

Nebraska's Update on Robust Review Results and
Second Increment Planning (2020-2029)
Platte River Recovery Implementation Program
Nebraska New Depletion Plan
December 31, 2019

DATE: December 31, 2019

TO: Governance Committee (GC) of the Platte River Recovery Implementation Program (PRRIP)

FROM: Gordon W. "Jeff" Fassett, State of Nebraska's Representative to the GC Director, Nebraska Department of Natural Resources

SUBJECT: Nebraska's Update on Upper Platte Basin Robust Review Results and Second Increment Planning (2020-2029)

Background

This memo serves as an update on the results of the comprehensive evaluation of changes in post-1997 water use activities detailed in Nebraska's *Upper Platte Basin Robust Review, a report on management activities aimed at fulfilling the goals and objectives of the Upper Platte Basin-Wide Plan, the Upper Platte Basin individual NRD IMPs, and the Nebraska New Depletions Plan (2019)*, (Robust Review); and the status of management actions planned for the Nebraska's second increment of Integrated Management Planning (IMP) and Basin-Wide Planning activities in the Overappropriated portion of the Upper Platte River Basin (Figure 1). In previous years, Nebraska has provided supplemental updates to the Governance Committee on Nebraska New Depletion Plan (NNDP) activities that are not captured in its Annual Report. Those supplemental updates have described analyses and implementation activities that Nebraska has completed to comply with elements of the NNDP. This memo serves to 1) provide a final update on first increment planning activities (2009-2019) and 2) provide the goals and measures that will be utilized to fulfill NNDP requirements throughout the second planning increment (2019-2029).

The Robust Review analyzed the impacts of new or expanded permitted activities since July 1, 1997, along with the impacts of mitigation or offset measures conducted through 2013, and non-permitted activities such as changes in livestock populations, human populations, small reservoirs (<15 af), and sand pits. The Robust Review resulted in updated estimates of new net depletions due to new or expanded uses of water subsequent to July 1, 1997. The quantification and mitigation of these depletions is a requirement of the NNDP and Nebraska state law.

Milestone nine of the "Addendum to the Final Platte River Recovery and Implementation Program – First Increment Extension" (PRRIP extension document) identified that as of November 2016 the status of the NNDP was not achievable by the end of 2019. The results of Robust Review analysis and along with implementation of new mitigation measures beginning in 2020 show that Nebraska will be meeting its requirements under the NNDP

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through mitigation of post-1997 depletions within the basin. Summary of the evaluation results are provide within this memo with additional details on the analysis and basin planning efforts available at: <http://upjointplanning.nebraska.gov/>.

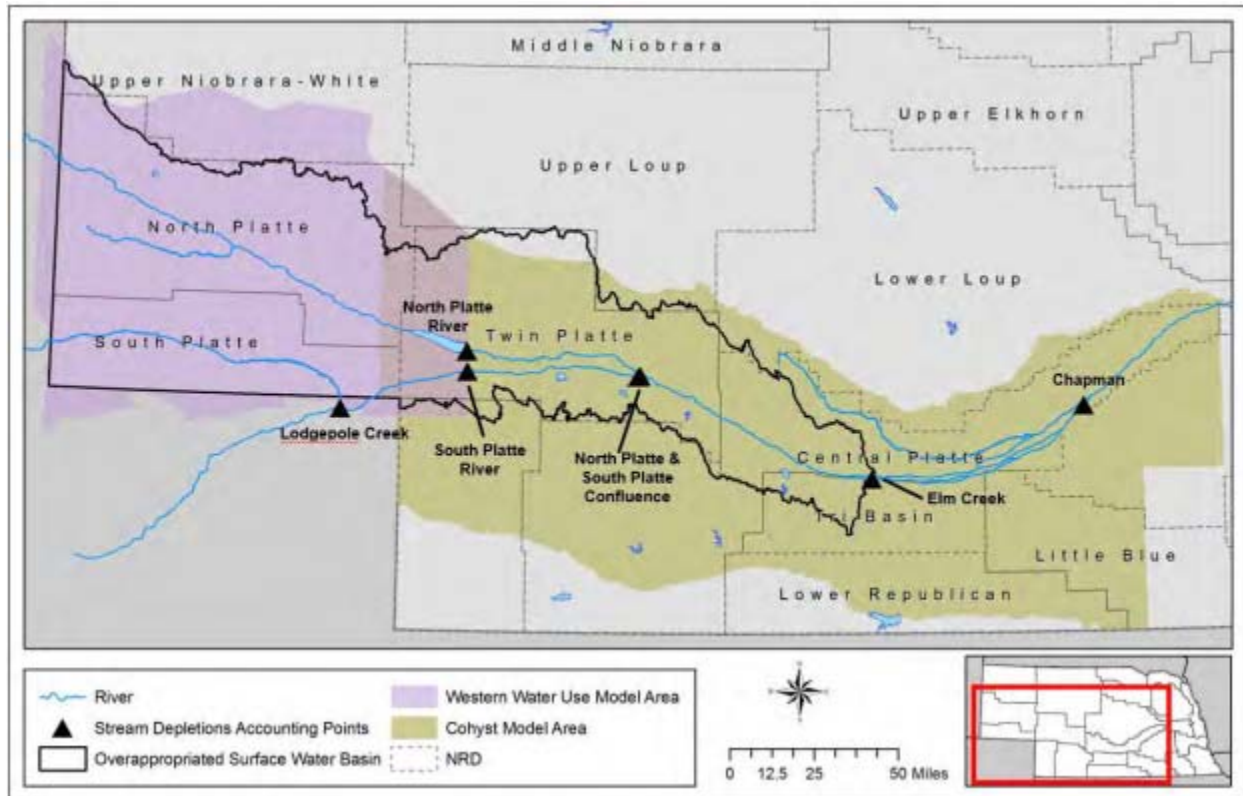


Figure 1: The overappropriated basin in Nebraska and the analyses points used in the 2019 Robust Review evaluation.

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Evaluation of Unpermitted Activities

The NNDP requires tracking and evaluation of a number of non-permitted water uses. The evaluation of unpermitted activities focused on evaluating the potential depletions associated with changes in small reservoirs, sand pits, and wells pumping less than 50 gpm (self-serve domestic and livestock uses) within the COHYST model area (Figure 2).

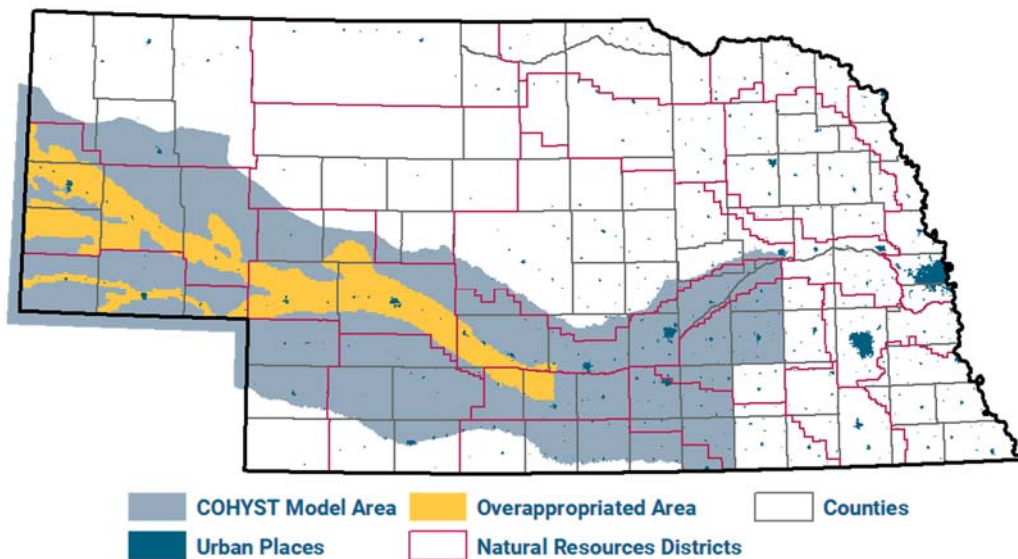


Figure 2: COHYST Model Area (as designated in the NNDP).

The methods and details of the evaluations of unpermitted activities have been shared with the Water Advisory Committee (WAC) and published to NeDNR's website: <https://dnr.nebraska.gov/water-planning/upper-platte-river-basin>. A summary of the results of evaluations related to unpermitted activities in the COHYST area are summarized in Tables 1-3 and Figure 3 below. Negative values indicate a reduction in the estimated level of depletion relative to the 1997 baseline conditions.

Table 1 illustrates the changes in rural population across the COHYST Model Area. Rural population was used as a surrogate to represent water use associated with self-serve domestic water use. The results indicate that rural populations have decreased relative to 1997 population estimates through the 2017 period. Tables 2 and 3 illustrate changes in water use associated with livestock water use. The methods for estimating livestock water use differ between the various natural resources districts. The results contained in Table 2 are based on livestock population statistics and per head estimates while the results in

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Table 3 are derived from measured water use of livestock facilities. Both methods indicate general concurrence that livestock water use has been generally stable through the evaluation period with a slight reduction in water use relative to 1997 baselines.

The information contained in Figure 3 illustrates the consumptive use changes that were estimated to be the result of changes in the extent sand pit excavations and small unpermitted reservoirs (<15 af of total storage). The methods used to estimate consumptive use changes included the use of remote sensing techniques and aerial image analysis pared with the Natural Resource Conservation Service Consumptive Use Calculator¹. These methods were presented to and approved by the WAC in 2014. The results indicate an overall reduction in consumptive use associated with these unpermitted activities.

In total, the cumulative effects of unpermitted activities indicates that net new depletions have not occurred. Further consideration of these activities were not incorporated in the 2019 Robust Review results contained in the subsequent section of this memo.

Table 1: Rural Population Change in the COHYST Model Area².

Estimated Population within the COHYST Model Area 1997-2017				
	1997	2005	2017	Change 1997 to 2017 (%)
Rural Population	91,660	92,887	85,533	-6,127 (-6.7%)

¹ Documentation available at <https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/water-planning/upper-platte/platte-river-recovery-implementation-program/nrcs.pdf> and calculator available for download at <https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/water-planning/upper-platte/platte-river-recovery-implementation-program/nrcs.xls>.

² From *Upper Platte Population Change Analysis 1997-2017*, available at https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/water-planning/upper-platte/publications/20190715PRRIP_Census2017_FinalDraft.pdf.

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Table 2: Estimated Change in Annual Livestock Consumption (CPNRD, TBNRD, TPNRD)³.

Estimated Change in Annual Livestock Water Consumption (af) 1997-2013			
NRD	Average Difference	High Value (Year)	Low Value (Year)
CPNRD	-297	102 (1999)	-610 (2004)
TBNRD	-22	78 (2007)	-101 (2003 & 2005)
TPNRD	52	176 (2013)	-44 (2003)

Table 3: Estimated Change in Annual Livestock Pumping (SPNRD and NPNRD)⁴.

Difference Between 1997 and Successive Year's Estimated Livestock Water Pumped in NPNRD and SPNRD (af)					
	NPNRD	SPNRD		NPNRD	SPNRD
1998	124	10	2006	-115	-76
1999	151	0	2007	-19	-71
2000	151	-19	2008	-54	-75
2001	119	-38	2009	-67	-96
2002	17	-62	2010	41	-87
2003	-91	-81	2011	-296	-168
2004	-112	-95	2012	-48	14
2005	-108	-86	2013	-112	-31

³ From 2019 Robust Review Appendix B.1.1

⁴ From 2019 Robust Review Appendix B.1.2

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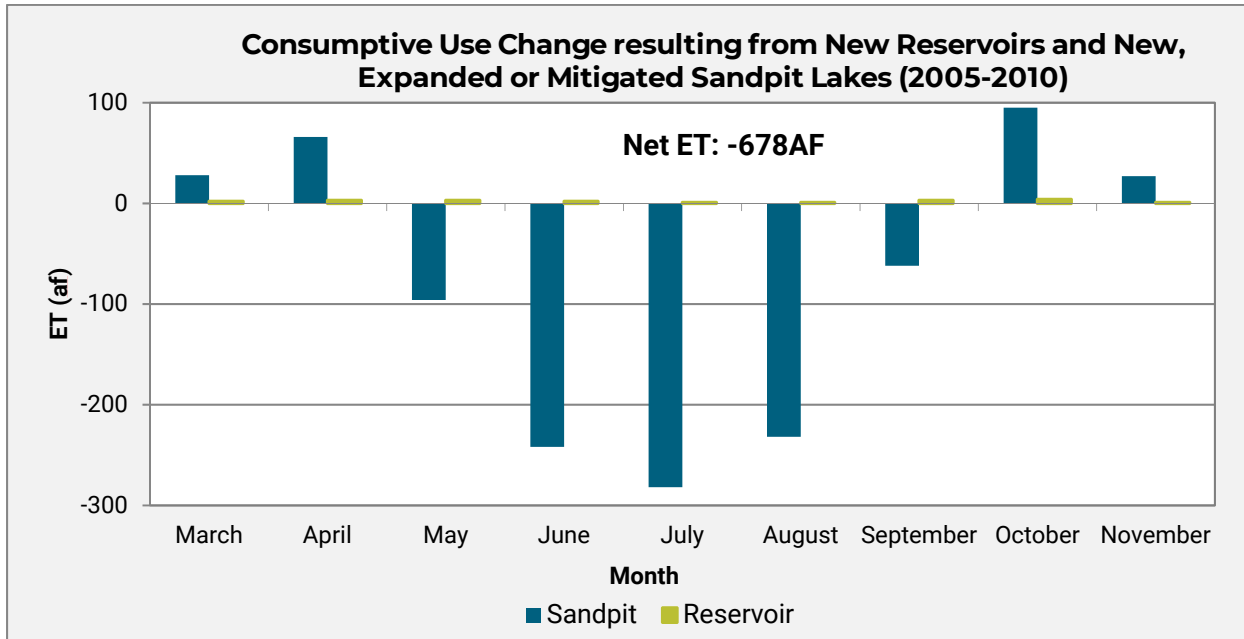


Figure 3: Consumptive Use Change Resulting from Unpermitted New Reservoirs (<15 af of total storage) and Sand Pits⁵.

Robust Review Evaluation

The Robust Review focused on evaluating the new net depletions associated with permitted activities. The Robust Review evaluates the following water use activities:

1. Changes in depletions due to increases/decreases in groundwater irrigated acres. Nebraska effectively established an informal moratorium on new or expanded surface water appropriations in 1993 in the Upper Platte Basin and declared a formal moratorium in 2004.
2. Changes in depletions due to increases/decreases in municipal and industrial use.

⁵From *Upper Platte River Basin Consumptive Use Change from New Reservoirs and New or Expanded Sandpit Lakes: 2005 to 2010*, available at https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/water-planning/upper-platte/upper-platte-basin-wide-meetings-and-annual-reports/2019/20190612_PRRIPsandpitsReport_ap_az_jjs_mmm_AP_CLEAN.pdf

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3. Mitigation accretions from management actions implemented through 2013⁶.
4. Changes in depletions due to groundwater uses permitted after January 1, 2006, that are outside of the Platte Basin watershed and/or 28% in 40 year lines.

Depletions due to items 1 and 2 above require mitigation and offset. Mitigation measures evaluated in the Robust Review include: 1) retirements or leases of irrigated land; 2) diversions of excess flows (flows in excess of state protected and target flows) for groundwater recharge; and 3) regulatory allocations of groundwater irrigation pumping (NPNRD and SPNRD). Additionally, management actions have been implemented subsequent to 2013 and will be described in further detail below. Depletions due to changes in groundwater uses permitted after January 1, 2006, that are outside of the Platte Basin watershed and/or 28% in 40 year lines do not require mitigation but must be tracked and reported (Table 4). Negative values indicate an increase in streamflow depletions and positive values indicate a reduction in streamflow depletions relative to 1997 levels of development. The results in Table 4 indicate that Nebraska is projected to remain within the limitations contained in the NNDP through the second planning increment. Should these depletions exceed an average of 2,000 af per year prior to the end of the next Program increment Nebraska understands that, for such subsequent increment, the NNDP exemption may not be acceptable to the Governance Committee.

⁶ Mitigation measures do not include the Water Service Agreement entered into with CNPPID (J-2 Project)

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Table 4: Depletions due to changes in groundwater uses permitted after January 1, 2006, that are outside of the Platte Basin watershed and/or 28% in 40 year lines.

Year	Other NRDs’ Impact on Platte River Upstream of Chapman (af)
2019	400
2020	300
2021	300
2022	300
2023	200
2024	200
2025	100
2026	100
2027	0
2028	0
2029	-100

The total of all new net depletions associated with post-1997 activities evaluated through the Robust Review are summarized in Table 5. The values shown in Table 5 show the depletions by reach with negative values indicating an increase in streamflow depletions and a positive value indicating a reduction in streamflow depletions relative to 1997 levels of development. The total level of depletions upstream of Chapman indicate that the management actions through 2013 were insufficient to mitigate post-1997 depletions through the second planning increment. Additional management actions have been implemented subsequent to 2013 including: excess flow diversions for groundwater recharge, retirements and leases of irrigation uses, augmentation well fields, and conjunctive management of surface water and groundwater. These management actions and second increment planning activities are described in the section below.

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Table 5: New Net Depletions Associated with Post-1997 Activities Evaluated through the current Robust Review.

Year	North Platte River (af)	South Platte River (af)	Lodgepole Creek (af)	Platte River between North and South Platte Confluence and Elm Creek (af)	Platte River Elm Creek to Chapman (af)	Total Upstream of Elm Creek (af)	Total Upstream of Chapman (af)
2019	16,400	-5,700	4,300	-22,000	5,600	-7,100	-1,500
2020	16,400	-5,900	4,300	-22,200	5,600	-7,300	-1,700
2021	16,500	-6,000	4,300	-22,400	5,700	-7,600	-1,900
2022	16,500	-6,200	4,300	-22,500	5,800	-7,900	-2,100
2023	16,500	-6,300	4,300	-22,700	5,900	-8,200	-2,300
2024	16,600	-6,500	4,400	-22,900	5,900	-8,400	-2,500
2025	16,600	-6,600	4,400	-23,100	6,000	-8,700	-2,700
2026	16,700	-6,800	4,400	-23,300	6,100	-9,000	-2,900
2027	16,700	-6,900	4,400	-23,500	6,200	-9,300	-3,100
2028	16,700	-7,100	4,400	-23,700	6,300	-9,600	-3,300
2029	16,800	-7,200	4,500	-23,900	6,300	-9,800	-3,500

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Second Increment Planning Update

NeDNR and the Upper Platte Basin Natural Resources Districts initiated second increment planning efforts in 2016. These collaborative planning efforts resulted in updates and modifications to Basin-Wide Plan and individual NRD IMP goals. Second increment planning goals require a continued commitment to maintain first increment progress and ensure that each individual NRD is fully offsetting their post-1997 depletions. The new net depletions associated with post-1997 activities evaluated through the Robust Review (Table 5 results) when summed with key new management actions implemented subsequent to 2013 are summarized in Table 6. The primary new management actions incorporated into Table 6 include augmentation pumping from N-CORPE (5,600 af annually) and surface water irrigation retirements in the CPNRD (2,272.5 acres retired or converted to groundwater). The results in Table 6 indicate that with implementation of these new management actions and sustained efforts to maintain progress achieved through the first increment, that the total depletions upstream of Chapman will remain positive through the second planning increment. Values representing management actions subsequent to 2023 are based on triggers and required actions that will be implemented incrementally through the second planning increment.

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Table 6: New Net Depletions Associated with Post-1997 Activities Evaluated through the Robust Review, Continued Implementation of Regulatory Management Actions, and New Management Actions (N-CORPE pumping 5,600 af annually and surface water irrigation retirements in the CPNRD). Values representing management actions subsequent to 2023 are based on triggers and required controls that will be implemented incrementally through the second planning increment.

Year	Total Upstream of Elm Creek (af)	Total Upstream of Chapman (af)	Management Actions (af)	Total Upstream of Elm Creek (af)	Total Upstream of Chapman (af)
2020	-7,300	-1,700	7,850	750	6,350
2021	-7,600	-1,900	7,850	550	6,150
2022	-7,900	-2,100	7,850	250	5,950
2023	-8,200	-2,300	7,900	0	5,800
2024	-8,400	-2,500	18,950	10,750	16,650
2025	-8,700	-2,700	18,950	10,550	16,450
2026	-9,000	-2,900	18,950	10,250	16,250
2027	-9,300	-3,100	18,950	9,950	16,050
2028	-9,600	-3,300	34,900	25,600	31,800
2029	-9,800	-3,500	35,000	25,400	31,700

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Summary

The results of the Robust Review and second increment planning activities indicate that starting January 1, 2020, Nebraska will be in full compliance with its NNDP and achieving Milestone 9 of the Program extension document. This compliance will be achieved through implementation of a variety of management actions. Future Robust Reviews are planned for 2023 and 2027. Nebraska will no longer be providing supplemental update reports annually, but will inform the GC of the completion of future Robust Review activities and provide the results as they are available.

Supporting information for the Robust Review can be found at
<http://upjointplanning.nebraska.gov/>