

Basin-Wide Plan for Joint Integrated Water Resources Management of Overappropriated Portions of the Platte River Basin, Nebraska SECOND INCREMENT (2019-2029)

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1.0 Introduction

The purpose of this Basin-Wide Plan (Plan) is to meet the requirements of *Nebraska Revised Statute* §46-715(5)(a) for those portions of the Upper Platte River Basin upstream of the Kearney Canal Diversion designated as overappropriated by the Nebraska Department of Natural Resources (NeDNR) on September 15, 2004. This area is defined in the NeDNR's 2004 Order, which also defines the area in which groundwater is hydrologically connected to the overappropriated surface water basin (see Figure 1). The overappropriated basin and the hydrologically connected area will hereinafter be referred to as the "overappropriated basin." The overappropriated basin encompasses portions of the Central Platte Natural Resources District (CPNRD), Tri-Basin Natural Resources District (TBNRD), Twin Platte Natural Resources District (TPNRD), South Platte Natural Resources District (SPNRD), and North Platte Natural Resources District (NPNRD).

As described in *Neb. Rev. Stat.* §46-715(5), NeDNR and the Natural Resources Districts (NRDs) have implemented an incremental approach to integrated water planning in the overappropriated area of the Upper Platte River Basin to sustain a balance between basin water uses and water supplies. Activities identified in the first ten-year increment plan (effective date of September 11, 2009) have been implemented over the past ten years, with the results of these efforts described in Section 3.0 of this Plan. This Plan includes goals, objectives, and action items for the second ten-year increment, which were developed utilizing the consultative and collaborative process described in *Neb. Rev. Stat.* §46-715(5)(b).

Vision Statement

The consultative and collaborative process utilized in developing the Plan included the formation of a single planning group (SPG) consisting of stakeholders representing surface water and groundwater interests from throughout the Basin, as described in Section 2.0. The SPG developed a list of shared values that guided the planning process, and ultimately the development of this Plan:

- ✓ Generational Stewardship
- ✓ Maintaining the good life
- ✓ There is a space for all; willingness and interest in working together; shared burden
- ✓ Looking beyond our own fences
- ✓ Others can make good use of the water we save
- ✓ We are making a difference!
- ✓ We have a long culture of adapting and changing with the times
- ✓ "Putting water back to the river without causing economic harm"

These values are represented in the following vision statement for the Plan: As generational stewards with a recognition that there is a space for all, and the willingness and interest in working together, we'll look beyond our own fences to develop a plan to sustain a balance between basin

water uses and supplies without causing economic harm.

Effective Date and Time Frame of the Basin-Wide Plan

This second increment of the Upper Platte River Basin-Wide Plan became effective on [PLACEHOLDER FOR DATE]. The time frame to implement the Plan is ten years, spanning from the effective date of the Plan to no later than [PLACEHOLDER FOR TEN YEAR DURATION FROM PLAN ADOPTION].

Authority

Neb. Rev. Stat. §46-715(5) requires in any river basin that is designated as overappropriated, when the designated area lies within two or more natural resources districts, that NeDNR and the affected NRDs shall jointly develop and adopt a basin-wide plan for the area designated as overappropriated.

Purpose and Scope of Basin-Wide Plan and IMPs

This Plan is the result of a collaborative effort by NeDNR, CPNRD, TBNRD, TPNRD, NPNRD, SPNRD, and a basin-wide group of stakeholders that formed the Single Planning Group (SPG). This Plan is the second increment of the Upper Platte River Basin-Wide Plan and was developed to fulfill the requirements of *Neb. Rev. Stat. §46-715(5)* which requires NeDNR and the NRDs to jointly develop and adopt a plan to incrementally achieve the goals and objectives described in *Neb. Rev. Stat. §46-715(2)*.

Collaborative integrated water management planning within the Upper Platte River Basin occurs at both the local (individual NRD) and regional (basin-wide) scales. Locally, individual integrated management plans (IMPs) are jointly developed and implemented by NeDNR and a single NRD. Under *Neb. Rev. Stat. §46-715*, an IMP is required for each of the five NRDs in the Basin (see Figure 1). Regionally, a basin-wide plan is jointly developed by NeDNR and the five NRDs.

Broadly, the Basin's required IMPs and Basin-Wide Plan support cooperation between NeDNR and the Basin's NRDs to ensure coordinated management of the Basin's hydrologically connected surface and groundwater supplies. Through the development and implementation of these planning processes, NeDNR, the NRDs, and local stakeholders foster better communication and collaboration concerning the Basin's water issues, which provides a foundation for more efficient, adaptable, and sustainable water management now and in years to come.

Many of the planning elements in required NRD IMPs and this Plan are shared, but a few conceptual and practical differences exist. The two following subsections describe the background and unique role for each type of plan, as well as how the two types of plans work together to improve integrated water management in the Basin.

Integrated Management Plans

In 2004 the State Legislature passed LB 962, which required IMPs be developed for NRDs or basins designated as overappropriated or fully appropriated. All five Upper Platte River NRDs in the designated overappropriated area adopted their first generation IMPs in 2009. CPNRD updated its IMP in 2012; TPNRD and NPNRD updated their IMPs in 2013. At the time of this Plan's adoption, each of the five NRDs are in the process of updating their IMPs. Through adaptive management, all of the NRD IMPs will continue to be updated as needed.

As described in *Neb. Rev. Stat. § 46-715*, a required IMP must contain clear goals and objectives intended to protect existing uses and manage for new uses for a sustainable balance between water uses and water supplies. It must also include a map of the plan's geographic area (which must include the portion of the NRD determined by NeDNR to be hydrologically connected, but may include the entire NRD), at least one groundwater control, at least one surface water control, and a plan for monitoring and data collection. Management actions initiated through IMPs must also comply with federal and state laws and interstate compacts and agreements. In addition, NeDNR and the NRD consult with water users in the affected area and offer those water users with an opportunity to provide input during development of an IMP. Each IMP is developed to uniquely suit the needs of the individual NRD, and thus monitoring protocols, actions, and controls are tailored to fit the differing goals and objectives of each plan.

The Platte River Basin-Wide Plan

The requirements for this Plan are described in *Neb. Rev. Stat. § 46-715(5)*. Like the individual IMPs, this Plan contains goals and objectives; however, unlike IMPs, the Basin-Wide Plan does not require groundwater or surface water controls. Instead, this Plan provides clear goals and objectives for the entire Basin, to which the NRDs can then align the controls and actions of their IMPs to achieve.

For consistency across the Upper Platte Basin, this Plan also includes information on monitoring, data collection, and regular evaluation. The ongoing evaluation includes information on the overall difference between current and fully appropriated levels of development and determining progress toward meeting the Plan's goals and objectives.

Development of both the IMPs and the Basin-Wide Plan in the Upper Platte Basin involve a conscientious process of consultation and collaboration with stakeholders that rely on water from the affected area. Through consultation and collaboration, stakeholders are involved in formulating, evaluating, and recommending Plan details, including preferred solutions. Following statutory requirements, NeDNR and the NRDs work to reach agreement among all official participants.

Overall, this Plan provides a general framework, focusing on regional, cross-boundary issues and opportunities such as those related to hydrologic connectivity and management strategies that cross the NRDs' borders. This Plan also provides opportunities for consistency among all of the Basin's NRDs by offering an umbrella framework for the individual IMPs. Individual IMPs must be consistent with the Basin-Wide Plan, but contain additional goals, objectives, and controls that are tailored to local conditions, management issues, and opportunities found within the specific NRD.

Responsibilities and Authorities of NeDNR and NRDs

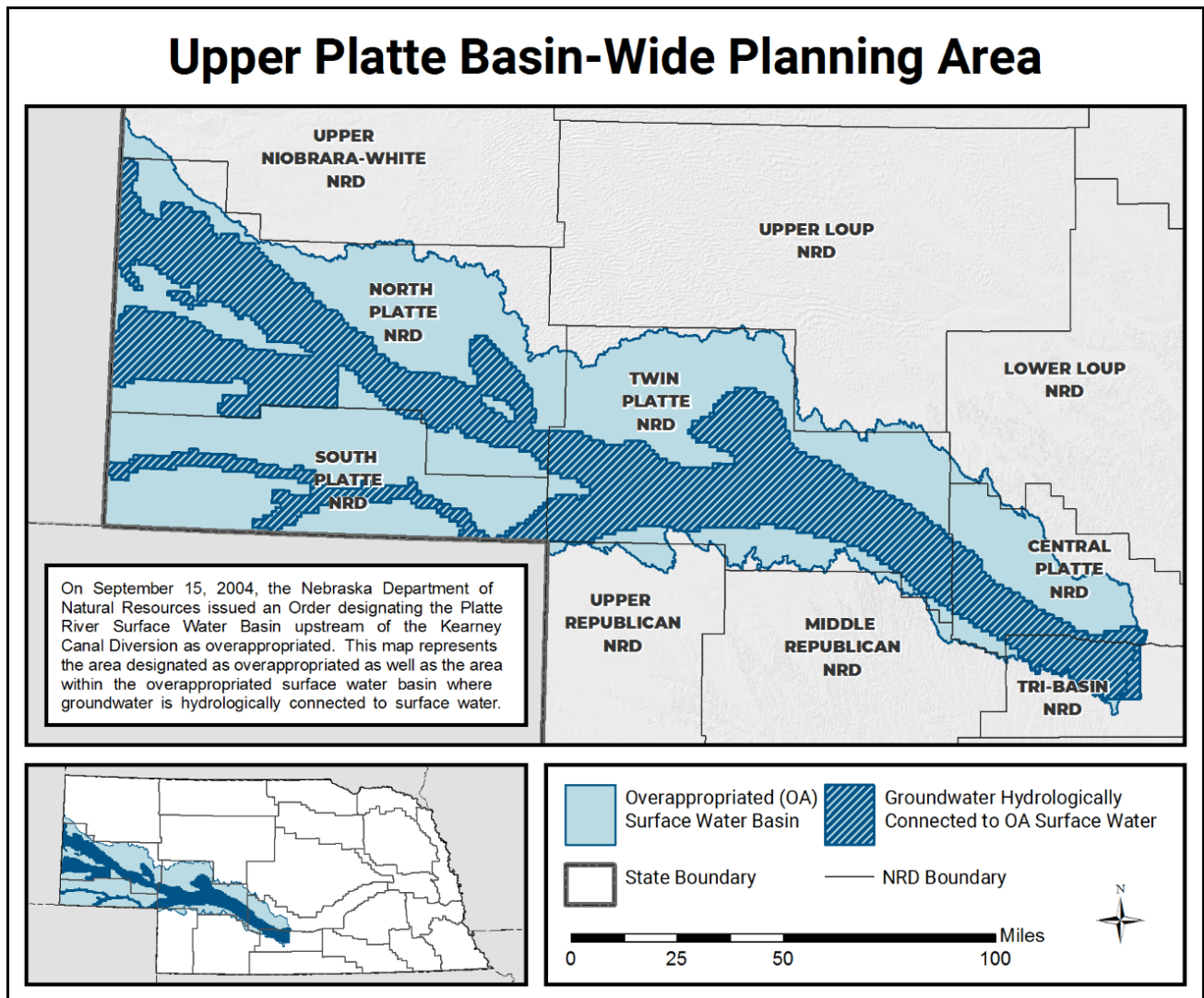
NeDNR is responsible for permitting and administering surface water rights for beneficial uses including, but not limited to storage, irrigation, hydropower, and instream flows. Among its duties, NeDNR registers wells, delineates hydrologically connected aquifers and flowing water, regulates dams, delineates floodplains, and provides technical and policy assistance. NeDNR also collaborates with all 23 NRDs to develop and manage integrated water management plans and basin-wide plans.

Among their other statutory authorities, NRDs are responsible for local development, management, utilization, and conservation of groundwater and surface water resources. NRDs manage groundwater use permitting and monitor and regulate groundwater quality. The NRDs have the legal authority to regulate groundwater use within their boundaries to ensure that irrigated agriculture remains an important industry to Nebraska in accordance with *Neb. Rev. Stat.* §§46-701 and 46-703(3). Additionally, NRDs are authorized, along with the Nebraska Game and Parks Commission to hold instream water rights for fish, wildlife, and recreation. The NRDs collaborate with NeDNR to develop and implement integrated water management plans and basin-wide plans.

Plan Area

The Plan addresses the overappropriated basin, illustrated in Figure 1, including the portion of the Upper Platte River Basin upstream of the Kearney Canal Diversion and hydrologically connected areas.

Figure 1. Overappropriated Basin of the Platte River



2.0 Planning Process

This Plan was jointly developed by NeDNR, CPNRD, TBNRD, TPNRD, NPNRD, SPNRD, and the Plan's stakeholder advisory committee. The inclusive process was guided by a shared vision statement, which was created based on the priorities and values identified throughout the planning process and development of the Plan. The vision statement is as follows:

As generational stewards with a recognition that there is a space for all, and the willingness and interest in working together, we'll look beyond our own fences to develop a plan to sustain a balance between basin water uses and supplies without causing economic harm.

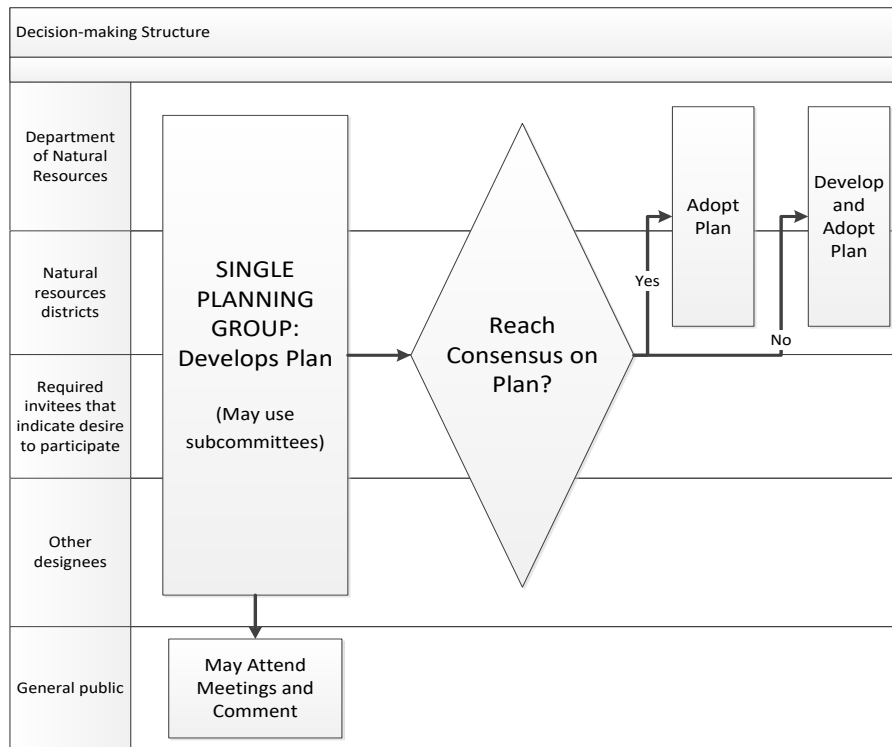
Public Participation Plan

In preparation of the development of the second increment Upper Platte Basin-Wide Plan, a committee made up of representatives from NeDNR, CPNRD, TBNRD, TPNRD, NPNRD, SPNRD, irrigation districts, and power districts worked collaboratively to create the Public Participation Plan (PPP) (Appendix G) to guide the process for developing the Plan. The PPP was created with the intent to provide an overall vision for how the basin-wide planning process was approached.

The committee's goal was to create a robust, understandable, transparent approach for the second increment planning. The PPP provided direction related to the required participants and their respective roles and responsibilities. The PPP outlined the decision-making structure, which called for representatives of all parties to form a single planning group to develop the Basin-Wide Plan (Figure 2).

The PPP also informed the planning process and timeline, which consisted of orientation and preparation; planning; approval; and adoption, set to be completed by September 2019. Finally, the PPP outlined the governance guidelines to address the following issues: meeting times and locations, communications, meeting notice and preparations.

Figure 2. Planning structure



Planning Activities

Single Planning Group

A Single Planning Group (SPG) of Upper Platte Basin stakeholders was formed and met twelve times from June 2016 – September 2018 to achieve consensus on the content of the second increment Plan. Approximately 55 primary and alternate stakeholders were invited via postcards and email invitations to each meeting, as well as staff members from participating NRDs and NeDNR. For the list of primary and alternative stakeholders, please see Appendix G.

Primary stakeholders were made up of representatives from the following affiliations:

AFFILIATION	NUMBER OF PRIMARY STAKEHOLDERS
Agriculture	4
Environment/Wildlife	1
Financial	2
Groundwater Irrigator	2
Ground Water User	2
Irrigation District	5
Municipality	6
Public Power District	2
Surface Water User	4

A summary of the SPG meeting dates and topics is as follows.

DATE	PURPOSE OF MEETING
June 16, 2016	Introduce stakeholders to the planning process and explain their roles.
July 20, 2016	Review first increment Basin-Wide Plan goals and objectives and implementation by each NRD.
September 21, 2016	Present on the hydrogeology of the Platte River Basin and discuss models used.
November 16, 2016	Review the First Increment, modeling, and Plan goals.
March 15, 2017	Discuss Second Increment and depletions.
May 17, 2017	Define additional elements to be incorporated into second increment and discuss the goal of economic viability of the Basin.
July 19, 2017	Agree on the values of the basin and discuss new goals and objectives.
September 20, 2017	Discuss Statute 46-715 interpretation and continue defining additional elements: safety, welfare, and social and environmental health.
January 17, 2018	Present first increment activities cost & benefits and the intent for the second increment.
March 21, 2018	Included special presentations explaining agricultural hydrology, drought mitigation, conjunctive water management, and conservation study.
May 16, 2018	Discuss elements of the draft second increment Plan and identify the second increment intent.
September 19, 2018	Review second increment and achieve consensus.

For meeting agendas, attendance lists, and detailed meeting notes, please refer to Appendix G. All meeting materials will be maintained for the second increment and can be found on the DNR website here: <https://upbwp.nebraska.gov/>

Single Planning Group Sub-Committee

In the course of the over two years of SPG meetings, NeDNR, the Upper Platte NRDs, and stakeholders representing hydropower interests held four additional meetings in order to more comprehensively discuss issues within the Basin that impact hydropower and could be addressed in the second increment Plan; as well as issues that lie outside of the scope of the Plan and may require further negotiation apart from the Basin-Wide planning process. Plan language proposals stemming from these hydropower sub-committee meetings were brought to the larger SPG for consideration and eventual vote. The additional discussions of this sub-committee assisted the planning process by ensuring that some of the more complicated issues impacting various interests within the Basin could be fully considered, while also allowing the larger planning process to stay on schedule.

Platte Basin Coalition

Throughout the planning process, the Platte Basin Coalition/Platte Overappropriated Area

Committee served as a general steering committee of the basin-wide planning effort. A portion of the agenda for their regular bi-monthly meeting was devoted to SPG meetings including setting agendas, reviewing meeting materials, and discussing the development of the Basin-Wide Plan. This group is made up of representatives from NeDNR, CPNRD, TBNRD, TPNRD, NPNRD, and SPNRD.

Public Involvement

The general public was invited to participate in the Basin-Wide Plan development throughout the planning process. Information was available through the Upper Platte Basin-Wide Planning website hosted by NeDNR, which contained information about the planning process and meeting materials. The public was notified of the meetings through public notices published in: Grand Island Independent; Scottsbluff Star Herald; Kearney Hub; North Platte Telegraph; and Sidney Sun-Telegraph. Notices were also posted at NRD offices and on the NeDNR website. All SPG meetings were open to the public and each agenda included the opportunity for public comment.

Pursuant to statute (*Neb. Rev. Stat. §46-715 to 46-719*), the following joint public hearings on the Basin-Wide Plan were conducted by NeDNR and the individual NRDs:

- NPNRD, July 18, 2019,
- SPNRD, July 17, 2019,
- TPNRD, July 16, 2019,
- CPNRD, July 15, 2019, and
- TBNRD, July 16, 2019.

Consensus

The decision-making process outlined in the PPP described that the SPG would be striving to reach agreement (consensus) on all sections of the Plan, if that could not be reached for all plan sections then DNR and the NRDs would move forward to resolve any areas where agreement was not reached by all parties. On September 19, 2018, the SPG met for the final review and approval of the Plan goals, objectives, and action items. Each goal, objective, and action item was reviewed and an initial vote on consensus for each goal (and supporting objectives and action items) as-is was taken. Unanimous consensus was achieved on Goal 4 during this initial vote. Goals 1, 2, 3, and 5, were then discussed in detail with the SPG. A final vote of approval for the Plan in its entirety was held, with one dissenting vote. Post-meeting discussions identified the concerns of the dissenter as related to the concept of the overall water budget as it relates to fully appropriated conditions, and not the goals of the Plan itself. These water budget concepts and water as a reusable resource have been addressed in the background discussion of Section 4. For meeting notes detailing discussion and votes on the Plan elements at the September 19, 2018, SPG meeting, see Appendix G.

3.0 Activities of First Increment

During implementation of the first increment of the Basin-Wide Plan, a primary focus was to offset depletions to streamflows for new and expanded uses initiated after July 1, 1997, consistent with *Neb. Rev. Stat. §46-715(5)(d)(i)*. Table 1 summarizes the depletions offsets identified for each of the Upper Platte NRDs in the first increment of the Plan.

Table 1 – Post-1997 New Use Depletions from First Increment Plan

	Average Annual Depletion within entire NRD (AF)	Average Annual Depletion within Overappropriated Area (AF)
NPNRD	-8,000	-7,900
SPNRD	-700	-200
TPNRD	-7,700	-6,700
CPNRD	-3,400	-1,400
TBNRD	-5,000	-2,200
TOTAL	-24,800	-18,400

** From Table 1 of the first increment Basin-Wide Plan*

First Increment Achievements

Through a combination of retirements, leases, regulatory actions (certifying irrigated acres, restrictions on new uses and transfers, etc.), and conjunctive management projects, NeDNR and the NRDs achieved the first increment goal of offsetting the basin-wide average annual depletion, and in some NRDs, achieved progress toward offsetting pre-1997 use depletions. A general summary of approaches used to achieve these goals is provided below:

- NPNRD – combination of irrigated land retirements (permanent and lease), allocations on groundwater users, and intentional recharge to retime and augment baseflows.
- SPNRD – combination of irrigated land retirements (conservation easements), allocations on groundwater users, and intentional recharge to retime and augment baseflows.
- TPNRD – combination of intentional recharge to retime and augment baseflows, flow retiming (J2 Regulating Reservoir), and streamflow augmentation (NCORPE).
- CPNRD – combination of irrigated land retirements (conservation easements), purchase and operational changes to surface water canals (Thirty-mile and Orchard-Alfalfa canals), flow retiming (J2 Regulating Reservoir), and intentional recharge to retime and augment baseflows.
- TBNRD – combination of intentional recharge to retime and augment baseflows, flow

retiming (J2 Regulating Reservoir), and streamflow augmentation (North Dry Creek).

- NeDNR – Implemented the surface water controls identified in the individual IMPs, administered existing surface water uses, and as partners in the Basin-Wide Plan and the individual IMPs, participated in the NRD efforts, providing technical and financial assistance, as well as invested separately in the J2 Regulating Reservoir Project.

A more detailed description of individual NRD efforts can be found in the most recent annual reports included in Appendix C.

In addition to offsetting depletions, NeDNR and the NRDs accomplished several additional activities that were identified in the goals and objectives of the first increment Plan:

- Conservation Measures Study - During implementation of the first increment Plan, Phase I and Phase II of a study of the effects of conservation measures on water supplies was completed. Phase I (Appendix E) focused on an overall evaluation of a wide spectrum of conservation measures across the Basin. The results of this study were used to inform and focus the evaluation of Phase II of the study. Phase II (Appendix F) focused on two types of conservation measures: 1) the effects of tillage practices and 2) irrigation efficiencies on available water supplies. Tillage practices and irrigation efficiencies are driven by producer choices and are considered part of the spectrum of producer practices. Current evaluation of the study results indicates that changes in tillage practices and irrigation efficiency changes over time have impacted available water supplies in varying degrees across the Basin. Further efforts identified for this increment of the Plan are identified in Action Item 1.4.3.1.
- Current to Fully Appropriated Study – Prior to development of the first increment Plan, as a preliminary step in developing the overall difference between current and fully appropriated conditions, representatives of NeDNR, the Central Nebraska Public Power and Irrigation District (CNPPID), Nebraska Public Power District (NPPD), and CPNRD performed a preliminary estimate of the changes in stream reach gains and surface water demands affected by such reach gain changes, *Preliminary Estimate of Historical Stream Flow Reductions in the Overappropriated Portion of the Platte River in Nebraska* (see Appendix D). An assessment of water supplies and water demands within the Basin was conducted during implementation of the first increment. This assessment generally followed the NeDNR INSIGHT methodology for determining the quantity of available hydrologically connected water supplies and the demands on those supplies. The analysis looked at supplies over a representative climate period taking into account wet and dry phases of the hydrologic cycle. Consumptive and non-consumptive surface water demands were considered as well as groundwater depletions and groundwater consumptive use. A description of the INSIGHT methodology as applied to the Upper Platte Basin is included in Appendix A. An analysis of Streamflow Impacts from Uses Initiated Prior to July 1, 1997, and after July 1, 1997, was also conducted. This study provides an estimate of total depletions to streamflows resulting from all groundwater development in the Upper Platte Basin. This is part of what statute says must be considered

when evaluating the difference between current and fully appropriated conditions. See Evaluation of the difference in streamflow impacts in the Upper Platte River Basin due to water uses initiated prior to and after July 1, 1997 in Appendix I. Additional studies for this increment of the Plan are described in Action Item 1.4.3.2.

- Robust Review – As required by *Neb. Rev. Stat. §46-715(5)(d)(iii)* a technical analysis was conducted to determine the progress towards meeting first increment goals and objectives. The analysis evaluated the controls and management actions implemented by NeDNR and the NRDs during the first increment. The updated modeling tools and datasets jointly developed by NeDNR and the NRDs were used to estimate streamflow impacts resulting from gained and lost irrigated land, controls, expansion and contraction of municipal and industrial uses, managed recharge, stream augmentation and permitted uses. Additional evaluations of unpermitted uses (sand and gravel mining operations, small reservoirs [less than 15 AF in storage capacity], livestock and small-scale domestic uses) were also conducted through the first increment. The results of this analysis not only provide an update on progress achieved during the first increment, but inform the goals and objectives of the second increment. The results of the robust review are provided in Appendix B.
- Excess Flow Evaluation – A key tool utilized in offsetting depletions is conjunctive management of surface and groundwater resources, primarily diversion and storage/recharge of surface water when it is available. An evaluation to determine times, durations, and quantities of excess flows in the Upper Platte River Basin was conducted to assist in planning and evaluation of conjunctive management projects. The analysis developed daily natural flows in the Platte River from historic records and applied current surface water appropriations to determine if natural flow was available, i.e. “excess flow” was in the River and could potentially be used.
- Conjunctive Management Study – In 2011, HDR and The Flatwater Group, Inc. published the Conjunctive Management Study. The objectives of this study were to identify general elements, potential approaches, and constraints necessary for planning and evaluation of conjunctive management projects. Findings were then used to evaluate several hypothetical projects involving the Western Canal to illustrate the application of these concepts. Although the Western Canal, a 20-mile canal that diverts from the South Platte River, is located in SPNRD and TPNRD, the concepts from this case study were applicable basin-wide.
- Inventory of Sandpits and Small Reservoirs – As part of Nebraska’s commitment to PRRIP, the NeDNR has been charged with estimating the cumulative impacts of new or expanded, unregulated surface water activities. Therefore, in 2013, NeDNR conducted an inventory and analysis of sandpits and reservoirs with capacity below 15 acre-feet throughout the Basin. Baseline data generated from 2005 multi-temporal aerial imagery were compared to 2010 imagery in order to identify changes in the overall surface areas of these unregulated water bodies within the Basin. Once these new or expanded water bodies were identified, the Natural Resources Conservation Service (NRCS) Evapo-Transpiration

(ET) calculator was used to estimate the resulting change in consumptive use due to ET. Ultimately, the NRCS analysis estimated that the increase in unregulated surface water acreage from 2005 to 2010 resulted in a net decrease in consumptive use of 678 acre-feet per year throughout the Basin.

- Data Collection and Modeling Tools – Significant data collection efforts focused on land uses, irrigation practices, evapotranspiration rates, and well meters to better understand water uses occurring in the Basin. Substantial improvements were made to the modeling tools used to predict water uses and their depletive effects. The Western Water Use Management Model (WWUMM) and Cooperative Hydrology Study (COHYST, the primary modeling tools employed in the Basin, were modified to integrate the surface water components, resulting in enhanced tools with the ability to simulate the full hydrologic cycle. These efforts provided a more realistic representation of the physical system and an improved ability to assess management actions and conjunctive management projects. In addition, the newly collected data was incorporated to inform and enhance the modeling tools, resulting in a much better representation of the Basin uses and overall hydrology.

Finally, the first increment actions of NeDNR and the NRDs provided mitigation for post-1997 new use depletions in lieu of retirement of these new uses. These actions allowed over 200,000 acres of irrigated land added within the Basin after July 1, 1997 (including over 50,000 acres within hydrologically connected areas of the Platte River) to remain in production - vital to the economy of the Basin and the region as a whole.

Costs Incurred for First Increment Activities

The first increment efforts were funded through the individual NRDs, state, and federal monies. The state and federal funds were administered by NeDNR and included funding from the general fund, Nebraska Environmental Trust (NET), Interrelated Water Management Plan Program (IWMPP), Environmental Quality Incentives Program (EQIP), Conservation Reserve Enhancement Program (CREP), and Platte Basin Habitat Enhancement Program (PBHEP). A summary of costs is included in Table 2.

Table 2. First Increment Costs (through 2017)

	Projects	Retirements	Studies	Administration**	Total
NRD Costs	\$34.8M	\$8.5M	\$4.1M	\$10.0M (1.25M Annually)	\$57.4M
NeDNR Costs*	\$43.8M	\$5.6M	\$0.9M	\$7.2M (\$0.9M Annually)	\$57.5M
Total Costs	\$78.6M	\$14.1M	\$5.0M	\$10.0M	\$114.9M

*NeDNR Costs include funding from NeDNR general fund, NET, PBHEP, IWMPP, CREP, and EQIP

**NRD costs for regulation included in administration costs. Costs to producers and third party economic

impacts due to regulation not monetized in table.

Many of the activities implemented in the first increment are long-term projects with monetary commitments that extend beyond the first increment (long-term agreements, continuing administration, operation and maintenance, etc.). Table 3 provides an estimate of these annual costs and financial commitments for first increment activities that extend into the second increment.

Table 3. Annual costs for first increment activities that extend into second increment

	Projects	Retirements	Studies	Administration**	Total
NRD Costs	\$2.3M	\$0.6M	-	\$1.2M	\$4.1M
NeDNR Costs*	-	-	-	\$0.9M	-
Total Costs	\$2.3M	\$0.6M	-	\$1.2M	\$4.1M

*While new project costs are expected, no first increment projects will include maintenance costs from NeDNR

**NRD costs for regulation included in administration costs. Costs to producers and third party economic impacts due to regulation not monetized in table.

4.0 Goals, Objectives, and Action Items

The following excerpts from the *Nebraska Revised Statutes*, as of 2018, provide context for the development of goals, objectives, and action items for this Plan. To the extent that anything in this Plan could be interpreted as being in conflict or inconsistent with any state statute, any such statute prevails.

Integrated Management Plans

Neb. Rev. Stat. §46-715(2): "In developing an integrated management plan, the effects of existing and potential new water uses on existing surface water appropriators and ground water users shall be considered. An integrated management plan shall include the following: (a) Clear goals and objectives with a purpose of sustaining a balance between water uses and water supplies so that the economic viability, social and environmental health, safety, and welfare of the river basin, subbasin, or reach can be achieved and maintained for both the near term and the long term...."

Neb. Rev. Stat. §46-715(3): "In order to provide a process for economic development opportunities and economic sustainability within a river basin, subbasin, or reach, the integrated management plan shall include clear and transparent procedures to track depletions and gains to streamflows resulting from new, retired, or other changes to uses within the river basin, subbasin, or reach. The procedures shall:

- (a) Utilize generally accepted methodologies based on the best available information, data, and science;
- (b) Include a generally accepted methodology to be utilized to estimate depletions and gains to streamflows, which methodology includes location, amount, and time regarding gains to streamflows as offsets to new uses;
- (c) Identify means to be utilized so that new uses will not have more than a de minimis effect upon existing surface water users or ground water users;
- (d) Identify procedures the natural resources district and the department will use to report, consult, and otherwise share information on new uses, changes in uses, or other activities affecting water use in the river basin, subbasin, or reach;
- (e) Identify, to the extent feasible, potential water available to mitigate new uses, including, but not limited to, water rights leases, interference agreements, augmentation projects, conjunctive use management, and use retirement;
- (f) Develop, to the extent feasible, an outline of plans after consultation with and an opportunity to provide input from irrigation districts, public power and irrigation districts, reclamation districts, municipalities, other political subdivisions, and other water users to make water available for offset to enhance and encourage economic development opportunities and economic sustainability in the river basin, subbasin, or reach; and
- (g) Clearly identify procedures that applicants for new uses shall take to apply for approval of a new water use and corresponding offset..."

Fully Appropriated Definition

Neb. Rev. Stat. §46-706(27): "Overall difference between the current and fully appropriated levels of development means the extent to which existing uses of hydrologically connected surface water and ground water and conservation activities result in the water supply available for purposes identified in subsection (3) of section 46-713 to be less than the water supply available if the river basin, subbasin, or reach had been determined to be fully appropriated in accordance with section 46-714."

Neb. Rev. Stat. §46-713(3): "A river basin, subbasin, or reach shall be deemed fully appropriated if the department determines based upon its evaluation conducted pursuant to subsection (1) of this section and information presented at the hearing pursuant to subsection (4) of section 46-714 that then current uses of hydrologically connected surface water and ground water in the river basin, subbasin, or reach cause or will in the reasonably foreseeable future cause (a) the surface water supply to be insufficient to sustain over the long term the beneficial or useful purposes for which existing natural-flow or storage appropriations were granted and the beneficial or useful purposes for which, at the time of approval, any existing instream appropriation was granted, (b) the streamflow to be insufficient to sustain over the long term the beneficial uses from wells constructed in aquifers dependent on recharge from the river or stream involved, or (c) reduction in the flow of a river or stream sufficient to cause noncompliance by Nebraska with an interstate compact or decree, other formal state contract or agreement, or applicable state or federal laws."

Essence of the Statutes

The excerpts of statute above provide the overall guidance for the goals, objectives, and action items contained in this Plan. Specifically, the statutes:

1. Define the difference between over and fully appropriated as the condition where existing uses of surface water and groundwater result in the available water supply to be less than the water supply needed to sustain: a) the beneficial or useful purpose for which existing natural-flow or storage appropriations were granted, b) beneficial uses from wells constructed in aquifers dependent on recharge from the river or stream, c) compliance by Nebraska with an interstate agreement.
2. State that the integrated management plan (IMP) goals and objectives should strive for sustaining a balance between uses and supplies so that the economic viability, social and environmental health, safety, and welfare of the river basin, for both short-term and long-term, is maintained.

The goals and objectives of this Plan address the activities necessary to make progress from current to fully appropriated conditions, while considering the economic viability, social and environmental health, safety, and welfare of the Basin.

Water Supplies and Uses

The Platte Basin water supply is variable. The primary source of water in the Upper Platte River Basin is precipitation, which varies spatially and temporally across the region. In the mountains of Wyoming and Colorado, much of the precipitation falls as snow, which serves as a seasonal, natural reservoir, releasing water when snow melts in the late spring and summer. This natural, seasonal reservoir is supplemented across the Basin with human-made structures, such as Pathfinder Reservoir and Lake McConaughy. In addition to surface water runoff, precipitation also infiltrates and recharges the aquifers that provide baseflow to the Platte River. Aquifer recharge has also been enhanced due to the development and use of surface water canals, where a portion of flows conveyed through the canals seep into the aquifer. Through a combination of natural and human-made influences, three distinct time scales exist for precipitation contributions to the Platte River. Natural runoff from rainfall feeds river flows in a matter of hours to days. Runoff from snowfall and storage/releases from human-made surface water reservoirs typically occur on a seasonal scale. Finally, aquifer recharge and baseflow accretions to the Platte River occur over a period of months to years.

These natural and human-made storage options have enabled development of large-scale surface water agricultural irrigation during the otherwise dry later summer months in the western portions of the Upper Platte River Basin. In spite of the substantial basin water storage capacity, during extended drought periods water user needs can potentially exceed the ability of these storage options to fully mitigate drought, as observed during the 2003-2006 extended drought period.

Water use is also variable. Irrigation demands consistently peak during July and August, but the timing and amount of peak demand in one year can be substantially different from year to year at any particular location. Storage water is also used for hydroelectric power generation and for cooling steam-electric power plants. Both uses are dependent on regional power demands on any given day. Likewise, demands for other purposes such as municipal, industrial, and commercial uses also varies day to day.

Consumptive Use

By definition, consumptive use of water is that portion of the water that is taken out of a water source and not returned to the water system. The water you use to brush your teeth is returned to the water system, and is considered non consumptive. The water you use to water your plants or your lawn is not returned to the system, therefore; it is considered consumptive. It is this portion of used water that is critical to the integrated management planning effort. Evapotranspiration (ET) from a watershed's surface is the largest component of consumptive use and is the depletion or loss of water from the basin associated with plant water use.

Water diverted from its natural course through a canal, pipe, or other conveyance measure and applied as irrigation in excess of ET is not lost because it returns into the basin from which it was withdrawn via surface runoff or deep percolation to the aquifer. This water can be available to other users at other times in other locations. One user's water inefficiency often serves as the

source of another user's water supply. A modeled representation of a basin's hydrology and water mass balance allows for quantification of these consumptive uses, and can account for return flows to the surface water system or aquifer, which then become available as supply for other uses.

Basin Water Budget

Generally, state statutes define a fully appropriated condition as one in which current uses will result in not having the water necessary to meet the beneficial purposes of existing surface water and groundwater uses in aquifers dependent upon recharge from the river or stream. A key element of evaluating this condition is determining the water budget for the basin using the best available information, data, and science, as required by statute. The models and other tools that are used to evaluate the hydrology of the basin represent the basin's water budget, considering all water inflows and outflows within the basin. The basin hydrology is based on the principle of water mass balance, defined in both 'flows' and 'stocks'.

The most important 'flows' tracked by the models include headwater flows, streamflows at the basin's important stream gauges, water diverted, water applied to crops, water depleted, reservoir releases, groundwater pumping, seepage to aquifers, return flows to streams, reservoir evaporation, and reservoir releases. The models include major functions that influence any of the flows described above.

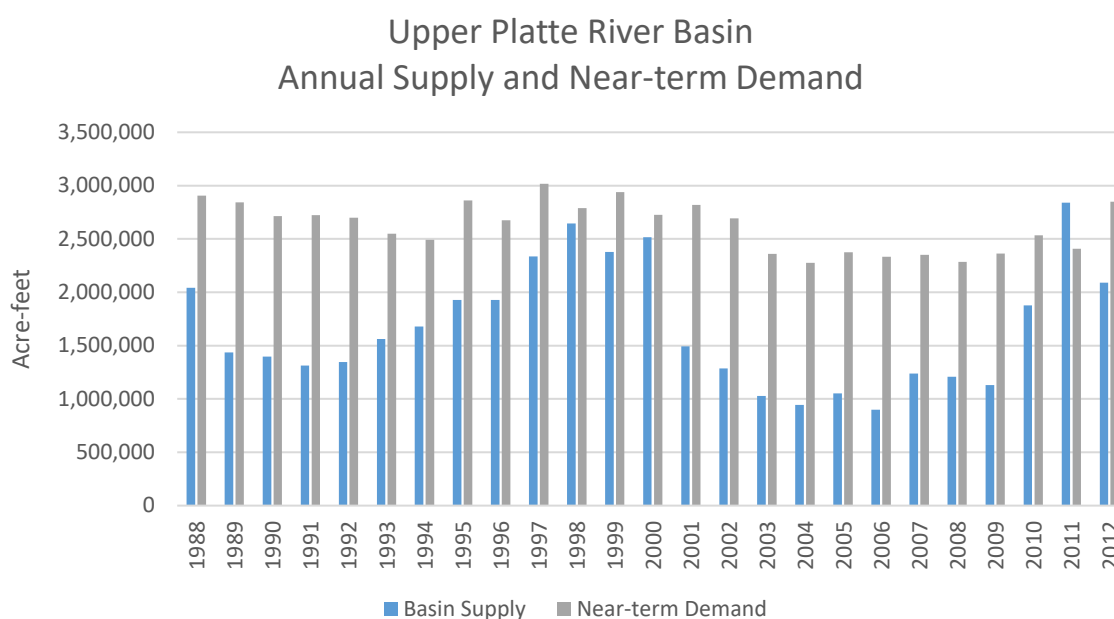
Important 'stocks' include reservoir and aquifer levels. A hydrologic mass balance for both surface water and groundwater is enforced for all flows and stocks. The mass balance for reservoir stocks is given by starting storage minus reservoir releases plus river inflows to the reservoir minus evaporation. Changes in any period's groundwater stock are represented through effects of seepage, water applied, and water pumped.

Both the supply side of the equation and the use side of the equation are variable spatially and temporally across the Upper Platte River Basin, so on any given day, the Basin could be in a fully appropriated condition with all the beneficial uses being met, or in an overappropriated condition with the beneficial uses not being met. Understanding that water uses cannot exceed water supplies (natural-flow and storage supplies), a balance will likely exist each year in the overappropriated basin. However, *water demand* can exceed water use when supplies are limited (for further information, see discussion in Appendix 1 of Appendix I). Table 4 and Figure 3 below summarize the results of the INSIGHT analysis conducted for the Basin above Odessa (for years 1988-2012) during the first Plan increment and illustrates this variability (see Appendix A). The INSIGHT analysis looks at the water supplies during a given year and the demands for water – both from surface water and hydrologically connected groundwater – in that same year. The years 1988-2012 represent a statistically unbiased representation of hydrological variability in the Basin.

Table 4. Summary of Supplies and Demands for the Platte Basin above Odessa – 1988-2012¹

	Maximum Annual	Minimum Annual	Mean Annual
Supply	2.09M AF (2011)	0.9M AF (2006)	1.66M AF
Demand	3.02M AF (1997)	2.28M AF (2004)	2.62M AF

Figure 3. Summary of Supplies and Demands for the Platte Basin above Odessa – 1988-2012



Because of the variability of hydrologic conditions within this river system, spatially and temporally appropriate management actions must be developed, implemented, monitored, and regularly re-evaluated to ensure that existing beneficial uses are being protected, so that the

¹ The Basin Supply term represents an estimate of total water supply without human-made depletions and can be summarized as: Basin Supply = Streamflow + SW Consumptive Use + GW Depletions. The Near Term Demand represents an estimate of total basin demands and can be summarized as: Near Term Demand = GW Depletions + SW Demand + Net SW Loss + Non-Consumptive Use Demand. The Non-Consumptive Use term of the total demand recognizes that these types of demands are not cumulative, therefore the maximum of the non-consumptive uses (instream flow demand, hydropower, and downstream demand) is used.

economic viability, social and environmental health, safety, and welfare of the Basin can be maintained for both the near-term and the long-term. The focus of the management actions are not on mitigating shortages that may occur due to the natural variations in the hydrologic cycle. The prior appropriation doctrine used in Nebraska for administering surface water has provided and will continue to provide a mechanism for managing those shortages that can be expected due to variations in the hydrologic cycle. Rather, the management actions, and this Plan, are focused on mitigating human-made effects on surface water supplies to maintain beneficial uses of appropriations and provide adequate recharge to those aquifers dependent on streamflow during times of shortages in water supply.

Statute requires working towards a balance of water supply and water use, while considering impacts on the near- and long-term economic viability, social and environmental health, safety, and welfare of the Basin. Throughout the stakeholder process for the second increment, significant discussion occurred on this topic. Stakeholders identified economic viability in a number of ways, including:

- A steady income,
- water needed to provide for the beneficial uses of appropriators including the generation of hydropower,
- financial support to maintain benefits of surface water irrigation projects,
- cooling water for power generation,
- the sustainability of canal systems,
- resiliency to withstand drought,
- flexibility in the use of natural flow and stored water, and
- conjunctive management.

Stakeholders clearly believe that the most significant impact on the economic viability of users across the Basin occurs during times of drought. Therefore, the second increment Plan recognizes that a focus on drought planning and mitigating the effect of depletions that amplify effects of drought conditions, will be an important step toward consistently achieving a fully appropriated condition. In addition, more data and analyses of water supply and demands as related to economic viability, social and environmental health, safety, and welfare of the Basin, for both the short-term and long-term, are needed to develop a more targeted set of goals and objectives for achieving a fully appropriated condition for the long-term. Finally, much has been accomplished through implementation of the first increment Plan and individual NRD IMPs. Stakeholders recognized these successes and generally felt those elements should be retained for the second increment of the Plan.

The goals, objectives, and action items contained in this Plan were developed through extensive collaboration with the stakeholders of the Basin and define the activities to be accomplished in this increment, to the extent possible based on staffing and resource constraints.

Goals, Objectives, and Action Items

Goal 1: Incrementally achieve and sustain a fully appropriated condition while maintaining economic viability, social and environmental health, safety, and welfare of the Basin.

Objective 1.1: Maintain previous increment mitigation progress.

During the development of the first increment Plan, estimates of post-1997 use depletions requiring offset for each NRD were developed. Each of the NRDs met the identified depletion offset during implementation of the first increment Plan. A summary of first increment activities is included in Appendix B.

Models, tools, and overall understanding of the Basin hydrology were also improved during implementation of the first increment Plan and applied in the first increment robust review (process described in Objective 1.4). Application of these tools and understanding has resulted in refined estimates of post-1997 depletions, which are typically greater than the original estimates included in the first increment Plan. The robust review also provided estimates of the first increment offsets achieved by each of the NRDs.

Table 5 summarizes the results of the first increment robust review by NRD. Negative values in the table represent depletions to the stream and positive values represent accretions to the stream. The first column is the estimated impacts from all groundwater uses through time (pre-1997 and post-1997 uses). The second column is the portion of computed impacts due to those uses initiated before July 1, 1997, referred to as pre-1997. The third column is the portion of computed impacts from those uses initiated after July 1, 1997, referred to as post-1997. The fourth column is the current estimate of offsets achieved in 2019 from excess flow recharge events that occurred through 2013 in each NRD. The fifth column is the current estimate of the impacts that each NRD must either offset (if a depletion) or maintain (if an accretion). Finally, the last column displays the 2019 target accretions or depletions for each NRD based on the linear trend of modeled streamflow impacts. Because of year-to-year variability in modeled results due to modeled climate inputs, the average trend line of modeled results is used as the target in each NRD's IMP.

Table 5 First Increment Robust Review and Other Management Actions Summary

	Total Depletion in 2019 (AF)	Pre-1997 Use Depletion in 2019 (AF)	Post-1997 Use Depletion or Accretion in 2019 (AF)	Other Management Actions in place as of 2019 ² (AF)	Total 2019 Post-1997 Impacts (AF)	2019 Target ³ (AF)
NPNRD	-87,600	-108,700	20,800 ⁴	400	21,200	23,300
SPNRD	-37,400	-42,700	5,200 ⁴	100	5,300	4,500
TPNRD	-149,600	-127,200	-22,800	6,200	-16,600	-22,900
TBNRD	-35,800	-37,500	1,400	1,600	3,000	4,200
CPNRD	-101,100	-88,100	-13,700	3,100	-10,600	-10,500
Total			-9,100	11,400	2,300	

² The estimated 1st increment offsets achieved in 2019 include excess flow/recharge projects, NCORPE in TPNRD (5,600 af), North Dry Creek Augmentation Well in TBNRD (1,400 af), and Surface Water Retirements in the CPNRD (2,500 af).

³ The Robust Review analysis, which generated the IMP targets for each NRD, did not include NCORPE in TPNRD (5,600 af), North Dry Creek Augmentation Well in TBNRD (1,400 af), and Surface Water Retirements in the CPNRD (2,500 af).

⁴ Includes impacts from groundwater allocation management actions of the NRD.

Table 6 summarizes the total change in the number of groundwater-only irrigated acres since July 1, 1997, as well as the total number of groundwater-only irrigated acres in 2019, by NRD⁵. In addition, Table 6 displays the volume of groundwater pumping in 2019 attributed to groundwater-only irrigation and the volume of groundwater pumping in 2019 attributed to municipal and industrial uses.

Table 6 First Increment Robust Review Groundwater Irrigation and Pumping Summary

	Change in Groundwater-only Irrigated Acres 1997 to 2019 (AF)	Total Groundwater-only Irrigated Acres in 2019 (AF)	Groundwater-only Irrigation Pumping in 2019 (AF)	M&I Pumping in 2019 (AF)	Groundwater-only and M&I Pumping in 2019 (AF)
NPNRD	0	134,400	113,300	11,500	124,800
SPNRD	12,000	115,800	78,400	3,100	81,500
TPNRD	58,000	263,700	322,100	8,100	330,300
TBNRD	55,000	461,600	237,500	3,200	240,600
CPNRD	85,200	902,500	575,100	22,300	597,400

Progress made during the first increment will be maintained in this increment and keep the Basin moving toward achieving a long-term balance of water supplies and uses while maintaining economic viability, social and environmental health, safety, and welfare of the Basin.

Action Item 1.1.1: Keep policies, projects, and practices in place that provide offsets, or supply equivalent offsets, so that the current level of depletions is not exceeded.

Much progress toward reaching a fully appropriated condition was made in the first increment through implementation of various offsets and mitigation actions. This includes efforts to offset depletions from water uses initiated after July 1, 1997, and in some areas progress toward offsetting pre-1997 depletions. Many of these efforts capitalized on federally funded programs, like the Conservation

⁵ Acres values were maintained at constant levels after 2013, with the exception of temporary retirements that were reincorporated into subsequent years when the retirements terminated.

Reserve Enhancement Program, and on state and local programs funded through NeDNR and the Upper Platte NRDs. Continued availability of these funding sources during the second increment of the Plan is uncertain and may affect management activities during the second increment. NeDNR and the NRDs will continue implementation of cost effective policies, projects, and practices to maintain the progress made during the first increment in this increment toward achieving a long-term balance of water supplies and uses while maintaining economic viability, social and environmental health, safety, and welfare of the Basin.

Objective 1.2: Offset impacts of streamflow depletions to (A) surface water appropriations and (B) water wells constructed in aquifers dependent on recharge from streamflow to the extent those depletions are due to water use initiated after July 1, 1997.

In accordance with statutes, to reach a fully appropriated condition, the first step is to ensure that depletions to streamflows from uses initiated after July 1, 1997, are offset. The action items under this objective outline the process and considerations for addressing these depletions during Plan implementation. Depletions associated with post-1997 levels of development are to be fully offset by the end of the second increment. The timetable for addressing the post-1997 use depletions during implementation of this Plan increment will be identified by the individual NRDs and included in the individual IMPs.

Neb. Rev. Stat. § 46-715(3) provides guidance on facilitating new development within overappropriated areas. The statutes call for procedures and processes to be identified in the individual IMPs for allowing new uses while ensuring that mitigation measures sufficient to offset those new depletions are put in place.

Action Item 1.2.1: The identification of pre- and post-1997 levels of development and associated depletions includes assessment of the following:

- changes in irrigated acres;
- changes in municipal and domestic uses of water;
- changes in livestock use of water;
- changes in industrial uses of water;
- changes in the amount of surface water and groundwater applied on commingled irrigated land; or
- any other relevant changes in water consumption that affect streamflow.

Estimates of pre- and post-1997 levels of development and associated depletions have been determined for each NRD and are illustrated in Table 5. The first step in this process involved using modeling tools to estimate depletions to streamflow from water uses initiated prior to July 1, 1997. This establishes a pre-1997 level of development condition. The second step in the process is to add the post-1997 uses to the pre-1997 level of development condition and simulate these conditions using the same modeling tools. Computed depletions from this simulation in excess of the pre-1997 condition are then required to be offset.

Appendix B contains a summary of estimated depletions and offsets requirements for the second increment, specifically:

- Computed streamflow depletions from the pre-1997 level of development
- Computed depletions including those resulting from post-1997 uses within each NRD and the Upper Platte River Basin as a whole.
- Current estimate of depletions within each NRD that must be offset.

As noted in Appendix B, the robust review results recognize the temporal variability in required depletion offsets – both from year to year, as well as seasonally within the year. The results of the robust review can be used to determine seasonal and monthly offset requirements. The seasonal variation is important as it illustrates the opportunity for active vs. passive management to meet depletion offset requirements. Examples of passive management projects are intentional recharge of excess flows using canals or recharge pits, where water seeps into the aquifer and baseflow accretions due to the additional recharge occur naturally throughout the year. Active management includes targeted mitigation projects such as augmentation projects, where water is pumped or released at a specific time to directly impact streamflow during times of shortage. The information contained in Appendix B can be used to determine appropriate targets for passive or active management approaches.

The depletion estimates presented in Appendix B are based on the most recent modeling efforts in support of the first increment robust review, completed in 2018 during development of the second increment Plan. These depletion estimates will be reviewed periodically using agreed upon modeling tools. Models, supporting data and information, and the understanding of the Basin's hydrology continue to evolve. As new tools, information, and understanding is applied, it is anticipated that the values for depletions presented in Appendix B may change. As new depletion information is developed and considered, the values presented in Appendix B may be updated and the Plan revised via a public hearing at the annual basin-wide meeting. While values for the level of allowable depletions and depletions requiring offsets may change during this increment of the Plan,

Objective 1.1 calls for continuing, as appropriate, first increment activities to offset depletions.

Action Item 1.2.2: Identify, quantify, and proportion the source and quantity of water used on acres irrigated with both surface water and groundwater. Gather data on water use on such lands (both why and when irrigators use surface water or groundwater).

The impacts to water supply on lands with access to both surface water irrigation and groundwater irrigation, referred to as “commingled acres”, need to be investigated. Data on when surface water or groundwater is used on commingled acres is important to fully understand the impact of irrigation of these lands on streamflow. Surface water irrigation and groundwater irrigation typically have different delivery and application efficiencies which affect the amount of water withdrawn to meet crop demands, and ultimately the fate of that water (seepage, evaporation, returns, consumptive use, etc.). The timing of impacts on streamflow is also affected by the source of water used: surface water diversion is an immediate depletion to streamflow, while use of groundwater has a time-lagged effect on streamflow.

Further understanding the sources of water used on commingled acres allows better representation of water usage in modeling tools and evaluations. For modeling purposes and to determine post-1997 depletions, it is important to know historically when acres may have changed from irrigation by surface water alone to commingled or groundwater-only irrigation.

Action Item 1.2.3: Continue to identify and implement projects that may be used to enhance water supply. These projects shall be pursued on a basin-wide level, when such projects will help achieve sustainable levels of supply and use and address water shortages in one NRD that affect more than one NRD.

Options for offsetting the impacts of post-1997 depletions can be either direct reduction of consumptive use (Action Item 1.2.4), enhancing existing water supplies in other ways, or projects that improve management of existing supplies in such a way that depletions can be either reduced or directly offset. Projects to offset depletions that affect more than one NRD will be coordinated and pursued at a basin-wide level. Platte River Recovery Implementation Program (PRRIP) Water Action Plan projects, if funded in part or wholly by the State or NRDs, can be used to meet post-1997 offset requirements or progress towards fully appropriated. If no State or NRD funding is used for a Water Action Plan project,

the benefits of the project - depending on the location, timing, operation, etc. - may accrue as progress towards fully appropriated.

Action Item 1.2.4: Continue to reduce consumptive water use through retirement of irrigated lands, water use allocation, and/or other management options.

One option for offsetting the impacts of post-1997 depletions is reduction of consumptive water use. This can be accomplished through retirement of irrigated acres, water use allocations, and/or other management options. The analyses described in Action Items 1.4.2 and 1.4.3.1 are the basis for determining offsets provided by management activities aimed at reducing consumptive use. Crop types and producer practices may result in increases or decreases in consumptive use, so tracking current crop types and practices will be important to determine future estimates of consumptive use. Offsets that are accrued through consumptive use reductions are credited to the NRD in which they occur, and ultimately the Basin, in meeting the post-1997 offset requirements.

Action Item 1.2.5: Ensure that offsets of depletions occur at the appropriate time, amount, and location to mitigate the impact of the depletion. Allow for flexibility in providing offsets when appropriate.

The timing of the highest demand, and therefore potential impact of depletions, varies spatially across the Basin. It is important that depletion offsets identified in Action Items 1.2.3 and 1.2.4 provide a volume of water to the stream sufficient to make up for the associated depletions in the locations in which the depletions occur to effectively offset depletions. Preferably monthly, and at a minimum seasonally, offsets would occur in the same time and within the same reach as the depletions they are mitigating so as not to affect downstream users' access to water. The results of the robust review contained in Appendix B provide the timing, quantity, and location of required depletion offsets.

Action Item 1.2.6: Apply current methodologies, and continue to refine these methods of estimating depletions and accretions. Gather and evaluate data that could be used to estimate depletions and accretions to streamflow using tools as agreed on by NeDNR and the NRDs. Apply these methods for calculating depletions and offsets uniformly across the Basin.

Whenever an analysis is performed to determine compliance with this Basin-Wide Plan or any IMP subject to this Plan, the methods utilized will be conceptually

consistent so that stream depletions estimated/calculated in one area of the Basin are an “apples to apples” comparison to stream depletions estimated/calculated in another area of the Basin.

Models, supporting data and information, and our understanding of Basin hydrology will continue to evolve during implementation of the Plan. As this information becomes available and is evaluated, NeDNR and the NRDs will refine the methodologies and tools used to estimate depletions and accretions throughout the Basin. This information will be shared as part of the annual reporting for this Plan described in Objective 5.1. Methods, tools, and data used will be made available to the stakeholders and the public. The process for incorporating new information and results into this Plan document and/or supporting appendices will include a public hearing at the annual meeting.

The term ‘uniform’ in this action item (and elsewhere in the Plan when referring to consistency in analysis) is not intended to dictate that same methods be used throughout the Basin, as differences in available data, water supply and uses, climate, etc. across the Basin will require differences in the methodologies employed. Rather the term ‘uniform’ is intended to indicate that the methodologies must be consistent in concept to provide an apples-to-apples comparison across the Basin.

Objective 1.3: Make progress toward a fully appropriated condition.

Objective 1.1 calls for maintaining first increment offset achievements and Objective 1.2 addresses post-1997 use depletions – a priority in making progress towards a fully appropriated condition. The intent of Objective 1.3 is to identify actions that assist in making progress towards fully appropriated conditions while maintaining the economic viability, social and environmental health, safety, and welfare of the Basin. Throughout the planning process and stakeholder discussions, it was understood that some of these elements are believed to be largely addressed through other activities in the Basin or will be addressed through implementation of this Plan and will not require specific additional actions. Namely:

- Social and environmental health: Addressed through implementation of the Platte River Recovery Implementation Program (See Objective 2.1) and continued protection of instream flow appropriations.
- Safety: Addressed by not limiting access to emergency water supplies, as well as the capture and conjunctive management of flood flows to reduce flooding.
- Welfare: Addressed through implementation of this Plan.

Economic viability was identified as a critical element that warranted the inclusion specific objectives in order to be fully addressed.

Based on examination of the water supplies and water demands in the Basin (INSIGHT analysis – see Appendix A) and extensive work done with the stakeholder group through the planning process to determine conditions where water users are economically vulnerable, cyclical supply variability due to both short and extended drought periods and natural geographic variation in precipitation distribution are significant factors affecting economic viability. Human-made depletions amplify dry periods of the cyclical supply variability. This goal is focused on maintaining the Basin’s economic viability in the face of these variations in water supply and human-made depletion impacts.

The first three action items supporting this objective are organized in a logical progression—first, understanding and developing tools for determining economic impacts of supply variability (1.3.1), then approaches and protocols for assessing supplies, demands, and potential shortages and excesses⁶ (1.3.2), and finally, developing approaches and solutions to maintain economic viability of water users in the Basin (1.3.3). Each action item determines the necessity and informs the action items of the subsequent objective. Action Item 1.3.4 is a focused effort to address shortages to water users during periods of drought. Many of the stakeholders identified droughts as the only time their water supply was affected. Addressing human-made depletion impacts during these shortages will be a step toward a fully appropriated condition.

Action Item 1.3.1: Understand the economic impacts of supply variability on water users.

Through the planning process conducted for the second increment, extensive discussion centered on vulnerabilities of stakeholders to the variable water supply. The action items related to this objective are geared toward developing a fundamental and quantitative understanding of the economic impacts on Basin water users from variability in water supply.

Action Item 1.3.1.1: Identify who is affected (hydrologically and economically), and to what extent, by water supply variability.

Conduct a study that identifies water users that are affected during cyclical variations in water supply. This hydrologic element analysis will be conducted by NeDNR and the NRDs by evaluating data such as stream gage and diversion records, and well hydrograph data. Focused surveys of, as well as meetings with Basin water users can be used to build on stakeholder input gathered throughout the planning process. Once impacted water users who are hydrologically affected by water

⁶ The assessment of supplies and demands under Objection 1.3 are focused on current and future conditions.

supply variability are identified, economic impacts can be estimated as described in Action Items 1.3.1.2 and 1.3.1.3.

Action Item 1.3.1.2: Partner with impacted water users and other entities to gather data and study economic impacts of supply variability as well as regulatory and management actions.

NeDNR and the NRDs will collaborate with impacted water users and other entities to gather relevant economic data. Potential partners include economists and other subject matter experts familiar with the economic drivers of the Basin who can help identify data needs and formulate the tools and methodologies for assessing economic impacts. The tools and methodologies will be used to not only evaluate impacts of supply variability, but also evaluate human-made depletion impacts, management actions, regulatory actions, and potential projects or other activities considered during implementation that may affect water availability.

Action Item 1.3.2: Assess short- and long-term Basin water supply and demand.

This objective is focused on coordination and dissemination of information, not developing new methods or predictive tools. Many entities within the Basin currently assess and predict upcoming water supplies (CNPPID, NPPD, surface water irrigation districts, NRDs, etc.), with varying degrees of complexity in the methods used. Likewise, forecasting of short- and long-term demands under variable hydrologic conditions is also necessary. Basin water use and supply data, such as the INSIGHT analysis results, can be used as a reference for forecasting future supply and demands. Likewise modeling tools such as the CROPSIM model can be used to forecast demands in the short- and long-term. Timely coordination and information exchange amongst Basin stakeholders can further understanding of hydrologic conditions within the Basin and inform management decisions. This objective is targeted toward drought preparedness. Understanding potential for excess flows is as important as identifying potential droughts because management of excess supplies can build resiliency within the Basin to better withstand drought conditions.

Action Item 1.3.2.1: Evaluate expected natural flows of the Basin and available storage water.

Anticipated supplies for the coming year will be assessed, including consideration of factors such as mountain and plains snowpack, current reservoir storage levels, and current aquifer levels and prevailing trends. Communication and dissemination of this information provides a clear and consistent understanding of current and expected hydrologic conditions throughout the Basin.

Action Item 1.3.2.2: Identify specific locations and flow targets critical to water users in the Basin.

The results of action items 1.3.1.1 through 1.3.1.2 provide the basis for determining locations and flow thresholds critical to each water user in an effort to maintain the economic vitality of the Basin. The flow thresholds should consider variable demands and provide a range of anticipated demands based on variable hydrologic conditions. This information, coupled with anticipated supplies from action item 1.3.2.1, will inform management decisions.

Action Item 1.3.2.3: Forecast location and timing of shortage and excess within the Basin.

The anticipated supplies from action item 1.3.2.1, coupled with location and flow targets from action item 1.3.2.2, will inform management decisions in each year. In addition to seasonal or upcoming season forecasts of water supply, the feasibility of developing long-term forecasts of water supply (3-yr or 5-yr time frame) will be evaluated.

Action Item 1.3.2.4: Develop protocols for assessing and communicating available excess flows

The ability to capture and use excess flows is dependent on advanced notice of the availability of excess flows. NeDNR will develop a protocol for assessing, predicting, and communicating 1) the potential of excess flows to Basin water users, and 2) notice of actual availability of excess flows.

Action Item 1.3.3: Explore and implement potential measures to mitigate impacts (hydrologic and economic) of Basin supply variability due to human-made depletions on surface water and groundwater users.

This objective is focused on mitigating hydrologic and economic impacts of supply variability due to human-made depletions identified during completion of Action Items 1.3.1 and 1.3.2. Discussions with the stakeholder group through the planning process identified potential approaches (hydrologic, financial, etc.) for mitigating impacts. Action items 1.3.3.1 through 1.3.3.5 are to further evaluate these approaches for consideration.

Action Item 1.3.3.1: Evaluate options to maintain economic viability of surface water and groundwater infrastructure.

Potential strategies to mitigate economic impacts that may be considered include:

- Compensation, which may include financial, for lost hydropower production to the extent groundwater depletions may have impacted hydropower production
- Funding for surface water irrigation district canal infrastructure improvements (storage, efficiency, etc.)
- Funding for groundwater recharge projects

Action Item 1.3.3.2: Identify conjunctive management opportunities.

Potential conjunctive management strategies to mitigate hydrologic impacts that may be considered include:

- Aquifer recharge enhancement to mitigate water level declines
- Offsetting depletions to groundwater aquifers due to groundwater use or reduced surface water recharge to allow land to stay in production while maintaining or increasing available water supply

Action Item 1.3.3.3: Study potential for developing markets and transfer protocols for annual surface water and groundwater supplies.

A water market is an economic platform for temporary or permanent trades of the rights to use water (both surface water and groundwater, subject to NeDNR and NRD approval, respectively), where the price of water is determined by variable economic and market conditions. Much is still unknown about the logistics, framework, and interest of water users in such a market. Some questions to be addressed include if there

is potential for market-driven water management approaches in the Basin and what might the physical, regulatory, and administrative framework of such a system look like for the Basin. This action item is focused on addressing these questions by working cooperatively with Basin water users in determining potential applicability and potential framework for a basin-wide water market. NeDNR and CPNRD's pilot study in 2016 and 2017 developed an algorithm and established a water market within CPNRD. Lessons learned from the pilot study can inform efforts under this action item.

Action Item 1.3.3.4: Study management options of storage water (both surface water reservoirs and aquifer storage; and existing and potential new storage) to provide flexibility and increase resiliency of water supplies.

The importance of storage to the resiliency of Basin water supply was a consistent theme during the stakeholder process. The ability to capture and store flow during times of excess, either in the aquifer or in surface water reservoirs, was identified as an important approach to improve the Basin's resiliency under variable hydrologic conditions.

Many of the existing surface water storage facilities within the Basin serve multiple purposes (irrigation, aquifer recharge, hydropower, environmental, recreation, etc.), increasing the complexity of operations. Within this context, new storage management approaches will be evaluated that could potentially improve the resiliency of the water supplies, while considering impacts to the multiple purposes currently served. Potential new storage opportunities, whether in new facilities or new storage allocations in existing facilities, will also be evaluated.

Opportunities for enhancing aquifer storage will also be studied. In addition to identifying supplies and recharge sites, effects on existing aquifer water quality and aquifer levels require consideration.

Action Item 1.3.3.5: Support diversity in revenue streams of water users within the Basin.

During the stakeholder process, diversification of revenue streams was identified by many of the participants as a means for maintaining economic viability. Examples included eco-tourism, crop diversification, changes in land use, etc. While these types of activities are solely at the discretion of the individual users, NeDNR and the NRDs can provide

expertise and education in support of constituent activities that support the goals and objectives of this Plan and the individual NRD IMPs.

Action Item 1.3.4: Develop a Basin drought contingency plan for management of supplies during times of shortage.

The Basin drought contingency plan is part of the continuing efforts to reach fully appropriated conditions by addressing those shortages caused by short- and long-term drought conditions. The contingency plan discussed herein is to be completed within the first 3 to 5 years of this increment and address conditions under a basin-wide or regional drought condition, not a local (county or NRD level) drought condition.

The Basin drought contingency plan will focus on vulnerabilities identified through coordination with Basin water users in Action Item 1.3.1, and developing a monitoring and communication protocol for consistency across the Basin. The Basin drought contingency plan will serve as a guide for plans to be developed by each individual NRD as part of this action item. District-level mitigation measures and response actions corresponding to the drought conditions will be identified and implemented at the individual NRD level. Elements of a drought contingency plan include:

1. Vulnerabilities (Action Item 1.3.1)
2. Monitoring protocols (Basin-Wide Plan)
3. Triggers (individual NRD plans)
4. Mitigation actions (individual NRD plans – potentially basin-wide activities)
5. Response actions (individual NRD plans – potentially basin-wide activities)
6. Plan administration (individual NRD plans and Basin-Wide Plan)

Action Item 1.3.4.1: Develop a Basin drought monitoring protocol for defining and determining drought conditions.

This effort will focus on defining the severity of drought conditions (including identifying trigger points that will be linked to response actions) and determining the protocols for monitoring drought conditions at a basin level. The focus is on providing consistency and communication of Basin drought conditions. The monitoring protocol will identify information and an approach to determining Basin drought severity. Current monitoring activities and information utilized by Basin water managers and other agencies responsible for developing forecasts will be reviewed and considered during the development of

the monitoring protocols. Examples of information that can be used include snowpack, streamflow, system storage, soil moisture, National Drought Mitigation Center reports, Standardized Precipitation Index reports, and aquifer levels.

The result of this effort is intended to be consistency in communicating drought conditions to users across the Basin.

Action Item 1.3.4.2: Identify potential basin-wide mitigation and response actions to drought conditions and opportunities for cooperation across the Basin (for example, management of storage water).

Each NRD will develop individual drought contingency plans. The individual NRD drought contingency plans will contain mitigation and response actions specific to each District. The responsibility for implementation of those activities will, therefore, lie with each District. The purpose of this action item is to identify potential mitigation and response actions that are basin-wide or near basin-wide in scale, and/or involve multiple entities within the Basin (NeDNR, NRDs, irrigation districts, power districts, etc.). Collaboration with Basin water managers and water users impacted by drought conditions is anticipated in the identification and development of potential mitigation measures.

Action Item 1.3.4.3: Conduct a drought simulation workshop with NeDNR, NRDs, and water users to assist in developing and testing of protocols during a drought.

The workshop will test the proposed monitoring and communication protocols, as well as potential mitigation and response actions through simulation of conditions from a historic drought period.

Action Item 1.3.4.4: Identify roles for administering and implementing Basin drought contingency plan.

The administration of the Basin drought contingency plan requires defining specific roles and responsibilities for monitoring, communication, and implementation activities at the basin level. In addition, protocols for updating the plan need to be developed for inclusion in the plan administration.

Objective 1.4: Conduct technical analyses to support and evaluate effectiveness of Plan and adequacy in sustaining progress toward a fully appropriated level of water use.

This objective focuses on the technical analyses of water supplies and uses to support plan implementation and evaluation. Specific activities include:

- An annual review of any permitted new or expanded uses of surface water and groundwater within the Basin and associated mitigations (Action Item 1.4.1)
- An evaluation (robust review) of pre- and post-July 1, 1997 development (Action Item 1.4.2)
- An evaluation of current and fully appropriated conditions (Action Item 1.4.3)
- Development of necessary tools and technical analyses to support the robust review (Action Item 1.4.4)

Action Item 1.4.1: NeDNR and the NRDs will continue to assemble and share data annually on any permitted new and expanded uses of surface and groundwater and any associated mitigations in the Basin.

Statute describes both an annual review (*Neb. Rev. Stat. §46-715(5)(d)(ii)*) and a second more robust review of new or expanded uses and associated mitigation actions (*Neb. Rev. Stat. §46-715(5)(d)(iii)*) (Action Item 1.4.2). NeDNR and the NRDs will annually share data on any permitted new or expanded uses of surface water and groundwater and any associated mitigations in the Basin. Data will be shared in accordance with the requirements of state statutes, including meeting compliance with the individual IMPs and the Nebraska New Depletion Plan. Data will be analyzed to assess the collective amount, timing, and locations of the depletions to streamflows resulting from new or expanded uses and the collective amount, timing, and locations of all mitigations put in place. These analyses will be done using the agreed upon methods and tools. The results of these analyses will be shared as part of the annual reporting for this Plan described in Objective 5.1. Methods and tools used will be available to the stakeholders and the public. Basin-wide data collected will then be trimmed to the relevant PRRIP area, analyzed, and used for required annual and periodic reporting for the Nebraska New Depletion Plan, helping facilitate Nebraska's compliance with the Nebraska New Depletion Plan (supporting Goal 2). Details of annual reporting requirements can be found within the Monitoring and Studies Chapter of each District's IMP. The most recent annual reports can be found on the Department's website. Recent reports are included as Appendix A.

Action Item 1.4.2: An evaluation (robust review) of the impact of pre- and post-July 1, 1997, development and progress towards Plan goals/objectives/action items shall be conducted for each plan increment.

The purpose of the robust review is two-fold: 1) Update estimates of depletions from pre- and post-July 1, 1997 development; and 2) Evaluate management actions taken and their overall effectiveness in making progress towards the goals and objectives outlined in the Plan. The latter purpose serves as the basis for determining the need for further increments, and if so, to inform the planning process for the next increment. The process for the evaluation is described in *Neb. Rev. Stat. §46-715(5)(d)(iii)* and will identify the following information:

- A 50-year estimate of the streamflow depletions associated with pre- and post-1997 levels of water use development within the hydrologically connected area of the overappropriated basin within each NRD and within the entirety of the NRD.
- A 50-year estimate of streamflow accretions associated with management actions implemented by each NRD and NeDNR within the hydrologically connected area of the overappropriated basin within each NRD and within the entirety of the NRD.
- A summary of the net streamflow depletions within the overappropriated basin resulting from groundwater pumping within each NRD.

The net streamflow depletions estimated may need to be adjusted based on actual hydrologic conditions to reflect the requirement to offset only those amounts needed to prevent depletions to (A) surface water appropriations; (B) water wells constructed in aquifers dependent on recharge from streamflow; and (C) ensure compliance by Nebraska with the New Depletion Plan included in PRRIP, for as long as the Program exists.

The data collected on an annual basis (Action Item 1.4.1) will be used to update land use datasets for the accepted modeling tools. The models will be used to assess impacts of the permitted activities as part of the robust review process. The robust review will also evaluate the effects of other actions taken to reduce consumptive use and enhance streamflows to meet the goals and objectives in the Plan.

During the first increment, the robust review and evaluation of depletions focused on the impacts to stream baseflows. The groundwater modeling tools are used to assess baseflow impacts. During the second increment of the Plan, more focus will be given to activities that may have broader impacts and the impacts to overall streamflows may be evaluated, which would require the use of integrated modeling tools that incorporate surface water. NeDNR and the

NRDs will agree upon when it may be appropriate to use integrated modeling tools, what methods should be used, and how evaluations will be done.

The general method for conducting the robust review will be as follows:

- i. The groundwater models used for this process will be calibrated to streamflows/baseflows and groundwater levels in the area with the ability to assess the impacts on a monthly basis. The groundwater models will be updated periodically to simulate the management practices that have been implemented to date. The evaluation period of these models will be 50 years into the future.
- ii. The following groundwater model runs will be conducted to measure the success toward reaching Objective 1.2:
 - a. The 1997 Development Level Run. A model run that simulates holding the number of irrigated acres and crop types or mix in 1997 constant through the current date and the fifty-year projection period. It will assume the full crop irrigation requirement for the crop types or mix. The run will be conducted using climate data through the current date and will include a 50-year projection using an agreed to climate pattern.
 - b. The Historical Run. A model run that simulates the actual annual changes of the irrigated acres, excess flow recharge events, retirements, allocation effects, augmentation projects, and other water management regulations or projects throughout the evaluation period starting in 1997 through the current date and the 50-year projection period. The 50-year projection period will repeat an agreed to land use, regulation, or project dataset. The model will use available flow meter data or, in the absence of flow meter data, assume the full crop irrigation requirement was met at all times. The run will be conducted using data through the current date and will include a 50-year projection using an agreed to climate pattern.
 - c. Difference between the 1997 Development Level Run and the Historical Run. The simulated output from each model run will be compared to determine the difference in the baseflow that has resulted from post-1997 development.
 - d. Surface Water Accretions and Other Uses not Covered by the Models. If surface water acres are retired to offset streamflow depletions due to new uses begun subsequent to July 1, 1997, accretions resulting from those retirements will be determined

using agreed upon methodologies. This would include conjunctive management activities that are not otherwise captured in the models.

- e. Evaluation Results. For Objective 1.2 to be considered achieved, the results of combining the difference between the 1997 Development Level Run and the Historical Run with the addition of surface water accretions and other uses not covered by the models must be greater than or equal to zero.

(simulated streamflow/baseflow from the Historical Run) - (simulated streamflow/baseflow from the 1997 Development Level Run) + (other Surface Water Accretions) = Net Depletions

(***Note: In equation above, streamflow/baseflow is positive)

- iii. An additional groundwater model run will be conducted to measure total depletions. This will be the Pre-Development Run. The Pre-Development Run will simulate no groundwater development. The run will be conducted using climate data through the current date and will include a 50-year projection using the historical Run's agreed to climate pattern.

- a. Total Depletions Evaluation.

(simulated streamflow/baseflow from the Historical Run) – (simulated streamflow/baseflow from the Pre-Development Run) = Total Depletions

(***Note: In equation above, streamflow/baseflow is positive)

- iv. If integrated models are used to assess impacts to the total streamflow, the methods to be used will be developed jointly between NeDNR and the NRDs to properly design and constrain those analyses so that the results can be used to assess progress toward the goals and objectives of the Plan.

For Conjunctive Management Projects, or other management actions taken to meet the objectives and goals of the Plan, the conceptual basis for the analysis will be to compare the new water balance effect of the management action to the 1997 level of development water balance effect of the management action.

Activities such as conjunctive management projects, land use changes, retirement of irrigated acres, etc. can be represented in the modeling tools and compared to the 1997 level of development model results to evaluate the effects on water supply in the Basin in relation to the 1997 level of development and the effectiveness of those activities at offsetting post-1997 levels of

depletions.

In other cases it may be necessary to compare the management activities to the historical run to assess their impacts, or to other model runs that may not be the same as the historical run or 1997 development level run described above. This will need to be assessed on a case-by-case basis to determine the best approach to appropriately evaluate the impacts and effectiveness.

Action Item 1.4.3: Continue to refine the methodology used to determine the difference between the current and fully appropriated levels of development in each NRD.

The evaluation of the difference between current and fully appropriated levels of development is tied to Nebraska Statute and the current rules of the NeDNR for declaring a basin fully appropriated. Statute requires that this evaluation will:

- take into account cyclical supply, including drought;
- identify the portion of the overall difference that is due to conservation measures;
- identify the portion of the overall difference that is due to water use initiated prior to July 1, 1997; and
- identify the portion of the overall difference that is due to water use initiated or expanded on or after July 1, 1997.

The current NeDNR rules for determining fully appropriated status includes evaluation of the most junior appropriator's access to water, adjustments for lag effect of groundwater depletions and accretions on water supplies, and consideration of instream flows, among other guidance for conducting the analysis. The rules also provide flexibility for NeDNR to "....utilize a standard of interference appropriate for the use, taking into account the purpose for which the appropriation was granted...."⁷ for uses which are not defined in the rule. These include storage and hydropower appropriations, which are significant appropriators in the Upper Platte River Basin. NeDNR and the NRDs have and will continue to work with impacted water users on the process for determining the difference between the current and fully appropriated condition of the Basin.

Prior to development of the first increment Plan, as a preliminary step in developing the overall difference between fully and overappropriated conditions, representatives of NeDNR, the Central Nebraska Public Power and Irrigation District (CNPPID), Nebraska Public Power District (NPPD), and CPNRD

⁷ Title 457, Chapter 24, Section 001.01B of the Nebraska Administrative Code, dated June 27, 2008.

performed a preliminary estimate of the changes in stream reach gains and surface water demands affected by such reach gain changes in, *Preliminary Estimate of Historical Stream Flow Reductions in the Overappropriated Portion of the Platte River in Nebraska* (see Appendix D).

Action Item 1.4.3.1: Continue to study the effects of conservation measures impacts on the overall difference between current and fully appropriated conditions.

During implementation of the first increment Plan, Phase I and Phase II of a study of the effects of conservation measures on water supplies was completed. Phase I (Appendix E) focused on an overall evaluation of a wide spectrum of conservation measures across the Basin. The results of this study were used to inform and focus the evaluation of Phase II of the study. Phase II (Appendix F) focused on two types of conservation measures: 1) the effects of tillage practices and 2) the effects of irrigation efficiencies on available water supplies. Tillage practices and irrigation efficiencies are driven by producer choices and are considered part of the spectrum of producer practices. Current evaluation of the study results indicates that changes in tillage practices and irrigation efficiency changes over time have impacted available water supplies in varying degrees across the Basin.

Additional studies, building on the results of what was learned in Phases I and II of the conservation measures study, will be conducted during the second increment to further evaluate the effects of conservation measures on the overall difference between current and fully appropriated conditions, including verification of appropriate representation of existing and proposed producer practices in modeling tools.

In the current modeling tools, current levels of consumptive use are established based on the current understanding of on-farm producer practices, crop types, and current water management regulations. Changes from the current level of consumptive water use due to changes in production practices (on-farm practices, crop type, etc.) and current water management regulations will be estimated and compared to the current level of consumptive uses to determine and track offsets.

Action Item 1.4.3.2: As part of understanding the difference between the current level of development and a fully appropriated level of development, an evaluation of the balance of water supplies and demands shall be conducted for each plan increment.

As part of understanding the difference between the current level of development and a fully appropriated level of development, an evaluation of the balance of water supplies and demands shall be conducted for each 10-year plan increment.

An assessment of water supplies and water demands within the Basin has been conducted during implementation of the first increment. This assessment generally followed the NeDNR INSIGHT methodology for determining the quantity of available hydrologically connected water supplies and the demands on those supplies. The analysis looks at supplies over a representative climate period taking into account wet and dry phases of the hydrologic cycle. Consumptive and non-consumptive surface water demands are considered as well as groundwater depletions and groundwater consumptive use. A description of the INSIGHT methodology as applied to the Upper Platte Basin is included in Appendix A. INSIGHT methodologies will continue to be revised as necessary during this plan increment and used to assess total supplies and total demands within the Basin and methodologies refined as necessary.

Action Item 1.4.4: The NRDs and NeDNR will continue to cooperate on the development of the necessary modeling tools or technical analyses that are aimed at providing updated or refined estimates for the robust review.

Throughout this Plan document the terms “agreed upon tools/models/analysis” are used. As this Basin-Wide Plan and the IMPs are joint plans between NeDNR and the NRDs, all tools, models, analyses used to evaluate the progress toward the goals and objectives of this Plan or the related IMPs must be jointly developed and agreed upon by NeDNR and the NRDs. Methods, tools, and data used will be made available to the stakeholders and the public.

Objective 1.5: Use available funds and actively pursue new funding opportunities to cost effectively offset depletions, as well as to develop, maintain and update data and analytical tools needed to implement this Plan.

NeDNR and the NRDs will identify and pursue funding opportunities to support plan implementation. Funding sources may include federal, state, and local partners in addition to NeDNR and NRD contributions. Funding priorities identified in the action items include:

- Reductions in consumptive use
- Enhancement of water supplies
- Maintaining existing and implementing proposed projects to meet goals of this Plan
- Data acquisition and maintenance, and model improvements for plan implementation

Action Item 1.5.1: Cooperate with the federal government to use programs such as the Conservation Reserve Enhancement Program and others that promote reductions in consumptive use and enhance water supplies.

Action Item 1.5.2: Encourage Upper Platte River Basin NRDs, agencies, and water users to participate in these programs.

Action Item 1.5.3: Work to secure necessary funding for existing and proposed projects that will advance the goals of this Plan.

Action Item 1.5.4: Maintain, improve, or acquire data and modeling tools, as agreed by NeDNR and the Upper Platte River Basin NRDs that will be useful for assessing progress and further implementing this Plan.

Objective 1.6: Update and continue implementing IMPs in each Upper Platte River Basin NRD.

This objective provides guidance for each individual Upper Platte River Basin NRD IMP and outlines its relation to this Basin-Wide Plan.

Action Item 1.6.1: Update individual NRD IMPs to be consistent with this Upper Platte River Basin-Wide Plan.

Each of the NRDs currently has an IMP that will be updated for consistency with this Basin-Wide Plan. In addition, each IMP will:

- Identify management options that will help to achieve the goals and objectives of this Plan.
- Management actions should take into account the cyclical nature of water supplies as well as the impact of conservation measures.
- Management options available to be used in the IMPs to address the objectives of the second and any subsequent increments are those found in *Neb. Rev. Stats. §§ 46- 716 and 46-739*. Other options that are not regulatory include, but are not limited to: augmentation and retiming projects; alternative management of canals; new storage reservoirs or underground storage; water banking; incentive programs for retiring irrigated acres or purchasing surface water; alternative management of existing reservoirs; and PRRIP water action plan projects. The Historical Run for the robust review described in Action Item 1.4.2 serves as the basis for evaluating management options and their effectiveness.
- Riparian and riverine vegetation control may be considered as a management option when a change in consumptive use can be scientifically estimated and there is a comprehensive assessment of changes in such vegetation over the development period.
- Ensure that depletions caused by new or expanded uses within each Upper Platte River Basin NRD are offset.
- Describe how progress toward the depletion reduction objective for that Upper Platte River Basin NRD is to be measured. Possible tools to use for such measurements include, but are not limited to the following:
 - tracking reductions in irrigated acres;
 - monitoring reductions in consumptive water uses; and
 - performing new model runs.
- Include actions that will offset depletive impacts of post- July 1, 1997, water uses outside the overappropriated area, to the extent that those new uses deplete streamflow within the overappropriated area.
- Allow for the transfer of certified acres within and across NRD boundaries, subject to NRD approval, while not increasing streamflow depletions to the Platte River.

Action Item 1.6.2: Monitor and amend individual IMPs as needed to keep the IMPs current.

During implementation of the IMPs, NeDNR and the NRDs will monitor IMP actions consistent with the analyses and methods contained in the Basin-Wide Plan and amend the IMP if activities are determined by the parties to not be capable of meeting goals. If NeDNR and an Upper Platte River Basin NRD determine that management actions have not provided the offsets required to

meet the goals of the Plan, they will agree to increase offset activities to the extent possible and revise the individual NRD IMP, if necessary. These revisions may include additional controls, if needed, to meet goals of the Plan.

Action Item 1.6.3: As prescribed by *Nebraska Revised Statute* §46-715(5)(d)(iv), a consultative and collaborative process shall identify goals and objectives for subsequent increments, if necessary, of the individual NRD IMPs.

NeDNR and the individual NRDs will engage stakeholders in a consultative and collaborative process in the development of goals and objectives for subsequent increments (beyond the second increment) of the individual IMPs, if necessary. The need for subsequent increments will be determined through the robust review process completed at the end of the second increment and described in Action Item 1.4.2. Should a subsequent increment be necessary, the planning process will be initiated by NeDNR and each NRD developing a public participation plan that outlines the stakeholder engagement process for the NRD's IMP, including identification of participants/parties, definition of roles, decision-making protocols, planning processes, and timelines. This public participation plan serves as a reference guide for participants as well as the general public throughout the planning process. This effort is analogous to the basin-wide collaborative process described in Objective 5.3, but focused on the individual NRD stakeholder collaboration. The public participation plan that was developed for the second increment Plan is included in Appendix G for reference.

Goal 2: Prevent or mitigate human-induced reductions in the flow of a river or stream that would cause non-compliance with an interstate compact or decree or other formal state contract or agreement.

Maintaining compliance with *Neb. Rev. Stat.* §46-713(3), including commitments under compacts, decrees, and other formal agreements is a fundamental goal that must be considered throughout implementation of all goals, objectives, and action items identified in the Plan. This goal applies not only to those activities included in this Plan, but also to activities of the individual NRD IMPs.

Objective 2.1: Prevent human-induced streamflow depletions that would cause non-compliance by Nebraska with the Nebraska New Depletion Plan included within the Platte River Recovery Implementation Program, for as long as the Program exists.

Nebraska's New Depletion Plan (Attachment 5, Section 8 of the Platte River Recovery

Implementation Program (PRRIP) document) describes the actions Nebraska proposes to take to prevent or mitigate for new depletions to current United States Fish and Wildlife Service target flows and state protected flows as described in the Nebraska New Depletion Plan as part of the state's commitment to PRRIP. New depletions are defined as those uses started or expanded on or after July 1, 1997. The current United States Fish and Wildlife Service target flows were developed for the first increment of the PRRIP and considered the social and environmental health of the Platte River. The target flows are included in the PRRIP document and will be reevaluated during the extension of the first increment of PRRIP. Should the target flows change based on the reevaluation, the Nebraska New Depletion Plan will be updated accordingly.

This objective specifies that activities within the Basin during plan implementation must maintain compliance with the Nebraska New Depletion Plan, that is, depletions to United States Fish and Wildlife Service target flows and state protected flows, as described in the Nebraska New Depletion Plan, must be prevented or mitigated. In doing so, this objective addresses the requirements of *Neb. Rev. Stat. §46-715(2)* to maintain the social and environmental health of the Basin.

This objective recognizes that naturally occurring variations in the Basin's hydrologic cycle affects Basin water supplies; therefore, the focus of this objective is explicitly on impacts of human-induced depletions to water supplies.

Action Item 2.1.1: Ensure that the groundwater and surface water controls adopted in the individual NRD IMPs are sufficient to ensure that the State will remain in compliance with the Nebraska New Depletion Plan.

This action item specifies that during consideration and development of the controls for inclusion in the individual NRD IMPs, NeDNR or the NRDs will evaluate the net effects of the IMP controls to ensure they are adequate to prevent or mitigate depletions to as identified in the Nebraska New Depletion Plan.

Action Item 2.1.2: Collectively, as defined in the Nebraska New Depletion Plan, offset the new depletions caused by new uses within the Upper Platte River Basin NRDs.

In this context, the term offset is an action that either reduces water use or increases the water supply in an amount corresponding to the estimated volume of authorized new depletions. Depletive effects of new uses, as defined in the Nebraska New Depletion Plan, continue to accrue and must be offset to maintain compliance with the Nebraska New Depletion Plan. Statutory guidance regarding

new depletions is provided in *Neb. Rev. Stat. §46-715(3)*. Procedures for offsetting depletive effects of new uses are now and will continue to be identified and described in the individual NRD IMPs.

Action Item 2.1.3: Prepare reports to the Governance Committee of the Platte River Recovery Implementation Program on status and activities related to the Nebraska New Depletion Plan.

This action item is closely related to and coordinated with Objective 1.4 where technical analysis and reporting efforts for activities within the Basin are outlined. As outlined in Action Item 1.4.1, the annual reporting and data exchange efforts of NeDNR and NRDs will include portions of the Basin covered by PRRIP and will be used in preparing annual and other periodic reports to the Governance Committee as identified in the Nebraska New Depletion Plan.

Goal 3: Partner with municipalities and industries to maximize conservation and water use efficiency.

Municipal and industrial groundwater users are an important group of water users in the Basin. The availability of water to these users directly affects the social and environmental health, safety, and welfare of the Basin. Existing users must be protected while ensuring compliance with state laws and the Nebraska New Depletion Plan. *Nebraska Revised Statute §46-715 (3)* provides guidance and procedures that enable new development to occur with appropriate offsets, facilitating future growth while protecting existing uses.

Conservation and efficiency are needed for local populations to sustain water supplies and provide opportunity to grow and attract new industries. This objective is not intended to dictate development of conservation plans, but rather foster an understanding of current water usage and identify potential conservation measures that would benefit overall water supplies. The first step is to understand how water is being used by municipalities and industries and to understand the challenges they face.

Objective 3.1: Continue to collect data on water use and existing conservation plans of municipalities and industries within the Basin.

Action Item 3.1.1: To advance understanding of water usage by municipalities and industries, gather information on total pumping, consumptive use, and timing of any return flows and collect data on water use efficiency and conservation methods being employed.

Action Item 3.1.2: Uniformly assess consumptive use, impacts on streamflows, and requirements and responsibilities for offsets due to current and expanded municipal and industrial uses, using agreed upon modeling tools. Consistent methods for tracking municipal and industrial consumptive use will be specified in individual NRD IMPs.

Action Item 3.1.3: If any municipalities have formal conservation plans in place, review these for strategies that can be applied to other municipalities in the Basin.

Objective 3.2: Invite municipalities and industries to the annual meetings.

Action Item 3.2.1: To improve communication among all entities in the Basin regarding water uses and facilitate the sharing of data, all municipalities and industrial users in the Basin will be invited to the annual basin-wide meetings.

Action Item 3.2.2: Solicit feedback from municipalities and industries on impacts of water regulations, restrictions, and conservation on their development, ability to attract new industries and accommodate economic growth.

Action Item 3.2.3: Communicate to municipalities and industries the changes that will occur when relevant statutes change in 2026, making sure expectations and requirements are clear, and work with them to develop strategies.

Action Item 3.2.4: Keep open conversations going about what is being done and what can be done to conserve water and what impacts conservation has on streamflows.

Objective 3.3: Establish baseline water use levels for each municipal and industrial user by January 1, 2026.

Through the course of the first increment, NeDNR and the NRDs have developed a 1997 baseline for municipal and industrial uses that will continue to be used to determine whether or not there are increases or reductions in consumptive use relative to the 1997 baseline. This is separate from the baselines that may be used by each NRD to establish a municipal or industrial allocation under *Neb. Rev. Stat. §46-740*. Nothing in Objective 3.3 or its associated action items changes the obligation of the NRD and NeDNR to provide offsets for post-1997 increases in consumptive use. However, subsequent to January 1, 2026, baseline allocations may be set for each municipal or industrial user in accordance with *Neb. Rev. Stat. §46-740*. Should such allocations be established and the municipal or industrial user exceed those allocations, the NRD may require the municipal or industrial user to provide offsets for the expanded use.

Action Item 3.3.1: Use data collected from the municipalities and industries to track increases or decreases in consumptive use relative to the 1997 baseline.

Action Item 3.3.2: For purposes of *Neb. Rev. Stat. §46-740*, establish baselines that may be used to develop allocations, incorporating feedback and input received from the municipal and industrial users. In accordance with statute, the base amount of the allocation for a municipality shall be determined as the greater of either a) the amount of water authorized by a permit, or b) their greatest annual use of governmental, commercial, and industrial use prior to January 1, 2026, plus a per capita allowance. The base amount of the allocation for an industrial or commercial user is the greater of either a) the amount authorized by a permit, or b) the amount of water necessary to achieve the industrial or commercial use as long as the consumptive use is less than 25 million gallons annually. Further details and exceptions to developing baselines and setting allocations can be found in state statutes.

Action Item 3.3.3: In accordance with *Neb. Rev. Stat. §46-740*, the NRDs will continue to offset any new depletions that occur as a result of municipal and industrial consumptive use exceeding 1997 levels up to any allocation that may be established for municipal or industrial users, with the exception of new or expanded municipal and industrial uses greater than 25 million gallons per year. Any reductions in consumptive use by municipalities or industrial users that result in accretions to streamflow may be used to offset depletions from other water uses in that NRD or by the municipal or industrial user, subject to the rules established by each NRD.

Action Item 3.3.4: For purposes of *Neb. Rev. Stat. §46-740*, on and after January 1, 2026, after municipal and industrial baseline allocations have been established, the requirement to offset any new uses beyond the baseline allocation that cause depletions to streamflow may be addressed by municipal and industrial users. The specific requirements for municipal and industrial users will be established in the individual NRD IMPs and NeDNR rules and regulations.

Goal 4: Work cooperatively to identify and investigate disputes between groundwater users and surface water appropriators and, if determined appropriate, implement management solutions to address such issues.

There is a hydrologic connection of surface water and groundwater resources and the potential exists for uses to affect one another. NeDNR and the NRDs will work cooperatively with Basin water users to identify potential conflicts, evaluate those conflicts, and if appropriate, implement solutions to address conflicts.

Objective 4.1: Identify disputes between groundwater users and surface water appropriators.

The purpose of this objective is to identify potential conflicts between surface water and groundwater users, with Action Items 4.1.1 and 4.1.2 outlining the processes for identifying potential conflicts.

Action Item 4.1.1: Surface water appropriators or groundwater users may present data and other supporting information identifying the nature and scope of potential disputes at the annual meeting.

Any surface water or groundwater user in the Basin with a potential conflict may submit data and supporting information to NeDNR and the NRDs for consideration. The submittal should include a concise description of the potential conflict, as well as relevant information for NeDNR and the NRDs to use in their evaluation.

Action Item 4.1.2: The Upper Platte River Basin NRDs and NeDNR may present data and other supporting information identifying the nature and scope of potential disputes at the annual meeting.

This action item provides the opportunity for the NeDNR and the Upper Platte River Basin NRDs to provide information to Basin water users and the public on potential conflicts occurring within the Basin at the annual meeting.

Objective 4.2: Investigate and address issues between groundwater users and surface water appropriators, based on investigation results.

Once potential conflicts have been identified, Action Items 4.2.1 through 4.2.5 outline the approach and roles of NeDNR, the Basin NRDs, and affected users in evaluating

and addressing conflicts.

Action Item 4.2.1: NeDNR and the Upper Platte River Basin NRDs shall determine whether specific disputes identified via Goal 5, Objective 1, have a hydrologic impact.

Action Item 4.2.2: NeDNR and the Upper Platte River Basin NRDs will investigate a given dispute to determine whether the issue should be addressed through modification of the Upper Platte River Basin-Wide Plan, individual NRD IMPs, or by other means.

Action Item 4.2.3: If it is determined, as a result of the investigation, that the issue is not a basin-wide issue, the issue will be turned over to the appropriate affected NRD(s) or NeDNR.

Action Item 4.2.4: NeDNR or the affected Upper Platte River Basin NRD(s), as determined in Action Item 4.2.3, working with the affected water user(s), shall develop management solutions, as appropriate, to address the issue(s).

Action Item 4.2.5: NeDNR and the affected Upper Platte River Basin NRD(s) shall update the Upper Platte River Basin-Wide Plan and/or individual IMP, as appropriate.

Goal 5: Keep the Upper Platte River Basin-Wide Plan current and keep stakeholders informed.

Objective 5.1: Meet at least annually to review progress toward achieving the goals and objectives of this Upper Platte River Basin-Wide Plan and those portions of individual NRD IMPs that implement this Plan.

Annual meetings will be held in June or July each year, unless agreed to otherwise, at a location designated by NeDNR and the NRDs. Discussion shall include, but not be limited to the following:

1. revisions to this Plan;
2. revisions to IMPs;
3. new data and information
4. disputes related to implementation of IMPs; and/or
5. any other topic which NeDNR and the Upper Platte Basin NRDs have mutually agreed to discuss.

A proposed agenda will be made available to the public, along with any available supporting documents, at least two weeks prior to the annual meeting. As a result of actions taken at the annual meeting, the Plan may be revised, if necessary.

Stakeholder and/or public feedback concerning the Basin-Wide Plan or individual IMPs will be considered in the following process:

1. Basin-Wide Plan

- a. Any groundwater user, surface water appropriator, NRD, or NeDNR may, at least 30 days before the annual review meeting between the NRDs and NeDNR, send a written request to NeDNR or an Upper Platte Basin NRD for revision to the Basin-Wide Plan.
 - i. The affected Upper Platte Basin NRD(s) and NeDNR will review the proposed issues prior to the annual meeting.
 - ii. Opportunity for input regarding the proposed issues will be provided to the party making the request during the annual meeting.
 - iii. Written requestors will receive a written response, regardless of whether the NRDs and NeDNR agree to consider proposed Plan revisions.
- b. If NeDNR and the Upper Platte River Basin NRDs agree to consider potential revisions to the Plan, then the public will be notified of the potential revisions to the Plan, and input will be solicited at a minimum via a hearing.
 - i. An advisory or stakeholder group may be convened, if the affected NRD(s) and NeDNR determine that the proposed changes warrant the formation of such a group.
- c. After receiving public comments, Plan revisions will be considered for adoption.
- d. If the NRD(s) and NeDNR agree on revisions to the Plan, then a hearing will be held to solicit formal comment. Following the public hearing, the proposed changes will be considered and may be adopted.

2. IMPs

- a. If the Basin-Wide Plan is revised, then revisions to the individual Upper Platte Basin IMPs will be made as necessary, in accordance with *Neb. Rev. Stat. §46-715(4)*.
- b. If the Upper Platte River Basin NRD(s) and NeDNR agree on revisions to an IMP after the annual meeting, then a hearing will be held to solicit formal comment. The IMPs for each of the five Upper Platte Basin NRDs shall be provided to all

other NRDs in the overappropriated basin for comment before revisions are approved.

- c. NeDNR and any Upper Platte Basin NRD may amend an IMP as more data and information become available, as provided in *Neb. Rev. Stat.* §46-715(4)(d)(ii).

Action Item 5.1.1: Regular presentations are anticipated to include an annual forecast of basin water supply and demand once a forecast is developed under action item 1.3.2, and other plan implementation updates.

Objective 5.2: Improve information sharing with interested stakeholders.

Action Item 5.2.1: Maintain a database of interested stakeholders; it is the responsibility of interested parties to keep their contact information current by notifying NeDNR or their respective NRD of changes.

Action Item 5.2.2: Send notice of annual meeting to interested stakeholders, municipalities, and industries.

Action Item 5.2.3: Send electronic notice when new reports pertinent to this Plan have been published to the internet.

Objective 5.3: Conduct planning for subsequent increments of the Plan, as necessary.

Action Item 5.3.1: As prescribed by Statute, a consultative and collaborative process shall identify goals and objectives for subsequent increments, if necessary, of the Basin-Wide Plan.

NeDNR and the NRDs will engage stakeholders in a consultative and collaborative process in the development of goals and objectives for subsequent increments of the Plan, if necessary. The need for subsequent increments will be determined through the robust review process described in Action Item 1.4.2. Should a subsequent increment be necessary, the planning process will be initiated by NeDNR and the NRDs by developing a public participation plan that outlines the stakeholder engagement process, including identification of participants/parties, definition of roles, decision-making protocols, planning processes, and timelines. This public participation plan serves as a reference guide for participants as well as the general public throughout the planning process. The public participation plan

developed for the second increment Plan development process is included in Appendix G for reference.

5.0 Monitoring

During implementation of this increment of the Basin-Wide Plan, progress towards identified goals and objectives will be monitored, actions and/or plans revised as necessary, and Basin stakeholders kept informed of activities occurring within the Basin.

Reporting

Objective 5.1 requires the NeDNR and NRDs to meet annually and exchange reports on Plan progress. These reports will contain, but are not limited to, data and information about:

- Water supplies and uses in the Basin
- New or expanded uses within the Basin
- Water management activities in support of the Plan and individual IMPs
- Progress toward goals, objectives, and action items of the Plan

Copies of the 2018 annual reports can be found on the Department website: [add web address]. Reports will be made available to the public following annual meetings.

Annual Meeting

Annual meetings will be held in June or July each year, unless agreed to otherwise, at a location designated by NeDNR and the NRDs. The annual meeting will be open to the public and time allotted on the agenda for public comment. Discussion shall include, but not be limited to the following:

1. revisions to this Plan;
2. revisions to individual NRD IMPs;
3. new data and information,
4. disputes related to implementation of IMPs; and/or
5. any other topic which the NeDNR and the Upper Platte Basin NRDs have mutually agreed to discuss.

A proposed agenda will be made available to the public, along with any available supporting documents, at least two weeks prior to the annual meeting. To improve communication among all entities in the Basin regarding water uses and to facilitate the sharing of data, municipalities and industrial users in the Basin will be invited to the annual basin-wide meetings and feedback solicited on impacts of water regulations, restrictions, and conservation on their development, ability to attract new industries, and accommodate economic growth. As a result of actions taken at the annual meeting, the Plan may be revised, if necessary.

Technical Analyses

Technical analyses to support plan implementation and evaluation of progress are identified in Objective 1.4. Specific analyses identified include:

- An annual review of any permitted new and expanded uses of surface water and groundwater within the Basin and associated mitigations (Action Item 1.4.1)
- An evaluation (robust review) of pre- and post-July 1, 1997 development (Action Item 1.4.2)
- Continued evaluation of current and fully appropriated conditions (Action Item 1.4.3)
- Development of necessary tools and technical analyses to support the robust review (Action Item 1.4.4)

The referenced action items provide additional information related to the data collection, purposes, and analyses to inform status and progress towards identified Plan goals and objectives. During implementation of this Plan, NeDNR and the NRDs may identify and prioritize additional technical analyses in support of monitoring and achieving Plan goals and objectives.

Modifications to the Plan

If NeDNR and the Upper Platte River Basin NRDs agree to consider potential revisions to the Basin-Wide Plan, then the public will be notified of the potential revisions, and input will be solicited, at a minimum, via a hearing. An advisory or stakeholder group may be convened if the affected NRD(s) and NeDNR determine that the proposed changes warrant the formation of such a group. After receiving public comments, Plan revisions will be considered for adoption. If the NRD(s) and NeDNR agree on revisions to the Plan, then a hearing will be held to solicit formal comment. Following the public hearing, the proposed changes will be considered and may be adopted.

6.0 Glossary

28 / 40 Area: The area within the North Platte, South Platte, or Platte River watershed in which groundwater intentionally withdrawn for 40 years will result in a cumulative stream depletion to the North Platte, South Platte, or Platte River or a baseflow tributary greater than or equal to 28 percent of the total groundwater consumed as a result of the withdrawals.

Accretion: Addition to streamflow that results from an offset/mitigation action or project

Acre-Foot (AF): Volume of water required to cover 1 acre of land (43,560 square feet) to a depth of 1 foot, equivalent to 325,851 gallons.

Appropriation: A permit granted by the NeDNR to use surface water for a beneficial use in a specific amount, purpose and location, and is based on first-in-time, first-in- right

Aquifer: A geological formation or structure of permeable rock or unconsolidated materials that stores and/or transmits water, such as to wells and springs

Augmentation Well: A groundwater well drilled to pump water into a stream to augment streamflows

AWEP: Agricultural Water Enhancement Program

AWREP: Agricultural Water Resources Enhancement Program

BWP: Basin-Wide Plan

CFS / Cubic Feet per Second: The flow rate or discharge equal to one cubic foot of water per second or about 7.5 gallons per second

COHYST: Cooperative Hydrology Study

Conjunctive Management: The coordinated and combined process that utilizes the connection between surface and groundwater to maximize water use, while minimizing impacts to streamflow and groundwater levels in an effort to increase the overall water supply of a region and improve the reliability of that supply.

Consumptive Use: The amount of water that is consumed under efficient practices, which satisfies the beneficial use without waste and does not return to a water resources system

CREP: Conservation Reserve Enhancement Program

Depletion: Reduction to streamflow that results from a new use of either groundwater or surface water

Drought: A deficiency of precipitation over an extended period of time (usually a season or more), resulting in a water shortage. The effects of this deficiency are often called drought impacts.

EQIP: Environmental Quality Incentives Program

Flood Control: Referring to water withdrawn from the surface water source for the purpose of protecting health and well-being of society

Fully Appropriated: From 46-713, subsection (3): A river basin, subbasin, or reach shall be deemed fully appropriated if the NeDNR determines based upon its evaluation conducted pursuant to subsection (1) of this section and information presented at the hearing pursuant to subsection (4) of section 46-714 that then current uses of hydrologically connected surface water and ground water in the river basin, subbasin, or reach cause or will in the reasonably foreseeable future cause (a) the surface water supply to be insufficient to sustain over the long term the beneficial or useful purposes for which existing natural-flow or storage appropriations were granted and the beneficial or useful purposes for which, at the time of approval, any existing instream appropriation was granted, (b) the streamflow to be insufficient to sustain over the long term the beneficial uses from wells constructed in aquifers dependent on recharge from the river or stream involved, or (c) reduction in the flow of a river or stream sufficient to cause noncompliance by Nebraska with an interstate compact or decree, other formal state contract or agreement, or applicable state or federal laws.

GDP / Gallons per Day: Referring to the approved amount of acre-feet of water legally allowed to be pumped from a surface water source, as long as all other conditions are met

Groundwater: Water which occurs in or moves, seeps, filters, or percolates through ground under the surface of the land, and shall include ground water which becomes commingled with waters from surface sources

Instream Use: Water that is appropriated for use within the stream and is not withdrawn from a surface water source

IWMPP: Interrelated Water Management Plan Program

LB 962: Bill passed by Nebraska Legislature in 2004. The amendment establishes a proactive approach to the integrated management of hydrologically connected groundwater and surface

water and creates funds to direct money towards data gathering, research, conservation and implementation of integrated management plans in fully and overappropriated basins.

LB 1098: Passed in 2014, altered and created water sustainability funding opportunities

Moratorium: A legally authorized suspension of drilling of groundwater wells or approval of new surface water appropriations

NET: Nebraska Environmental Trust

NNDP: Nebraska New Depletion Plan

NSWCP: Nebraska Soil and Water Conservation Program (alternatively NSWCF - Nebraska Soil and Water Conservation Funds)

OAI: Ogallala Aquifer Initiative

Offset: A reduction in water use that corresponds with an increased use of water. An offset may be used as a management strategy to balance uses and supplies. The offset will have a corresponding amount, time, and location. Also referred to as mitigation.

Overappropriated: From 46-713, subsection (4a): A river basin, subbasin, or reach shall be deemed overappropriated if, on July 16, 2004, the river basin, subbasin, or reach is subject to an interstate cooperative agreement among three or more states and if, prior to such date, the NeDNR has declared a moratorium on the issuance of new surface water appropriations in such river basin, subbasin, or reach and has requested each natural resources district with jurisdiction in the affected area in such river basin, subbasin, or reach either (i) to close or to continue in effect a previously adopted closure of all or part of such river basin, subbasin, or reach to the issuance of additional water well permits in accordance with subdivision (1)(k) of section 46-656.25 as such section existed prior to July 16, 2004, or (ii) to temporarily suspend or to continue in effect a temporary suspension, previously adopted pursuant to section 46-656.28 as such section existed prior to July 16, 2004, on the drilling of new water wells in all or part of such river basin, subbasin, or reach.

PBC: Platte Basin Coalition

PBHEP: Platte Basin Habitat Enhancement Program

PRRIP: Platte River Recovery Implementation Program

PRRIP Critical Habitat Reach: The reach of the Platte River from Lexington, NE, to Chapman, NE,

which is of critical importance to the endangered target species

Recharge: A hydrologic process where water moves downward from surface water to groundwater, both naturally through the hydrologic cycle or through intentional practices

Replacement Well: A groundwater well drilled to replace an existing groundwater well which has become unusable. The replaced well must be decommissioned. No increase in irrigated acres is associated with a replacement well unless a variance is granted.

RCPP: Regional Conservation Partnership Program

Streamflow: The discharge that occurs in a natural channel of a surface stream course

Supplemental Well: A groundwater well drilled to either supplement an existing groundwater well or to augment surface water irrigation when surface water is not available. No increase in irrigated acres is associated with a supplemental well unless a variance is granted.

Surface Water: Water which occurs or moves on the surface of the planet such as in a stream, river, lake, wetland, or ocean

Telemetry: A process by which measurements and other data are collected at remote or inaccessible points and transmitted to receiving equipment for monitoring

Temporary Recharge: A temporary (for one year) surface water permit issued for the purpose of diverting excess streamflow (unappropriated water) to recharge groundwater, intended to supply baseflow accretions back to the river

Transfer: To allow for the historic consumptive use of water to be changed, in location and/or purpose without causing an increase in depletions to the river or an impact to existing surface water or groundwater uses

USDA – NRCS: U.S. Department of Agriculture - Natural Resources Conservation Service

Use: The legally accepted use of the well or water appropriation

Variance: To allow an exception to the stay on new irrigated acres and new consumptive uses while providing adequate mitigations or transfers to assure that there is no net increase in depletions to the river or impacts to existing surface water or groundwater uses; any request that is contrary to existing rules or regulations will require a variance

WWUMM: Western Water Use Management Model