

Forecast of Allowable Depletions in the Republican Basin During 2012 and 2022

*Nebraska Department of Natural Resources
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The Nebraska Department of Natural Resources (NDNR) predicts that Nebraska's allowable depletions to Republican River streamflow during 2012 (if it is a dry year) will be approximately 298,680 acre-feet. The NDNR is predicting that Nebraska will be in compliance with the Republican River Compact under all likely weather conditions (using current accounting procedures). The Bureau of Reclamation is predicting that Water Short Year Administration will not be in effect during 2012; therefore the two-year compliance standard above Guide Rock will not be in effect.

Background

Pursuant to Neb. Rev. Stat. § 46-715(6), in consultation with the affected natural resources districts, the NDNR is required to provide an annual short-term and long-term forecast of maximum allowable depletions to streamflow that will ensure compliance with interstate compacts. The NDNR has determined that the short-term forecast should apply to the coming irrigation season, and that the long-term forecast should be for a decade later. Therefore, this document includes the dry-year forecast of allowable depletions to streamflow in 2012 and 2022.

Short-Term Forecast

The NDNR has determined a simplified method of estimating the streamflow-related water supply of the Republican River Basin and Nebraska's resulting share. The water supply is related to eight variables:

- Surface water consumptive use in Colorado, Kansas, and Nebraska,
- Groundwater consumptive use in the three states,
- Nebraska's Imported Water Supply Credit, and
- Surface water flow at the Kansas – Nebraska state line.

These eight variables may be estimated for the next year:

- Surface water consumption in Colorado has reduced to a low near-constant number in recent years,
- Surface water consumption in Kansas is related to evaporation from lakes in Kansas and the water available for irrigation in Harlan County Lake at the end of each year

- Surface water consumption in Nebraska is related to water available for irrigation in the five Bureau of Reclamation project reservoirs in Nebraska at the start of each year,
- Groundwater consumption and the Imported Water Supply Credit show little variation from year to year and may be estimated in all three states using a two-year average, and
- Streamflow, assuming that the upcoming year is a dry year, may be estimated from the volume of water in Harlan County Lake and the most recent five years of streamflow.

Historically Nebraska's share of the available water supply has been approximately half of the total water supply. The information used to forecast allowable depletions for 2012 is summarized in table 1.

Table 2 summarizes the estimated allocations, consumption, and imported water supply for the period 2008 – 2012. The resulting positive five-year average is approximately 58,000 acre-feet.

Based on current reservoir contents and projected inflows, the Bureau of Reclamation is not projecting a Water-Short Year during 2012; therefore the two-year compliance standard above Guide Rock will not be in effect.

Methodology for Long-Term Forecast

Due to the absence of a long-term trend in water supply, the lowest water supply in the future is likely to be similar to the lowest available supply in the past. So, the allowable depletion during 2022, assuming several dry years, is estimated to be approximately 200,000 acre-feet.

Table 1. Information Used for 2012 Forecast of Allowable Depletions.

Year	Item	Information Source
2008		Draft; current Accounting Procedures (v. 2005)
2009		Draft; current Accounting Procedures (v. 2005)
2010		Draft; current Accounting Procedures (v. 2005)
2011 Provisional	Pumping	Power records estimate
	Surface Water Use	Estimated from preliminary data and previous years values
	Stream Flow	Provisional records through December 11, 2011, end of year estimated
	Evaporation	2010 records
2012 Forecast	Groundwater Consumptive Use and Imported Water Supply Credit	Average of 2010 and 2011
	Surface Water Consumptive Use	Colorado: Previous two-year average Kansas: + (.1858 x HCL content) + 9,575 Nebraska: - (0.0000004) x (NE lake volume) ² + (0.5151) x (NE lake volume) - 41,518
	Stream Flow	+ (5-year average of state line flows) x 0.41 + 0.23 x HCL content - 27,450

Table 2. Estimated Summary of Stream Flow Depletions.

Year	Allocation	Computed Beneficial Consumptive Use	Imported Water Supply Credit	Allocation - (CBCU - IWS Credit)
2008	314,630	256,220	26,050	84,460
2009	273,810	287,100	22,743	9,453
2010	357,490	265,400	24,766	116,856
2011 Provisional	323,460	270,260	23,774	76,974
2012 Forecast	298,680	320,320	24,270	2,630
Average	313,614	279,860	24,321	58,075

Note: 2008 – 2011 values are based on current accounting procedures. Values are not finalized by the RRCA.