Texas Watershed Coordinator Roundtable
July 26, 2012

Texas Well Owner Network: TWON

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Texas AgriLife Extension Service
Program Goals:

- Changes in knowledge, awareness, attitudes and actions of private well managers
- Improvement of private well management to safeguard homeowner health and protect aquifer integrity.
Approach and methods:

- Arizona
- Pennsylvania
- Virginia
- Rhode Island
- Montana Well Educated
- Update TEX*A*Syst
TWON Educational Training:

- 1-day training (~6 hours)
- Reach a broad audience
- No “master” requirements
- Stimulate initial interest and responsibility

- PowerPoints ‘plus’
  - Well water quality Screenings
  - Groundwater sand-tank model
  - Well components
Aquifers in Texas: Aquifer Basics

Minor Aquifers of Texas

Major Aquifers of Texas

Legend
- Pecos Valley
- Gruver
- Carizo-Wilcox (outcrop)
- Edwards-Trinity Plateau (outcrop)
- Edwards-Trinity Plateau (subcrop)

Legend
- Brazos River Alluvium
- West Texas Basins
- Llano (outcrop)
- Edwards-Trinity Cliffs Plains
- Travis-Jackson
- Eagle Ford
- South Texas Coast
- South Texas Coastal
- Edwards-Trinity Plateau (outcrop)
- Edwards-Trinity Plateau (subcrop)
- Edwards-Trinity Plateau (outcrop)
- Edwards-Trinity Plateau (subcrop)
- Edwards-Trinity Plateau (outcrop)
- Edwards-Trinity Plateau (subcrop)

GROUNDWATER CONSERVATION DISTRICTS*
(Confirmed and Pending Confirmation)
What makes an aquifer?
Aquifer outcrop and recharge area

Layers of Sediment: Unconsolidated and Consolidated Aquifers and Aquitards
TYPICAL PERMEABILITY OF AQUIFERS

**GRAVEL**
Highly Permeable - water flows rapidly
300 feet/day to 3000 feet/day

**LIMESTONE**
Permeable - water flows through fractures and solution cavities
0.1 feet/year to 3 feet/day

**SAND**
Permeable - water flow is moderate to rapid
0.03 feet/day to 3000 feet/day

**SANDSTONE**
Impermeable to Permeable - water flows through fractures and areas where cementing material dissolves
1 foot/100 years to 3 feet/day

**SILT**
Slowly Permeable - water flows slowly
0.1 feet/year to 1000 feet/year

**SHALE**
Impermeable - water rarely flows through shale unless shale is fractured
1 foot/100,000 years to 0.1 feet/year

**CLAY**
Relatively Permeable - water barely moves
1 foot/10,000 years to 0.1 feet/year

**ROCK**
Extremely Impermeable to Highly Permeable - rock rendered porous by fracturing, water flows through fractures
1 foot/100,000 years to 300 feet/day

©VVM
Bladder Tanks
Well Head
Water Quality Basics

Well Screenings

- Bacteria / Pathogens
- Nitrate
- TDS / Salinity
- Arsenic
- Radionuclides
POU: Point of Use Treatment Options

**FILTER APPLICATION GUIDE**

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Drawdown

Cone of depression
pumping lowers the cone of depression

overpumping lowers the cone of depression

OVERPUMPING
- lowers the cone of depression
- dries up the stream
- original home owner must spend $$$$ to drill a deeper well
What’s in your cone?
Wellhead Protection
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.
DROUGHT 2012
Public Water Supply Systems Affected
as of May 16, 2012

Total number of Community water systems affected: 1006
Total number of active Community water systems in Texas: 4702

Resolved: A public water supply that has corrected production capacity deficiencies, or drought conditions for mandatory water use restrictions have alleviated.

Watch - Voluntary: A public water supply that has reported problems with high water usage and production, but has not suffered a loss of distribution system pressure. Voluntary water use restrictions have been implemented.

Watch - Mandatory: A public water supply that has reported problems with high water usage and production, but has not suffered a loss of distribution system pressure. Mandatory water use restrictions have been implemented.
Response to Precipitation

Kristine Uhlman
How to communicate the need for water conservation?
Half-life 12.3 years

Three Nuclides of the Hydrogen Isotopes:

- **Protium**: 1 proton
- **Deuterium**: 1 proton, 1 neutron
- **Tritium**: 1 proton, 2 neutrons
Tritium Age

Dating

of Groundwater
Tritium: 

\[ \leq 0.5 \text{ TU} \geq 60 \text{ years old} \]
Savings account
or
checking account?

2,000–6,500 years
Southern California alluvial basins

N-Aquifer, 10,000–30,000 years
Tucson Basin, 300–8,000 years
Middle Rio Grande, 2,900–23,000 years

Hueco Bolson, 12,100–25,500 years

Ground-water ages for selected western aquifers
Northern, 700–8,400 years
Central, 2,600–12,800 years
Southern, 2,500–6,700 years
Savings Account!
Thank you!