequency analysis for the years 1971-2000. The Gaged Flows are measured after depletions by Beneficial Consumptive Use and change in reservoir storage.

Attachment 6: Computing Water Supplies and Consumptive Use Above Guide Rock

Note: At its Annual Meeting on August 21, 2020, the RRCA agreed that the Accounting Procedures (Rev. May 25, 2017) do not properly implement the Flood Flows provisions at the Hardy gage with respect to the calculation of Computed Water Supply above and below Guide Rock. The current implementation could impact Nebraska's Table 5C compliance test, specifically the Allocation above Guide Rock. Nebraska and Kansas each offered proposals to resolve the issue but could not reach agreement on a solution. Due to the infrequent occurrence of Flood Flows, the RRCA deferred resolution of the matter to a future date necessitated by and preceding impact to Nebraska's Table 5C compliance. The states wish to acknowledge and memorialize the issue to encourage work towards its resolution. As it stands, Attachment 6 calculates Virgin Water Supply Guide Rock to Hardy rather than Computed Water Supply Guide Rock to Hardy which would reduce Virgin Water Supply by the relevant Flood Flows as described in Section II. Definitions and

Year	Total Mainstem CWS	Hardy Gage	Superior Courtland Diversion Dam	Courtland Canal Diversions	Superior Canal Diversion	Courtland Canal Returns	Superior Canal Returns	Total Bostwick Returns Below Guide Rock	NE CBCU Below Guide Rock	KS CBCU Below Guide Rock	Total CBCU Below Guide Rock	Gain Guide Rock to Hardy	VWS Guide Rock to Hardy	Mainstem VWS Above Guide Rock	NE MS Allocation Above Guide Rock	KS MS Allocation Above Guide Rock	Nebraska Guide Rock to Hardy Allocation	Kansas Guide Rock to Hardy Allocation
2019	399,550	626,375	502,644	55,120	7,741	4,280	6,308	10,588	1,780	197	1,977	113,143	115,120	284,430	139,086	145,344	56,294	58,826
2020	264,600	251,239	202,416	44,380	10,070	7,327	8,024	15,352	2,266	616	2,882	33,471	36,353	228,247	111,613	116,634	17,777	18,577
2021	204,980	142,152	115,649	73,224	9,551	10,536	6,475	17,011	3,084	723	3,807	9,492	13,299	191,681	93,732	97,949	6,503	6,796
2022	160,360	69,608	32,213	74,964	9,827	15,494	6,460	21,954	2,870	661	3,531	15,441	18,972	141,388	69,139	72,249	9,277	9,695
2023	98,590	34,861	14,677	77,296	11,708	8,802	7,692	16,494	3,702	871	4,572	3,690	8,263	90,327	44,170	46,157	4,040	4,222

COURTLAND CANAL					
	2019	2020	2021	2022	2023
Return Flow From Courtland Canal To Republican River Above Lovewell From Kansas	761	536	912	835	1,007
Return Flow From Courtland Canal To Republican River Above Hardy From Nebraska	3,519	6,791	9,625	14,659	7,794
Courtland Canal Diversions At Headgate	55,120	44,380	73,224	74,964	77,296
Courtland Canal At Kansas-Nebraska State Line	50,721	35,756	60,776	55,667	67,145
NE Courtland Canal CBCU (includes transportation loss)	108	342	711	1,420	646
Superior Canal CBCU	1,433	2,046	3,076	3,367	4,016

NEBRASKA					
	2019	2020	2021	2022	2023
SW Diversions - Irrigation - Small Pumps - Nebraska Below Guide Rock	84	552	665	763	1,026
SW Diversions - M&I - Nebraska - Below Guide Rock	0	0	0	0	0
SW Non-Federal Reservoir Evaporation - Below Guide Rock	(6)	84	51	95	78
SW Return - Irrigation	21	138	166	191	257
SW Return - M&I	0	0	0	0	0
GW CBCU Nebraska Below Guide Rock	1,723	1,769	2,534	2,203	2,854

KANSAS					
	2019	2020	2021	2022	2023
SW CBCU - Irrigation - Small Pumps	148	565	667	598	802
SW CBCU - M&I	0	0	0	0	0
GW CBCU Kansas Below Guide Rock	49	51	56	63	69

2023

Attachment 7: Calculations of Return Flows from Bureau of Reclamation Canals

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12
Canal	Canal Diversion	Spill to Waste-Way	Net Diversion	Field Deliveries	Canal Loss	Average Field Loss Factor	Field Loss	Total Loss from District	Percent Field and Canal Loss That Returns to the Stream	Total return to Stream from Canal and Field Loss	Return as Percent of Canal Diversion
Name Canal	Headgate Diversion	Sum of measured spills to river	Col 2 - Col 3	Sum of Deliveries to the field	Col 4 - Col 5	1 -Weighted Average Efficiency of Application System for the District*	Col 5 x Col 7	Col 6 + Col 8	Estimated Percent Loss*	Col 9 x Col 10 + Col 3	Col 11/Col 2
Σ Irrigation Season											
Σ Non- Irrigation Season											
Culbertson	0	0	0	0	0	30%	0	0	82%	0	100.0%
	0	0	0	0	0	30%	0	0	92%	0	100.0%
Culbertson Extension	0	0	0	0	0	30%	0	0	82%	0	100.0%
	0	0	0	0	0	30%	0	0	92%	0	100.0%
Meeker - Driftwood	0	0	0	0	0	30%	0	0	82%	0	100.0%
	0	0	0	0	0	30%	0	0	92%	0	100.0%
Red Willow	0	0	0	0	0	30%	0	0	82%	0	100.0%
	0	0	0	0	0	30%	0	0	92%	0	100.0%
Bartley	7,099	950	6,149	2,182	3,967	30%	655	4,622	82%	4,740	66.8%
	0	0	0	0	0	30%	0	0	92%	0	100.0%
Cambridge	22,285	1,584	20,701	10,241	10,460	30%	3,072	13,532	82%	12,680	56.9%
	0	0	0	0	0	30%	0	0	92%	0	100.0%
Naponee	862	184	678	326	352	35%	114	466	82%	566	65.7%
	0	0	0	0	0	35%	0	0	92%	0	100.0%
Franklin	19,810	2,671	17,139	6,423	10,716	35%	2,248	12,964	82%	13,302	67.1%
	0	0	0	0	0	35%	0	0	92%	0	100.0%
Franklin Pump	1,253	134	1,119	600	519	35%	210	729	82%	732	58.4%
	0	0	0	0	0	35%	0	0	92%	0	100.0%
Almena	0	0	0	0	0	30%	0	0	82%	0	100.0%
Superior	11,708	497	11,211	3,531	7,680	31%	1,095	8,775	82%	7,692	65.7%
	0	0	0	0	0	31%	0	0	92%	0	100.0%
Nebraska Courtland	867	0	867	775	92	23%	178	270	82%	221	25.5%
Courtland Canal Above Lovewell (KS)	21,178	1,733	19,445	12,095	7,350	23%	2,782	10,132	82%	10,041	47.4%
Courtland Canal Below Lovewell	38,774	5,128	33,646	27,227	6,419	23%	6,262	12,681	82%	15,527	40.0%

Attachment 8: Calculations of the Computed Water Supply Adjustment and Remaining Compact Compliance Volume for implementation of 2016 RRCA Resolution

CCV and RCCV Tracking ^a												
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10	Col. 11	Col. 12
Year	Start of Year RCCV	RCCV Adjustme nt	CCV	CCV Inflow Into HCL	RCCV Inflow Into HCL	Total CCV and RCCV Inflow Into HCL	Total CCV and RCCV Available for Release	CCV Released from HCL as Flow	CCV Released from HCL as Evaporation	CCV Retained in HCL (at End of Year)	CWSA	End of Year RCCV
	=Col. 12 of previous year	^b	^c			= Col. 4 + Col. 5	=Col. 6 + Col. 10 of previous year			= Col. 7 – (Col. 8 + Col. 9)	=Col. 10 – Col. 10 of previous year	= Col. 1 – Col. 2 + Col. 3 - Col. 6 ^d
2007	0	0	0	0	0	0	0	0	0	0	0	
2008	0	0	0	0	0	0	0	0	0	0	0	
2009	0	0	0	0	0	0	0	0	0	0	0	
2010	0	0	0	0	0	0	0	0	0	0	0	
2011	0	0	0	0	0	0	0	0	0	0	0	
2012	0	0	0	0	0	0	0	0	0	0	0	
2013	0	0	0	0	0	0	0	0	0	0	0	
2014	0	0	0	0	0	0	0	0	0	0	0	
2015	0	0	0	8332	0	8332	8332	0	0	8332	8332	
2016	0	0	41,935	24752	0	24752	33084	5084	4321	23679	15347	9,300
2017	9300	0	20,000	20,000	0	20000	43679	20000	2241	21438	-2241	9,300
2018	9300	0	0	0	0	0	21438	0	1339	20099	-1339	9,300
2019	9300	0	0	0	0	0	20099	0	2340	17759	-2340	9,300
2020	9300	1860	0	0	0	0	17759	0	3889	13870	-3889	7,440
2021	7,440	1860	0	0	0	0	13870	0	1550	12320	-1550	5,580
2022	5,580	1860	0	0	0	0	12320	0	4354	7966	-4354	3,720
2023	3,720	1860	0	0	1860	1860	9826	0	1026	8800	834	

APV and RWS					RCCV Calc
Colorado		Nebraska			
Aug. Pumping Volume (APV)	Resolution Water Supply Credit (CORWS)	Aug. Pumping Volume (APV) Rock Creek That Passed Sub-basin Gage in the Current Year	Aug. Pumping Volume (APV) N-CORPE That Passed Sub-basin Gage in the Current Year	Resolution Water Supply Credit (NERWS)	Extra CCV Efforts Above CCV (Use with RCCV Calc)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	15,766	0	15,766	0
7,448	7,448	19,397	42,758	62,155	0
10,760	10,760	1,098	25,932	18,698	8332
10,130	10,130	499	22,803	41,935	449
11,330	11,330	4,563	11,106	20,000	0
13,578	13,578	0	0	0	0
8,905	8,905	0	0	0	0
6,218	6,218	0	0	0	0
9,390	9,390	0	0	0	0
8,501	8,501	0	0	0	0
12,259	12,259	0	0	0	0

a. Calculations for RCCV, CWSA, & RWS don't start until Oct. 1, 2015

b. See Provision 10 of the RRCA Resolution signed August 24, 2016, titled "Resolution Approving Long-Term Agreement Related to the Operation of Harlan County Lake for Compact Call Years" for the terms of assigning RCCV Adjustment. The RCCV Adjustment for each year is equal to 20% of the unadjusted portion of the RCCV, if it is a non-Compact Call Year, plus any remaining volumetric reductions from the previous four years.

c. In years when the contributions from Nebraska's water management activities, consistent with the 2016 CCY HCL Operations Resolution, are greater than CCV and the NERWS is equal to the greater contribution volume, CCV in Column 3 should also be set equal to the contribution.

d. The formula for calculation of RCCV is based on calendar year operations and will vary when operations occur in a different calendar year than NERWS Credit is applied.

Flood Flow Calculations Based on Accounting Procedures III.B.1 and Attachment 1.

Hardy Gage Monthly Data (acre-feet)					
	2019	2020	2021	2022	2023
January	13,289	55,339	7,475	8,005	2,523
February	6,875	33,332	7,332	7,615	2,410
March	61,131	33,775	28,746	9,074	7,361
April	21,669	23,421	20,400	6,592	4,173
May	66,000	31,732	25,198	4,958	2,091
June	69,761	10,810	14,672	3,981	3,006
July	118,015	30,811	8,141	18,172	2,301
August	82,834	8,337	8,550	3,666	2,561
September	30,188	3,488	3,034	2,326	1,918
October	21,527	4,298	2,535	1,624	1,454
November	59,330	7,632	7,470	1,775	1,673
December	75,757	8,265	8,600	1,815	3,389
ANNUAL	626,376	251,239	142,153	69,603	34,861
Over 400K	226,376	0	0	0	0

5-month Consecutive Period Flows (acre-feet)					
	2019	2020	2021	2022	2023
Jan-May	168,964	177,598	89,151	36,244	18,558
Feb-Jun	225,436	133,069	96,348	32,220	19,041
Mar-Jul	336,576	130,548	97,157	42,777	18,932
Apr-Aug	358,279	105,110	76,961	37,369	14,132
May-Sep	366,798	85,177	59,595	33,103	11,878
Jun-Oct	322,325	57,743	36,932	29,769	11,241
Jul-Nov	311,894	54,566	29,730	27,563	9,908
Aug-Dec	269,636	32,020	30,189	11,206	10,995

2-month Consecutive Period Flows (acre-feet)					
	2019	2020	2021	2022	2023
Jan-Feb	20,164	88,671	14,807	15,620	4,933
Feb-Mar	68,006	67,107	36,078	16,689	9,771
Mar-Apr	82,800	57,195	49,146	15,666	11,534
Apr-May	87,669	55,152	45,598	11,550	6,264
May-Jun	135,761	42,541	39,870	8,939	5,097
Jun-Jul	187,776	41,621	22,813	22,153	5,307
Jul-Aug	200,849	39,148	16,691	21,838	4,862
Aug-Sep	113,022	11,825	11,584	5,992	4,479
Sep-Oct	51,715	7,786	5,569	3,950	3,373
Oct-Nov	80,857	11,930	10,005	3,399	3,127
Nov-Dec	135,087	15,898	16,070	3,590	5,062

Final Sub-basin Flood Flows					
	2019	2020	2021	2022	2023
North Fork Flood Flow	0	0	0	0	0
Arikaree Flood Flow	0	0	0	0	0
Buffalo Flood Flow	0	0	0	0	0
Rock Flood Flow	0	0	0	0	0
Southfork Flood Flow	0	0	0	0	0
Frenchman Flood Flow	0	0	0	0	0
Driftwood Flood Flow	0	0	0	0	0
Red Willow Flood Flow	0	0	0	0	0
Medicine Creek Flood Flow	0	0	0	0	0
Beaver Flood Flow	0	0	0	0	0
Sappa Flood Flow	15988	0	0	0	0
Prairie Dog Flood Flow	25260	0	0	0	0
Mainstem Flood Flow	185128	0	0	0	0

Sub-basin Flows Above Attachment 1 Flood Flow Thresholds					
	2019	2020	2021	2022	2023
North Fork	0	0	0	0	0
Arikaree	0	0	0	0	0
Buffalo	0	0	0	0	0
Rock	0	0	0	0	0
South Fork	0	0	0	0	0
Frenchman	0	0	0	0	0
Driftwood	0	0	0	0	0
Red Willow	0	0	0	0	0
Medicine Creek	0	0	0	0	0
Beaver	0	0	0	0	0
Sappa	15,988	0	0	0	0
Prairie Dog	25,260	0	0	0	0
Sub-basin Sum	41,248	0	0	0	0

5-month Consecutive Period Test					
	2019	2020	2021	2022	2023
Jan-May	0	0	0	0	0
Feb-Jun	0	0	0	0	0
Mar-Jul	1	0	0	0	0
Apr-Aug	1	0	0	0	0
May-Sep	1	0	0	0	0
Jun-Oct	0	0	0	0	0
Jul-Nov	0	0	0	0	0
Aug-Dec	0	0	0	0	0
TOTAL	3	0	0	0	0

2-month Consecutive Period Test					
	2019	2020	2021	2022	2023
Jan-Feb	0	0	0	0	0
Feb-Mar	0	0	0	0	0
Mar-Apr	0	0	0	0	0
Apr-May	0	0	0	0	0
May-Jun	0	0	0	0	0
Jun-Jul	0	0	0	0	0
Jul-Aug	1	0	0	0	0
Aug-Sep	0	0	0	0	0
Sep-Oct	0	0	0	0	0
Oct-Nov	0	0	0	0	0
Nov-Dec	0	0	0	0	0
TOTAL	1	0	0	0	0

Combined Test					
	2019	2020	2021	2022	2023
FINAL TOTAL	4	0	0	0	0