

**Elwood Reservoir Groundwater Recharge Project**

Source: Excess flows Score: 3,000 AF (preliminary) 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 USFWS targets (excess flows). Excess flows are diverted at the Tri County Supply Canal, pumped from the E-65 Canal into Elwood Reservoir and seep into the underlying aquifer. Seepage rates vary depending on the stage of the reservoir. Approximately 80% 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.

To facilitate the project, the CNPPID obtains temporary annual permits from Nebraska Department

**Elwood Reservoir, May 2018**

of Natural Resources (DNR) to divert excess flows for recharge operations. The Program has entered temporary water service agreements with the CNPPID in which the Program receives 50% of the amount 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 900 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 and anticipated long-term operations, the project is credited a score of 3,000 AF (preliminary) at Grand Island.

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.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year of Operation** | **Amount Recharged1**  **(AFY)** | **Lagged Accretions2  (AFY)** | **Yield at Grand Island3 (AFY)** | **Deficit Reductions to Target Flows  (AFY)** |
| 2015 | 3,700 | 20 | 10 | 0 |
| 2016 | 5,800 | 800 | 700 | 200 |
| 2017 | 8,100 | 1,500 | 1,200 | 600 |
| **Total** | **16,500** | **2,200** | **1,800** | **900** |
| **Average** | **5,500** | **700** | **600** | **300** |

1 Estimated amount recharged into the aquifer.

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

3 Accounts for transit losses between the location of river accretions to Grand Island.

Note: Values are preliminary and subject to change.



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

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

**Carl T. Curtis Pump Station**