

# REPORT ON THE DEPLETIONS AND MITIGATIONS (ACCRETIONS) FROM 2017 PERMITTED ACTIVITIES FOR CENTRAL PLATTE, NORTH PLATTE, SOUTH PLATTE, TRI-BASIN, AND TWIN PLATTE NATURAL RESOURCES DISTRICTS FOR THE 2019 BASIN-WIDE MEETING

## I. INTRODUCTION

This report is to satisfy, in part, the tracking and reporting requirements as described in Chapter 7, Section II.A.1(b)(2), the Monitoring and Studies section of the Central Platte, North Platte, Tri-Basin, and Twin Platte Natural Resources Districts (Platte Basin NRDs) integrated management plans (IMPs). The South Platte NRD IMP Monitoring and Studies section reference is 9.3.1.1.1.1.2.2.

For the Central Platte NRD IMP, Chapter 7, Section II.A.1(b)(2) states:

(2) The reports from the CPNRD and the Department should include information on the location, amount and timing of the depletions caused by each permitted new or expanded water use, as well as the associated offset and the location, amount and timing of the offset's accretions to the river. *The depletions and/or the accretions should be reported for each year throughout the first ten (10) year increment.*

The North Platte NRD, South Platte NRD, and Twin Platte NRD IMPs also state the above, as does the Tri-Basin NRD IMP, except the italicized sentence does not appear.

Each of the five Platte Basin NRD IMPs requires that the Department and the NRDs annually track and report new or expanded water use activities. These new or expanded uses are then evaluated along with any offsets to estimate the location, amount, and timing of impacts to the river and to aid in the annual assessment of the progress being made toward achieving the goals and objectives of the IMP for the first 10 year increment, as required by the IMPs. The Department reported on the accretions and depletions due to their new or expanded permitted activities during 2018 in their 2019 annual report. The accretion and depletion analysis of the NRD issued permits is reported in this document. For details on the permitting activities of each NRD, refer to their individual reports on new or expanded permit activities for the 2018 calendar year.

### 1. Analysis of NRD 2018 permitted activities.

Table 1 shows the depletions, mitigations (accretions), and net effect of the 2018 permitted new or expanded uses reported by each of the five NRDs through the remainder of the first increment of the IMPs, ending in 2019, and the second increment which will extend through 2029. A positive value in Table 1 indicates that the accretive effect of the mitigations exceeded the depletive effect of the new or expanded permitted uses. Effects to the river

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were estimated for each permitted action representing a new consumptive use of water and the corresponding mitigation for each new use. For each permitted action evaluated, there was a new use initiated and an existing use retired. Some of the permits listed in the individual NRD reports are not for new or expanded consumptive uses of water and are therefore not included in the analysis of depletions. The number of permits used to calculate depletions and accretions to the river from these permits in each NRD is shown at the top of table 1.

The depletion and accretion analysis was performed following the guidance document developed by the technical committee for the Platte Basin Habitat Enhancement Project. In general, for actions where the new and retired uses were a change in agricultural land use, the difference in consumptive use was estimated based on land use data provided with the permit information, or on land use conversions typical of the area (i.e. irrigated corn to dryland corn, or vice versa) if specific data was not available. The change in consumptive use for other types of uses, such as new industrial uses, was estimated based upon available data. The annual effect to the river from each individual permitted action (new/expanded uses or mitigations) was estimated using an annual depletion percentage series developed using the Hunt (1999)<sup>1</sup> equation and average hydraulic characteristics taken from COHYST data as developed by the technical committee. The guidance document for the annual calculations, *Basin-wide Technical Committee Guidance Document – Procedures for Annual Accounting Review and Robust Review to Assist Integrated Management Planning and Facilitate Reporting to the Platte River Recovery and Implementation Program*, can be found on the Department’s website at: <https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/water-planning/upper-platte/other/basin-wide-technical-committee-guidance20120814.pdf>.

### 2. Analysis of First Increment

The NRDs and NeDNR recently completed the Robust Review of changes in land use, permitted activities, new uses, offsets, and mitigation activities in the basin since July 1, 1997. This analysis was conducted according to the methodology outlined in the guidance document and the NRDs’ IMPs. The Robust Review used the updated COHYST 2010 model and the WWUM model. The results of the Robust Review are being used to set targets for the second increment IMPs. In the second increment, annual analyses of permitted activities will use tools that are consistent with the Robust Review, following the guidance document methodology.

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<sup>1</sup> Hunt, B. (1999). Unsteady Stream Depletion from Ground Water Pumping. *Ground Water*, 37(1), 98-102.

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Table 1. Depletions and Mitigations from NRD 2018 permits (in acre-feet)

	CPNRD (129 Permits)			NPNRD (No Permits)			SPNRD (2 Permits)			TBNRD (4 Permits)			TPNRD (9 Permits)			All NRDs
Year	Depletion	Mitigation	Net Effect	Depletion	Mitigation	Net Effect	Depletion	Mitigation	Net Effect	Depletion	Mitigation	Net Effect	Depletion	Mitigation	Net Effect	Total Net Effect
2018	-12.58	15.02	2.44	0.0	0.0	0.0	-0.02	4.65	4.63	-1.13	2.02	0.90	-2.07	5.94	3.87	11.84
2019	-27.76	27.29	-0.47	0.0	0.0	0.0	-0.25	7.60	7.35	-1.70	2.94	1.23	-4.49	11.77	7.27	15.39
2020	-41.33	37.42	-3.90	0.0	0.0	0.0	-0.70	9.70	9.00	-2.07	3.48	1.40	-6.89	16.37	9.48	15.98
2021	-53.26	46.14	-7.12	0.0	0.0	0.0	-1.27	11.36	10.09	-2.34	3.84	1.50	-9.05	20.42	11.37	15.85
2022	-64.02	53.97	-10.06	0.0	0.0	0.0	-1.87	12.73	10.86	-2.55	4.12	1.57	-10.96	24.10	13.14	15.51
2023	-73.91	61.15	-12.75	0.0	0.0	0.0	-2.49	13.91	11.42	-2.71	4.33	1.62	-12.64	27.45	14.81	15.11
2024	-83.06	67.82	-15.24	0.0	0.0	0.0	-3.09	14.95	11.86	-2.85	4.51	1.66	-14.13	30.51	16.38	14.66
2025	-91.57	74.04	-17.53	0.0	0.0	0.0	-3.68	15.88	12.20	-2.96	4.65	1.69	-15.49	33.32	17.83	14.20
2026	-99.50	79.85	-19.65	0.0	0.0	0.0	-4.25	16.73	12.47	-3.06	4.78	1.72	-16.73	35.90	19.17	13.71
2027	-106.91	85.29	-21.62	0.0	0.0	0.0	-4.81	17.50	12.70	-3.14	4.88	1.74	-17.88	38.28	20.40	13.21
2028	-113.85	90.39	-23.46	0.0	0.0	0.0	-5.34	18.22	12.88	-3.22	4.98	1.76	-18.97	40.48	21.51	12.69
2029	-120.36	95.19	-25.17	0.0	0.0	0.0	-5.86	18.90	13.04	-3.29	5.06	1.77	-20.01	42.53	22.52	12.16