

Environmental Flows in Texas



Dr. Wendy Gordon
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Texas Commission on Environmental Quality
Water Rights Permitting & Availability Section



Impetus Behind Defining Environmental Flow Needs

- Legislature recognizing the importance of maintaining a healthy ecosystem while meeting human needs for water
- Since 1985, the Texas Water Code has required the Commission to assess effects of a water use permit on:
 - existing instream uses
 - water quality
 - fish and wildlife habitat
 - freshwater inflow needs for bays and estuaries

Legislation

Senate Bill 2 (2001) provides the basic framework for the *Texas Instream Flow Program*

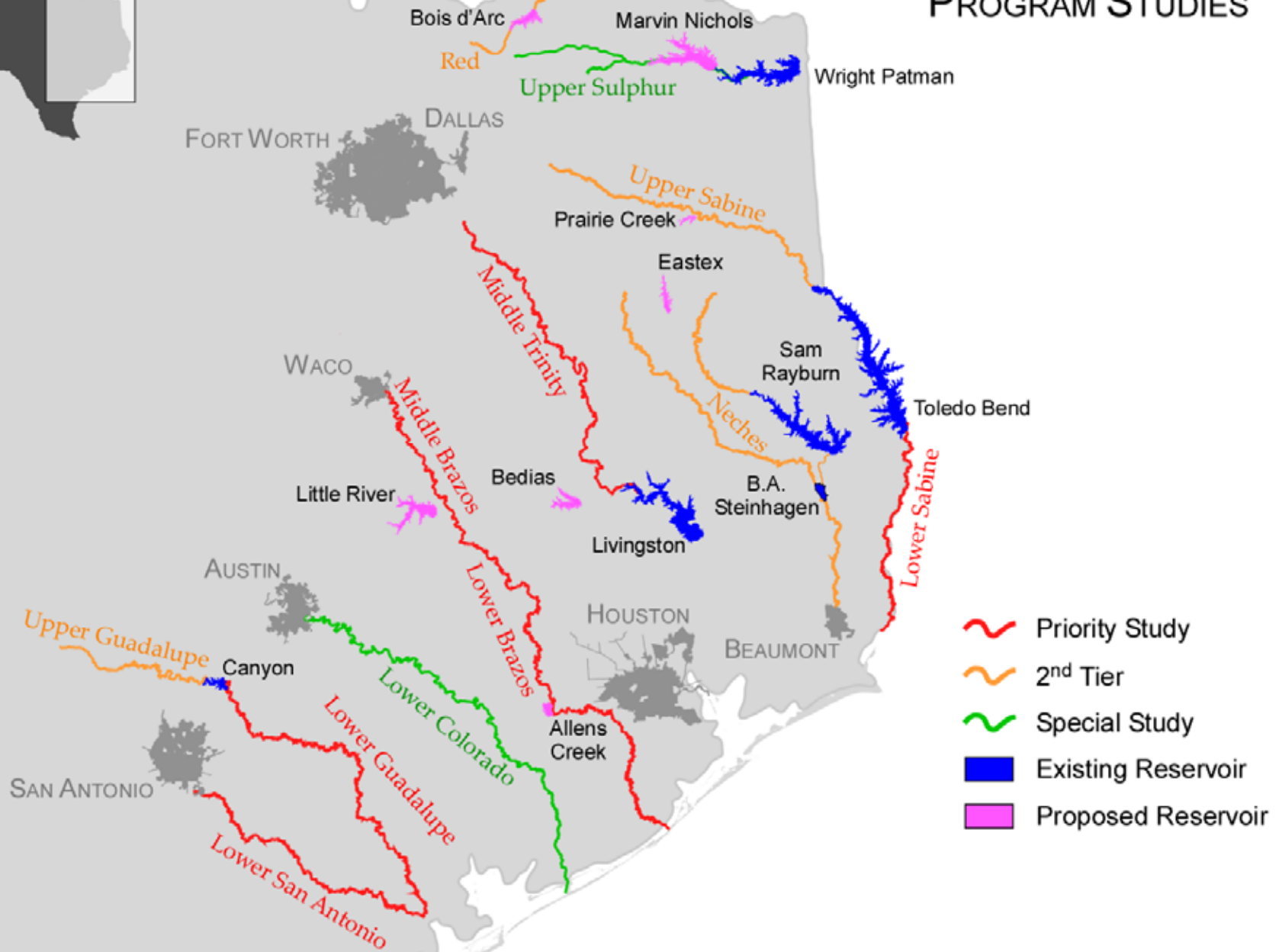
Senate Bill 3 (2007) provides the framework for setting environmental flow standards

Senate Bill 2

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
- Complete priority studies by December 31, 2010, now 2016

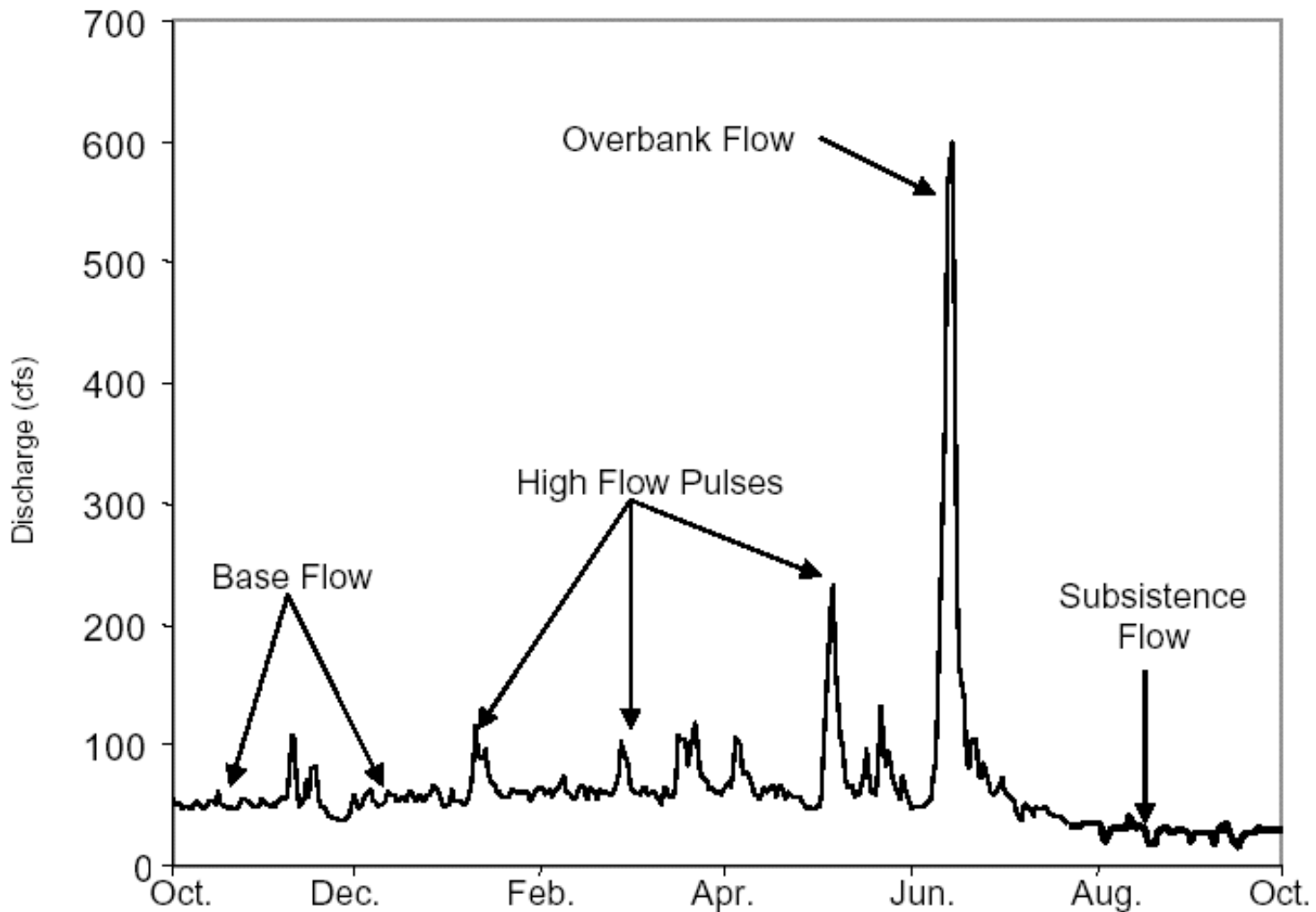
TEXAS INSTREAM FLOW PROGRAM STUDIES



Status of SB 2

- Review of program by National Academy of Sciences (National Research Council); report published March 2005
 - Major Recommendation: Establish Flow Regimes
- Revision of Technical Overview 2006-07
- Study planning underway in Brazos, Sabine, and San Antonio river basins

Environmental Flow Regime



Flow Regime Functions

Component	Hydrology	Geomorphology	Biology	Water Quality
Subsistence Flows	Infrequent, low flows	Increased deposition of fine & organic particles	<ul style="list-style-type: none"> •Restricted aquatic habitat •Limited connectivity 	<ul style="list-style-type: none"> •Elevated temp •Reduced levels of DO
Base Flows	Normal flow conditions with variability	<ul style="list-style-type: none"> •Maintain soil moisture & groundwater table •Maintain diversity of habitats 	<ul style="list-style-type: none"> •Suitable aquatic habitat •Connectivity along channel corridor 	Suitable in-channel water quality
High Flow Pulses	In-channel, short duration, high flows	<ul style="list-style-type: none"> •Maintain channel & substrate characteristics •Prevent encroachment of riparian vegetation 	<ul style="list-style-type: none"> •Recruitment events for organisms •Connectivity to near-channel water bodies 	Restore in-channel water quality after prolonged low-flow
Overbank Flows	Infrequent, high flows that exceed normal channel	<ul style="list-style-type: none"> •Floodplain maintenance •Lateral channel movement •New habitat construction •Flush organic material into channel •Deposit nutrients in floodplain 	<ul style="list-style-type: none"> •Life phase cues for organisms •Riparian recruitment & maintenance •Connectivity with floodplain 	Restore water quality in floodplain water bodies

Evaluations

Hydrology
Hydraulics

Physical
Processes

Water
Quality

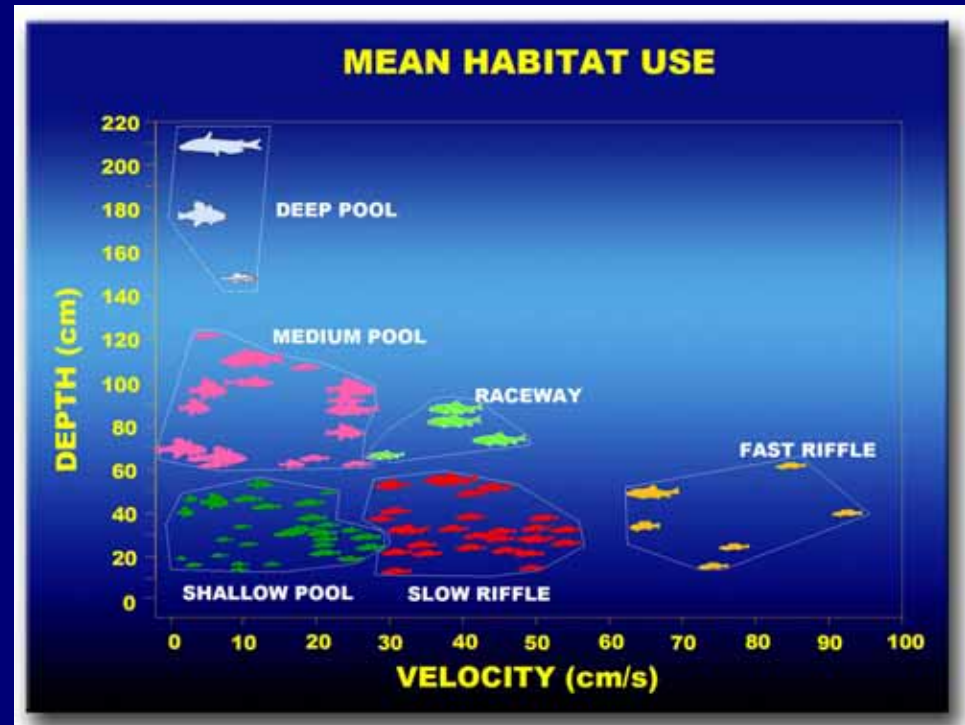
Biology

Biology

Biodiversity



Habitat Diversity



Evaluations

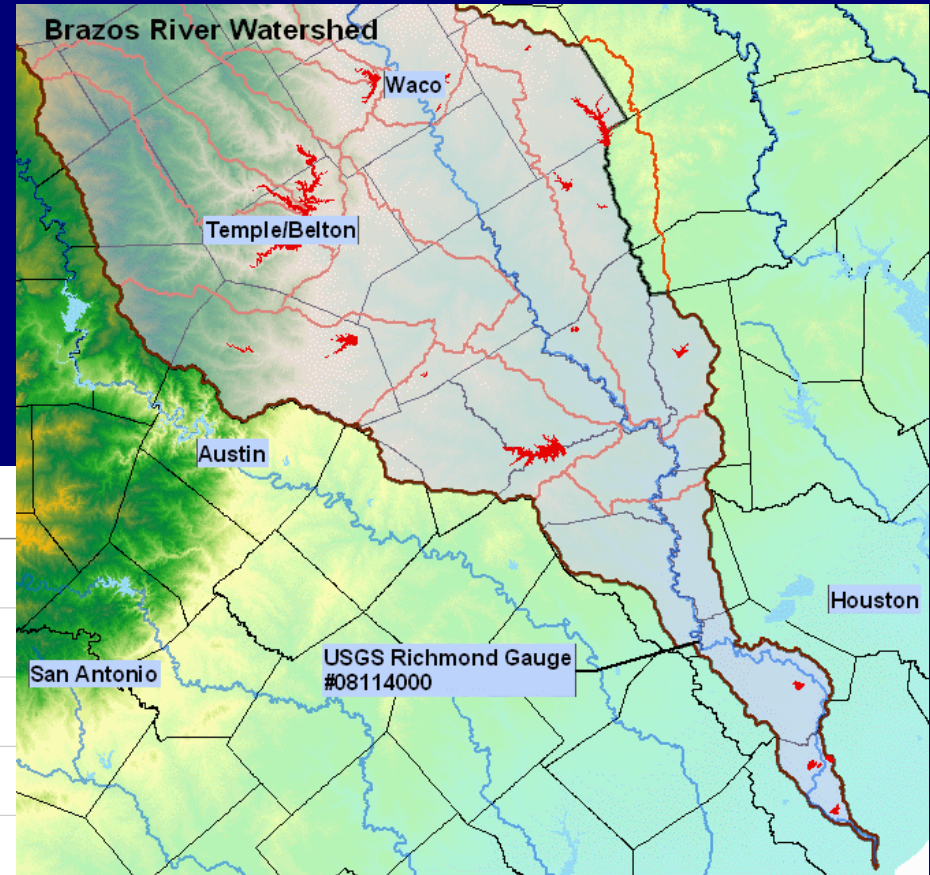
Hydrology
Hydraulics

Physical
Processes

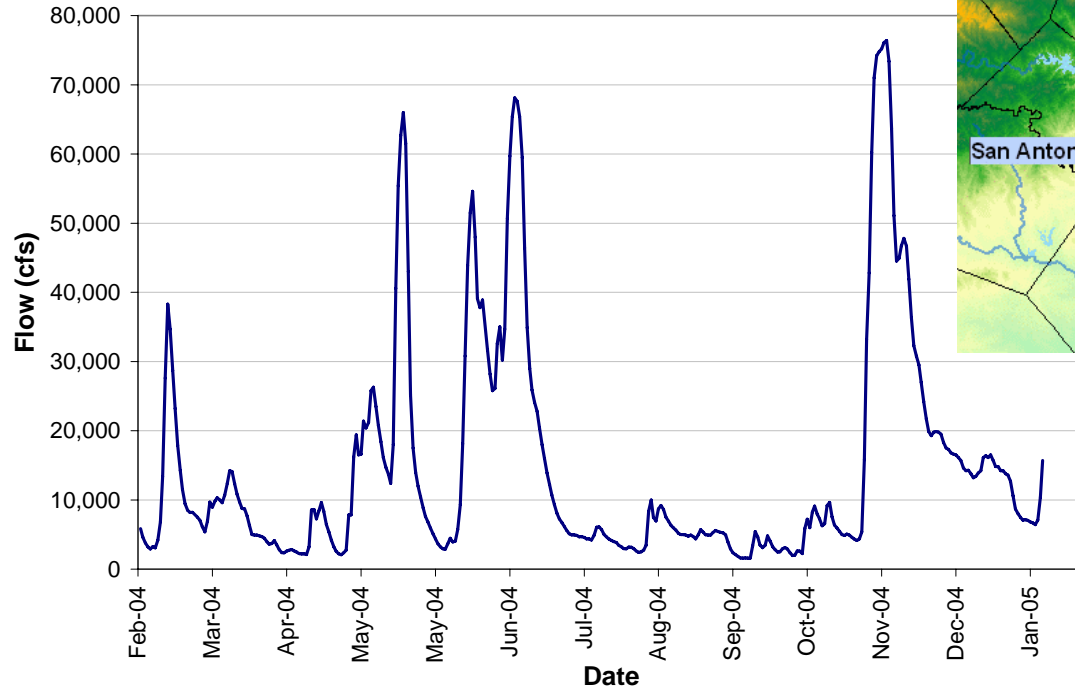
Water
Quality

Biology

Hydrology and Hydraulics

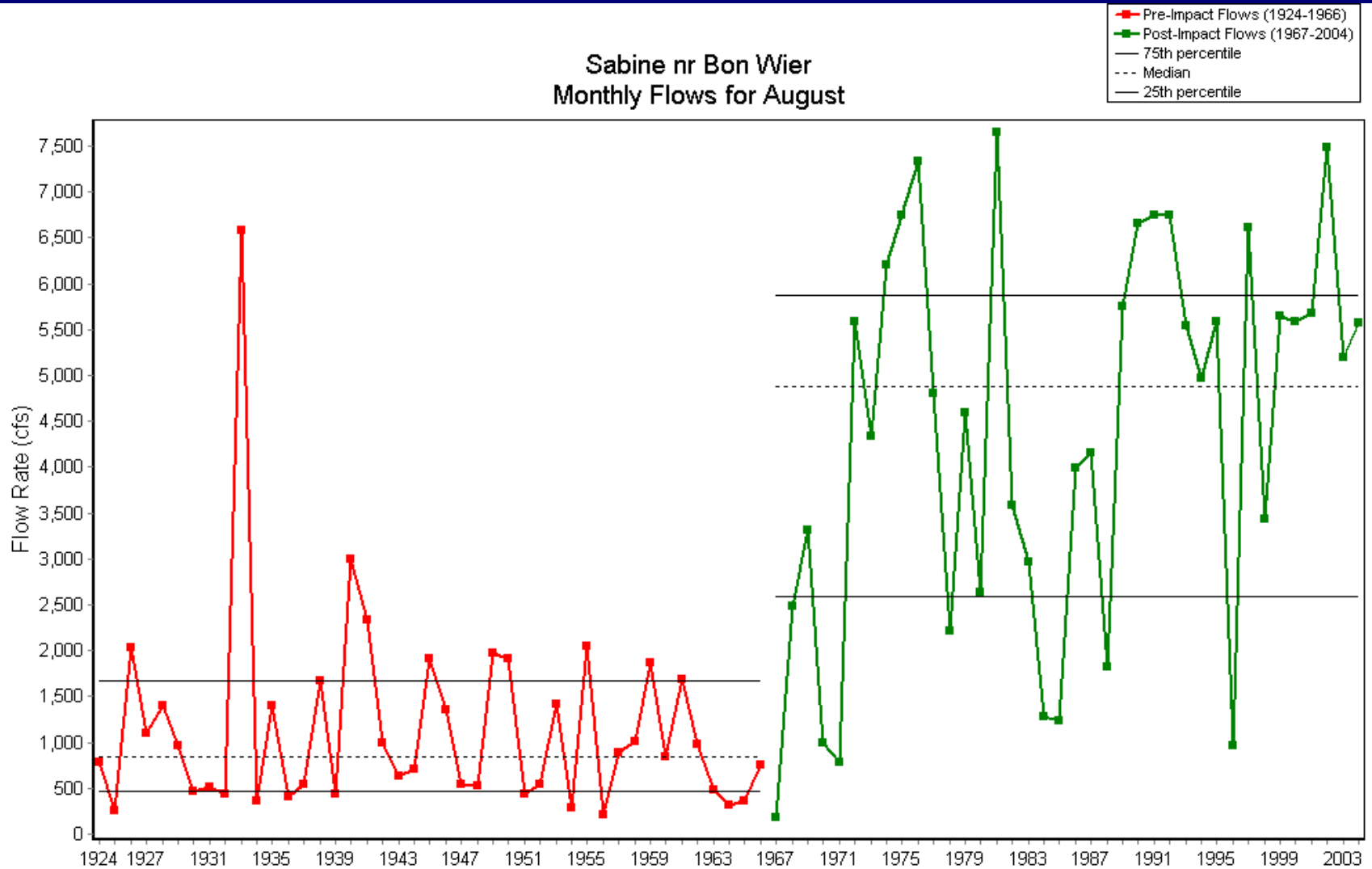


Brazos River at Richmond 08114000

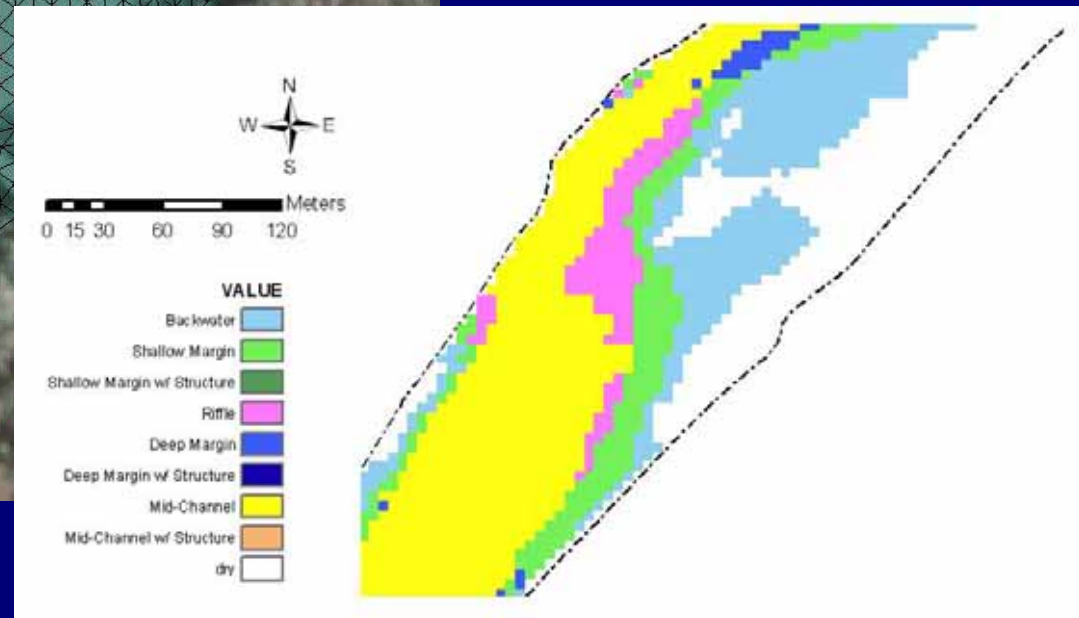
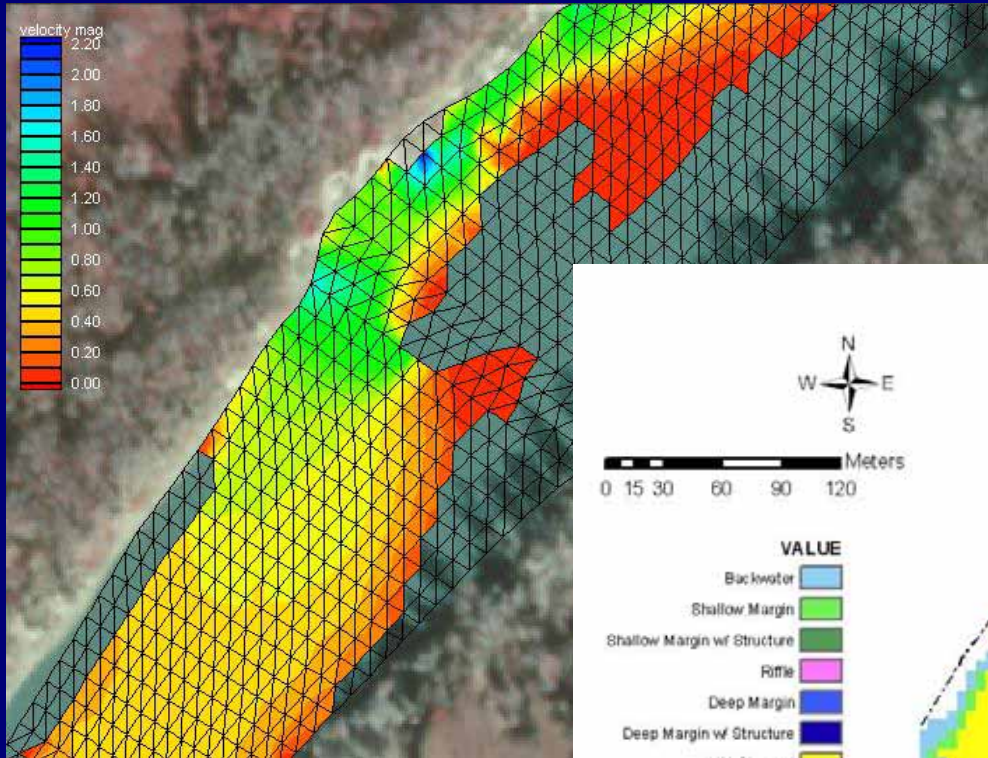


Hydrology

Sabine nr Bon Wier
Monthly Flows for August



Hydraulic and Habitat Modeling



Habitat changes with flow

Evaluations

Hydrology
Hydraulics

Physical
Processes

Water
Quality

Biology

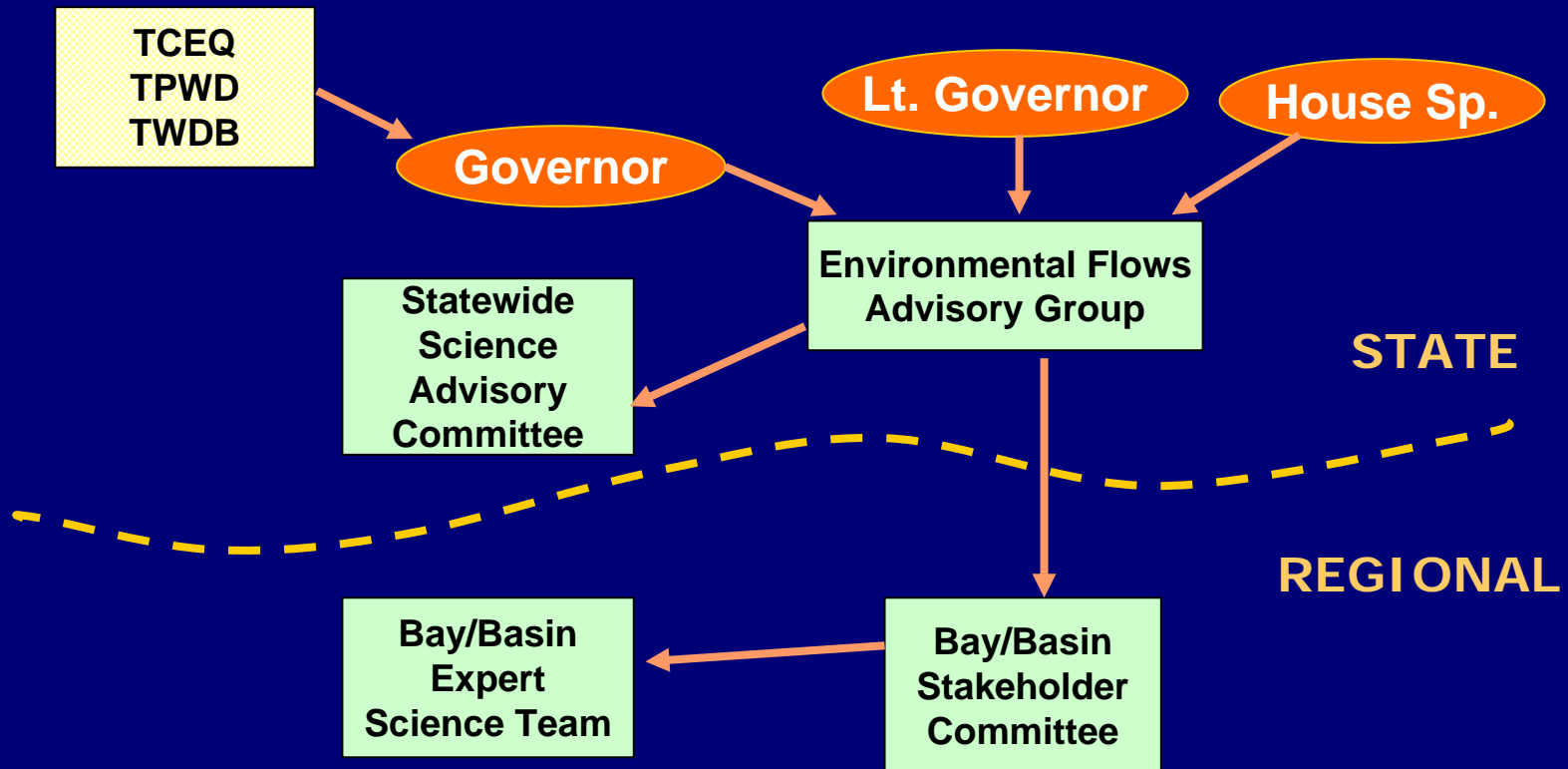
Water Quality

- Dissolved oxygen
- Temperature
- pH
- Total Dissolved Solids
- Turbidity/clarity

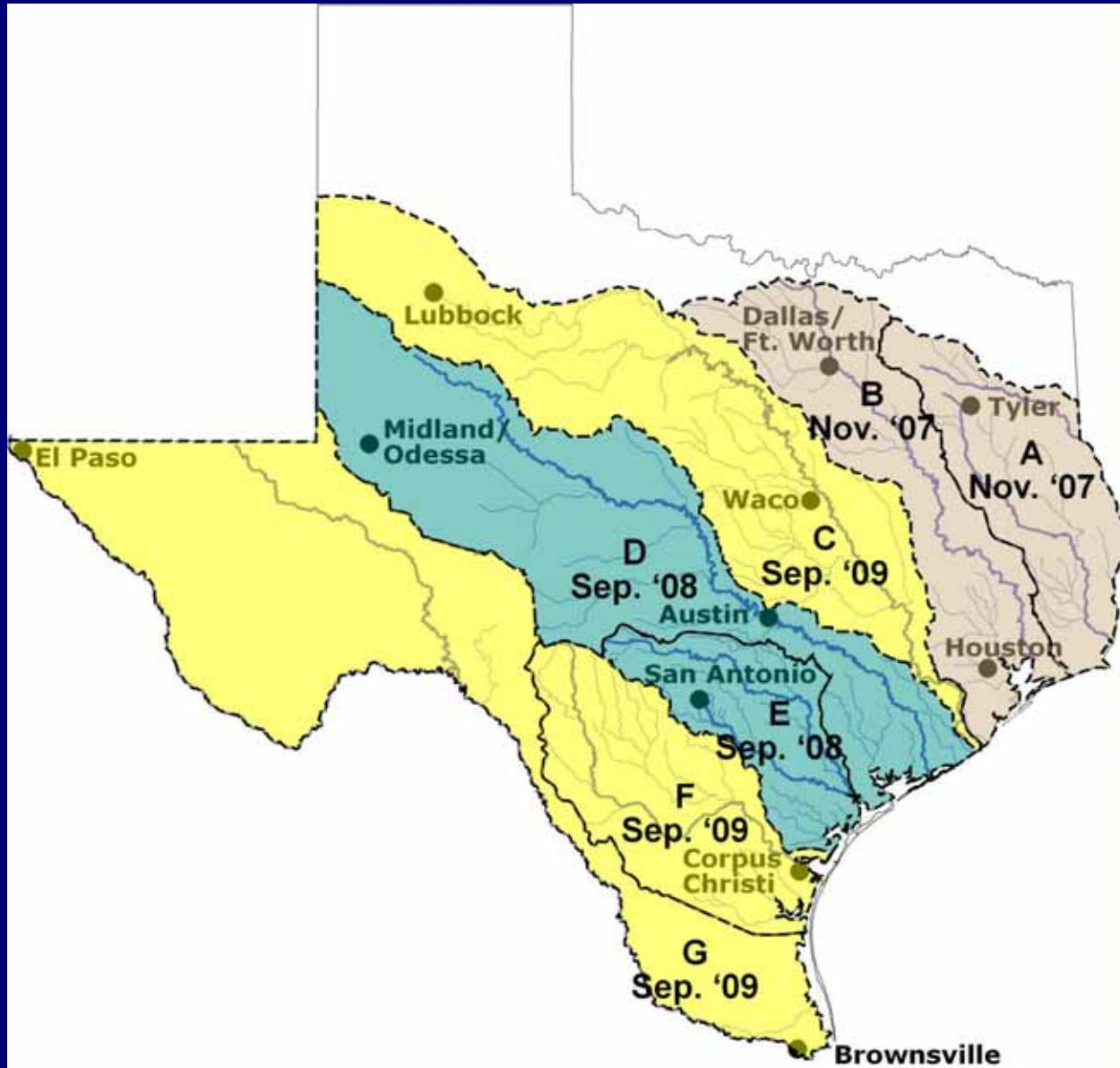
Senate Bill 3

- A process for establishing an **environmental flow regime** with input from scientists and stakeholders
- Directs TCEQ to promulgate flow standards by basin starting in 2010
- Adaptive management component whereby standards are reviewed once every 10 years for efficacy

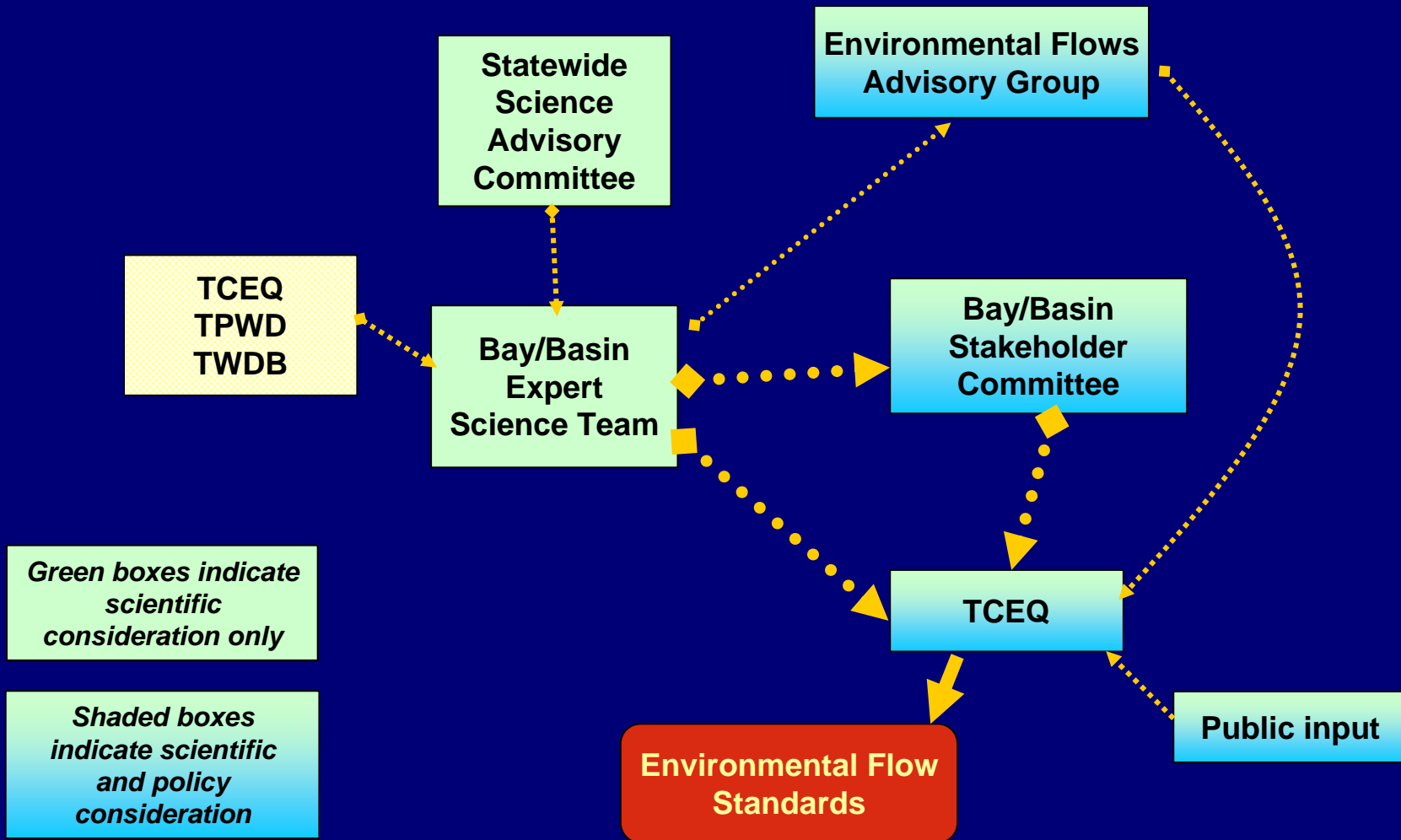
SB 3 Process for Environmental Flows – the Players



SB 3 Basins / Timeline



SB 3 Process for Environmental Flows – the Method



What SB 3 Does

- In basins where water is available, the TCEQ should establish an environmental set-aside below which water should not be available for [new water rights];
- In basins where available water is not sufficient to fully satisfy the environmental flow standards established by TCEQ, a variety of market approaches, both public and private, for filling the gap must be explored and pursued.

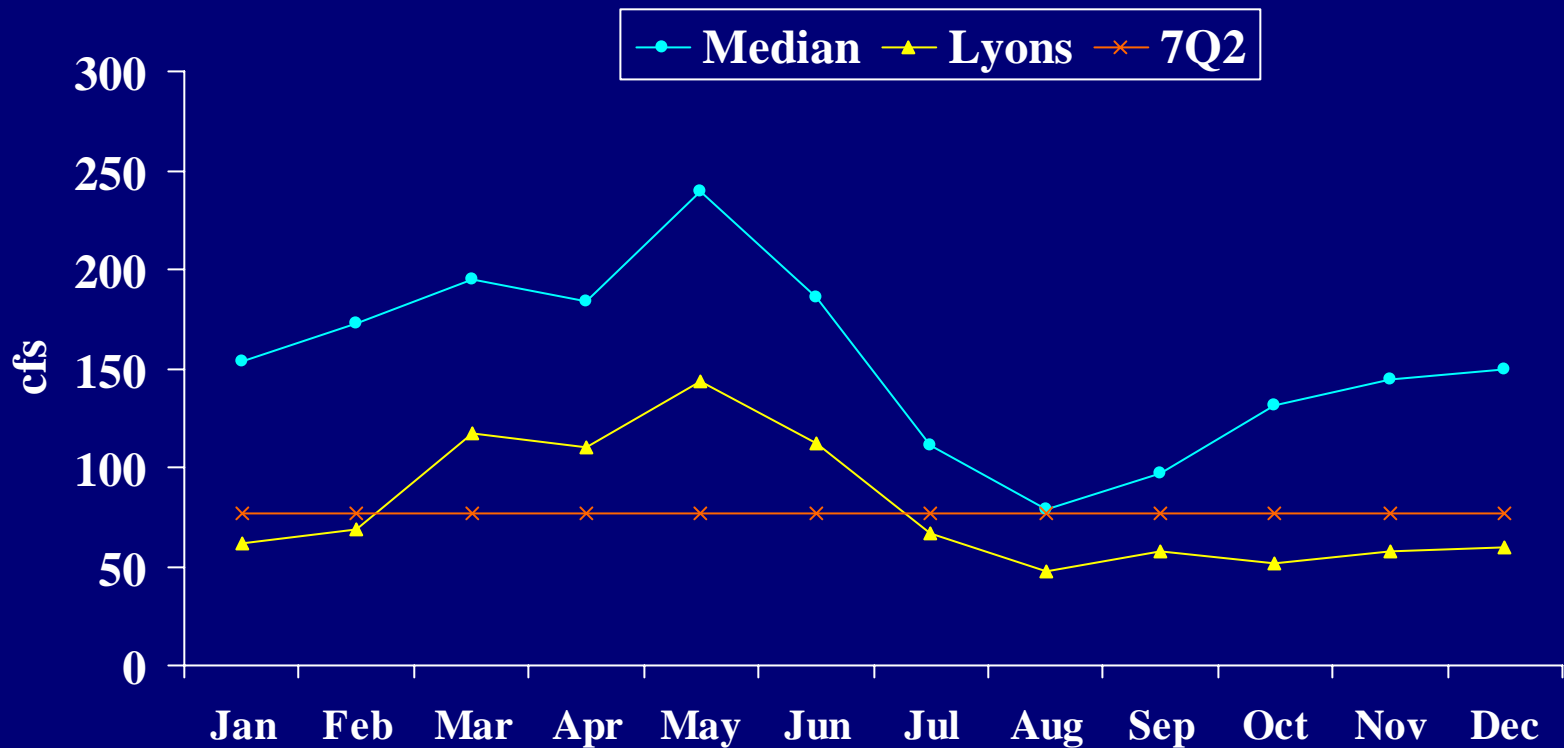
What SB 3 Does Not Do

- guarantee adequate water for environmental flows in every river basin and to each estuary
- create funding mechanism for “variety of market approaches”

Current TCEQ Process for Setting Instream Flow Requirements

- Site-specific studies and data, or
- Desktop methodology: Lyons' Method and/or 7Q2 value
- Lyons' Method provides 60% of median flow during March – September and 40% of median during October – February.
- 7Q2 value (two year, 7-day low flow) used when greater than Lyons'

Instream Flow Recommendations using Lyons Method and 7Q2 flows



Example of Flow Restriction

“In order to provide sufficient flows for the instream uses of the Green River, diversions of water should be limited to times when streamflow equals or exceeds the following monthly flows at USGS gaging station #08000000:”

Recommended monthly flows (cfs)

Jan	Feb	Mar	Apr	May	Jun	Etc.
11	14	37	40	64	40	Etc.

Summary

- Two state initiatives: SB 2 and SB 3
- SB 2 is about conducting instream flow studies in select river basins
- SB 3 is a stakeholder-driven process to establish instream flow and freshwater inflow standards basin by basin
- Goal of both is to provide water for the environment using best available science

Contact Information

Dr. Wendy Gordon

wgordon@tceq.state.tx.us



<http://www.twdb.state.tx.us/instreamflows/>