

Engineering Committee Report

Republican River Compact Administration

August 24, 2016

EXECUTIVE SUMMARY

The Engineering Committee (EC) met four times since last August's Republican River Compact Administration (RRCA) Annual Meeting. Over the past year, the EC completed these assignments: 1) holding quarterly meetings and 2) exchanging information listed in Section V of the RRCA Accounting Procedures and Reporting Requirements, including all required data and documentation and 3) drafting a letter to the USGS to discuss finalized gage data by April 15 of each year.

Ongoing assignments include 1) continuing efforts to resolve concerns related to varying methods of estimating ground and surface water recharge and return flows and related issues, 2) continuing to finalize accounting for 2006-2015, 3) working to resolve issues preventing agreement on final accounting for 2006-2014, 4) discussing developing an application and approval process for future augmentation plans, 5) exploring options for sharing evaporation charges for Harlan County Lake, 6) Assign responsibility for collecting specific fields of data collected for the annual data exchange, 7) create a document memorializing when RRCA Accounting Procedures have changed over the years and incorporated it into the Accounting Procedures.

The EC recommends discussion by the RRCA on the exchange of data and documentation and the modeling runs completed by Principia Mathematica for 2015, discussion of Nebraska's proposal to revise the RRCA Accounting Procedures and Reporting Requirements, and the recommended EC assignments for the following year.

Details of the various EC tasks are described further in the remainder of this report, including as attachments, the EC meeting notes.

COMMITTEE ASSIGNMENTS AND WORK ACTIVITIES RELATED TO THESE ASSIGNMENTS

1. Meet quarterly to review the tasks assigned to the committee.
 - a. Assignment completed.
 - b. The EC held four meetings since the August 2015 RRCA Annual Meeting. Notes from the four EC meetings are attached: November 16, 2015 (Attachment 1), February 18, 2016 (Attachment 2), April 28, 2016 (Attachment 3), and July 7, 2016 (Attachment 4).
2. Exchange by April 15, 2016, 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, 2016, the states will exchange any updates to these data.

- a. Assignment completed.
 - b. Kansas, Nebraska, and Colorado posted preliminary data by April 15, 2016. The status and details of the preliminary data exchange was discussed at the April 28 and July 7, 2016, EC meetings (Attachments 3 and 4). Nebraska posted final data on April 15, May 26, and July 7, 2016, and Kansas posted final data on June 8, 2016. The Colorado procedure for 2015 uses the metered pumping for those wells covered by the Metering Rules with acreage data from 2010. Wells without meter records in parts of two counties use average application rates from Kit Carson County along with the acreage associated with each well. Due to data availability issues Colorado's CIR based estimate of pumping was not distributed. The pumping estimate will be distributed when it is complete.
 - c. In advance of the July 2016 meeting, Willem Schreüder of Principia Mathematica executed the most recent model run for 2015 using full-year temperature and precipitation data, river data, and pipeline information. He also executed a preliminary model run for 2016 using temperature data, long-term average precipitation data, 2015 evaporation data, river data, and pipeline information. This information has been posted to the RRCA website.
 - d. The Committee continued to discuss updating documentation of the modeling processes. Principia Mathematica will continue to update the modeling process documentation. The write-up for the update will have two versions of the processing programs: 2001 to 2006 and 2007 skipping intermediate steps and describing the current version of the model (5 run).
3. When possible, continue efforts to resolve concerns related to varying methods of estimating ground and surface water irrigation recharge and return flows within the Republican River Basin and related issues.
- a. Assignment ongoing.
 - b. Kansas is working on a scope and needs document for this task regarding changes in irrigation efficiency through time.
4. When possible, continue efforts to finalize accounting for 2006-2015.
- a. Assignment ongoing.
 - b. The EC discussed and analyzed Schreüder's "SWinputs Spreadsheet" in order to determine the most suitable inputs for the years 1996-2015.
5. Work to resolve issues preventing agreement on final accounting for 2006-2015, as identified in the 2015 EC Report. These issues include:
- a. Kansas's request for beginning and ending meter data from other states.
 - i. Assignment ongoing.

- ii. Kansas is reviewing Colorado's annual meter data for 2015. Colorado's 2012, 2013, and 2014 meter data are now available on the RRCA website. As Colorado has no meter data older than 2012, Kansas is examining how the 2012-2015 data correspond with the 75 percent Crop Irrigation Requirement assumption.
- b. Reaching consensus about how to model Bonny Reservoir.
 - i. Assignment ongoing.
 - ii. Kansas and Colorado discussed this issue in ongoing confidential conversations, the EC deferred discussion of this assignment.
- 6. Discuss any accounting changes that may be needed for surface water diversions for the purpose of recharging groundwater, as data become available from Nebraska projects.
 - a. Assignment ongoing.
 - b. Nebraska submitted a proposal for changes to the RRCA Accounting Procedures and Reporting Requirements document, which included changes to Attachment 7 of the document for Percent Field and Canal Loss that Returns to Stream for the Non-Irrigation Season. This proposal is available as Attachment A to the July 7 EC Minutes (Attachment 5). The EC discussed this proposal briefly at the July 7, 2016 meeting.
- 7. When possible, discuss developing an application and approval process for future augmentation plans.
 - a. Assignment not completed.
 - b. Due to ongoing consideration of this topic at Three-States meetings throughout the year, the EC deferred discussion of this assignment.
- 8. Continue to explore options for sharing evaporation charges for Harlan County Lake when accounts exist separate from the project water supplies of Bostwick Irrigation District and explore potential means to adjust the compact accounting of Harlan County Lake for the mutual benefit of the States.
 - a. Assignment not completed.
 - b. Kansas and Nebraska have discussed the issues related to calculating the incremental increase in reservoir areas, and they are close to being resolved. Discussion of these issues will continue at Three-States meetings.
- 9. Assign responsibility for collecting specific fields of data collected for the annual data exchange by determining who has the best available data and assigning them the responsibility of populating those fields in order to avoid confusion between multiple datasets.
 - a. Assignment ongoing.
 - b. The EC is utilizing the SWInputs Spreadsheet to collaborate and agree upon which source/state has the responsibility of populating data fields.
- 10. Draft a letter to the USGS to discuss how the RRCA can get finalized gage data by April 15 of each year.

- a. Assignment complete.
 - b. The RRCA Chair drafted a letter dated February 24, 2016 to the USGS requesting timely gage data. A phone conversation took place on April 6, 2016 between RRCA staff and the USGS to field questions related to the request. A letter dated April 13, 2016 was received from USGS acknowledging their understanding of the request and agreeing to provide support. The RRCA chair replied by letter dated May 16, 2016 acknowledging the understanding that was reached and thanking the USGS. All letters are included with this report as Attachment 6.
11. Create a document memorializing when RRCA Accounting Procedures have changed over the years and incorporated it into the Accounting Procedures
- a. Assignment ongoing.
 - b. Kansas is spearheading this document and the work has yielded a draft document that was presented to the EC during the July 7 meeting. The draft document is broken out into Accounting Procedure changes, Model Update and Resolution Action, and how the document is kept current.

OTHER COMMITTEE ACTIVITIES

1. Updates on the status of the development and review of RRCA annual reports for 2014, and 2015 were given by the states at each quarterly EC meeting.
2. Nebraska reminded the EC that moving forward only the Medicine Creek gage data would be maintained by Nebraska. The Beaver and Guide Rock gages were formerly maintained by Nebraska and will now be managed by the USGS.
3. The EC discussed Nebraska's 2016 water administration during each quarterly meeting. This is a Compact Call Year, but the N-CORPE and Rock Creek augmentation projects will provide water for the forecasted water shortage quantity.
4. Kansas suggested that the RRCA develop an administrative website that would be an informational page for the general public. Kansas has developed a draft to share with the EC for discussion and requested feedback from other states.
5. Nebraska has developed a new method for tracking non-federal reservoirs. The new method was described in a write-up prepared by Nebraska, dated November 13, 2015, and was discussed at the February 18th EC meeting. Kansas and Colorado agreed that the new methodology was suitable for use and Nebraska will continue to use the methodology for years 2013-present. This is included as Attachment #7.
6. The EC elected to form an ad hoc subcommittee between members of each state to discuss details surrounding the SWInputs spreadsheet and the origins of data populating said spreadsheet.

ITEMS FOR RRCA DISCUSSION & ACTION

Based upon the EC discussions and information presented in this report, the EC recommends RRCA discussion and potential action on the following items:

1. Agreement that the Data Exchange & Modeling Results for 2015 were performed. The EC has examined the data exchanged and the results from Principia Mathematica and agrees that the 2015 modeling runs are complete.
2. Discussion and direction on the specific modeling and data tasks to be assigned to Principia Mathematica for 2016.
3. Discussion of Nebraska's proposal to revise the RRCA Accounting Procedures and Reporting Requirements as well as Attachment 7 to account for non-irrigation season canal diversions intended for aquifer recharge purposes.
4. Discuss the continuation of efforts to draft and develop an RRCA administrative website that would be an informational page for the general public.
5. Discussion of the recommended EC assignments and other potential assignments for the next year and agreement on a final set of assignments. The EC presents the list of 12 items in this report as recommended assignments to report on at the 2017 annual meeting of the RRCA.

RECOMMENDED ASSIGNMENTS FOR THE COMING YEAR

The Engineering Committee recommends that the Republican River Compact Administration assign the following tasks:

1. Meet quarterly to review the tasks assigned to the committee.
2. Exchange by April 15, 2017, 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, 2017, the states will exchange any updates to these data.
3. When possible, continue efforts to resolve concerns related to varying methods of estimating ground and surface water irrigation recharge and return flows within the Republican River Basin and related issues.
4. Continue efforts to finalize all accounting for years since 2006. Issues between the states currently include:
 - a. Kansas's request for beginning and ending meter data from other states.
 - b. Agreement on appropriate Surface Water Inputs.
 - c. Reaching consensus on how to model Bonny Reservoir.
5. Continue work to assign responsibility for collecting specific fields of data collected for the annual data exchange by determining who has the best available data and assigning them the responsibility of populating those fields in order to avoid confusion between multiple datasets.

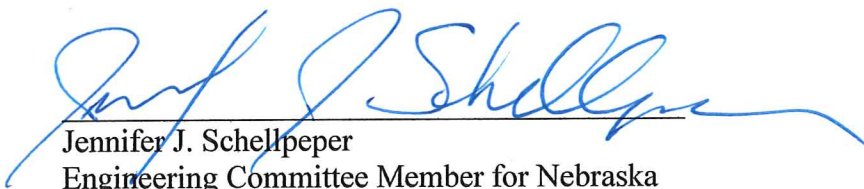
6. Continue work on creating a document memorializing when RRCA Accounting Procedures have changed over the years and incorporate it into the Accounting Procedures.
7. When possible discuss developing an application and approval process for future augmentation plans.
8. Continue to explore options for sharing evaporation charges for Harlan County Lake when accounts exist separate from the project water supplies of Bostwick Division and explore potential means to adjust the compact accounting of Harlan County Lake for the mutual benefit of the States.
9. Continue efforts to develop and publish an administrative website that would be an informational page for the general public.
10. By December 31, 2016 unify accounting procedures and reporting requirements approved by all RRCA resolutions including determining the appropriate model run or runs to be performed by Principia Mathematica.
11. Continue work and provide future update on improving accounting tools developed by the Engineering Committee.

The Engineering Committee Report and the exchanged data will be posted on the web at www.republicanrivercompact.org.

SIGNED BY



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