



# Work Session Edwards Aquifer Discussion

City of San Marcos  
Edwards Aquifer Authority  
Greater San Marcos Partnership

**October 18, 2022**



# Topics of Discussion

- Edwards Aquifer Overview – Edwards Aquifer Authority
- GIS Tool – Greater San Marcos Partnership
- City Regulations
- How We Compare
- Conservation/Greenspace
- One Water Concept - City vs Site
- Code SMTX/Comprehensive Plan



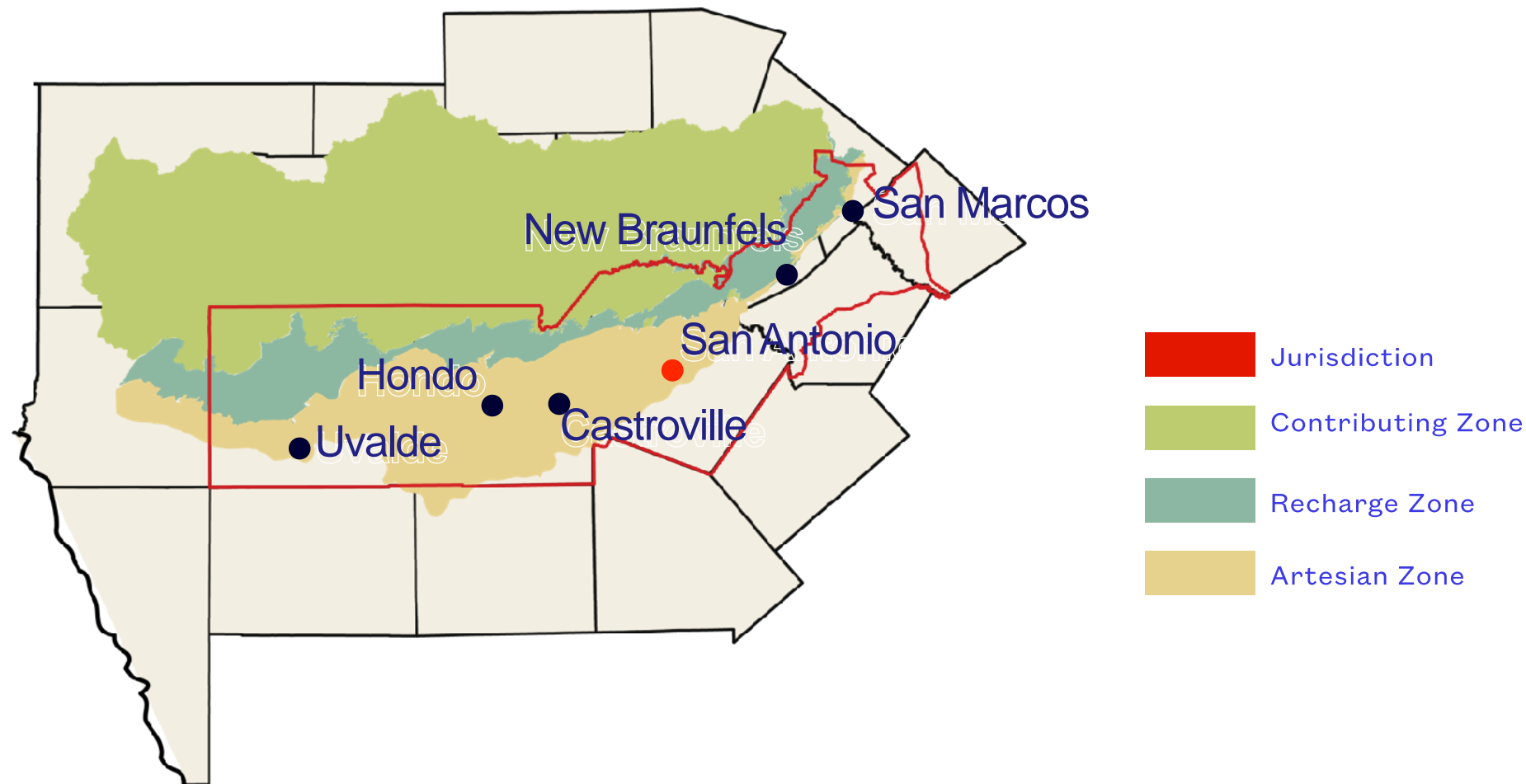


MANAGE • ENHANCE • PROTECT

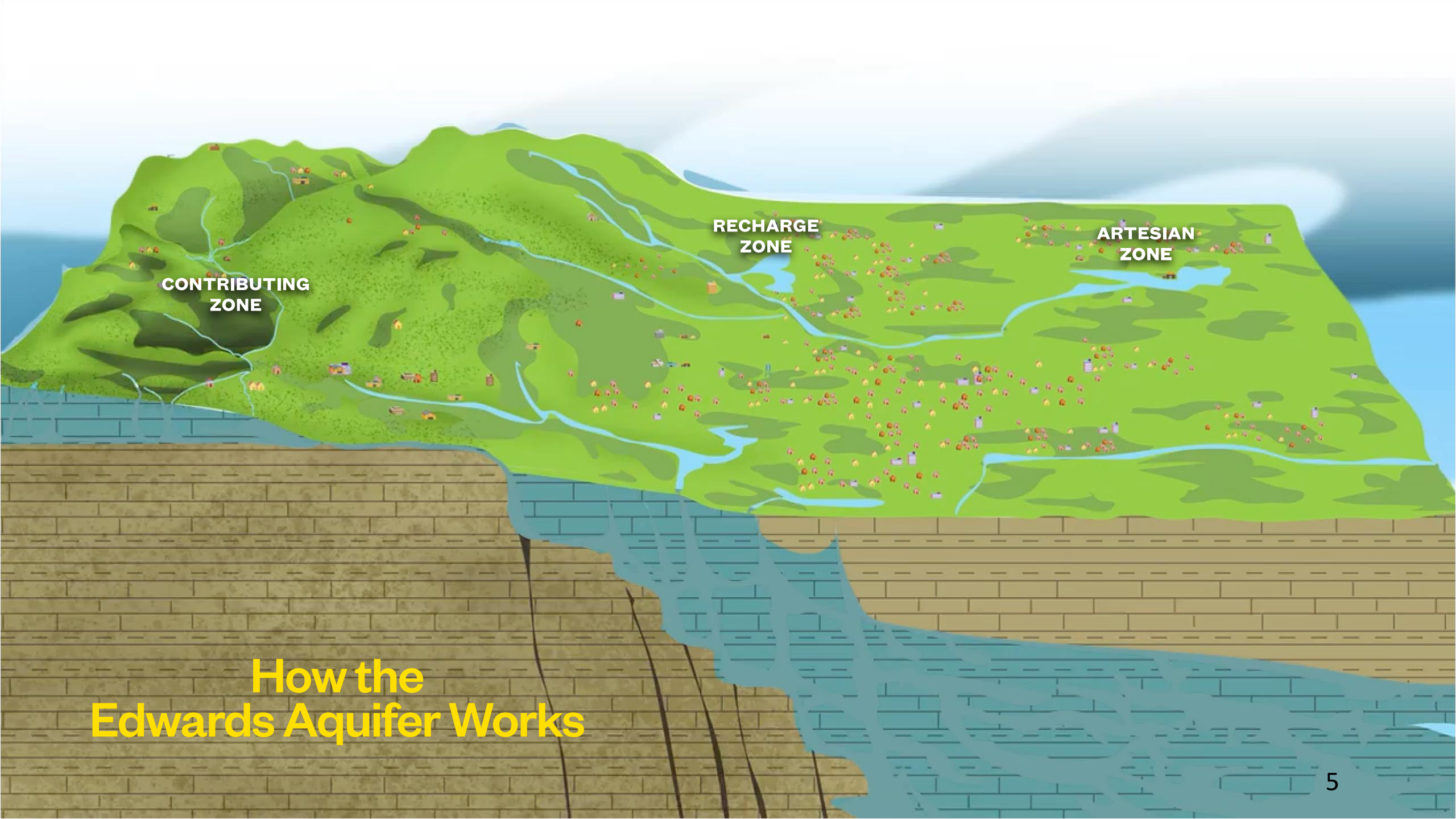
**Edwards Aquifer Authority**



# Edwards Aquifer System







CONTRIBUTING  
ZONE

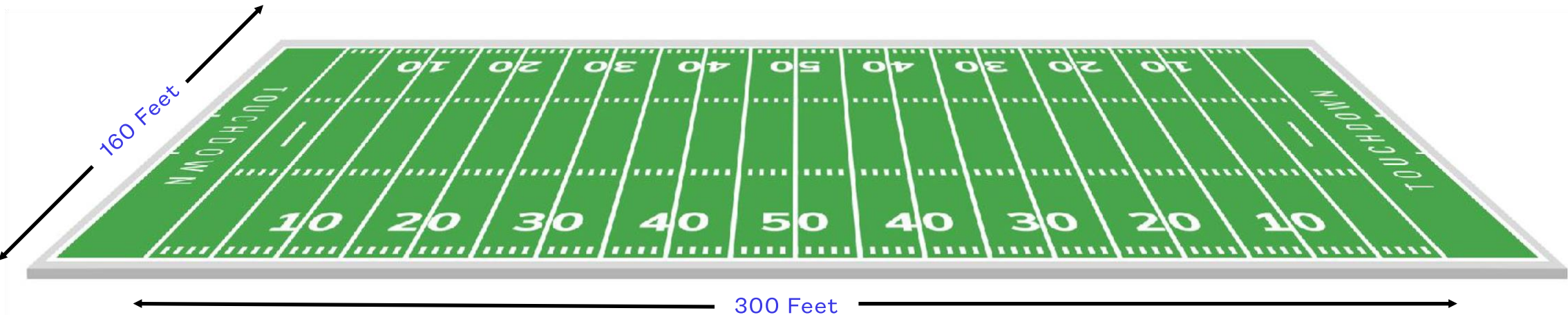
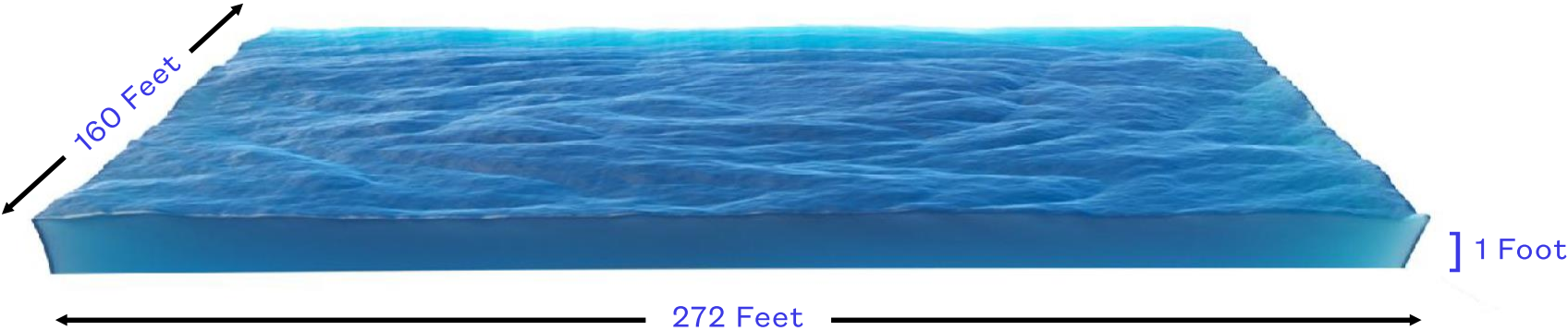
RECHARGE  
ZONE

ARTESIAN  
ZONE

# How the Edwards Aquifer Works

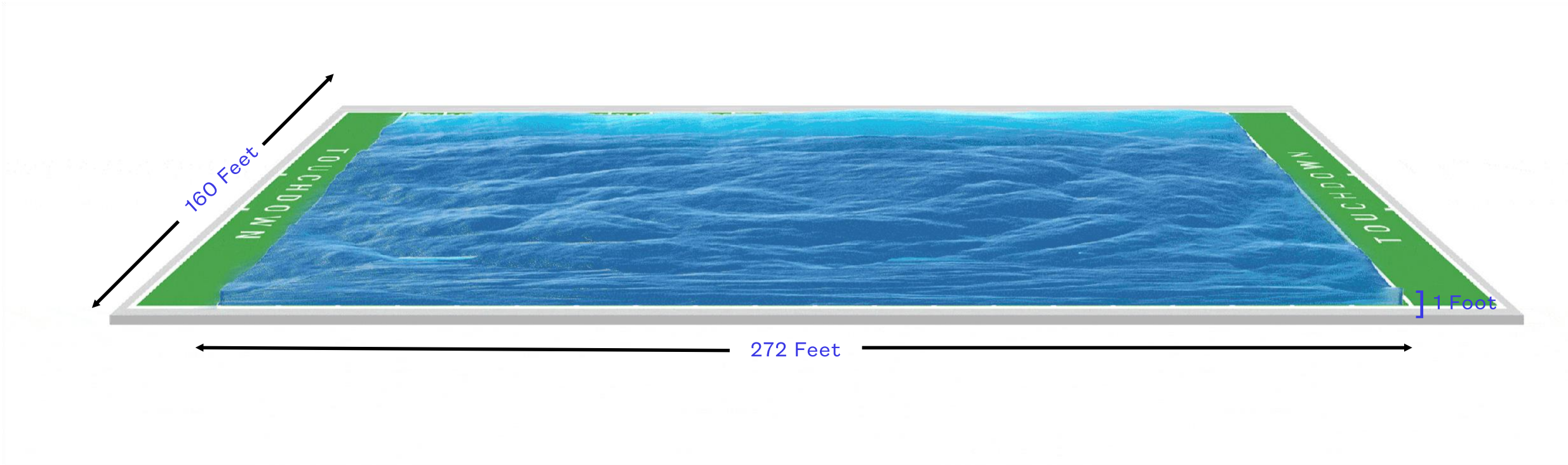


# Acre-foot of water





# Acre-foot of water







# The Success Story

- Aquifer more valued
- Greater conservation ethic
- Drought sustainability
- Predictability



# Manage

- Regulate pumping
- Benefit more than 2 million people
- Pumping cap of 572,000 acre-feet (equivalent to 186 billion gallons of water)







# Enhance

- Understanding
- Sustainability (quantity and quality of recharge)
- Certainty (reliability)





# Protect

- Educate and equip
- Abandoned Wells
- Natural Solutions





# THE NEXT GENERATION

Legacy of Sustainability  
Certainty Through Credibility



# Field Research Park



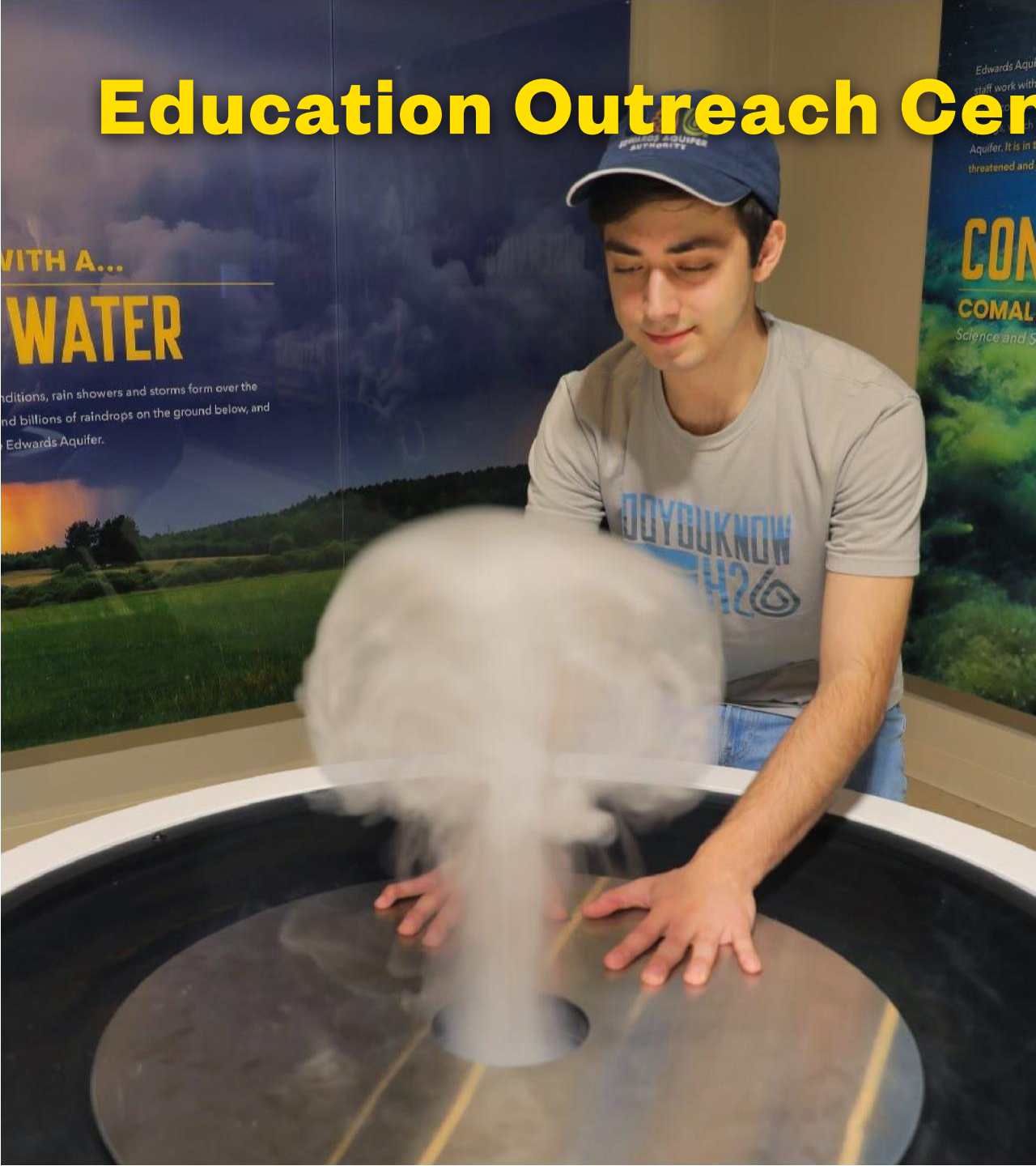


- Research hub
- Validate nature-based solutions
- Attract partnerships

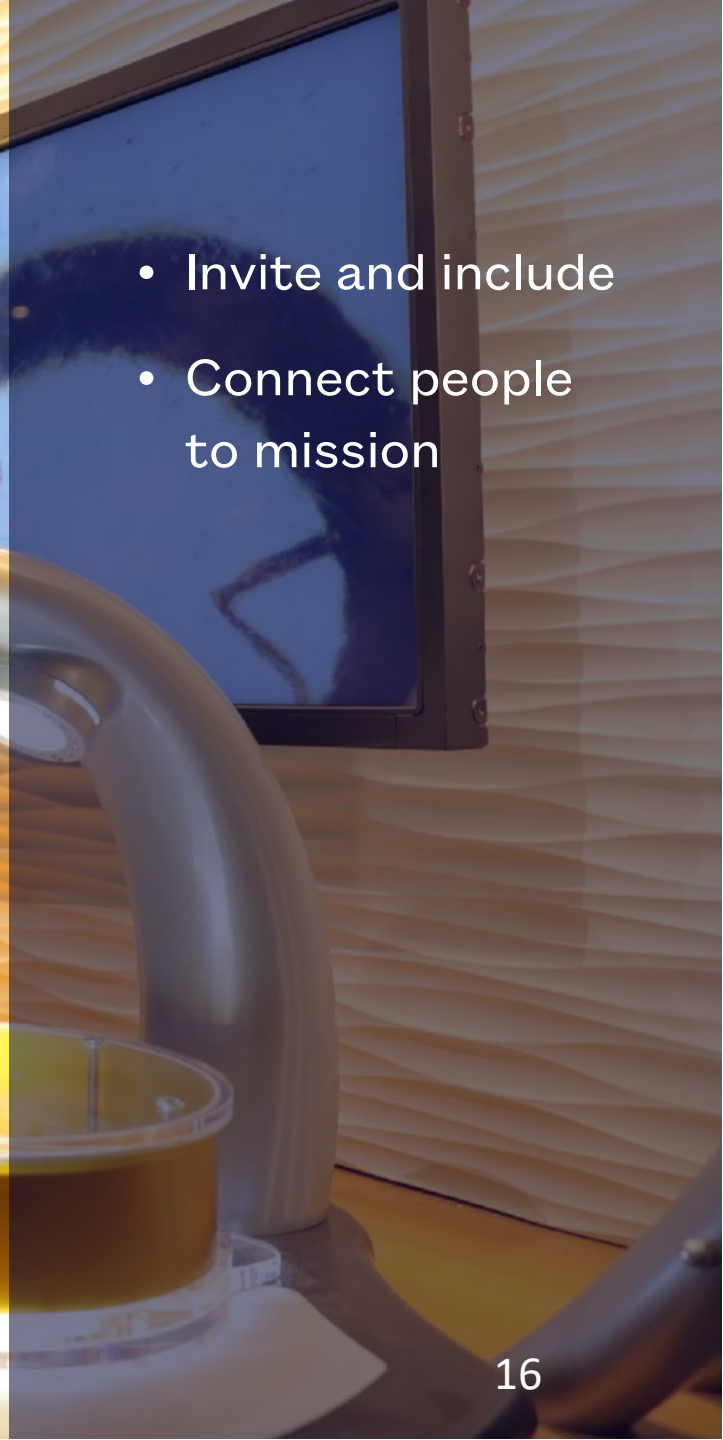




# Education Outreach Center





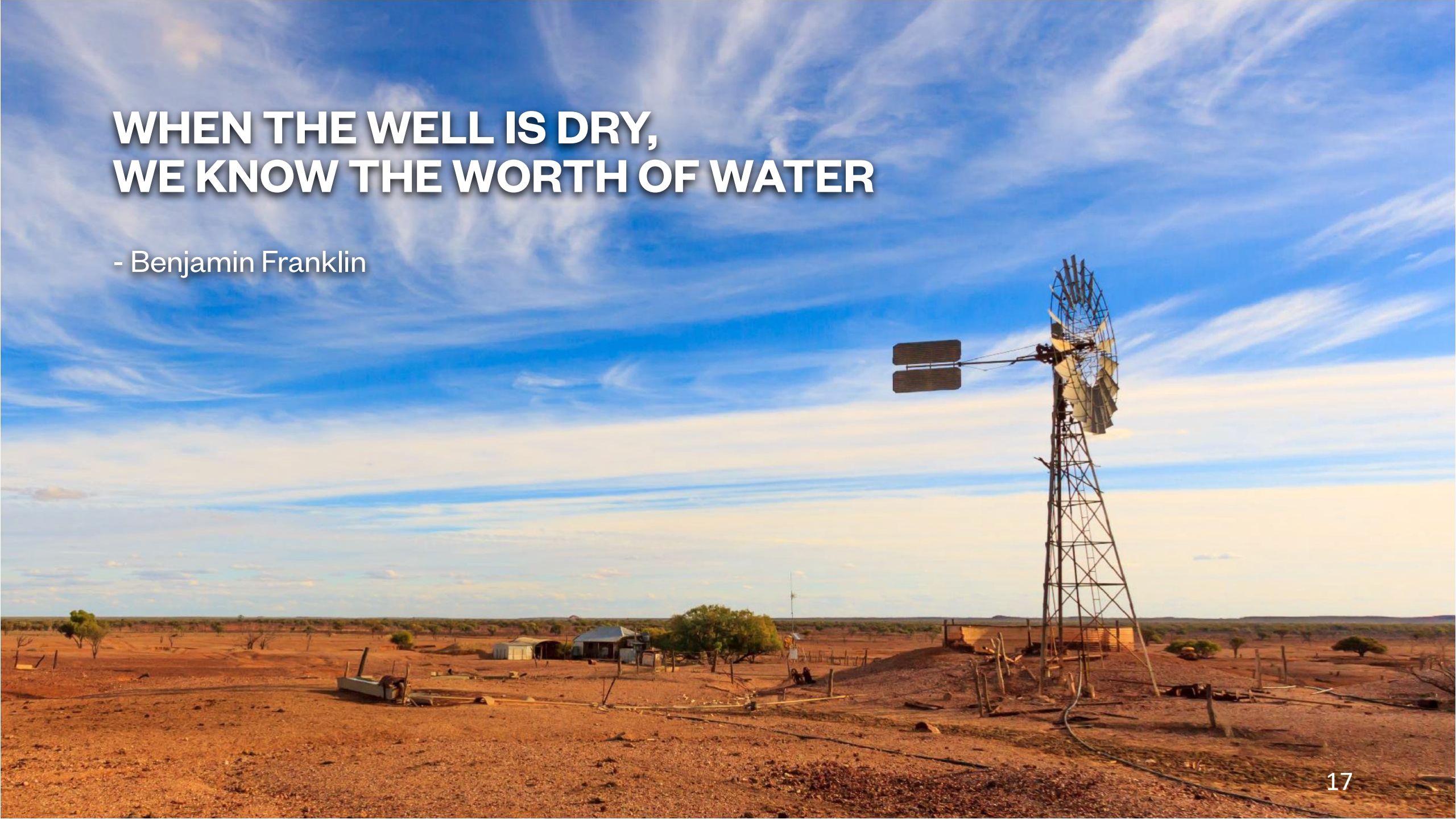


- Invite and include
- Connect people to mission



# WHEN THE WELL IS DRY, WE KNOW THE WORTH OF WATER

- Benjamin Franklin





# Questions & Answers







# Topics of Discussion

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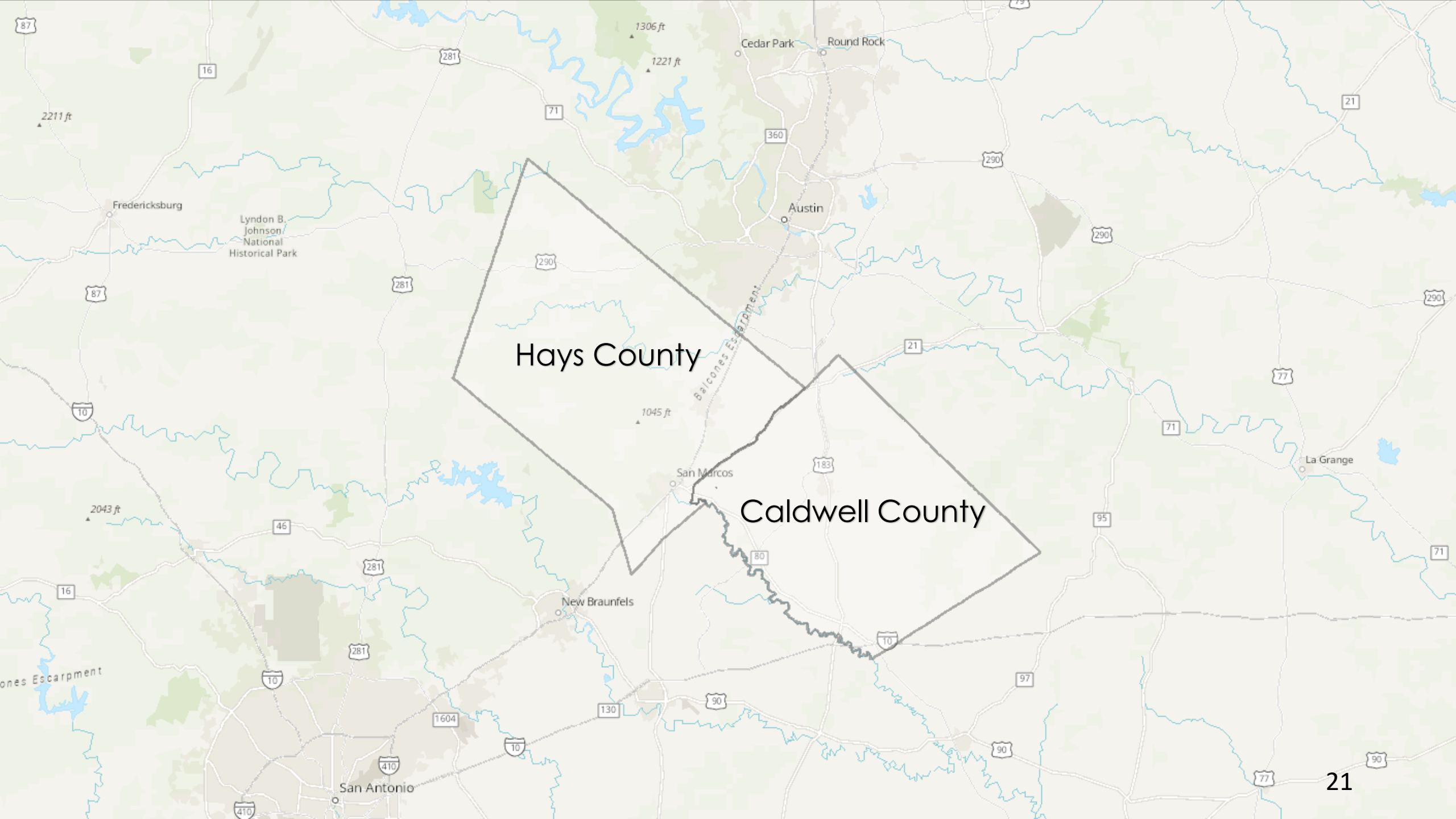
An aerial photograph of Greater San Marcos, Texas, taken at sunset or sunrise. The city is densely packed with buildings, mostly multi-story apartment complexes or commercial buildings. The sky is a deep orange and red, and the city lights are beginning to glow. The overall tone is warm and urban.

# GREATER SAN MARCOS

P A R T N E R S H I P

Workgroup IV: Enhance Community Appeal





Hays County

Caldwell County



An aerial photograph of Greater San Marcos, Texas, taken at sunset or sunrise. The city's urban landscape is visible, featuring a mix of residential and commercial buildings. The sky is a deep orange, and the city lights are beginning to glow. The text "VISION 2025" is overlaid in the center in a large, white, serif font.

# VISION 2025

**GREATER+SAN MARCOS**  
P A R T N E R S H I P





- ★ Strategic development plan focused on consensus, community, and regionalism
- ★ Four goals were highlighted to enhance growth and quality of life
- ★ Grassroots groups comprised of volunteers from all around the region



**GREATER SAN MARCOS**  
PARTNERSHIP





An aerial photograph of a city, likely San Marcos, Texas, taken during the "golden hour" of sunset. The sky is a deep orange, and the city's buildings are silhouetted against the bright horizon. The architecture is a mix of modern and traditional styles, with several large, multi-story buildings visible. The overall mood is serene and urban.

# WORKGROUP IV: Enhancing Community Appeal

**GREATER+SAN MARCOS**  
P A R T N E R S H I P





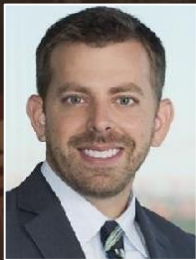
An aerial photograph of a city at sunset, with buildings and streets visible in the foreground and middle ground. The sky is a deep orange and red, and the city lights are beginning to glow. The image is used as a background for the slide.

## Enhancing Community Appeal: A Complex Task

- ★ There do not have to be winners and losers – but everything is an exchange
- ★ Good data accessible all in one place
- ★ Visualizing exchanges
- ★ Defining success
- ★ Development, conservation, and transportation



# Leaders & Members



TxIC Co-Chairs

**Meagan McCoy Jones** McCoys Building and Supply

**Lon Shell** Hays County Commissioner, Pct. 3

**Jeff Nydegger** Attorney, Winstead PC

Caldwell County Judge	Hoppy Haden
Hays County Commissioner, Pct. 1	Debbie Ingalsbe
San Marcos City Council Members	Maxfield Baker, Shane Scott
City of Luling City Council	Lee Rust
City of Buda Deputy City Manager Administrator	Micah Grau
City of San Marcos, Assistant City Manager	Joe Pantalione
City of San Marcos, Planning Manager	Andrea Villalobos
City of Lockhart, City Planner	Dan Gibson
Hays County Natural Resources Coordinator	Alexandra Thompson
Hays County Director of Development Services	Marcus Pacheco
Live Oak Real Estate Development	Ryan Whalen
DPEG, Managing Principal	Rick Rosenberg
Hill & Wilkinson	Blake Wilson
THCCN / WWA Watershed Partners	David Baker, Robin Gary, Ray Don Tilley
THCCN / Hill Country Alliance	Katherine Romans
Meadows Center for Water and the Environment	Nick Dornak, Aspen Navarro, Christina Lopez
San Marcos River Foundation	Virginia Parker
Great Springs Project	Gary Merritt, Lyda Creus Molanphy
Guadalupe-Blanco River Trust	Tyler Sanderson, Stephen Risinger
WGI	Augustine Verrengia
Drenner Group	Temaria Davis
Page	Ginny Chilton
coLAB Landscape Architect	Adam Barbe
EA Environmental	Lisa Arceneaux
Doucet Engineers	Sarah Weber
HALFF Associates	Jim Carillo
Siglo Group	Jonathan Ogren, Rita Johansen, Haley Wagoner
Greater San Marcos Partnership	Jessica Inacio, Colin Sherman



# Our Values

- ★ Development, conservation, and transportation are interrelated and inform community appeal
- ★ We value data, analysis, and metrics to inform a thriving future
- ★ Diverse perspectives are an asset to our region and can work in thoughtful collaboration
- ★ Small decisions and regular guidance create lasting influence
- ★ Challenging work should still be fun



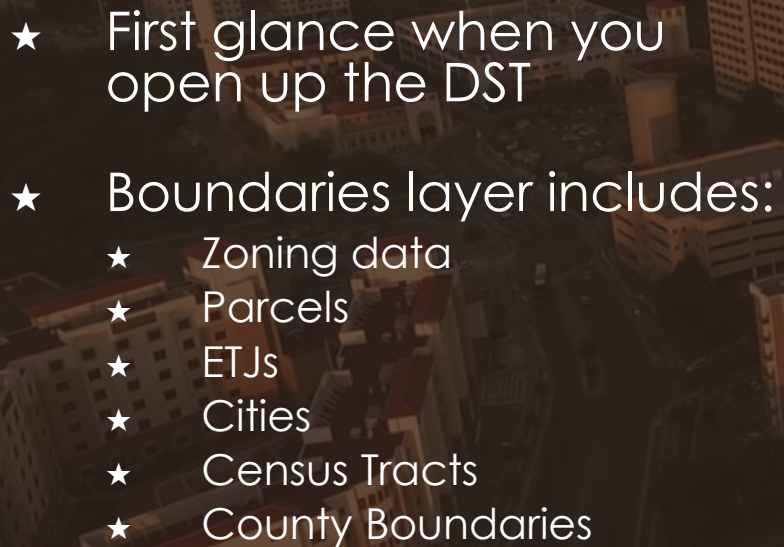
# THE DECISION SUPPORT TOOL

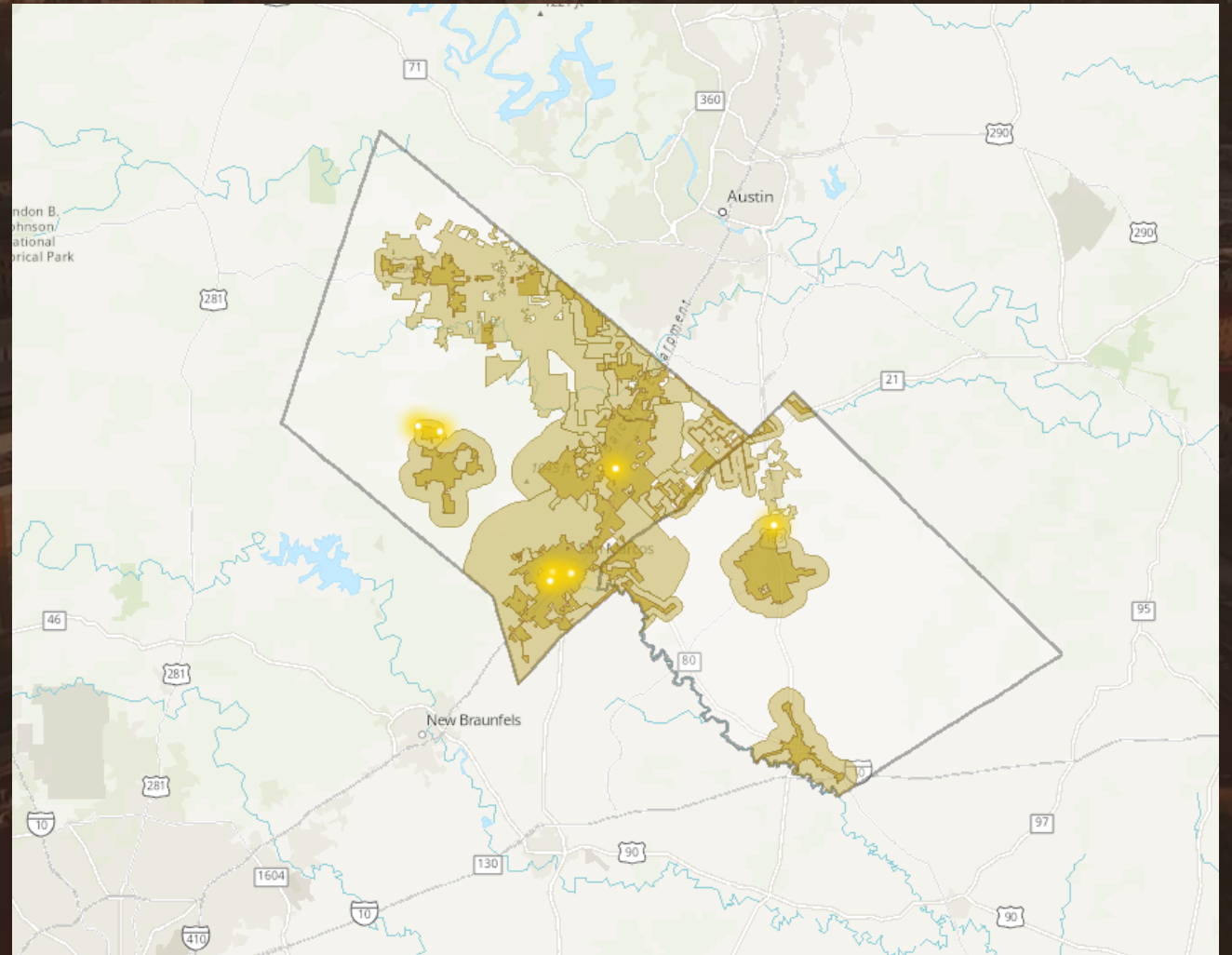
**GREATER+SAN MARCOS**  
P A R T N E R S H I P





# Base Boundaries

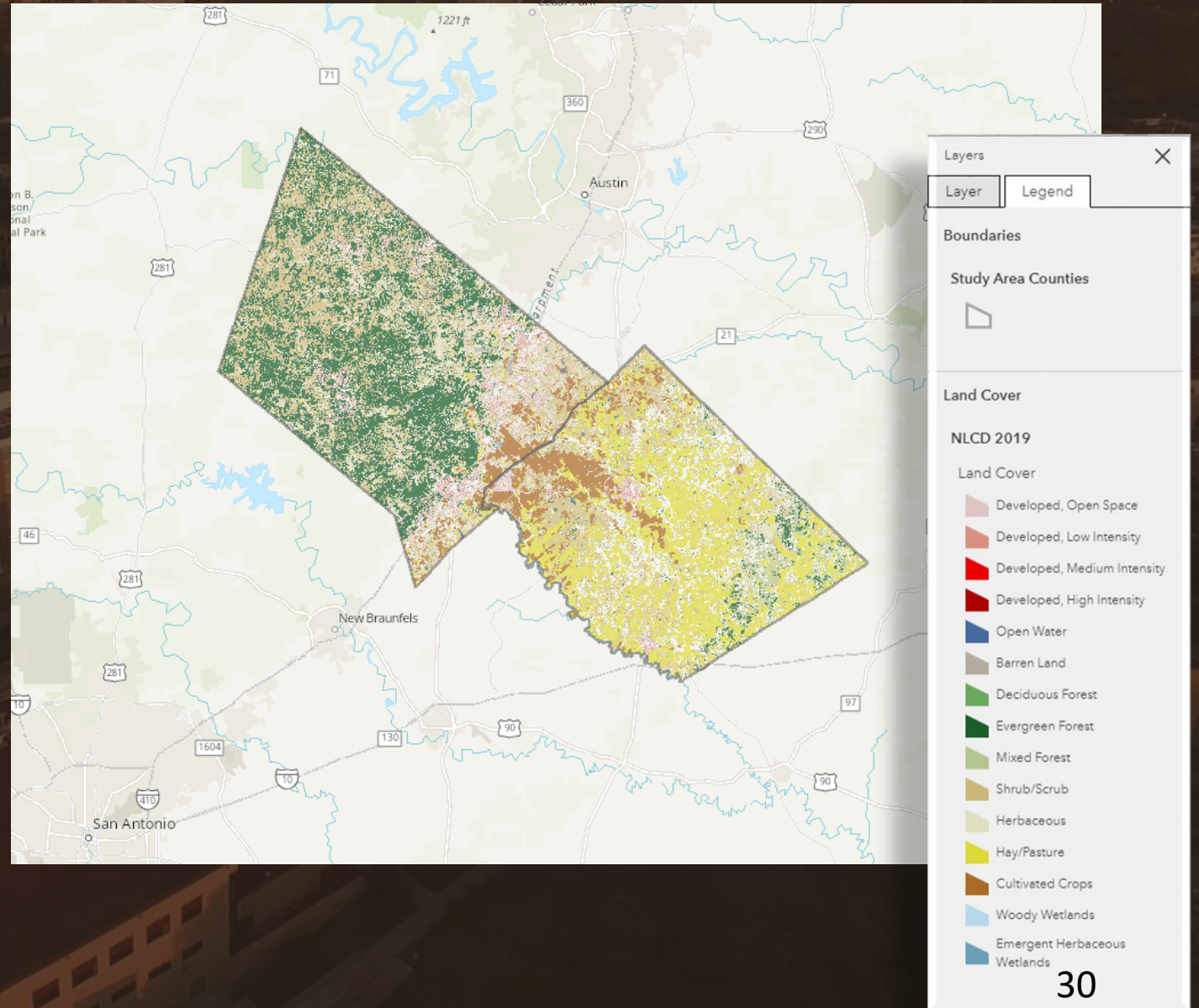
- 
- An aerial photograph of a city grid, likely New York City, showing various buildings and streets. A semi-transparent dark overlay covers the bottom half of the image, containing a list of bullet points. The text is white and clearly legible against the dark background.
- ★ First glance when you open up the DST
  - ★ Boundaries layer includes:
    - ★ Zoning data
    - ★ Parcels
    - ★ ETJs
    - ★ Cities
    - ★ Census Tracts
    - ★ County Boundaries





# NLCD 2019

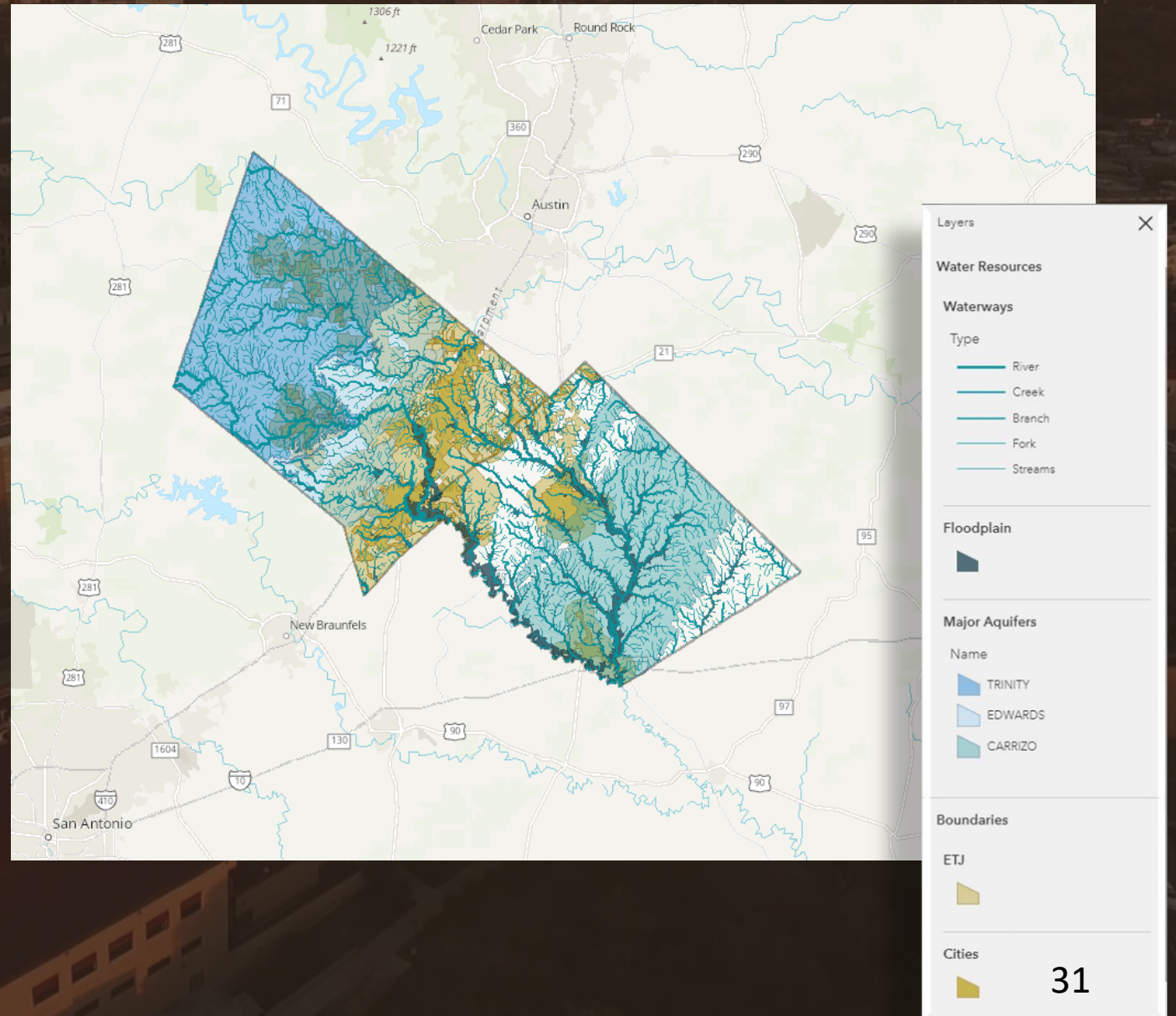
- ★ Data from the National Landcover Database
- ★ Provides spatial reference and descriptive data for characteristics of the land surface, percent impervious surface, and percent tree canopy cover
- ★ Allows current and prospective community members to see land use



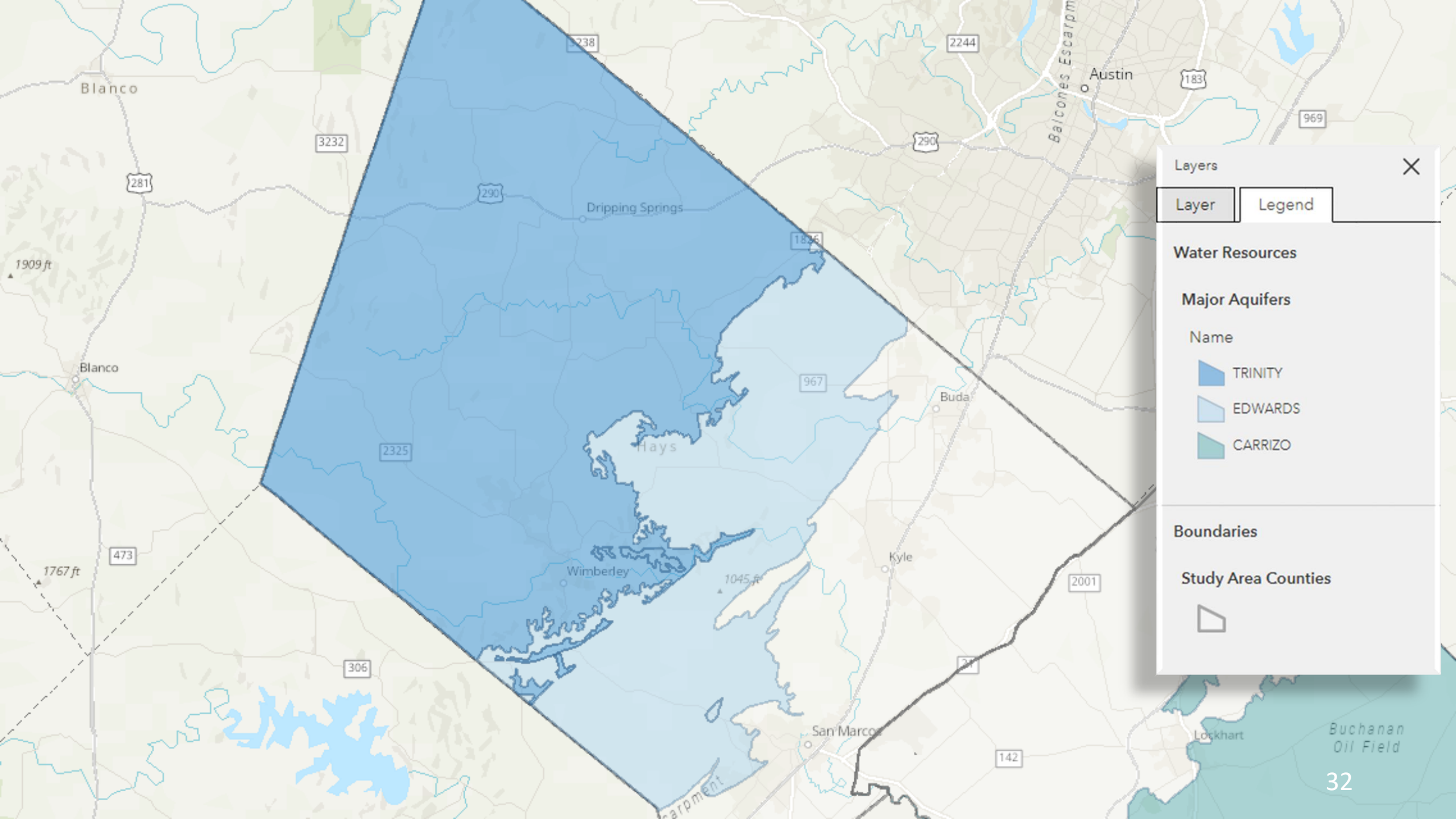


# Water Resources

- ★ Highlights streams, rivers, and artificial path vector features, floodplains, major aquifers, and watersheds
- ★ Can guide development for safety, permitting or conservation reasons
- ★ How do we guide development?







Layers

Layer

Legend

Water Resources

Major Aquifers

Name

TRINITY

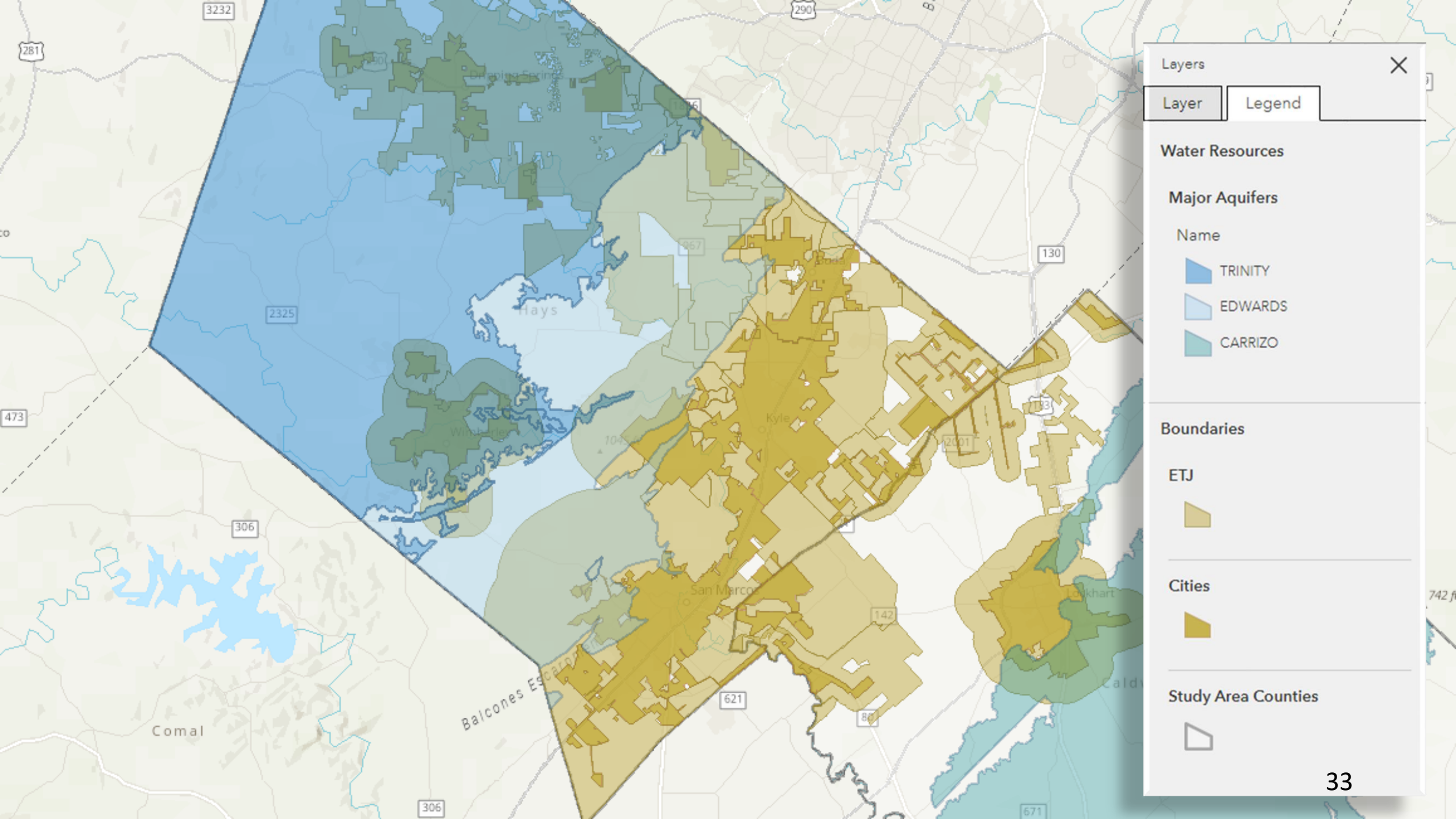
EDWARDS

CARRIZO

Boundaries

Study Area Counties





Layers ✕

Layer

Legend

Water Resources

Major Aquifers

Name

TRINITY

EDWARDS

CARRIZO

Boundaries

ETJ

Cities

Study Area Counties



# Thank you

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**GREATER+SAN MARCOS**  
P A R T N E R S H I P





# City Aquifer Protection Strategies

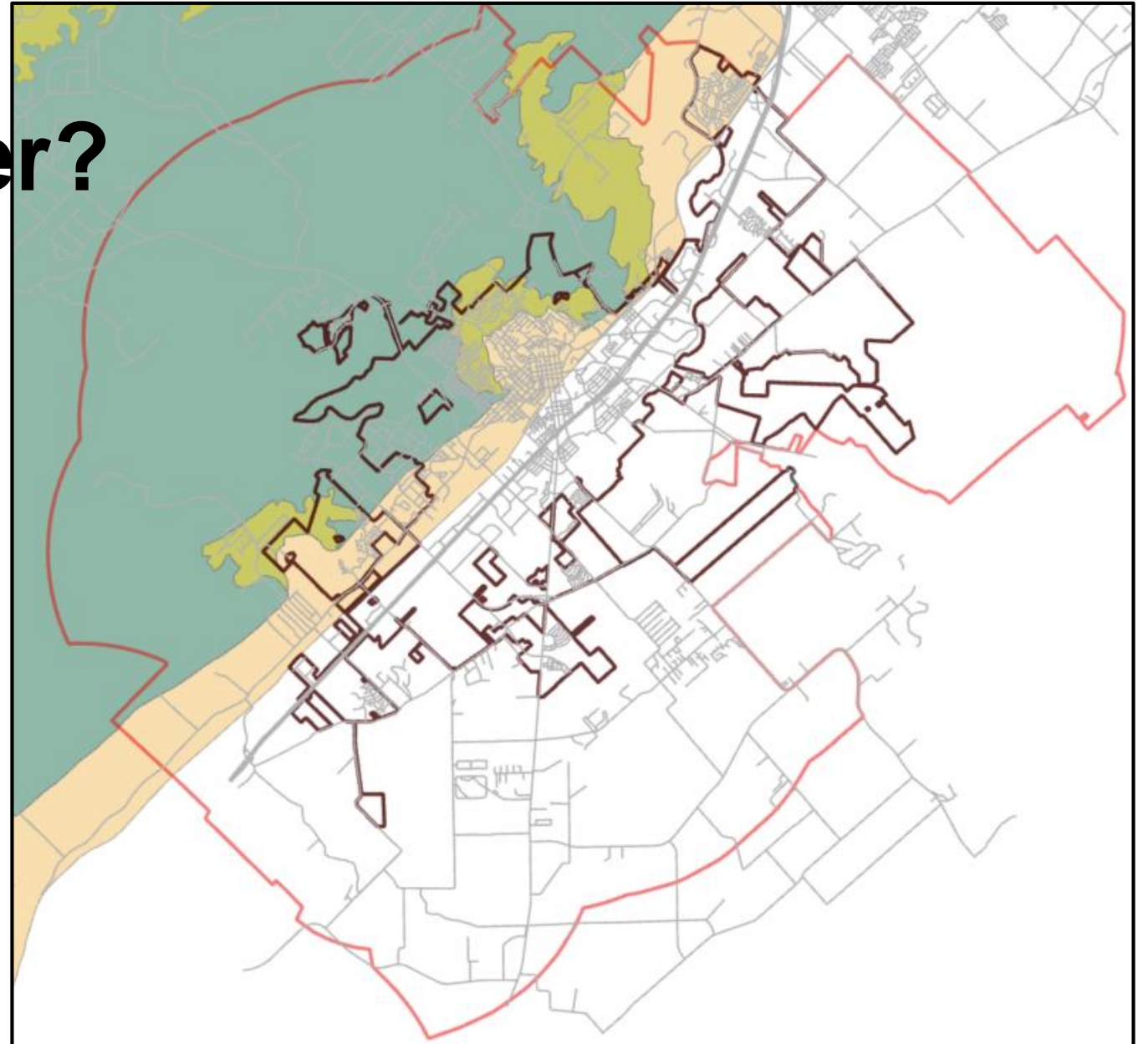
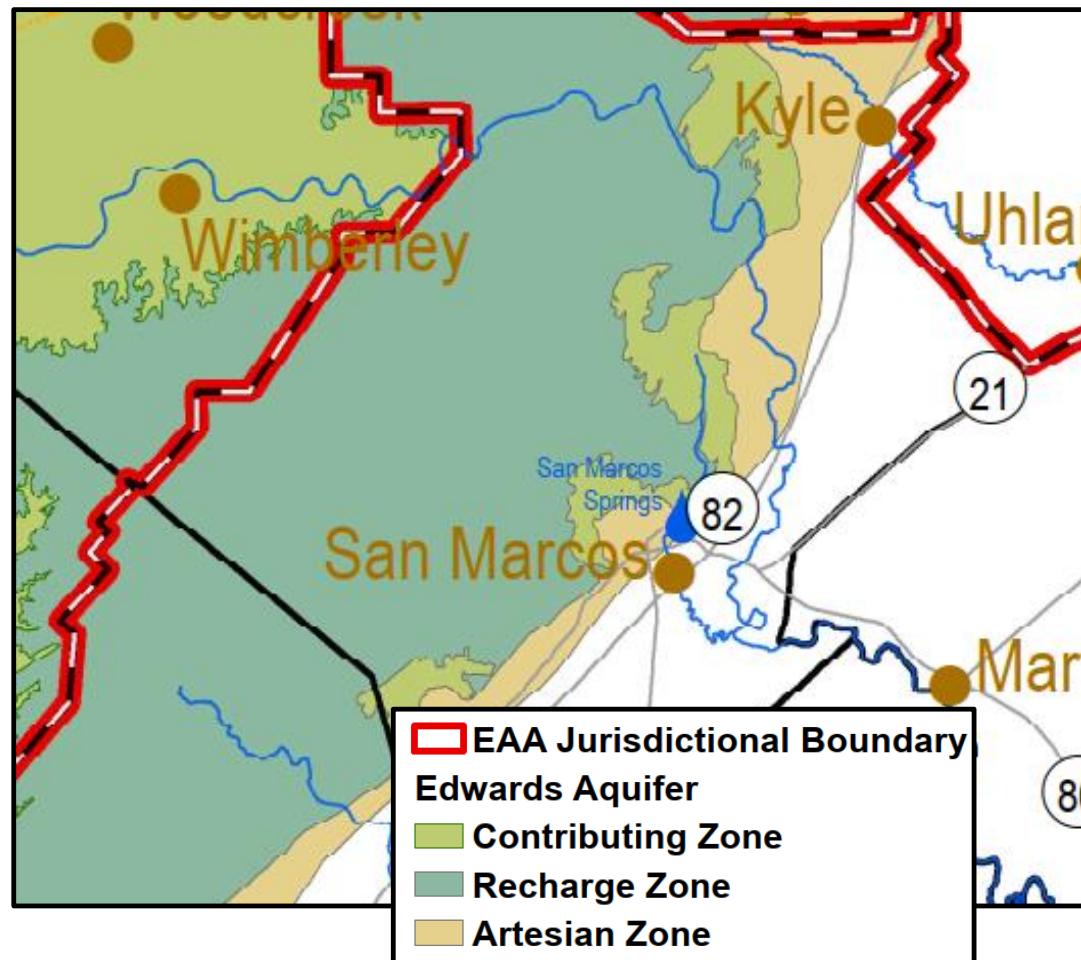
- Regulatory Protections
- Land Preservation
- Water Conservation and Reuse
- Planning for the Future







# Where is the Aquifer?







# San Marcos Development Regulations on EARZ

## Key Environmental Requirements

- **Impervious Cover Limits**
- **Stormwater Treatment**
  - 89% removal of increased TSS
- **Stream Protection**
  - Stream protection volume (1.60-in. rainfall)
  - Water quality and buffer zones
    - Begin with drainage areas of 5 ac. or greater
    - No development allowed in water quality zones except in certain instances
- **Sensitive Geologic Feature Protection**

**Impervious Cover Limits**

Size of Site	Impervious Cover Limit
Up to and including 3 acres	40%
More than 3 acres and less than 5 acres	30%
5 acres or more	20%





# Comparison of Development Regulations on EARZ

## Key Environmental Requirements

Description		San Marcos	San Marcos
		Pre 2018 Code Update	Post 2018 Code Update
Impervious Cover Limits		20% - 40%	20% - 40%
Stormwater Treatment (1)		Limited to a 20% max. increase of TSS	89% reduction in increased TSS required
Stream Protection	Stream Protection Volume	No	Yes
	Stream Protective Zones (2)	50 acres and greater	5 acres and greater
Stormwater Treatment and Stream Protection Volume Required for Redevelopment		No	Yes
Sensitive Geologic Feature Protection		Yes	Yes- 25-ft min. buffer around permitter added

Notes:

1) Stream protection areas shown are the size of creek drainage areas necessary for before protection is required.





# Comparison of Development Regulations on EARZ

## Key Environmental Requirements

Description		State	San Marcos	Austin	Kyle	New Braunfels	San Antonio
Impervious Cover Limits		None	20% - 40%	15%	None in ETJ limited by zoning	None	30% - 50% in City 15% in ETJ
Stormwater Treatment		80%	89%	100% Barton Springs	80%	80%	80%
				80%			
Stream Protection	Volume	No	Yes	Yes	No	No	No
	Zone	None	5 acres and greater	64 acres and greater	None	64 acres and greater	100 acres and greater
Sensitive Geologic Feature Protection		Yes	Yes*	Yes*	Yes	Yes	Yes*

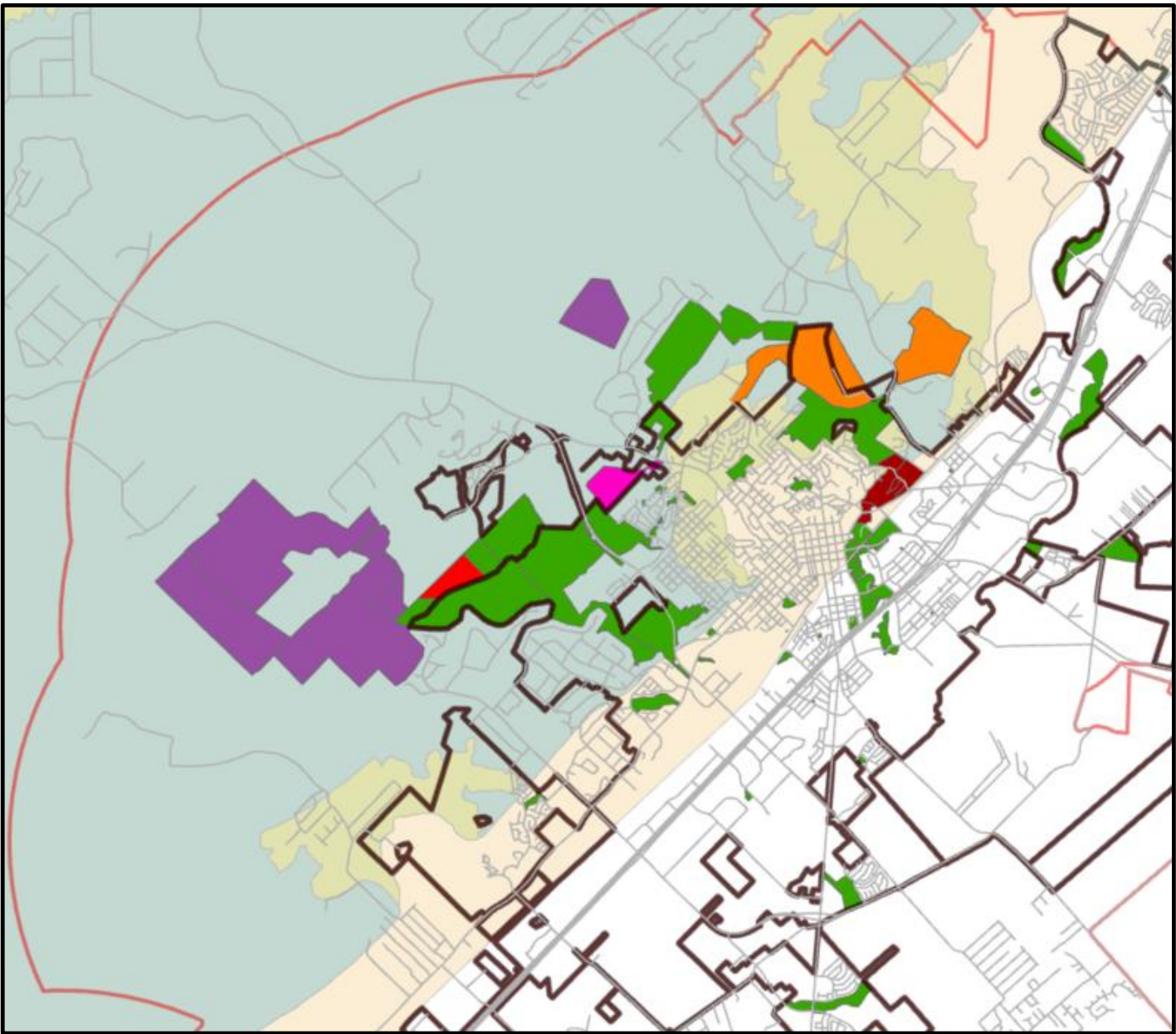




# Conservation/ Greenspace

## OWNER

-  City of San Marcos
-  Hays County
-  Private
-  La Cima Development
-  Texas State University
-  Hill Country Land Reserve



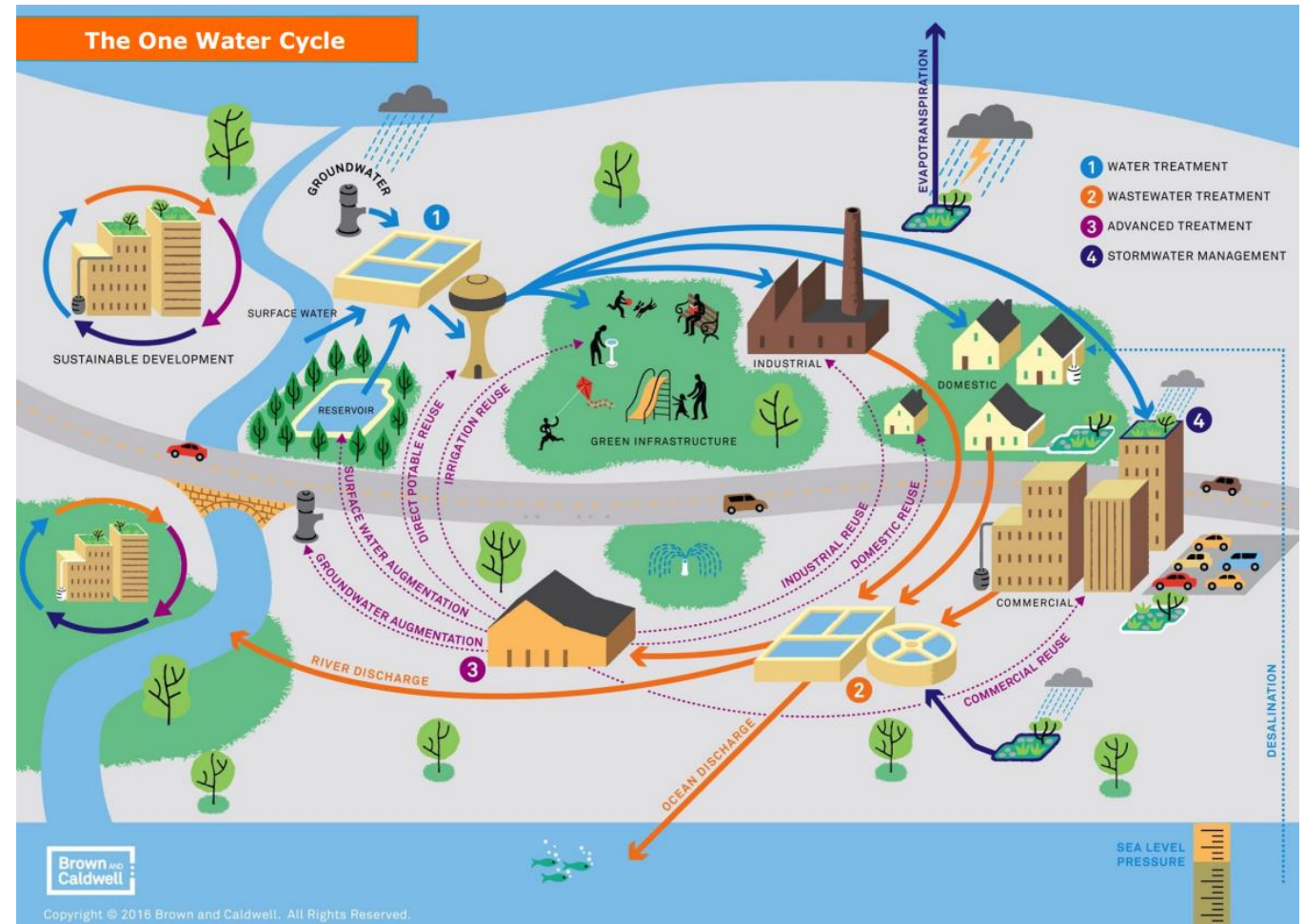




# One Water Concept

## One Water defined

One Water is an integrated planning and implementation approach to managing finite water resources for long-term resilience and reliability, meeting both community and ecosystem needs.







# One Water Approach

## - Site Level

- **Water conservation**
  - Water saving fixtures
  - Drip landscape irrigation
  - Native landscaping that requires minimal irrigation
- **Water reuse**
  - Use rainwater harvesting and collected AC condensate for toilets and landscape irrigation
- **Stormwater quality**
  - Use stormwater BMPs to remove pollutants and prevent erosion of creeks downstream.
- **Infiltration**
  - Reduce impervious cover
  - Use pervious pavements







# One Water Approach

## - Site Level

- **Wimberley ISD- Blue Hole Primary Campus**

- 200,000 gallons of storage for rainwater and AC condensate used for toilets and landscape irrigation
- On-site treatment and reuse system allow gray and black water to be reused through subsurface drip irrigation system for high quality turf field
- Bioswales, rain gardens, and walkways with permeable pavers promote stormwater quality and infiltration
- Reduces water consumption footprint by approximately 90% compared to conventional approaches
- Annual cost savings relative to standard construction and centralized water/wastewater service is expected to be between \$29,000 and \$48,000 per year. Total cost savings over 30 years to exceed \$1,000,000 in 2018 dollars.
- Conservation of 237 acre-feet of groundwater over 30 years is estimated.



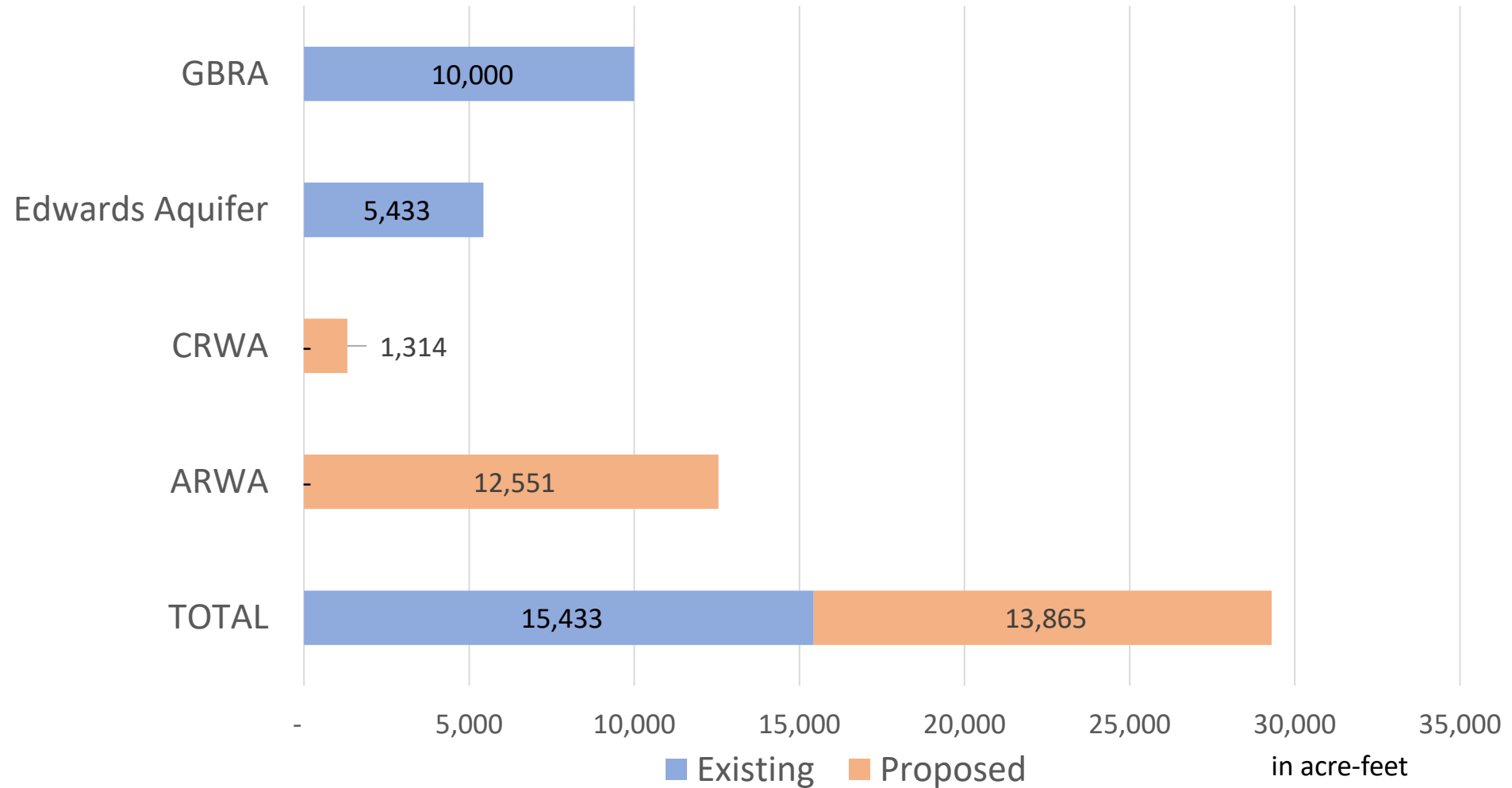


# WATER SOURCES

- Guadalupe Blanco River Authority
- Edwards Aquifer Ground Water
- Alliance Regional Water Authority
- Canyon Regional Water Authority



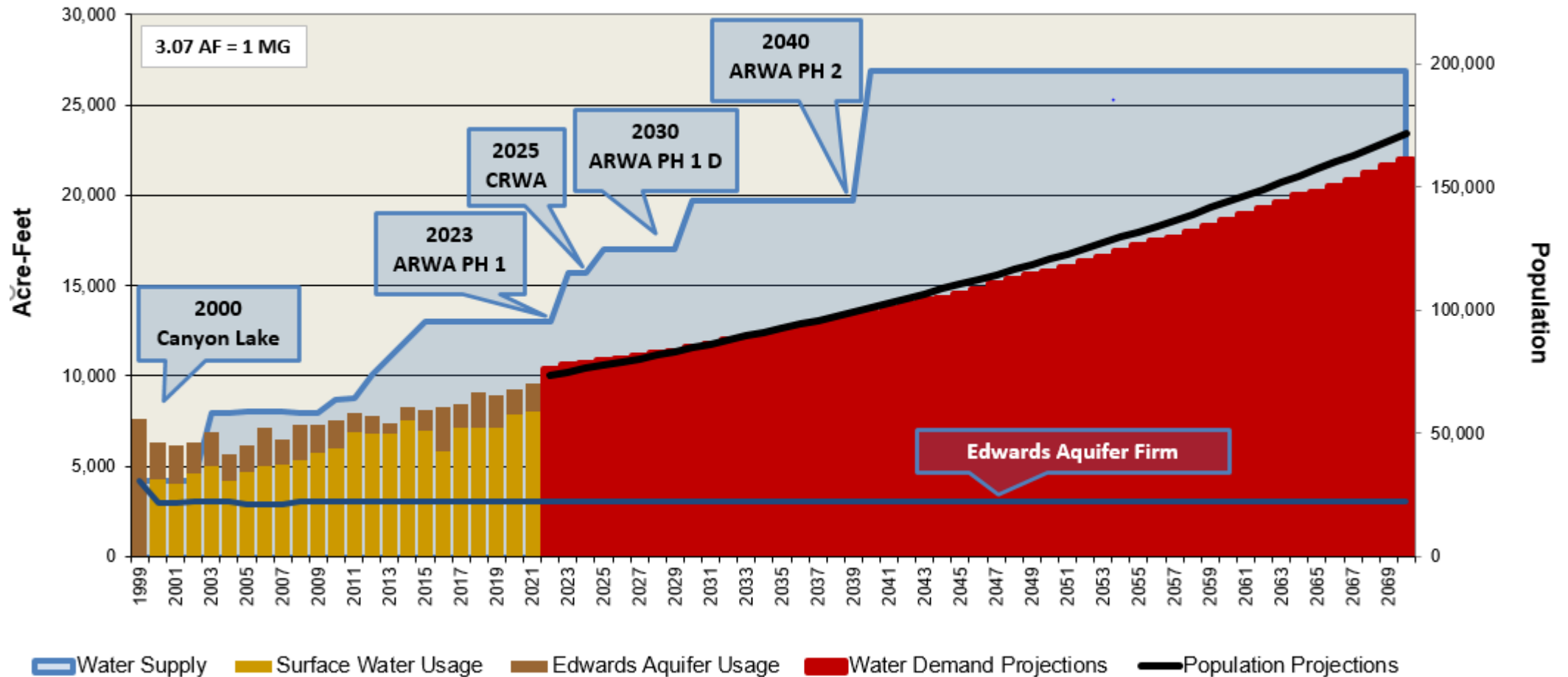
# WATER SUPPLY





# Water Sources

## City of San Marcos Water Supply vs Demand

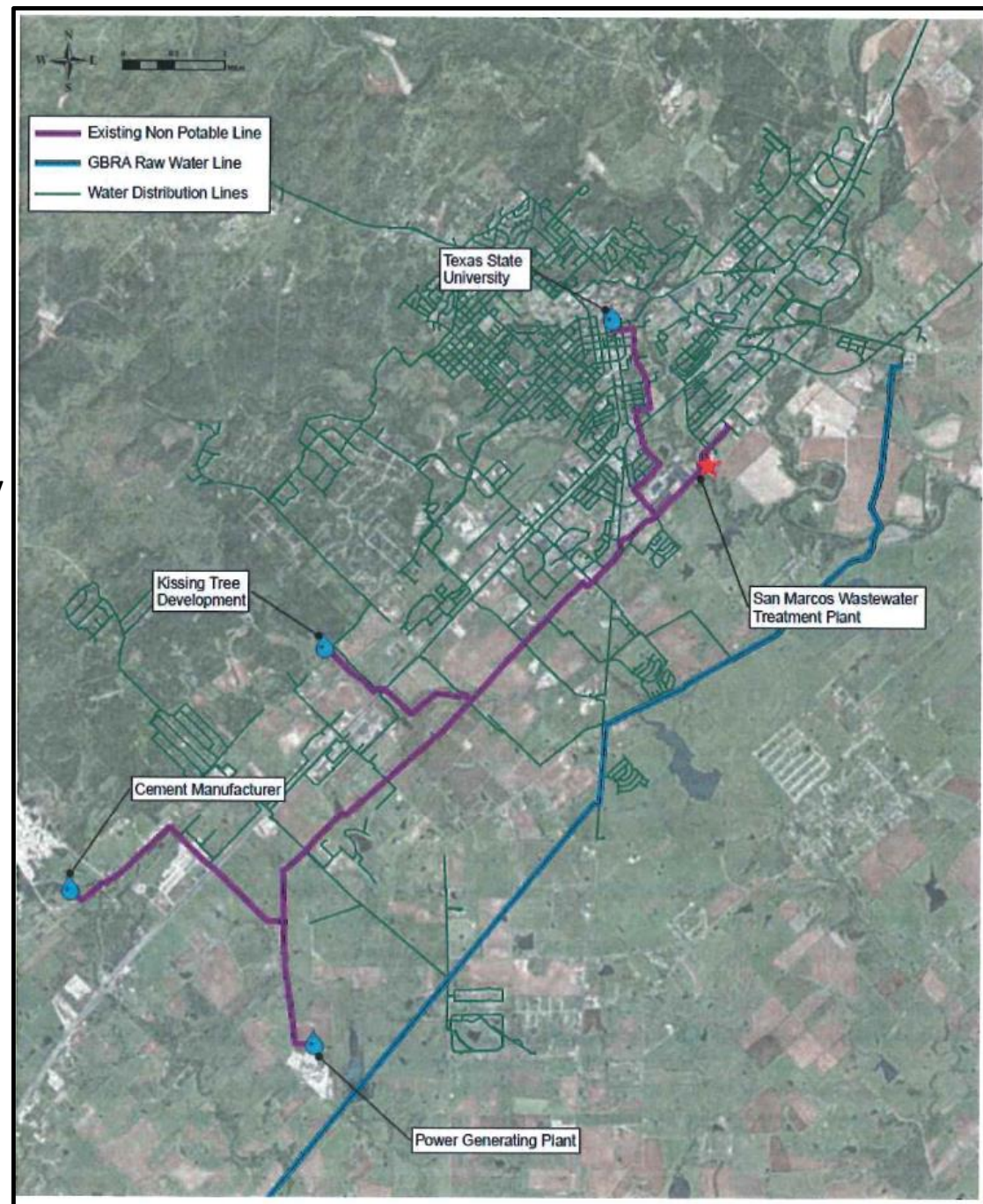






# Water Reuse

- Existing Reclaim System
- Current Capacity 5.5 Million Gallons per Day
- Current Use <1 MGD
- Current Contracts 5 MGD
- Evaluate with Comprehensive Plan
- Reclaim Water Master Plan
- Evaluate with CIP and Development Projects







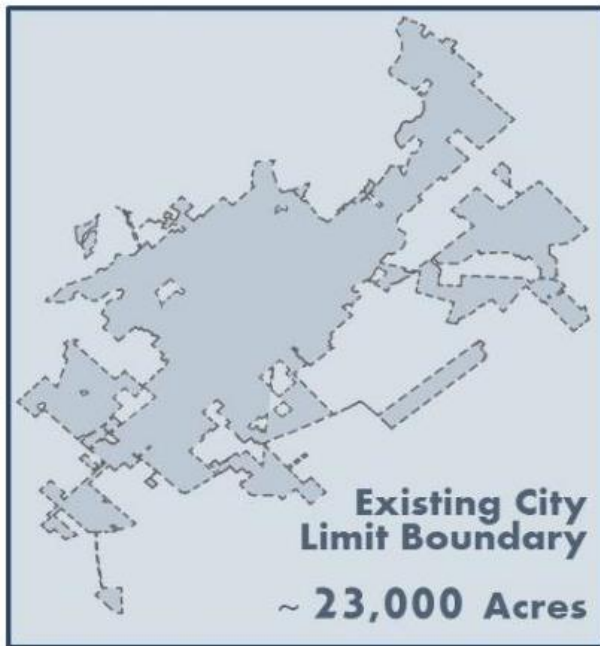
# Comprehensive Plan as a Tool to Guide Growth





# San Marcos' Projected Growth

San Marcos is growing. We are projected to see 42,000-64,000 new housing units and 51,000 new jobs by 2050.



High Acreage Estimate  
(Low density)



Low Acreage Estimate  
(High density)

## Draft Guiding Principle:

*Sustainable and Resilient* – San Marcos strives to promote and balance economic, environmental resiliency, and social sustainability for current residents and future generations.



# Tool #1: Draft Preferred Growth Scenario Map

- The Preferred Scenario Map **guides growth spatially** throughout the City
- The map must **balance population growth** with the **goals & needs of the community**, such as housing, transportation, environment & resource protection, emergency management, equity, and fiscal sustainability
- Used as a **tool for land use policy** & can be implemented through zoning, development standards, and other programs/plans

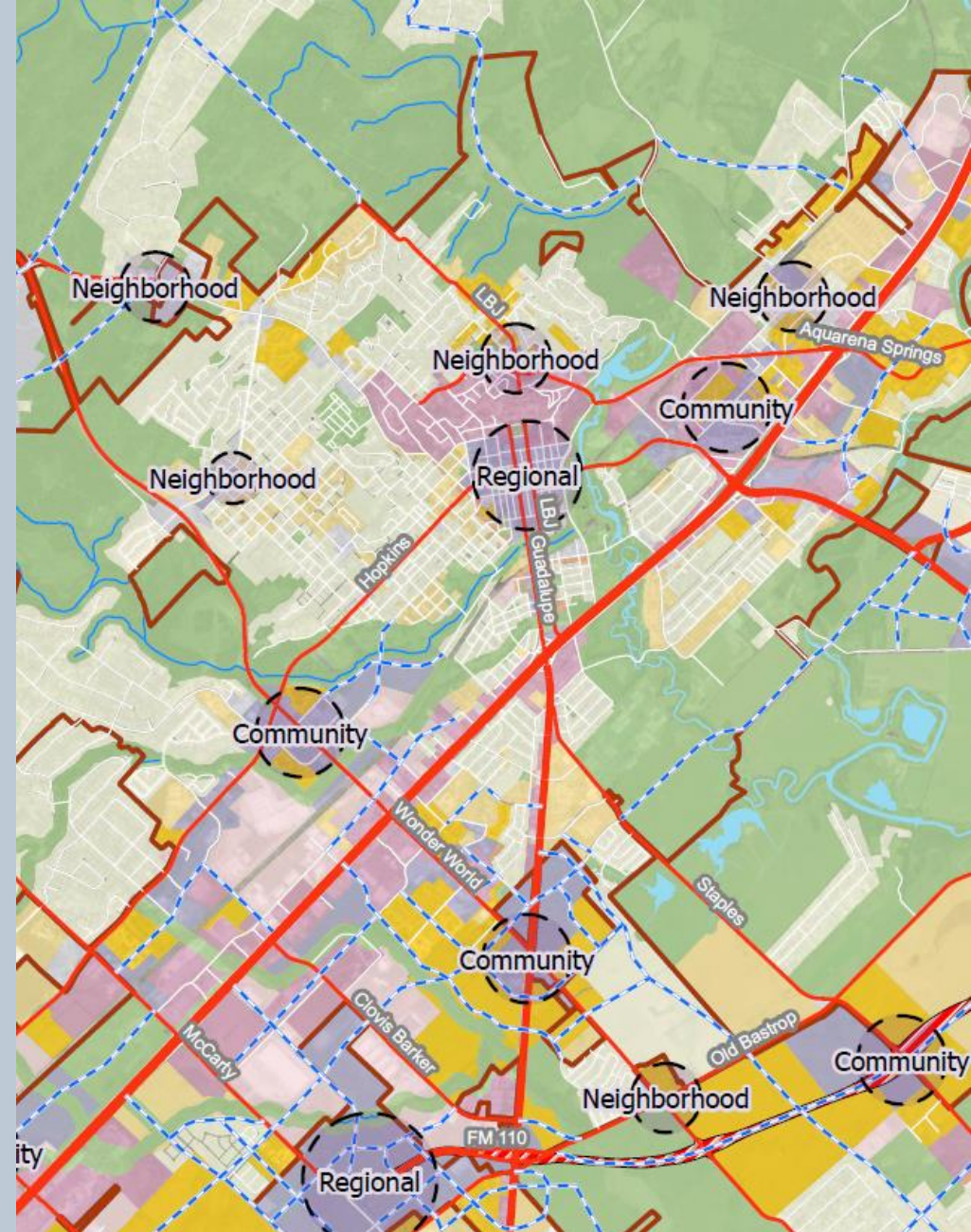
## Draft Preferred Scenario

- Neighborhood - High
- Neighborhood - Medium
- Neighborhood - Low
- Neighborhood Transition
- Mixed Use - Medium
- Mixed Use - Low
- Commercial/Employment Medium
- Commercial/Employment Low
- Conserve/Reserve





- Areas for **existing neighborhoods and new traditional neighborhoods**;
- Areas to facilitate commercial and **employment opportunities**;
- Identified areas for **conservation and reservation of land**;
- The creation of several growth centers in strategic locations which serve the community at **different scales**;
- Mixed use areas along **key roadways and intersections**; and
- Smaller commercial centers that are walkable and near neighborhoods so that residents have **convenient, safe, and equitable access to services**;





# Conserve / Reserve



**Conserve:** To allow and shape sustainable development while protecting an area's natural environmental features, including preserving and protecting open space, sensitive lands, farmland and/or natural habitats for wildlife.

**Housing Density:** The max density of approximately 10 units per acre in developed areas and a typical net density of less than 5 units per acre.

**Land Uses:** Parks, improved open space and undeveloped land, but may have pockets of clustered/compact housing and/or mixed-use development.

**Mobility:** Emphasis on pedestrian facilities, connected trails, and shared use paths. In Reserve areas, utilities should generally be provided locally (e.g., well, septic, etc.)

**Reserve:** To facilitate appropriate development and to set expectations for City provided services in areas designated as reserve in the Comprehensive Plan future land use map.





# Tool #2 Planning Elements: Goals, Policies, & Objectives

WHAT DO YOU SEE SAN MARCOS IN THE NEXT 10-20 YEARS?  
What would you like to see accomplished for the topics that are most important to you?

Grab a sticky note and let us know what you think!

COMMUNITY DESIGN & CHARACTER	ARTS & CULTURE	ECONOMIC DEVELOPMENT	HOUSING
<p>Vision SMTX will create strategies to protect existing historic and cultural areas and guide future growth. <b>Think about existing neighborhoods and what is important to preserve or enhance!</b></p> <p>Use that it's a college town - seems like a happy place</p> <p>Some of my hometown existing neighborhoods are forgotten. Remember we're a small community. San Marcos is there. All power to it!</p>	<p>Vision SMTX will create recommendations to promote of arts and culture. <b>Think about what existing or new cultural assets we should celebrate or strengthen!</b></p> <p>There needs to be more arts &amp; culture activities like concerts, plays, speakers.</p> <p>raising art gallery district</p> <p>Cultural center not important for future generations</p> <p>incorporate more arts and community activity in the urban history district</p>	<p>Vision SMTX will leverage community assets and diversify the City's economic base. <b>Think about what economic opportunities are important to you!</b></p> <p>weekly business networking group</p> <p>Missing in downtown hotel. We should have to drive</p> <p>More green space on south side</p> <p>HEB off of McLaughlin road more grocery stores</p>	<p>Vision SMTX will provide recommendations for meeting housing demand. <b>Think about what kinds of housing types (single family, townhomes, apartments) you'd like to see and where!</b></p> <p>Affordable housing - mid-rise</p> <p>high rent prices, high property values to keep rising</p> <p>No more of - as filled - tell us to do</p> <p>we need more affordable housing</p> <p>we will have an excess of big houses in the future. Millennials want smaller houses - not want less college support</p> <p>Big houses are too much maintenance. Younger generations want diversity of choice.</p>

SMTX VISION



## #3 - PLANNING ELEMENTS



**GOALS = What do we want to accomplish?**

**POLICIES = How can we reach our goals?**

**OBJECTIVES = How will we know if we're successful?**



## ENVIRONMENT & RESOURCE PROTECTION GOALS

- Establish or strengthen **best practices for resource protection and preservation** in the development process.
- Provide **financial incentives** to encourage developers to **implement green building practices, conservation style development, and increased density** in targeted areas as indicated on the Preferred Scenario Map.
- Continue to **advance the recommendations of the Habitat Conservation Plan**, including endangered species and river recreation protections.



## LAND USE + COMMUNITY DESIGN & CHARACTER GOAL

- **Discourage sprawl by facilitating mixed-use development** in appropriate locations, clustering development, and encouraging a mix of housing types.
- Establish and incentivize **conservation development guidelines, green infrastructure practices, and compact development.**
- Encourage and incentivize **cluster development** to protect open space, provide recreation amenities, and minimize impervious surfaces.



## PARKS & PUBLIC SPACE + HEALTH, SAFETY & WELLNESS

- Prioritize **native plants and low-maintenance materials** in design of parks, greenways, and facilities.
- Create an **urban forest management plan** to protect and enhance the city's tree canopy.
- Locate parks, open spaces and natural areas to **protect and benefit the aquifer**.



## TRANSPORTATION

- Create a multi-modal, well-connected, and efficient transportation network that minimizes congestion, energy use, and climate pollutants
- Establish / update **green infrastructure policies**, standards and guidelines for roadways.
- Ensure a **well-integrated, connected transportation network** that includes a hierarchy of roadways appropriate for adjacent land uses and development types.

## HOUSING

- Update, review, and adopt a **Housing Action Plan** using the Workforce Housing Task Force Draft Plan in 2019 as a foundation.
- Encourage and **allow housing in mixed use centers** identified on the Preferred Scenario Map with close proximity to schools, employment centers, transit, recreational opportunities, and other community resources.
- Encourage and incentivize **diverse housing types**.



## ECONOMIC DEVELOPMENT

- **Protect and promote land uses that support target industries**, support diversification of the City's tax base, and enhance economic development through intentional infrastructure planning, recruitment, and the land use entitlement process.
- Review **incentive policies** with consideration of current economic development strategy.





# Next Steps

- Complete Comprehensive Plan
  - Council provide policy guidance
- Master Plans
  - Initiate/Continue
    - Wastewater – In Progress
    - Stormwater – Scoping
    - Transportation – Following Comprehensive Plan
    - Reclaim Water - Evaluation
  - Adoption and Implementation

## QUESTIONS & FEEDBACK