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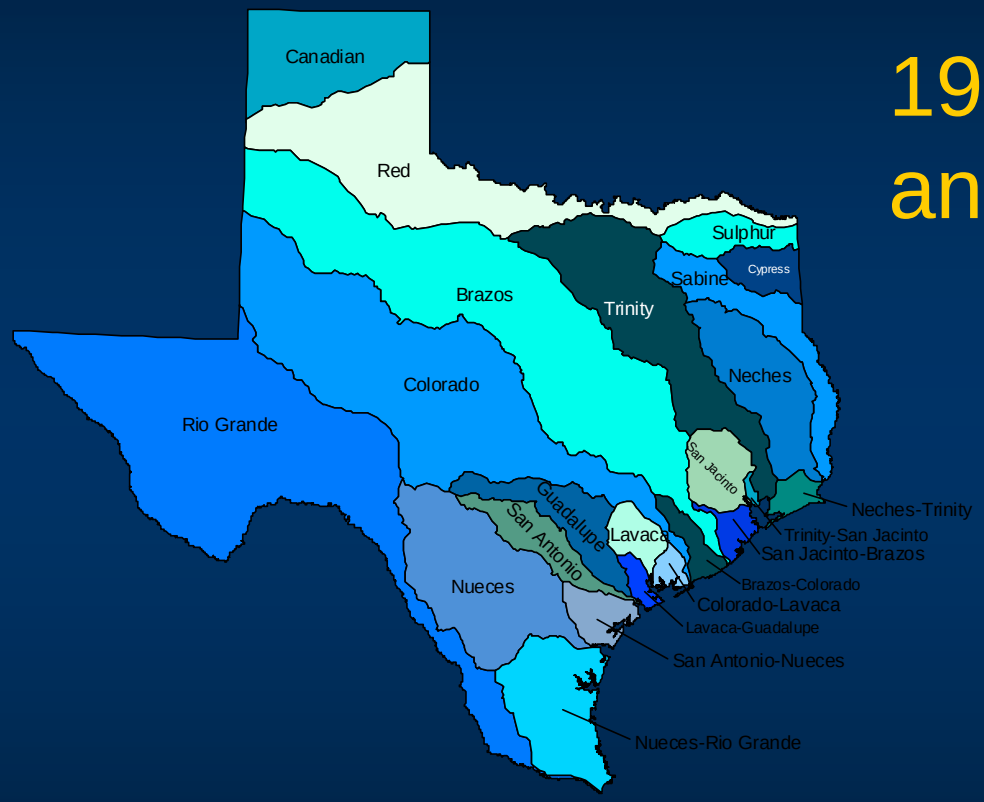
Overview of Environmental Flows

Cindy Loeffler, Chief

Water Resources Branch

Texas Surface Water Resources

15 major river basins



191,000 miles of rivers and streams

7 major estuaries

~ 200 springs

6 million acres of bottomland hardwoods and forested wetlands

Importance of Aquatic Ecosystems

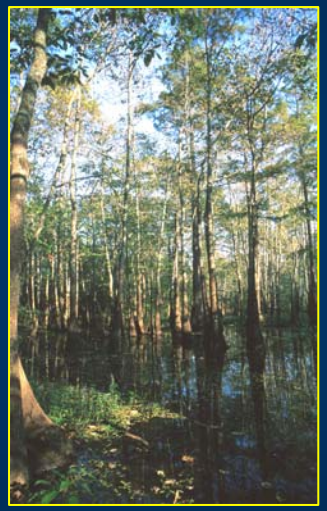
- 191,000 miles of rivers and streams in Texas provide habitat for 255 species of fishes
- With over 150 species of native freshwater fishes, Texas ranks among the most biologically diverse states
- Texas ranks 2nd nationally in terms of angler days and the amount of money spent on fishing
- Sportsmen spend $6.6 billion per year in Texas
- 91% of Texans polled felt protecting state's water resources "very important"

Threats to Aquatic Ecosystems

- At least 5 native Texas fishes are now extinct and 3 more are extirpated throughout the Texas portion of their range
- ~20% of Texas fishes are threatened with extinction or extirpation from the Texas portion of their range
- With 31 state and federally-listed endangered aquatic animals Texas ranks in the top 5 states for numbers of endangered aquatic species
- Population of Texas expected to double by 2060

Environmental Flows

Flows that remain in the stream and provide for aquatic and riparian habitat; water quality protection; recreation; navigation; and freshwater inflows to bays and estuaries



Environmental Flows Benefits

Maintenance of native and rare species, biodiversity,

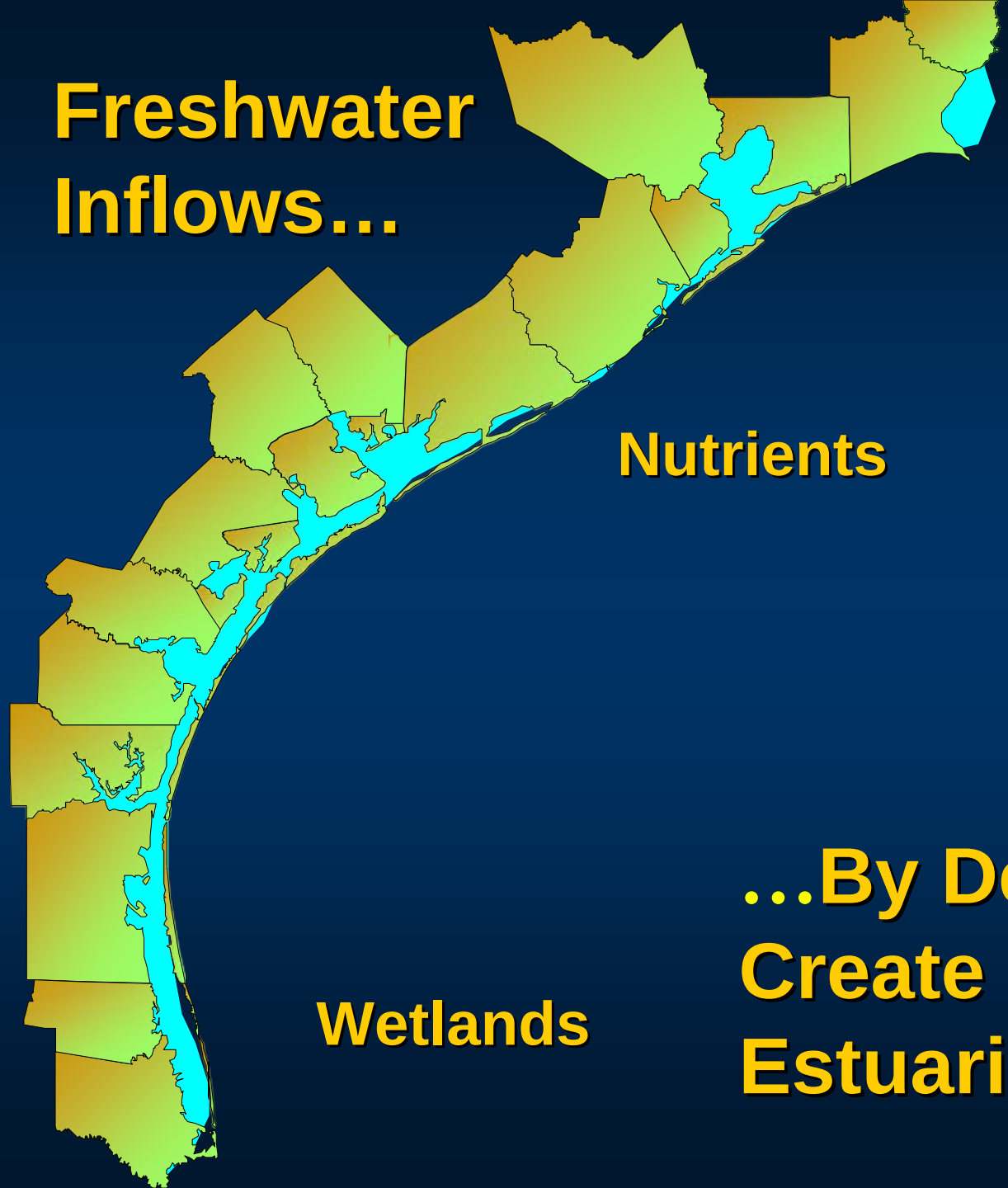
Water quality and assimilative capacity

habitat

Channel maintenance

Recreation

Economics



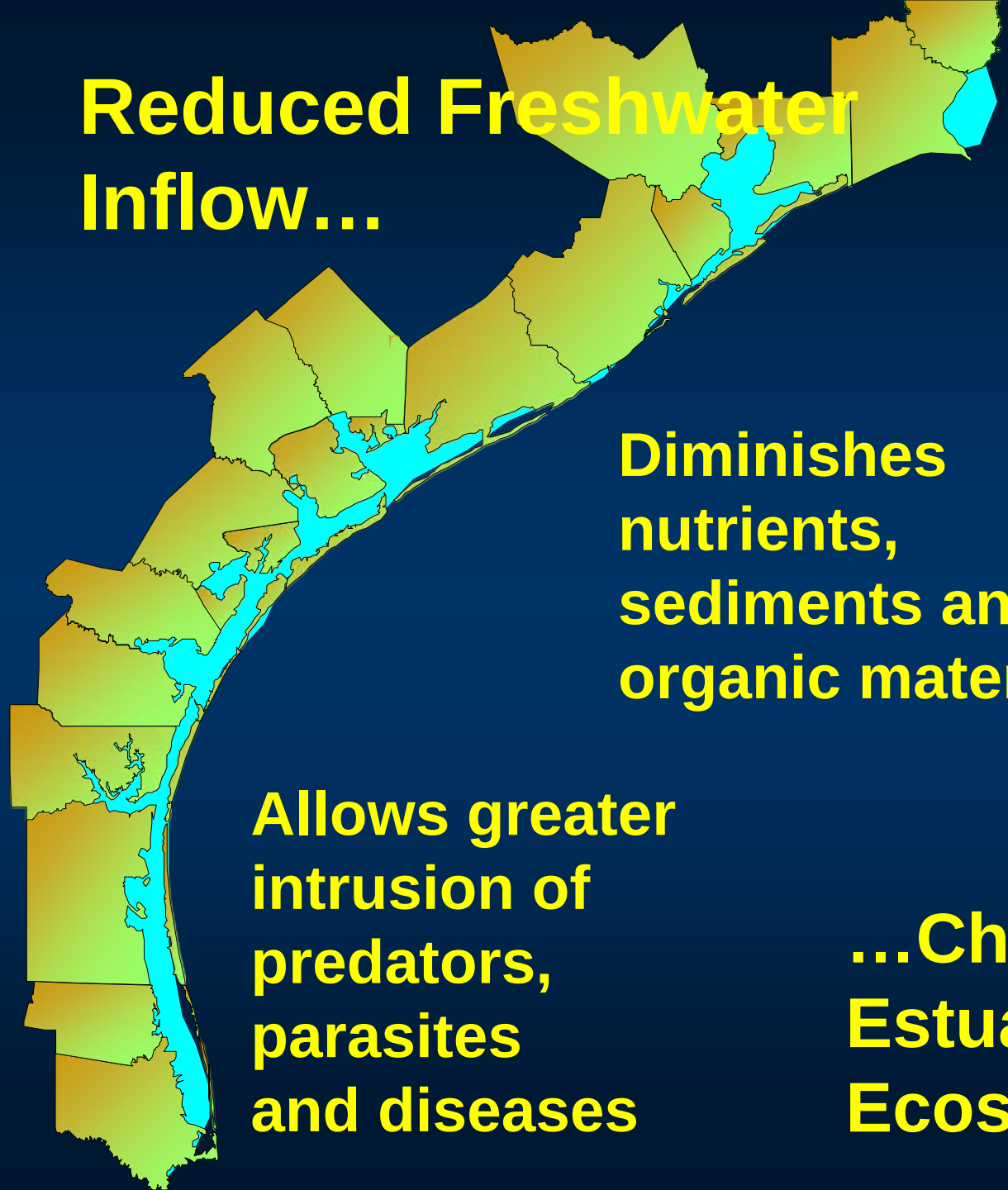
Freshwater Inflows…

Nutrients

Gradients

Wetlands

…By Definition Create and Sustain Estuaries



Reduced Freshwater Inflow…

Increases salinities and reduces mixing

Diminishes nutrients, sediments and organic material

Allows greater intrusion of predators, parasites and diseases

…Changes the Estuarine Ecosystem

Legal Basis for Bays and Estuaries Studies (1977)

§ 12.0011 Texas Parks and Wildlife Code
Names TPWD as agency responsible for protection of fish and wildlife resources

§ 11.147 Texas Water Code
Defines beneficial inflows

§ 16.058 Texas Water Code
Requires TPWD to collect bays and estuaries data; conduct freshwater inflow studies.

Water Right Permitting

Prior Appropriation; perpetual permits;
only one chance to address environmental impacts

Most rights were issued prior to 1985 and have no environmental protection

Of the estimated 7500 rights, fewer than 15% include environmental restrictions

Burden falls to post 1985 rights to protect environmental flows; piecemeal basis

Article 1 SB 3/HB 3 Environmental Flows 80th Texas Legislature

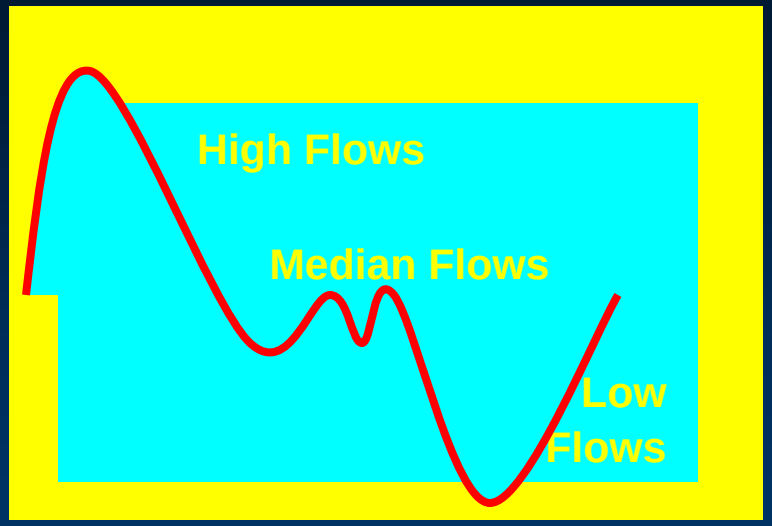
Senate Bill 3 and House Bill 3 set out a new regulatory system for protecting environmental flows; consensus-based regional approach involving a balanced representation of stakeholders

Environmental Flow Regime Development

Environmental flow regimes are to be developed and recommended by the expert science teams working with technical support from state agencies and academic institutions; <u>recommendations shall be based solely on best available science</u>

Environmental flow regime recommendations are then adopted by the stakeholder committees and submitted to TCEQ for formal consideration in commission rulemaking

Environmental Flow Regime Definition



"A schedule of flow quantities that reflects seasonal and yearly fluctuations that typically would vary geographically, by a specific location in a watershed, and that are shown to be adequate to support a sound ecological environment and to maintain the productivity, extent, and persistence of key aquatic habitats in and along the affected water bodies."

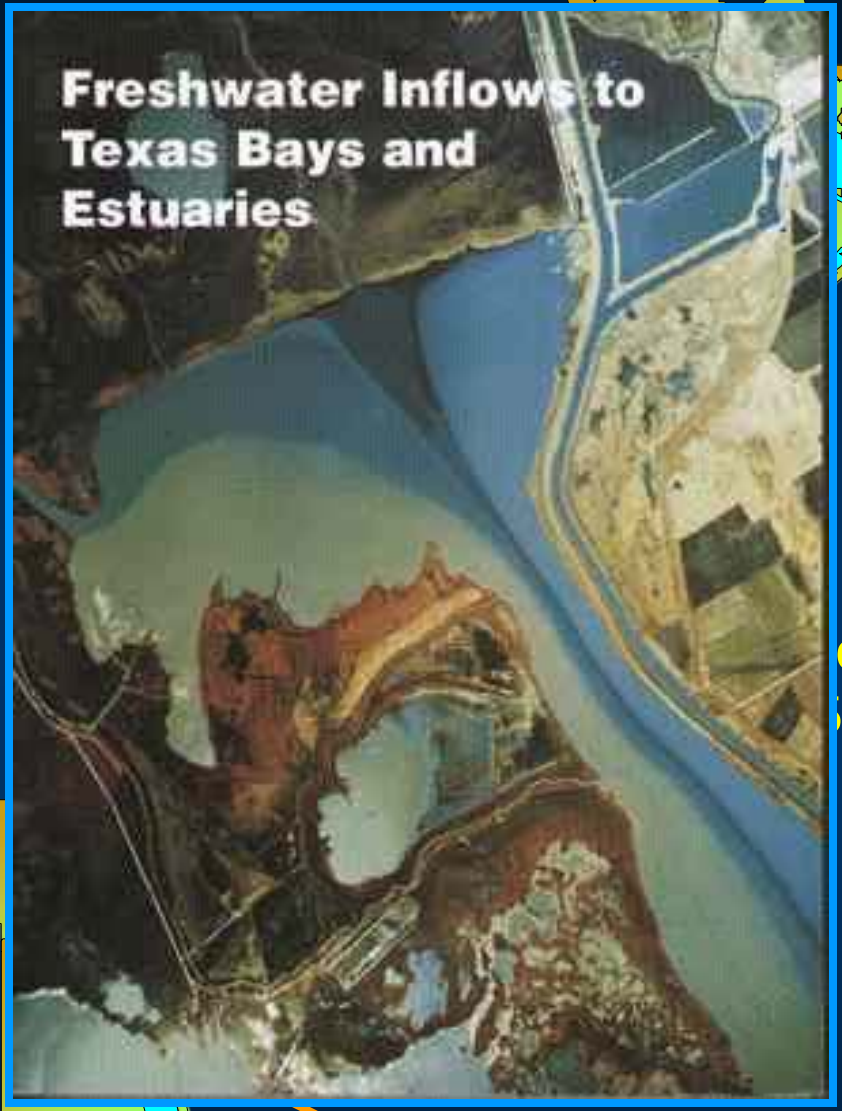
Environmental Flows Process

Each Basin/Bay Area Stakeholders Committee reviews findings of Expert Science Team and recommends environmental flow regimes to TCEQ

Through rulemaking, TCEQ adopts environmental flow standards and establishes an environmental flow “set aside” if unappropriated water is available; rulemaking process allows for broad public input

Environmental Flows Management

Environmental flow standards and implementation strategies are subject to “adaptive management,” meaning that the success and/or failure of management measures will be assessed and adjusted as new science and information becomes available. Flow standards will be subject to periodic review and revision.



Sabine
9.5*

Galveston
5.2

Matagorda
2.0

onio

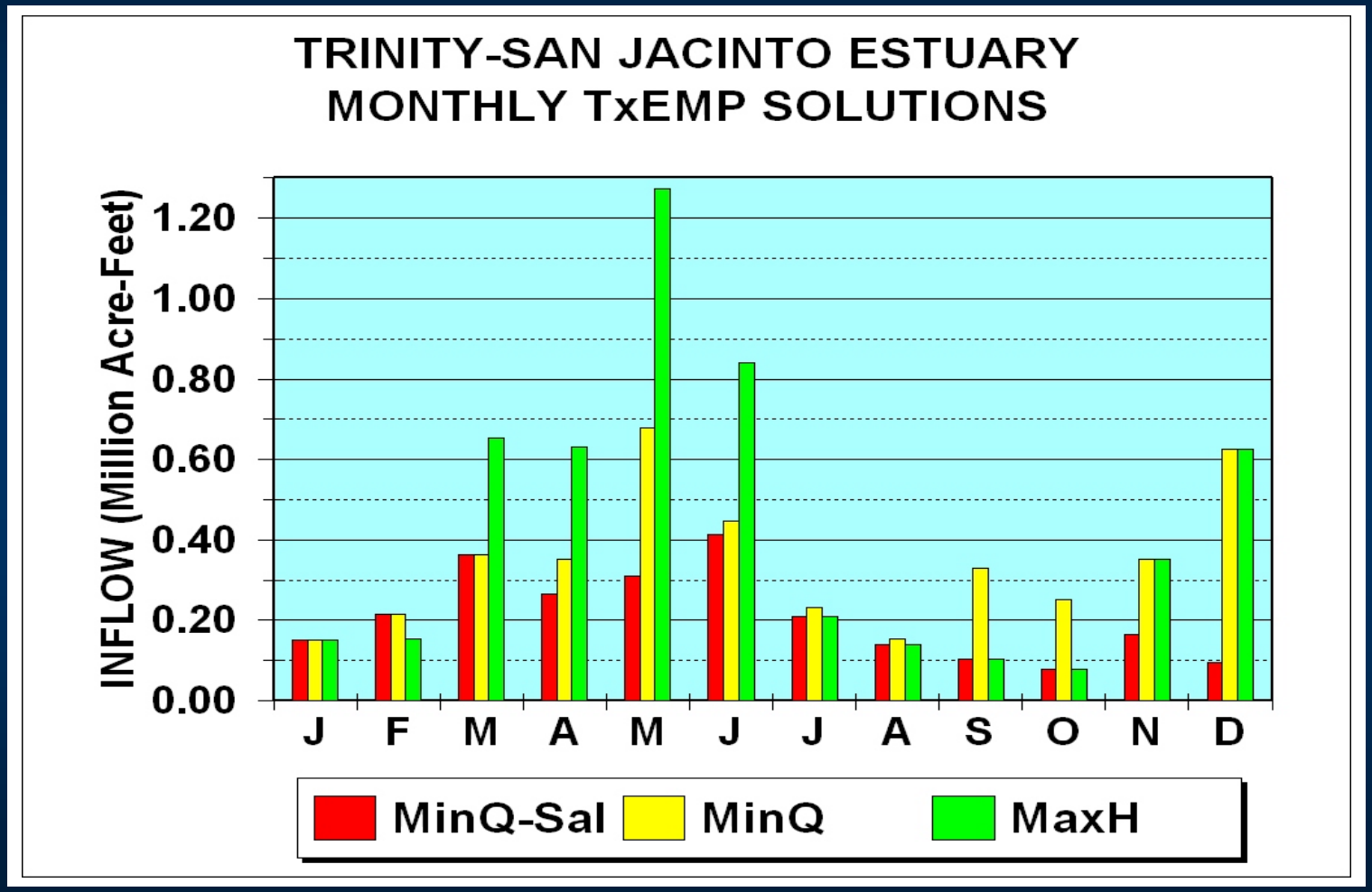
Laguna Madre
0.25

Best Available Science:

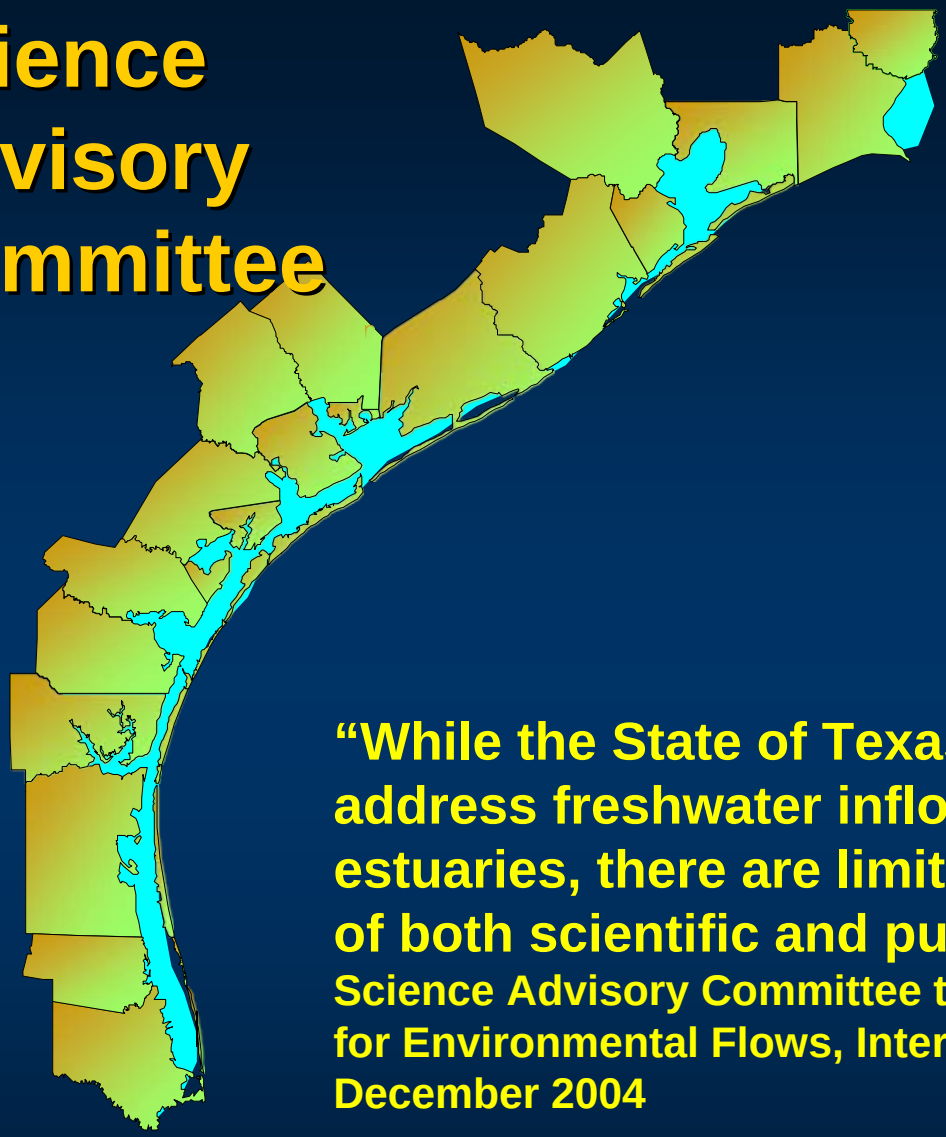
Legislatively mandated studies to determine "beneficial inflows" necessary to conserve health and productivity of Texas major estuaries have been completed. Some are being updated.

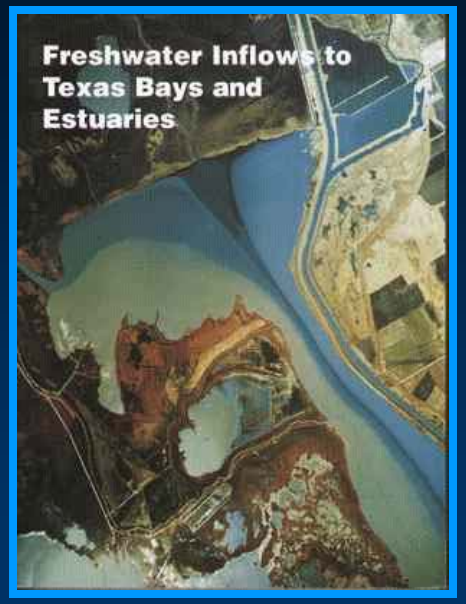
* Millions of Acre Feet Per Year

TxEMP Monthly Flow Distribution



Science Advisory Committee



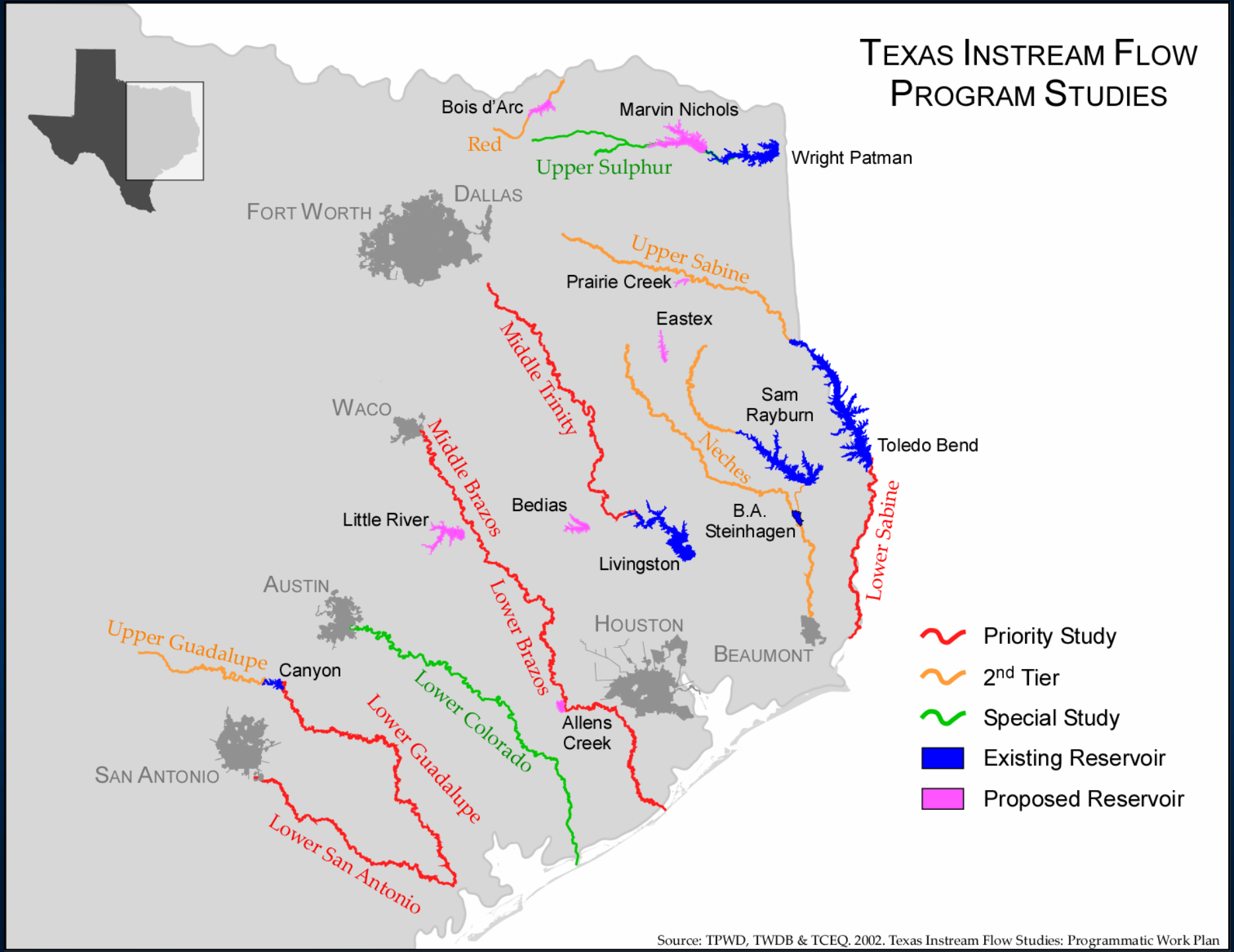


"While the State of Texas has pioneered tools to address freshwater inflow needs for bays and estuaries, there are limitations to these tools in light of both scientific and public policy evolution." –
Science Advisory Committee to the Study Commission on Water for Environmental Flows, Interim Report to the 79th Legislature, December 2004

SB 2
Texas Instream Flow Program

The Texas Legislature directed TPWD, TWDB and TCEQ to:

- Establish a data collection and evaluation program
- Determine flow conditions necessary to support a sound ecological environment in Texas rivers and streams
- SB 3 extended deadline to complete priority studies December 31, 2016
- http://www.twdb.state.tx.us/instreamflows/index.html



Source: TPWD, TWDB & TCEQ. 2002. Texas Instream Flow Studies: Programmatic Work Plan

“Desktop” Methodologies

- Technical Review Group (TRG) review of existing Desktop Methodologies
- Recommended Index of Hydrologic Alteration (IHA) as a tool for identifying flow regimes (subsistence flows, base flows, high flow pulses and overbanking flows)
- “Reluctantly” recommended continued use of Lyons method (% of monthly median flows) when permitting small diversions and minor amendments

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