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Brazos River Basin Monitoring to Support Environmental Flow Standards

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Purpose

- **Provide data to support refinement of TCEQ Environmental Flow Standards through SB3 mandated adaptive management mechanisms**
- **Provide data to Texas Instream Flow Program, as requested**
- **Voluntary effort**

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Goal

- Generate baseline data across the range of adopted subsistence and base flows for each location
- Fill knowledge gaps identified during environmental flow standard development

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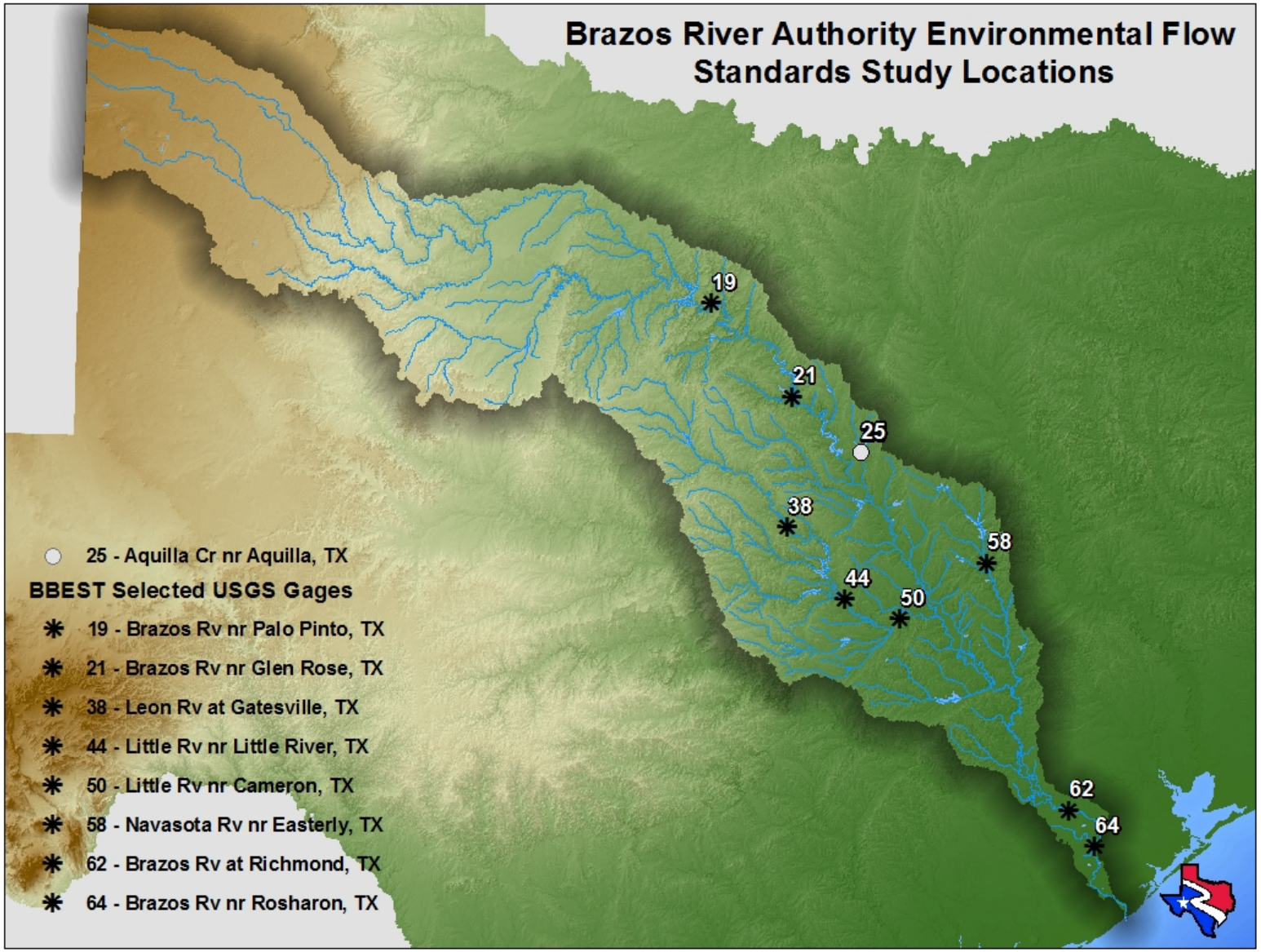
Current Study Locations



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Instream Flow Studies (IFS) Performed at Each Location

- Discharge
- Velocity
- Water Quality
  - Temperature, pH, Conductivity, Dissolved Oxygen
- Fixed photography
- Habitat mapping
- Channel Surveys
- Macroinvertebrates
- Mussels
- Fish
- Riparian Tree Surveys
- Sediment

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IFS Sampling Frequency

- **Biological and Instream Habitat**
  - Events scheduled based on flows
  - Goal a total of 15 events at each location, relatively evenly distributed across baseflows
  - Attempt one in spring and one in summer/fall – nature does not always allow
- **Riparian and Channel Surveys**
  - One per year
  - Goal a total of 5 events per site
- **Sediment**
  - One initial sample
  - Additional samples collected once/year if a high flow pulse occurs at the site
- **Water quality**
  - Monthly or quarterly per CRP schedule

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Comparability to SWQM Methods - Fish

- IFS reach lengths typically 40x average stream width, up to a maximum of 1 km in large streams
- Sample all mesohabitat types within a reach, plus microhabitats after high-flow pulses
- IFS fish collection effort greater than that required by SWQM

Typical SWQM event:

- Electrofishing: 900 second minimum
- Seine hauls: 6
- Combined Length of Seine Hauls: 60 m

Typical IFS event:

- Electrofishing: 2,650 seconds
- Seine hauls: 13
- Combined Length of Seine Hauls: 185 m

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Comparability to SWQM Methods - Macroinvertebrates

- Using SWQM method for field collection
- IFS counts utilize a greater number of individuals
  - IFS - 250 ± 10%
  - SWQM – 175 ± 20%

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Comparability to SWQM Method - Mussels

- Visual survey
- Number collected per time and area searched
- IFS collection equivalent to SWQM methods

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Comparability to SWQM - Sediment

- IFS method more intensive than best professional judgement used in SWQM
- Collection, processing and analysis techniques derived from ASTM C117-04 and ASTM C136-06
- 5 samples per transect, 3 transects per reach
- Size of fine and coarse aggregates quantified
- Particle size distribution graph for each transect

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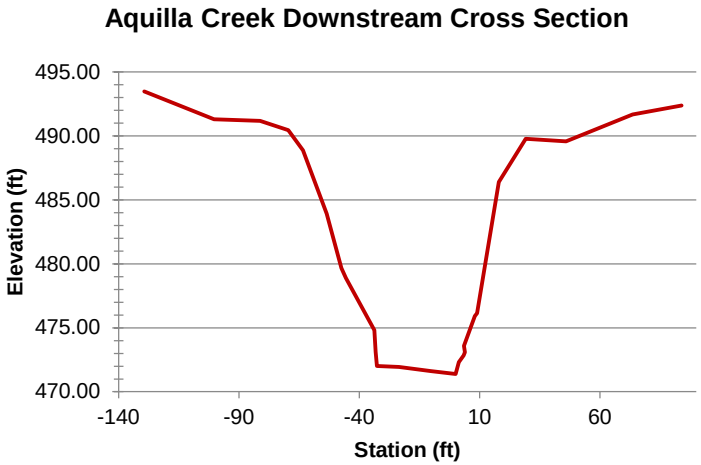
Comparability to SWQM – Channel Survey

- Much more intensive than individual bank angle method in SWQM
- Determine thalweg, bank shape, channel slope and elevation of channel bed



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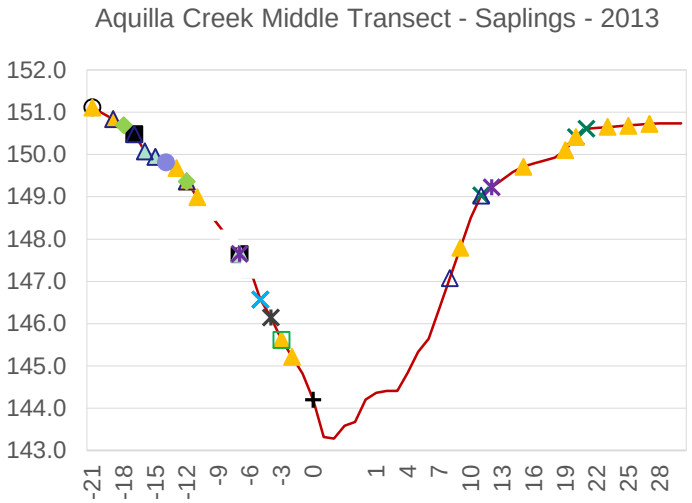
Comparability to SWQM – Riparian Trees

- IFS tree canopy measures use entire densiometer
- Transects perpendicular to stream
  - 3 transects per locations
  - 10 m wide transects
  - Length dependent on site (goal is a minimum 30m)
- Identify all trees, saplings, and seedlings
- Measure DBH on all trees and saplings > 2 inches
- Classify species by USACE Wetland Indicator Category and Stability Rating



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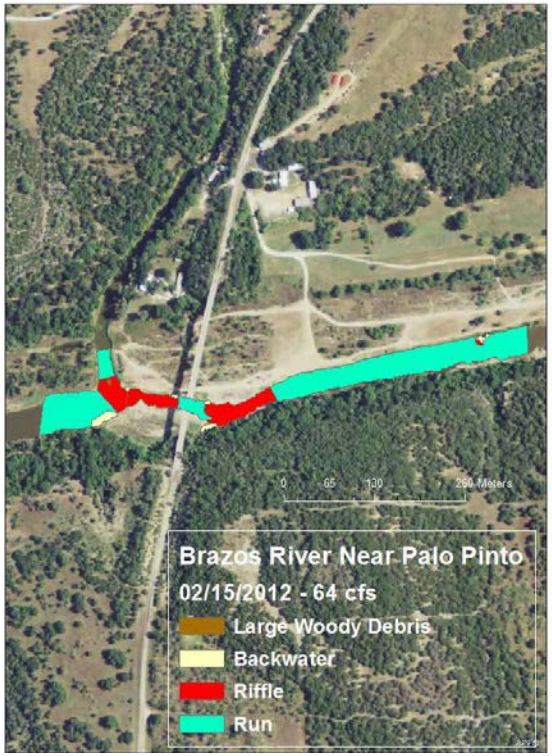
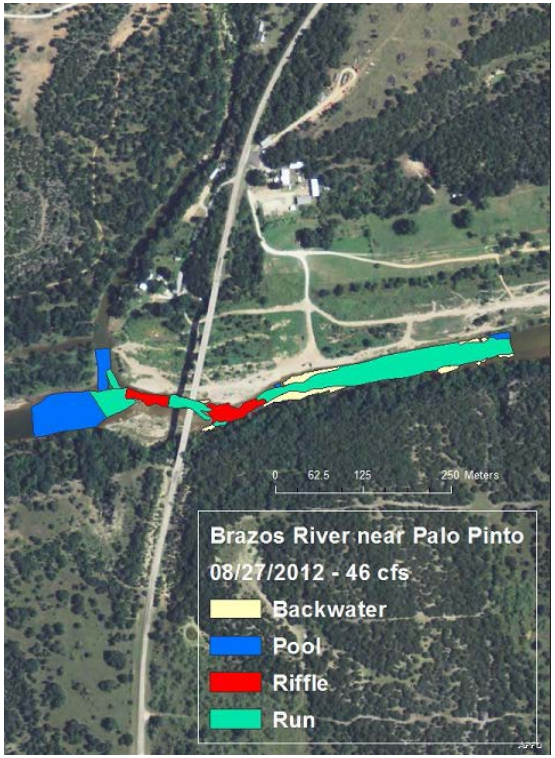
Instream Habitat Mapping





Overall

- **IFS sampling protocols very similar to ALM protocols**
  - **Level of effort greater than ALM protocols**
- **IFS data should be more robust**

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