

VIA ELECTRONIC MAIL ONLY

DATE: April 21, 2017

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 Update on Continued Implementation of the Nebraska New Depletion Plan (NNDP)

Nebraska continues to meet the terms of the Nebraska New Depletions Plan (NNDP). Based upon current estimates, the amount of accretions due to mitigation measures exceeds the amount of depletions from new or expanded uses. Details on the estimates and Nebraska's continued efforts to implement the NNDP are discussed in this memo. This memo also contains a general description of Nebraska's ongoing work to develop and utilize comprehensive tools to continue updating its assessment of all post-July 1, 1997, water related activities.

This update is being provided to the Governance Committee (GC) to outline Nebraska's depletive activities and mitigation measures through September 15, 2016, resulting from new and expanded uses of water as defined in the NNDP. This update utilizes information from previous memos and annual reports as well as additional information developed by Nebraska to summarize the net effect (difference between depletive activities and mitigation measures) through the end of the first increment (2019). The four sections in this update are described in detail below. If there are questions on the contents of this document please contact Jennifer Schellpeper at 402-471-2899 or jennifer.schellpeper@nebraska.gov.

MEMO ORGANIZATION

The memo is organized similarly to the December 31, 2015 update provided by Nebraska to the GC. Section 1 includes updates on new or expanded permitted uses post-2005 and other new or expanded uses since July 1, 1997. Section 2 reviews the mitigation measures currently in place to offset the depletions from the activities described in Section 1. Section 3 summarizes the net effect of the combined depletions and mitigation measures from Sections 1 and 2 and the resulting effect of these activities on streamflows of the Platte River in Nebraska. Section 4 describes the continued efforts currently in process to refine assessment methodologies.

1.0 UPDATE ON NEW OR EXPANDED WATER RELATED ACTIVITIES

Post-2005 Permitted Activities

Summarized in Table 1 are the net effects of new or expanded post-2005 permitted activities. Details on the sources of the data can be found in Nebraska’s annual reports to the GC¹. Table 1 shows the total estimated depletions, mitigations, and net effects through the end of the first increment (2019) by stream reach for permitted new and expanded groundwater and surface water uses issued between January 1, 2006, and December 31, 2015. The table also shows the total impacts of the permitted uses and their associated mitigations through 2019. A negative value in the table represents depletion and positive represents an accretion to streamflow. The total net effects are positive, resulting in accretions to streamflow.

Table 1: 2006-2015 permitted new and expanded groundwater and surface water use depletions and mitigations and the impacts through 2019 in acre-feet. A negative value represents depletion and a positive value represents accretion.

Year	Upstream of Critical Habitat Reach			Within Critical Habitat Reach			Total
	Depletions	Mitigations	Net Effect	Depletions	Mitigations	Net Effect	
2006	-9	25	15	-206	4	-202	-187
2007	-25	66	41	-11	15	4	45
2008	-84	180	95	-31	38	7	102
2009	-190	377	187	-60	55	-5	182
2010	-285	522	237	-94	124	30	268
2011	-386	733	347	-131	159	28	375
2012	-509	993	484	-172	197	25	509
2013	-683	1249	566	-230	245	15	582
2014	-832	1488	656	-293	305	10	666
2015	-1004	1721	717	-355	356	1	717
2016	-1141	1883	741	-412	363	-17	726
2017	-1249	2012	763	-463	425	-36	727
2018	-1338	2116	779	-509	451	-58	722
2019	-1414	2204	791	-552	473	-79	712

Note: Due to rounding in the calculations, the Net Effect shown does not exactly match the sum of effects in some rows

¹ Available at this website: <http://dnr.nebraska.gov/iwm/PRRIP>

Other New or Expanded Use Activities since July 1, 1997

Nebraska reported on changes in human and livestock population post-1997 to 2010 in the 2011 Update dated January 6, 2012². Updates to these uses and industrial uses are scheduled to occur for data collected through 2015 as part of the 5-year review. Impacts from post-1997 changes in irrigated acres will also be reassessed with updated models as part of Nebraska's 5-year review.

Analysis of the sandpits and reservoirs less than 15 AF for 2005 to 2010 was completed in 2014. The results were reported in the December 31, 2014, Update to the Governance Committee³. No further analysis of these small water bodies will be conducted.

2.0 MITIGATION MEASURES FOR NEW OR EXPANDED WATER USE ACTIVITIES

There are a number of mitigation projects implemented by Nebraska that are ongoing or that have effects to streamflow that will continue throughout the first increment. These projects and current estimates of their potential accretions, if available, include:

- Projects that have operated or are completed and could operate in 2017
 - Diversions of excess flow that have occurred:
 - From 2011 to 2016, over 23 canals across the upper Platte River basin diverted more than 190,000 AF of excess flows. Over 84,000 AF of water was recharged between 2011 and 2015 and over 21,000 AF of that water is estimated to return to the Platte River within the first 10 years after the recharge events. Estimates of the 2016 recharge and 10 year benefits have not yet been completed;
 - Diversions into Elwood Reservoir during the non-irrigation season.
 - Potential future diversions of excess flow for which current legal arrangements and temporary permits exist:
 - Cozad Canal, Thirty-Mile Canal, and Southside (Orchard-Alfalfa) Canal excess flow recharge (0 AF – 16,000 AF accretion annually);
 - 5-year agreements, lasting through 2018, signed between Twin Platte Natural Resources District and five irrigation districts to carryout groundwater recharge projects in times of excess flows (No current estimate of potential accretions).
 - E65 Canal and Elwood Reservoir excess flow recharge through August 2017 (13,500 AF of diversion contracted, no current estimate of accretions)

² Schneider, J., 2012. *Nebraska Update on Continued Implementation of the Nebraska New Depletion Plan (NNDP), Memo to the Governance Committee (GC) of the Platte River Recovery Implementation Program (PRRIP)*, January 6, 2012. Available here:

http://dnr.nebraska.gov/Media/iwm/PDF/20120106_NebraskaUpdate_NNDP.pdf

³ Schneider, J., 2014. *Nebraska Update on Continued Implementation of the Nebraska New Depletion Plan (NNDP), Memo to the Governance Committee (GC) of the Platte River Recovery Implementation Program (PRRIP)*, December 31, 2014. Available here:

http://dnr.nebraska.gov/media/iwm/pdf/prrip/2014_PRRIP_AnnualUpdate.pdf

- Retirement of water use both temporarily and permanently on irrigated land using several programs including the Platte Basin Habitat Enhancement Project (PBHEP), Platte Basin Water Project Coalition (PBC), and Federal programs such as the Agricultural Water Enhancement Program (AWEP), Conservation Reserve Enhancement Program (CREP), and Environmental Quality Incentive Program (EQIP) (5,200 – 8,370 AF accretion annually);
- Reduced groundwater withdrawals via regulatory measures that place an allocation on groundwater withdrawals within North Platte Natural Resources District (3,800 – 4,700 AF accretion annually);
- North Dry Creek Augmentation Project (0 – 1,325 AF accretion annually).
- Projects currently planned
 - Reservoirs: J-2 Regulating Reservoirs (10,200 AF accretion annually) [this is a water action plan project but is currently on hold, see footnote below after table];
 - Transfer of Cozad Canal, Thirty-Mile Canal, and Southside (Orchard-Alfalfa) Canal surface water rights to instream use (0 – 16,500 AF accretion annually) [permits pending];
 - Nebraska Cooperative Republican Platte Enhancement Project (N-CORPE) (0 – 24,000 AF accretion annually) [construction on pipeline to Platte River began in fall 2016].

Table 2 gives a summary of the accretive effect of these mitigation measures through the first increment. Activities included in the table meet one of these three conditions: 1) in operation as of 2016, 2) constructed as of 2016 and able to operate in future years with an accretion estimate, or 3) PRRIP Water Action Plan Projects to which Nebraska has committed. The mitigation measures are categorized by type of project; for example, the excess flow diversions for groundwater recharge are summarized into one column in the table. The measures included in each column are explained following the table.

Table 2: Total accretive effect from other mitigation measures.

Year	1	2	3	4	5	Total Accretive Effect
2016	10,200	740	5,900	2,670	4,200	23,710
2017	10,200	740	5,760	2,460	4,370	23,540
2018	10,200	740	5,320	2,260	4,560	23,080
2019	10,200	740	5,220	2,080	4,750	22,980

Note: Due to rounding in the calculations, the Total Accretive Effect shown does not exactly match the sum of effects in some rows

1. J-2 Reservoir⁴
2. North Dry Creek Augmentation Project⁵
3. Retirement of Water Use on Irrigated Land (PBHEP, PBC, AWEP, CREP, EQIP)⁶
4. Diversions of Excess Flow for Groundwater Recharge: 2011 demonstration project⁷, 2013 – 2015 excess flow diversions, Elwood Reservoir⁸, and Cozad Canal, Thirty-Mile Canal, and Southside (Orchard-Alfalfa) Canal Conjunctive Management Projects (excess flow portion only)⁹
5. Reduced Groundwater Withdrawals in North Platte Natural Resources District¹⁰

3.0 SUMMARY OF DEPLETIVE ACTIVITIES AND MITIGATION MEASURES

Table 3 shows the overall impacts to streamflow resulting from depletive activities and mitigation measures covered in this report, including all post-1997 new or expanded uses that are to be offset in accordance with the NNDP. Column 2 in Table 3, the 'net effect of the permitted activities' is the result of permits issued by the NRDs and Department from 2006 through 2015, given in Table 1 of this report. Column 3 in Table 3, the 'depletive effect from other activities' includes impacts from changes in irrigated acres, human population, and livestock populations from 1997 to 2005, reported in Nebraksa's January 6, 2012, Update. Column 4 in Table 3, the 'accretive effect from other mitigation measures' is the result of the mitigation projects summarized in section 2 of this report and quantified in Table 2 above. According to this preliminary assessment, current and projected accretive effects from mitigation measures exceed the calculated depletive effect of permitted and other activities by approximately 2,100 acre-feet per year at the end of the first increment.

Updated analysis on these depletive effects and mitigation measures, including analysis of the additional projects listed in section 2.0 and not quantified in Table 2, will be done as part of Nebraska's more robust assessment anticipated to be completed in 2017.

⁴ J-2 Reservoir value from PRRIP Water Action Plan Project score. The J-2 Reservoir project has been put on hold at this time by the Governance Committee, however Nebraska's planned credit from the project is included in this table as the state of Nebraska is committed to providing that volume of accretions to the stream. In accordance with the Nebraska New Depletion Plan, the State of Nebraska will, no later than 2 years after the original projected operational date (2023), implement other interim or permanent measures, as are necessary to fulfill any outstanding offset obligations (NNDP, Section IV, Bullet 2).

⁵ A value of 742 AF (rounded to 740 AF) assumed for North Dry Creek based upon annual pumping of 1,325 AF and depletion factor of 44 percent.

⁶ Department analysis of retirements through 2013

⁷ The 2011 demonstration project report is located here:

<http://dnr.nebraska.gov/Media/iwm/PDF/2011RechargeTM2013.pdf>. The supporting spreadsheet can be found here: <http://dnr.nebraska.gov/iwm/upper-platte#PubsEtc>

⁸ The 2013 – 2015 excess flow diversions and Elwood Reservoir recharge and accretions estimated using same methodology as the 2011 project .

⁹ Canal Conjunctive Management Project values estimated based upon Central Platte Natural Resources District's accretion estimates reduced by 50 percent to account for PRRIP contract.

¹⁰ Department analysis done for NPNRD IMP in 2009

Table 3: Net effect through 2019 of depletions and accretions (acre-feet). A negative value represents depletion and a positive value represents accretion.¹¹

Year	Net effect of permitted activities ¹²	Depletive effect from other activities ¹³	Accretive effect from mitigation measures ¹⁴	Total Net Effect
2016	730	-20,400	23,710	4,040
2017	730	-20,800	23,540	3,470
2018	720	-21,300	23,080	2,500
2019	710	-21,600	22,980	2,090

4.0 CONTINUED EFFORTS TO REFINE ASSESSMENT METHODOLOGIES

The analyses contained in this report were conducted using tools developed from the original 2008 COHYST model. Newer models exist that may more accurately assess the impacts to streamflows from permitted and non-permitted activities and mitigation measures. The 2008 COHYST is used here to maintain consistency with previous reports under the Nebraska New Depletions Plan and the basin-wide plan and individual integrated management plans in the Platte Basin, as these are also based on the original 2008 COHYST.

The guidance document that outlines the general process by which a more robust assessment of all water use activities and mitigation measures will be evaluated is available at: <http://dnr.nebraska.gov/Media/iwm/PDF/Guidance20120814.pdf>. This process will provide a means to temporally and spatially refine Nebraska’s assessment of the combined effects of depletive activities and mitigation measures. This approach will utilize integrated groundwater, watershed, and operations models to assess the timing, amount, and location of depletive effects and mitigation measures.

A contract has been signed between the Platte Basin Water Project Coalition and consultants to conduct the work on this robust review. Nebraska is working with the consultants to develop the necessary datasets and incorporate all of its compiled data on all new or expanded uses and all mitigation measures since July 1, 1997, for the robust assessment. The Western Water Use Management model and Version 27 of the COHYST2010 model will be used to conduct the analysis. Nebraska’s work plan anticipates completion of the analysis in 2017.

¹¹ All Values in Table 3 have been rounded

¹² Values from Table 1 above, permitted activities from calendar year 2006 through 2015

¹³ Values reported in Tables 2 & 5 in the January 6, 2012, Update; includes changes in irrigated acres, human population and livestock between 1997 and 2005.

¹⁴ Values from Table 2 above, including J-2 reservoir, streamflow augmentation from groundwater pumping, retirement of irrigated land, diversions of excess flows, and reduced groundwater withdrawals.

Nebraska has begun planning for the development of the second increment of the Upper Platte Basin-Wide Plan. With the assistance of the University of Nebraska Public Policy Center, a public participation plan, outlining the stakeholder involvement requirements laid out in *Nebraska Revised Statutes* §46-715 for the second increment plan development, was drafted. The first of a series of public stakeholder meetings was held in June 2016, and continue on a bi-monthly basis. The current timeline for the basin-wide plan development and stakeholder process anticipates that the plan will be in place by January 1, 2019. Each of the Upper Platte Basin natural resources districts' integrated management plans will also be updated corresponding to the basin-wide plan and improvements to modeling tools.