# The Guadalupe-Blanco River Authority's Water Planning Perspective

2006 Conference on the
EDWARDS AQUIFER
Held at
The Witte Museum

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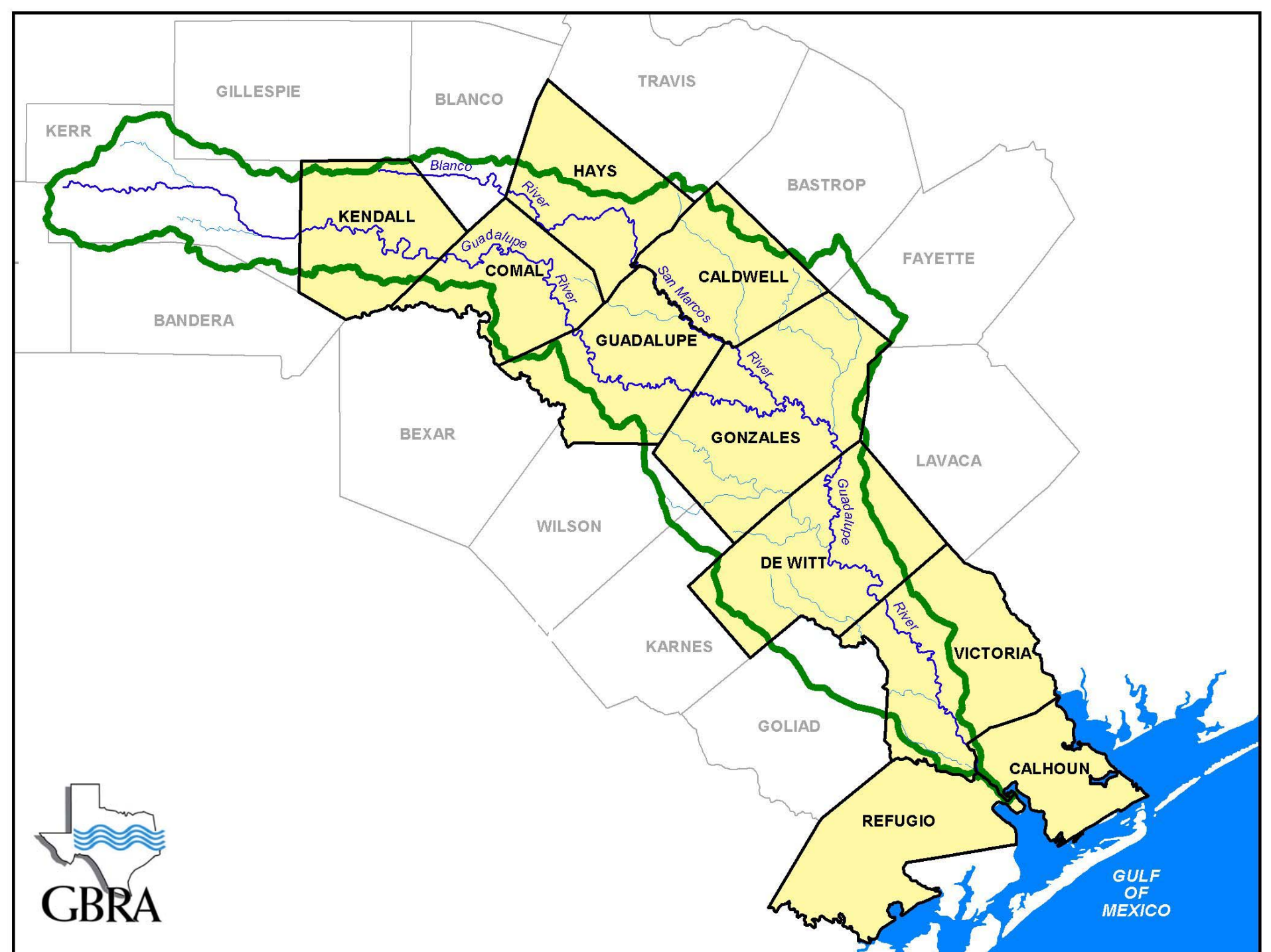
GILLESPIE
BLANCO
TRAVIS
KERR
HAYS
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Blanco River
Guadalupe River
COMAL
FAYETTE
CALDWELL
San Marcos River
BANDERA
GUADALUPE
BEXAR
GONZALES
LAVACA
WILSON
DE WITT
Guadalupe River
KARNES
VICTORIA
GOLIAD
CALHOUN
REFUGIO
GULF OF MEXICO
GBRA

# Guadalupe-Blanco River Authority

- GBRA is a conservation & reclamation district.
- It was created in 1933 under Section 59, Article 16 of the Constitution of Texas.
- GBRA was established to develop, conserve & protect the water resources of the Guadalupe River basin & make them available for beneficial use.
- GBRA is governed by a board of nine directors, appointed by the Governor.
- GBRA cannot levy or collect taxes.
- GBRA revenues are derived from the sale of products & services.


GBRA
River authorities manage competing interests for water.

# Texas Water Law

## Edwards Aquifer-Associated Rivers

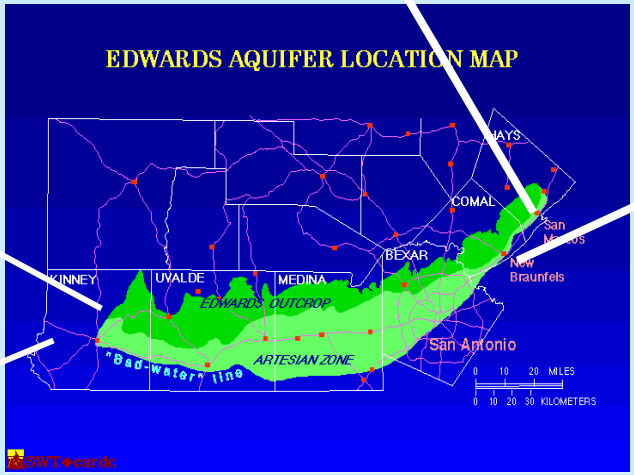
- Begins as State surface water – recharge along streambeds
- Becomes private groundwater pumped by wells
- Becomes State surface water again – at springs
- Edwards Aquifer water goes from State water to regulated by TCEQ to groundwater regulated by the EAA to State water as it travels
- Texas groundwater law, the Rule of Capture - pumping can dry up springs – no remedy

# All of the Largest Springs in Texas Originate from the Edwards Aquifer…

**San Felipe**
***Del Rio***

**San Marcos**
***San Marcos***

**Comal**
***New Braunfels***



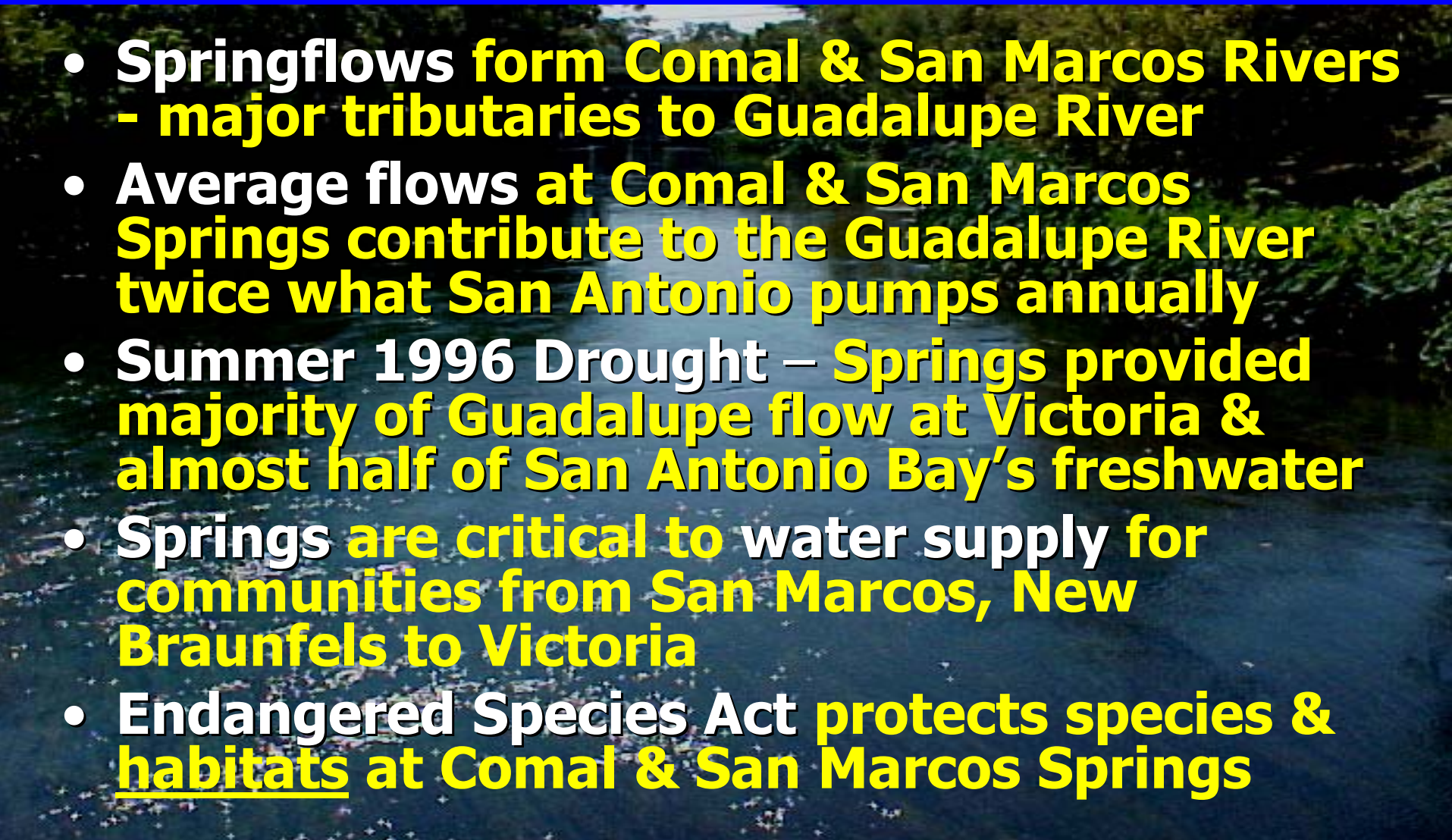

**Las Moras Springs**
***Brackettville***



**Most Have Endangered Species**

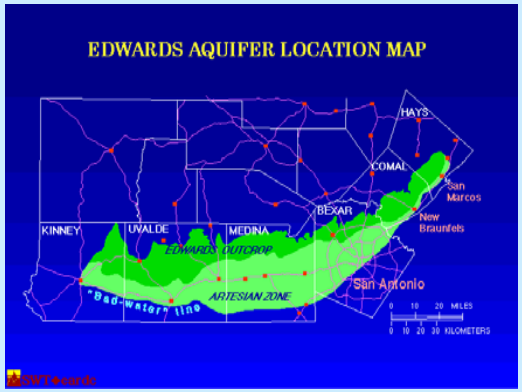

Comal Springs –
New Braunfels, Texas
•Most prolific spring system West of the Mississippi River
•Average discharge is 300 cfs
•Home of the endangered fountain darter and other listed species
Photograph (C) 1995 by Gregg A. Edkha

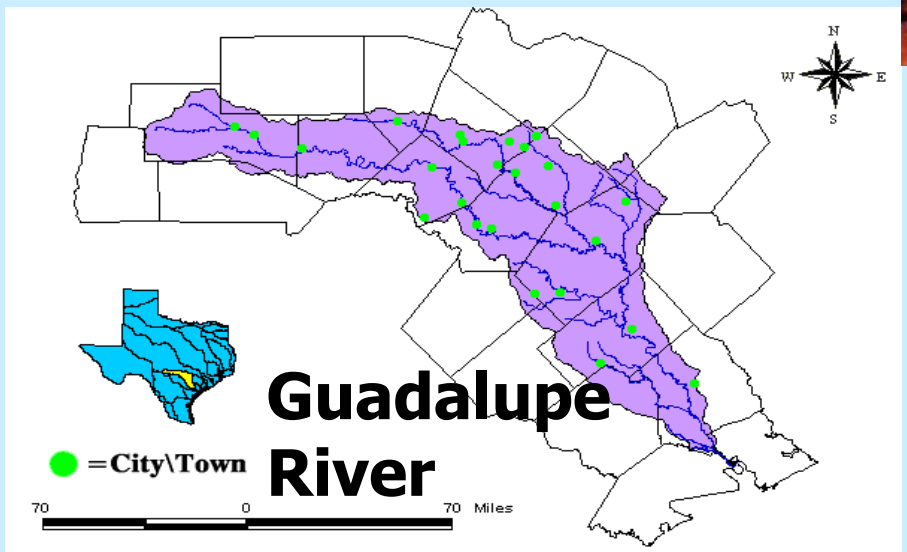
# Why are the Springs Important to the Guadalupe Basin?



- Springflows form Comal & San Marcos Rivers - major tributaries to Guadalupe River
- Average flows at Comal & San Marcos Springs contribute to the Guadalupe River twice what San Antonio pumps annually
- Summer 1996 Drought – Springs provided majority of Guadalupe flow at Victoria & almost half of San Antonio Bay's freshwater
- Springs are critical to water supply for communities from San Marcos, New Braunfels to Victoria
- Endangered Species Act protects species & habitats at Comal & San Marcos Springs

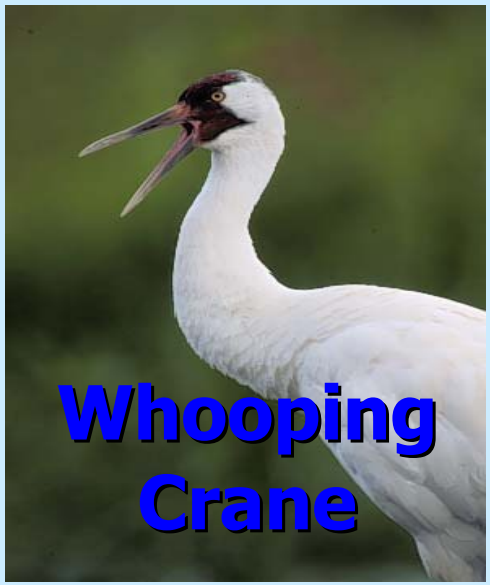
# The Guadalupe River is the Primary Source of Freshwater Inflows to San Antonio Bay…

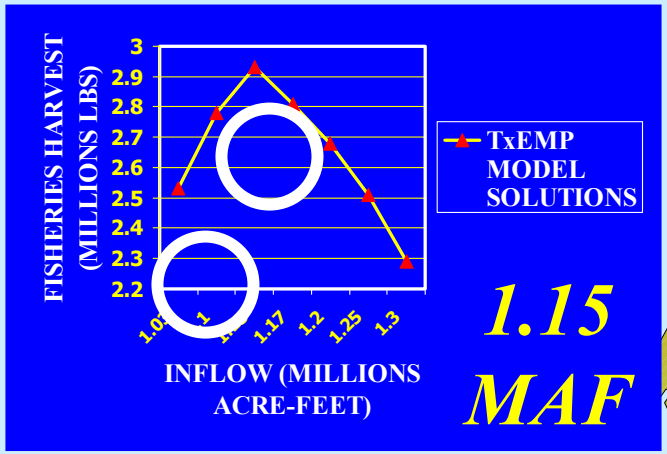


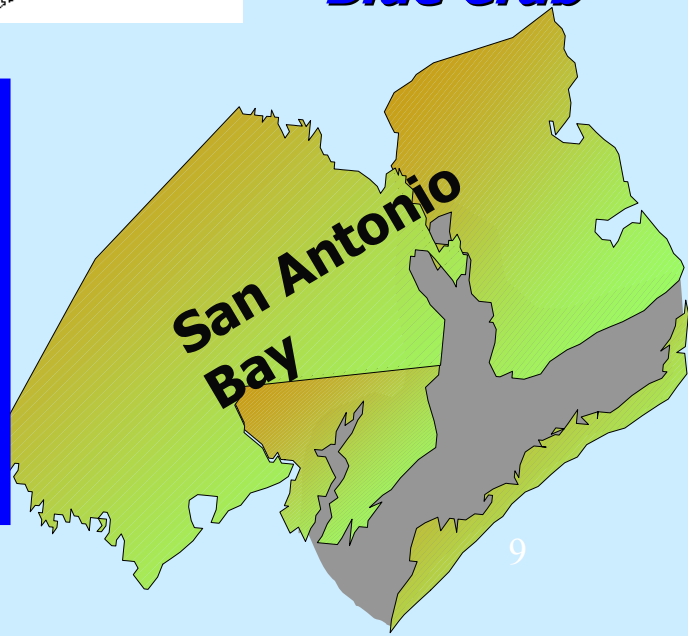




**Brown Shrimp**

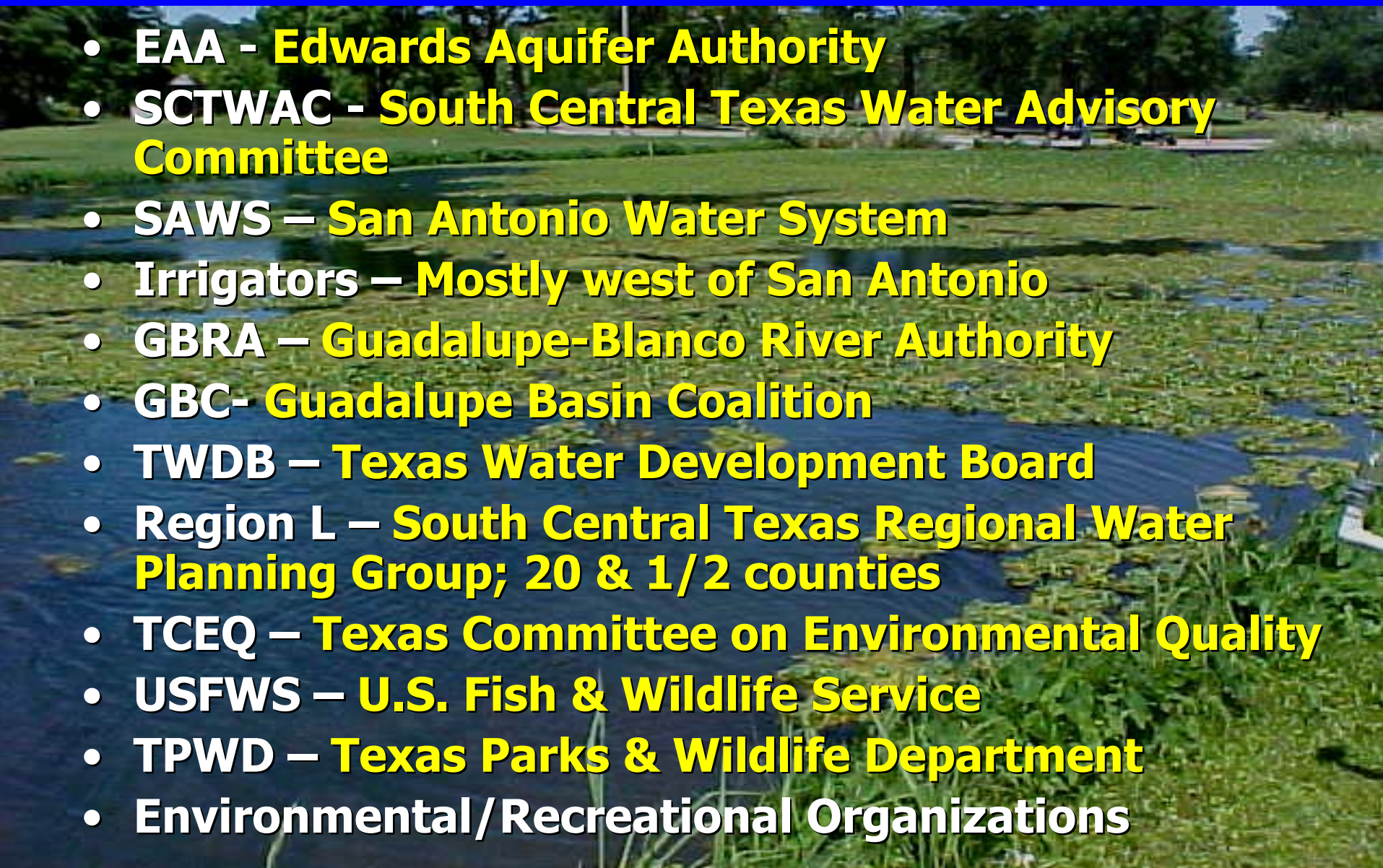
**Blue Crab**



# Edwards Aquifer: Who is Involved?

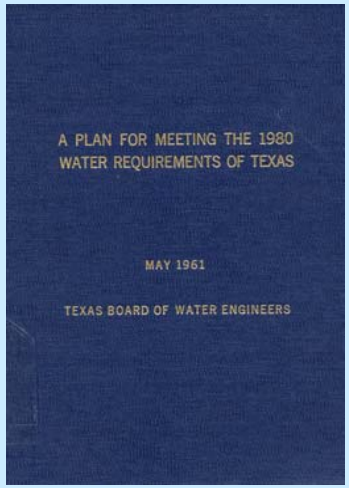


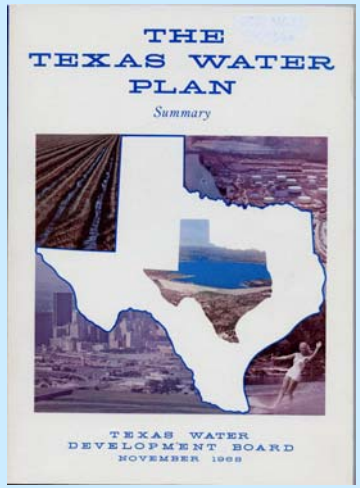
- EAA - Edwards Aquifer Authority
- SCTWAC - South Central Texas Water Advisory Committee
- SAWS – San Antonio Water System
- Irrigators – Mostly west of San Antonio
- GBRA – Guadalupe-Blanco River Authority
- GBC- Guadalupe Basin Coalition
- TWDB – Texas Water Development Board
- Region L – South Central Texas Regional Water Planning Group; 20 & 1/2 counties
- TCEQ – Texas Committee on Environmental Quality
- USFWS – U.S. Fish & Wildlife Service
- TPWD – Texas Parks & Wildlife Department
- Environmental/Recreational Organizations

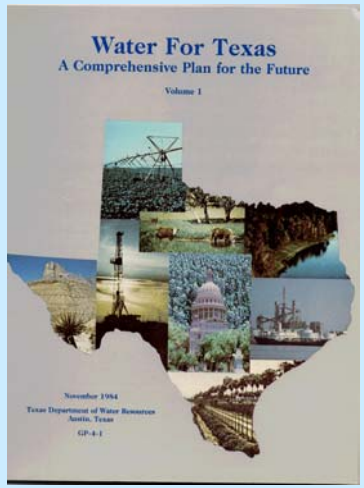
# Edwards Aquifer Characteristics

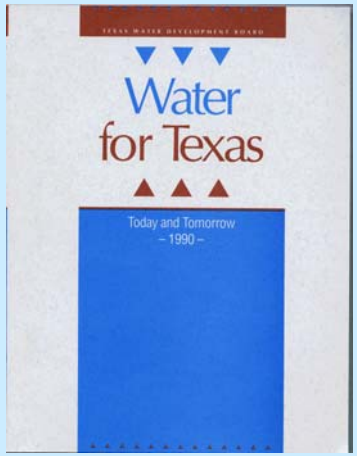
| | |
|---|---|
| Record Edwards Aquifer Pumping - 1989 | 542,500 acft/yr |
| Average Edwards Irrigation: 1993-2003 | 121,500 acft/yr |
| Average Edwards M/I Use: 1993-2003 | 288,000 acft/yr |
| Average Comal/San Marcos Spring Discharge - 1993-2003 | 436,600 acft/yr |
| Record High Edwards Recharge - 1992 | 2.49 M acft |
| Edwards Recharge - 2004 | 2.2 M acft |
| Record Low Recharge - 1956 | 43,700 acft |

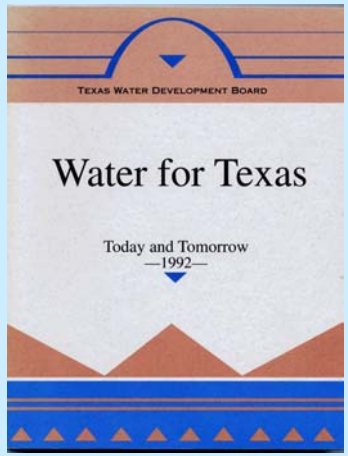
# State Water Planning

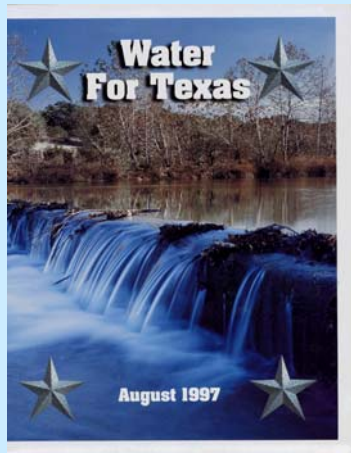



**1961, 1968, 1984, 1990, 1992, 1997**

# The Evolution of Pumping Limits

| YEAR | EVENT |
|---|---|
| 1956 | Drought of Record:<br>Comal Springs Ceases to Flow |
| 1961 | State Water Plan Recommends Unspecified Limit on Edwards Aquifer |
| 1967 | First Edwards Aquifer Species Added to List of Endangered Species |
| 1968 | Texas Water Plan Recommends 400,000 acft/yr Limit on Edwards Aquifer Pumping |
| 1973 | Endangered Species Act Becomes Law |

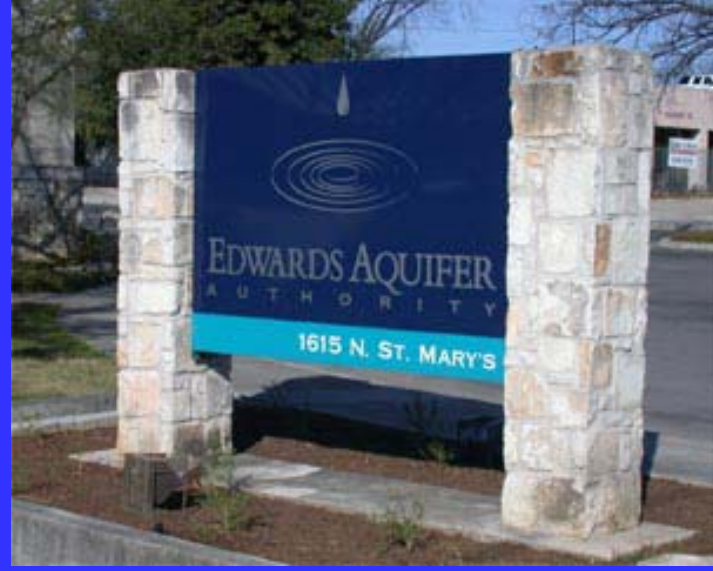
# The Evolution of Pumping Limitations

| YEAR | EVENT |
|---|---|
| 1984<br>1990<br>1992 | Water for Texas Recommends 425,000 acft Limit on Edwards Aquifer Pumping |
| 1992 | USFWS Recommends 450,000 acft Limit Followed by 400,000 acft Limit |
| 1993 | Judge Bunton Rules in Favor of Aquifer Regulation in Sierra Club v. Babbitt ESA Litigation |
| 1993 | Through Senate Bill 1477, Texas Legislature Mandates a 450,000 acft Limit Followed by 400,000 acft in 2008 |

# Edwards Aquifer Litigation

- In 1992, TCEQ declared the Edwards Aquifer an underground stream to regulate it like surface water – a State Court overturned the ruling
- In 1993, Sierra Club v. Babbitt Endangered Species Act lawsuit was decided;
  - USFWS ordered to set springflow minimums to protect the Comal & San Marcos Springs species
  - Federal Court gives State an ultimatum: regulate aquifer or the Court will regulate it

**In 1993 the Texas Legislature replaces the Edwards Under-Ground Water District with the *Edwards Aquifer Authority***




**The Act requires EAA to:**

- **Issue permits & regulate pumping**
- **Permits based on historical use**
- **Permit cap @ 450,000 acft/yr**
- **2008 cap is 400,000 acft/yr**
- ***Requires continuous minimum springflows to preserve endangered species habitats by 2012***
- **Adopt pumping drought rules**

***The "Catfish Farm" World's Largest Artesian Well***

# Edwards Aquifer Issues

- **450,000 acft/yr until 2007; 400,000 acft/yr in 2008 – yet permits currently total 549,000 acft/yr, some 99,000 acft/yr over the limit**
- **Caps on Annual Aquifer Pumping**
  - **Issue: What to do about excess permit rights above 450,000 acft/yr?**
  - **State legislation in 2005 to increase cap to "sum of all permits" did not pass**
- **EAA solution is to make the portion of permits above cap "Junior" rights – can be accrued when aquifer is above certain levels**

# Edwards Aquifer Issues

- **Bifurcated ("Junior-Senior") Permit Rules**
  - **Under the proposed rules the portion of permits above cap - "junior" rights – can be used when aquifer below 665 at J-17; junior rights sold apart from senior rights**
- **SCTWAC contested "junior" rights at TCEQ**
- **TCEQ concluded that Junior rights harm downstream interests**

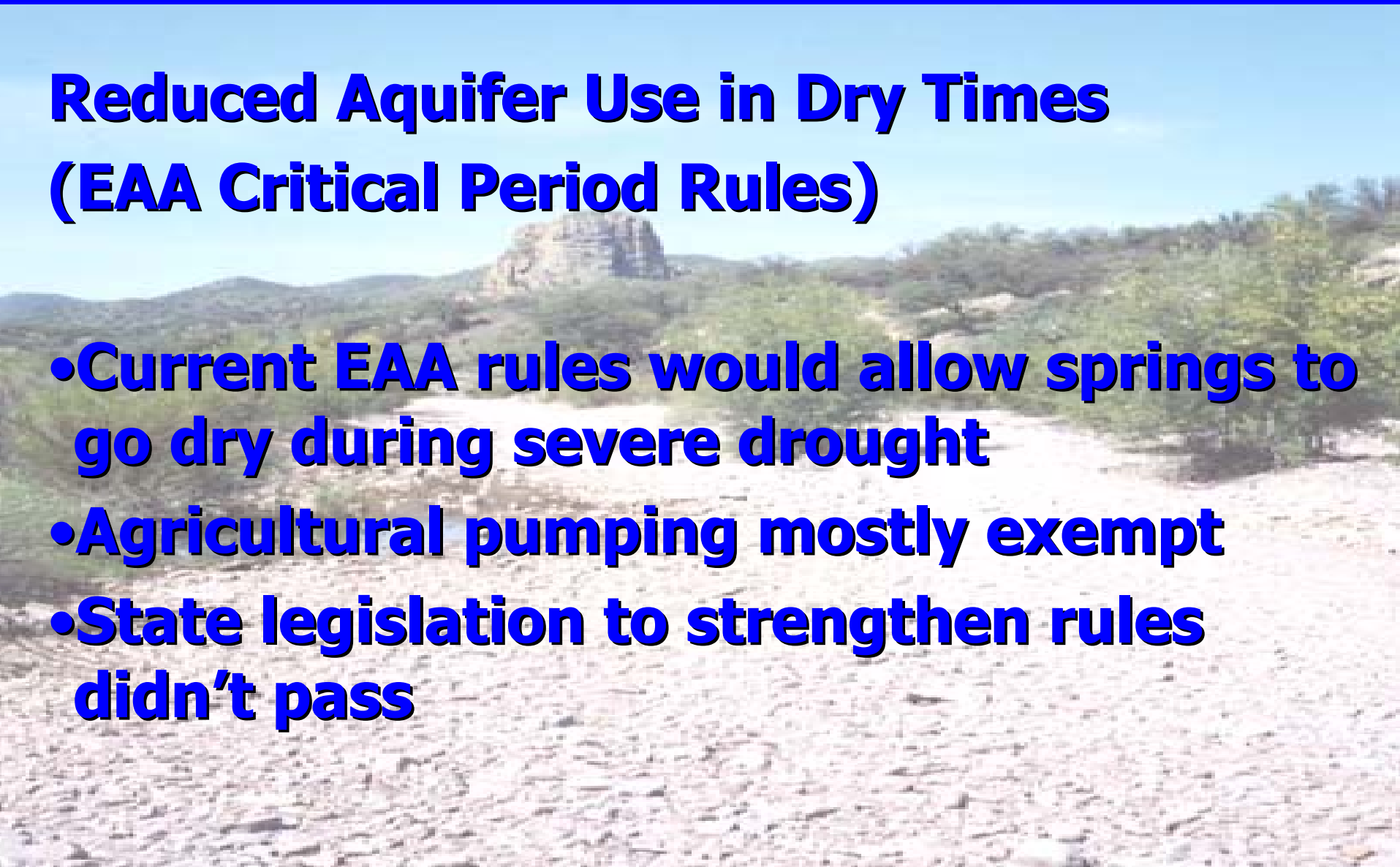
# TCEQ Resolution on Junior/Senior Water Rights , Essentially a Recommendation ...

- "[T]he EAA's Junior/Senior permit rules will have a measurable effect on downstream water interests, particularly surface water right holders"; and
- "[T]he EAA's Junior/Senior permit rules are contrary to the [TCEQ's] actions affecting downstream interests because they could measurably deprive downstream water right holders of a portion of river flows . . . under permits and certificates of adjudication . . . and also could otherwise measurably deprive flows for instream uses."

# Edwards Aquifer Issues

- **SAWS letter to USFWS in 2004** - Requested lower Comal & San Marcos springflow levels for endangered species, which means less water in the Guadalupe River – particularly during droughts
- **EAA "Recharge & Recirculation"**– Could re-circulate water from Guadalupe to the Edwards keep springs flowing, but reduce water downstream

# Edwards Aquifer Issues

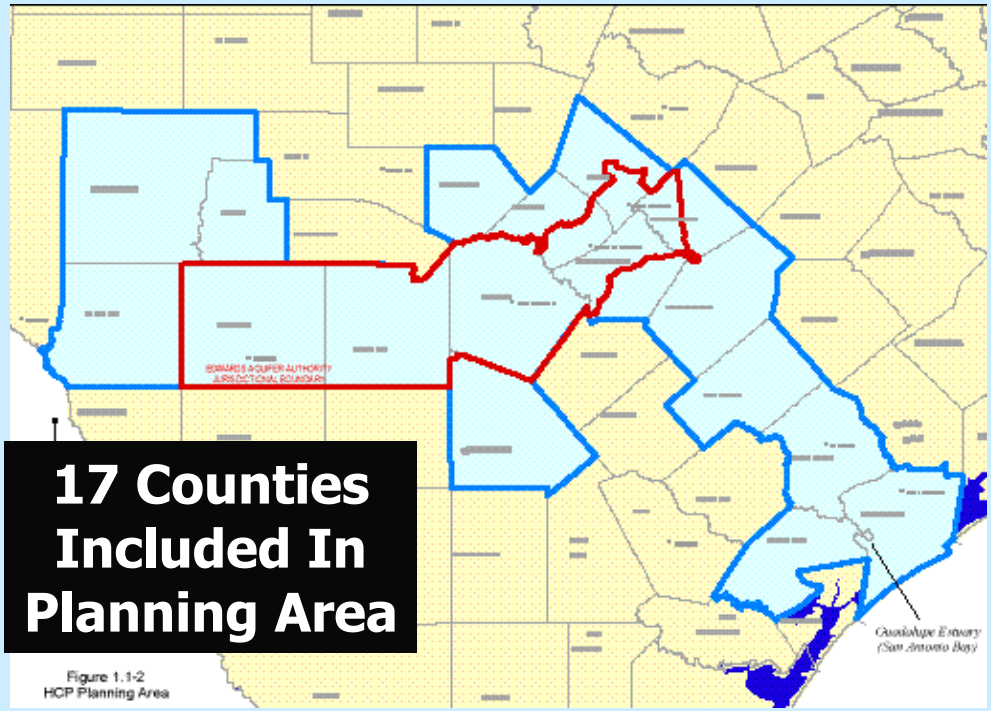


**Reduced Aquifer Use in Dry Times (EAA Critical Period Rules)**

- Current EAA rules would allow springs to go dry during severe drought
- Agricultural pumping mostly exempt
- State legislation to strengthen rules didn't pass

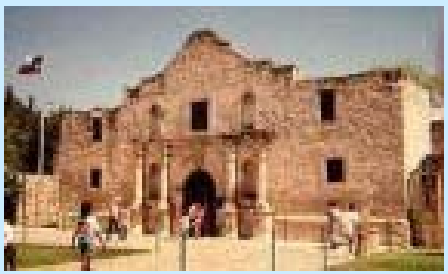
# Habitat Conservation Plan

**The biological, hydrological & political issues of Edwards Aquifer HCP are some of the most complex & difficult natural resource issues in Texas…**




**17 Counties Included In Planning Area**

Figure 1.1-2
HCP Planning Area



**Edwards remains almost the sole water source for San Antonio**

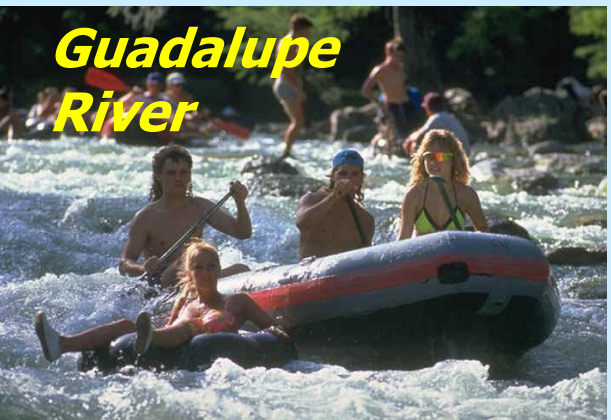
**Most major South Texas rivers recharge the Edwards**


**Direct impacts to bays & estuaries**

# Habitat Conservation Plan

**EAA Habitat Conservation Plan (HCP)**

- **March 2005, EAA submits draft HCP to USFWS**
- **HCP would be rulebook for aquifer management for next 50 years**
- **Draft provides *no guarantee for springflow during a repeat of the Drought of Record***
- **Endangered species to be preserved with "in-situ refugia" or artificial refuges**




# Whooping Crane Populations in North America

## (Aransas – Wood Buffalo National Park)

# Whooping Crane Chronology

**1865: Some 500 - 1400 birds in North America**

**1912: Numbers Louisiana to King Ranch – 200**

**1937: King Ranch birds disappeared – Aransas Migratory Waterfowl Refuge established**

**1941: Record low number of Whooping Cranes (16)**

**1954: Wood Buffalo National Park found to be Crane's long sought breeding grounds**

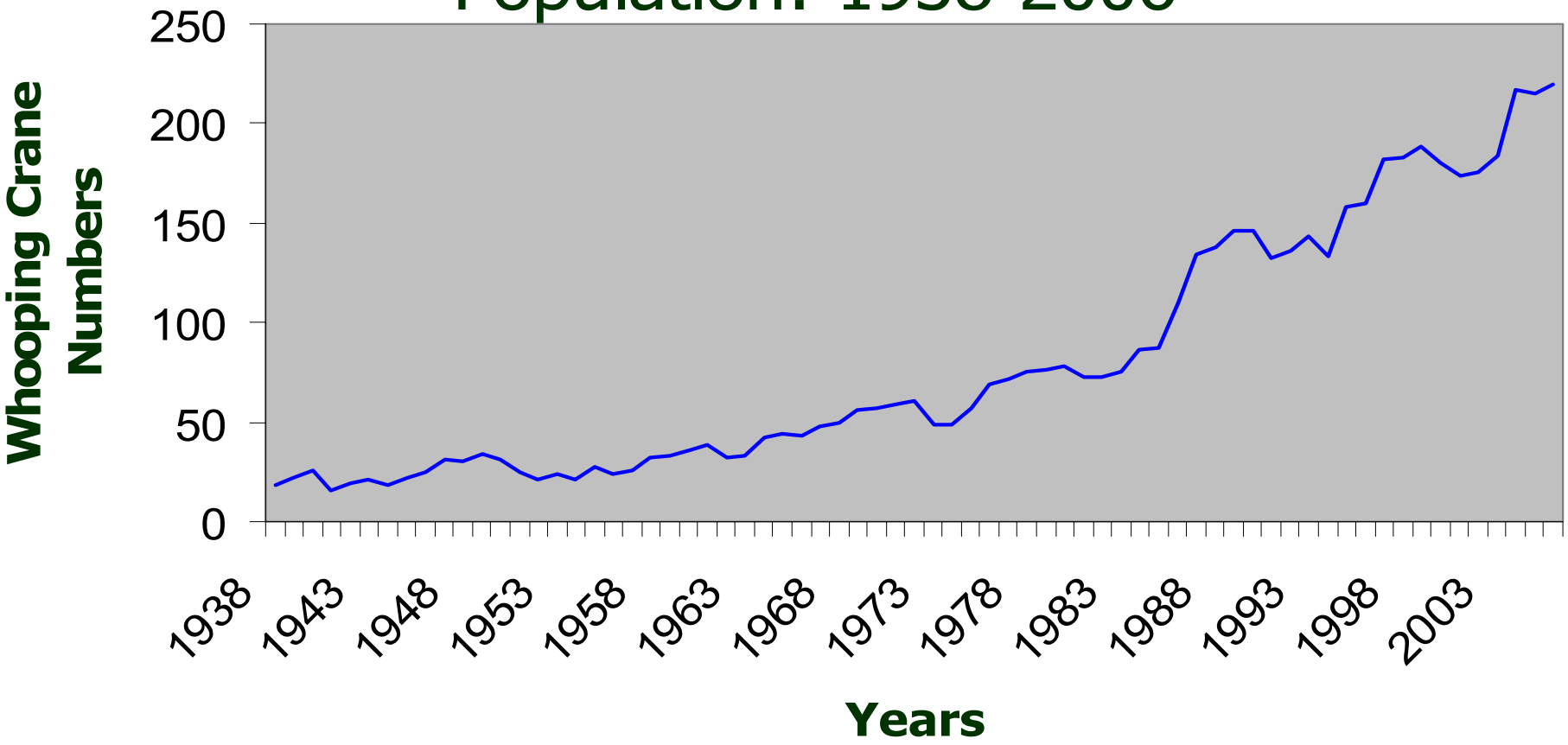
**1973: Endangered Species Act**

**1975 - 1989: Initiated Rocky Mountain Flock**

**1989: Baraboo, Wisconsin flock; ultralights**

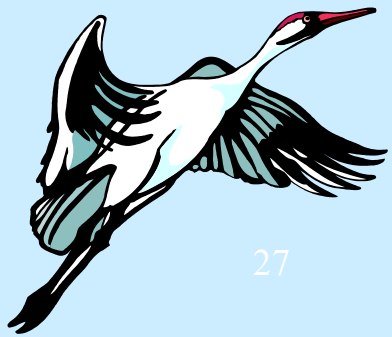
**1993: Kissimmee Prairie non-migratory flock**

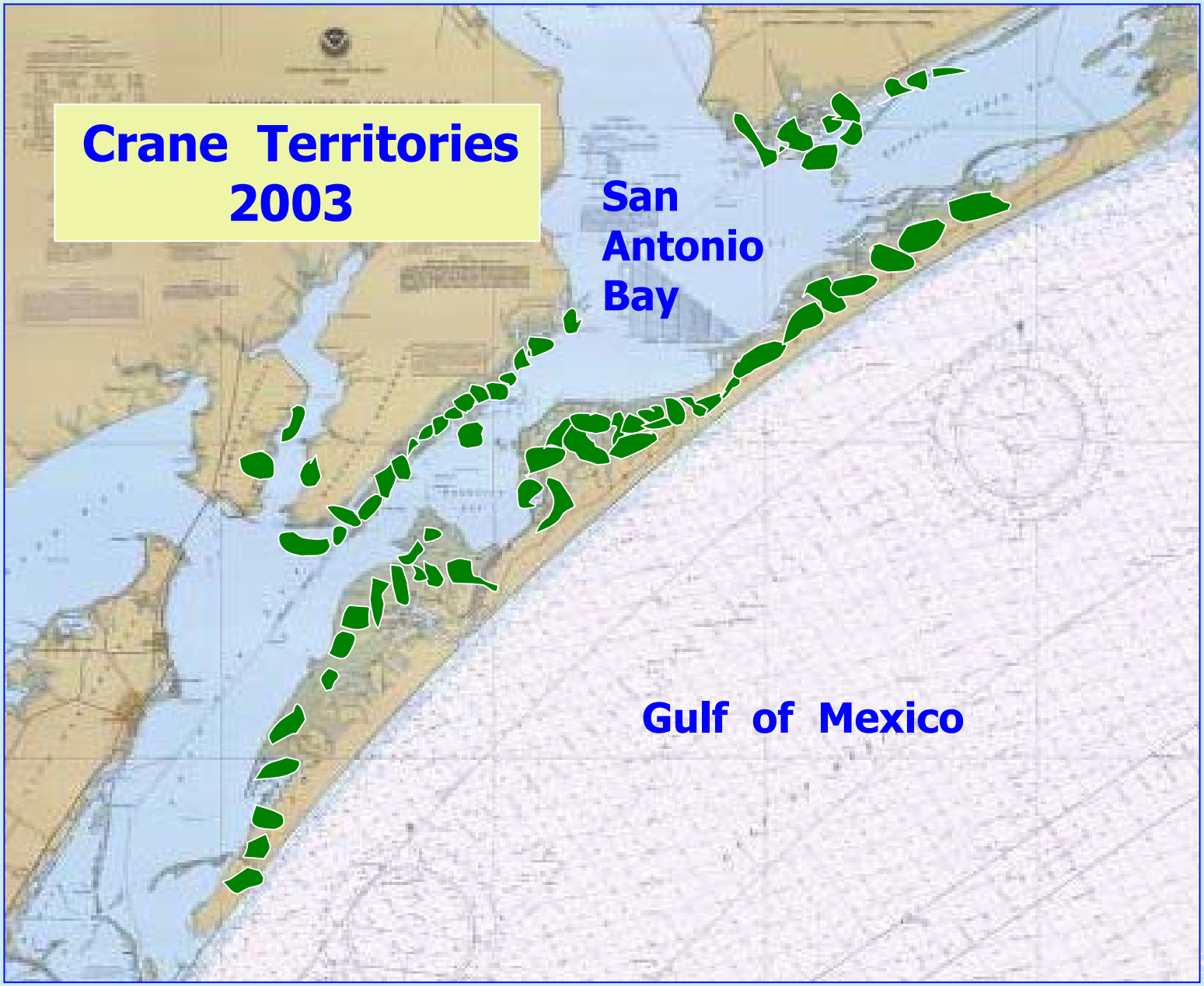
# Aransas NWR Whooping Crane Population: 1938-2006




**In 2006 there were 217.**

**<u>Total</u>: Wild + Captive: 341 + 135 = 476 Birds; 121 Breeding Pairs**




Crane Territories
2003
San
Antonio
Bay
Gulf of Mexico

# Linking Freshwater Inflows & Marsh Community Dynamics in San Antonio Bay to Whooping Cranes

R. Douglas Slack

William E. Grant

Stephen E. Davis, III

Texas A&M University

# Whooping Crane Study Sponsors

- Guadalupe-Blanco River Authority
- San Antonio River Authority
- San Antonio Water System
- Texas Agricultural Experiment Station
- United States Fish & Wildlife Service

# Whooping Crane Study Collaborators

- **Kenneth A. Rose:** Louisiana State University - Dept. of Oceanography & Coastal Sciences
- **Fred Sklar**: Everglades Florida Bay Division
- **Ed Rykiel**: Rykiel Consulting
- **Tom Stehn**: Aransas National Wildlife Refuge
- **Felipe Chavez-Ramirez:** Platte River Whooping Crane Trust
- **Thomas J. Minello**: Southeast Fisheries Science Center, Galveston, TX

# Whooping Crane Study Collaborators

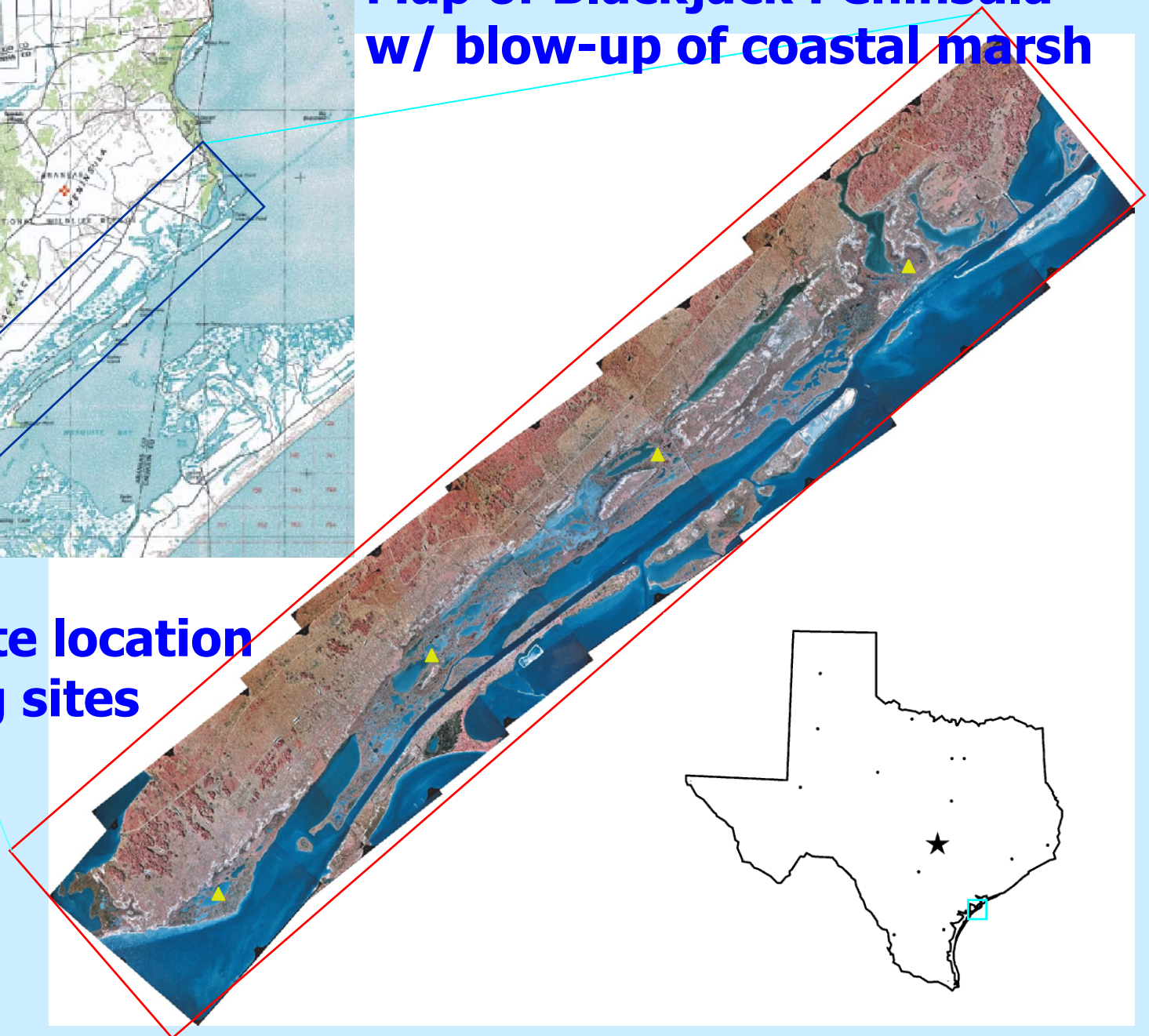
- **Vince Guillory**: Louisiana Department of Wildlife and Fisheries
- **Daniel Childers**: Florida International University
- **Denise Reed**: University of New Orleans
- **Tom Wagner**: Texas Parks & Wildlife Department
- **Robert Twilley**: Louisiana State University
- **Brian Johns**: Canadian Wildlife Service

**GOAL: Evaluate relationship between freshwater inflows and the health of Whooping Crane population**

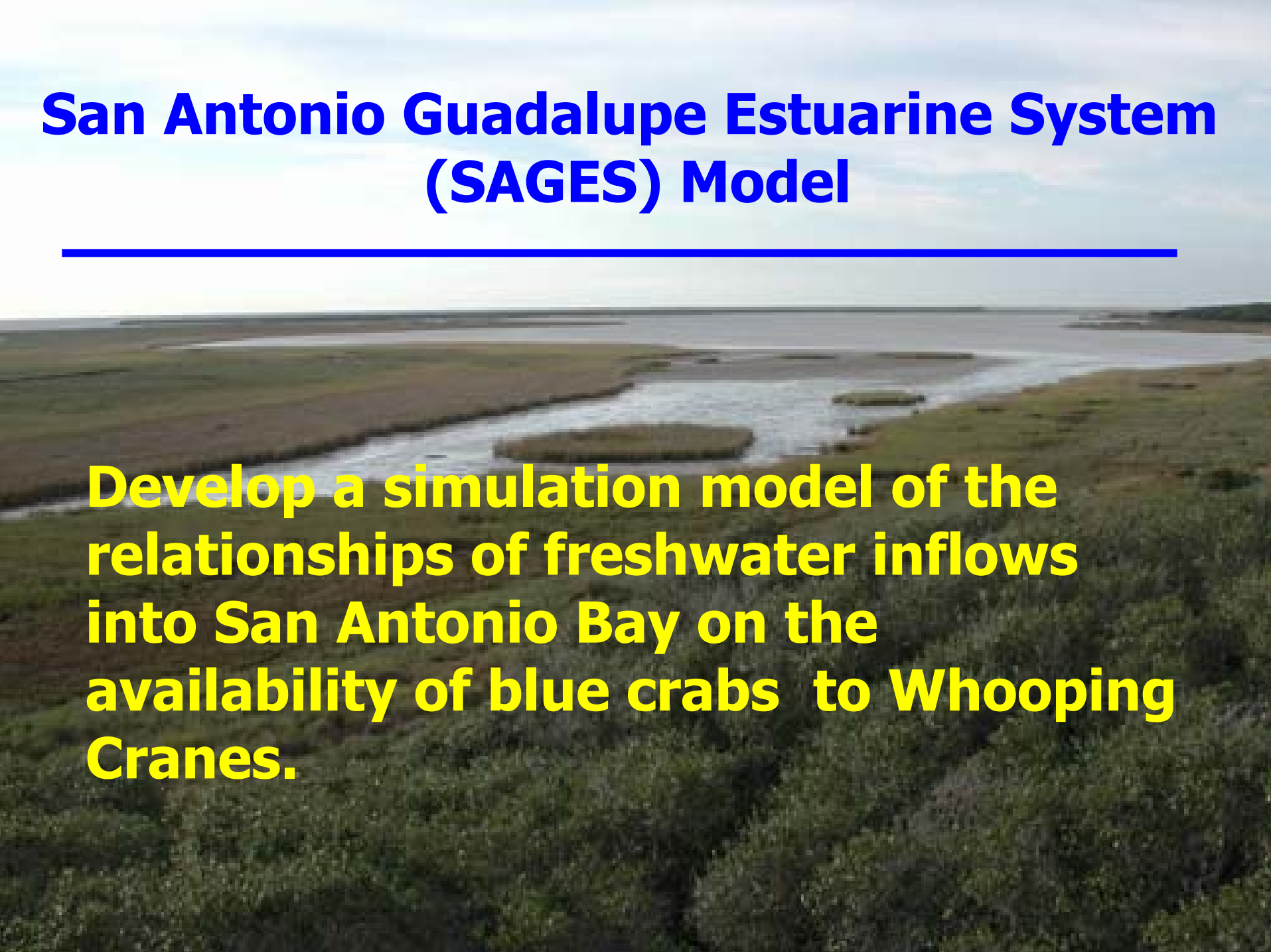
- Quantify patterns of crane habitat use and foraging behavior in relation to blue crab availability and abundance, temperature, and human induced disturbances
- Determine impacts of abiotic factors on crab abundance, movements & distribution
- Evaluate marsh vegetation responses to variability in freshwater inflows & water chemistry

# Map of Blackjack Peninsula w/ blow-up of coastal marsh


▲ Approximate location of sampling sites

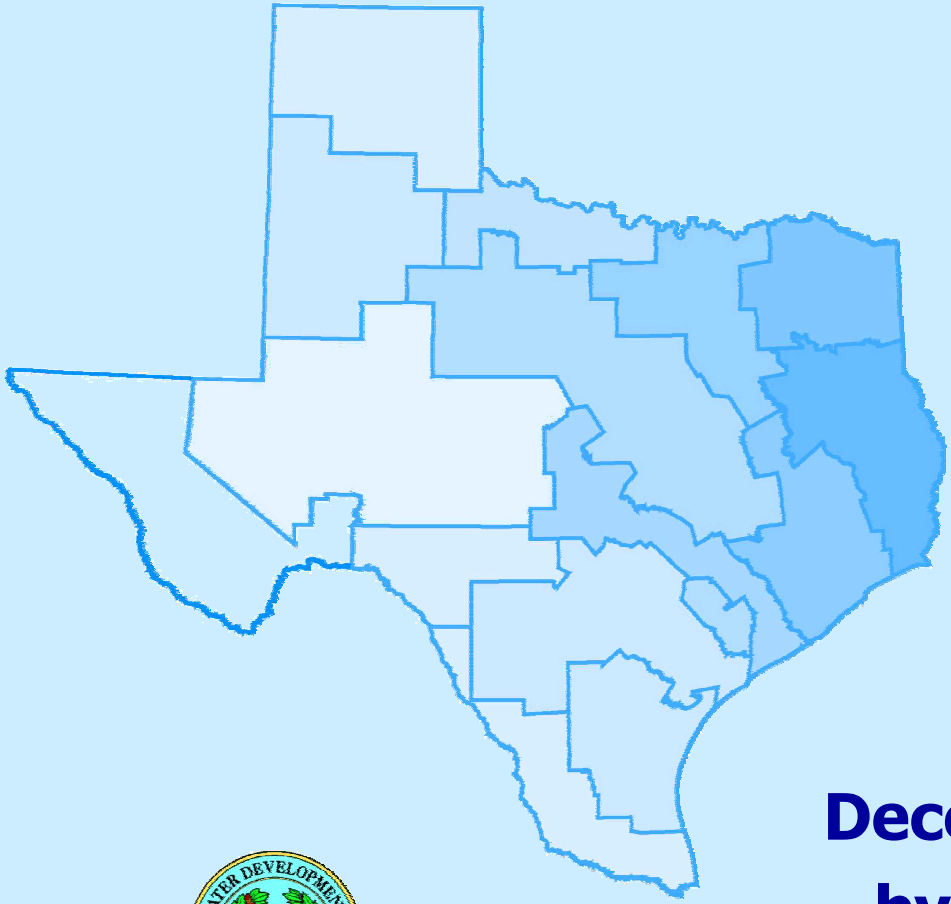


# San Antonio Guadalupe Estuarine System (SAGES) Model



**Develop a simulation model of the relationships of freshwater inflows into San Antonio Bay on the availability of blue crabs to Whooping Cranes.**

# Water for Texas 2002



**Adopted December 12, 2001 by TWDB, will be update in 2006**

*Texas Water Development Board*
*January 2002*

# Region L & SAWS 2005 Water Plan Update

**Area Monthly Water Rates** – 10,000 gallons residential use: $16 SAWS; $27 NBU; $27 Victoria; $49 San Marcos

**SAWS – 2005 Water Plan Update**

- Abandons some Edwards Aquifer alternative water projects; delays others
- Increases use of Edwards Aquifer
- Bases Edwards supply on 1984 drought, not Drought of Record – increases risk to Springs

**Region L becomes first region ever to miss planning deadline - so TWDB will prepare plan, but will likely defer to Region L Plan approved after the deadline**

# Drought of Record Considerations

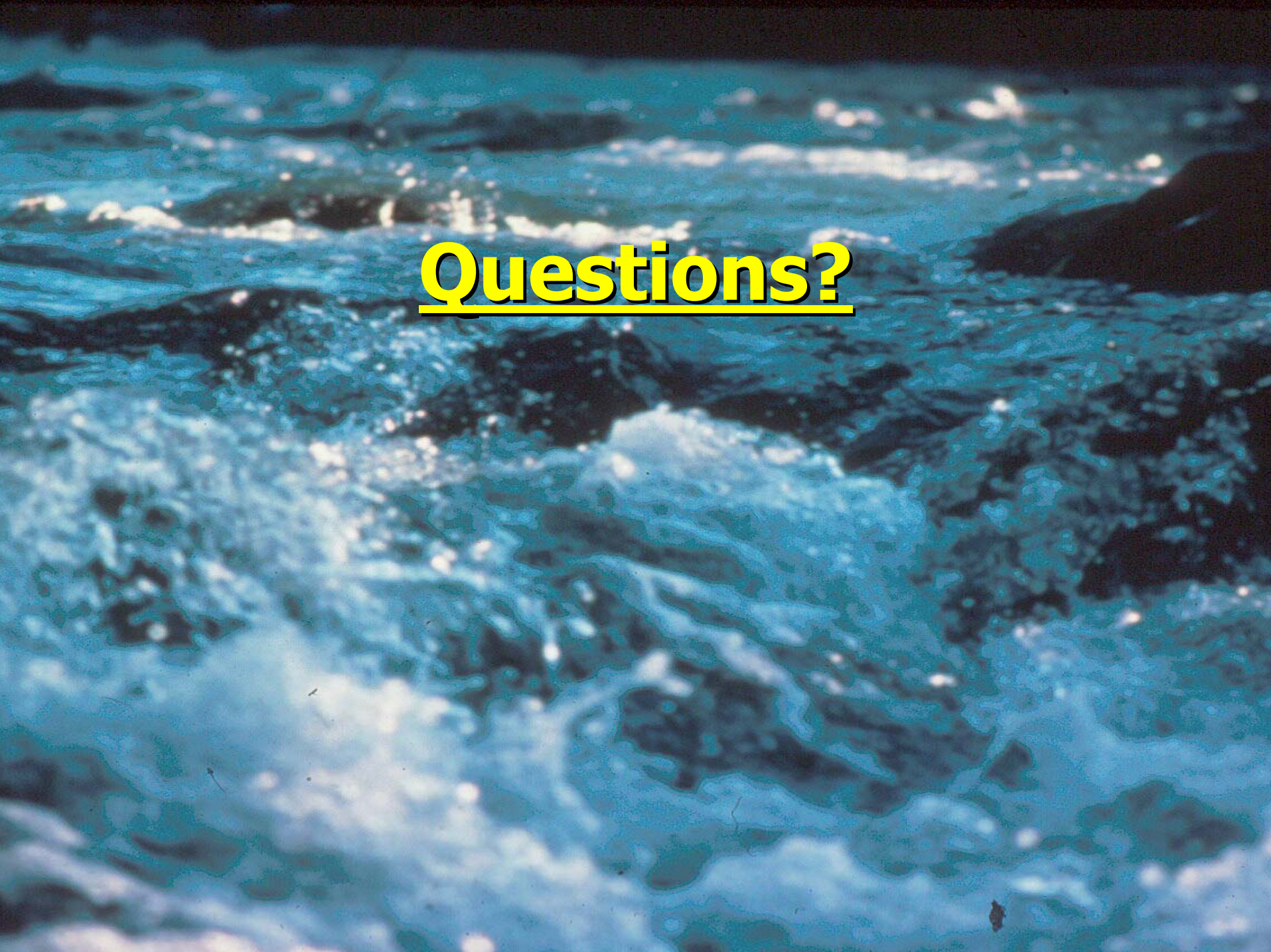
- **Drought of Record is** when natural hydrological conditions provided the least amount of water supply
- Regional water plans must be based on the **Drought of Record**
- SAWS selected 1984 as foundation of 2005 Water Plan Update instead of Drought of Record
- Historical recharge indicates 1984 was third most severe drought

# Latest Analysis of Tree-Ring Chronologies in Edwards Region; 1648-1995

The reconstructions confirm that the 1950s drought was very bad, even when viewed in a long-term context. The reconstructions also indicate that there may have been periods when drought was more protracted and the impact might have been considerably worse. It would appear unwise for civil authorities to assume that the 1950s drought represents the worst case scenario to be used for planning purposes in water resources management in the South Central and Edwards Plateau climate divisions of Texas.

# For More Information

- Call GBRA at (800) 413-4130.
- On the Internet go to www.gbra.org.
- Also see the section on Edwards Aquifer issues at www.gbra.org.
- To learn more about the Whooping Crane studies go to http://sages.tamu.edu/.


Questions?