Sabine and Trinity BBEST's Lessons Learned

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Presentation to the Colorado/Lavaca Stakeholders and Environmental Flows Science Team

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Environmental Flows Process

Revise environmental flow standards based on new information

Next 10 yrs: Adpative Management: additional analyses and studies if funded.

Environmental Flow Standards by TCEQ

Environmental Flows Advisory Group and Stakeholders Recommendations to TCEQ

Flow regime by BBEST

Definitions

Sec. 11.02362. DEVELOPMENT OF ENVIRONMENTAL FLOW REGIME RECOMMENDATIONS.

(m) Each basin and bay expert science team shall develop environmental flow analyses and a recommended environmental flow regime for the river basin and bay system for which the team is established through a collaborative process designed to achieve a consensus. In developing the analyses and recommendations, the science team must consider **all reasonably available science, without regard to the need for the water for other uses**, and the **science team's recommendations must be based solely on the best science available**.

Sec. 11.002. DEFINITIONS.

(15) "Environmental flow analysis" means the **application of a scientifically derived** process for predicting the response of an ecosystem to changes in instream flows or freshwater inflows.

(16) "Environmental flow regime" means a **schedule of flow quantities that reflects seasonal and yearly fluctuations** that typically would vary geographically, by 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.

While “Sound Ecological Environment” is not defined in SB3 it is defined in the National Academy of Science reviewed Texas Instream Flow Studies: Technical Overview “A resilient, functioning ecosystem characterized by intact, natural processes, and a balanced, integrated, and adaptive community of organisms comparable to that of the natural habitat of a region.”

Task

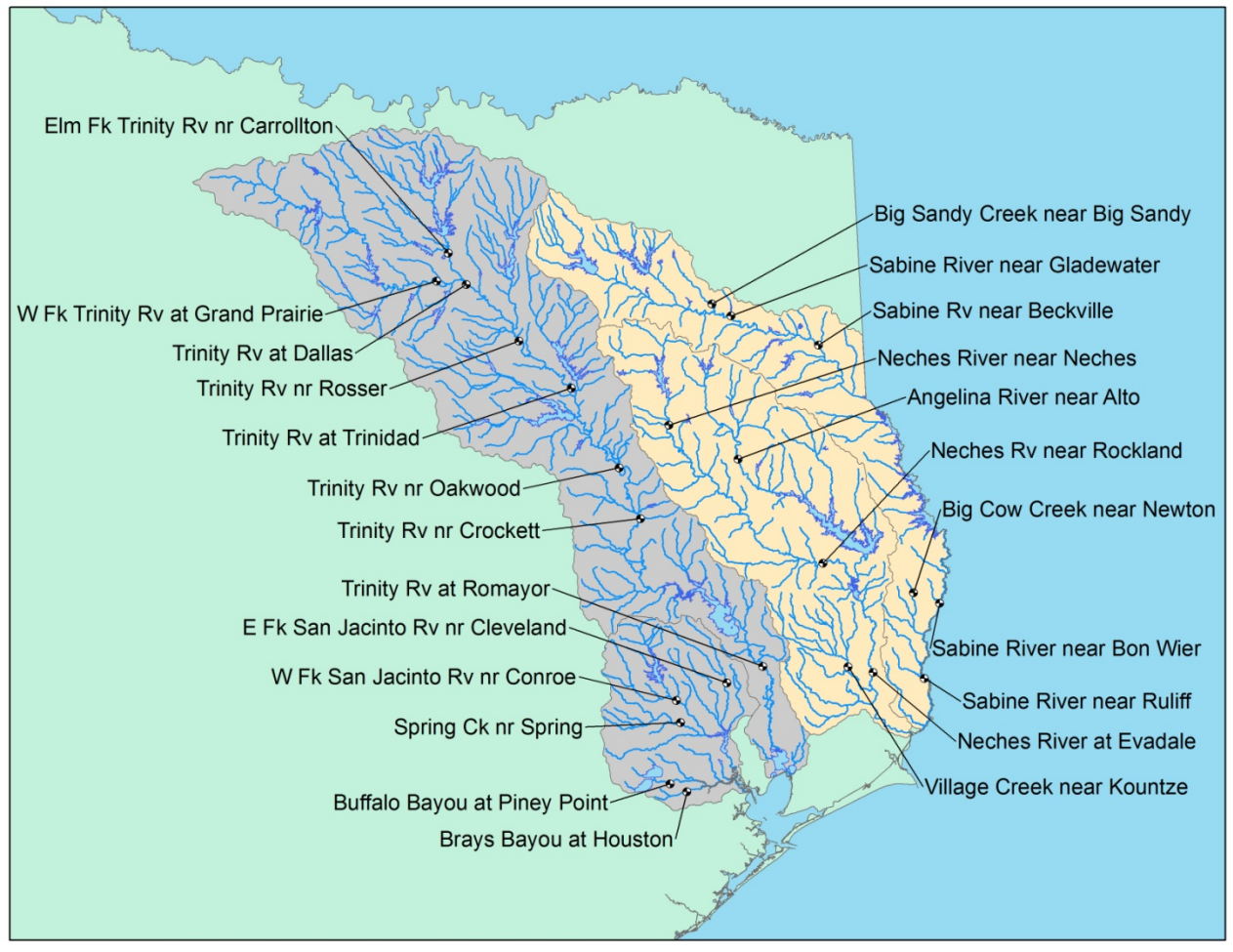
- **Meet the SB3 legislative mandate**. With support of Statewide Science Advisory Committee guidance documents
- **Use best available science.** Thorough review and application of state of the art instream flow science. Includes best professional judgment .
- **Protect a sound ecological environment**. Based on “natural flows paradigm”. Includes inter- and intra- annual variability, and attainment frequencies.

Challenges

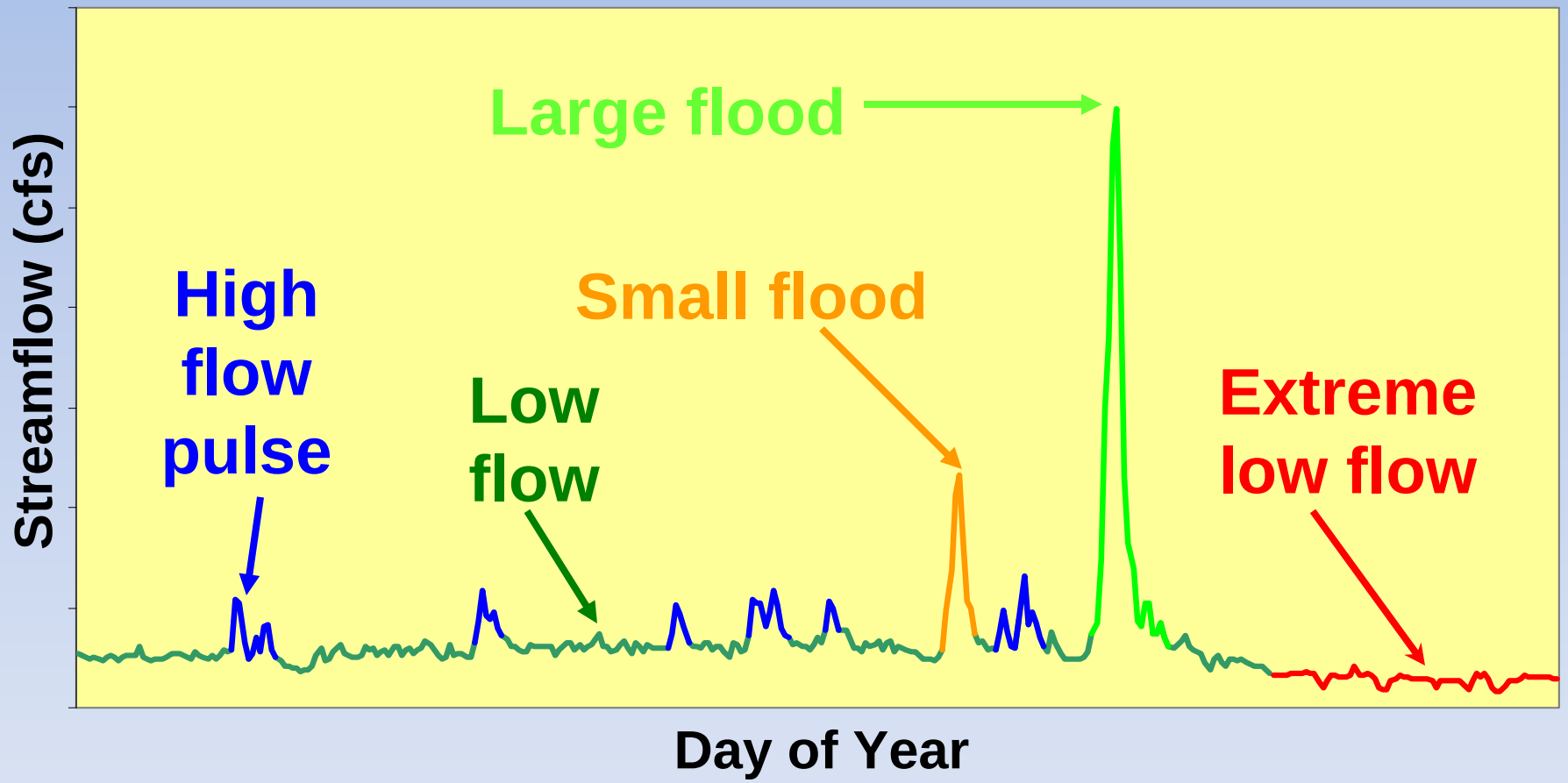
- Is the SB3 objective understood in the same way by everyone?
- Do participants understand and accept the process?
- Previous BBESTS relied heavily on hydrologic analysis and struggled with limited overlay information.
- Implementation and interpretation of flow recommendations occurs after the flow regime is described.

Rivers – Instream Flow

- Geographic Scope – Site Selection
- Hydrologic Analysis
- Overlays
- Interpretation



Hydrologic Analysis



Overlays

Table 10-1. Definitions and objectives for instream flow components.

Subsistence flows

Definition: Infrequent, seasonal periods of low flow

Objectives: Maintain water quality criteria

Base flows

Definition: Normal flow conditions between storm events

Objectives: Ensure adequate habitat conditions, including variability, to support the natural biological community

High flow pulses

Definition: Short-duration, in-channel, high flow events following storm events

Objectives: Maintain important physical habitat features
Provide longitudinal connectivity along the river channel

Overbank flows

Definition: Infrequent, high flow events that exceed the normal channel

Objectives: Maintain riparian areas
Provide lateral connectivity between the river channel and active floodplain

Overbank Flows	Q: 24,600 cfs with Frequency 1 per 2 years Volume is 626,471 Duration is 26			
High Flow Pulses	Q: 15,000 cfs with Frequency 2 per year Volume is 326,119 Duration is 18			
	Q: 11,200 cfs with Frequency 1 per season Volume is 257,289 Duration is 14 Q: 3,200 cfs with Frequency 2 per season Volume is 18,931 Duration is 5	Q: 15,700 cfs with Frequency 1 per season Volume is 362,910 Duration is 19 Q: 7,840 cfs with Frequency 2 per season Volume is 141,705 Duration is 11	Q: 2,930 cfs with Frequency 1 per season Volume is 26,246 Duration is 5 Q: 1,180 cfs with Frequency 2 per season Volume is 4,866 Duration is 2	Q: 3,050 cfs with Frequency 1 per season Volume is 39,239 Duration is 5
Base Flows (cfs)	1110	1398	682	819
	623	820	411	439
	340	458	257	265
Subsistence Flows (cfs)	196	280	70	101

Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Winter			Spring				Summer			Fall	

Hydrologic Conditions	
	Wet
	Average
	Dry
	Subsistence

High Flow Pulse Characteristics	
	F = Frequency (per season)
	D = Duration (days)
	Q = Peak Flows (cfs)
	V = Volume (ac-ft)

Bay and Estuary – Freshwater Inflow

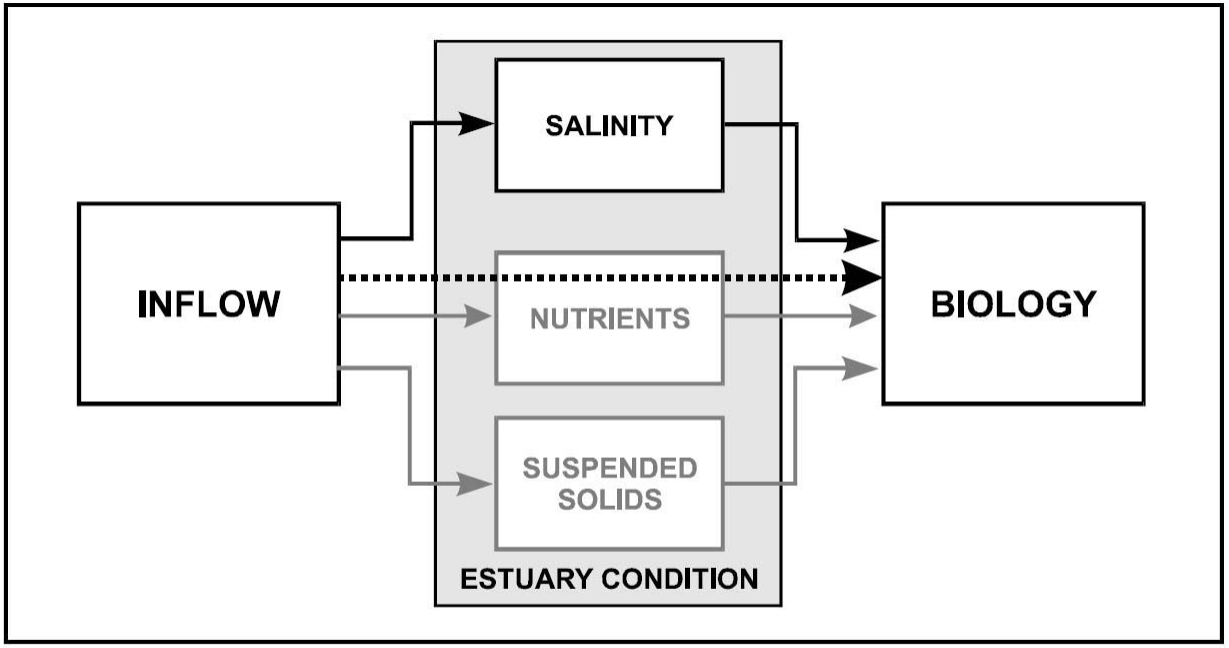
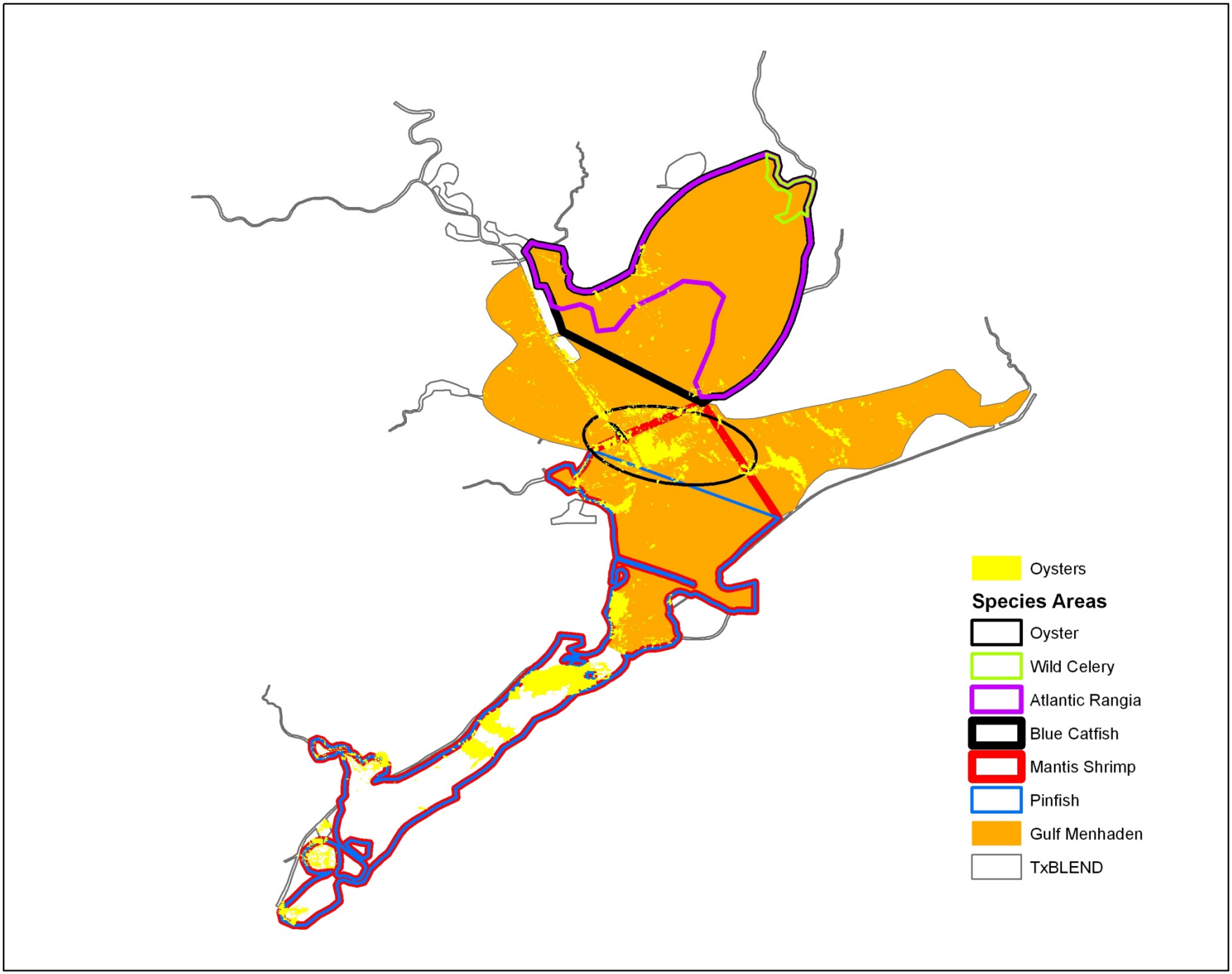


Figure 2.1-2 – Schematic of Relation of "Biology" to "Inflow" (Compressed from Figure 2.2-1)

1. Indicator Selection
   - salinity range
   - geographic area
2. Salinity Model
3. Flows to meet desired conditions
4. Interpretation


Oysters
Species Areas
Oyster
Wild Celery
Atlantic Rangia
Blue Catfish
Mantis Shrimp
Pinfish
Gulf Menhaden
TxBLEND

Recommendation

Season	Spring	Summer	Fall	Winter
Flow	302,000	257,000	250,000	
Periodicity	1 of 3 months	2 of 3	1 of 3	
Annual Occurrence	15 of 23 years	5 of 23	13 of 23	
Recommended Annual Frequency	1 in 2 years	1 in 5 years	1 in 2 years	

Flow Regime: Description not Prescription

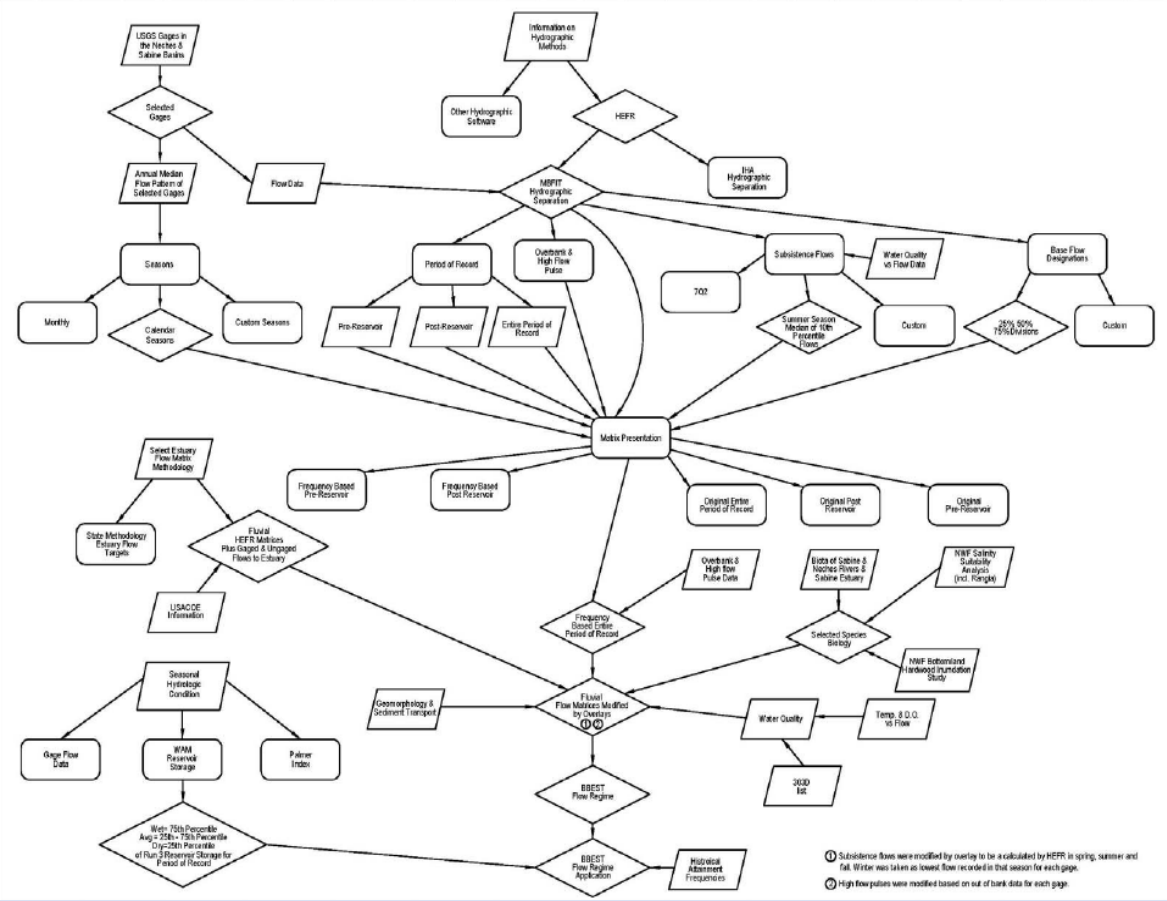
Does not create a new ecosystem

Are not values that should never be changed

Does not mandate that flow standards equal flow regime

Improvements to the Process

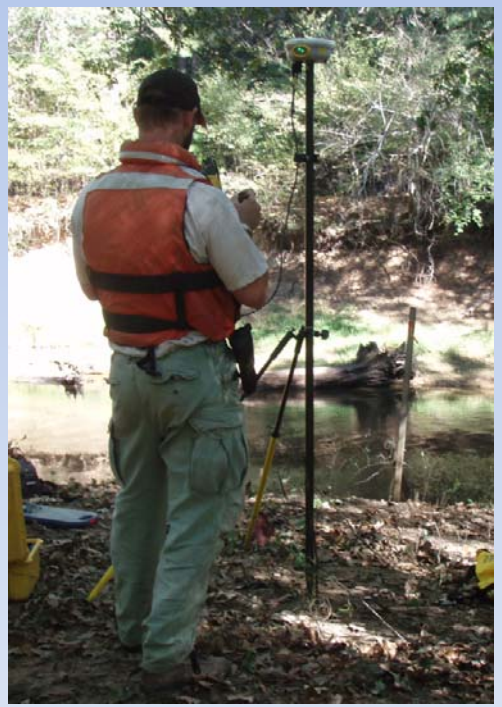
- Internal deadlines
- Organize subject-based committees
- Documentation of decisions.



Products and Timeline

- Site Selection, Hydraulic Analysis and Preliminary Flow Matrices – 3 months
- Overlay Analysis – 5 months
- Draft Environmental Flow Regime – 1 month
- Environmental Flow Analysis – 2 months
- Final Report – 1 month

Field Trips – I'm serious about this!



TPWD Comments on Trinity BBEST Analysis

- Acknowledge flows have changed to streams and bays with effects on habitat and native species
- Avoid implementation considerations
- Provide flow regimes for tributaries
- Compare river flow regimes to freshwater inflow regimes to bays

SAC Comments on Trinity BBEST Analysis

- Relate water quality, sediment, and biological with flow as much as possible
- Site-specific species/flow relationship data are not necessary
- Base recommendations solely on science
- Freshwater Inflow recommendations do not embody comprehensive range of flow conditions

BBEST-BBASC Interaction

- Should the BBEST and BBASC work in a more integrated manner OR maintain separation.
- Start thinking about implementation and considering "present and future needs for water for other uses related to water supply planning"
- Examples the BBASC could weigh in on.
  - number and geographic scope of sites selected.
  - scope of FWI recommendation (total bay or sub-bays).
  - defining a desired ecological condition or range of alteration for which an environmental flows analysis might be applicable