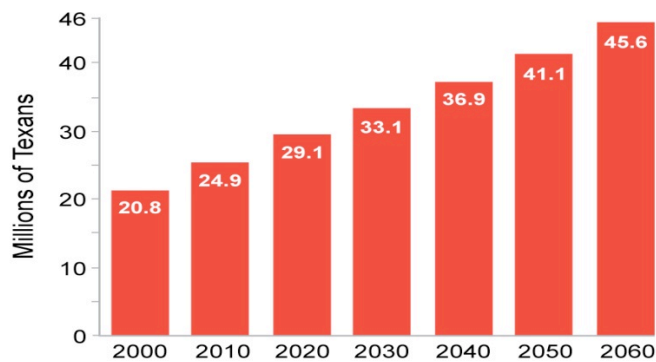


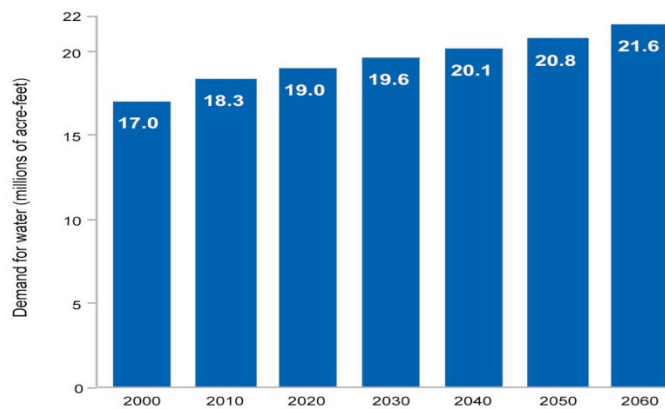
The Future of Water Solutions

In the last issue, we looked at the overall Future of Water. In this issue we will first explore the projected water needs of Texas and the projected water supply. Then we will examine the proposed solutions.

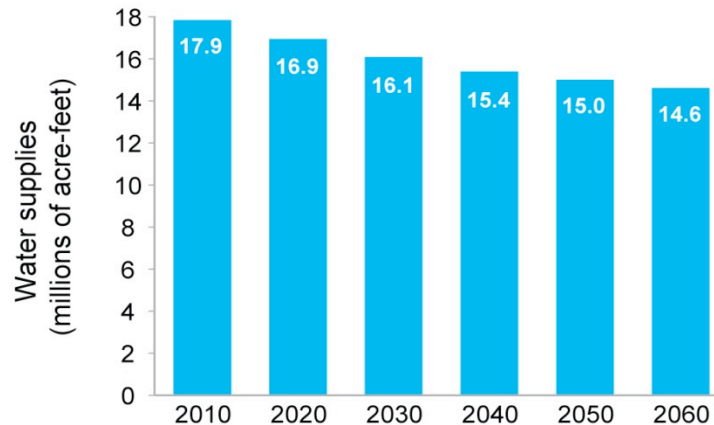
Texas Projected Population Growth



Texas Projected Water Demand



Texas Projected Water Supply



All the charts shown are from the Texas Cooperative Extension Service. Taking 2040 as a sample year we find that our population is expected to grow to 36.9 million with a projected water demand of 20.1 million acre feet of water. Unfortunately, the projected water supply for 2040 will only provide 15.4 million acre feet of water leaving a shortfall of 4.7 million acre feet.

There are several ideas for solving the shortfall problem.

✚ We could get more water by:

- Importing it from somewhere else
- Making more fresh water through desalination

✚ We could reduce demand through:

- Conservation,
- Pricing
- Creating a new water ethic plus imaginative technologies.
- Controlling our population growth.

✚ We could take water from others

- Legally

- Water wars.

There are difficulties with each of these solutions. Others may not want to export water to use. Desalination costs \$1,000 – \$4,000 per acre foot compared to \$200 per acre foot for river water. Educating the public takes time and money, but ultimately it could be the best solution reducing consumption by 50%. If we price water according to what it is worth taking into account the development costs of delivery systems, the cost to the consumer could easily go up by 1,000%. Stop subsidizing the price of water for agriculture and ranching. Many irrigations systems waste 90% of the water they spray out and one pound of beef takes 25,000 lbs of water to grow. Of course then the cost of food would go up rapidly. Stop private corporations from buying up water and charging inflated prices for it. The Rule of Capture in Texas allows a property owner to take water from neighbors without compensating them or even notifying them. If you think Water Wars are unlikely, the only instance of a Governor using the National Guard against a neighboring state occurred in 1944 when Governor Benjamin Mauer dispatched the Arizona National Guard to stop the construction of the Parker dam. He claimed that California was illegally stealing water without Arizona's permission. The Supreme Court agreed; then Congress passed a retroactive bill making it legal.

In my judgment, a better solution is rainwater collection. You can collect rainwater from rooftops, from agricultural terraces, by diverting flash floods into ponds, by blocking gullies or by putting low earth embankments across hillsides or even around individual plants.

Passive Collection

Spreader Dams, Stock



There is great interest in collecting rainwater for a variety of reasons.

- ✚ Increasing demand for a decreasing supply of water
- ✚ Higher environmental and economic costs of supplying water
- ✚ Health concerns
- ✚ Conservation and drought
- ✚ Providing water to areas having little

- ✚ Reducing runoff from storm water
- ✚ Rainwater is pure and requires little treatment

There are many benefits to using rainwater:

- ✚ Zero hardness without chemicals
- ✚ Sparkling fixtures
- ✚ Cleaner clothes and bodies
- ✚ Longer lasting appliances
- ✚ Better tasting vegetables in your garden
- ✚ Great taste
- ✚ Low cost

Just as in other water supplies, one must determine the intended use of rainwater to determine the quality and, therefore, the level of treatment required to meet the use goal. For non-potable water such as water designed for irrigation use only, leaf screens and roof washers should be sufficient. If you intend to use the collected rainwater for human consumption (potable water) then additional treatment is required to remove sediment and pathogens. The most common potable water treatment setup includes a 5 – micron particulate filter followed by a 3–micron charcoal filter for the removal of undesirable particles and odors followed by a UV–light capable of treating 12 gallons per minute for the treatment of pathogens. These filters and the UV light are in the distribution system after the pressure tank or on–demand pump.

One inch of rain on one square foot of roof yields .6233 gallons of water. If you average roof size is 2,000 square feet and your average annual rainfall is 32” you will collect 1,100 gallons of water from a one inch rain or about 35,200 gallons in an average year.

When figuring the size storage tank you will need allow 50 gallons per person per day or about 200 gallons per day for a four person household. Our bad droughts average 75 days, using a conservative figure of 100 days (think about last year) and you will need about 20,000 gallons of storage. Of course, if you conserve, you can get by with a smaller tank. These figures do not include

landscape watering. The best tanks are fiberglass and run about \$1.00 per gallon to purchase. The advantages of fiberglass include: interior coating FDA approved food grade resin, exterior UV resistant gel-coat, easily repaired and can be painted with latex house paint.

The other equipment that you will need includes gutters, preferably aluminum, PVC pipes to carry water to and from the tank, a roof washer or Eliminator to remove leaves, etc from the water before it enters the tank, a shallow well jet pump and pressure tank or an on demand pump, a sediment filter, a carbon filter and a UV light. Total cost will depend on the length of gutter and PVC needed, but figure around \$8,000 – \$10,000 for a complete installation. Probably less than the cost of drilling a well. Your annual costs will be about \$200. For filters and UV bulbs. Sediment filters are replaced monthly, carbon filters quarterly and UV bulbs every 14 months.

Here are pictures of my installation:

Tank with Eliminator
UV lamp



On Demand pump, filters and



Grundfos MQ on demand pump
the pump house

The complete package including

In closing, keep an eye on your legislators, encourage them to do away with the Rule of Capture and don't let some lobbyist convince them to ban rainwater collection by landowners (Colorado actually had a law against rainwater collection until recently) Next issue we will look at rainwater for landscaping, agricultural use and for wildlife.

Websites that you might find interesting:

www.tcebookstore.org

www.texaswaterinfo.net

<http://water.tamu.edu>

<http://texaswater.tamu.edu>

www.twdb.state.tx.us

<http://rainwaterharvesting.tamu.edu>

<http://rainwatercollection.com/>

<http://www.ecoearth.info/waterfuture/>

<http://permanent.access.gpo.gov/lps21800/www.epa.gov/safewater/sdwa/futuresforum.html>

<http://www.sfu.ca/cstudies/science/water.htm>