Water for Whooping Cranes Wintering Along the Middle Texas Coast:

Competing with Human Water Needs in a Semi-Arid, Drought-Prone Environment!

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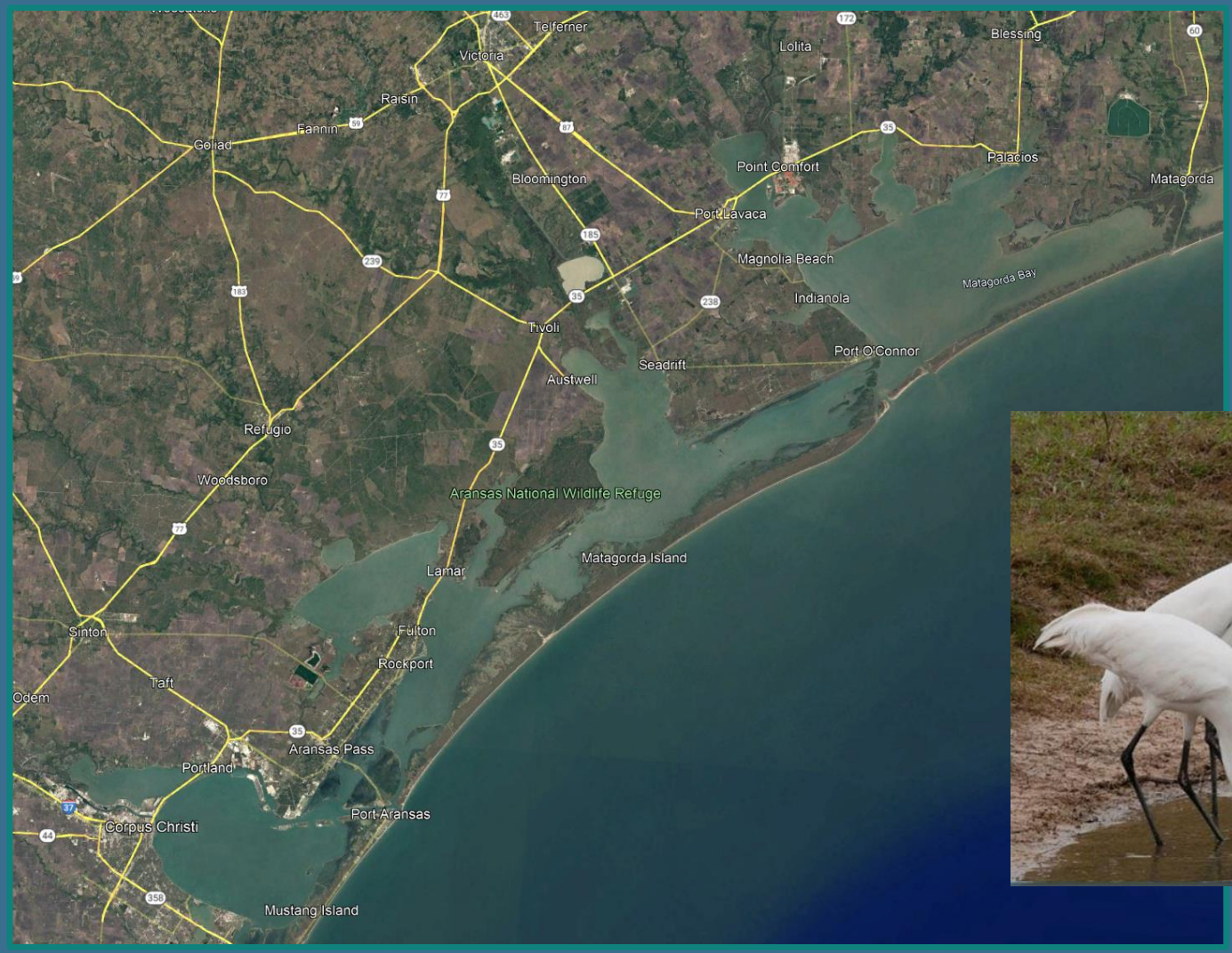
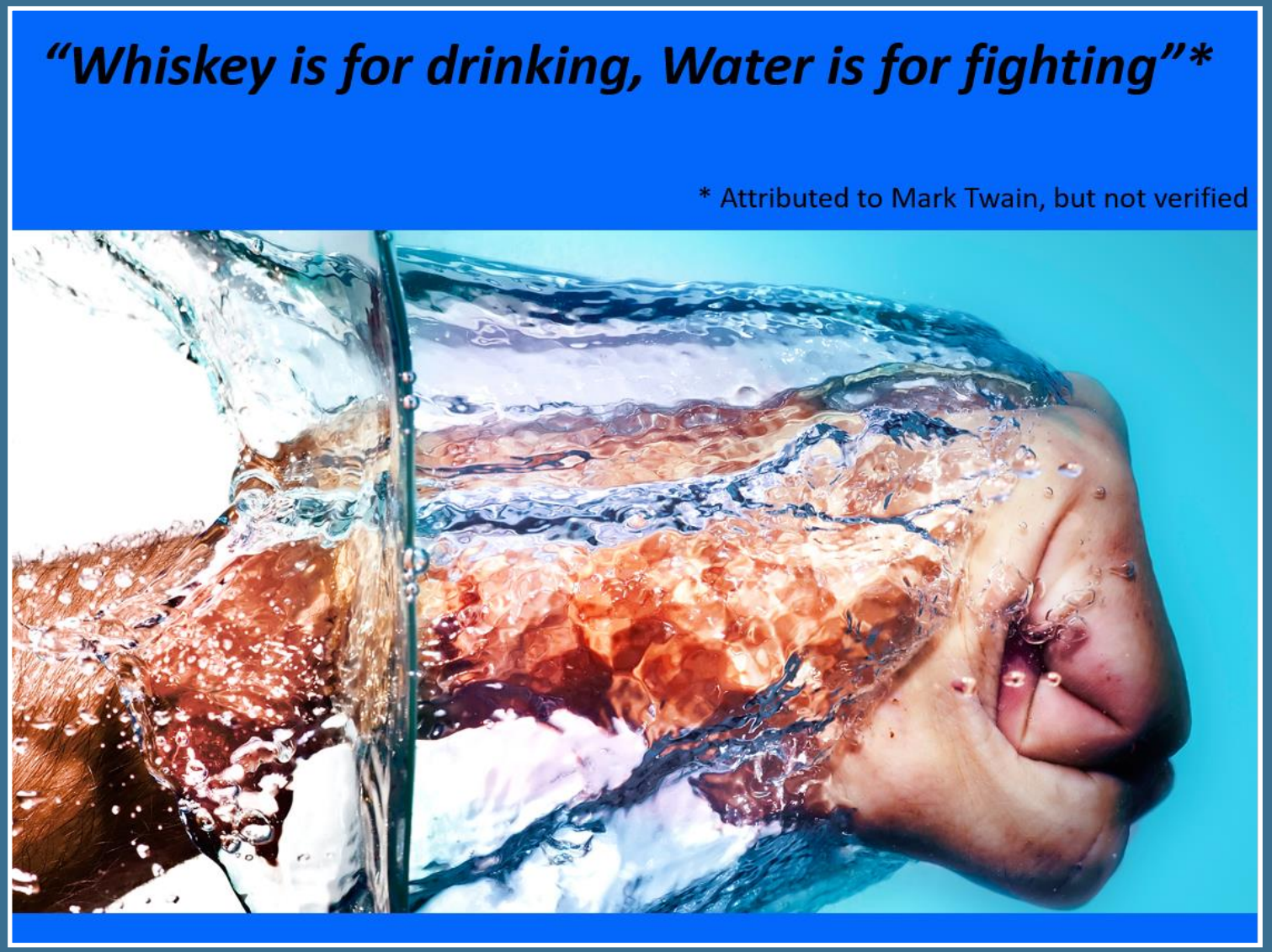
Texas Water and Coastal Resources Consultant to ICF

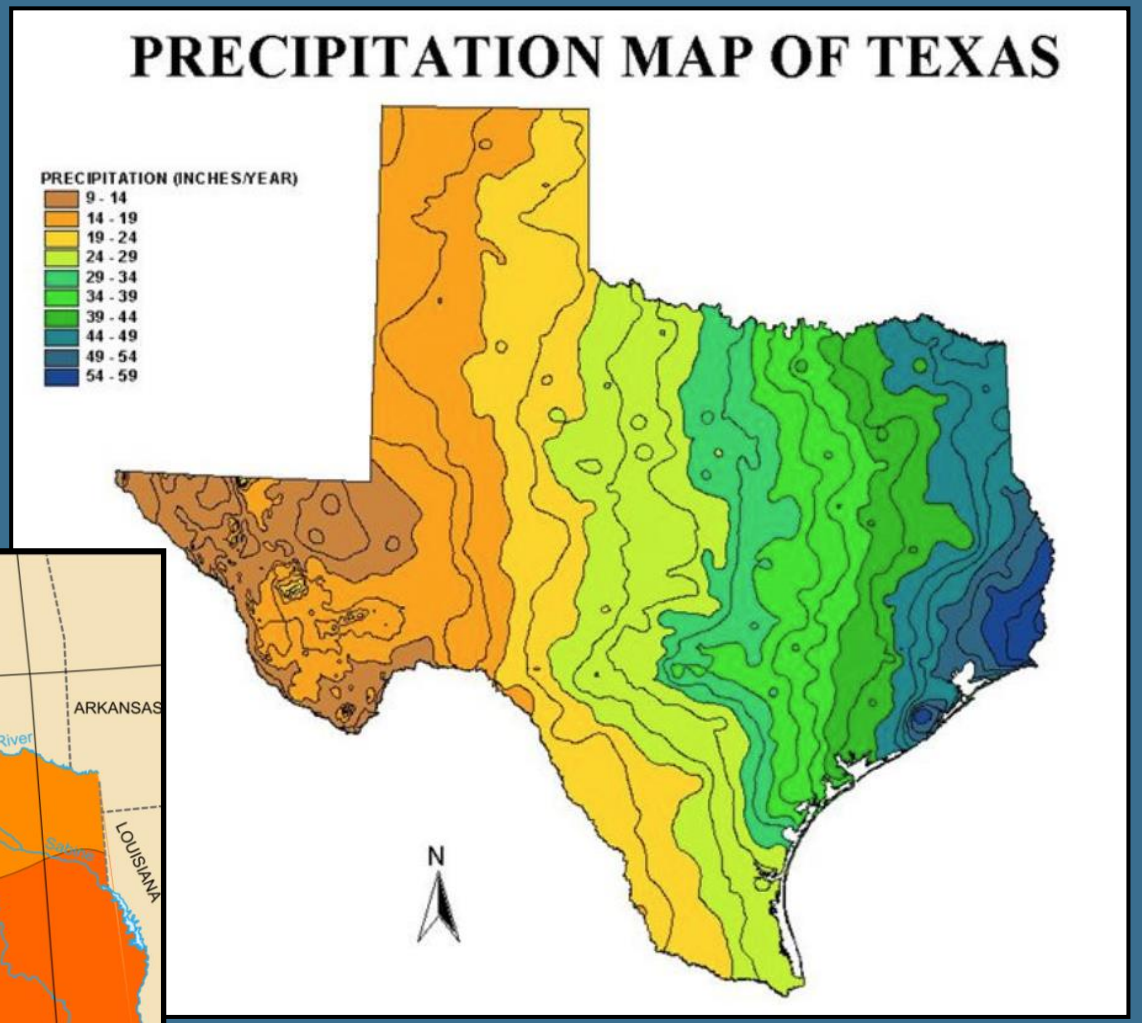
September 28, 2023

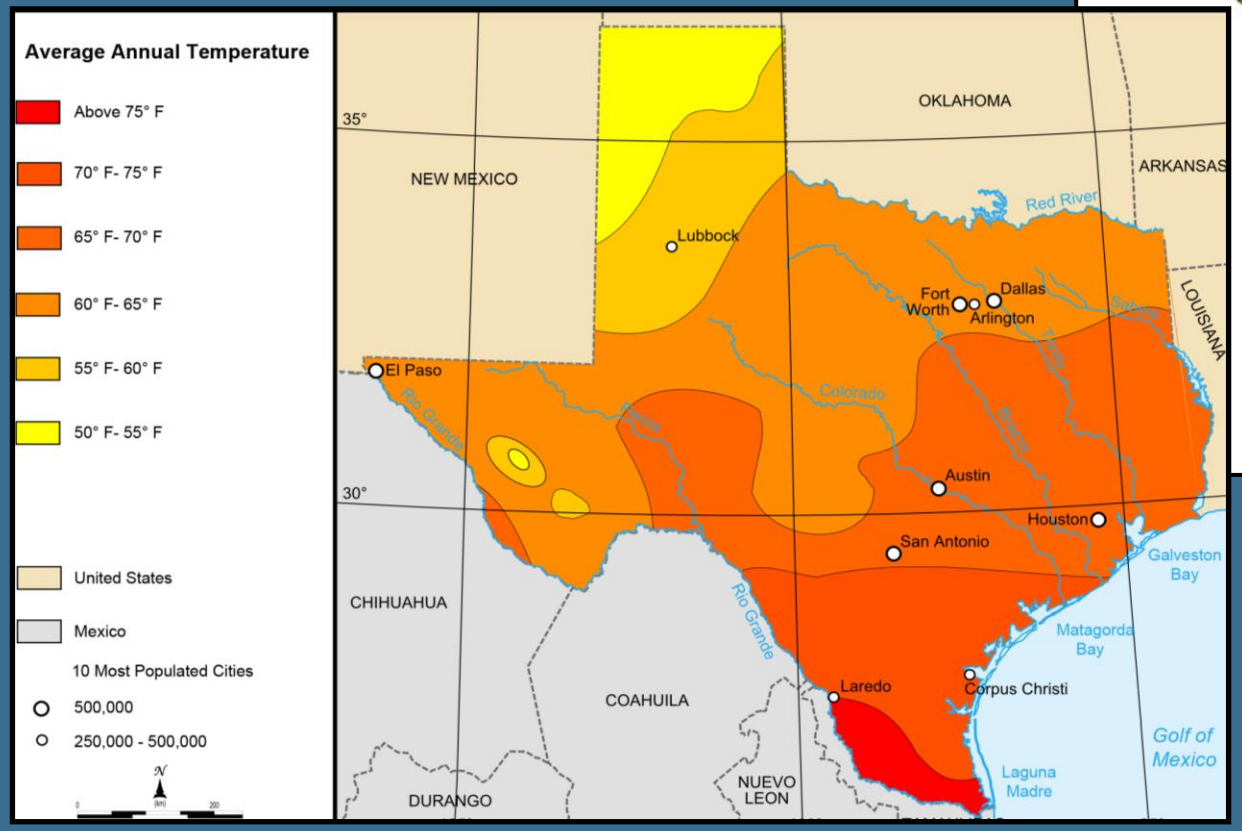


In Much of Texas, Water is a Precious Resource Which Must be Managed Carefully to Assure that there is Enough to Support both Human and Environmental Needs



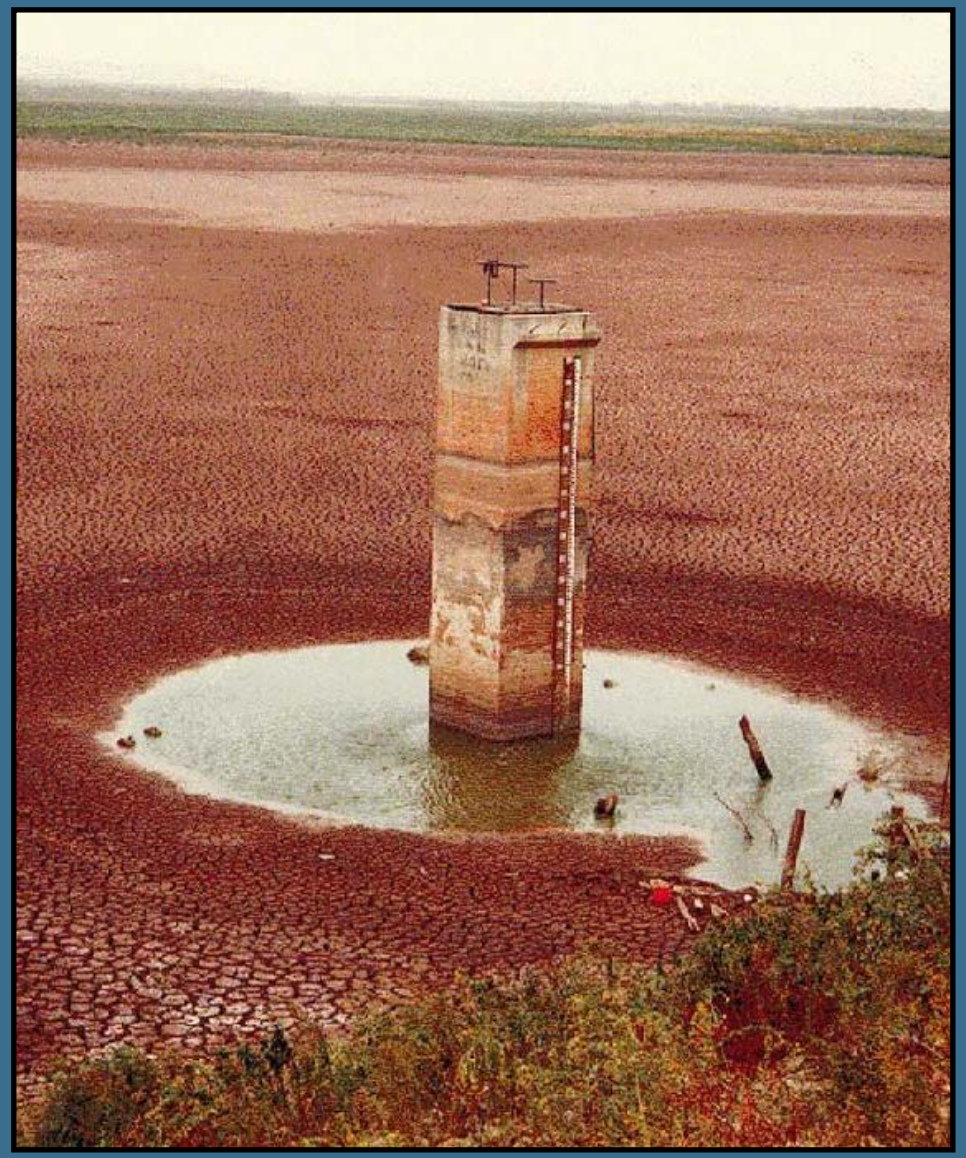
Rainfall and Temperature "Cross-Gradients" Shape Texas' Climate and Ecosystems





But . . . Extreme Events also Play a Major Role!

Droughts and Floods:
Bookends of the Precipitation Spectrum in Texas

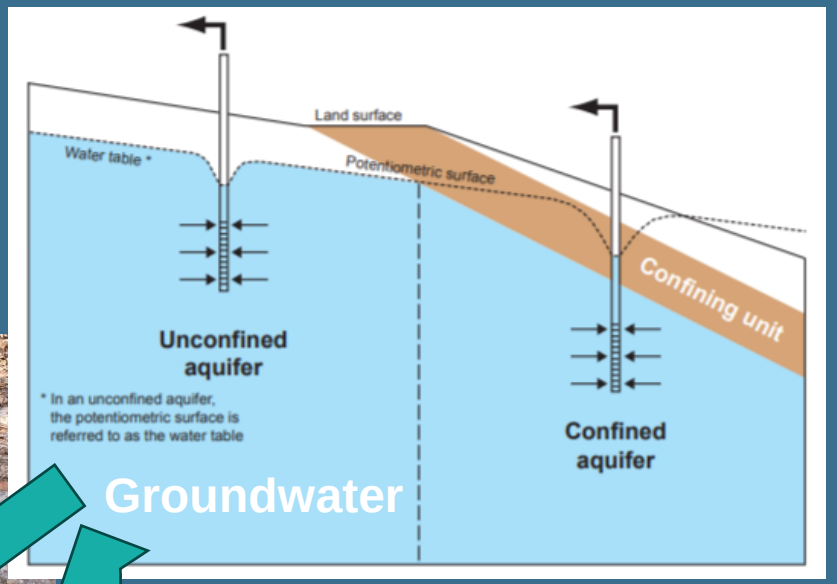


(AP Photo/David J. Phillip)

Texas Water Law: Two Legal Frameworks, *One Water*

This "bi-furcated" legal framework complicates the challenge of managing Texas' water resources for the benefit of the environment.

Surface water is *property* of the State of Texas which can be permitted for various private and public uses



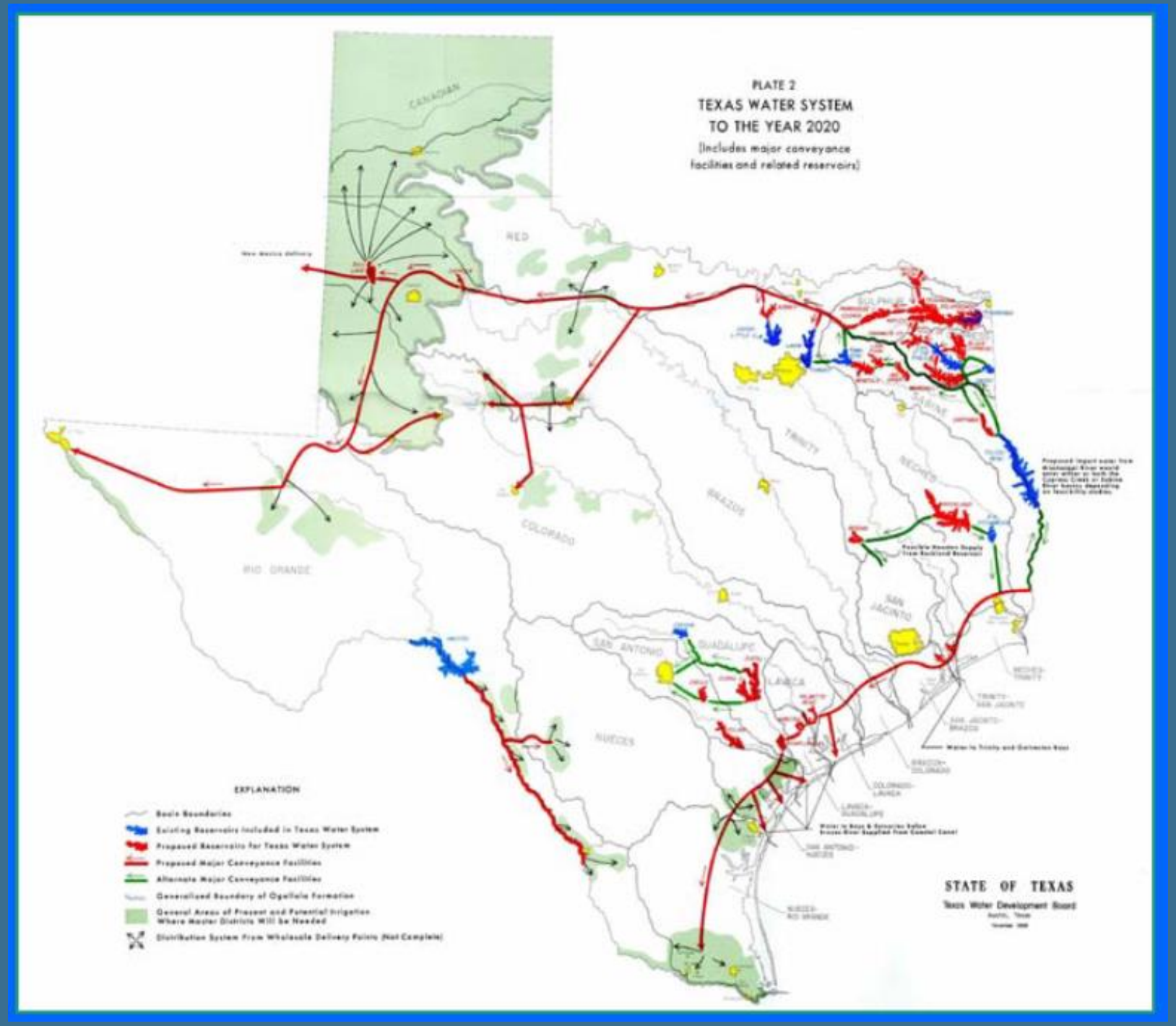
Groundwater is a private property right associated with the surface estate, but its use is now largely regulated by local groundwater conservation districts

A bit of information about Water Planning in Texas might help:

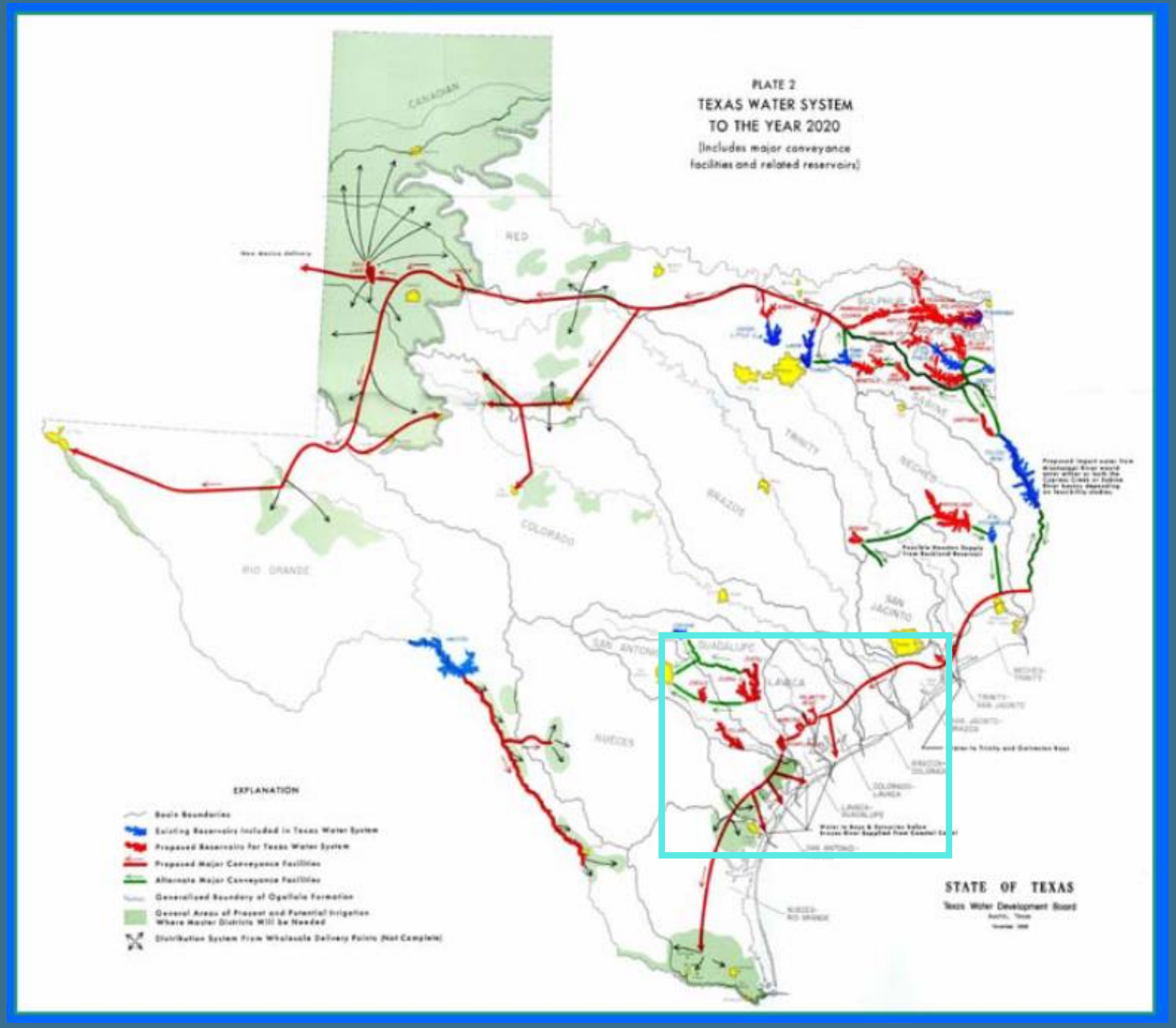
Like everything else in Texas . . .

WE DO IT REALLY, REALLY BIG!

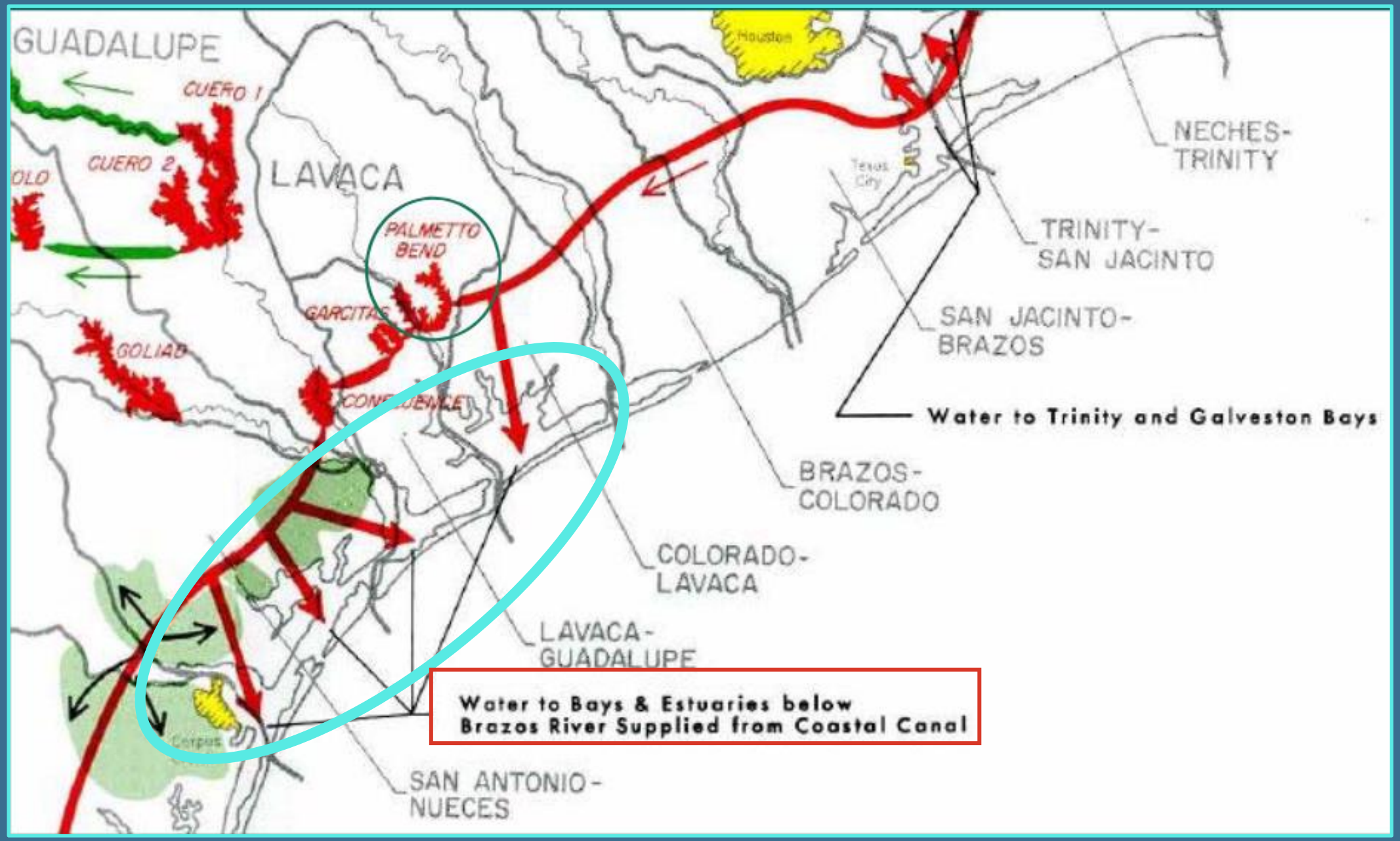
(i.e., The 1968 Texas Water Plan)



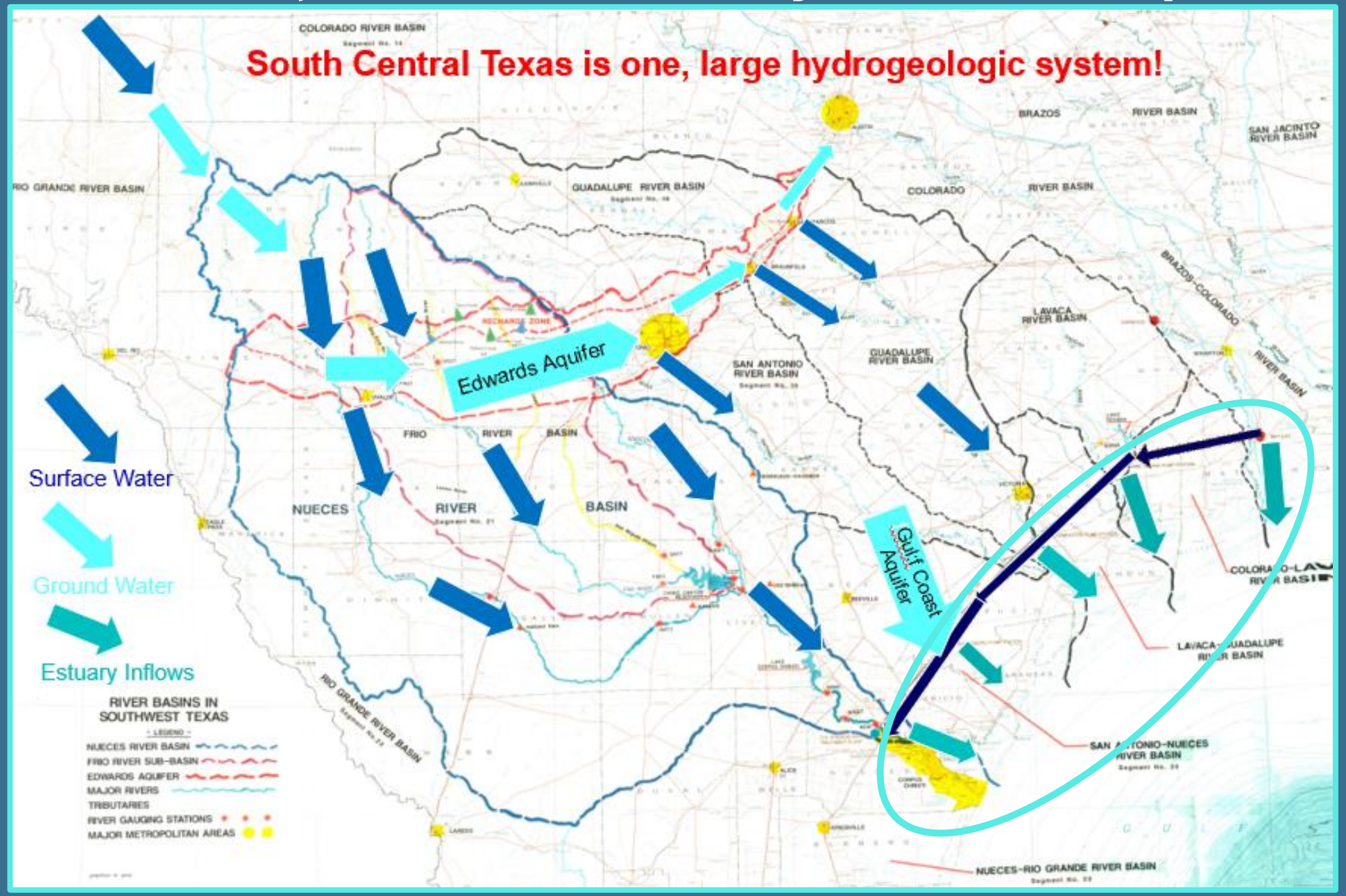
But we also try to pay attention to the *small stuff*, like providing water for Bay & Estuary Inflows to maintain coastal ecosystems



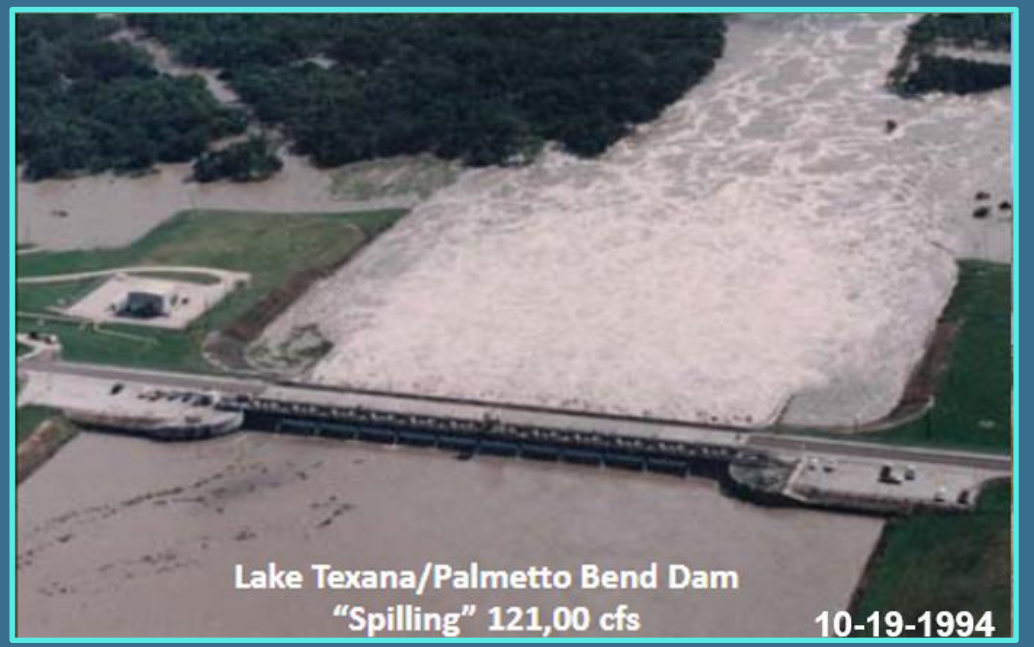
Planning for water for Bays and Estuaries, Texas Style



Sometimes, old ideas eventually take new shapes!



Two Very Different South Texas Watersheds
"Bookends" of the Mid-Texas Coast



Nueces/Frio River Watershed (16,950 mi^2) **Lake Texana Watershed (1,385 mi^2)**

W ← 110 Miles → E

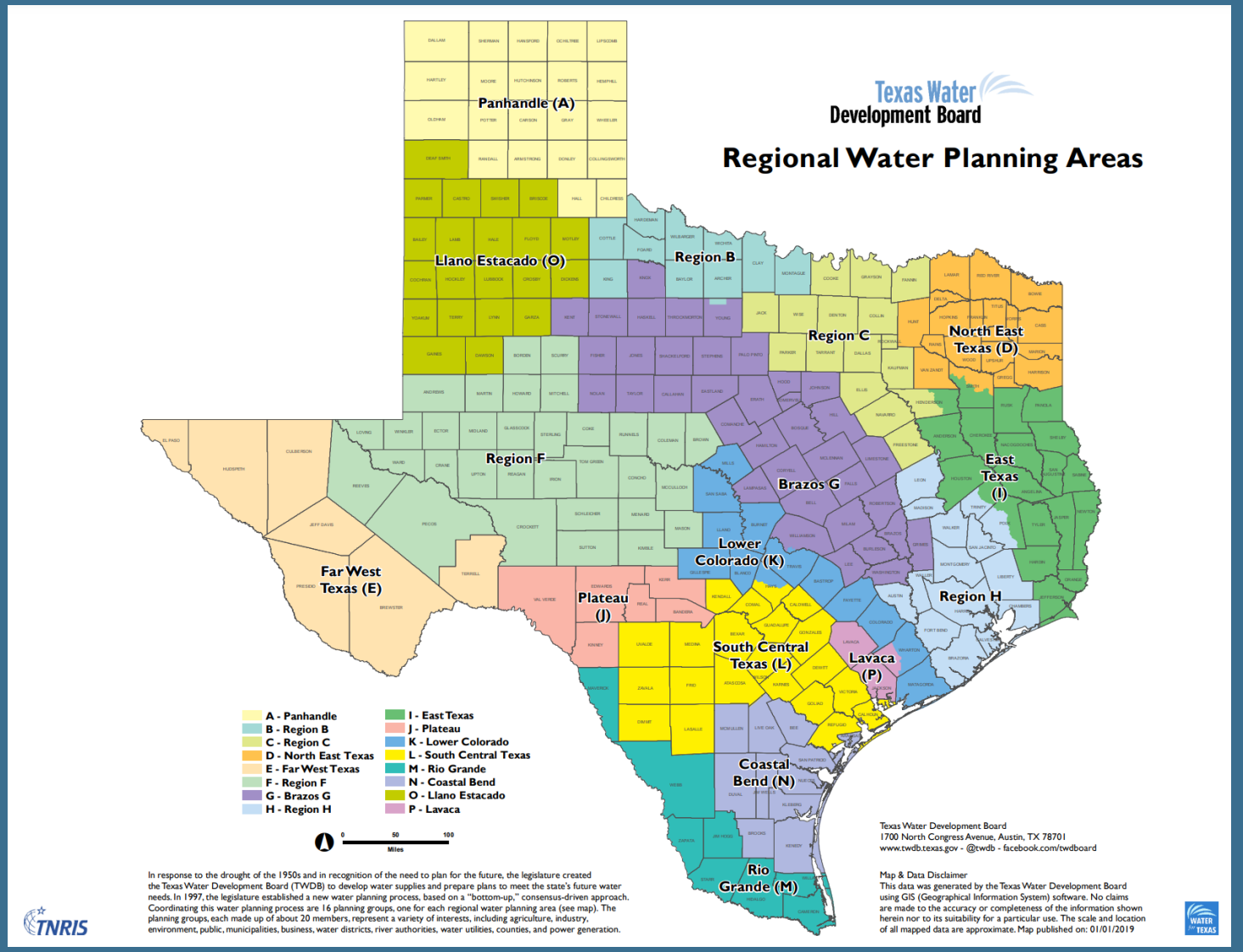
Each new generation tends to forget – until it confronts the sobering reality – that dryness has always been the normal condition in the western half of the state. Wet years have been the exceptions.

Elmer Kelton, in "The Time it Never Rained" (Doubleday, 1973; TCU Press, 1984)

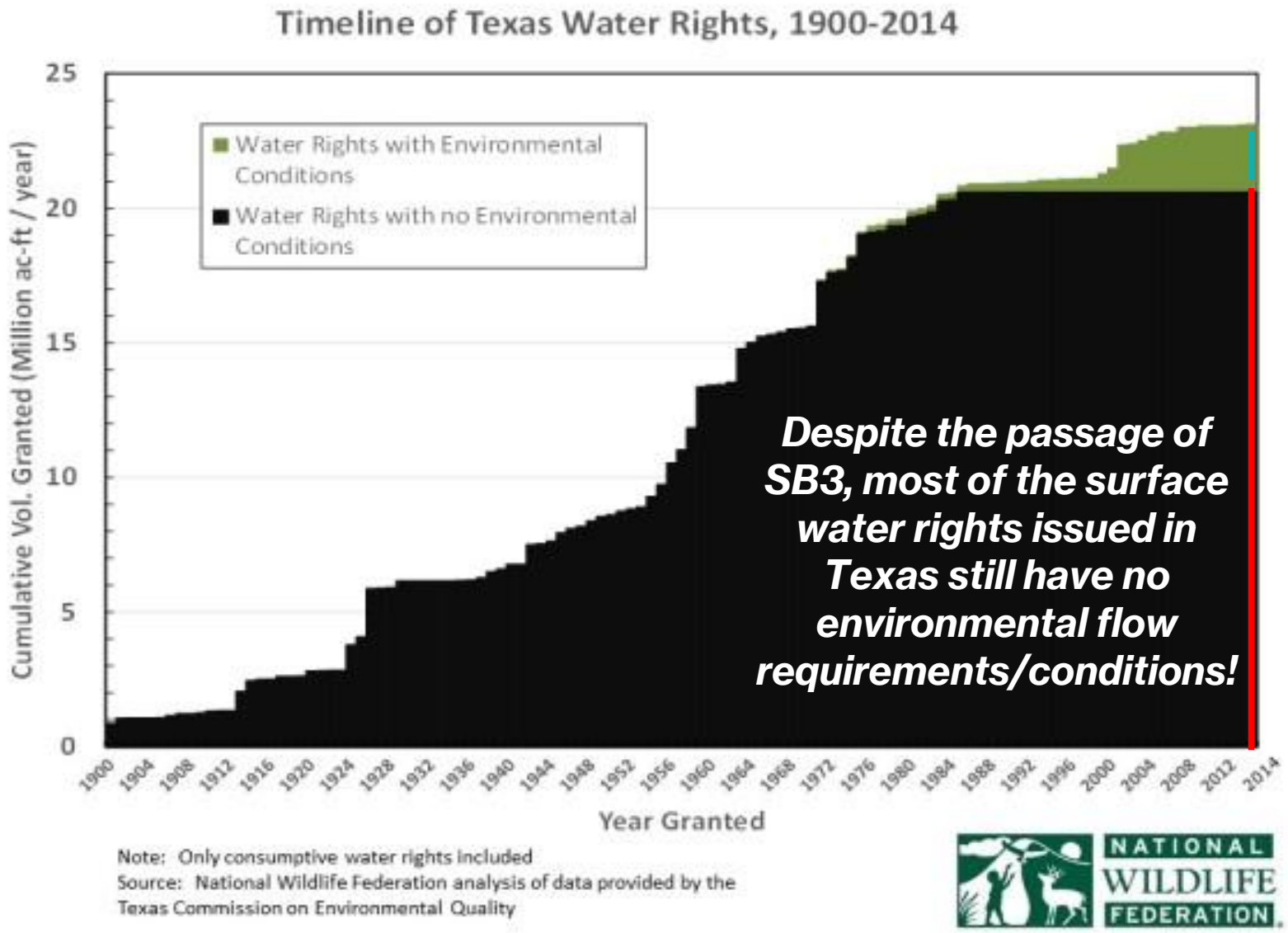
Texas Water Planning has come a long way since the 1968 Texas Water Plan. After years of centralized water planning, in 1997 Texas established a "bottoms up" state water planning process based on the development and adoption of regional water plans revisited every five years.

The purpose was to guide the development of water supply strategies which are pertinent within the surface water and groundwater conditions in the various regions of the State.

Unfortunately, the regional water plans do not evaluate or include strategies to provide water for environmental needs!



The “First in Time is First in Right” Method of Surface Water Rights Appropriations in Texas Makes it Difficult to Permit E-Flows



Under Texas water law, most older surface water rights have no conditions on their use to assure environmental flow protection.

Beginning in about 1976, a few new water rights included “voluntary” e-flow protection provisions.

But SB3 -- passed in 2007 -- required all new water rights to include e-flow protections. However, as fewer new water rights have been issued, about 90% of all current water rights still have no e-flow protection requirements

While Wintering along the Texas Mid-Coast Whooping Cranes Need Two Types of Water:

"*Drinking Water*"

Fresh enough for Their Physiological Needs

and

"*Water for the Environment*"

Freshwater Inflows to Bays/Estuaries to Assure that Texas' Mid-Coast Estuarine Ecosystems Can Provide Adequate Food Supplies for Whooping Cranes

Satisfying these two water demands means working at two very different scales:

*** Using Water Wells to Provide Whooping Cranes with Access to Drinking Water, and**

*** Acquiring Large Volumes of Freshwater to Deliver to Texas Mid-Coast Estuaries During Drought Periods in Order to Maintain Adequate Freshwater Inflows**

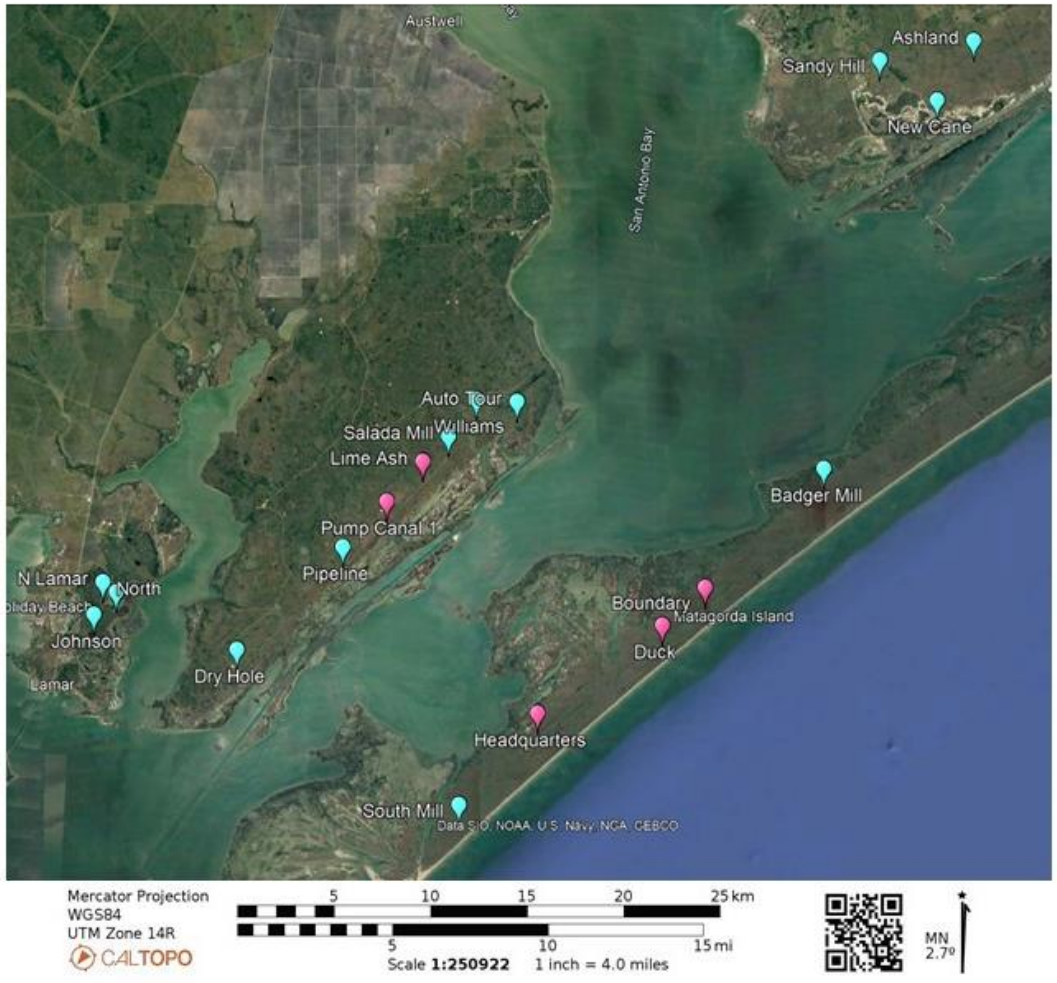
ICF-SABP Water for Wildlife Solar Water Wells Program

"Water, water everywhere!"
But, is There Water Fresh Enough for Whooping Cranes to Drink?
(There is if you put in a water well!)

Whooping Cranes and Sandhill Cranes Sharing a New Source of Freshwater Which Resulted from the Installation of a Solar "Water for Wildlife" Well on the Aransas National Wildlife Refuge Just Days Before the Photo was Taken

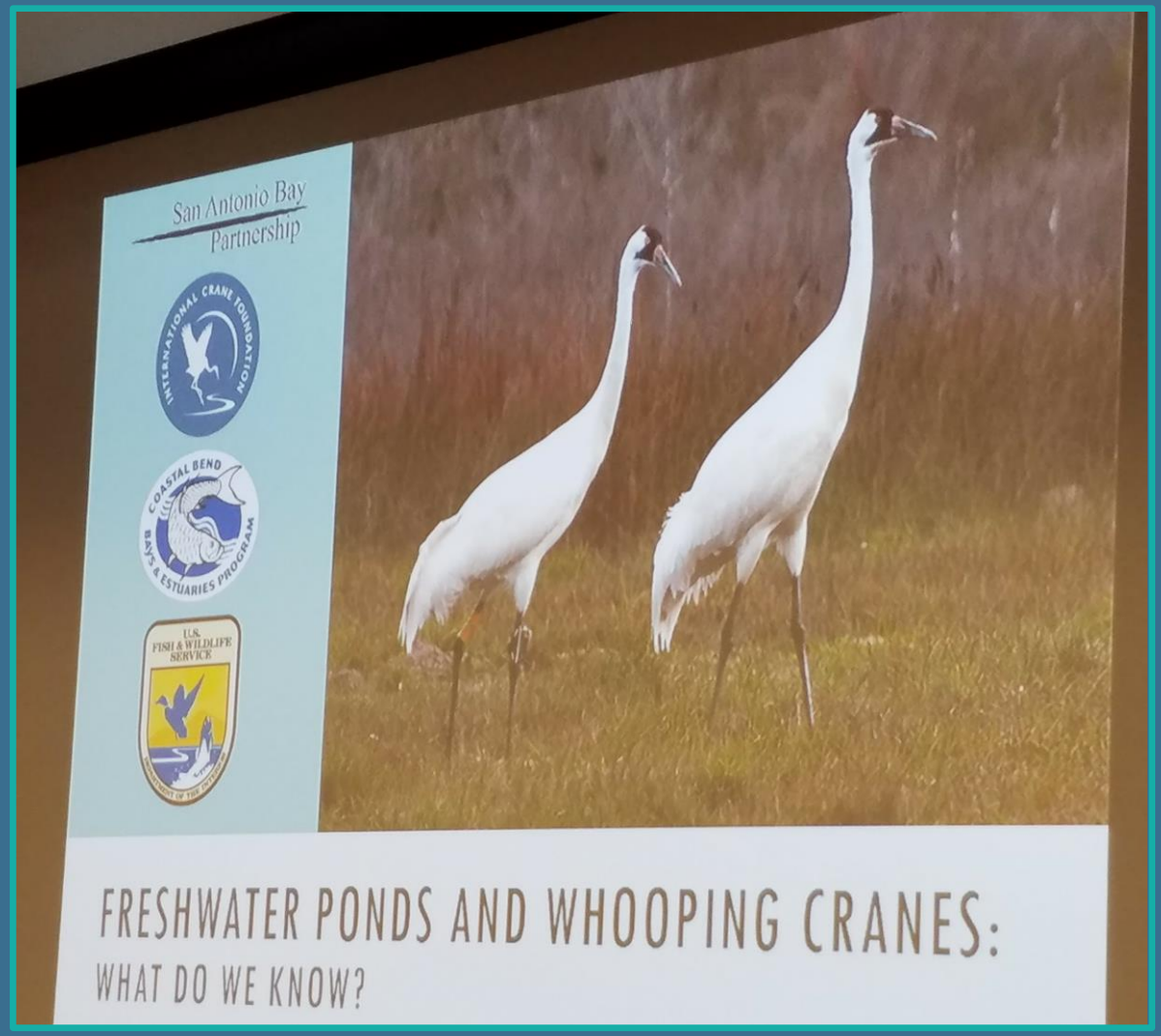
How Many “Water for Wildlife Wells” Are There, and Where?

- The Largest Number of Water for Wildlife Wells are on Aransas National Wildlife Refuge (ANWR) Property (12 out of 18)
- Many of These Are New Wells Drilled Within the Last Ten Years; Some Are Older Windmill Wells Which Have Been Converted to Solar Wells
- Six of the Eighteen Wells Are On Private Properties Which Have Conservation Easements in Place
- Many of These Wells Were Damaged by Hurricane Harvey in 2017, But Were Repaired Using National Fish and Wildlife Foundation Grant Funds



For Over 15 Years, ICF and Its Partners Have Been Using Game Cameras to Monitor How Whooping Cranes Use Freshwater Ponds – Both Natural and Created – As Sources of "Drinking Water" and Food

Studies Have Also Investigated How Managing Vegetation Around These Ponds Affects Whooping Crane Use



Partners in ICF's Water for Wildlife Program

San Antonio Bay Partnership

Coastal Bend Bays & Estuaries Program

Texas Water Trade

U.S. Fish & Wildlife Service — Department of the Interior

U.S. Department of the Interior — U.S. Fish and Wildlife Service — National Wildlife Refuge System

Texas Parks & Wildlife

San Antonio River Authority

GBRA — Guadalupe-Blanco River Authority

Using “Focused Flows” to Enhance Habitat for Whooping Cranes via a Partnership for Purchasing and Delivering Freshwater to Coastal Marshes

INTERNATIONAL CRANE FOUNDATION

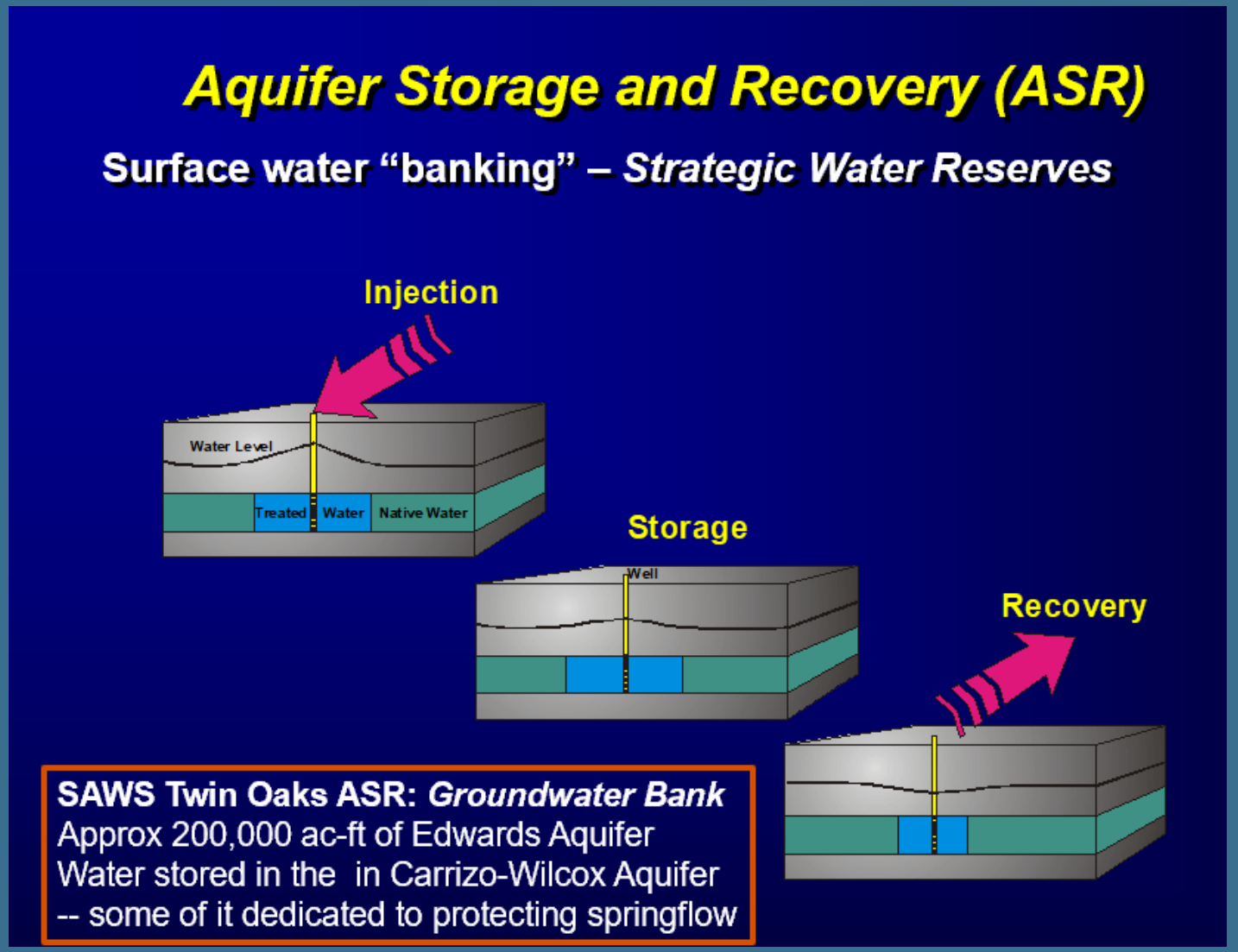
TEXAS WATER TRADE

TEXAS PARKS & WILDLIFE

GBRA
Guadalupe-Blanco River Authority

“Focused Flows” – A Partnership for Making Water Purchases and Targeted Deliveries to Enhance Habitat for Whooping Cranes

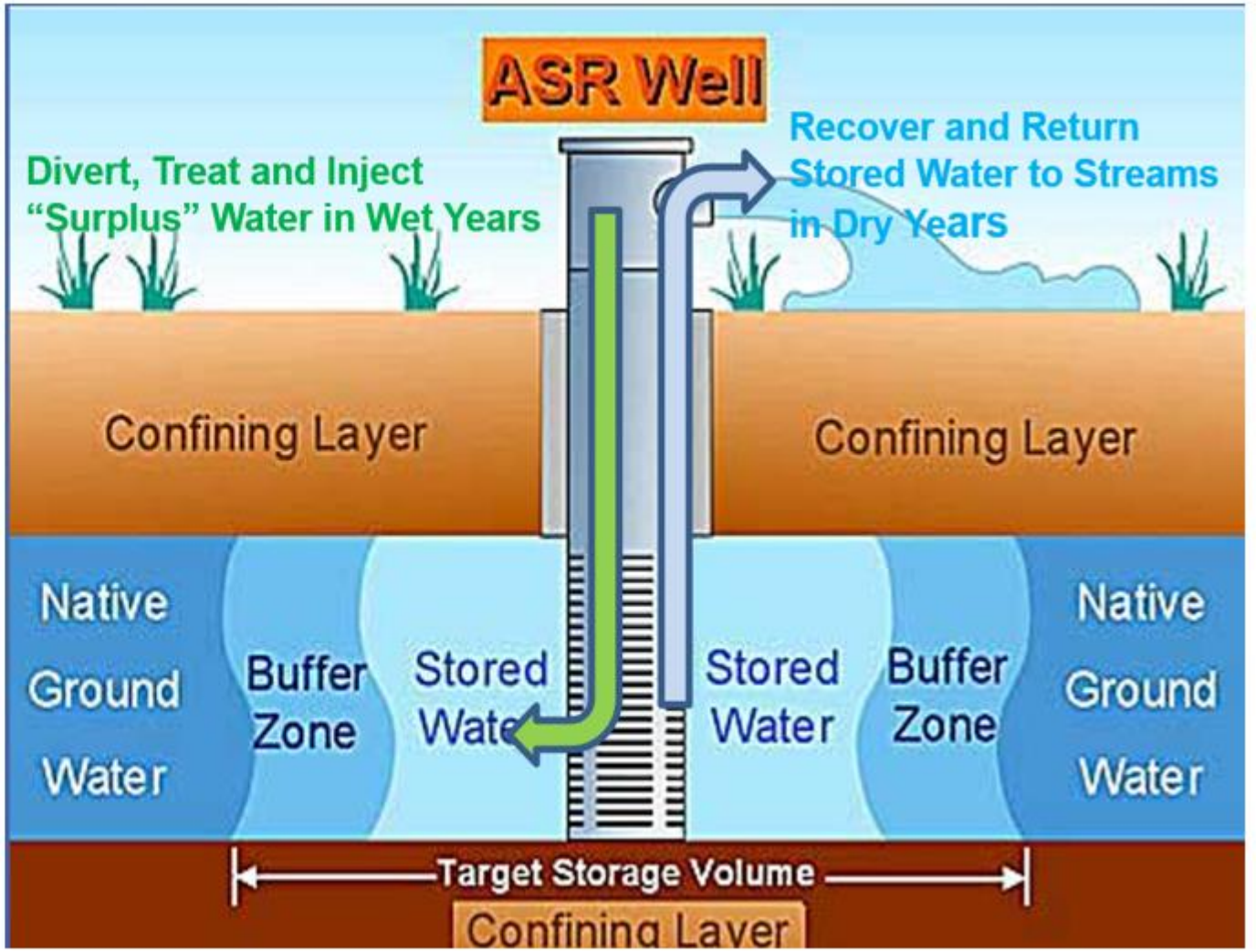
Investigating Innovative Approaches to Providing Freshwater Inflows to Texas Estuaries During Droughts



"Water Banking" for Environmental Flows

ASR Allows "Time-Shifting" of Water Availability

- **ASR** involves diverting, treating and injecting, via a well, "surplus" water available in wet years; storing that water in a suitable portion of an aquifer, and then recovering some or all of that stored water and using it to meet a water supply goal – in this case, satisfying STF goals for FWIs to SAB-GES.
- On average, 95% of the water injected into ASR storage can later be recovered and put to beneficial use – a much higher storage efficiency than surface water reservoirs
- ASR requires treating surface water prior to injecting it into aquifer storage in order to protect the native groundwater from any potential contamination. This is typically done by conventional surface water treatment plants.



Using ASR Facilities to Bank Water for Bay & Estuary Inflows to the San Antonio Bay/Guadalupe Estuary System was Investigated in the SB3 Environmental Flows Program

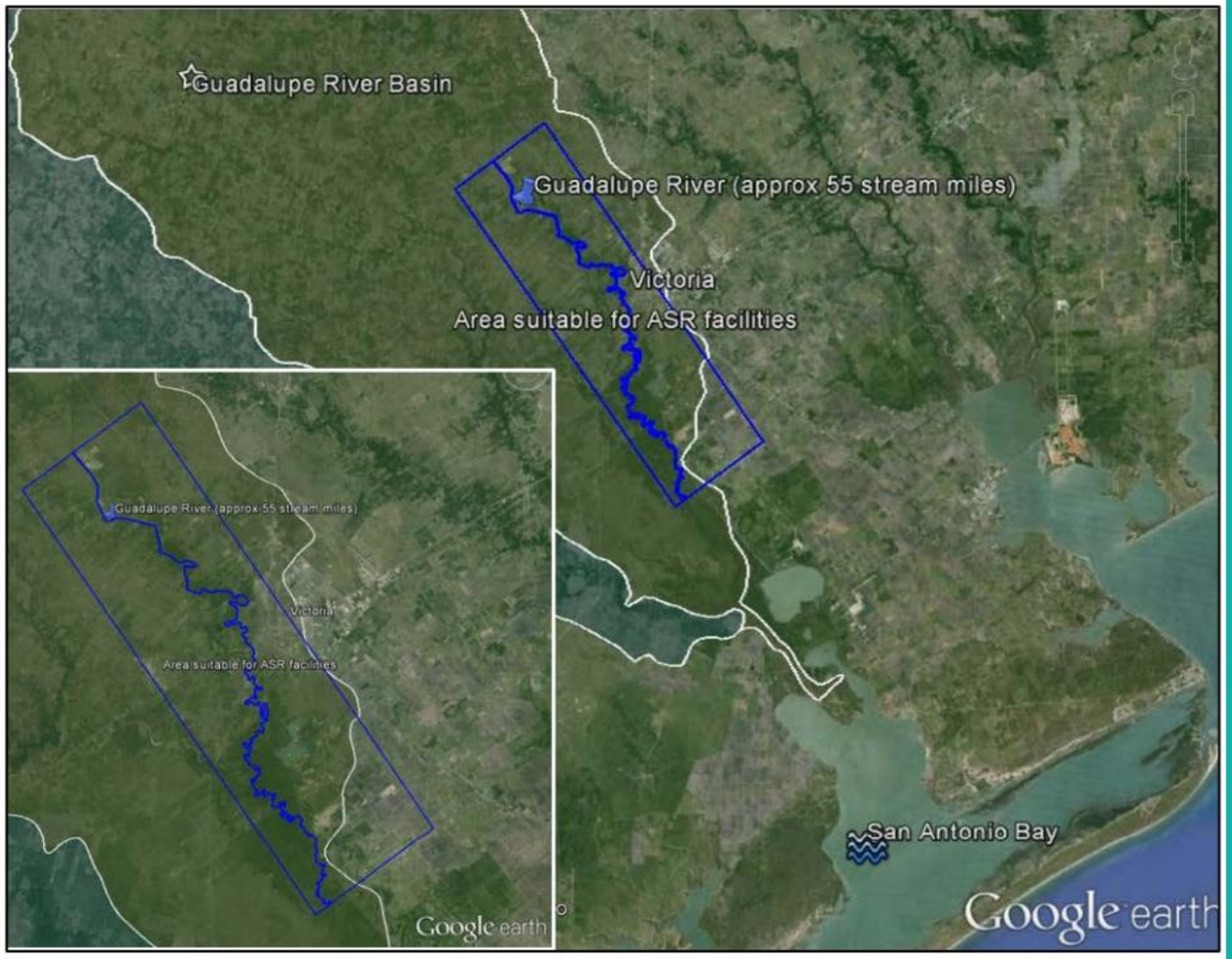


Figure 4-7 General Location of Proposed Wellfields near Victoria, Texas

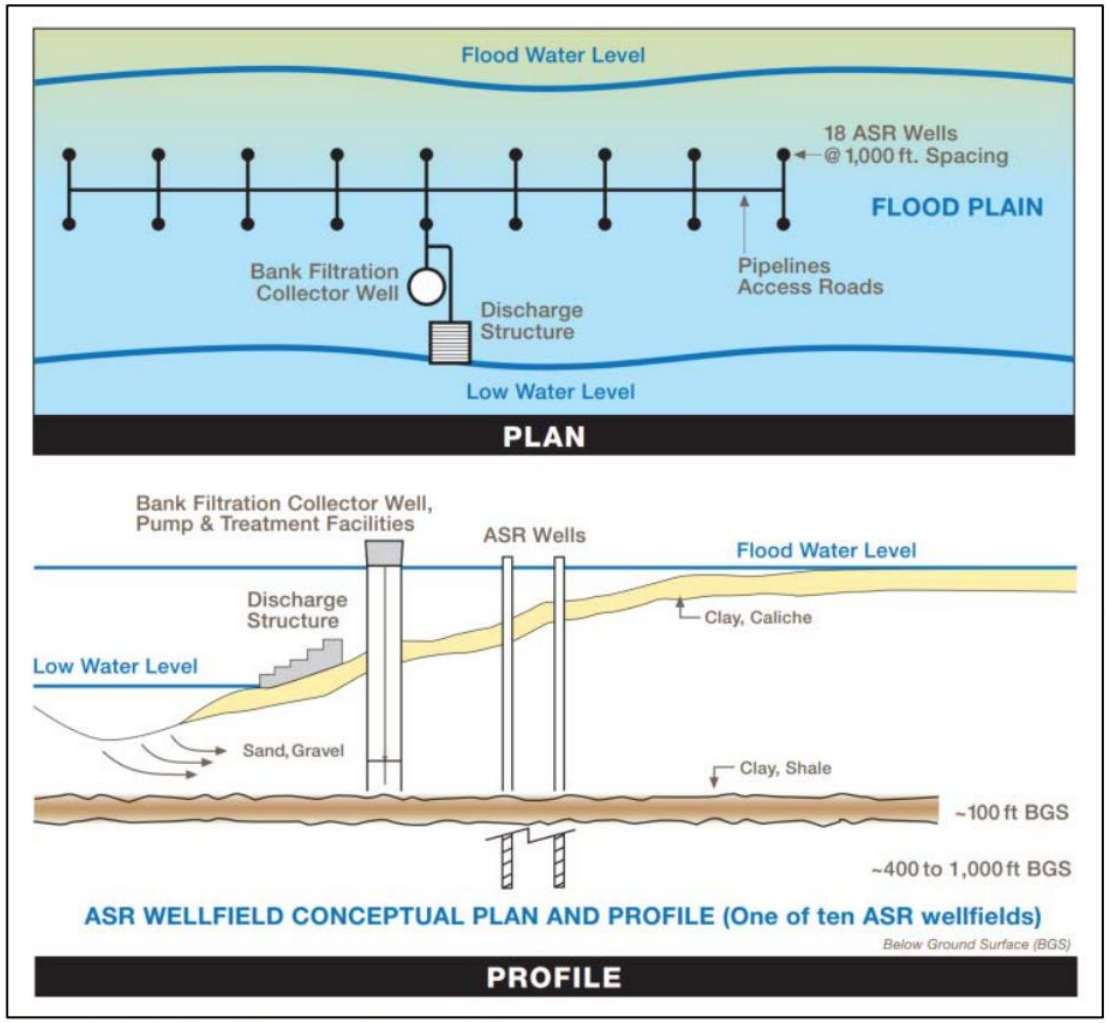


Figure 4-8 ASR Wellfield Conceptual Plan and Profile

My Thanks to:

- Liz Smith, for her years of service to ICF and the Texas Program
- The Gulf Coast Program staff for all their hard work
- All the folks at ICF, and its partners, who have worked hard to protect Whooping Crane habitat along the Texas Coast and, particularly, the landowners and agencies who have made sure there is ample and available “Water for Wildlife”

Questions?

Photo taken of a part of: Going Away, Coming Home – by Hung Liu Oakland International Airport

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