



Republican River Accounting: How It's Done

Nebraska's forecast of available water supplies in the Republican Basin

This is the final installment of a four-part series exploring how Nebraska, Kansas, and Colorado work together to administer the Republican River Compact (Compact) and how Nebraska uses Compact accounting data to help manage water and forecast future water availability in the Republican River Basin.

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As much as we would like to be able to “go with the flow,” so to speak, of surface water supply availability in the Republican River Basin, it is imperative that NeDNR, the natural resources districts, and water users in the basin have a sense of certainty in the maximum amount of surface water that may be available for use in the coming year. Since the Republican River Compact (Compact) data exchange and accounting calculations for assessing compliance with the Compact are not finalized by the Republican River Compact Administration (RRCA) until after the end of the year, Nebraska needs to have a prediction of the coming year's allocation and use to begin assessing what management actions might be needed for compliance in the coming year. NeDNR is required to consult with the three NRDs in the fully appropriated portion of the Republican River Basin (i.e., Upper Republican, Middle Republican, and Lower Republican NRDs) to provide an annual forecast of the maximum amount of water that may be available from streamflow for beneficial use in the short term and long term to ensure Nebraska's compliance with the Compact (*Neb. Rev. Stat. § 46-715 (6)*). The forecasted values must also comply with the requirements of the groundwater and surface water



Republican River Continued From Page 1

controls within the integrated management plans (IMPs) jointly developed by NeDNR and the three NRDs.

NeDNR estimates how much water use can occur for the coming year by assuming conditions will be dry. In December 2017, NeDNR issued a short-term forecast of dry-year, or maximum, allowable depletions to streamflow in the Republican River Basin of Nebraska for 2018 and a long-term forecast for a decade later – 2028. NeDNR's *Forecast of Allowable Depletions in the Republican Basin during 2018 and 2028* and previous year's forecasts are available online at <https://dnr.nebraska.gov/water-planning/republican/publications>. Detailed in the IMPs, NeDNR's short-term forecast is largely dependent on the two- and five-year averaging periods used by the RRCA to assess Nebraska's compliance, the previous years' balances, and the projection of the available water supplies and water consumption within the basin in Nebraska for the coming year.

The period used by the RRCA to assess Nebraska's Compact compliance is determined based on projections of the total irrigation water supplies available to the Nebraska Bostwick Irrigation District and Kansas Bostwick Irrigation District (KBID). The forecast projection is that 2018 will require use of the more restrictive two-year averaging (2017-2018) upstream of Guide Rock, in addition to five-year averaging (2014-2018) upstream of Hardy to measure Nebraska's Compact compliance. Nebraska's Compact balances upstream of Guide Rock and Hardy have been approved and finalized by the RRCA through 2016. The 2017 balance used in the

forecast was estimated by NeDNR using the current RRCA accounting procedures.

NeDNR has developed a method of forecasting the streamflow-related available water supply of the Republican River Basin for Nebraska's use, which is detailed in the IMPs. Estimation of supplies and consumption is based on previous years' averages, water available for irrigation in the five Bureau of Reclamation project reservoirs in the Basin in Nebraska at the start of each year,



and recent stateline streamflow.

The 2017-2018 Compact balance above Guide Rock is forecast to be -11,100 acre-feet. Since the two-year balance above Guide Rock is projected to be required and is negative, 2018 is a Compact Call Year. Since 2018 is a Compact Call Year, an additional 9,300 acre-feet of water that Kansas did not request to be made available in Harlan County Lake in the most recent Compact Call Years, referred to as Remaining Compact Compliance Volume, is available for Kansas to

Republican River Continued From Page 2

request in addition to the potential that Nebraska may need to address the projected 11,100 acre-foot shortfall. The five-year (2014-2018) Compact balance above Hardy is forecast to be positive and is not expected to require additional actions by Nebraska.

The RRCA was able to take advantage of this forecast of Nebraska's available streamflow in the Republican River basin to fine-tune Nebraska's potential management actions for compliance to what Kansas' irrigation water requirements are for the coming year. As described in Part 3 of this newsletter series in the Autumn 2017 NeDNR newsletter, Kansas did not

request any water from the Remaining Compact Compliance Volume to be made available to KBID in Harlan County Lake by June 1 of this year. This means that management actions that in the past would have been required can now be deferred until at least Fall 2018, at a time when Nebraska can more accurately determine what, if any, shortfall may exist. The 2018 forecast volumes will be updated with actual values as 2018 progresses, and a forecast for 2019 will be discussed with the RRCA to determine if any management actions will be necessary in the fall of this year.