Drought Management

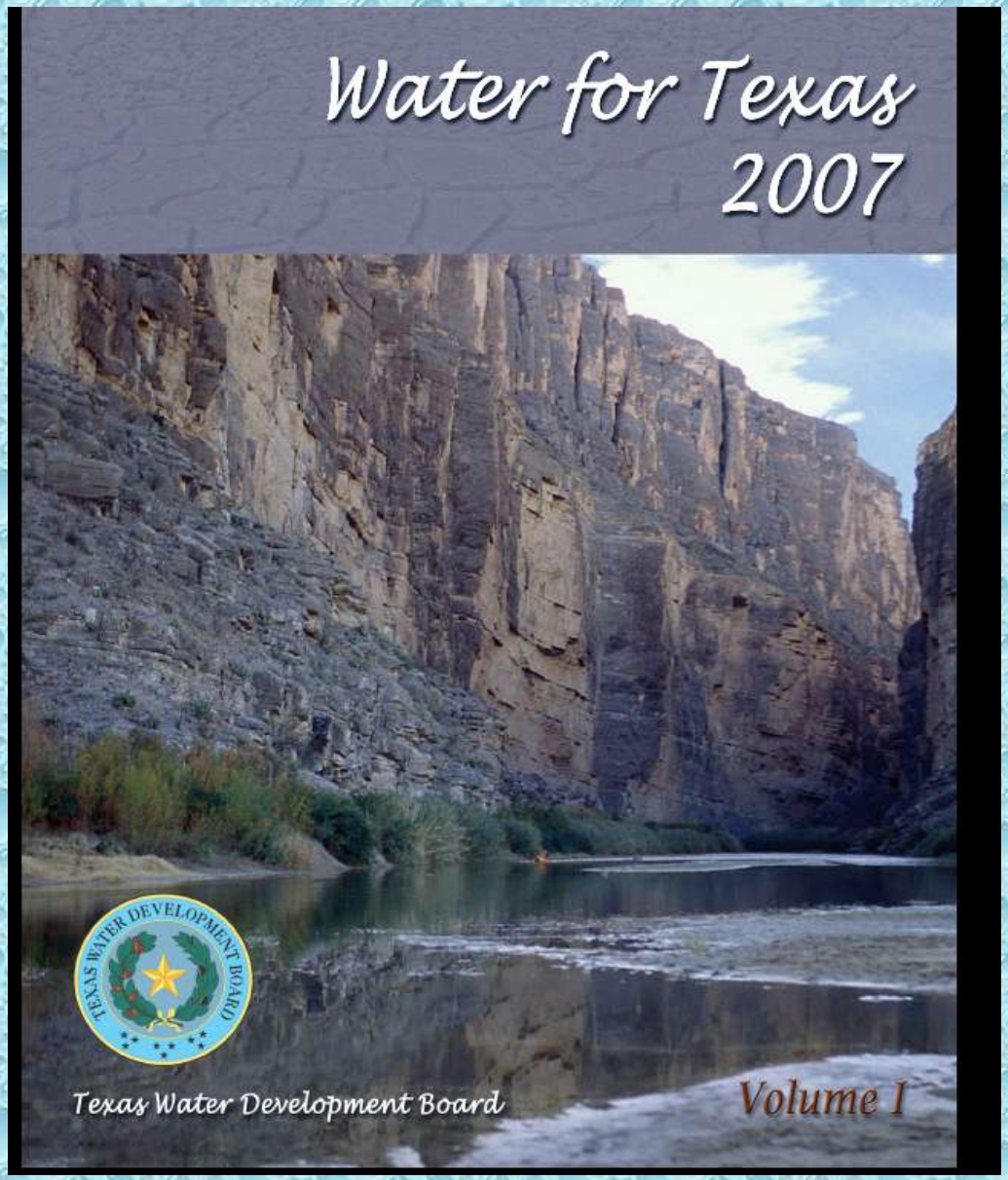
How Much Water Do We REALLY Need?

Tyson Broad
Lone Star Chapter Sierra Club

October 20, 2007
Richland College

Having Enough Water is Important!

Mud Pit Belly Flop at Redneck Games



Water Supply Planning

- *Water Demands*
- *Water Supplies*

Calculating Water Demands

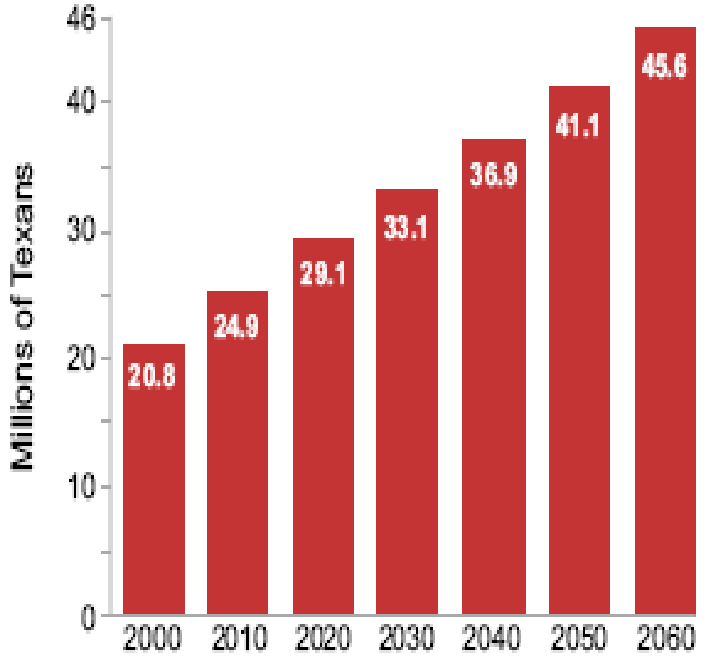


Figure 2. Projected population growth.

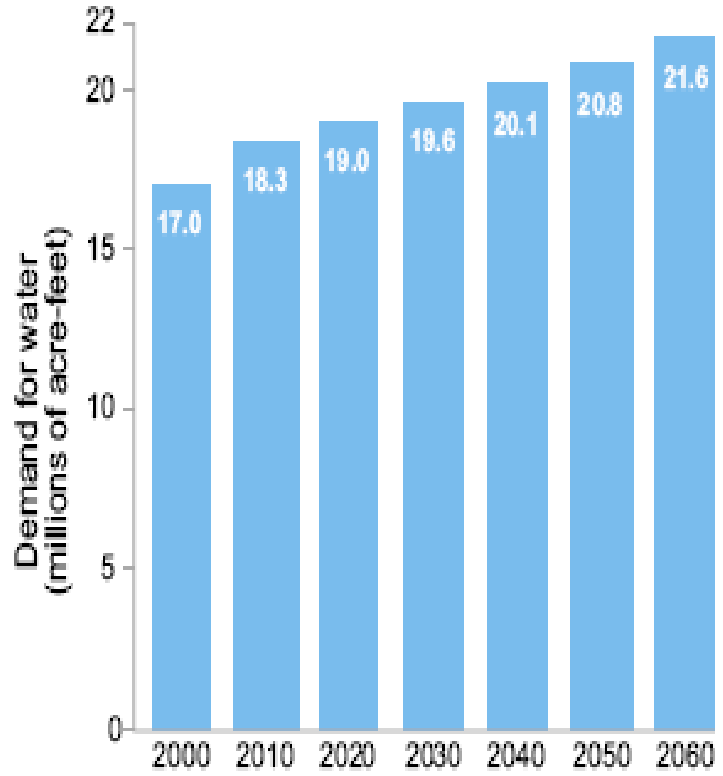


Figure 3. Projected water demand.

Increase Water Supplies to Meet Demands

Reduce Demands to Meet Supplies with DEMAND MANAGEMENT

- Water Conservation
- Drought Management

Water Conservation

Drought Management

Demand Management

Water Conservation & Drought Management

Not as flashy!

But very effective

Why is Demand Management Effective?

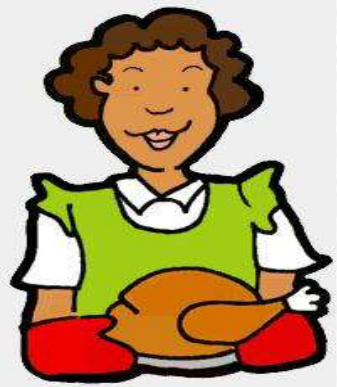
- Extends Existing Water Supplies
- Reduces *Peak* Demands
- Ensures *Critical* Water Needs are met during dry periods
- Reduces *Economic* Impacts
- Reduces *Environmental* Impacts
- Reduces *Social* Impacts

How does Demand Management do so much?

Think of a Formal Dining Room

How often do we use the Formal Dining Room?

- Holidays



- Guests

Is it really worth the cost and the space?

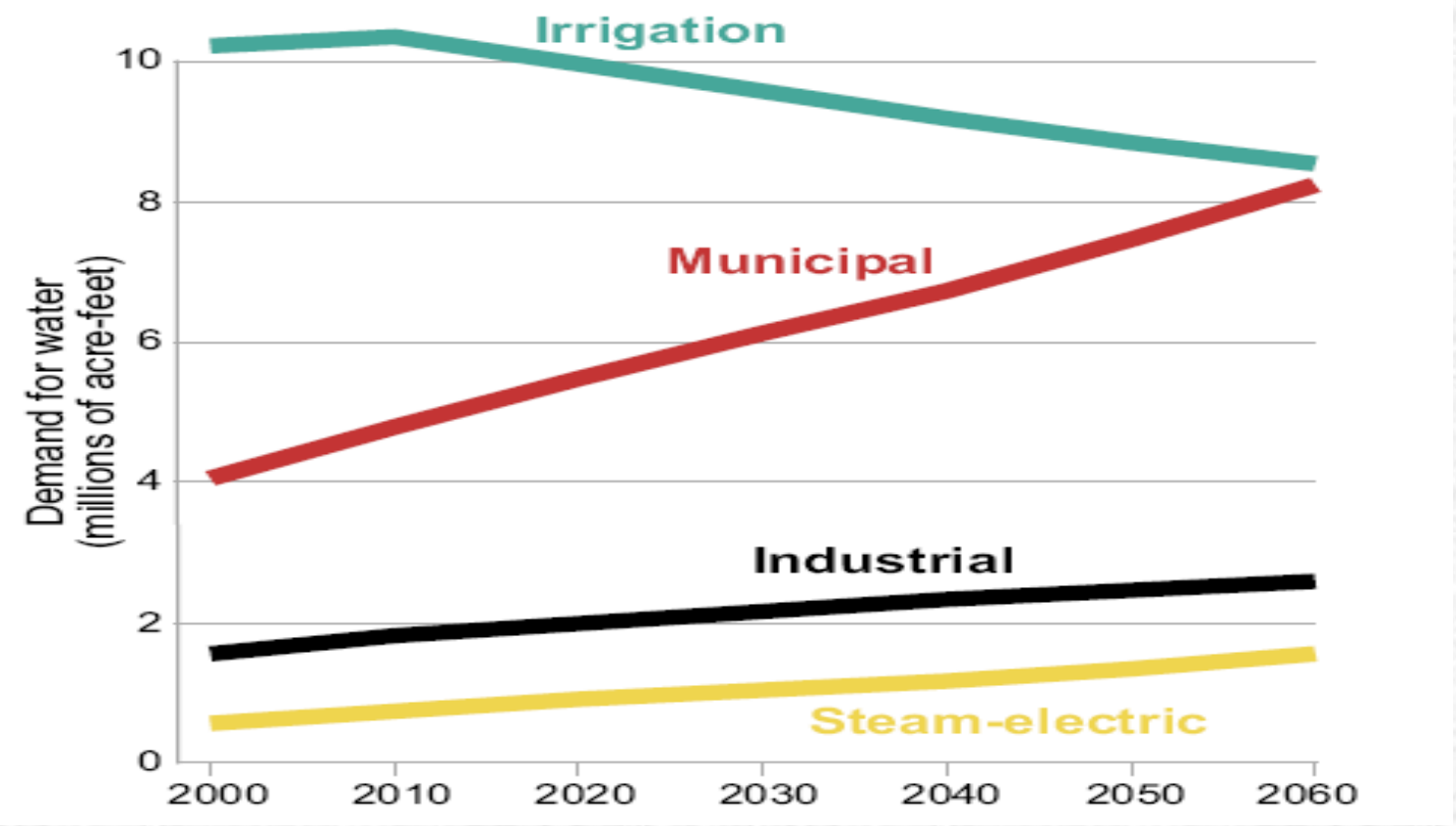
Think of a New Water Supply System as a Formal Dining Room

How *often* will it be used?

Is it *worth* the cost?

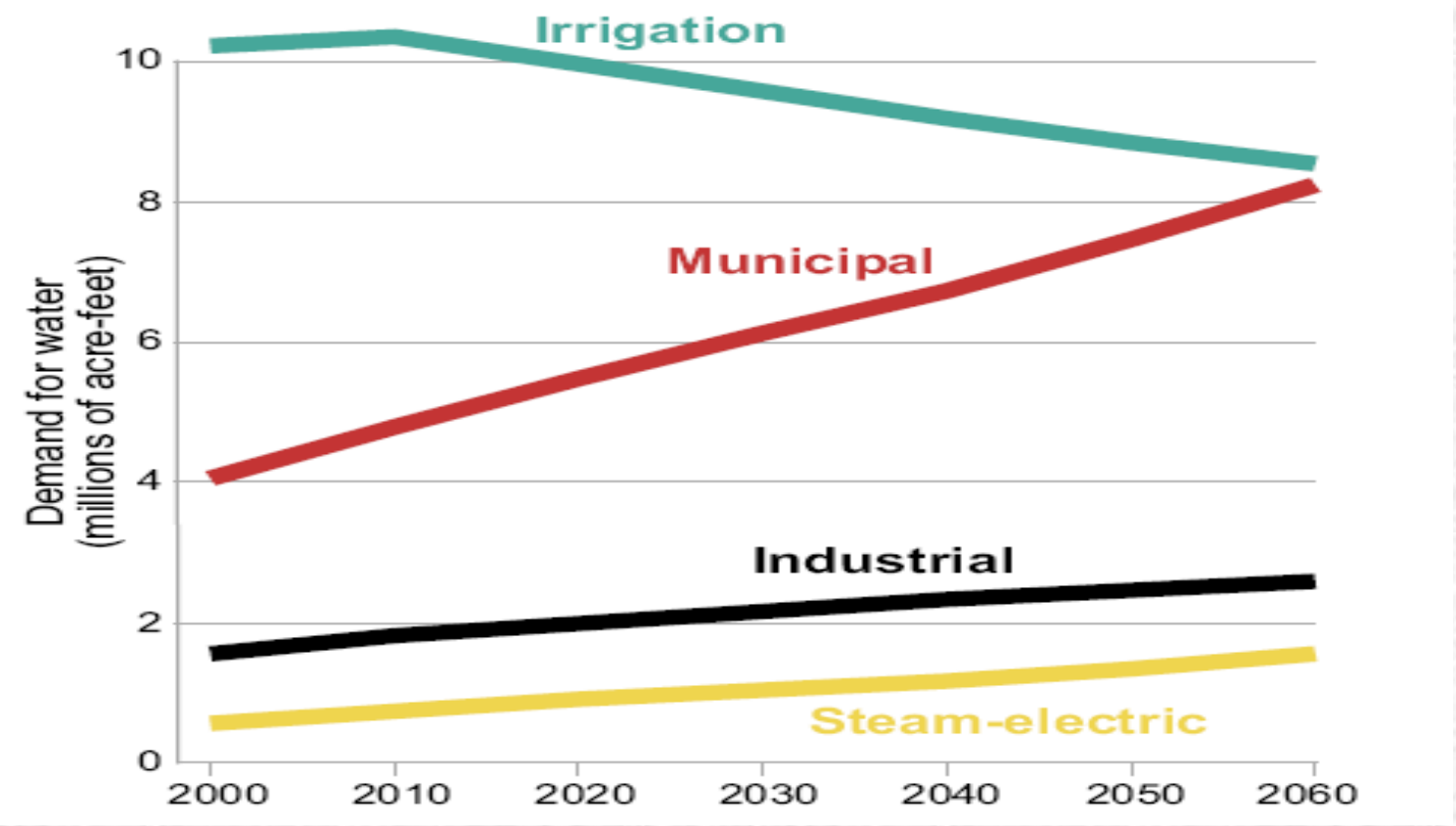
Is there really a *demand* for it?

2006 State Water Plan- Projected Demands

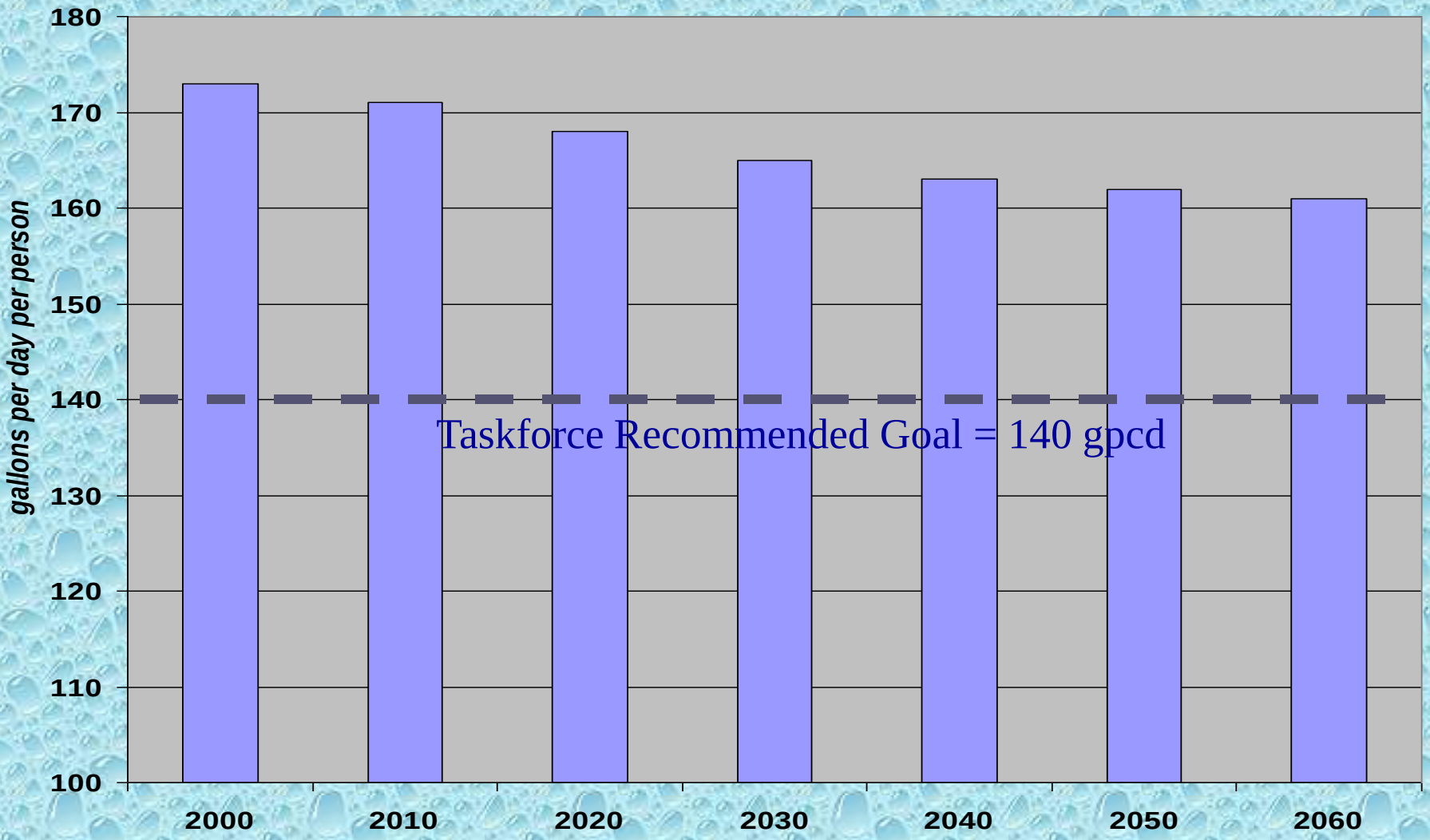


Oklahoma
COPYRIGHT JOHN S. PITCHETT

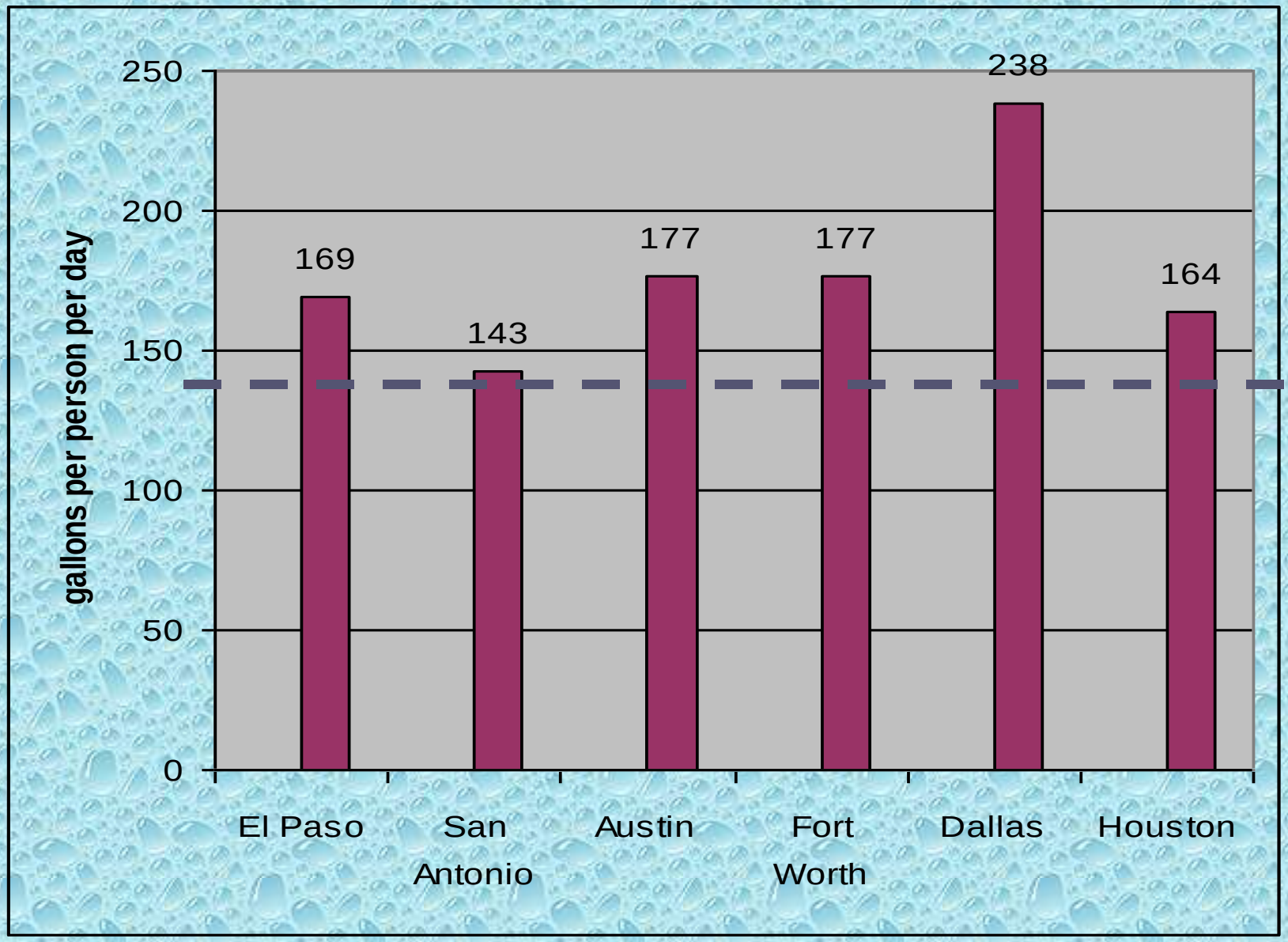
2006 State Water Plan- Projected Demands



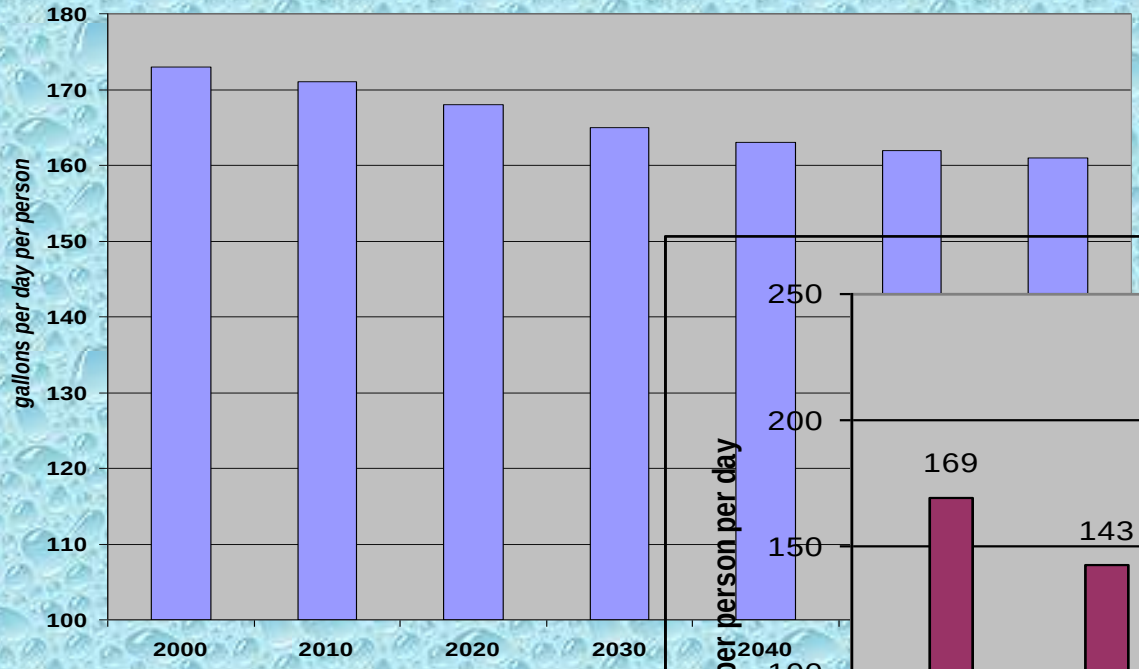
Projected Statewide Per Capita Water Use

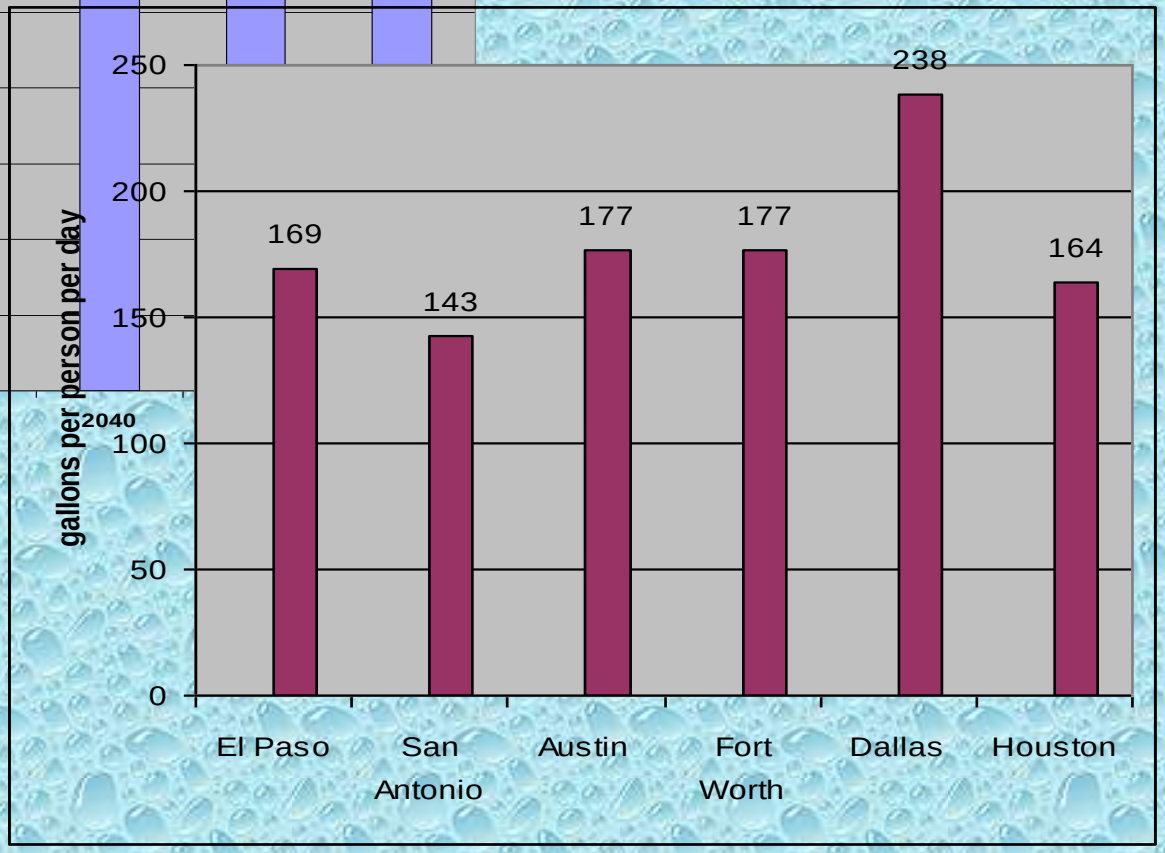


Selected 2003 Per Capita Water Use



Reduce Water Demands and Account for Reductions Accurately





What is the difference?

- Water Conservation involves *on-going* approaches
  - Low-flow toilets
  - Improved sprinkler efficiencies
  - Reduced Water Loss from system
- Drought Management is *short-term* response to water supply shortage
  - Once a week watering
  - Restrictions on non-necessary uses

Drought Management in Action

City of Austin

Drought Contingency Plan

May 2005

- Every Community > 3000 Connections MUST Prepare

Why Drought Management Works

- By *inexpensively reducing* demands…

…we *delay* the need for *expensive* supplies

- This *creates* more opportunities by
  - Not invested in something that is seldom used
  - Saves natural resources
  - Saves money

Why is Drought Management Inexpensive?

- Drought Management is a *Behavioral* solution to Water Supply Shortages
- Education is *cheaper* than Construction

How Drought Management Works

- *Reduces* Non-necessary Water Demands which…

- *Extends* existing Water Supplies necessary to meet Essential Needs:

Drinking Water
Manufacturing
Environment

Lawn Watering is **Largest** Non-necessary Demand

- Municipal Water Use More than *Doubles* during Summer Months due to irrigation
- According to Texas Water Development Board…Half of water applied to lawns is *wasted* due to over-watering and runoff

Drought Management uses *Trigger Levels* and *Stages*

- Trigger Levels
  - Indicate a Drought's impact on water supply
    - Reservoir level
    - Streamflow
    - Aquifer Level
    - Water Use
- Stages
  - Reduction Goal based on Trigger Level

San Antonio Drought Management Plan

- Trigger Level

Based on Aquifer Level and Springflows

660’/225 cfs = Stage 1
650’/200 cfs = Stage 2
640’/150 cfs = Stage 3
630’/100 cfs = Stage 4

- Stage

Water Use Reduction Goal

Stage 1 = 20 percent
Stage 2 = 30 percent
Stage 3 = 35 percent
Stage 4 = 40 percent

Lubbock Drought Management Plan

- Trigger Level

Based on percent maximum daily capacity

> 80% = Stage 1

> 90% = Stage 2

> 100% = Stage 3

> 105% = Stage 4

- Stage

Water Use Reduction Goal % maximum daily capacity

Stage 1 = < 90%(?)

Stage 2 = < 80%

Stage 3 = < 70%

Stage 4 = < 50%

Dallas Drought Management Plan

- Trigger Level

Based on Reservoir Levels

35% depleted = Stage 1
45% depleted = Stage 2
55% depleted = Stage 3
70% depleted = Stage 4

- Stage

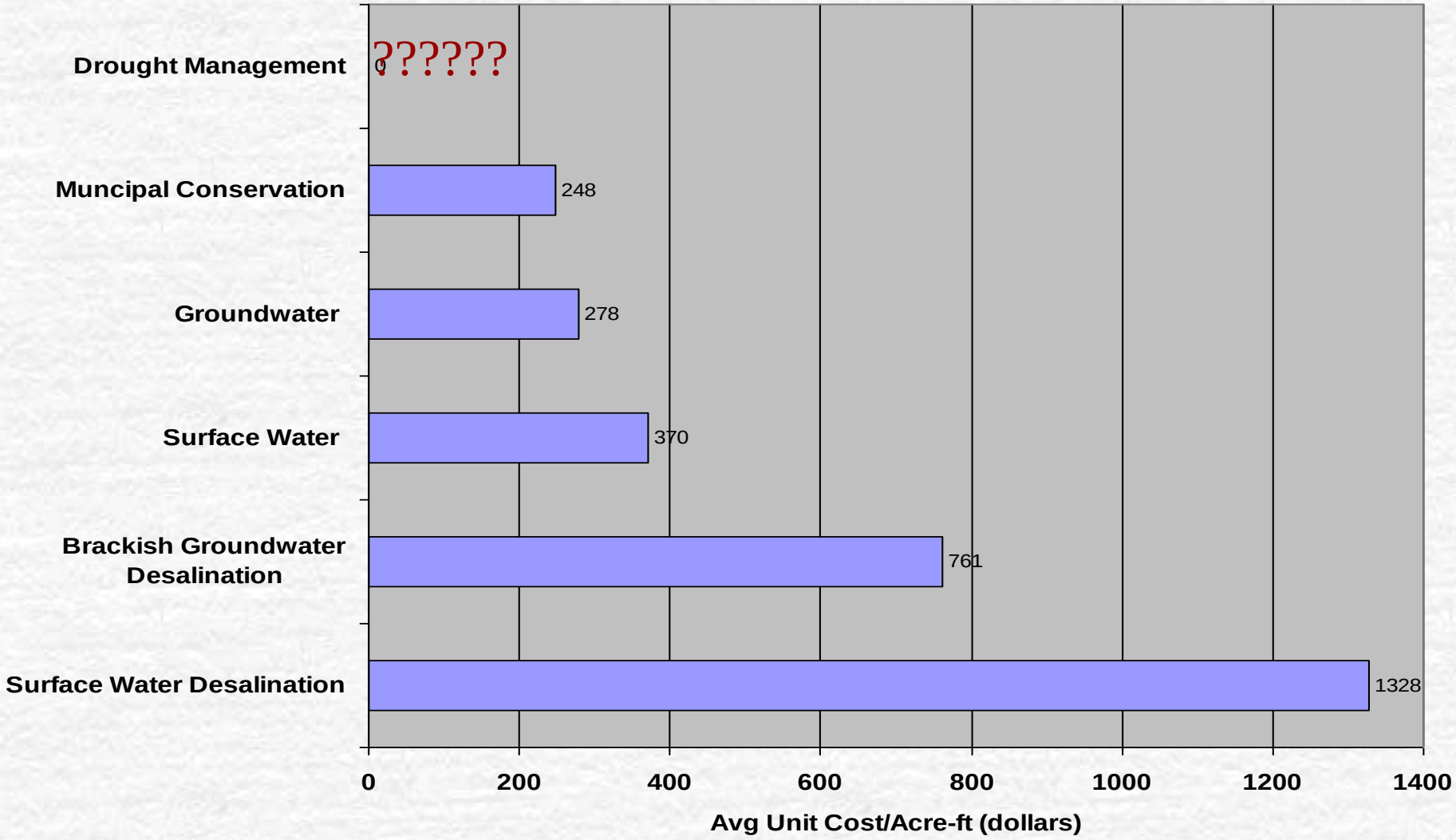
Water Use Reduction Goal

Stage 1 = 1 percent
Stage 2 = 5 percent
Stage 3 = 15 percent
Stage 4 = 25 percent

Why Use Stages?

- Educational Process
  - Learning Curve allows time for users understand Plan
  - Gives water users opportunity to discover what practices work for their situation
  - Can't go from no restrictions to no watering overnight
- Buffer
  - *Smaller* Reductions in use early may delay *Larger* reductions in use later

How inexpensive is Drought Management?



Cost Considerations

Little cost in impact from once-week watering

Not implemented every year, so less annual cost

Like Water Conservation, not subject to power elasticity costs

What is being done?

- State Water Law
  - Requires all municipal systems to develop Drought Contingency Plans
- Is it working?
  - Apparently so…
  - During drought of 2006, 266 water systems implemented their Drought Contingency Plans.

What else is being done?

- Regional Water Planning Groups
  - Required to consider Drought Management as an Water Management Strategy in the recently filed 2006 Plans
- Was this done?
  - No.
  - In fact, *none* of the Planning Groups considered Drought Mgmt. as a strategy
  - Region H & L doing studies this round
  - TWDB proposing study

Why is Drought Management important to Regional Water Planning?

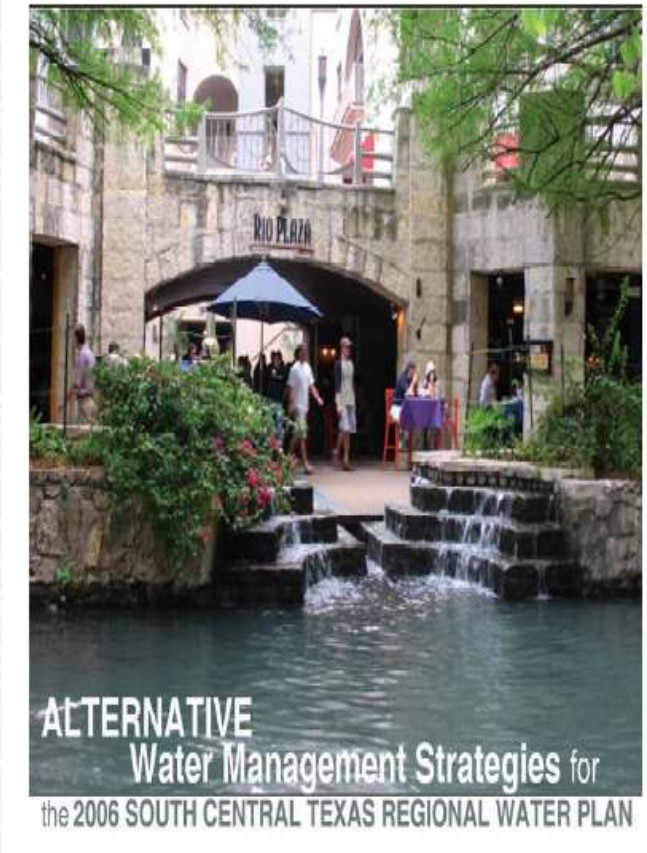
1. Water Demands are based on Per Capita Use during a drought…
2. If Per Capita Use reductions resulting from Drought Management efforts are not considered…
3. Over estimate demands and the need to build additional water supply projects

Is this significant?

Consider…

1. During 2002, drought management efforts in San Angelo reduced per capita use to 118 gallons per capita per day (gpcd). The average is 200 gpcd.
2. During 2000, drought restrictions reduced water use in San Antonio by 14% over a six-month period.
3. During 2006, drought restrictions reduced water use in Llano by 30%.

How much could be saved with Drought Management?

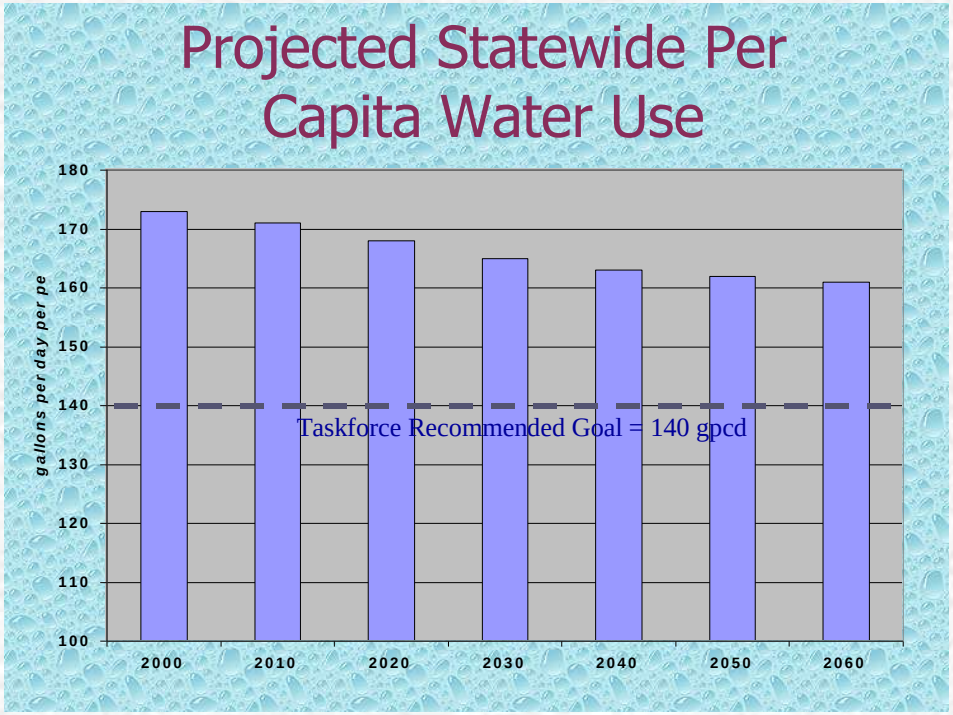


- 2006 Study by Lone Star Sierra Club.

In South Central Texas (Region L)

Once-a-week watering requirements for 9 largest cities in Region could save **47,000** acre-feet in 2060

Remember this graphic?



If Drought Management efforts were to reduce Per Capita Use by just 5% (9 gpcd) water demands in 2000 would have decreased by > 200,000 acre-feet…

Proposed Reservoirs in 2007 Water Plan

dam	water supply acre-feet/yr
Allens Creek	97,410
Fatrill	112,000
Columbia	75,700
Marvin Nichols	489,840
Cedar Ridge	34,413
Lower Bois d' Arc	123,000
Brownsville Wier	20,643
Texana II	23,000
total	**1,092,021**

This reduction will be 400,000 acre-feet in 2060!

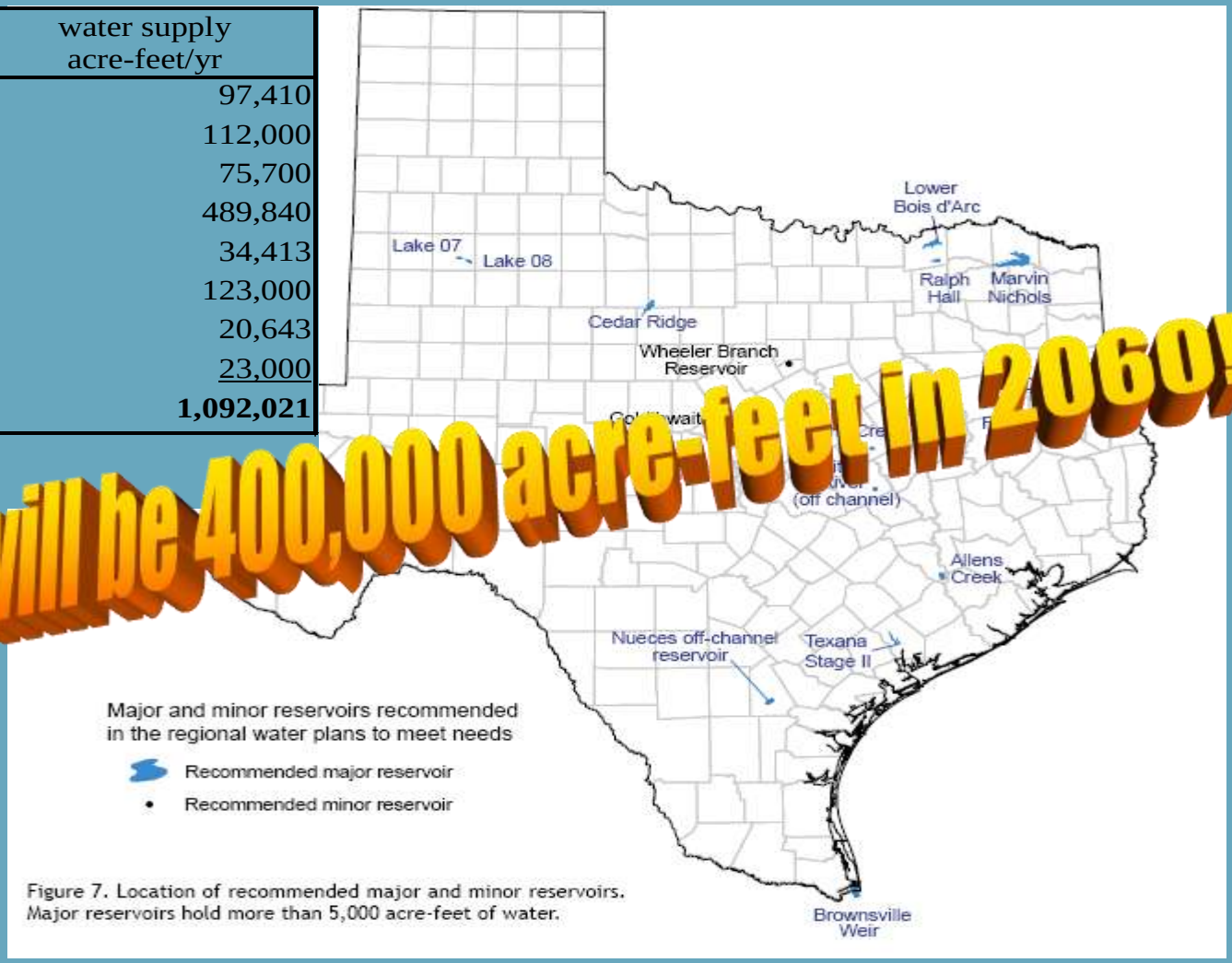


Figure 7. Location of recommended major and minor reservoirs. Major reservoirs hold more than 5,000 acre-feet of water.

- www.TexasWaterMatters.org