CLOVIS | CURRY COUNTY | PORTALES | ROOSEVELT COUNTY

SOURCE WATER PROTECTION PLAN

Prepared by the Eastern Plains Council of Governments
In Conjunction with the New Mexico Environment Department
Drinking Water Bureau and New Mexico Bureau of Geology and Mineral Resources and the Aquifer Mapping Program

June 2016

PROJECT FUNDING

Funding was provided by the New Mexico Environment Department, Drinking Water Bureau, as part of the Source Water Protection program. Additional support was provided by the New Mexico Bureau of Geology and Mineral Resources and its Aquifer Mapping Program.

Farm water well (CP-0008)

NM Tech collecting well water samples

Melrose, NM well (CP-0005)

Texico, NM well (CP-0011)

(CP-0008) well sampled

Lupe Aragon, NM Rural Water Association

CLOVIS, CURRY CO., PORTALES & ROOSEVELT CO.
SOURCE WATER PROTECTION PLAN

June 2016

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Source Water Protection Program Purpose

U.S. Congress amended the Safe Drinking Water Act in 1996 to encourage Source Water Protection partnerships between states and communities for the purpose of assessing and protecting sources of water supply.

The U.S. Environmental Protection Agency (EPA) has specifically recommended that Source Water Protection partnerships efforts be done at a regional scale, engaging multiple water systems and stakeholders, when practical. Fulfilling this statutory directive for Source Water Protection has become even more important because public waters systems in New Mexico are now facing extraordinary and unprecedented challenges in protecting the quality and sustainability of their water sources.

The New Mexico Environment Department (NMED) has been granted primacy by EPA to administer the federal safe drinking water act program in the State of New Mexico.

Source Water Protection Plan

The objective of the Source Water Protection Program is to protect drinking water sources before they become contaminated. **"Safe Drinking Water Starts at the Source!"**

Benefits of Source Water Protection Plan:

- Avoid the cost of contamination
- Receive monitoring waivers
- Economic Benefits
- Quality of Life
- Protecting resources for future generations
- Healthy ecosystems
- Reduced risk to human health

The primary purpose being to protect New Mexico water resources and to ensure that our region is prepared to meet future water demands.

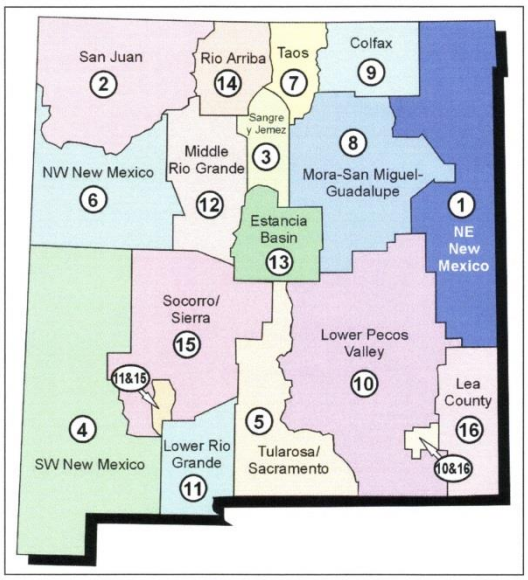

Figure ES-1. Northeast New Mexico Water Planning Region

Source Water Protection Program Background

Access to clean, safe drinking water is a key component to a healthy and viable community. Protecting sources of drinking water from contamination and depletion can prevent adverse human health, ecological and economic consequences.

Source Water Protection is a voluntary program, created by Congress in the 1996 amendments to the Safe Drinking Water Act, to encourage partnerships between states and public water systems to protect sources of water supply. The U.S. Environmental Protection Agency provides guidance and funding to help states develop partnerships with public water system to protect water sources from contamination and depletion, and to develop contingency plans in the event that water sources dry up or become contaminated. The New Mexico Environment Department (NMED) Drinking Water Bureau and the Eastern Plains Council of Governments have partnered to develop the region's Source Water Protection Plan. In addition to establishing measures to monitor and protect Curry/Roosevelt Counties sources of drinking water, this Plan also assembles valuable information about Curry/Roosevelt Counties hydrogeology and water sources into a single document that can serve as an important reference in the future.

The Eastern Plains Council of Governments is pleased to introduce its Source Water Protection Plan. This plan is designed to promote the protection of New Mexico's vital water resources by assisting communities like Clovis, Curry County, Portales, and the Roosevelt County area in planning for the protection of their drinking water and well resources. Over 90% of domestic water supplies come from aquifers deep below the ground where water has been stored for years (water.usgs.gov/edu/wugw.html). If pollution sources such as leaking underground gasoline tanks or septic systems seep into the aquifer or are drawn in from nearby drinking water wells, it is possible that your drinking water source could become contaminated. A contaminated well means a contaminated drinking water supply which is detrimental to the health of our communities and very costly to treat and/or clean up. This is the reason the Eastern Plains Council of Governments and the New Mexico Environment Department are actively promoting source water protection as a means to assure the safety and quality of our drinking water sources.

It is important that communities and water systems work together to improve and protect our water resources.

Source Water Protection Team

The role of the Source Water Protection Team is to assemble relevant technical information and draft the Source Water Protection Plan. The Team reviews the Source Water Protection Areas, identifies and assesses contaminant sources that have the potential to pollute ground water within these areas, and decides on a strategy to protect ground water. The most important duty of the planning team is to carry out and implement the Source Water Protection Plan within the community to protect the community's drinking water

The following Team assembled relevant technical information and drafted this Source Water Protection Plan.

Source Water Protection Program Team

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Source Water Protection Steps

Source Water Protection is the means by which a public water system can actively protect its valuable drinking water resources and the capital investment used to develop these water resources. ***The term Source Water Protection Area*** – sometimes called the ***Wellhead Protection Area*** – is defined as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield" (42 U.S.C. §300h—7(e)). The purpose of developing a Source Water Protection Plan is to identify the Source Water Protection Area(s). Then take the necessary steps to safeguard the area from potential sources of contamination (PSOCs) in the effort to protect the community's water resources. The New Mexico Environment Department Source water protection program follows the 5-step process established by the EPA, which is also used by the National Rural Water Association under the Well Protection Program Plan. **These five steps are:**

NMED DWD/Danielle Shuryn

Step 1: Form a community planning team (Source Water Protection Team)
Step 2: Define the Source Water Protection Area
Step 3: Identify potential sources of contamination
Step 4: Manage the Source Water Protection Area
Step 5: Contingency planning

SECTION 2: MAPPING THE REGIONAL PROTECTION AREA

New Mexico Bureau of Geology and Mineral Resources, Open file Report 580
Hydrogeological Report Executive Summary, by Geoffrey Rawling (2016)

EXECUTIVE SUMMARY:

As part of development of a regional source water protection plan, in 2015–2016, the New Mexico Bureau of Geology and Mineral Resources in partnership with Eastern Plains Council of Governments performed a technical review of existing hydrogeology studies in Curry and Roosevelt counties in east-central New Mexico. Additionally, groundwater quality was tested in several wells, and groundwater levels were examined to provide up-to-date information on the availability of groundwater in the region. This report describes the results of the hydrogeologic review and findings from the groundwater study.

In Curry and Roosevelt counties, irrigated agriculture is a major basis of the regional economy. Virtually all of the water used for agricultural, commercial, municipal, and domestic purposes in the two-county area is groundwater withdrawn from the High Plains Aquifer within the Miocene- to early Pliocene-age (~20 to ~5 million years old) Ogallala Formation. This study characterizes current conditions and changes in groundwater levels since the 2004–2007 periods and describes variations in groundwater chemistry across the region. These data are then discussed in the context of the extensive, ongoing withdrawals of groundwater, physical and chemical processes controlling the water quality and chemistry, and possible sources and physical mechanisms of recharge to the aquifer.

The long-recognized importance of the High Plains Aquifer and the Ogallala Formation as a groundwater source has resulted in an enormous number of geologic and hydrologic studies. The geology of the aquifer has been characterized and the bedrock surface at its base has been mapped in detail. Thousands of water level measurements since the 1930s have documented a progressive and ongoing decline in groundwater levels due to decreasing volumes of water in storage. Storage is decreasing because groundwater withdrawals continue to greatly exceed recharge.

Many studies have focused on quantifying the amount of recharge to the High Plains Aquifer and attempted to identify spatially where it may occur. In general, recharge can vary greatly in space and time and is an inherently difficult quantity to measure. Estimated recharge quantities, in units of inches or millimeters per year, have ranged widely. However, there is a consensus that what natural recharge does occur is dominated by infiltration though playas of accumulated precipitation. Regardless of the amount of recharge, it has been and continues to be much less than the amount of water withdrawn from the aquifer by pumping.

In this study, water levels measured in 121 wells from 2010–2015 in Curry and Roosevelt counties were compared with water levels from 2004–2007 in the same wells. Thirty-four water samples were collected from public supply, irrigation, and domestic wells in summer 2015 and analyzed for major ion chemistry, trace elements, and the stable isotopic composition of oxygen and hydrogen. Eleven of the samples were also analyzed for the environmental tracers tritium and carbon-14 to aid in understanding groundwater recharge. Historic water chemistry data were obtained from the U.S. Geological Survey and the New Mexico Environment Department.

Aside from progressively declining water levels, current (2010–2015) groundwater conditions are similar to those in 2004–2007. Regionally, groundwater flows east and southeast, except where flow is diverted into northwest-southeast trending groundwater troughs. These coincide with paleo channels eroded into bedrock at the base of the Ogallala Formation. Very low water table gradients result in slow groundwater flow velocities and long travel times. Based on the depth to water, some of the large playas appear to be sites of groundwater discharge. The maximum depth to water of greater than 450 ft. occurs north of Clovis. The depth to bedrock and the ground surface elevation are the main regional controls on the depth to water.

Declines in the thickness of the saturated portion of the aquifer since 2004-2007 are due to the long term trend of groundwater withdrawals greatly exceeding recharge. In some areas, the High Plains Aquifer has been dewatered down to the underlying bedrock. The median water level decline was 4.2 ft. from 2004-2007 to 2010-2015. Ninety-one of the 121 wells experienced net water level declines and 30 experienced net rises over the time interval reviewed.

The apparent change in the volume of water in the aquifer from 2004–2007 to 2010–2015 is a loss of 1,943,105 acre-feet. The average apparent net change in water volume over the study area is a loss of 277,586 acre-feet per year. Spatially delineated yearly apparent losses and gains of water in the study area correlate reasonably well with independent estimates of groundwater withdrawals and recharge. This correlation is quite tentative however, due to the limited amount of well data, and the numerous assumptions required for these independent estimates to be considered as equivalent. A conservative interpretation of the water level data is that the estimates of groundwater withdrawals (discharge) are generally in accord with independent estimates, groundwater withdrawal estimates are much more robust than the estimates of recharge, and that withdrawals continue to be several times the amount of recharge, resulting in net losses of water in storage.

Water samples from five wells had concentrations of several chemical constituents that exceeded maximum contaminant levels recommended for drinking water. Samples from

three of these wells also exceeded some secondary drinking water recommendations for other constituents. Concentrations of other analyzed chemical constituents in these and the remaining samples are within acceptable ranges for drinking water.

Water chemistry shows regional differences, with homogeneous chemistry north of the Portales Valley, and great variety to the south. Processes affecting water chemistry may include dissolution of solutes in the soil and unsaturated zone, evapotranspiration of recharge water prior to infiltration, reaction with aquifer materials during groundwater flow, and mixing with water derived from bedrock units beneath the Ogallala Formation. Evaluating the relative importance of these processes is difficult, and they probably vary spatially. There have not been large changes in groundwater chemistry since the 1950s.

Water chemistry and environmental tracer data are consistent with some recharge occurring via return of irrigation water to the aquifer. This is not "new" water added to the aquifer, but rather a return of some of the groundwater previously withdrawn for agricultural use. There is no evidence of significant recharge occurring via infiltration of precipitation though playas, although this process has been shown to be the main recharge mechanism to the High Plains Aquifer in previous studies.

Irrigation return can introduce agricultural chemicals, pesticides, and other contaminants to the aquifer. Irrigation is widespread in the study area, and thus introduction of contaminants may be also. Given the regional importance of playas, their protection as potential recharge sources should be considered, and efforts made to keep them free of contaminants that could infiltrate to the aquifer along with any recharge water.

The data and interpretation in this study are consistent with many other studies throughout the southern High Plains, and indicate that groundwater withdrawals continue to greatly exceed recharge. The result is progressive declines of the quantity of groundwater in storage, resulting in water level declines.

With regard to the protection of the source water for the Curry and Roosevelt County region, the groundwater level declines indicate a concern for groundwater availability in the region. There is evidence of naturally occurring groundwater contaminants, such as arsenic and fluoride. Alternative groundwater options are limited in the area, as aquifers in the underlying bedrock have poor water quality, and limitations to pumping. There are no significant surface water resources. Addressing both water quantity and water quality concerns through increasing public awareness and education, with particular focus on irrigation practices, may help improve the situation. However, long-term, drastic water conservation measures across the broader region may be the most effective means of extending the useful life of the High Plains Aquifer. (Geoffrey C. Rawling, New Mexico Bureau of Geology and Mineral Resources)

Geology and Hydrology:

HYDROLOGIC SETTING AND DEFINING THE SOURCE WATER PROTECTION AREA

From New Mexico Bureau of Geology and Mineral Resources, Open File Report 590, by Geoffrey Rawling

The study area of Curry and Roosevelt counties lies within the Southern High Plains subdivision of the Great Plains physiographic province (Figures 1 and 2). The Portales Valley, an abandoned channel of the ancestral Pecos River (Pazzaglia and Hawley, 2004), bisects the study area into two disconnected, gently east-southeast sloping upland surfaces, together referred to as the Llano Estacado. Surface drainage development is almost nonexistent on these surfaces other than Running Water Draw and Frio Draw north of Clovis. However, shallow surface depressions (playas) are ubiquitous and often fill with ephemeral lakes after rainfall (Osterkamp and Wood, 1987; Wood and Osterkamp, 1987; Gustavson et al., 1995). Within the study area, the High Plains Aquifer occurs within the Miocene to early Pliocene-age (~20 to ~5 million years old) Ogallala Formation and overlying unconsolidated sandy and silty Quaternary (<1.8 million years old) deposits that are hydraulically connected to the Ogallala Formation (Cronin, 1969; Hart and McAda, 1985) (Figure 3). Hart and McAda (1985) identified regions where the High Plains Aquifer is not saturated, or the saturation is discontinuous. The Ogallala Formation is a vertically and laterally complex rock unit consisting of pebble- to cobble-gravel, sand, silt, and clay that is variably cemented by calcium carbonate and silica. Gravel clasts are composed of quartz and quartzite, chert, igneous and metamorphic rocks, and lesser limestone and abraded fossils. Cemented gravels forming conglomerate are common at the base of the unit (Bureau of Economic Geology, 1974; Bureau of Economic Geology, 1978). Sandy, pisolitic calcium carbonate soil, or caliche, is abundant at the top of the unit and may be up to several meters thick.

The Source Water Protection Area is the physical area around a drinking water source that the Source Water Protection Team defines as the focal point of the drinking water protection process. The localized and regional hydrogeology of the Source Water Protection Area provides valuable information on the intrinsic-susceptibility of the ground water resource. Intrinsic susceptibility is the ease with which water and contaminants can travel to and through an aquifer

The vulnerability of the public-supply well depends in part on groundwater vulnerability. Groundwater vulnerability is the likelihood that a contaminant will reach the water table or the depths used for public-water supply. A specific vulnerability refers to an assessment of groundwater vulnerability that identifies a particular, or specific, contaminant. An intrinsic vulnerability refers to an assessment for any contamination in general. Three factors influence groundwater vulnerability:

1. The presence of natural contaminant and/or manmade sources.
2. The combination of chemical and physical processes subsurface that affect contaminant concentrations; and
3. The intrinsic susceptibility of the groundwater resource.

Ground water vulnerability is a function not only of the properties of the ground water flow system but also of the proximity of contaminant sources, relative location of wells, and the fate and transport of the contaminant(s).

In addition to the factors influencing groundwater vulnerability, however, the public-supply well's vulnerability also depends on the nature of the well itself. The location, design, construction, operation, and maintenance are factors in determining the likelihood of contaminants' reaching a well.

Hydrologic Setting

The localized and regional hydrogeology of the Source Water Protection Area provides valuable information on groundwater vulnerability and the vulnerability of public-supply wells. Curry and Roosevelt Counties are located within an area of eastern New Mexico and west Texas known as the High Plains section of the Great Plains physiographic province. The physiography includes numerous shallow depressions, playa lakes, sand dunes, and small stream valleys. Sand hills are typical of Roosevelt County and are the most common geomorphic feature in the area around the Village of Causey. Grassland is the dominant vegetation. The natural grasslands have been affected by ranching and farming.

Some of the land is now under the USDA Farm Services Agency's Conservation Reserve Program (CRP). The CRP is a land conservation program intended to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat. Farmers plant species that will improve environmental health and quality rather than agricultural produce. They receive a yearly rental fee, and lands are enrolled in the CRP for 10-15 years (USDA FSA 2014).

Surface water flow for eastern New Mexico originates primarily in the higher elevations, as snowmelt during the spring and as monsoonal rainfall during the summer. According to the Office of the State Engineer's Northeast New Mexico Regional Water Plan (OSE 2007), currently surface water provides no drinking water in this region of New Mexico (Region 1).

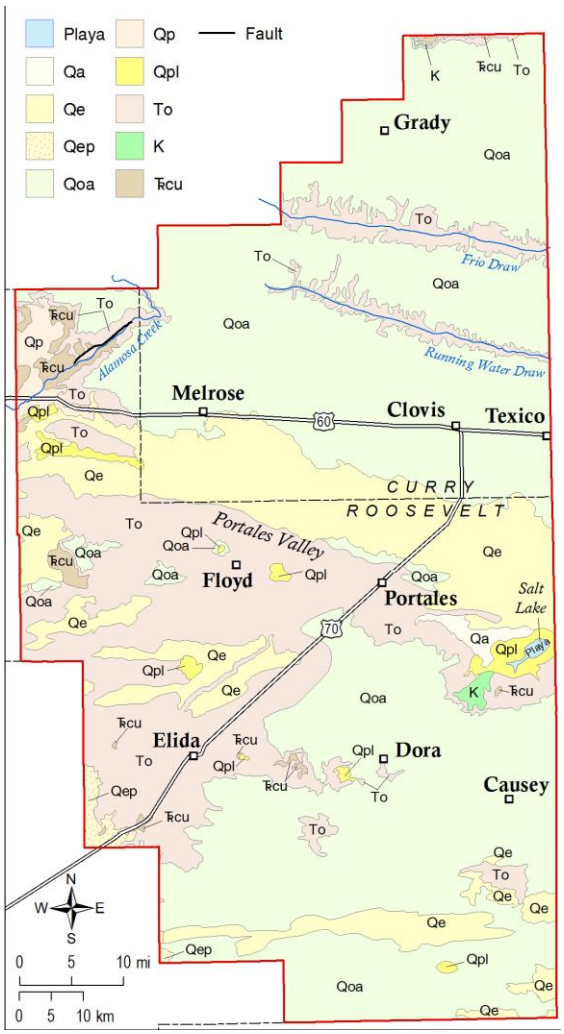
Groundwater supplies all communities in the region with their drinking water as well as stock and irrigation water. Groundwater occurs in the sedimentary rocks and alluvial valleys of the region. Water quality is highly variable.

The subsurface geology of the Southern High Plains aquifer includes the Chinle, Ogallala, and Blackwater Draw Formations. The Chinle Formation is the bottom of the unconfined Southern

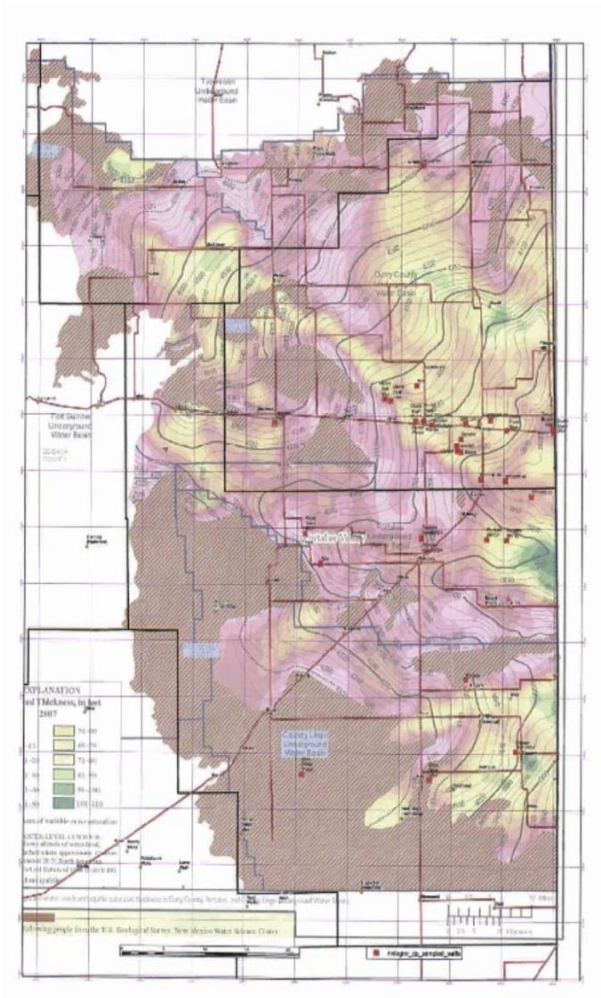
High Plains aquifer in this area, and generally slopes to the east-southeast, towards the Texas state line. The Ogallala Formation is the main water-yielding unit of the Southern High Plains aquifer and lies unconformably on top of the Chinle Formation. The Blackwater Draw Formation overlies the Ogallala Formation.

The Office of the State Engineer has declared eight groundwater basins, either wholly or in part, in Region 1. The water table in Curry County, Portales, and Roosevelt County shows the underground Water Basins slopes to the east-southeast, towards the Texas state line. Therefore, while groundwater generally flows to the east-southeast, towards Texas, the depth/vertical distance to groundwater increases to the northeast (Rawling, 2016, figure 9).

Source Water Protection Area



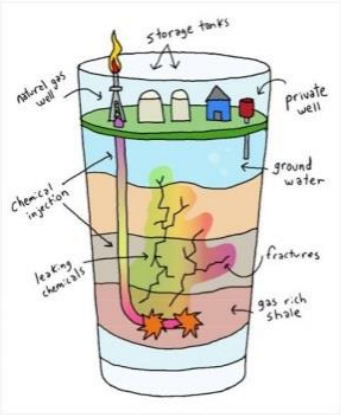
Map 1



Map 2

SECTION 3: IDENTYFYING POTENTIAL SOURCES OF CONTAMINATION AND WATER QUALITY CONCERNS

POTENTIAL SOURCES OF CONTAMINATION (PSOC)
(Refer to Map 2 on page 17)



What the frack?

A PSOC (Potential Source of Contamination) is any facility or activity that stores, uses, or produces, as a product or by-product, contaminants regulated by the Safe Drinking Water Act. The facilities or activities have the potential to release contaminants, which could pose a concern relative to drinking water sources. The most direct pathway of contamination into an aquifer is through surface water seepage such as storm water run-off along the supply well casings.

It is important to understand that a release may never occur from a potential contaminant source if best management practices (BMPs) are being used. Many PSOCs are regulated at the federal or state level, or both, to reduce the risk of release. When farming or ranching facility, or other property, is identified as a PSOC, it should not be interpreted to mean that it is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the activity, industry, or operation.

Types of Pollution

Nonpoint source (NPS) pollution is “any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act” (EPA 2014). Point source pollution refers to discrete, discernable pollution sources, such as those coming from ditches, containers, and concentrated animal feeding operations. NPS pollution comes from many different sources. As runoff from rainfall or snowmelt moves over the ground and infiltrates the subsurface, it picks up and carries away natural and human-made pollutants. It deposits the pollutants into lakes, rivers, wetlands, coastal waters, and underground sources of drinking water.

Regional water quality

Of the 34 wells sampled in the NM Bureau of Geology hydrogeology study, several wells in the study revealed elevated levels of contaminants, most of which are likely naturally occurring from the regional geology (see Rawling, 2016). These results include elevated levels of uranium, arsenic, sulfate, total dissolved solids, fluoride, and manganese. All well owners were notified of the water quality test results in writing. Private domestic wells are not regulated by the state of New Mexico or U.S. EPA to meet any drinking water standards, but these standards serve as a

comparison of the water quality results. Public supply wells are required to meet the state or U.S. water quality standards. Sampling performed in the hydrogeology study was performed prior to any treatment.

In general, the findings of the hydrogeology study (Rawling, 2016) showed that water quality is better north of the Portales Valley than south of it. Comparisons of historic water quality data with current sampling suggest that there has been little to no change in water quality since the 1950s.

Clovis / Portales water systems

The City of Clovis water system is owned and operated by EPCOR water, a privately owned company. It provides water service to approximately 16,000 billed customers in the Clovis service area. The Clovis district is located in Curry County in the high plains of eastern New Mexico, approximately nine (9) miles west of the Texas border. EPCOR's consumer confidence report states that the Clovis water system is well maintained and operated, and sources of drinking water are generally protected from potential sources of contamination based on well construction, hydrogeologic settings and system operations and management. Copies of the source water assessment can be obtained from the New Mexico Environment Department-Drinking Water Bureau 1 877-654-8720.

The City of Portales water system is owned and operated by the City of Portales. The City of Portales currently relies exclusively on pumping groundwater for its water supply. Groundwater levels in Portales' Blackwater Wellfield continued to decline in 2014 but by a slower rate due to two more wells being added to the system. The average depletion rate dropped to 1.5 feet/year in 2014 as compared with 1.8 feet/year in 2013 and 2.7 feet/year in 2012. The average remaining aquifer saturated thickness in 2014 was 35.6 feet but the average remaining useable saturated thickness (after accounting for pumping drawdown and a 5-foot buffer) was only 17.5 feet. Well yields have been declining along with the decreases in saturated thickness. In order to maintain adequate pumping capacity the City has embarked on an aggressive program to add new wells to the system. Since 2011 the City has converted 17 agricultural wells to municipal use at the average rate of about 4 wells per year. A similar rate of expansion will likely be needed into the future. Most of the former agricultural wells in the City's groundwater reserve have now been converted to municipal use and most of the future wells that will be needed to maintain an adequate pumping capacity will be new. It will be important to maintain a depletion rate of less than 2 feet/year to conserve existing groundwater supplies until water from Ute Reservoir becomes available. With regard to water resources considerations, local water resources are no longer believed to be sufficient to meet long-term needs. Demand management interventions in the form of water-conserving City ordinances, promotion of water conservation through rate structuring and example, water conservation education, and

wastewater reuse are being actively pursued and are community goals along with water loss reduction

Water Quality Monitoring

Elida, NM water monitoring

Federal rules state that all public drinking water systems must monitor their water supply for public health threats. In accordance with Federal and State regulatory statutes, the communities of Clovis and Portales samples in a regular basis for bacterial analysis and annually for listed SDWA analytes for Consumer Confidence Reporting.

The NMED Drinking Water Bureau is responsible for sample collection for routine chemical monitoring that is collected at sample locations just before the first customer in order to protect public health. Costs related to sample collection and testing for secondary contaminants and source (untreated well water) monitoring are the responsibility of individual water systems.

Non-regulatory Approaches to Preventing Contamination

The non-regulatory management approaches discussed here are intended to reach as broad a spectrum of the communities as possible. Protection of the communities' drinking water is possible only if the whole community cooperates to achieve protection.

Public Education

Public education is an essential tool for drinking water protection, and the majority of the non-regulatory approaches discussed below rely on public education for effective implementation. The Communities of Clovis and Portales Curry and Roosevelt Counties could provide its ranching, farming, and dairy community with information on this Source Water Protection Plan to help promote the necessity of protecting the water supply. Public education activities can include any one or a combination of the following: newspaper articles, drinking water protection messages attached to water bills, and school district activities. (**see Tab 8 for examples of educational materials).**

Another resource for public education is the New Mexico Farm*A*Syst (Farmstead Assessment System, http://aces.nmsu.edu/farmasyst/ accessed October 10, 2014). The New Mexico Farm*A*Syst is a voluntary groundwater protection program for New Mexico farms, ranches, and rural homeowners presented by the New Mexico State University Cooperative Extension Service, Plant Sciences Department. Factsheets and worksheets developed for the New Mexico Farm*A*Syst program are designed specifically for protection groundwater in ranching and farming settings. They are available via the New Mexico Farm*A*Syst website (http://aces.nmsu.edu/farmasyst/.

Abandoned and unused wells

All wells are a direct conduit to the groundwater and distribution system. Abandoned and unused wells often are not monitored or maintained properly, thus increasing the likelihood of source water contamination or cross contamination. These wells must be decommissioned properly. That means removing the well from active service and sealing it off from the from the distribution system and groundwater source. The standards for abandonment are set by the Office of the State Engineer.

Agricultural land

The use of pesticides, herbicides, fertilizers, manures, and other potentially dangerous substances can cause field leaching or runoff into surface and ground water. Nitrogen leaching into drinking water supplies above the MCLs can cause “blue baby syndrome” in infants less than 6 months old. Phosphorus from the fertilizer may affect the taste and the odor of drinking water and may require treatment. Pesticides contain organic and inorganic substances that are poisonous, if inhaled or consumed, pesticides can be hazardous to human health.

Community members should eliminate excess use of agricultural chemicals by planting native plants and grasses, which would require less fertilizer and water. The chemicals should be properly selected and properly applied. Application of chemicals should be timed with periods of maximum crop uptake. The use of chemicals should be avoided near wells, drainages, and

any type of surface waters. Items should be properly stored and disposed by following label directions stated on the product. Bulk storage of these substances should be avoided. Irrigation water should be managed so that runoff and leaching can be minimized.

Animal feeding Areas

Animal waste originates from a variety of sources; the most obvious comes from livestock animals. A study performed in the U.S. indicates that animal waste is generated 13 times greater than human waste. The environment can be affected by livestock waste through direct discharges, open feedlots, animal housing, and pastures. The greatest health concern from animal waste consists of pathogens such as Cryptosporidium and Giardia lamblia. These pathogens may cause serious gastrointestinal illness in healthy individuals, and may be fatal in people who have weak immune systems. Animal waste may also contain solids that increase turbidity and decrease the aesthetic value of water.

Diverting clean water away from manure piles is one way to avoid contamination of precipitation and surface runoff as it enters into drinking water sources. Residents can construct earthen ridges or terraces above the feedlots to divert the runoff away from these areas. Rain gutters and downspouts can also be placed on the rooftops of animal shelters.

Composting can assist in eliminating and reducing the volume of manure. Compost sites should be located away from Source Water Protection Areas to prevent leaching during precipitation events. They should also be placed on flat surfaces to prevent water collection or runoff. Composting should take place at proper temperatures and at a proper amount of time in order to kill the pathogens.

Borrow ditches, canals, and drainages

Ditches, arroyos, riverside drains, and streams are intimately linked with their adjacent groundwater formations. It is possible for contaminants such as pesticides, fertilizers, and salts, to enter the aquifer system through the arroyos, borrow and irrigation ditches, canals, drainages and irrigation ditches, as well as streams and creeks.

While it is difficult to prevent these nonpoint PSOCs, involving the individuals living near ditches in outreach activities regarding the Source Water Protection Area would be beneficial. Furthermore, the communities and counties of Curry and Roosevelt could monitor the condition of ditches and drainages, and follow the BMPs to prevent any contamination of its wells.

Pasture / Rangeland

Pasture or grazing management methods are available to keep livestock away from bodies of water. Fencing can be used to prevent damage to stream banks and to prevent livestock from

defecating in or near streams and wells. Providing alternate water sources and hardened stream crossings for livestock will assist in reducing the impact on water quality.

Residential septic systems

Improperly maintained or poorly constructed septic systems are a potential source of ground water contaminants including but not limited to coliform bacteria, nitrates, and household hazardous waste. Ground water contamination from septic tanks can cause waterborne disease outbreaks and other serious health effects. Bacteria and viruses present in the effluent can cause gastrointestinal illness, cholera, hepatitis A, blue baby syndrome, and typhoid if consumed. Inadequate operation and maintenance of septic systems can cause them to fail even if they have been properly installed. In addition, septic systems located in flood plains are prone to malfunction because of high water tables and periodic flooding.

Septic tank owners should continuously monitor the operation of their septic system. Septic tanks should be pumped and inspected periodically. Water conservation can also prevent the septic system from filling up too quickly and causing the leach field to fail. The state of New Mexico requires that individuals obtain a septic tank permit from the NMED before they install septic systems. NMED also has established setback requirements for the siting of septic systems. Septic tanks must be at least 100 feet from a community wellhead and the leach field must be at least 200 feet from the wellhead. The educational materials in Tab 8 include information regarding the proper care and maintenance of septic systems.

Roads

Roads allow for the movement of people, goods, and services important to our daily lives. However, road surfaces accumulate pollutants deposited from vehicles during travel. Typical pollutants associated with roads are nutrients, metals, oils and grease, salts, and volatile organic compounds. Road drainage systems also collect contaminants from atmospheric deposition, soil erosion, street dirt and liter, leaf litter and animal waste. Many of the substances that accumulate on roadways are toxic and have negative health effects on humans and the environment.

When a storm event happens pollutants are washed from the road surface – especially paved, impervious roads – into nearby surface waters, or infiltrate ground water. Potential spills of hazardous materials and fuels during transport or vehicular accidents also represent a risk to water quality. Dirt roads also can pose challenges to water quality.

Water Conservation

Encouraging water conservation efforts is another non-regulatory management approach that the rural communities around Clovis and Portales could pursue. The New Mexico Rural Water Association will assist the rural communities in their conservation efforts. Additionally, the

New Mexico Natural Resource Conservation Service conducts workshops on irrigation efficiency and using drought tolerant landscape designs.

The New Mexico Environment Department and the Eastern Plains Council of Governments (EPCOG) are collaborating on a Regional Source Water Protection Plan encompassing water systems in Curry and Roosevelt Counties. This Regional Source Water Protection Plan will emphasize water conservation and sustainability of water quality.

CONCLUSION

The Clovis and Portales water systems are in a good position to continue providing a safe and reliable drinking water supply to its residents. The water system personnel recognize that the most effective way to protect their water supply is to prevent contamination. This plan serves the interests of the residents by protecting their drinking water supply at minimal cost to consumers, while maintaining compliance with drinking water program regulations. With the continued dedication of the water system personnel and a heightened awareness of ground water protection by residents and local businesses, the communities can likely have a clean, reliable water supply for years to come.

WATER PLANNING

Water planning in New Mexico is complicated for a number of reasons. Our state's terrain is considerably more varied than our western neighbors (with mountain, high plains and desert). Consequently, from a hydrological standpoint, water is managed differently throughout the state.

New Mexico is also home to 21 tribes and pueblos, each with water rights. And, as noted before, over 71,000 defendants await resolution to pending water rights adjudications.(Office of State Engineer website www.ose.state.nm.us.

Another challenge is resources. We are not a wealthy state. New Mexico funds and staffs water planning at considerably lower levels than our neighbors. Wyoming, for example, allocated $3.7 million for the development of seven regional water plans, followed by $500,000 per year for ongoing planning and updates. Wyoming also employs five water planners. Colorado spends about $1 million annually for regional planning, which is led by the Office of the State Engineer. Our wealthiest neighbor, Texas, spent $21 million to develop 16 regional water plans and $15 million on its state plan – plus annual appropriations for updates and maintenance. The table in this section illustrates New Mexico's funding levels. (http://uttoncenter.unm.edu/pdfs/Water-Matters-2013/State%20and%20Regional%20Water%20Planning%20in%20NM%20.pdf.)

State Funding for New Mexico Water Planning

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Funding amount	$55,000	$55,000	$55,000	$300,000 for state water planning update	$0	$0	$0	$400,000	$275,000
Number of water planners	1	1	1	2	2	1	1	1	1

Groundwater

Groundwater supplies more than 90% of the water currently used in the Region and is the sole source of drinking water supplies for all communities and rural residences in the planning region (water.usgs.gov/edu/wugw.html). The Region (Curry, De Baca, Guadalupe, Harding, Quay, Roosevelt, and Union Counties) contains all or part of eight separate groundwater basins declared by the New Mexico Office of the State Engineer (OSE) (Figure ES-4).

Local groundwater resources include the Ogallala Formation, also called the High Plains aquifer in parts of the region, (Figure ES-5) sandstone units including the Dakota, Morrison, and Entrada formations in Union, Harding, and Quay Counties, and the Dockum Group (Chinle/Redonda Formation and Santa Rosa Sandstone) in Quay County. Groundwater sustainability concerns are centered on areas supplied by the Ogallala aquifer, as it supplies the bulk of ground water use in the Region yet exhibits the most significant water level declines. In 2000, the maximum saturated thickness of the Ogallala aquifer in New Mexico was 200 feet. Concerns about the sustainability of the Ogallala aquifer are most acute in Curry and Roosevelt Counties, particularly near Clovis, Texico, and Portales, where water levels decline at rates of more than 2 feet per year. Aquifer sustainability is less of an issue in most of Harding and Quay Counties, where Ogallala water levels appear to be fairly stable.

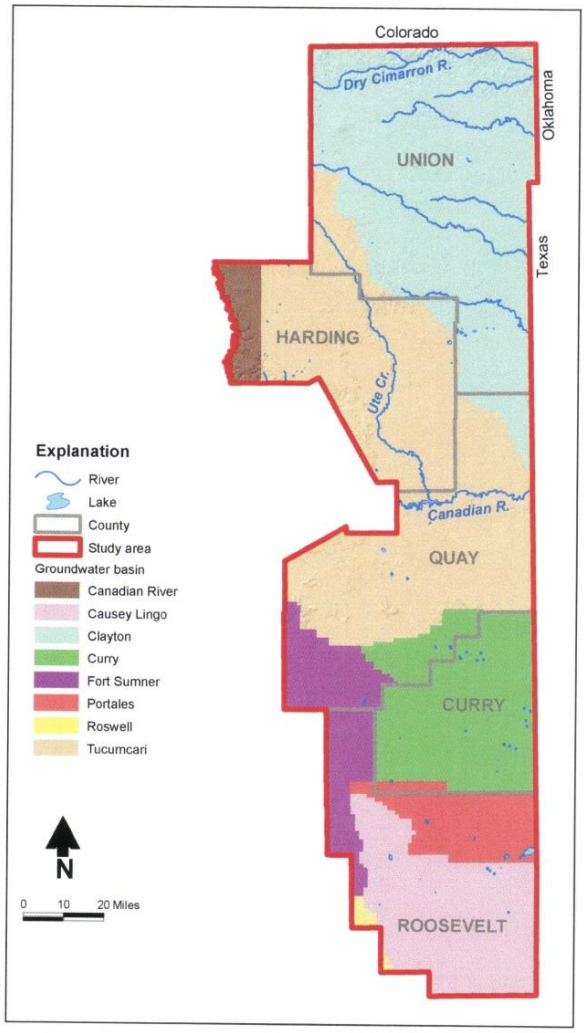


Figure ES-4. OSE-declared groundwater basins

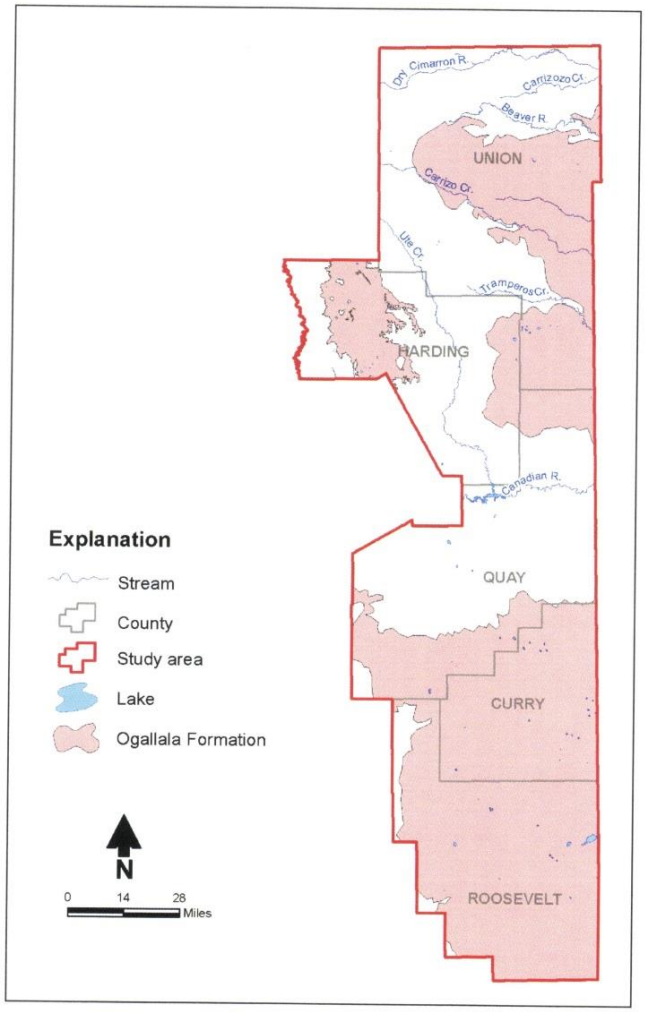


Figure ES-5. Extent of Ogallala aquifer in Northeast Region

Several modeling efforts have been conducted to simulate changes in water levels based on current economic trends, governmental policies, and pumping rates, and results have indicated average saturated thicknesses as little as 25 feet in the Southern Ogallala by the year 2020 and 50 feet in the central portion of the aquifer by 2050, with many areas of the Ogallala completely dewatered. Modeling of the Southern Ogallala indicated that significantly decreasing current pumping could prolong the life of the aquifer (https://twdb.texas.gov/groundwater/models/gam/oglll_s/ogll_s.asp).

Current Regional Water Demand

- Public and domestic water supply
- Irrigated agriculture
- Livestock
- Evaporation (includes stock-pond and playa evaporation during 1975 and stock-pond evaporation through 1985)

- Other (commercial, mining, power, industrial and, during 1975 through 1985, fisheries, military, and recreation)

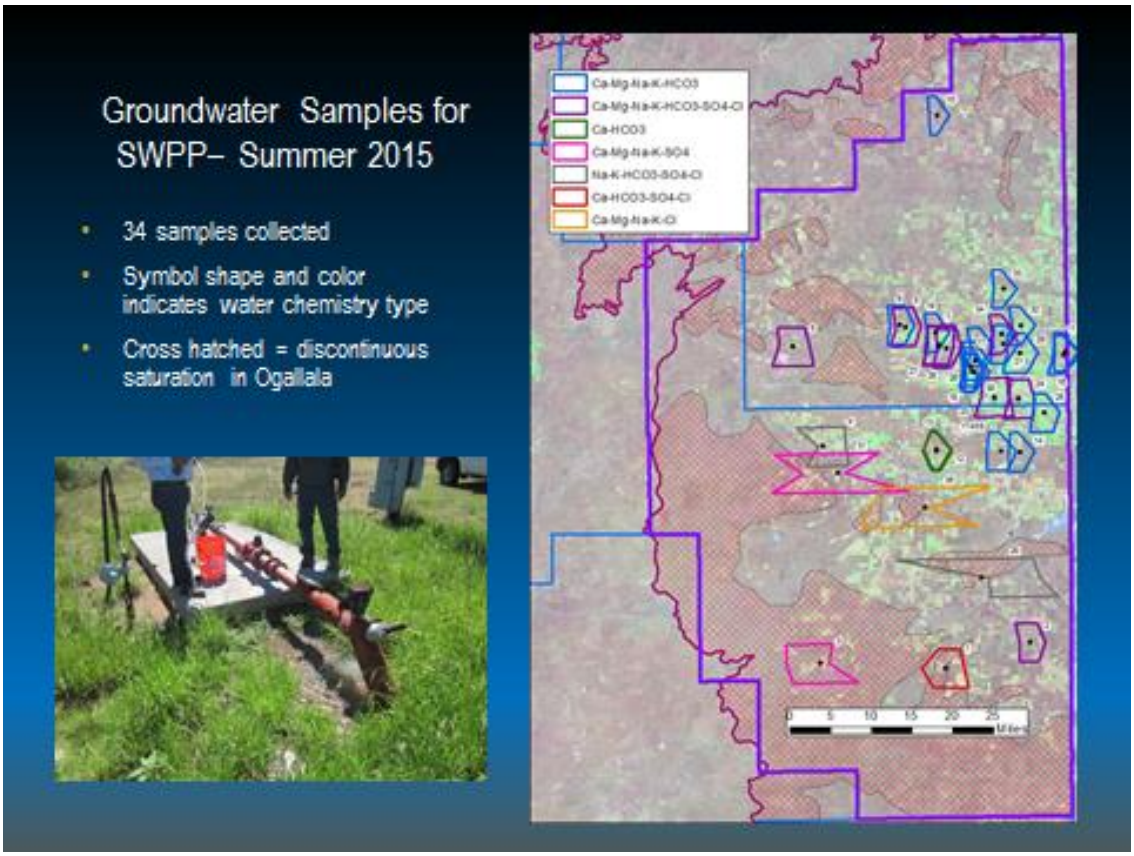
Well Water Testing Summary

In order to characterize the ambient groundwater conditions in the region of the SWPP, the NM Bureau of Geology and Mineral Resources collected 34 water samples from public and private wells around the region. This water quality testing (described above and in Rawling, 2016) was useful in finding regions of naturally occurring contaminants that must be considered in water planning efforts. For public supply, if groundwater contains elevated levels of contaminants, it must be treated prior to public use. For private domestic wells, it is incumbent upon the well owner to treat their water to safe levels for consumption and use.

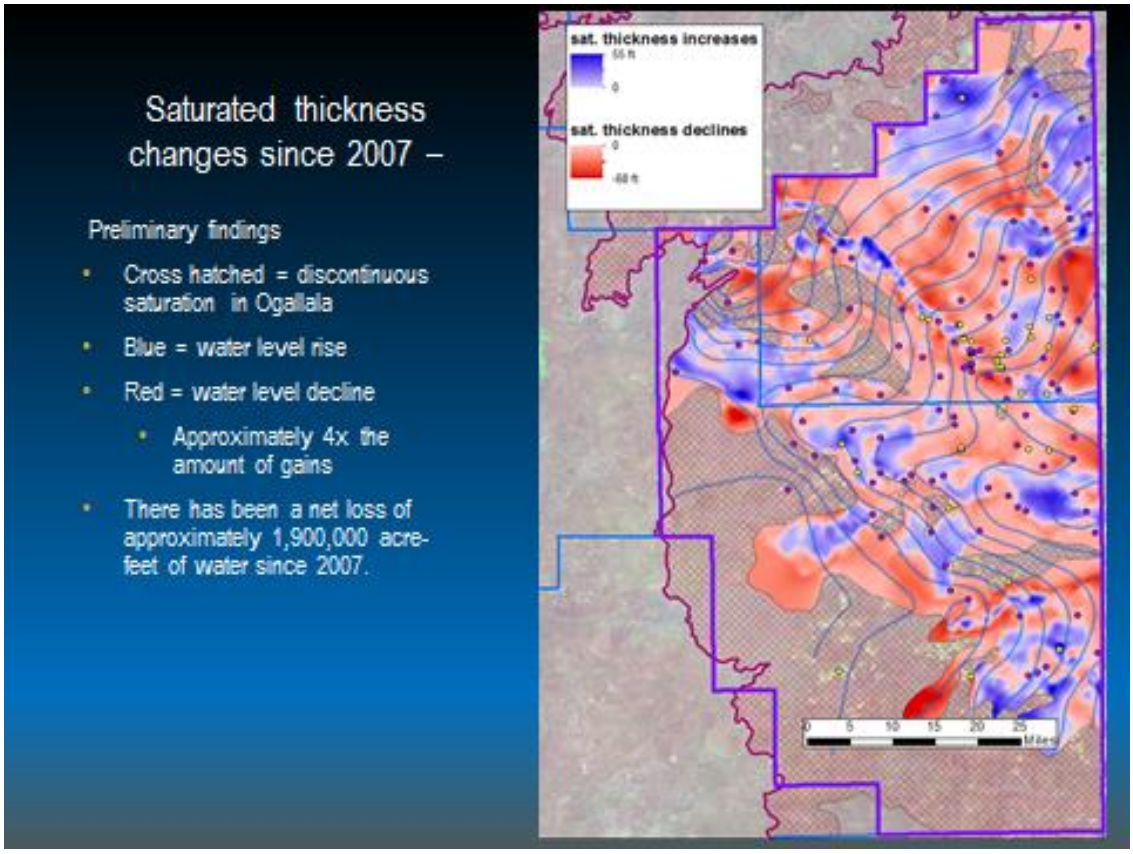
Causey, NM Water Well samples obtained (CP-0002)


Dora, NM domestic well water sampling (CP-0002)


Water sampling from private irrigation well (CP-0008) near the paleo channel



Presentation from Geoff Rawling, 2016, well/water chemistry map



SECTION 4: EXISTING DRINKING WATER QUALITY AND QUANTITY MANAGEMENT IN THE REGION

WATER CONSERVATION PLANS

Clovis/Portales Water Systems

CITY OF PORTALES CONSERVATION PLAN:

http://www.portalesnm.gov/egov/documents/1450710839_46567.pdf

The City of Portales owns their water system. The Portales Mayor and City Council recognize that water is both an essential element of life and a limited resource. The City of Portales has adopted a water conservation plan as well as a water conservation and drought contingency plan by resolution that outlines specific tasks and implementation strategies to be undertaken for the purposes of conserving and providing sustainable water usage within the city limits. The city has performed a review of the water conservation needs within the City of Portales and has developed an action plan for water conservation and drought management.

Purpose and Rationale Purpose: The goal of the plan is to conserve water resources and to provide drought management restrictions to become applicable when water availability, pumping conditions, temperature and weather considerations, and other factors indicate the need for restriction of water consumption in order to preserve and protect water supplies for essential needs.

The City of Portales finds that water is a precious natural resource and both short-term and long-term supply conditions require that water be conserved. The City of Portales further finds that when conditions exist that threaten the supply and availability of water for essential use, restrictions must be imposed to conserve water consumption through mandatory restrictions. The City of Portales adopted the following action plan for water conservation and drought management:

Water Conservation and Drought Contingency Plan Policy: It is the policy of the City of Portales to enact water conservation practices in order to insure and protect the availability of the supply of water for all residents and consumers of the City. Ongoing voluntary water conservation measures described herein shall be in effect to preserve the availability of the water supply. During periods of drought, or at any time during which the supply, pumping capacity, weather conditions and weather forecasts indicate that the availability of water is

threatened or compromised, the mandatory measures set forth in this plan shall become effective and shall be implemented and enforced in the manner provided herein. Ongoing Water Conservation Education and Community Outreach Efforts: The City of Portales encourages residents and businesses to conserve water, an essential element for life and a limited resource, at every available opportunity including water saving tips for inside the home and outdoors. As part of a concerted public education campaign, the City of Portales Water Department will help City management distribute the annual voluntary watering schedule for April through October and be able to communicate possible ways in which to conserve water to residents and businesses including the following: finding, fixing and preventing indoor water leaks, installing water-saving devices, purchasing water-efficient appliances, outdoor and indoor water saving information with estimated savings and water reuse potentialities. The City of Portales will encourage residents and business owners to contact City Hall to obtain or review copies of water use and conservation information, to use the information and links on the City of Portales website, and pursue additional information and educational programs on water conservation in our local area. In conjunction with City Management, the City of Portales Water Department will create reference information locations for residents to refer to on the following information: local businesses and online references that sell/provide water efficient household items as well as provide information on how to reduce outdoor water use such as adjusting sprinklers to avoid watering pavement and sidewalks; avoiding daytime watering or watering during periods of high wind; using mulch and drip irrigation or soaker hoses on flowers, shrubs and gardens; and where not to plant grass and where to hand-water. The City of Portales will make accessible to the public information on water use and conservation in the following areas: a comprehensive guide to xeriscaping, or water efficient landscaping that is appropriate to the natural environment; rainwater harvesting techniques; irrigation basics, design and installation techniques; and indoor and outdoor water conservation information including brochures and flyers. It is suggested to water consumers in the City of Portales that the following recommended practices/restrictions be followed year-round on a voluntary basis: ♦ Landscape watering is discouraged on Mondays. 2 ♦ Landscape watering is discouraged between the hours of 10:00 a.m. and 6:00 p.m. all other days of the week. ♦ Shutoff nozzles are recommended on hoses used for hand-watering. ♦ Washing a hard surface is discouraged (e.g. driveways, sidewalks, parking lots, outdoor eating areas). ♦ Fugitive water shall not be permitted to leave the intended irrigation area. Water Savings Required. Water restriction stages shall be determined when the possibility exists that the City of Portales water utility will not be able to meet all of the water demands of its customers. Water usage restrictions designated in three (3) stages of water rationing and restriction as identified below shall be enacted when the water elevation level in the City supply tanks fall below levels specified in Appendix A, attached hereto and made a part of this plan: A) Stage 1 - Voluntary Water Conservation. Voluntary water conservation shall be in effect on an ongoing basis due to high seasonal usage demands April through October or whenever the City Manager declares that the

water supply or capacity of the water works system to deliver water is approaching levels at which water rationing will be required to preserve the ability of the City utility to deliver a necessary amount of water to each water user. The procedure for Stage 1 shall be as follows: 1) The City Manager or designee will make public announcements in the news media that Stage 1 voluntary water conservation is in effect. The announcements will include a description of the provisions in effect. 2) Users will be urged to conserve water in every way possible, in their homes and in their businesses. 3) People will be urged to avoid sprinkling their lawns and avoid watering gardens, shrubs or trees in the manner set forth in Appendix A. B) Stage 2 – Mandatory Water Rationing. Mandatory water rationing will be in effect whenever the water elevation level in the City supply tanks fall below twenty feet and/ or continues falling below the twenty foot mark. The following requirements will be in effect: 1) The City Manager or designee will make public announcements through the news media concerning Stage 2 water rationing, whenever Stage 2 water rationing is in effect. The announcement will include a description of the restrictions. The announcement of mandatory water rationing will require City Council concurrence within seventy-two (72) hours to remain in effect. Concurrence will be sought at the next regularly scheduled City Council meeting if said meeting occurs within the stated seventy-two (72) hour time frame or at a special meeting called with public notice of said special meeting being given at least twenty-four (24) hours prior to said meeting. 2) All restrictions identified in Appendix A will become effective until Stage 2 water rationing is cancelled by the City Manager or upon expiration of the seventy-two (72) hour period for City Manager obtaining City Council concurrence without said concurrence being granted. C) Stage 3 – Emergency Water Rationing. Stage 3 water rationing will be in effect whenever the water elevation level in the City supply tanks fall below 18 feet and/ or continues falling below the 18 foot mark with a declaration of a water emergency by the City Council. The following requirements will be in effect:

1) The City Manager will present to the City Council such information as is available regarding the water elevation level deficiency and request authority from the City Council to engage Stage 3 water rationing restrictions at the next regularly scheduled public meeting if said meeting occurs within twenty-four (24) hours of the emergency water elevation level deficiency occurring or at an emergency meeting called with as much advance notice as possible for the express purpose of dealing with the water elevation level emergency.

2) The City Council shall declare Stage 3 water rationing and direct enforcement of the restrictions set forth in Appendix A. 3) The City Manager or designee will make public announcements that Stage 3 water rationing is in effect in the news media, which restrictions shall continue in effect until the City Manager determines that the water level in the City supply tanks has raised above the stage 2 designation.

Refer to tab Number: 5

CITY OF CLOVIS WATER CONSERVATION PLAN:

1. Introduction

The City of Clovis relies entirely on groundwater out of the Ogallala aquifer for its municipal water supply. Water levels in the Ogallala are declining, indicating that the aquifer is being mined. The City of Clovis (City) (Figure 1) anticipates future growth and further declines in the amount of available groundwater and wants to ensure that existing available water supplies will be sufficient to meet future demand. Water conservation provides one option for how to meet future demand with existing supplies.

Water conservation is an important component of City of Clovis water planning for several reasons:

- Water conservation can prevent or delay the need for expensive capital expenditures for developing new water supplies and acquiring additional water rights.
- The New Mexico water code calls for conservation planning as a prerequisite for applying for funding from key state funding agencies (NMSA 1978, Section 72-14-3.2).
- The New Mexico Office of the State Engineer (OSE) evaluates water rights transactions (including changes in point of diversion or place or purpose of use, as well as new permit applications) with respect to whether the transaction will impair existing water rights, and whether it is consistent with public welfare and conservation. For example, water suppliers with large losses in their system, high per capita water use rates, or other indicators of high water use may be required to address these issues before the OSE will approve an application to appropriate additional water. This requirement is part of an overall strategy by the State to ensure that water is being used wisely before additional water rights are permitted.

This water conservation plan addresses the above state and federal conservation requirements and provides multiple conservation methods that can reduce per capita demand. This plan will assist the City of Clovis in making efficient use of its existing resources by allowing for a reduction in groundwater withdrawals thus extending the available water supply.

2. Water System Summary

City water supply wells are completed in the Ogallala aquifer, the principal source of groundwater for all of Curry County (Lansford et al., 1982). Aquifer sustainability is a concern, and although other measures will be pursued (e.g., purchasing additional water rights, developing additional production wells [NMAW, 2004], and/or acquiring Ute Reservoir water through the Eastern New Mexico Rural Water System [ENMRWS]), adequacy of future water supply for Clovis will depend upon water conservation.

The U.S. Census Bureau reported that 37,775 people lived in Clovis in 2010, a 15.6 percent increase over the total population in 2000 (U.S. Census, 2010). The 2010 census listed 15,573 housing units in Clovis, NM with an average household size of 2.57 people (U.S. Census, 2010). Based on the rates of growth predicted for Curry County as presented in the *Northeast New Mexico Regional Water Plan,* the population of Clovis could be as high as 72,000 in 2050; or more than twice the population.

EPCOR Water owns and operates the water utility in Clovis. Total metered water sales were 2.294 billion gallons in 2006 (Table 1), with an average total metered water sales of 6.286 million gallons per day (Wright, 2007). Per capita use was 192 gallons per day for all sectors and 126 gallons per day in the residential sector in 2006 (based on 2006 metered water sales and the 2000 population). Total metered water sales were higher in 2006 in Clovis than in the previous three years, with a pronounced spike in metered sales for June 2006.

Water conservation could potentially reduce the amount of money spent on water by the City and school district, in addition to prolonging the life of the City's supply.

3. Wastewater Re-Use

The City of Clovis treats an average of 2.8 to 3 million gallons of wastewater per day; this volume has remained relatively unchanged in the last 13 years. The lowest average volume of wastewater treated since 1994 was 2.6 million gallons per day (Thomas, 2007). The Southwest Cheese plant produces an additional 1.2 million gallons of wastewater per day (Thomas, 2007), and while Southwest Cheese plans to send their wastewater to the City wastewater treatment plant in the future (Wang, 2007), they currently re-use their effluent for irrigation because the levels of nitrogen and phosphorus in their effluent do not meet current water quality standards (George, 2007).

All City of Clovis wastewater is re-used. The City currently provides all of its treated wastewater to several customers, primarily to S&H Farms, which uses it for irrigation. Wastewater effluent is reused from March 1 through November 30 each year. The City plans to develop the additional infrastructure to irrigate City-owned land with its treated effluent. Implementation of such a program would allow the City to reduce use of potable water for irrigation of City parks and golf courses. The potential and feasibility for wastewater re-use in Clovis is currently being evaluated by Camp, Dresser, and McKee (CDM), and current estimates indicate that wastewater re-use demand could be as much as 2.85 million gallons per day (McHaley, 2007).

Refer to tab Number: 6

The City of Portales, New Mexico and the Village of Causey have both completed Source Water Protection Plans for their communities.

CANNON AIR FORCE BASE

Cannon AFB water quality report complies with state and U.S. Environmental Protection Agency (EPA) regulations. In it you will find information on:

www.cannon.af.mil/News/ArticleDisplay/tabid/136/Article/602528/2014-water-quality-report.aspx

- **Where your water comes from**
- **Protecting your water**
- **What is in your water**

During the last five years, samples were taken to test for 83 various constituents at numerous sampling points in the water system. Bioenvironmental Engineering compiled the information in this report from the drinking water results received from state labs certified by the New Mexico Environment Department (NMED).

An important part of our day-to-day operations is providing high-quality, safe, reliable drinking water to our Air Commandos, their families, and our guests. This report is our way of showing you the results of these efforts.

This report summarizes the results of sampling by Bioenvironmental Engineering (BE) and the on-going operations by Civil Engineering. All of the Cannon AFB water samples are collected on base and sent to a state-certified drinking water laboratory for analysis.

In 2014, the water that Cannon AFB provided to the base met or surpassed all but one federal and state primary drinking water quality regulations. Two routine bacteriological water samples submitted for July 2014 tested positive for total coliform. This led to the violation of 40 Code of Federal Regulations (CFR) 141.63. In accordance with 40 CFR 141.63 (a)(2), 'for a system which collects fewer than 40 samples/month, if no more than one sample collected during a month is total coliform-positive the system is in compliance with the Maximum Contaminant Level (MCL) for total coliforms." However, due to the two positive samples, the 27 SOW was required to give notice to the public within 30 days of notification of violation. The SOW received the notice of violation on 17 July, and the public notice was distributed on 23 July. We took repeat samples and neither total nor fecal coliform was detected confirming the safety of the water.

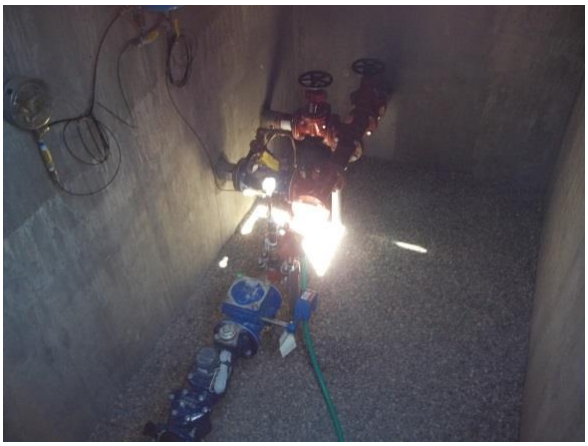
This track record of sustained achievement is a testimony to the hard work and dedication of the Cannon AFB personnel who provide you and your families with high quality water year in and year out.

Access to clean, safe water is important to all of us here at Cannon AFB. We take pride in ensuring that we take care of you and your water supply.

Cannon AFB uses groundwater as the source for all potable water supplied to the installation and Chavez housing areas. Water is extracted from the Ogallala Aquifer using seven wells located on base property. This water is disinfected with chlorine and delivered to the consumer through a distribution system consisting of a network of water towers and underground pipes. Based on the size of our system and the number of consumers, the base wells are registered with the NM Environmental Department as community water sources.

Groundwater wells:

How do we protect the groundwater? We protect source water by ensuring proper well construction, system operations, and additional environmental management practices. Below are two examples of clean, well-constructed, and easy to maintain.



How can you help? Take hazardous household chemicals to hazardous material collection centers and limit your pesticide and fertilizer use.

Source Water Assessment:

The Cannon AFB water system is well maintained and operated by the Civil Engineer Squadron. The aquifer is protected from potential sources of contamination based on well construction, hydrogeologic settings, and system operations and management.

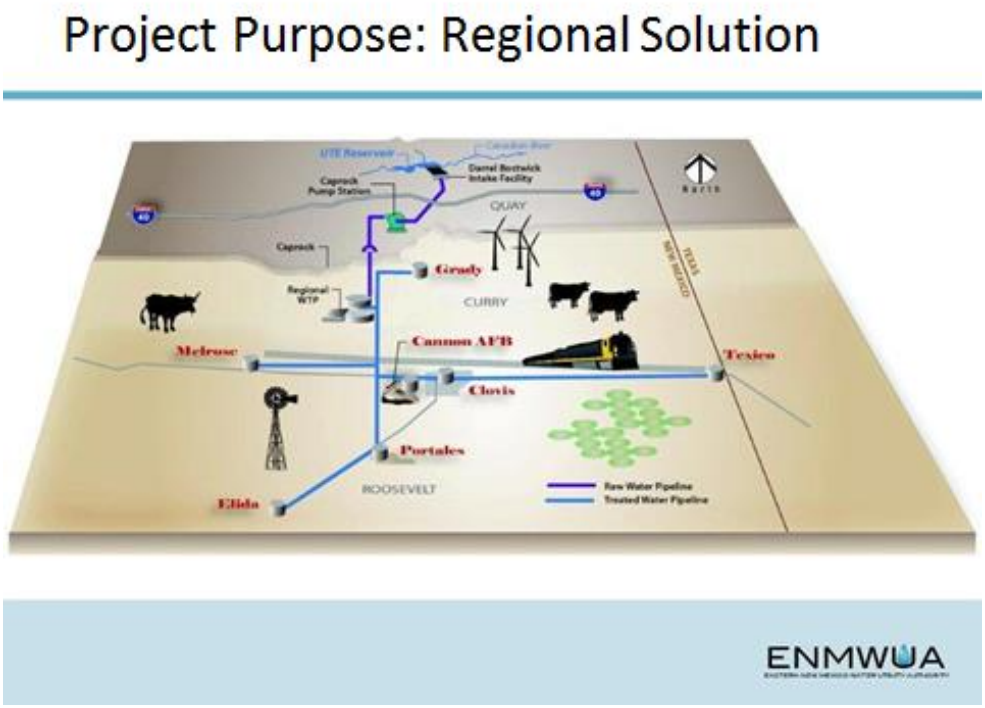
The susceptibility rank of a water system is based upon the number of potential sources of contamination and how well source water is protected. Cannon AFB's susceptibility rank is **Moderate.** If you would like to obtain a copy of the Source Water Assessment report or discuss its findings, please contact Bioenvironmental Engineering at 575-784-4063.

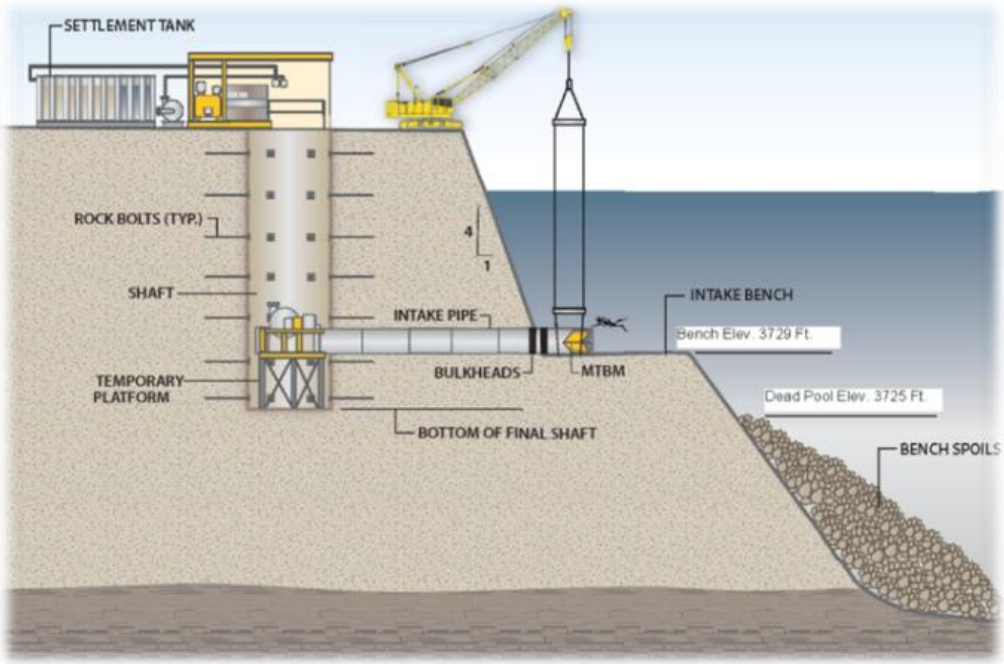
Refer to Tab Number: 4

Ute Water Pipeline Project:

ENMWUA

EASTERN NEW MEXICO WATER UTILITY AUTHORITY

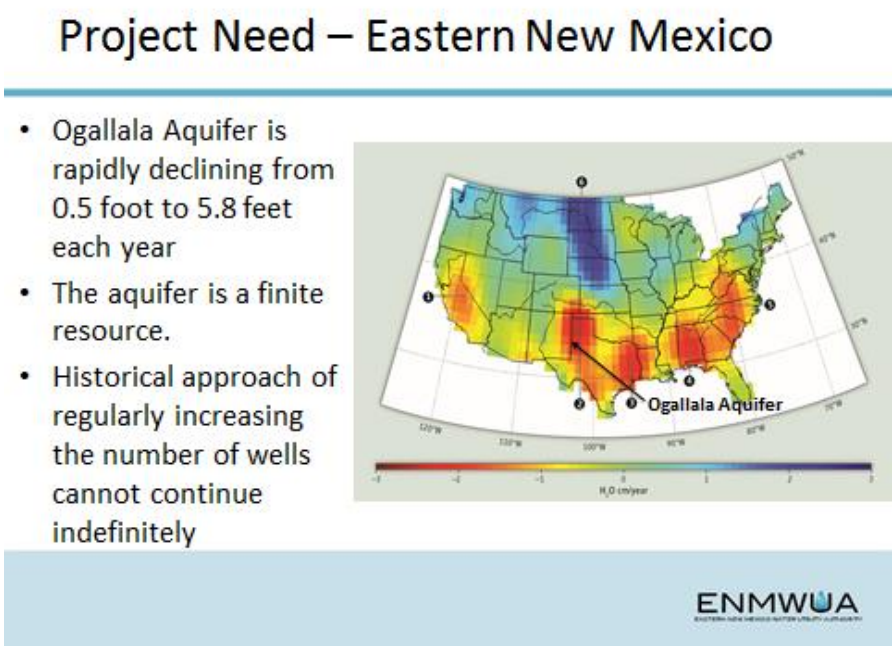


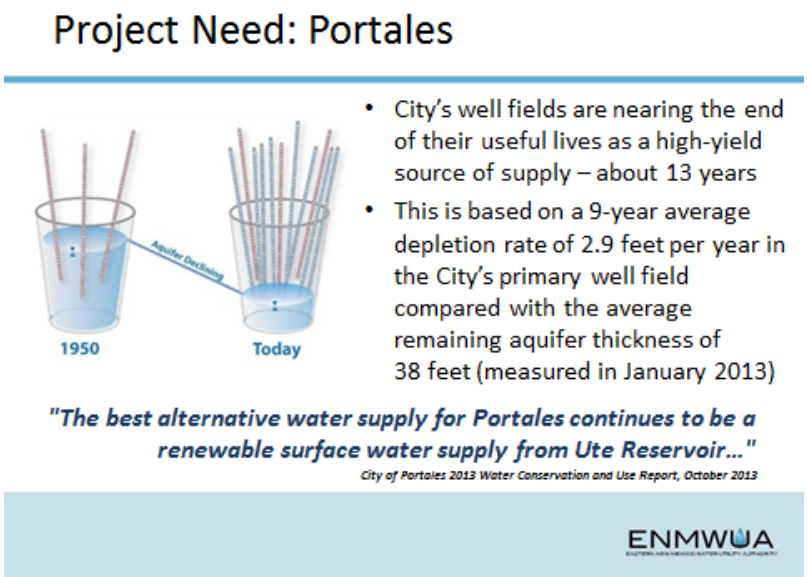


Intake structure completed – Ute Lake, Logan NM

Project background and description:

Water levels in the Ogallala aquifer below Clovis, Portales, and surrounding communities have declined in excess of 100 feet in the past decades. In addition to the decline in water level (as much as 6 feet per year in some places), there is evidence of deteriorating water quality. Aggressive private and public water conservation measures have been and continue to be implemented. However, hydrologic experts from the U.S. Geological Survey has conducted numerous detailed investigations of the entire High Plains Aquifer and predict (ENMWUA.com/FAQ) the groundwater supply will not be able to sustain municipal activities in the near future. (Weeks et al.,1998; Luckey et al.,1981; Weeks and Gutentag, 1981) Extensive studies of water supply alternatives have been completed over the last 50 years. Studies completed in 2005 and 2006, The U.S. Geological Survey continues to regularly monitor water levels across the High Plains (USGS) in conjunction with local and state agencies, and periodically produces reports documenting water level changes (e.g. McGuire, 2007; McGuire 2011; McGuire et ak., 2012. The most recent water levels studies in Curry and Roosevelt Counties., was conducted by Tillery (2008). and using the most current technology and data, thoroughly evaluated the most feasible alternatives. These ranged from diverting and treating water from Ute Reservoir; importing groundwater from Texas; pumping and treating brackish groundwater from underlying aquifers in Curry County; and continuing with the status quo (pumping groundwater from the Ogallala aquifer). The alternative to divert, treat and convey renewable surface water from Ute Reservoir was found to have the lowest overall cost and greatest benefit. The Eastern New Mexico Rural Water System (ENMRWS) project includes a water intake facility to divert surface water from Ute Reservoir; a water treatment facility with an average capacity of 15 million gallons per day (mgd) and peak capacity of 28 mgd; over 90 miles of water supply pipes; and over 60 miles of lateral pipes to serve Grady, Melrose, Texico, Clovis, Portales, Elida, Curry County, Roosevelt County and Cannon Air Force Base. Its purpose is to address municipal and industrial water supply issues resulting from declining and deteriorating groundwater (aquifer) resources.





ENMRWS project funding:

The project will be paid for with a combination of federal, state, and local funds. The current financial model is based on a 75% federal, 15% state, and 10% local contribution. The ENMRWS project was federally authorized in 2009. This authorization allows the Eastern New Mexico Water Utility Authority (ENMWUA) to receive federal funding, which is vital to the success and completion of this project. The Authority works closely with local leaders, state legislators, and our New Mexico congressional delegation to secure continued funding for the project. Recognizing the critical need for this project, the State of New Mexico, the federal government, and members communities of the ENMWUA combined have invested over $48 million for

program management, design, and construction. In May 2014, the New Mexico Water Trust Board awarded an additional $3.2 million to continue the program management, design, and construction. The majority of this investment has been in grants. Member communities of the ENMWUA have also provided significant financial and in-kind services including program and financial management, legal support, and administrative services.

Status of the design of the ENMRWS project:

Construction of the first phase of the Ute Reservoir water intake facility has been completed. The consulting engineer designing the project (CH2M HILL) has completed the final design of the water supply pipeline connecting Clovis and Cannon Air Force Base. The water supply pipeline that will connect Portales is currently being designed and will be in construction in the next two years.

SECTION 5: ACTION PLANNING

MANAGING THE SOURCE WATER PROTECTION AREAS

Protective strategies integrate the information collected in the steps of identifying the Source Water Protection Areas, inventorying PSOCs within them, and providing workable strategies for preventing, detecting, and responding to ground water contamination within a Source Water Protection Area. These strategies range from local regulations or ordinances to public education and voluntary action. The Clovis, Curry County and Portales, Roosevelt County areas could use a combination of regulatory and non-regulatory methods to manage PSOCs identified within its Source Water Protection Areas.

Regulatory methods can include zoning ordinances that address land uses, design standards on new or existing facilities, and mandatory use of certain practices that reduce or prevent pollution. Non-regulatory approaches rely on voluntary implementation to be effective. At the core of any non-regulatory method is information and education. The ultimate goal of public education is to inform the public so they can support drinking water protection efforts.

Source Water Monitoring and Protection Plan

Sustainability Issues

Curry/Roosevelt Counties are two of many communities in New Mexico where the sustainability of water quantity is the most important Source Water Protection issue, more than potential contamination. The ongoing severe drought has decreased the amount of water available from surface water sources, and has created wildfire hazards.

Public Outreach and Education

With regard to the protection of the source water for the Curry and Roosevelt County region, the groundwater level declines indicate a concern for groundwater availability in the region. There is evidence of naturally occurring groundwater contaminants, such as arsenic and fluoride. Alternative groundwater options are limited in the area, as aquifers in the underlying bedrock have poor water quality, and limitations to pumping. There are no significant surface water resources. Addressing both water quantity and water quality concerns through increasing public awareness and education, with particular focus on irrigation practices, may help improve the situation. However, long-term, drastic water conservation measures across the broader region may be the most effective means of extending the useful life of the High Plains Aquifer.

Eastern Plains Council of Governments will continue monitoring for water quality standards and conducting community water fairs in partnership with NMED Drinking Water Bureau. (Water Fair held at Eastern Plains Council of Governments July 2015 in partnership with Department of Health and NMED).

Regional Water Fair Clovis/Portales

Drastic water conservation efforts are being done by Clovis and Portales. Both communities have adopted water conservation policies which will be added as a tab to this report.

Key Water Issues

Key water issues facing Eastern New Mexico and the Northeast Region are:

- ***Long-term water supply availability:*** All municipal water in the planning region is currently supplied by groundwater, and a significant portion of the planning region's groundwater supply comes from the Ogallala aquifer, where declining water levels and projected dewatering of portions of this aquifer indicate the need for additional monitoring and careful management practices. Some portions of the planning region are examining possibilities for using a renewable surface water source, including importing Ute Reservoir water through the Eastern New Mexico Rural Water System project (also referred to as the Ute Water Pipeline Project), as a future water supply. Members of the Eastern New Mexico Rural Water Authority need near-term (over approximately the next 15 years) fiscal and programmatic support for the ongoing development of the groundwater resource to meet their needs until such time as the Eastern New Mexico Rural Water System project is able to provide them with municipal and industrial water.

- ***Infrastructure needs:*** Addressing aging infrastructure and upgrades are needed in communities throughout the region. A new water source is vital for the entire region.

- ***Protection of water rights:*** Most of the planning region has not been adjudicated, and the resulting uncertainties regarding water rights ownership create complexities in the planning process. Efforts to protect water rights and ensure that water resources remain within the planning region were identified as priorities during the planning process. Of particular concern is protection of water rights and water resources along the Texas border.

- ***Water quality:*** There is considerable interest within the region in protecting and/or enhancing water quality, in particular, protecting Ute Reservoir water quality from septic systems near the lake, for the Ute Pipeline Project.

- ***Rangeland and watershed management:*** The need for rangeland and watershed management to protect water quality and potentially to reduce riparian depletions is seen as an important component of the planning effort. There is consensus in the region that all salt cedar removal efforts should be supported.

- ***Drought vulnerability:*** Although the bulk of the needs in this region are met by groundwater, there is still concern over drought vulnerability. Surface water currently supplies agricultural users in the Arch Hurley Conservancy District on the Canadian River and along the Dry Cimarron and is expected to supply municipalities in the southern portion of the region (through the Eastern New Mexico Rural Water System) in the future.

- ***Economic development:*** The region is pursuing economic development opportunities, including tourism, recreation, and commercial and or industrial development. Ensuring that long-term supplies are adequate to support the growth and vitality of the region is a key concern.

- ***Data gaps:*** Lack of information about water use, water depletions, and extent of water resources causes uncertainty in water planning efforts.

Water Supply

As required by ISC (Interstate Stream Commission) guidance, existing sources of information about surface water and groundwater supplies in the region were used to characterize the

regional water supply. These sources included documents by federal, state, and local agencies, academic research, and privately funded works.

Watershed Information

http://www.nmda.nmsu.edu/wp-content/uploads/2016/06/WaterShed_Tab_2016.pdf

SWPP Conclusions and Action Items

Action Item #1

The Ute water pipeline project is a very important water resource for the citizens of Eastern New Mexico. The Ute water pipeline project is a long term project and the Eastern NM Water Utility Authority is in place and an Executive Director has been hired to manage the project. The project continues to receive NM water authority funding for the project. The interim pipeline is the backbone of the project. It's the part that's going to be down here in Curry County and goes down to Roosevelt County. The reason we're going that direction is because we will have instant utility. That's the plan.
The design is complete. Now the project is looking at different funding options. The project is on some year-end money from the federal government (Bureau of Reclamation) and the project is looking at bonding, bonding capacities (of member communities). Congress has authorized the Ute water pipeline project. To really put the pipeline from the (Cannon Air Force) base down to Portales is about $20 million.

Action Item #2

Curry and Roosevelt Counties and the communities within the counties need to keep an open mind about the possibility of purchasing water rights from area farmers and ranchers. (The City of Clovis purchased water rights from a farmer north of Cannon AFB. 10 wells are no longer in operation in order to try to reduce ground water declines.) Communities need to be mindful that water is the next gold. As value increases, purchasing water rights, from the agriculture community, in areas with the greatest need of water, would be beneficial for a longer term of water sustainability.

Action Item #3

Recommend to the Office of State Engineer to designate critical conservation areas and the State of New Mexico create potential tax credits for agriculture to stop or reduce pumping their water wells and continue with aggressive water conservation plans and implement policies. This is a bold recommendation, especially with the continued declines, in water levels, of the Ogallala Aquifer within Eastern New Mexico.

Action Item #4

Continue coordinated monitoring, tracking and sampling of groundwater levels and water chemistry quality within the study area. Conduct periodic water fairs within the study areas and coordinate with the Department of Health and Drinking Water Bureau. Monitor the release of the consumer confidence reports in July of each year within the study areas for any problems with water quality.

Action Item #5

Explore greater reuse of treated wastewater; Wastewater Recovery and Reuse. These practices are being used primarily to achieve the City's wastewater reuse goal from its treatment plant upgrade and will benefit all water users by reducing wellfield demands. The City of Portales entered into a $27 million dollar project with the State's Environment Department, which represents the largest state investment in a water facility in the history of the environment department, to construct a new wastewater treatment plant and for water reuse purposes. The funding was combined loan & grant funds. The household grey water reuse component is applicable to the City's outdoor water use reduction goal. The term wastewater refers to water collected in a municipal sewer system and treated in a treatment plant. Gray water refers to untreated household water that has not come in contact with toilet waste. Both types of water can be recovered for reuse.

- City Park Irrigation with Wastewater. The City is upgrading its treatment plant to improve the quality of the discharged water so it can be used to irrigate the City's public parks. Treated wastewater used for irrigation will reduce demand on the City's primary groundwater supply and can therefore be considered a water conservation measure. The upgraded system is expected to be operational in 2016.
- Water Conservation in City Parks. Water conservation in the City's public parks has been an important part of the City's conservation effort even before the planned introduction of reclaimed wastewater. Automatic, timed sprinkler systems have been installed in City parks allowing for controlled use of water and nighttime watering. In addition, sprinkler systems in the parks are designed with controlled nozzle sizes and equal overlap to minimize overwatering. The City also cooperated in conversion to drought-resistant landscaping at ENMU.
- Potable Uses of Treated Wastewater. The option to extend wastewater treatment to include directly supplementing Portales' drinking water supply has been considered by the City Council. The advantages and disadvantages of such an action are described in the City's recent Review of Water Supply Options (Wilson 2013). In weighing these considerations, the City Council has concluded that potable uses of treated wastewater are not appropriate for implementation at this time.
- Household Irrigation with Gray Water. Gray water is defined by the NMOSE as untreated household wastewater that has not come in contact with toilet waste. Gray water can be captured and successfully used to irrigate household landscaping and fruit trees, and reduces the amount of potable water that would otherwise have been

used. Increasing water rates and an increased emphasis on public education are expected to provide residential customers with incentives for gray water reuse.

Action Item #6

Expand public education and outreach programs in regards to water conservation and water quality efforts within the communities, schools, all public buildings, universities, large water users and conduct extensive public awareness campaigns etc. And conduct periodic water meetings with the general public, expand continued water conservation education, conduct water summits, and water fairs. Encourage local governments, state and federal authorities to get involved when putting together regional meetings because water crosses all boundaries.

SECTION 6: IMPLEMENTATION AND FOLLOW-UP

Eastern Plains Council of Governments, Raymond Mondragon, will follow-up and take the lead on the listed action items and coordinate with the proper individuals and agencies. The plan will be re-visited in the fall of 2017 for proper implementation.

References

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Curry County, NM (www.currycounty.org)

Roosevelt County, NM (www.rooseveltcounty.com)

U.S. Census http://quickfacts.census.gov/qfd/stats

Eastern New Mexico Water Utility Authority Executive Director Justin Howalt (howalt@gmail.com 575-749-7265)

EPCOR 2014 Water Quality Report (www.wpcor.com)

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Cannon Air Force Base 2014 Water Quality Report (www.cannon.af.mil)

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Raymond Mondragon of Eastern Plains Council of Governments recruited many of the well owners and operators, and provided invaluable support during field work. The New Mexico Environment Department and the U.S. Geological Survey provided data. This project would not have been possible without direction and assistance from Danielle Shuryn, with the NM Environment Department, Drinking Water Bureau, Miriam Wamsley, from the NM Department of Health, Environmental Health Epidemiology Bureau, provided discussions and useful recommendations for water quality concerns in the area. Discussions with John Hawley and Talon Newton clarified several topics. Critical reviews by Talon Newton, Alex Rinchart, and Stacy Timmons greatly improved the report. Funding was provided by the New Mexico Environment Department, Drinking Water Bureau, as part of the Source Water Protection Program. Additional support was provided by the New Mexico Bureau of Geology and Mineral Resources and its Aquifer Mapping Program. And Mary Gray, Executive Assistant, of Eastern Plains Council of Governments, for her assistance to Raymond Mondragon.