Impacts of Growth on Environmental Flows

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BPA Symposium

20 October 2008

Freshwater Inflows to Galveston Bay

- Volume of inflows affects salinity, sediment and nutrient loadings
- Timing of inflows affects reproduction of bay species
- Location of inflows affects salinity gradients and wetlands habitat

…..Freshwater inflows by definition create and sustain estuaries – where freshwater meets saltwater

Freshwater inflows were identified as a priority problem by the Galveston Bay Plan in 1995:

"Future demands for freshwater and alterations to circulation may seriously affect productivity and overall ecosystem health. "

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"

Source: C. Loeffler, TPWD, October 2, 2008

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

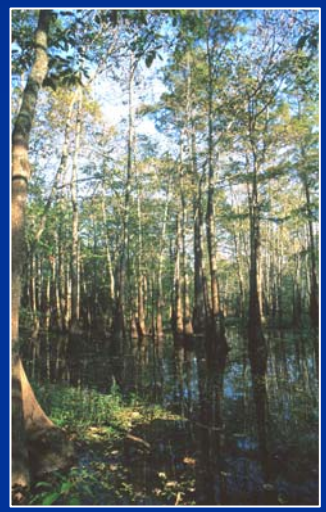
Source: C. Loeffler, TPWD, October 2, 2008

From Freshwater Inflows to Environmental Flows

The Legislature has settled on "environmental flows" as the term to include stream flows and spring flows as well as freshwater inflows to bays and estuaries.

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,

habitat

Water quality and assimilative capacity

Channel maintenance

Recreation

Economics

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

THE RIO GRANDE GOING DRY FROM BOTH ENDS

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

- Initiates a new regulatory system for protecting environmental flows
- Establishes a consensus-based regional approach involving a balanced representation of stakeholders

Parts of the Process

- Environmental Flows Advisory Group
- Texas Environmental Flows Science Advisory Committee
- Bay and Basin Advisory Stakeholders Committee (BBAS)
- Bay and Basin Expert Science Team (BBEST)
- Support from State Resource Agencies

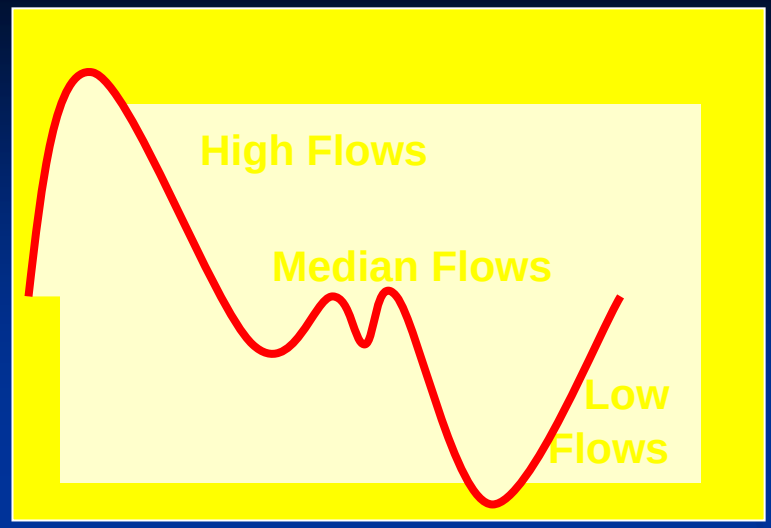
The Job

BBEST working with technical support from state agencies and academic institutions is to develop and recommend an environmental flow regime based solely on best available science to BBAS and TCEQ

BBAS considers environmental flow regime recommendations in light of social or economic factors (stakeholder interests) and then may adopt BBAS recommendations or submit its own recommendations to TCEQ

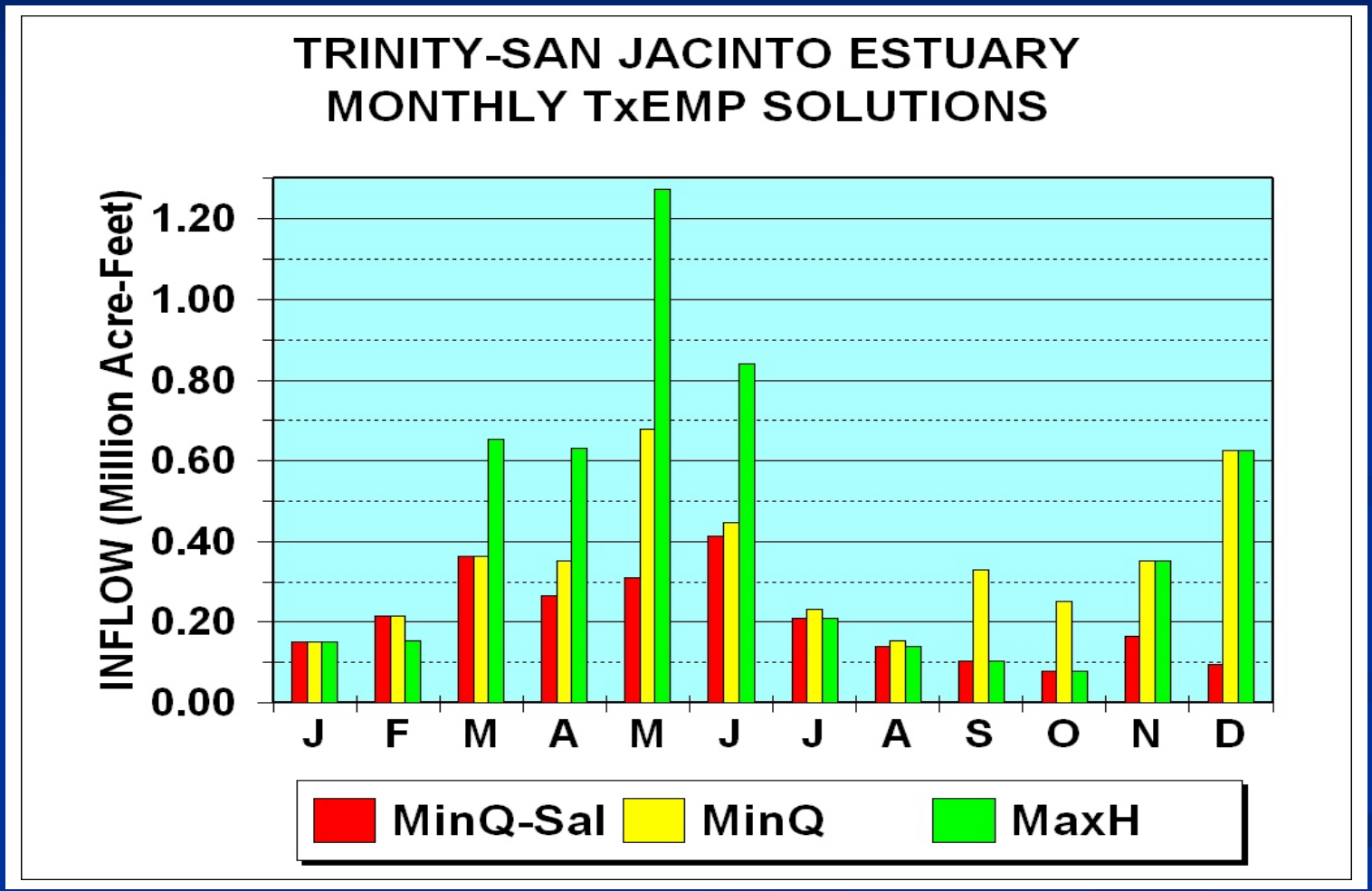
Through rulemaking, TCEQ adopts environmental flow standards and establishes an environmental flow “set aside” if unappropriated water is available; rulemaking process allows for broad public input

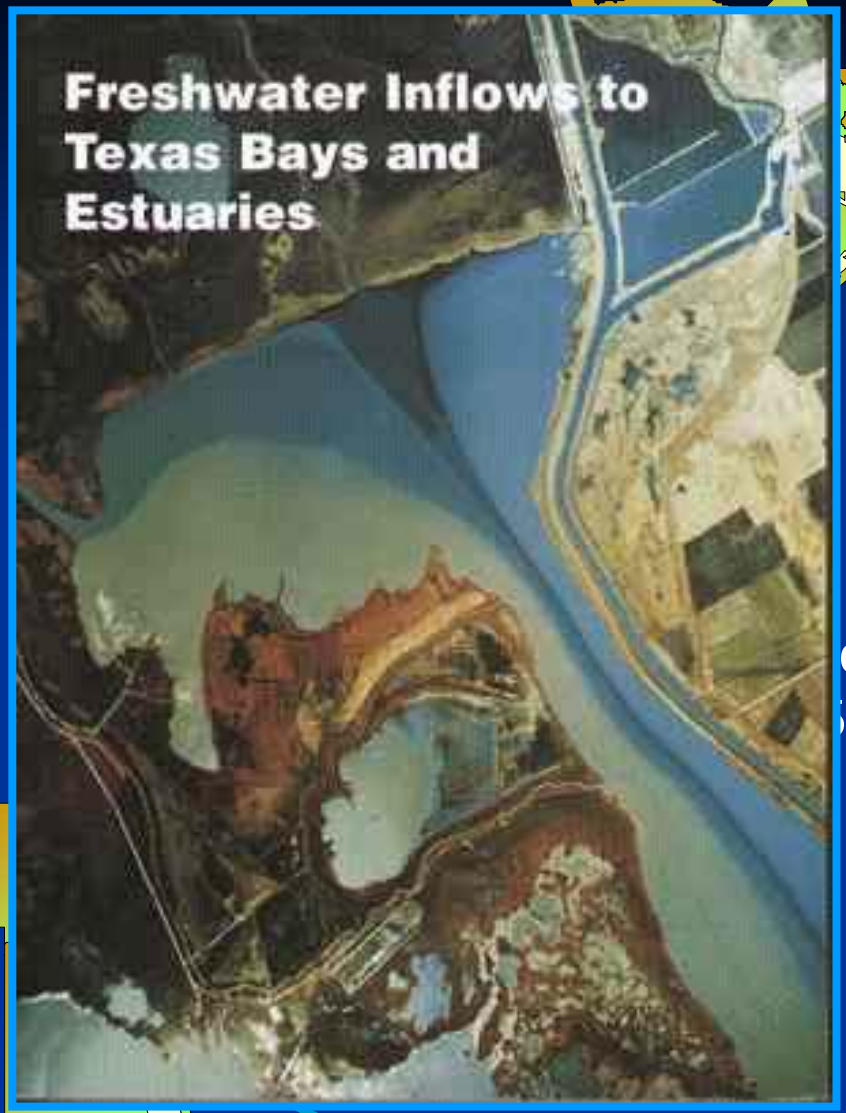
Environmental Flow Regime Definition



"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."

TxEMP Monthly Flow Distribution





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.

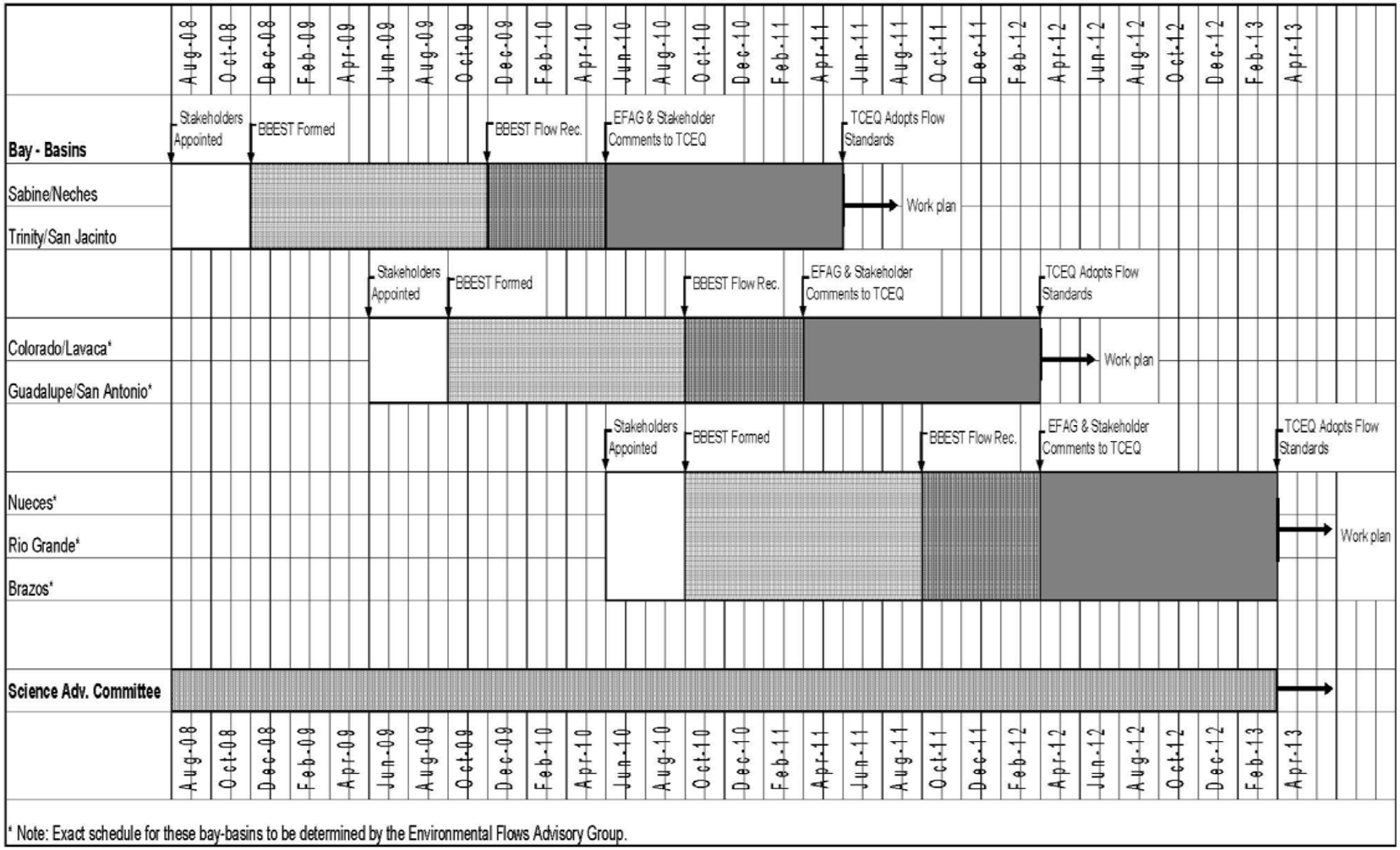
* Millions of Acre Feet Per Year

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

SB3/HB3 Revised Schedule



* Note: Exact schedule for these bay-basins to be determined by the Environmental Flows Advisory Group.

Adaptive Management

- Flow standards will be subject to periodic review and revision – at least once every ten years.
- The success and/or failure of environmental flow management measures will be assessed and adjusted as new science and information becomes available.
- Water rights permits now carry a “re-opener” provision to allow for new information; SB-3 limits the extent of permit revision.

Texas Living Waters Project

- Collaborative effort of National Wildlife Federation, Environmental Defense, and Lone Star Chapter of Sierra Club
- Galveston Bay Foundation assisting locally
- Supported by private foundations
- Sponsor statewide and regional conferences, website
- Aim to educate and involve citizens in decision making process for water management

In the end…

we want water for both people and the environment