

**Texas Instream Flow Program
Lower San Antonio River Study Design Workgroup
Meeting Notes
December 9, 2008**

The Study Design Workgroup met in Floresville on December 9, 2008 from 8:30 a.m. to approximately 4:30 p.m. The following notes capture key discussions and decisions of the group.

Development of Indicators

The group discussed and developed indicators by the following disciplines for the objectives they had developed at their workgroup meeting on Oct. 21.

Miscellaneous objectives

The group first reviewed the following two objectives that had been generated by small breakout groups at the Oct. 21 meeting, but which had not been discussed with the workgroup as a whole:

- Define goals for recreational uses of the San Antonio River (type and location)
- Buy-in from stakeholders and users.

The group tentatively agreed that these will be background ideas that will be used in the development of indicators, but that no specific indicators for these two proposed objectives were needed.

Biology

Biology Objective *(confirmed by group)*

- Determine and maintain flows necessary to support:
 - native species and biological communities known to occur in the river and riparian zones
 - key aquatic habitats

Biology Indicators *(selected by workgroup)*

Editing shows additions (underlined) and deletions (strike-through) from list proposed by TIFP agencies

Category	Indicator
<i>Instream Biological Communities</i>	Native Richness
	Relative Abundance
	Fish <ul style="list-style-type: none"> • Flow sensitive species • Sport fish • Prey species • Imperiled species • Intolerant species
	Other Aquatic Organisms <ul style="list-style-type: none"> • Benthic invertebrates (<u>as validation of aquatic community health only</u>) • River prawn • Mussels • <u>River and riparian plants, if any</u> • Other Vertebrates

<i>Instream Habitat</i>	Habitat Quality and Quantity for Key Species
	Mesohabitat Area and Diversity
<i>Riparian Habitat</i>	Vegetation <ul style="list-style-type: none"> • Age class distribution of riparian plant species • Riparian species richness and diversity • Density • % Canopy cover
	Soils <ul style="list-style-type: none"> • Riparian soil types
	Hydrology <ul style="list-style-type: none"> • Gradient of inundation • Base flow levels

Prioritization of biology indicators:

Agencies indicated they believe all indicators, as modified, can be studied, and therefore prioritization not needed.

Notes from discussion

Taxa: Fish

- Temperature tolerance of non-natives
- Sport fish
- Balance of fish community for sustainability
 - Key species related to specific habitat (micro-habitat data)
- Value richness and abundance
- Taxa to be studied:
 - represent community health
 - related to specific habitat
 - let experts choose species, with study group deciding overarching ideas
 - sampling might show other needed study elements

Taxa: Other

- Riparian – covered elsewhere
- Mussels
 - TPWD indicates they are of interest as a “canary in the mine”
 - Golden orb of interest
 - Concern that its analysis be tied to flow
- Do not use river prawn
- Use benthic invertebrates only as validation studies
- Birds: they relate to the recreational portion of the goal for the river but are not needing to be specifically studied as part of the instream flow studies

Riparian Habitat

- Successional age
- Some existing information on types of plants/population
- Important areas:
 - Goliad County
 - Near the Guadalupe confluence
 - Cypress trees: in Sutherland Springs, Lavernia
 - Womack wetlands
 - Fagan wetlands – type II hunting area?

- Buffer width
- Canopy (cooling)/ Roots (riffles)/ Supports species diversity
- Oxbows: make sure these are captured in study

Hydrology

At the 2nd workgroup meeting in Floresville on October 21st, the group did not reach agreement on the wording for objectives related to Hydrology and Hydraulics. TWDB provided, by e-mail, a draft set of objectives that it felt reflected the ideas provided by workgroup members, for the workgroup to consider at its Dec. 9th meeting. After discussion of the proposed draft, the group adopted the objective:

Hydrology Objective (adopted by workgroup)

Develop a flow regime that sustains ecological processes throughout the system:

- Determine components of the flow regime and their characteristics (frequency, timing, duration, rate of change, magnitude) that support study objectives from other disciplines
- Determine the natural variability of flow component characteristics
- Evaluate water losses and gains throughout the system

Notes from discussion of objective: The system is considered to be the San Antonio River and Cibolo Creek, subject to the availability of funds for the study.

Hydrology Indicators (selected by workgroup)

Editing shows additions (underlined) and deletions (strike-through) from list proposed by TIFP agencies

Category	Indicator
<i>Flow regime components</i>	<ul style="list-style-type: none"> • Overbank flows (frequency, timing, duration, rate of change, and magnitude) • High pulse flows (frequency, timing, duration, rate of change, and magnitude) • Base habitat flows (frequency, timing, duration, rate of change, and magnitude) • Subsistence flows (frequency, timing duration, rate of change and magnitude)
<i>Natural variability</i>	<ul style="list-style-type: none"> • Natural • Current
<i>Losses/gains</i>	Gain or loss in section of river

Prioritization of hydrology indicators:

Agencies indicated they believe all indicators can be studied, and therefore prioritization not needed. Availability to study Cibolo Creek will be evaluated as the study design is developed.

Water Quality

Water Quality Objective (confirmed by group)

- Maintain flow in order to sustain water quality to support:
 - Biodiversity,

- Economic uses, and
- Recreational uses
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Water Quality Indicators (selected by workgroup)

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Category	Indicator
<i>Nutrients</i>	<u>Nitrogen</u> Organic Nitrate plus nitrite Ammonia Total
	<u>Phosphorus</u> Filterable reactive Total
<i>Oxygen</i>	Dissolved oxygen
<i>Temperature</i>	Temperature
<i>pH</i>	pH
<i>Water clarity</i>	Suspended solids
	Turbidity
	Secchi depth
<i>Salinity</i>	Conductivity
<i>Microalgal growth</i>	Chlorophyll-a
<i>Recreational health</i>	Bacteria (<u>high flow</u>)
<i>Metals</i>	Concentration of metals in water
<i>Organics</i>	Concentration of organics in water
<i>Biological</i>	Benthic invertebrates
	Fish
<i>Fish consumption advisories and closures</i>	Fish tissue analysis

Prioritization of water quality indicators: Agencies indicated they believe all indicators, as modified, can be studied, and therefore prioritization not needed.

Notes from discussion

- Nutrients: nitrogen and phosphorous
 - Discussed Qualtex model
- Qualtex also looks at temperature and oxygen
- Check Qualtex model availability for Cibolo
- Explore indices like IBI re sensitivity to flow
- Can remove fish tissue analysis for this study
- Flow Specific indicators:
 - Dissolved oxygen

- Temperature
- Bacteria (high flow)
- Nutrients (low flow)
- Community structure of benthics – captured in biology discipline
- Other water quality parameters mentioned may be available as monitoring data

Geomorphology

Geomorphology Objective *(confirmed by group)*

- Determine and balance the geomorphic effects of different flows, including:
 - channel migration
 - positive and negative effects of overbank flows
 - woody-debris dynamics

Geomorphology Indicators *(selected by workgroup)*

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Category	Indicator
<i>Channel migration</i>	<ul style="list-style-type: none"> ● Rate of lateral channel migration ● Rate of channel avulsion ● Rate of bank erosion
<i>Overbank flows</i>	<ul style="list-style-type: none"> ● Total area inundated ● Habitat area inundated ● Stage (at USGS gage locations)
<i>Woody debris</i>	<ul style="list-style-type: none"> ● Volume ● Transport rate ● Recruitment rate
<i>Channel shape characteristics</i>	<ul style="list-style-type: none"> ● In-channel bars (area, configuration, sediment, size) ● Meander pools (depth)

Prioritization of geomorphology indicators: Agencies indicated they believe all indicators can be studied, and therefore prioritization not needed.

Notes from discussion

- Workgroup encourages the development of programs/ recommend ways to prevent man-made debris from entering the waterway (not instream flow study related). The issue of debris also relates to water quality
- Woody debris: relate indicators/study to patterns of accumulation/snags

Connectivity

Connectivity Objectives *(confirmed by group)*

- Identify the interaction of groundwater and surface water
- Evaluate the connectivity of important habitat features of the river and riparian zone that support the basin goal

Connectivity Indicators *(selected by workgroup)*

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Category	Indicator
<i>Groundwater/surface water interaction</i>	Gain or loss in section of river
<i>Habitat features</i>	Connection to river (Frequency, duration, and timing)
<i>Freshwater inflows to estuary</i>	Volume of flow (monthly and yearly totals at USGS gage #08188500 at Goliad)

Prioritization of connectivity indicators: Agencies indicated they believe all indicators can be studied, and therefore prioritization not needed.

Notes from discussion

- Longitudinal Connectivity:
 - study Lower San Antonio system and be aware of issues that arise
 - consider possible indicators

Next Steps

- Agencies will send study site criteria to participants and ask for input on possible sites
- Agencies and study partners will proceed with drafting the study design, including individual meetings and communications
- Final meeting of study design workgroup will provide specific feedback on the draft study design