

VIA ELECTRONIC MAIL ONLY

Date: December 31, 2014

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

FROM: Jim Schneider, State of Nebraska's Representative to the GC
Deputy 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, activities.

This update is being provided to the Governance Committee (GC) to outline Nebraska's depletive activities and mitigation measures through September 15, 2014, 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 Jesse Bradley at 402-471-0586 or jesse.bradley@nebraska.gov.

MEMO ORGANIZATION

The memo is organized similarly to the December 31, 2013, 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 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 first 10-year increment (2019) by stream reach for permitted new and expanded groundwater and surface water uses issued between January 1, 2006, and December 31, 2013. The table also shows the total impacts of the permits 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: 2006-2013 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	-805	1411	606	-285	284	-2	604
2015	-901	1533	632	-333	313	-20	612
2016	-981	1631	650	-375	337	-38	612
2017	-1048	1712	664	-412	356	-56	608
2018	-1107	1780	674	-447	373	-73	601
2019	-1158	1839	681	-478	388	-90	591

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. For the 5-year review of data collected through 2010, Nebraska is compiling data on industrial uses to present to the GC when it becomes available. Updates to these uses are scheduled to occur for data collected through 2015 as part of the 5-year review.

¹ Available at this website: http://dnr.ne.gov/PRRIP/docs/PRRIP_NE_DepletionPlan.html

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/iwm/prrip-2011-update>

The inventory of sandpits and reservoirs less than 15 acre-feet for 2005 to 2010 was recently completed. Geospatial technologies and Farm Service Agency aerial images were used to conduct this inventory. The 2005 baseline spatial inventory of these water bodies was compared to the 2010 inventory to identify new reservoirs and new or expanded sandpits. New reservoir features were cross-referenced with Dam Safety and Surface Water rights records to determine if storage permits existed and if there were any associated depletions and offsets/mitigations. New or expanded sandpits were checked for depletions estimates and existing offsets/mitigations. If the water bodies did not have existing offsets/mitigations, further analysis was done to determine their impact on consumptive use.

In total, there were 9 new reservoirs and 94 new or expanded sandpits, totaling 747 acres, which required consumptive use analysis. This analysis was done by using the Natural Resources Conservation Service (NRCS) Consumptive Use Calculator³ to estimate the change in monthly evapotranspiration (ET) from 2005 land cover conditions to 2010 land cover conditions: shallow water for reservoirs and deep water for sandpits. It was found that consumptive use (ET) increased during all months for the new reservoirs and increased during October to April (non-irrigation months) and decreased during May to September (irrigation months) for new or expanded sandpits. Overall, there was estimated to be an annual decrease of 678 acre-feet consumptive use resulting from these changes in small water bodies. More than 2,500 working hours were invested in this analysis by the Department. Given the relatively minor change in consumptive use, that the net annual consumptive use change is positive, and the extensive effort required for analysis, further effort to evaluate the effects of these small water bodies in the first increment is unnecessary.

More information about the sandpits and reservoirs analysis can be found on the Department's website at <http://dnr.nebraska.gov/iwm/2005-2010-consumptive-use-of-small-man-made-water-bodies-in-the-platte-surface-water-basin-above-columbus>

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 stream flow that continue throughout the first increment. These projects include:

- Reservoirs: J-2 Regulating Reservoirs (10,200 AF, annually); Elm Creek Reservoir currently being studied to evaluate its usefulness for storing and releasing excess flows (No current estimate AF);
- Streamflow Augmentation from Groundwater Pumping: North Dry Creek Augmentation Project (0 – 1,325 AF, annually); Nebraska Cooperative Republican Platte Enhancement Project (N-CORPE) (0 – 24,000 AF, annually)⁴;

³ The NRCS Consumptive Use Calculator is an Excel Spreadsheet tool which can be downloaded from the Department's Platte River Recovery Nebraska Depletion Plan webpage at <http://dnr.nebraska.gov/iwm/prrip-depletion> . More information on using this calculator can be found here <http://dnr.nebraska.gov/iwm/prrip-nrcs-consumptive-use-calculator-report>.

⁴ N-CORPE chart value of 2,600 AF based upon IMP requirements and existing J-2 contractual amount. North Dry Creek data (742 AF) based upon annual pumping of 1,325 AF and depletion factor of 44%.

- 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, annually);
- Diversions of Excess flows: Groundwater Recharge Demonstration Project in the 2011 water year which diverted excess Platte River flow into existing canals before and after the normal irrigation season allowing water to seep through the canals, laterals, and ponds into the groundwater and eventually return to the Platte River⁵ (1,150 – 1,590 AF, annually); Diversion 43,693 acre-feet of Platte River excess flood flows in the fall of 2013 into canals, laterals, and ponds resulting in an estimated 28,161 acre-feet of groundwater recharge (265 – 320 AF, annually); Canal Conjunctive Management Projects: Cozad Canal, Thirty-Mile Canal, and Southside (Orchard-Alfalfa) Canal (0 AF – 16,000 AF, annually)⁶; 5-year agreements signed between TPNRD and three irrigation districts to carryout groundwater recharge projects in times of excess flows (No current estimate); Elwood E-65 and Phelps Recharge for TBNRD (1,320 – 3,990 AF, annually);
- Reduced groundwater withdrawals via regulatory measures that place an allocation on groundwater withdrawals (3,800 – 4,700 AF, annually);
- Conversion of surface water rights to instream use: Canal Conjunctive Management Projects: Cozad Canal, Thirty-Mile Canal, and Southside (Orchard-Alfalfa) Canal (No current estimate AF).

Table 2: Total accretive effect from other mitigation measures

Year	1	2	3	4	5	Total Accretive Effect
2014	10,200	3,340	8,370	6,450	3,820	32,200
2015	10,200	3,340	7,570	6,280	4,010	31,400
2016	10,200	3,340	5,900	4,870	4,200	28,500
2017	10,200	3,340	5,760	3,870	4,370	27,500
2018	10,200	3,340	5,320	3,300	4,560	26,700
2019	10,200	3,340	5,220	2,950	4,750	26,500

1. Reservoirs
2. Streamflow Augmentation from Groundwater Pumping
3. Retirement of Water Use on Irrigated Land (PBHEP, PBC, AWEP, CREP, EQIP)
4. Diversions of Excess Flow for Groundwater Recharge
5. Reduced Groundwater Withdrawals

⁵ The 2011 demonstration project report is located here: <http://dnr.nebraska.gov/iwm/conjunctive-management-toolbox>. The supporting spreadsheet can be found here: <http://dnr.nebraska.gov/iwm/upper-platte#PubsEtc>

⁶ Chart values of 437 – 1148 AF annually, according to CPNRD estimate of accretions from actual diverted excess flows and 50% reduction for PRRIP contract.

3.0 SUMMARY OF DEPLETIVE ACTIVITIES AND MITIGATION MEASURES

As shown in table 3, the accretive effect from mitigation measures exceeds the depletive effect of permitted and other activities according to the estimates from the analysis. Results of the preliminary assessment indicate current and projected accretive effects from mitigation measures exceed the calculated depletions by approximately 12,000 acre-feet per year at the end of the first increment.

Table 3: Net effect through 2019 of depletions and accretions (acre-feet). A negative value represents depletion and a positive value represents accretion.⁷

Year	Net effect of permitted activities ⁸	Depletive effect from other activities ⁹	Accretive effect from other mitigation measures ¹⁰	Net effect of permitted, other and mitigation activities
2014	600	-20,000	32,200	12,800
2015	610	-20,200	31,400	11,800
2016	610	-20,400	28,500	8,700
2017	610	-20,800	27,500	7,400
2018	600	-21,300	26,700	6,000
2019	590	-21,600	26,500	5,500

4.0 CONTINUED EFFORTS TO REFINE ASSESSMENT METHODOLOGIES

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/iwm/basin-wide-technical-committee-guidance-document>. 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.

The modeling tools being developed by Nebraska are calibrated and have been peer reviewed by independent experts. Nebraska will now 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, and a comprehensive assessment will be made of the impacts on the streamflow of the Platte River and its tributaries. Nebraska’s work plan anticipates completion of the analysis in 2016.

⁷ All Values in Table 2 have been rounded

⁸ Values from Table 1 above, permitted activities from calendar year 2006 through 2013

⁹ 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.

¹⁰ Includes estimates for Groundwater Recharge Demonstration Projects in 2011, canal conjunctive management projects, retirement of irrigated acres through 2012, J-2 Regulating Reservoirs, Elwood Reservoir recharge from 2009 and 2010 diversion, groundwater allocations, North Dry Creek Augmentation Project, and N-CORPE Project. Updated analysis on these mitigation measures and analysis of the additional projects listed in section 2.0 will be done as part of Nebraska’s more robust assessment to be completed by 2016.