

# Platte River Recovery Implementation Program

## Initial State Project - Nebraska

### Lake McConaughy Environmental Account Storable Natural Inflow

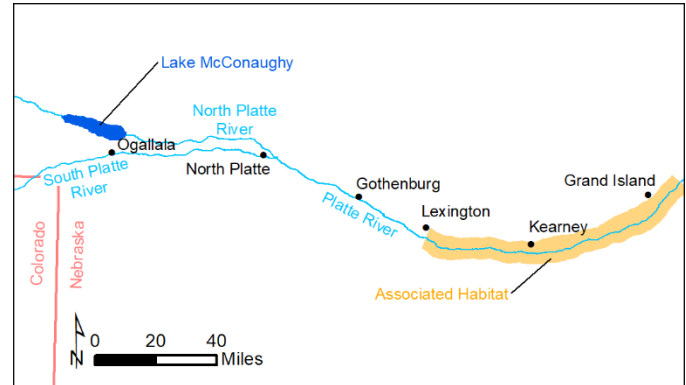
*Source:* Appropriated water *Score:* ~50,000 AFY *Operations started:* 2007 *Mechanism:* Storage

#### History

The Lake McConaughy Environmental Account (EA) was established pursuant to 1998 Federal Energy Regulatory Commission (FERC) relicensing requirements for the Central Nebraska Public Power and Irrigation District (CNPPID) and Nebraska Public Power District (NPPD) and is one of the Program's three initial state projects. The EA itself is comprised of 200,000 AF of storage capacity within Lake McConaughy. Ten percent (10%) of Storable Natural Inflows (SNI) that flow into Lake McConaughy outside of the irrigation season (October through April) are credited to the EA up to an annual limit of 100,000 AF.

If Lake McConaughy fills to regulatory capacity (as defined by FERC's dam safety requirements), the EA is "reset" to 100,000 AF. If less than 100,000 AF is stored in the EA in a given water year, CNPPID and NPPD contribute the volume of water necessary to increase the EA to 100,000 AF, regardless of the volume of releases that have already occurred that year. If more than 100,000 AF is stored in the EA and the reservoir is at regulatory capacity, all "excess" EA water is lost, regardless of its original source.

Water stored in the EA is subject to evaporation and seepage losses. Total reservoir losses are calculated monthly and the proportional amount of the losses are deducted from the EA. For example, if the EA constitutes 10% of the water stored in Lake McConaughy, 10% of the total monthly losses will be deducted from the EA.



#### Operations

A U.S. Fish and Wildlife Service (USFWS) employee designated as the EA Manager has the authority to request releases from the EA to reduce deficits to target flows or achieve other USFWS or Program objectives. The EA Manager is supported by an Environmental Account Committee (EAC) and Reservoir Coordinating Committee (RCC) that provide input and coordinate annual EA operations with other water projects in the basin.

#### Yield and Score

SNI contributions to the EA averaged 42,300 AFY during the period of 2007 – 2017. On average, 9,700 AFY of SNI were lost annually due to seepage and evaporation resulting in an average net yield of 32,500 AFY in Lake McConaughy. Annual SNI, evaporation and seepage losses and net yields are presented in Table 1.

The Lake McConaughy EA and Pathfinder EA were two of the three initial state projects. Pathfinder EA releases are delivered to Lake McConaughy, credited to the Lake McConaughy EA and no longer tracked independently. The Pathfinder EA and Lake McConaughy EA were given a combined score of 70,000 AFY. It is estimated that about 50,000 AFY of that total is attributable to the SNI contributions to the Lake McConaughy EA.

#### Financials

The SNI component of the Lake McConaughy EA is an in-kind water contribution to the Program from the State of Nebraska. Accordingly, the Program does not pay for annual SNI accruals.



Lake McConaughy near Outlet, May 2018



# Platte River Recovery Implementation Program

Initial State Project - Nebraska

**Table 1: Lake McConaughy EA Storable Natural Inflows (SNI) Yields**

| Year of Operation | SNI in EA (AFY) <sup>1</sup> | SNI Evaporation and Seepage Losses in EA (AFY) <sup>2</sup> | Net SNI Yield in EA (AFY) <sup>3</sup> |
|-------------------|------------------------------|---|--|
| 2007              | 34,500                       | 17,300  | 17,200                                 |
| 2008              | 37,400                       | 17,700  | 19,700                                 |
| 2009              | 39,700                       | 9,200   | 30,500                                 |
| 2010              | 37,500                       | 8,900   | 28,600                                 |
| 2011              | 27,200                       | 2,300   | 24,900                                 |
| 2012              | 43,800                       | 11,100  | 32,700                                 |
| 2013              | 39,600                       | 5,400   | 34,200                                 |
| 2014              | 45,000                       | 6,400   | 38,600                                 |
| 2015              | 49,300                       | 9,300   | 40,000                                 |
| 2016              | 53,700                       | 11,700  | 42,000                                 |
| 2017              | 57,100                       | 7,500   | 49,600                                 |
| <b>Total</b>      | <b>464,800</b>               | <b>106,800</b>  | <b>358,000</b>                         |
| <b>Average</b>    | <b>42,300</b>                | <b>9,700</b>  | <b>32,500</b>                          |

<sup>1</sup> Amount of storable natural inflow available to the Lake McConaughy EA during the months of October through April. This is ten percent of the Lake McConaughy SNI.

<sup>2</sup> Amount of SNI loss in the EA attributed to evaporation and seepage losses.

<sup>3</sup> Net yield in the EA from Lake McConaughy SNI accounting for evaporation and seepage losses.

Note: This table is based on the best available accounting to date. Minor modifications may be made in the future.



Lake McConaughy, May 2015



**DRAFT** - September 2018

# Platte River Recovery Implementation Program

## Water Action Plan Project

### Net Controllable Conserved Water

*Source:* Conserved water *Score:* 260 AFY *Operations started:* 2001 *Mechanism:* Storage

#### History

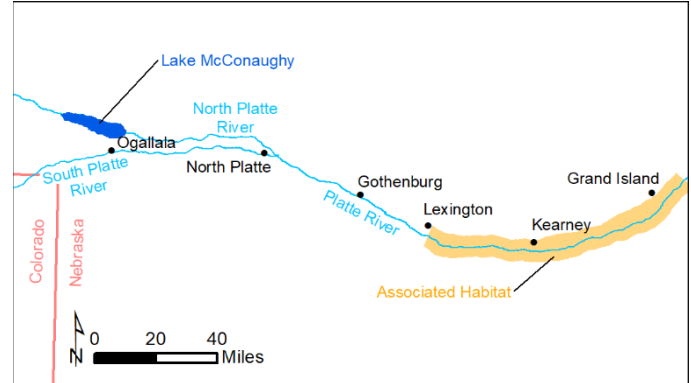
Net Controllable Conserved Water (NCCW) in Lake McConaughy was made available through the implementation of conservation projects in compliance with a 1992 settlement agreement between the Central Nebraska Public Power Irrigation District (CNPPID) and the National Wildlife Federation (NWF). The project concept was defined in the 1997 Cooperative Agreement and a portion of the NCCW yield made available through U.S. Bureau of Reclamation (USBR) funding was recognized as a Water Action Plan project with the inception of the Program in 2007.

#### Operations

The NCCW resulted from the following conservation measures implemented in the CNPPID system:

- Canal distribution and delivery improvements such as installation of pipelines, canal compaction, canal lining, structure automation, etc.
- On-farm efficiency improvements including installation of center pivots and flow meters, modification of irrigation schedules, etc.
- Operational adjustments to Elwood Reservoir to minimize seepage losses.

These measures have reduced irrigation water demands downstream of Lake McConaughy. As a result, water that would have been released from Lake McConaughy



before the conservation measures now remains stored in the reservoir. Each year, the CNPPID makes a request to the Nebraska Department of Natural Resources (DNR) to add water saved through the NCCW project to the Lake McConaughy Environmental Account (EA) on October 1. This water is credited to the Program on an annual basis.

#### Yield and Score

Since 2007, a yield of 314 AFY has been credited to the Program in the Lake McConaughy EA on October 1 of most years, shown in Table 1. Per the terms of the CNPPID's 1998 Federal Energy Regulatory Commission (FERC) license, the NCCW project list was reviewed periodically to determine any new, modified, or replaced conservation measures that would result in a change in the water savings or costs. The validity of the assumptions used to estimate the water savings were also reviewed. In successive reviews, the annual yield estimate was consistently 314 AFY. Based on the Program's scoring analysis methodologies, the project is credited with a score of 260 AFY at Grand Island.

#### Financials

Per Article 402 of the CNPPID's 1998 FERC license for the Kingsley Dam Project, the volume of NCCW water resulting from conservation projects partially funded by the USBR (314 AF) is to be added to the Lake McConaughy EA each year at no cost to the Program.



Supply Canal Diversion Dam





# Platte River Recovery Implementation Program

## Water Action Plan Project

**Table 1: NCCW Yields**

| Year | Project Yield Credited to Lake McConaughy EA (AF) |
|------|---|
| 2007 | 314   |
| 2008 | 314   |
| 2009 | 314   |
| 2010 | 0   |
| 2011 | 0   |
| 2012 | 314   |
| 2013 | 314   |
| 2014 | 314   |
| 2015 | 314   |
| 2016 | 314   |
| 2017 | 314   |

Note: This table is based on the best available accounting data to date. Minor modifications may be made in the future.



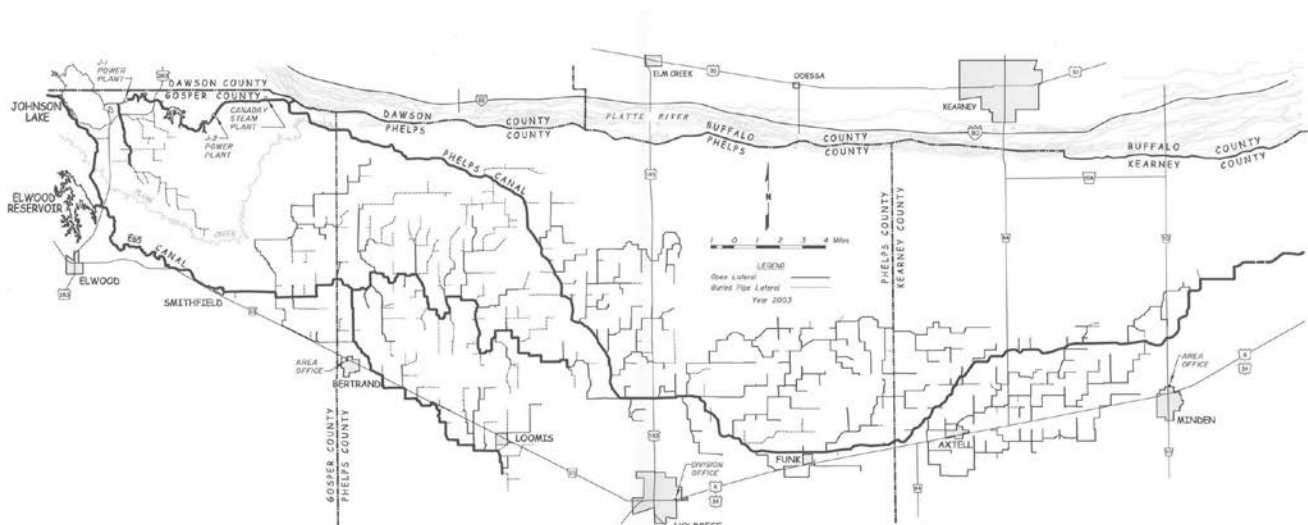
**Center Pivot Irrigation (credit: cropwatch.unl.edu)**



**Lake McConaughy Outlet Tower and Emergency Spillway, May 2018**



**Gates at J2 Return**



**CNPPID Irrigated Area (credit: cnppid.com)**



# Platte River Recovery Implementation Program

## Water Action Plan Project

### Phelps County Canal Groundwater Recharge and Cook Recapture Well

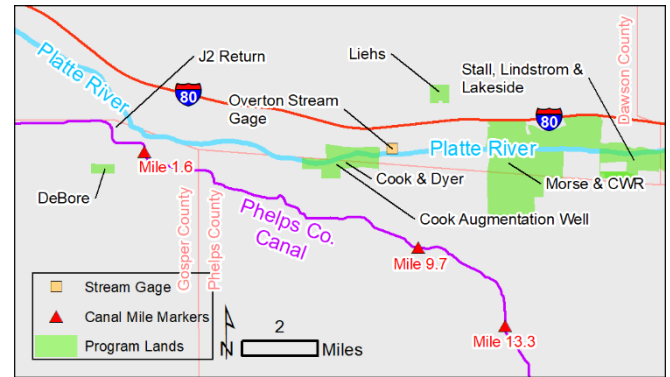
*Source:* Excess flows *Score:* 2,700 AFY (Phelps), 160 AFY (Cook) *Operations started:* 2012 (Phelps), 2016 (Cook) *Mechanism:* Recharge & retiming

#### History

The Phelps County Canal is owned and operated by the Central Nebraska Public Power Irrigation District (CNPPID), delivering water to customers in Phelps and Kearney counties. Following extensive feasibility assessment, the Phelps County Canal Groundwater Recharge Project began pilot-scale operations during the 2011-2012 non-irrigation season from mid-September to mid-April. The project was expanded starting with recharge operations during the 2012-2013 non-irrigation season. In 2015, the Program constructed a well on the Cook tract to recapture a portion of return flows recharged through the Phelps County Canal. Well operations began in 2016.

#### Operations

The Phelps County Canal recharge project utilizes divertible flows in excess of U.S. Fish and Wildlife Service (USFWS) targets (excess flows) during the non-irrigation season. The CNPPID delivers excess flows into the canal and a check structure at Mile Post 13.3 which allows water levels to be maintained for recharge into the underlying aquifer. The recharged groundwater slowly moves towards the Platte River, resulting in long-term river accretions. Deliveries for recharge are measured by the CNPPID at the flume located at Mile Post 1.6. The CNPPID obtains temporary annual permits from Nebraska Department of Natural Resources (DNR) to divert up to 600 cfs of excess flows for recharge operations in Phelps Canal during the non-irrigation season. The Program has entered temporary water service agreements with the CNPPID to facilitate



operations in which the Program receives between 50% and 75% of annual recharge. The Cook Well increases the project's short-term yield and efficiency by recapturing a portion of the return flows from recharge operations in the Phelps County Canal recharge project. When there are shortages to USFWS target flows, the well is turned on and delivers water directly through a drain to the river upstream of the Overton bridge. The well operates from March through November.

#### Yield and Score

Total recharge through the Phelps County Canal from 2012-2017 is estimated to be 22,400 AF, with an annual average of 3,700 AF. Lagged accretions returning to the river averaged 3,100 AFY, of which averages of 2,600 AFY reached Grand Island and 1,300 AFY contributed to reduction of deficits to USFWS target flows. The annual recharge and yield are provided in Table 1. Based on the Program's scoring analysis methodologies, the Phelps County Groundwater Recharge and Cook Well projects are credited scores of 2,700 AFY and 160 AFY, respectively.

#### Financials

CNPPID charges the Program by volume of deliveries to the Phelps County Canal for Program recharge. The unit cost of water delivered through the Mile Post 1.6 flume began at \$25 per AF in 2011. This rate has generally increased annually, per the temporary service agreements between CNPPID and the Program. The current service agreement specifies a maximum rate of \$31.91 per AF by the end of the First Increment in 2019 based on a rate increase of 3% each year.



Phelps County Canal





# Platte River Recovery Implementation Program

## Water Action Plan Project

**Table 1: Phelps County Recharge and Cook Well Projects Yields**

| Year of Operation | Amount Recharged <sup>1</sup> (AFY) | Cook Well Pumping <sup>2</sup> (AFY) | Lagged Accretions <sup>3</sup> (AFY) | Yield at Grand Island <sup>4</sup> (AFY) | Deficit Reductions to Target Flows <sup>5</sup> (AFY) |
|-------------------|-------------------------------------|--------------------------------------|--------------------------------------|--|---|
| 2012              | 1,900                               | 0                                    | 1,800                                | 1,400                                    | 900   |
| 2013              | 5,000                               | 0                                    | 3,400                                | 2,600                                    | 1,800   |
| 2014              | 1,300                               | 0                                    | 2,100                                | 1,800                                    | 1,300   |
| 2015              | 4,000                               | 0                                    | 2,600                                | 2,300                                    | 900   |
| 2016              | 6,000                               | 100                                  | 4,200                                | 3,800                                    | 1,200   |
| 2017              | 4,100                               | 200                                  | 4,300                                | 3,500                                    | 1,900   |
| <b>Total</b>      | <b>22,400</b>                       | <b>300</b>                           | <b>18,500</b>                        | <b>15,400</b>                            | <b>8,000</b>  |
| <b>Average</b>    | <b>3,700</b>                        | <b>150</b>                           | <b>3,100</b>                         | <b>2,600</b>                             | <b>1,300</b>  |

<sup>1</sup> Estimated amount recharged into the aquifer delivered by CNPPID.

<sup>2</sup> The calculated average for Cook Well Pumping reflects only two years of operations.

<sup>3</sup> Amount accreting to the river as the recharge slowly moves in the aquifer to the river in addition to amount recaptured by Cook well. A portion of recharge reaches the river as lagged accretions within the same year of

<sup>4</sup> Accounts for transit losses between the location of river accretions and Cook Well returns to Grand Island.

<sup>5</sup> Calculated using real time hydrologic conditions.

Note: This table is based on the best available accounting data to date. Minor modifications may be made in the future.



Phelps County Canal



Phelps County Canal



Cook Well



# Platte River Recovery Implementation Program

## Initial State Project - Wyoming

### Pathfinder Environmental Account

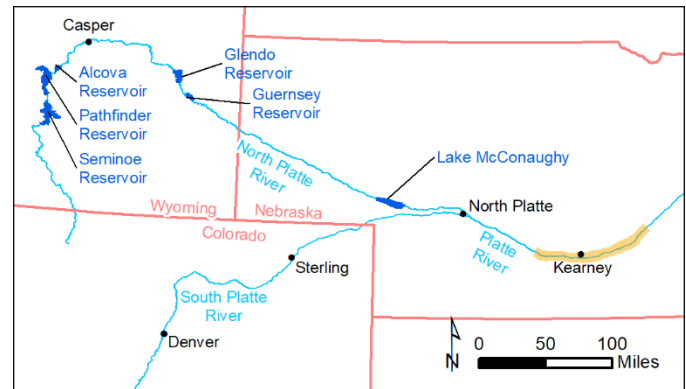
*Source:* Appropriated water *Score:* ~20,000 AFY *Operations started:* 2012 *Mechanism:* Storage

#### History

Pathfinder Reservoir was the first major reservoir constructed in the North Platte Basin. The dam was completed in 1909, storing 1,070,000 AF for irrigation and domestic use. During a century of reservoir operations, 54,000 AF of storage was lost to sedimentation. The Pathfinder Modification Project, one of the Program's original three State projects, raised the existing spillway by 2.4 feet to recapture the 54,000 AF of lost storage volume. Spillway modifications were completed in 2012 with 34,000 AF of the storage space allocated to the Pathfinder Environmental Account (EA) and the remaining 20,000 AF allocated to the Municipal Account (or Wyoming Account). The Program began receiving Pathfinder EA water upon project completion in 2012.

#### Operations

The Pathfinder EA volume of 34,000 AF represents 3.18% of the total reservoir storage volume of 1,070,000 AF. The Pathfinder EA is credited with 3.18% of inflows to the reservoir during the water year and are storable under the 1904 water right, up to a maximum of 34,000 AF. In late September of each year, the Pathfinder EA water is released and routed to Lake McConaughy via the North Platte River. On average, 9% of the Pathfinder EA water is lost in transit with the remaining volume reaching Lewellen, NE credited to the Lake McConaughy EA. Occasionally, delivery of Pathfinder EA water could cause the Lake McConaughy EA to "reset" resulting in a loss of Program EA water. Pathfinder EA water can be



retained in Pathfinder Reservoir to prevent this from happening. However, retained water counts towards the maximum storage volume in Pathfinder Reservoir the following year, reducing the volume of new water that can be accrued in the EA account. For example, if 10,000 AF of water is retained in the Pathfinder EA, the amount of additional water that could be stored in the account the following year is limited to 24,000 AF.

#### Yield and Score

From 2012 to 2017, an average of 27,100 AFY of Pathfinder EA water was released annually from Pathfinder Dam. After deducting transit losses, an average of 24,500 AFY (91%) was credited to the Lake McConaughy EA. These values are presented in Table 1.

Once Pathfinder EA water is delivered and credited to the Lake McConaughy EA, it is no longer tracked separately. The Pathfinder EA and Lake McConaughy EA are credited with a combined score of 70,000 AFY at Grand Island. It is estimated that about 20,000 AFY of that combined score is attributable to Pathfinder EA deliveries.

#### Financials

The Pathfinder EA is an in-kind water contribution to the Program from the State of Wyoming. Accordingly, the Program does not pay for annual deliveries from the Pathfinder EA.



Pathfinder Reservoir





# Platte River Recovery Implementation Program

## Initial State Project - Wyoming

**Table 1: Pathfinder Environmental Account Yields**

| Year           | Releases Measured at Pathfinder Dam<br>(AF) | Deliveries to Lake McConaughy <sup>1</sup><br>(AF) | Transit Losses<br>(%) |
|----------------|---|--|-----------------------|
| 2012           | 21,600                                      | 19,700   | 9%                    |
| 2013           | 14,400                                      | 13,100   | 9%                    |
| 2014           | 32,600                                      | 28,800   | 12%                   |
| 2015           | 30,300                                      | 29,100   | 4%                    |
| 2016           | 33,100                                      | 28,500   | 14%                   |
| 2017           | 30,300                                      | 28,000   | 8%                    |
| <b>Total</b>   | <b>162,300</b>                              | <b>147,200</b>                                     | <b>-</b>              |
| <b>Average</b> | <b>27,100</b>                               | <b>24,500</b>                                      | <b>9%</b>             |

<sup>1</sup> Deliveries are credited to the Lake McConaughy EA.

Note: This table is based on the best available accounting data to date. Minor modifications may be made in the future.



**Pathfinder Reservoir**



**Pathfinder Dam**



**Pathfinder Reservoir Modified Spillway**





# Platte River Recovery Implementation Program

## Water Action Plan Project

### Pathfinder Municipal Account Lease

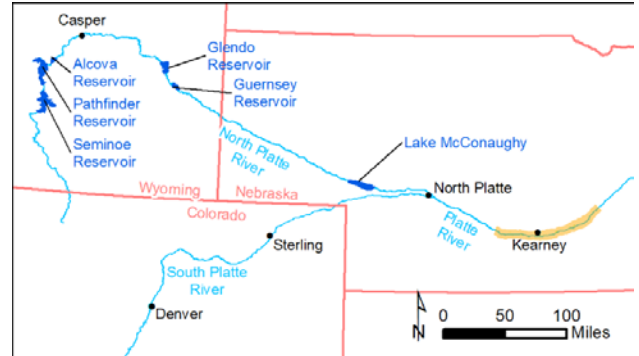
*Source:* Appropriated water *Score:* 6,350 AFY *Operations started:* 2012 *Mechanism:* Storage

#### History

Pathfinder Reservoir was the first major reservoir constructed in the North Platte Basin. The dam was completed in 1909, storing 1,070,000 AF for irrigation and domestic use. During a century of reservoir operations, 54,000 AF of storage was lost to sedimentation. The Pathfinder Modification Project, one of the Program's original three State projects, raised the existing spillway by 2.4 feet to recapture the 54,000 AF of lost storage volume. Spillway modifications were completed in 2012 with 34,000 AF of the storage space allocated to the Pathfinder Environmental Account (EA) and the remaining 20,000 AF allocated to the Municipal Account (or Wyoming Account). In 2011, the Program entered into an agreement with the State of Wyoming to purchase 38,400 AF that accrued to the Municipal Account during the period of 2012-2019. Under the terms of the lease, the Program made an up-front payment for the total volume to be delivered at minimum of 4,800 AF annually with the option to deliver up to an additional 4,800 AF, if available. The lease also allowed for the Program to continue purchasing Pathfinder Municipal Account water on an annual basis once 38,400 AF had been delivered. The Program reached 38,400 AF in 2017 and now purchases the lease water annually.

#### Operations

The Wyoming Water Development Office (WWDO) annually provides an estimate of water available to the Program on or before the first day of May and if warranted, provides an updated estimate by June 15. The Program Executive Director, after consultation with the EA Manager, responds with the quantity of water the



Program would like to have released from the Municipal Account and the timing of release. The Pathfinder EA and Municipal Account Lease water are typically released in late September and routed to Lake McConaughy via the North Platte River. On average, 9% of the water is lost in transit with the volume reaching Lewellen, NE credited to the Lake McConaughy EA.

#### Yield and Score

The Program received a base delivery of 4,800 AFY of Municipal Account water from 2012-2017. In three of those years, an additional 4,800 AFY was accepted for a total of 9,600 AFY. In 2016, the additional 4,800 AFY was available but declined by the Program. These yields are measured at the Pathfinder Reservoir dam. Transit losses (average of 9.7%) are deducted to determine the amount of Municipal Account water that is credited to the Lake McConaughy EA. These annual amounts along with the Municipal Account deliveries at Pathfinder Dam are summarized in Table 1.

The Pathfinder Municipal Account Lease was originally assigned a scored 4,000 AFY based on the minimum annual delivery of 4,800 AF. The score was updated to reflect the regular availability of water exceeding the 4,800 AF base delivery, with a new recommendation of 6,350 AFY.

#### Financials

The Program paid \$1,958,400 in 2012 for the initial 38,400 AF of deliveries, representing an average delivery of 4,800 AFY from 2012-2019 at a cost of \$51 per AF. In 2017, total cumulative deliveries exceeded 38,400 AFY, at which point the Program and WWDO invoked a contract clause to purchase additional water at \$65 per AF through the end of the First Increment in 2019.



Pathfinder Modification Project ogee weir construction, 2011



# Platte River Recovery Implementation Program

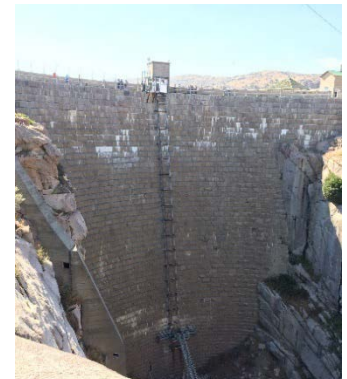
## Water Action Plan Project

**Table 1: Pathfinder Municipal Account Lease Yields**

| Year           | Releases Measured at<br>Pathfinder Dam<br>(AF) | Deliveries to Lake<br>McConaughy <sup>1</sup><br>(AF) | Transit Losses<br>(%) |
|----------------|--|---|-----------------------|
| 2012           | 4,800  | 4,400   | 8%                    |
| 2013           | 4,800  | 4,400   | 8%                    |
| 2014           | 9,600  | 8,500   | 11%                   |
| 2015           | 9,600  | 9,200   | 4%                    |
| 2016           | 4,800  | 4,100   | 15%                   |
| 2017           | 9,600  | 8,900   | 7%                    |
| <b>Total</b>   | <b>43,200</b>                                  | <b>39,500</b>   | <b>N/A</b>            |
| <b>Average</b> | <b>7,200</b>                                   | <b>6,600</b>  | <b>9%</b>             |

<sup>1</sup> Deliveries are credited to the Lake McConaughy EA.

Note: This table is based on the best available accounting data to date. Minor modifications may be made in the future.



**Pathfinder Reservoir Dam**



**Pathfinder Reservoir**





# Platte River Recovery Implementation Program

## Water Action Plan Project

### Elwood Reservoir Groundwater Recharge Project

*Source:* Excess flows *Score:* 2,800 AFY *Operations started:* 2015 *Mechanism:* Recharge & retiming

#### History

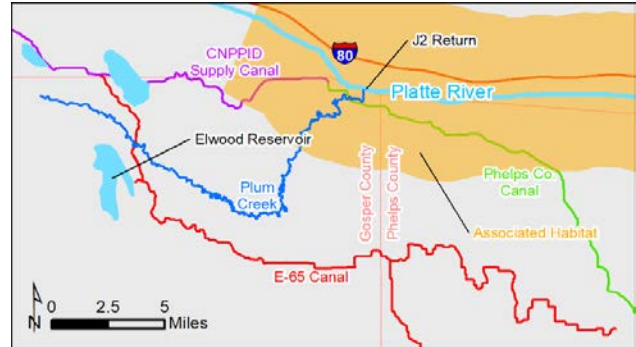
Elwood Reservoir is a 37,800 AF water storage facility in Gosper County, Nebraska. Constructed in 1976, the reservoir is owned and operated by the Central Nebraska Public Power and Irrigation District (CNPPID) to supplement irrigation in the E-65 Canal system. Historically the reservoir filled in the spring and fall and released water for irrigation from May through September. Deliveries are gravity fed through the E-65 Canal and then pumped into the reservoir by the Carl T. Curtis Pump Station. Reservoir releases are made to the E-65 Canal by gravity. The reservoir is constructed in permeable soils and loses a significant amount of water as seepage. The Elwood Reservoir Groundwater Recharge project, which began in 2015, takes advantages of these high seepage losses.

#### Operations

The Elwood Reservoir Groundwater Recharge project utilizes divertible flows in excess of U.S. Fish and Wildlife Service (USFWS) targets (excess flows). Excess flows are diverted from the Platte River into the Tri County Supply Canal, pumped from the E-65 Canal into Elwood Reservoir and seep into the underlying aquifer. Seepage rates range from 30 AF/day to 120 AF/day depending on the stage of the reservoir. Approximately 76% of the seepage slowly flows north and east towards the Platte River while the remainder flows south towards the Republican River. Water directed towards the Platte River can either emerge as long-term accretions to the river or may be intercepted by Plum Creek and then conveyed into the Platte River via the creek.



Elwood Reservoir, May 2018



To facilitate the project for the Program and other users, the CNPPID obtains temporary annual permits from Nebraska Department of Natural Resources (DNR) to divert excess flows for recharge operations. The Program has entered multiple annual water service agreements with the CNPPID in which the Program receives 50% of the water diverted into Elwood Reservoir for recharge. A maximum Program recharge cap of 8,000 AFY was specified in the initial 2015 agreement and increased to 12,000 AFY in January 2018.

#### Yield and Score

From 2015-2017, a total of 16,500 AF was recharged through Elwood Reservoir, with increasing volumes in each successive year. Given the time required for substantial migration of recharged groundwater back to the river and the short period of project operations, total lagged accretions reaching the river are estimated to be about 2,200 AF to date. Of that volume, approximately 1,800 AF reached Grand Island and 800 AF contributed to reducing deficits to USFWS target flows. The annual recharge and yield are provided in Table 1. Based on the Program's scoring analysis methodologies, a score of 2,800 AFY was recommended for the Elwood Reservoir groundwater recharge project.

#### Financials

CNPPID charges the Program for the estimated volume of water pumped into Elwood Reservoir for Program recharge. The cost per AF of water delivered began at \$42.64 per AF in 2015. Under the current water service agreement, the unit cost of recharge water increases by 3% annually, with an expected billing rate of \$49.88 per AF by the end of the First Increment in 2019.



# Platte River Recovery Implementation Program

## Water Action Plan Project

**Table 1: Elwood Reservoir Groundwater Recharge Project Yields**

| Year of Operation | Amount Recharged <sup>1</sup> (AFY) | Lagged Accretions <sup>2</sup> (AFY) | Yield at Grand Island <sup>3</sup> (AFY) | Deficit Reductions to Target Flows (AFY) <sup>4</sup> |
|-------------------|-------------------------------------|--------------------------------------|--|---|
| 2015              | 3,700                               | 20                                   | 10                                       | 0   |
| 2016              | 5,800                               | 750                                  | 650                                      | 200   |
| 2017              | 7,000                               | 1,450                                | 1,150                                    | 600   |
| <b>Total</b>      | <b>16,500</b>                       | <b>2,200</b>                         | <b>1,800</b>                             | <b>800</b>  |
| <b>Average</b>    | <b>5,500</b>                        | <b>700</b>                           | <b>600</b>                               | <b>300</b>  |

<sup>1</sup> Estimated amount recharged into the aquifer.

<sup>2</sup> Amount accreting to the river upstream of Overton, NE as the recharge slowly moves in the aquifer to the river.

<sup>3</sup> Accounts for transit losses between the location of river accretions to Grand Island.

<sup>4</sup> Deficit reductions are calculated using real time hydrologic conditions.

Note: This table is based on the best available accounting data to date. Minor modifications may be made in the future.



**Elwood Reservoir Inlet and Outlet Canal from E-65**



**Elwood Reservoir as seen from the boat ramp, May 2018**



**Carl T. Curtis Pump Station**





# Platte River Recovery Implementation Program

## Initial State Project - Nebraska

### Lake McConaughy Environmental Account (All Water Sources)

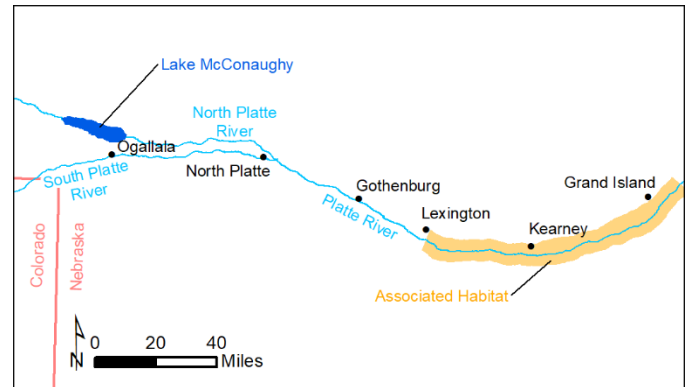
*Source:* Various *Score:* ~75,000 AFY *Operations started:* 2007 *Mechanism:* Storage

#### History

The Lake McConaughy Environmental Account (EA) was established pursuant to 1998 Federal Energy Regulatory Commission (FERC) relicensing requirements for the Central Nebraska Public Power and Irrigation District (CNPPID) and Nebraska Public Power District (NPPD) and is one of the Program's three initial state projects. The EA itself is comprised of 200,000 AF of storage capacity within Lake McConaughy. Ten percent (10%) of Storable Natural Inflows (SNI) that flow into Lake McConaughy outside of the irrigation season (October through April) are credited to the EA up to an annual limit of 100,000 AF. In addition, water from other Program projects can be stored in the EA. These currently include the Pathfinder EA, Pathfinder Municipal Account, CNPPID irrigator lease, and Net Controllable Conserved Water (NCCW).

Anytime Lake McConaughy fills to regulatory capacity (as defined by FERC's dam safety requirements), the EA is "reset" to 100,000 AF. If less than 100,000 AF is stored in the EA in a given water year, CNPPID and NPPD contribute the volume of water necessary to increase the EA to 100,000 AF, regardless of the volume of releases that have already occurred that year. If more than 100,000 AF is stored in the EA and the reservoir is at regulatory capacity, all "excess" EA water is lost, regardless of its original source.

Water stored in the EA is subject to evaporation and seepage losses. Total reservoir losses are calculated monthly and a proportional amount of the losses are deducted from the EA. For example, if the EA constitutes 10% of the water stored in Lake McConaughy, 10% of the total monthly losses will be deducted from the EA.



#### Operations

A U.S. Fish and Wildlife Service (USFWS) employee designated as the EA Manager has the authority to request releases from the EA to reduce deficits to target flows or achieve other USFWS or Program objectives. The EA Manager is supported by an Environmental Account Committee (EAC) and Reservoir Coordinating Committee (RCC) that provide input and coordinate annual EA operations with other water projects in the basin.

#### Yield and Reductions to Target Flow Deficits

A total of 506,000 AF was released from the Lake McConaughy EA over the period 2007-2017, with an average release of 46,000 AFY. Approximately 34,100 AFY (74% of releases) reached Grand Island, and 29,200 AFY (63% of releases) reduced deficits to USFWS target flows. The remainder was released for other environmental purposes or arrived at Grand Island when there was not a deficit.

The cumulative score for the Lake McConaughy SNI in combination with other active Program water projects that contribute to the Lake McConaughy EA is estimated to be about 75,000 AFY. This estimate will be updated to account for any new Program projects that include an EA storage component and as scoring continues to be refined.

#### Financials

There is no cost to store water in the EA. However, costs are incurred by the Program if EA releases bypass hydropower facilities.



Lake McConaughy near Outlet, May 2018



# Platte River Recovery Implementation Program

## Initial State Project - Nebraska

**Table 1: Lake McConaughy EA Accruals, Releases, and Reductions to Target Flow Deficits**

| Year of Operation | Net Accruals to EA (AFY) <sup>1</sup> | Net Losses (AFY) <sup>2</sup> | Net Water: Accruals - Losses (AFY) | Total EA Releases (AF) <sup>3</sup> | Net Yield at GI (AFY) <sup>4</sup> | Reductions to Deficits (AFY) <sup>5</sup> |
|-------------------|---------------------------------------|-------------------------------|------------------------------------|-------------------------------------|------------------------------------|---|
| 2007              | 34,800                                | 17,300                        | 17,500                             | 34,400                              | 24,400                             | 13,000                                    |
| 2008              | 37,700                                | 17,700                        | 20,000                             | 30,100                              | 17,800                             | 13,600                                    |
| 2009              | 40,000                                | 9,200                         | 30,800                             | 23,000                              | 13,300                             | 8,200                                     |
| 2010              | 37,800                                | 8,900                         | 28,900                             | 0                                   | 0                                  | 0   |
| 2011              | 27,500                                | 47,200                        | -19,700                            | 0                                   | 0                                  | 0   |
| 2012              | 68,100                                | 11,100                        | 57,000                             | 81,000                              | 40,900                             | 40,900                                    |
| 2013              | 57,400                                | 5,400                         | 52,000                             | 74,600                              | 56,100                             | 47,800                                    |
| 2014              | 82,600                                | 6,400                         | 76,200                             | 45,800                              | 37,600                             | 37,600                                    |
| 2015              | 88,000                                | 9,300                         | 78,700                             | 51,500                              | 43,500                             | 42,600                                    |
| 2016              | 87,400                                | 43,700                        | 43,700                             | 23,300                              | 18,200                             | 15,700                                    |
| 2017              | 95,200                                | 7,500                         | 87,700                             | 142,300                             | 123,300                            | 101,700                                   |
| <b>Total</b>      | <b>656,500</b>                        | <b>183,700</b>                | <b>472,800</b>                     | <b>506,000</b>                      | <b>375,100</b>                     | <b>321,100</b>                            |
| <b>Average</b>    | <b>59,700</b>                         | <b>16,700</b>                 | <b>43,000</b>                      | <b>46,000</b>                       | <b>34,100</b>                      | <b>29,200</b>                             |

<sup>1</sup> Amount of inflows into Lake McConaughy EA including 10% of SNI, the Pathfinder EA, Pathfinder Municipal Account lease, NCCW and CNPPID irrigator lease pilot program. All sources of water into the Lake McConaughy EA are viewed as a combined volume for operational purposes, but Water Action Plan projects contributing to the EA are scored independently.

<sup>2</sup> Losses due to evaporation, seepage and EA resets when reservoir fills to capacity.

<sup>3</sup> Releases were made to reduce target flow shortages and for other environmental purposes.

<sup>4</sup> Accounts for transit losses between Lake McConaughy releases to Grand Island.

<sup>5</sup> Calculated using real time hydrologic conditions.

Note: This table is based on the best available accounting data to date. Minor modifications may be made in the future.



Lake McConaughy, May 2015

