

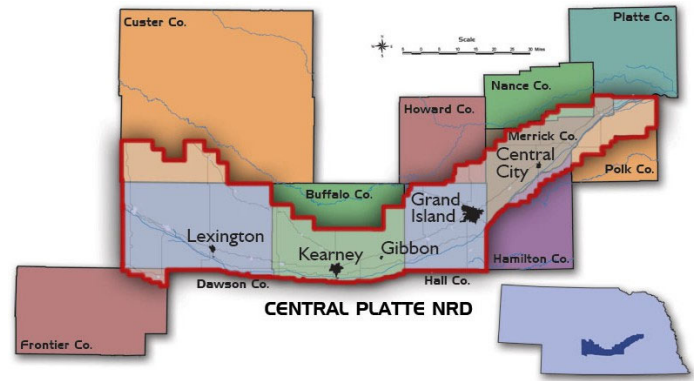
Central Platte NRD

215 Kaufman Ave Grand Island, NE 68803

(308) 385-6282

www.cpnrd.org

General Manager: Lyndon Vogt vogt@cpnrd.org



WATER MANAGEMENT- PAST, PRESENT, FUTURE

Central Platte NRD has 1,029,213 irrigated acres including: 937,674 acres irrigated with groundwater only; 14,359 acres surface water only; and 77,180 acres are co-mingled use. Crops irrigated in the CPNRD include corn, soybeans, sorghum, potatoes, alfalfa, small grains and sunflowers.

GROUNDWATER QUALITY

PROGRAM The Groundwater Quality Management Program was implemented in 1987 to provide long-term solutions for widespread high groundwater nitrate-nitrogen (N) problems. The management plan uses a phased program to implement controls when needed. Average nitrate levels have been reduced from 19.24 in 1987 to 13 ppm in 2019. CPNRD works closely with the Department of Environment & Energy to issue Chemigation permits to producers who are properly trained and certified. In 2019, CPNRD issued 1,858 renewal permits and 267 new chemigation permits.

PROJECTS CPNRD began nitrogen management demonstration projects in 1980 with the Hall County Water Quality Special Project. The CPNRD/UNL Nitrogen Irrigation Management Project followed in 1984 and has had over 400 demonstration sites located on producers' cornfields. The project uses randomized levels of nitrogen applied in increments of 50 lbs. above and 50 lbs. below the recommendation based on UNL's algorithm. These plots have provided over 290 field days and meetings. New technologies demonstrated include ET gages, watermark sensors to schedule irrigation, soil moisture capacitance probes, polymer material, slow/controlled release nitrogen products, and cover crops in seed corn.

Cover crop field days are held annually to show crop mixes planted on different dates and to compare above-ground biomass with below ground; and best mixes for grazing. Research includes whether compaction and infiltration are impacted, how biological activity and organic matter are affected, highest quality forage mixes for grazing, and expected crop-usable nitrogen.

RESEARCH The Crop Irrigation and Demand Program started in 2013 receives a vast amount of real-time data and allows CPNRD to view water usage and soil moisture from fields where producers have installed telemetry equipment. The amount of water pumped and precipitation are measured to provide data to develop irrigation efficiencies by equipment type, soil water holding capacities, and crop type. Participants check their GPM used, inches applied per day and throughout the season, and soil moisture readings.

In 2016, UNL digitized vadose zone core sites collected in the 1990s to determine where additional cores may best characterize nitrate storage and transport rates to the water table. Core samples were collected in new and previously sampled areas being used for ag production. Initial results indicate nitrate concentrations in the vadose zone were lower due to reduced nitrogen fertilizer applied, reduced irrigation, and land use practice changes.

In 2018, the On-Farm Fertigation (OFF) Research project was initiated to assist producers with timing of nitrogen and insecticide applications. The Project expanded to two fields in 2019 and has taken steps towards fertigation research utilizing the use of sensors and drone imagery to improve nitrogen fertilization timing to improve applications for efficiency.

GROUNDWATER QUANTITY

PROGRAM In 1987, the Groundwater Quantity Management Program was developed using USGS's computer model of the hydrogeologic aquifer system. CPNRD's plan has 24 Ground Water Management Areas and a phased program to implement controls as needed. The Cooperative Hydrology Study (COHYST) models are used for management decisions. COHYST models represent real-world features such as rivers, streams, groundwater aquifers, groundwater pumping, and canals to predict how changes on the groundwater system may impact flows in the Platte River.

PLANS In 2003, CPNRD issued a suspension on drilling new wells and expansion of irrigated acres to determine what groundwater and surface water problems existed and how future water supplies could be affected. In 2004, the Platte Basin above Elm Creek was declared over-appropriated and the area from Columbus to Elm Creek was designated as fully appropriated; meaning any additional uses would cause water supply to be out of balance with demand. In response, CPNRD and NeDNR began working on individual Integrated Management Plan (IMP) in 2005. In 2009, the CPNRD's IMP was approved and the corresponding Rules and Regulations were revised to correlate with the requirements in the IMP.

The second increment IMP was approved in 2019. The NeDNR held an annual review of the basin-wide IMPs in 2010. The revised basin IMP became effective in 2012 to set objectives to incrementally reduce the difference between current and fully appropriated levels of development within the basin. In 2019, the second increment Platte River Basin-Wide Plan was developed and approved by the North Platte, South Platte, Central Platte, Twin Platte, Tri-Basin NRDs; and NeDNR.

Platte River Recovery Implementation Program (PRRIP) - CPNRD has a big stake in the PRRIP's goal to improve and conserve habitat for threatened/endangered species on the central Platte (whooping crane, piping plover) and the endangered pallid sturgeon on the lower Platte. PRRIP was developed by the federal government and the basin states of Nebraska, Colorado, and Wyoming and signed in 2006; which requires no new depletions to target flows and to bring the Platte River back to 1997 levels. In 2017, a sub-regional groundwater model was developed for real-time tracking of water recharged to the aquifer. The model tracks flows on a cell-by-cell basis to provide specific monthly accounting of water returned to the Platte River. A proposed 13-year PRRIP extension is going through the federal legislative process with the expectation to be approved in 2019.

PROJECTS The CPNRD has been proactive in meeting water depletion goals. In 2007, the CPNRD initiated the first Water Bank in Nebraska to acquire water rights from willing landowners. In 2012, the NRD initiated partnerships to rehabilitate surface water canals in Dawson County. Cozad Ditch, Thirty Mile Irrigation District, and Southside Irrigation District canals were rehabilitated and approved by NeDNR for excess flow rights in 2015. All three canals deliver water for surface water irrigation and divert water for retimed recharge during excess flow events. The canal water is instrumental to CPNRD to reach its post-1997 water mitigation goals. The NRD has partnered with CNPPID, NPPD, and NeDNR to store a portion of the unused surface water irrigation water in Lake McConaughy that is transferred to the Environmental Account October 1st of each year. This mitigation water can then be released to meet various water management targets, goals, or for water flow experiments. In 2018 and 2019, the surface water exchange led to 14,100 to 14,200 AF of stored water transferred to the Environmental Account. Through further negotiations with NeDNR, U.S. FWS, and NGPC, this water may be used in such a manner that the majority of CPNRD's water mitigation obligations are met.

RESEARCH

The Central Nebraska Irrigation Project was initiated in 2018 with 40 producers currently enrolled. Producers use the Arable Mark field-level weather and crop monitoring device, which collects over 40 different data streams on precipitation, ET, solar radiation, plant health, weather, harvest timing, wind, and soil moisture. The Project also includes use of pivot telemetry and flow meters. The Nature Conservancy is partnering with the NRD on the project.

In 2018, results from the Airborne Electromagnetic (AEM) Survey provided CPNRD with improved water table and geological data to determine where additional wells may be drilled and vadose zone and recharge monitoring are needed. Airborne surveys are conducted by helicopter and cover large areas with minimal impacts to the environment. 3-D maps are combined with water table elevation maps to provide the geometry of the aquifer including locations of the most saturated thickness, heterogeneity of aquifer materials, recharge zones, lithologic barriers to groundwater flow, and connections to the surface water system. Ultimately, this information may be used to site wells, focused-recharge areas, facility construction, and other areas of interest when considering the impact to the aquifer. This data will also be used for groundwater models to do predictive analysis of management scenarios.

FLOOD RISK REDUCTION

CPNRD has 40 flood reduction projects that protected most of the District when the cyclone bomb storm hit the state in March of 2019. In the western area of the District, the Buffalo Creek Watershed Structures protected Custer, Dawson, and Buffalo Counties. B-1 Reservoir, the largest of seven structures, was full for the first time since it was built in 1983. In 2006, the Kearney Northeast Project, completed in 2006, protected the City of Kearney this year.

Two major projects protected the City of Grand Island. The Wood River Flood Risk Reduction Project in southern Grand Island that was completed in 2004 and the Upper Prairie/Silver/Moores Creek Project that was nearly completed when the storm hit.

Projects in the eastern area of the District also worked as designed. The Warm Slough/Trouble Creek Project, completed in 1993, helped protect the entire watershed by reducing flooding caused by storm runoff into the Warm Slough, Dry Run, and Trouble creeks. CPNRD was recently selected to receive \$1.35 million through the Watershed & Flood Prevention Operations Program from the USDA-Natural Resources Conservation Service to identify what is needed to address flooding within the Spring/Buffalo Creek Watershed and the Lower Wood River Watershed and to design specific watershed plans.

FUTURE WATER SUSTAINABILITY

In looking forward, the District will continue to strive towards water resources sustainability and studies which create tools to better manage groundwater and surface water in the Central Platte Valley by collecting and evaluating data to develop a hydrologic budget. Additional conjunctive management projects such as recharge projects will be considered.