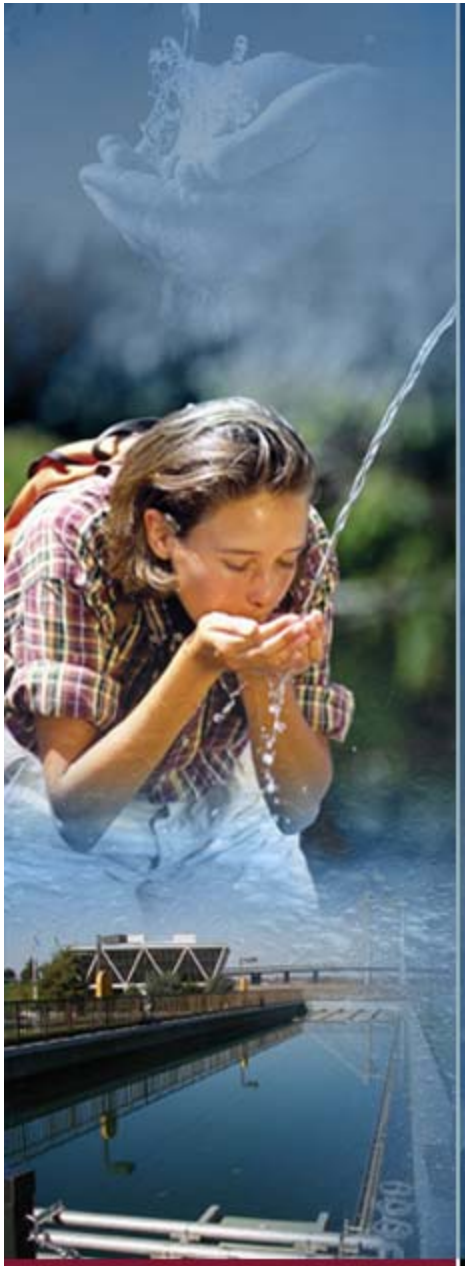

City of College Station

City of Bryan

Texas A&M University

Impact of Large Groundwater Withdrawals on the Economies of Brazos and Robertson Counties

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Purpose of Study

"Provide input to rule makers regarding potential economic impacts of future large groundwater withdrawals."

Overview

- Groundwater Management Areas
- Groundwater Hydrology Analysis
- Direct Costs to Current Users
- Future Economic Impacts

Groundwater Conservation Districts

- Water Code § 36.0015: *"Groundwater conservation districts created as provided by this chapter are the state's preferred method of groundwater management…"*
- Provide local regulation and control
- 95 GCDs covering all or parts of 144 counties
- No uniform management required across a shared resource
  - 59 single county districts
  - Different requirements when you cross the county line
  - Aquifer systems don't respect county lines

House Bill 1763 Process

- 79th Texas Legislature (2005)
- Establishes 16 Groundwater Management Areas (GMAs) covering entire State
  - Led by confirmed GCDs
  - Counties without GCDs are essentially unrepresented
  - Process is unfunded by the State
- GCDs develop Desired Future Conditions (DFCs)
  - How should the aquifer look in the future?
    - Water levels, springflows, etc.
  - Public process
- TWDB uses DFCs to estimate Managed Available Groundwater (MAG) by aquifer by county
  - Groundwater Availability Models (GAMs)

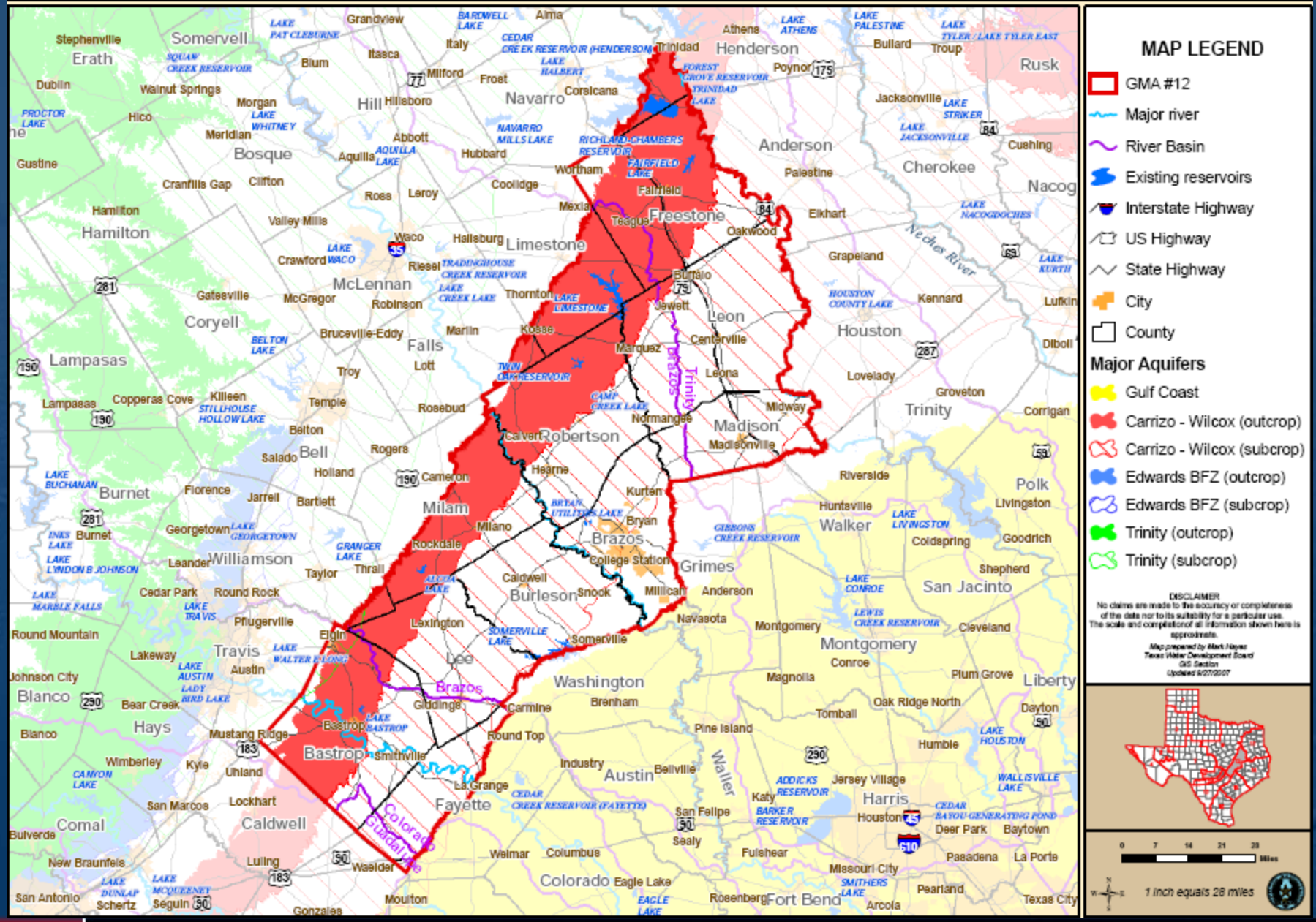
Brazos County is in GMA 12

- 5 Groundwater Conservation Districts in GMA 12
  - Mid-East Texas, Brazos Valley, Post Oak Savannah, Lost Pines, Fayette County
- Concerns regarding water level declines from future large withdrawals
  - Increased pumping costs
  - New wells, lowered pumps, etc.
  - Will Bryan, College Station, TAMU, others be forced to pursue alternative supplies?
- Bryan, College Station & TAMU sponsoring study to address economic costs of future large withdrawals

Managed Available Groundwater

- GCDs required to use MAG in management plans and rules
- Used by regional water planning groups
  - Different from 2006 planning cycle
  - Use in 2011 plans only if DFCs determined prior to January 2008 (only one GMA met the deadline)
  - Required to use in 2016 plans
  - Impacts State funding decisions
  - Could influence surface water right permitting decisions by TCEQ

Groundwater Management Area #12



Concerns for the Future

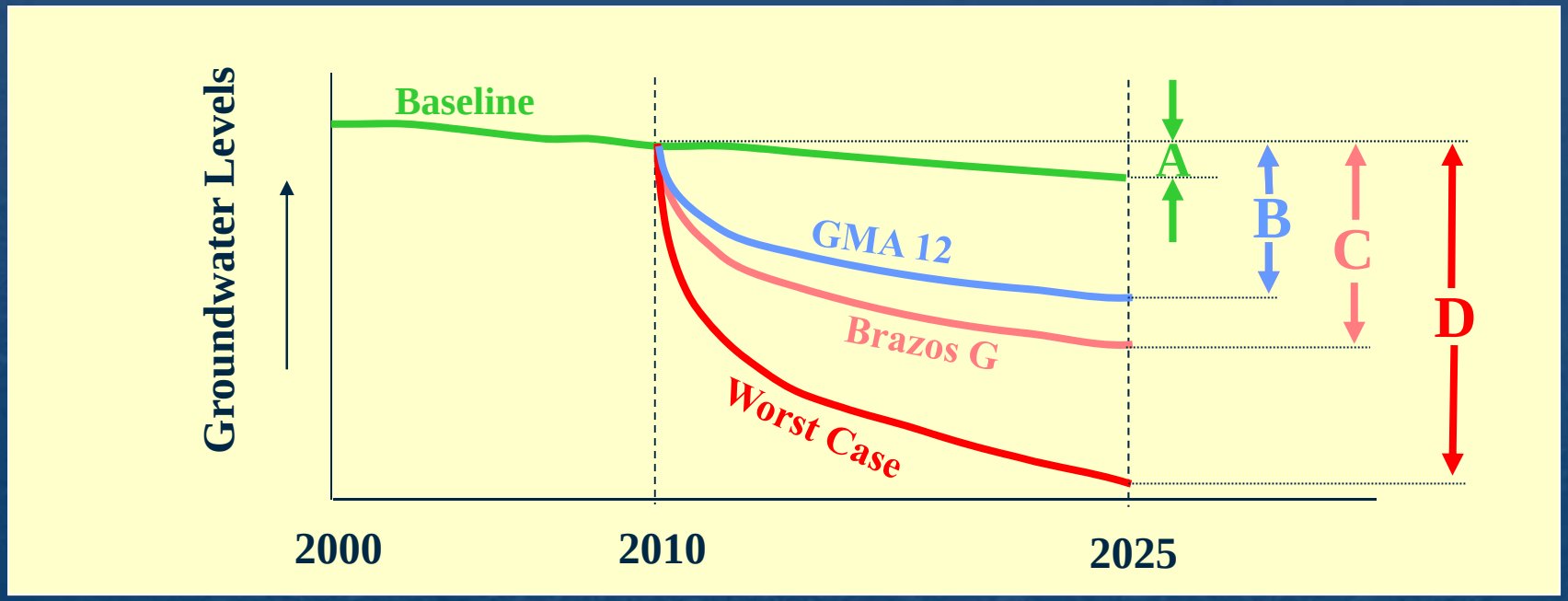
- Will there be enough water?
- Will it be of good quality?
- How will future pumping of additional large quantities impact existing users?

Purpose of Study

"Assist the GMA 12 process by providing input regarding potential economic impacts within the Brazos Valley Groundwater Conservation District (GCD) of future large groundwater withdrawals from GMA 12."

Ground Water Level Declines

Impact on Groundwater Levels: Drawdown from 2010 to 2025



A = Baseline (In-County Uses)

B = GMA 12 (Baseline plus Additional Large Projects)

C = Brazos G (Brazos G Availability Estimates)

D = Worst Case (Total Aquifer Storage)

Direct Costs – Two Types Determined

1. Costs to existing well owners
   - Costs to rehab wells (lower pumps)
   - Costs to replace wells
   - Increased pumping costs
2. Increased costs for Bryan and College Station to develop future supplies
   - Greater well costs, **or**
   - Develop new surface water supply
     - Brazos River Diversion
     - Millican Reservoir
   - Existing users typically bear 30 to 60 percent of these costs

Costs for New Supplies for Bryan and College Station

- Decreased aquifer levels will increase the cost of new supplies for Bryan and College Station
- 30% to 60% of the costs for new supplies are typically born by existing users (water rates)
  - Projects funded in advance of growth
  - New growth pays for a portion through impact fees and rates to new users, but not all
- Based on current growth projections, Bryan and College Station will require a combined 18.3 MGD of additional peak day supply by 2060 (2006 Brazos G Plan)
  - Accelerated to 2025 to fit accelerated GMA 12 pumping schedule
- Three alternatives for new supply
  - New wells (5 for College Station, 1 for Bryan)
    - Baseline = Costs to develop new wells
    - GMA 12 & Worst Case = Additional costs to develop more expensive wells
  - New surface water supply from Brazos River (assumes new wells prohibited by GCD)
    - Baseline = Costs to develop new wells
    - GMA 12 & Worst Case = Brazos supply costs minus Baseline well costs
  - New surface water supply from proposed Millican Reservoir

Project Features

- New Simsboro Aquifer Wells ($9.7 million per well)
  - College Station: 5 new wells
  - Bryan: 1 new well
- Brazos River Diversion ($65 million)
  - Purchase of water from Brazos River Authority
  - Brazos River intake, advanced treatment, pipeline and pump station
  - Shared Costs
    - College Station: 86.9%
    - Bryan: 13.1%
- Millican Reservoir
  - Dam and reservoir ($659.3 million)
    - Shared capital for dam and reservoir
      - College Station and Bryan share 26.86% of project cost
  - Intake, conventional treatment, pipeline and pump station ($60.6 million)
    - College Station: 86.9%
    - Bryan: 13.1%

Economic Impacts

- Impacts arising from direct costs to existing uses
  - Includes all current uses outside Bryan and College Station
  - Includes current Bryan, College Station and TAMU uses

- Impacts arising from additional costs to Bryan and College Station to develop new supplies as they grow
  - Groundwater only – continued ability to develop all new supplies from fresh groundwater
  - Surface Water – necessity to develop surface water supplies
    - Brazos River diversion
    - Millican Reservoir

Economic Impacts of New Supplies

- Economic output decreases sharply in 2015
  - $287 thousand decrease with new supplies not considered (GMA 12 case)
  - $532 thousand decrease if additional wells provide new supplies
  - $5.58 million decrease if Brazos River diversion project is necessary
  - $15.67 million decrease if Millican Reservoir is necessary
- Economic impact depends on relative timing of capital construction between scenarios

Summary

Assumptions

- Impacts are applied to existing uses. Impacts to future uses are not considered.

- All economic impacts are based on 2006 economy
  - Provides “snapshot” look at a possible future
  - Future economy not guaranteed to look like 2006

Summary

Results

- Additional large groundwater withdrawals will increase costs to existing uses
  - Negative overall impact to economy
    - Modest impacts – less than one tenth of one percent, even in GMA 12 case
    - Output will slow, income will decrease and some jobs could be lost
- Costs to develop new supplies will increase economic impacts
  - Costs for future Bryan and College Station wells will almost double economic impact
  - Economic impacts will increase 10-fold if cities are forced to develop expensive surface water source

Conclusions

- Economic Cost of depleting the Simsboro aquifer is extremely high.
- Desired Future Conditions must provide the Simsboro as a dependable water source in perpetuity.
- **Our groundwater is a shared resource**. Many "water marketers" advocate basing availability on estimates that lead to depletion of the aquifer (Total Aquifer Storage basis).