

# Karst Systems of Hays County and the Edwards and Trinity Aquifers

*Presentation to Kinder Morgan, Inc.*

*February 20, 2019*



**Barton Springs/Edwards Aquifer  
CONSERVATION DISTRICT**

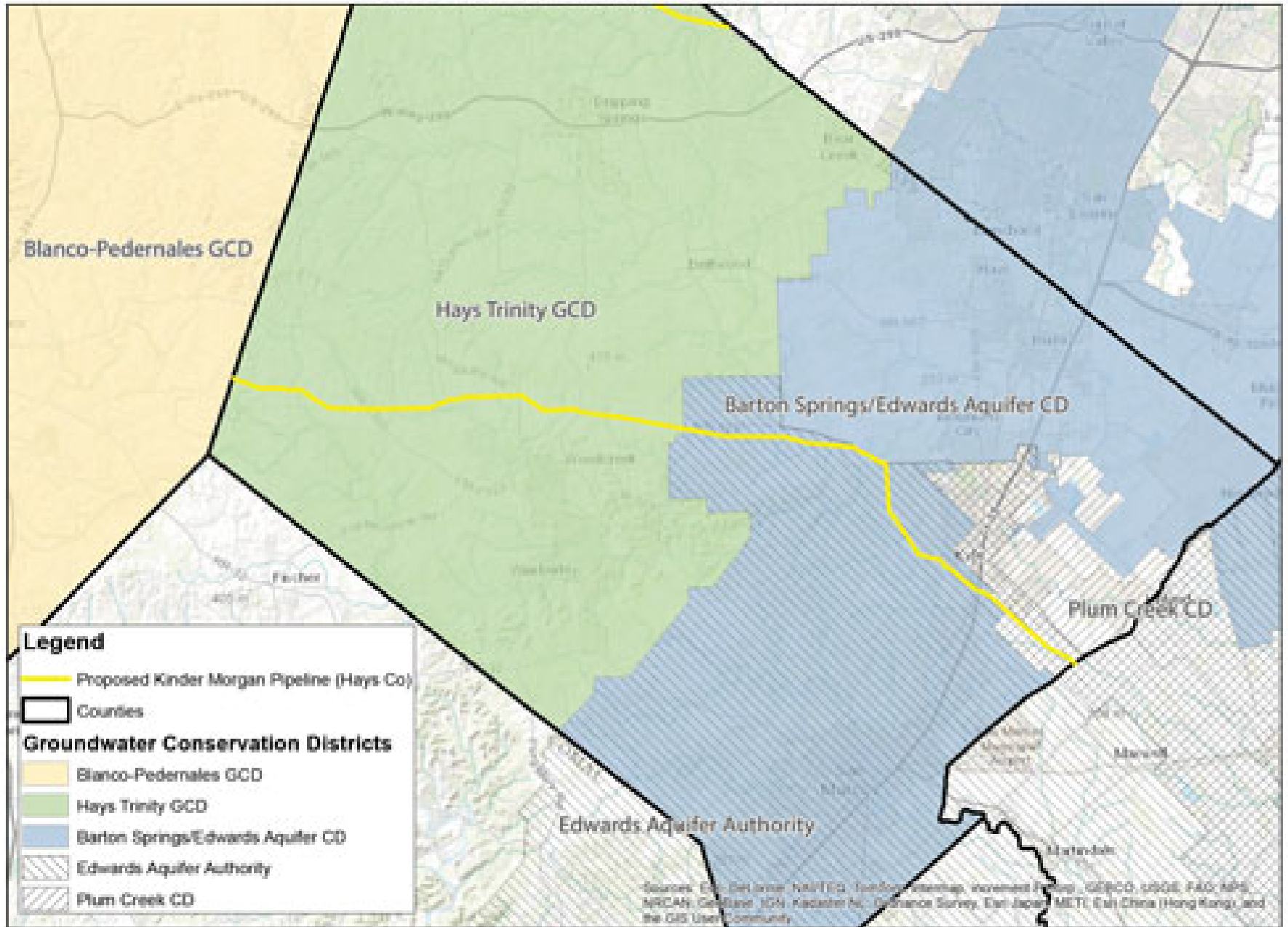


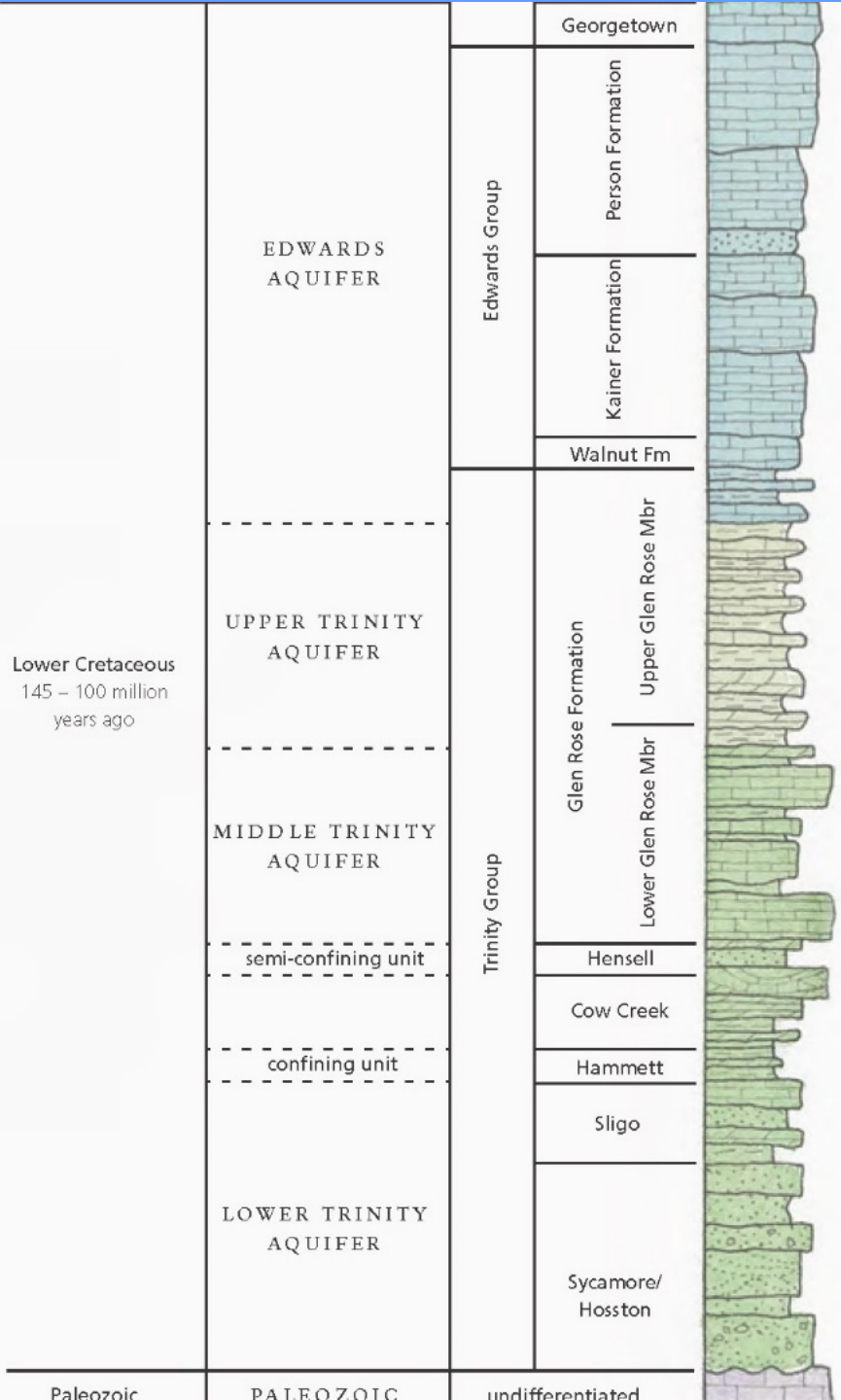
Hays Trinity Groundwater Conservation District

# Outline

1. What is karst?
2. Hydrogeology and karst of Hays County
3. Pathways and contaminant transport in karst
4. Highway and pipeline construction over karst
5. Questions from BSEACD and HTGCD
6. Conclusions

# Groundwater Conservation District Jurisdictions





# Hydrostratigraphy

Edwards Group  
(+/- Upper Glen Rose)

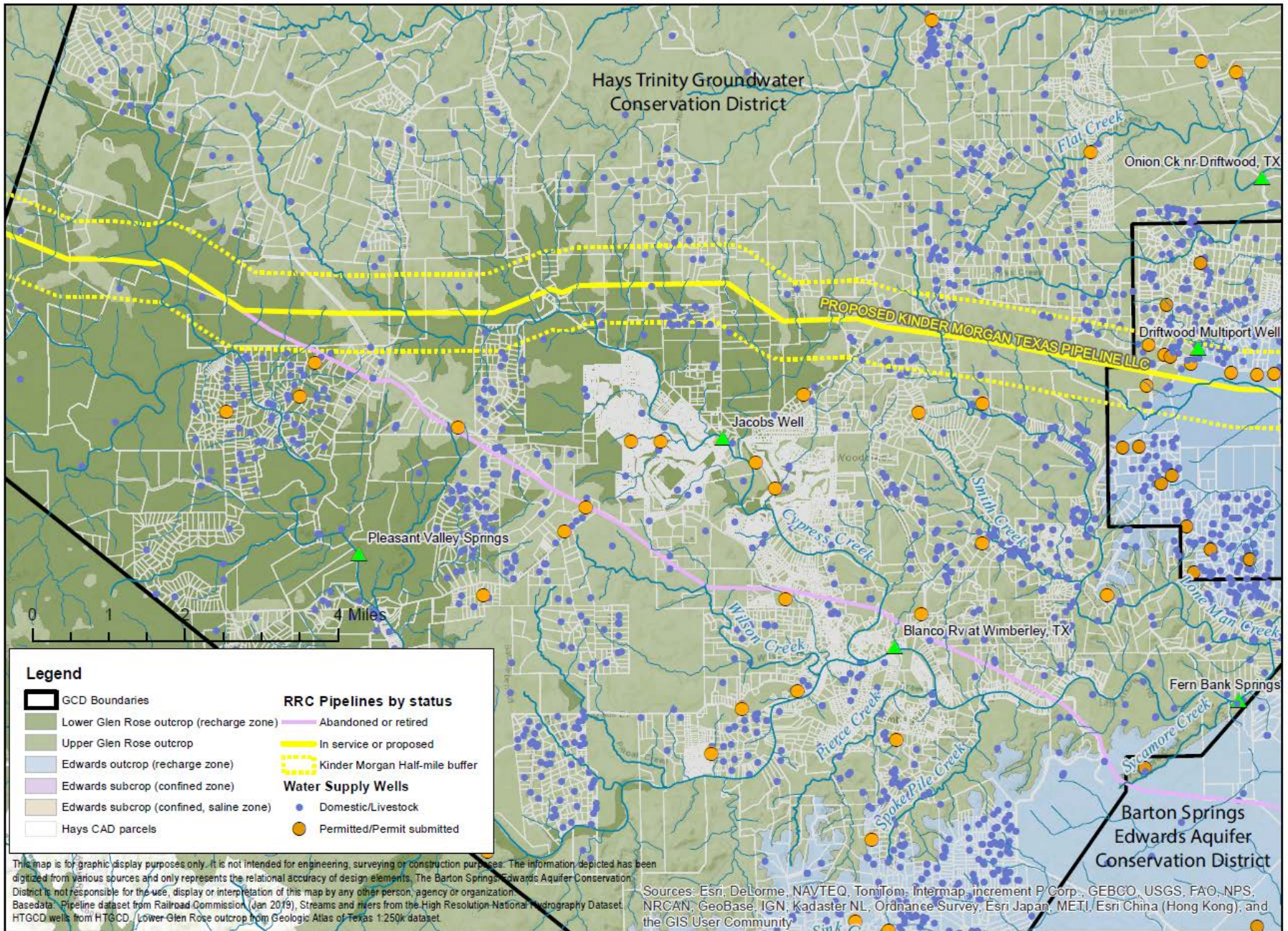
Upper Trinity Aquifer

- Upper Glen Rose

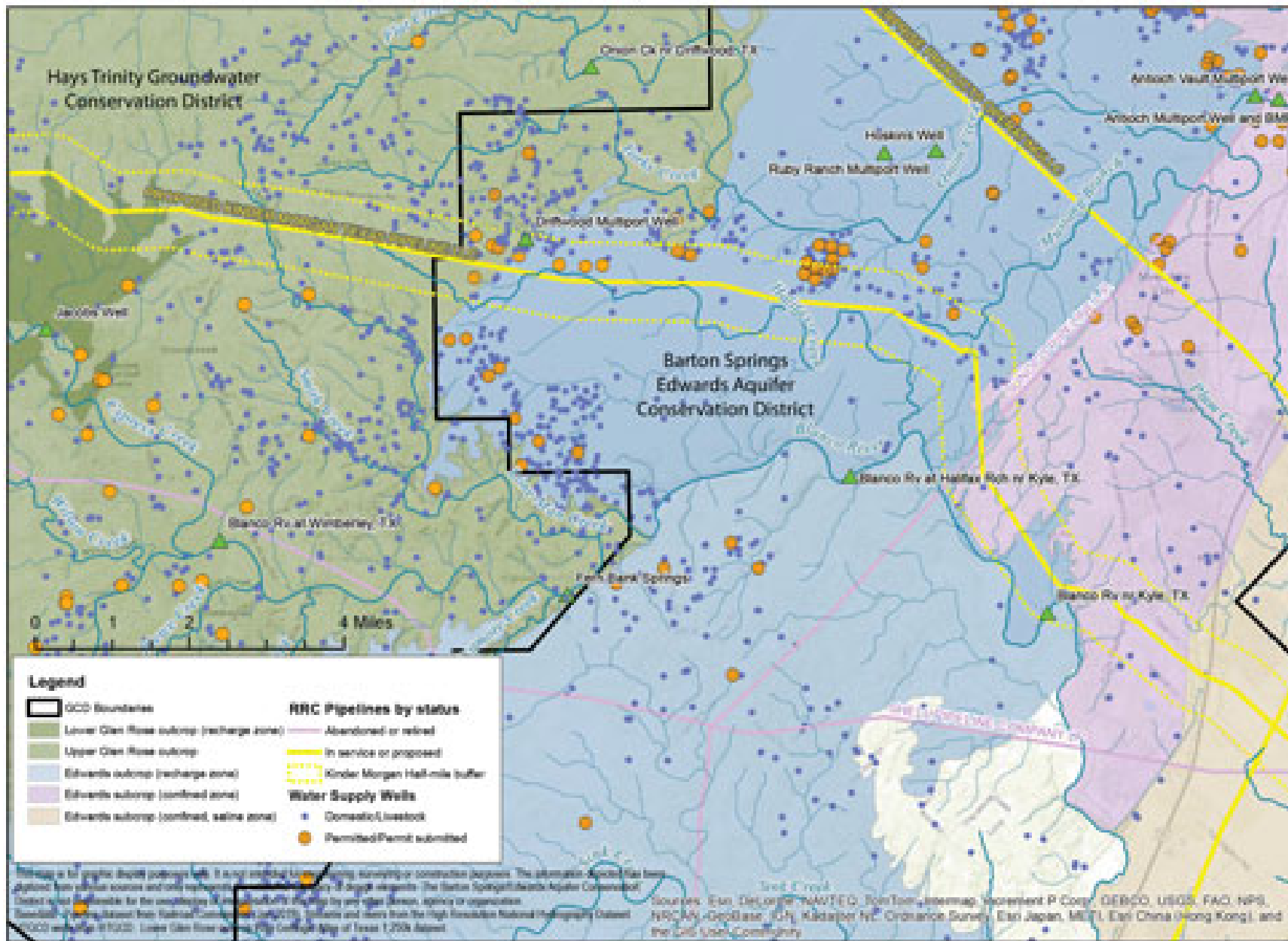
Middle Trinity Aquifer

- Lower Glen Rose
- Hensell
- Cow Creek

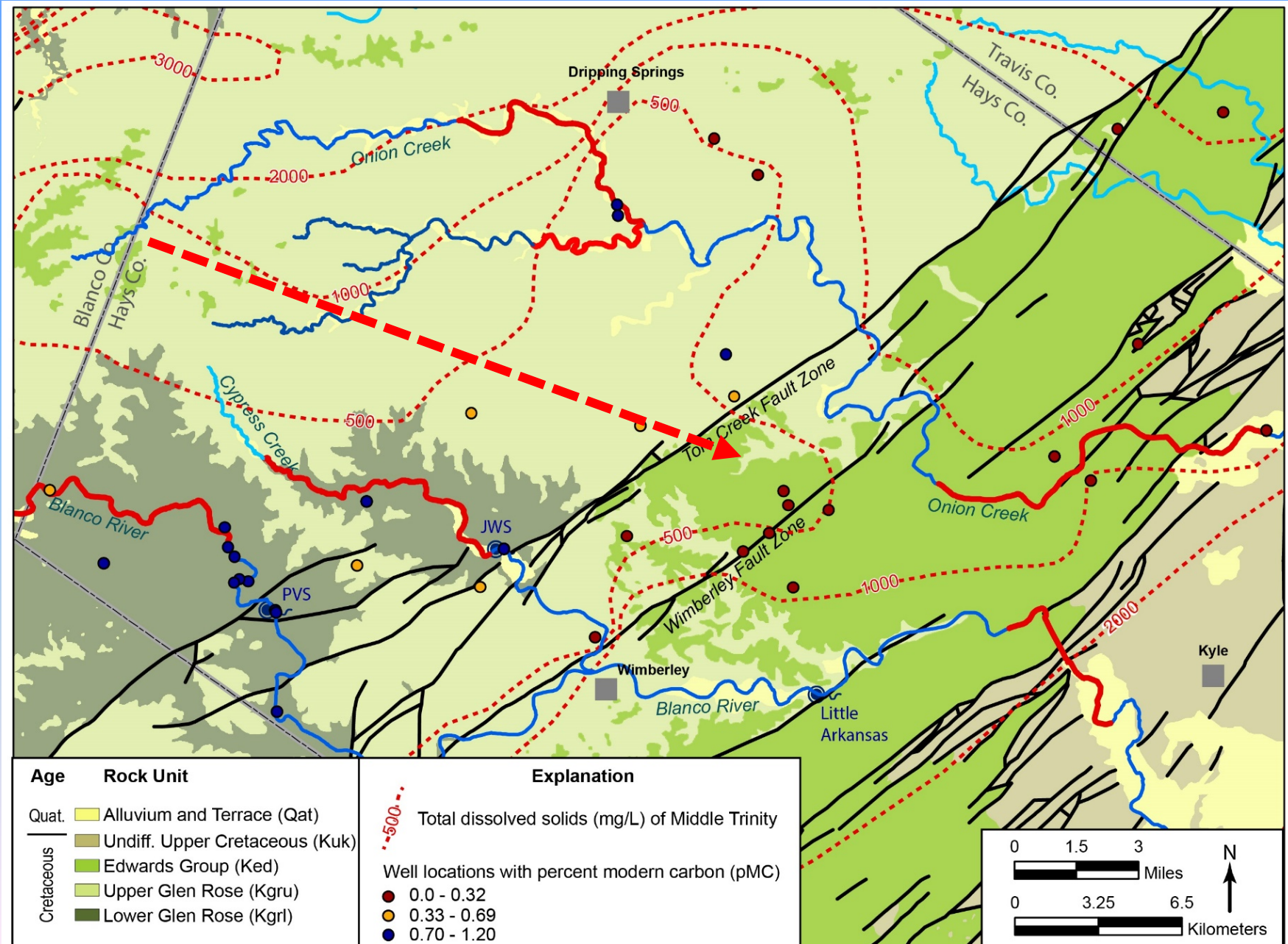
# HTGCD, Pipelines, Hydro Zones, and Wells










# BSEACD, Pipelines, Hydro Zones, and Wells

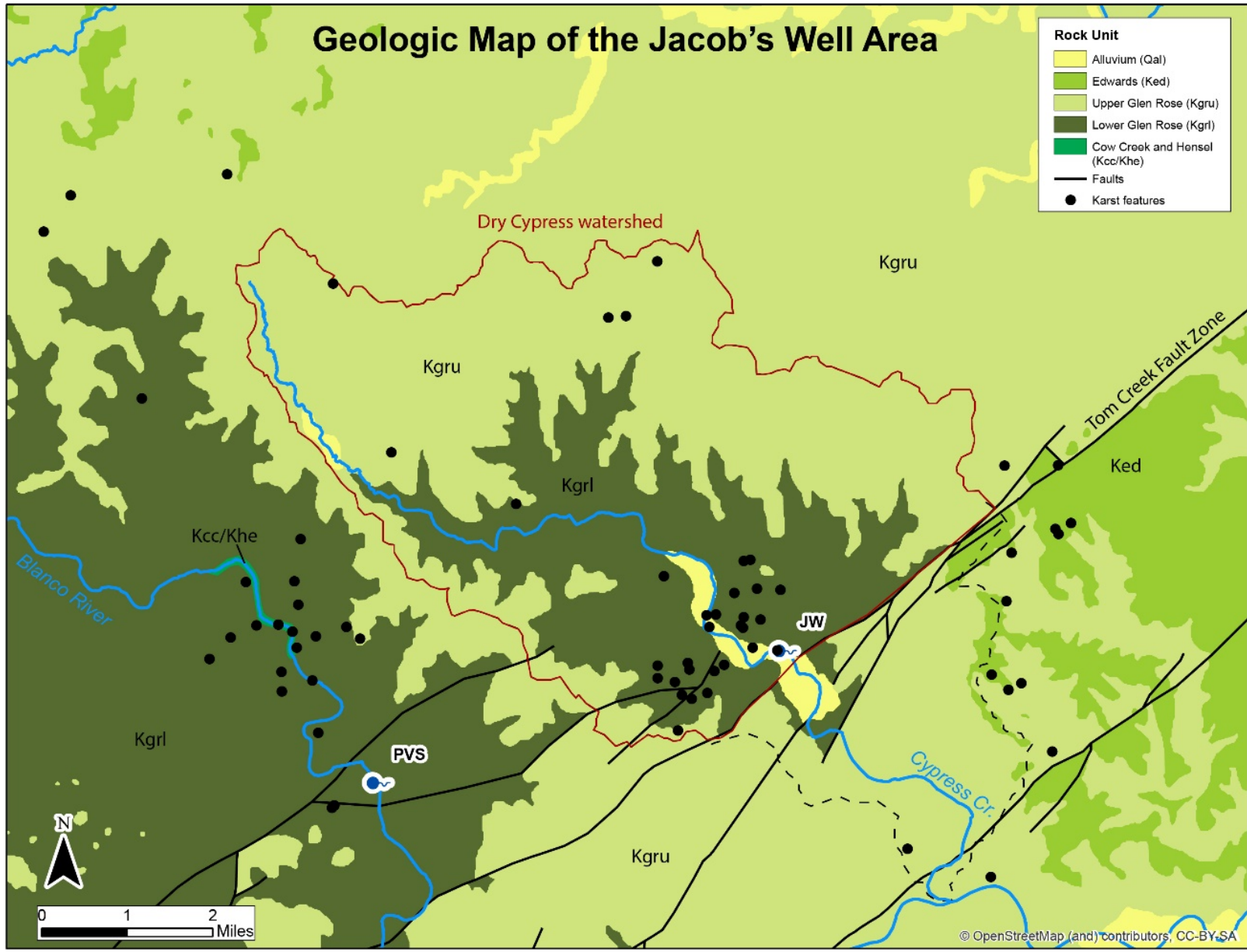


# Middle Trinity Water Quality and Flow Direction



# Geologic Map of the Jacob's Well Area

Rock Unit	
	Alluvium (Qal)
	Edwards (Ked)
	Upper Glen Rose (Kgru)
	Lower Glen Rose (Kgrl)
	Cow Creek and Hensel (Kcc/Khe)
	Faults
	Karst features





# Lower Glen Rose



DiLeo Cave

# Lower Glen Rose—Hensel



**Lower  
Glen  
Rose**

*limestone*

*Silty  
dolomite*

**Hensel**

*Little Blanco River, Hays County*  
Photo by Steve Musick



Jacob's Well Spring

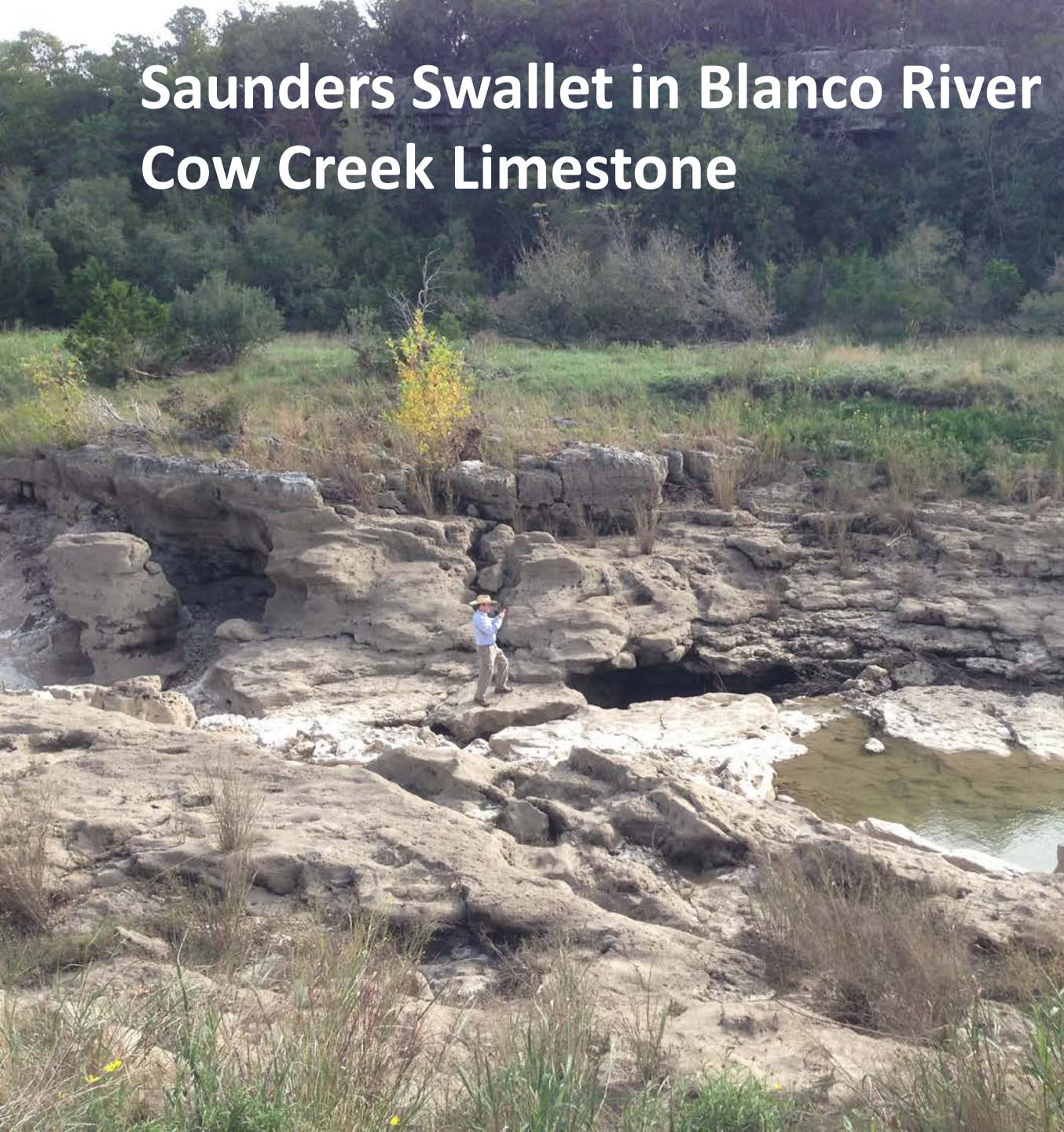


Kiwi Sink (Upper Glen Rose limestone)

# Blanco Basin: Lower Glen Rose Karst



# Saunders Swallet in Blanco River Cow Creek Limestone



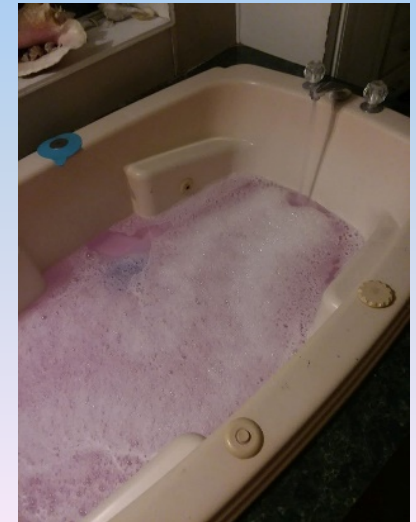
# Trinity Aquifer Dye Traces



Saunders Swallet (Blanco Basin)



Bigote Swallet (Onion Creek Basin)





Void in side of wall for highway construction

Karst features  
encountered in the  
Edwards limestone during  
construction activities in  
South Austin



Void in the bottom of trench for water pipeline installation

# Highway 45- South Austin



PF-004 after mitigation

Highway rerouted to avoid large karst feature.

Photo 2. Feature PF-004.



# Longhorn Pipeline- South Austin



# Questions and Concerns

## Construction Phase

- **Excavation Impacting Karst Features and Potential for Groundwater Contamination**
  - Has KM estimated the number of karst features?
  - If KM does not plan to conduct karst surveys, can GCD staff access ROW to perform surveys?
  - What are the construction methods to eliminate potential impacts to karst features?
  - Will KM develop a void mitigation plan?
  - Will background water-quality sampling of wells be conducted?
- **Oversight to Pipeline Design and Construction**
  - Will KM have a karst expert?
  - Will KM notify the Districts during construction?
- **Pipeline Specifications and Cathodic Protection Wells**
  - Will the pipeline be double-walled?
  - Does KM plan to drill cathodic protection wells along the pipeline? If so, what are the specifications (depth, casing, material, spacing, etc.)?
  - Will there be an opportunity for GCDs to use wells for data collection (geophysical logs, downhole camera survey, etc.)?

# Questions and Concerns

## Operational Phase

- **Potential for Liquids in Highly Permeable Rock**
  - What liquids might be in the pipeline and how much could be released if a leak or spill occurs?
  - Will KM notify GCDs if pipeline switches from transporting natural gas to crude or other liquid?
  - What resources will be in place to respond in the event of a leak/contamination?
  - In the event of drinking water contamination, what actions will be taken to protect water users?
  - Will KM conduct ongoing sampling of Trinity Aquifer wells for possible pipeline contaminants?
- **Pipeline Management Plan**
  - Will herbicides be used for vegetation control?
  - How will KM inspect the pipeline and how often?
  - How will KM test the pipeline and how often?

# Conclusions

- The Trinity and Edwards Aquifer meet the definition of a karst aquifers due to conduit permeability within soluble rocks.
- These aquifers are very sensitive to activities, such as construction and contaminant spills, at and near the surface.
- Tens of thousands of people in central Hays County depend on these aquifers as their sole source of drinking water.

Additional information and maps:

<https://bseacd.org/2019/02/proposed-kinder-morgan-pipeline/>

Edwards Aquifer

Upper Trinity Aquifer

Hill Country Middle Trinity Aquifer

BFZ Middle Trinity Aquifer

