

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

Source: Excess flows Score: 2,700 AF (Phelps), 160 AF (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. The scale of the project was expanded 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. Operations began in 2016.

Operations

The Phelps County Canal recharge project utilizes divertible flows in excess of USFWS targets (excess flows) during the non-irrigation season from mid-September to Mid-April. The CNPPID delivers excess flows into the canal and a check structure at Mile Post 13.3 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



**Phelps County Canal**

CNPPID to facilitate operations in which the Program receives between 50% and 75% of recharged water each year. 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, 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 AF and 160 AF, 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 with a current annual rate of increase of 3%.

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year of Operation** | **Amount Recharged1**  **(AFY)** | **Cook Well Pumping2 (AFY)** | **Lagged Accretions3  (AFY)** | **Yield at Grand Island4 (AFY)** | **Deficit Reductions to Target Flows  (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 |
| **Total** | **22,400** | **300** | **18,500** | **15,400** | **8,000** |
| **Average** | **3,700** | **150** | **3,100** | **2,600** | **1,300** |

1 Estimated amount recharged into the aquifer.

2 The calculated average for Cook Well Pumping reflects only two years of operations.

3 Amount accreting to the river as the recharge slowly moves in the aquifer to the river in addition to amount recaptured by Cook well.

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

A picture containing ground, outdoor, grass

Description generated with very high confidenceNote: Values are preliminary and subject to change.

**Cook Well**





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