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EL PASO'S MUNICIPAL RECLAIMED WATER PROGRAM

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Thank you for the introduction. I would like to provide you with an overview of El Paso's Municipal Reclaimed Water Program.

El Paso's Priorities for Water Supplies

First allow me to give you a brief view of El Paso's "water supply portfolio." Conservation is at the top of our list and has been since the early 1990s. Our aggressive public education and conservation programs have led the way in reducing both indoor and outdoor water use. Up until about 1988, El Paso's per capita water use was 200 gallons per person per day. Last year, it was down to 139 gallons per person per day.

Reclaimed water, which I will describe further later, is also very high on our priority list. One of the big advantages of both conservation and reclaimed water is that they do not require any "new water." Reclaimed water can be a little more complicated than conservation, since reclaimed water is wastewater that would normally be discharged back into a receiving stream. In the case of El Paso, some of our wastewater discharged into the Rio Grande is already committed in the form of a contract with the local irrigation district, El Paso County Water Improvement District #1.

As most of you are probably aware, El Paso uses surface water at two plants during the irrigation season

lasting typically from mid-February to mid-October. We also have year round supply from wells in the Hueco and Mesilla aquifers. If the trend of El Paso's water use had continued since 1970, El Paso would today be pumping 194,000 acre feet per year from the Hueco Bolson aquifer. Fortunately, pumping from the Hueco peaked in 1990 at about 80,000 acre feet per year and today, and hopefully into the future, we will stay down at 40,000 acre feet per year.

For the past few years, both Fort Bliss and El Paso Water Utilities have been planning to build desalination plants. The effort was combined into one plant and as many of you already know, construction on a 27.5 million gallon per day desalination plant has begun in El Paso with a completion date in 2007.

Importation of groundwater has been planned from three ranches located in adjoining counties to the east of us from 80 to 150 miles away.

El Paso Water Utilities Cost Per Acre Foot Comparison

In order to compare the cost of our water supplies, we need to look at the cost of El Paso's water supplies with capital and operational costs (Figure 1). Groundwater is the least expensive source of supply at \$163/acre foot, followed by surface water at \$300. Desalination cost is next at \$508/acre foot and would have been much more expensive even a few years ago, but the cost of membrane technology has come down significantly. Reclaimed water cost is \$706/acre foot. The most expensive option will be groundwater importation at a cost of \$1,400/acre foot. Thus, importation is going to be delayed as a water supply for as long as possible.

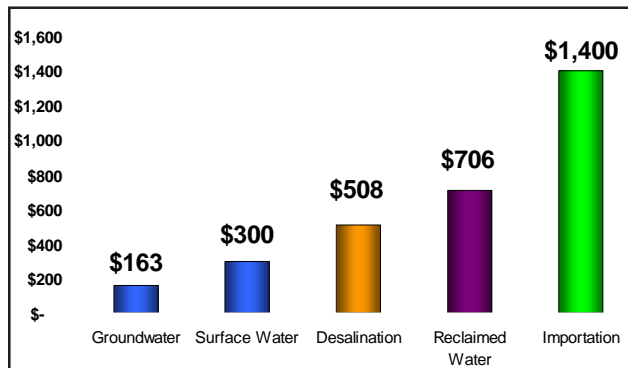


Figure 1. El Paso Water Utilities Cost Per Acre Foot Comparison

Reclaimed Water Use in El Paso

The primary benefit of using reclaimed water is obviously a direct savings on your potable supply. There are some very good secondary benefits to the use of reclaimed water. I won't go through them all but they are significant.

Concerning quantities of reclaimed water, in 2004 we reused 3.3 billion gallons from our four wastewater plants and produced 21.2 billion gallons of wastewater effluent. Of these 3.3 billion gallons, we sold about half, or 1.6 billion gallons, directly to customers. We are able to reclaim and sell about 7.7 percent of our wastewater effluent for use in the city. The City's 2004 Strategic Plan calls for doubling our reclaimed water use to 7.0 billion gallons over the next ten years.

The State has authorized the City to use reclaimed water for irrigation of golf courses, schools, parks, apartment complexes, commercial properties, home lawns, cemeteries, road medians, and for industrial uses, construction, fire protection, commercial laundries, automatic car washing, concrete mixing, cattle watering and toilet water uses. We also have the authorization to recharge groundwater with effluent from the Fred Hervey plant, which produces water of drinking quality.

As you can see from the pie chart in Figure 2, industrial uses, groundwater recharge, and irrigation account for the bulk of our uses. We also have some minor uses in ranching and construction.

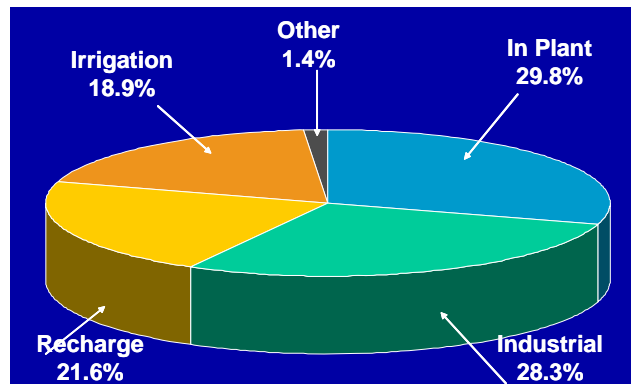


Figure 2. Reclaimed Water Uses in El Paso

Texas Reclaimed Water Standards

In Texas, there are two types of reclaimed water. Type I water can be used to irrigate at unrestricted sites such as parks, schools, and golf courses. Type II water is of lesser quality and can be used to irrigate only when access is controlled to the sites.

We produce water at all four of our wastewater plants that meets Type I, so we can use it to supply any irrigation or industrial customer. This quality of water is produced from advanced secondary wastewater treatment facilities that use sand filters to polish the water. Two of our plants use chlorination to disinfect the water. One plant uses ultraviolet light, and the advanced plant uses ozone. Chlorine is also added to the reclaimed water in our distribution system as an added safety practice even though it is not mandated by the state regulation.

Water Quality for Various Sources

Table 1 shows the salinity content of our various sources of water. Across the top it shows the TDS (total dissolved solids) and other indicators of salinity. Keep in mind that in Texas the drinking water standard for potable water in terms of TDS is 1,000 ppm. Our City's potable water, which is a combination of groundwater and Rio Grande water, has an average salinity of 640 parts per million. Some private wells with highly brackish water contain salinity levels that exceed 2,000 ppm. As a comparison, our four wastewater plants produce reclaimed water with salinity ranging from 670 ppm to 1,083 ppm. Later I will talk a little more about salinity problems at one of our wastewater plants and how we have controlled increases.

Table 1. Water Quality for Various Sources

	TDS ppm	EC dS m ⁻¹	SAR	Na ppm	Cl ppm
City water	640	1.0	5.3	150	140
Valley well	2580	3.5	13	540	550
Fred Hervey	670	1.2	5.1	160	200
Bustamante	1083	1.8	7.5	265	332
Haskell	877	1.5	6.7	215	231
Northwest	1052	1.7	9.0	280	233

Most golf courses will frown upon salinity levels that exceed 1,000 ppm TDS. Salinity control is an issue when providing reclaimed water especially to golf courses. But as I will explain later, salinity is only one factor in reclaimed water.

Northeast System (1985)

Now I would like to talk about our four wastewater treatment plants and the customers served. In northeast El Paso, the Fred Hervey Reclamation Plant went

online in 1985. This plant is a 10 million gallon per day wastewater treatment plant that produces drinking water quality reclaimed water. All of the effluent from this plant is used by El Paso Electric's Newman Power plant for cooling water or to irrigate the Painted Dunes Golf Course or used to recharge the Hueco Bolson aquifer.

Northwest System (1998)

The Northwest Wastewater Treatment Plant serves most of the westside of El Paso. It provides secondary activated sludge treatment and has ultraviolet light for disinfection and sand filters for the entire plant's effluent. This plant provides service to the largest diversity of customers consisting of multiple parks, schools, one golf course, several apartments, town homes, commercial customers, and five residential customers. We have about 25 miles of distribution lines and five reservoirs to provide services to these customers.

Lower Valley (2000)

The Roberto Bustamante plant has the ability to discharge to either the Riverside Canal or the Riverside Drain. Discharges to the Riverside Canal are used chiefly for irrigation purposes. Discharges to the Riverside Drain go mainly to the Rio Bosque Wetlands Preserve where they help maintain and sustain the aquatic habitat required by the diverse animal and plant species present. The plant also has a distribution system and an elevated tank that provides reclaimed water to the City's Tree Farm located in the Riverside Industrial Park. This reclaimed water system is being expanded to serve a cemetery, park, and two schools.

Central (2003)

Construction of the first phase of the Central El Paso Reclaimed Water Project was completed in 2003 and included building a 1 million gallon elevated storage tank, pumping station, treatment filters, and pipelines. This project provides reclaimed water services to seven parks, three schools, the zoo's exhibit moats, one golf course, and two cemeteries.

Haskell North Central Project

In addition to the joint desalination plant project with Fort Bliss, the City is also planning to serve Fort Bliss with reclaimed water for irrigation purposes. The city is planning a 100 acre soccer complex on Fort Bliss property, and the lines are being extended from

the Haskell plant in central El Paso to supply reclaimed water for irrigation.

Soil Map of El Paso

In planning which sites to serve, we have also considered the soil types at each particular site. Soil types should be an important consideration in landscape planning and in planning reclaimed water projects. With reclaimed water, the salinity is elevated and soils without adequate drainage may not be able to handle additional salinity loads. We have eliminated schools and parks from service to reclaimed water in the upper and lower valleys due to the high clay content of the soils.

Irrigation Modifications

Another consideration with reclaimed water is whether the sodium and chloride levels impact salt sensitive trees and shrubs by causing foliar damage to leaves. In the case of one golf course irrigated with reclaimed water, the problem of foliar damage due to salts is being addressed through the lowering of sprinkler head spray angles to avoid spraying salt sensitive trees. This golf course participated in a demonstration project where many sprinkler heads were reduced from about 25 degrees down to 12 degrees by simply replacing a nozzle inside the sprinkler head.

Infiltration Reduction Program

The El Paso Water Utilities has also made improvements to the wastewater collection system in order to reduce groundwater infiltration into the system. In about 1992, the salinity of the wastewater influent at our Northwest Plant was averaging around 1,700 ppm. A program to identify where groundwater infiltration was occurring and replacement or repair of those areas from 1992 to 2000 eliminated 2.5 mgd of infiltration at a cost of \$4.2 million and reduced the TDS concentration from 1,700 down to 1,100 ppm currently. This investment helped greatly to convince irrigation customers to switch to the reclaimed water system.

Thank you for your attention.