

2018 ANNUAL REPORT OF 2017 DATA
BY THE NEBRASKA DEPARTMENT OF NATURAL RESOURCES
TO MEET THE REQUIREMENTS OF THE INTEGRATED MANAGEMENT PLAN FOR
THOSE PORTIONS OF THE TRI-BASIN NATURAL RESOURCES DISTRICT
WITHIN THE REPUBLICAN RIVER BASIN

I. INTRODUCTION

This report is intended to satisfy the Department of Natural Resources (Department or NeDNR) tracking and reporting requirements as described in the Monitoring and Studies Section of the integrated management plan (IMP) for those portions of the Tri-Basin Natural Resources District (TBNRD or District) located within the Republican River Basin. This is the sixth annual report to be filed following the adoption of the IMP in June 2012. The IMP requires that the Department track and report on the following items on an annual basis: a) any surface water permits issued; b) any dam safety permits issued; c) any groundwater transfer permits issued; d) reports of water diverted and when available, water stored by surface water users; and e) the associated offsets for any new permits issued. This report covers activities that occurred from January 1, 2017, to December 31, 2017. Data from streamgages within the District are also provided with this report along with calculations of streamflow depletions using the Republican River Compact Administration (RRCA) model.

The information contained in this report will assist in measuring the success of the IMP in meeting its goals and objectives.

II. ACTIVITIES TO BE REPORTED ANNUALLY

A. Summary

Items reported annually include permits that are issued by the Department and the amount of water diverted by surface water users. When an application for a surface water or groundwater permit is reviewed, the Department assesses the potential for the permitted action to increase, decrease, or not affect existing water users. Existing surface water users have the right to divert water in accordance with their permit. The Department field office uses water use reports to verify that surface water users are following the conditions of their permits. During calendar year 2017, the Department issued one new surface water permit in the Republican River Basin portion of the TBNRD.

B. Surface water permits

One new surface water permit was approved in the Republican River Basin portion of the TBNRD by NeDNR in 2017.

2018 ANNUAL REPORT OF 2017 DATA
BY THE NEBRASKA DEPARTMENT OF NATURAL RESOURCES
 TO MEET THE REQUIREMENTS OF THE INTEGRATED MANAGEMENT PLAN FOR
 THOSE PORTIONS OF THE TRI-BASIN NATURAL RESOURCES DISTRICT
 WITHIN THE REPUBLICAN RIVER BASIN

Table 1. Surface water permits approved by NeDNR in the Republican Basin of TBNRD in 2017.

SURFACE WATER APPLICATION APPROVED CALENDAR YEAR 2017										
Appropriation Number	Approval Date	S-T-R	Source	Use	Grant in CFS	Grant in AF	Surface Acres	Year Built	Mitigation	Associated Variance
A-19486	1/26/2017	16-6-23W	Muddy Creek, East Branch, Trib. To	ST	NA	45.8	NA	Before 1993	NA	VAR-5794

One new dam safety permit was issued in the Republican River Basin portion of the TBNRD during the reporting period and is shown in Table 2. It is also listed in Table 1.

Table 2. Dam safety permits in the Republican River Basin portion of TBNRD

Dam ID	NIDID	Plan Number	County	Order Date	SW Appropriation
4092	NE04092	P-19756	Gosper	1/26/2017	A-19486

No new groundwater transfer permits in the Republican River Basin portion of the TBNRD were approved by NeDNR in 2017.

C. Water Diverted by Surface Water Users

In 2017, no water was reported as having been diverted from natural flow for irrigation purposes. Water administration, lack of water, or using groundwater instead of surface water were reasons cited for not irrigating with surface water rights in 2017.

There are no Federal reservoirs or non-Federal reservoirs with capacities greater than 200 AF within the Republican River Basin region of TBNRD. Evaporation from small reservoirs (capacity to store 15 to 200 AF) is estimated on an annual basis to comply with the RRCA. The total estimated net evaporation for small reservoirs in the Republican River Basin portion of the TBNRD for 2017 was 198 AF. Net evaporation is calculated by multiplying the presumptive average annual surface area of each small reservoir by the net evaporation measured at the nearest United States Bureau of Reclamation reservoir climate and evaporation station. The presumptive average annual surface area of each small reservoir is 25% of the area at the principal spillway elevation, as measured in 2012. The presumptive average surface area may change from year to year based on evaluations by the Dam Safety section of the Department.

2018 ANNUAL REPORT OF 2017 DATA
BY THE NEBRASKA DEPARTMENT OF NATURAL RESOURCES
TO MEET THE REQUIREMENTS OF THE INTEGRATED MANAGEMENT PLAN FOR
THOSE PORTIONS OF THE TRI-BASIN NATURAL RESOURCES DISTRICT
WITHIN THE REPUBLICAN RIVER BASIN

D. Associated Depletion Offsets

No offsets were necessary in 2017.

E. Estimated Depletions

There is no information to include on estimated depletions from permitted new or expanded water use or accretions from associated offsets for 2017.

III. STREAMGAGE DATA

The data for streamgages located on Muddy Creek at the Furnas-Gosper County line, Muddy Creek at Arapahoe, Turkey Creek at the Furnas-Gosper County line, and Turkey Creek at Edison from October 1, 2016, through September 1, 2018, can be found in Figure 1. Please note the data from January 1, 2017, through September 1, 2018, are considered provisional for Muddy Creek at Arapahoe, Turkey Creek at Edison, and Turkey Creek at the Furnas-Gosper County line and may be subject to change upon further review. October 1, 2017, through September 1, 2018 are considered provisional for Muddy Creek at the Furnas Gosper County line and may be subject to change upon further review.

IV. STREAMFLOW DEPLETION CALCULATIONS

This section of the report includes information on the calculated depletions to streamflow due to groundwater pumping within the TBNRD and the imported water credit (Table 3 and Figure 2). The data shown on the table and figures below were calculated using the August 2017 RRCA accounting method approved by the U.S. Supreme Court. These calculations were completed using historical TBNRD pumping data, groundwater mound, and recharge data as inputs to the RRCA groundwater model. Net effect to baseflow for each calendar year was calculated by totaling the imported water credit (mound accretions) and the streamflow depletion at the southern boundary of the TBNRD. The net effects are summarized into a rolling three-year average to assess the progress towards achieving and sustaining a hydrologically balanced condition in accordance with the IMP. The three-year average net effect is positive for 2017 (Table 3 and Figure 3). In accordance with the IMP, these data will be used to assess the TBNRD's progress to meet Goal A, Objective 1, of the IMP. In instances where the balance is negative, TBNRD and NeDNR will set an objective for an offset of up to 1000 acre-feet and TBNRD could begin augmentation pumping the same year. These data differ slightly from previous years' reports because previous reports included provisional RRCA accounting data, whereas this report includes the final data approved by the RRCA for calendar years 2006-2017.

2018 ANNUAL REPORT OF 2017 DATA
BY THE NEBRASKA DEPARTMENT OF NATURAL RESOURCES
 TO MEET THE REQUIREMENTS OF THE INTEGRATED MANAGEMENT PLAN FOR
 THOSE PORTIONS OF THE TRI-BASIN NATURAL RESOURCES DISTRICT
 WITHIN THE REPUBLICAN RIVER BASIN

Table 3. Calendar years 2012 to 2017 modeled streamflow depletion, mound accretion, and net effect to baseflow in acre-feet and previous three-year average net effect to baseflow for 2014 through 2017. A negative value represents depletion, and a positive value represents accretion.

Year	Streamflow Depletion (AF)	Mound Accretion (AF)	Net Effect (AF)	3-year Average Net Effect (AF)
2012	-8,783	10,674	1,891	--
2013	-9,174	9,476	302	--
2014	-9,588	9,455	-133	687
2015	-9,636	9,836	200	123
2016	-9,794	10,078	284	117
2017	-9751	10,256	505	330

2018 ANNUAL REPORT OF 2017 DATA
BY THE NEBRASKA DEPARTMENT OF NATURAL RESOURCES
 TO MEET THE REQUIREMENTS OF THE INTEGRATED MANAGEMENT PLAN FOR THOSE PORTIONS OF THE TRI-BASIN
 NATURAL RESOURCES DISTRICT
 WITHIN THE REPUBLICAN RIVER BASIN

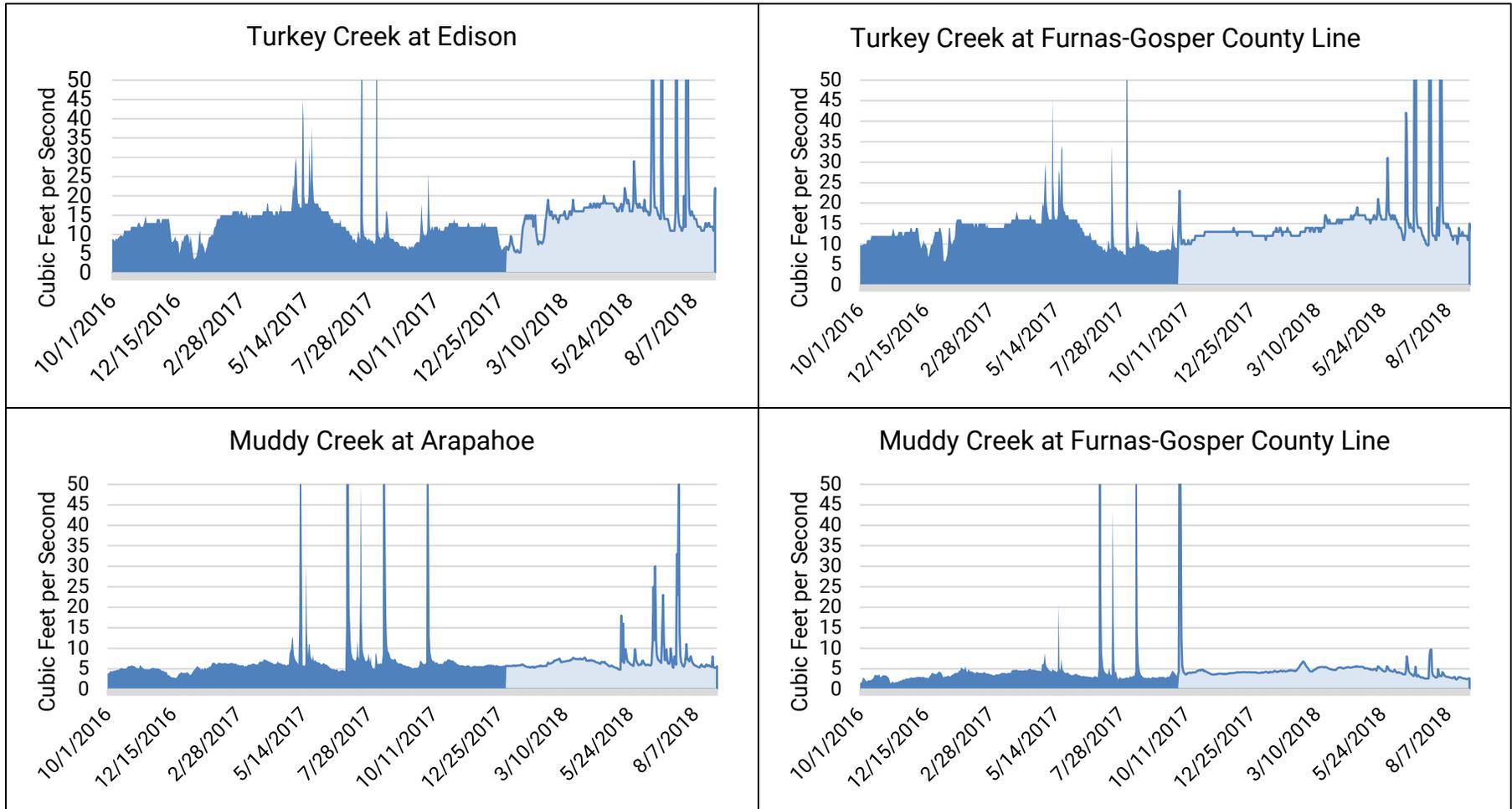


Figure 1: Measured flow at 4 streamgages in the Republican River Basin of Tri-Basin NRD. Data above have been finalized since the 2017 report (dark blue), or are new preliminary data (light blue). Due to high variability of flow, flow measured above 50 cfs were truncated in the graphs above for visualization purposes. Streamgage data can be downloaded from <https://nednr.nebraska.gov/RealTime/Gage/Index>.

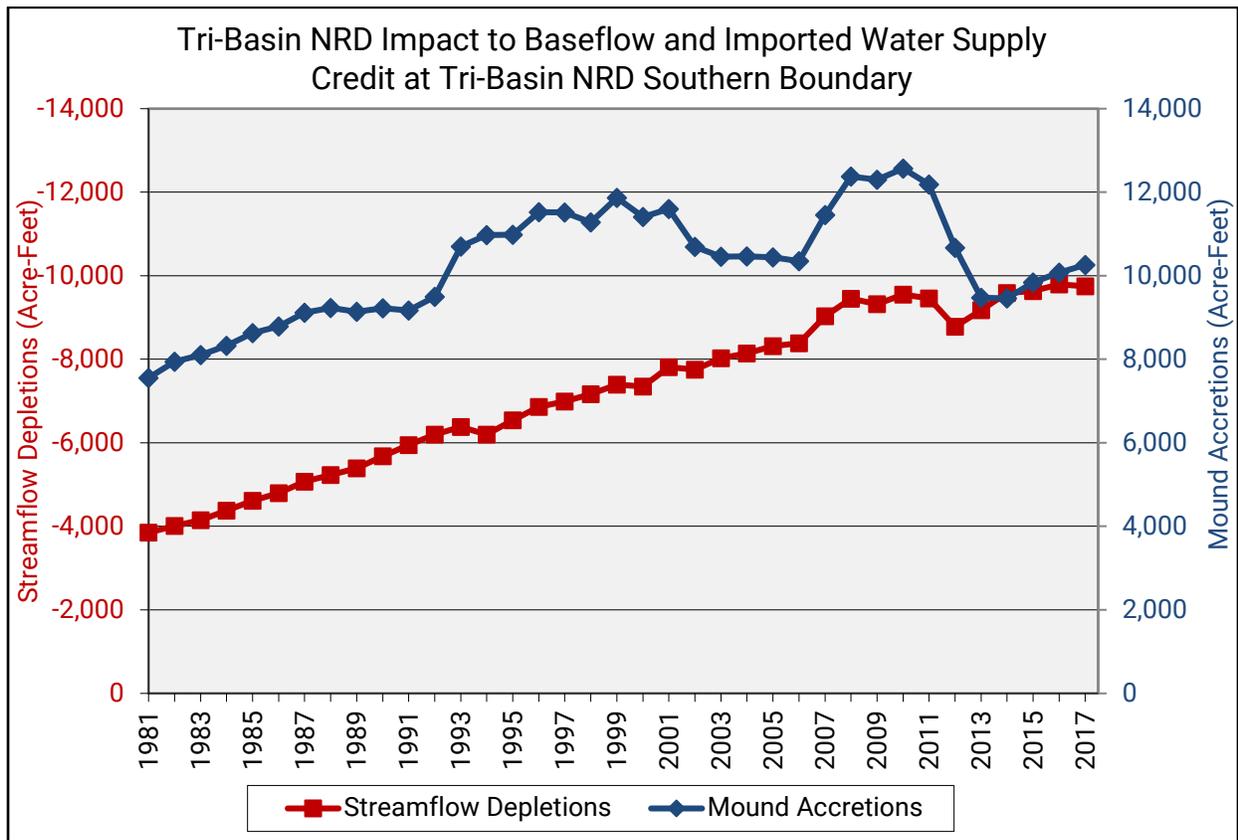


Figure 2: Modeled annual streamflow depletions and mound accretion for calendar years 1981 through 2017. The data in this figure were calculated using the August 2017 RRCA accounting procedures. In order to show both streamflow depletions and mound accretions for comparison in one chart, the negative values on the left vertical axis pertain to the red line, representing stream depletion values, and positive values on the right vertical axis pertain to the blue line, representing mound accretions.

2018 ANNUAL REPORT OF 2017 DATA
BY THE NEBRASKA DEPARTMENT OF NATURAL RESOURCES
 TO MEET THE REQUIREMENTS OF THE INTEGRATED MANAGEMENT PLAN FOR
 THOSE PORTIONS OF THE TRI-BASIN NATURAL RESOURCES DISTRICT
 WITHIN THE REPUBLICAN RIVER BASIN

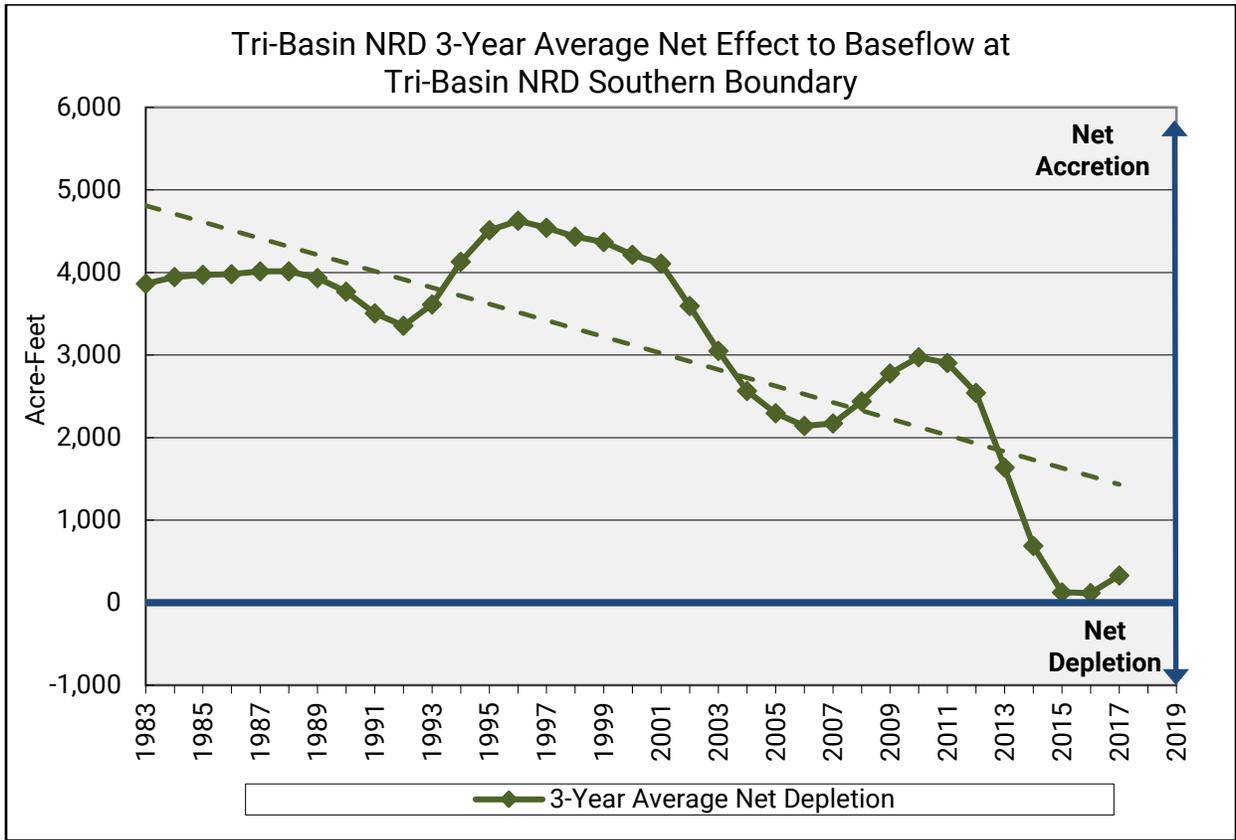


Figure 3: Rolling three-year average net effect to baseflow for calendar years 1981 through 2017, as the total of modeled values of streamflow depletion and mound accretions using the August 2017 RRCA Accounting Procedures.