

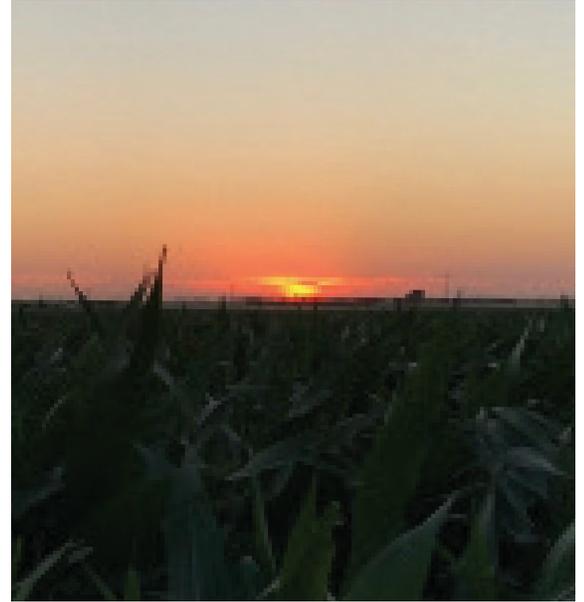
# Upper Republican Natural Resources District Master Plan 2010-2020

*Protecting Lives,  
Protecting Property &  
Protecting the Future  
Since 1972*



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# The Upper Republican Natural Resources District

## Introduction

The URNRD has actively managed water use since the late 1970's when it became what is believed to be the first entity in the country to limit and require the reporting of agricultural water use. In 1997, it became the first NRD in Nebraska to place a moratorium on new groundwater development. The URNRD and other NRDs in the State of Nebraska operate under a nationally unique system that gives them authority to regulate water use in manners that are appropriate for the hydrology and other aspects of their Districts. By exercising this authority, the rate at which groundwater within the URNRD has been preserved is 50%-80% above what was predicted would occur without regulations.

The District will continue to develop management programs to extend groundwater reservoir life to the greatest extent practicable, allowing for the beneficial use of water in an effective and efficient manner to satisfy the District's socio-economic needs and obligations while minimizing the risk that water resources will be insufficient for future generations.

The District plans to develop and enforce rules and regulations that provide for appropriate protection of the aquifer to slow and eventually stop water table declines so that usable quantities of water remain in the aquifer. The District will continue its practice of offering incentives to induce practices that increase water use efficiency.

The URNRD has management plans and actions in place to reduce the potential for non-point source contamination of ground and surface water through education, research, management practices, incentives, and rules that protect the water but also minimize adverse effects on the economy of the area. A total of 250 wells across the District are sampled each year for contaminants and the URNRD has drinking water test kits available for individuals to test domestic and livestock water wells at no charge. The District's water-quality sampling program began in 1974 and currently, 64 domestic wells are sampled for nitrate levels.

The District has a goal of maintaining the quality and productivity of soil resources and prevent on and offsite damage from sediment caused by wind and water erosion. This is accomplished through education, cooperation with entities including the USDA, enforcement of sediment and erosion control rules pursuant to state law, and other measures. The District distributes trees at cost to help achieve these goals. Tree planting also corresponds with a District mission of establishing and enhancing wildlife habitat.

Maintaining and enhancing, when possible, grasslands within the District is accomplished through educational outreach to landowners, cooperation with partner entities, and cost share on the establishment of eligible grassland. The District provides grass seed and the use of no-till grass drills at cost to help accomplish these goals.

The District endeavors to minimize loss of life and property through feasible floodwater and sediment control programs. The District assists entities in applying for local, state and federal programs for the construction of terraces, waterways, and other projects. Landowners are also informed of sources of engineering and technical assistance to solve flood, erosion and water-related problems.

The District works with entities to implement hazard mitigation projects identified in hazard mitigation plans to reduce or eliminate damage from natural disasters such as wildfire, tornadoes, blizzards, drought and flooding.

# THE DISTRICT

The Upper Republican Natural Resources District is located in the Republican River Basin in Southwest Nebraska and consists of three counties: Perkins, Chase and Dundy. The District is bordered by Colorado on the west and Kansas to the south. The population of the District, according to the 2010 census, was 8,944. The three county seats in the District are Grant in Perkins County, Imperial in Chase County and Benkelman in Dundy County. Residents of these three towns represent 43% of the total population of the District.

Agriculture and agricultural related employment are the primary sources of income in the District. There are about 1.73 million acres in the District.

Crops are grown on 980,000 acres or 57% of the total land area. The remainder is utilized for pasture/range, towns and miscellaneous purposes. Irrigated land (449,000 acres) accounts for approximately 47% of cropland and 27% of all land in the District. Crops grown include corn, wheat, sugar beets, edible beans, potatoes, soybeans, sunflowers, sorghum, alfalfa, irrigated grass/hay, popcorn and grapes. Inventories of cattle and hogs are an estimated 150,000 and 130,000 respectively. Most of the grain produced in the District is shipped to areas outside the District.

There are approximately 3,300 irrigation wells in the District. Average annual water use per certified acre during the past decade has been just under 12 inches. Total annual water use for irrigation is approximately 433,000 acre feet.

Recreation, such as hunting and fishing, is enjoyed in all areas of the District. Surface waters include the Frenchman and Republican Rivers, and several creeks and springs. Enders Dam, located on the Frenchman River, is a popular camping and boating area for local residents. Many Colorado residents also regularly visit the Enders area.

## CLIMATE

The climate of the Upper Republican NRD is transitional between continental sub-humid and semiarid, with semiarid conditions predominant in most years. Average annual precipitation ranges from about 17 inches in the northwestern and southwestern parts of the District to nearly 20 inches in the southeastern part. Annual amounts, however, are highly variable.

About 75 percent of the annual precipitation occurs during the warm season (April-September). This peak precipitation season coincides with large rates of plant evapotranspiration, which generally results in no seasonal surplus of soil water. Warm-season precipitation, which often occurs as small scattered thunderstorms, is typically distributed irregularly within the District. The cool season (October-March)

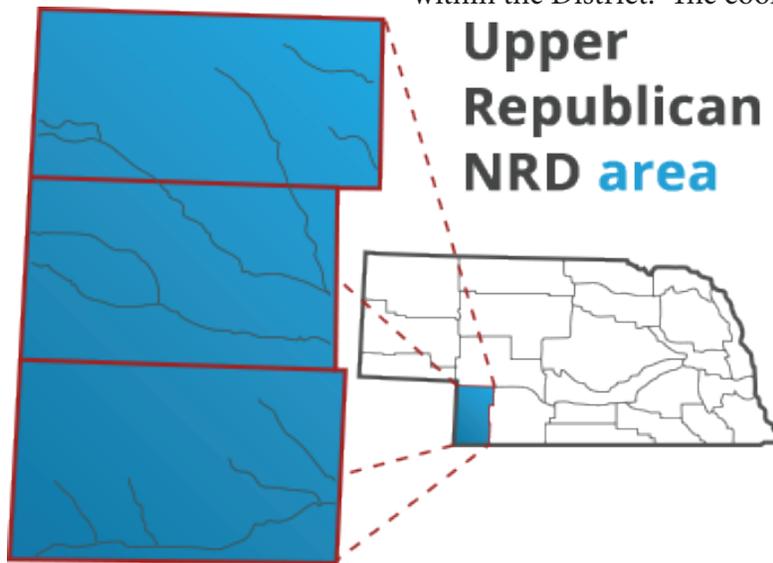
is normally very dry.

Annual potential evapotranspiration (PET), which is affected by factors such as solar radiation, air and soil temperatures, humidity, and wind, ranges from nearly 50 inches in the northeastern part of the District to 66 inches in the southwestern part, and averages about 53 inches. The combination of a high percentage of

days with sunshine, high temperatures, low humidity, and high average wind speed, particularly during the warm season, contributes to these large PET values. Warm-season PET (April-September) averages about 42 inches.

## SOILS

Soils in the District can generally be placed in three categories, reflecting the parent-material differences that in turn affect the available water holding capacity. These are silt loam to silty clay loam soils with high water holding capacity at 0.18 to 0.21 of an inch per inch of depth; sandy loam soils with medium water holding capacity at 0.11 to 0.17 of an inch per inch of depth; and sandy soils with low water holding capacity at 0.05 to 0.10 of an inch per inch of depth.



<u>Soil Types</u>	<u>Holding Capacity Level</u>	<u>Holding Capacity Amount</u>
Silt Loam to Silty Clay Loam	High	0.18 to 0.21 of an inch per inch of depth
Sandy Loam	Medium	0.11 to 0.17 of an inch per inch of depth
Sandy Soils	Low	0.05 to 0.10 of an inch per inch of depth

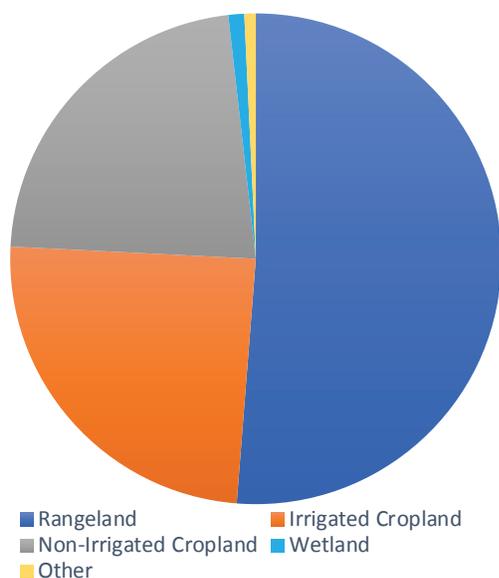
The proportion of soils in each county in the high, medium, and low water holding capacity categories respectively are: Dundy – 24%, 14%, and 53%; Chase – 45%, 22%, and 33%; Perkins – 62%, 18%, and 20%. These proportions are reflected in the relative per acre water use among counties, with Dundy usually averaging the highest, and Perkins generally having the lowest per acre irrigation water use.

### LAND USE

Soils and topography largely determine land use in the District. Soils derived from sand dunes or with large topographic slopes often are left uncultivated and in native vegetation. Soils with less sloping topography and less sandy texture are generally well suited for cultivation and irrigation.

About 51 percent of the area of the District is grassland (pasture and rangeland not harvested for hay). Dryland agriculture accounts for almost 23 percent of the area. Irrigated agriculture accounts for 24 percent of the area. Less than two percent of the area is used for nonagricultural purposes, including transportation, communication, farmstead,

### **URNRD Land Usage**



commercial, and urban functions. Natural woodlands occupy less than one percent of the District. These woodlands generally occur along permanent streams and consist largely of phreatophytes, such as willows and cottonwoods that thrive under shallow water-table conditions.

Although the percentage of land area classified as cultivated has remained generally constant through time, short-term fluctuations have occurred as some rangeland was cultivated temporarily but later allowed to revert to rangeland. Since 1950, the total acreage of crops has remained relatively constant, but crop types have changed over time. Wheat and grain sorghum acreage has decreased, but corn acreage has increased. These changes are related principally to the development of groundwater irrigation between the 1960's and the late 1970's and, to a lesser extent, to changes in government agricultural programs, herbicides, corn genetics and commodity prices.

### HYDROGEOLOGIC SYSTEM

**Surface Water:** The surface-water system in the District consists of streams, reservoirs, and one surface water irrigation district, the Pioneer Irrigation District. These components, along with the aquifer system, form a complex hydrogeologic system. The Republican River is the major stream system in the District. The Republican River and the North Fork of the Republican River have several tributaries within the District, including: Stinking Water, Frenchman, and Spring Creeks in Chase County, and Buffalo, Rock, Horse, Spring, Indian, and Muddy Creeks in Dundy County.



Enders Reservoir is the only surface-water impoundment in the District with storage capacity greater than 1,000 acre-feet. Numerous small impoundments also exist. There are no permanent natural lakes in the District. Enders Reservoir, on Frenchman Creek, has an average surface area of 1,242 acres. Enders Reservoir provides no irrigation water

for lands within the District. The Pioneer Irrigation District is a surface water appropriator on the North Fork of the Republican River, an interstate stream, in Dundy County. Pioneer holds a water right to 47.39 cubic feet per second (cfs) of water with a priority date of April 4, 1890. The water is diverted into a canal called the Pioneer Ditch, which runs from Yuma County, Colo. across the state border into Nebraska. Pioneer's right to divert water in Colorado to irrigate Nebraska lands has been memorialized by the Republican River Compact, an interstate agreement between the states of Colorado, Nebraska, and Kansas.

**Groundwater:** The High Plains Aquifer is the foundation of irrigated agriculture in the District, and likewise, is the base of much of the economic activity in the District. In the past three decades, there have been significant declines in the aquifer level under some areas of the District. The declines have generally been greatest in Dundy County and the western part of Chase County.

**Geology:** The youngest geologic unit underlying the District is the Pierre Shale of Cretaceous age. Pierre Shale consists mostly of blue, ochre, or black-colored shale and clay, and is the uppermost bedrock unit in the District, except in parts of Chase and Perkins Counties, where it is overlain by the White River Group. The White River Group consists of two formations, the lower of which is the Chadron Formation and the upper of which is the Brule Formation. The Chadron Formation generally consists of olive-green to brick-red silty to sandy clay

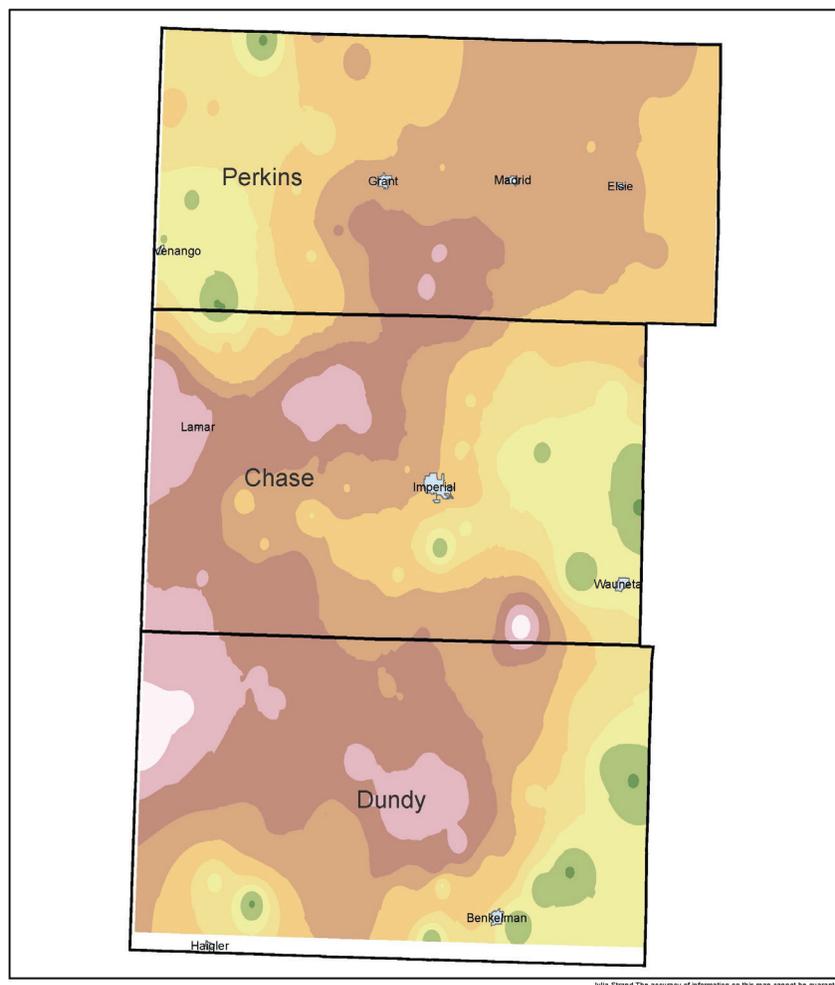
and claystone. The Brule Formation, which overlies the Chadron Formation, contains buff to olive-green clay silt and siltstone. Where present, these units are overlain by the Ogallala Formation of Tertiary age. The Ogallala Formation directly overlies the Pierre Shale where the White River Group is absent.

The Ogallala Formation underlies all but the extreme southern and northwestern parts of the District. It ranges in thickness from a feathered edge to more than 400 feet. The Ogallala Formation consists of beds of silt, sand, gravel, caliche, and clay, with considerable variability in the character of the formation within short vertical or horizontal distances. These variations are consistent with the fluvial environment in which the Ogallala was deposited. This environment was characterized by a series of braided streams carrying sediment eastward. Some of the sand and gravel deposits are weakly

cemented by calcium carbonate into rocks ranging from friable sandstone to relatively hard, ledge-forming mortar beds. Except in a few areas, most notably western Perkins and Chase Counties, the Ogallala Formation is overlain by unconsolidated Quaternary deposits.

The unconsolidated Quaternary deposits, which comprise the land surface of most of the District, consist of sand, gravel, silt, and clay of fluvial origin and sand, silt, and clay carried in by the wind. These deposits range in thickness from a feathered edge to more than 100 feet. These occur as alluvium and terraces in stream valleys and dune sand and loess

Upper Republican NRD Groundwater Level Changes 1980-2018



Ground Water Level Changes in Feet		
+0.92 - +5.1	10 - 16	32 - 40
0.74 - 5	16 - 24	40 - 48
5 - 10	24 - 32	48 - 56.476

deposits in upland areas.

**High Plains Aquifer:** The uppermost aquifer in the District is the High Plains aquifer. It consists of the saturated parts of the Quaternary deposits and the underlying Ogallala Formation. The aquifer is unconfined. In general, the direction of ground-water flow in the District is west to east except in the vicinity of the Republican River, a prominent discharge area. Average ground-water-flow velocities range from less than 50 to more than 200 feet per year.

The White River Group and the Pierre Shale are relatively impermeable in the District, and form the base of the High Plains aquifer. The volume of groundwater in storage in the High Plains aquifer is a function of the saturated thickness of the aquifer, the area that aquifer covers, and the porosity of the aquifer. All groundwater cannot be withdrawn by dewatering

or pumping because some water molecules cling to rock or soil particles due to the surface tension of water. The typical specific-yield value or recoverable, available water for the aquifer is in the range of 0.18.

**Irrigation Development:** The first irrigation well in the District was completed in 1913 near the town of Champion, and only a few additional wells were dug in the following 20 years. Between the mid-1930s and mid-1950s, more than 90 additional irrigation wells were constructed. During the 1960s and 1970s the number of irrigation wells greatly increased so that by 1975 there were more than 1,700 registered irrigation wells in the District; and almost 2,800 in 1980. Drilling activity leveled off in the 1980s. There are currently 3,300 registered active irrigation wells in the District.

### URNRD Timeline of Significant Events

1976 - Groundwater Management Act passed by Legislature with encouragement from the Upper Republican NRD (URNRD). The Act gives NRDs the authority to regulate groundwater use.

1977 - URNRD establishes the first Groundwater Management Area in Nebraska with approval from the state. The entire URNRD is within the management area.

1978 - 1979 -

- Board adopts order making the URNRD the first in the state to require metering and reporting of groundwater use.
- URNRD becomes first in the state to restrict irrigation, setting allocation at 20 inches per year.
- Spacing limits are imposed requiring new wells to be at least 3,300 feet from wells.

1980 - Allocation set at 22 inches per year.

1983 - Allocation decreased to 20 inches per year for flood irrigation; 16 inches for pivots.

1988 - Allocation for all irrigated acres reduced to 15 inches per year.

1992 - Well-spacing rules tightened so new wells must be at least 5,280 feet from existing wells.

1993 - Allocation reduced to 14.5 inches per year.

1997 - Moratorium on new wells approved. It is the first well-drilling moratorium in the state.

2005 - URNRD and entire Republican River Basin designated as fully appropriated by the state. URNRD subsequently

adopts an Integrated Management Plan with the state that calls for long term reductions in water use.

2007 - First of several revisions are made to the Integrated Management Plan that include reducing water use by 20 percent relative to 1998-2002 average water use.

2008 - Allocation reduced to 13 inches.

2010 - Revisions to Integrated Management Plan primarily intended to ensure compliance with the Republican River Compact during water-short years as suggested by an arbitrator managing the dispute between Kansas and Nebraska.

2012 - URNRD constructs Rock Creek Augmentation project in Dundey County that includes retirement of 5,000 irrigated acres to offset groundwater piped into Rock Creek when needed to maintain compliance with Republican River Compact.

2013 - New limitations on use of carryforward allocation and borrowing allocation from the next allocation period are approved by the Board intended to reduce water use. URNRD initiates NCORPE Augmentation Project in Lincoln County that includes three other NRDs. NCORPE and Rock Creek projects prevent irrigation shutdowns in 2013, 2014, 2015, 2016 and 2017.

2015 - Nebraska receives beneficial decision from U.S. Supreme Court regarding Compact compliance that rejects efforts to shut down irrigation in much of Nebraska's portion of the Republican Basin.

2015-2016 - Kansas and Nebraska reach mutually beneficial agreement on Compact compliance matters.

# NATURAL RESOURCE CHALLENGES

## GROUNDWATER USE AND LEVELS

As the number of irrigation wells increased in the District during the 1960s and 1970s, groundwater withdrawals exceeded recharge, and the amount of water in storage in the aquifer under the District declined. The USGS estimates that during the period 1952 to 1975, groundwater in storage decreased by 420,000 acre-feet. This is slightly less than the current annual groundwater withdrawals for irrigation in the District. From 1980 to the present, groundwater level changes have declined on average 20 feet District wide with half of the decline occurring during the drought years of 2000 to 2007 and more than a quarter of the decline occurring from 1980 to 1990. These declines were determined using approximately 245 wells measured continuously from 1980 to present by District staff.

To better understand the hydrology and other factors causing these declines, the Board in the early 1970s cooperated with the USGS to develop a groundwater model for the District. In the early 1990s, the Board contracted with USGS to update that model.

Utilizing the information from the model, and in response to the generally declining aquifer level, the District Board of Directors, in cooperation with the Nebraska Department of Water Resources, established a groundwater control area and adopted rules and regulations designed to slow the rate of withdrawal of water from the aquifer. Controls initially adopted by the Board included the requirement that groundwater pumped by irrigation, industrial, and municipal wells be measured, and a five-year maximum allocation of groundwater for each certified acre. However, in the Board's opinion, the initial rules and regulations did not sufficiently arrest the declines in aquifer level. Therefore, the Board established lower allocations, and eventually a moratorium on the number of certified irrigated acres and tracts and on new wells with pumping capacity of more than 50 gallon per minute.

In spite of the actions taken by the Board, groundwater levels under most of the District are still declining, however the declines are about 70% less than what was predicted in models done by USGS in the early 1980s. How to control declines to an

acceptable level without imposing undue economic hardship on water users in the District will continue to present a management challenge. This issue will be addressed through actions to be taken in accomplishing the groundwater management goal and objectives set out in the next section of this plan.

## GROUNDWATER QUALITY

The Board recognizes a responsibility to monitor and protect the quality of the groundwater in the District. To this end, District staff members have for several years annually inspected all chemigation systems. Each year, defective check valves, low-pressure drains, and injection valves have been identified.

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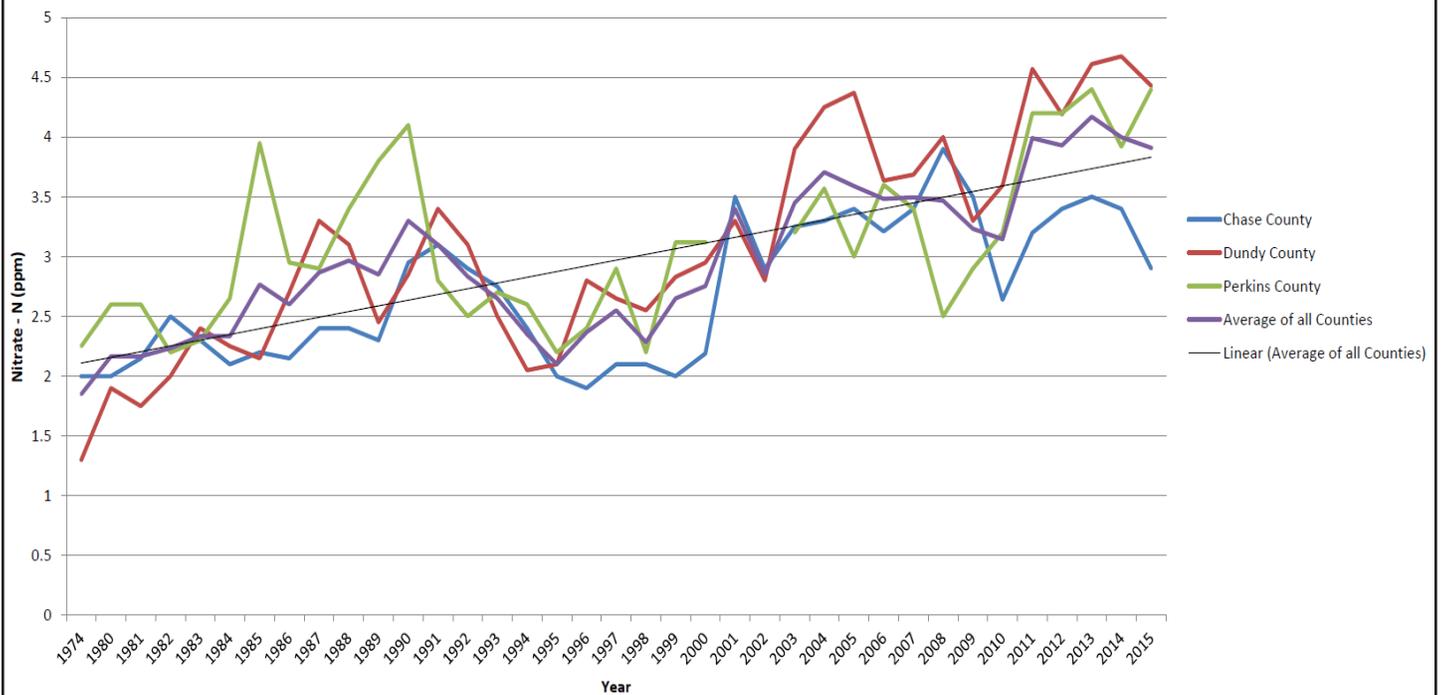
*Because of the importance of groundwater quality, the Board, in 1997, designated the entire District as a groundwater quality management area.*

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The goals of the current water testing program are to identify and reduce human health risk and improve the general health of the aquifer beneath the URNRD. Beginning in the summer of 2017, summer sampling began focusing on the general aquifer health within the District. One hundred thirty-four irrigation wells are sampled to estimate the average nitrate concentration throughout the District. The locations of the wells were chosen to obtain an accurate nitrate concentration throughout the District. The results of the analyses determine the boundary designations of the different phase requirements for farm management practices within the District. While most of the District has relatively good water quality, some areas have higher nitrate concentrations and in those areas the URNRD requires land owners and operators to follow farm management practices that will maintain or reduce nitrate concentrations in the groundwater.



## AVERAGE NITRATE LEVELS IN THE UPPER REPUBLICAN NRD



The winter sampling focuses more on human health. There are about 380 registered domestic wells in the District, and the District samples approximately 76 wells each year on a 5-year cycle, so all registered domestic wells will be sampled every 5 years. If a well has a nitrate-nitrogen concentration greater than 10 mg/l, then an URNRD representative will inspect the well's construction information and site to determine the potential source of the high nitrate.

Provided sufficient funds are available, actions implied by the goal and objectives specified under Groundwater Management in the next section will lead to an effective and appropriate approach to maintaining and even enhancing groundwater quality for all residents of the District.

### SOIL CONSERVATION

Soil erosion caused by wind and water is an ongoing problem in the District. The potential for wind erosion is especially serious in areas of the District dominated by medium to low water holding capacity soils. However, even silt loam soils are subject to wind erosion if they are void of surface residue. All soils, and especially sandy soils, require tillage practices that leave adequate residue on the surface to protect the soil from the strong winds that are typical in this region.

Although average annual moisture received throughout the District is less than 20 inches, local rainfall of three to five inches, or even more, within a 24-hour period is not uncommon. Severe gully erosion and rill erosion are common results of such concentrated moisture.

Soil erosion, whether caused by wind or water can reduce the productive capacity of the soil. It can also cause detrimental off-site sediment and economic damage to fields, pastures, waterways, fences, and road ditches.

The District has adopted sediment and soil erosion control rules and actively investigates erosion complaints. Through the actions implied by the goals and objectives set out in the next section, the District will cooperate with the Natural Resources Conservation Service to develop conservation plans and to make cost-share funds available for eligible soil erosion control practices.

The Upper Republican NRD is participating in a multi-jurisdictional Hazard Mitigation Plan with several entities in all three counties of the District. A Hazard Mitigation Plan is a pre-disaster planning document that provides a pro-active approach to reduce damages from disasters through planning. By having a Hazard Mitigation Plan the jurisdictions involved are eligible for Federal grant funding for

mitigation projects. Pre-disaster mitigation projects are designed to reduce or eliminate damages that occur due to natural disasters such as wildfire, tornados, blizzards, drought, and flooding. JEO Consulting Group, Inc. worked with the jurisdictions involved in Chase and Perkins counties to develop and finalize the Hazard Mitigation Plan, both of which have been approved by FEMA. A Dundy county plan is being developed by JEO Consulting Group, Inc. and the involved jurisdictions.

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*In 2017, the URNRD sold 41,323 trees and shrubs.*

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The Upper Republican NRD participates in the Nebraska Association of Resources Districts tree planting program where over 89 million trees have been planted since NRDs were formed in 1972. Each spring the URNRD offers a variety of trees and shrubs for sale, like Eastern Redcedar, Cottonwood, and Chokeberry. In 2017, the URNRD sold 41,323 trees and shrubs. The URNRD also sells weed barrier, weed barrier staples, grass seed and no-till drills.



### GROUND AND SURFACE WATER RELATIONSHIPS

During the past decade, there has been substantial consideration at the state and local levels of the conjunctive nature of ground and surface water. In 1996, the Nebraska Legislature passed LB 108 that allowed for potential NRD action to study and develop management plans addressing ground and surface water interaction. Also, an U.S. Supreme Court lawsuit by Kansas against Colorado and Nebraska raised questions regarding the interaction of ground and surface water. As indicated in the next section, the Board will continue investigation of the conjunctive nature of ground and surface water in the District.

If results of the investigation imply Board action is desirable, the Board will take appropriate steps.

### CONJUNCTIVE WATER MANAGEMENT

Conjunctive management of ground and surface water supplies within the URNRD and Republican Basin is an emerging area of water management that could benefit all water users while also preserving water. Generally, conjunctive management utilizes the connection between groundwater and surface water to maximize water use, while minimizing impacts to stream flow and groundwater levels. It can help increase the overall water supply and improve the reliability of that supply.

Components of conjunctive water management include storing surface water when it is abundant during wet periods, then timing the release of the water through canals and other diversions to recharge groundwater supplies. The additional groundwater supplied through this type of intentional, planned recharge is then available during dry periods. This type of management is useful to irrigators who have access to both groundwater and surface water supplies, and to solely groundwater irrigators in areas that experience recharge from conjunctive management.

Stream flow augmentation projects are a form of conjunctive management. Through the retirement of irrigated acres, water that would otherwise be used for irrigation is instead stored in the underground aquifer and released into streams during dry periods. The intent of the projects of course is to maintain compliance with the Republican River Compact, but the operation of the projects act as conjunctive management activities by providing water to users that otherwise wouldn't be available.

The URNRD Board will continue investigation of the conjunctive nature of ground and surface water in the District. If results of the investigation imply Board action is desirable, the Board will take appropriate steps.

### COMPACT COMPLIANCE ACTIVITIES AND PROJECTS

Compliance with the Republican River Compact has been aided greatly by augmentation projects in Dundy and Lincoln Counties and cooperative agreements between the three Compact states of Nebraska, Kansas and Colorado. Both activities have improved the previously litigious nature of interstate Compact relationships, namely between Nebraska and

Kansas, and provided stability to the farm economy of the URNRD and the Republican Basin in Nebraska by almost completely negating widespread irrigation curtailments as a Compact compliance tool. It is hoped, and expected, that the multistate agreements and augmentation projects will sustain this regulatory stability for the long term.

The two augmentation projects have a annually combined capacity of approximately 85,000 acre feet to offset depletions to stream flow from groundwater pumping that exceed what is allowable under the Compact and associated settlement agreement. They are funded solely by irrigators via the occupation tax on irrigated lands, which at the time of this writing is \$10 per irrigated acre within the URNRD. While the size of the projects differs, conceptually they are the same: Significant amounts of irrigated land have been retired from irrigation, allowing water that otherwise would have been applied to crops to be piped into tributaries of the Republican River when necessary to maintain Compact compliance. The frequency the projects will be operated is impossible to predict because precipitation is a major driver of Compact needs, but history suggests one or both projects may be operational possibly one-half to one-third of the time.

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*It is hoped, and expected, that the multistate agreements and augmentation projects will sustain this regulatory stability for the long term.*

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The Rock Creek Augmentation Project, developed by the URNRD, was the first of the two augmentation projects. It was constructed in 2012 and consists of more than 5,000 acres retired from irrigation north of Parks, Neb. Ten high-capacity wells are plumbed to a



24” main pipeline that discharges water into an upper reach of Rock Creek. Used at full capacity, the project can generate approximately 20,000 acre feet in a year’s time. All the previously irrigated land has been seeded to native grasses and is actively managed for public purposes including the restoration of rangeland in a manner that prevents erosion.

The Nebraska Cooperative Republican-Platte Enhancement Project (NCORPE) is jointly owned and operated via an interlocal-agency structure consisting of the URNRD, Middle Republican NRD, Lower Republican NRD and Twin Platte NRD. It was constructed in 2013 and includes approximately 14,500 acres of previously irrigated cropland in the sandhills south of North



Platte, Neb., in Lincoln County. The property, when purchased by NCORPE, had 115 irrigation wells; now retired, 30 of those wells have been converted to augmentation wells that are tied to a 42” main pipeline that discharges water into Medicine Creek. Like Rock Creek, Medicine Creek is a tributary of the Republican River. At full capacity, NCORPE can annually produce approximately 65,000 acre feet of water and, like Rock Creek, is actively being restored to native rangeland.

The volume of water generated by the projects, and possibly their frequency of use, could be lessened by cooperative agreements reached in recent years by Nebraska, Kansas and Colorado. Previous to the agreements, Nebraska’s expectedly conservative estimates of Compact shortfalls determined how much water was provided by the projects. At times, this led to volumes of water greater than what Kansas water users



needed, provided at times when it couldn't be used. Now, Kansas evaluates the needs of its water users and available water supplies. If it's decided additional supplies aren't needed, Kansas' water is instead stored in the ground at the augmentation sites to provide to Kansas if, and when, it does need the water.

Another important feature of the agreements is Nebraska and the NRDs receiving 100% credit for the water that is pumped. Previously, Nebraska and the URNRD received credit for 69% of the water pumped at Rock Creek; at NCORPE, the state and NRDs received just 54% credit. That resulted in a total of 11,400 more acre feet of water being pumped at Rock Creek in 2013-2014 than if 100% credit was received.

The URNRD will closely monitor and project Compact needs in the future so we can respond accordingly.

### RANGE MANAGEMENT

Much of the range and grass in the District is on sandy soils. These land are fragile and highly susceptible to erosion caused by wind and water. "Blow-outs" can be caused by what sometimes seems to be minor disturbance of the grass cover. Erosion can be caused by over grazing of areas within the pasture due to lack of distributed water sources, vehicle trails, livestock paths, and even installing or replacing poles for telephone or electric lines.

Once erosion starts, prevention of expansion and successful reseeding can be a complicated and difficult undertaking. Grazing plans with cross fencing and appropriately distributed water sources are critical for prevention of erosion as well as for maximizing the productivity of the grasslands of the District. Cooperation with the Natural Resources Conservation Service and the availability of cost-share funds for cross fencing and planned water sources are essential components of establishing good range management in the District. The URNRD aids the establishment and



maintenance of rangeland throughout the District by providing grass seed and rental of no-till grass drills. While it can vary depending on the year, the drills are used to plant roughly 600 acres of grass annually. The activities implied under the goal and objectives set out in the next section for range management will bring about progress in the prevention of soil erosion and enhancement of productivity of the grasslands in the District.

### WILDLIFE HABITAT AND RECREATION

Maintaining sufficient habitat for game and non-game wildlife is a continuing challenge. The relatively severe weather, summer and winter, makes it important that birds and wild animals have trees, shrubs and grasslands for food and shelter. Windbreak and shrub plantings are essential to the enhancement of wildlife habitat. Improved habitat generates recreation opportunities and economic activity from hunters and anglers. Non-game species contribute to the quality of life for residents, and are important components of the overall ecosystem.

The URNRD allows public hunting on a portion of the land at the Rock Creek Augmentation Project. There is also public hunting at NCORPE, along with hiking and biking trails and wildlife viewing.

As is indicated in the next section, the District will cooperate with state and federal agencies and private organizations to generate cost-share funds for planting of trees and shrubs, seeding CRP lands, and assisting landowners to develop and complete wildlife enhancement plans.

### POLLUTION CONTROL

The District is primarily responsible for monitoring and controlling non-point source pollution, while the Nebraska Department of Environmental Quality has the lead role in preventing or controlling point-source pollution. Excess contamination of the ground or surface water can potentially result in serious detrimental health and/or economic effects on residents, domestic animals and wildlife. The District conducts chemigation inspections, cooperates with landowners and government agencies in ground and surface water sampling, and distributes educational material on preventing pollution. District staff members, in the process of carrying out other activities regularly travel throughout the District and are vigilant for sites that represent potential ground or surface water contamination. If appropriate, such



in the next section, the Board will continue to meet District responsibilities in flood and sediment control.

It is the general policy of the District not to provide financial assistance for drainage improvement and channel rectification unless a project has public benefit and is sponsored by a city or county.

sites are reported to the appropriate agencies. The goal and objectives set out in the next section provide the framework to assure that groundwater quality is appropriately protected.

In recent years, Nebraska's solid waste regulations have changed. Landfills that weren't properly designed, operated or sited were required to shut down, as were unauthorized dumps. Now, all landfills must be approved and permitted by the State. If a permit is not issued, the landfill cannot legally operate. Currently, the only permitted landfill in the Upper Republican NRD is a facility northwest of Grant.

### FLOOD CONTROL

Even though the District normally receives less than 20 inches of moisture annually, serious local flooding and sediment erosion does occur and can result in substantial economic losses to structures and fields. The District cooperated with state and federal agencies and the town of Wauneta to develop a flood control canal. The District regularly cost-shares on terraces, waterways, and other structures and practices that can help to minimize detrimental effects of unusually heavy rainfall. Also, the District cooperates with the Natural Resources Conservation Service and the Farm Service Agency to identify flood-damaged lands and to develop proposals for emergency funding assistance to rebuild damaged structures such as terraces, dams, and waterways. As outlined under goals and objectives



# DISTRICT PROGRAM GOALS AND OBJECTIVES

## GENERAL GOAL

To preserve and enhance the natural resources of the URNRD for the benefit of the people of the District and the State.

## PROCESS

The URNRD Board will initiate and execute plans and programs as appropriate under the powers and authorities granted by the legislature and according to the priority needs of the District as related to:

- Groundwater management, utilization, and conservation
- Soil erosion prevention and control
- Range management
- Wildlife habitat and recreation
- Pollution control
- Prevention of damages from floodwater and sediment

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## INTEGRATED MANAGEMENT PLAN GOALS AND OBJECTIVES

The following goals and objectives have been adopted by the Upper Republican NRD and the Nebraska Department of Natural Resources in the Integrated Management Plan:

- In cooperation with the State and the other NRDs, maintain compliance with the Republican River Compact as adopted in 1943 and as implemented in accordance with the settlement agreement as approved by the U.S. Supreme Court on May 19, 2003.
- Ensure that water users within the URNRD assume their share, but only their share, of the responsibility to maintain compliance with the Compact.
- Provide the URNRD's share of compliance responsibility and impact be apportioned within the URNRD in an equitable manner, and to the extent possible, minimize the adverse economic, social and environmental consequences arising from compliance activities.
- Protect groundwater users whose water wells are dependent on recharge from the river or stream from depletions caused by surface water uses and

groundwater uses begun after the date the river basin was designated as fully appropriated, and

- Reserve any stream flow available from regulation, incentive programs, and purchased or leased surface water and groundwater required to maintain Compact compliance from any use that would negate the benefit of such regulations or programs, to the extent allowed by statute.

## REPUBLICAN RIVER BASIN OBJECTIVES

- Monitor, provide testimony on, and inform citizens of the impact of pending legislation; and work with legislators to introduce and support legislation that will promote conservation and management of groundwater available to the District groundwater users.
- Cooperate with other agencies and ground and surface water users in the Republican River Basin.
- Continue study of the conjunctive nature of ground and surface water in the District.
- The URNRD is involved with ongoing invasive weed management in stream channels. As a member of the Southwest Weed Management area, the URNRD supports invasive plant removal along stream channels.
- Implement and operate stream flow enhancement projects that benefit Republican River Compact Compliance and protect the local economy.
- Prevent the initiation of new or expanded uses of water, with limited exceptions, that increase Nebraska's computed beneficial consumptive use of water within the URNRD, as required for Compact compliance and by Nebraska law.
- Ensure administration of surface water appropriations in the Basin is in accordance with the Compact and Nebraska law.
- To assist in ensuring long-term Compact compliance, reduce existing groundwater use within the URNRD by 20 percent from the 1998 to 2002 baseline pumping volumes under average precipitation conditions so that, when combined with stream flow augmentation and incentive programs, the URNRD's groundwater depletions are maintained within their portion of Nebraska's Allowable Groundwater Depletions as computed through use of the Republican River Compact Administration Groundwater Model. Additionally, voluntary reductions in baseline pumping volumes will continue to be pursued with the incentive of limiting the level of long-term management actions that are needed during Compact Call Years.

- Make such additional reductions in groundwater use in Compact Call Years as are needed, after taking into account any reduction in beneficial consumptive use achieved through basin-wide incentive and stream flow augmentation programs, to achieve a reduction in beneficial consumptive use in the URNRD that ensures the District limits its groundwater depletions to the Allowable Groundwater Depletion General Goal to preserve and enhance the natural resources of the URNRD for the benefit of the people of the District and the State.

- Cause the reductions in water use required for Compact compliance to be achieved through a combination of regulatory, incentive, and augmentation programs designed to reduce consumptive use. To the extent funds are available, incentive programs will be made available through targeted incentive programs.

- Develop a program to provide offsets for new consumptive uses of water so that economic development in the district may continue without producing an overall increase in groundwater depletions as a result of new uses.

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### GROUNDWATER MANAGEMENT

*Goal:* Develop management programs to extend groundwater reservoir life to the greatest extent practicable, consistent with beneficial use of the groundwater and best management practices, and protect the quality of groundwater aquifers within District boundaries.

*Objectives:*

(a) Develop, promulgate and enforce rules and regulations that provide for appropriate protection of the aquifer so as to slow and eventually stop water table declines in order that beneficially usable quantities of water remain in the aquifer; incentives to use water efficiently; conservation of groundwater; and maintaining or enhancing groundwater quality.

(b) Conduct monitoring and other data collection activities and research necessary for interpretation of changes in groundwater levels and actual and potential pollution of the aquifer.

(c) Cooperate with other agencies to plan and conduct data collection activities related to ground and surface water quantity and quality.

(d) Reduce the potential for non-point contamination of ground and surface water through education, research, management practices, incentives, and rules that protect the water but also minimize

adverse effects on the economy of the area.

(e) Carry out provisions of the Nebraska Chemigation Act by annually inspecting all chemigating systems in the District.

(f) Through education programs and cost-share assistance, encourage proper decommissioning of water wells that are no longer used.

(g) Initiate, with the Natural Resources Conservation Service, County Extension Educators, and the UNL West Central Nebraska Research and Extension Center, irrigation efficiency research and education programs.

(h) Disseminate to citizens, agencies, and organizations information regarding changes in water quantity and quality in the District.

(i) Inform citizens and furnish materials to schools for educational programs about District activities and principles of water conservation and pollution prevention.

(j) Assist communities to plan and delineate appropriate wellhead protection areas.

(k) Establish contacts for residents of the District with agencies associated with or responsible for water related issues.

(l) Monitor, provide testimony on, and inform citizens of the impact of pending legislation; and work with legislators to introduce and support legislation that will promote conservation and management of groundwater available to the District groundwater users.

(m) Cooperate with other agencies and ground and surface water users in the Republican Basin.

(n) Continue study of conjunctive nature of ground and surface water in the District.

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### SOIL CONSERVATION

*Goal:* Maintain, and where possible improve, the quality and long-term productivity of soil resources of the District, and prevent on-site and off-site damage from sediment caused by wind and water erosion.

*Objectives:*

(a) Distribute educational information to individuals, businesses, agencies, and organizations that encourages soil management and tillage practices, which will maintain or improve the quality and productive capability of land resources in the District.

(b) Cooperate with the USDA Natural Resources Conservation Service to develop conservation plans and to provide cost-share assistance to landowners for eligible voluntary soil management practices that will

reduce wind and water erosion.

(c) Implement, update, and enforce sediment and erosion control rules as specified by the Nebraska Erosion and Sediment Control Act and other related legislation.

(d) Cooperate with and seek technical advice from local, state and federal agencies relative to best management and tillage practices that will increase effective surface residue and help to prevent erosion.

(e) Provide secretarial and personnel assistance to the Natural Resources Conservation Service as deemed necessary and appropriate by the Board for District land and water programs.

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#### HAZARD MITIGATION LONG RANGE

*Goal:* Work with entities in Chase, Dundy and Perkins counties to implement hazard mitigation projects identified in Hazard Mitigation Plan to reduce or eliminate damages from natural disasters such as wildlife, tornados, blizzards, drought, and flooding.

*Objectives:*

(b) Ensure that Hazard Mitigation Plan objectives and projects are achieving Upper Republican NRD legislative goals and objectives for flood prevention and control.

(c) Identify and submit to FEMA revisions needed in Chase, Dundy, and Perkins counties Hazard Mitigation Plans.

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#### RANGE MANAGEMENT

*Goal:* Maintain and, where possible, enhance the productivity of the grasslands of the District.

*Objectives:*

(a) Provide private landowners educational information on developing grazing plans that include cross fencing and appropriately distributed watering sites for controlled and rotational grazing.

(b) Cooperate with the Natural Resources Conservation Service, county extension educators, and UNL by holding workshops, mini-courses, and demonstrations on effective range management.

(c) Pursue, in cooperation with landowners and other agencies, an active noxious weed control program.

(d) Distribute to owners of grassland information on the prevention of wind and water erosion in fragile grassland areas; and provide assistance in re-establishing grass stands on eroded areas.

(e) Cost-share on the establishment of eligible grassland, grazing, and other effective management

practices.

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#### WILDLIFE HABITAT AND RECREATION

*Goal:* Enhance game and non-game wildlife resources in the District.

*Objectives:*

(a) Cooperate with federal and state agencies, private organizations, and individuals to establish projects that improve wildlife habitat.

(b) Provide tree-planting services to private landowners for the establishment or enhancement of wildlife habitat areas.

(c) Obtain funding from private, local, state and federal sources that can be used as cost share for habitat projects.

(d) Encourage private landowners to preserve wetlands where practical.

(e) Provide information and educational material on practices that enhance game and non-game resources.

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#### POLLUTION CONTROL

*Goal:* Protect water and land resources from non-point contamination, enhance and maintain the quality of, surface and groundwater resources of the District.

*Objectives:*

(a) Update and implement District groundwater, sediment, and erosion control rules and regulations.

(b) Monitor groundwater quality in the District.

(c) Cooperate with the Department of Environmental Quality on point-source contamination problems.

(d) Increase public awareness of the importance of protecting natural resources from contamination by either point or non-point sources.

(e) Promote installation of buffer strips by landowners through cooperation with state and federal programs.

(f) Provide technical assistance to municipalities and other public water suppliers in the development and management of appropriate wellhead protection areas.

(g) Assist and encourage communities in establishing collection locations for recyclable wastes.

(h) Assist District cities and counties in establishing pickup days for hazardous household and farmstead wastes.

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#### FLOODWATER AND SEDIMENT MANAGEMENT

*Goal:* Minimize loss of life and property through

feasible floodwater and sediment control programs.

*Objectives:*

(a) Encourage management practices that reduce runoff.

(b) Assist entities in applying for local, state and federal financial assistance for constructing terraces, waterways, and other water management projects.

(c) Inform landowners of sources of engineering and technical assistance to solve flood, erosion, and related water problems.

(d) Cooperate with other districts where runoff problems extend across district boundaries.

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COOPERATION WITH OTHER AGENCIES

- The District and the Natural Resources Conservation Service will cooperate on programs that enhance conservation and wise use of land, water and related resources. The District will rely on the Service for technical assistance on wildlife, range and tillage practices.
  - The District will request assistance from the Department of Natural Resources on cost-share, databases and other related activities.
  - The District will cooperate with the Extension Service on issues of mutual interest.
  - The District will cooperate with the Nebraska Department of Environmental Quality and the Nebraska Department of Agriculture on point and non-point pollution issues.
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# GOVERNANCE OF THE DISTRICT

An eleven member Board of Directors governs the Upper Republican Natural Resources District. All eligible electors of the District may vote for Board members at general elections.

The District is divided into ten sub-districts. One Board Member is elected from each sub-district, and one at-large member is elected. Candidates for sub-district Board positions must reside in the sub-district for which they are elected. The at-large Board Member may reside anywhere within the District. The Board appoints eligible persons to fill unexpired terms.

The Board is responsible for establishing District policies, programs, rules and regulations, and adopting budgets required to fulfill responsibilities of the District as authorized and required by law. The Board oversees management to insure that policies, programs, and regulations, are carried out as intended.

The Board holds regularly scheduled monthly public meetings, at which time action is taken as necessary and required by law. These meetings must comply with the Open Meetings Law. The Board generally conducts business according to Robert's Rules of Order.

**Officers of the Board:** Officers include Chairperson, Vice-Chairperson, and Secretary-Treasurer. The officers of the Board are elected by majority vote of the Board.

Officers are elected for a one-year term. A vacancy in any office is filled by election of the Board for the unexpired term of the office.

**Committee Responsibilities:** There are five standing committees. The Executive Committee appoints membership to the other four standing committees. The committees exercise duties in the best interest of the District. The committees have responsibilities of overseeing District functions and activities and making recommendations to the board as necessary and appropriate.

The Executive Committee, consisting of the Chairperson, Vice-Chairperson, and Secretary-Treasurer, is responsible for Board organization, functions, ethics, and discipline. The Committee oversees personnel (including salary, wages, and benefits), building and equipment needs, and general management of the District, and makes

recommendations to the Board regarding these issues.

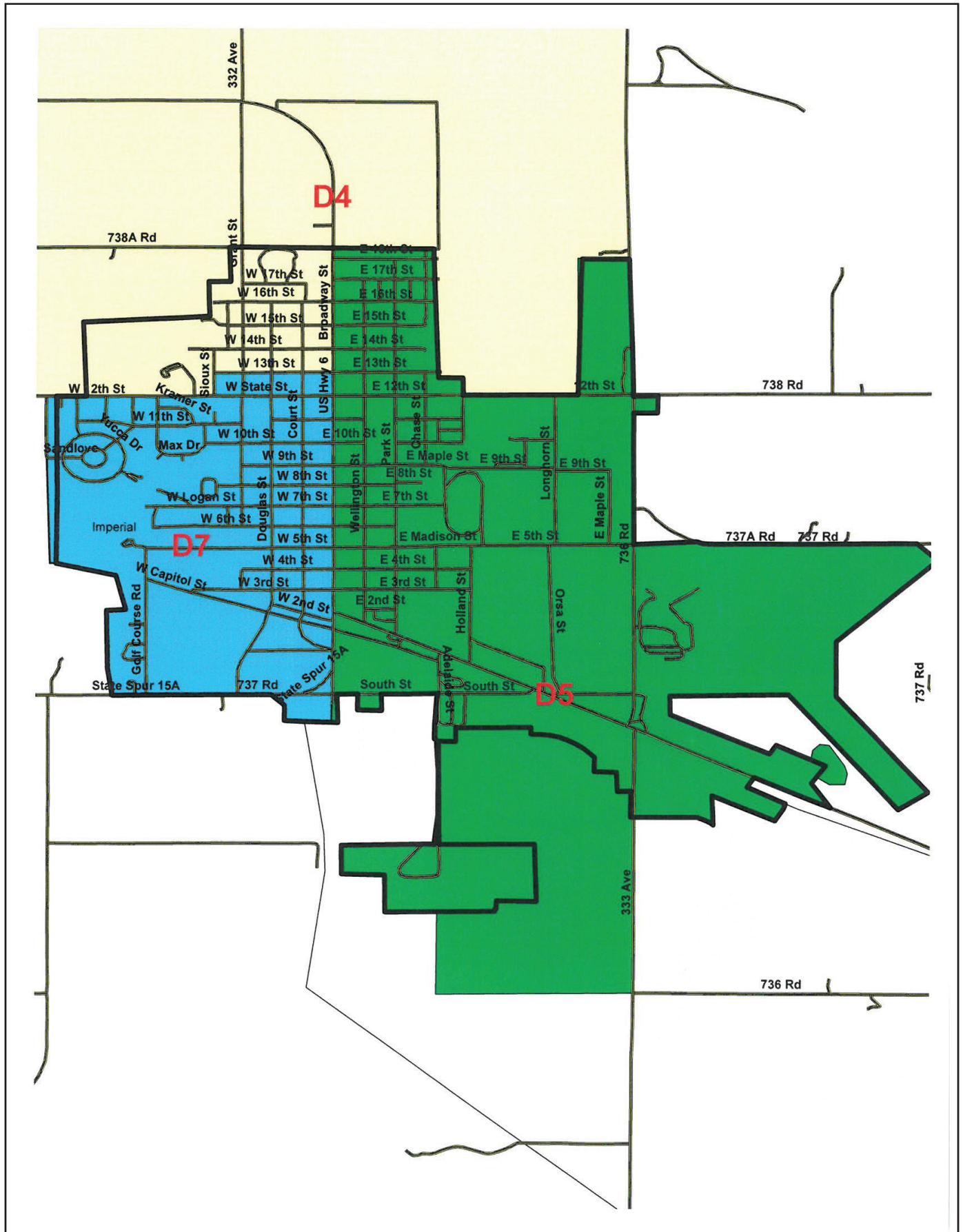
The Budget Committee oversees the financial management and long range planning of the District. The annual budget of all the District's activities is reviewed and approved by this Committee which then makes recommendations to the Board prior to Board consideration and approval of the budget.

The Variance Committee meets with all individuals who request a variance from the rules and regulations of the Board. The Committee reports to the Board. Variance requests are reviewed by the Board at one meeting and placed on the agenda for the next regular meeting for decision. At that time, the Committee recommends action on the request.

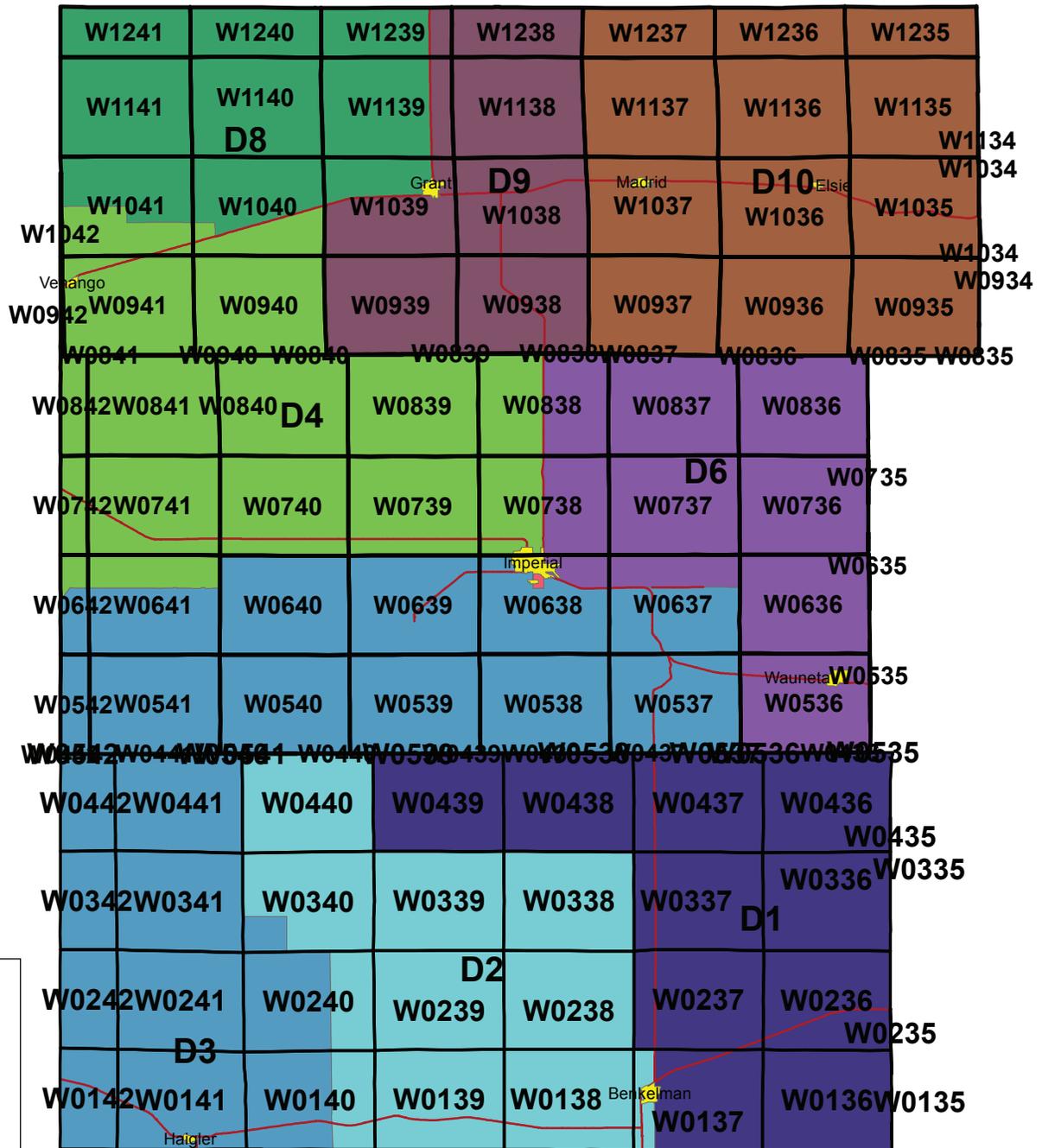
The Groundwater Control Committee reviews information received from the staff, and state and federal agencies. The Committee makes recommendations to the Board on needed studies and research projects; amendments to the groundwater control rules and regulations; date, time and place to hold information meetings and public hearings; and material to be made available to the public at information meetings and public hearings.

The Education and Information Committee oversees education and information activities related to tree planting, wildlife habitat, public relations, legislative analyses and proposals, long-term groundwater levels, and informing the public of District activities.

# URNRD Subdistricts within Imperial



# URNRD Subdistricts



## FISCAL POLICY

The Board sets an annual budget following procedures outlined by the State Auditor and the Natural Resources Commission. The Board must:

- Hold an annual budget public hearing as required by the statutes of the State.
- Maintain an accounting system of all revenues and expenditures as required by the State Auditor and the Department of Natural Resources.
- Have an annual audit by a Certified Public Accountant as set by the Statutes of the State of Nebraska.

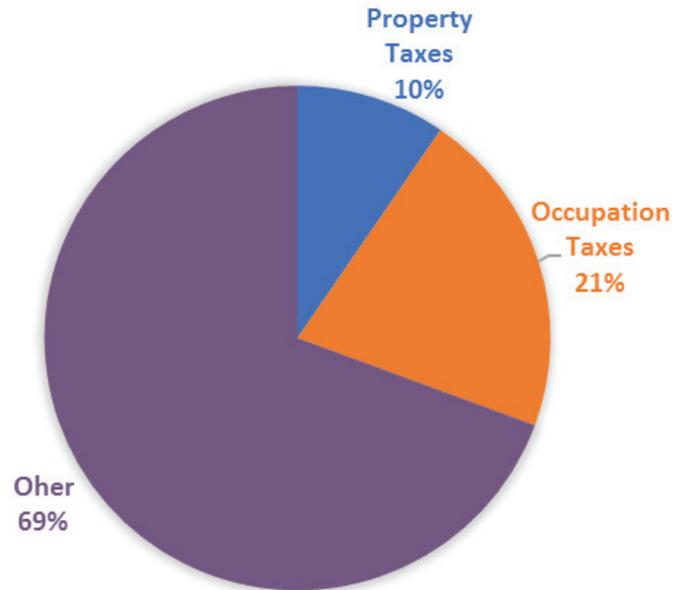
The District may make available for resale certain items that are not readily available from private enterprises. Sales will be on a cash basis with accounts due within thirty days of the first billing. The District shall send statements to all persons owing bills on the first of each month. Accounts receivable will be discussed at each regular board meeting. After 30 days the accounts shall bear an interest charge of 1.5 percent per month. The District shall file past due accounts with the Small Claims Court when all other methods of collection have been exhausted.

The District Treasurer with the assistance of the District General Manager will pay routine expenditures that occur in the general operation and maintenance of the District. These items must be approved by the Board of Directors and shall be included in the minutes of the Board Meetings.

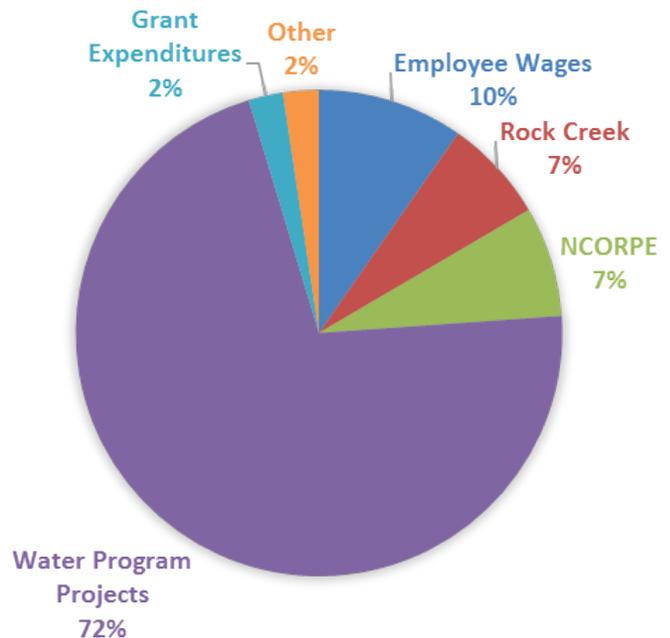
The Directors shall review and approve at each regular Board meeting a monthly financial statement. This statement will be made available to Board members with an agenda of the meeting.

Acquisitions of real estate and property rights will be conducted in a manner consistent with laws and regulations and negotiations will be in a manner serving both the interests of the general public and the owner whose property rights are being relinquished.

## URNRD INCOME 2018-19



## URNRD OPERATION COSTS 2017-18



## URNRD STAFF

Jasper Fanning - General Manager

Nate Jenkins - Assistant Manager

Bruce Curtis - Assistant Manager

Deb Hayes - Office Manager

Mike Nesbitt - Conservation Programs Coordinator

Julia Strand - Water Program Specialist

Danielle Haarberg - Information and Education Specialist

Cooper Bollman - Conservation Technician

John Lemon - Conservation Technician

Todd Burrell - Conservation Technician

Wilma Zimbelman - NRCS Imperial Field Office Secretary

Patricial Clough - NRCS Grant Field Office Secretary

Dwain Curtis - Part-time Conservation Technician