# GMA 12

# Hydrological Conditions Summary

by

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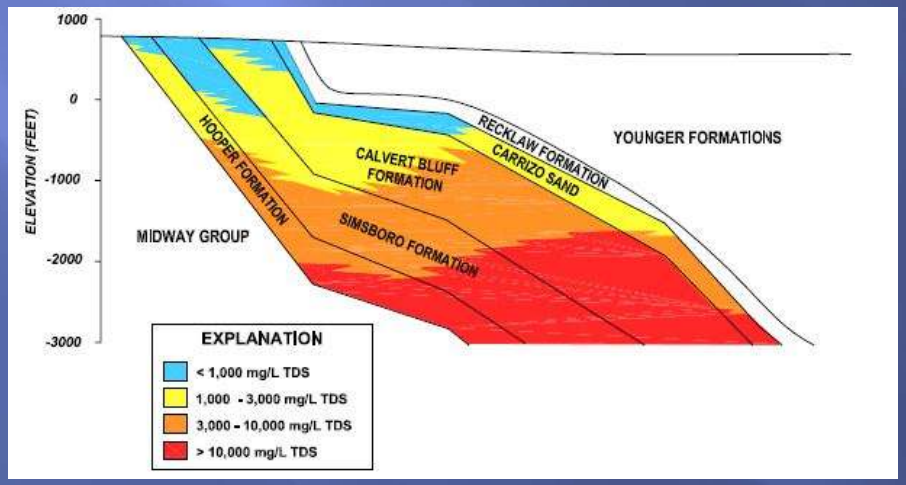
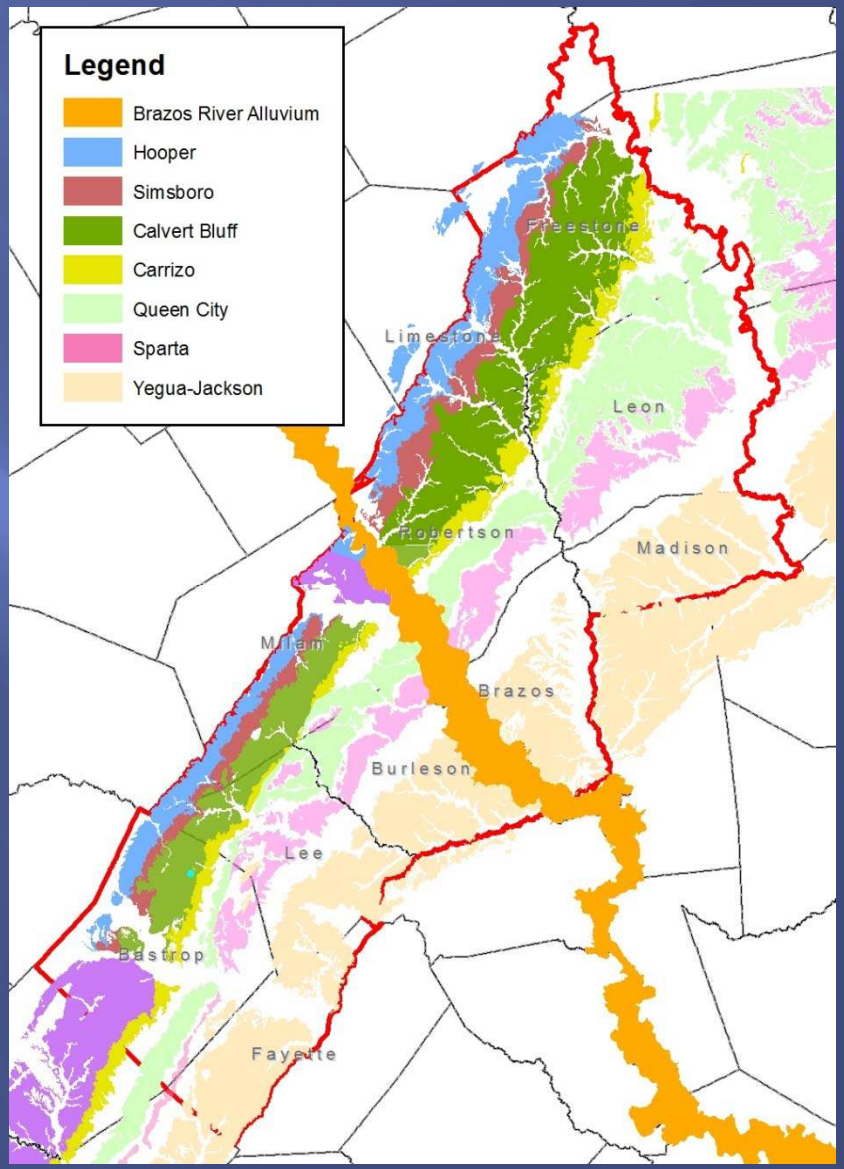
# Consideration 3

- Describe the hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge

# Hydrological Conditions

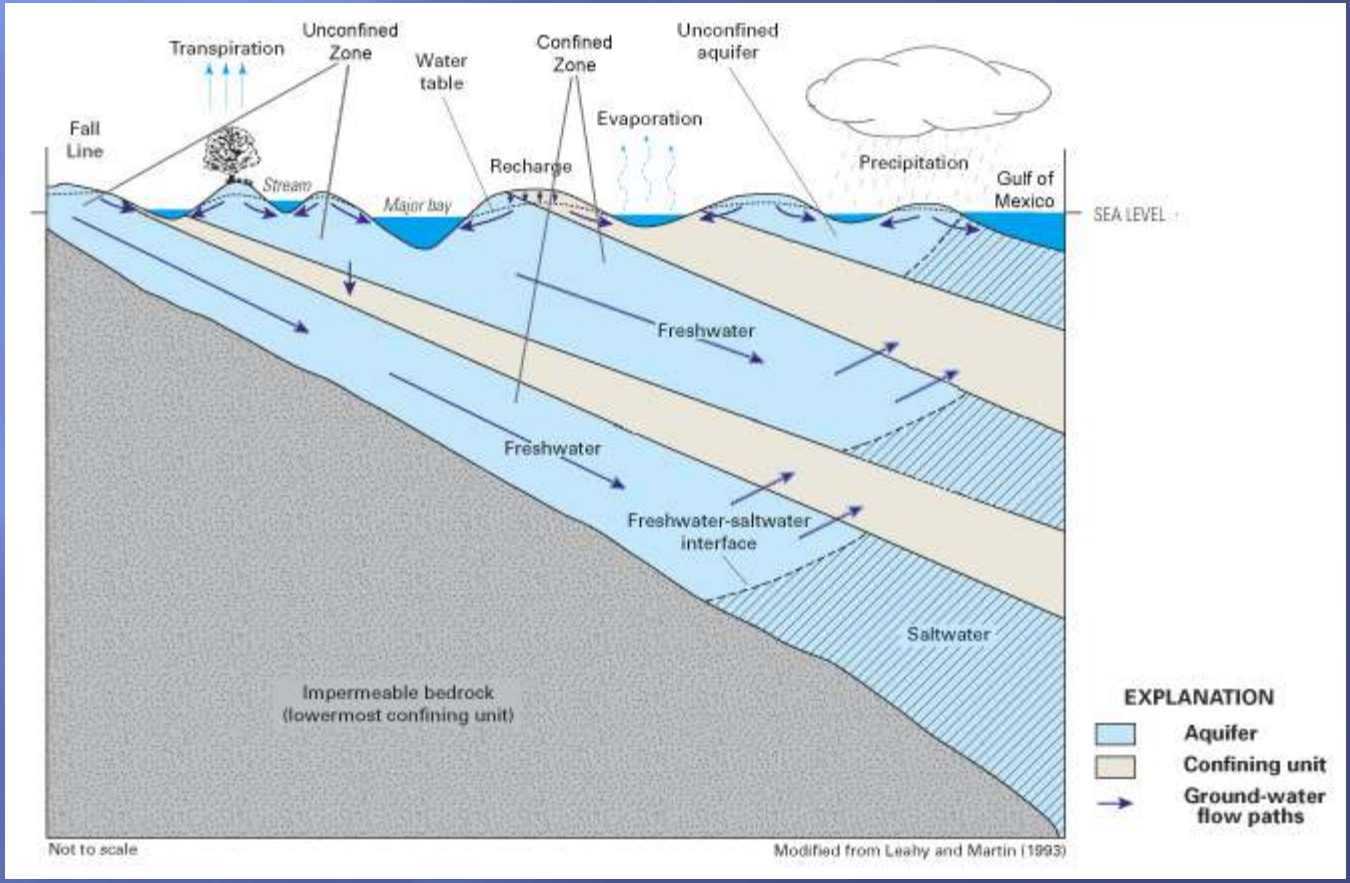
- Outcrop from SW to NE
- Dip towards the coast
- Unconfined in outcrop, confined downdip
- Fresh water generally in and near outcrop, but some large projects downdip
- Faults!!!!!



# Hydrological Conditions

- Unconfined in outcrop, confined downdip



# Faults

- Impact of faulting on groundwater flow in much of the west part GMA 12 is an important consideration
- Many of the faults included in the GAM are “sealing” faults, allowing little water to move across them
- Unsure of real impact of faults on groundwater flow
- Impact of faults on the flow system is about to be re-evaluated in an updated GAM

# Yegua-Jackson Aquifer

- Water is produced from the Yegua Formation and the Jackson Group, generally treated together as one aquifer unit
- Groundwater primarily produced from shallow wells, most <1000'
- Variable water quality due to composition of sediments in the formations
- Fairly consistent aquifer conditions across the extent of the aquifer within GMA 12
- Not a highly productive aquifer anywhere within GMA 12

# Sparta Aquifer

- Water is produced from the Sparta Formation of the Clairborne Group
- Sand-rich formation interbedded with silt and clay
- Groundwater primarily produced from shallow to moderately deep wells (most <1000', a few up to 2,000')
- Water quality usually fresh in and near outcrop, deteriorates downdip
- More prolific towards the northeastern portions of GMA 12
- Can produce small to moderate quantities of water in GMA 12

# Queen City Aquifer

- Water is produced from the Queen City Formation
- Water stored in sand, loosely cemented sandstone, and interbedded clay
- Water quality generally fresh in and near outcrop, deteriorates downdip
- Fairly consistent aquifer conditions across the extent of the aquifer within GMA 12
- Can produce small to moderate quantities of water in GMA 12

# Carrizo Aquifer

- Water is produced from the Carrizo Formation, which is just above the Wilcox, and it is considered part of the Carrizo-Wilcox Aquifer
- Sand-rich formation interbedded with silt and clay. Sand thicknesses 100-200 feet and more laterally continuous.
- Water quality generally fresh in and near outcrop, but can have fresh water farther downdip,
- Becomes more prolific to the southwest, especially in GMA 13.
- Can be a very productive aquifer within GMA 12 in the southwest and northeast.

# Calvert Bluff Aquifer

- Water is produced from the Calvert Bluff Formation, the very upper unit of the Wilcox Group
- Consists mostly of lower permeability clays and lignites. Sands, where present, can be productive. Very thick formation.
- Water quality usually fresh in and near outcrop, deteriorates downdip
- Fairly consistent across the GMA
- Can produce low to moderate quantities of water in GMA 12

# Simsboro Aquifer

- Water is produced from the Simsboro Formation of the Wilcox Group
- Predominantly sand-rich formation. Can have more than 500 feet of sandstone. Thick sands extend well downdip, make up 80% of the formation
- Defined as a separate unit of the Wilcox in most of the GMA
- Water quality generally fresh, deteriorates farther downdip
- More productive in the central portion of the GMA
- Extremely productive aquifer within GMA 12

# Hooper Aquifer

- Water is produced from the Hooper Formation of the Wilcox Group
- Made up of interbedded shales and sandstones with minor amounts of lignite, generally 20-40% sand, can be higher locally. Sand thicknesses thin to near zero in most of the downdip areas.
- Water quality usually fresh in and near outcrop, deteriorates downdip
- Not a highly productive aquifer in most areas of GMA 12

# Brazos River Alluvium Aquifer

- Water is produced from the alluvium deposited by the Brazos River
- Wells are extremely shallow (<100 feet)
- Water quality usually fresh, some pockets of poorer quality water
- Fairly consistent aquifer conditions across the extent of the aquifer within GMA 12
- Can be fairly productive

# Total Estimated Recoverable Storage (TERS)

- Required to be evaluated as part of the DFC process
- Provided by the TWDB in GAM Task 13-035 report dated August 30, 2013
- "Recoverable" is defined as the estimated amount of groundwater that accounts for recovery scenarios that range from 25% to 75% of the total storage
- Total storage = L x W x H x Storage coefficient

# Total Estimated Recoverable Storage (TERS)

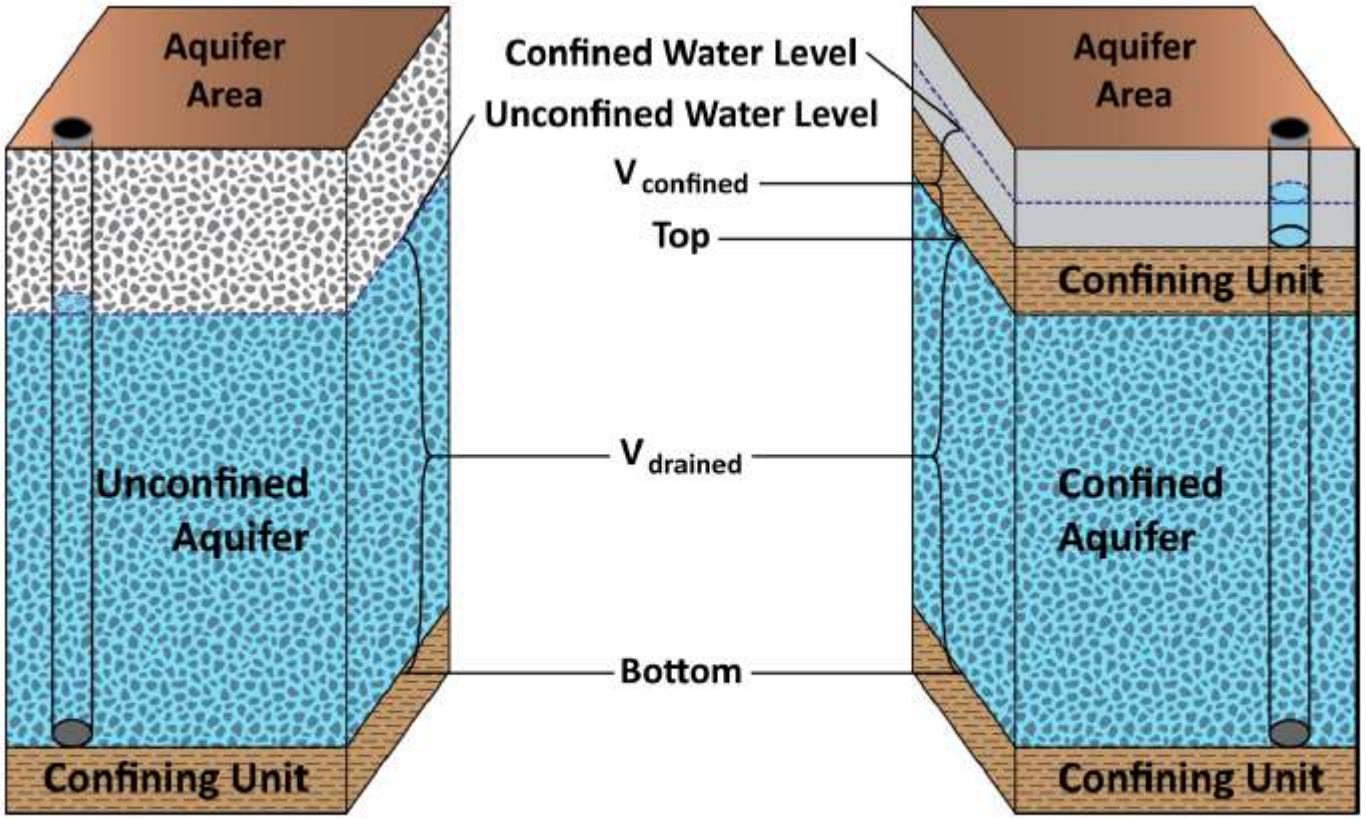



FIGURE 1. SCHEMATIC GRAPH SHOWING THE DIFFERENCE BETWEEN UNCONFINED AND CONFINED AQUIFERS.

# Total Estimated Recoverable Storage (TERS)

- Solely based on how much water is present and how much can be pumped out based on TWDB definition of 25% to 75%
- One-size-fits-all definition of "recoverable". How much is actually recoverable may actually vary based on aquifer type
- TERS does not consider water quality, subsidence, impact on surface water, etc.
- Vast majority of water is in unconfined storage
- Lots of water in recoverable storage as defined by TERS

# Annual Recharge, Inflows, and Discharge

- Required to be evaluated as part of the DFC process
- Provided by the TWDB in GAM Run reports in support of management plan development
- Fayette County GCD = GAM Run 13-002
- Lost Pines GCD = GAM Run 10-014
- Post Oak Savannah GCD = GAM Run 10-029
- Brazos Valley GCD = GAM Run 14-005
- Mid-East Texas GCD = GAM Run 13-024
- No values for Brazos River Alluvium

# Water Budgets

- Evaluated the simulation PS-4, which is an "anticipated use" model run
- Budgets extracted from results for 2070, presented in May, 2015 meeting
- Budgets presented by GCD
- Budgets included: Recharge, pumpage, surface water interaction, lateral and vertical flow, storage contributions