



PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM (PRRIP -or- Program)

TO: Governance Committee (GC)
FROM: Executive Director's Office (EDO)
RE: Net Controllable Conserved Water (NCCW) Agreement
DATE: September 2, 2022

GC DECISION:

The EDO developed this memorandum to inform discussion of the potential NCCW Agreement at the September 2022 GC meeting in Kearney, NE. At the conclusion of that discussion, the GC will be asked to provide direction on whether to proceed with the NCCW implementation and assessment strategy proposed at this end of this memorandum.

Introduction

The 2019 Addendum to the Program Document outlining First Increment Extension activities stipulates the Program will invest available resources to achieve 120,000 acre-feet (AF) in annual reductions to target flow shortages as quickly as possible in the Extension and conduct the scientific investigations necessary to determine if an additional 10,000 AF is justified. This strategy resulted in the Program focusing on acquisition of surface water supplies that can be stored in the Lake McConaughy Environmental Account (EA) and used to implement flow management actions in the Associated Habitat Reach (AHR). The State of Nebraska and Nebraska Water Users assisted the Program with identifying potential water projects as part of a larger effort to develop a Unified Water Plan (UWP) focused on both improving integrated management of Nebraska's surface and groundwater resources and on assisting the Program in achieving the Water Milestone during the Extension.

One of the major components of the UWP is a renewed offer of 10,586 AF of Central Nebraska Public Power and Irrigation District's (CNPPID) Net Controllable Conserved Water (NCCW) in conjunction with: 1) elimination of the reset of the EA upon McConaughy filling to capacity, and 2) modifications of certain flow release requirements during the non-irrigation season, as further described below.

Background - EA Reset, Minimum Diversion Requirements, and NCCW

The Federal Energy Regulatory Commission (FERC) issued a new license to CNPPID for the Kingsley Dam Project (Project No. 1417) on July 29, 1998. The license includes language and provisions related to resetting the EA upon reservoir filling, operational rules including flow release requirements during the non-irrigation season, and the requirement that CNPPID offer NCCW to the Program. Each of these items is discussed in further detail below.

EA Reset

The document *An Environmental Account for Storage Reservoirs on the Platte River System in Nebraska* (Nebraska EA Document) was approved and made a part of the FERC license as Exhibit X.¹ Section II.A. of the exhibit describes conditions for EA reset at reservoir filling. Exhibit X provides in part that whenever Lake McConaughy fills to regulatory capacity as defined by FERC's dam safety requirements

¹ The Nebraska EA Document originally appeared as Appendix A (Water Component), Tab 1A of the July 1997 Cooperative Agreement for Platte River Research and was subsequently incorporated into the October 2006 Program Document as Attachment 5 (Water Plan), Section 5.



the amount of water in the EA will be reset to 100,000 AF, whether that be an increase or decrease from the EA volume the time capacity is reached.

During the First Increment of the Program, the EA has twice been reset down (2011 & 2016), reducing EA contents by a total of 77,360 AF.² CNPPID also modified operations in 2019 to avoid a reset that would have resulted in the loss of an additional 51,000 AF. At the time the EA was established it was assumed that resets would typically add water to the EA, not result in losses. Contrary to expectations, operational experience indicates losses will almost always occur at resets because there is limited or no opportunity to release EA water prior to filling due to limited channel capacity or lack of shortages during wet periods that lead to reservoir fills.

This unexpected outcome has led the U.S. Fish and Wildlife Service (USFWS) and the EDO to identify elimination of the EA reset provision to be desirable to minimize the risk associated with maximizing EA volume during wet periods so that it can be carried over to benefit target species during transitional and dry years.

Non-Irrigation Season Flow Release Requirements

Section III of Exhibit X also provides for certain operating requirements of CNPPID's hydropower project, in particular flow releases required during the non-irrigation season to achieve certain amounts of water at both the CNPPID diversion at North Platte and the Nebraska Public Power District (NPPD) diversion at Keystone.³ Flow release requirements generally vary with time of year (from October 1 through the beginning of the irrigation season in April) and water supply conditions and were established for the purpose of providing certain guaranteed operational flows upon which EA releases from Lake McConaughy might build.

In 8 of the 11 water years (WY) from 2005-2015, CNPPID requested and was granted temporary waivers of non-irrigation season release requirements specified in Section III.E.3 of Exhibit X for dry conditions.⁴ A key factor motivating the waiver requests was that lower than expected non-irrigation season inflows to Lake McConaughy subsequent to the issuance of the FERC license resulted in more rapid drawdown of the reservoir storage volume during dry years.⁵ FERC consulted with other agencies before granting the temporary waivers, with the order for WY 2015 stating that the USFWS "provided a letter of support" and that the Nebraska Game and Parks Commission had "no objections".⁶

As a condition of a potential new NCCW Agreement, CNPPID is proposing to modify or eliminate the non-irrigation season flow release requirements defined in Section III of Exhibit X. Modified Exhibit X language is included as **Attachment 1**. Of particular interest to the Program, releases required for diversion at the Keystone diversion dam would be eliminated under both dry and very dry conditions, and the releases required under dry conditions would be modified to include only those necessary to

² Cash equivalent value of water lost to reset was nearly \$9,000,000.

³ Although the Keystone diversion is owned and operated by NPPD, the requirement to provide for flows at this location is Central's.

⁴ Wisner, Rick. October 9, 2015. MEMO: Article 405, Temporary Waivers of Non-Irrigation Season Releases. Central Nebraska Public Power and Irrigation District, Holdrege, Nebraska. Waivers were granted in 2005 – 2009, 2015 and 2015.

⁵ Federal Energy Regulatory Commission. November 4, 2014. Order Approving Temporary Partial Waiver of Non-Irrigation Season Releases Under Article 405. Central Nebraska Public Power and Irrigation District, Project No. 1417-256.

⁶ Ibid.



achieve specific flows at the CNPPID diversion dam from October 15-November 15 and again from March 15 through the start of the irrigation season.⁷

Net Controllable Conserved Water

Article 402 of CNPPID's FERC license requires CNPPID to determine the quantity of NCCW associated with certain past conservation measures undertaken by CNPPID and its customers and offer that water for purchase by the Program at the same total costs to CNPPID and its customers to conserve that water. Consistent with the provisions and of Article 402, the amount of NCCW was determined to be 10,586 acre-feet per year at a cost of approximately \$60 million.⁸ The Program declined to purchase the NCCW at that price. While the FERC license only requires that CNPPID offer the NCCW at the cost to develop, CNPPID and the EDO have periodically discussed the possibility that CNPPID might be willing to sell the water to the Program at a reduced cost under the right conditions, such as changes to the EA reset and non-irrigation season flow release requirements described above.

Components of Proposed Agreement

CNPPID has combined the three items described above into a proposed Agreement as follows:

1. The GC will approve⁹ the following temporary changes to Exhibit X of CNPPID's FERC license for Project No. 1417 for the period of 2022 – 2032 as proposed in **Attachment 1** to this memo including:
 - a. Elimination of the 100,000 AF EA reset at reservoir filling. Instead, the EA will remain static at the volume at filling during the period when the reservoir is at or above full elevation.
 - b. Modification of non-irrigation season flow release requirements.
2. If FERC accepts these changes, CNPPID would enter a surface water Agreement with the Program that would provide 10,586 AF of NCCW water annually for the period of 2022-2032. That water would be credited to the EA on October 1 of each year. The Program would make an up-front lump sum payment for the water at Agreement initiation.

Potential Program Benefits

The principal benefits of the proposed Agreement are 1) eliminating the loss of EA water at reservoir filling; 2) securing an additional 10,560 AF of storage water that can be used to implement Program flow management actions during the Extension; and 3) creating operational certainty during time of drought. During the First Increment, approximately \$9,000,000 in EA water was lost to reset. CNPPID coordinated with the EDO to avoid an additional \$5,800,000 loss by altering their operations to avoid filling in October 2019.

The NCCW Agreement, in conjunction with existing surface water exchange projects, upstream storage leases and groundwater recharge projects, would also achieve the 120,000 AF score directive and place the Program in the best position to implement flow management actions. Finally, modifying non-

⁷ Exhibit X, Section III.F includes no requirement to release for diversions at the CNPPID diversion dam under very dry conditions, only at the Keystone diversion dam.

⁸ The volume of NCCW and cost of conservation measures excludes the 314 AF made available with Bureau of Reclamation funding and already made available to the Program each year at no cost.

⁹ The term approve comes directly from CNPPID's FERC license. In practice the GC would authorize the ED to send a letter to FERC supporting the proposed changes to Exhibit X.



irrigation season flow release requirements will reduce operational uncertainty, replacing an ad hoc temporary waiver process with consistent operational rules during times of drought.

Potential Tradeoffs

Amending the non-irrigation season flow release requirements would result in changes to flows through the AHR. These changes in the timing and magnitude of Lake McConaughy outflows would result in corresponding changes to the distribution of deficits and excesses to USFWS target flows in the AHR that affect the Program's ability to operate groundwater recharge projects and the State of Colorado's retiming of South Platte water to offset pre- and post-1997 depletions (Tamarack I & II projects). Additionally, the redistribution of winter flows could affect target species habitat and/or use of the AHR. CNPPID and the EDO (in coordination with the USFWS) completed preliminary analyses to estimate the potential changes to Platte River flows and associated river conditions. Methods and results are presented in **Attachment 2**.

The preliminary analyses focused on dry and very dry years, the types of conditions under which CNPPID was granted temporary waivers of the non-irrigation season flow requirements, and the conditions under which any changes to those requirements are expected to be the most impactful. Estimated flow changes through the AHR vary by month and year, with both increases and decreases likely to occur. Increases in flow are most often seen during the spring whooping crane migration period, and to the extent that decreases in flow may occur, it is generally during the November-January months. The Platte River is wide and shallow through the AHR, so even flow changes of a few hundred cfs only translate to modest changes in stage and wetted width.

Decreases in flow, particularly in December and January, have the potential to reduce divertible excess flows into recharge projects, but most often those excesses are already very limited and intermittent at best in dry and very dry years. As an example, through the first 11 months of water year 2022, there were only 10 days of excess flow diversions (8 days in December and 2 days in March) for the Program's central Nebraska recharge projects. In contrast, deficits to target flows are typically an order of magnitude greater in these same years, and may increase or decrease somewhat, depending on how much water gets added to the system during the spring migration. This can actually be advantageous for Program recharge projects, as the prevalence of deficits in dry and very dry years provides for greater deficit reduction credit from the ongoing accretions and recapture pumping resulting from diversions into recharge projects during previous wetter years.

Evaluations of past and future direct and/or indirect impacts to water operations, water accounting, and target species habitat are complicated by the reality that irrigation operations, EA management, and the Program's flow management action(s) have all evolved substantially since the early 2000s. Likewise, a change in winter flows combined with water administration calculated in part based on reservoir levels makes it difficult to quantify future effects of the changes, which are likely small compared to overall hydrologic variability. *Taken together, these uncertainties argue for an approach that allows for implementation and assessment of benefits & impacts of these actions without committing stakeholders to changes that are permanent or extend into a Second Increment.*

Implementation and Assessment Strategy and Timeline

Given the need to both move forward with PRRIP water acquisition and protect and provide certainty to Program stakeholders, *we propose approaching the NCCW Agreement and associated Exhibit X changes*



as a temporary Extension flow management action that can be used to inform GC decision-making and Second Increment negotiations. Specifically:

- The Water and Technical Advisory Committees (WAC & TAC) will evaluate this proposal at their regularly scheduled fall meetings and provide technical feedback and questions to the EDO. Any technical questions will be addressed with answers provided to the committees and to the GC prior to the December 2022 meeting.
- At the December meeting, the GC will vote on a motion approving¹⁰ of the proposed temporary changes to Exhibit X. If that motion is successful, the EDO will draft a letter of support for the proposed changes and provide to CNPPID in support of their filing.
- If the first motion is successful, the GC would also pass a motion affirming changes to winter flow diversion requirements will not impact the scoring or accounting for existing Program water projects or state depletions plans.
- If FERC accepts changes to Exhibit X, CNPPID and the Program will develop and execute an Agreement for 10,560 AF of NCCW water annually through the remainder of the Extension. General terms include up-front payment for the total volume of water at \$90/AF with repayment of funds for undelivered water in the case of early termination.
- Potential habitat and species uncertainties will be explored by the TAC and evaluated through the Program's Extension Science Plan. This may include revising the plan to add additional Extension Big Questions related to winter flows.
- Potential long-term effects on water operations, accounting, and depletions plans will be evaluated by the Water Advisory Committee (WAC) over the course of the Extension.

¹⁰ FERC license paragraph (D) on page 11 states: If the Licensee (Central) files a revision with the approval of the Licensee for Project No. 1835 (NPPD) and the PRRIP Governance Committee, FERC can deem the changes accepted after 30 days or within those 30 days can open a "proceeding on the revisions" involving a list of stakeholders.



PRRIP NCCW Memo – Attachment 1

**PROPOSED PLATTE RIVER RECOVERY
IMPLEMENTATION PLAN**

APPENDIX A, WATER COMPONENT

TAB 1A

**AN ENVIRONMENTAL ACCOUNT FOR STORAGE RESERVOIRS
ON THE PLATTE RIVER SYSTEM IN NEBRASKA**

**PROPOSED PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM
APPENDIX A, WATER COMPONENT**

TAB 1A

**AN ENVIRONMENTAL ACCOUNT
FOR STORAGE RESERVOIRS
ON THE PLATTE RIVER SYSTEM IN NEBRASKA**

I. INTRODUCTION

A. Definitions

1. "MOA" means the Memorandum of Agreement among the states of Colorado, Nebraska, Wyoming and the Department of the Interior dated June 1994, the Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats Along the Central Platte River, Nebraska (Cooperative Agreement) developed pursuant to that Memorandum of Agreement, and any Platte River Recovery Implementation Program (Program) implemented following that Cooperative Agreement.
2. "Governance Committee" means the committee designated in the Cooperative Agreement, or its successor governance body as it may be structured under the Program.
3. "Central" means the Central Nebraska Public Power and Irrigation District.
4. "NPPD" means the Nebraska Public Power District.
5. "Districts" means Central and NPPD.
6. "FERC" means the Federal Energy Regulatory Commission.
7. "Projects" means FERC Project 1417 and FERC Project 1835.
8. "NEDWR" means the Nebraska Department of Water Resources.
9. "Approved Storage Facilities" means a District facility or facilities proposed for EA storage in Nebraska by the Districts and approved by the Governance Committee and NEDWR.

10. "EA" means Environmental Account, an annual account of water in Lake McConaughy, or other Approved Storage Facilities, available for release for environmental purposes during the October 1 to September 30 water year.

11. "Current Regime of the River" means the flow characteristics of the North Platte, South Platte and Platte River drainage which are available under existing conditions, as defined by the Governance Committee, determined in accordance with procedures to be adopted pursuant to the MOA. The principal purpose will be to serve as a reference point for determining whether and how relevant flow characteristics are changed by the MOA or future developments.

12. "EA Manager" means an individual designated by the Regional Director of the U.S. Fish and Wildlife Service ("FWS") to manage and coordinate operations of the EA and to be responsible for calling for releases from the EA pursuant to such contracts as may be executed to meet the objectives of the MOA.

13. "New Water" means water which is not included in the Current Regime of the River, but which is the result of the management and operation of the MOA and is available for storage in the EA.

B. The EA makes storage in, and water from, Lake McConaughy or other Approved Storage Facilities available for instream flow releases and allows the manager of the EA the flexibility to make releases that are most efficient for accomplishing the goals set by the Governance Committee.

C. This document describes how water contributed becomes part of the EA. Contributions to the EA, defined in Paragraph II.B, may be from Colorado, Wyoming, Nebraska and/or from water conservation/supply activities carried out under the MOA, or from other sources approved by the Governance Committee.

D. Nothing in this document shall preclude any entity from exercising its state water rights to ensure those water rights are not reduced, relinquished or extinguished by failure to use.

E. Consistent with the guidelines below, and to the extent possible, water released from the EA should be used for as many beneficial uses as possible.

II. ENVIRONMENTAL ACCOUNT

A. General Description

1. Water contributed to the EA, regardless of its source, loses any separate identity upon entering Lake McConaughy or other Approved Storage Facility, and simply becomes part of the EA.

2. Water remaining in the EA after September 30 of each year may be carried over and added to the following year's contributions to the EA, subject to the limitations of Paragraphs II.A.3 through II.A.6 below.

3. The total quantity of water in the EA in Lake McConaughy may never exceed 200,000 acre-feet (af) at any time during the water year.

~~4. Whenever Lake McConaughy fills to regulatory capacity as defined by FERC's dam safety requirements for Project No. 1417 and the EA is less than 100,000 af, the Districts shall contribute additional water to increase the EA to 100,000 af regardless of the quantity of EA water already released during that water year.~~

~~5. At any time that Lake McConaughy reaches regulatory capacity as defined by FERC's dam safety requirements for Project No. 1417 and the EA exceeds 100,000 af, the EA shall be reduced to 100,000 af regardless of the sum of the contributions from the states and from Conservation Activities, or the quantity of carryover from a prior year.~~

6.4. Storage losses for Lake McConaughy and other Approved Storage Facilities shall be calculated by the NEDWR and assigned monthly to the EA using the following formula: (average monthly storage in the EA) divided by the (average monthly storage in total)) times the total losses for the storage facility for that month, or by another mutually agreed upon formula.

7.5. Transportation losses for EA water shall be calculated by the NEDWR in the same manner as the NEDWR calculates such losses for other water in the North Platte and Platte Rivers.

8.6. Contributions to the EA shall be protected by the NEDWR from groundwater or surface water depletion from the state line or the source of contribution from within Nebraska to Lake McConaughy or other Approved Storage Facilities.

B. EA Contributions

1. Nebraska's Contributions

a. Central and NPPD

(1) The EA contribution by the Districts, and the water users served by them, is based upon the understanding that the flows available at Lewellen on the North Platte River and at the Korty Diversion on the South Platte River remain representative of the Current Regime of the River except for changes to the Current Regime of the River which are compensated, mitigated, or offset at Lewellen or the Korty Diversion pursuant to the MOA. A system will also be established to resolve disputes on detrimental impacts and appropriate compensation, mitigation or offsetting measures, including disputes arising after the Program has been implemented.

(2) Storable Natural Inflows are those North Platte River waters entering Lake McConaughy that are measured at the Lewellen gauge and that may be stored consistent with legal, regulatory or public safety restrictions. Flows which are not considered to be Storable Natural Inflows include: a) environmental contributions from Wyoming, Colorado, MOA Conservation Activities or other entities; b) transfers of storage water from upstream facilities; and c) demands based upon senior non-hydropower natural flow water rights.

(3) At the end of each month from October through April, the EA shall be credited with an amount equal to 10% of the Storable Natural Inflows to Lake McConaughy for that month, as determined by the NEDWR based upon the real-time gauge data available from the NEDWR for the Lewellen gauge, up to an annual limit of 100,000 af. The 100,000 af limit shall not be construed to affect the adjustment of the contents of the EA to 100,000 af when the reservoir fills, as described in Paragraphs II.A.4 and II.A.5.

b. Other Nebraska Contributions

Other Nebraska water contributions may be provided to the EA by the state or other water users through plans or programs that are approved by the Governance Committee provided that: (1) the Districts are assured that as a result of a contribution, inflows into Lake McConaughy and flows at the Korty Diversion remain

representative of the Current Regime of the River, except for changes to the Current Regime of the River impacting the Districts' operations which are compensated, mitigated, or offset pursuant to the MOA; and (2) these new contributions may be characterized by the NEDWR as New Water; and (3) those contributions may be stored in Lake McConaughy or other Approved Storage Facilities.

2. Wyoming's Contributions

a. New Water attributable to the State of Wyoming may be contributed to the EA through its "Pathfinder Modification Project" or other plans or programs that are approved by the Governance Committee.

b. It is anticipated that the Governance Committee in cooperation with the Wyoming State Engineer and the NEDWR will develop an accounting system for the purpose of defining and determining the amount of New Water at the state line attributable to the State of Wyoming under its Pathfinder Modification Plan or under any other plan which may be approved by the Governance Committee. The accounting system to be developed will include a system for resolving any disputes that may arise relative to the determination of the amount of New Water provided by the State of Wyoming to the EA.

c. Wyoming's contribution to the EA shall be the quantity delivered at the state line for MOA purposes, as defined in Paragraph II.B.2.b, less losses to the Lewellen gauge on the North Platte River as determined by the NEDWR.

3. Colorado's Contributions

a. New Water attributable to the State of Colorado may be stored in the EA under procedures developed by the Districts and Colorado and approved by the Governance Committee.

b. It is anticipated that the Governance Committee in cooperation with the Colorado State Engineer and the NEDWR will develop an accounting system for New Water attributable to the State of Colorado and delivered to the state line which, under the procedures developed pursuant to Paragraph II.B.3.a above, is available to be stored in the EA under the Program. The accounting system to be developed will include

a system for resolving any disputes that may arise relative to storage of New Water in the EA attributable to the State of Colorado.

4. Conservation Water

a. Activities carried out under the Program Water Conservation/Supply Component may contribute to the EA any quantifiable net conserved water, as defined and accounted for in the Water Conservation/Supply Action Plan, which can be controlled and credited to storage in Lake McConaughy or other Approved Storage facilities.

b. The Governance Committee in consultation with the appropriate state water entity will develop an accounting system for the EA contributions developed by water conservation/supply activities, to include operational agreements with owners of the facilities in which these contributions will be stored. The accounting system developed will include a system for resolving any disputes that arise relative to the accounting process.

C. EA Operations

1. EA Committee and EA Manager

a. The EA Manager shall possess the authority to request releases from the EA pursuant to the terms of a contract with Central in the case of Lake McConaughy or with the appropriate District in connection with releases from other Approved Storage Facilities.

b. An EA Committee ("EAC") shall be organized by the EA Manager to work with and provide guidance to the EA Manager. The EA Manager shall invite representatives from Central, NPPD, U.S. Bureau of Reclamation ("BOR"), FWS, NEDWR, the Nebraska Game and Parks Commission, Colorado, Wyoming, the Audubon Society and the Platte River Whooping Crane Critical Habitat Maintenance Trust to participate in the EAC. The EA Manager shall meet with the EAC at least twice a year, in October and March, and more frequently at the discretion of the EA Manager.

c. Central shall release EA water from Lake McConaughy as requested by the EA Manager as it would for any other customer, and will coordinate with NPPD and the NEDWR regarding such releases. Procedures and protocol will be developed as necessary to facilitate coordination of operations with EA releases.

d. In October of each year, in consultation with the EAC, the EA Manager shall establish flow targets and an annual operating plan for the EA based on predicted water supplies, the status of the species of concern and the goals set by the Governance Committee. Consistent with the FWS priority recommendations described in "Instream Flow Recommendations for the Central Platte River, Nebraska" and attached to "The Department of the Interior's Amended Comments under Section 10j of the Federal Power Act" dated August 11, 1994, a priority will be given to the use of EA water to maintain flows throughout the summer. Adjustments throughout the year to the operating plan would be expected to reflect prevailing conditions and increased knowledge of species needs.

e. To protect the EA water stored in and released from Lake McConaughy to and through the habitat area, and for Central to have the authority to contract with the EA Manager to make releases as directed, Central will use best efforts to seek and, if granted, to maintain storage use permits and other regulatory authorities as necessary. For other Approved Storage Facilities, the appropriate District shall likewise seek and, if granted, maintain storage use permits and other regulatory authorities as necessary. The Districts will not abandon or take any action which will reduce, relinquish or extinguish the storage use permit for the EA.

f. The EA Manager shall coordinate with the NEDWR and the Districts as necessary for NEDWR to perform accounting functions related to the storage and release of the EA.

2. General Rules for EA Operations

a. EA releases may be temporarily reduced or suspended if events occur which limit or prevent the Districts' ability to provide them. The types of events which would limit or prevent EA releases include but are not limited to inspections of facilities, maintenance or repair of structures, failure of a structure, or existence of an emergency condition which is not otherwise predicted. Weather related events such as icing conditions, regional or localized rain or snowstorms, flooding events and high wind conditions may also require the alteration or suspension of EA releases. No alteration or suspension of releases for these or similar types of occurrences will be deemed to be a lack of compliance. The Districts will coordinate all planned safety and maintenance activities with the EA Manager, and will notify the EA Manager of all events which lead to reduction or suspension of releases. The Districts will maintain appropriate records of such events.

b. If an emergency situation occurs such that water must be evacuated (in whole or part) from Lake McConaughy, the EA shall be reduced in proportion to the ratio of the total quantity of water evacuated and total storage prior to the evacuation.

c. The EA Manager may not request releases from the EA when the Platte or North Platte River at Keystone, North Platte, Brady, Cozad, Kearney or Grand Island is at or above flood stage as defined for those locations by the National Weather Service ("NWS"). If the EA Manager requests a release of EA water that the Districts believe would cause the Platte or North Platte River to rise above flood stage, the request for release may be denied. However, the EA Manager may appeal the denial by requesting the NWS to make a determination as to whether or not the requested release would cause either of the rivers to rise above flood stage at any of the previously listed sites. If the NWS determines the requested release would cause either of the rivers to rise above flood stage, the denial would stand. If the NWS determines the requested release would not cause either of the rivers to rise above flood stage, the requested releases will be made.

III. OPERATING RULES FOR PROJECT NO. 1417 AND PROJECT NO. 1835

A. General Rules for Project Operations

1. The operating rules for the Projects are based upon the understanding that flows available to the Districts in the North Platte and South Platte Rivers remain representative of the Current Regime of the River except for changes to the Current Regime of the River impacting the Districts' operations which are compensated, mitigated, or offset pursuant to the MOA. Procedures and processes developed in consultation with NEDWR and adopted by the Governance Committee shall be used to verify that such flows are not altered in a manner which causes impacts to either of the Districts' operations which are not compensated, mitigated, or offset pursuant to the MOA. Under the MOA, notwithstanding the foregoing, the obligations of Colorado and Wyoming are fully set forth in the Cooperative Agreement and the Proposed Program, and nothing in this EA document is intended to impose any additional or independent obligations, requirements, or restrictions of any sort on Colorado or Wyoming. For as long as there is a Program, if Colorado and Wyoming reregulate flows in accordance with their proposed Tamarack Plan (Appendix A, Tab 3A) and Pathfinder Modification Plan (Appendix A, Tab 2A) and their respective new depletions proposals (Appendix A, Tabs 2B, 3B), existing and new water-related activities in Colorado and Wyoming will be included in the Current Regime of the River.

2. Operations plans for the Projects which include monthly release and

storage goals shall be developed annually in October and modified as necessary by the Districts through the water year after communicating with the EA as described in Paragraph IV.D.

3. Neither release requirements, nor allocation of water to the EA, nor any other provision in this document is intended to relieve the Districts or their successors or assigns from complying with the terms of the May 21, 1954 Water Storage Agreement between Central and the Platte Valley Public Power and Irrigation District (NPPD's predecessor), and amendments thereto, except to the extent that this document is in direct conflict with the terms of the agreement. Additionally, the provisions of this document are not intended to prevent the Districts or their successors or assigns from further amending such agreement, provided such amendments are not inconsistent with this document. These operating rules are not intended to favor one District or the other.

4. The Districts shall have responsibility for determining predicted Storable Natural Inflows as referenced in Paragraphs III.B.1, III.C.1, III.D.1, and III.E.1 for the purposes of determining whether very wet, wet, transitional or dry conditions exist. Predicted Storable Natural Inflows, and the category of conditions anticipated, should be determined by October 15 of each water year and may be adjusted and refined by the Districts.

5. The Districts will use South Platte flows to the extent possible.

~~6. Whenever the use of surface water for irrigation in the Platte River valley ends before September 30, operational flows for Central and NPPD for the remainder of the water year shall be in the range specified for the preceding November 16 to February 14 time period.~~

~~7.6.~~ Operational rules may be temporarily suspended if events occur which prevent operations in the manner prescribed. The types of events which would require suspension of the operating rules include, but are not limited to, inspections of facilities, maintenance or repair of structures, failure of a structure, hydraulic limitations of facilities or existence of an emergency condition which is not otherwise predicted. Weather related events such as icing conditions, regional or localized rain or snowstorms, flooding events and high wind conditions may also require suspension of the operating rules. No alteration or suspension of the operating rules for these or similar types of occurrences will be deemed to be a lack of compliance. The Districts will coordinate all planned safety and maintenance activities with the EA Manager, and will notify the EA Manager of all events which lead to reduction or suspension of the operational rules. The Districts will maintain appropriate records of such events.

8. Releases from Lake McConaughy may be made as needed to

supplement flows and river gains to meet irrigation requirements.

9. All EA water or other water made available to the Program for environmental purposes which must be released from or passed through Lake McConaughy or other Approved Storage Facilities may be diverted by the Districts, at their discretion, into Project facilities. The diverting District shall return the diverted environmental water to the river and shall replace any losses of water in excess of those which the NEDWR determined otherwise would occur if that water had been transported via the Platte River system. Although such water released or passed through may be used for as many beneficial uses as possible, neither EA releases nor pass through of environmental water are restricted by canal capacity or hydropower generation constraints.

10. Notwithstanding Paragraph III.A.9, if the total flow in the Platte River at Brady (currently measured by USGS gauge number 06766000) at any time in March or April of a very wet, wet or transitional year as defined below is less than 200 cubic feet per second (cfs), the EA Manager may request Central to route enough EA water through its Jeffrey Return such that the quantity released from the Jeffrey return plus the Platte River at Brady totals up to 200 cfs. The total volume of EA water released in this manner shall not exceed 3000 ~~of~~af in any one water year unless agreed to by Central.

11. The Districts shall pass through or release waters from Lake McConaughy as needed to supplement river flows and river gains to provide at least the lowest operational flows described in Paragraphs III.B through III.F, without taking into account and in addition to any releases being made from the EA. Such operational flows may be diverted by the Districts, at their discretion, into Project facilities.

~~12. Throughout the water year, the combined flow from the Keystone Diversion and the Korty Diversion shall provide an average of, at least 400 cfs inflow to the Sutherland Reservoir and maintain an elevation of at least 3,045 feet in Sutherland Reservoir.~~

13. Diversions at the Korty Diversion Dam may be up to canal capacity.

14. The rules for the Projects' operations require the Districts to accept constraints on the use of a portion of their respective water rights. These rules were specifically based upon current upstream project operations and river conditions, and the Districts' contribution to the EA. The Districts shall have no obligation to accept further constraints on the use of their respective water rights for these operational rules if the reservoir contents of Lake McConaughy are

subject to greater or more frequent fluctuations as a result of, or to accommodate, contributions to the EA from others. The Districts may take any dispute regarding additional constraints to the Governance Committee for resolution.

B. Very Wet Conditions

1. Very Wet conditions are defined as those circumstances when the total Lake McConaughy contents as of October 1, including the EA, plus the predicted Storable Natural Inflows from October 1 to March 31, exceed 2.1 million acre feet (maf^t).

~~2. Releases from Lake McConaughy in the non-irrigation season for diversion at the Keystone Diversion Dam should be at least 700 cfs and average at least 875 cfs.~~

~~3.2.~~ Non-irrigation season releases from Lake McConaughy shall supplement river flows and river gains to provide for a minimum diversion at the Central Diversion Dam of 1000 cfs and an average diversion of at least 1600 cfs from October 1 through November 15, a minimum diversion of 800 cfs and an average diversion of at least 1000 cfs from November 16 through February 14, and a minimum diversion of 1100 cfs and an average diversion of at least ~~1400-1700~~ cfs from February 15 through the beginning of irrigation season (use of surface water for irrigation below Lake McConaughy or Korty Diversion).

~~4. Requirements in Paragraphs III.B.2 and 3 are independent of each other and each must be met.~~

~~5.3.~~ There shall be no upper limit on outflows from Lake McConaughy other than meeting the standards of safety and beneficial use.

C. Wet Conditions

1. Wet conditions are defined as those circumstances when the total Lake McConaughy contents, including the EA, equal or exceed 1.50 maf as of October 1, or the total Lake McConaughy contents level as of October 1 plus the predicted Storable Natural Inflows from October 1 to March 31 is between 1.85 maf and 2.1 maf.

~~2. Releases from Lake McConaughy in the non-irrigation season for diversion at the Keystone Diversion Dam should be at least 700 cfs. If the October 1 lake level is less than 1.25 maf, diversions at the Keystone diversion in October may be at a reduced rate, but not less than 450 cfs.~~

~~3.2.~~ Non-irrigation season releases from Lake McConaughy shall supplement river flows and river gains to provide for a minimum diversion at the Central Diversion Dam of 900 cfs and an average diversion of at least 1200 cfs from October 1 through November 15, and a minimum diversion of 800 cfs and an average diversion of at least 1000 cfs from November 16 through February 14, and a minimum diversion of at least 1000 cfs and an average diversion of at least ~~1240~~ 1440 cfs from February 15 through the beginning of irrigation season.

~~4. Requirements in Paragraphs III.C.2 and 3 are independent of each other and each must be met.~~

~~5.3.~~ There shall be no upper limit on outflows from Lake McConaughy other than meeting the standards of safety and beneficial use.

~~6.4.~~ Releases should be managed to allow Lake McConaughy to fill to approximately 1.5 maf by March 31 and to fill to licensed or authorized capacity thereafter. Filling to less than 1.5 maf by March 31 will be permitted if inflows expected after that date would cause reservoir spills or flooding downstream. After consultation with the EA Manager by the Districts as described in Paragraph IV.4, releases for diversion at the Central Diversion Dam may be reduced to the rates required in transitional conditions (Paragraph III.D.~~32~~) if necessary to allow Lake McConaughy to fill as provided in this paragraph.

D. Transitional Conditions

1. Transitional conditions are defined as those circumstances that exist between wet and dry conditions as they are defined in this document.

~~2. Non-irrigation season releases from Lake McConaughy for diversion at the Keystone Diversion Dam should be at least 450 cfs and average no more than 900 cfs (exclusive of EA releases) except as otherwise permitted herein.~~

~~3.2.~~ Non-irrigation season releases from Lake McConaughy shall supplement river flows and river gains to provide for a minimum diversion at the Central Diversion Dam of 900 cfs and an average diversion of at least 1000 cfs from October 1 through November 15, and a minimum diversion of 800 cfs and an average diversion of at least 950 cfs from November 16 February 14, and a minimum of diversion of at least 850 cfs and an average diversion of at least 1100 cfs from February 15 through the beginning of irrigation season.

~~3. Requirements in Paragraphs III.D.2 and 3 are independent of each other and each must be met.~~

~~4.3.~~ There shall be no upper limit on outflows from Lake McConaughy

other than meeting the standards of safety and beneficial use.

~~5.4.~~ Releases should be managed to allow Lake McConaughy to fill to between 1.27 and 1.5 maf by March 31 with the goal to optimize reservoir storage taking into account whether the transition is from wet to dry or from dry to wet. After consultation with the EA Manager by the Districts as described in Paragraph IV.D, releases for diversion at the Central Diversion Dam may be reduced to the rates required in dry conditions (Paragraph III.E.32) if necessary to allow Lake McConaughy to fill as provided in this paragraph.

E. Dry Conditions

1. Dry conditions are defined as those circumstances when either the total Lake McConaughy contents, including the EA, as of October 1 plus the predicted Storable Natural Inflows from October 1 to March 31 is less than 1.55 maf, or the October 1 total Lake McConaughy content is less than 800 thousand acre-feet (kaf), but excluding those conditions defined as very dry in Paragraph III.F.1.

~~2. Non-irrigation season releases from Lake McConaughy for diversion at the Keystone Diversion Dam should average between 250 cfs and 700 cfs (exclusive of EA releases).~~

~~3.2.~~ Non-irrigation season releases from Lake McConaughy shall supplement river flows and river gains to provide a minimum diversion at the Central Diversion ~~Dam~~ Dam of 700 cfs and an average diversion of at least 900 cfs from October 15 through November 15, ~~and a minimum diversion of 700 cfs and an average diversion of at least 850 cfs from November 16 through February 14,~~ and a minimum diversion of at least 800 cfs and an average diversion of at least 960 cfs from ~~February~~ March 15 through the beginning of irrigation season.

~~4. Requirements in Paragraphs III.E.2 and 3 are independent of each other and each must be met.~~

3. There shall be no upper limit on outflows from Lake McConaughy other than meeting the standards of safety and beneficial use.

4. Releases should be managed to impound ~~between 250 kaf and 550~~ 400 kaf during the non-irrigation season with a goal to optimize reservoir storage. After consultation with the EA Manager by the Districts, releases for diversion at the Central Diversion Dam may be at rates less than the average but not below the minimums specified in Paragraph III.E.3-2 if necessary to allow Lake McConaughy to fill as provided in this paragraph.

F. Very Dry Conditions

1. Very dry conditions are defined as those circumstances when the total Lake McConaughy content, including the EA, as of October 1 is less than 650 kaf.

~~2. Non-irrigation season releases from Lake McConaughy for diversion at the Keystone Diversion Dam should average between 250 cfs and 700 cfs (exclusive of EA releases).~~

~~3.2.~~ Non-irrigation season releases ~~beyond those required in Paragraph III.F.2 above~~ shall be planned in consultation with the EA Manager and other customers to maximize multiple use of water and to share the effects of shortages. It is anticipated that irrigation season releases will be adjusted by the Districts and their customers consistent with existing policies and contracts to reduce water use to preserve future drought protection.

G. Compliance Measurement

~~1. Compliance with release requirements for diversion at the Keystone Diversion Dam shall be accomplished if the real time mean daily average or non-irrigation season average gauge readings meet or exceed the requirements.~~

~~2.1.~~ Central shall plan its operations to target mean daily flows at its diversion which meet or exceed minimum diversion requirements. In recognition of the distance involved and potential intervening factors affecting flows, compliance with release for minimum diversion requirements at the Central Diversion Dam shall be accomplished if either: 1) the real-time mean daily gauge reading less EA flows at that location meets or exceeds the required minimum minus 5 percent; or 2) the seven-day running average of the real-time mean daily gauge readings less EA flows meets or exceeds the required minimum. Compliance with releases for average diversion requirements at the Central Diversion Dam shall be accomplished within each period provided the average for the period of real-time mean daily gauge readings less EA flows conforms with the required average. Neither the seven-day running average nor the period average shall be calculated including any day during which the operational rules were suspended pursuant to Paragraph III.A.7.

~~3.2.~~ Details of measurement and accounting protocols to verify compliance will be developed by the Districts, the EAC and NEDWR.

IV. COORDINATING RESERVOIR MANAGEMENT

A. A Reservoir Coordination Committee ("RCC") shall be established to provide a forum to coordinate annual operation plans. This committee shall consist of one representative each from Central, NPPD, the EA Manager, BOR, Colorado, Wyoming and NEDWR. The RCC will coordinate operations plans and review reservoir accounting, inflow projections, storage and release goals and river monitoring methodologies.

B. The RCC shall meet at least annually and as often thereafter during the water year as is necessary to coordinate Central's and NPPD's water operations with the EA Manager's operation of the EA.

C. The RCC is for coordination purposes only. The Districts and the EA Manager retain the authority to develop their individual operations plans.

D. Central, as the operator of Lake McConaughy, and NPPD as the operator of the Sutherland project, shall communicate with the EA Manager in the manner the Districts communicate with other water users to facilitate effective day to day coordination. Central, NPPD and the EA Manager shall communicate as necessary to effectively coordinate their respective plans as they are implemented. The EA Manager shall be informed and provided background data if the Districts conclude it is appropriate to change the designation of the type of year before the plan is changed and related changes are made in required releases for diversion. The EA Manager also shall be informed as expeditiously as possible under the circumstances, should contingencies arise such as those described in Paragraphs II.C.2.a and b and Paragraph III.A.7. Increases or decreases in releases of operational flows or the EA shall be coordinated to ensure impacts to the hydraulic systems are minimized and beneficial uses maximized.



PRRIP NCCW Memo – Attachment 2



TO: PRRIP GOVERNANCE COMMITTEE (GC)
FROM: PRRIP EXECUTIVE DIRECTOR'S OFFICE (EDO)
SUBJECT: PRELIMINARY IMPACTS ASSESSMENT FOR PROPOSED WAIVER OF NON-IRRIGATION SEASON RELEASE REQUIREMENTS
DATE: SEPTEMBER 2, 2022

The technical analysis described herein is based on modeling completed by CNPPID in May 2022 and the proposed changes to non-irrigation season flow release requirements that were current at that time. Attachment 1 includes the most recent proposed changes as of early August 2022, which are slightly different, and thus this analysis is not entirely up to date. However, it still provides a reasonable assessment of the timing and magnitudes of anticipated changes to flow at Grand Island and related river conditions.

I. INTRODUCTION

The Platte River Recovery Implementation Program (PRRIP or Program) is engaged in negotiations with CNPPID to acquire water previously evaluated as a potential Water Action Plan (WAP) project referred to as Net Controllable Conserved Water (NCCW).¹ NCCW was made available through the implementation of conservation projects within the CNPPID irrigation system as part of a 1992 settlement between CNPPID and the National Wildlife Federation. The proposed acquisition would be for an annual volume of 10,586 acre-feet (AF) that would be credited to the Lake McConaughy Environmental Account (EA) each year through the end of the Program's First Increment Extension in 2032. This would increase the highly valuable controllable water supply available to be used for Program purposes, including flow releases necessary to meet Science Plan objectives.

Exhibit X of CNPPID's FERC license specifies non-irrigation season flow release requirements that vary by date and type of water year.² As a condition of a potential new NCCW Agreement, CNPPID is proposing to modify or eliminate some of these flow release requirements.³ If the non-irrigation season flow release requirements were modified or eliminated as proposed by CNPPID, more water could be retained in Lake McConaughy to ensure that the 10,586 AF of NCCW is available for leasing to the Program each year through the end of the First Increment Extension. At the request of the U.S. Fish and Wildlife Service (USFWS), CNPPID and the Program's Executive Director's Office (EDO) have completed preliminary analyses to estimate the potential changes to Platte River flows and associated river conditions. Methods and results of these preliminary analyses are presented in the following sections.

II. ANALYSIS

CNPPID developed a spreadsheet model to estimate changes in flow at the Tri-County Supply Canal diversion and the J2 Return that would result from the proposed changes to non-irrigation season flow release requirements. The model conservatively represents a worst-case scenario in which no water was released from Lake McConaughy except for limited periods in which the flow release requirements

¹ After several years of analysis and negotiation, the GC declined a high-dollar lump sum offer from CNPPID to purchase NCCW in December 2013 ([Meeting Minutes](#), at line 359). Per an offer submitted by CNPPID on September 5, 2013, the proposal was for a maximum of 10,586 AF each year but could be reduced at CNPPID's discretion if it was determined to be "hydrologically justified."

² Exhibit X defines Very Wet, Wet, Transitional, Dry, and Very Dry Conditions based on October 1 storage in Lake McConaughy and predicted Storable Natural Inflows between October 1 and March 31.

³ Paragraph (D) on page 11 of CNPPID's FERC license for Project No. 1417 stipulates how revisions to Exhibit X can be made.



are retained (e.g., February 15 through the start of irrigation season in dry years), and no water was routed through NPPD's Sutherland Canal system.

CNPPID's modeled diversions are otherwise entirely dependent on natural flows from the South Platte and North Platte rivers; historical outflows from the Sutherland Power Return were excluded. If the available water supply on a given day was less than the historical diversion, the diversion was reduced accordingly. The difference in the diversion was then reduced by 10 percent to account for transit losses and applied to the historical J2 Return outflow on the same day to get an adjusted J2 Return flow. Lag time was not applied between the diversion and J2 Return because it would not alter the net volumetric flow change over the non-irrigation season of a particular water year.

The EDO routed the modeled flow changes from the J2 Return to the Platte River near Grand Island gage. **Table 1** identifies the dry and very dry years that were included in the analysis, in which temporary waivers were granted by FERC or likely would have been if requested.⁴

Table 1. Years Modeled for Potential Changes Due to Flow Waivers.

Scenario	Years Included in Analysis
Waiver Requested and Granted	2005, 2006, 2007, 2008, 2009, 2014, 2015
Waiver Likely, if Requested	2002, 2003, 2004, 2013, 2021, 2022

⁴ CNPPID's model only makes non-irrigation season flow releases as needed to meet required diversion rates at the Tri-County Canal headgates. This analysis focuses only on dry and very dry years because CNPPID's model better reflects actual operations under those conditions, with just enough water being released to satisfy the required diversions. The model does not accurately capture wet year operations because CNPPID would typically release more than was required in order to avoid a fill-and-spill situation.



Figure 1 provides a representative example of daily historical vs modified (“waiver scenario”) flows at the Tri-County Canal diversion, the J2 Return, and Grand Island flows using October 1-April 30 of WY 2008.

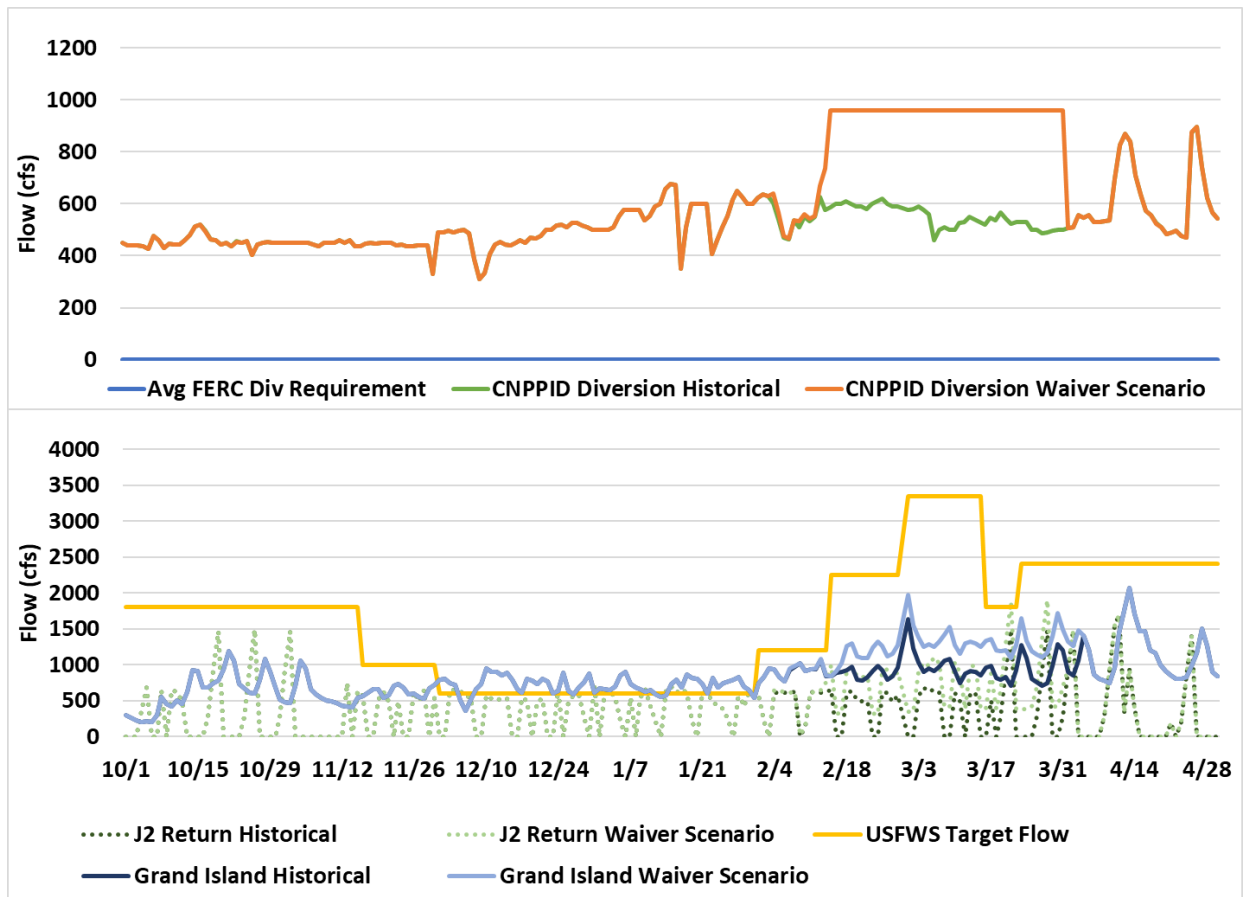


Figure 1. 2008 Non-Irrigation Season Historical vs Flow Waiver Scenario.

Figure 1 clearly shows the effect of the proposed modification of requirements in Section III.E of Exhibit X to emphasize release requirements from February 15 through the start of irrigation season (generally early- to mid-April) in dry years. This effect was also seen in model results for WY 2003, 2004, 2006, and 2009.

A. Flow, Stage, and Wetted Width

Of particular interest to the Program are changes to the river during the spring whooping crane migration period (March 6-April 29). **Figure 2** illustrates median flow at Grand Island during the spring migration, with most years showing increases or only modest decreases. An exception is 2015, in which historical diversions were well above the proposed requirements starting in mid-November and continuing through the rest of the non-irrigation season. These diversions were reduced (but still exceeded the requirement) during most of February and March in the waiver scenario modeling, resulting in the median flow reduction of 350 cfs at Grand Island during the spring migration. **Table 2** provides historical vs waiver scenario comparisons of Grand Island flow across a range of percentiles for the full October 1-April 30 period.

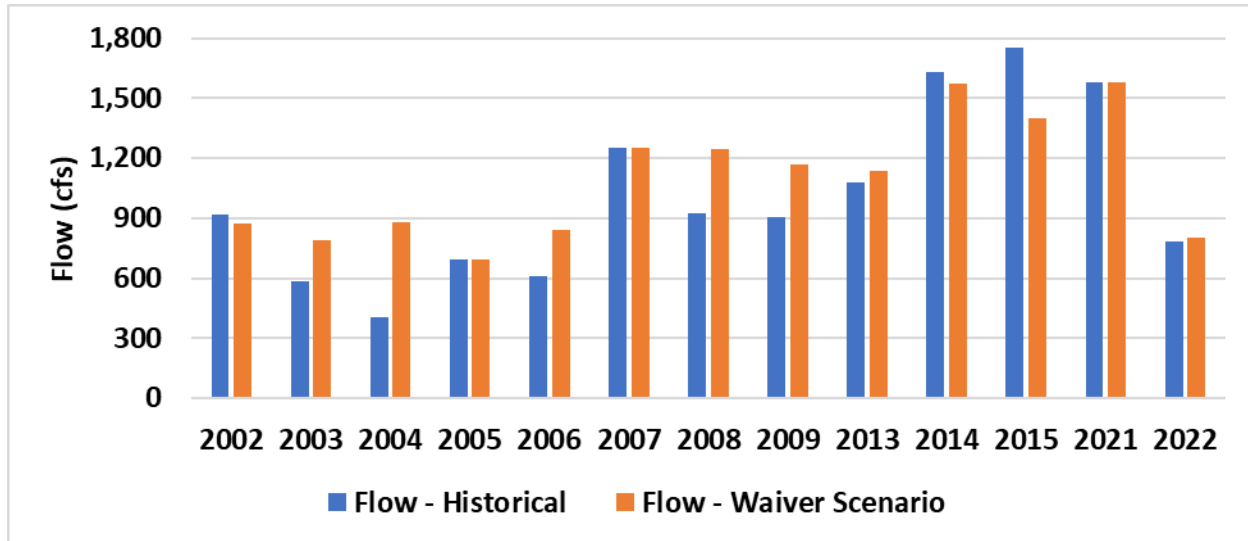


Figure 2. Platte River near Grand Island, Median Flow During Spring Migration Period.

Table 2. Grand Island Flow (cfs) Percentiles, Historical vs Waiver, October 1-April 30.

%tile	Scenario	Water Year												
		2002	2003	2004	2005	2006	2007	2008	2009	2013	2014	2015	2021	2022
5 th	Historical	428	162	0	25	108	243	428	361	65	480	370	388	303
	Waiver	221	104	0	24	103	243	428	361	57	480	529	337	282
25 th	Historical	680	430	161	380	327	450	654	773	335	884	999	815	538
	Waiver	506	375	150	362	323	450	654	863	272	840	970	625	526
50 th	Historical	1,095	564	436	552	483	646	793	956	634	1,180	1,690	1,060	900
	Waiver	796	547	394	532	491	646	809	1,090	603	1,175	1,419	886	833
75 th	Historical	1,383	800	677	677	668	1,170	919	1,343	1,063	1,793	2,010	1,505	1,110
	Waiver	1,056	796	780	653	799	1,170	1,145	1,380	957	1,743	1,884	1,471	1,070
95 th	Historical	1,715	1,054	1,040	847	892	3,390	1,264	2,165	2,259	2,880	2,972	2,846	1,935
	Waiver	1,580	1,158	1,308	840	1,096	3,390	1,482	2,165	2,259	2,920	2,559	2,580	1,960

River stage at Grand Island and the average Associated Habitat Reach (AHR) main channel wetted width are both derived from Grand Island flow and therefore exhibit similar patterns in the historical vs waiver scenario comparisons. **Figure 3** illustrates median stage during the spring whooping crane migration, and **Table 3** provides comparative stages for different percentiles for the October 1-April 30 period. **Figure 4** and **Table 4** provide the same respective information for average AHR main channel wetted width. Because the Platte River is so wide and shallow, changes in flow during the non-irrigation season appear to have fairly limited impact on the magnitudes of stage and wetted width.

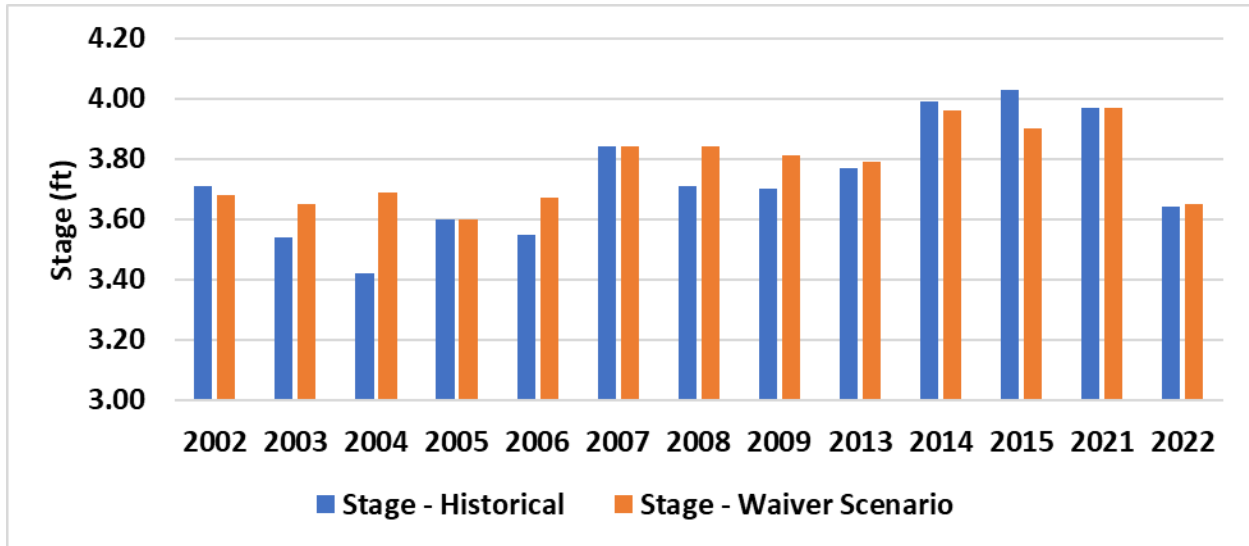


Figure 3. Platte River near Grand Island, Median Stage During Spring Migration Period.

Table 3. Grand Island Stage (ft) Percentiles, Historical vs Waiver, October 1-April 30.

%tile	Scenario	Water Year												
		2002	2003	2004	2005	2006	2007	2008	2009	2013	2014	2015	2021	2022
5 th	Historical	3.44	3.19	0.00	2.89	3.11	3.29	3.44	3.39	3.02	3.47	3.40	3.41	3.35
	Waiver	3.26	3.10	0.00	2.88	3.10	3.29	3.44	3.39	3.00	3.47	3.50	3.37	3.32
25 th	Historical	3.59	3.44	3.19	3.40	3.36	3.45	3.58	3.64	3.37	3.69	3.74	3.66	3.51
	Waiver	3.49	3.40	3.18	3.39	3.36	3.45	3.58	3.68	3.31	3.67	3.73	3.56	3.50
50 th	Historical	3.78	3.53	3.44	3.52	3.47	3.57	3.65	3.72	3.57	3.81	4.01	3.76	3.70
	Waiver	3.65	3.52	3.41	3.51	3.48	3.57	3.65	3.78	3.55	3.81	3.90	3.69	3.67
75 th	Historical	3.89	3.65	3.59	3.59	3.58	3.81	3.70	3.87	3.76	4.05	4.13	3.94	3.78
	Waiver	3.76	3.65	3.64	3.58	3.65	3.81	3.80	3.89	3.72	4.03	4.08	3.92	3.77
95 th	Historical	4.02	3.76	3.76	3.67	3.69	4.56	3.84	4.18	4.21	4.41	4.44	4.40	4.10
	Waiver	3.96	3.80	3.86	3.67	3.77	4.56	3.92	4.18	4.21	4.42	4.31	4.32	4.11



Figure 4. Platte River Associated Habitat Reach, Median Main Channel Wetted Width During Spring Migration Period.

Table 4. AHR Wetted Width (ft) Percentiles, Historical vs Waiver, October 1-April 30.

%tile	Scenario	Water Year												
		2002	2003	2004	2005	2006	2007	2008	2009	2013	2014	2015	2021	2022
5 th	Historical	568	240	0	32	158	353	568	507	90	603	517	532	443
	Waiver	323	150	0	23	150	353	568	507	75	603	623	480	413
25 th	Historical	657	571	240	528	470	583	651	674	478	686	700	678	625
	Waiver	618	518	225	510	468	583	651	684	405	681	697	645	624
50 th	Historical	707	630	571	630	606	649	675	695	646	713	735	704	688
	Waiver	675	625	540	625	613	649	678	706	641	712	726	686	681
75 th	Historical	724	678	657	653	653	711	689	721	704	739	748	732	708
	Waiver	704	676	675	651	676	711	710	724	695	739	742	729	704
95 th	Historical	739	703	702	682	688	777	718	751	753	767	769	767	745
	Waiver	732	711	721	681	707	777	729	751	753	769	762	762	745

B. Excesses and Shortages

Changes to excesses and shortages relative to U.S. Fish and Wildlife Service (USFWS) target flows during the non-irrigation season are also of interest because of potential impacts to Program water projects, including recharge projects that divert from the central Platte River in Nebraska and the South Platte River in northeastern Colorado. Figure 5 provides a conceptual illustration of excesses (Grand Island flow > USFWS target flow) and shortages (Grand Island flow < USFWS target flow) using historical data from WY 2015.

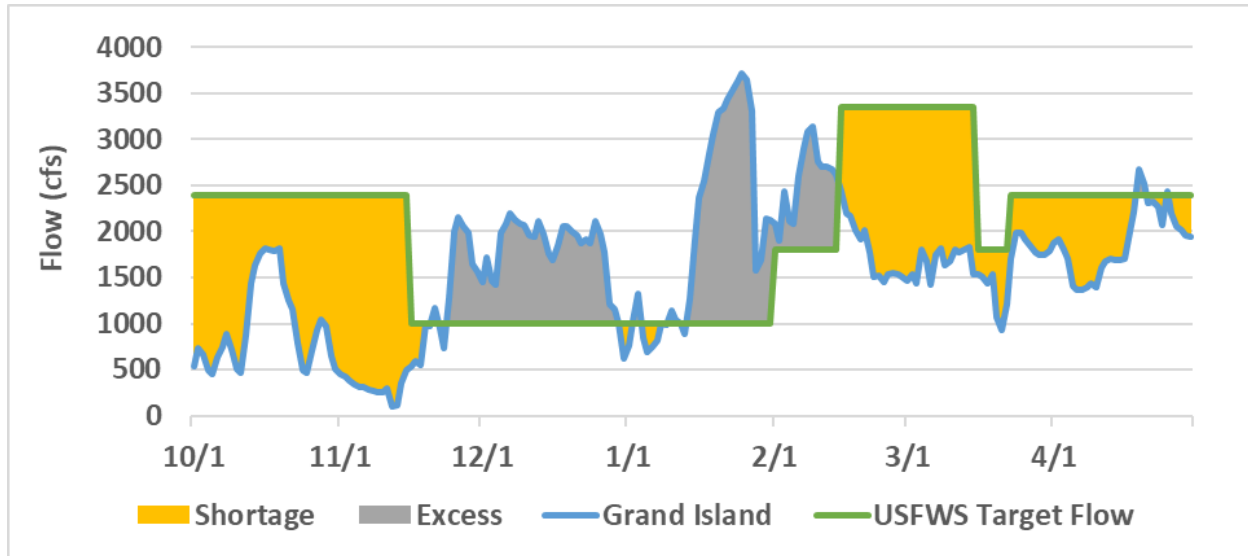


Figure 5. Conceptual Illustration of Excesses and Shortages at Grand Island.

All years evaluated were characterized as dry or very dry based on October 1 storage in Lake McConaughy. As such it is important to recognize that these years would be expected to have lower availability of excess flows compared to wet or normal/transitional years such as 2011 or the 2016-2019 period. Conversely, these dry and very dry years would be expected to have much greater frequency and volume of shortages or deficits to USFWS target flows at Grand Island. This is not an inherently bad thing for Program water project operations. While limited excess availability certainly does preclude the diversion of new water into recharge projects, the greater prevalence of shortages allows the Program to take credit for more shortage reductions from the ongoing accretions (or recapture pumping) from recharge that occurred in wetter years.

a. Excesses

The EDO compared historical and waiver scenario average daily Grand Island flows to USFWS target flows as determined by the real-time hydrologic condition for the December-March period of the dry and very dry years specified in Table 1. These are the non-irrigation season months in which excess flows and recharge diversions are most likely to occur. Both the frequency of excesses (number of days Grand Island flow > target) and volume of excesses (Grand Island flow > target, converted to AF) were evaluated to determine potential impacts to Program recharge projects.

Any day in which Grand Island flow exceeds the USFWS target flow is assumed for this analysis to have excesses, but this likely does not reflect winter operational realities. During periods with just a few intermittent excess days it is generally not practical to open canal headgates to divert for recharge. It is also the case that the Grand Island gage is frequently subject to ice conditions during the winter, and what may appear as an excess day based on subsequent USGS flow estimates was not possible to know in real time.



Figure 6 shows the comparison of excess days for the December 1-March 31 period in each of the water years that were modeled. In most years, nearly all of these excess days occurred in December and January. **Figure 7** provides a comparison of excess flow volumes, which in most of the years analyzed totaled well under 20,000 AF for the December-March months.

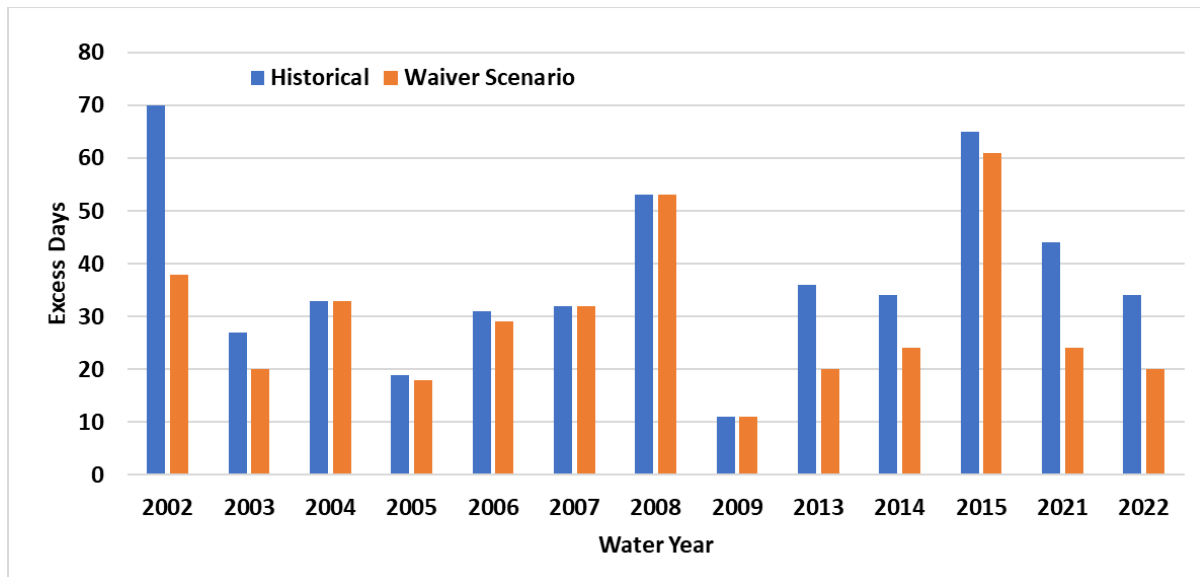


Figure 6. Excess Days, December 1-March 31.

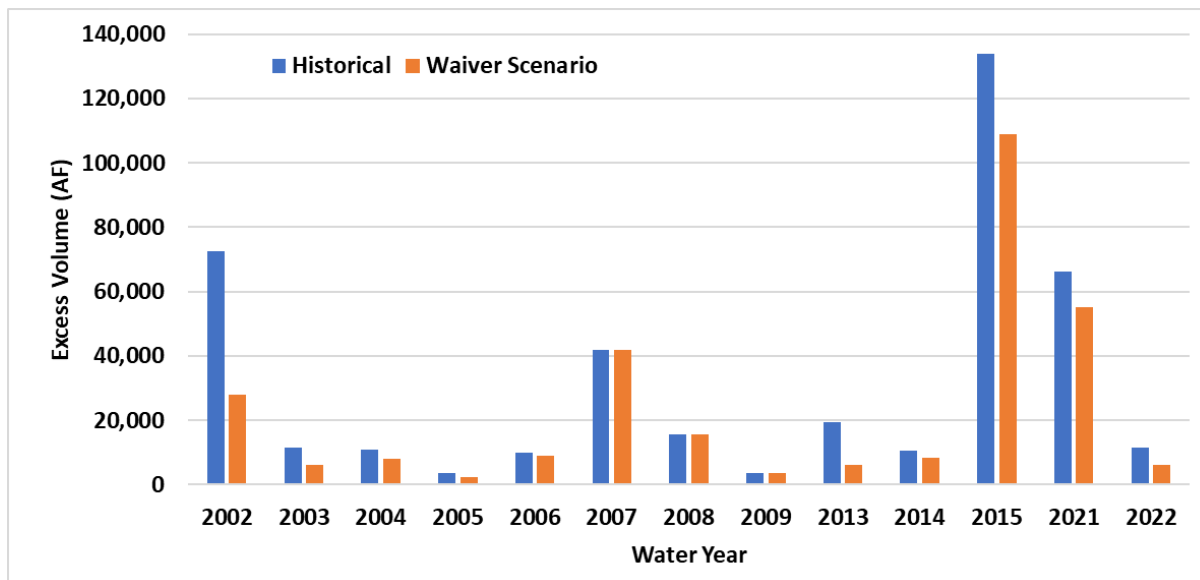


Figure 7. Excess Volume, December 1-March 31.

Comparison of excess flows under the historical and waiver scenarios at Grand Island indicates the following:

- The analysis suggests large impacts to both excess days and excess volume in WY 2002 but given the many subsequent changes to hydrology and operations in the Platte Basin, it is reasonable to not draw specific conclusions from the model results for that transitional year and WY 2003.



- The waiver scenario would have caused minimal reductions in excesses during WY 2004-2009, likely because the historical record already reflects operations with the temporary waivers of non-irrigation season release requirements in most of those years.
- The modeling indicates reductions of 10 or more excess days in WY 2013-2014 and a reduction of nearly 25,000 AF of excess volume in WY 2015. As raw numbers these suggest some amount of decline in excesses available for Program recharge projects, but the unique context for real-time operations in each of those years suggests these changes likely would not have detrimentally impacted Program recharge operations.
- Results suggest that the waiver scenario may have reduced some of the excesses available for Program recharge projects in WY 2021-2022. However, flows estimated later by USGS suggest many more days of excess than there actually were because of real time ice conditions at the Grand Island

Although the waiver scenario appears to have the potential to cause some reductions to winter excesses available to Program recharge projects under certain conditions, the addition of 10,586 AF of fully controllable water supply to the Lake McConaughy EA each year through the First Increment Extension would offset any loss of supply to recharge projects over which the Program has only limited control.

b. Shortages

Shortages to USFWS target flows are essentially the opposite of excesses and occur on any day that the average daily flow at Grand Island is less than the target flow. **Figure 8** shows the frequency of shortages for the entire October 1-April 30 period that was evaluated, and **Figure 9** shows the volume of shortages for the same period.

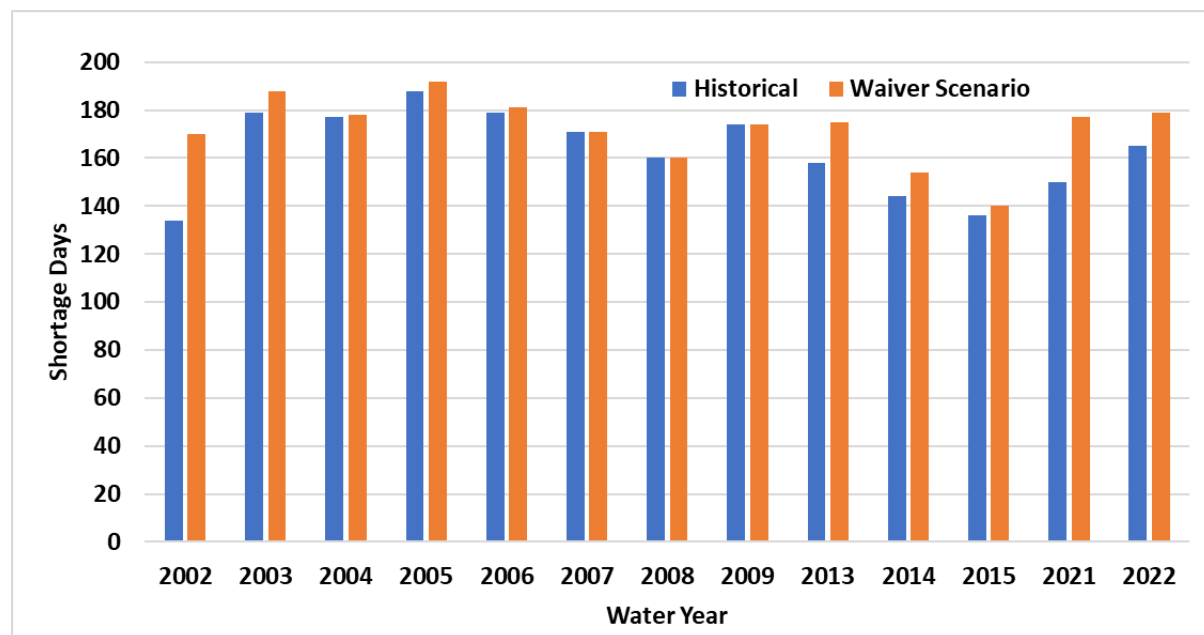


Figure 8. Shortage Days, October 1-April 30.

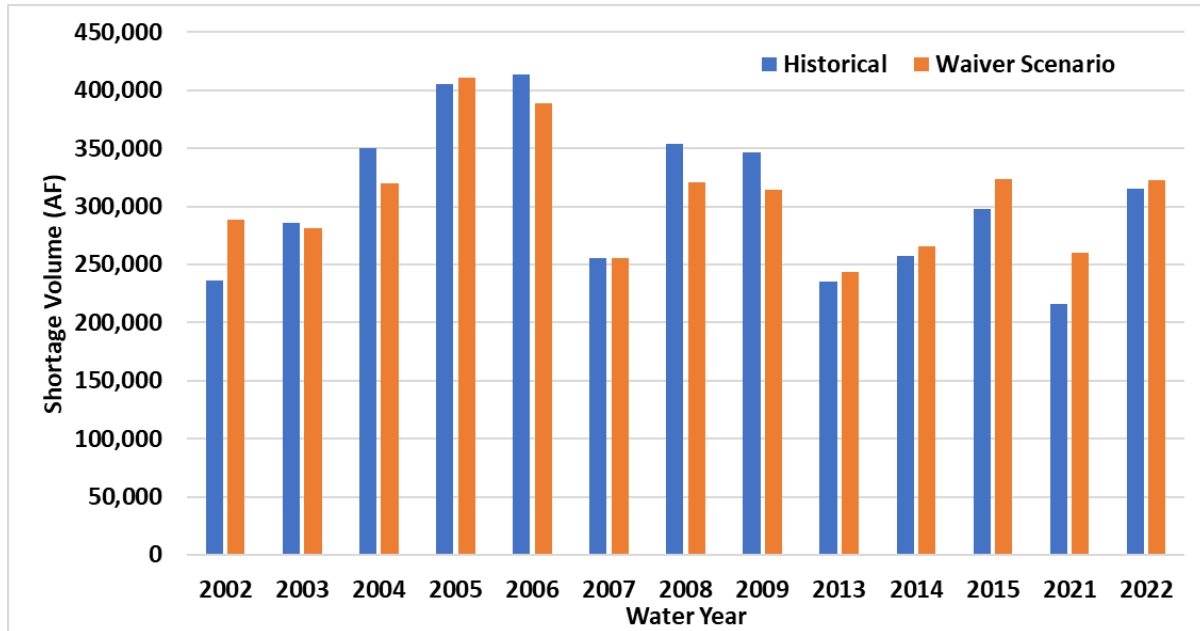


Figure 9. Shortage Volume, October 1-April 30.

For both the historical and waiver scenarios, October 1-April 30 shortage frequency ranges from about 130 to 190 days, and the shortage volume ranges from about 215,000 AF to 415,000 AF. Except for WY 2015, these shortage volumes are generally an order of magnitude greater than available excesses. However, in several years (e.g., 2003-2004, 2006, 2008-2009) the frequency of shortages under the waiver scenario changes very little, but the shortage volumes actually decline somewhat owing to the proposed dry year flow requirements from mid-February through the start of irrigation in April.