Dealing with the Drought

July 16, 2008

Overview

- Drought Update and Forecast
- Orange County Drought Response ("H2Orange")
- What We're Seeing – Well Permits
- Water Conservation Tips

Drought Update

- 2007 One of Driest Years
- Some Spring (and recent) Improvement but…
- …still "Moderate Drought"
- OWASA lakes at 80%, Hillsborough -4" from full
- Precipitation is -3.9" for last 12 months (prev year -11.8")
- Ongoing soil moisture deficit, groundwater levels still low

Drought Monitor – July 8

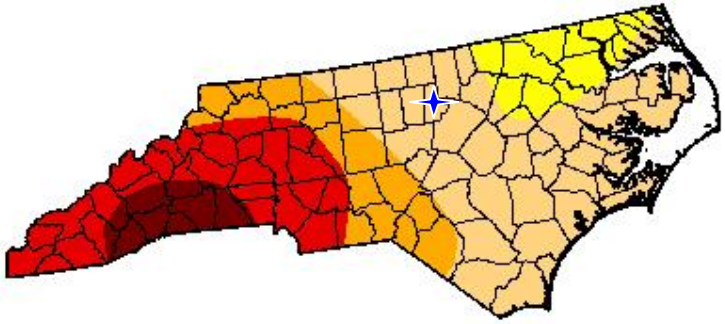
U.S. Drought Monitor

July 8, 2008
Valid 7 a.m. EST

North Carolina

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.0	100.0	89.8	44.2	28.8	6.6
Last Week (07/01/2008 map)	0.0	100.0	99.6	61.9	30.3	6.6
3 Months Ago (04/15/2008 map)	0.0	100.0	70.9	46.0	4.9	0.0
Start of Calendar Year (01/01/2008 map)	0.0	100.0	100.0	100.0	83.7	51.3
Start of Water Year (10/02/2007 map)	0.0	100.0	100.0	92.8	79.4	37.7
One Year Ago (07/10/2007 map)	0.7	99.3	73.5	10.3	3.1	0.0



Intensity:

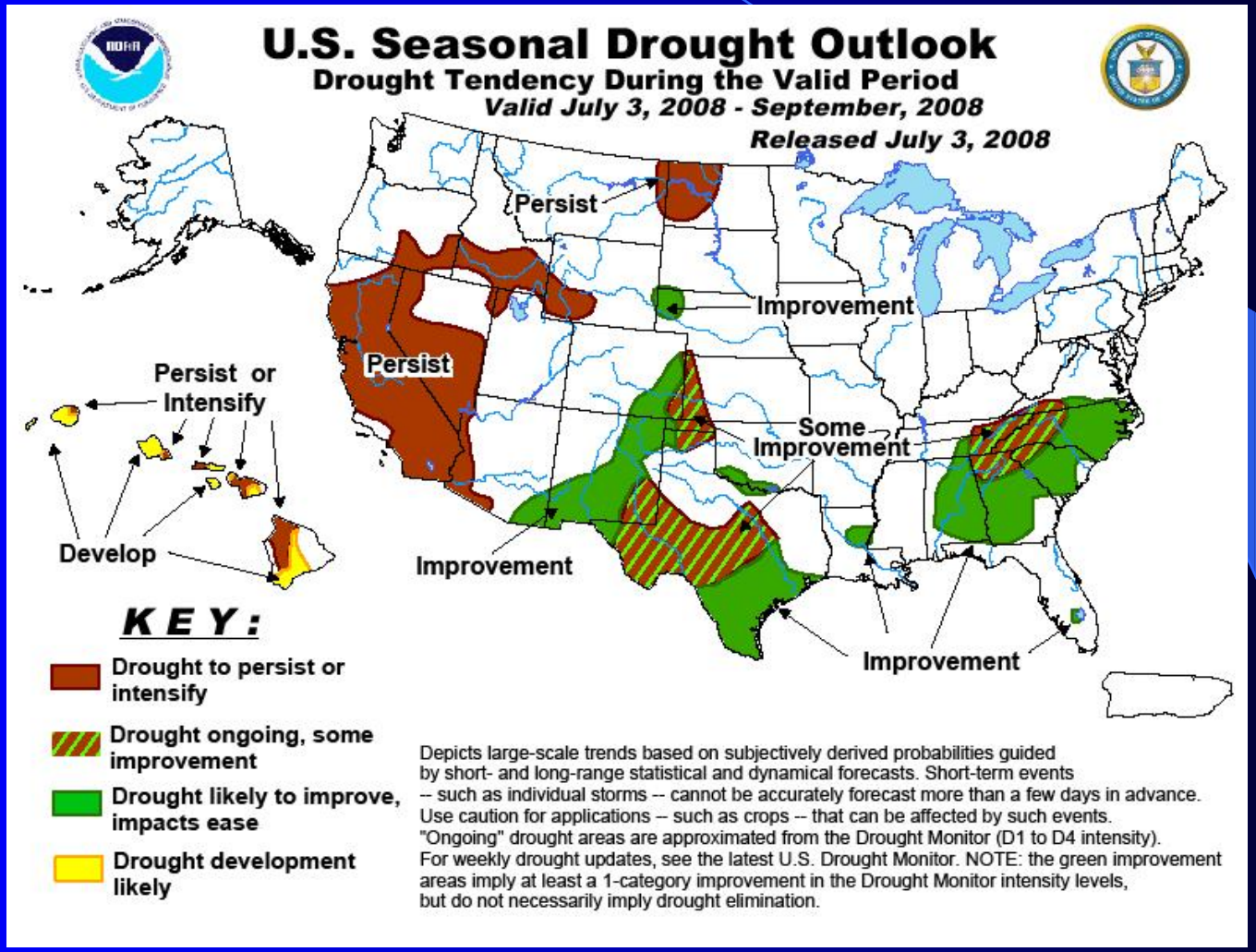
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

Released Thursday, July 10, 2008
Author: Rich Tinker, CPC/NOAA

Summer ’08 Forecast



H2Orange

- Water suppliers pursuing conservation (no restrictions at present, permanency?)
- …but what about wells and rural areas?
- Joint project of several County departments to:
  - Explore and provide info on ground water
  - Stress - conservation important for well users, too
  - Offer conservation and landscaping tips

www.H2Orange.org

- **Drought workshops in rural areas**
- **Lots of drought and water info and links can be found on site**
- **www.H2orange.org**
- **Also, Drought Hotline – 644-3333**

Ground Water

- 37% of County citizens rely on wells
- Average Orange County well
  - 300 feet deep
  - 18 gallons per minute
- Often a delay in impacts on groundwater, slower to happen, slower to recover

Surface Water Supplies

- No mandatory restriction in place at present (OWASA has year-round conservation)
- But its summer, and things can get dry in a hurry!
- Rely on tropical moisture events (hopefully the rainy aftermath) and the lingering t-storms!
- Restrictions could return in some jurisdictions before fall if normal or less than normal rainfall

Follow-Up Actions

- Environmental Responsibility Goal
- Joint Water Resources Program - Water Resources Coordinator
- Observation Well Network?

Groundwater Protection in Orange County

- **Approximately 40% of OC Population relies on groundwater for drinking water source**
- **Board of Health adopted well regulations for Orange County in 1980**
- **Expanded to groundwater protection regulations in mid 90's**

Groundwater Program

- **Well regulations provide for:**
  - **Siting, specifications, construction observation, & approval**
    - **Drinking water wells**
    - **Irrigation / Agricultural**
    - **Monitoring**
    - **Geothermal**
    - **Well abandonment**
  - **Protection of Groundwater Resources**
  - **Safety of water supply**

Groundwater Program

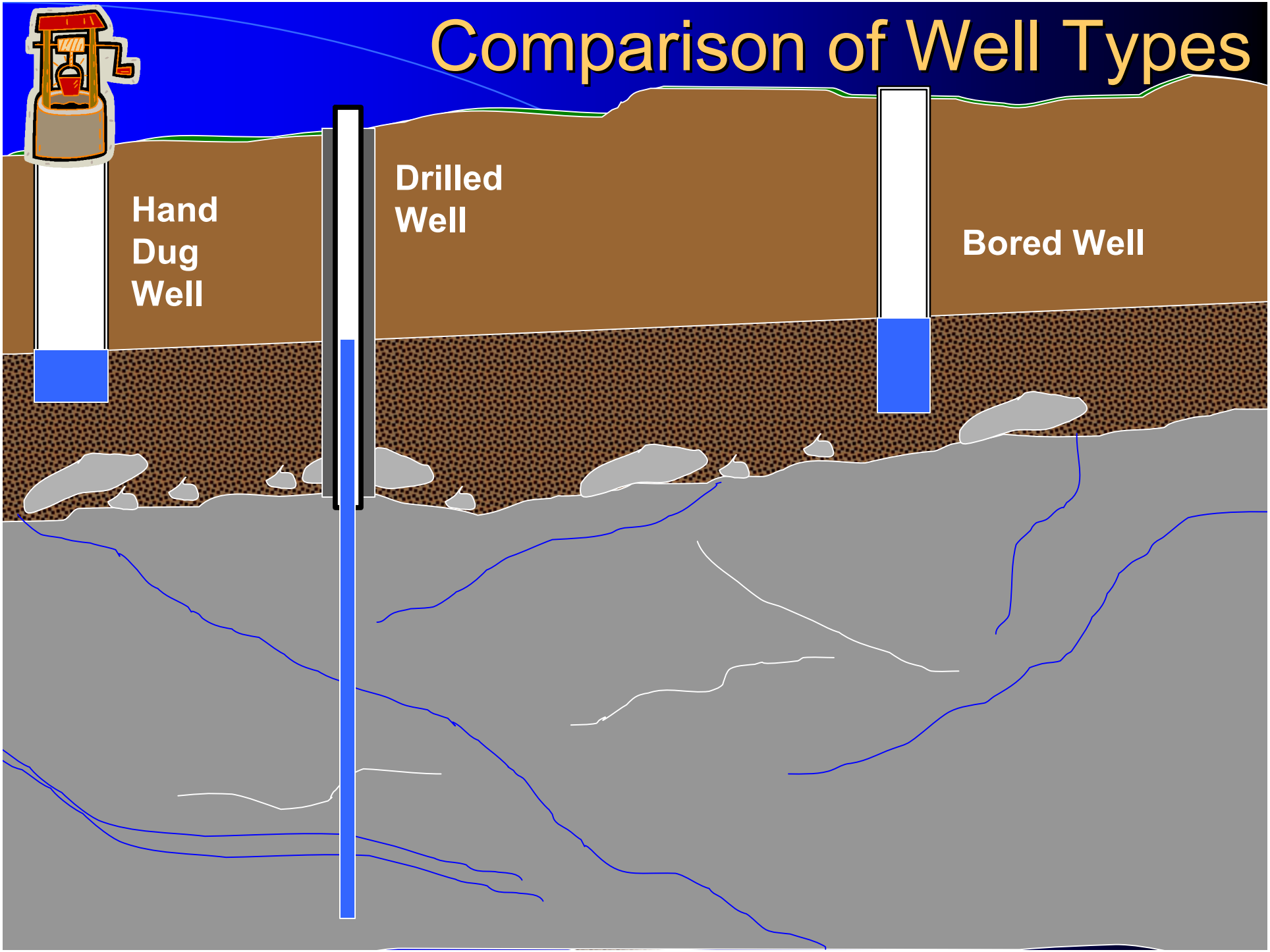
- **Orange County Health Department also provides:**
  - **Water sampling**
  - **Consultation for water treatment**
  - **Common water quality issues**
    - **Iron**
    - **Manganese**
    - **Low pH**
    - **Arsenic**

Well Siting & Permitting

- Approximately 300 wells per year
- Average well in this area:
  - 300 feet deep
  - 59' depth to bedrock
  - 70' casing (63' minimum required)
  - 18 GPM
    - First water hit averages 160 feet deep
    - Average yield of 10 GPM

➢ Records are on file - available on request

Comparison of Well Types

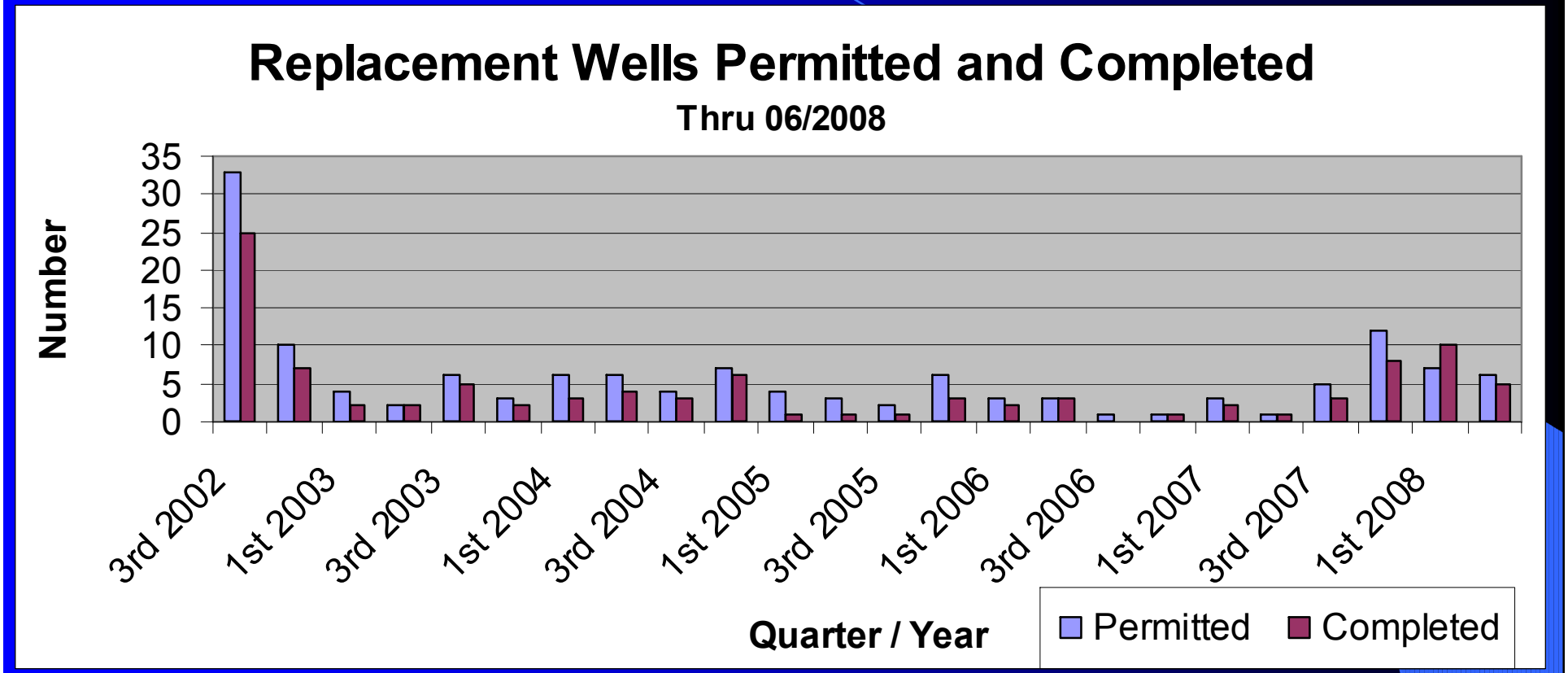


Well Yield vs. Withdrawal

- Yield estimated at time of drilling
- Generally there are few high yield water bearing zones >400’
- Household use = 60 gallons/person/day
- 1 to 2 GPM can sustain a household

  1 GPM = 1440 Gallons / Day

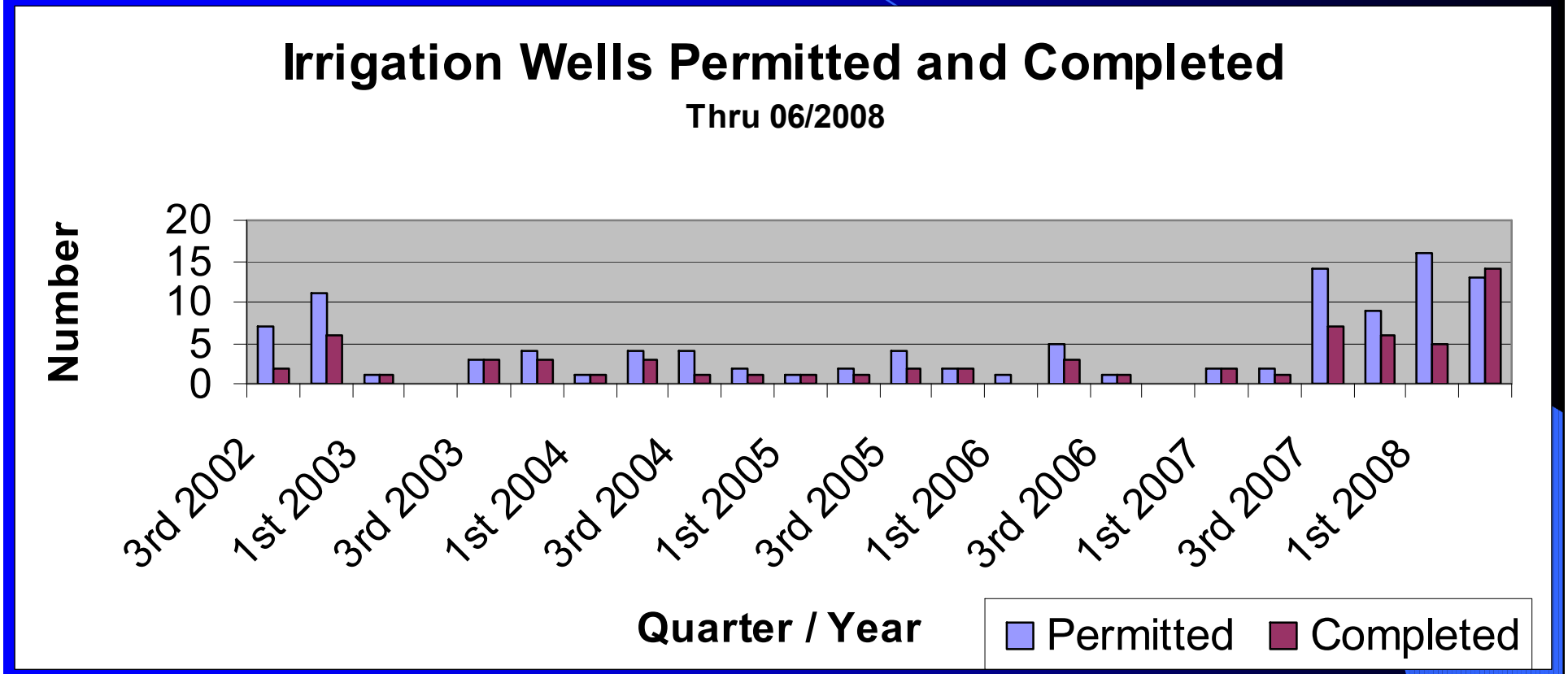
Drought Effects on Well Activities



Replacement Wells

- All water supplies that went dry were:
  - Springs
  - Shallow bored wells
  - Hand-dug wells
  - Shallow drilled wells - <75 feet in depth
- Most "borderline" wells replaced in the 2001 – 2002 drought
- No observations of drought effects on viable wells

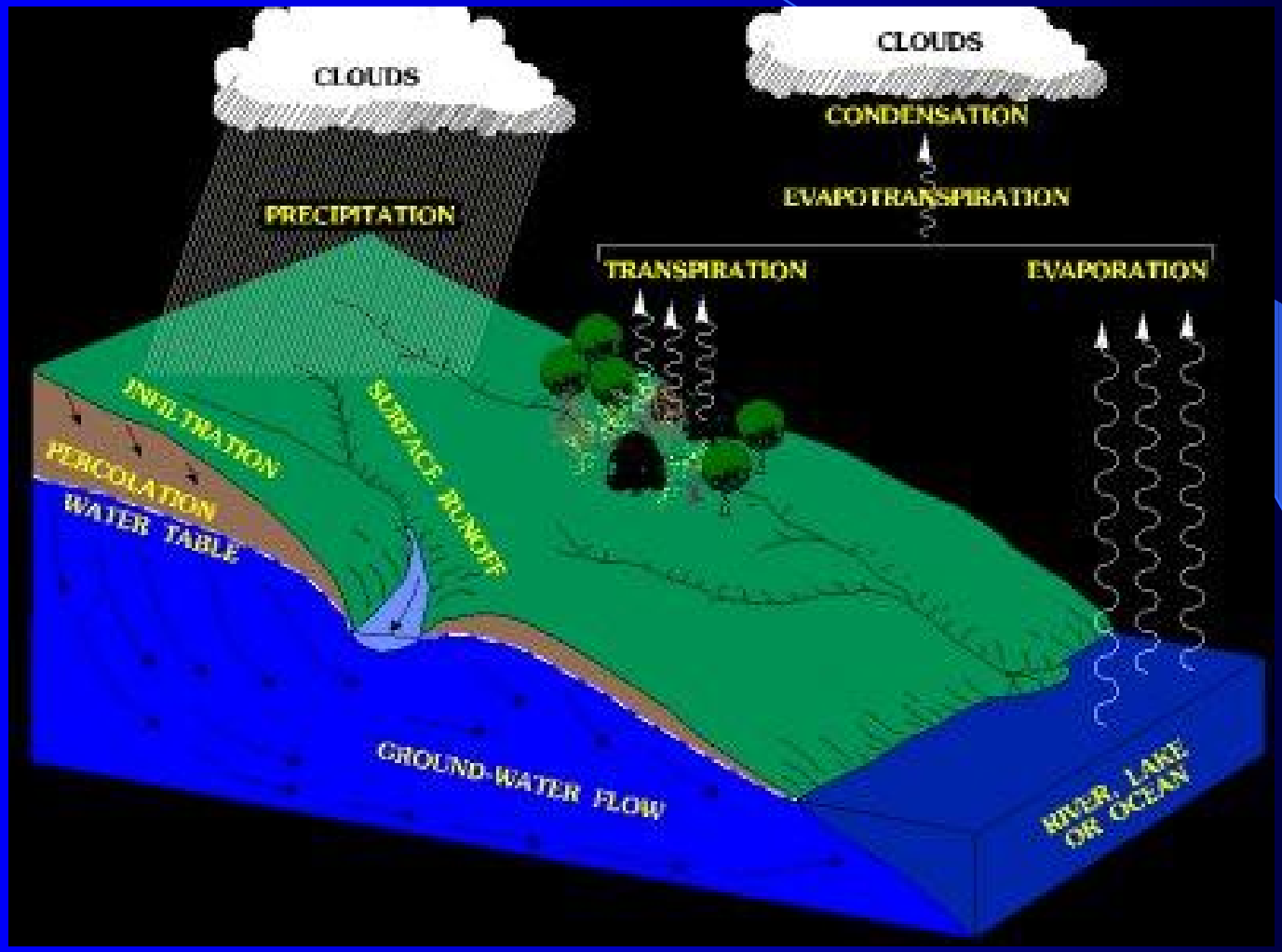
Drought Effects on Well Activities



Irrigation Wells

- **Marked increase in agricultural and irrigation wells in the past 6 months**
  - **Agricultural**
    - **Replacing springs, ponds, and creeks**
  - **Residential irrigation**
    - **Both rural and in-town**

The Hydrologic Cycle



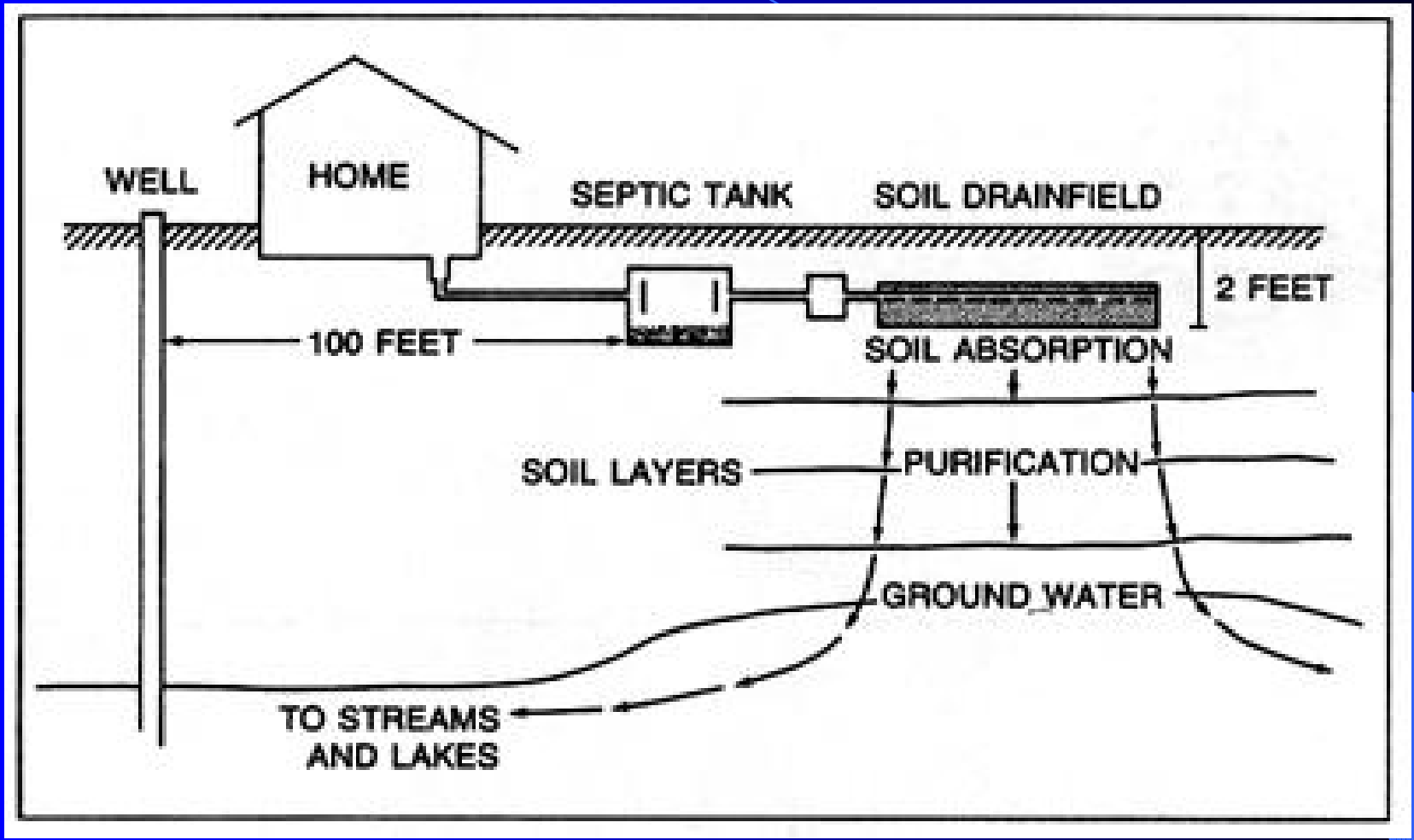
www.srh.noaa.gov/mrx/hydro/hyd_cyc.htm

Hydro - Cycle Manipulation

- Reduction of runoff
  - Landscaping for retention
  - Less curb & gutters
  - Less lawn, more natural areas
- Control withdrawal
  - Water conservation
- Return

Targeting Conservation

Recharge / Recycle



Adapted from Tyler et.al., 1977