



# WATER ACTION PLAN UPDATE REPORT



February 2021

First Increment Progress, 2007-2019



PLATTE RIVER  
RECOVERY IMPLEMENTATION PROGRAM

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**FINAL DRAFT  
FOR GC REVIEW**



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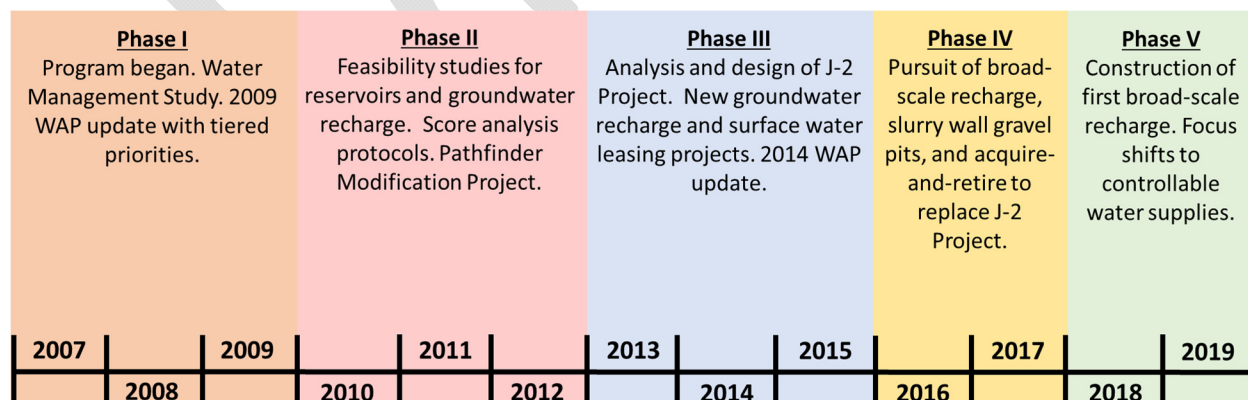
## Executive Summary

Water Plan goals for the 13-year First Increment (2007-2019) of the Platte River Recovery Implementation Program (PRRIP or Program) were as follows:

- First Increment water objective: Provide water capable of reducing shortages to [U.S. Fish and Wildlife Service] target flows by an average of 130,000-150,000 acre-feet per year.
- Milestone 4: The Reconnaissance-Level Water Action Plan, as may be amended by the Governance Committee, will be implemented and capable of providing at least an average of 50,000 acre-feet per year of shortage reduction to target flows, or for other Program purposes, by no later than the end of the First Increment.

These goals were not achieved in full, necessitating a First Increment Extension (2020-2032), but significant progress was made by the end of 2019. The three initial water projects—Tamarack I groundwater recharge in Colorado, the Pathfinder Modification Project in Wyoming, and the Lake McConaughy Environmental Account (EA) in Nebraska—were collectively credited with providing an average of 80,000 acre-feet per year (AFY) towards the First Increment water objective at the outset of the Program.

For purposes of documenting the history of Water Action Plan (WAP) progress, it was useful to divide the First Increment into five phases, periods of two or three years that were dominated by specific activities (e.g., feasibility studies) or project pursuits (e.g., J-2 Regulating Reservoirs). These phases are illustrated in **Figure ES-1**. In general, work on multiple projects was proceeding simultaneously, but a thorough review of Water Advisory Committee (WAC) and Governance Committee (GC) meeting minutes clearly showed how the Program’s highest-priority Water Plan activities evolved over time. Throughout the First Increment, Program staff and stakeholders learned valuable lessons from numerous project pursuits—some that were successful and others that were not—that continue to guide water policies now and into the future.



**Figure ES-1. Phases of Water Action Plan implementation during the Program’s First Increment.**



**Table ES-1** shows that 11 individual WAP projects with approved or estimated scores that collectively exceed 34,000 AFY were implemented between 2007 and 2019. Most of these projects were characterized as either Nebraska groundwater recharge (including the Cook recapture well) or Nebraska water leasing. In addition, a small volume of Net Controllable Conserved Water (NCCW) is credited to the Lake McConaughy Environmental Account (EA) each year at no cost to the Program, and Wyoming water is leased from the Municipal Account in Pathfinder Reservoir. Overall, the cumulative score from the three initial water projects and the 11 active WAP projects was estimated to be 114,120 AFY at the end of the First Increment.

**Table ES-1. WAP Projects Implemented During the PRRIP First Increment (2007-2019).**

Project	Project Type	Year of First Operations	Score [AFY]	Score Status
NCCW (No Cost)	Other	2007	260	Approved
Phelps County Canal	Nebraska groundwater recharge	2011	2,700	Approved
Pathfinder Municipal Account Lease	Other	2012	6,350	Approved
CPNRD Canals	Nebraska groundwater recharge	2013	600	Estimated
CPNRD Canals	Nebraska water leasing	2015	10,800	Estimated
Elwood Reservoir	Nebraska groundwater recharge	2015	2,800	Approved
NPPD Canals	Nebraska groundwater recharge	2015	1,800	Estimated
CNPPID Irrigators	Nebraska water leasing	2016	1,900	Approved
Cook Recapture Well	Nebraska groundwater recharge	2016	160	Approved
NPPD Canals	Nebraska water leasing	2019	2,750	Estimated
Broad-Scale Recharge	Nebraska groundwater recharge	2020*	4,000	Estimated
WAP Projects (6) Approved Score =			14,170 AFY	
WAP Projects (5) Estimated Score =			19,950 AFY	
WAP Projects (11) Total Score =			34,120 AFY	

\* Construction of the Cottonwood Ranch broad-scale recharge project was completed in October 2019, and test fill operations occurred July-September 2020.

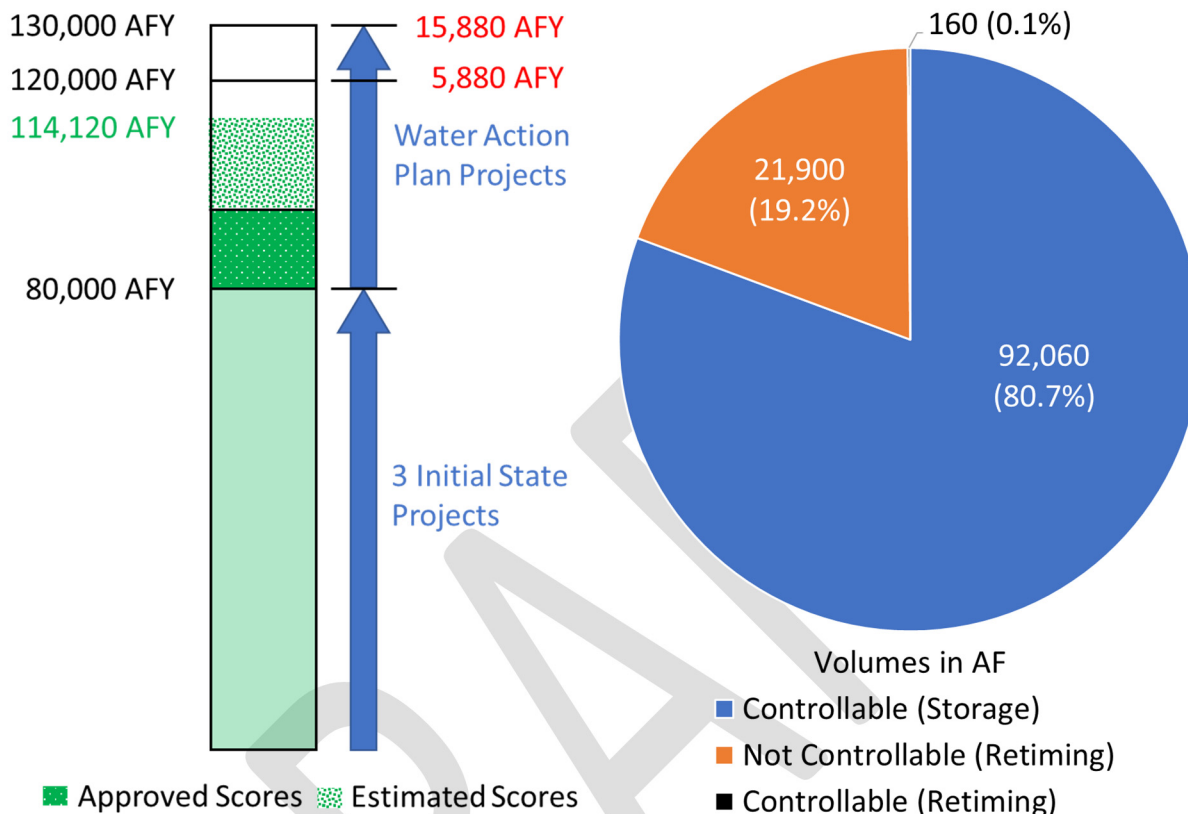
For the First Increment Extension, the water goals were slightly modified to reflect both the Program's budgetary constraints and the more complicated than expected reality of securing the necessary water supplies. The Program remains committed to achieving average annual shortage reductions of 130,000 AFY. However, the course of action will be to reach 120,000 AFY as quickly as possible during the First Increment Extension, then conduct the science necessary to determine if the next 10,000 AFY is needed to achieve target species management objectives.

The left side of **Figure ES-2** illustrates the modified water objective and progress made through 2019. The right side of the figure reframes the 114,120 AFY cumulative score in terms of whether Program water projects are controllable or not controllable. More than 80 percent of Program water is controllable, nearly all of which ends up in the Lake McConaughy EA. These supplies will be essential to the success of water-related science experiments and Adaptive





Management Plan activities during the First Increment Extension. Recharge projects account for all of the water that is not controllable.



**Figure ES-2. (Left) Modified First Increment Water Objective and Overall Progress through 2019. (Right) Controllable and Not Controllable Program Water Supplies.**

Just under 6,000 AFY is still needed to reach 120,000 AFY, and prospects are good for the Program to reach this level of deficit reduction between 2022 and 2025. Three potential future WAP projects constitute the most likely path forward:

- Recapture wells. Accretions to the Platte River from the Program's groundwater recharge projects are expected to occur as continuous low flow rate contributions to baseflow over periods of decades. Recapture wells can be used to accelerate these return flows with controlled operations timed to coincide with target flow shortages. The Program is already developing a pilot-scale network of seven recapture wells that will pump water recharged through the Phelps County Canal, Elwood Reservoir, and the Cottonwood Ranch broad-scale recharge project. This pilot project is estimated to have a score of about 1,500 AFY; future expansions of the recapture well network could achieve a total score of up to **8,000 AFY**.
- North Platte irrigator/irrigation district lease(s). Glendo Reservoir holds 25,000 AF of storage water allocated for irrigation in the North Platte River basin of western



Nebraska. The 2001 North Platte River Settlement further allows this water to be (a) used for fish and wildlife purposes anywhere in the Platte River basin downstream of Glendo Reservoir and (b) administered and protected as storage water until it is used for such purposes. The Program is pursuing a lease agreement with an irrigation district that has a long-term contract with the U.S. Bureau of Reclamation for 3,000 AF of the Glendo storage water. Leased water would be transferred downstream to the Lake McConaughy EA each year and result in an estimated score of about **2,500 AFY**. Agreements with other North Platte irrigation districts could bring additional controllable water into the Lake McConaughy EA.

- CNPPID storage lease. The Program may also be able to lease storage water from CNPPID in variable amounts up to 10,586 AF each year depending on the October 1 total storage volume in Lake McConaughy. Based on 1947-1994 modeled storage data and proposed lease terms from 2018, the estimated score for this project is about **6,600 AFY**.

With combined scores up to and possibly exceeding 17,100 AFY, these three potential future WAP projects provide the Program with a great deal of flexibility on the way to achieving its water objectives. Either recapture wells or the CNPPID storage lease could individually fill the remaining gap to reach 120,000 AFY if developed to the fullest extent. Smaller versions of one or both of those projects together with leases from North Platte irrigation district(s) could serve the same purpose. Furthermore, combinations of these projects could provide a buffer should any of the 11 active WAP projects be terminated or if scores that are eventually approved for certain projects are less than current estimates. If the science indicates a need for the last 10,000 AFY, these three projects also represent a way to reach 130,000 AFY.



# 1 Introduction

The Platte River Recovery Implementation Program (PRRIP or Program) was established to improve and maintain associated habitats for threatened and endangered species in the central Platte River, including the whooping crane, piping plover, interior least tern, and pallid sturgeon. The Program set out to accomplish a combination of land, water, and science-related objectives during a 13-year First Increment (2007-2019). As stated in the Program Document<sup>1</sup> with regard to water:

The Program’s First Increment water objective is to provide water capable of reducing shortages to [U.S. Fish and Wildlife Service] target flows by an average of 130,000-150,000 acre-feet per year.

Three initial Program water projects—Tamarack I groundwater recharge in Colorado, the Pathfinder Modification Project<sup>2</sup> in Wyoming, and the Lake McConaughy Environmental Account (EA)<sup>3</sup> in Nebraska—were credited with providing an average of 80,000 acre-feet per year (AFY) towards the First Increment water objective. Milestone 4 in the Program’s Milestones Document<sup>4</sup> specifies the means by which the balance of the First Increment water objective is to be achieved:

The [2000] Reconnaissance-Level Water Action Plan,<sup>5</sup> as may be amended by the Governance Committee, will be implemented and capable of providing at least an average of 50,000 acre-feet per year of shortage reduction to target flows, or for other Program purposes, by no later than the end of the First Increment.

Relative to the overall First Increment water objective, the projects that make up the Water Action Plan (WAP) are to provide average annual shortage reductions of 50,000-70,000 AFY.

Additionally, the Milestones Document identifies seven steps that “are necessary to implement the Water Plan and are needed to successfully complete Milestone 4.” An October 2019 memo (**Appendix A**) provides a detailed status update on each of those steps at the end of the First Increment. Milestone Step 4.4 states:

Recognizing that the initial Reconnaissance-Level Water Action Plan...is based on reconnaissance-level project evaluations, the Governance Committee will complete

<sup>1</sup> Final Platte River Recovery Implementation Program, Section III.E.1.a. October 24, 2006.

<sup>2</sup> The Pathfinder Modification Project reclaimed 53,493 AF of storage capacity lost to sedimentation over a century of reservoir operations. Of that volume, 33,493 AF was allocated as the Pathfinder Environmental Account (EA), and the remaining 20,000 AF was dedicated as the Wyoming Account (aka Pathfinder Municipal Account). Pathfinder EA water is provided as part of Wyoming’s contribution to the Program, and the Municipal Account water is leased by the Program as a Water Action Plan project.

<sup>3</sup> The Lake McConaughy EA has a maximum storage capacity of 200,000 AF. Ten percent (10%) of Storable Natural Inflows (SNI) during the non-irrigation season (October-April) are credited to the EA, up to an annual limit of 100,000 AF. Additional water credited to the Lake McConaughy EA includes the water released from the Pathfinder EA and Municipal Account as well as the annual yields from several surface water-related Water Action Plan projects.

<sup>4</sup> Program Document, Attachment 2. December 7, 2005.

<sup>5</sup> Program Document, Attachment 5, Section 6. September 14, 2000.





feasibility studies on proposed project and develop a Water Action Plan, if necessary, by the end of Year 3 of the First Increment.

This step was satisfied by development of the 2009 WAP Update<sup>6</sup> which organized the water project concepts from the 2000 Reconnaissance-Level WAP into tiers in order “to identify a general sequencing of projects to help focus the WAP related efforts.” The 2009 WAP Update coincided with the initiation of pre-feasibility studies for Central Platte regulating reservoirs and Nebraska groundwater recharge. Project evaluations at this time began incorporating consideration of the potential to supplement short-duration high flow (SDHF) releases in addition to the capacity of a project to reduce target flow shortages. Milestone Step 4.5 states:

This Water Action Plan, as may be amended by the Governance Committee, will be capable of providing at least an average of 25,000 acre-feet per year of shortage reduction to target flows, or for other Program purposes, by the end of Year 8 of the First Increment.

This step was fulfilled as documented in the 2014 WAP Update,<sup>7</sup> which reported combined scores of three WAP projects<sup>8</sup> totaling 37,300 AFY of target flow shortage reduction. The 2014 WAP Update further designated WAP projects as active, future, or inactive based on “additional assessment subsequent to the 2009 WAP Update” and defined those terms as follows:

- Active projects were those “considered either currently implemented and operational or projects the Program has commenced funding for implementation.”
- Future projects were those “scheduled for feasibility studies in the latter years of the First Increment from 2015 through 2019.”
- Inactive projects were those that were “conceptually and/or financially evaluated for feasibility; however the Program decided not to pursue implementation of these projects during the First Increment.”

The J-2 Regulating Reservoirs Project (J-2 Project), which had been the primary focus of WAP-related funding and activity for several years, began to collapse in late 2015 due to cost and other factors, and within a year the Program’s Governance Committee (GC) placed the project on hold. This effectively nullified a shortage reduction credit (project score) that represented more than 60 percent of the total required under Milestone 4. The Program started to pursue a group of alternative water project concepts that were not part of any previous iteration of the WAP, but it was soon evident that it would not be possible to meet the requirements of Milestone 4 and the First Increment water objective by the end of 2019.

<sup>6</sup> 2009 Water Action Plan Update. Prepared by the Platte River Recovery Implementation Program Office of the Executive Director and the Water Advisory Committee. Final Approval. February 23, 2010.

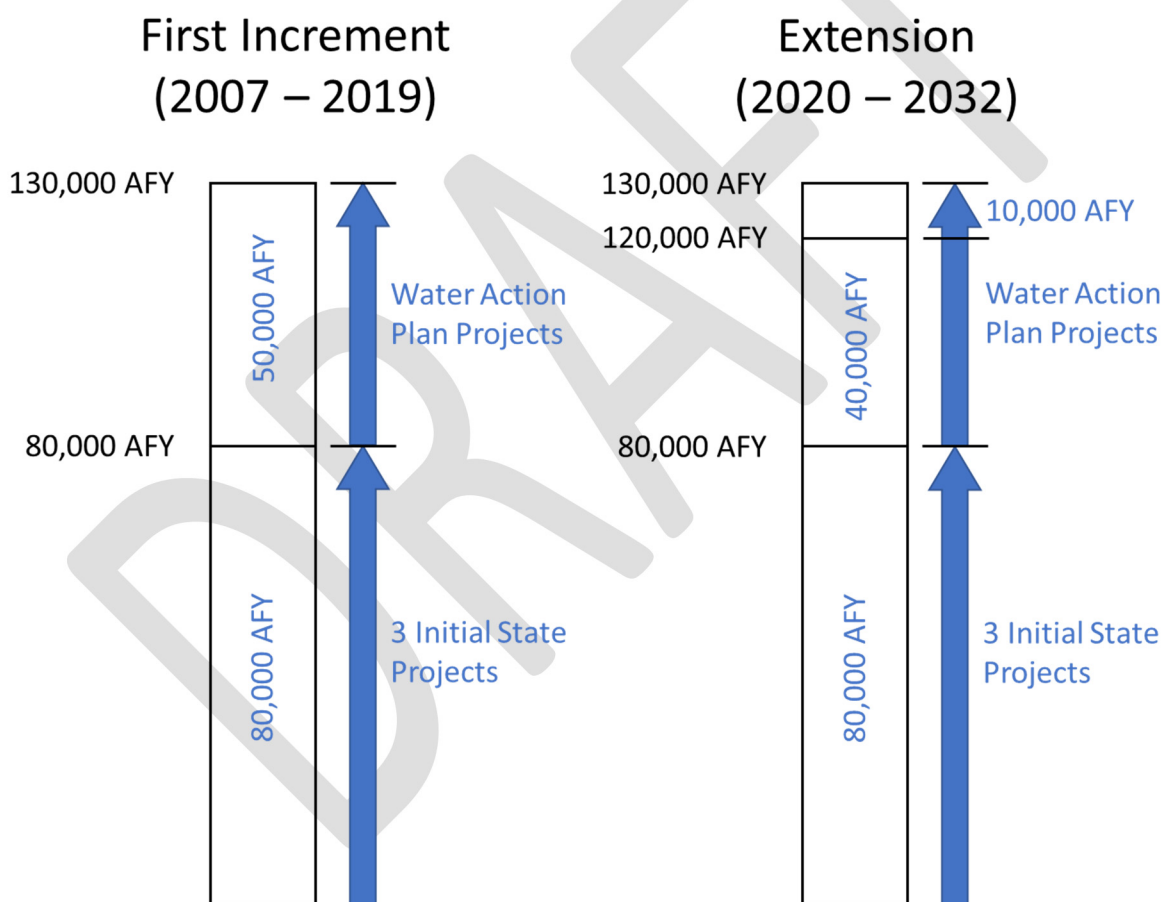
<sup>7</sup> 2014 Water Action Plan Project Update: Active, Future & Inactive WAP Projects. Prepared by Executive Director’s Office staff of Platte River Recovery Implementation Program. May 22, 2015.

<sup>8</sup> J-2 Regulating Reservoirs (30,600 AFY), Phelps County Canal groundwater recharge (2,700 AFY), and Pathfinder Municipal Account lease (4,000 AFY).



In response, GC approved a First Increment Extension Proposal in November 2016. This was followed by an Addendum to the Program Document<sup>9</sup> in June 2017, which explicitly stated that “the primary purpose of this [First Increment] Extension is to fulfill the Program’s obligations under the Water Action Plan.” The commitment to achieving a minimum shortage reduction of 130,000 AFY was maintained for the First Increment Extension,<sup>10</sup> but given the status of Program water projects at the time and in recognition of the Program’s financial constraints, the terms of that objective were qualified as stated below and illustrated in **Figure 1**:

The Program will invest the resources available to achieve at least 120,000 acre-feet in annual reductions to target flow shortages as quickly as possible during the [First Increment] Extension and will also invest in the science necessary to determine if the additional 10,000 acre-feet is justified.



**Figure 1. Comparative illustration of the First Increment and Extension approaches to the Program’s water objective.**

<sup>9</sup> Addendum to the Final Platte River Recovery Implementation Program – First Increment Extension. June 7, 2017.

<sup>10</sup> The First Increment Extension includes the 13-year period 2020-2032. In late 2019, the GC formally approved the First Increment Extension, the Addendum to the Program Document was signed by the Signatories (Colorado, Nebraska, Wyoming, and the Department of the Interior), and the U.S. Congress passed the required funding legislation.



This WAP Update Report presents the status of Program water projects at the end of the First Increment in late 2019, just before the transition into the First Increment Extension. Much has changed since the 2014 WAP Update: the major Program water project that dominated the years leading up to that report had to be abandoned;<sup>11</sup> several entirely new water project concepts were developed and pursued, with moderate success; and the Program's priorities under the WAP gradually shifted towards controllable water supplies, e.g., contributions to the Lake McConaughy EA, that will better facilitate water management activities during the First Increment Extension.

As discussed above, the 2009 and 2014 WAP Updates were tied to specific steps towards the completion of Milestone 4. With a few exceptions, both of those reports provided detailed updates on project descriptions, yield estimates, costs, and next steps for each of the individual WAP projects or project concepts. That is not the intent of this WAP Update Report, which instead aims to more broadly document the past, present, and future of the Program's WAP implementation efforts:

- **The Past:** Section 2 presents a timeline of the key points in the development of the WAP during the 13 years from the Program's beginnings in January 2007 to the approval of funding for the First Increment Extension in December 2019. This timeline chronologically documents critical decisions by the GC and the Water Advisory Committee (WAC) regarding Program water projects, the completion of major project studies, and the initiation of new project operations.
- **The Present:** Section 3 provides an update on the status of the Program's WAP projects at the end of the First Increment in late 2019. Approved and estimated scores for WAP projects are summarized, but this is mostly a qualitative assessment of projects as active, future, or inactive. The Program's current water portfolio is also viewed through the lens of controllable versus uncontrollable water supplies. Quantitative evaluations of the Program's active water projects are presented in separate documentation.<sup>12</sup> Section 4 discusses the lessons learned through 13 years of work on a range of WAP project pursuits, both successful and unsuccessful.
- **The Future:** Section 5 takes a closer look at the future WAP projects identified in Section 3 and lays out a plan for securing at least 120,000 AFY of target flow shortage reduction by the mid-2020s, if not earlier.

In sum, this WAP Update Report provides a comprehensive historical review of the Program's WAP-related activities during the First Increment and the outcomes of that work by the end of 2019 as well as a roadmap for those additional efforts still needed to achieve Milestone 4 and the First Increment water objective.

<sup>11</sup> Technically, the J-2 Project is still officially on hold, but there is no active work being done, and the project is not included in the mix of active and future WAP projects that are expected to reach the 120,000 AFY shortage reduction goal.

<sup>12</sup> As of this writing, the most recent quantitative analysis is the EDO's 2018 PRRIP Water Projects Accounting memo completed in August 2019. Water projects accounting for 2019 and 2020 is expected to be completed in 2021.



## 2 Water Action Plan Implementation Timeline

As explained in Section 1, Milestone 4 dictates that the projects comprising the Program’s WAP have the capacity to provide an average annual deficit reduction of at least 50,000 AF by the end of the First Increment. The evolution of the WAP during the years 2007-2019 can be divided into five distinct phases which were not planned in advance but were derived from a backward-looking perspective after all of the events and decisions described below took place. Breakpoints between phases are not meant to imply exclusive containment of certain project pursuits within specific years but instead provide a useful delineation of major proceedings for describing WAP history. **Figure 2** illustrates these five phases of WAP development activities.

<b>Phase I</b> Program began. Water Management Study. 2009 WAP update with tiered priorities.			<b>Phase II</b> Feasibility studies for reservoirs and groundwater recharge. Score analysis protocols. Pathfinder Modification Project.			<b>Phase III</b> Analysis and design of J-2 Project. New groundwater recharge and surface water leasing projects. 2014 WAP update.			<b>Phase IV</b> Pursuit of broad-scale recharge, slurry wall gravel pits, and acquire-and-retire to replace J-2 Project.		<b>Phase V</b> Construction of first broad-scale recharge. Focus shifts to controllable water supplies.	
2007		2009		2011		2013		2015		2017		2019
	2008		2010		2012		2014		2016		2018	

**Figure 2. Phases of Water Action Plan implementation during Program’s First Increment.**

- Phase I, 2007-2009:** The Program began on January 1, 2007. By mid-summer that year, a contractor was selected for the Program’s first major water-related study; the Water Management Study (WMS) was completed in two phases in 2008. The Program emerged from the WMS with a priority focus on WAP projects that could support Short Duration High Flow (SDHF) releases, specifically reservoir alternatives in the Central Platte area. In addition, the original 2000 Reconnaissance-Level WAP was updated in 2009, with the various water project options organized into three tiers for prioritization. By mid-2009, some level of preliminary study or information gathering was underway for all 10 Tier I and Tier II projects.
- Phase II, 2010-2012:** Following the WMS and the 2009 WAP Update, the 2010-2012 era was marked by a focus on pre-feasibility and feasibility-level studies for several reservoir storage and groundwater recharge projects. These included regulating reservoirs to be located within the Central Nebraska Public Power and Irrigation District (CNPPID) system, an Elm Creek regulating reservoir option, and Nebraska groundwater recharge and management. Reservoir options were winnowed down to a preferred alternative in the area of the J-2 Return. Groundwater recharge advanced to a pilot study at the Phelps County Canal. Protocols were developed for “score” analysis to quantify the potential for WAP projects to reduce deficits to target flows. Also during this phase, Wyoming constructed the Pathfinder Modification Project, creating the Pathfinder Environmental Account (EA) and the Wyoming Account (aka Municipal Account).



Independent of the Program, the Central Platte Natural Resources District (CPNRD) initiated its own groundwater recharge pilot project in 2011, using the Thirty Mile, Cozad, and Orchard-Alfalfa canals. Long after applications were originally filed in the late 1990s, Colorado’s water rights for the Tamarack groundwater recharge project were finally approved in 2012.

- **Phase III, 2013-2015:** With the potential to both supplement SDHF releases and meet as much as 60 percent of the score credit needed from the WAP, analysis and design of the J-2 Project dominated the years 2013-2015. The project advanced to a final design phase by mid-2015 when updated cost assessments suddenly pushed the project far beyond the limits of the Program’s budget constraints. Attempts were made to reconfigure the J-2 Project at a smaller scale, but to no avail, and the work was ultimately brought to a halt. Several other groundwater recharge and surface water leasing projects emerged during this phase, and by the end of 2015, the Program had recharge and/or leasing agreements with CPNRD, CNPPID, and the Nebraska Public Power District (NPPD).
- **Phase IV, 2016-2017:** While efforts to save the J-2 Project were still underway, the Program scrambled to develop new WAP project concepts that could supplement a smaller J-2 Project or replace it altogether. Ideas that were pursued during the years 2016-2017 included “broad-scale” groundwater recharge across large tracts of land, below grade reservoir storage in slurry wall gravel pits, and a plan to “acquire-and-retire” agricultural water supplies that would be converted to instream use for the benefit of the Program’s subject threatened and endangered species. The year 2017 saw the selection of contractors for engineering design of the Program’s first broad-scale recharge (BSR) project at the Cottonwood Ranch complex and the first slurry wall gravel pit project at an existing aggregate materials mine site known as Lakeside. At the same time, the Program sought to identify and purchase lands to build more of these projects in future years. A single irrigated parcel was purchased for the purpose of implementing an acquire-and-retire project, but the effort proved to be unsuccessful and the project concept was eventually abandoned. Despite these multifaceted efforts, it became evident that the timeline to develop alternatives to the J-2 Project was such that the First Increment Water Objective would not be achievable by the end of 2019. In response, plans were made for a First Increment Extension, with the expectation of meeting the water objective by the mid-2020s.
- **Phase V, 2018-2019:** Design of the BSR and slurry wall gravel pit projects continued to advance. Construction of the BSR project at the Program’s Cottonwood Ranch complex began in late 2018 and was completed a year later after extensive weather-related delays. Design of the Lakeside slurry wall gravel pit progressed to completion at the end of 2019. However, as the design evolved, construction costs kept escalating and the potential project score kept shrinking, prompting the Program’s GC to shelve the design and not proceed with construction. The experience with both of these infrastructure projects led the Program to back off on plans to pursue more of either BSR or slurry wall gravel pit projects. Instead, priorities shifted to focus on controllable water supplies that would

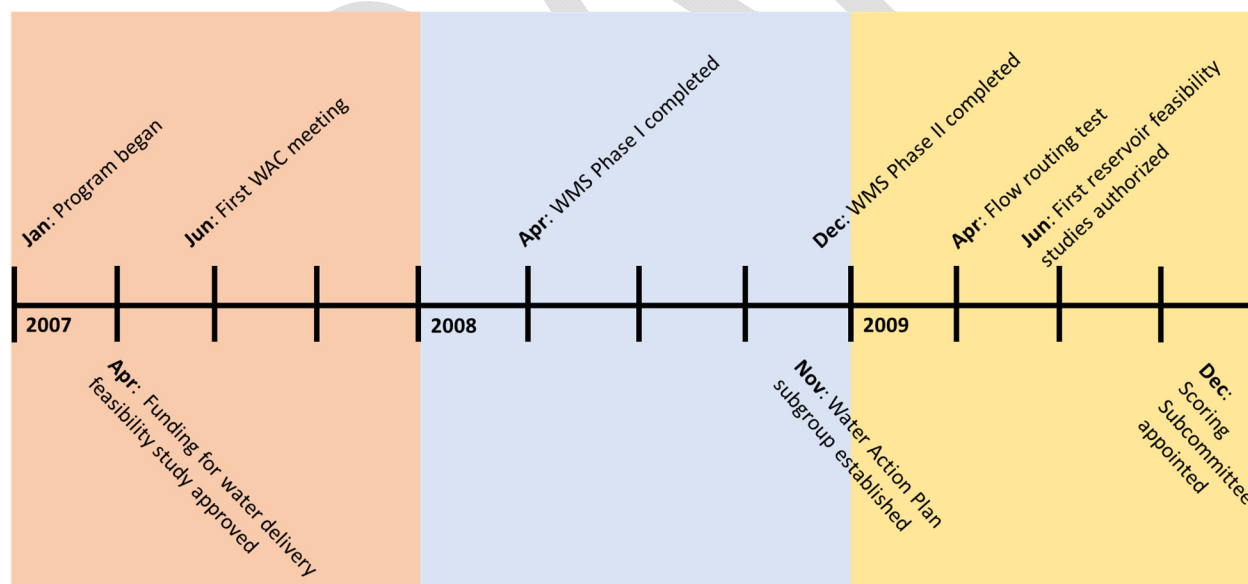




more effectively support Adaptive Management Plan activities anticipated during the First Increment Extension. This revised approach encompassed greater contributions to the Lake McConaughy EA and the development of recapture wellfields to improve the efficiency of existing groundwater recharge projects. After recognizing that direct returns to the Platte River during the irrigation season were providing limited deficit-reduction benefit to the Program, the former included re-envisioning the CPNRD (beginning 2018) and NPPD (beginning 2019) surface water leases as credits to the Lake McConaughy EA. The latter would take advantage of abundant volumes of water recharged during the First Increment that would otherwise slowly migrate to the river over decades.

At the end of 2019, the GC approved extending the First Increment through 2032, the agreement was signed by the governors of the three Platte River basin states and the Secretary of the Interior, and legislation funding the First Increment Extension was passed by Congress.

For the purposes of a thorough historical accounting of these experiences, the following pages provide a year-by-year timeline of WAP implementation during the Program’s First Increment. Major milestones and decision points for the Program’s water projects were identified through a comprehensive review of the minutes from every Water Advisory Committee (WAC) and GC meeting that occurred from 2007 through 2019. **Figure 3** highlights the events and decisions for the period 2007-2009.



**Figure 3. WAP implementation timeline, 2007-2009.**

## 2007

- **January 2007:** Platte River Recovery Implementation Program (PRRIP or Program) began.
- **April 2007:** GC approved funding for a water delivery feasibility study as specified in Section III.E.2.d.ii of the Program Document.



- **June 2007:** First WAC meeting.
- **August 2007:** WMS was underway. Objectives were to “examine routing alternatives for delivery of Program water via the River or via NPPD/CNPPID facilities and re-examine the Water Action Plan Alternatives for on-going viability and develop new concepts to meet Program water supply objectives.”

## 2008

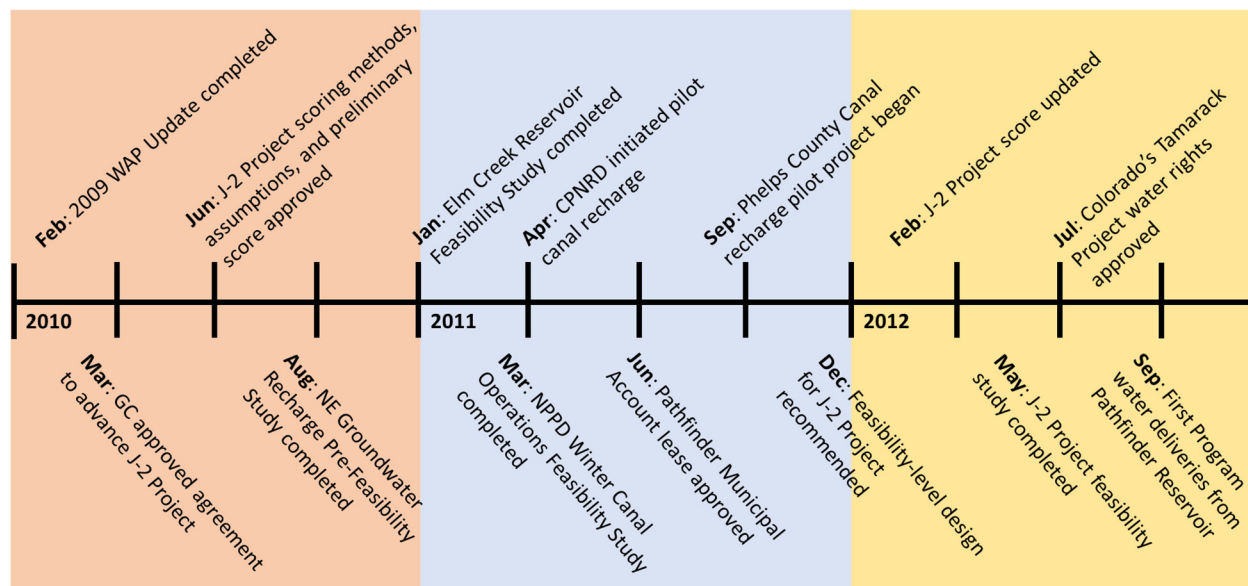
- **April 2008:** WMS Phase I completed.
- **May 2008:** WMS Phase II progress review and alternatives screening workshop held. “The direction from the discussion was to move forward with projects that are most suited to contribute to the goal of a pulse flow.”
- **July 2008:** WAC selected three downstream reservoir alternatives to supplement pulse flows: Elwood Reservoir, Plum Creek sites, and off-channel Central Platte Reregulating Reservoirs generally associated with CNPPID facilities that release directly to the river. These were to be carried forward for reconnaissance-level evaluation in WMS Phase II.
- **November 2008:** WAC established subgroup to “advance evaluation of Water Action Plan projects,” including reservoir feasibility studies. Focus was on getting a project in place to make a pulse release while moving forward on the WAP.
- **December 2008:** WMS Phase II completed.

## 2009

- **April 2009:** Program successfully conducted flow routing test. North Platte River at North Platte flow capacity at 6.0 ft minor flood stage estimated to be 1,700 cfs to 1,800 cfs. Around this time, Adaptive Management Working Group introduced the term “short duration high flows” (SDHF) to describe 2- to 5-day flow objectives.
- **May-November 2009:** Tiered priorities were defined for WAP projects identified in 2000 Reconnaissance-Level WAP. Tier I projects were those being actively advanced. Additional information was being collected to help advance the Tier II projects. Tier III projects were to be worked on in the future. Emphasis was on projects that could support SDHF. During this period, some level of project evaluation or information update process was underway for all 10 Tier I and Tier II WAP projects.
- **June 2009:** GC approved proceeding with Phase I studies for CNPPID Reregulating Reservoirs (Elwood and J-2 Return), to include conceptual alternatives and prefeasibility analysis.
- **November-December 2009:** CNPPID Reregulating Reservoirs pre-feasibility study was proceeding with aggressive schedule. New reservoir in the J-2 Return area emerged as favored alternative, with little or no contribution from Elwood Reservoir, and the WAC recommended advancement to a Phase II full feasibility study.
- **December 2009:** GC appointed a Scoring Subcommittee to investigate unresolved issues related to target flows and how they would be used in scoring Program water projects.



**Figure 4** illustrates the WAP timeline for the years 2010-2012.



**Figure 4. WAP implementation timeline, 2010-2012.**

## 2010

- **February 2010:** 2009 WAP Update completed and approved by WAC. CNPPID Reregulating Reservoir Phase I (Pre-feasibility) final report completed and approved by WAC.
- **March 2010:** GC approved an agreement between the Program and CNPPID to advance the J-2 Regulating Reservoirs Project (J-2 Project), with possible contributions from Elwood Reservoir, through full feasibility.
- **May 2010:** Following the completion of a pre-feasibility study for an Elm Creek Regulating Reservoir project led by CPNRD, potential Program benefits were being evaluated.
- **May-June 2010:** Scoring Subcommittee presented an initial score analysis case study based on the J-2 Project. GC approved the methods and assumptions used along with a preliminary score for the project.
- **August 2010:** Nebraska Groundwater Recharge Pre-Feasibility Study completed. The original project concept involving Gothenburg and Dawson County Canals was expanded to include other sites; Phelps County Canal (to Mile Post 9.7) and Gothenburg Canal (area south of golf course) were recommended for further feasibility-level analysis. Construction of the Pathfinder Modification Project began.
- **December 2010:** Work begins on the Nebraska Groundwater Recharge Feasibility Study, with a focus on Phelps County Canal.

## 2011

- **January 2011:** Elm Creek Regulatory Reservoir Feasibility Study completed.



- **March 2011:** NPPD Canal Winter Operations Feasibility Study completed, assessing viability of recharge operations for the benefit of the Program.
- **April-May 2011:** CPNRD initiated diversions of excess flows<sup>13</sup> for groundwater recharge operations using the Thirty Mile, Cozad, and Orchard-Alfalfa canals.
- **June 2011:** GC approved lease agreement for an average of 4,800 AFY from the Pathfinder Municipal Account for the remainder of the First Increment (38,400 AF total volume for 2012-2019). Program decided to not move forward with participation in the Elm Creek Regulating Reservoir project due to water supply issues, landowner impacts, lower yields compared to the J-2 Project, and other factors.
- **September 2011:** Excess flow diversions to supply the Phelps County Canal groundwater recharge pilot project to the check location at Mile Post 9.7 began at the end of the month and continued until early January 2012. GC passed motion declaring the J-2 Project to be the best alternative and most feasible water supply available to the Program.
- **December 2011:** CNPPID Reregulating Reservoir Workgroup recommended to the GC a feasibility-level design for J-2 Project with a combined capacity of 13,959 AF in two reservoir cells, filled through the Phelps County Canal with an increased capacity of 1,675 cfs. This reservoir would be used by the Program for both target flow operations and SDHF releases, as well as to provide flow regulation and hydrocycling mitigation for CNPPID. Construction of the Pathfinder Modification Project completed.

## 2012

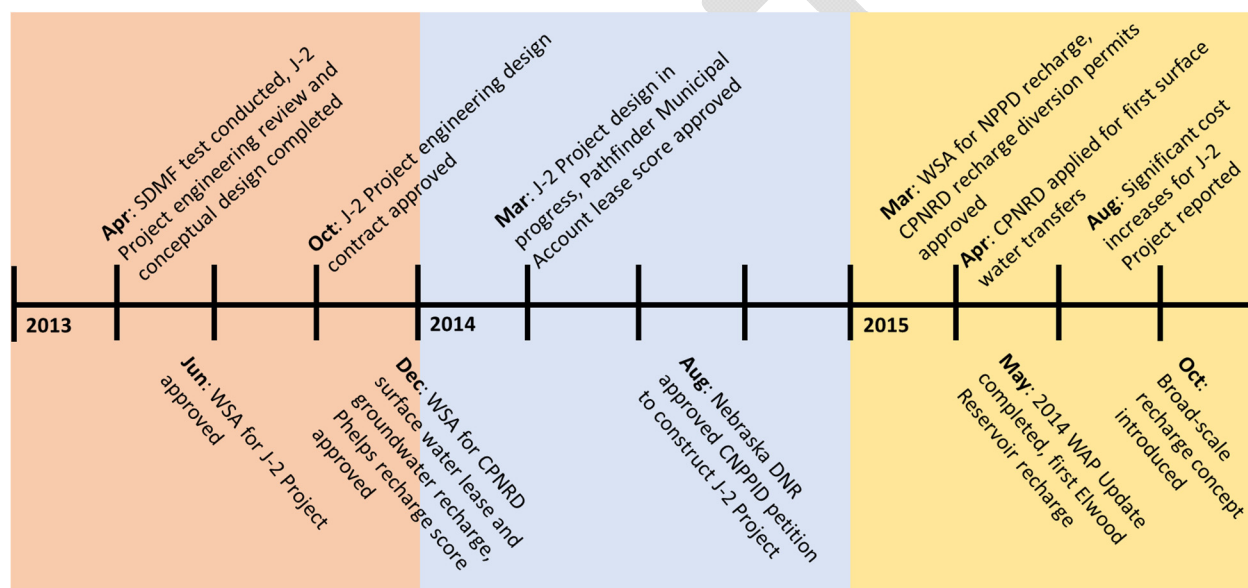
- **February 2012:** Updated score analysis for the J-2 Project was completed using the methodology approved by the GC in June 2010 with the recommended design parameters and revised operations assumptions. A total project score of 40,800 AFY was recommended, with 75% (30,600 AFY) credited to the Program and the balance to Nebraska Department of Natural Resources (DNR).
- **May 2012:** Final report of the CNPPID J-2 Reregulating Reservoir Feasibility Study completed.
- **June 2012:** GC appointed a new Scoring Subcommittee to address groundwater recharge and water leasing scoring questions.
- **July 2012:** Pilot-Scale Recharge Report for the Nebraska Groundwater Recharge Feasibility Study completed. Colorado water rights for the Tamarack Project were decreed, concluding a process that began in 1996.
- **August 2012:** CPRND offer to lease surface water and accretions from groundwater recharge to the Program first presented to the WAC. CPNRD already initiated necessary rehabilitation and construction work on the Thirty Mile, Cozad, and Orchard-Alfalfa canals.

<sup>13</sup> Streamflows in excess of targets are determined based on the river conditions at Grand Island, NE and USFWS target flows as dictated by the real-time hydrologic condition. Grand Island is at the lower end of the Program's associated habitat reach and is also downstream of diversions that may impact water availability for Program projects. Excess flows are theoretically the same as free river water in that the availability of excesses is dependent on the needs of all other (senior) water users including instream water for fish and wildlife purposes having been met already, but in recent years Nebraska DNR has taken steps to more closely regulate the allocation of excess flows to better ensure equitable distribution among multiple recharge projects for the Program and other entities.



- **September 2012:** First water delivered from Pathfinder EA and Pathfinder Municipal Account
- **December 2012:** Phelps County Canal groundwater recharge resumed and continued into March 2013, with operations extended to the check location at Mile Post 13.3. Water from the Lake McConaughy EA was used for recharge during the 2012-2013 season due to dry conditions and a lack of available excess flows. The project continued to operate for the next several years under a succession of one-year Water Service Agreements (WSA) between the Program and CNPPID and temporary annual excess flow diversion permits issued by Nebraska DNR.

The timeline for WAP development during the years 2013-2015 is shown in **Figure 5**.



**Figure 5. WAP implementation timeline, 2013-2015.**

### 2013

- **February 2013:** Program and NPPD initiated discussions of surface water leasing opportunities.
- **April 2013:** Engineering review, conceptual design, and updated cost assessment for the J-2 Project completed. Short Duration Medium Flow (SDMF) test was conducted.
- **June 2013:** GC approved WSA between the Program, CNPPID, and Nebraska DNR for the two-cell J-2 Project.
- **September-October 2013:** Excess flows resulting from Colorado flood event were diverted into several Nebraska canals and Funk Lagoon to decrease peak flows and recharge groundwater.
- **October 2013:** CNPPID board approved engineering design contract for J-2 Project.
- **December 2013:** GC approved recommended score of 1,800 AFY for the Phelps County Canal groundwater recharge project, based on a 50% project share for the Program. GC approved Water Use Lease Agreement with CPNRD for up to 20,500 AF at the river each





year from a combination of transferred surface water and accretions from groundwater recharge of excess flows in the Thirty Mile, Cozad, and Orchard-Alfalfa canals. Program made initial purchase of recharge accretions from CPNRD. After working on cost issues since 2009, GC declined to accept high-dollar lump sum offer from CNPPID to purchase Net Controllable Conserved Water (NCCW).

#### 2014

- **February 2014:** Project concept to lease water from CNPPID irrigators first presented to WAC.
- **March 2014:** By this time, engineering design, permitting, land acquisition, and other elements of the J-2 Project were already or soon to be in progress. GC approved a score of 4,000 AFY for the Pathfinder Municipal Account Lease project.
- **May 2014:** A potential lease agreement for CNPPID storage water in Lake McConaughy was proposed as an alternative to the NCCW offers declined in 2013.
- **August 2014:** Elwood Reservoir groundwater recharge was introduced as a potential WAP project. Preliminary analysis of groundwater pumping (recharge recapture) under the Phelps County Canal was presented as a WAP project concept that is cost effective and can be implemented quickly compared to other projects. Nebraska DNR approved CNPPID petition to construct the J-2 Project as new return flow points for existing appropriations.
- **October 2014:** CPNRD reported that construction and rehabilitation of the three canal systems used for groundwater recharge and surface water leasing was complete.
- **November 2014:** Public hearings on land acquisitions for the J-2 Project site were held.

#### 2015

- **February 2015:** Design and permitting activities for the J-2 Project continued to progress.
- **March 2015:** GC approved WSA with NPPD for groundwater recharge in the Gothenburg and Dawson County canals. Nebraska DNR approved permanent permit applications (filed in 2012) to divert excess flows for groundwater recharge in the Thirty Mile, Cozad, and Orchard-Alfalfa Canals. All other groundwater recharge projects operated for the benefit of the Program continued to require temporary annual excess flow diversion permits.
- **April-June 2015:** CPNRD submitted permit applications for temporary surface water transfers from the Thirty Mile, Cozad, and Orchard-Alfalfa canals. By the end of the irrigation season, the pilot project returned a net volume of about 14,000 AF to the river for the Program. The project continued to operate in this manner through the 2017 irrigation season.
- **May 2015:** The 2014 WAP Update was completed, providing comprehensive updates on the status of all WAP projects. A pilot project to pump groundwater recharged in the Phelps County Canal directly to the river was being developed for the Cook property owned by the Program. With significant excess flows available, the Program and CNPPID entered into a WSA and began groundwater recharge at Elwood Reservoir as a pilot project. After operating intermittently during construction and rehabilitation (2012-



2014), excess flow diversions for groundwater recharge resumed at all three CPNRD canals.

- **June 2015:** GC formally approved proceeding with the recapture well pilot project.
- **August 2015:** New analysis indicated significant cost increases for the J-2 Project.
- **September 2015:** GC approved agreement for a one-year pilot project to lease water from CNPPID irrigators. GC authorized investigation of ways to continue the J-2 Project within existing budget constraints. First excess flow diversions for Program groundwater recharge at Gothenburg and Dawson County canals.
- **October 2015:** Alternatives for a reconfigured J-2 Project were being developed by the design consultant. Broad-scale recharge was introduced as an option to supplement a reduced-capacity J-2 Project. This project concept would involve groundwater recharge on large land areas and could be scaled up on an incremental basis. A feasibility study concluded that Funk Lagoon is not good for either water storage or groundwater recharge. WAC recommended against further pursuit of Funk Lagoon as a WAP project.
- **November 2015:** GC expressed concern about meeting the First Increment Water Objective and suggests that an extension may need to be considered.
- **December 2015:** GC authorized renegotiation of WSA for the J-2 Project, to be reconfigured as a single cell of the maximum size possible within existing budget constraints. GC approved new temporary WSA with CNPPID that increased the Program share of the Phelps County Canal groundwater recharge project from 50% to 75% and another that continued the Elwood Reservoir recharge project with a 50% Program share. Tri-Basin NRD approved permit for well on Cook property to pump recharged groundwater.

Figure 6 shows major WAP activities during 2016-2017.

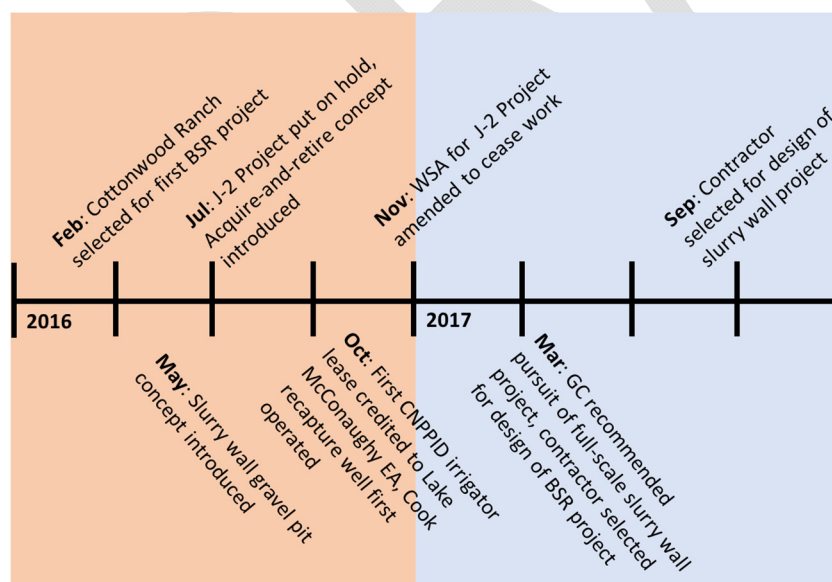


Figure 6. WAP implementation timeline, 2016-2017.

2016

- **February 2016:** By this time, the Program was focused on Cottonwood Ranch for an initial broad-scale recharge project. A conceptual design and plans for a feasibility study were already in progress.
- **March 2016:** GC approved score of 260 AFY for the No-Cost NCCW as a stand-alone WAP project based on conservation improvements in the CNPPID system that were funded by the U.S. Bureau of Reclamation, resulting in 314 AF credited to the Lake McConaughy EA each year at no cost to the Program.
- **May 2016:** The slurry wall gravel pit concept was first introduced to the WAC as a potential WAP project for retiming excess flows.
- **July 2016:** Program Water Plan A and Plan B were presented to the GC to demonstrate how the First Increment Water Objective could be achieved with and without the J-2 Regulating Reservoirs Project. The “acquire and retire” WAP project concept was introduced as part of Water Plan B. GC put the J-2 Project on hold and approved moving forward with work on potential broad-scale recharge, slurry wall gravel pit, and acquire and retire projects. GC approved purchase of first property intended to be developed as an acquire and retire project, a small parcel under the Alliance Canal near Bayard, Nebraska.
- **September 2016:** Consistent with the then-most recent WSA, GC approved proportional increase to Phelps County Canal groundwater recharge project score from 1,800 AFY (50%) to 2,700 AFY (75%). GC approved score of 160 AFY for Cook recapture well.
- **October 2016:** CNPPID irrigator lease pilot project resulted in 778 AF credited to the Lake McConaughy EA based on initial enrollment of 1,037 acres and a yield of 9 inches per acre. The project continued to operate on an annual pilot basis for the 2017 and 2018 irrigation seasons, with increasing enrollment each year.
- **October-November 2016:** Cook recapture well first operated to reduce shortages to target flows.
- **November 2016:** GC amended WSA with CNPPID and Nebraska DNR for the J-2 Project to cease future work on the project after completion of specific tasks already in progress. With the project officially on hold, the approved score of 30,600 AFY was effectively nullified. GC approved First Increment Extension Proposal.

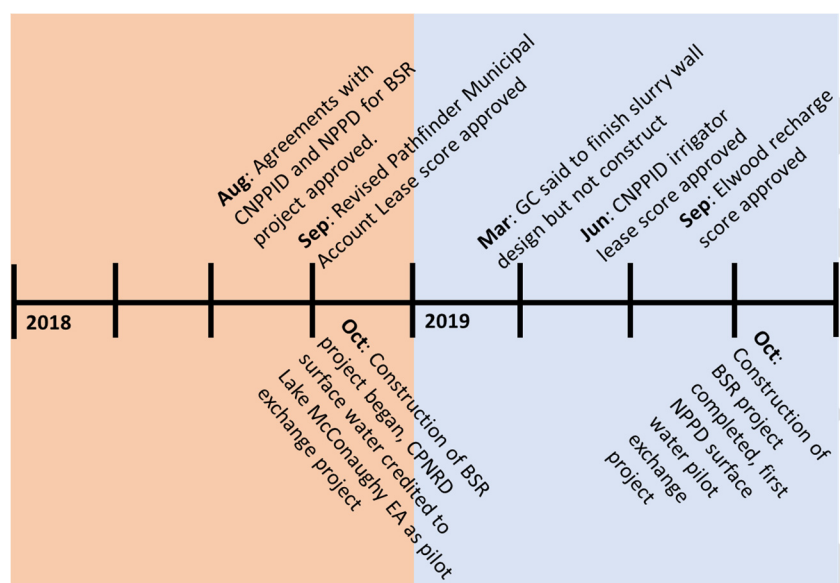
2017

- **February 2017:** The Program’s Executive Director’s Office (EDO) presented a road map for completing WAP projects with a cumulative score greater than 40,000 AF by the mid-2020s. This plan was heavily dependent on broad-scale recharge, slurry wall gravel pits, acquire and retire, and recapture wells to replace the J-2 Project.
- **March 2017:** GC recommended pursuit of a full-scale initial slurry wall project at an existing gravel pit site and authorized land acquisition related to the project. Contractor was selected for engineering design and construction administration of a broad-scale recharge project at Cottonwood Ranch. Initial efforts were underway to begin quantifying water use at the Alliance Canal acquire and retire property. The plan was to continue irrigation for several years and collect data needed to quantify consumptive use.



- **September 2017:** Contractor was selected for engineering design and construction administration of the initial slurry wall gravel pit project, to be located at the Lakeside Pit near the Elm Creek interchange.

Major WAP events and decisions during the years 2018-2019 are shown in **Figure 7**.



**Figure 7. WAP implementation timeline, 2018-2019.**

## 2018

- **August 2018:** GC approved WSA with CNPPID for delivery of water to the broad-scale recharge project via a pipeline to be constructed from Phelps County Canal to Cottonwood Ranch. GC approved Cottonwood Ranch land use agreement between Program and NPPD. GC concurred that final design of the Lakeside slurry wall gravel pit project can proceed. CPNRD announced a proposed reconfiguration of the surface water lease as a “pilot exchange project” to keep that water in storage—rather than direct returns from the canals to the river—for credit to the Lake McConaughy EA.
- **September 2018:** GC approved revised score of 6,350 AFY for the Pathfinder Municipal Account Lease to better reflect actual project deliveries during the First Increment. GC approved agreement extending the CNPPID irrigator lease for 5 years (through the 2023 growing season) with an annual enrollment cap of 3,000 acres.
- **October 2018:** Construction of the Cottonwood Ranch broad-scale recharge project began. The CPNRD surface water pilot exchange project resulted in a credit of 14,251 AF to the Lake McConaughy EA, and the project continued with similar terms in 2019.
- **November 2018:** After attempts to purchase adjacent irrigated lands were unsuccessful, GC approved sale of the Program’s Alliance Canal property, effectively ending acquire and retire as an active WAP project pursuit.



## 2019

- **March 2019:** GC approved contract extending Pathfinder Municipal Account lease through 2032. GC gave direction to finalize the Lakeside slurry wall gravel pit design and bring the project to a bid-ready status, but construction was not to proceed.
- **June 2019:** GC approved score of 1,900 AFY for the CNPPID irrigator lease project. GC approved agreement for NPPD surface water lease, to be operated as a pilot exchange project consistent with the CPNRD surface water lease. GC approved WSA extending the Elwood Reservoir groundwater recharge project through 2023.
- **August 2019:** EDO completed first comprehensive accounting of Program water project operations during the First Increment through 2018. Preliminary WAP project concept for an extensive wellfield to recapture groundwater from the Phelps County Canal, Elwood Reservoir, and Cottonwood Ranch recharge projects was introduced to the WAC.
- **September 2019:** GC approved score of 2,800 AFY for the Elwood Reservoir groundwater recharge project. GC approved WSAs extending three groundwater recharge projects: Phelps County Canal (through 2023), CPNRD (through 2024), and NPPD (through 2025).
- **October 2019:** Construction of the Cottonwood Ranch broad-scale recharge project completed. The NPPD surface water pilot exchange project resulted in 3,121 AF credited to the Lake McConaughy EA.
- **November 2019:** GC approved motion to extend the First Increment through 2032.
- **December 2019:** Congress passes legislation funding the First Increment Extension through 2032.

Although there is still work to be done, the Program made significant strides towards achievement of Milestone 4 and the First Increment Water Objective during the 13 years from 2007-2019. Numerous water project concepts were evaluated, and many that were determined to be feasible within the Program's temporal and budgetary constraints were advanced to full-scale development and operation. Other project pursuits holding great promise for the Program collapsed in an untimely matter. Rather than giving up on meeting water-related goals, though, the Program adapted and responded by conceiving and pursuing new strategies, many of which remain in progress.

### 3 Status of Program Water Projects

The EDO routinely updates the WAC and GC on the status of active WAP projects and those that are in the development process. In the last couple years of the First Increment, a quarterly Water Objective Summary was prepared and presented to the GC to provide regular updates on progress towards completion of the Program's target flow shortage reduction goals. Examples of the Water Objective Summary from September and December 2019 are included in **Appendix B**.

The tier structure introduced in the 2009 WAP Update to help prioritize the Program's 13 WAP project pursuits was highly effective at establishing a path forward early in the First Increment but became less so over time as more projects were found to be infeasible or limited by other constraints. Another layer of organization was added in the 2014 WAP Update, as projects were





also designated as having active, future, or inactive status. Unlike the tiered priorities, these status descriptors continued to be useful at the end of the First Increment and were retained for this WAP Update Report. Future status now applies to WAP project pursuits that are to occur during the First Increment Extension in 2020 and beyond.

### 3.1 Active WAP Projects

As the First Increment drew to a close, there were 11 individual active WAP projects, representing only four of the 13 tiered WAP projects evaluated in the 2009 WAP Update. Of the seven projects that were assigned Tier I priority in 2009, only two remained fully active by 2019, along with a very small portion of a third:

- Nebraska groundwater recharge
- Pathfinder Municipal Account lease
- Net Controllable Conserved Water (NCCW) – No Cost<sup>14</sup>

There were three projects designated as Tier II in 2009, and Nebraska water leasing was the only one of those projects still active in late 2019.

#### 3.1.1 Changes to WAP Project Concepts

Some of the WAP project concepts evolved or expanded significantly from the original conception in the 2000 Reconnaissance-Level WAP or one of the later updates in 2009 and 2014. The following sections provide examples of both types of project changes.

##### 3.1.1.1 Nebraska groundwater recharge

Nebraska groundwater recharge is an example of a project concept expanding, having started with the idea of using only the Gothenburg and Dawson County canals owned and operated by NPPD for recharge via surface water diversions and canal seepage during the non-irrigation season. At the time of the 2009 WAP Update, the Nebraska groundwater recharge pre-feasibility study was underway; the project concept was expanded to include Phelps County Canal recharge, which progressed to a pilot study in 2011 and full-scale operations in 2012. The pre-feasibility study also started to incorporate elements of the Nebraska groundwater management project such as recapture wells, which the 2009 WAP Update described as allowing for “active pumping of recharged water for release to the Platte River during times of shortages to target flows.”

<sup>14</sup> The NCCW is a pool of water in Lake McConaughy that was made available by the implementation of irrigation efficiency improvements and other water-saving measures in the CNPPID system during the 1990s, which resulted in a net savings compared to historical water use. A small portion (314 AFY) of the NCCW is available at no cost to the Program because of conservation measures that were paid for by the U.S. Bureau of Reclamation. The much larger portion (10,586 AFY) of NCCW that was available for purchase by the Program has been inactive since the GC declined the offers to purchase from CNPPID in December 2013. The distinction of NCCW (No Cost) and NCCW (Purchased) as separate WAP projects was not introduced until the 2014 WAP Update, after the purchase offers were declined.



By the time of the 2014 WAP Update, recharge was also active at the CPNRD canals (Thirty Mile, Cozad, and Orchard-Alfalfa). The potential to use CNPPID's Elwood Reservoir for recharge was being considered and came to fruition during high flows in May 2015. Recharge first occurred at the Gothenburg and Dawson County canals in September 2015, representing fulfillment of the original Nebraska groundwater recharge project concept.

The installation of the Program's first recapture well and the development of broad-scale recharge came in the years after the 2014 WAP Update. Broad-scale recharge was a new project concept that emerged during 2015-2016 as an alternative to the J-2 Project. Most of the active recharge projects were designed to take advantage of seepage from existing, earth-lined irrigation facilities (i.e., canals and reservoirs), but the broad-scale recharge project implemented at the Program's Cottonwood Ranch property involved all new construction.<sup>15</sup> Specifically, a series of low berms (< 6 ft) was built to temporarily retain water in shallow ponds in eight interconnected cells spread broadly across an area of more than 400 acres. When filled during the spring and fall migrations, the broad-scale recharge project will also provide ancillary benefit as crane habitat.

#### 3.1.1.2 Nebraska water leasing

Nebraska water leasing demonstrates the evolution of a WAP project, in terms of both the source of water and the nature of project operations. The project was described in the 2000 Reconnaissance-Level WAP as follows:

The project evaluated assumes that leased water rights are dependent on storage rights in Lake McConaughy. In general, water will be leased from an irrigation district or farmer with storage rights in Lake McConaughy. The reduction in consumptive use will likely be added to the EA when storage space is available and released during times of shortage at the critical habitat...Although it may be feasible to lease natural flow water rights, it will be more difficult to [e]nsure protection.

Prioritized as a Tier II project in the 2009 WAP Update, the report presented very little new information about Nebraska water leasing, but it was "anticipated that this project may be initiated in 2012 and completed by the end of 2016."

In 2012, the offer for the Program to lease surface water from the CPNRD canals was first presented, and CPNRD began canal rehabilitation work to facilitate the operations of such a project. The preceding years saw major changes in irrigation practices, as there was a widespread shift from surface water to groundwater sources following the early 2000s drought, and the consumptive use portion of the now-unused surface water became the supply available for leasing by the Program. The CPNRD canals had water portfolios including both natural flow

<sup>15</sup> Construction of the Cottonwood Ranch broad-scale recharge project was completed in October 2019. Initial fill operations were planned for summer 2020, after the establishment of vegetation on the berms. Water is delivered to Cottonwood Ranch through a pipeline from the Phelps County Canal.



and storage water,<sup>16</sup> but in a deviation from the original project concept, it was determined that only the natural flow water could be leased. In December 2013, the Program and CPNRD signed a Water Use Lease Agreement for up to 20,500 AFY from the combination of transferred surface water and accretions from groundwater recharge. The agreement stated that water may be provided to the Program specifically from the “natural flow associated with transferred surface water” and confirmed that “lands previously irrigated by these now transferred surface water rights will instead be irrigated by ground water pumped from existing wells.”

For the first three years of CPNRD surface water lease operations (2015-2017), natural flow water was diverted at the canal headgates during the irrigation season, and measured amounts of consumptive use water were returned directly to the Platte River through newly constructed turnouts on the downstream sides of the headgates. After accounting for depletions from groundwater pumping for irrigation, the net accretions to the river were less than the gross river returns. Even though the real-time hydrologic condition during these years was almost always “normal” or “wet,” the leased surface water was continuously returned to the river regardless of whether there were target flow shortages or excesses at Grand Island.<sup>17</sup> This meant that the net volume of surface water accretions purchased by the Program (ranging from 13,759 AF to 15,777 AF) was typically much larger than the volume that could be credited with reducing target flow shortages.

In 2018-2019, after recognizing that the project as implemented was an inefficient way to meet Program goals, the CPNRD worked with Nebraska DNR and CNPPID to reconfigure the operations so that the leased surface water was credited to the Lake McConaughy EA in October instead of being returned directly to the river during the irrigation season. This was accomplished by not delivering irrigation water that would otherwise be released for diversion by the CPNRD canals downstream. The change in approach brought the Nebraska water leasing project in a full circle back to the original concept of adding leased irrigation water to the Lake McConaughy EA. Volumes credited in both years exceeded 14,000 AF.

As far back as 2013, the Program and NPPD sought to develop a similar project based on leasing surface water from lands historically served by the Gothenburg and Dawson County canals that had switched to groundwater irrigation. Following the successful implementation of the CPNRD pilot exchange project, an NPPD surface water lease was finally carried out in the same manner in 2019, resulting in a credit of 3,121 AF to the Lake McConaughy EA in October of that year.

Also consistent with the original project concept of leasing from farmers, the Program and CNPPID implemented an irrigator lease starting with the 2016 growing season. Individual

<sup>16</sup> The irrigation districts that operate the CPNRD canals have contracts with NPPD for storage water for irrigation. Under the terms of the 1954 Water Storage Contract between NPPD and CNPPID, that water is stored in Lake McConaughy.

<sup>17</sup> Based on analysis of available data, CPNRD recorded 67 days during the 2015 irrigation season on which at least one of the three canals was making river returns of transferred surface water. There were real-time target flow shortages at Grand Island on only 14 of those days (21%). CPNRD spreadsheets from 2016 show 71 days with surface water returns, and 23 of those days (32%) had shortages. Of the gross water volumes returned to the river from the CPNRD canals before adjusting for groundwater pumping depletions, approximately 17% (2015) and 39% (2016) occurred on those days with shortages at Grand Island. The EDO does not have this data for 2017.



irrigators in the CNPPID system enroll specific parcels of land that will not be irrigated, and a portion of the saved water is credited to the Lake McConaughy EA in October each year. Enrollment in the irrigator lease grew each year from 1,037 acres (778 AF)<sup>18</sup> the first year to 2,934 acres (2,201 AF) in 2019. Potential new permutations of Nebraska water leasing are discussed in Section 5.

### 3.1.2 Score Summary for Active WAP Projects

**Table 1** provides a status summary of all active WAP projects as of late 2019. A larger version of this table with additional annotations is included in an October 2019 memo in **Appendix C**.

**Table 1. Summary of Active WAP Projects.**

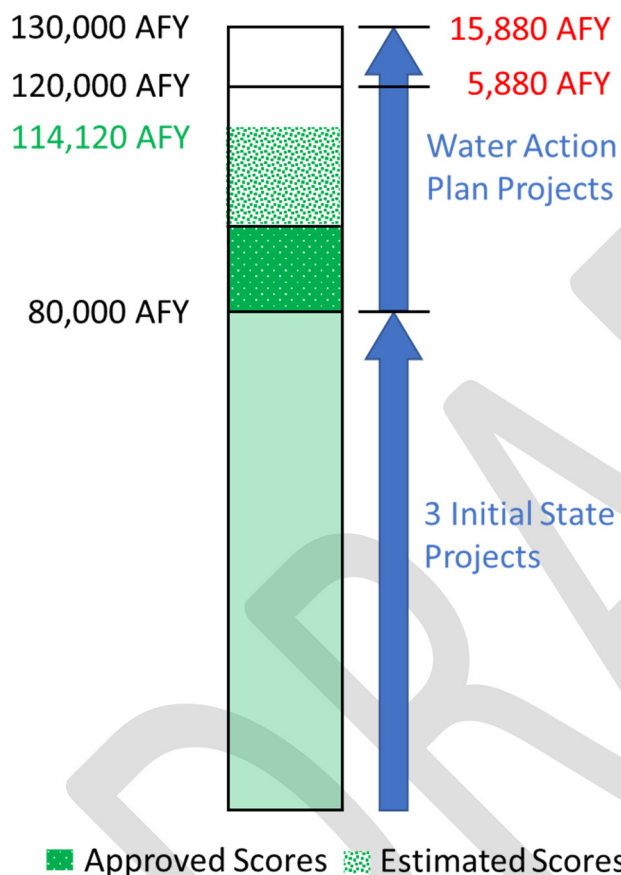
Project	Year of First Operations	Score [AFY]	Score Status	Notes
Nebraska Groundwater Recharge <sup>1</sup>				
Phelps County Canal	2011	2,700	Approved	WSA through 2023
Cook Recapture Well	2016	160	Approved	Well permit approved 2015
Elwood Reservoir	2015	2,800	Approved	WSA through 2023
CPNRD Canals	2013	600	Estimated	WSA through 2024
NPPD Canals	2015	1,800	Estimated	WSA through 2025
Broad-Scale Recharge	2020	4,000	Estimated	WSA through 2032
Nebraska Water Leasing (Surface Water)				
CNPPID Irrigators	2016	1,900	Approved	Lease agreement through 2023
CPNRD Canals	2015	10,800	Estimated	Pilot exchange 2018-2019
NPPD Canals	2019	2,750	Estimated	Pilot exchange 2019
Other WAP Projects				
NCCW (No Cost)	2007	260	Approved	314 AF annual credit to Lake McConaughy EA
Pathfinder Municipal Account Lease	2012	6,350	Approved	Lease contract through 2032
Active Projects (6) Approved Score =		14,170 AFY		
Active Projects (5) Estimated Score =		19,950 AFY		
Active Projects (11) Total Score =		34,120 AFY		

<sup>1</sup> Nebraska DNR approved individual excess flow diversion permits (A-18922, A-18923, and A-18924) for the three CPNRD canals (Cozad, Orchard-Alfalfa, and Thirty Mile, respectively) to recharge groundwater in March 2015. Recharge at Phelps, Elwood, and Cottonwood Ranch is administered under a single temporary annual permit, the most recent (A-19735) approved November 30, 2020. Current temporary annual permits for NPPD recharge operations at the Dawson County (A-19682) and Gothenburg (A-19683) canals were approved February 14, 2020.

<sup>18</sup> CNPPID irrigator lease volumes credited to the Lake McConaughy EA are based on 0.75 AF per enrolled acre.



Most of the active WAP projects began operations between 2011 and 2019.<sup>19</sup> Six of the active projects have approved scores, and the EDO developed score estimates for the other five projects based on actual or anticipated operations. **Figure 8** illustrates the overall progress toward the First Increment water objective as modified for the First Increment Extension, with the approved and estimated active WAP project scores (34,120 AFY) combined with the score credit from the Program’s three initial projects (80,000 AFY).



**Figure 8. Illustration of First Increment water objective progress through 2019.**

The overall total score of the Program’s active water projects is estimated to be 114,120 AFY of target flow shortage reduction. Just under 6,000 AFY is still needed to reach 120,000 AFY; after reaching that level, the Program will undertake the scientific experiments and analysis as dictated in the Addendum to the Program Document to determine if the cost of the next 10,000 AFY (to reach 130,000 AFY) is justified.<sup>20</sup>

<sup>19</sup> The No-Cost NCCW project is shown to start in 2007 since that is when the Program formally began; however, the Lake McConaughy EA was created earlier, and records show 314 AF credits in most years starting in October 2001. In a few years, the No-Cost NCCW was not credited due to account resets or accidental oversight. Construction of the broad-scale recharge project at Cottonwood Ranch was completed in 2019 and initial operations were expected to follow in 2020.

<sup>20</sup> When the terms of the First Increment Extension were agreed upon in 2017, it was expected that the unit costs for the last 10,000 AFY would be substantially higher than the unit costs for those water supplies needed to reach 120,000 AFY. Given potential new leasing opportunities identified later, this concern may prove to be unfounded.





### 3.1.3 Controllable vs Not Controllable Water Projects

There are only two basic types of active Program water projects, storage and retiming. All of the active storage projects result in contributions to designated reservoir accounts from storable natural inflows to the reservoir, conservation savings, or leases. Retiming projects are those that divert from the river when there are excesses to target flows and return water to the river at a later time, ideally when there are target flow shortages. Towards the end of the First Increment, the Program began to view water projects from a new perspective: controllable versus not controllable. **Table 2** presents all of the active Program water projects (three initial projects plus WAP) according to this framing; unit costs for water purchased in 2019 are also shown.

**Table 2. Program Controllable and Not Controllable Water Projects.**

Project	Score [AFY]	2019 Unit Cost [\$ / AF]
<b>Controllable – Storage</b>		
Pathfinder EA + Lake McConaughy EA	70,000	N/A
NCCW (No Cost)	260	N/A
Pathfinder Municipal Account Lease	6,350	\$65.00
CNPPID Irrigator Lease <sup>1</sup>	1,900	\$293.33
CPNRD Canals Surface Water Lease	10,800	\$159.14
NPPD Canals Surface Water Lease	2,750	\$159.14
<b>Subtotal =</b>	<b>92,060</b>	
<b>Controllable – Retiming</b>		
Cook Recapture Well <sup>2</sup>	160	\$52.90
<b>Not Controllable – Retiming</b>		
Tamarack I Groundwater Recharge <sup>3</sup>	10,000	\$46.00
Phelps County Canal Recharge	2,700	\$31.91
Elwood Reservoir Recharge	2,800	\$48.46
CPNRD Canals Recharge	600	\$45.62
NPPD Canals Recharge	1,800	\$31.83
Broad-Scale Recharge <sup>4</sup>	4,000	N/A
<b>Subtotal =</b>	<b>21,900</b>	
<b>Total Score =</b>	<b>114,120</b>	

<sup>1</sup> The unit cost for the CNPPID irrigator lease is based on payment of \$220/acre for a yield of 9 inches per enrolled acre (0.75 AF/acre).

<sup>2</sup> The unit cost for the Cook recapture well is based on payment for electricity to pump 25.57 AF in 2019.

<sup>3</sup> The unit cost for Tamarack I is based on the average annual cost for leases plus O&M (electricity).

<sup>4</sup> Construction of the Cottonwood Ranch broad-scale recharge project was completed in October 2019, but the project was not yet operational.

The vast majority of controllable water supplies are those that are held in reservoir storage, mostly in the Lake McConaughy EA,<sup>21</sup> with a very small contribution from the Cook recapture

<sup>21</sup> Controllable storage water that accrues to the Pathfinder EA and Pathfinder Municipal Account is transferred to the Lake McConaughy EA in August-September each year.



well. The ability to control Program water supplies allows for targeted releases to reduce target flows deficits, which results in controllable WAP projects having greater score efficiencies,<sup>22</sup> or to meet other specific habitat or species needs. Controllable supplies are expected to be a great asset during the First Increment Extension for conducting necessary water-related science experiments and supporting other elements of the Adaptive Management Plan.

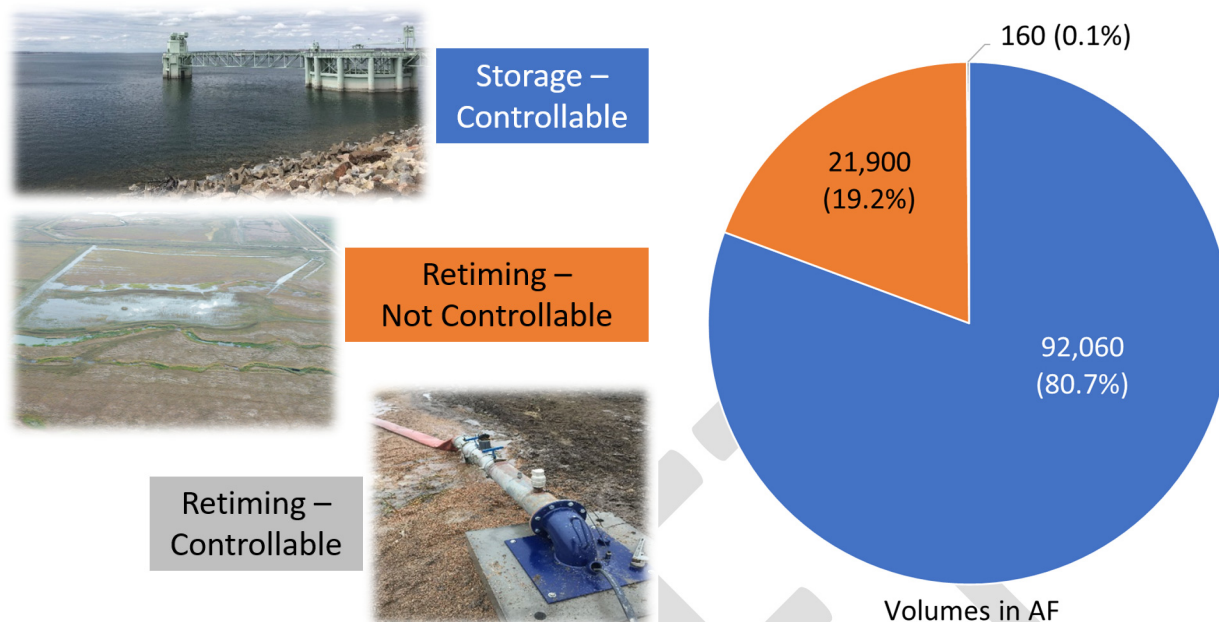
All of the Program's active groundwater recharge projects qualify as not controllable. While the diversion of excess flows into the projects is controlled by the operators of those facilities, the Program has no control over the physical processes of seepage and groundwater transport as recharged water slowly migrates through the alluvial aquifer towards the river. Uncontrolled accretions at the river from groundwater recharge will provide a low rate of continuous baseflow returns for decades, regardless of whether the river is experiencing target flow shortages or excesses in any given time period. Consequently, the score efficiencies of these projects are much lower than the controllable counterparts,<sup>23</sup> and large volumes of water must be diverted into recharge to achieve a reasonable score as a measure of target flow shortage reductions on an annual average basis.

The unit costs shown in Table 2 also reflect the relative value of the different types of project water, as the controllable supplies from surface water leases were generally much more expensive than uncontrolled groundwater recharge.<sup>24</sup> **Figure 9** illustrates the proportions of controllable and not controllable Program water projects.

<sup>22</sup> Score efficiency is the proportion of water that a project adds to the river that contributes to the reduction of target flow shortages.

<sup>23</sup> Controllable recapture wells, which the Program can use to improve the efficiencies of recharge projects, are discussed in Section 5.2.1.

<sup>24</sup> In 2019, billing for CPNRD recharge was based on calculated accretions (return flows) at the river. The Phelps, Elwood, and NPPD recharge projects were billed based on amounts of excess flows diverted for recharge.



**Figure 9. Active Program Water Project Score Volumes, Controllable and Not Controllable.**

### 3.2 Future WAP Projects

Potential future WAP projects identified as of late 2019 are summarized in **Table 3** below.

**Table 3. Potential Future WAP Projects.**

Project	Status	Estimated Score [AFY]
Nebraska Groundwater Recharge		
Recharge Recapture Well Field Project(s)	Pilot Project	8,000
Nebraska Water Leasing (Surface Water)		
CNPPID storage and/or NCCW lease	Conceptual	6,600
North Platte Irrigator/Irrigation District lease(s)	Conceptual	2,500
Other Projects		
Slurry Wall Gravel Pit storage	Design Final	2,800
Nebraska Water Management Incentives	Conceptual	N/A
Future Projects Total Score =		19,900

Collectively, the potential future WAP projects have estimated scores totaling nearly 20,000 AFY. This could push the cumulative score to about 134,000 AFY, but it is unlikely that all of the potential future projects will be implemented, and scores that are eventually approved may not be the same as current estimates. The first three projects listed in Table 3 will be discussed further in the context of the next steps for achieving Milestone 4 and the water objective (**Section 5**).



Slurry wall gravel pit storage was another of the project concepts that emerged in 2016 as alternatives to the J-2 Project that could be used for the retiming of excess flows. Common in the South Platte Basin of Colorado but non-existent in Nebraska, these projects involve reclaiming aggregate mine pits as below-grade reservoir storage by constructing an impermeable barrier that surrounds the pit and isolates it from the surrounding alluvial aquifer.

In March 2017, a land acquisition opportunity emerged involving an existing sand and gravel mine—located southwest of the Elm Creek interchange on Interstate 80—that was nearing completion. Despite the uncertainties associated with a first of its kind project in Nebraska, the GC recommended moving forward with a full-scale initial slurry wall gravel pit location at this site (the EDO also presented pilot-scale options in other locations). The property known as Lakeside was acquired, and contractor for engineering design was selected later in 2017. As the design of the slurry wall gravel pit project advanced during the 2017-2019 period, the construction costs kept increasing while the storage capacity and estimated score decreased. The GC ultimately gave direction to complete the final design, which was done at the end of 2019, but construction was not to proceed. For now the project is on hold, but if other combinations of WAP projects are not able to meet the requirements of Milestone 4 and the First Increment water objective, the Lakeside slurry wall gravel pit may be revisited in the future.

The Nebraska water management incentives project was originally presented in the 2000 Reconnaissance-Level WAP as options for changes in cropping and/or irrigation practices that would result in reduced consumptive use. It was assumed that the irrigation supplies would be from storage water and that the savings would be credited to the Lake McConaughy EA, eventually resulting in increased river flows. The project was assigned a Tier II priority in the 2009 WAP Update, efforts were made to scope a feasibility study, and a workgroup of Water Advisory Committee (WAC) members was established, but by 2012 the pursuit stalled, and nothing was ever implemented. In 2017-2018, the water management incentives project was briefly revived with the Program financially sponsoring efforts by the University of Nebraska and other organizations to improve efficiencies in agricultural production. The goal remained the same, to implement measures that would reduce irrigation consumptive use and improve river flows. At the end of the First Increment, some form of the water management incentives project remained a possibility for future implementation, but no specific opportunities were identified.

### 3.3 Inactive WAP Projects

**Table 4** lists the WAP projects that were inactive at the end of the First Increment, along with the project status given in previous WAP updates.

**Table 4. Inactive WAP Projects.**

Project	Project Status		
	2009	2014	2019
J-2 Regulating Reservoirs	Tier I	Tier I, Active	Inactive
Elm Creek Reregulating Reservoir	Tier I	Tier I, Inactive	Inactive
Glendo Reservoir Storage	Tier I	Tier I, Inactive	Inactive
Colorado Groundwater Management	Tier I	Tier I, Future	Inactive
NCCW (Purchased)	Tier I	Tier I, Inactive	Inactive
Nebraska Groundwater Management	Tier II	Tier II, Future	Inactive
Power Interference	Tier III	Tier III, Inactive	Inactive
Wyoming Water Leasing	Tier III	Tier III, Inactive	Inactive
LaPrele Reservoir	Tier III	Tier III, Inactive	Inactive
Acquire-and-Retire	N/A	N/A	Inactive

As shown, nine of the 13 WAP projects originally assigned tiered priorities in the 2009 WAP Update were inactive by 2019, more than half of which were among the Program's highest priority WAP projects early in the First Increment. Those projects were effectively eliminated for a variety of reasons as discussed in the sections below.

### 3.3.1 Former Tier I Projects

A key finding of the 2007-2008 WMS was the need for a reservoir near the upper end of the Program's associated habitat reach to augment pulse flow releases. The J-2 Project soon emerged as the preferred alternative and progressed through the pre-feasibility, feasibility, conceptual design, and cost assessment stages of development by early 2013. In 2010, the project was also used as the case study for defining the methods and assumptions to be used for WAP project score analyses. Having the capacity to make major contributions to both pulse flow releases and target flow shortage reduction goals while remaining within the Program's budgetary constraints, the J-2 Project was long the Program's top priority WAP project pursuit. Engineering design of the reservoirs proceeded, along with requisite studies (geotechnical, environmental, cultural resources, etc.), permitting, and initial land acquisition efforts. All of this work ground to a halt in 2015 when an updated analysis indicated a near-tripling of construction costs. Over the next year, extensive efforts were made to devise a scaled-down J-2 Project that could be built within the available budget, but those efforts were ultimately unsuccessful. By late 2016 the J-2 Project was on hold, and the GC gave direction to pursue other project alternatives.

The concept for a new flood control reservoir on Elm Creek emerged from a study conducted for CPNRD in the mid-2000s. Additional feasibility-level analyses during 2009-2010 expanded the project scope to include potential target flow shortage reduction and SDHF augmentation benefits for the Program. Based on costs, the difficulty of delivering water to the reservoir, and a preference for the J-2 Project, the WAC and GC recommended that the Program not move forward with the Elm Creek Regulating Reservoir project.



When the 2000 Reconnaissance-Level WAP was developed, it was assumed that a portion of the Wyoming's storage water allocation in Glendo Reservoir<sup>25</sup> could be made available for Program purposes. Instead, Wyoming needed that source of water for compliance with terms of the 2001 Modified North Platte Decree requiring mitigation of depletions between the Whalen Diversion Dam and the Wyoming-Nebraska state line. The 2009 WAP Update speculated that since those replacement water operations would conceptually increase flows relative to pre-1997 conditions, there still might be some means for the Program to get some credit for that water, but that never came to pass. As a Wyoming project, Glendo Reservoir storage was inactive at the end of the First Increment, but as will be discussed in Section 5, the potential to lease some of Nebraska's allocation in Glendo Reservoir from North Platte River irrigation districts is an ongoing pursuit for possible future implementation.

Colorado groundwater management was a broad project concept that encompassed the Tamarack III groundwater recharge project. Tamarack III was planned as an extension of the existing Tamarack I and II projects,<sup>26</sup> which rely on a combination of dedicated recharge infrastructure and surplus recharge credits leased from other water users in the lower South Platte Basin to generate retimed accretions that benefit the Program and satisfy Colorado's depletions plan obligations. While May-June accretions from the Tamarack projects continue to be adequate for offsetting May-June river depletions attributable to post-1997 population growth in the South Platte Basin, the average annual target flow shortage reductions attributable to Tamarack I during the First Increment were less than the project's 10,000 AFY score credit. As explained in Colorado's annual project reports,<sup>27</sup> the actual excess flows available for diversion by Tamarack I in the winter months (December-March) of the First Increment years were much less than what was anticipated based on the 1947-1994 historical period used for Program water projects modeling and score analyses. Given this reality, there is no reason to expect that adequate water supplies would be available for a Tamarack III project, and Colorado currently has no plans to develop additional recharge capacity.

Section 3.1 noted that a very small portion (314 AFY) of the Tier I NCCW project that is available to the Program at no cost each year remains active. A much larger volume of NCCW was to be available for purchase by the Program as dictated by Article 402 of CNPPID's Federal Energy Regulatory Commission (FERC) license for the Kingsley Dam Project (Project No. 1417-001), which states the following:

Upon implementation of a Program, the Licensee shall offer to the Program a quantity of water equal to the estimated Net Controllable Conserved Water achieved by conservation counted toward fulfilling the Licensee's obligations under the National Wildlife Federation agreement but not funded by the U.S. Bureau of Reclamation, and shall assign

<sup>25</sup> Glendo Reservoir includes 40,000 AF available for irrigation, of which 15,000 AF is allocated to users in Wyoming and 25,000 AF is allocated to users in Nebraska.

<sup>26</sup> Tamarack I was Colorado's contribution to the Program's three initial state water projects, and Tamarack II was the name originally used for what is now Colorado's Plan for Future Depletions.

<sup>27</sup> Colorado's Tamarack I annual reports for the years 2013-2019 all include discussion of winter excess availability. In 2016, the EDO prepared an Excess Analysis White Paper that validated the conclusion that January-May excess flows during the First Increment were less than the 1947-1994 historical period, with the greatest deficits in February and March.





that quantity of water to the Environmental Account, provided that...the Program purchases the water at a price equal to the average cost in 1997 dollars accrued by the Licensee and/or its irrigation customers, as appropriate, in achieving that conservation.

The Program began working with CNPPID in 2009 to update costs, but it was apparent from the start that costs would be much higher than the estimates in the 2000 Reconnaissance-Level WAP (4,500 AFY for \$305,000 annually for 13 years, or about \$68/AF). Related analyses continued for several years, and CNPPID made a series of offers for the Program to purchase NCCW in 2013. The final offer required pre-payment for 10,586 AFY for 25 years, through the end of CNPPID's current FERC license term in 2038. Total upfront costs of nearly \$58 million were not compatible with the Program's Water Plan budget, most of which was already dedicated to the J-2 Project at that point. The offer was declined by the GC in December 2013, and the project was considered inactive for the rest of the First Increment.

### 3.3.2 Former Tier II Projects

By the late 1990s, there was a large groundwater "mound" in the Central Platte region as a result of decades of seepage from unlined surface water irrigation systems. Nebraska groundwater management was a WAP project concept originally conceived to take advantage of high groundwater levels as a source of supply. The 2000 Reconnaissance-Level WAP included a generic Nebraska groundwater management project with four options such as active pumping from high groundwater areas and switching from surface water to groundwater irrigation. That plan also included the Dry Creek/Fort Kearny Cutoffs, which were essentially specific applications of the active pumping concept within the Tri-Basin NRD. The "cutoffs" were small ditches that would cross drainage boundaries to facilitate project water returns at river locations farther upstream in order to benefit a larger segment of the associated habitat reach.

The drought of the early 2000s was followed by significant changes in irrigation practices. For example, many of the earthen laterals in the CNPPID irrigation systems were lined or replaced with buried pipe. Other irrigators converted from surface water to groundwater, as evidenced by the changes that made the CPNRD and NPPD surface water leases possible. Consequently, the excessive canal seepage that sustained the groundwater mound in earlier years began to diminish. The 2009 WAP Update reported that the cutoff projects were no longer viable because "the project's anticipated water source has decreased and the project focus changed." Other groundwater management elements such as the active pumping of recharged water during target flow shortages (i.e., recapture wells) were merged into the Nebraska groundwater recharge concept.

At the time of the 2014 WAP Update, only Funk Lagoon remained as a potential groundwater management project.<sup>28</sup> A feasibility study completed in 2015 determined that Funk Lagoon was not a good option for either water storage (too much seepage) or groundwater recharge (seeps too fast, groundwater gradient in the wrong direction). The WAC strongly recommended against

<sup>28</sup> The 2014 WAP Update also discussed a potential dewatering project with an individual landowner under the Phelps County Canal but said that the project was reviewed in 2012 and determined to be unfavorable.



1000 Funk Lagoon as a WAP project, after which no other groundwater management projects were  
1001 considered.

### 1002 3.3.3 Former Tier III and Other Inactive WAP Projects

1003 Each of the three former Tier III projects (power interference, Wyoming water leasing, and  
1004 LaPrele Reservoir) was originally introduced in the 2000 Reconnaissance-Level WAP, but no  
1005 new information was ever developed or presented in one of the subsequent WAP updates. The  
1006 projects remained perpetually inactive during the First Increment, and there were no plans for  
1007 future pursuit after 2019.

1008  
1009 The final inactive WAP project was a short-lived concept called “acquire-and-retire” that the  
1010 Program tried to develop as a means to replace some of the score credit from the J-2 Project. For  
1011 practical purposes, this project involved agricultural buy-and-dry without the negative  
1012 connotations associated with that practice in Colorado. The idea was for the Program to  
1013 purchase irrigated lands in Nebraska, sever the water from the land, and change the water rights  
1014 to allow the consumptive use portion to be used for instream flows. To recoup some of the  
1015 expenses, the Program planned to re-sell the land for dryland farming, which would help to  
1016 minimize negative social and economic impacts to agricultural communities.

1017  
1018 In mid-2016, the Program purchased a small irrigated parcel (about 30 acres of pasture grass)  
1019 under the Alliance Canal near Bayard, Nebraska. Plans were made to continue irrigation for  
1020 several years and install surface and groundwater monitoring equipment to collect data that  
1021 would be used to quantify the transferable consumptive use. Initial steps were taken in this  
1022 direction, and at the Program’s request, the irrigation district built a new check structure to better  
1023 control flood irrigation from the lateral that crossed the property. Since the volume of water  
1024 from the parcel was expected to be quite small, the Program attempted to acquire other nearby  
1025 lands from which the transferable water supplies could be pooled together for eventual delivery  
1026 to the Lake McConaughy EA, but these efforts were not successful. After considering the  
1027 remote location of the lone acquire-and-retire property and the lack of legitimate prospects for  
1028 expanding the project, the GC gave direction to sell the land. The sale was approved by the GC  
1029 in late 2018 and finalized in 2019, effectively ending acquire-and-retire as a WAP project.

## 1030 4 Lessons Learned

1031 As demonstrated in the preceding sections, implementation of the WAP during the First  
1032 Increment was a process of shifting priorities and approaches. The initial focus was on water  
1033 projects that could both contribute significantly to target flow deficit reductions and supplement  
1034 SDHF releases. Accordingly, top priority was given to the pursuit of a reservoir project in the  
1035 Central Platte region that was below the North Platte chokepoint<sup>29</sup> and near the upper end of the

<sup>29</sup> The North Platte chokepoint is a reach of the North Platte river extending a few miles upstream and downstream of the Highway 83 bridge at North Platte, NE. The Program Document specifies a goal of achieving flows of 3,000 cfs through the chokepoint, while remaining below flood stage. However, the current estimated flow capacity at the minor flood stage of 6.0 ft is less than 2,000 cfs based on recent updates to the rating curve by NDNR. The idea behind a Central Platte reservoir was that it would have gates capable of releasing several thousand cfs to supplement releases from the Lake McConaughy EA that are constrained by the chokepoint.



Program's associated habitat reach. Despite the considerable efforts of Program staff, stakeholders, and outside consultants, the Program's attempts to build new infrastructure projects met with limited success during First Increment. Over time, natural high flow events showed that SDHF were not likely to provide the expected habitat benefits,<sup>30,31</sup> and several other WAP projects were implemented with a primary objective of reducing deficits to target flows.

All of these efforts by the Program to implement WAP projects during the First Increment required a great deal of adaptation and perseverance. Although early iterations of the WAP included fairly expansive lists of potential WAP projects, the status updates in Section 3 showed that all of the WAP projects active at the end of the First Increment could fit into just two main categories: surface water leasing and groundwater recharge (including recapture wells, which draw on the intentionally recharged groundwater). Through successes and failures, lessons were learned that will continue to guide the Program into and through the First Increment Extension.

#### 4.1 New Infrastructure Projects

After investing significant resources in the study and design of a Central Platte reservoir over several years, changing economic conditions and escalating costs rendered the preferred J-2 Project infeasible. This occurred in 2015, which was year nine of the 13-year First Increment. Up to that point, the Program was depending on the J-2 Project alone to provide more than 60 percent of the score credit necessary to fulfill the intent of the WAP and achieve Milestone 4. An urgent effort began that was to find solutions to replace the J-2 Project. New project concepts—still with a primary emphasis on new infrastructure and storage—were developed that in combination appeared capable of generating the needed score credit. However, it was quickly recognized that it would not be possible to fully implement the projects within the span of the few remaining years of the First Increment; plans and processes to extend the First Increment were set in motion. The Program moved ahead with the simultaneous pursuit of both broad-scale recharge and slurry wall gravel pit storage projects, which were either entirely new ideas (the former) or in use elsewhere but untested in Nebraska (the latter).

Design and permitting for these new projects progressed, but slowly due to various issues arising from the unique nature of the projects. Property owned and/or managed by the Program at Cottonwood Ranch was available to use for the first broad-scale recharge project, but the extensive swaths of land that would need to be acquired—having both the characteristics necessary for effective recharge and accessibility for deliveries—limited prospects for more of these projects. The Program seized an opportunity to purchase an existing aggregate mine that was nearing completion but retrofitting the site as a slurry wall gravel pit when it was not planned for that purpose proved to be far more complicated and costly than anticipated. Delivering water to the site presented challenges, and the need to pump water out of a below-grade storage reservoir severely limited the project's capacity to supplement environmental flows (SDHF or otherwise) or reduce target flow deficits. Ultimately, construction of the

<sup>30</sup> Jason M. Farnsworth, David M. Baasch, Patrick D. Farrell, Chadwin B. Smith, Kevin L. Werbylo. Investigating whooping crane habitat in relation to hydrology, channel morphology and a water-centric management strategy on the central Platte River, Nebraska. *Heliyon* 4 (2018) e00851.

<sup>31</sup> 2019 State of the Platte. Prepared by the Executive Director's Office of the Platte River Recovery Implementation Program.



Cottonwood Ranch broad-scale recharge project was completed in 2019,<sup>32</sup> but the GC elected to shelve the slurry wall gravel pit project in favor of less expensive WAP project options. Lessons learned through these processes include the following:

- Program policies specify acquisition of land from willing sellers, but new civil projects (e.g., reservoirs and pipelines) can be very difficult to construct without the ability to condemn land for easements and infrastructure. The Program does not have this authority, which imposes serious limitations on the scope and scale of new infrastructure projects.
  - To elaborate, most civil infrastructure projects are undertaken by political subdivisions with power of eminent domain (including many PRRIP stakeholders represented on the GC). Those entities all follow a similar process starting with reconnaissance-level siting studies and progressing through increasingly detailed feasibility and design efforts. Land acquisition does not commence until siting is finalized and the design is advanced far enough to be sure of cost feasibility and land acquisition needs. At that point, acquisition negotiations proceed with the understanding that eminent domain may be used in cases where owners will not sell.<sup>33</sup>
  - The Program does not have power of eminent domain but First Increment attempts to develop infrastructure projects still followed the traditional study-design-acquire process. As a result, the Program invested heavily in engineering designs for projects only to be unable to secure the necessary land rights. Landowners were either uninterested in selling or were unwilling to sell at prevailing agricultural land value. The Program may have been able to purchase land at two to three times the assessed value but the Signatories determined purchases at multiples of assessed value to be politically unpalatable.
  - In retrospect, lack of eminent domain necessitates a process more like private development. Private developers often purchase (or take an option) on land prior to project design, speculating that a feasible project will emerge after the land has been acquired. This approach was discussed with the GC but was not embraced as a number of stakeholders were hesitant to speculate with public money.
- Permitting can slow and extend project development time, especially if Federal permits are needed (e.g., Section 404 permits). Securing the necessary permits from Nebraska DNR can be understandably complicated for new project types for which there is little or no existing regulatory guidance.
- The amount of Program staff time needed through the entire process of developing an infrastructure project is easy to underestimate, even when using outside consultants for design and construction administration. Extensive time is required for all steps, from development of the Request for Proposals (RFP) through design (oversight of

<sup>32</sup> Initial fill operations for the Cottonwood Ranch broad-scale recharge project were planned to take place in the summer of 2020, after vegetation is established on the berms, with regular spring-fall operations to begin in 2021.

<sup>33</sup> The exception in Nebraska is that eminent domain cannot be used to condemn/vacate road right-of-way so unwillingness to close or move roads can stop civil infrastructure projects.



consultants, design reviews, costs, etc.) and on to construction (oversight of both design consultants and building contractors, billing, coordinating with neighboring landowners, etc.). Additional staff time is needed to oversee operations and monitoring of completed projects.

- On the ground realities at a project site can require expensive adjustments to the design. Weather can cause costly delays during construction.

Though the design, permitting, and construction processes can be arduous, the upside of new infrastructure is that the Program controls most or all aspects of the completed project rather than being dependent on the existing infrastructure and operations of partner districts or other entities.

## 4.2 Surface Water Leases

Volumetrically, surface water represented the major portion of the Program's water portfolio at the end of the First Increment. Much of that comes from natural inflows to the Lake McConaughy EA and Pathfinder EA that were established as part of the Program's initial state water projects, but more than 20,000 AF of approved and estimated score credit was derived from a variety of surface water leases. All of the Program's leased surface water eventually ends up in the Lake McConaughy EA. The Pathfinder Municipal Account lease was long planned as part of Wyoming's Pathfinder Modification Project, and it was implemented as soon as project construction was completed and the water became available.<sup>34</sup>

Other surface water leases took advantage of changes in irrigation practices after the drought of the early- to mid-2000s. Large numbers of irrigators under the CPNRD and NPPD canal systems converted to groundwater sources, and the relinquished surface water<sup>35</sup> was made available for leasing by the Program. As discussed in Section 3.1.1.2, the original tactic of returning surface water leased from the CPNRD canals directly to the river during the irrigation season was an inefficient means of meeting the Program's target flow shortage-reduction objectives. Having learned this lesson after a few years of project operations, the project was reconfigured to credit the leased water to the Lake McConaughy EA. This required the cooperation of several Program partners (CPNRD, CNPPID, and Nebraska DNR) and demonstrated the advantages of working together towards common goals with mutual benefits to the partners and the Program. Still, the more important lesson is to recognize the value in continuing to review WAP projects after they are implemented in order to know how and when operations or other aspects need to be modified to best meet Program goals. After the new approach proved to be successful, a functionally identical project to lease relinquished surface water from NPPD canals was implemented.

The CNPPID irrigator lease represents another permutation of surface water leasing from agricultural sources, with a very important distinction: CPNRD and NPPD irrigators relinquished surface water, but that was a result of switching to groundwater for irrigation supplies. There was essentially no change in production for these irrigators other than the change in sources, which happened independently of Program activities. CNPPID irrigators who

<sup>34</sup> A leasing contract between the Program and the Wyoming Water Development Office was signed in 2011, and the first water deliveries occurred in 2012.

<sup>35</sup> Specifically, the historical consumptive use component of the natural flow surface water rights.





participate in the lease program specifically forego production of an irrigated crop on the enrolled lands for that year. The price paid by the Program for this water is meant to compensate for the reduced or lost crop yields when the land is dryland farmed or fallowed, respectively.

Lessons learned through the implementation of the CNPPID irrigator lease include the following:

- The farmlands under the CNPPID canals (Phelps County Canal, E-65 Canal, and E-67 Canal) have been continuously irrigated since the early 1940s. It is difficult for a comparatively new entity such as the Program to break into entrenched systems with entrenched practices, particularly if the objective is to remove water from agricultural production and use it for other purposes such as to benefit fish and wildlife.
- Consequently, the Program needed to provide a financial incentive to participate. The initial unit cost was set high (\$220/acre) to entice participation in a new and unfamiliar leasing program. Skepticism on the part of irrigators resulted in enrollment during the first year (2016) of little more than half of the acreage allowed under the original leasing agreement (1,037 out of 2,000 acres). However, the irrigator lease quickly caught on and by the fourth year (2019), maximum enrollment was nearly achieved at an even higher level (2,934 out of 3,000 acres).
- Agricultural market conditions are an important factor for a project such as the CNPPID irrigator lease. Irrigators need to consider the financial aspects of growing a crop versus leasing the water instead. Compared to just a few years before, corn prices since the inception of the CNPPID irrigator lease have been relatively low, which has perhaps helped irrigators to better understand the value of water as a “crop.” At the same time, normal to wet hydrologic conditions and precipitation during many of those years also allowed for very good yields from dryland crops, essentially providing two revenue streams for those farmers who chose to go that route.
- While it was necessary to incentivize participation at the start of the CNPPID irrigator lease, the high unit cost for this project (effectively \$293/AF) may have created unrealistic expectations for leasing other surface water from agricultural sources. This lesson was noted by WAC members interviewed by the EDO to gather feedback for this report, who commented that the unit costs paid for surface water may have opened too wide, and the Program must now try to reign those in to reflect actual on the ground costs.<sup>36</sup>

Surface water leases were integral to Program activities during the First Increment and may become even more so in the future. As the prospects for successfully developing multiple new infrastructure projects dwindled, and other new project concepts such as acquire-and-retire were attempted without success, the focus of WAP project pursuits shifted again during the final years of the First Increment. Efforts to prioritize contributions to the Lake McConaughy EA were

<sup>36</sup> The unit cost for Pathfinder Municipal Account lease water was \$51/AF for the first 38,400 AF during the First Increment, then increased to \$65/AF. The new contract extending that project for the duration of the First Increment Extension (2020-2032) fixes the cost at \$65/AF for the entire period. Surface water leased from CPNRD was subject to an annual price escalator, which was 3% during the final years of the First Increment. The price for that water reached \$159.14/AF in 2019, and the same price was applied to NPPD surface water for the first year of that pilot exchange project in 2019. For 2020, the unit cost for both CPNRD and NPPD surface water was negotiated down to \$90/AF. The cost for the CNPPID irrigator lease was to remain \$220/acre (\$293/AF) in 2020, but the lease agreement includes the option to adjust that cost through an annual pricing addendum.





renewed, and as controlled storage, this water can be released as needed to reduce target flow deficits through the associated habitat reach and will be vital to Adaptive Management Plan flow experiments during the First Increment Extension.

With this emphasis on controllable water supplies comes the need for careful management of both EA releases and surface water lease projects that are credited to the EA to avoid negative consequences from unforeseen circumstances. For example, flooding and ice jams on the Platte River and tributaries downstream of the Program's associated habitat reach in late winter 2019 precluded typical EA releases for the spring whooping crane migration and channel maintenance. These events also prevented the Program from proceeding with a planned flow test on the North Platte River during the late spring or summer of 2019. Higher storable natural inflows and WAP project contributions to the EA, combined with an inability to make releases for much of the year, resulted in the EA volume exceeding 180,000 AF (more than 90 percent of the 200,000 AF capacity) by May 2020. If releases had been limited for a second year in a row, there was a significant risk of losing Program water if the EA had exceeded capacity or if Lake McConaughy reached effective capacity and forced a reset of the account to 100,000 AF.

#### 4.3 Groundwater Recharge

The expansion of the Nebraska groundwater recharge WAP project concept was described in Section 3.1.1.1., illustrating how a successful pilot project starting with just the Phelps County Canal was scaled up to encompass separate projects at five other Central Platte canals, a reservoir, broad-scale recharge, and recapture wells. All of the canal and reservoir recharge projects utilize existing irrigation facilities owned and operated by Program stakeholder entities, which is advantageous in light of the many obstacles to building new infrastructure.

At the same time, this factor greatly limits Program control of these projects. The Program does not have standing and is thus reliant on those partners to secure the necessary permits from Nebraska DNR to divert excess flows for recharge; for all except the CPNRD canals (Thirty Mile, Cozad, and Orchard-Alfalfa), this remains an annual requirement. Program staff can set the hydrologic condition, monitor the availability of excess flows, and coordinate plans for recharge, but the actual operations to start or stop diversions are still subject to approval by Nebraska DNR and dependent on the partner districts to carry them out. Even the newly constructed Cottonwood Ranch broad-scale recharge project, for which the Program will control on-site operations, is still dependent on CNPPID to deliver water to the project via a pipeline from the Phelps County Canal.

Not only does the Program generally lack control over recharge projects, but the projects are inefficient.<sup>37</sup> Subject to hydrologic conditions (i.e., normal to wet years) and availability, large

<sup>37</sup> Inefficiency in this context means that on an average annual basis, a recharge project's contribution to the reduction of target flow shortages is a relatively small percentage of the total volume of water that the project returns to the river each year because accretions (return flows) from recharge occur continuously during both shortages and excesses. Total annual accretions are also generally much smaller than the water volumes purchased by the Program and diverted into the projects. Stated another way, recharge project inputs are greater than recharge project returns, which are greater than the target flow shortage reductions attributable to recharge projects. In contrast, releases of leased surface water from the Lake McConaughy EA can be controlled to maximize shortage reductions, and thus those projects can be said to have much higher efficiencies.



volumes of excess flows can be diverted for recharge in any given year, but it takes years or decades for that water to migrate back to the river. This is a function of both aquifer properties and distance from the river. Uncontrolled accretions to the river occur continuously at a low rate of flow regardless of whether the river has target flow shortages or excesses.<sup>38</sup> The consistent baseflow contributions are certainly beneficial to the ecosystem, but recharge projects are not providing significant contributions to reducing large deficits and cannot substantially enhance high flow releases.

Paradoxically, recharge projects are dependent on opposite hydrologic conditions for optimal performance: wet years with abundant excess flows are best for diverting new water into the canals and reservoirs to then seep into the aquifer, and dry years with low streamflows allow for more extensive contributions to shortage reductions. Nonetheless, recharge projects do provide some measure of target flow shortage reductions each year and thus do generate score credit for the Program, but the annual amounts on average can be small compared to the volumes of water diverted into the projects. The long response times, inefficiencies, and generally uncontrolled nature of recharge projects are reflected in the costs paid for the water, which are much less than what is paid for controllable surface water.

The Phelps County Canal and NPPD (Gothenburg and Dawson County canals) recharge projects are billed on the basis of measured diversions or net recharge<sup>39</sup> of excess flows. Even with built-in annual cost escalators, the unit cost for both projects remained below \$32/AF in 2019. CPNRD recharge water was more expensive (\$45.62/AF in 2019) because billings were based on smaller volumes of calculated accretions from current and past years' recharge operations rather than the volumes diverted at the canal headgates each year. This approach was advantageous to CPNRD in 2018 and 2019 when there were few or no new diversions of excess flows but accretions from earlier recharge continued. However, the inconsistent approaches to reporting and billing complicated Program efforts to complete accounting analyses and other evaluations of what are essentially functionally identical projects utilizing six different existing canals for recharge purposes.

New WSAs extending these projects a few years into the First Increment Extension established common unit costs (starting at \$32.87/AF in 2020, to increase by 3% per year thereafter) and reporting metrics<sup>40</sup> (measured diversions or net recharge). Elwood Reservoir seepage is somewhat different than the canal projects in that the unit cost paid by the Program (\$48.46/AF in 2019) is higher still because of the need to pump all diverted water into the reservoir<sup>41</sup> and

<sup>38</sup> Controllable recapture wells, which the Program can use to improve the efficiencies of recharge projects, are discussed in Section 5.2.1.

<sup>39</sup> Net recharge = measured diversions – measured spills or tailwater returns

<sup>40</sup> Starting in 2020, CPNRD and NPPD will both bill for net recharge as defined above. CNPPID measures Phelps County Canal diversions with a flume at Mile Post 1.6, and the canal is checked at Mile Post 13.3 during recharge operations. Phelps recharge often occurs beneath an ice cap on the canal during the winter, and there is essentially no need to account for spills or surface returns. If there is water remaining in the canal at the end of recharge operations that has not yet seeped, CNPPID will deduct that volume from the measured diversions that are billed. When doing the project accounting calculations, the EDO also estimates the canal seepage that occurs between the headgates and the measurement flume.

<sup>41</sup> In contrast, canal recharge is entirely driven by gravity.



because of the opportunity cost of diverting that water off of the main CNPPID Tri-County Supply Canal upstream of the two Johnson hydropower plants.<sup>42</sup>

With multiple active projects, large volumes of water were diverted into recharge in 2015 and the next few years, all of which experienced normal to wet hydrologic conditions in the Central Platte region. However, initial accounting analyses indicate that comparatively little of that water returned to the river in those early year of project operations, and much of what did return was not during shortage periods. As discussed in the 2018 PRRIP Water Projects Accounting Memo, this was partly a function of time, in that the returns will accrue over decades and the projects had simply not operated long enough to achieve the steady state returns that will occur after years of consistent operations. Distance was also a factor, as the largest volumes of recharge water were diverted into Elwood Reservoir, which also happens to be much farther away from the Platte River than other recharge areas.

This large volume of water stored in the aquifers, particularly on the south side of the river, presents an opportunity for further adaptation of Program recharge projects: recapture wells. The idea is that recapture wells can pump recharged groundwater directly to the river only during periods of shortage, thereby improving the efficiency of the parent recharge projects, i.e., larger percentages of both the annual return flows and the original excess flows that were diverted will achieve the desired purpose of reducing target flow shortages.

A single recapture well was installed on the Program's Cook property in 2016 to draw on water recharged through Phelps County Canal. Pumping was limited during the first years of operations due to wetter conditions and a relative lack of shortage periods but is expected to increase should a dry spell occur during the coming years of the First Increment Extension. At the end of the First Increment, the Program began developing conceptual plans for a larger network of recapture wells to pump from the large reserve of recharged groundwater resulting from multiple projects that contribute seepage to aquifers under the jurisdiction of the Tri-Basin Natural Resources District (TBNRD). More about this future WAP project is provided in Section 5.

## 5 Next Steps

The previous sections of this report described progress towards implementation of the WAP during the First Increment—what projects were pursued and when, where did the Program find success and where did it not, how did the plan itself evolve over time—and the lessons that were learned through those efforts. This section outlines the plan moving forward into the First Increment Extension, including the path to achieving cumulative score credit of 120,000 AFY or greater and the specific projects that are likely to be pursued to help reach that goal. Plans to use the Program's portfolio of water projects to conduct experiments under the Adaptive Management Plan are also discussed.

<sup>42</sup> Phelps County Canal diverts just above the river return from the CNPPID system, downstream of the Johnson hydropower plants.



## 5.1 The Path to 120,000 AFY

Table 1 and Figure 8 in Section 3 show the status of approved and estimated scores for the Program's active water projects as follows:

- Initial State Water Projects = 80,000 AFY
- Active WAP Projects with Approved Scores = 14,170 AFY
- Active WAP Projects with Estimated Scores = 19,950 AFY

With a combined score estimate of 114,120 AFY at the end of the First Increment, an additional 5,880 AFY is needed to achieve the stated goal<sup>43</sup> of reaching 120,000 AFY as quickly as possible during the First Increment Extension. Table 3 in Section 3 identifies the following potential future WAP projects and score estimates:

- Recapture wells = 8,000 AFY
- North Platte Irrigator/Irrigation District Lease(s) = 2,500 AFY
- CNPPID storage lease = 6,600 AFY

The total score from these projects is estimated to be 17,100 AFY, which is nearly triple the amount needed to reach 120,000 AFY. This provides the Program with some flexibility, particularly if the eventual approved scores for those projects currently estimated are less than expected or if any currently active WAP projects are terminated. The combination of these three potential future projects also represents a pathway to 130,000 AFY if the additional 10,000 AFY is determined to be necessary to achieve target species management objectives.

## 5.2 Planned and Potential Future Projects

The following sections provide additional details on the planned and potential future WAP projects.

### 5.2.1 Recapture wells

Recharge projects generally provide steady baseflow returns to the Platte River over periods of years to decades. As a result, a portion of the return flows from these projects reaches the river at times of excess to target flows, providing little or no benefit to the river as defined in the context of the Program's water objectives. Recapture wells are a means of increasing the efficiency of recharge projects by controlling the timing at which recharge return flows reach the river. The recapture wells can be operated specifically when there are deficits to target flows, thereby improving the operational score credit for the Program.

The Program's analysis of operational score improvements associated with recapture wells considers the timing and location of recharge and recapture facilities, the availability of return flows over time, the volumes of water that are delivered to the river via the recapture wells, and the delayed impacts of the pumping on the river. These analyses will be ongoing to show that

<sup>43</sup> Addendum to the Program Document – First Increment Extension, Section II.B. Water Plan, second bullet point.



the combined effects of recharge return flows, pumping deliveries, and lagged depletions from that pumping consistently result in net positive benefits to the river. As discussed previously, a well was installed on the Program's Cook property with the goal of pumping during periods of shortage to recapture groundwater that was intentionally recharged in the Phelps County Canal. That recapture well provided a "proof of concept" and has operated successfully since 2016.

In 2019, the Program began developing a pilot project for a larger network of recapture wells to be located in the vicinity of Cottonwood Ranch. This project will be a partnership with the TBNRD and will initially draw on the significant volumes of water recharged through the Phelps County Canal and Elwood Reservoir during the First Increment. Program accounting analysis showed that the cumulative volume recharged in the Phelps County Canal from the start of pilot operations in 2011 through the end of calendar year 2018<sup>44</sup> was 29,300 AF.<sup>45</sup> Of that total recharge volume, 19,400 AF returned to the river as baseflow accretions and 330 AF was pumped by the Cook well. That leaves (through 2018) a balance of 9,570 AF remaining in "storage" in the aquifer.

The 2018 PRRIP Water Projects Accounting memo<sup>46</sup> summarized Elwood Reservoir recharge as follows:

Of the 44,300 AF diverted into Elwood Reservoir for the Program by the end of calendar year 2018, approximately 25,000 AF had seeped from the reservoir as groundwater recharge, 2,300 AF was lost to evaporation, and 17,000 AF remained in storage in the reservoir itself. Of the total seepage volume, 4,200 AF had returned to the Platte River as lagged accretions, and the balance of 20,700 AF either migrated towards the Republican River or remained in aquifer storage en route to the Platte River.

Elwood Reservoir sits atop a groundwater divide between the Platte River and Republican River basins. In the score analysis for Elwood recharge,<sup>47</sup> it was estimated that about 76% of recharged water would eventually return to the Platte River, and the rest would end up in the Republican River basin to the south. Applying that percentage to the 25,000 AF total recharge from Elwood Reservoir (through 2018) would indicate 19,000 AF will return to the Platte River. With 4,200 AF of lagged accretions to the Platte River having already occurred, then an estimated 14,800 AF remains in the aquifer.

The reservoir also still held 17,000 AF of recharge water, of which as much as 12,920 AF (76%) could be destined for the Platte River (minus some additional evaporation losses from the reservoir surface). In total, about 37,000 AF was diverted for recharge in the Phelps County Canal and Elwood Reservoir but had not yet returned to the Platte River as baseflow accretions

<sup>44</sup> WAP projects accounting for 2019 has not yet been completed.

<sup>45</sup> The calculated volume of recharge exceeds the volume invoiced by CNPPID. For accounting purposes, the EDO also estimates seepage from the Phelps County Canal between the headgate and the MP 1.6 measurement flume.

<sup>46</sup> PRRIP Executive Director's Office. 2018 PRRIP Water Projects Accounting. Memo to PRRIP Water Advisory Committee, Final, August 27, 2019.

<sup>47</sup> PRRIP Executive Director's Office. Elwood Reservoir Groundwater Recharge Scoring Analysis. Memo to PRRIP Scoring Subcommittee, Final, September 17, 2019.



by the end of 2018, thus representing a substantial volume available for withdrawal by future recapture wells. Phelps and Elwood recharge operations will continue during the First Increment Extension, and once the Cottonwood Ranch broad-scale recharge project begins regular operations, that water will also be available to recapture.

The pilot project currently in development would include the installation of seven recapture wells on Program land at Cottonwood Ranch or nearby private lands, with the wells collectively having an estimated score of up to 1,500 AFY. Under an agreement with TBNRD, the Program will pay for the initial construction and annual operations and maintenance for the new recapture wells. Installation is anticipated to be completed in 2021. If the pilot project is successful, it may be scaled up in the future; assuming a consistent score for each well, 40 or more additional recapture wells may be required to achieve a total project score of 8,000 AFY.

### 5.2.2 North Platte leases

The 1953 Order Modifying and Supplementing Decree of October 8, 1945 allocated 40,000 AF of storage water in Glendo Reservoir for irrigation purposes. This water was divided, with 15,000 AFY for irrigation in southeastern Wyoming downstream of Guernsey Reservoir, and 25,000 AFY for irrigation in that portion of western Nebraska within the North Platte River basin. The 2001 North Platte River Settlement resulted in further modifications to the original decree. Appendix C of the Final Settlement Stipulation is the Amendment of the 1953 Order to Provide for Use of Glendo Storage Water. Paragraphs 2 and 5 are of particular interest for Program purposes:

2. With Glendo Reservoir storage supplies, each state may substitute or supplement quantities of storage water obtained under other contractual arrangements. Subject to contractual arrangements with the United States Bureau of Reclamation, including any required Endangered Species Act and NEPA compliance, **each state shall also enjoy unrestricted use of its respective storage allocation in Glendo Reservoir so long as the use is below Glendo Reservoir and within the Platte River Basin.**

**5. Storage water in Glendo Reservoir from either state's allocation may be used for fish and wildlife purposes downstream of Glendo Reservoir under contractual arrangements with the United States Bureau of Reclamation,** subject to approval of Wyoming for contracts for water from Wyoming's storage allocation and subject to approval of Nebraska for contracts for water from Nebraska's storage allocation. **Any water released pursuant to such an agreement shall not be considered natural flow but shall be administered and protected as storage water in accordance with state law within both Wyoming and Nebraska until used for its intended purposes.** (emphasis added)

In simpler terms, there is a storage water account in Glendo Reservoir historically designated for irrigation that can now be used for fish and wildlife purposes anywhere in the Platte River basin downstream of Glendo Reservoir, and releases of that water are to be administered and protected as storage water as it flows downstream to the place of use for such purposes.





As described in the 2000 Reconnaissance-Level WAP and discussed in Section 3.3.1 of this report, the original Tier I Glendo Reservoir Storage WAP project was based on the premise that a portion of Wyoming's 15,000 AF allocation would be available for leasing by the Program, but the project did not come to fruition because Wyoming needed the water for other mitigation purposes. That project having long been deemed inactive, the more recent pursuit of a portion of Nebraska's Glendo Reservoir storage allocation is considered to be part of a Nebraska water leasing strategy focused on the North Platte River.

Four Nebraska entities have long-term contracts with the U.S. Bureau of Reclamation for a portion of the state's 25,000 AF allocation of Glendo Reservoir storage water, as shown in **Table 5**.

**Table 5. Contracts for Nebraska's Glendo Reservoir storage water.**

District	Contractual Amount [AF]
Enterprise Irrigation District	3,000
Mitchell Irrigation District	12,000
Bridgeport Irrigation District	2,000
Central Nebraska Public Power and Irrigation District	8,000
<b>TOTAL =</b>	<b>25,000</b>

In 2015, Program staff began researching the viability of leasing Glendo storage water from users in Nebraska, and in 2019, the Program initiated informal discussions with representatives of the Enterprise Irrigation District (Enterprise) regarding a potential lease of the district's Glendo storage water. Enterprise currently has a 2009 contract with the U.S. Bureau of Reclamation (USBR) for 3,000 AFY for a term of 40 years. The contract restricts the water to irrigation use on the district's lands, but other provisions of the contract and the specific terms of the 2001 North Platte River Settlement described above suggest that leasing the water for Program purposes should be feasible.

Specifically, Subarticle 3.d. of the Enterprise contract with USBR provides for 90 percent (2,700 AF)<sup>48</sup> of the district's portion of the Glendo water supply to be paid for as needed during the irrigation season, with a significant caveat:

Provided, however, that if during any year of the term of this Contract, the United States should receive a firm offer or offer from a third party or parties, to purchase during such year, all, or a part of the remainder of the Contractor's portion of the Glendo Water Supply for that year, then after written notice by the Secretary to the Contractor, the Contractor will either agree to pay for the remaining water supply for that year, or pay for

<sup>48</sup> Subarticle 3.c. of the contract requires payment for the initial 10 percent (300 AF) of Enterprise's portion of the Glendo water supply on or before May 1.



such part as the Contractor desires to retain...and release to the United States as much of said water supply as the Contractor does not desire to retain.

Based on this contract language, the Program should be able to make an offer to USBR to purchase at least 2,700 AF of Enterprise's Glendo water in any given year. If Enterprise does not intend to utilize the Glendo water, all or a portion would be released to USBR, which retains the actual ownership of the water, and USBR would in turn lease that water to the Program. Leased Glendo water could then be delivered for storage in the Lake McConaughy EA until it is needed for Program purposes. If the full 3,000 AFY could be leased, the estimated score would be on the order of 2,500 AFY.

Although Enterprise does not own water rights for the Glendo storage water, the district has had contracts for it since the 1950s. The Program does not have data indicating how frequently Enterprise has actually taken delivery of Glendo water since that time, but the district regards it as an important reserve supply in dry years. Any contract for the Program to lease Glendo water would be with USBR, but Program staff believe it is in the interest of the Program's good neighbor policy that Enterprise should be compensated if the district is to relinquish a portion of their water supply. One possible means of compensation would be for the Program to provide financial support for much-needed repairs within the Enterprise irrigation system.

To that end, Program Special Advisor Anderson Consulting Engineers completed a review of critical structures in the Enterprise irrigation system and estimated rehabilitation costs in late 2019. The study found that the structures most in need of repair are the diversion dam, the headgates, and the flow measurement device. There are not yet any specific details of a potential lease arrangement between the Program and USBR and/or Enterprise, but this and possibly other leases from Glendo or other North Platte River sources will be a high priority WAP project pursuit for the Program in the early years of the First Increment Extension.

### 5.2.3 CNPPID storage lease

The 2009 WAP Update reported that the NCCW in Lake McConaughy available for purchase by the Program ranged from 7,151 AFY to 10,586 AFY. As documented in the 2014 WAP Update and discussed in Section 3.3.1 of this report, the GC declined a series of offers to purchase NCCW from CNPPID in 2013 due to high unit costs and required advance payment in full for 25 years of water deliveries, and that portion of the NCCW project was deemed inactive for the remainder of the First Increment.

Subsequently, an alternative proposal was developed for a CNPPID storage water lease from appropriation A-2374 in Lake McConaughy, but formal action was never taken. The 2014 WAP Update described this as a future Nebraska Water Leasing project with an estimated maximum volume of 5,000 AFY and an annual average of 3,900 AFY. It was noted that "some of the water for this lease could come from, though may not necessarily come from, water that was available for the NCCW option."



In 2018, new terms were proposed for the amount of water available each year under an NCCW or CNPPID storage lease, which would be variable as a function of the total storage volume in Lake McConaughy:

- a. If total storage contents in Lake McConaughy on October 1 equals or exceeds 1,200,000 acre-feet, the available water amount shall be 10,586 acre-feet.
- b. If total storage contents in Lake McConaughy on October 1 is less than 1,200,000 acre-feet, but equals or exceeds 1,000,000 acre-feet, the available water amount shall be 8,000 acre-feet.
- c. If total storage contents in Lake McConaughy on October 1 is less than 1,000,000 acre-feet but equals or exceeds 800,000 acre-feet, the available water amount shall be 6,000 acre-feet.
- d. If total storage contents in Lake McConaughy on October 1 is less than 800,000 acre-feet, or if CNPPID's Board of Directors has determined by October 1 that there will be less than a full water delivery allocation for CNPPID's irrigation customers, regardless of storage contents in Lake McConaughy, the available water amount shall be zero acre-feet.

The estimated score of 6,600 AFY for a CNPPID storage lease project is derived from a rough score analysis using modeled Lake McConaughy storage volumes for the period 1947-1994 and the water availability terms specified above. As of late 2019, the Program and CNPPID had not reached any agreement for long-term implementation of a storage lease, but the project remains feasible and may be pursued if needed during the First Increment Extension.

### 5.3 Nebraska grand water bargain

Late in the First Increment, Nebraska DNR and a group of Program stakeholders began negotiating a plan—informally referred to as the “Nebraska grand water bargain”—that would provide regulatory certainty and funding for Program water obligations far into the future. The plan encompasses a collection of active and potential future WAP projects in Nebraska, including groundwater recharge and storage water contributions to the Lake McConaughy EA:

- Groundwater recharge
  - CPNRD and NPPD canals
  - CNPPID system projects (Phelps County Canal, Elwood Reservoir, and Cottonwood Ranch broad-scale recharge)
  - Recapture wells pilot project and potential future expansion
- Storage water
  - CPNRD and NPPD surface water leases
  - Unspecified additional water that could come from leases from North Platte irrigation district(s), CNPPID storage leases, or other sources not yet identified.

In terms of regulatory certainty, the grand water bargain would replace the annual pilot exchange projects for the CPNRD and NPPD surface water leases with long-term agreements, although the annual volumes of water available from those projects may shift somewhat over time. With the



exception of the CPNRD canals, all other recharge projects were required to apply for temporary annual permits from Nebraska DNR; the grand water bargain may include permanent permits for those recharge diversions.

The negotiating parties have not agreed to the specific terms of such an arrangement, but in concept, the Program would make a large lump sum payment into an endowment that would provide funding to purchase water and continue operations of these projects for an extended period well beyond the First Increment.

#### **5.4 Water Plan tasks for the First Increment Extension**

The Nebraska grand water bargain is expected implemented by 2022. If this happens, the inclusion of the recapture wells, North Platte irrigation district leases, and/or the CNPPID storage lease would immediately result in a cumulative water projects score exceeding 120,000 AFY, at least on paper (additional time would likely be required to bring all of the component projects online and complete score analyses). However, if the Nebraska grand water bargain does not succeed, the Program will still need to negotiate long-term agreements for individual WAP projects such as the CPNRD and NPPD surface water leases. The current WSAs for several recharge projects are set to expire between 2023 and 2025, and those will need to be renegotiated to ensure continuation of the projects at least through the scheduled end of the First Increment Extension in 2032.

With development of the pilot scale recapture wells network already underway and plans to diligently pursue North Platte irrigation district leases in the early years of the First Increment Extension, the Program would most likely still be on track to reach at least 120,000 AFY no later than 2025. The Addendum to the Program Document<sup>49</sup> defines the water-related tasks that are to be undertaken after this goal is achieved:

- The Program is committed to achieving the minimum water milestone of 130,000 acre-feet in annual reductions to target flow shortages. However:
  - The Program recognizes there are fiscal constraints to achieving this milestone, and
  - Scientific investigations need to be completed to confirm the need for 130,000 acre-feet in annual reductions to target flow shortages.
- The Program will invest the resources available to achieve at least 120,000 acre-feet in annual reductions to target flow shortages as quickly as possible during the Extension and will also invest in the science necessary to determine if the additional 10,000 acre-feet is justified.
- The Program is committed to finding the additional resources necessary to achieve that additional 10,000 acre-feet if justified by the science.

<sup>49</sup> Addendum to the Program Document – First Increment Extension, Section II.B. Water Plan.



In order to accomplish these tasks, the Program must also do the following:

- Design, construct, and implement Water Action Plan (WAP) projects in time to enable scientific evaluation prior to the end of the Extension term.
- Renew water project agreements as deemed necessary to achieve water milestone.

Program water management activities during the First Increment Extension will be closely coordinated with the Adaptive Management Plan in order to ensure that the required scientific investigations are completed in an appropriate and effective manner. As noted in Section 3.1.3, the shift that occurred late in the First Increment to prioritize controllable water supplies, particularly those that can be held in the Lake McConaughy EA, will be instrumental to the successful completion of these tasks.



## **Appendix A**

PRRIP Water Milestone Update Memo (October 4, 2019)

DRAFT





**TO:** PRRIP WATER ADVISORY COMMITTEE  
**FROM:** PRRIP EXECUTIVE DIRECTOR'S OFFICE  
**SUBJECT:** PRRIP WATER MILESTONE UPDATE  
**DATE:** OCTOBER 4, 2019

## **I. STATUS OF WATER MILESTONE**

This memorandum provides an overview of the progress made by the Platte River Recovery Implementation Program to achieve the Water Milestone (Milestone #4). Milestone #4 is specifically related to the Water Action Plan (WAP) and is stated as follows, per the Program Milestones Document<sup>1</sup>:

“The [2000] Reconnaissance-Level Water Action Plan, as may be amended by the Governance Committee, will be implemented and capable of providing at least an average of 50,000 acre-feet per year of shortage reduction to target flows, or for other Program purposes, by no later than the end of the First Increment.”

The Explanatory Material and Schedules section of the Milestones Document identifies seven steps that “are necessary to implement the [Program] Water Plan and are needed to successfully complete Milestone 4.” While these steps provide guidance, they are not to be considered as individual milestones for purposes of Endangered Species Act compliance. The steps are listed below, along with their respective status updates as of late 2019.

### **Milestone Step 4.1: Ongoing**

“The Governance Committee is responsible for allocating funds necessary to implement the [2000] Reconnaissance-Level Water Action Plan in accordance with the Program budget, as approved by the signatories and may be revised by the Governance Committee.”

### **Milestone Step 4.2: Ongoing**

“The Governance Committee is responsible for acquiring the necessary permits for individual water related activities and for insuring compliance with all relevant local, state and federal laws and regulations.”

### **Milestone Step 4.3: Ongoing**

“The Governance Committee will determine which projects in the [2000] Reconnaissance-Level Water Action Plan are retained through the reconnaissance, feasibility, and implementation level. Water related activities implemented in accordance

<sup>1</sup> Program Document, Attachment 2



with the Water Plan will be credited to the Program’s long-term objective as set forth in the Platte River Recovery Implementation Program, Section III.A.3.a.(1) and the objective for the First Increment of the Program. As appropriate, the Governance Committee will develop and use protocols to determine what quantities of water will be credited to the individual projects.”

The Program operated in compliance with these three steps during the First Increment from 2007 to the present. Funding and permitting requirements were satisfied as needed by the Governance Committee (GC). Many projects were evaluated through the feasibility level, and several were carried forth to the implementation level. In addition, the GC accepted a set of general assumptions to estimate the quantity of water credited to the Program’s milestone from an implemented WAP project, which is referred to as the project score. **Appendix A** provides the generally accepted methodology used to score WAP projects and the assigned project scores as of October 2019.

#### **Milestone Step 4.4: Completed**

“Recognizing that the initial [2000] Reconnaissance –Level Water Action Plan (Attachment 5, Section 6 [of the Program Document]), is based on reconnaissance level project evaluations, the Governance Committee will complete feasibility studies on proposed projects and develop a Water Action Plan, if necessary, by the end of Year 3 of the First Increment [2009].”

The Program completed several feasibility studies to advance projects, such as the J-2 Regulating Reservoirs, Elm Creek Reregulating Reservoir and the Phelps County Canal Groundwater Recharge project. The Program also completed a 2009 WAP Update, in compliance with the specification that this be done by the end of Year 3 of the First Increment. A 2014 WAP Update provided further progress updates related to the 2000 Reconnaissance-Level WAP projects and new projects under consideration.

#### **Milestone Step 4.5: Ongoing**

“This Water Action Plan, as may be amended by the Governance Committee, will be capable of providing at least an average of 25,000 acre-feet per year of shortage reduction to target flows, or for other Program purposes, by the end of Year 8 of the First Increment [2014].”

#### **Scored WAP Projects 2007 through 2014 (First Increment Year 1 to Year 8)**

The Program successfully achieved this goal by implementing or initiating negotiations for implementation for the following projects by the end of Year 8: J-2 Regulating Reservoirs<sup>2</sup>, Phelps County Canal Groundwater Recharge<sup>3</sup>, and the Pathfinder Municipal Account Lease<sup>4</sup>.

<sup>2</sup> EDO 2012

<sup>3</sup> EDO 2013

<sup>4</sup> EDO 2014



The GC originally accepted scores for these three projects totaling 36,400 acre-feet per year (AFY) of deficit reduction relative to U.S. Fish and Wildlife Service (USFWS) target flows. Scored WAP Projects 2015 through 2019 (First Increment Year 9 to Year 13) Unanticipated and significant increases in the costs for materials and construction of the J-2 Regulating Reservoirs project were presented to the GC in September 2015. Following more than a year of unsuccessful attempts to develop a workable reduced-capacity version of the project, the previously accepted score of 30,600 AFY was retracted pending resolution of a hold placed on the project by the GC in November 2016. New and updated WAP project scores accepted by the GC since 2016 are shown in Table 1.

**Table 1. WAP Project Scores Accepted 2016-2019**

Project	Score [AFY]	Date Accepted
No-Cost Net Controllable Conserved Water (NCCW) <sup>5</sup>	260	March 2016
Phelps County Canal Groundwater Recharge + Cook Recapture Well <sup>6</sup>	2,860	September 2016
Pathfinder Municipal Account Lease <sup>7</sup>	6,350	September 2018
CNPPID Irrigator Lease <sup>8</sup>	1,900	June 2019
Elwood Reservoir Groundwater Recharge <sup>9</sup>	2,800	September 2019
<b>TOTAL</b>	<b>14,170</b>	

The Program's share of the Phelps County Canal Groundwater Recharge project was increased from 50 percent (1,800 AFY) to 75 percent (2,700 AFY) when the GC approved a Water Service Agreement (WSA) reflecting the modified allocation and in conjunction with the score analysis for the Cook Recapture Well. The score analysis for the Pathfinder Municipal Account Lease was updated to better reflect actual operational yields, and the GC accepted a revised score of 6,350 AFY, an increase of 2,350 AFY over the original 4,000 AFY score. The combined total of active project scores accepted by the GC was 14,170 AFY as of October 2019 (Year 13 of the First Increment).

Unscored WAP Projects in Various Stages of Development or Implementation

Since the start of Year 9 of the First Increment, the Program entered into WSAs to continue or initiate the leasing of surface water from several stakeholder districts or the diversion of excess flows for groundwater recharge. Active projects that have not been scored yet, but provide an annual yield for the Program include the following:

- Central Platte Natural Resources District (CPNRD) WSA for diversion of excess flows for groundwater recharge during the non-irrigation season, ongoing since 2013, and the leasing of surface water from the Thirty Mile, Cozad, and Orchard-Alfalfa canals. From 2015-2017, leased surface water was measured and returned to the river at the canal

<sup>5</sup> EDO 2016a

<sup>6</sup> EDO 2016b

<sup>7</sup> EDO 2018a

<sup>8</sup> EDO 2019a

<sup>9</sup> EDO 2019b



headgates during the irrigation season. These were normal to wet years with fewer days of shortage, which significantly limited the operational yield (i.e., actual shortage reduction at Grand Island) of the project compared to the large volumes of water leased. In 2018, a pilot exchange project was initiated to instead credit that surface water to the Lake McConaughy EA following the end of the irrigation season. This retooled approach to the surface water lease was continued in 2019.

- Nebraska Public Power District (NPPD) WSA for excess flow deliveries into the Gothenburg and Dawson County canals for recharge operations, ongoing since 2015.
- NPPD WSA for a surface water exchange from the Gothenburg and Dawson County canals to be credited to the Lake McConaughy EA following the irrigation season, initiated in 2019.

Since September 2015, the EDO has actively pursued the development and implementation of new project concepts, initially to supplement a reduced-capacity J-2 Regulating Reservoirs project and eventually to replace that project entirely. These new projects, including broad-scale recharge, slurry wall gravel pits, and the acquisition and retirement of irrigated farmland (“acquire & retire”) were not included in any of the previous Water Action Plan documents.

The new project concepts were critical components of the Water Plan A and B options presented to the GC in July 2016. These revised water plans demonstrated that the shortage reduction goal of Milestone #4 (50,000 AFY) could still be successfully achieved with smaller or no J-2 Regulating Reservoirs. The EDO presented a further-refined Water Projects Work Plan to the GC in March 2017, which showed that projects with combined scores exceeding 40,000 AFY could be developed by 2025 (Year 6 of a proposed First Increment Extension). The 40,000 AFY is consistent with current plans to achieve 120,000 AFY of target flow deficit reductions as quickly as possible during the First Increment Extension.

In March 2017, a contractor was selected for engineering design and construction administration of the first broad-scale recharge project, to be developed at the Program’s Cottonwood Ranch complex. A pipeline will deliver divertible excess flow water from the Phelps County Canal to Cottonwood Ranch. Construction of the project began in October 2018 and is expected to conclude in October 2019. Recharge operations will commence in 2020, once vegetation is established on the berms that retain water to create the recharge ponds.

Following a recommendation from the GC to pursue development of a full-scale storage facility, the Lakeside gravel pit located southwest of Elm Creek and adjacent to other Program properties was selected for the initial slurry wall storage project and acquired by the Program in 2017. Engineering design of the slurry wall and other facilities was completed in 2019. Given the high construction cost estimates, a comparatively small anticipated project score, and lower-cost alternatives with higher expected yields, the GC decided not to proceed with permitting and construction of the project until such time that the project is deemed necessary to meet the First Increment Water Objective.

The Program’s first acquire & retire transaction was completed for a property under the Alliance Irrigation District near Bayard, Nebraska in September 2016. Preliminary efforts to quantify the



volume of transferable consumptive use water were made, but the GC gave direction for the property to be sold in 2018, and the sale was completed in 2019. The acquire & retire concept was abandoned as a source of water for the WAP in favor of additional water leasing pursuits that could contribute to the Lake McConaughy EA.

Estimated scores for the five projects that are currently active, but for which score analyses have not yet been completed as of September 2019 are shown in Table 2.

**Table 2. Estimated scores for other active WAP projects**

Project	Estimated Score [AFY]
CPNRD groundwater recharge (Thirty Mile, Cozad, Orchard-Alfalfa canals)	600
CPNRD surface water lease	10,800
NPPD groundwater recharge (Gothenburg and Dawson County canals)	1,800
NPPD surface water lease	2,750
Cottonwood Ranch broad-scale recharge	4,000
<b>TOTAL</b>	<b>19,950</b>

The combined estimated score for all active WAP projects is 34,120 AFY. At this time, it is anticipated that the remaining water required to meet Milestone #4 will come from some combination of (1) a well field to recapture groundwater intentionally recharged through the Phelps County Canal and Elwood Reservoir; (2) leases of surface water from Nebraska irrigators or irrigation districts along the North Platte River upstream of Lake McConaughy; and/or (3) leasing of conserved water stored in Lake McConaughy from the CNPPID.

**Milestone Step 4.6: Ongoing**

“The Governance Committee will ensure that projects implemented under this Water Action Plan are operated in accordance with approved operating plans and that they are having the intended effects on Program purposes.”

**Milestone Step 4.7: Ongoing**

“The Governance Committee will ensure that water produced by projects implemented under this Water Action Plan is included in approved tracking and accounting procedures and that these projects are coordinated with other Program activities including other water projects and with the management of the Environmental Account.”

The Program actively operated and managed WAP projects in compliance with the specifications of these milestone steps through 2019. Annual reports for the Phelps County Canal Groundwater Recharge Project were prepared for the 2012-2013 through 2016-2017 recharge seasons. Accounting procedures for other WAP projects were developed and refined between 2017 and 2019. The 2018 PRRIP Water Projects Accounting memo<sup>10</sup> documented project operations and

<sup>10</sup> EDO 2019c



accounting through the end of that calendar year, including comparison of operational yields versus approved scores.

## II. FEASIBILITY STUDIES AND EVALUATIONS

The following project feasibility studies and other evaluations have been completed to further WAP projects and Milestone #4:

- Water Management Study Phases I and II: Evaluation of Pulse Flows for the Platte River Recovery Implementation Program (2008)<sup>11</sup>
- Platte River Recovery Implementation Program 2009 Water Action Plan Update (2010)<sup>12</sup>
- Nebraska Ground Water Recharge Pre-Feasibility Study (2010)<sup>13</sup>
- CNPPID Reregulating Reservoir: Elwood and J-2 Alternatives Analysis Project Report (2010)<sup>14</sup>
- Canal Winter Operations Feasibility Study (2011)<sup>15</sup>
- Feasibility Study – Elm Creek Regulatory Reservoir (2011)<sup>16</sup>
- CNPPID J-2 Reregulating Reservoir Feasibility Report (2012)<sup>17</sup>
- Pilot-Scale Recharge Report for Nebraska Groundwater Recharge Feasibility Study (2012)<sup>18</sup>
- Conceptual Design Report: J-2 Regulating Reservoir Project (2013)<sup>19</sup>
- Platte River Recovery Implementation Program 2014 Water Action Plan Update (2015)<sup>20</sup>
- Funk Lagoon Feasibility Study (2015)<sup>21</sup>
- Water Leasing White Paper (2015)<sup>22</sup>
- Broad-Scale Recharge Summary of Concept, Work Completed, and 2016 Work Plan (2016)<sup>23</sup>
- Broad-Scale Recharge Status Update (2016)<sup>24,25</sup>
- Conceptual Example of Slurry Wall Gravel Pits for PRRIP (2016)<sup>26</sup>
- Update on Slurry Wall Gravel Pits for PRRIP (2016)<sup>27</sup>

<sup>11</sup> Boyle Engineering Corporation et al. 2008a,b

<sup>12</sup> EDO and WAC 2010

<sup>13</sup> EDO et al. 2010

<sup>14</sup> Olsson Associates and Black & Veatch 2010

<sup>15</sup> Applegate Group, Inc. 2011

<sup>16</sup> Olsson Associates 2011

<sup>17</sup> Olsson Associates and Black & Veatch 2012

<sup>18</sup> EA Engineering, Science, and Technology, Inc., and Daniel B. Stephens and Associates, Inc. 2012

<sup>19</sup> RJH Consultants, Inc. 2013

<sup>20</sup> EDO and WAC 2015

<sup>21</sup> EDO 2015a

<sup>22</sup> EDO 2015b

<sup>23</sup> EDO 2016c

<sup>24</sup> EDO 2016d

<sup>25</sup> EDO 2016e

<sup>26</sup> EDO 2016f

<sup>27</sup> EDO 2016g





- Program Water Plan – Plan A and Plan B (2016)<sup>28</sup>
- Osborne Property Status and Work Plan (2016)<sup>29</sup>
- Water Action Plan Project Status and Scores (2017)<sup>30</sup>
- Water Action Plan Projects Update (2017)<sup>31</sup>
- Water Action Plan Project Status and Scores (2018)<sup>32</sup>
- Water Action Plan Projects Status and Scores (2019)<sup>33</sup>

Projects that were not recommended to move forward into implementation include the Elm Creek Reregulating Reservoir, the For-Purchase NCCW project, the Glendo Reservoir storage project, and the Funk Lagoon as a Nebraska Groundwater Management project, as discussed below:

- Elm Creek Reregulating Reservoir: The GC agreed not to move forward with the Elm Creek Reregulating Reservoir at the June 2011 meeting, as the J-2 Regulating Reservoir was the preferred reservoir site.
- For-Purchase NCCW: Consistent with its FERC license obligation, the CNPPID made an initial offer to the Program on March 4, 2013 with subsequent offers made on September 5, 2013 and December 2, 2013 (final offer) for the For-Purchase NCCW. The GC did not accept the terms of the final offer at the December 2013 meeting due to the high unit cost and the required upfront payment for the total volume of water purchased through 2038. However, as discussed in the 2014 WAP Update, “conserved water retained in the CNPPID’s account in Lake McConaughy could be a source of water for a storage lease with the CNPPID.”
- Glendo Reservoir storage: Wyoming’s allocation of Glendo storage water is needed to meet all or a portion of the replacement water obligations described below; therefore, Wyoming’s allocation of Glendo storage water is no longer directly available for Program uses. The Final 2001 Settlement Stipulation for the Nebraska v. Wyoming lawsuit modified the original 1945 North Platte Decree (as amended in the 1953 Modified Decree), and the provisions in the stipulation (Exhibits 10 and 11) required Wyoming to provide replacement water for depletions to the North Platte River from wells and tributaries from the Whalen Diversion Dam to the state line reach.
- Funk Lagoon: The EDO completed a feasibility of the site as a WAP project and presented the results to the WAC at the October 2015 meeting. The WAC recommended the Program not pursue the project and the GC was updated on the feasibility study results at the December 2015 meeting.

These projects are regarded as inactive for the remainder of the First Increment for budgetary or other reasons but could be reevaluated if conditions change.

<sup>28</sup> Kenny and EDO 2016

<sup>29</sup> EDO 2016h

<sup>30</sup> EDO 2017a

<sup>31</sup> EDO 2017b

<sup>32</sup> EDO 2018b

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## APPENDIX A: ACCEPTED ASSUMPTIONS AND SCORES

The GC approved a set of scoring assumptions recommended by the Scoring Subcommittee in 2010. The methodology was used to score the J-2 Regulating Reservoir (two-cell concept), the Phelps County Canal Groundwater Recharge project, the Pathfinder Municipal Account Lease, the No-Cost Net Controllable Conserved Water project and the Cook Tract Recapture project. The key assumptions are listed in **Table A-1**. **Table A-2** provides a list of projects scored to-date, as recommended by the Scoring Subcommittee and assigned by the GC.

**Table A-1. Key scoring assumptions for WAP projects, accepted by the GC.**

Component	Data
Hydrology	OpStudy Adjusted Present Condition with Three State Projects (without pulse flows)
Analysis Period	1947-1994
Analysis Time Step (A)	Daily or Monthly
Excesses/Shortages Calculation	Calculated at Grand Island
Target Flows	Appendix A-5, Column 4 or 8 in the Water Plan Reference Materials of the Program Document
Routing (B)	WMC Loss Model

Notes:

- (A) The scoring of project yields against USFWS shortages is completed on a monthly basis for most projects; however, the J-2 Regulating Reservoir project was completed on a daily time step.
- (B) The WMC Loss Model was updated in the Water Management Study Phase I (2008) by Boyle Engineering Corporation. It was originally developed by the Program's Water Management Committee, as required by milestone W14-1 of the Cooperative Agreement.



**Table A-2. Project scores assigned by the GC.**

WAP Project	Program Score (AFY)	Approval Date	Notes
J-2 Regulating Reservoir	<del>30,600</del>	Mar-2012; RETRACTED Nov-16	The GC approved a score of 30,600 AFY at the March 2012 GC meeting for an assumed 75% of the project (assuming the NDNR would receive 25%). The score is based on a two-cell reservoir concept with a capacity of 13,959 AF, with "Area 2" unavailable for Program uses during the irrigation season due to the CNPPID's hydrocycling mitigation activities. <b>This project was placed on hold by the GC in November 2016. The assigned score was retracted, pending resolution of the hold.</b>
Phelps County Canal Groundwater Recharge	2,700	Dec-13; Sep-16	The GC approved a score of 1,800 AFY at the December 2013 meeting for an assumed 50% of the project (assuming the NDNR would receive 50%). The Phelps recharge score was increased from 1,800 AFY to 2,700 AFY to represent the draft permanent agreement with the CNPPID of 75% of deliveries to the Program (25% to the NDNR). <b>The GC approved the score update in September 2016 in conjunction with the Cook recapture well score.</b>
Cook Tract Recapture Project	160	Sep-16	A recapture well was constructed on the Cook tract to route recharged water (from the Phelps County Canal) to the river more quickly during USFWS target flow shortages. <b>A score of 160 AFY was approved by the GC in September 2016.</b>
Pathfinder Municipal Account Lease	6,350	Mar-14; Sep-18	<b>The GC approved a score of 4,000 AFY at the March 2014 meeting</b> , based on 4,800 AF available in Pathfinder Reservoir each year (the total volume is 38,400 AF per the agreement with the Wyoming Water Development Commission). <b>The GC approved an updated score of 6,350 AFY in September 2018</b> based on analyses revised to better reflect actual operations and the regular availability of additional water from the Pathfinder Municipal Account.
No-Cost Net Controllable Conserved Water (NCCW)	260	Mar-16	Each year 314 AF are added to the Lake McConaughy Environmental Account at no cost to the Program. <b>The GC approved a score of 260 AFY at the March 2016 meeting.</b>
CNPPID Irrigator Lease	1,900	Jun-19	<b>The GC approved a score of 1,900 AFY at the June 2019 meeting</b> , based roughly on 2019 project enrollment of 2,948 acres (out of max 3,000 acres) and yield of 9 inches per acre (0.75 AF/acre).
Elwood Reservoir Groundwater Recharge	2,800	Sep-19	<b>The GC approved a score of 2,800 AFY at the September 2019 meeting</b> , based on maximum annual recharge of 30,000 AF, a 5,600 AFY total score, and 50% allocation to the Program.
<b>TOTAL PROGRAM SCORE FOR ACTIVE PROJECTS</b>	<b>14,170</b>		<b>Total scored projects yielding water; does not include J-2 Regulating Reservoir</b>





## **Appendix B**

PRRIP Water Objective Summary (September 2019)

PRRIP Water Objective Summary (December 2019)

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**WATER OBJECTIVE SUMMARY****SEPTEMBER 2019**

During the First Increment of the Platte River Recovery Implementation Program (Program), progress toward the Program objectives for Endangered Species Act (ESA) compliance purposes are measured through the achievement of Milestones. The Program's First Increment Water Objective is to achieve at least an average of 130,000 AF per year of shortage reduction to target flows. The three initial state projects (Pathfinder Reservoir Environmental Account, Lake McConaughy Environmental Account, and Tamarack I) were credited with providing the first 80,000 AF of shortage reduction. Milestone #4 calls for implementation of the Water Action Plan (WAP) to provide additional shortage reduction of at least 50,000 AF. The following tables summarize Program progress towards meeting the First Increment Water Objective and associated milestone.

***EXISTING WATER PROJECTS***

PROJECT	SCORING STATUS	SCORE (AF)	EST. COST (2018-2032)	NOTES	CUMULATIVE SCORE (AF)	CUMULATIVE COST (\$M)
EA Storable Natural Inflow	Complete	80,000	\$-		80,000	\$0.00
Pathfinder Modification	Complete					
Tamarack I	Complete					
No-Cost NCCW	Complete	260	\$-		80,260	\$0.00
Pathfinder Municipal	Complete	6,350	\$7,170,000	Score approved 9/2018. Cost reflects avg releases.	86,610	\$7.20
NPPD Groundwater Recharge	Estimated	1,800	\$2,312,000		88,410	\$9.50
Phelps County Recharge	Complete	2,860	\$1,606,000	Includes costs and score for Cook recapture well	91,270	\$11.10
CPNRD Groundwater Recharge	Estimated	600	\$1,130,000		91,870	\$12.20
Elwood Recharge	In Progress	2,800	\$8,165,000	Scoring Subcommittee recommended score	94,670	\$20.40
Cottonwood Ranch BSR	Estimated	4,000	\$10,000,000	Will be refined when operational data available	98,670	\$30.40
CPNRD Surface Water Transfer	Estimated	10,800	\$21,142,000	Reflects lower cost during Extension	109,470	\$51.50
CNPPID Irrigator Lease	Complete	1,900	\$9,532,000	Score approved 6/2019.	111,370	\$61.00
NPPD Surface Water Transfer	Estimated	2,750	\$3,932,000	Based on 3,121 AF max annual transfer	114,120	\$64.90
	<b>TOTALS</b>	<b>114,120</b>	<b>\$64,989,000</b>			

**POTENTIAL FUTURE WATER PROJECTS**

PROJECT	PROJECT STATUS	EST. SCORE (AF)	EST. COST (2018-2032)	STATUS	CUMULATIVE SCORE (AF)	CUMULATIVE COST (\$M)
Recharge Recapture Project(s)	Conceptual	8,000	\$7,000,000	Conceptual design. Implementation in 2020	122,120	\$71.90
North Platte Irrigator Lease(s)	Conceptual	2,500	\$5,900,000	Preliminary discussions	124,620	\$77.80
Lakeside Gravel Pit	Final Design	2,800	\$10,000,000	Final design	127,420	\$87.80
CNPPID NCCW Lease	Conceptual	6,600	\$8,991,000	Preliminary discussions	134,020	\$96.80
	<b>TOTALS</b>	<b>19,900</b>	<b>\$31,891,000</b>			

**COMBINED EXISTING AND FUTURE WATER PROJECT SCORE AND COST ESTIMATE**

	SCORE (AF)	ESTIMATED COST (2018-2032)
<b>EXISTING WATER PROJECTS</b>	114,120	\$64,989,000
<b>POTENTIAL FUTURE WATER PROJECTS</b>	19,900	\$31,891,000
	<b>134,020</b>	<b>\$96,880,000</b>
<b>APPROXIMATE 2018 - 2032 WATER BUDGET</b>		<b>\$85,000,000</b>

**WATER OBJECTIVE SUMMARY****DECEMBER 2019**

During the First Increment of the Platte River Recovery Implementation Program (Program), progress toward the Program objectives for Endangered Species Act (ESA) compliance purposes are measured through the achievement of Milestones. The Program's First Increment Water Objective is to achieve at least an average of 130,000 AF per year of shortage reduction to target flows. The three initial state projects (Pathfinder Reservoir Environmental Account, Lake McConaughy Environmental Account, and Tamarack I) were credited with providing the first 80,000 AF of shortage reduction. Milestone #4 calls for implementation of the Water Action Plan (WAP) to provide additional shortage reduction of at least 50,000 AF. The following tables summarize Program progress towards meeting the First Increment Water Objective and associated milestone.

***EXISTING WATER PROJECTS***

PROJECT	SCORING STATUS	SCORE (AF)	EST. COST (2020-2032)	NOTES	CUMULATIVE SCORE (AF)	CUMULATIVE COST (\$M)
EA Storable Natural Inflow	Complete	80,000	\$-		80,000	
Pathfinder Modification	Complete					
Tamarack I	Complete					
No-Cost NCCW	Complete	260	\$-		80,260	
Phelps County Recharge	Complete	2,860	\$2,086,000	WSA through 2023. Includes Cook recapture well.	83,120	
Pathfinder Municipal	Complete	6,350	\$8,112,000	Lease contract through 2032.	89,470	
Elwood Recharge	Complete	2,800	\$11,695,000	WSA through 2023.	92,270	
CNPPID Irrigator Lease	Complete	1,900	\$8,710,000	Lease agreement through 2023.	94,170	
NPPD Groundwater Recharge	Estimated	1,800	\$2,567,000	WSA through 2025.	95,970	
CPNRD Groundwater Recharge	Estimated	600	\$2,567,000	WSA through 2024.	96,570	
Cottonwood Ranch BSR	Estimated	4,000	\$10,000,000	Construction complete, operations to begin 2020.	100,570	
CPNRD Surface Water Lease	Estimated	10,800	\$TBD	Pilot exchange in 2018 and 2019.	111,370	
NPPD Surface Water Lease	Estimated	2,750	\$TBD	Pilot exchange in 2019.	114,120	
	<b>TOTALS</b>	<b>114,120</b>	<b>\$TBD</b>			<b>\$TBD</b>

**POTENTIAL FUTURE WATER PROJECTS**

PROJECT	PROJECT STATUS	EST. SCORE (AF)	EST. COST (2020-2032)	STATUS	CUMULATIVE SCORE (AF)	CUMULATIVE COST (\$M)
Recharge Recapture Project(s)	Conceptual	8,000	\$7,000,000	Conceptual design. Nebraska DNR may develop.	122,120	
North Platte Irrigator Lease(s)	Conceptual	2,500	\$TBD	Preliminary discussions	124,620	
Lakeside Gravel Pit	Final Design	2,800	\$12,000,000	Final design	127,420	
CNPPID NCCW Lease	Conceptual	6,600	\$TBD	Preliminary discussions	134,020	
	<b>TOTALS</b>	<b>19,900</b>	<b>\$TBD</b>			<b>\$TBD</b>

**COMBINED EXISTING AND FUTURE WATER PROJECT SCORE AND COST ESTIMATE**

	SCORE (AF)	ESTIMATED COST (2018-2032)
<b>EXISTING WATER PROJECTS</b>	<i>114,120</i>	<i>\$TBD</i>
<b>POTENTIAL FUTURE WATER PROJECTS</b>	<i>19,900</i>	<i>\$TBD</i>
	<b>134,020</b>	<b>\$TBD</b>
<b>APPROXIMATE 2020 - 2032 WATER BUDGET</b>		<b>\$TBD</b>



## **Appendix C**

### **PRRIP Water Action Plan Projects Status and Scores Memo (October 4, 2019)**

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**TO:** PRRIP WATER ADVISORY COMMITTEE  
**FROM:** PRRIP EXECUTIVE DIRECTOR'S OFFICE  
**SUBJECT:** PRRIP WATER ACTION PLAN PROJECTS STATUS AND SCORES  
**DATE:** OCTOBER 4, 2019

The Platte River Recovery Implementation Program (PRRIP or Program) has a water objective of reducing deficits to U.S. Fish and Wildlife Service (USFWS)-defined target flows by 130,000 to 150,000 acre-feet per year (AFY) by the end of the Program's First Increment in 2019. The three initial state projects—the Pathfinder Modification Environmental Account (EA) in Wyoming, Tamarack I in Colorado, and the Lake McConaughy EA in Nebraska—collectively meet 80,000 AFY of that objective. The Program was tasked with implementing a Water Action Plan (WAP) to meet a milestone of developing projects to fulfill the remaining 50,000 AFY to 70,000 AFY of shortage reduction.

This document provides a brief update to project status information that was presented in the 2014 Water Action Plan (WAP) Update. In that report, completed more than four years ago, the WAP included 14 potential water supply projects or project categories. Additional projects or project concepts developed after the 2014 WAP Update are also included here. Projects were previously prioritized on a 3-tiered system and were identified as active at the time, anticipated for future activity near the end of the First Increment or beyond, or inactive for the duration of the First Increment. This update eliminates the Tier 1, 2, and 3 designations, which have become less effective for prioritizing projects over time. Instead, the present update focuses on the current project status as active, future, or inactive as the end of the First Increment approaches in late 2019.

The table below summarizes the present status of each WAP project or project category. For the purposes of this memo, “active” projects are those that are currently operational or under construction. “Future” projects are currently in various stages of planning or design; some combination of these projects is needed to meet the First Increment Water Objective. Projects identified as “inactive” are those for which there is currently no ongoing pursuit or evaluation underway.

#### WAP Projects Brief Status Updates

Project	Location
<b>Active Projects</b>	
Nebraska Groundwater Recharge <ul style="list-style-type: none"><li>Phelps County Canal<ul style="list-style-type: none"><li><b>Program score = 2,700 AFY.</b></li><li>Non-irrigation season recharge of divertible excess flows.</li><li>Program allocation is 75 percent.</li><li>CNPPID Water Service Agreement extended through 2023.</li></ul></li></ul>	Nebraska



Project	Location
<p>Nebraska Groundwater Recharge (cont'd)</p> <ul style="list-style-type: none"> <li>• Cook recapture well <ul style="list-style-type: none"> <li>○ <b>Program score = 160 AFY.</b></li> <li>○ Recaptures groundwater intentionally recharged through Phelps County Canal, can pump when there are deficits to USFWS target flows and no risk of ice issues.</li> <li>○ Well permit issued by Tri-Basin NRD in 2015.</li> </ul> </li> <li>• CPNRD canals <ul style="list-style-type: none"> <li>○ Non-irrigation season recharge of divertible excess flows through Thirty Mile, Cozad, and Orchard-Alfalfa canals.</li> <li>○ Water Service Agreement for recharge diversions up to 5,000 AF per year extended through 2024.</li> </ul> </li> <li>• NPPD canals <ul style="list-style-type: none"> <li>○ Non-irrigation season recharge of divertible excess flows through the Gothenburg and Dawson County canals.</li> <li>○ Water Service Agreement extended through 2025.</li> </ul> </li> <li>• Elwood Reservoir <ul style="list-style-type: none"> <li>○ <b>Program score = 2,800 AFY.</b></li> <li>○ Primarily non-irrigation season recharge of divertible excess flows; recharge during irrigation season is possible at times.</li> <li>○ Program allocation is 50 percent, with upper limit of 30,000 AF per calendar year diversions into reservoir for recharge.</li> <li>○ CNPPID Water Service Agreement extended through 2023.</li> </ul> </li> <li>• Broad-Scale Recharge <ul style="list-style-type: none"> <li>○ Project developed at Cottonwood Ranch complex.</li> <li>○ Engineering design and permitting completed in 2018, construction completed in 2019, project expected to be operational in 2020 after vegetation is established.</li> <li>○ Initial Water Service Agreement with CNPPID through 2032.</li> <li>○ No additional BSR projects are planned at this time.</li> </ul> </li> </ul>	Nebraska
<p>Net Controllable Conserved Water (No Cost)</p> <ul style="list-style-type: none"> <li>• <b>Program score = 260 AFY.</b></li> <li>• Conservation measures that made this water available were funded by USBR grant, water credited to Lake McConaughy EA at no cost to the Program.</li> </ul>	Nebraska
<p>Pathfinder Municipal Account Lease</p> <ul style="list-style-type: none"> <li>• <b>Program score = 6,350 AFY.</b></li> <li>• Program leases base volume of 4,800 AFY, with option for up to 4,800 AF additional depending on hydrologic conditions.</li> <li>• Lease agreement with Wyoming Water Development Office extended through 2032.</li> </ul>	Wyoming



Project	Location
<p>Nebraska Water Leasing</p> <ul style="list-style-type: none"> <li>• CPRND canals <ul style="list-style-type: none"> <li>○ Surface water lease from Thirty Mile, Cozad, and Orchard-Alfalfa canals.</li> <li>○ From 2015-2017, water measured and returned to river at canal headgates during irrigation season.</li> <li>○ During 2018 and 2019, pilot exchange project added leased water to Lake McConaughy EA following end of irrigation season.</li> </ul> </li> <li>• CNPPID irrigators <ul style="list-style-type: none"> <li>○ <b>Project score = 1,900 AF.</b></li> <li>○ 9 inches/acre into EA following end of irrigation season, enrollment now capped at 3,000 acres. <ul style="list-style-type: none"> <li>▪ 1,037 acres in 2016 (778 AF).</li> <li>▪ 1,275 acres in 2017 (956 AF).</li> <li>▪ 2,055 acres in 2018 (1,541 AF).</li> <li>▪ 2,948 acres in 2019 (2,211 AF).</li> </ul> </li> <li>○ Lease agreement extended through 2023.</li> </ul> </li> <li>• NPPD canal(s) <ul style="list-style-type: none"> <li>○ Surface water lease from Gothenburg and Dawson County canals.</li> <li>○ Pilot exchange project in 2019 to add water to Lake McConaughy EA following end of irrigation season.</li> </ul> </li> </ul>	Nebraska
Future Projects	
<p>Nebraska Groundwater Recharge</p> <ul style="list-style-type: none"> <li>• Recharge Recapture Well Field Project(s) <ul style="list-style-type: none"> <li>○ Recapture groundwater intentionally recharged through Phelps County Canal, Elwood Reservoir, and Cottonwood Ranch.</li> <li>○ Conceptual design in progress in 2019. Construction of first wells anticipated in 2020.</li> </ul> </li> </ul>	Nebraska
<p>Nebraska Water Leasing</p> <ul style="list-style-type: none"> <li>• CNPPID Storage and/or NCCW Lease <ul style="list-style-type: none"> <li>○ Water would be credited to Lake McConaughy EA.</li> </ul> </li> <li>• North Platte Irrigator/Irrigation District Lease(s) <ul style="list-style-type: none"> <li>○ Water would be delivered downstream and credited to Lake McConaughy EA.</li> </ul> </li> </ul>	Nebraska
<p>Nebraska Water Management Incentives</p> <ul style="list-style-type: none"> <li>• Program sponsored conservation-related UNL-TAPS and PRECIP programs in 2017 and 2018.</li> <li>• Concept may be expanded to include irrigation system improvements to facilitate future water leasing projects.</li> </ul>	Nebraska



Project	Location
<b>Slurry Wall Gravel Pit Storage</b> <ul style="list-style-type: none"><li>GC recommended pursuit of full-scale initial slurry wall storage project, Lakeside pit acquired in 2017.</li><li>Engineering design completed in 2019.</li><li>Permitting and construction not to proceed at this time per GC consensus.</li></ul>	Nebraska
<b>Inactive Projects</b>	
<b>J-2 Regulating Reservoirs</b> <ul style="list-style-type: none"><li>Pre-feasibility, feasibility, and score analyses completed by 2013.</li><li>Design activities continued into 2016, when GC placed project on hold due to escalating materials and construction costs and land acquisition issues.</li></ul>	Nebraska
<b>Elm Creek Reregulating Reservoir</b> <ul style="list-style-type: none"><li>Feasibility study completed in January 2011; based on extensive concerns, GC declined to move forward.</li></ul>	Nebraska
<b>Acquire &amp; Retire</b> <ul style="list-style-type: none"><li>Single property with small Alliance Irrigation District allocation acquired in 2016, site improvements were constructed in 2018. Pursuits to acquire additional water from nearby properties were unsuccessful. Property was sold in 2019 per direction of GC.</li><li>No further plans for this type of water acquisition at this time.</li></ul>	Nebraska
<b>Glendo Reservoir Storage</b> <ul style="list-style-type: none"><li>Not available for Program use. Wyoming's allocation of Glendo storage water is needed to meet replacement water obligations in compliance with the 2001 Modified North Platte Decree.</li></ul>	Wyoming
<b>Colorado Groundwater Management</b> <ul style="list-style-type: none"><li>Additional recharge capacity for the Tamarack III project not expected to be added in the near future.</li></ul>	Colorado
<b>Nebraska Groundwater Management</b> <ul style="list-style-type: none"><li>Feasibility assessment for Funk Lagoon project completed in 2015, WAC recommended no further pursuit as WAP project.</li><li>No other potential projects under consideration at this time.</li></ul>	Nebraska
<b>Power Interference</b> <ul style="list-style-type: none"><li>No new information developed since 2000 Reconnaissance-Level WAP. No plans to pursue during First Increment or beyond.</li></ul>	Nebraska
<b>Wyoming Water Leasing</b> <ul style="list-style-type: none"><li>No new information developed since 2000 Reconnaissance-Level WAP. No plans to pursue during First Increment or beyond.</li></ul>	Wyoming
<b>LaPrele Reservoir</b> <ul style="list-style-type: none"><li>No new information developed since 2000 Reconnaissance-Level WAP. No plans to pursue during First Increment or beyond.</li></ul>	Wyoming