

REPORT ON THE DEPLETIONS AND MITIGATIONS (ACCRETIONS) FROM  
2022 PERMITTED ACTIVITIES FOR CENTRAL PLATTE, NORTH PLATTE,  
SOUTH PLATTE, TRI-BASIN, AND TWIN PLATTE NATURAL RESOURCES  
DISTRICTS FOR THE 2023 BASIN-WIDE MEETING

## I. INTRODUCTION

This report is to satisfy, in part, the tracking and reporting requirements as described in Chapter 10.7, the Monitoring and Evaluation section of the Central Platte, North Platte, South Platte, Tri-Basin, and Twin Platte Natural Resources Districts (Platte Basin NRDs) second increment integrated management plans (IMPs).

For the Central Platte NRD second increment IMP, Chapter 10.7.2, paragraph III states:

(2) The reports from the CPNRD and the NeDNR 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 ten-year increment.

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 second 10-year increment, as required by the IMPs. 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 2022 calendar year.

This will be the third report on depletions and mitigations from permitted activities for the second increment of the IMPs.

### 1. Analysis of NRD 2022 permitted activities.

Table 1 shows the depletions, mitigations (accretions), and net effect of the 2022 permitted new or expanded uses reported by each of the five NRDs through the remainder of the second increment of the IMPs (which ends in 2029), and 1 year into the third increment, as well. A positive value in Table 1 indicates that the accretive effect of the mitigation activities exceeded the depletive effect of the new or expanded permitted uses. Effects to the river 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

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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 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 for the first increment IMP. 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 the original 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>.

NeDNR and the Upper Platte NRDs are currently updating models used for inputs to this report and may update the methodology of accretion and depletion calculations in conjunction with the 2023 Robust Review. Model updates planned for the 2023 Robust Review include a conversion to MODFLOW 6, the creation of updated inputs, and re-calibration. More details on the model updates can be found in the model documentation.

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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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Year	CPNRD (114 Permits)			NPNRD (1 Permit)			SPNRD (No Permits)			TBNRD (6 Permits)			TPNRD (15 Permits)			All NRDs
	Depletion	Mitigation	Net Effect	Depletion	Mitigation	Net Effect	Depletion	Mitigation	Net Effect	Depletion	Mitigation	Net Effect	Depletion	Mitigation	Net Effect	Total Net Effect
2022	-11	32	21	0	0	0	0	0	0	0	1	0	-19	36	17	38
2023	-33	58	25	0	0	0	0	0	0	-5	6	0	-27	58	31	56
2024	-55	79	24	0	0	0	0	0	0	-9	10	1	-32	73	41	66
2025	-74	95	22	0	0	0	0	0	0	-12	14	2	-35	83	48	72
2026	-90	109	19	0	0	0	0	0	0	-14	16	2	-38	92	53	75
2027	-105	121	17	0	0	0	0	0	0	-15	18	3	-41	98	58	77
2028	-118	132	15	0	0	0	0	0	0	-16	19	3	-43	104	61	78
2029	-129	142	12	0	0	0	0	0	0	-18	21	3	-45	109	64	79
2030	-140	150	10	0	0	0	0	0	0	-19	22	3	-47	113	66	80

Table 1. Depletions and Mitigations from analyzed NRD 2022 permits (in acre-feet)