LOWER LOUP
NATURAL RESOURCES DISTRICT

2024

Columbus Area Recharge Report

Platte County Nebraska

Christopher's Cove Homeowners Association

Project Description

The project partners, consisting of the Lower Loup Natural Resources District (LLNRD), Archers Daniel Midland (ADM), City of Columbus, Platte County, and the Christopher's Cove Homeowners Association, worked collectively to develop and complete the Columbus Area Recharge Project. The project transfers water from the nearby Loup Tailrace Canal and discharges it into the Lost Creek channel near the city. The water infiltrates into the dry channel, recharging the area's groundwater. The project also discharges recharged water from an auxiliary well into Christopher Cove, which is a nearby water body used by the project for additional groundwater recharge storage. The recharged water provided by the project offers more stable groundwater levels for public use, especially in dry years. Construction of the project was started in 2021 and completed in 2022. The LLNRD began pumping recharge water in June 2022 following construction.

Project Operations

The surface water intake site operated between March 21, 2024, and November 7, 2024, for approximately 193 days. The pumping was achieved throughout multiple periods where runtime varied from a few days up to a few weeks. The surface water intake is equipped with a variable speed pump but it was operated at the lowest rated operating capacity which is approximately 1550 gpm. The surface water intake was operated at a slow rate to maximize water infiltration and minimize the potential of water loss downstream to the Loup River.

Lost Creek Channel Outlet - Initial Startup

Christoper's Cove Outlet - Initial Startup

The auxiliary well site operated between March 21, 2024, and November 8, 2024, for approximately 129 days. The pumping was achieved throughout multiple periods where runtime varied from a few days up to a few weeks. The auxiliary well is a single speed pump with an output of approximately 550 gpm. The auxiliary well remained inactive for much of the summer because significant rainfall at the project area increased water levels in Christophers Cove making pumping unnecessary.

Project Operations - Pumping Totals

Pump Location	Description	2022 Totals	2023 Totals	2024 Totals
Surface Intake	Pumping Days	86 days	129 days	193 days
	Average Pumping Rate	2300 gpm	1750 gpm	1558 gpm
	Pumping Total	878 Ac-Ft	998 Ac-Ft	1326 Ac-Ft
Auxiliary Well	Pumping Days	73 days	226 days	129 days
	Average Pumping Rate	525 gpm	544 gpm	549 gpm
	Pumping Total	169 Ac-Ft	545 Ac-Ft	313 Ac-Ft

Project Operational Cost

The primary operational cost for the 2024 season consisted of water delivery by the Loup Power District, Lost Creek channel vegetation control and the electrical service powering both the surface water intake and auxiliary well delivery by the Loup Power District. The LLNRD personnel time and miscellaneous channel maintenance expenses have not been included in the reported project operational cost.

Project Operational Cost				
Pump Location	**Cost Description**	**2022 Cost**	**2023 Cost**	**2024 Cost**
Surface Intake	Electrical Service	$7,760	$9,031	$10,185
	Surface Water Service	$0	$3,180	$13,260
	Channel Vegetation Control	$0	$1,255	$4,740
Auxiliary Well	Electrical Service	$3,496	$10,764	$6,513

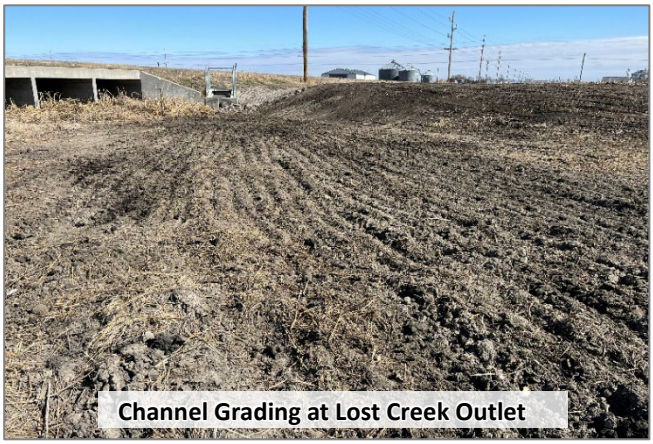
Project Groundwater Recharge

The estimated groundwater recharge amounts are based on data collected throughout the 2024 operating season. The calculations consider the volume of water pumped, recharge area, evapotranspiration rates, operation time length and weather factors that may affect groundwater recharge. The recharge estimates do not consider amounts from Christopher's Cove although groundwater recharge is evident when comparing pumped volumes to measured lake water levels. Project groundwater modeling demonstrated Christopher's Cove effectively retains and retimes water in the project area. The benefits are realized through enhanced groundwater recharge and reduced conflict among groundwater users during periods of drought.

Project Groundwater Recharge Estimates		
2022 Recharge Estimate	**2023 Recharge Estimate**	**2024 Recharge Estimate**
466 Ac-Ft (Conservative)	958 Ac-Ft (96% SI Volume)	1286 Ac-Ft (97% SI Volume)

Project Maintenance

The LLNRD performed Lost Creek channel maintenance throughout the 2024 season to promote groundwater recharge and to ensure that the channel could provide adequate storm water drainage. The channel was cleaned of debris, mowed, and undesirable vegetation was controlled. Vegetation control cost has increased because of herbicide application required to control undesirable channel vegetation. The channel bottom is deep tilled every year to loosen the soil structure and promote water infiltration. The LLNRD will continue channel maintenance to maintain function and enhance groundwater recharge.



Channel Grading at Lost Creek Outlet

Auxiliary Well Vault Access Riser

Project Monitoring

During all periods of project operation, the LLNRD monitors potential impacts from the recharge project. The project is monitored onsite daily and remotely via water level sensors that communicate data to HydroVu online services. The HydroVu service allows both LLNRD staff and the public to view project water conditions. The public can access HydroVu by using the LLNRD website and navigating to the Columbus Recharge Project real time well data.

Project Map