Comal County Water Talk

Managing our groundwater resources

Natalie Ballew, P.G.
Groundwater Division Director, TWDB
October 18, 2023

Texas Water Development Board

Texas Water Development Board

DATA & SCIENCE

PLANNING

FINANCE

What we'll talk about

Groundwater: The Basics

Comal County Aquifers

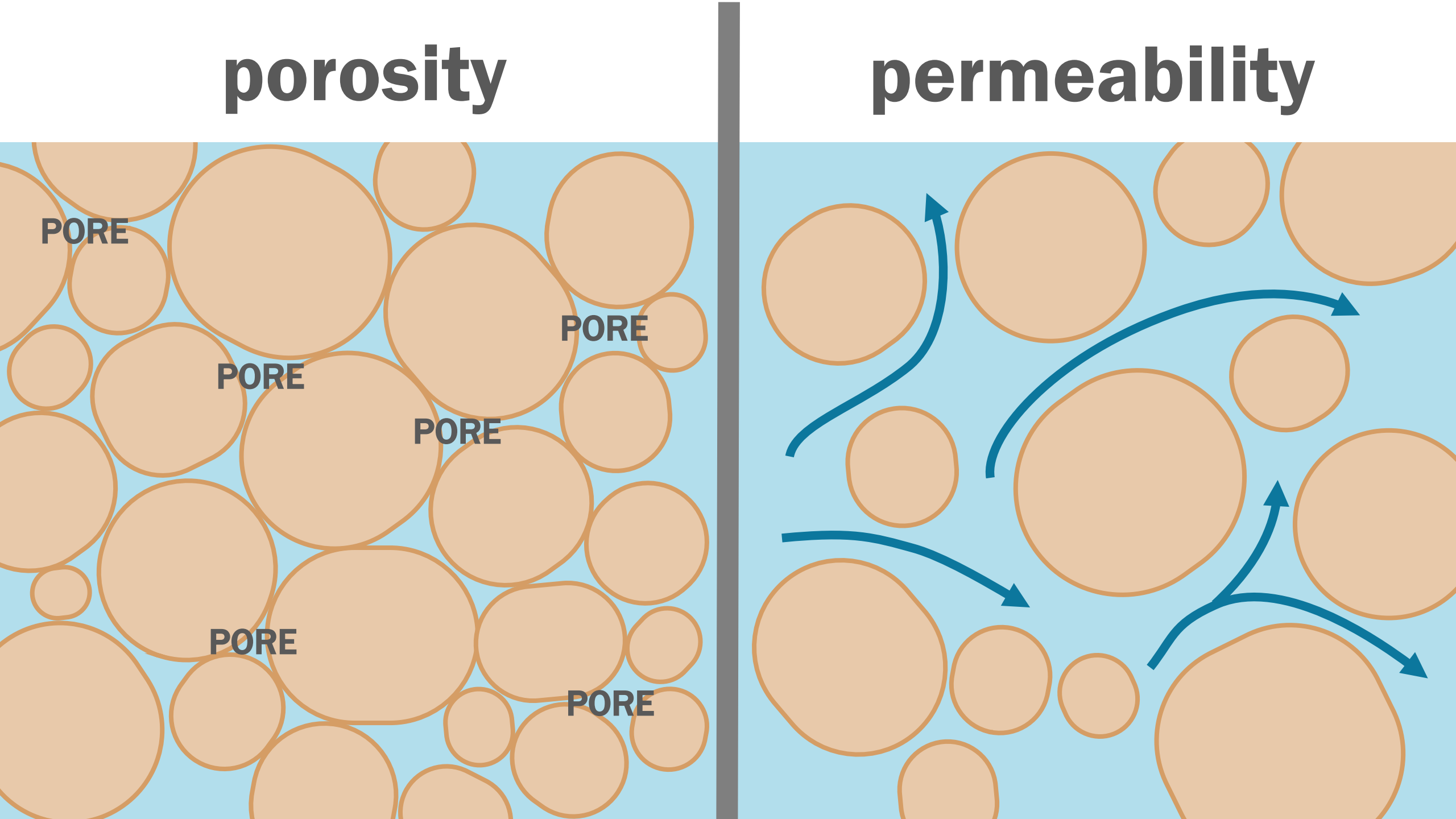
Groundwater Management: Who does what?

Joint Groundwater Planning

Groundwater: The Basics

DIRT & ROCKS

An aquifer is a **geologic media** that can yield **economically usable** amounts of water


porosity
permeability
PORE
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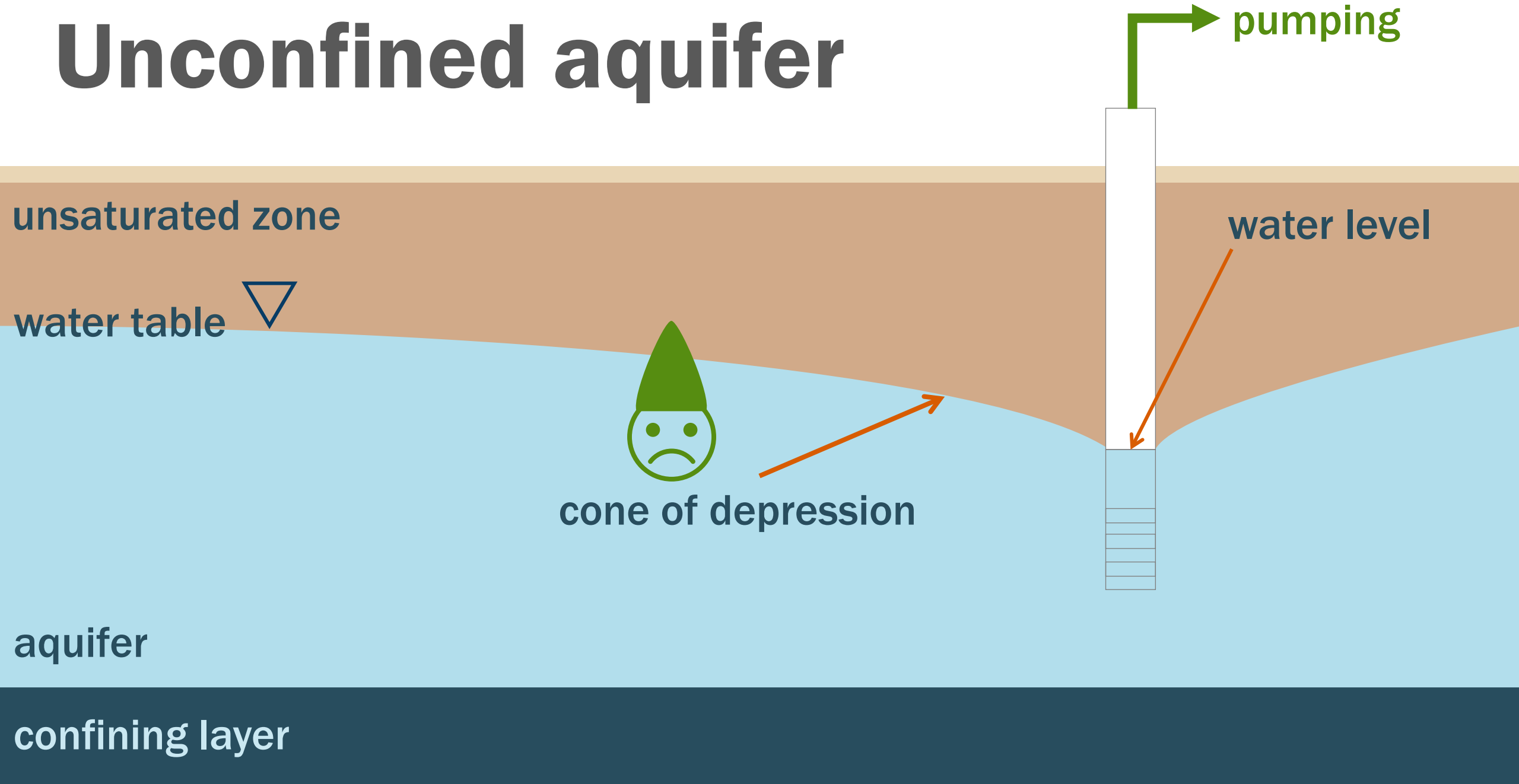
PORE

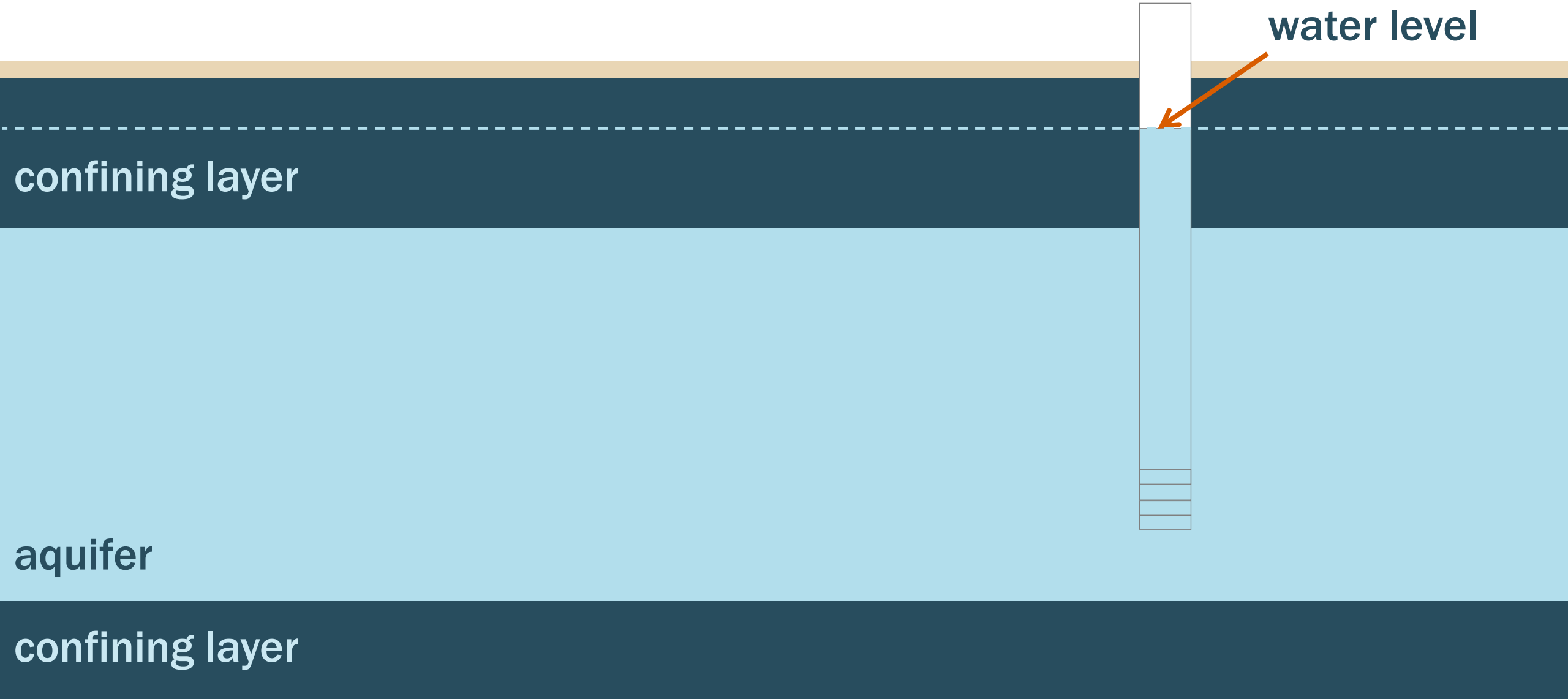
Two general types of aquifers

Unconfined aquifer

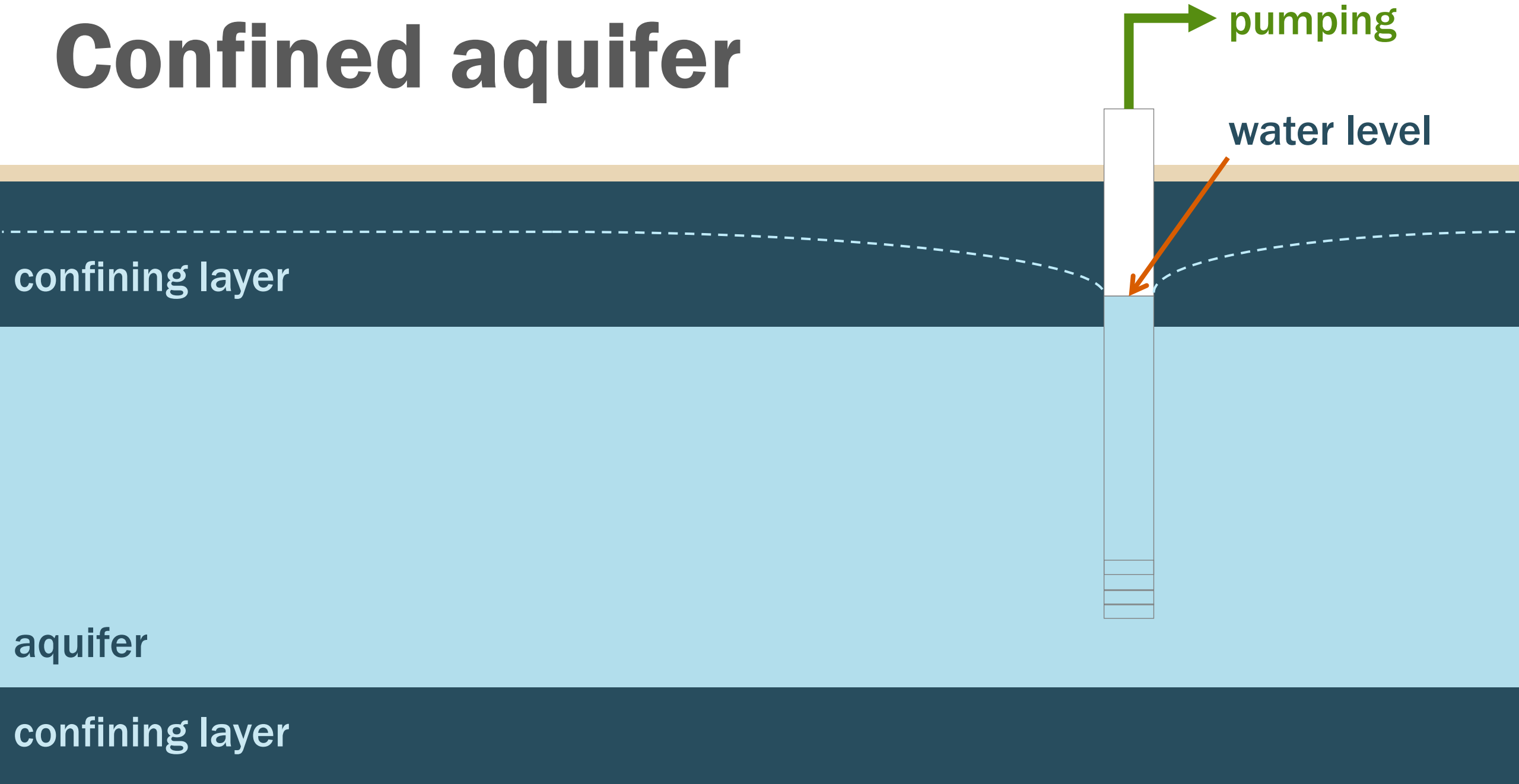
Unconfined aquifer



Confined aquifer



Confined aquifer



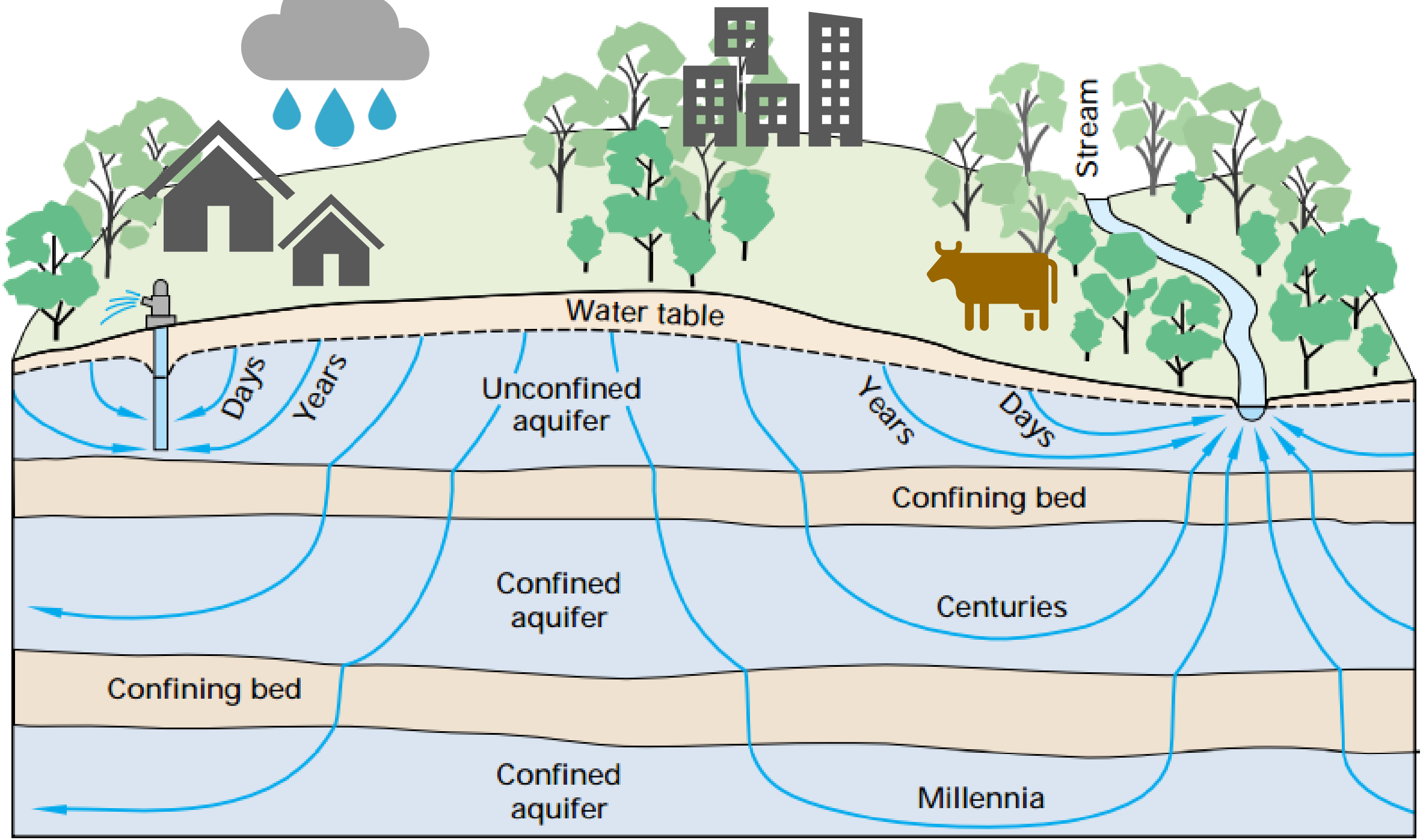


Diagram from pubs.usgs.gov/circ/circ1139/htdocs/natural_processes_of_ground.htm

Water budgets

Inflows

like income

Aquifer storage

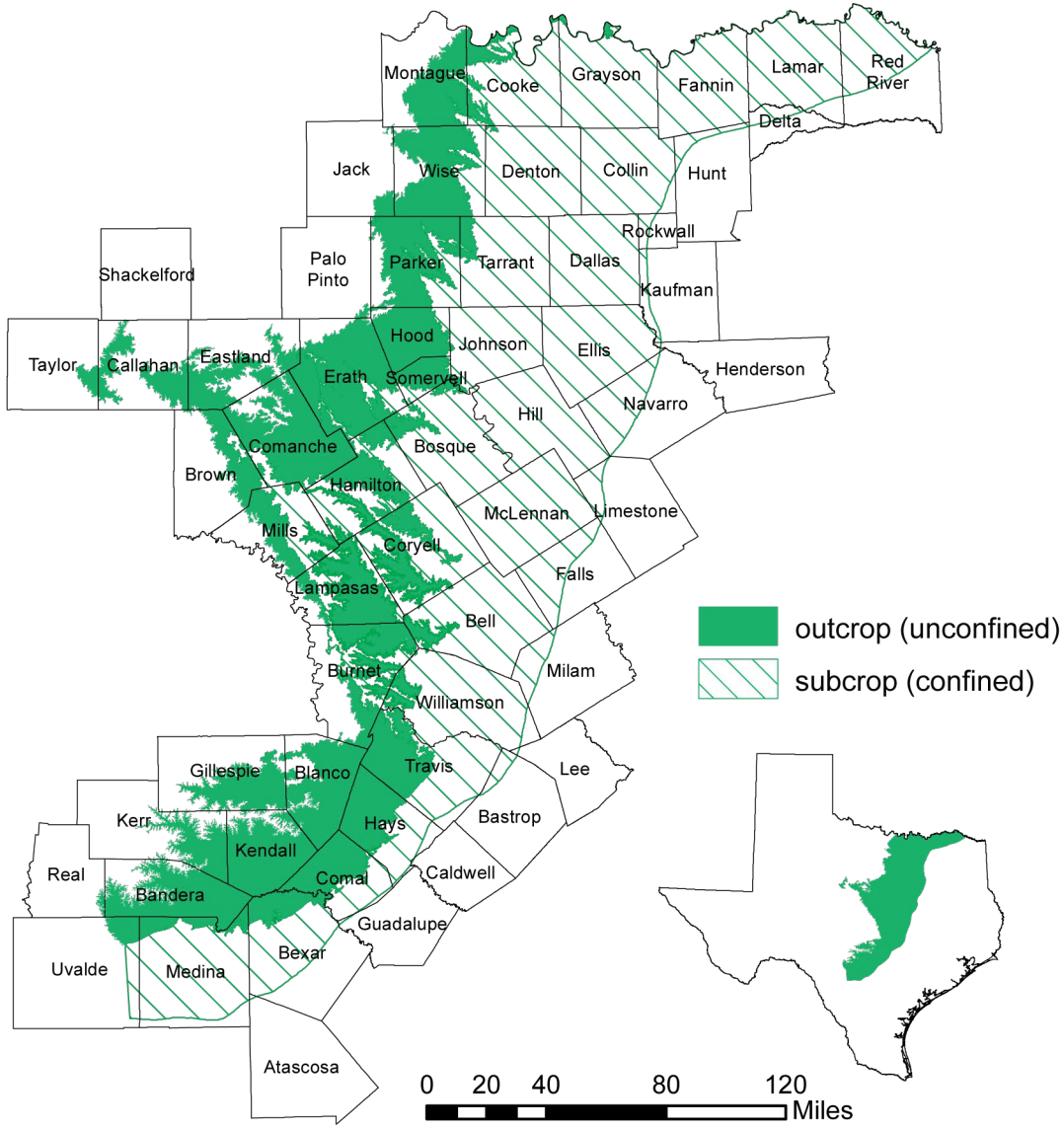
like a bank account

Outflows

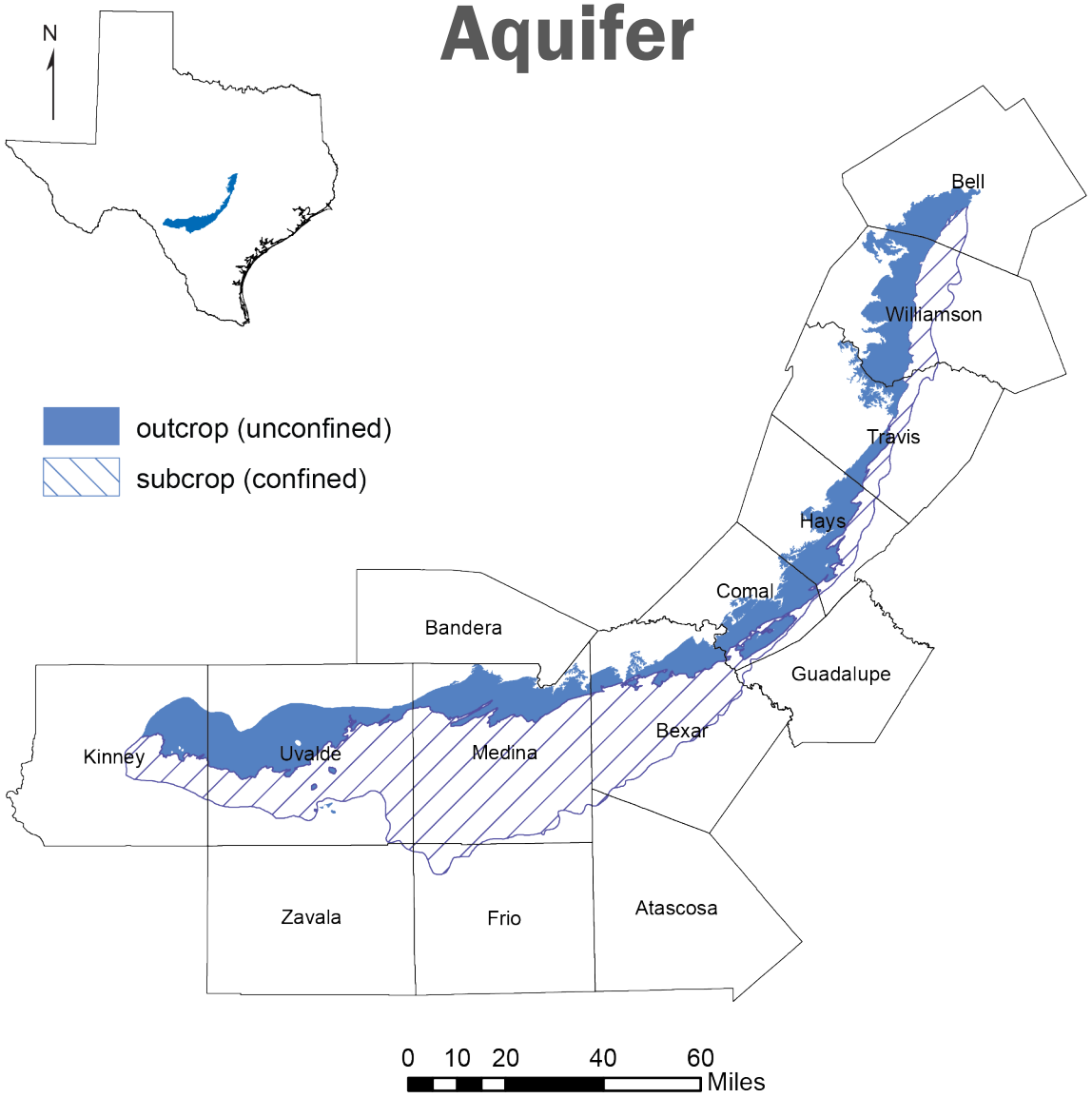
like spending

Comal County Aquifers

Trinity Aquifer



Edwards (Balcones Fault Zone, aka BFZ) Aquifer

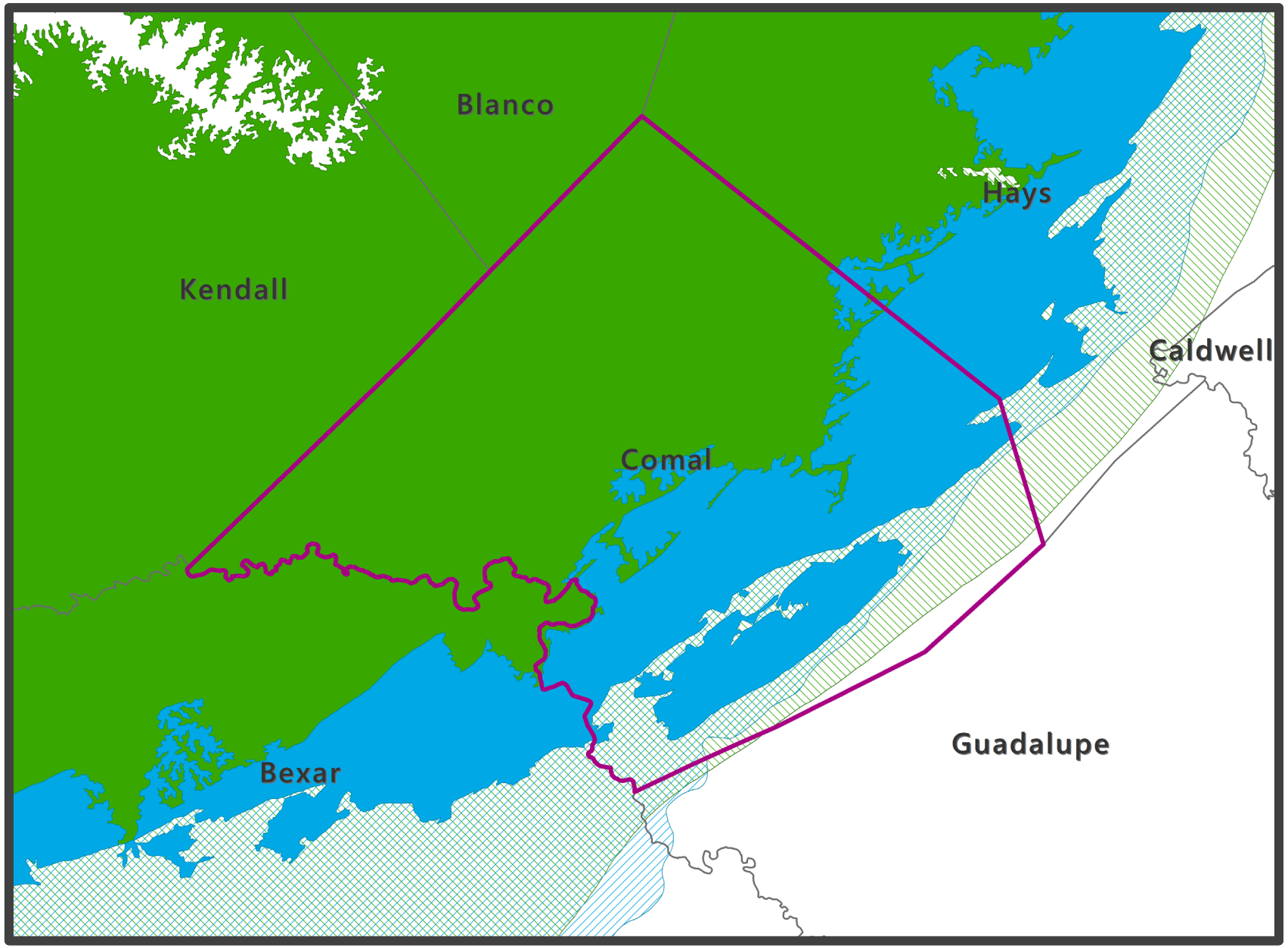


Trinity Aquifer (outcrop/unconfined)

Trinity Aquifer (subcrop/confined)

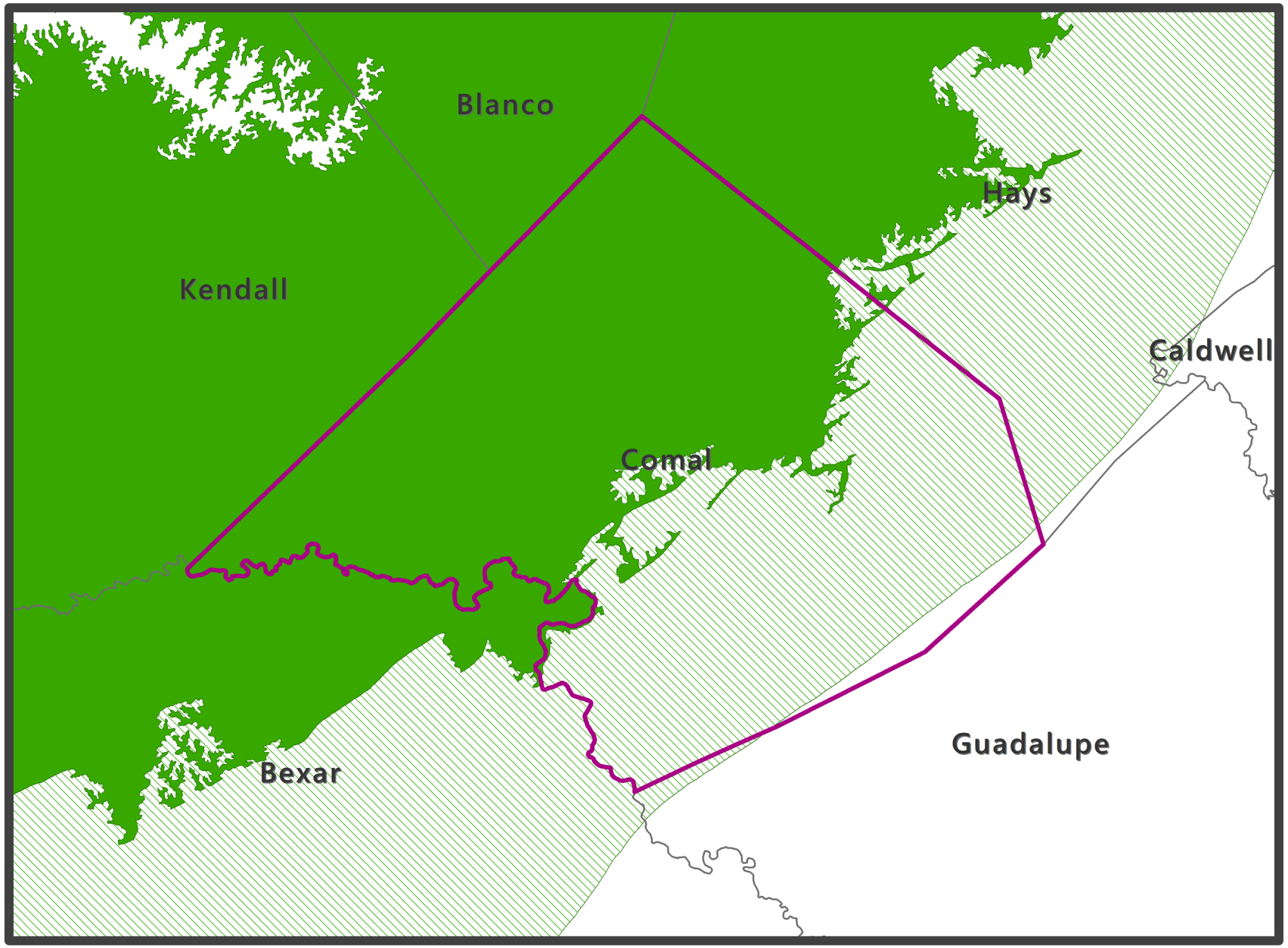
Edwards (BFZ) Aquifer (outcrop/unconfined)

Edwards (BFZ) Aquifer (subcrop/confined)



Trinity Aquifer (outcrop/unconfined)

Trinity Aquifer (subcrop/confined)

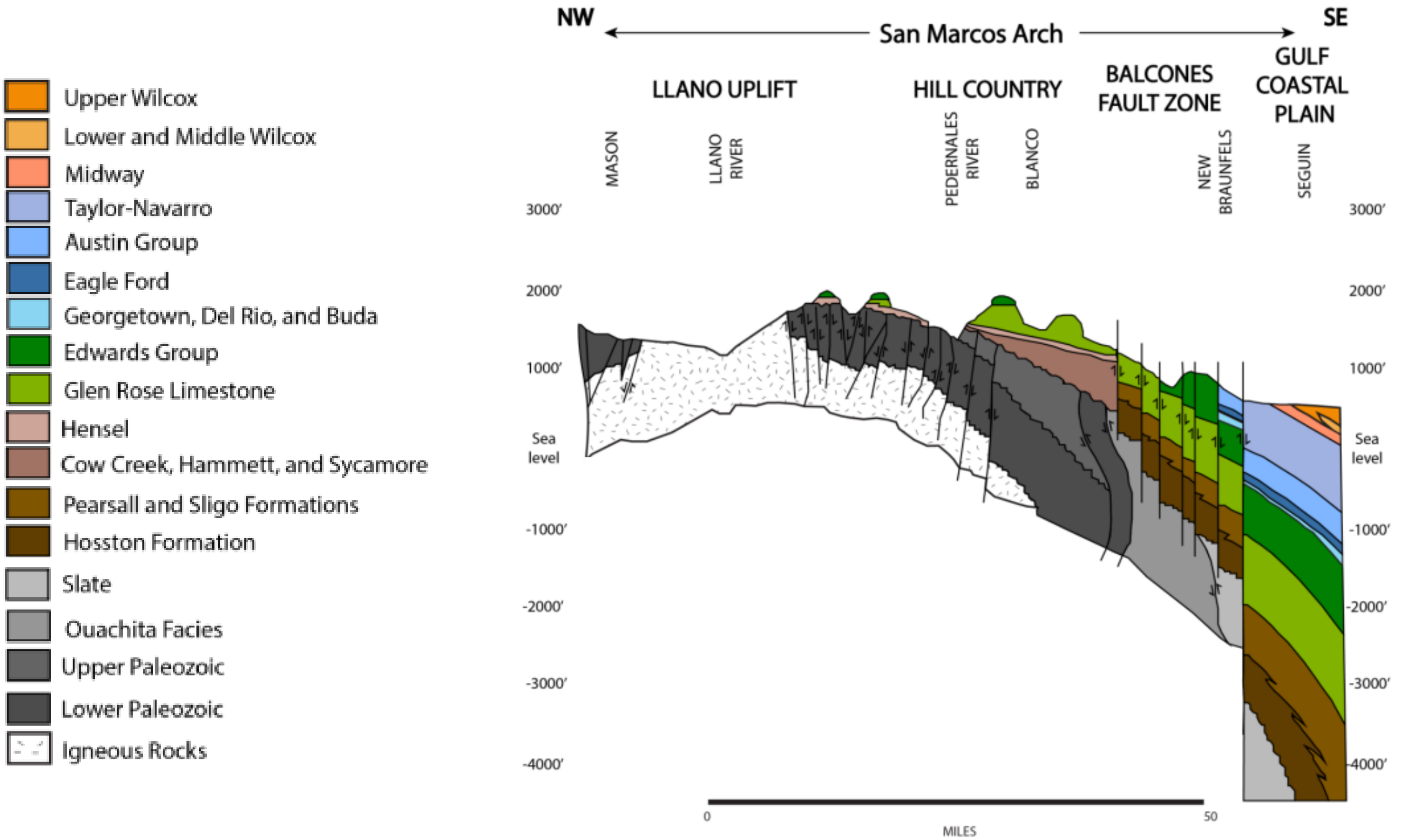


younger

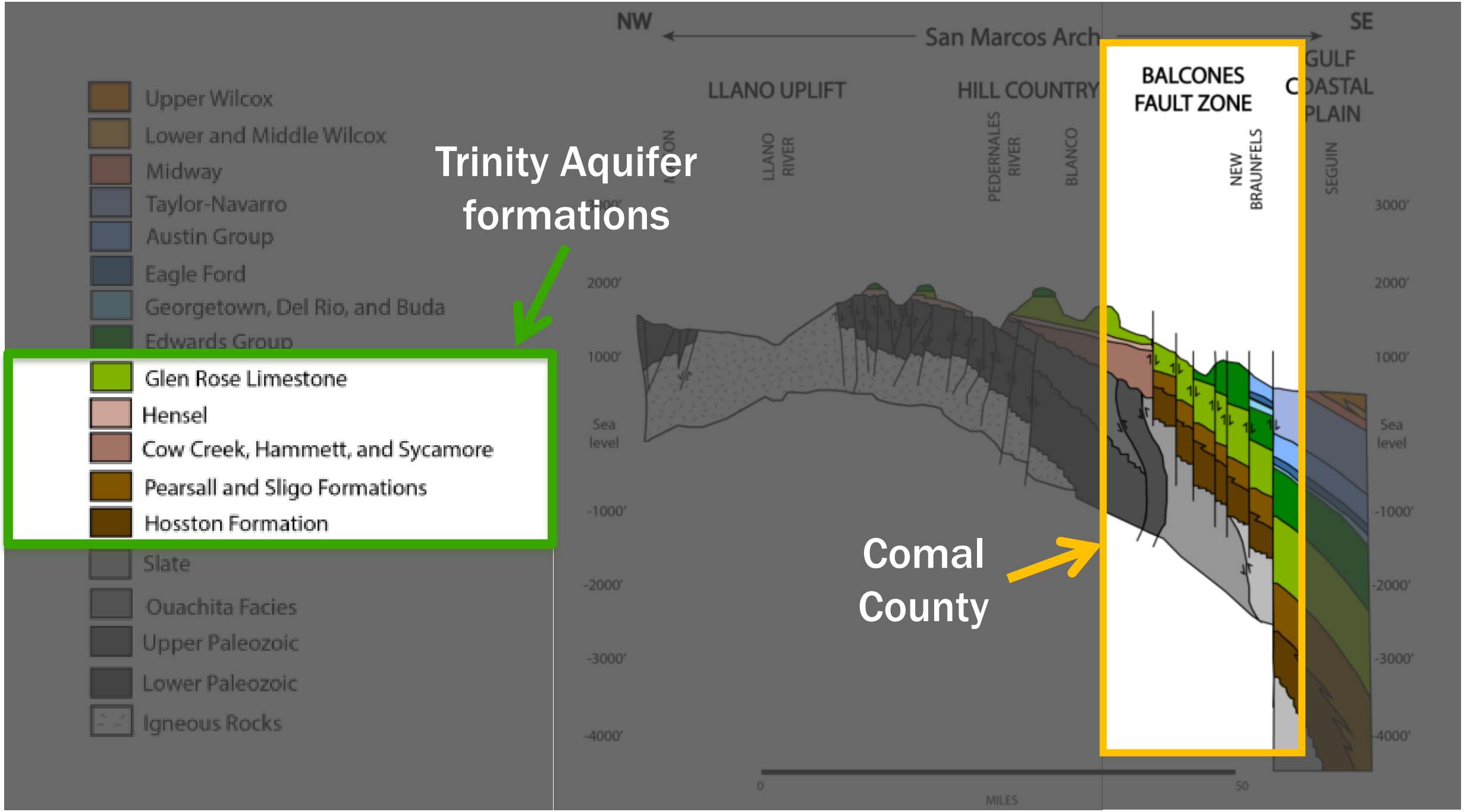
older

ERA	SYSTEM	GROUP	STRATIGRAPHIC UNIT		HYDROLOGIC UNIT	
Cenozoic	Quaternary		Alluvium		Alluvium	
Mesozoic	Cretaceous	Edwards	Segovia Formation		Edwards Group	
			Fort Terrett Formation			
		Trinity	Glen Rose Limestone	Upper Member	Trinity Aquifer System	Upper Trinity
				Lower Member		Middle Trinity
			Hensell Sand/Bexar Shale			
			Cow Creek Limestone			
			Hammett Shale			confining unit
			Sligo Formation			Lower Trinity
			Sycamore Sand/Hosston Formation			
Paleozoic			Undifferentiated Pre-Cretaceous rock			

Modified diagram from www.twdb.texas.gov/groundwater/models/gam/trnt_h/TRNT_H_2009_Update_Model_Report.pdf



Modified diagram from www.twdb.texas.gov/groundwater/models/gam/trnt_h/ConceptualModelReport.pdf



Modified diagram from www.twdb.texas.gov/groundwater/models/gam/trnt_h/ConceptualModelReport.pdf


5204 Farm To Market Rd 2722
Upper Trinity aquifer
Upper Glen Rose
Limestone
5204 Farm To Market Rd 2722
Canyon Lake, Texas
Google Street View
Mar 2023
See more dates
Google
Image capture: Mar 2023 © 2023 Google United States Terms Privacy Report a problem


29°33'40" N, 98°54'17" W
14127 FM1283
Mico, Texas
Google Street View
Sep 2023
See more dates
Edwards (BFZ) Aquifer
Edwards Limestone
Google
Image capture: Sep 2023
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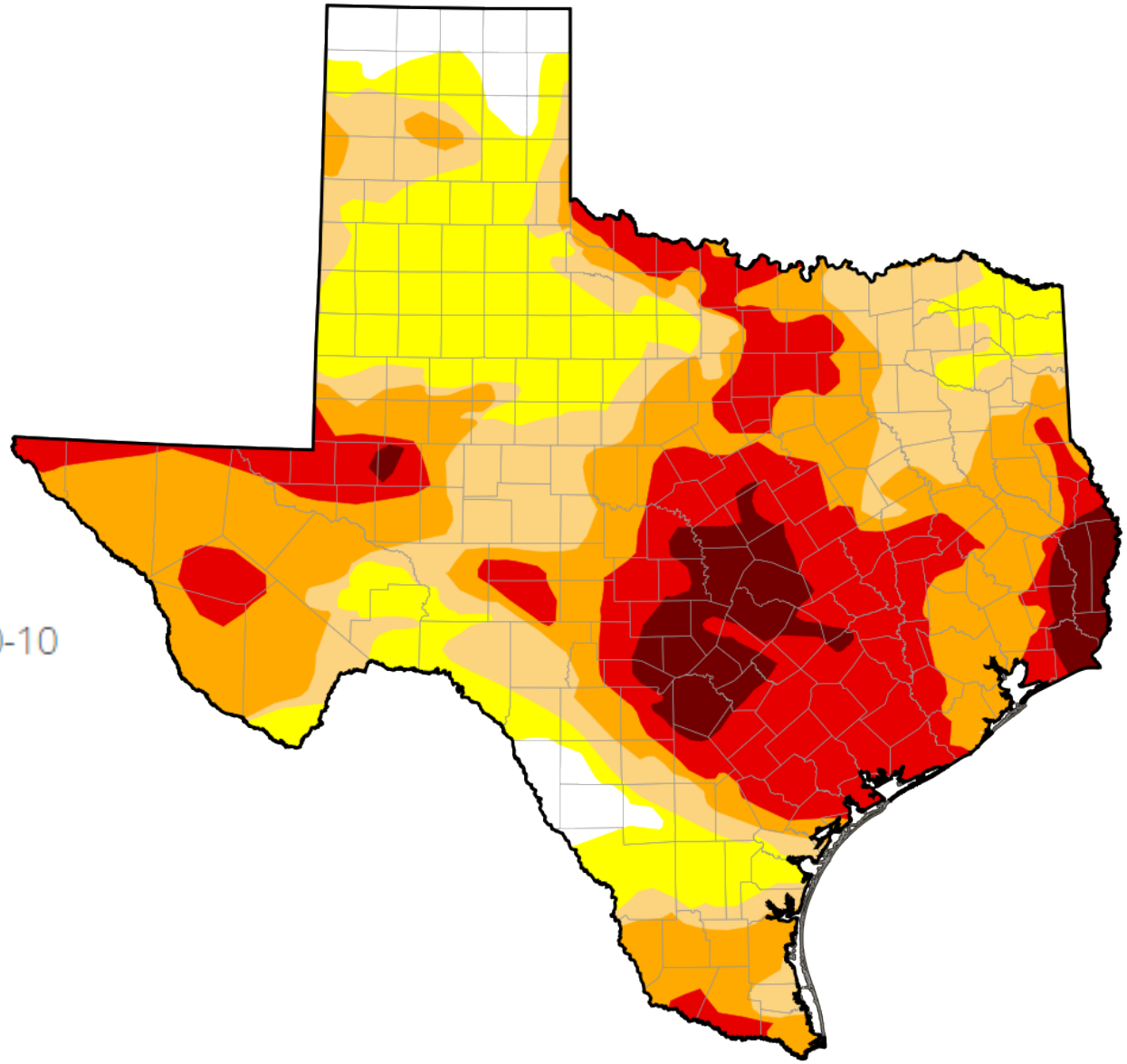
Report a problem



Map Date: 2023-10-10

Texas

- None: 9.67%
- D0+: 90.33%
- D1+: 74.95%
- D2+: 55.96%
- D3+: 28.28%
- D4: 6.27%

Groundwater response to drought

Increased pumping → water level declines

Correlate observations with dry condition periods

Differences in aquifer sensitivity

Water levels and spring discharges – changes on variable timescales

Tools to track GW response

Well drilling counts

TWDB monthly Texas Water Conditions Report

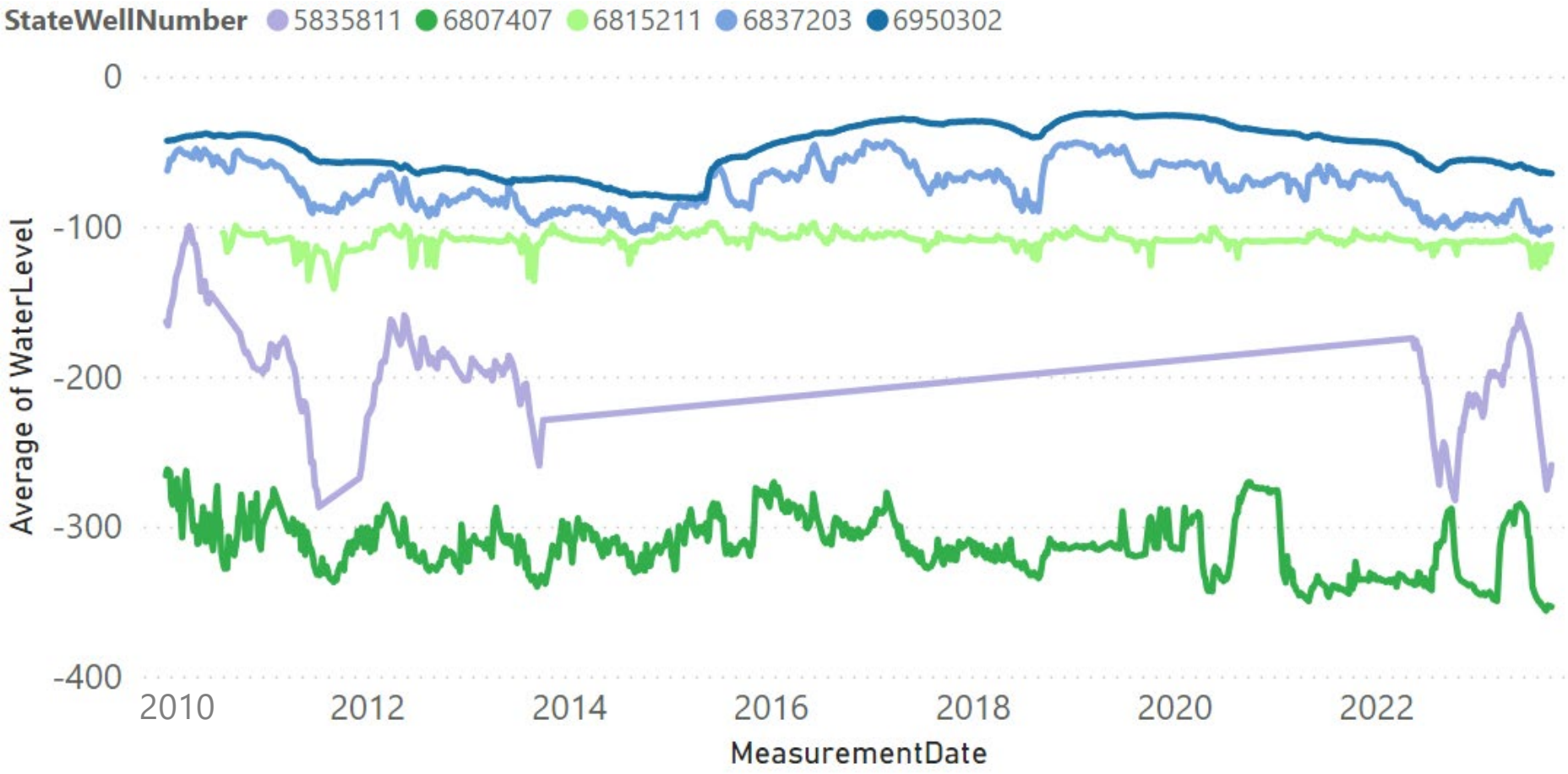
Average water level changes

Hydrographs

Drought indicator wells and springs

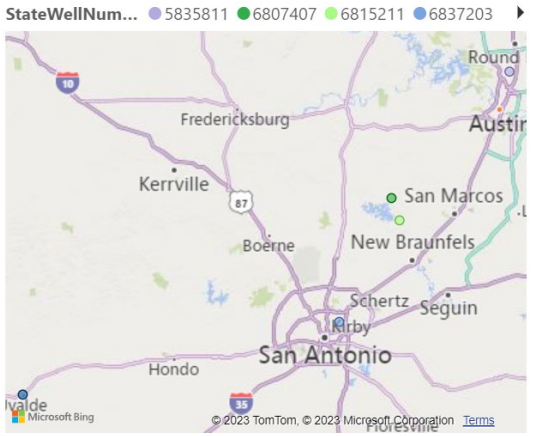
Near Real-time Data from Wells

Water level trends since 2010 in Comal, Travis, Bexar, and Uvalde counties



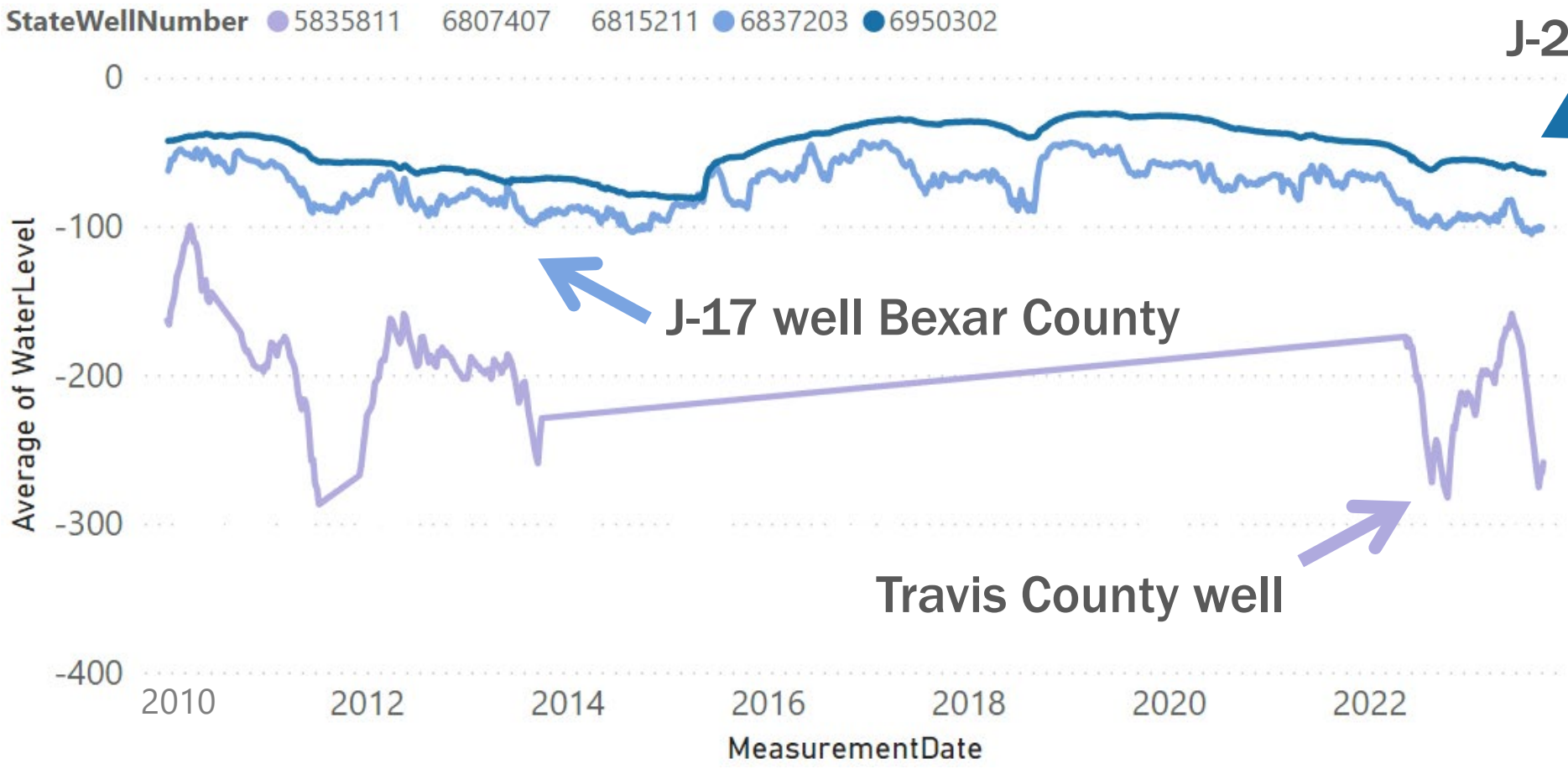
Edwards (BFZ) Aquifer

Trinity Aquifer



Edwards (Balcones Fault Zone) Aquifer

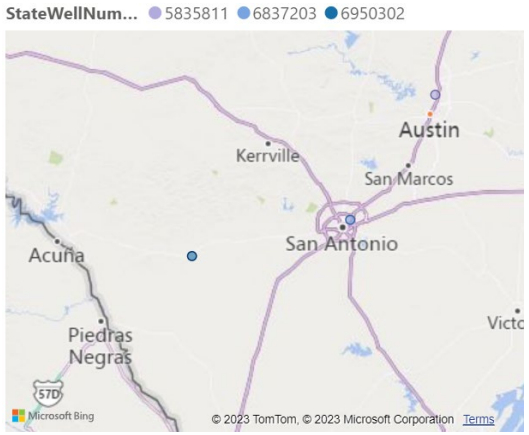
Water level trends since 2010 in Bexar, Travis, and Uvalde counties



J-27 well Uvalde County

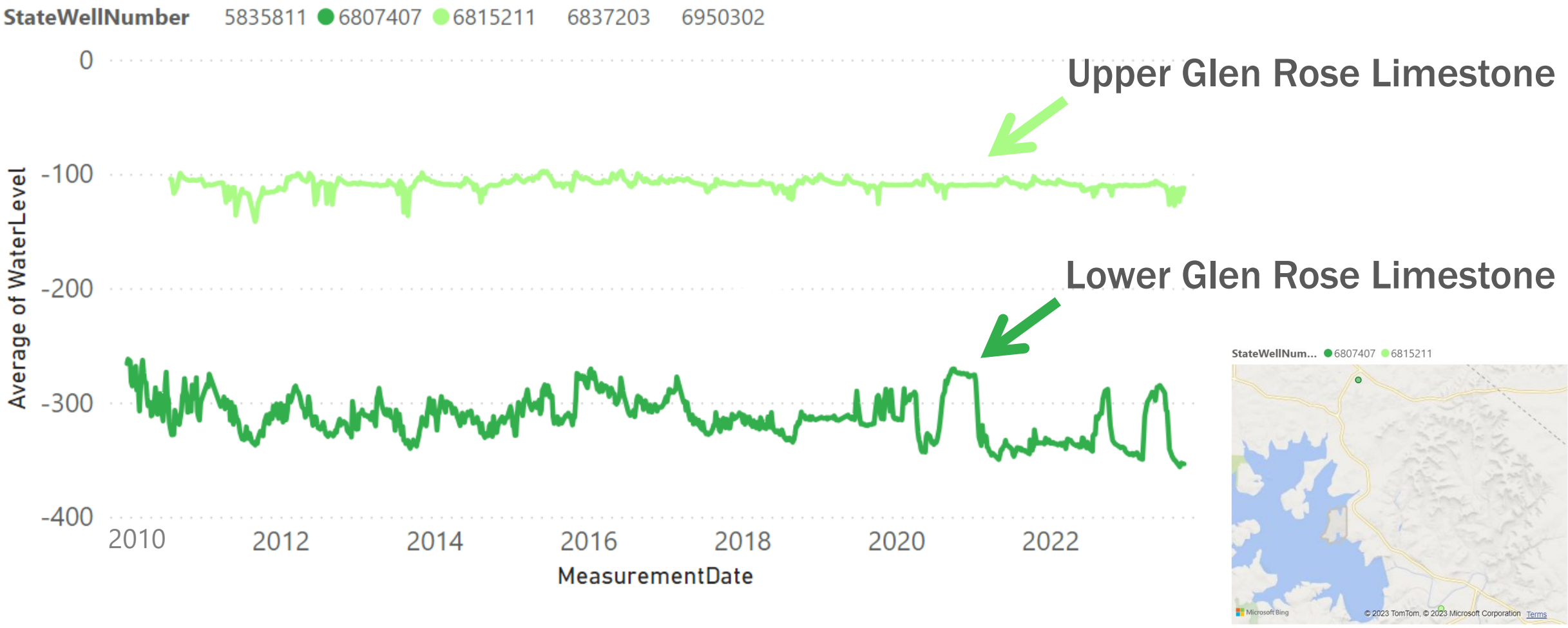
J-17 well Bexar County

Travis County well



Trinity Aquifer

Water level trends since 2010 in Comal County



Near Real-time Data from Wells

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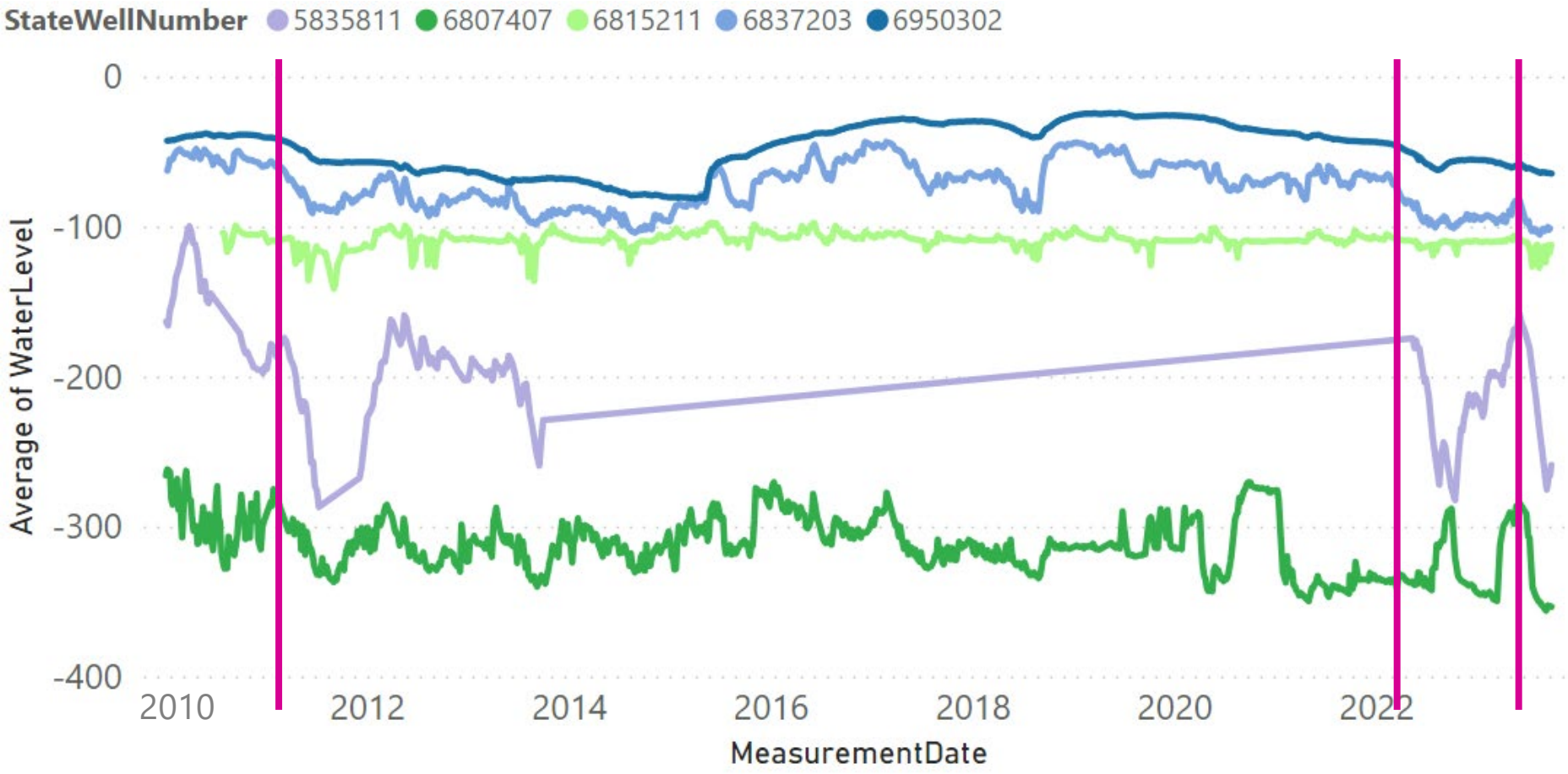


Edwards (BFZ) Aquifer

Trinity Aquifer

Groundwater Management

Who does what?

hillcountryalliance.org/wp-content/uploads/2023_HCA_ManagingGroundwater_Paper.pdf

Groundwater conservation districts

Sec. 36.0015. PURPOSE. (a) In this section, "best available science" means conclusions that are logically and reasonably derived using statistical or quantitative data, techniques, analyses, and studies that are publicly available to reviewing scientists and can be employed to address a specific scientific question.

(b) In order to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions, consistent with the objectives of Section 59, Article XVI, Texas Constitution, groundwater conservation districts may be created as provided by this chapter. Groundwater conservation districts created as provided by this chapter are the state's preferred method of groundwater management in order to protect property rights, balance the conservation and development of groundwater to meet the needs of this state, and use the best available science in the conservation and development of groundwater through rules developed, adopted, and promulgated by a district in accordance with the provisions of this chapter.

SUBCHAPTER D. POWERS AND DUTIES

Sec. 36.101. RULEMAKING POWER. (a) A district may make and enforce rules, including rules limiting groundwater production based on tract size or the spacing of wells, to provide for conserving, preserving, protecting, and recharging of the groundwater or of a groundwater reservoir or its subdivisions in order to control subsidence, prevent degradation of water quality, or prevent waste of groundwater and to carry out the powers and duties provided by this chapter. In adopting a rule under this chapter, a district shall:

(1) consider all groundwater uses and needs;

(2) develop rules that are fair and impartial;

(3) consider the groundwater ownership and rights described by Section 36.002;

(4) consider the public interest in conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and in controlling subsidence caused by withdrawal of groundwater from those groundwater reservoirs or their subdivisions, consistent with the objectives of Section 59, Article XVI, Texas Constitution;

(5) consider the goals developed as part of the district's management plan under Section 36.1071; and

(6) not discriminate between land that is irrigated for production and land that was irrigated for production and enrolled or participating in a federal conservation program.

(f) The district shall adopt rules necessary to implement the management plan. Prior to the development of the management plan and its approval under Section 36.1072, the district may not adopt rules other than rules pertaining to the registration and interim permitting of new and existing wells and rules governing spacing and procedure before the district's board; however, the district may not adopt any rules limiting the production of wells, except rules requiring that groundwater produced from a well be put to a nonwasteful, beneficial use. The district may accept applications for permits under Section 36.113, provided the district does not act on any such application until the district's management plan is approved as provided in Section 36.1072.

(g) The district shall adopt amendments to the management plan as necessary. Amendments to the management plan shall be adopted after

Fundamental mandate

Balance protection of property rights, conservation, and development of groundwater using best-available science

COMAL TRINITY
GROUNDWATER CONSERVATION DISTRICT

GROUNDWATER MANAGEMENT PLAN

Comal Trinity Groundwater Conservation District Management Plan

Adoption and Revision Record

CTGCD Adoption: March 19, 2018
TWDB Approval: April 25, 2018

First Revision
CTGCD Adoption: March 13, 2023
TWDB Approval: May 5, 2023

GCD tools

- Well spacing and pumping limits
- Water use reports
- Drought contingency plans
- Management zones for local conditions
- Production curtailments to achieve desired future conditions
- Develop science to inform decision making
- Education and outreach

From hillcountryalliance.org/wp-content/uploads/2023_HCA_ManagingGroundwater_Paper.pdf

County tools

Water availability requirements for new subdivisions

Conservation development incentives

Minimum lot sizes for lots with septic systems and water supply wells

Invest in land protection to promote recharge

From hillcountryalliance.org/wp-content/uploads/2023_HCA_ManagingGroundwater_Paper.pdf

City tools

Strong drought contingency plans + enforcement

Promote low impact development practices

Encourage rainwater harvesting and other alternative water sources

Invest in wastewater reuse

From hillcountryalliance.org/wp-content/uploads/2023_HCA_ManagingGroundwater_Paper.pdf

How you can get involved

Get to know your GCD

Engage with your elected officials

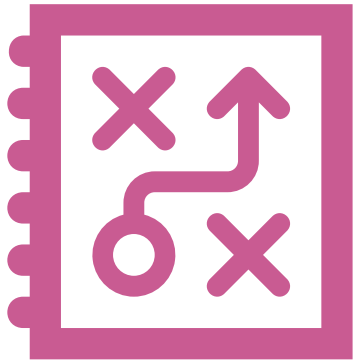
Support scientific development

Practice groundwater stewardship

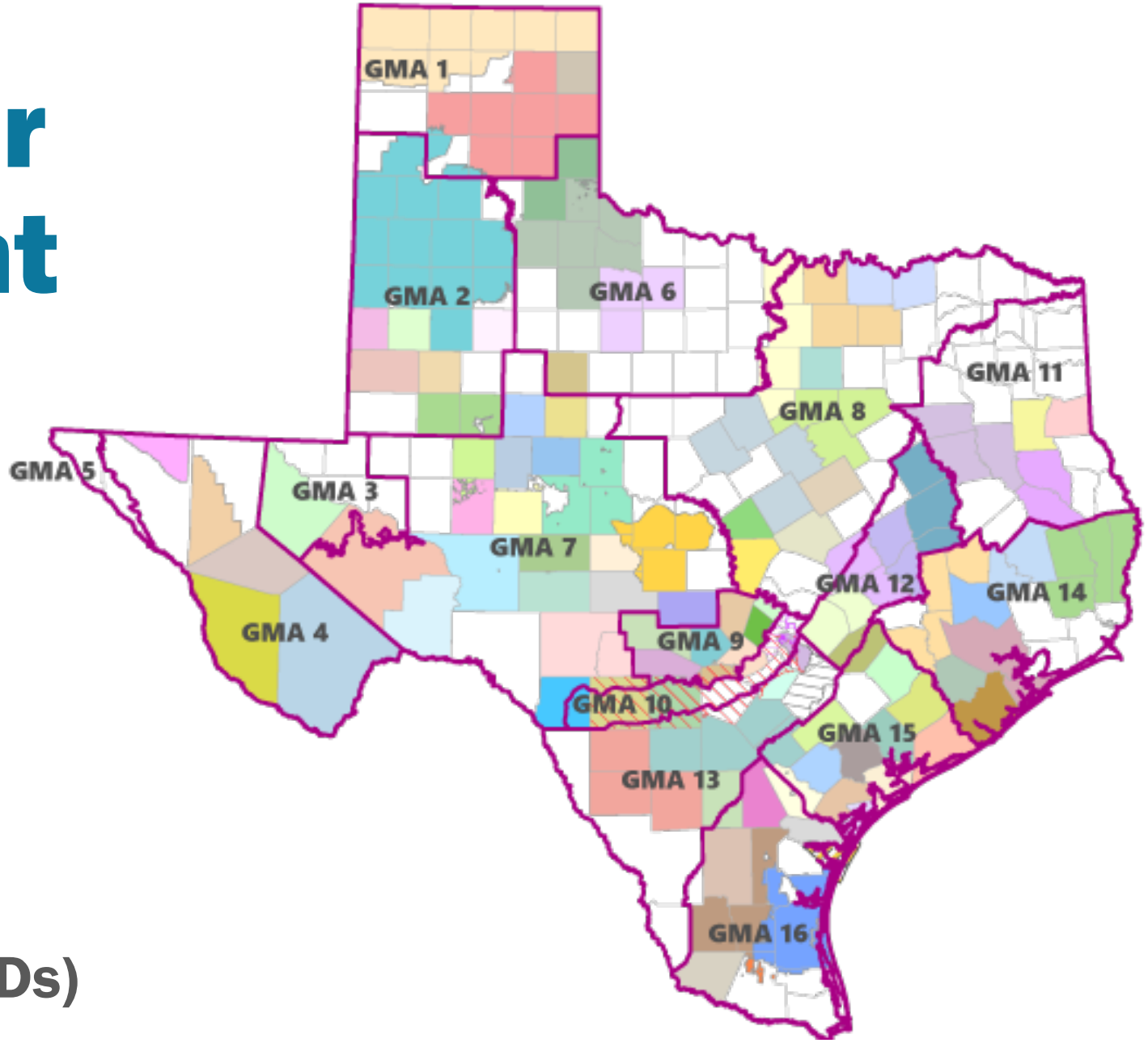
Share concerns at public meetings

From hillcountryalliance.org/wp-content/uploads/2023_HCA_ManagingGroundwater_Paper.pdf

Joint Groundwater Planning



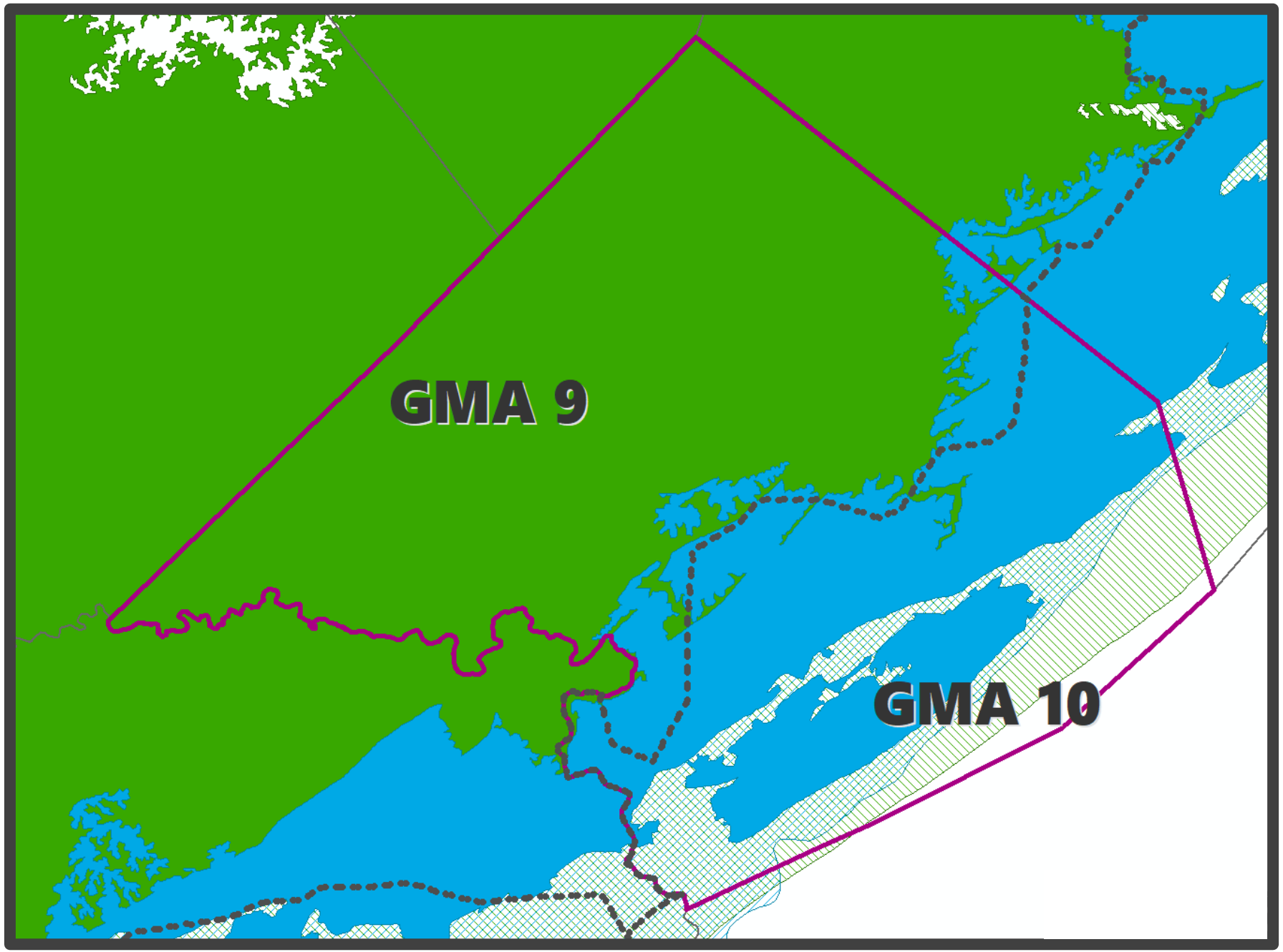
Groundwater management areas (GMAs)



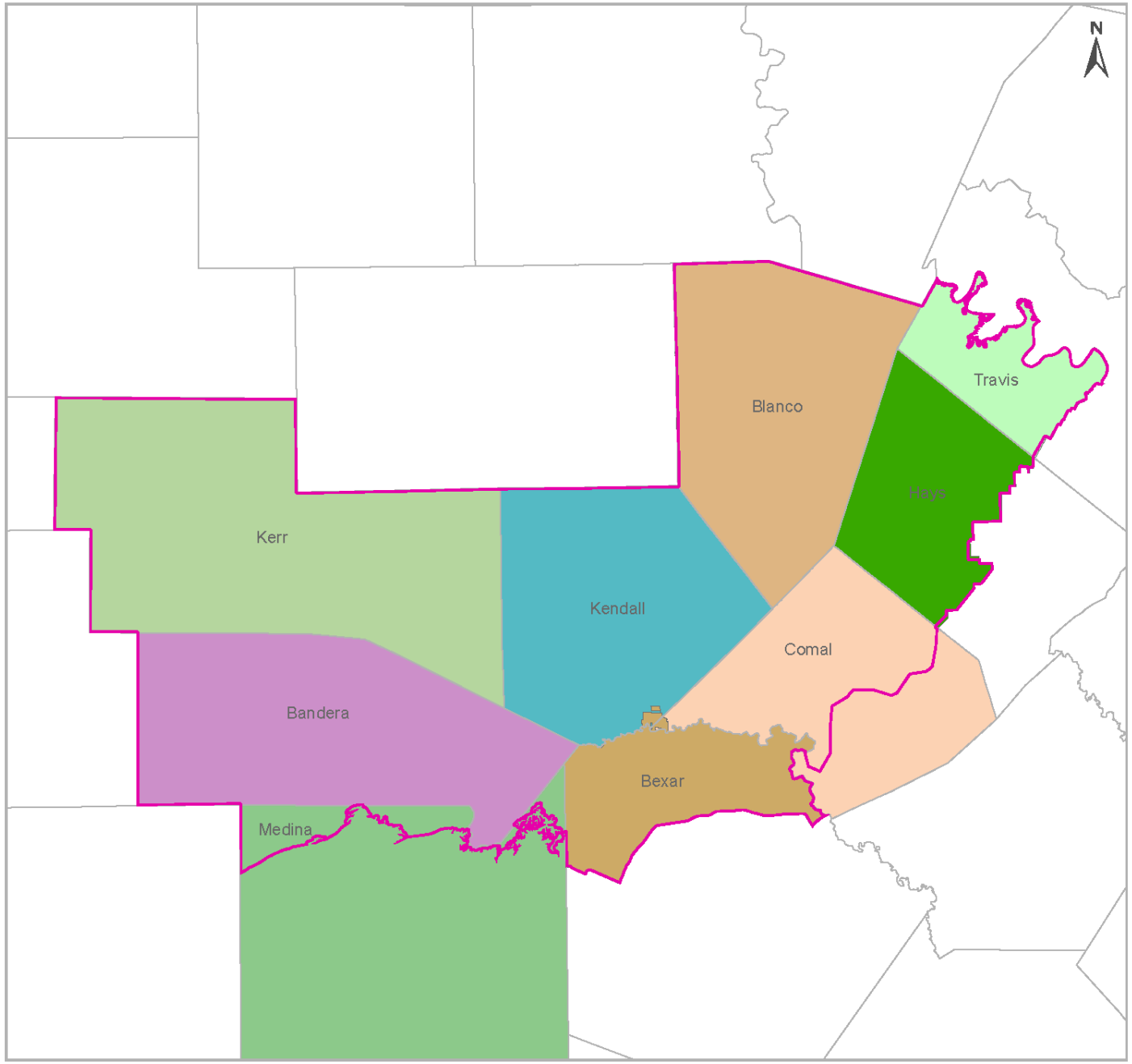
Groups of groundwater conservation district (GCDs)

GMAs, GAMs, MAGs…OMG!

GCD	Groundwater conservation district
GMA	Groundwater management area
DFC	Desired future condition
TWDB	Texas Water Development Board
GAM	Groundwater availability model
MAG	Modeled available groundwater


GMA 9
GMA 10

Groundwater Management Area 9



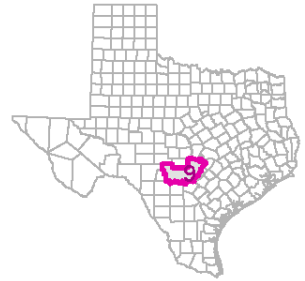
Groundwater Management Areas

Counties

Groundwater Conservation Districts

- Bandera County River Authority & Ground Water District
- Blanco-Pedernales GCD
- Comal Trinity GCD
- Cow Creek GCD
- Hays Trinity GCD
- Headwaters UWCD
- Medina County GCD
- Southwestern Travis County GCD
- Trinity Glen Rose GCD

Updated 5/20/2021

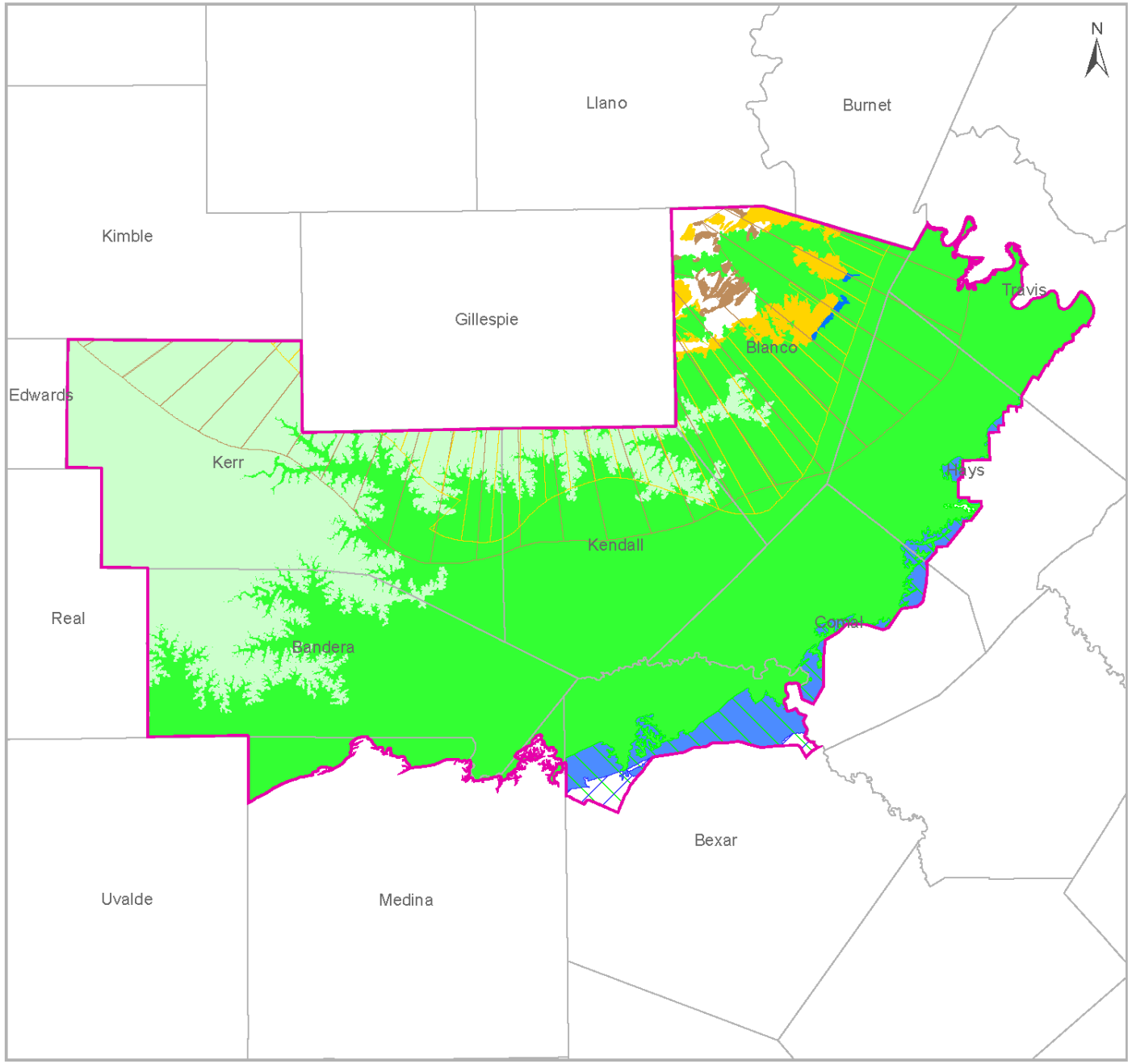


0 105 210 420 630 840

Miles

1 inch = 505 miles

Groundwater Management Area 9



Groundwater Management Areas

Counties

Major Aquifers

Edwards - Trinity Plateau (outcrop)

Edwards BFZ (outcrop)

Edwards BFZ (subcrop)

Trinity (outcrop)

Trinity (subcrop)

Minor Aquifers

Marble Falls

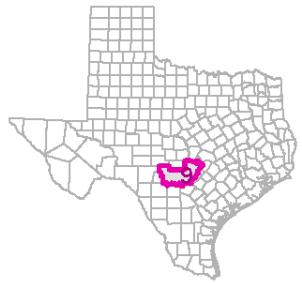
Ellenburger - San Saba (outcrop)

Ellenburger - San Saba (subcrop)

Hickory (outcrop)

Hickory (subcrop)

Updated 4/11/2022



0 105 210 420 630 840

Miles

1 inch = 505 miles

What is joint planning?

- District representatives in a GMA meet at least annually to:
  - conduct joint planning
  - propose to adopt new or amended desired future conditions
  - review management plans and GMA accomplishments

Texas Water Code § 36.108

Desired future conditions

DFCs

Broad policy goal

Quantitative description

Updated at least every 5 years

Used to determine future groundwater availability

Drawdown, springflow, storage volume, etc.

May be established for:

- aquifer
- aquifer subdivision
- geologic strata
- geographic area

Why DFCs matter

Districts shall manage production to achieve desired future conditions

A criteria for GCD planning and rule making

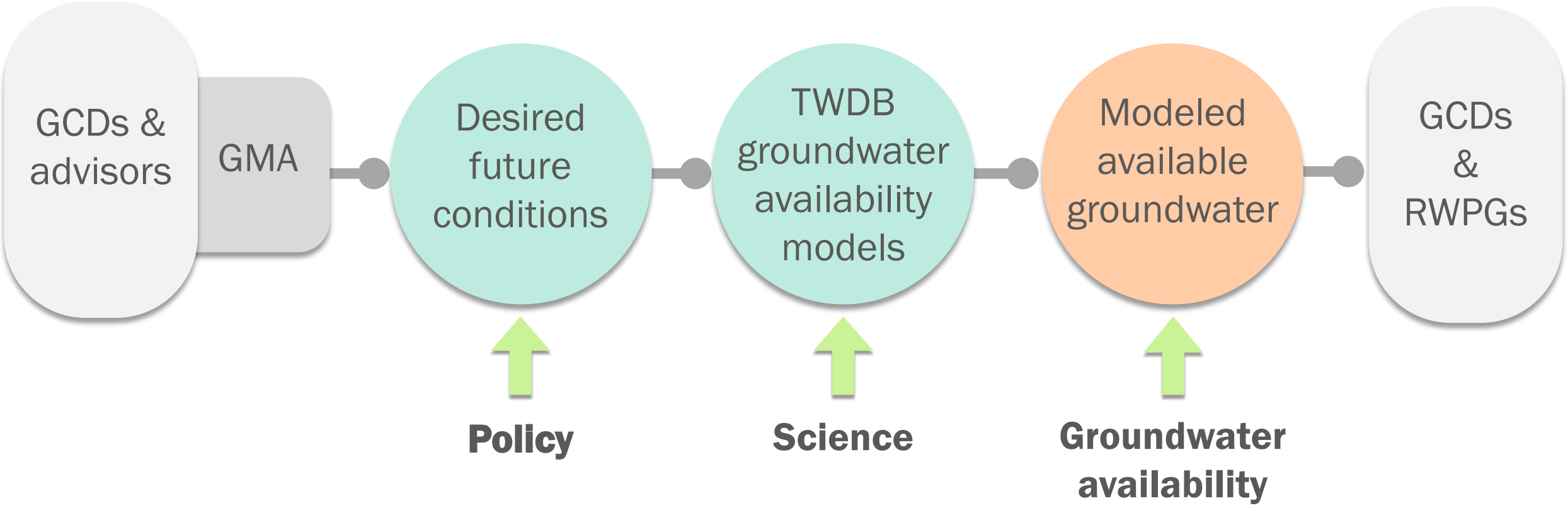
Results in modeled available groundwater that can be used to evaluate permit applications

Why DFCs matter

MAGs = water availability components that feed into regional water plans and state water plan

Influence policy and resource management decisions that affect most of the water that Texans use

Joint groundwater planning



What is the DFC Process?


GMA proposes to adopt DFCs
by May 1, 2026
90-day public comment period
Each district has a public hearing
GMA adopts DFCs
by January 5, 2027
GMA submits explanatory report to TWDB
with model files

Joint planning meetings leading up to DFC proposal

★ Good time for stakeholder involvement is now, at the beginning of joint planning round, far before any DFC proposals happen

GMA proposes to adopt DFCs
by May 1, 2026

9 factors

Aquifer uses and conditions	Environmental impacts	Property rights
State water plan	Land subsidence	Feasibility
Hydrologic conditions	Socioeconomics	Any other information

GMA proposes to adopt DFCs
by May 1, 2026

A balancing act

Highest practicable level of groundwater production

Conservation, preservation, protection, recharging, prevention of waste of groundwater, and control of subsidence

GMA proposes to adopt DFCs
by May 1, 2026

Assessing DFC scenarios

GMAs often hire consultants to use groundwater availability models to assess various DFC scenarios

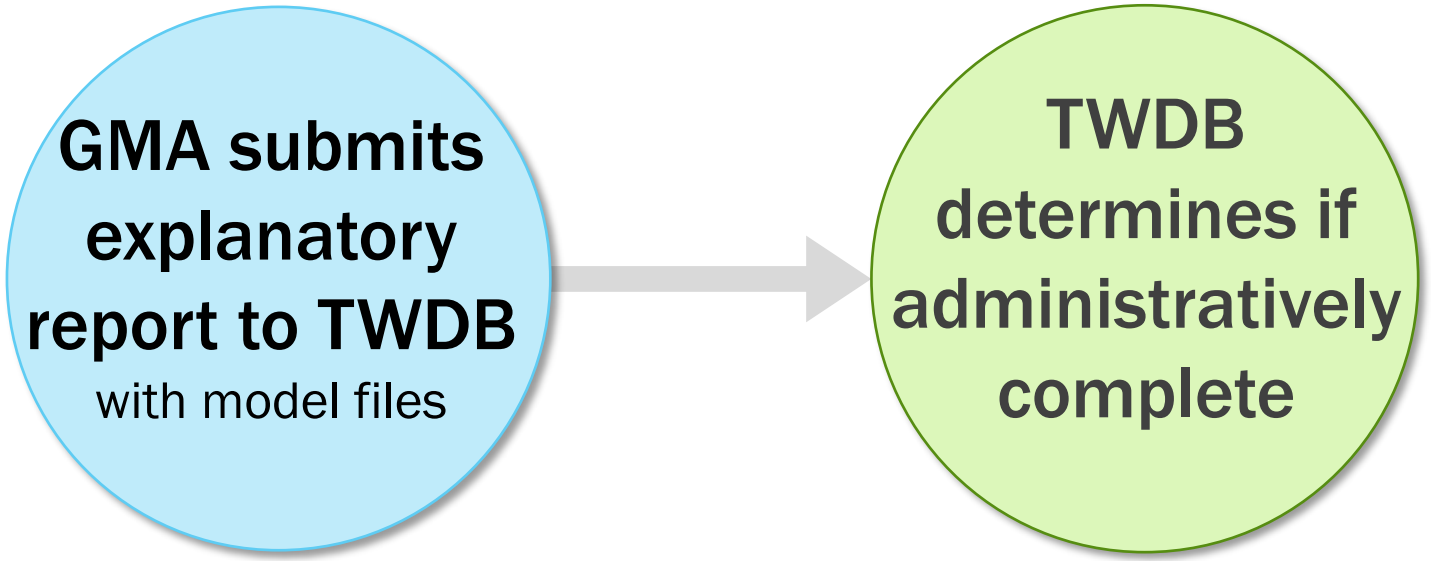
★ Active participation in the process could get a scenario you want to see on the decision table.

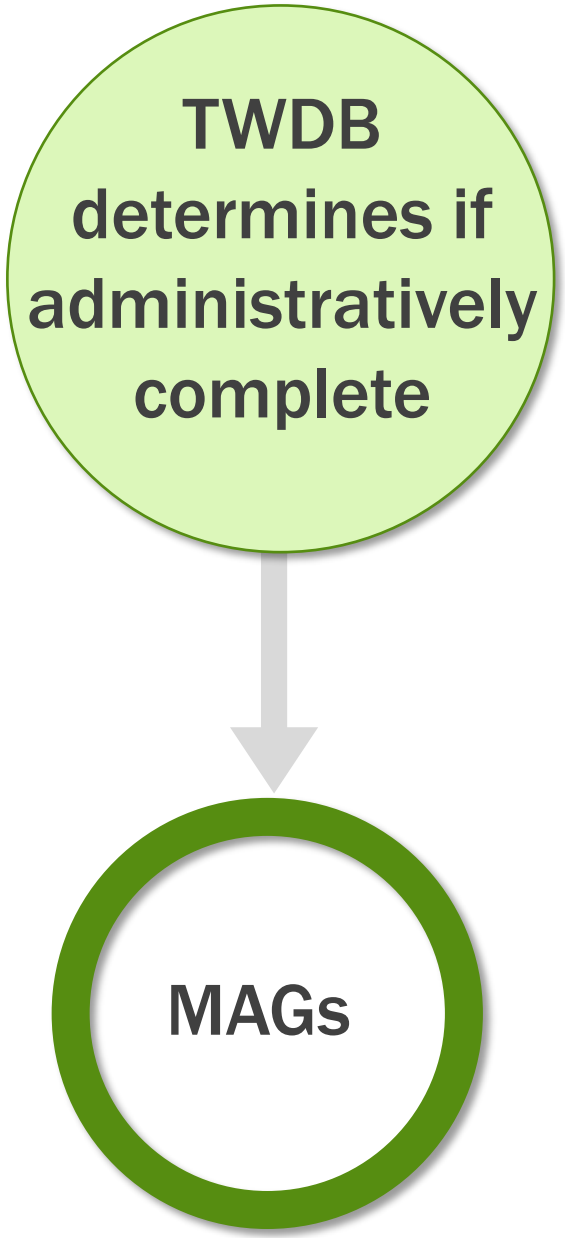
GMA submits explanatory report to TWDB
with model files

DFC Explanatory Report

Needs to include

- Each desired future condition
- Policy and technical justification
- Consideration of 9 factors
- Other desired future conditions considered
- Public comments
- Non-relevant aquifer documentation


GMA submits explanatory report to TWDB
with model files
TWDB determines if administratively complete


TWDB determines if administratively complete
MAGs

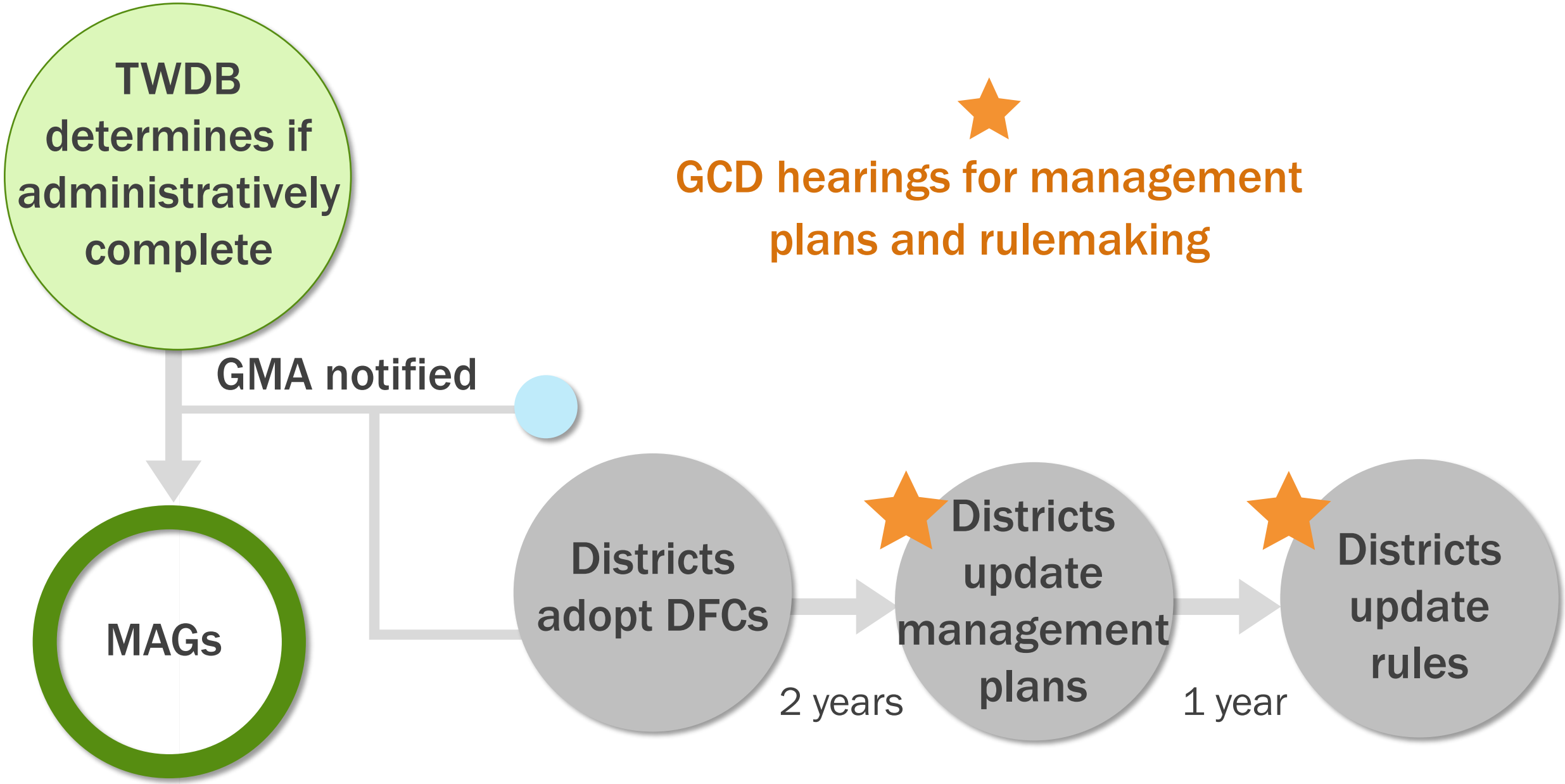
Modeled available groundwater

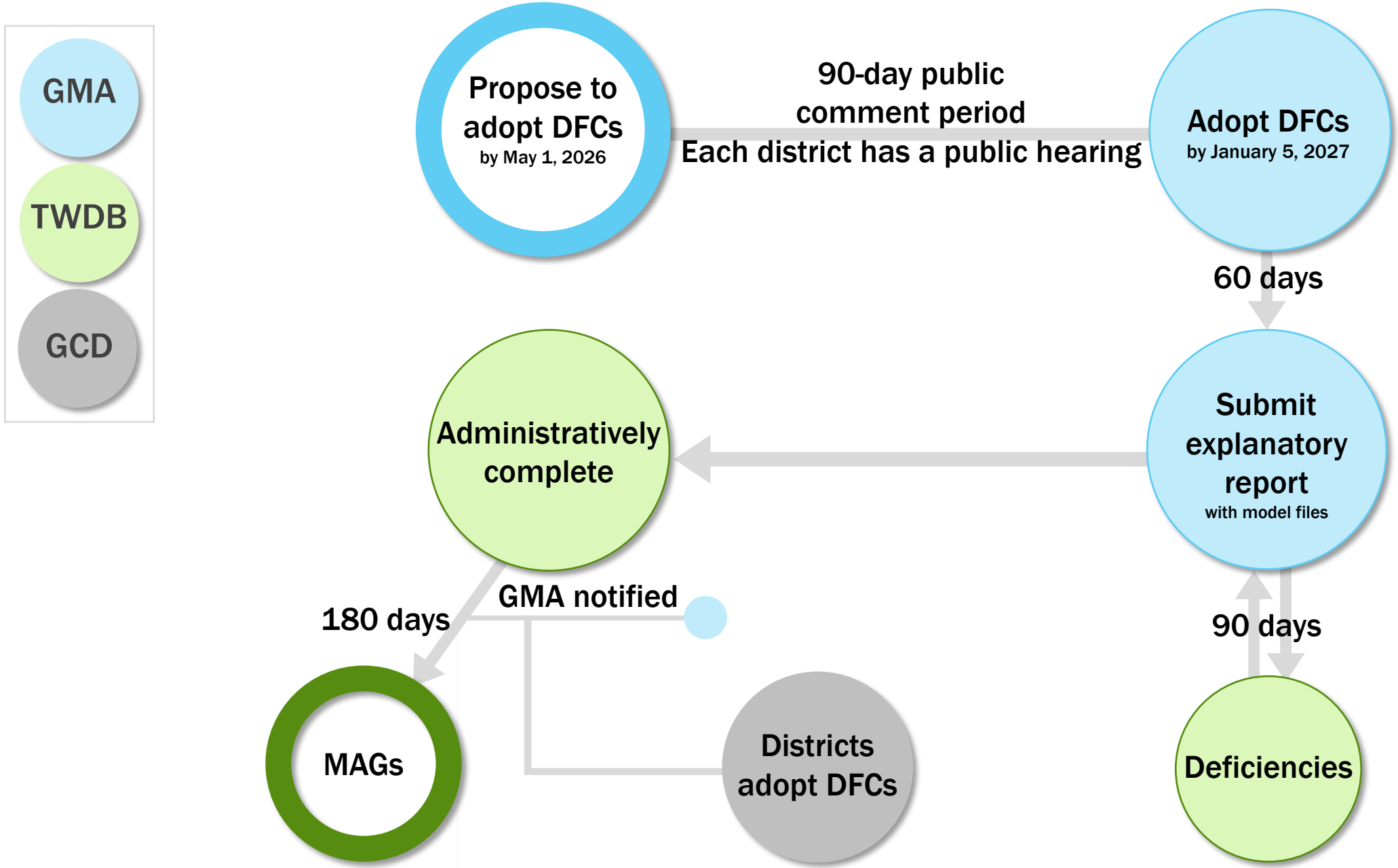
MAG

Amount of water that may be produced on an average annual basis to achieve a desired future condition

Calculated by the TWDB using GAMs

Provided to regional water planning areas as groundwater availability


TWDB determines if administratively complete
GMA notified
GCD hearings for management plans and rulemaking
MAGs
Districts adopt DFCs
2 years
Districts update management plans
1 year
Districts update rules


GMA
TWDB
GCD
Propose to adopt DFCs
by May 1, 2026
90-day public comment period
Each district has a public hearing
Adopt DFCs
by January 5, 2027
60 days
Submit explanatory report
with model files
90 days
Deficiencies
Administratively complete
GMA notified
180 days
MAGs
Districts adopt DFCs

Resources

Educational groundwater videos

Water Data for Texas and Groundwater Data Viewer

TWDB Agricultural Conservation Grants Program – Opens soon!

Hill Country Alliance

Comal Trinity GCD

Groundwater Management Area 9

Q&A

Questions?