2014 WATER ACTION PLAN UPDATE

May 2015

2014 Water Action Plan Project Update: **Active, Future & Inactive WAP Projects**

Prepared by Executive Director's Office staff of
Platte River Recovery Implementation Program
4111 4th Avenue, Suite 6
Kearney, NE 68845

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Acronyms

AF	acre-feet
AFY	acre-feet per year
cfs	cubic feet per second
CNPPID	The Central Nebraska Public Power and Irrigation District
CPNRD	Central Platte Natural Resources District
EA	Environmental Account (in Lake McConaughy)
EDO	Executive Director's Office
FERC	Federal Energy Regulatory Commission
GC	Governance Committee
NCCW	Net Controllable Conserved Water
NDNR	Nebraska Department of Natural Resources
NPNRD	North Platte Natural Resources District
NPPD	Nebraska Public Power District
NRD	Natural Resources District
PRRIP or Program	Platte River Recovery Implementation Program
SDHF	Short Duration High Flow
USBR	United States Bureau of Reclamation
USFWS	United States Fish and Wildlife Service
WAC	Water Advisory Committee
WAP	Water Action Plan for the Program
WWDC	Wyoming Water Development Commission

Definitions

Associated habitat: With respect to the interior least tern, whooping crane, and piping plover: habitat located in the Platte River valley beginning near Lexington, Nebraska, and extending eastward to Chapman, Nebraska. With respect to the pallid sturgeon: habitat located in the lower Platte River between its confluence with the Elkhorn River and its confluence with the Missouri River.

Excess flows: Streamflows greater than the water right appropriations and in excess of the maximum of either the USFWS target flows or the CPNRD/Nebraska Game and Parks Commission instream flows.

First Increment: The Program's 13-year period beginning January 1, 2007 and ending December 31, 2019.

Instream flows: CPNRD and Nebraska Game and Parks Commission instream flows in the central and lower reaches of the Platte River.

Milestone 4: From the Milestones Document (Program Document, Attachment 2), Milestone 4 is the WAP requirement and states, "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."

OPSTUDY Model: The Central Platte River OPSTUDY Model was developed by the USBR and the USFWS as a tool for evaluating management alternatives affecting flows in the central Platte River in Nebraska. The OPSTUDY Model is a water accounting model for tracking gains, losses, diversions from and accretions to the central Platte River system. The model uses a monthly time step for simulating water management scenarios assuming a replication of 1947 through 1994 climatic conditions.

Program Document: The document supporting the October 24, 2006 Platte River Recovery Implementation Program Cooperative Agreement, which defines the purposes, goals, elements, and other aspects of the Program, and includes the Program Finance Document, Milestones Document, Adaptive Management Plan, Land Plan, and Water Plan.

Score: Per the Water Plan References Material (Program Document, Attachment 5, Section 11), "scoring" refers to quantifying the extent to which a water project results (or is anticipated to result) in reductions in streamflow shortages to USFWS target flows. Scoring provides one tool for evaluating and comparing the potential benefits of water projects in the context of the Program and comparative purposes among projects; however, it is not the only means of assessing potential benefits and adverse impacts of projects. A project's "score" is the quantification of the project's reduction to USFWS streamflow shortages, as accepted by the Governance Committee.

Shortages to target flows: When the streamflow is below the USFWS target flow for the time period evaluated, the difference in the streamflow and the target flow is considered the shortage. Shortages are typically calculated at Grand Island, Nebraska.

Special Advisor: Independent consultant contracted by the Program to advise the EDO in specific areas of expertise, such as infrastructure, hydrogeology or economics.

Target flows: USFWS target streamflows from Appendix A-5 and Appendix E in the Water Plan Reference Materials in the Program Document (Attachment 5, Section 11) and utilized as the Program's target streamflow goals.

Water Objective: The water objective is to reduce shortages to USFWS target flows by 130,000 to 150,000 AFY on average over the course of the First Increment. The three initial state water projects – the Lake McConaughy Environmental Account, the Pathfinder Modification Project Environmental Account and Tamarack I – are credited to providing a combined 80,000 AFY towards the water objective. The remaining 50,000 to 70,000 AFY to meet the water objective will be reached through water supply and conservation projects identified in the WAP.

Executive Summary

The Platte River Recovery Implementation Program (PRRIP or Program) is a collaborative process involving the States of Nebraska, Wyoming, and Colorado and the U. S. Department of the Interior, together with water users and environmental groups for the benefit of four threatened or endangered bird and fish species—the whooping crane, interior least tern, piping plover, and pallid sturgeon. The Program was initiated by the October 24, 2006 Cooperative Agreement, which was signed by the Secretary of the Interior and the Governors of the three states.

The purpose, goals, and elements of the Program were established in the *Final Platte River Recovery Implementation Program*, which is also dated October 24, 2006 and is referred to as the Program Document. The Program Document includes the Program's Adaptive Management, Land, and Water Plans, as well as other foundational information. The Program's First Increment began on January 1, 2007 and is intended to continue for 13 years through December 31, 2019.

Associated habitat for the three threatened or endangered bird species is defined as the reach of the Platte River extending from Lexington, Nebraska, at the upstream or western end and continuing downstream past Overton, Kearney, and Grand Island. The downstream or eastern end of this habitat is at Chapman, Nebraska. For the pallid sturgeon, the associated habitat is that reach of the lower Platte River between Elkhorn and Missouri Rivers. The U.S. Fish and Wildlife Service (USFWS) defined target flows for the purpose of meeting and maintaining the habitat needs of the threatened or endangered species through the associated habitat reach from Lexington to Chapman, Nebraska. Total shortages to USFWS target flows were estimated to be between 333,100 acre-feet per year (AFY) and 417,000 AFY[1].

The Program's water objective is to reduce shortages to the USFWS target flows in the habitat reach by 130,000 AFY to 150,000 AFY by the end of the First Increment in 2019. Contributions from the three initial state projects —the Tamarack I Project in Colorado, the Pathfinder Modification Project Environmental Account in Wyoming, and the Environmental Account (EA) in Lake McConaughy in Nebraska—provide a combined total yield of 80,000 AFY toward this objective. The Water Action Plan (WAP) was developed to contribute the remaining 50,000 to 70,000 AFY of yield towards the water objective, which is referred to as the WAP milestone[2]. The milestone includes explanatory information describing the steps needed to successfully implement the WAP and achieve the desired yield by the end of the First Increment. The Program accomplished two significant steps towards completion of the milestone, including development of an updated WAP by the end of Year 3 (2009) and development of

[1] Program Document, Attachment 5, Section 11, Appendix A-4

[2] Program Document, Attachment 2, Milestone 4. The WAP milestone states the WAP will be implemented and capable of providing at least an average of 50,000 AFY of shortage reduction to target flows, or other Program purposes, by the end of the First Increment.

projects that are capable of providing at least an average of 25,000 AFY of reductions to USFWS target flow shortages by the end of Year 8 (2014). The Program operated under other on-going steps regarding WAP operations through 2014, and intends to continue work towards the completion of these steps through the end of the First Increment.

Through Year 8 of the First Increment, the Program successfully implemented three WAP projects including the Phelps County Canal Groundwater Recharge project, the Pathfinder Municipal Account Lease, and the Central Platte Natural Resources District (CPNRD) water leasing project. A fourth project, the No Cost Net Controllable Conserved Water (NCCW), began actively contributing water to the EA in Lake McConaughy for the Program in 2001. In addition, considerable advancements were completed for the J-2 Regulating Reservoirs project, which is anticipated to begin portions of the construction in 2017.

In 2010, the Program established a Scoring Subcommittee to assess various WAP project yields and provide the Governance Committee (GC) with recommendations on project scores toward the First Increment objective and the WAP milestone. The project score is considered the project's reduction to USFWS target flows, or the yield of the project towards meeting the WAP milestone. The GC approved project scores for the J-2 Regulating Reservoirs, Phelps County Canal Groundwater Recharge and Pathfinder Municipal Account Lease projects for a total combined score of 37,300 AFY, which is approximately 75 percent of the minimum requirement of the WAP to provide at least 50,000 AFY. The Program also evaluated several potential WAP projects and determined that they should not be actively pursued during the First Increment. The Program continues to pursue additional projects to develop the remaining yield to reach the WAP milestone.

During the first half of the First Increment, the Program focused efforts on WAP projects that utilized excess flows and/or storage leases as water supplies. These projects are generally more straight-forward to implement, have a minimal impact on other water users, and yield large volumes of water. The Program is moving into the next phase of WAP project development, which consists of water leasing opportunities and water right acquisitions in Nebraska. These types of projects are likely more challenging to implement as new water markets must be developed and permitting processes must be determined. After substantial effort has been put towards the development of water leasing projects, the Program anticipates moving onto the evaluations of Colorado Groundwater Management (Tamarack III), Nebraska Groundwater Management, and Water Management Incentives in Nebraska in the latter part of the First Increment. Additional projects not listed in this document may also be identified and evaluated as potential WAP projects in the future.

Based on the existing approved score and projections of future WAP project yields, it is expected the Program will reach and likely surpass the minimum requirement of 50,000 AFY, while staying within the proposed Water Plan budget. The yields and budget will continue to be closely monitored by the Program to ensure the future success of the water objective and WAP milestone.

The 2014 WAP Update reflects information available through the end of 2014 regarding conceptual project designs, implementation schedules, and cost projections. This is a working document that can be utilized to assess the progress towards completing the Program First Increment WAP milestone and for planning purposes through 2019. The information provided in this document was prepared by the Executive Director's Office (EDO) in conjunction with the GC, Water Advisory Committee (WAC) and Special Advisors. The yield, cost and Program score projections may change after more detailed evaluations are completed. To that extent, the Program and its partners will continue investigating the WAP projects described herein and develop more accurate yield and cost projections, and are not bound by any of the current estimates.

The process for advancing WAP projects will remain as previously identified in the 2000 Reconnaissance-Level WAP and the 2009 WAP Update. The GC will be provided with WAP project proposals, evaluations, and budgets for project implementation approval or rejection. The EDO will continue to monitor the progress of the WAP towards the milestone to ensure the Program's success in meeting the First Increment water objective.

This 2014 WAP Update serves as a status update regarding the Program's progress implementing the WAP through 2014 (Year 8 of the First Increment). This document also identifies changes since the previous WAPs—the 2000 Reconnaissance-Level WAP[3] and the 2009 WAP Update[4]—and provides planning and sequencing of projects anticipated in the 2015 through 2019 (Years 9 through 13 of the First Increment) timeframe. It serves as a guide to assess progress and to identify the next steps towards furthering WAP project development.

[3] Program Document, Attachment 5, Section 6
[4] EDO and WAC 2010

Section 1 Introduction

The Platte River Recovery Implementation Program (PRRIP or Program) is a collaborative process involving the States of Nebraska, Wyoming, and Colorado; the U.S. Department of the Interior; water users; and environmental groups for the benefit of four threatened or endangered bird and fish species:

- **Whooping Crane**, listed as endangered in 1967. This is the tallest bird in North America and one of the rarest bird species in the world, with a known population of only a few hundred[5]. The Central Platte basin is a critical stopover on the whooping crane's migration route.
- **Interior Least Tern**, listed as endangered in 1985. The interior least tern is the smallest tern species in North America, and the population is estimated to contain 17,500- 18,000 birds[6]. The Central Platte basin serves as a nesting site for these birds.
- **Piping Plover**, listed as threatened in 1986. The piping plover is a small shorebird; those birds utilizing the Central Platte River basin are part of the Northern Great Plains population, which numbers around 8,000-10,000[7].
- **Pallid Sturgeon**, listed as endangered in 1990. The pallid sturgeon is a large bottom-dwelling fish which may be found in the lower reach of the Platte River above its confluence with the Missouri River.

The Program was established through the October 24, 2006 Cooperative Agreement, and the Program purposes, goals, and elements—including the Adaptive Management, Land, and Water Plans—were defined in the *Final Platte River Recovery Implementation Program*, which is also dated October 24, 2006 and is referred to as the Program Document.

The First Increment of the Program, a 13-year period ending in 2019, was initiated in 2007 and progressed through Year 8 as of the end of 2014. One of the tasks undertaken during the First Increment is the implementation of a Water Action Plan (WAP) that identifies various projects in each state that can be applied toward the overall water objective of the Program. This report represents the third such iteration of the WAP, following a Reconnaissance-Level WAP[8] in 2000 and a 2009 WAP Update[9] at the end of Year 3 of the First Increment. Most Program activities to date focused on the Platte River associated habitat reach for the three avian species, located between Lexington and Chapman, Nebraska. The Program generally operates on a "do no harm" basis with

[5] International Crane Foundation 2015
[6] Lott, et al. 2013
[7] Elliott-Smith, et al. 2009
[8] Program Document, Attachment 5, Section 6
[9] EDO and WAC 2010

regard to the pallid sturgeon habitat reach of the lower Platte River and the potential effects of upstream Program activities.

The remainder of this introductory section provides a brief overview of the history and purpose of the WAP, as well as an update on the progress made during the First Increment through the end of Year 8. Section 2 provides context for the geographic and hydrologic settings of the Program, including a summary of historical streamflows at key gages in the associated habitat and locations upstream. Section 3 describes the hydrologic classification of wet, normal, and dry years and sub-annual periods. This section also summarizes instream flows of importance to the Program, including U.S. Fish and Wildlife Service (USFWS) target flows and short-duration high flows (SDHF). Section 4 describes the WAP projects that were first identified in the 2000 Reconnaissance-Level WAP and have undergone varying degrees of study and implementation during the First Increment (more detailed project descriptions are included in the report appendices). Approved Program scores for several of the WAP projects are presented in Section 5, and Section 6 discusses the cost analyses performed for WAP projects. Section 7 offers a summary and conclusion to this 2014 WAP Update.

1.1 History and Purpose of the WAP

The USFWS developed recommendations for flows that it believes are needed at different times of the year for endangered species and other wildlife. The Program's First Increment water objective is to provide water capable of reducing shortages to the USFWS target flows by an average of 130,000 to 150,000 acre-feet per year (AFY)[10]. The USFWS instream flow recommendations for the central Platte River are described in the Program Document[11] and are quantified in the Program Water Plan Reference Materials[12]. Implementation of the three initial water projects by the states—the Environmental Account (EA) in Lake McConaughy (Nebraska), the Pathfinder Modification Project Environmental Account (Wyoming), and Tamarack I (Colorado)—was credited an average annual 80,000 AFY toward the Program First Increment water objective[13]. The EA in Lake McConaughy has operated during the entirety of the Program. Foreshadowed in the 2009 WAP Update, construction at Pathfinder Reservoir was completed in 2012, and deliveries of water from the Pathfinder Environmental Account to the Program began the same year. Most of the Tamarack infrastructure in Colorado began operating in 2001 and was active during the First Increment through 2014, including ten recharge wells at the Tamarack site used to build-up groundwater storage in the area and create future lagged accretions to the river. Six additional wells were drilled in 2013 to enhance the project yield during drier times to better reach the planned water contribution of approximately 10,000 AFY[14].

[10] Program Document, page 11
[11] Program Document, pages 11-14
[12] Program Document, Attachment 5, Section 11, Appendix A-5 and Appendix E
[13] Program Document, page 14
[14] Program Document, Attachment 5, Section 3

The remaining portion of the First Increment water objective, or 50,000 to 70,000 AFY, will be met through the development and implementation of the WAP (as stipulated in Milestone 4[15]). The WAP consists of project concepts that retime excess flows, water leasing projects, groundwater management and water management incentives. The 2000 Reconnaissance-Level WAP[16] included a combination of potential projects located in each of the three states: eight projects in Nebraska, four projects in Wyoming, and one project in Colorado. The 2009 WAP Update[17] was prepared by the Program's Executive Director's Office (EDO) and provided project updates and assigned "tier" designations to create a priority system for evaluating projects. Permutations of those original 13 WAP projects continue to be studied today.

This 2014 WAP Update reflects information available through the end of 2014 regarding conceptual project designs, implementation schedules and cost projections. The information provided in this document was prepared by the EDO in conjunction with the Governance Committee (GC), Water Advisory Committee (WAC) and Special Advisors. This is a working document that can be utilized to assess the progress towards completing the Program First Increment WAP milestone and for planning purposes through 2019. The 2014 WAP Update accomplishes the task by building upon the previous versions and further describing the progress made in continuing to study the feasibility of some WAP projects while moving forward with implementation and scoring of others.

In addition to the previously-established tier status, WAP projects are further defined in this 2014 WAP Update has having "active", "future," or "inactive" status determinations, relative to the likelihood of implementation within the First Increment. "Active" projects are considered projects that were implemented and are operational, or projects that were studied for feasibility and the funding for project implementation was initiated. "Future" projects are anticipated to be evaluated for feasibility and potential implementation during the remaining years of the First Increment. "Inactive" projects are currently not anticipated to move into the implementation phase during the First Increment due to feasibility concerns, financial reasons or other reasons, although conditions or opportunities could develop that warrant reconsideration of a project.

1.2 Overview of Progress through the First Increment

The following sections identify project feasibility and other evaluation studies undertaken during the First Increment and summarize the progress toward completion of the steps listed under Milestone 4.

1.2.1 Project Studies and Initial Implementation Status

Varied stages of development were achieved for the identified WAP projects through Year 8 of the First Increment, including completion of the feasibility and conceptual design studies listed on the following page:

[15] Program Document, Attachment 2.
[16] Program Document, Attachment 5, Section 6
[17] EDO and WAC 2010

- Water Management Study Phases I and II: Evaluation of Pulse Flows for the Platte River Recovery Implementation Program (2008)[18]
- Platte River Recovery Implementation Program 2009 Water Action Plan Update (2010)[19]
- Nebraska Ground Water Recharge Pre-Feasibility Study (2010)[20]
- CNPPID Reregulating Reservoir: Elwood and J-2 Alternatives Analysis Project Report (2010)[21]
- Canal Winter Operations Feasibility Study (2011)[22]
- Feasibility Study – Elm Creek Regulatory Reservoir (2011)[23]
- CNPPID J-2 Reregulating Reservoir Feasibility Report (2012)[24]
- Pilot-Scale Recharge Report for Nebraska Groundwater Recharge Feasibility Study (2012) [25]
- Conceptual Design Report: J-2 Regulating Reservoir Project (2013)[26]

That many of these studies were completed subsequent to the 2009 WAP Update is indicative of the significant advancement made with regard to the evaluation of WAP projects as the First Increment progressed. As a result of these collaborative efforts through the end of 2014, the Program secured initial funding or implementation of five WAP projects, which are either active at present or planned for construction during the latter years of the First Increment:

- J-2 Regulating Reservoirs in the Central Nebraska Public Power and Irrigation District (CNPPID) system,
- Nebraska Groundwater Recharge in the Phelps County Canal, also part of the CNPPID system,
- Pathfinder Municipal Account Lease in Wyoming,
- Central Platte Natural Resources District (CPNRD) Water Leasing project in Nebraska, and
- No Cost Net Controllable Conserved Water (NCCW), made available via a grant from the U.S. Bureau of Reclamation (USBR).

Of these five projects regarded as having active status designations (see Section 4), the first three have scores that were accepted by the GC for their contributions toward meeting the First Increment water objective and WAP milestone. The fourth project, CPNRD water leasing, actively provided a yield to the Program in 2013 and 2014; it is anticipated that the project scoring process will begin in 2015. Water from the No Cost NCCW has been added to the EA in Lake McConaughy each year since 2001, but the

[18] Boyle Engineering Corporation et al. 2008a,b
[19] EDO and WAC 2010
[20] EDO et al. 2010
[21] Olsson Associates and Black & Veatch 2010
[22] Applegate Group, Inc. 2011
[23] Olsson Associates 2011
[24] Olsson Associates and Black & Veatch 2012
[25] EA Engineering, Science, and Technology, Inc., and Daniel B. Stephens and Associates, Inc. 2012
[26] RJH Consultants, Inc. 2013

project has not been scored for Program purposes. Additional projects were studied but were not recommended to move forward into implementation, such as the Elm Creek Reregulating Reservoir and that portion of the NCCW project requiring purchases by the Program; while these evaluations represent progress toward meeting Program water goals, 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.

1.2.2 Milestone Status Update

Milestone 4 is related to the WAP projects and is stated as follows, per the Program Milestones Document[27]:

> 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." Note that 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 the end of 2014.

> 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 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.

[27] Program Document, Attachment 2

The Program operated in compliance with these three steps during the initial 8 years of the First Increment (2007 through 2014). Funding and permitting requirements were satisfied as needed by the 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. Assumptions for project scoring are explained in Section 5.1.

> 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. This 2014 WAP Update provides further progress updates related to the 2000 Reconnaissance-Level WAP projects and new projects under consideration.

> Milestone Step 4.5: Completed
> 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].

This milestone step is the primary impetus for preparation of this 2014 WAP Update. The Program successfully achieved this goal by implementing or initiating funding for implementation for the following projects: J-2 Regulating Reservoirs, Phelps County Canal Groundwater Recharge, Pathfinder Municipal Account Lease and the Central Platte Natural Resources District (CPNRD) Lease projects. The GC has accepted scores for the J-2 Regulating Reservoirs, the Phelps County Canal Groundwater Recharge project and the Pathfinder Municipal Account Lease. These projects provide a combined score of 37,300 AFY of reduction to USFWS target flow shortages for the Program. The Program also has a lease agreement with the CPNRD for recharge accretions from excess flows and the consumptive use credit from transferred surface water rights. This project has not been officially scored by the GC; however, the project provides a yield for the Program and is anticipated to be scored in 2015.

> 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 through 2014 in compliance with the specifications of these milestone steps.

Section 2 Geographic and Hydrologic setting of the Program

The following sections describe the geography and historical hydrology of the Platte River basin.

2.1 Geographic setting

Figure 1 illustrates the geographic extent of the overall Platte River basin and its major sub-basins, described as follows:

- North Platte River basin – Refers to the drainage of the mainstem river and tributaries from its headwaters in northern Colorado through Wyoming, and through Nebraska to the confluence with the South Platte River.
- South Platte River basin – Refers to the drainage of the mainstem river and tributaries from its headwaters along the Continental Divide in Colorado to its confluence with the North Platte River in Nebraska.
- Central Platte River basin – Refers to the drainage of the mainstem river and tributaries from the confluence of the North Platte and South Platte Rivers to the confluence with the Loup River.
- Platte River basin – Refers to all of the above sub-basins collectively.

The topography of the basin is highly variable, ranging from mountain peaks exceeding 14,000 feet elevation along the Continental Divide in Colorado and Wyoming to an elevation of 1,765 feet at Chapman, Nebraska, the downstream end of the Central Platte basin. The drainage area of the combined sub-basins across the three states is about 90,000 square miles. Respective river mainstem lengths are about 618 miles for the North Platte River, 424 miles for the South Platte River, and 310 miles for the Platte River between the confluence just east of North Platte, Nebraska, and the river mouth where it joins the Missouri River south of Omaha, Nebraska[28].

[28] Freeman 2003

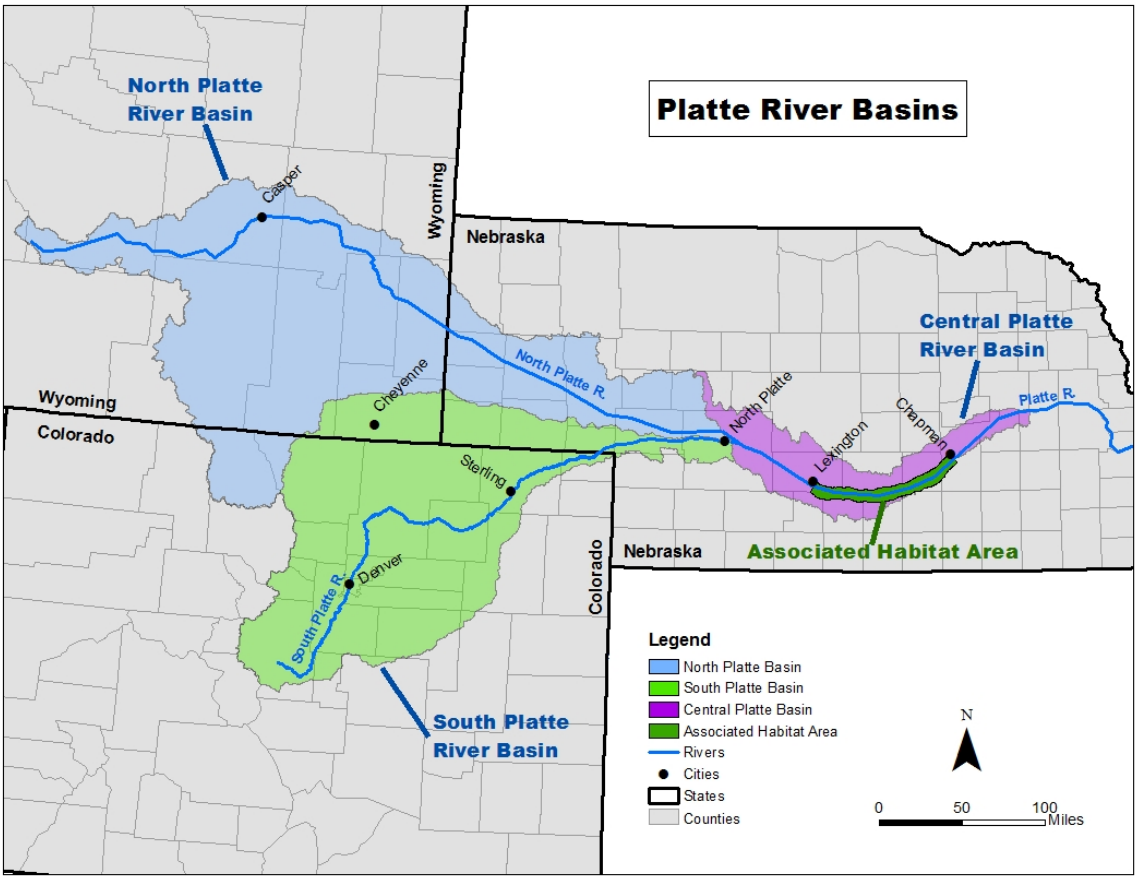

Figure 1. Platte River Basin map

Figure 1 also shows the "PRRIP Associated Habitats" for the three threatened or endangered avian species, located in the eastern reaches of the Central Platte basin. For Program purposes, the associated habitats were defined[29] as follows:

> [T]he term "associated habitats" means, with respect to the interior least tern, whooping crane, and piping plover, the Platte River valley beginning at the junction of U.S. Highway 283 and Interstate 80 near Lexington, Nebraska, and extending eastward to Chapman, Nebraska, including designated critical habitat for the whooping crane and that portion of any designated critical habitat for piping plover within that Lexington to Chapman reach. With respect to the pallid sturgeon, the term "associated habitat" means the lower Platte River between its confluence with the Elkhorn River and its confluence with the Missouri River. "Associated habitats" may, to the extent approved by the Governance Committee, include any critical habitat in the Lexington to Chapman reach of the Platte River basin which is subsequently designated by the U.S. Fish and Wildlife Service for the target species.

Figure 2 provides a more detailed view of the Central Platte basin, including the many canals and reservoirs that are utilized for agricultural irrigation and hydropower

[29] Program Document, page 1

generation. Most of these canals divert from the rivers between Lake McConaughy and the upstream end of the associated habitats, with some of the irrigation return flows accruing to the associated habitat reach.

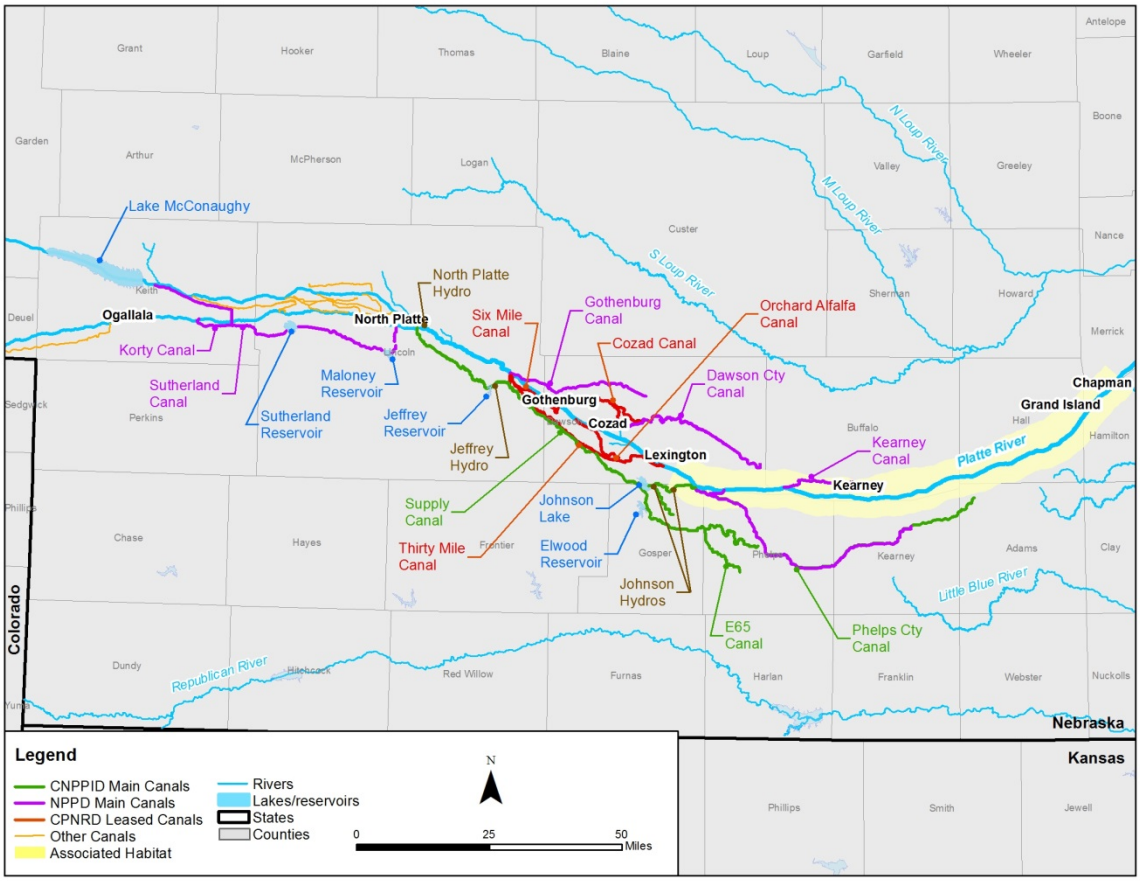

Figure 2. Central Platte River location map

2.2 Hydrologic setting

Precipitation, runoff, and streamflows in the Platte River basin are highly variable given the range of elevations and the corresponding changes in climate as the rivers travel generally eastward from the Rocky Mountains and across the plains of eastern Colorado and Wyoming and western and central Nebraska. Hydrologic conditions are further influenced by the extensive diversions and return flows associated with agricultural, municipal and industrial, and other uses of water. Numerous on- and off-channel reservoirs store or retime water during high flow periods when water is plentiful, and release water to generate power or to meet demands when streamflows are low. **Figure 3** shows the locations of seven streamflow gages in the Platte River system, which were selected to illustrate streamflows both upstream of and through the associated habitat.

- **USGS 06764000 South Platte River at Julesburg, Colorado.** Represents flows entering Nebraska from Colorado.
- **USGS 06765500 South Platte River at North Platte, Nebraska.** Represents flows on the South Platte River upstream of the confluence with the North Platte

River, but between the Korty Diversion and downstream point of return for the Nebraska Public Power District's (NPPD) Sutherland Canal system.

- **USGS 06674500 North Platte River at Wyoming-Nebraska State Line.** Represents water entering Nebraska from Wyoming.
- **USGS 06693000 North Platte River at North Platte, Nebraska.** Represents streamflows just upstream of the confluence with the South Platte River and downstream of Lake McConaughy and several major irrigation diversions.
- **USGS 06768000 Platte River near Overton, Nebraska.** Represents streamflows near the upper end of the associated habitats for the avian species, and downstream of the return from the CNPPID's Tri-County Supply Canal, which diverts just below the confluence at North Platte, Nebraska.
- **USGS 06770200 Platte River near Kearney, Nebraska.** Represents streamflows near the midpoint of the associated habitats for the threatened and endangered avian species.
- **USGS 06770500 Platte River near Grand Island, Nebraska.** Represents streamflows near the downstream end of the associated habitats; this gage is also the location for the assessment of annual hydrologic condition, target flows, and scoring for the Program (see Section 3 and Section 5).

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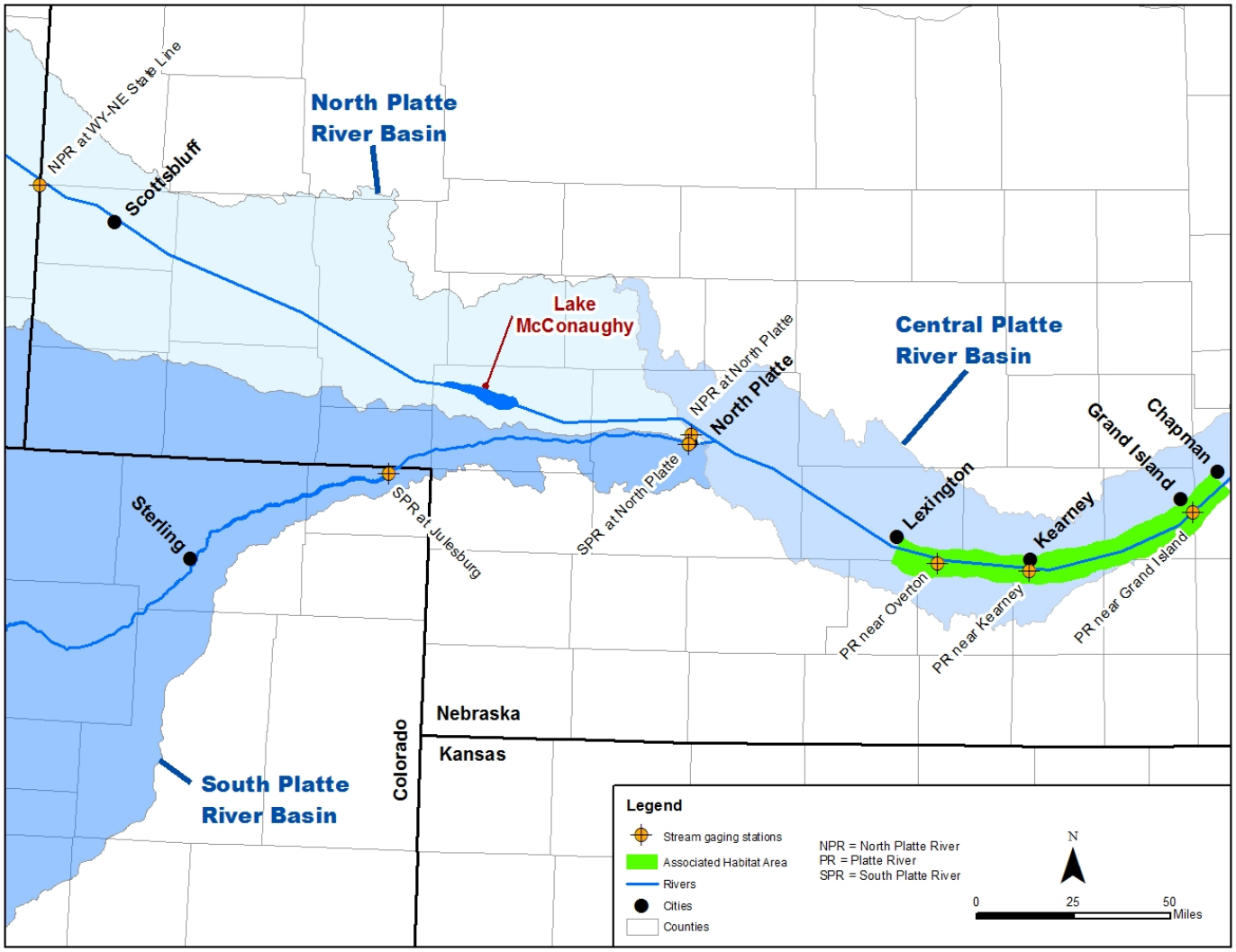

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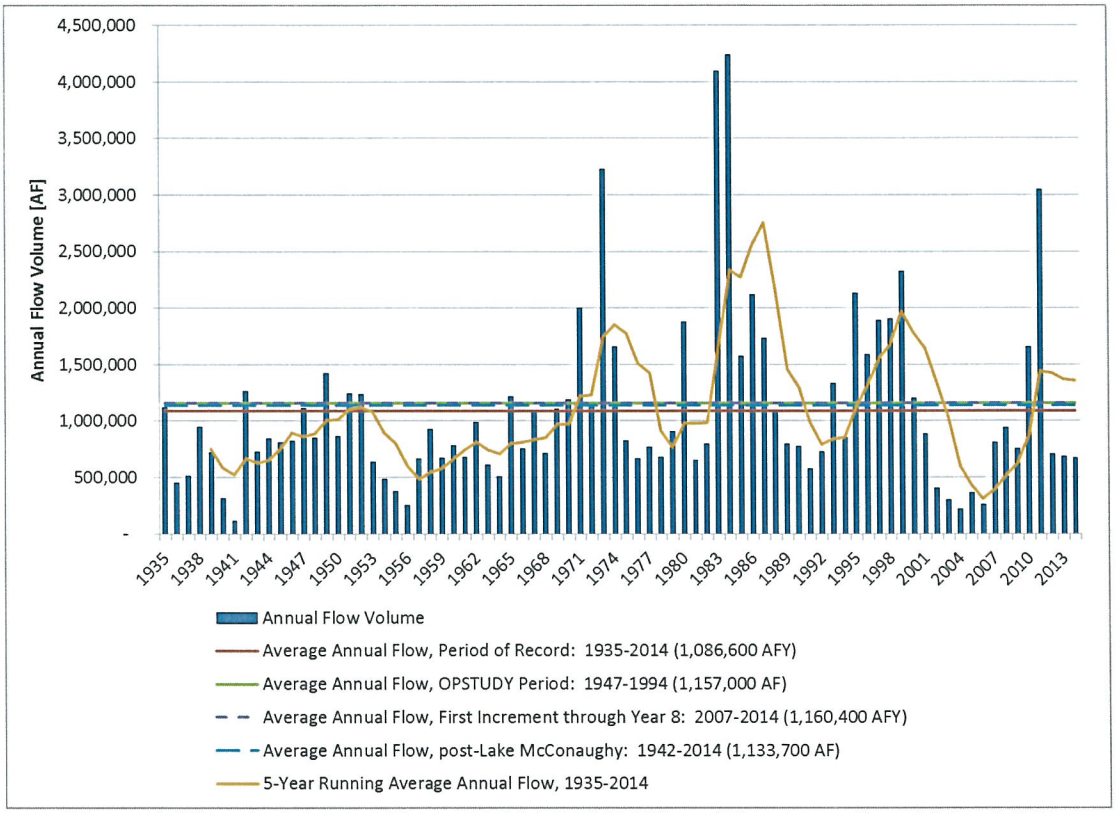
705 **Figure 3. Representative Platte River Basin Streamflow Gage Locations**

Table 1 summarizes historical annual flow volumes over several time periods, including the complete available period of record, the OPSTUDY modeling period (1947-1994), and the First Increment through Year 8 (2007-2014), subject to data availability. **Figures 4 and 5** illustrate historical annual flow volumes and average daily flows, respectively, at the Grand Island gage (USGS 06770500) over several time periods. Similar figures for the other six gages are included in **Appendix A**. This data provides valuable context for understanding the First Increment objective of reducing USFWS target flow shortages by an average of 130,000 to 150,000 AFY.

Table 1. Average Annual Flow Volumes, in AFY, at Representative Platte River Basin Stream Gages

USGS Gage ID	River and Location	Period of Record	Average Annual Flow Volume [AFY][a,b]		
			Period of Record	OPSTUDY Period (1947-1994)	First Increment through Year 8 (2007-2014)
06764000	South Platte River at Julesburg, CO	1903-1906, 1908-1912, 1914-1921, 1925-2014[c]	389,100	434,100	392,100
06765500	South Platte River at North Platte, NE	1932-2014[d]	313,300	311,800	381,500
06674500	North Platte River at WY-NE State Line	1930-2014[e]	561,200	565,600	671,800
06693000	North Platte River at North Platte, NE	1923-2014[f]	714,400	548,600	507,400
06768000	Platte River near Overton, NE	1942-2014[g]	1,125,300	1,181,900	1,065,800
06770200	Platte River near Kearney, NE	1982-2014[h]	1,151,700	N/A	1,054,900
06770500	Platte River near Grand Island, NE	1935-2014[i]	1,086,600	1,157,000	1,160,400

[a] Average annual flow volumes rounded to the nearest 100 AFY.
[b] Only calendar years with complete data were used in the calculations.
[c] Provisional data for 10/1/2013 through 12/31/2014, based on sum of ONEJURCO (Channel #1) and 06763990/PLAJURCO (Right Channel #2) gages.
[d] Provisional data from 10/1/2011 through 12/31/2014. Missing data 11/5/2013 through 1/9/2014.
[e] Provisional data for 12/3/2014 through 12/31/2014. No data due to ice on 12/30/2014 through 12/31/2014.
[f] Provisional data 10/1/2011 through 12/31/2014.
[g] Provisional data for 10/22/2013 through 12/31/2014. No data due to ice on 12/7/2013-2/9/2014, 11/12/2014-11/18/2014, and 12/30/2014-12/31/2014. Missing data on 9/17/2014, 10/10/2014-10/18/2014, 11/22/2014-11/25/2014, 11/29/2014, 12/1/2014-12/4/2014, and 12/6/2014-12/9/2014.
[h] Provisional data for 11/14/2013 through 12/31/2014. No data due to ice on 12/5/2013-3/9/2014 and 11/11/2014-11/27/2014. No data due to equipment malfunction on 7/14/2014-8/7/2014. Missing data on 1/1/1982-1/26/1982, 10/1/1985-11/18/1985, 10/23/1987-10/25/1987, 10/29/1987, 1/6/1988, 1/28/1988, 2/3/1988-2/4/1988, 2/16/1988, 2/18/1988-2/19/1988, 3/28/1988-3/30/1988, 5/1/1988-5/3/1988, 5/8/1988, 6/23/1988-6/24/1988, 6/27/1988-6/28/1988, 7/7/1988, 7/15/1988, 8/13/1988, 9/7/1988, 9/9/1988, 9/12/1988, 9/16/1988, 9/29/1993-9/30/1993, 10/1/1998-9/30/1999, 10/1/2000-9/30/2001, and 12/27/2014-12/31/2014.
[i] Provisional data for 12/2/2013 through 12/31/2014. No data due to ice on 12/4/2013-3/9/2014, 11/11/2014-12/4/2014, and 12/30/2014-12/31/2014.



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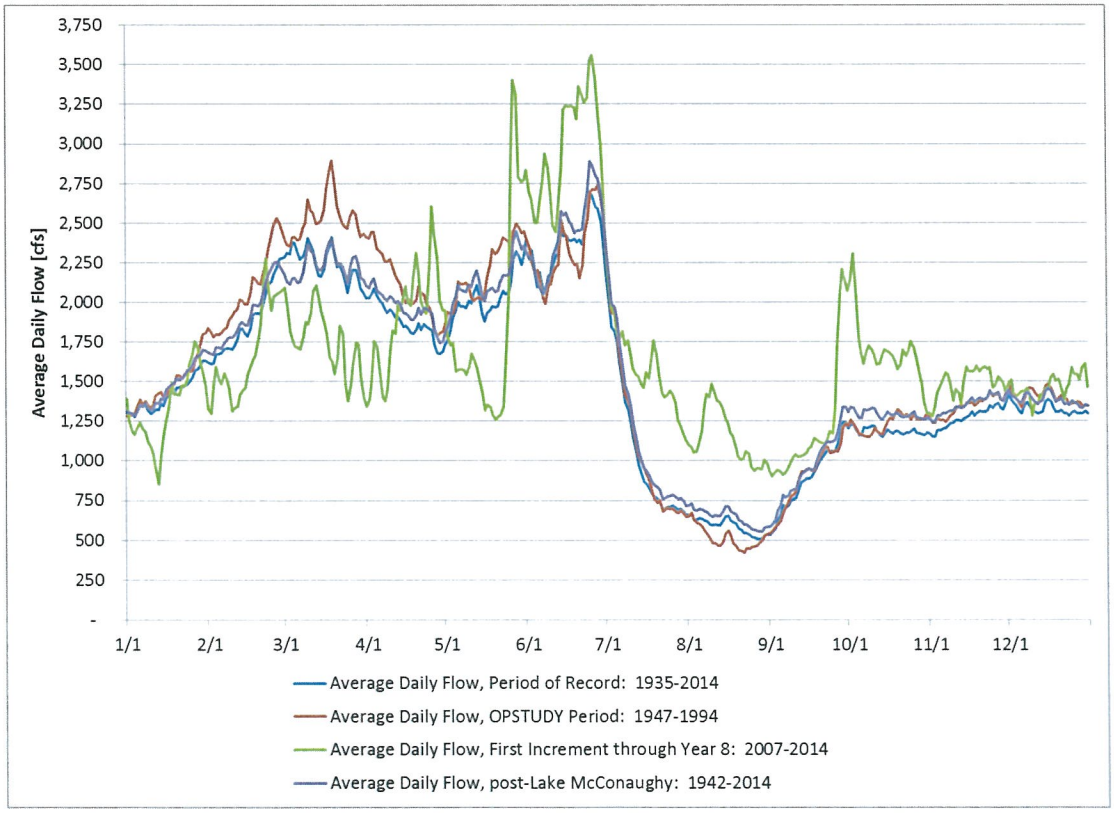
736 **Figure 4. Historical Annual Flow, USGS 06770500 Platte River near Grand Island, NE**



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738 **Figure 5. Average Daily Flow, USGS 06770500 Platte River near Grand Island, NE**

Section 3 Target Flows and Short Duration High Flows

The USFWS instream flow recommendations for the central Platte River are described in the Program Document[30] and are quantified in the Program Water Plan Reference Materials[31]. These USFWS recommendations for the Central Platte River include target flows, peak flows and other flows deemed important by the USFWS, and are to be examined through the Program's Adaptive Management Plan and may be modified by the USFWS accordingly. Two subsets of instream flows are addressed in this document, target flows and SDHF events.

The USFWS flow targets apply to the Program's associated habitat reach for the three threatened or endangered avian species from Lexington to Chapman, Nebraska. The targets vary based on the current hydrologic regime as determined by hydrologic condition designations to account for differences in flow between wet, normal, and dry years. The following sections summarize the methods and results of hydrologic conditions analysis, as well as target flows and SDHF events.

3.1 Wet/Normal/Dry Hydrologic Conditions

Hydrologic condition designations were developed by the USFWS and are determined on an annual and a periodic or "real time" basis with the possibility of a wet, normal, or dry designation.

3.1.1 Annual Hydrologic Condition

Annual hydrologic condition designations are based on streamflow thresholds at the Grand Island gage (USGS 06770500) over calendar years 1947 to 1994, corresponding to the same years used in the OPSTUDY model. The average annual streamflow was calculated from the average daily gaged flows for each year in the period and the years were ranked from highest to lowest average streamflow values. Years with the highest 33% of average annual streamflow were designated as wet, years with the lowest 25% of average annual streamflow were designated as dry, and years with streamflows between these limits were designated as normal[32]. **Table 2** identifies the calendar years in the 1947-1994 as hydrologically wet, normal, or dry[33].

Table 2. Annual Hydrologic Condition, 1947-1994

Condition	Years
Wet	1949, 1951, 1952, 1965, 1970, 1971, 1972, 1973, 1974, 1980, 1983, 1984, 1985, 1986, 1987, 1993
Normal	1947, 1948, 1950, 1958, 1960, 1962, 1966, 1967, 1968, 1969, 1975, 1977, 1978, 1979, 1982, 1988, 1989, 1990, 1992, 1994
Dry	1953, 1954, 1955, 1956, 1957, 1959, 1961, 1963, 1964, 1976, 1981, 1991

[30] Program Document, pages 11-14
[31] Program Document, Attachment 5, Section 11, Appendix A-5 and Appendix E
[32] Program Document, Attachment 5, Section 11
[33] EDO 2011

For Program application, the designated years in Table 2 were used to set the annual target flow regime in the scoring models. In addition, threshold average annual flow rates and volumes were determined to be the following for the 1947-1994 period:

- Wet years: ≥ 1,575 cubic feet per second (cfs) (1,140,200 AFY)
- Dry years: ≤ 939 cfs (679,800 AFY)

Since the inception of the First Increment, these thresholds have been used every calendar year to assess a wet, normal, or dry annual hydrologic condition based on the streamflows at the Grand Island gage. First Increment annual hydrologic conditions are listed below in **Table 3**.

Table 3. First Increment Annual Hydrologic Conditions, 2007-2014

Year	Average Annual Flow at Grand Island[cfs]	Hydrologic Condition
2007	1,121	Normal
2008	1,300	Normal
2009	1,039	Normal
2010	2,289	Wet
2011	4,214	Wet
2012	978	Normal
2013	1,025	Normal
2014	1,209	Normal

Additional information regarding the annual hydrologic condition can be found in the "Hydrologic Condition Annual and Periodic Designations" document[34], as well as the *Annual Platte River Surface Water Flow Summary*[35], which is updated annually by Program staff.

3.1.2 Periodic or "Real Time" Hydrologic Condition

The methods developed to determine real time hydrologic condition designations were initially described in a journal paper by Anderson and Rodney[36]. Real time designations apply to periods lasting from one to three months and are calculated at the beginning of the period (hence the "real time" classification). The Program calculates real time hydrologic designations according to the Anderson and Rodney paper with some modifications (e.g., the August-September method was developed after the original paper), with the methods specifically described on the Hydrologic Conditions Calculations page of the Program website[37]. The methods for determining the real time hydrologic condition vary throughout the year, according to this schedule:

- December-January-February
- March-April

[34] EDO 2011
[35] EDO 2015
[36] Anderson and Rodney 2006
[37] https://www.platteriverprogram.org/PubsAndData/Pages/HydrologicConditionCalculations.aspx

- May
- June
- July
- August-September
- October-November

The periodic wet, normal, or dry hydrologic condition is used as the basis for varying target flows as needed throughout the course of the year. The target flows are in turn used to evaluate streamflow excesses and shortages on a real time basis and to coordinate Program water project activities.

3.2 Target Flows

Target flows are defined by the USFWS as "recommended species and annual pulse flows for the central Platte River."[38] Target flows do not include Short Duration High Flows, which are described in Section 3.3. The Water Plan Reference Materials[39] provide further definitions of the target flow components:

- *Species flows* "were established as recommended…minimum flows for various periods of the years…for the purpose of meeting the habitat needs of native biotic components of the ecosystem."
- *Annual pulse flows* "were identified as being important to maintaining the physical structure and other characteristics of the river for biological benefits."

These targets are the flow levels that the Program actively seeks to attain through Program water projects and re-timing of river flows through the associated habitat. Deficits to target flows are typically calculated by comparing streamflows at the Grand Island gage (USGS 06770500) to the USFWS target flows. The USFWS estimated a mean annual historic deficit to target flows of 417,000 AFY during wet and normal years and 333,100 AFY during dry years[40]. These flow deficits are equivalent to about 30 to 38 percent of the average annual flow volume at the Grand Island gage over the available period of record (see Table 1 and Figure 4). The First Increment water objective of reducing these target flow deficits by 130,000 to 150,000 AFY represents an increase on the order of 12 to 14 percent of the long-term average annual streamflow at the Grand Island gage.

Figure 6 illustrates the USFWS daily target flows[41], which vary for wet, normal, and dry hydrologic conditions. **Figure 7** superimposes the average daily flows at the Grand Island gage over the 1947-1994 OPSTUDY modeling period and the USFWS daily target

[38] Program Document, page 11
[39] Program Document, Attachment 5, Section 11
[40] Program Document, Attachment 5, Section 11, Appendix A-4
[41] Program Document, Attachment 5, Section 11, Appendix A-5

flows for normal conditions. **Figure 8** shows the USFWS monthly average target flows[42].

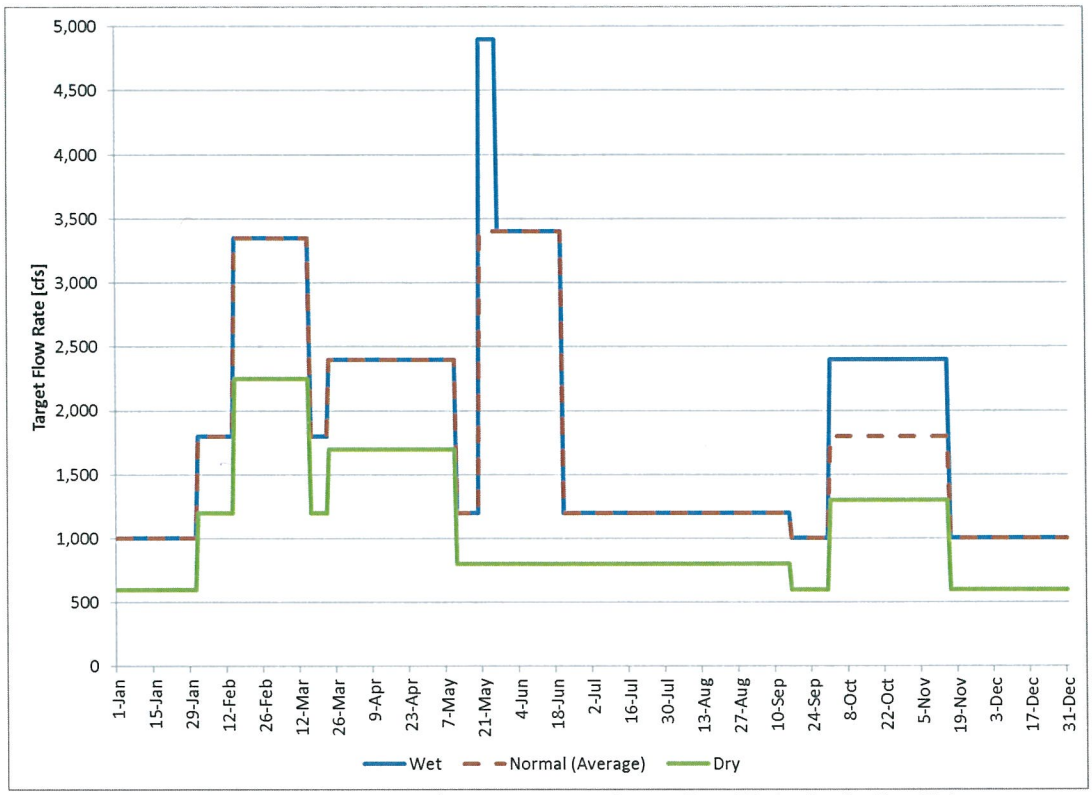

Figure 6. Daily Target Flows for Wet, Normal, and Dry Hydrologic Conditions.

[42] Program Document, Attachment 5, Section 11, Appendix A-5

Figure 7. Average Daily Flows at Grand Island Gage with USFWS Daily Target Flows for Normal Conditions

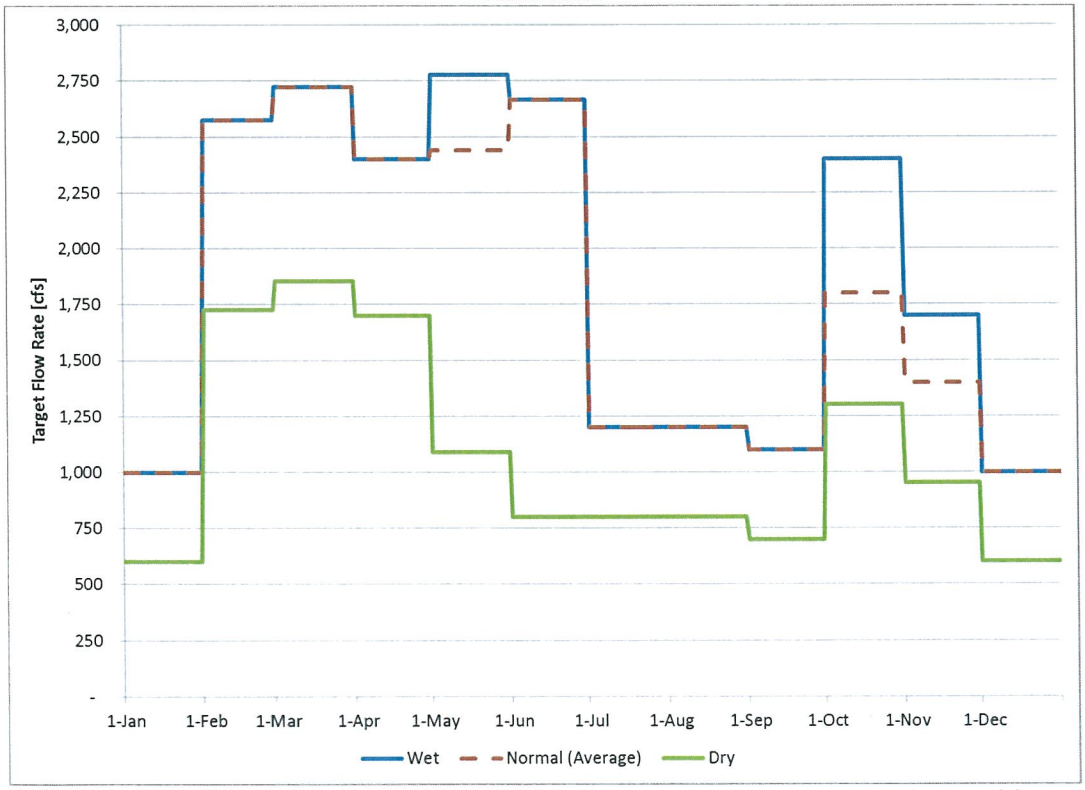

Figure 8. Monthly Average Target Flows for Wet, Normal, and Dry Hydrologic Conditions.

3.3 Short Duration High Flows

In addition to the monitoring of target flows, the Program completed a Water Management Study[43] in 2008 to determine the feasibility of delivering "5000 cfs of Program water for three days to the upper end of the associated habitat (at the Overton gage) for pulse flows when demands on water are low (normally September 1-May 31)."[44] Such events are known as SDHF events, which are distinct from the annual pulse flows included in the USFWS target flows and are generally defined in the Water Plan Reference Materials[45] as "flows of approximately three to five days duration with magnitudes approaching but not exceeding bankfull channel capacity in the habitat reach." The bankfull capacity in the associated habitat is between 5,000 cfs and 8,000 cfs[46]. Flows of this magnitude are desired on an annual or near-annual basis to help scour vegetation encroaching on channel habitat areas and to mobilize sand and build ephemeral sandbars to benefit the target species.

3.3.1 Program SDHF activities

The 2000 Reconnaissance-Level WAP identified water projects that could be used toward reducing shortages to target flows; however, at that time, there was no consideration of how projects could be operated to augment an SDHF. The objective is to produce a bankfull SDHF, a substantially higher peak than the maximum target flow, and to control that flow for a specific three days in order to perform the scientific experiments under the Adaptive Management Plan.

It is anticipated that the chokepoint[47] on the North Platte River, located near the Highway 83 Bridge near North Platte, Nebraska, will be able to convey 3,000 cfs towards an SDHF. Water would be released from the EA in Lake McConaughy and flow down the North Platte River, or be routed through canals to the South Platte River to avoid the choke point limitation. The J-2 Regulating Reservoirs project is designed to provide a 2,000 cfs release rate to reach the full 5,000 cfs minimum flow rate for an SDHF though the associated habitat reach. During the First Increment, the Program successfully executed a test flow release in 2009 and another release that reached a peak flow of about 4,200 cfs[48] in 2013.

3.3.2 Natural high flow events

Additional high flows in the range of 5,000 cfs to 8,000 cfs occurred in several years as a result of natural flow events; these are tracked in the *Annual Platte River Surface Water*

[43] Boyle Engineering Corporation et al. 2008a,b
[44] Program Document, page 16
[45] Program Document, Attachment 5, Section 11
[46] EDO 2015
[47] The chokepoint is considered a reach of the river where the channel capacity is restricted and not able to convey the Program's 3,000 cfs goal for SDHF releases from Lake McConaughy. The North Platte chokepoint is in the vicinity of the Highway 83 bridge.
[48] EDO 2014

Flow Summary reports[49] prepared by the EDO. Flow events greater than 5,000 cfs at the Overton gage were observed in five of the first eight years of the First Increment (2008, 2010, 2011, 2013, and 2014), as summarized below:

- 2008 – Peak flow exceeded the 5,000 cfs threshold for three days and exceeded the 8,000 cfs threshold for one day.
- 2010 – Flows remained between the 5,000 cfs and 8,000 cfs thresholds for 14 consecutive days.
- 2011 – Flows exceeded the 5,000 cfs threshold for a total of 70 days, and flows exceeded the 8,000 cfs threshold for nine days.
- 2013 – Flows exceeded the 5,000 cfs threshold for a total of 10 days, including six days on which flows exceeded the 8,000 cfs threshold.
- 2014 – High flows in June exceeded the 5,000 cfs on eight days.

The 2008, 2011, and 2013 high flow events included at least three consecutive days of flow greater than 5,000 cfs before May 31 or after September 1, corresponding to the desired pulse flow timing, or SDHF, specified in the Program Document. The other natural high flow events occurred during the summer months (June-August).

[49] EDO 2015

Section 4 WAP Projects

The 2000 Reconnaissance-Level WAP[50] identified 13 potential projects in the three states that could contribute water towards meeting the First Increment water objective. In the ensuing years, certain projects were prioritized, evaluated, and in some cases, implemented. Other projects were identified as having low chances for successful implementation to meet Program needs within the time constraints of the First Increment; these projects have been studied to a lesser degree. The 2009 WAP Update[51] introduced project sequencing via a tier structure, the purpose of which was "not necessarily to select one project over another, but rather to identify a general sequencing of projects to help focus the WAP related efforts." Tracking and prioritization of WAP projects was further enhanced by the designation of each project in this 2014 WAP Update as "active," "future," or "inactive" following additional assessment subsequent to the 2009 WAP Update.

Table 4 is a summary of the tier designations and project status updates. More detailed information on each project status as of the end of 2014 is included in Appendix B (active project descriptions), Appendix C (future project descriptions), and Appendix D (inactive project descriptions).

Table 4. List of WAP project tiers and project status updates

Tier	Project	Location	Status
Tier 1	J-2 Regulating Reservoirs	Nebraska	Active
	Elm Creek Reregulating Reservoir	Nebraska	Inactive
	Nebraska Groundwater Recharge	Nebraska	Active
	Net Controllable Conserved Water (No Cost)	Nebraska	Active
	Net Controllable Conserved Water (Purchased)	Nebraska	Inactive
	Pathfinder Municipal Account Lease	Wyoming	Active
	Glendo Reservoir Storage	Wyoming	Inactive
	Colorado Groundwater Management	Colorado	Future
Tier 2	Nebraska Water Leasing	Nebraska	Active/Future
	Nebraska Water Management Incentives	Nebraska	Future
	Nebraska Groundwater Management	Nebraska	Future
Tier 3	Power Interference	Nebraska	Inactive
	Wyoming Water Leasing	Wyoming	Inactive
	LaPrele Reservoir	Wyoming	Inactive

Figure 9 is a reference map identifying the locations of WAP projects that have fixed locations or area boundaries. The map also shows the locations of the three initial state projects, the Lake McConaughy EA in Nebraska, the Pathfinder Modification Project Environmental Account in Wyoming, and the Tamarack I groundwater recharge and re-timing project in Colorado.

[50] Program Document, Attachment 5, Section 6
[51] EDO and WAC 2010

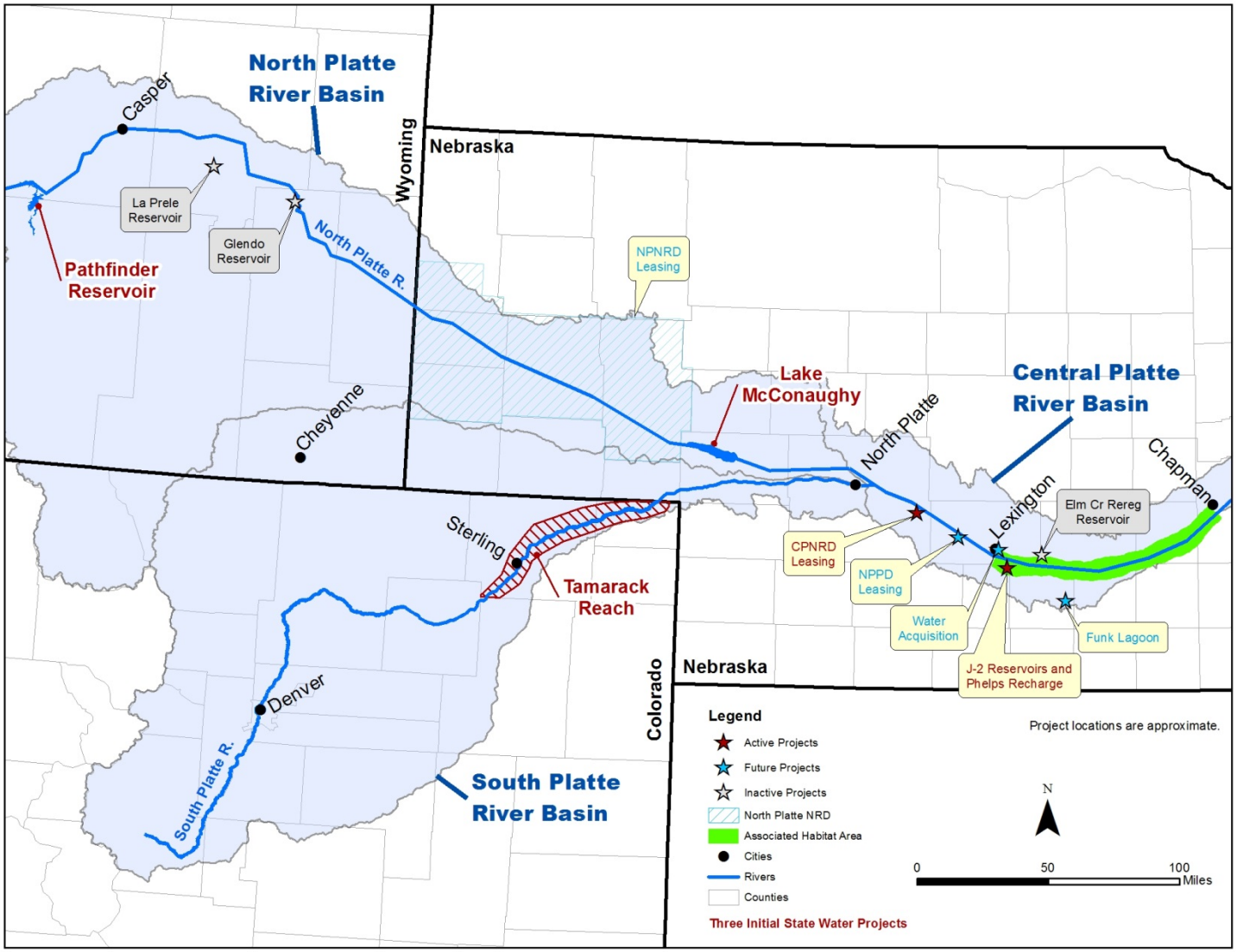

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Figure 9. Locations and status of WAP projects

4.1 Project Sequencing and Tier Classification

The Program focused on prioritizing the advancement of tier 1 WAP projects during the First Increment from 2007 through 2014. The tier designations refer to First Increment project sequencing established in the 2009 WAP Update to place a higher priority on more cost- and yield-efficient projects. Tier 1 WAP projects involve retiming water from times of excess flows to times of shortages to USFWS target flows as well as storage leasing, such as the Pathfinder Municipal Account Lease. These types of projects were selected as the priority for evaluations since they utilize existing water supplies and do not require "dry up" of agricultural land or impact other water rights holders. These types of projects also have relatively large yields and require less-extensive permitting requirements through the Nebraska Department of Natural Resources (NDNR) as the water supply is from unappropriated flows or existing supplies.

Tier 1 reservoir projects are the most operationally efficient as they allow the Program to control water and make releases during critical periods. Feasibility studies were completed for reservoir projects early in the First Increment to allow sufficient time to complete alternatives analyses, design and peer review, water service agreements, permitting and construction, as these can be lengthy processes. Reservoirs were also evaluated early in the First Increment to assess the capability of providing a 2,000 cfs release to augment SDHF releases out of the EA in Lake McConaughy.

Tier 1 groundwater recharge projects that retime excess flows were also prioritized for the early part of the First Increment. Pre-feasibility[52] and feasibility[53] studies were completed under the Program's guidance for various canals in the Central Platte River region, with a preferred option selected for full implementation. The Program also advanced the Pathfinder Municipal Account Lease and evaluated the purchased NCCW project. Evaluations for most of the tier 1 WAP projects listed in the 2009 WAP Update have been completed, with either a decision to implement projects or to consider the projects inactive for the First Increment. Colorado Groundwater Management (Tamarack III) is a remaining tier 1 project to be evaluated for potential future implementation. If developed into a WAP project, the Tamarack III project is expected to yield less than the 17,000 AFY initially estimated in the 2000 Reconnaissance-Level WAP. The Program will work with the State of Colorado to assess the likelihood of expanding the existing Tamarack project and the continued viability for Tamarack III to serve as a WAP project.

The tier 2 projects consist of Nebraska Water Leasing projects, Nebraska Groundwater Management and conserved water from implementation of Water Management Incentives in Nebraska. Water leasing projects became the tier 2 priority beginning in 2014 and will likely involve the development of new water markets and new permitting processes through the NDNR. The historical consumptive use of transferred surface water rights will need to be quantified, and the potential groundwater depletions from increased well pumping on those lands will be evaluated if groundwater pumping replaces surface water irrigation. Groundwater depletions are typically less than the surface water right's

[52] EDO et al. 2010
[53] EA Engineering, Science, and Technology, Inc. and Daniel B. Stephens and Associates, Inc. 2012

historical consumptive use credit at the river; therefore, there is a "net" credit after deducting the impact from new groundwater depletions. The offset requirements for depletions are also a policy issue to consider for future water leasing projects. The GC formed an ad-hoc Water Negotiations Committee in 2014 to aid in furthering negotiations and evaluating agreements for tier 2 water leasing projects.

In the latter part of the First Increment, the Program may evaluate the lower-priority tier 2 projects including) Nebraska Groundwater Management and Water Management Incentives in Nebraska. The Water Management Incentives projects are predicted to be more challenging than the tier 1 and the other tier 2 projects. The Program will likely assist with studies of quantification of Water Management Incentives activities towards the end of the First Increment and may acquire water from these types of projects by 2019. The EDO will assess the most efficient incentive-based projects likely to succeed in central Nebraska.

All of the tier 3 projects are considered inactive and are not anticipated to be implemented in the First Increment.

4.2 Project summaries

The following sections provide brief descriptions and status updates of the 13 WAP projects; more details are provided in Appendix B (active project descriptions), Appendix C (future project descriptions), and Appendix D (inactive project descriptions).

4.2.1 Tier 1 WAP Projects

As shown in Table 4, seven of the WAP projects were classified as tier 1, as follows (see Appendix B for more detailed project descriptions):

- **J-2 Regulating Reservoirs** – The proposed J-2 Regulating Reservoirs are an ACTIVE project that would be located in the CNPPID system in Gosper and Phelps Counties in the Central Platte basin of Nebraska, near the upper end of the associated habitat reach. Pursuant to a water service agreement with the CNPPID, the reservoirs would retime water to be released when there are shortages to USFWS target flows. Project score for the Program is 30,600 AFY, based on a 75 percent interest in the project.

- **Elm Creek Reregulating Reservoir** – This project, which would be located in Dawson and Buffalo Counties, was evaluated in a 2011 feasibility study that identified an optimal scenario involving retiming of flows via stored water supplied from winter well pumping and the capture of excess Platte River flows during the non-winter months. Given the constraints of the WAP project budget and the costs of yield from the Elm Creek Reregulating Reservoir relative to other reservoir options, the GC declined to move forward with this project, and it now has an INACTIVE status.

- **Nebraska Groundwater Recharge** – This WAP project is currently ACTIVE, with initial implementation through the Phelps County Canal. The Phelps County Canal is located in the CNPPID system in Gosper and Phelps Counties. The Program signed temporary water service agreements with the CNPPID to deliver excess flows into the canal during the non-irrigation season (mid-September through mid-April), which are contained by a check structure and allowed to seep from the canal to recharge the underlying aquifer. The project has been active since 2011 and provides a score of 2,700 AFY for the Program, based on a 75 percent interest in the project. A concept to increase the efficiency of the recharge project through groundwater pumping may be considered in the future, which would increase the score of the Phelps County Canal Groundwater Recharge project. The Program may also consider additional recharge operations under the CNPPID's system using Elwood Reservoir.

- **Net Controllable Conserved Water (NCCW)** – This project involves water saved within the CNPPID system as a result of conservation measures implemented to enhance canal distribution and delivery, on-farm irrigation, and optimal reservoir operations. Pursuant to terms in the CNPPID's Federal Energy Regulatory Commission (FERC) license, the saved water could be acquired by the Program and stored in the EA in Lake McConaughy.

    - No Cost NCCW – Approximately 314 AFY of NCCW was made available through a grant with the USBR; this amount is added to the EA in Lake McConaughy each year on October 1 at no cost to the Program. Although the No Cost NCCW has not been officially scored for Program purposes, the ongoing annual contributions to the EA designate it as an ACTIVE project for the WAP. Modeling performed for the 2009 WAP Update[54] estimated the project yield at the associated habitat to be in the range of 217-300 AFY, depending on assumed losses from the North Platte and Platte Rivers downstream of Lake McConaughy.

    - Purchased NCCW – Additional NCCW could be purchased by the Program as a WAP project. Consistent with the FERC license, the CNPPID submitted various yield, cost, payment, and duration offers to the Program in 2013, but the GC did not accept the offers. As a result, the component of the project requiring purchases by the Program is considered INACTIVE for the remainder of the First Increment. The Program will continue to receive the portion of the NCCW saved from conservation activities funded by the USBR grant on an annual basis. Although the GC did not accept the offers that the CNPPID was required to make under the FERC license, that water could still be a possible source of supply for a future project under different terms, such as a lease of storage water from the CNPPID as described in Section 4.2.2 and Appendix C (Section C-2.0).

[54] EDO and WAC 2010

- **Pathfinder Municipal Account Lease** – The Pathfinder Modification Project included 20,000 AF of recaptured reservoir capacity allocated to Wyoming for municipal uses. In 2011, the Program signed an agreement with the Wyoming Water Development Commission (WWDC) to purchase 38,400 AF from this account as a WAP project. This Pathfinder Municipal Account Lease is an ACTIVE project that provides an average yield of 4,800 AFY at Pathfinder Reservoir from 2012 through 2019, and a score for the Program of 4,000 AFY at Grand Island, Nebraska.

- **Glendo Reservoir Storage** – Glendo Reservoir is located on the North Platte River southeast of Glendo, WY. The 2000 Reconnaissance-Level WAP made assumptions regarding the viability of using Glendo Reservoir storage water as a Program component that were superseded by the terms of the subsequent Nebraska v. Wyoming lawsuit settlement. With Wyoming's allocation of Glendo storage water required to meet replacement water obligations described in the settlement stipulation, this WAP project is presently considered INACTIVE for Program purposes. However, the January 2015 Wyoming Water Strategy[55] proposes repurposing the Glendo Reservoir flood control pool in such a manner that may bring about future opportunities for the Program.

- **Colorado Groundwater Management** – Tamarack III is a potential FUTURE extension of the existing Tamarack I and II projects in northeastern Colorado. Tamarack III would utilize existing infrastructure to retime excess flows through aquifer recharge in the lower South Platte River.

4.2.2 Tier 2 WAP Projects

Three of the WAP projects were classified as tier 2, as follows (see Appendix C for more detailed project descriptions):

- **Nebraska Water Leasing** – This WAP project is ACTIVE through a lease agreement the Program signed with the CPNRD in December 2013 for the net consumptive use credit from transferred surface water rights and groundwater recharge accretions of excess flows in the Thirty-Mile, Cozad, and Orchard-Alfalfa Canals. The Program's lease agreement is for up to 20,500 AFY (maximum lease volume at the project location) through the end of the First Increment in 2019. Additional lease agreements for surface water, groundwater, and/or storage with other districts such as the CNPPID, CPNRD, North Platte Natural Resources District (NPNRD), NPPD or individual irrigators within those districts will be pursued in the FUTURE.

- **Nebraska Water Management Incentives** – These are FUTURE WAP projects that would consist primarily of programs resulting in reductions in consumptive use through practices such as conservation cropping, deficit irrigation, or land fallowing. Other options include changes to on-farm irrigation practices that

[55] Mead 2015

would improve efficiency and conserve water by reducing return flows that do not benefit the associated habitat reach.

- **Nebraska Groundwater Management** – This consists of possible FUTURE WAP projects involving lowering of the water table in areas of high groundwater by active pumping or passive means, switching irrigation sources from surface water to groundwater, or a conjunctive use project under the CNPPID system that would increase flows in the Central Platte River. Example groundwater management projects were identified in both the 2000 Reconnaissance-Level WAP and the 2009 WAP Update, including Funk Lagoon, which was studied in 2013 and 2014, and a potential dewatering project with an individual landowner, which was reviewed in 2012.

4.2.3 Tier 3 WAP Projects

The final three WAP projects classified as tier 3 are as follows (see Appendix D for more detailed project descriptions):

- **Power Interference** – This WAP project would entail paying hydroelectric generators (CNPPID or NPPD) to modify the release of water through the hydropower turbines to benefit the Program. These modifications could include changes in the timing of power generation or bypassing water to reduce USFWS target flow shortages through the associated habitat reach. This project is not currently included in the budget estimate for the First Increment and is considered INACTIVE.

- **Wyoming Water Leasing** – Water leasing in Wyoming, considered an INACTIVE WAP project, would be based on temporary or permanent agreements with irrigators or irrigation districts that would voluntarily lease the consumptive use credit of their water rights. Proposed water exports from Wyoming require the approval of the State Engineer (for all exports) and the state legislature (for exports exceeding 1,000 AF), a potential obstacle for the implementation of water leasing to benefit the Program.

- **LaPrele Reservoir** – Located on LaPrele Creek approximately 13 miles upstream of the confluence with the North Platte River in Wyoming, this potential WAP project assumes the Program could lease approximately 5,000 AF of storage in the reservoir. This project is not currently included in the budget estimate for the First Increment and is therefore considered to be INACTIVE.

Section 5 WAP Project Scoring

The following sections summarize approved scoring assumptions, WAP project scores accepted by the GC through 2014, and the anticipated total WAP project score by the end of the First Increment.

5.1 Approved Scoring Assumptions

A project score is in reference to the Program's First Increment objective of reducing shortages to USFWS target flows by an average of 130,000 to 150,000 AFY; WAP projects are 50,000 to 70,000 AFY of that total. The score of a project is considered the yield of the project routed to Grand Island, Nebraska, and credited during shortages to USFWS target flows. The score is modeled by the Program using OPSTUDY hydrology datasets from 1947 through 1994 and is therefore based on the similar hydrologic modeling data and assumptions as previous modeling efforts, but does not necessarily reflect the yield of a project during actual operations. The water yield at the project location may be greater than the project score, as routing losses are deducted from the project location to Grand Island, Nebraska, and accretions are not credited to the score if they occur at the river during excesses to USFWS target flows.

In 2010, the GC formed an ad-hoc Scoring Subcommittee to advance WAP project scoring. The Scoring Subcommittee recommended utilizing a set of score assumptions to maintain consistency between projects. These assumptions are utilized to aid the Scoring Subcommittee and GC in assigning project scores. The recommended assumptions were presented to the GC and accepted at the June 2010 GC meeting[56]. **Table 5** is a summary of the accepted general scoring assumptions utilized to score the J-2 Regulating Reservoirs, the Phelps County Canal Groundwater Recharge project, and the Pathfinder Municipal Account Lease. Additional assumptions and variations in the scoring methodology may be applied on a project-specific basis with the approval of the GC.

[56] EDO 2010. June 2010 GC meeting minutes.

Table 5. General WAP project score assumptions approved by the GC

Component	Data
Hydrology	OPSTUDY Adjusted Present Condition with Three State Projects (without pulse flows). EA Flows included at Grand Island, but not available for WAP project retiming.
Analysis Period	1947-1994
Analysis Time Step[a]	Monthly
Excesses/Shortages Calculation & Score Location	Evaluated at Grand Island, Nebraska
Target Flows	Appendix A-5, Column 4 or 8, depending on daily or monthly time step (provided in the Program Document)
Routing	Water Management Committee (WMC) Loss Model, updated through 2006[b]

[a] Generally, scoring is intended to be completed on a monthly basis unless project-specific assumptions justify the use of something different, such as a daily model.

[b] See Boyle Engineering Corporation et al. 2008a,b

Several of the WAP projects utilize excess flows as a water supply, as this source of water does not impact other water users. The estimated annual excesses are an average of 393,000 AFY based on the J-2 Regulating Reservoirs daily score model using OPSTUDY hydrology at Grand Island from 1947-1994. Based on this volume of annual excesses, it is anticipated that multiple Program projects that divert excess flows can operate simultaneously without significant impacts to individual project yields. There may be times when there is competition for excess flows among projects on a daily time step; in which case, certain projects may be prioritized, such as the J-2 Regulating Reservoirs. The Scoring Subcommittee takes the combined operations into account when evaluating and recommending scores for the GC to approve.

When assigning a score to a project, the goal is for a WAP project to provide water to benefit the full extent of the associated habitat reach whenever possible. It is assumed that projects above the Overton gage will be given a full score credit. However, some projects start downstream of the beginning of the associated habitat reach. WAP projects from which water accrues to the Platte River below Overton, Nebraska may be given a pro-rata share of score credit based on the distance within the associated habitat reach that the project yield benefits. Note that projects are scored based on their ability to reduce USFWS target flow shortages; however, project yields can be utilized for other Program purposes during actual operations, such as SDHF. In addition to meeting a portion of the Program's water objective, a share of project yields (for projects in Nebraska) may be reserved for project sponsors and/or the State of Nebraska. In some cases, the NDNR may not utilize their share of projects, in which case, the water may be leased back to the Program.

5.2 Approved Project Scores

Three WAP projects have been scored towards fulfilling the Program's First Increment WAP milestone[57] of reducing shortages to target flows by at least 50,000 AFY:

[57] Program Document, Attachment 2

- J-2 Regulating Reservoirs,
- Phelps County Canal Groundwater Recharge project, and
- Pathfinder Municipal Account Lease.

The J-2 Regulating Reservoirs project is anticipated to begin portions of the construction in 2017; the GC accepted a score for this project based on the design in the feasibility-level analyses. The Phelps County Canal Groundwater Recharge project and the Pathfinder Municipal Account Lease are operational projects for which the Program currently receives score credit. The GC has approved the project scores in **Table 6** for a total of 37,300 AFY, or about 75 percent of the milestone shortage reduction. The CPNRD water leasing project is active and generating yield for the Program, but has not yet been scored; the scoring process for this WAP project is anticipated to begin in 2015. Likewise, the 314 AFY of No Cost NCCW is actively contributed to the EA in Lake McConaughy on October 1 each year, but the project has not been officially scored for the Program.

Table 6. WAP project scores approved by the GC towards the First Increment milestone

Project	Percentage of project yield for Program use	Program score (AFY)
J-2 Regulating Reservoirs	75%	30,600
Phelps County Canal Groundwater Recharge	75%	2,700
Pathfinder Municipal Account Lease	100%	4,000
Total	**-**	**37,300**

The full score for the J-2 Regulating Reservoirs for the Program and other sponsors is 40,800 AFY, of which 75 percent (30,600 AFY) is allocated to the Program. This score was based on a total storage[58] volume of 13,959 AF; if the final design of the reservoirs has a different storage capacity, the score may be updated accordingly. The remaining 25 percent of project yield from the J-2 Regulating Reservoirs (10,200 AFY) is allocated to the NDNR for the purpose of satisfying depletions plan obligations. The NDNR performs a periodic review of post-1997 depletions to USFWS target flows due to new and expanded uses of water and secures water supplies to offset depletions exceeding 1997 levels as specified in the Nebraska New Depletions Plan[59].

The GC originally approved a score of 1,800 AFY for the Phelps County Canal Groundwater Recharge project, representing a 50 percent interest in the project for the Program. Based on the draft permanent water service agreement[60] with the CNPPID, the Program will now have use of 75 percent of the project, increasing the score from 1,800

[58] Use of the term "storage" in the context of the J-2 Regulating Reservoirs is a reference to that term in its engineering or common usage for capacity. The reservoirs are not considered to be storage reservoirs in the context of state water appropriations.
[59] Program Document, Attachment 5, Section 8
[60] CNPPID 2014a

AFY to 2,700 AFY. The remaining yield from the project is reserved for use by the NDNR.

The total reduction to target flow shortages at Grand Island, Nebraska for anticipated WAP projects is over 60,000 AFY by the end of the First Increment. This estimated score includes the active project yields from Table 6 plus additional project yields anticipated to be secured by 2019. This is a projected volume and will change based on available water sources for the individual projects.

Section 6 WAP Project Costs

The following information describes an update to the cost estimates for WAP projects, based on the EDO consultation with the Special Advisor for economics, George Oamek.

6.1 Current WAP Cost Estimates

The 2000 Reconnaissance-Level WAP provided estimated costs for the 13 identified projects and estimated the length of time required for their implementation. In the report, the present value of estimated WAP costs through 2019 was estimated to range from $36.9 to $68.8 million[61].

For purposes of comparing costs on a consistent basis between years, it is useful to express project costs in of terms of annual equivalent costs, in dollars per acre-foot per year ($/AFY). Annual equivalent costs are the sum of annualized capital cost plus annual O&M (operation and maintenance) expenditures. Annualized capital costs are the estimated capital costs amortized over the project's useful life. Dividing annual equivalent cost by the project yield, in AF, results in its estimated cost per AF.

The 2009 WAP Update estimated that the total annual equivalent cost of projects implemented between 2010 and 2019 would be approximately $15.5 million per year, with yield towards target flows estimated at 83,400 AFY. This resulted in an estimated annual equivalent water cost of about $186 per AF, as measured in 2009 dollars (see **Table 7**, which is from the 2009 WAP Update). As indicated above, this $186 per AF was composed of a capital component representing the amortized capital cost of the projects amortized over their useful lives, and an annual operational component.

To provide a consistent basis for comparison between estimated 2009 and 2014 WAP costs, the 2009 cost estimate was updated to 2014 dollars using the USBR cost escalation factors, or cost indices[62] (see **Table 8** for the 2009 WAP Update in 2014 dollars). These factors covered earthen dam structures, canals and laterals, pipelines, and other cost trends. This indexing increased the annual equivalent cost per AF of the 2009 WAP to approximately $214.

[61] It is important to note that the net present value estimates were developed for decision-making purposes and do not include the impact of cost escalation during the projects' planning and construction phases. As a result, these estimates are not directly comparable to cash flow estimates, which focus upon out-of-pocket expenditures for each year of the analysis, including cost escalation.

[62] http://www.usbr.gov/pmts/estimate/cost_trend.html, Last accessed April 24, 2015.

Table 7. 2009 WAP Update table: Economic comparison of 2009 WAP Project cost estimates (in 2009 dollars)[c]

WAP Project	Initial Cost [2009 $]	Useful Life [Years]	Annualized Initial Cost, Using Assumed Discount Rate[a] and Useful Life [2009 $]	Annual Operations and Maintenance [2009 $]	Total Annual Cost [2009 $]	Yield towards Target Flow[b] [AFY]	Annual Equivalent Cost [$/AF]
Tier 1							
J-2 Regulating Reservoirs	40,039,000	50	1,556,100	321,000	1,877,100	30,000	63
Elm Creek Reregulating Reservoirs					-		-
NE Groundwater Recharge	36,000	30	1,800	117,038	118,838	1,800	66
NCCW, No Cost	-	-		-	-	300	-
NCCW, Purchased	-			5,700,700	5,700,700	7,500	760
Pathfinder Municipal Account				716,100	716,100	3,900	184
Glendo Storage					-		-
CO Groundwater Management (Tamarack III)				765,000	765,000	17,000	45
Tier 2							
NE Water Leasing				1,942,807	1,942,807	7,000	278
NE Water Management Incentives				3,261,933	3,261,933	7,000	466
NE Groundwater Management	1,634,900	30	83,400	18,267	101,667	1,400	73
Tier 3							
Power Interference				212,287	212,287	1,400	152
WY Water Leasing				364,032	364,032	3,900	93
LaPrele Reservoir				415,570	415,570	2,200	189
TOTAL	41,709,900		1,641,300	13,834,734	15,476,034	83,400	186

[a] Assumed Discount Rate = 3.00 percent. Costs may not include all pre-feasibility and feasibility level expenditures.

[b] Note that this column represents either the yield at the project location, or the estimated score of the project at Grand Island, Nebraska.[c] **This table is reproduced from Table 8 of the 2009 WAP Update.**

Table 8. 2009 WAP Update table in 2014 dollars: Economic comparison of 2009 WAP Project cost estimates (converted to 2014 dollars)

WAP Project	Initial Cost [2014 $]	Useful Life [Years]	Annualized Initial Cost, Using Assumed Discount Rate[a] and Useful Life [2014 $]	Annual Operations and Maintenance [2014 $]	Total Annual Cost [2014 $]	Yield towards Target Flow[b] [AFY]	Annual Equivalent Cost [$/AF]
Tier 1							
J-2 Regulating Reservoirs	45,895,044	50	1,783,700	367,949	2,151,649	30,000	72
Elm Creek Reregulating Reservoirs					-		-
NE Groundwater Recharge	41,265	30	2,100	134,156	136,256	1,800	76
NCCW, No Cost	-	-		-	-	300	-
NCCW, Purchased	-			6,534,476	6,534,476	7,500	871
Pathfinder Municipal Account				820,836	820,836	3,900	210
Glendo Storage							
CO Groundwater Management (Tamarack III)				876,888	876,888	17,000	52
Tier 2							
3,781,474				2,252,246	2,252,246	7,000	322
NE Water Management Incentives				3,781,474	3,781,474	7,000	540
NE Groundwater Management	1,895,297	30	96,700	21,176	117,876	1,400	84
Tier 3							
Power Interference				246,098	246,098	1,400	176
WY Water Leasing				422,013	422,013	3,900	108
LaPrele Reservoir				476,351	476,351	2,200	217
TOTAL	47,831,607		1,882,500	15,933,663	17,816,163	83,400	214

[a] Assumed Discount Rate = 3.00 percent. Costs may not include all pre-feasibility and feasibility level expenditures.

[b] Note that this column represents either the yield at the project location, or the estimated score of the project at Grand Island, Nebraska.

Since 2009, significant progress has been made towards implementing the identified projects, with uncertainties about project costs and project yields being substantially reduced. For example, two of the more prominent projects in terms of total yield, the J-2 Regulating Reservoirs and Nebraska Water Leasing projects, are past the reconnaissance planning phase and are now in the design[63] and negotiation phases, respectively. As a result, there are still uncertainties associated with the ultimate costs of projects and their yields, but the uncertainties are much less than the 2000 Reconnaissance-Level WAP and the 2009 WAP Update.

Also during the 2009 WAP Update, there were reasonable concerns about rapidly escalating construction costs diminishing what the Program could afford to develop, plus high crop commodity prices driving-up farm incomes to record high levels, and reducing interests irrigators had shown in leasing irrigation water. However, the national and regional economies have cooled, construction cost escalation rates are near their long-term averages and crop commodity prices have dropped significantly, stopping the escalation in water lease rates. Although cost escalation rates are generally near average, site-specific projects may experience above-average escalation rates, such as the J-2 Regulating Reservoirs.

Table 9 reevaluates updated cost estimates and project yields for comparison to the estimates developed in 2009. The 2014 updated estimates reveal a less expensive average annual equivalent cost for projects, even with cost escalation. Specifically, some changes since the 2009 WAP include:

- NCCW purchased from the CNPPID is not currently being considered as a water supply option.
- Projects in the tier 3 category, including Power Interference, Wyoming water leasing, and LaPrele Reservoir, are not currently being considered.
- Water leasing in Nebraska is being developed on a slightly larger scale than anticipated in 2009.

[63] Design of the J-2 Regulating Reservoirs is being undertaken by the CNPPID, which will construct, own, and operate the reservoirs. Program water benefits will come from regulating performed in accordance with a water service agreement with the CNPPID.

Table 9. Economic comparison of 2014 WAP Project cost estimates (in 2014 dollars)

WAP Project	Initial Cost [2014 $]	Useful Life [Years]	Annualized Initial Cost, Using Assumed Discount Rate[a] and Useful Life [2014 $]	Annual Operations and Maintenance at end of First Increment [2014 $]	Total Annual Cost [2014 $]	Yield towards Target Flow[b] [AFY]	Annual Equivalent Cost [$/AF]
Tier 1							
J-2 Regulating Reservoirs	58,540,000	50	2,275,200	400,000	2,675,200	30,600	87
Elm Creek Reregulating Reservoirs				-	-	-	-
NE Groundwater Recharge[c]	357,840	30	18,300	185,400	203,700	3,450	59
NCCW, No Charge	-	-		-	-	250	-
NCCW, Purchased	-			-	-	-	-
Pathfinder Municipal Account	1,958,400	8	279,000	-	279,000	4,000	70
Glendo Storage				-	-	-	-
CO Groundwater Management (Tamarack III)				570,000	570,000	10,000	57
Tier 2							
NE Water Leasing, CPNRD[d]				1,075,000	1,075,000	4,780	225
NE Water Leasing, NPPD				154,000	154,000	430	358
NE Water Leasing, CNPPID, from Storage				1,462,300	1,462,300	4,050	361
NE Water Leasing, CNPPID, from Irrigators				904,400	904,400	4,050	223
NE Water Leasing, NPNRD				1,126,000	1,126,000	4,050	278
NE Water Management Incentives				600,000	600,000	1,800	333
NE Groundwater Management		0		-	2,400	-	-
Tier 3							
Power Interference				-	-	-	-
WY Water Leasing				-	-	-	-
LaPrele Reservoir				-	-	-	-
TOTAL	60,903,340	-	2,574,900	6,477,100	9,052,000	67,460	134

[a] Assumed Discount Rate = 3.00 percent. Costs may not include all pre-feasibility and feasibility level expenditures.

[b] Estimated score of the project at Grand Island, Nebraska at the end of the First Increment.

[c] This line includes the Phelps County Canal Groundwater Recharge project, groundwater pumping of recharged water under the Phelps County Canal system and the Elwood Reservoir seepage project.

[d] This line is for water leasing with the CPNRD and acquisition of a surface water right in the CPNRD. The initial upfront cost of the identified acquisition is not included in the cost estimate as it is relatively insignificant in comparison to total costs; however, the yield of the acquisition is included.

For purposes of assessing the "bang for the buck" with respect to the projects, **Figure 10** ranks the projects by annual yield (note that this is the yield at the project location) and shows the associated annual equivalent cost per AF of each. Figure 10 shows that, in terms of economic costs, the J-2 Regulating Reservoirs, Pathfinder Municipal Account Lease, Nebraska Groundwater Recharge and Colorado Ground Water Management (Tamarack III) projects provide the most economical water supply, as currently projected.

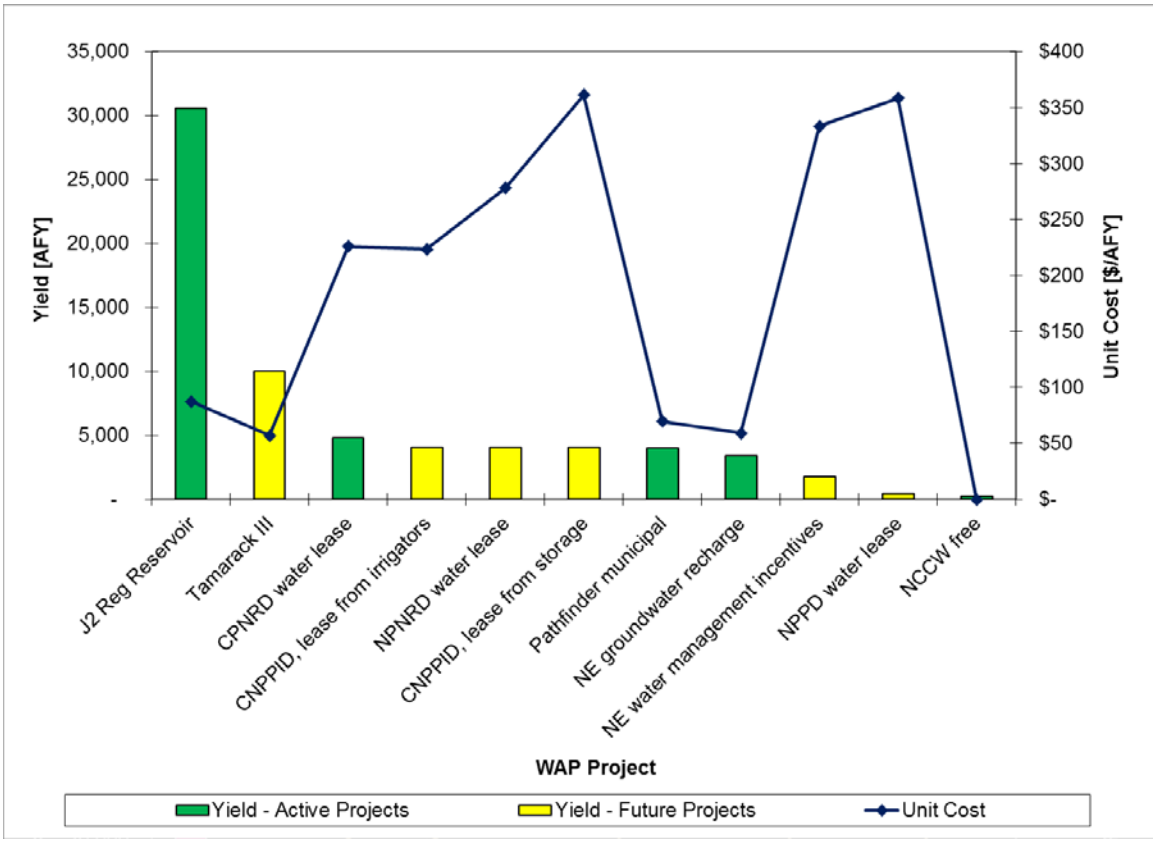

Figure 10. WAP project annual yields (AFY) and estimated unit costs in 2014 (dollar/AF/year)

It is interesting to note that in addition to economic feasibility, the financial feasibility of the combination of projects is critical. That is, can the most economical combinations of the projects be financed considering possible high up-front costs? The J-2 Regulating Reservoirs project is an example. Although it is one of the lower cost projects for water on a per AF basis, it has the highest initial cost. In addition, a majority of the J-2 Regulating Reservoirs cost is allocated to the Program and ultimately the federal government, who may have less flexibility in managing funds over time compared to other stakeholders.

6.2 Cash Flow Analysis

Table 10 provides a cash flow update for this 2014 WAP Update. Similar to the 2009 WAP Update, the assumed rate of cost escalation, or inflation, is generally 3 percent[64],

[64] Some escalation factors may be greater, based on negotiated agreements or projected rate increases for specific projects.

applied to future expenditures through the First Increment. The 2014 updated estimates reveal a less expensive WAP than the 2009 WAP in terms of overall expenditures, even with cost escalation. This is due to a lower overall yield of approximately 67,500 AFY[65] and the Program's method of strategically selecting projects that are the most cost- and yield-efficient.

It should also be noted that the 2009 cash flow analysis assumed implementation of all WAP projects, which is beyond the Program water objective for the First Increment. In the 2009 WAP Update, it was estimated that approximately $161 million would have been spent to achieve the 83,400 AFY yield through the First Increment. The updated cash flow analysis shown in Table 10 contributes towards an estimated yield of 66,500 AFY, which is within Program First Increment water objective for the WAP (50,000-70,000 AFY) and within the budget, at a total estimated cost of $87.6 million. Observations about the cash flow analysis include:

- On a proportionate per AF basis, the estimated cost of achieving the Program's water objective/milestone for the WAP has not increased over time and may be less than estimated in the 2009 WAP Update. The projects the Program has selected for implementation are the preferred cost- and yield-efficient alternatives of the projects identified in previous WAPs.
- The 2014 WAP Update estimates a cash outlay of $87.6 million for an estimated yield of 66,500 AFY, which is significantly less than the 2009 WAP update cost of $161 million cash outlay for a yield of over 80,000 AFY. The Program more closely evaluated the relationship of project yields and costs to obtain a cash outlay that reflects anticipated operations and scenarios in the 2014 WAP Update.

[65] This represents the yield at the end of the First Increment.

Table 10. Actual and estimated WAP expenditures through 2019, including anticipated inflation (all values in dollars)

WAP Project	Expenditures to Date[b]	2014, Budgeted	Estimated*					TOTALS
			2015	2016	2017	2018	2019	
Tier 1								
J-2 Regulating Reservoirs[a]	14,865,500	-	14,823,800	15,268,500	15,726,500	281,400	289,800	61,255,500
Elm Creek Reregulating Reservoir	-	-	-	-	-	-	-	-
NE Groundwater Recharge[c]	157,800	88,300	310,100	165,900	172,100	178,600	185,400	1,258,200
NCCW, No Cost	-	-	-	-	-	-	-	-
NCCW, Purchased	-	-	-	-	-	-	-	-
Pathfinder Municipal Account	1,958,400	-	-	-	-	-	-	1,958,400
Glendo Storage	-	-	-	-	-	-	-	-
CO Groundwater Management (Tamarack III)	-	-	-	604,300	622,400	641,100	660,300	2,528,100
Tier 2								
NE Water Leasing, CPNRD[d]	34,200	175,000	1,035,100	959,900	996,300	1,034,300	1,074,100	5,308,900
NE Water Leasing, NPPD	-	-	147,700	138,600	143,400	148,400	153,600	731,700
NE Water Leasing, CNPPID, from Storage	-	-	625,000	910,000	946,400	1,406,100	1,462,300	5,349,800
NE Water Leasing, CNPPID, from Irrigators	-	-	385,100	561,200	584,200	781,900	904,400	3,216,800
NE Water Leasing, NPNRD	-	-	390,000	721,000	742,600	983,500	1,125,500	3,962,600
NE Water Management Incentives	-	-	-	-	655,600	675,300	695,600	2,026,500
NE Groundwater Management	47,100	-	-	-	-	-	-	47,100
Tier 3								
Power Interference	-	-	-	-	-	-	-	-
WY Water Leasing	-	-	-	-	-	-	-	-
LaPrele Reservoir	-	-	-	-	-	-	-	-
Subtotal for WAP Projects	17,063,000	263,300	17,716,800	19,329,400	20,589,500	6,130,600	6,551,000	87,643,600

[a] Cost allocable to PRRIP.

[b] Expenditures to date may not include all pre-feasibility and feasibility level expenditures, as some of these expenditures may be under different budget line items.

[c] This line includes the Phelps County Canal Groundwater Recharge project, groundwater pumping of recharged water under the Phelps County Canal System and the Elwood Reservoir seepage project.

[d] This line includes water leasing with the CPNRD and acquisition of an identified surface water right in the CPNRD.

*Note: Estimated future costs change based on the volumes of water anticipated to be leased or purchased each year from 2015 through 2019, which change annually for some projects. This table was developed using projected inflation rates and/or inflation rates described in executed agreements, in conjunction with projected yields over the remaining years of the First Increment.

Section 7 Conclusions

The First Increment water objective is to reduce USFWS target flows shortages by 130,000 AFY to 150,000 AFY, with the WAP projects supplying an average of at least 50,000 AFY towards the objective. The three initial state projects are fully operational and are credited at providing 80,000 AFY towards the water objective. The Program has made significant advances in WAP project development since the 2009 WAP Update. Three WAP projects have been implemented since that time including the Phelps County Canal Groundwater Recharge project, the Pathfinder Municipal Account Lease and the CPNRD Water Leasing project. These projects are currently providing annual yields for Program uses and have been for multiple years. The Program already entered into a water service agreement with the CNPPID for the J-2 Regulating Reservoirs project, and the CNPPID is in the permitting and design phase, with significant work completed towards the implementation of this project. The Program made a significant payment in 2013 for the J-2 Regulating Reservoirs and is securing the necessary remaining funds for the construction cost of the reservoirs, with anticipated project construction beginning in 2017.

The Program also evaluated several other potential WAP projects that were ultimately not recommended for implementation, including the Elm Creek Reregulating Reservoir and the NCCW for purchase. These projects were not recommended because their yields and associated costs were generally unfavorable in comparison to other WAP projects.

During the First Increment to date (2007-2014), the Program focused efforts on WAP projects that utilized excess flows and/or storage leases as water supplies. These projects are generally more straight-forward to implement, have a minimal impact on other water users and yield large volumes of water. The Program is moving into the next phase of WAP project development, which consists of water leasing opportunities and water right acquisitions in Nebraska. These types of projects are likely more challenging to implement as new water markets must be developed and permitting processes must be determined. After working towards the development of water leasing projects in Nebraska, the Program anticipates moving onto the evaluations of Colorado Groundwater Management (Tamarack III) and Water Management Incentives in Nebraska in the latter years of the First Increment (ending in 2019). Additional projects not listed in this document may also be identified and evaluated as potential WAP projects.

In 2010, the GC developed a Scoring Subcommittee to assess various WAP project yields toward the First Increment water objective of reducing shortages to target flows. The total project score approved by the GC for WAP projects as of the end of 2014 (Year 8 of the First Increment) is 37,300 AFY[66]. This score is approximately 75 percent of the minimum WAP contribution requirement of 50,000 AFY towards the First Increment

[66] This score represents the J-2 Regulating Reservoir, the Phelps County Canal Groundwater Recharge project and the Pathfinder Municipal Account Lease projects. The CPNRD Water Lease is an active project that currently contributes a yield to the Program; however, the project has not been scored by the GC.

WAP milestone. The yields and budget will continue to be closely monitored by the Program to ensure the future success of the water objective and WAP milestone.

Moving forward, the Program partners agree to continue investigating the WAP projects described in this document and its appendices in order to develop more accurate yield and cost projections, but are not bound by any of the current estimates presented herein. Given the success in meeting the milestone steps (see Section 1.2.2), it is anticipated that the Program will achieve its goal of securing at least 50,000 AFY from WAP projects by the end of the First Increment, and that this will be accomplished within the budget allocated for the Water Plan. Although the active projects identified above (e.g., J-2 Regulating Reservoirs and Phelps County Canal Groundwater Recharge projects) relied on the retiming of excess flows and involved comparatively simple permitting requirements, it is anticipated that pursuit of additional water leasing projects will be the focus of WAP activities for the coming years. These leasing activities will require more complex analysis of consumptive use, depletions, and other factors; establishment of markets for leasing transactions; and more arduous permitting.

Given these considerations, the process for continuing to advance WAP projects will remain as previously identified in the 2000 Reconnaissance-Level WAP and the 2009 WAP Update. In that regard, the Program intends to maintain a methodical and conservative approach when assessing potential projects for implementation, particularly given the interrelated nature of projects and other efforts progressing within the Platte River basin. The GC will be provided with WAP project proposals, evaluations and budgets for project implementation approval or rejection. The EDO will continue to monitor the progress of the WAP towards the First Increment milestone to advance the Program's success in meeting the First Increment water objective.

Section 8 References

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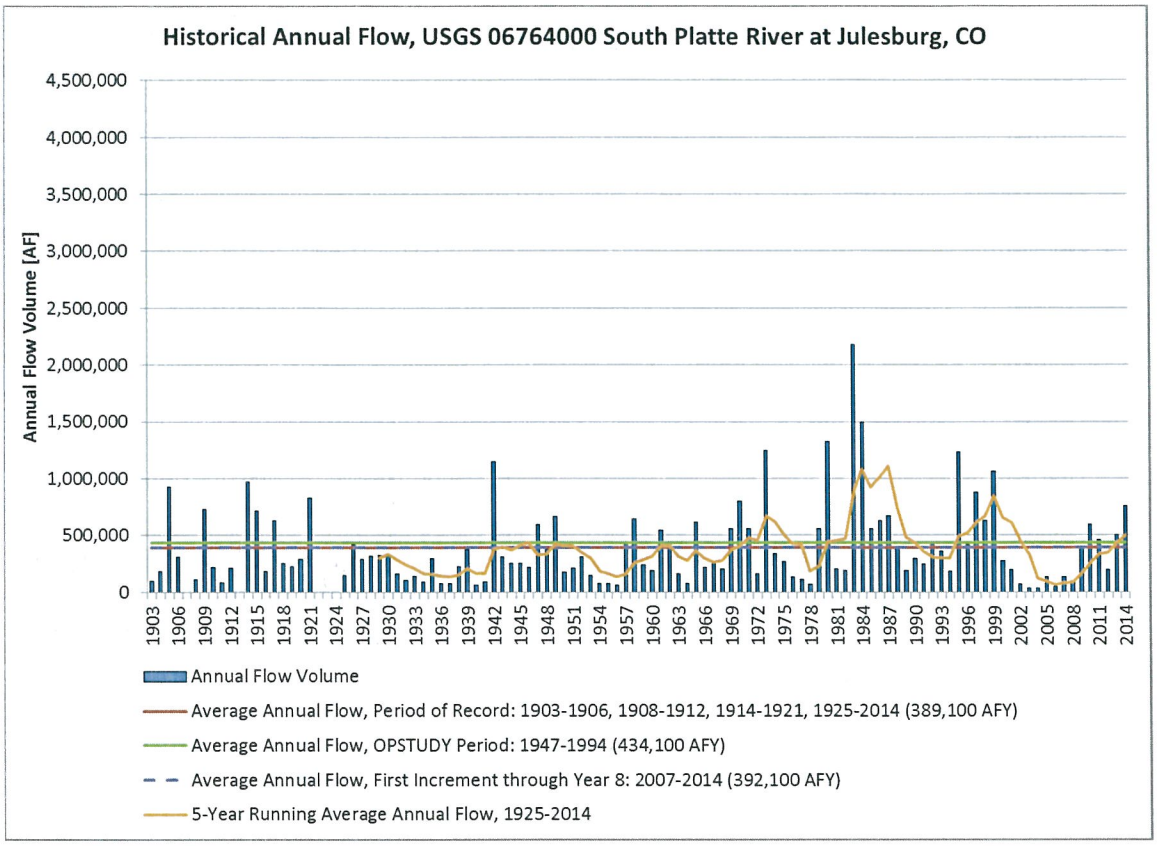
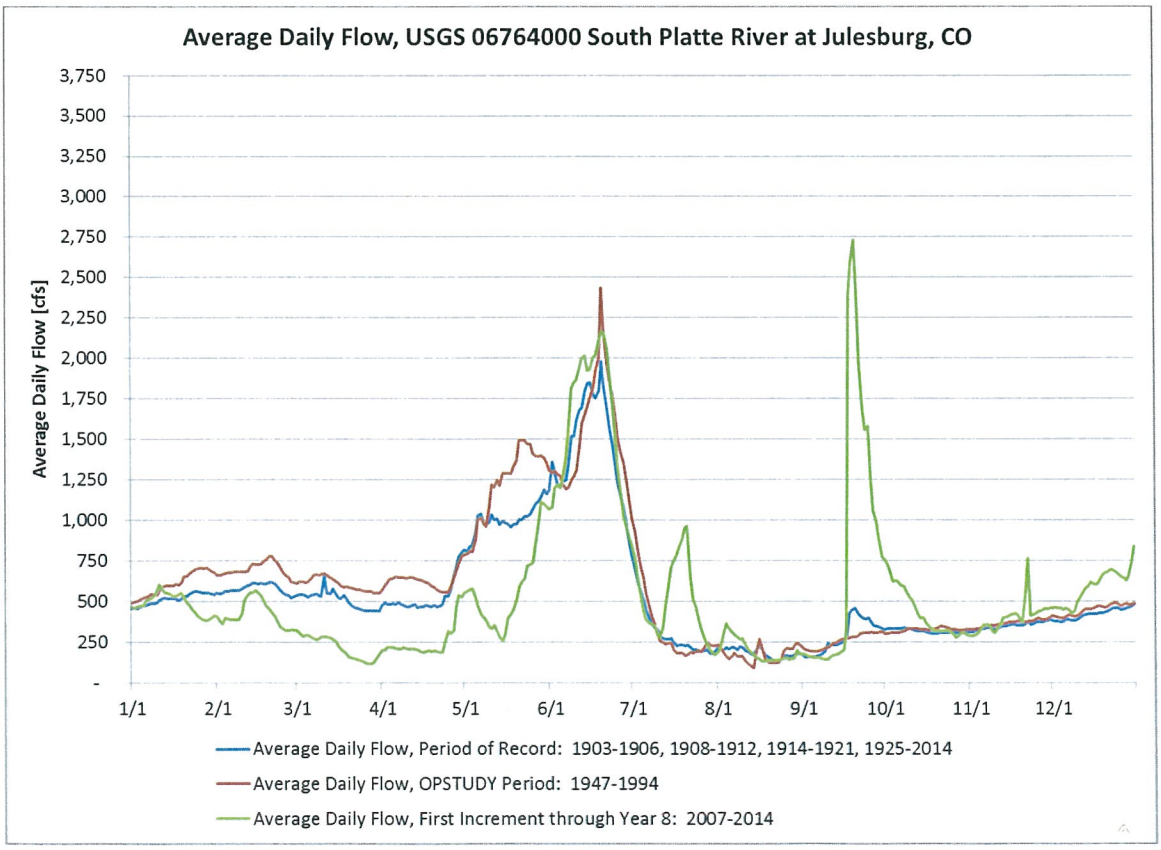
2014 Water Action Plan Update

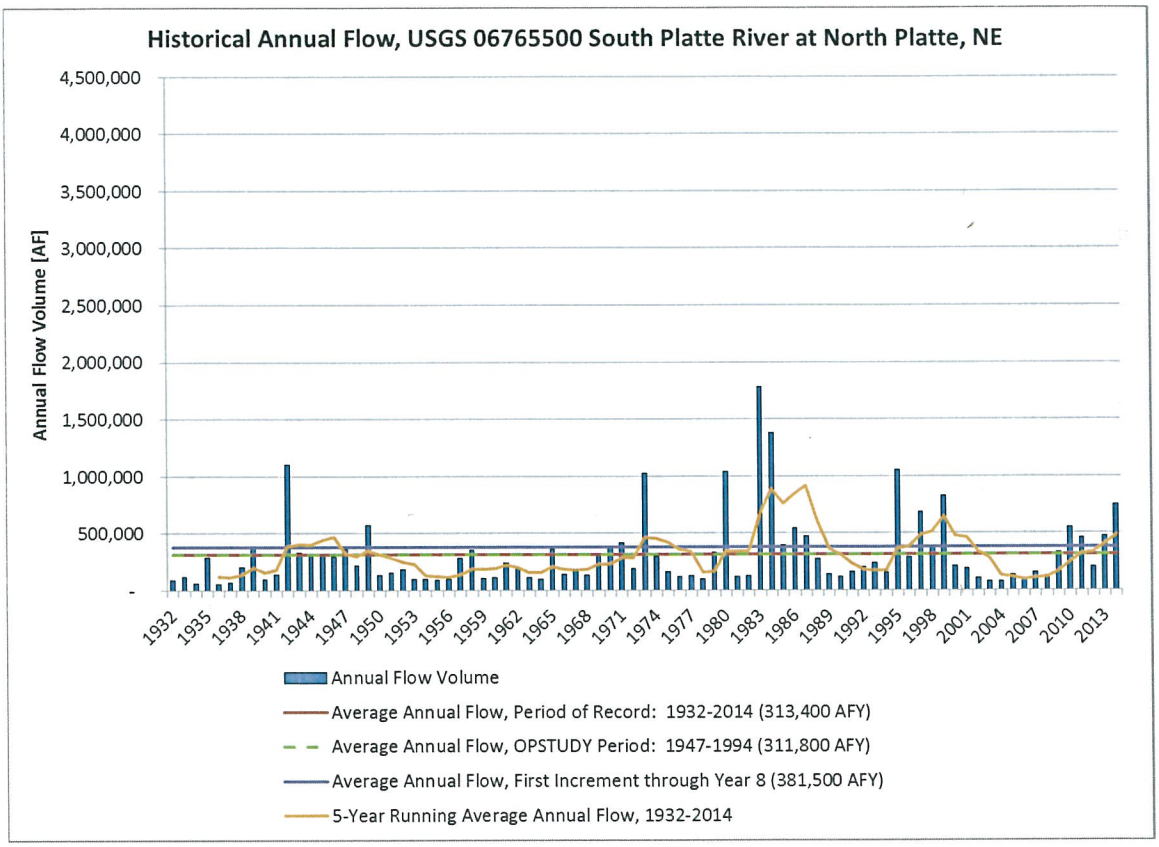
Appendix A – Historical Streamflows at Representative Gages


Historical Annual Flow, USGS 06764000 South Platte River at Julesburg, CO
Annual Flow Volume [AF]
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1903 1906 1909 1912 1915 1918 1921 1924 1927 1930 1933 1936 1939 1942 1945 1948 1951 1954 1957 1960 1963 1966 1969 1972 1975 1978 1981 1984 1987 1990 1993 1996 1999 2002 2005 2008 2011 2014
Annual Flow Volume
Average Annual Flow, Period of Record: 1903-1906, 1908-1912, 1914-1921, 1925-2014 (389,100 AFY)
Average Annual Flow, OPSTUDY Period: 1947-1994 (434,100 AFY)
Average Annual Flow, First Increment through Year 8: 2007-2014 (392,100 AFY)
5-Year Running Average Annual Flow, 1925-2014

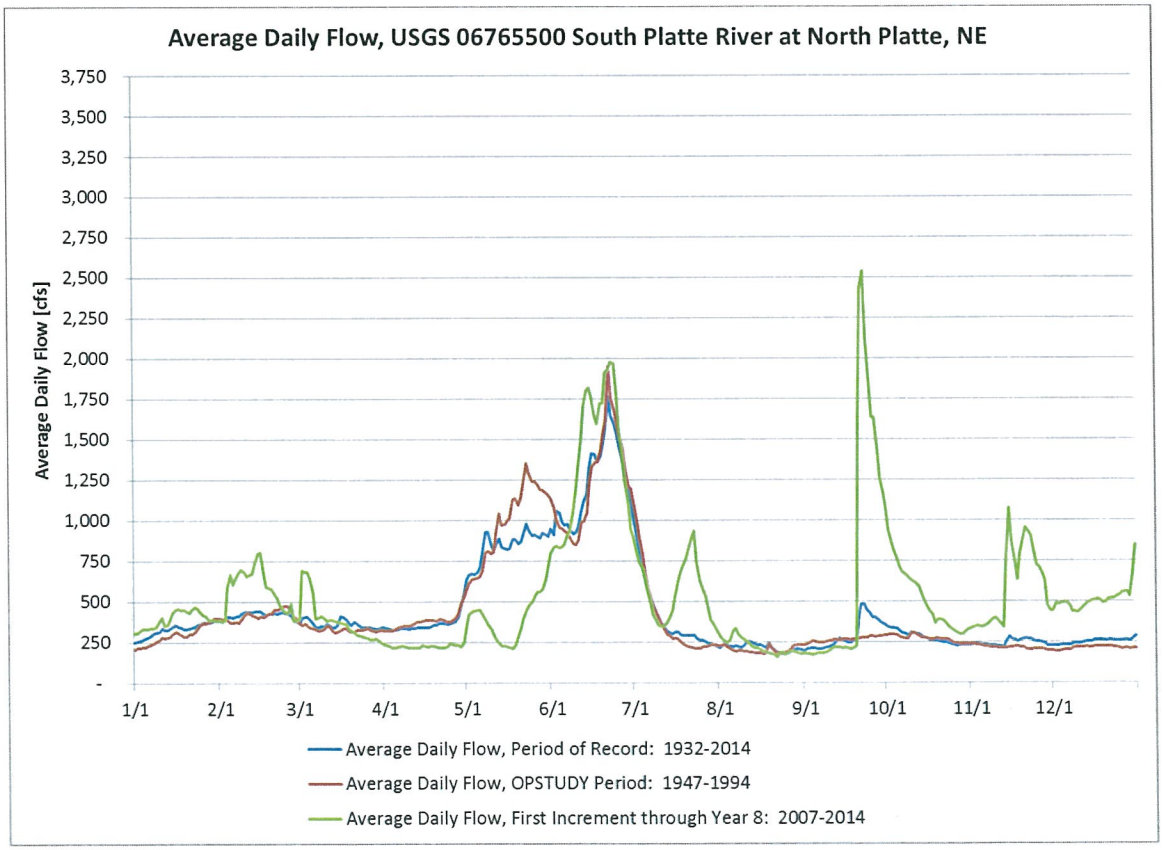
1568


Average Daily Flow, USGS 06764000 South Platte River at Julesburg, CO
Average Daily Flow [cfs]
3,750
3,500
3,250
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
-
1/1 2/1 3/1 4/1 5/1 6/1 7/1 8/1 9/1 10/1 11/1 12/1
Average Daily Flow, Period of Record: 1903-1906, 1908-1912, 1914-1921, 1925-2014
Average Daily Flow, OPSTUDY Period: 1947-1994
Average Daily Flow, First Increment through Year 8: 2007-2014

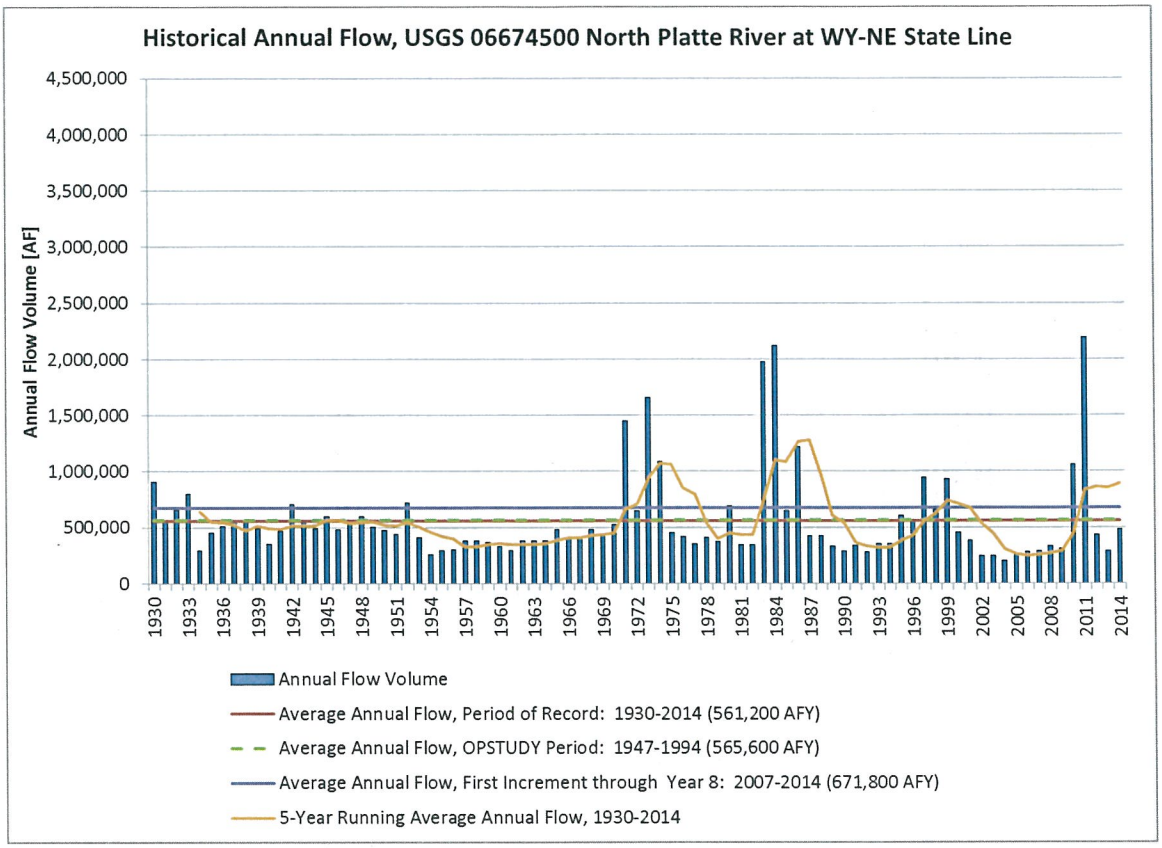
1569


Historical Annual Flow, USGS 06765500 South Platte River at North Platte, NE
Annual Flow Volume [AF]
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
1932
1935
1938
1941
1944
1947
1950
1953
1956
1959
1962
1965
1968
1971
1974
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
2007
2010
2013
Annual Flow Volume
Average Annual Flow, Period of Record: 1932-2014 (313,400 AFY)
Average Annual Flow, OPSTUDY Period: 1947-1994 (311,800 AFY)
Average Annual Flow, First Increment through Year 8 (381,500 AFY)
5-Year Running Average Annual Flow, 1932-2014

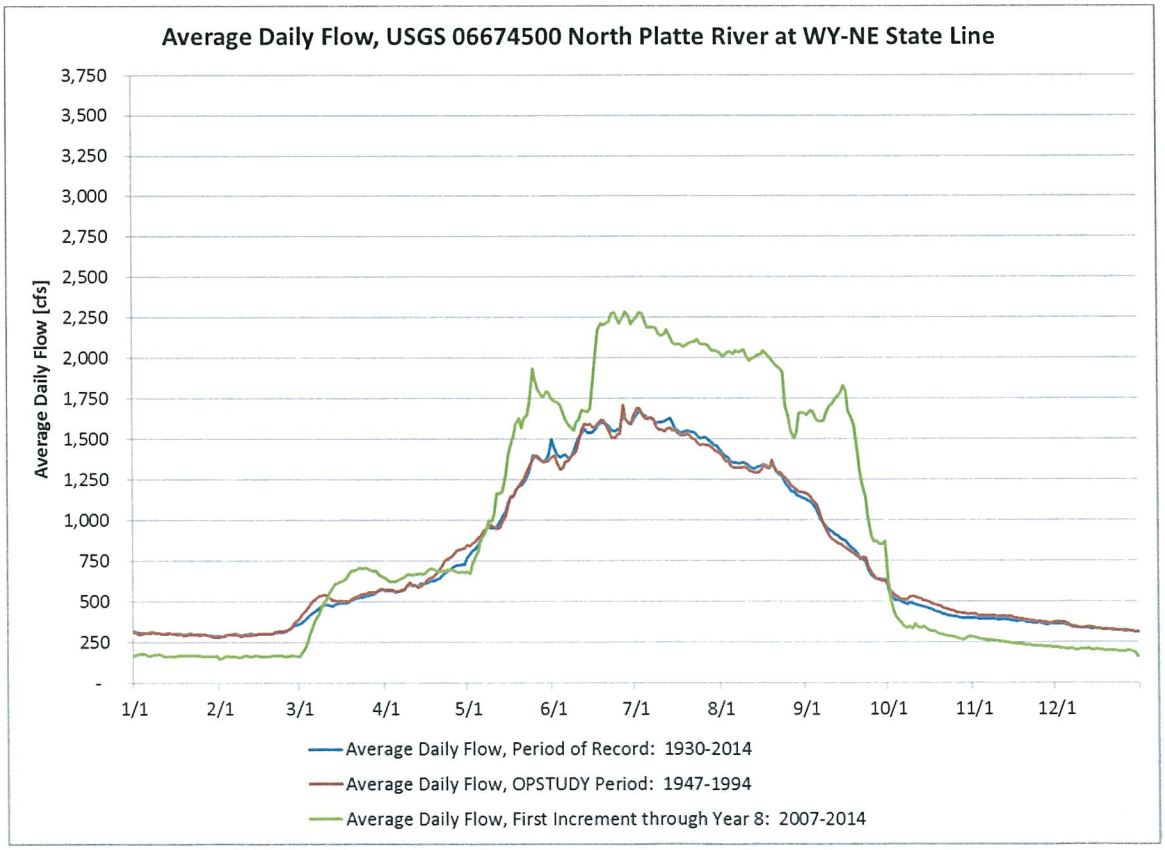
1570


Average Daily Flow, USGS 06765500 South Platte River at North Platte, NE
Average Daily Flow [cfs]
3,750
3,500
3,250
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
-
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
9/1
10/1
11/1
12/1
Average Daily Flow, Period of Record: 1932-2014
Average Daily Flow, OPSTUDY Period: 1947-1994
Average Daily Flow, First Increment through Year 8: 2007-2014

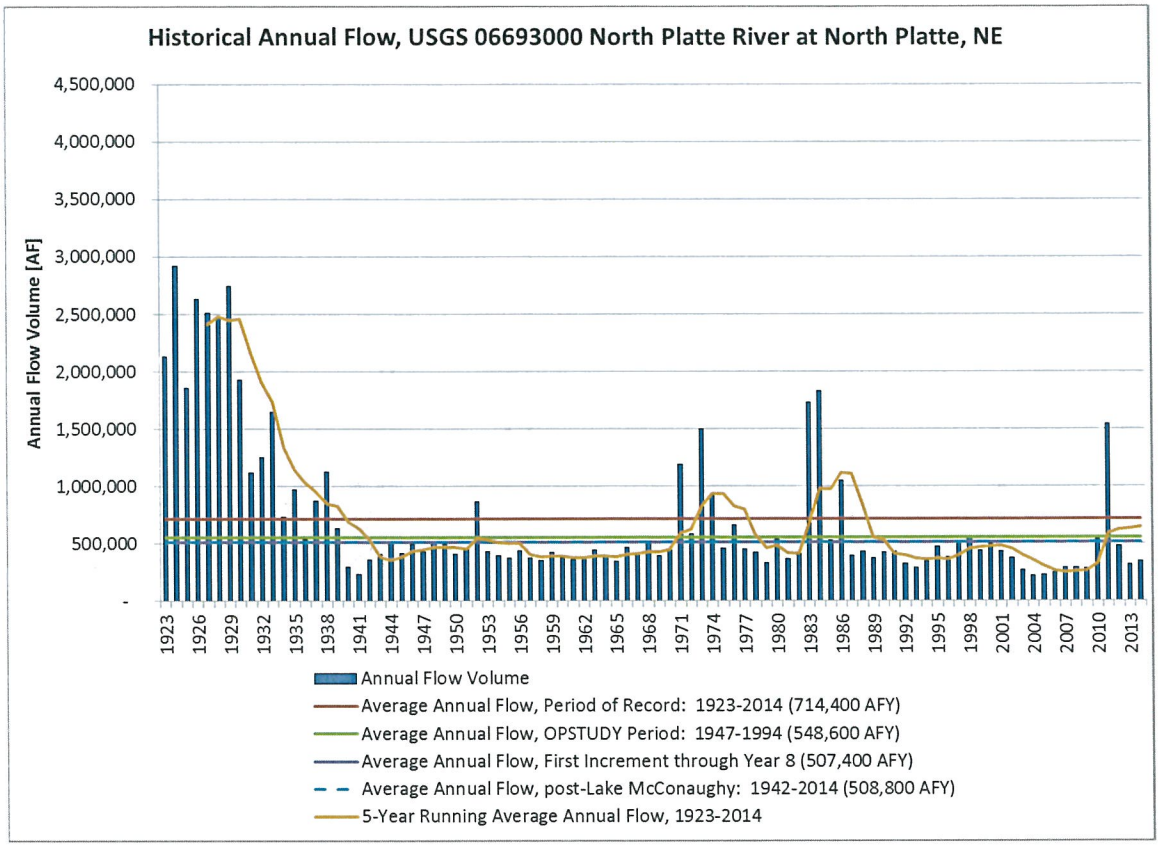
1571


Historical Annual Flow, USGS 06674500 North Platte River at WY-NE State Line
Annual Flow Volume [AF]
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1930
1933
1936
1939
1942
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
Annual Flow Volume
Average Annual Flow, Period of Record: 1930-2014 (561,200 AFY)
Average Annual Flow, OPSTUDY Period: 1947-1994 (565,600 AFY)
Average Annual Flow, First Increment through Year 8: 2007-2014 (671,800 AFY)
5-Year Running Average Annual Flow, 1930-2014

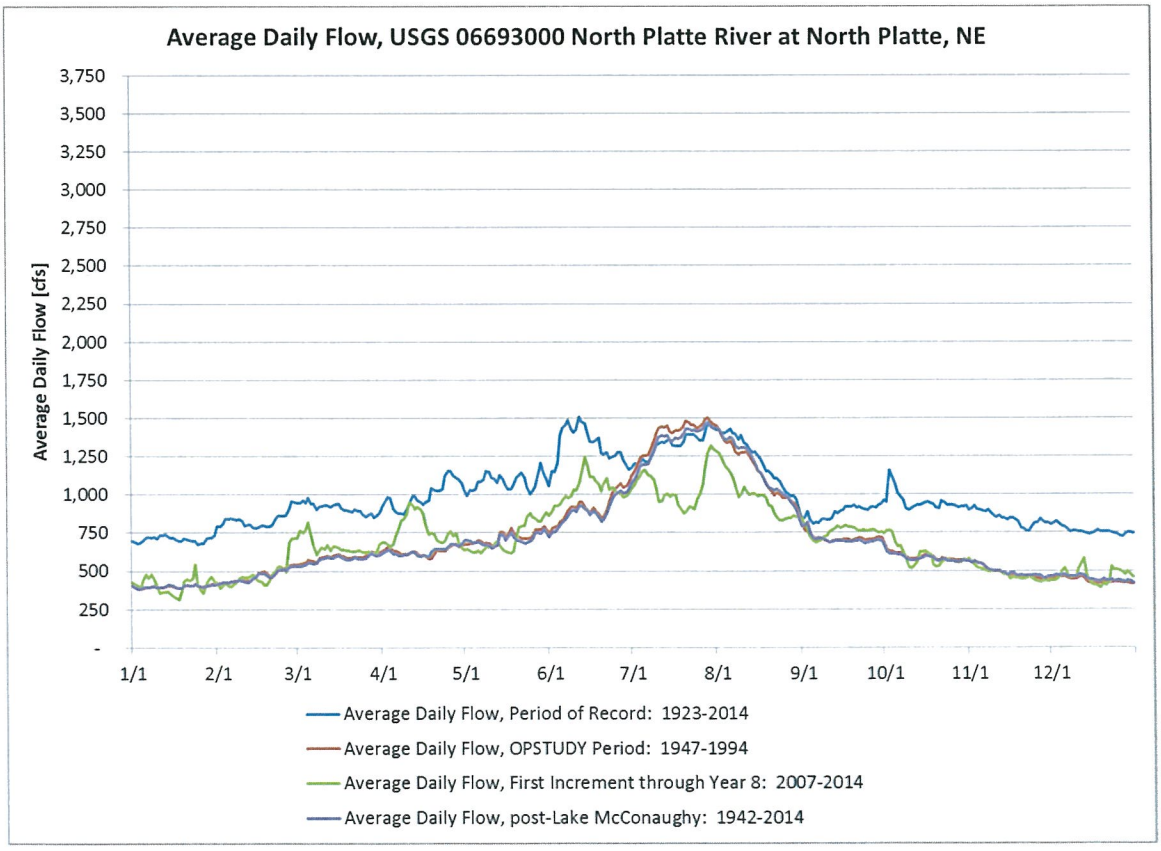
1572


Average Daily Flow, USGS 06674500 North Platte River at WY-NE State Line
Average Daily Flow [cfs]
3,750
3,500
3,250
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
-
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
9/1
10/1
11/1
12/1
Average Daily Flow, Period of Record: 1930-2014
Average Daily Flow, OPSTUDY Period: 1947-1994
Average Daily Flow, First Increment through Year 8: 2007-2014

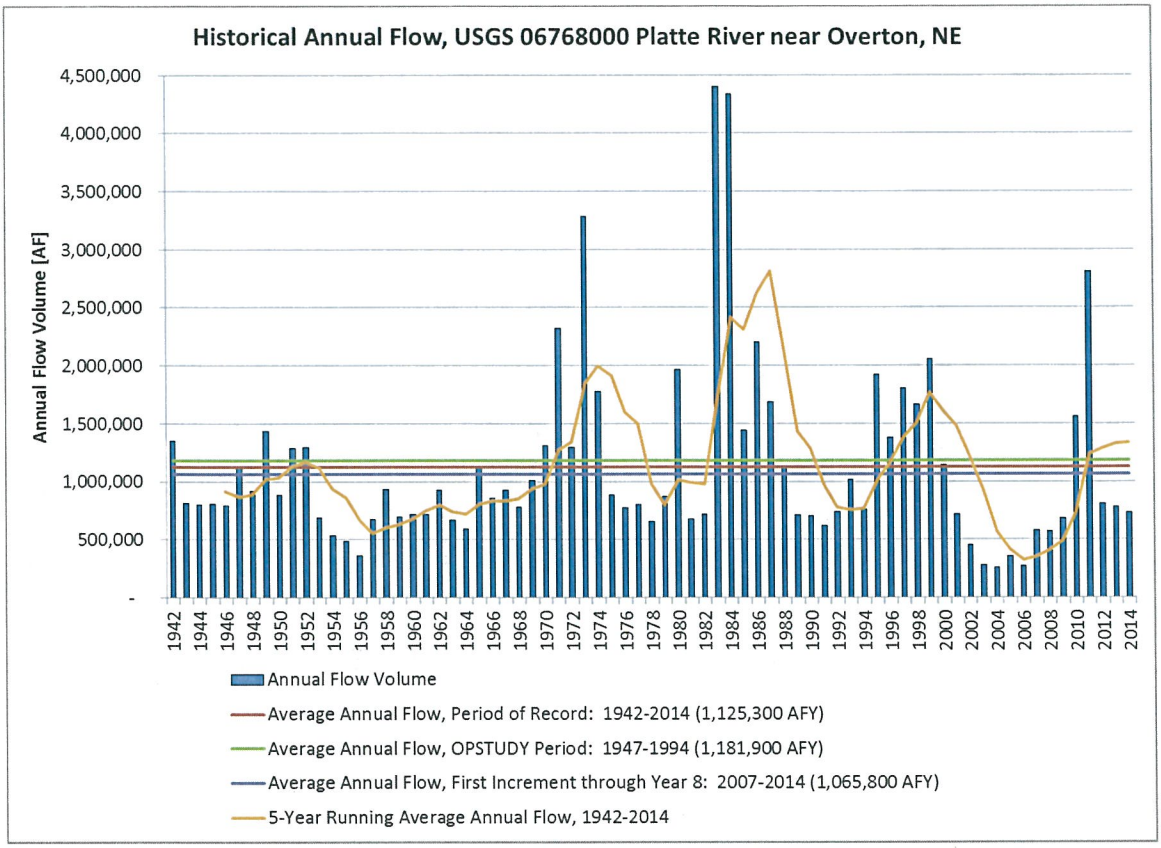
1573


Historical Annual Flow, USGS 06693000 North Platte River at North Platte, NE
Annual Flow Volume [AF]
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
1923
1926
1929
1932
1935
1938
1941
1944
1947
1950
1953
1956
1959
1962
1965
1968
1971
1974
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
2007
2010
2013
Annual Flow Volume
Average Annual Flow, Period of Record: 1923-2014 (714,400 AFY)
Average Annual Flow, OPSTUDY Period: 1947-1994 (548,600 AFY)
Average Annual Flow, First Increment through Year 8 (507,400 AFY)
Average Annual Flow, post-Lake McConaughy: 1942-2014 (508,800 AFY)
5-Year Running Average Annual Flow, 1923-2014

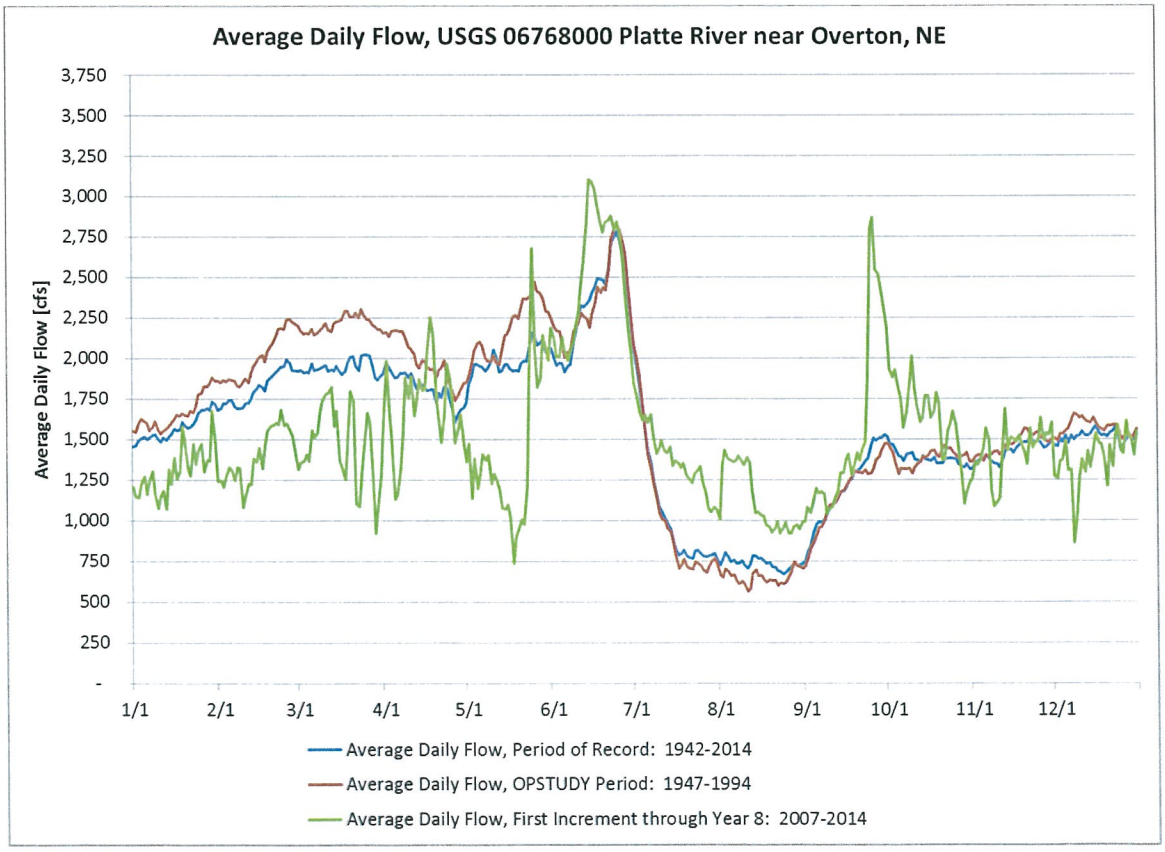
1574


Average Daily Flow, USGS 06693000 North Platte River at North Platte, NE
Average Daily Flow [cfs]
3,750
3,500
3,250
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
-
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
9/1
10/1
11/1
12/1
Average Daily Flow, Period of Record: 1923-2014
Average Daily Flow, OPSTUDY Period: 1947-1994
Average Daily Flow, First Increment through Year 8: 2007-2014
Average Daily Flow, post-Lake McConaughy: 1942-2014

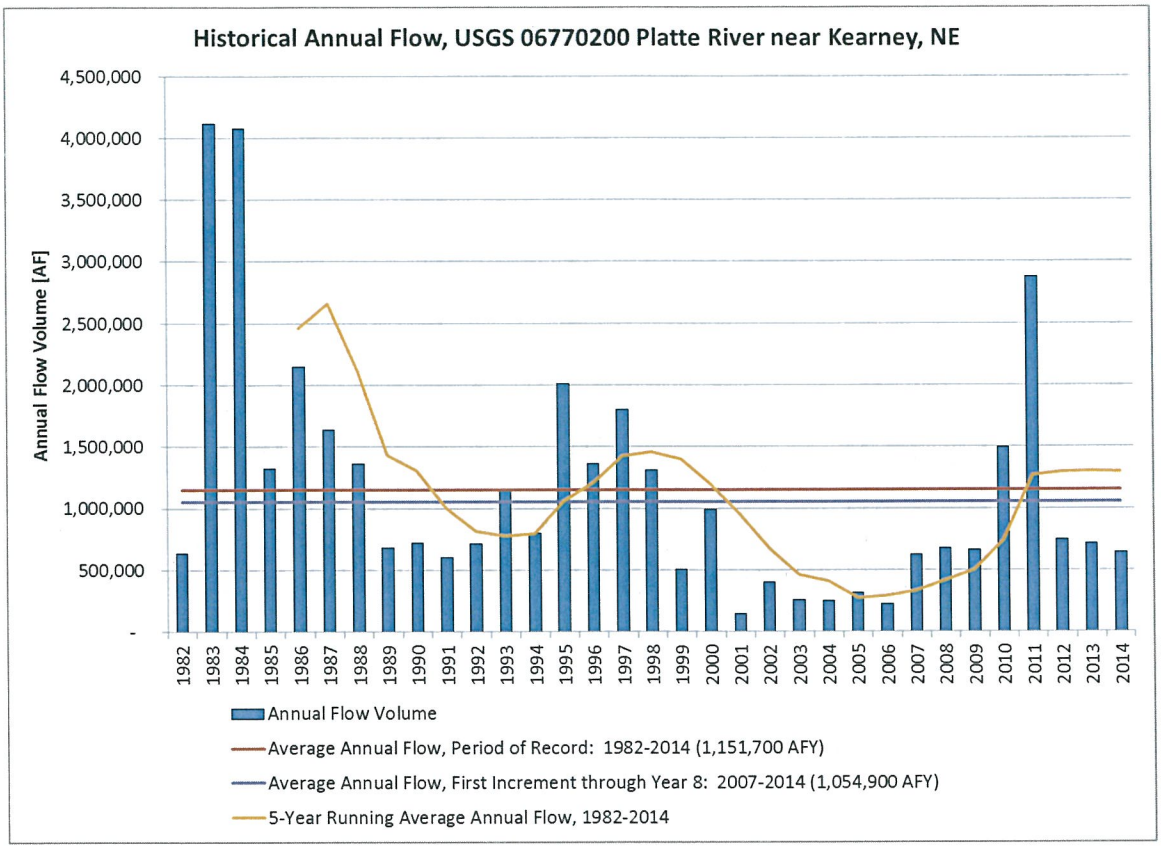
1575


Historical Annual Flow, USGS 06768000 Platte River near Overton, NE
Annual Flow Volume [AF]
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
1942 1944 1946 1948 1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014
Annual Flow Volume
Average Annual Flow, Period of Record: 1942-2014 (1,125,300 AFY)
Average Annual Flow, OPSTUDY Period: 1947-1994 (1,181,900 AFY)
Average Annual Flow, First Increment through Year 8: 2007-2014 (1,065,800 AFY)
5-Year Running Average Annual Flow, 1942-2014

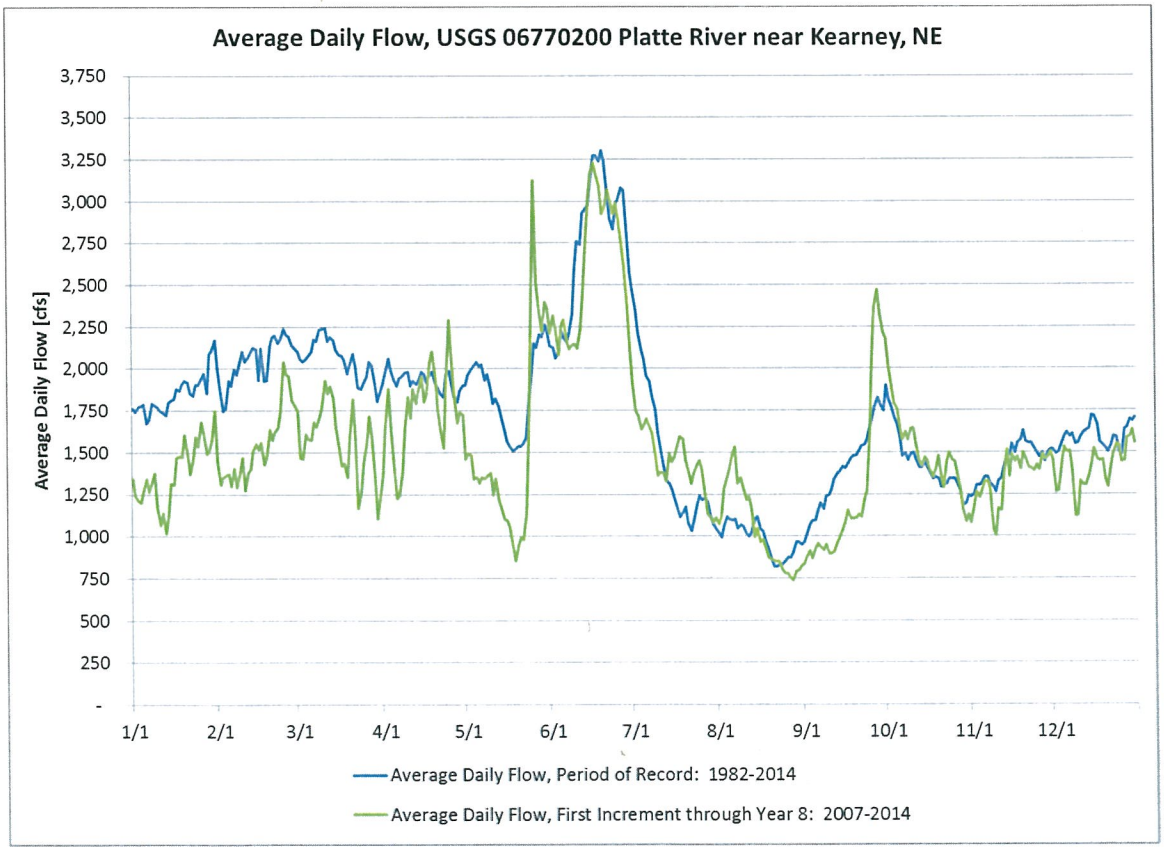
1576


Average Daily Flow, USGS 06768000 Platte River near Overton, NE
Average Daily Flow [cfs]
3,750
3,500
3,250
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
-
1/1 2/1 3/1 4/1 5/1 6/1 7/1 8/1 9/1 10/1 11/1 12/1
Average Daily Flow, Period of Record: 1942-2014
Average Daily Flow, OPSTUDY Period: 1947-1994
Average Daily Flow, First Increment through Year 8: 2007-2014

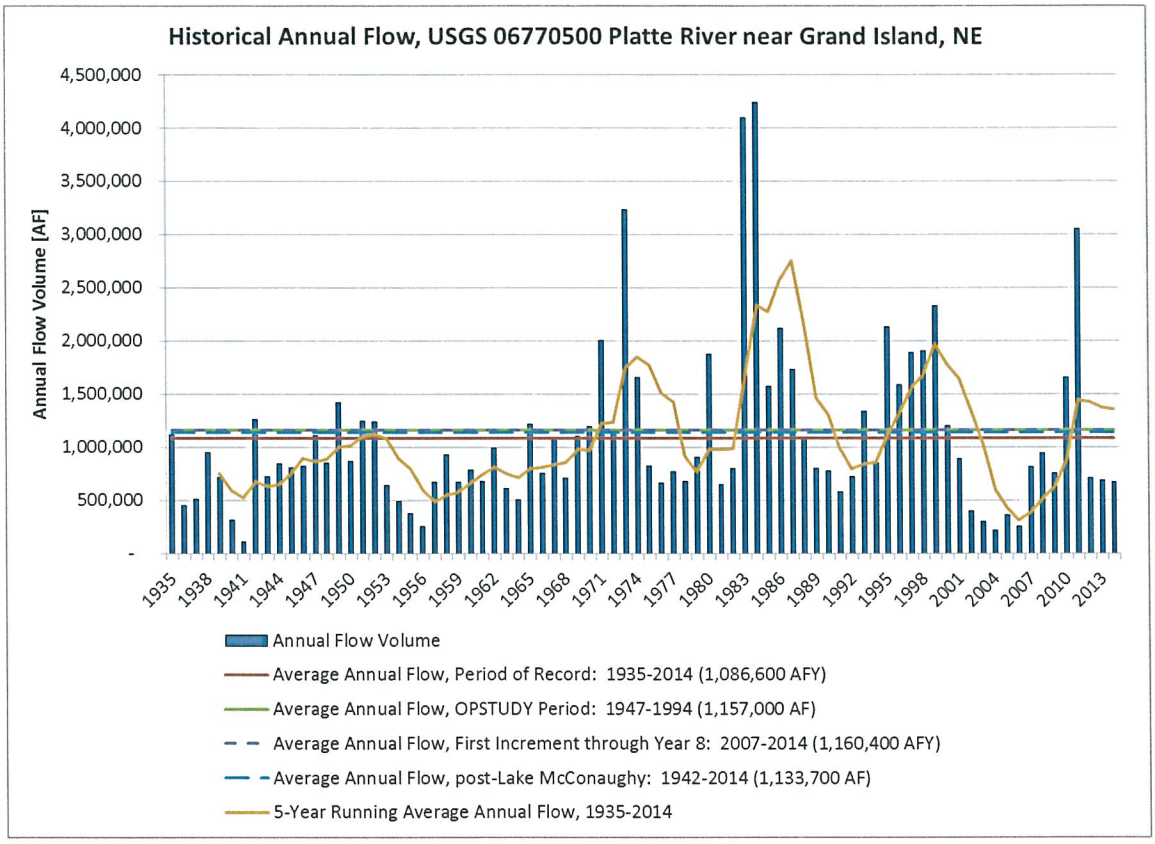
1577


Historical Annual Flow, USGS 06770200 Platte River near Kearney, NE
Annual Flow Volume [AF]
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
Annual Flow Volume
Average Annual Flow, Period of Record: 1982-2014 (1,151,700 AFY)
Average Annual Flow, First Increment through Year 8: 2007-2014 (1,054,900 AFY)
5-Year Running Average Annual Flow, 1982-2014

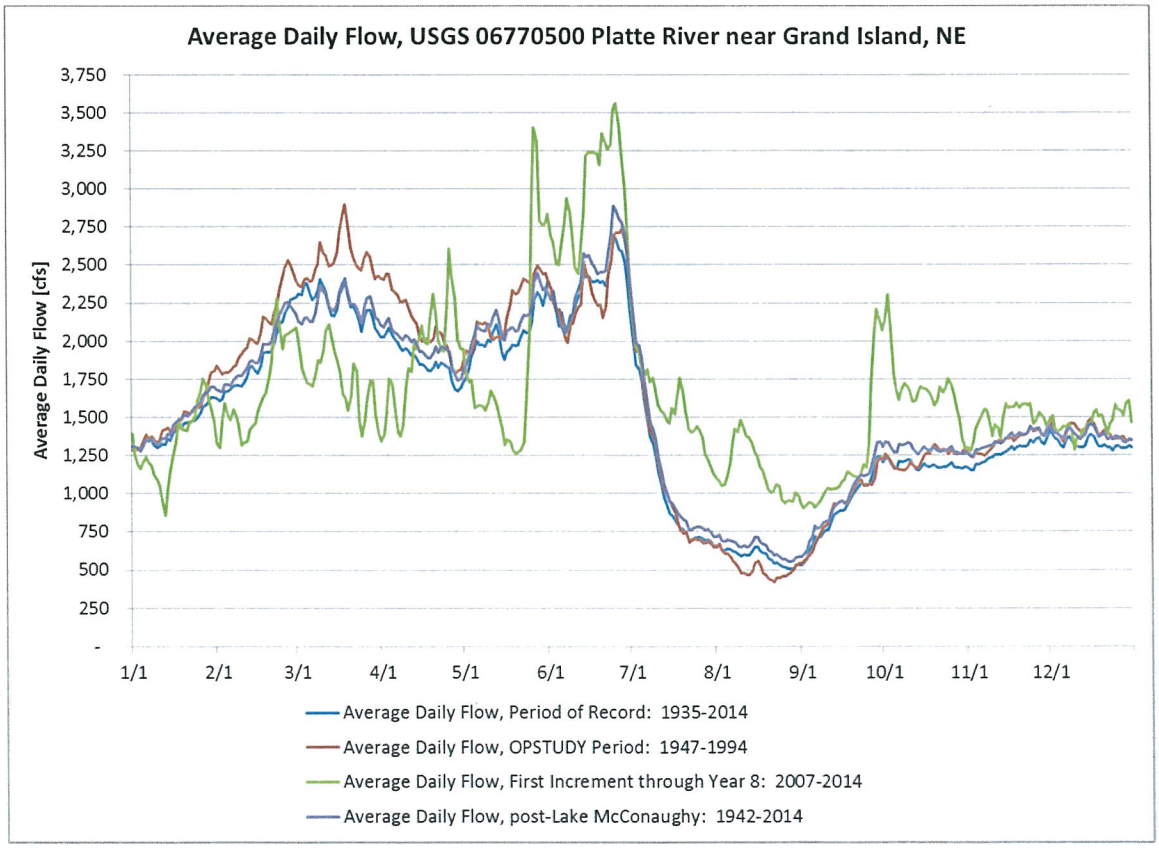
1578


Average Daily Flow, USGS 06770200 Platte River near Kearney, NE
Average Daily Flow [cfs]
3,750
3,500
3,250
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
-
1/1 2/1 3/1 4/1 5/1 6/1 7/1 8/1 9/1 10/1 11/1 12/1
Average Daily Flow, Period of Record: 1982-2014
Average Daily Flow, First Increment through Year 8: 2007-2014

1579



1580
1581



1582

1583 **Platte River Recovery Implementation Program**
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1585 # Appendix B – Active Project Descriptions

Active projects are considered either currently implemented and operational projects or projects the Program has commenced funding for implementation. There are 5 WAP projects considered active at this time: the J-2 Regulating Reservoirs (tier 1), the Phelps County Canal Groundwater Recharge project (tier 1), the Pathfinder Municipal Account Lease (tier 1), the CPNRD water leasing project (tier 2), and the No Cost NCCW (tier 1). The GC has approved scores for the active projects, except for the CPNRD water lease and the No Cost NCCW, which will likely be scored in 2015. Although the J-2 Regulating Reservoirs project is not constructed; significant work has been completed to advance the project to implementation and the Program is in the process of securing the funds for construction. The tier designations refer to the 2009 WAP Update designations for sequencing projects during the First Increment.

B-1.0 J-2 Regulating Reservoirs

B-1.1 Project Description

The proposed J-2 Regulating Reservoirs[67] are located in the CNPPID system in Gosper and Phelps Counties in the Central Platte region of Nebraska, as shown in **Figure B-1**.

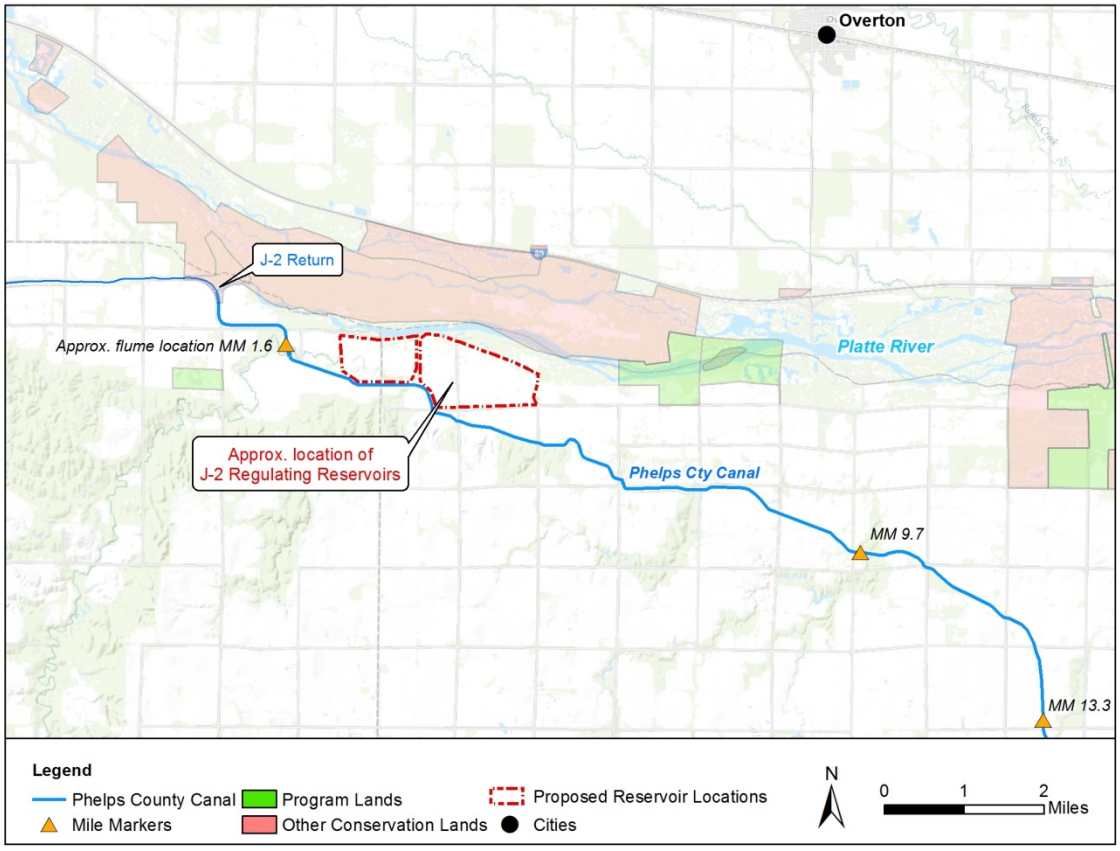

Figure B-1. Preliminary Location Map of the Proposed J-2 Regulating Reservoirs.

[67] This project was previously referred to as the CNPPID Reregulating Reservoir in the 2000 Reconnaissance-Level WAP and the 2009 WAP Update.

The reservoirs would retime excess to USFWS target flows and instream flows to times of USFWS target flow shortages. A schematic of the proposed J-2 Regulating Reservoirs is shown in **Figure B-2.**

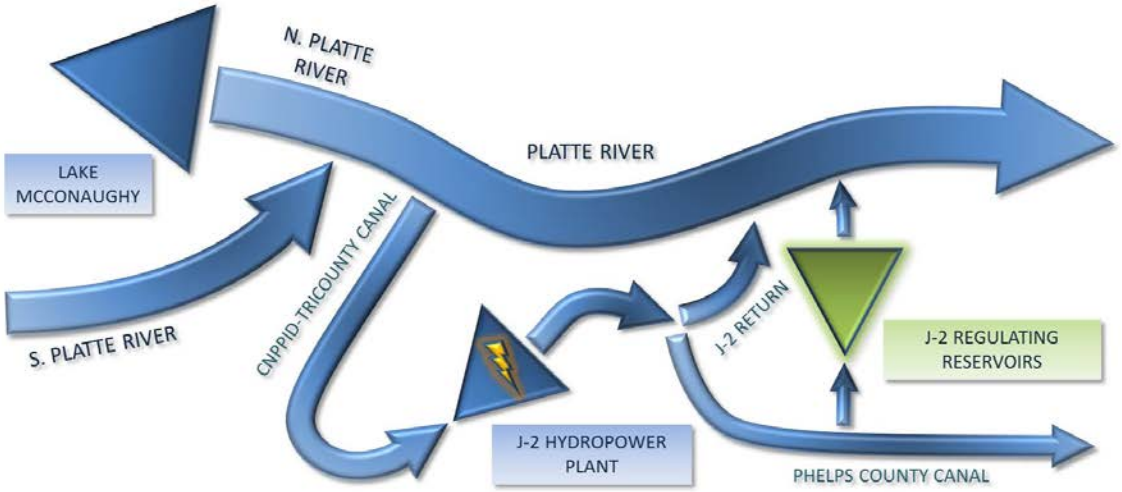

Figure B-2. Schematic of the J-2 Regulating Reservoirs.

There are two proposed reservoir cells and each cell has an inlet on the Phelps County Canal and an outlet to the Platte River to release retimed water for target flow shortages, SDHF events, and other Program purposes. The project benefits the Program, the NDNR, and the CNPPID. The CNPPID will build, own, and operate the reservoirs and utilize one reservoir cell during the irrigation season, while the Program and the NDNR will utilize the retimed water to reduce shortages in the river throughout the year. The funding for the project will come from the three parties: the Program, the NDNR, and the CNPPID.

The Program signed a water service agreement[68] with the CNPPID and the NDNR in 2013 regarding the ownership of the proposed reservoirs, the purpose and operations, the construction services and payments, and the terms. The water service agreement is referred to as the "Three Party Agreement". The Program will utilize 75 percent of the yield and the NDNR will utilize 25 percent of the yield of the project. The CNPPID will also utilize the reservoirs to operate their J-2 hydropower plant at peak efficiency and reduce fluctuations to irrigation deliveries into the Phelps County Canal and releases to the Platte River. Portions of the J-2 Regulating Reservoirs project are anticipated to begin construction activities in 2017. The NDNR approved the CNPPID's petition to modify their system by extending the Supply Canal, constructing two new regulating reservoirs, and adding two new return flow points in 2014[69].

B-1.2 Alternatives Evaluated

The regulating reservoir concepts were evaluated in a pre-feasibility study[70] completed in 2010, a feasibility report[71] in 2012 and a conceptual design report[72] in 2013. In the pre-

[68] CNPPID 2013a
[69] Approval of Petition MIP-5064, signed by the NDNR August 29, 2014.
[70] Olsson Associates and Black & Veatch 2010

feasibility study, there were various configurations of the J-2 Regulating Reservoirs and Elwood Reservoir alternatives considered. The J-2 Regulating Reservoirs alternative with Area 1 and Area 2 (now referred to as Reservoirs 1 and 2) was the recommended alternative in the study, due to its ability to provide a high yield and low unit cost relative to the other alternatives. In addition, the location of the project is ideal for providing water to the habitat reach, including releases of 2,000 cfs for an SDHF[73]. In 2014 and 2015, the CNPPID also evaluated and rejected a variation on the alternative that would have placed the project across the south river channel on Jeffrey Island. The CNPPID is moving into the preliminary design phase with the recommended alternative.

Recommended alternative

J-2 Regulating Reservoirs with cells known as Reservoir 1 and Reservoir 2 in Phelps and Gosper Counties.

B-1.3 Yield

The GC approved a scoring methodology and a preliminary score for the J-2 Regulating Reservoirs in 2010[74]. Utilizing the same scoring assumptions as approved by the GC in 2010, the J-2 Regulating Reservoirs project score was updated in 2012 to reflect the feasibility-level storage capacity and the co-sponsorship with the NDNR and the CNPPID. The J-2 Regulating Reservoirs score is 30,600 AFY[75] for the Program, representing a storage volume of 13,959 AFY and a 75 percent interest in the yield. The project score is based on the design in the feasibility report for the recommended alternative. The CNPPID will use Reservoir 2 during the irrigation season to operate their J-2 hydropower plant at an improved efficiency rate. This will reduce the storage[76] volume available to regulate for Program purposes during the irrigation season; the impact of the CNPPID's use of Reservoir 2 is included in the 30,600 AFY score for the Program.

B-1.4 Costs

The cost for the project is shared between the Program, the NDNR, and the CNPPID per the water service agreement. The Program's portion is 75 percent of the construction cost and the NDNR's portion is 25 percent of the construction cost, after deducting the CNPPID's portion of 5 percent or up to $2,500,000. The Program's total portion of the reservoir cost is approximately $58,000,000 and includes construction, permitting, and land acquisition costs. Annual operating costs may be added per year.

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[71] Olsson Associates and Black & Veatch 2012

[72] RJH Consultants, Inc. 2013

[73] It is assumed 3,000 cfs will be released from the EA in Lake McConaughy, in conjunction with the J-2 Regulating Reservoirs, to reach the minimum 5,000 cfs goal for a SDHF.

[74] EDO 2010. June 2010 GC meeting minutes.

[75] The total score for the project is 40,800 AFY; 75% of the project (30,600 AFY) is for the Program's use and 25% of the project (10,200 AFY) is for the NDNR's use. The GC accepted the revised score in 2012 [EDO 2012].

[76] Use of the term "storage" in the context of the J-2 Regulating Reservoirs in a reference to that term in its engineering or common usage for capacity. The reservoirs are not considered to be storage reservoirs in the context of state water appropriations.

The Program has expended approximately $15,474,000 to date on the reservoir WAP project, or approximately $14,612,000 on pre-construction costs and $862,000 on feasibility studies and testing. The CNPPID has expended $1,000,000 on pre-construction costs and $50,000 on feasibility studies. The NDNR has expended approximately $4,900,000 on pre-construction costs to date.

The Program will secure the remaining funds needed for its share of payments under the water service agreement in 2015, 2016, and 2017 or about $14,400,000 per year for a total of $43,200,000. This cost covers the Program's portion of the base construction cost (general site work, seepage management/liner, embankments, slope protection, tributary work, inlets/outlets, Phelps County Canal work), mobilization and demobilization (1.5 percent of base construction cost), bonds and insurance (1 percent of base construction cost), a 20 percent contingency on the direct construction cost (base construction cost plus mobilization and demobilization and bonds and insurance), construction engineering (8 percent of the direct construction cost), and a 2.5 percent administration cost (based on the subtotal cost less CNPPID's share of $1,500,000 for construction costs). The construction cost estimate is based on the J-2 Regulating Reservoirs conceptual design report prepared by RJH Consultants, Inc. in 2013[77].

B-1.5 Next Steps

The CNPPID is working on land acquisitions, licensing through the Federal Energy Regulatory Commission (FERC), and the preliminary design of the J-2 Regulating Reservoirs.

B-2.0 Nebraska Groundwater Recharge: Phelps County Canal

B-2.1 Project Description

The Phelps County Canal is located in the CNPPID's system in Gosper, Phelps, and Kearney Counties. The Program has signed temporary water service agreements with the CNPPID to deliver water into the canal during the non-irrigation season, considered approximately mid-September through mid-April, for recharge operations. Excess flows available in the CNPPID system are delivered into the canal and allowed to seep from the canal and recharge the underlying aquifer. The Program utilizes seepage that occurs in the main canal from the beginning of the canal in Gosper County to Mile Post 13.3[78] in Phelps County, which is shown in the location map in **Figure B-3.**

[77] RJH Consultants, Inc. 2013

[78] Mile Post 13.3 refers to the approximate distance in canal miles from the beginning of the canal to the checked location where recharge operations occur.

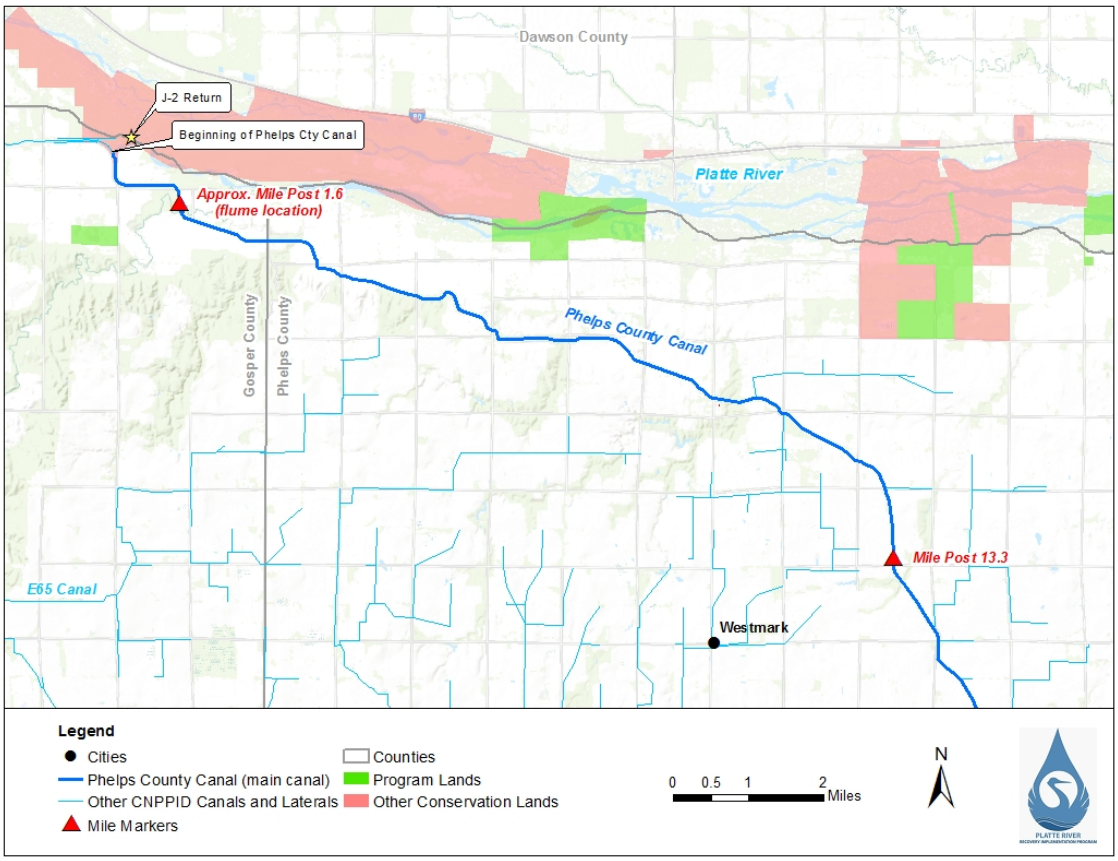

Figure B-3. Location Map of the Phelps County Canal.

There is a check structure at Mile Post 13.3, which allows the CNPPID to maintain water levels in the canal sections. The seepage from recharge operations returns to the Platte River as direct groundwater discharge and from discharge through drains that flow to the Platte River. The modeled recharge accretions at the river that occur during shortages to USFWS target flows are credited to the Program score.

The Program completed a Nebraska groundwater recharge project pre-feasibility study[79] in 2010 and a feasibility-level pilot program study[80] in 2012. The Phelps County Canal groundwater recharge project was selected as the preferred option of the various configurations identified in the pre-feasibility study and further studied in the feasibility study. The Phelps County Canal groundwater recharge project has been operational as a WAP project for the Program since the fall of 2012. Annual recharge report summaries are available for 2012 through 2014 operations and include water diverted into the canal for recharge, the water level measurements in designated monitoring wells, and the recharge rates and volumes.

[79] EDO et al. 2010

[80] EA Engineering, Science, and Technology, Inc., and Daniel B. Stephens and Associates, Inc. 2012

B-2.2 Alternatives Evaluated

A pre-feasibility study was conducted in August 2010 to identify the most feasible groundwater recharge concepts and configurations in the central Platte River region. In the pre-feasibility report, the Program completed evaluations of the Phelps County Canal, Thirty Mile Canal, Gothenburg Canal, and the Dawson County Canal[81]. These canals were selected through a screening process in coordination with the Groundwater Recharge Workgroup, an ad-hoc subcommittee of the WAC. In the pre-feasibility study, the two recommended alternatives for further feasibility studies were locations along the Phelps County Canal and the Gothenburg Canal. After the pre-feasibility findings, the NPPD completed a winter operations report[82] for the Gothenburg Canal, Dawson County Canal, and the Kearney Canal to assess potential non-irrigation season recharge operations. The report concluded recharge operations in the fall and spring are more feasible than mid-winter recharge operations in the NPPD canals. The Program decided to focus on the Phelps County Canal for the feasibility study in 2012, as this was the preferred canal that could accommodate recharge operations through the winter months.

The Program also evaluated potential recharge operations in the E65 Canal in the CNPPID's system in 2014. The EDO and William Hahn, EDO Special Advisor in hydrogeology, completed an investigation to determine whether recharge in the E65 Canal would benefit the Program. It was assumed the Program would recharge in the section of canal below Elwood Reservoir, from approximately Mile Post 5.9 to 13.9. There is a check structure at Mile Post 13.9, which could be used to control the water levels in the canal and the location of recharge operations. It was also assumed recharge would accrete to Plum Creek and flow as surface water to the Platte River, as Plum Creek intersects the path from the E65 canal to the river. Based on the results of the investigation, it appears a significant portion of water recharged in the canal may accrete to the Republican Basin, based on the estimated location of the groundwater divide[83]. The results suggest recharge in the E65 Canal would not be an efficient WAP project and this information was presented to the WAC[84]. The E65 Canal has not been evaluated further for recharge operations as a WAP project.

<u>Recommended Alternative</u>

Phelps County Canal groundwater recharge project, up to Mile Post 13.3.

B-2.3 Yield

The GC approved a score for the Program's portion of the Phelps County Canal Groundwater Recharge project in 2013[85], assuming the Program would have a 50 percent interest in the project yield, based on the temporary water service agreements with the

[81] Some of the study sites were identified in the 2000 WAP and additional site options were incorporated in the 2009 WAP Update.
[82] Applegate Group, Inc. 2011
[83] The split of the groundwater returns to the Platte Basin or the Republican Basin from canal recharge may be subject to reconsideration as new modeling is completed by the NDNR and other new information comes to light.
[84] EDO 2014c. August 2014 WAC meeting minutes.
[85] EDO 2014a. December 2013 GC meeting minutes.

CNPPID. The proposed 2014 permanent water service agreement[86] with the CNPPID states the Program will have access to 75 percent of the yield, instead of the initial 50 percent estimate. Maintaining the same assumptions as the GC-accepted score, the revised score is 2,700 AFY[87], based on a 75 percent interest in the yield. This includes a minor impact to the score due to the operations of the J-2 Regulating Reservoirs, although it is anticipated the CNPPID will be able to operate both projects simultaneously. The Program will utilize 75 percent of the yield and the NDNR will utilize the remaining 25 percent of the yield and associated costs.

B-2.4 Costs

The Program and the CNPPID have utilized annual temporary water service agreements to operate the Phelps County Canal groundwater recharge project. The CNPPID delivers excess flows available in their system into the canal during excesses to USFWS target flows and instream flows. The deliveries are measured by the CNPPID at the flume located at Mile Post 1.6 in the canal. The CNPPID charges the Program based on the measured volume of deliveries. The cost per AF of water delivered through the flume began at $25 per AF in 2011 with a new price set at $27 per AF in 2014, escalating at 4 percent per year through the First Increment. The Program has expended a total of approximately $857,000 on Nebraska Groundwater Recharge feasibility studies and Phelps County Canal recharge operations through 2014.

B-2.5 Next Steps

Section B-2.5.1 describes efforts underway to secure a permanent water service agreement for recharge operations. Section B-2.5.2 describes a new concept to enhance the score of the recharge project by pumping recharged water directly to the Platte River, which is under consideration by the Program. Section B-3.5.3 provides a brief description of a new concept to recharge water in Elwood Reservoir.

B-2.5.1 Permanent Water Service Agreement

The Program and the CNPPID are working on a permanent water service agreement for recharge operations. The CNPPID applied for a permanent permit to appropriate excess flows for the recharge project with the NDNR in September 2012. The status of the applications is pending but the applications are anticipated to be approved in 2015. The Program anticipates recharging each year through the end of the First Increment, as excess flows are available[88].

B-2.5.2 Groundwater Pumping Concept to Increase Score

Groundwater pumping is a new concept to increase the efficiency of water use in the Phelps County Canal Groundwater Recharge project. The Program intends to construct wells to pump groundwater directly to the Platte River during times of shortages to

[86] CNPPID 2014a

[87] The GC accepted a score of 1,800 AFY for the Program's portion of the project, which was assumed to be 50 percent of the total project yield. This score has been updated to 2,700 AFY to represent a 75 percent interest for the Program.

[88] Note, however, that the beginning of the Phelps County Canal will be enlarged to convey 1,675 cfs (the current capacity is approximately 1,000 cfs in this section) as part of the J-2 Regulating Reservoirs project. As a result, there may be times when recharge in the canal cannot occur due to construction.

USFWS target flows. The project would capture and retime water stored in the aquifer from recharge operations between the Phelps County Canal and the Platte River. Since recharge accretions are not controllable and may return to the river during excesses to target flows, groundwater pumping would allow the Program to pump recharged water to the river during shortage periods only to maximize the score. Pumping would also allow the recharged water to return to the river in a timelier manner than recharge operations alone. The groundwater would likely be pumped into an adjacent drain and return to the river as surface flow. The groundwater pumping concept may require revised or additional permitting though the NDNR.

Yield

The preliminary score model analysis used the assumption that each well can pump at 1,000 gallons per minute from March through November (the wells will only be operated during shortages to target flows). It was assumed the Program would pump from two wells at a maximum of approximately 1,700 AFY. The anticipated score is approximately 500 AFY combined for both wells; however, a score has not been assigned for this project. The 500 AFY estimated score represents the net increase in the score when groundwater pumping is added to the Phelps County Canal Groundwater Recharge project, as compared to the recharge project score alone (without pumping operations). The analysis takes into account the combined modeling of recharge accretions, groundwater pumping direct deliveries to the river and lagged groundwater depletions from pumping. Additional wells could be constructed in future phases of this project; however, it is dependent on the accretions from the Phelps County Canal Groundwater Recharge project.

Cost

The estimated cost associated with this project is for the construction of two new wells. Cost estimates also include future maintenance, pumping operation costs, and personnel time to aid in monitoring, testing, and maintenance. The estimated construction cost for two wells is approximately $154,000 and includes: construction, electrical hookup and power lines, flow meters, monitoring wells, engineering specifications and final design, construction oversight, data analyses and well testing. Based on the preliminary analysis completed by the EDO, it was assumed two wells would pump an average of approximately 1,700 AFY, collectively. This is based on the modeled Phelps County Canal Groundwater Recharge project operations and the intended groundwater pumping operations (based on OPSTUDY Hydrology from 1947-1994, utilized in the Program's score model). The estimated costs for annual pumping, maintenance and personnel time for two wells are approximately $29,000 per year. The feasibility of this project is currently under evaluation by the Program. See **Table B-1** for the cost breakdown for one well during the first year of operations.

Table B-1. Phelps County Canal groundwater pumping project cost summary.

No. of Wells	Construction Cost	Piping from Well to Ditch	Landowner Lease Cost Per Year	Pumping Cost per AF [1000 gpm/well]	Avg. Annual Pumping [AF]	Years of Pumping
	(A)	(B)	(C)	(D)	(E)	(F)
1	$85,000	$8,500	$1,000	$5.20	830	1

Maintenance Per Year	Personnel Costs Per Year	Total Cost (rounded)
(G)	(H)	(I)
$1,500	$8,000	$108,000

(A) Estimated cost based on data provided by Hahn Water Resources, LLC (EDO Special Advisor) for construction, engineering plans and oversight. The addition of a second well is an additional $69,000.
(B) Initial estimate to route water from well location to drains using piping.
(C) Rough estimate to utilize landowner property for well construction/easement. Note that lease costs may not be applicable if the well is located on Program land.
(D) Estimated cost based on data provided by Hahn Water Resources, LLC (EDO Special Advisor).
(E) Estimated volume of pumping in preliminary analysis for one well.
(F) Estimated number of years of pumping.
(G) Estimated cost based on data provided by Hahn Water Resources, LLC (EDO Special Advisor).
(H) Based on a cost of $50 per hour for one full month (160 hrs) of personnel time.
(I) Total first year cost for one well (construction, piping to ditch, lease costs, pumping, maintenance, personnel costs).

Next Steps

The Program will continue to refine the cost and score estimates for the pumping project to enhance the Phelps County Canal recharge project. One well is anticipated to be constructed on Program property and the other is anticipated to be on private land between the Phelps County Canal and the Platte River. Further refinement of the well locations will be considered. Revised or additional permitting through the NDNR may need to be obtained if the project advances into implementation.

B-2.5.3 Elwood Reservoir Seepage

The Program intends to evaluate seepage in Elwood Reservoir in the CNPPID's system as a potential Nebraska Groundwater Recharge project. Excesses to USFWS target flows/instream flows available in the CNPPID's system would be delivered into Elwood Reservoir and allowed to seep. The seepage is anticipated to accrue, in part or in full, to Plum Creek and flow as surface water to the confluence with Platte River, downstream of the J-2 Return. Accretions at the Platte River would be routed to Grand Island, Nebraska and credited during shortages to USFWS target flow shortages for Program score credit. Detailed yield and cost evaluations of this project have not been evaluated at this time. Preliminary cost estimates range from $43 to $53 per AF of water delivered into Elwood Reservoir under a water service agreement with the CNPPID, and estimated diversions are approximately 500 AFY for the Program. The NDNR and the Program would likely share the yield. The Program may work with the CNPPID and the NDNR to complete

feasibility analysis and water service agreement negotiations in the latter years of the First Increment.

B-3.0 Pathfinder Municipal Account

B-3.1 Project Description

The Pathfinder Modification Project recaptured 53,493 AF of permitted storage space in Pathfinder Reservoir that was lost to sedimentation. An "Environmental Account" of 33,493 AF was established as one of the Program's three initial state water projects. The three initial state water projects collectively provide an average of 80,000 AFY toward the Program's First Increment water objective. The State of Wyoming has the exclusive right to contract with the USBR for the use of the remaining 20,000 AF of recaptured capacity that is referred to as the "Wyoming Account." [89] In 2011, the Program signed an agreement[90] with the WWDC to purchase a total of 38,400 AF from the Wyoming Account as a WAP project. The purchased water represents an average of 4,800 AFY from 2012 through 2019, available at Pathfinder Reservoir. **Figure B-4** is a photograph of construction activities in 2011.

Figure B-4. Pathfinder Dam ogee weir construction in 2011.

B-3.2 Yield

In both 2012 and 2013, the Program utilized the 4,800 AFY of water available under the agreement. In 2014, the WWDC offered the Program an additional 4,800 AF, for a total of 9,600 AF at Pathfinder Reservoir, and the Program accepted the offer. It is anticipated that 4,800 AFY will be available in future years from 2015 through 2018. The Program may be able enter into an additional agreement with the WWDC for additional water in the future. The GC approved a project score of 4,000 AFY for the Pathfinder Municipal Account Lease in 2014[91].

[89] The Wyoming Account is also known as the Municipal Account.
[90] WWDO 2011
[91] EDO 2014b. March 2014 GC meeting minutes.

B-3.3 Costs

The Program paid a lump sum of $1,958,400 for the 38,400 AF under the agreement with the WWDC in fiscal year 2012. This equates to $51 per AF of water in Pathfinder Reservoir.

B-3.4 Next Steps

There are no additional steps for the project; it is considered complete. WWDC will continue to provide an estimate of water available under the agreement on or before the first day May of each year. The Executive Director of the Program, in consultation with the EA Manager, will respond with the quantity of water the Program would like to have released from the Wyoming Account. The water is then released in September each year, unless an alternative release schedule is requested by the Program. The Pathfinder Municipal Account Lease water is then routed to Lake McConaughy and entered into the EA for subsequent release. This will continue until the Program has utilized the purchased volume of 38,400 AF.

B-4.0 Nebraska Water Leasing: Central Platte NRD Lease

B-4.1 Project Description

The Program signed a water use lease agreement[92] with the CPNRD in December 2013 to lease transferred surface water rights and groundwater recharge in the Thirty-Mile, Cozad and the Orchard Alfalfa Canals[93]. The Program's lease agreement is for up to 20,500 AFY through 2019 from the two sources of water:

1. Net consumptive use credit from transferred natural flow surface water rights in the Six Mile, Cozad, Thirty-Mile, and Orchard-Alfalfa Canals. The water will be transferred from irrigation use to instream use for the Program. The increase in groundwater irrigation due to the transfer is accounted for in the consumptive use analysis; therefore, the Program will purchase the "net" consumptive use credit.

2. Recharge of excess flows in the Cozad, Thirty-Mile, and Orchard-Alfalfa Canals. The Program will purchase accretions from recharge.

The CPNRD submitted permit applications with the NDNR for excess flow appropriations for groundwater recharge in the canals in 2011; the permits are currently pending. The Program began purchasing lease water from recharge accretions in 2013. The CPNRD is working on the permit application process for the surface water transfers with the NDNR. Pending NDNR permit approval, yields from the surface water lease are projected to be available for the Program beginning in 2015. In 2013 and 2014, the CPNRD completed work to improve the canals and installed new structures and measuring devices for use in the surface water transfers and groundwater recharge operations.

[92] CPNRD 2013

[93] The CPNRD has lease agreements with Thirty-Mile Canal Company (Thirty-Mile Canal), the Cozad Ditch Company (Cozad Canal) and the Southside Irrigation Company (Orchard-Alfalfa Canal) for use of the canals. The CPNRD also bought out the water rights in the Six Mile Canal from landowners.

B-4.2 Yield

The lease agreement is for a volume of water not to exceed 20,500 AF annually, assumed to be at the project location, from a combination of the transferred surface water rights and the groundwater recharge accretions. The CPNRD will offer the Program at least 50 percent of the yields from each project, per the agreement. The CPNRD will provide water quantifications as the monthly net effect at the river, resulting in fully consumable water for Program use. The consumptive use credit will be diverted into the canals and returned to the river via a return structure with a measurement device. This project has not been assigned a score towards the First Increment milestone at this time; however, a score is anticipated to be assigned in 2015.

B-4.3 Costs

The transferred surface water consumptive use credit and the excess flow recharge accretions under the current lease agreement are priced at the same rate. The 2015 surface water cost is estimated at $40[94] per AF of consumptive use credit returned to the river. The cost for recharged water began at $35 per AF in 2013 and has increased at a rate of 7.5 percent per year, to approximately $40 in 2015. Billing will be based on the volume of water provided to the Program in a given calendar year, based on the CPNRD's estimates. In 2013 and 2014, the Program expended $56,000 for recharge water accretions from the CPNRD water leasing project.

B-4.4 Next Steps

The CPNRD will continue to work on permitting with the NDNR for both the surface water rights and groundwater recharge operations. The CPNRD is also working on the development of potential recharge ponds to enhance the project and water accounting forms. The Program will also work with the CPNRD to determine appropriate costs for transferred surface water. It is anticipated that the Program will begin the score analysis for this project in 2015.

B-5.0 Net Controllable Conserved Water (No Cost)

B-5.1 Project Description

Net Controllable Conserved Water (NCCW) (tier 1) is water saved within the CNPPID system through the implementation of a combination of conservation measures for canal distribution and delivery, on-farm changes in irrigation, and optimal reservoir operations. The saved water from conservation activities is stored in Lake McConaughy (due to the conservation measures, the water does not need to be released and remains in storage). These activities were completed to comply with the CNPPID's agreement with the National Wildlife Federation to provide reductions to average annual diversions of surface water. The CNPPID's FERC license requires that the portion of the NCCW that resulted from a grant with the USBR is added to the EA in Lake McConaughy on October 1 each year at no cost to the Program.

[94] Note that a revised cost of $150 per AF for consumptive use credit for transferred surface water was utilized by the Program for budget projections, beginning in 2015. The contract may be renegotiated with a price increase.

B-5.2 Yield

The yield from the No Cost NCCW is approximately 314 AFY at Lake McConaughy, and this amount has been actively entered into the EA for the Program since Water Year 2001. The project has not been officially scored for the Program, but modeling completed for the 2009 WAP Update[95] estimated project yields of 217-300 AFY at the associated habitat. The range of yield was derived based on varying assumptions of losses in the reaches of the North Platte River and Platte River downstream of Lake McConaughy. The 2009 WAP Update further states that "This portion of water is anticipated to be available through the Program First Increment, but will eventually be retired as the lifecycles of the associated project mature and yields drop off."

[95] EDO and WAC 2010

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Appendix C – Future Project Descriptions

Future projects are scheduled for feasibility studies in the latter years of the First Increment from 2015 through 2019. After evaluating the results of project feasibility, yield and cost information, the Program will decide whether these projects shall be implemented and credited towards the First Increment objective and WAP milestone or whether these projects shall be considered inactive for the remainder of the First Increment. Inactive projects will not be further pursued.

The evaluations for most tier 1 projects have been completed, except for the Colorado Groundwater Management (Tamarack III) project, which will be evaluated in the remaining years of the First Increment. The future tier 2 projects scheduled for evaluation from 2015 through 2019 are Nebraska Water Leasing and Acquisitions, Nebraska Groundwater Management, and Water Management Incentives. There are no tier 3 projects scheduled for evaluation from 2015 through 2019, as all of the tier 3 projects are considered inactive.

C-1.0 Nebraska Water Leasing: NPPD Lease

C-1.1 Project Description

The NPPD proposes to temporarily transfer the consumptive use portion of the natural flow available from 886.5 relinquished acres under the Dawson Canal Water Appropriation D-622 to an instream use for the Program. Irrigators have willingly relinquished these surface water rights to the NPPD. The NPPD filed for a temporary change of appropriation permit with the NDNR in July 2013. The permit application requested a temporary change from irrigation to instream use for 6 years from May 14, 2014 through 2019 at a rate of a maximum of 7.6 cfs up to a maximum of 761 AFY. Based on the NPPD's analysis of water right availability data from 2001 through 2013, the transfer will yield an average annual consumptive use volume of 718 AF. The Program submitted a letter of support for the temporary change of use that was included with the permit application.

The NPPD filed an amendment to the application in May 2014 and the permit application status is currently pending. For this water leasing project, the NPPD intends to continue diverting Appropriation D-622 into the Dawson County Canal and then return the consumptive use portion to the Platte River. The yield will be available for the Program just downstream of the Dawson County Canal headgate, at a return flow station that will be constructed after the permit is approved.

C-1.2 Yield

The yield of the project estimated by the NPPD is an average of 718 AFY of consumptive use credit with a maximum of 761 AFY of consumptive use credit at the project location. This estimate is based on 2001-2013 data on water availability. The maximum yield estimate calculation is shown in **Table C-1,** provided by the NPPD.

Table C-1 . Summary of the NPPD lease maximum yield estimate.

(A) Transferred Acres	(B) Weighted Average CIR [inches/acre]	(C) Proportion of Natural Flow	(D) Natural Flow CIR [inches/acre]	(E) Max Volume of Water for Transfer [AF]
886.5	11.1	93%	10.3	761

(A) Relinquished acres historically irrigated with surface water.
(B) Average based on cropping patterns in the canal area and CIR values from the Platte River Cooperative Hydrology Study (COHYST).
(C) Proportion of natural flow diverted into the canal (the remaining 7 percent is storage water, which will not be transferred).
(D) Natural Flow CIR = Columns (B × C).
(E) Transfer Volume = Columns (A × D) ÷ 12 inches/foot.
**CIR = Crop Irrigation Requirement*

C-1.3 Costs

The NPPD lease cost per AF is based on a projected maximum cost estimate completed by the EDO. There are potentially two cost considerations in the per AF cost estimate: (1). Cost associated with the consumptive use credit for relinquished surface water with the NPPD, and (2). Cost associated with offsets to mitigate increased groundwater irrigation on relinquished surface water lands.

For the consumptive use credit cost estimate, the EDO multiplied the crop irrigation requirement (CIR) per acre by the NPPD's initial asking price of $160 per acre of cropland. The CIR value was calculated by NPPD as 10.3 inches/acre. This is based on a weighted average canal area CIR of 11.1 inches/acre multiplied by 93% percent, which is the estimated proportion of natural flow in the canal (storage water will not be transferred). The EDO divided the $160/acre by (10.3 inches/12 inches per foot) to obtain an estimated water leasing cost for the consumptive use portion, which equates to a unit cost of approximately $190 per AF of consumptive use credit, with an estimated 3.4 percent annual cost escalation after the first year of operations. A final price will be determined during the water lease negotiations when a final agreement is signed between the Program and the NPPD.

The second potential cost consideration is for offset water to mitigate depletions to the Platte River basin due to increased groundwater irrigation on relinquished surface water lands. The NDNR has suggested the lease entity or the Program should be responsible for mitigating any increase in depletions from transferring the surface irrigation water to instream uses. It is assumed the Program will lease water to offset these depletions; although, the consumptive use credit in the NPPD lease agreement could also be utilized to mitigate offsets. The Program intends to lease recharge accretions from the CPNRD recharge operations on the Thirty Mile, Cozad and Orchard-Alfalfa Canals, described in Appendix B (Section B-4.0) of this document. The cost for offset water is estimated at $40 per AF in 2015, escalating at 7.5 percent per year thereafter, based on the Program's existing lease agreement the CPNRD for recharge accretions. During excesses to target and instream flows, the Program assumes offsets will not be required.

C-1.4 Next Steps

The Program will work with the NPPD towards negotiating an agreement to lease the transferred surface water for instream use, which will require approval by the GC. Assuming the GC approves a lease agreement with the NPPD, it is anticipated the Program will work with the CPNRD to lease recharge credits to offset any depletions created by an increase in groundwater pumping on lands previously irrigated by the transferred surface water rights. The CPNRD and the Program will complete the calculations to determine the groundwater depletions and required offset volume. The NPPD will continue to work with the NDNR to permit the surface water transfer and will also construct the required equipment and measuring devices once the transfer has been approved. After the lease agreements are in place, the Program will score the project towards the First Increment water objective and WAP milestone.

C-2.0 Nebraska Water Leasing: CNPPID Storage Lease

C-2.1 Project Description

The CNPPID has a water leasing option for storage water in Lake McConaughy. The Program would enter into an agreement with the CNPPID to lease water from appropriation A-2374 in Lake McConaughy[96], which would be transferred into the Program's EA for subsequent release during shortages or for other Program uses. A long-term draft water service agreement has been proposed between the CNPPID and the Program. The ability to transfer leased water into the EA allows the Program to control the releases to critical periods for the species. It also allows the water to be utilized for SDHF releases.

C-2.2 Yield

The annual yield of storage water may change from year to year based on the volume of storage water the CNPPID is willing to offer in any given year. Based on the draft permanent water service agreement[97], the CNPPID would notify the Program on May 1st each year as to the volume of water available for lease and the Program would request the desired amount by August 1st. The EDO estimates an average annual volume of 3,900 AFY (and up to a maximum of 5,000 AFY) through the end of the First Increment, although the amount offered to the Program will fluctuate annually, based on the volume of water the CNPPID is willing to lease. This volume is assumed to be the yield at Lake McConaughy.

C-2.3 Costs

The proposed cost per AF of leased water in the draft water service agreement is $250 beginning in 2015 and escalating at 4 percent per year.

C-2.4 Next Steps

The Program will work with the CNPPID to finalize a water service agreement and complete the required permitting through the NDNR, if required. The project will then be

[96] Some of the water for this lease could come from, though may not necessarily come from, water that was available for the NCCW option (see Section 4.2.1 and Section D-2.0).
[97] CNPPID 2014b

scored by the Scoring Subcommittee, in coordination with the EDO, and the results will be presented to the GC for approval.

C-3.0 Nebraska Water Leasing: CNPPID System Irrigator Leases

C-3.1 Project Description

The irrigator leases under the CNPPID's system would be with individual irrigators interested in temporarily leasing their surface water rights to the Program. The storage water needed to serve those irrigators would no longer be released from storage in Lake McConaughy for irrigation purposes, but would remain in Lake McConaughy and transferred into the EA for the Program. The consumptive use portion of the leased water rights would be available for Program uses and the return flows associated with the water rights may be maintained through releases from the EA. The CNPPID would manage the processes and operations of the individual lease agreements. The surface water irrigators may switch to groundwater for irrigation; therefore, the Program will evaluate leasing additional water to offset new depletions, or may utilize the net effect of the water right and account for depletions in the consumptive use estimate. As an alternative to groundwater, irrigators may choose to convert to dryland farming.

C-3.2 Yield

It is anticipated the Program could lease an average of 3,800 AFY through the First Increment (and up to a maximum of 5,000 AFY), as a preliminary estimate. The yield available for the Program will change from year to year, based on the amount of willing lessors. The available consumptive use credit and potential increased groundwater depletions will be estimated by the Program, in conjunction with the CNPPID, the Tri-Basin NRD, and the NDNR. It is assumed this yield projection will be available at Lake McConaughy.

C-3.3 Costs

The cost per AF of the surface water in the CNPPID's system includes two pieces: the cost associated with leasing the consumptive use portion from individual irrigators and the cost associated with offsetting increased depletions from groundwater irrigation, similar to the cost components listed in the NPPD lease described in Appendix C (Section C-1.0). It was assumed the lease cost for consumptive use credit would be $150 per AF beginning in 2015 and increase at a rate of 4 percent per year, based on the initial estimate by the EDO Special Advisor in economics, George Oamek.

The second cost consideration is for offset water to cover depletions from increased groundwater irrigation on leased surface water lands. It is anticipated the Program will provide the offsets for the lease agreements, although the consumptive use credit from the surface water leases could also be utilized to offset depletions. The most likely source of offset water will be from the CPNRD's groundwater recharge projects on the Thirty Mile, Cozad and Orchard-Alfalfa Canals, described in Appendix B (Section B-4.0) of this document. The CPNRD recharged water lease cost is $40 per AF beginning in 2015 and escalating at 7.5 percent per year, based on the Program's existing agreement with the CPNRD (for recharged water as a WAP project). It is assumed the Program will not be required to offset depletions during excesses to target and instream flows.

C-3.4 Next Steps

The Program and the CNPPID will identify interested parties for water leasing opportunities. The Program will further evaluate the water values based on crop prices in the CNPPID's service area for use in negotiations with individual irrigators. The surface water rights consumptive use credit and the potential offsets for increased groundwater depletions will be analyzed. The Program will work with the CPNRD and the CNPPID to evaluate both the surface water rights and any new groundwater irrigation on those lands. The permitting requirements through the NDNR for the transferred surface water rights will be explored and the appropriate permit(s) will be obtained. After the project is active and lease agreements have been executed, the Program will work towards approving a score for water leases under the CNPPID system towards the First Increment WAP milestone.

C-4.0 Nebraska Water Leasing: North Platte NRD Irrigator Leases and Acquisition

C-4.1 Project Description

The NPNRD potential acquisition opportunity could be either temporary leasing or permanent acquisition of surface water and/or groundwater with individual irrigators or irrigation districts within the NPNRD. Surface water in the NPNRD would benefit the Program as water would be available in the North Platte River and could be controlled in Lake McConaughy. The consumptive use credit from the surface water rights would be entered into the EA and released for target flow shortages or other Program purposes; therefore, all of the consumptive use credit could be controlled and subsequently utilized by the Program. The return flow associated with the water rights will be maintained in the river. At this time, it is assumed irrigators will switch to dry land farming or will "dry up" their land and cease irrigation; therefore, there are no increased groundwater depletions or offsets required.

C-4.2 Yield

The lease agreements and historical consumptive use evaluations would be managed by the NPNRD. The yield estimate provided in this section is a preliminary estimate utilized by the EDO for planning purposes. Actual yields available for lease by the Program will be based on a free-market system and will vary throughout the remaining years in the First Increment. The estimated yield is an average of approximately 3,700 AFY of consumptive use credit (and up to a maximum of 5,000 AFY), available at the project locations; however, the actual annual yields will fluctuate from year to year. The leased water will be available on the North Platte River above Lake McConaughy and will be added to the Program's EA. The collective yield of water leases will be further explored in the upcoming years.

C-4.3 Costs

The cost would be on a free-market system with willing lessors (or sellers). Based on an evaluation by the EDO's Special Advisor in economics, the estimated cost is $200 per AF of consumptive use credit, increasing by an estimated 3 percent per year after 2015. This is based on crop prices in the area.

C-4.4 Next Steps

The Program is currently working with the NPNRD to explore potential leasing opportunities with interested parties. If interested parties are identified, the Program will work with the NPNRD to calculate the consumptive use credit of the water rights available for lease. The Program will also negotiate water right prices with the lessors (or sellers) and install any necessary new measuring and recording equipment to allow the transfer to occur. The Program will score the water leasing projects towards the First Increment milestone, assuming the GC agrees to move forward with leases in the NPNRD.

C-5.0 Nebraska Water Acquisition: Surface Water in the CPNRD

C-5.1 Project Description

The Program has an opportunity to purchase 40 AF of surface water from an irrigator in the CPNRD. This is a new project in the 2014 WAP Update that has not been included in previous WAPs. The surface water right is from a tributary to the Platte River, located near Lexington, Nebraska, and would benefit the Program's full habitat reach. The water would be transferred from irrigation use to instream use for Program purposes through a permit with the NDNR. The irrigator would switch to groundwater as the source of supply; therefore, the net effects of the replacement pumping will be factored into the yield. The net effect consumptive use credit would be a permanent source of water for the Program. The CPNRD will aid the Program in estimating the surface water credit and serve as the lead on the negotiations and transactional aspects of the acquisition with the irrigator. Additional water acquisition transactions may be available in the future, but no other specific opportunities have been identified at this time.

C-5.2 Yield

The yield of the water right, identified in the previous paragraph, has been estimated by the CPNRD as 40 AFY, which represents the net consumptive use credit. The net consumptive use credit is considered the usable credit after accounting for increased groundwater depletions from switching from surface water to groundwater irrigation. This is the yield at the project location. There may be additional water acquisition opportunities similar to this in the future; however, the yields associated with those projects are unknown.

C-5.3 Costs

The price of the surface water right described in the previous sections is $2,500 per AF of estimated net consumptive use credit, plus a one-time transaction fee of 10 percent. This equates to a total cost of $110,000 for the acquisition. There are no other water acquisitions identified at this time.

C-5.4 Next Steps

The Program will work with the irrigator selling the water right, the CPNRD and the NDNR to determine the net consumptive use credit and the permitting requirements to transfer the water from irrigation to instream use for the Program. A purchase agreement has been drafted and will be reviewed by the EDO's Special Advisor in economics and the GC. After a transfer agreement is in place, the GC will assign a score to the project.

The Program will continue to explore additional opportunities to acquire water in the future.

C-6.0 Nebraska Groundwater Management

C-6.1 Project Description

Groundwater management can be accomplished through various projects including active groundwater pumping from high groundwater areas, passive lowering of the groundwater table, switching from surface water to groundwater irrigation, or a conjunctive use project under the CNPPID system. The 2009 WAP Update identified new groundwater management concepts (Tier 2) for the Dry Creek/Fort Kearney Cutoffs referenced in the 2000 Reconnaissance-Level WAP. Two projects have been evaluated for groundwater management since that time: the Funk Lagoon (identified in both previous WAPs) and a dewatering project with an individual landowner under the Phelps County Canal. The Program anticipates continuing to evaluate Groundwater Management projects for potential implementation. Groundwater Management projects may also overlap with Groundwater Recharge or Water Leasing WAP projects in the future.

C-6.1.1 Funk Lagoon

The Funk Lagoon was evaluated as a Nebraska Groundwater Management project in 2013 and 2014. The Funk Lagoon is a series of basins that fill with water from runoff and precipitation, located in the Tri-Basin NRD south of Kearney, Nebraska. The property is located just north of the Phelps County Canal, which can be used to provide a water supply to the lagoon. The Funk Lagoon property is owned by the USFWS and managed by the Rainwater Basin Wetland Management District as waterfowl habitat. The Program worked with the Rainwater Basin Wetland Management District and the CNPPID in 2013 to divert water into Funk Lagoon for groundwater testing. The CNPPID delivered approximately 2,050 AF of excess flows in 2013 to supply the Funk Lagoon, per a water service agreement[98] with the Program in September 2013. The Program collected groundwater level data from four monitoring wells equipped with measuring and recording devices in the area.

The EDO and the Special Advisor in hydrogeology, William Hahn, identified various project concepts to utilize the Funk Lagoon as a WAP project. The initial concept consisted of retiming leased water from the CNPPID in the Funk Lagoon with subsequent releases to reduce shortages to USFWS target flows by retiming flows. The natural runoff in the Funk Lagoon could also be used to reduce shortages to target flows. Other groundwater management techniques could also be evaluated. For the initial work completed in 2013 and 2014, the Program focused on monitoring groundwater levels and seepage impacts in the vicinity.

C-6.1.2 Dewatering with Individual Landowner

A dewatering project with a landowner under the Phelps County Canal was briefly reviewed in 2012. The landowner was interested in working with the Program to dewater high groundwater on an irrigated parcel of land between the canal and the Platte River.

[98] CNPPID 2013b

The EDO and the Special Advisor in hydrogeology reviewed the project concept and ultimately determined it was not likely a favorable project based on several factors, including the timing of groundwater pumping and the yield. The project wasn't considered further.

No additional Nebraska Groundwater Management projects have been identified at this time; however, there may be future opportunities to cosponsor projects with the Rainwater Basin Wetland Management District. The Program intends to continue evaluation of Funk Lagoon concepts and identifying other options for Groundwater Management projects in the central Platte River region.

C-6.2 Yield

The estimated project yield has not been updated since the 2009 WAP Update. The Program's yield was previously estimated at 1,400 AFY at the associated habitat.

C-6.3 Costs

The costs to implement Groundwater Management projects have not been updated since the 2000 Reconnaissance-Level WAP. The maximum estimated cost for Groundwater Management projects identified in the 2000 WAP is $590,000 in capital costs plus additional costs for operation and maintenance of projects. This is associated with a consumptive use volume of 1,400 AFY at the habitat location.

The Program expended approximately $47,000 in 2013 for the study of the Funk Lagoon. The expenditures included water delivery costs with the CNPPID and equipment for four monitoring wells to track groundwater levels in the vicinity of Funk Lagoon. The wells are owned by the CNPPID and each well was equipped with continuous measuring and recording devices. The unit cost described in the water service agreement with the CNPPID was $25/AF of water delivered from the Phelps County Canal to the Funk Lagoon. The Rainwater Basin Wetland Management District cosponsored the Funk Lagoon project and paid 20% of the lease cost. The CNPPID delivered approximately 2,050 AF into Funk Lagoon in September and October of 2013 during excesses to target and instream flows.

C-6.4 Next Steps

The Program will continue to explore options with the Rainwater Basin Wetland Management District to cosponsor Groundwater Management Projects in the Central Platte River basin. Data collected from monitoring wells at the Funk Lagoon in 2013 will be evaluated and the project concept may be reconsidered in the future. At the November 2013 Finance Committee meeting, the Funk Lagoon project was tentatively removed from the WAP budget for the First Increment, but if further investigation demonstrates sufficient potential, it may be reinstated.

C-7.0 Colorado Groundwater Management (Tamarack III)

C-7.1 Project Description

Tamarack III is a potential extension of the existing Tamarack I and II projects in eastern Colorado. Tamarack III would retime excess flows through aquifer recharge in the lower

South Platte River. Tamarack I is one of the Program's three initial state water projects and Tamarack II is utilized by the State of Colorado to offset depletions under the Colorado's New Depletions Plan. Tamarack III would use the existing Tamarack I and II infrastructure. During times of excesses in the river, surface water would be diverted directly from the South Platte River via canals or wells located adjacent to the river, and delivered to recharge sites.

The recharge sites are varying distances from the river to allow accretions to reach the river at different time periods. Colorado's water needs under the Tamarack project will be met prior to utilizing the accretions as a WAP project for the Program, as determined by Colorado. The recharged water accreting to the Platte River that exceeds the needs of Colorado in the first two phases of Tamarack would be credited to the Program score during shortages to USFWS target flows.

C-7.2 Yield

There have not been any project yield evaluations since the 2009 WAP Update and the 2000 Reconnaissance-Level WAP. The estimated yield in the previous WAPs is 17,000 AF of reduction to USFWS target flow shortages, based on historical hydrology of excesses flows. The Program has reduced this projection for budgeting purposes to approximately 10,000 AFY in the habitat reach; however, this estimate is subject to change.

Colorado completed a water availability study to evaluate the impact of the dry years in the 2000s on excesses available on the South Platte River. Based on this evaluation, it was estimated that between 2007 and 2013, only 37 percent of the months during the December through March period had excesses. This is lower than the historical period of 1947 through 1994[99], which showed 59 percent of months with excesses during the December through March period. The reduction in available excess flows has limited the diversions into the Tamarack I project, and will impact the development of Tamarack III as a WAP project. In 2013, six additional wells were drilled for Tamarack I to increase the yield of the project to meet the goal of approximately 10,000 AFY. As shown in annual reports from Colorado, the Tamarack II recharge projection is adequately replacing depletions in river flows from current and projected Colorado population growth.

C-7.3 Costs

There have not been any project updates since the 2009 WAP Update and the 2000 Reconnaissance-Level WAP. The estimated cost remains $45 per AF of retimed water for the Program. Additional infrastructure costs for the Tamarack III project will be completed by the State of Colorado and/or the South Platte Water Related Activities Program (SPWRAP), which is a non-profit group for water users working with the State of Colorado to meet water obligations under the Program. The lease costs with Colorado and SPWRAP will be negotiated to determine a final cost per AF of retimed water.

[99] The Tamarack I estimated yield is based on the 1947 through 1994 period.

C-7.4 Next Steps

The Program will work with the State of Colorado to determine the feasibility of the project, and the yield and costs associated with Tamarack III. An agreement between the Program and the State of Colorado/ SPWRAP may be negotiated and executed to lease Tamarack III water as a future WAP project.

C-8.0 Water Management Incentives

C-8.1 Project Description

Water Management Incentives projects consist primarily of programs resulting in reductions in consumptive use, or in the case of on-farm changes in irrigation techniques, reductions in return flows that do not return to the Platte River above the associated habitat. The programs evaluated in the 2000 Reconnaissance-Level WAP assumed the water rights involved with Water Management Incentives projects are dependent on storage rights in Lake McConaughy. An irrigation district or individual irrigators with storage rights in Lake McConaughy will be paid to reduce their irrigation diversions through conservation cropping, deficit irrigation, land fallowing or changes in irrigation techniques. The reduction in consumptive use would be added to the Lake McConaughy EA when storage space is available, and subsequently released during times of shortages at the associated habitat.

C-8.2 Yield

The yield has not been updated since the 2000 Reconnaissance-Level WAP and the 2009 WAP Update. The estimated yield is approximately 7,000 AFY at the associated habitat for one or a combination of the projects. For the purpose of future budgeting, the ED Office reduced this volume to approximately 3,000 AFY at the project location. Yield estimates will be further refined in the future as water management incentive projects are identified.

C-8.3 Costs

The cost has not been updated since the 2000 Reconnaissance-Level WAP and the 2009 WAP Update. The 2000 Reconnaissance-Level WAP lists unit costs at approximately $80-$217 per AF of consumptive use credit saved. As a preliminary estimate for the 2014 WAP Update, the cost is estimated to be approximately $200 per AF of water at the project location.

C-8.4 Next Steps

The Program will work with irrigation districts to determine if there opportunities for Water Management Incentives projects. If opportunities exist, the Program in conjunction with any project sponsors, will estimate the saved water available at Lake McConaughy for transfer into the EA. The EDO will continue to evaluate information regarding cooperative efforts to incentivize water conservation technology and management techniques in agriculture to assist in prioritizing methods that are both cost-effective and likely to succeed in Nebraska. As projects are identified, the Program will work with the Special Advisor in economics to determine appropriate unit costs to lease or purchase saved water in the various reaches of the river. The necessary permitting requirements will be completed and obtained through the NDNR, if necessary.

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Appendix D – Inactive Project Descriptions

Inactive projects have been conceptually and/or financially evaluated for feasibility; however, the Program decided not to pursue implementation of these projects during the First Increment. Tier 3 WAP projects are also included in this section as they are not anticipated to be active during the First Increment. The inactive projects in this section are not anticipated to move forward into implementation or provide a score towards fulfilling the Program's First Increment objective or WAP milestone.

D-1.0 Elm Creek Reregulating Reservoir

D-1.1 Project Description

A feasibility study[100] was completed in 2011 for the Elm Creek Reregulating Reservoir project (tier 1) in Dawson and Buffalo Counties, Nebraska. The optimal scenario identified in the feasibility study incorporated a combination of pumping wells for winter storage and capturing summer excess flows in the reregulating reservoir. The optimal alternative included the following design concepts:

Water Supply Source:

- Non-winter operations: Platte River excesses to target flows (and instream flows) diverted into the Dawson County Canal with an increased capacity of 125 cfs (divert excesses March 1 through November 15).
- Winter operations: Water pumped from groundwater wells with 70 cfs pump capacity along Dawson County Canal (pump groundwater as supply September 1 through May 1).

Reservoir Capacity (two options):

- Beneficial storage volume of 19,850 AF to obtain the 38,000 AF yield.
- Beneficial storage volume of 12,000 AF produces a lower yield, but the per AF cost remains relatively the same for both capacities (total cost changes with size).

Channel Conveyance Capacity:

- Reservoir releases of 1,000 cfs or less provide the lowest life cycle cost with optimal releases at 700 to 800 cfs (capacity of 1,000 cfs will require improvement costs for channel capacity and flood protection measures).

D-1.2 Yield & Costs

The optimal alternative of the 33 scenarios presented in the feasibility study provided both the highest reservoir release to target flow shortages of approximately 38,000 AFY and the lowest life cycle cost of $37 per AF. The yield is associated with the storage volume capacity of 19,850 AF and is an estimate of releases from the reservoir (not the score). The total reservoir cost was approximately $70 million and included canal improvements, groundwater pumping and 50-year operational costs. The Program expended approximately $290,000 in 2009 and 2010 on the feasibility study, which was coordinated with the CPNRD.

[100] Olsson Associates 2011

D-1.3 Recommendations

In 2011, the WAC was presented with the results in April 2011 from the feasibility study[101] completed on the Elm Creek Reregulating Reservoir. The WAC's opinion was not favorable towards the project based on the cost per unit yield and operational difficulties associated with providing inflows to the reservoir. The GC was presented with the WAC's comments at the June 2011 meeting and the GC agreed to not move forward pursing the reservoir project[102]. The Program's water budget is not sufficient for multiple reservoir projects and the J-2 Regulating Reservoirs project was selected as the preferred alternative from a yield, operational, and cost standpoint.

D-2.0 Net Controllable Conserved Water (Purchased)

D-2.1 Project Description

Net Controllable Conserved Water (NCCW) (tier 1) is water saved within the CNPPID system through the implementation of a combination of conservation measures for canal distribution and delivery, on-farm changes in irrigation, and optimal reservoir operations. The saved water from conservation activities is stored in Lake McConaughy (due to the conservation measures, the water does not need to be released and remains in storage). These activities were completed to comply with the CNPPID's agreement with the National Wildlife Federation to provide reductions to average annual diversions of surface water. The CNPPID's FERC license required the CNPPID to offer the NCCW to the Program at the average cost to the CNPPID and its customers to develop.

D-2.2 Yield & Costs

The estimated yield of the project for purchased NCCW is 10,586 AFY at Lake McConaughy (this does not include the no-cost 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. The NCCW final offer dated December 2, 2013 was for 10,586 AFY at Lake McConaughy at a total annual cost of $3,351,830 in 2014 and escalating to $5,030,022 by 2037. There was an option to purchase a lesser amount at a pro-rated cost; however, the offer required the Program to pay for a set volume of water each year, regardless if that volume was available in Lake McConaughy in any given year.

D-2.3 Recommendations

The GC did not accept the offers due to the high unit cost and the required upfront payment for the total volume of water purchased through 2038, which would have been $57,922,300 for the full 10,586 AFY. This upfront cost would not fit within the Water Plan budget, considering the J-2 Regulating Reservoirs project was approved and utilizes the majority of the WAP budget. The GC removed this WAP project from future Program activities in 2013[103]. This project is considered inactive for the remainder of the First Increment, unless other terms for an agreement different from those required by the CNPPID's FERC license can be negotiated with the CNPPID. Alternately, conserved water retained in the CNPPID's account in Lake McConaughy could be a source of water

[101] Olsson Associates 2011
[102] EDO 2011a,b. June 2011 GC meeting minutes and July 2011 WAC meeting minutes.
[103] EDO 2014a. December 2013 GC meeting minutes.

for a storage lease with the CNPPID as described in Section 4.2.2 and Appendix C (Section C-2.0).

D-3.0 Glendo Reservoir

D-3.1 Project Description

Glendo Reservoir (tier 1) is on the North Platte River southeast of the town of Glendo, Wyoming. In the 2000 Reconnaissance-Level WAP, it was anticipated that an amendment to the 1953 Order Modifying and Supplementing the North Platte Decree would allow the use of Glendo storage water as a component of the Program. 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). 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. Wyoming's allocation of Glendo storage water is needed to meet all or a portion of the replacement water obligations described above; therefore, Wyoming's allocation of Glendo storage water is no longer directly available for Program uses.

Although Wyoming's allocation is likely not available for the Program during the First Increment, there may still be future opportunities for the Program to utilize stored water in Glendo Reservoir. In January 2015, Governor Mead proposed a water strategy for Wyoming that included a water management initiative in Glendo Reservoir, referred to as the Glendo Reservoir Full Utilization Project. The project will seek federal authorization to reallocate a portion of the flood control pool managed by the U.S. Army Corps of Engineers for other operational uses[104]. It is unknown at this time whether the Program would be able to utilize the reallocated storage; however, the Program intends to stay informed on the progression of this project.

D-3.2 Yield & Costs

There have not been any updates since the 2009 WAP Update. This project is considered inactive and is not anticipated to yield water for the Program's First Increment milestone. The yield estimate in the 2000 Reconnaissance-Level WAP was approximately 2,650 AFY at Glendo Reservoir with unit costs ranging from $5 to $75 per AF.

D-3.3 Recommendations

Wyoming's allocation of Glendo Reservoir storage water is no longer available for use by the Program. This project is considered inactive through the First Increment.

D-4.0 Power Interference

The Power Interference project (tier 3) entails paying hydroelectric generators to modify the release of water through the hydropower turbines for Program benefits. The modifications could include changes in timing of generation or bypassing water in order to reduce target flows shortages in the habitat reach. Projects may involve the CNPPID system or the NPPD system. There are no updates from the 2000 Reconnaissance-Level

[104] Mead 2015

WAP and the 2009 WAP Update. This project is not currently included in the budget estimate for the First Increment and is considered inactive.

D-5.0 LaPrele Reservoir

LaPrele Reservoir (tier 3) is located on LaPrele Creek approximately 13 miles upstream of the confluence with the North Platte River. This potential WAP project assumes the Program could lease approximately 5,000 AF of storage in the reservoir that is available to the Panhandle Eastern Pipeline Company (PEPL). The PEPL's share of reservoir storage is limited by the yield of its share and the conditions under which water may be put to beneficial use in the context of the Program. There are no updates from the 2000 Reconnaissance-Level WAP and the 2009 WAP Update. This project is not currently included in the budget estimate for the First Increment and is considered inactive.

D-6.0 Wyoming Water Leasing

Water leasing in Wyoming (tier 3) would entail temporary lease agreements with irrigators or irrigation districts that voluntarily lease the consumptive use credit of their water rights. The 2000 Reconnaissance-Level WAP assumed the leases would be dependent on storage rights. The existing requirement for legislative approval to allow export of water from Wyoming creates a significant obstacle to this potential source of supply. The Program will continue to monitor the advancement of any changes in legislation and work under the existing rules should opportunities arise. There are currently no updates from the 2000 Reconnaissance-Level WAP and the 2009 WAP Update. This project is not currently included in the budget estimate for the First Increment and is considered inactive.