Instream Flows Planning Project

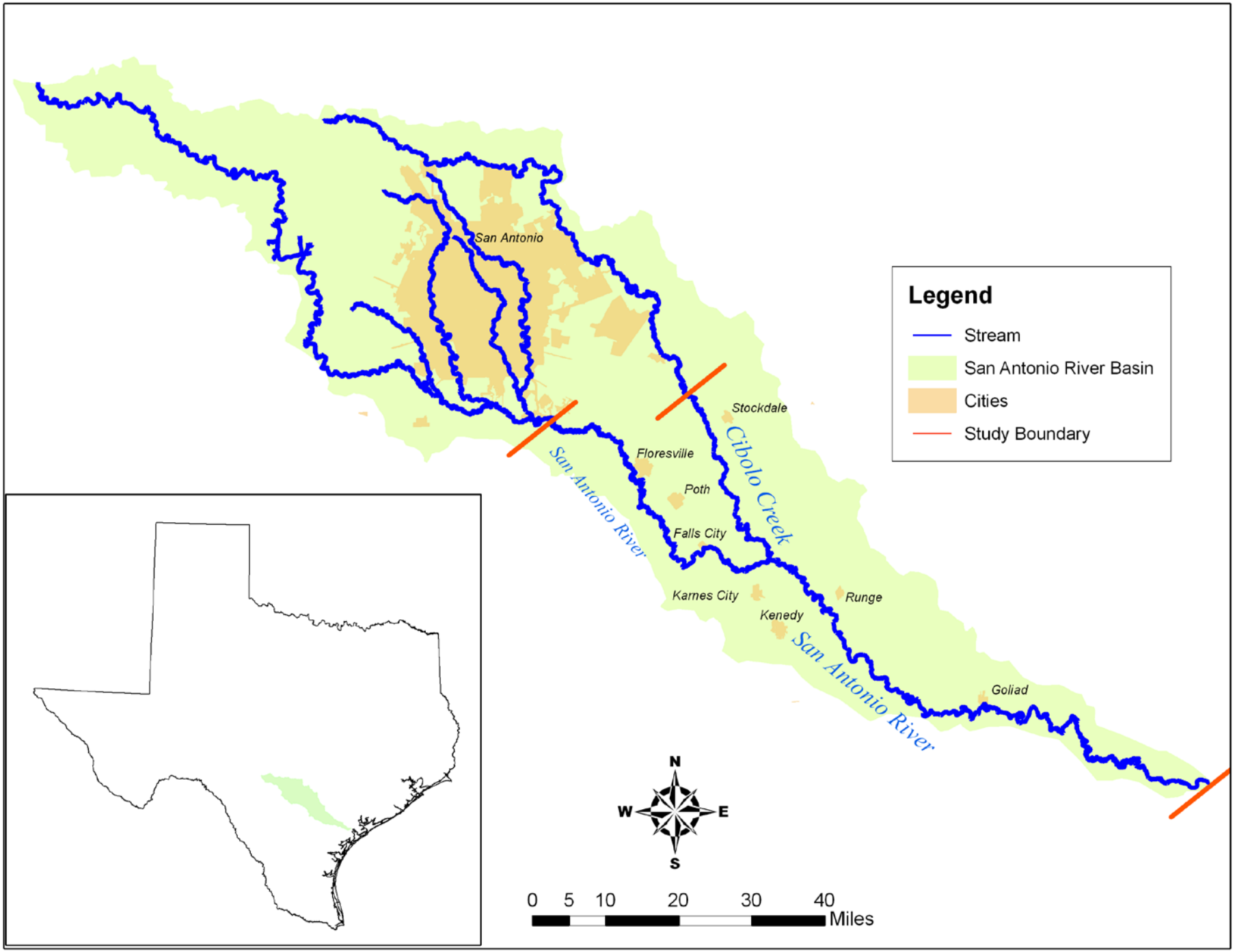
October 6, 2010

TEXAS INSTREAM FLOW PROGRAM

SAN ANTONIO RIVER AUTHORITY
Water Brings Us Together

Instream Flows Planning Project Overview

- Instream flow study – lower San Antonio River and lower Cibolo Creek
  - Texas Instream Flow Program (TIFP)
  - Senate Bill 2 Project Components
  - Progress to Date
  - Technical Disciplines
  - Focus on draft output for BBEST evaluation


San Antonio
Stockdale
Floresville
Poth
Falls City
Karnes City
Kenedy
Runge
Goliad
San Antonio River
Cibolo Creek
San Antonio River
Legend
Stream
San Antonio River Basin
Cities
Study Boundary
N
W
E
S
0 5 10 20 30 40
Miles

Sound Ecological Environment

- TIFP definition

  "a functioning ecosystem characterized by intact, natural processes, resilience, and a balanced, integrated, and adaptive community of organisms comparable to that of the natural habitat of a region."

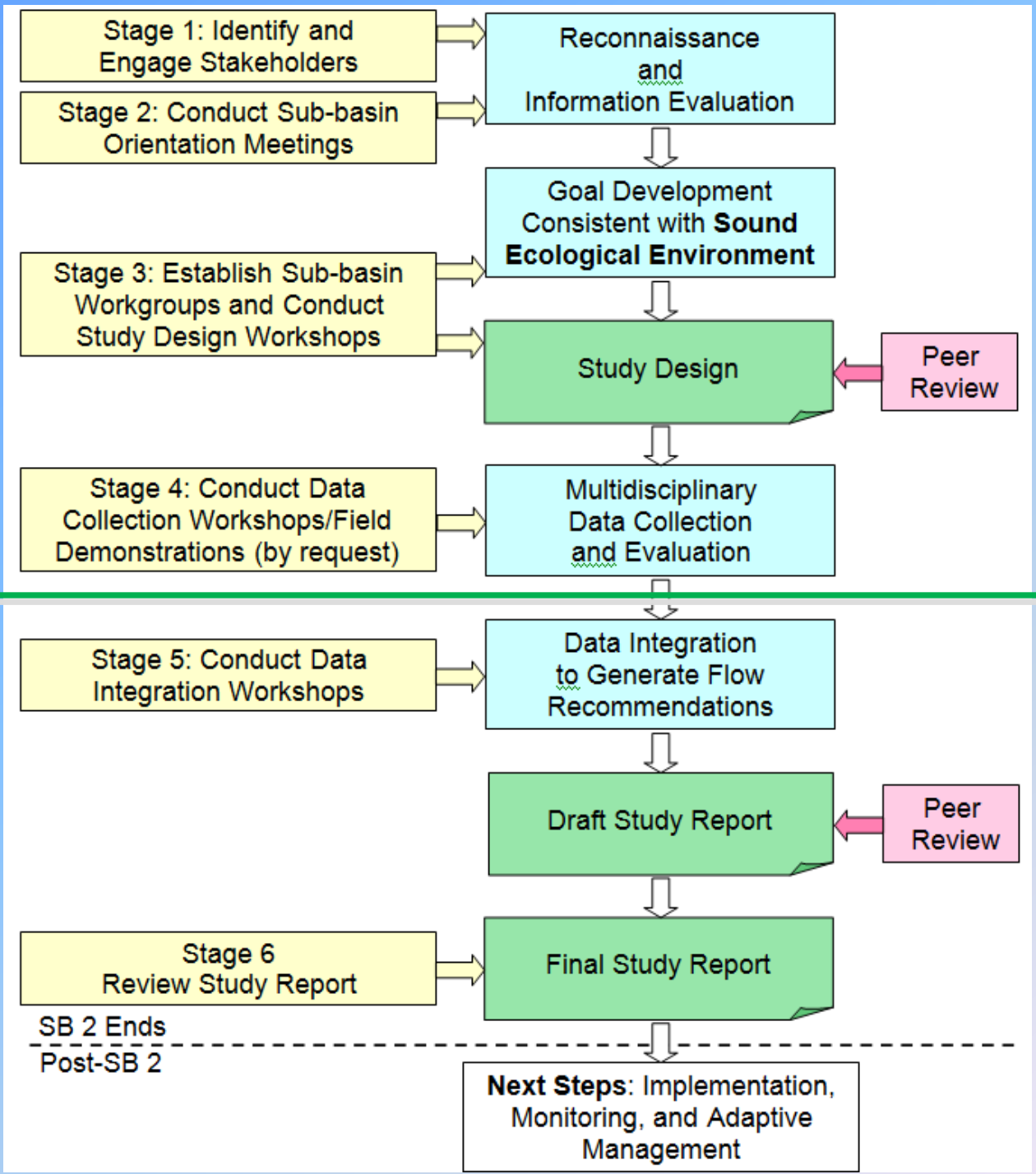
SB2 – Lower San Antonio Subbasin Stakeholders Goal

"a naturally functioning and sustainable ecosystem that supports a balance of ecological benefits and economic, recreational, and educational uses".

Instream Flow Components (TIFP)

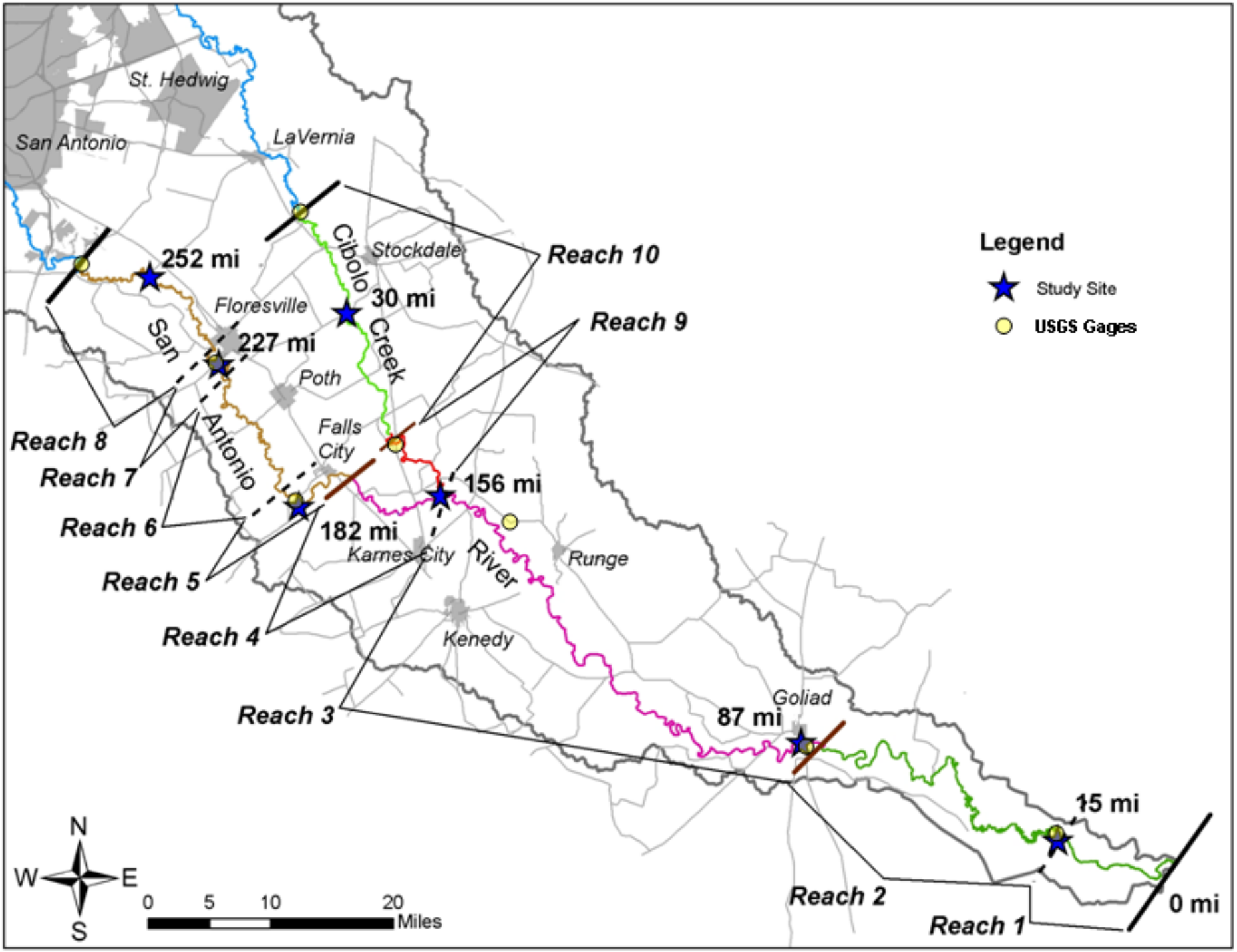
Subsistence flows	
Definition:	Infrequent, seasonal periods of low flow
Objectives:	Maintain water quality criteria
Base flows	
Definition:	Normal flow conditions between storm events
Objectives:	Ensure adequate habitat conditions, including variability, to support the natural biological community
High 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

PROJECT STATUS


Stage 1: Identify and Engage Stakeholders
Stage 2: Conduct Sub-basin Orientation Meetings
Reconnaissance and Information Evaluation
Goal Development Consistent with **Sound Ecological Environment**
Stage 3: Establish Sub-basin Workgroups and Conduct Study Design Workshops
Study Design
Peer Review
Stage 4: Conduct Data Collection Workshops/Field Demonstrations (by request)
Multidisciplinary Data Collection and Evaluation
Stage 5: Conduct Data Integration Workshops
Data Integration to Generate Flow Recommendations
Draft Study Report
Peer Review
Stage 6 Review Study Report
Final Study Report
SB 2 Ends
Post-SB 2
Next Steps: Implementation, Monitoring, and Adaptive Management

Holistic Ecological Considerations

- Hydrology
- Biology
  - Instream aquatic assemblages
  - Riparian corridor
- Physical Processes
  - channel processes, flushing flows, etc.
- Water Quality


St. Hedwig
San Antonio
LaVernia
Stockdale
Floresville
Poth
Falls City
Karnes City
Runge
Kenedy
Goliad
Cibolo Creek
San Antonio River
252 mi
227 mi
182 mi
156 mi
87 mi
30 mi
15 mi
0 mi
Reach 1
Reach 2
Reach 3
Reach 4
Reach 5
Reach 6
Reach 7
Reach 8
Reach 9
Reach 10
Legend
Study Site
USGS Gages
N
W
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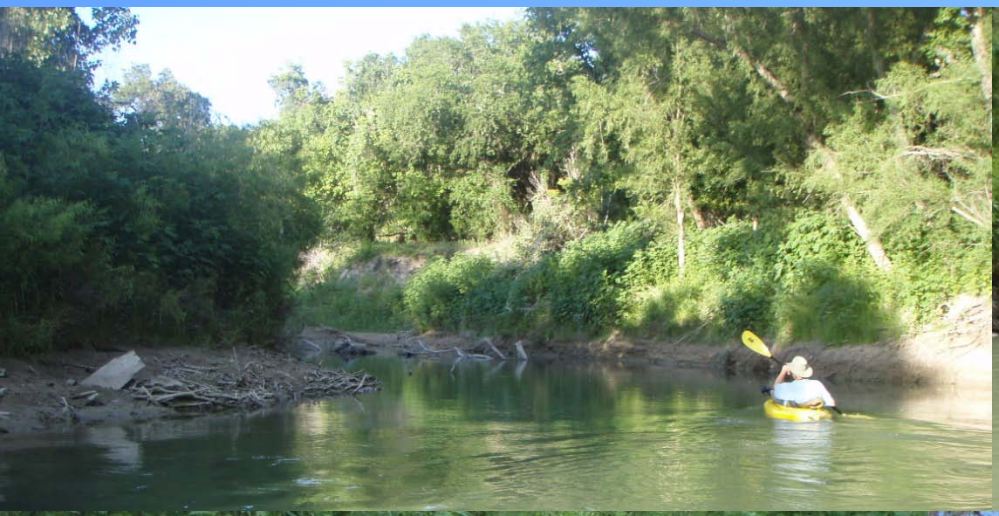
S
0 5 10 20
Miles

Calaveras Site



Falls City Site

Goliad Site

Highway 77 Upstream Site

Cibolo Creek Site

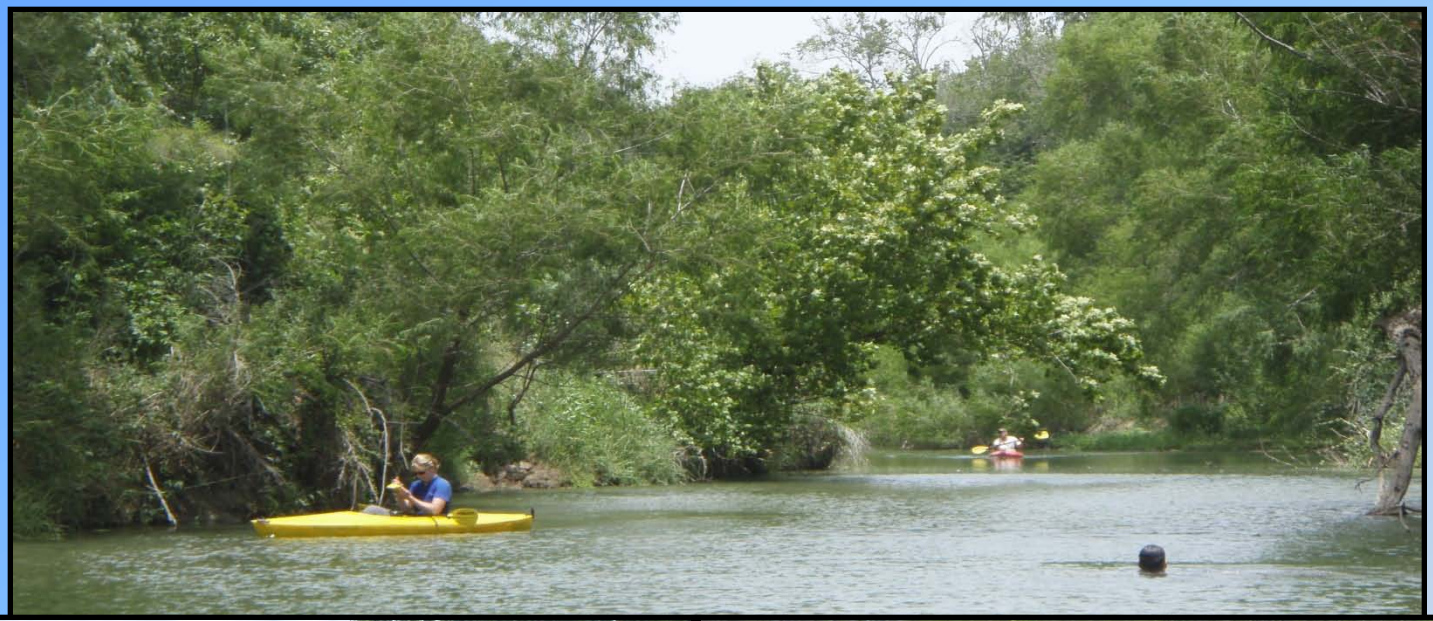
TIFP/SARA Field Efforts

- Habitat and Substrate Mapping
- Hydraulic data collection
  - Discharge, cross-sections, bathymetry
- Habitat measurements
  - Depth, velocity, substrate, cover, etc.
- Water Quality
  - Standard parameters (temperature, dissolved oxygen, conductivity, pH)
- Fish and Mussel sampling
  - Barge electrofishing, backpack electrofishing, seining, gill net, visual surveys
- Riparian sampling
- Sediment transport

Additional Study Efforts

- University of Texas – San Antonio (UTSA) sediment transport study
- University of Baylor – tree and soil coring project
- UTSA Woody debris analysis of Elm Bayou
- TCEQ/SARA Water Quality Study
- TPWD Mussel contract

Fieldwork



Fieldwork

Fieldwork

Fieldwork

Fieldwork

Photo: Clint Robertson (TPWD)

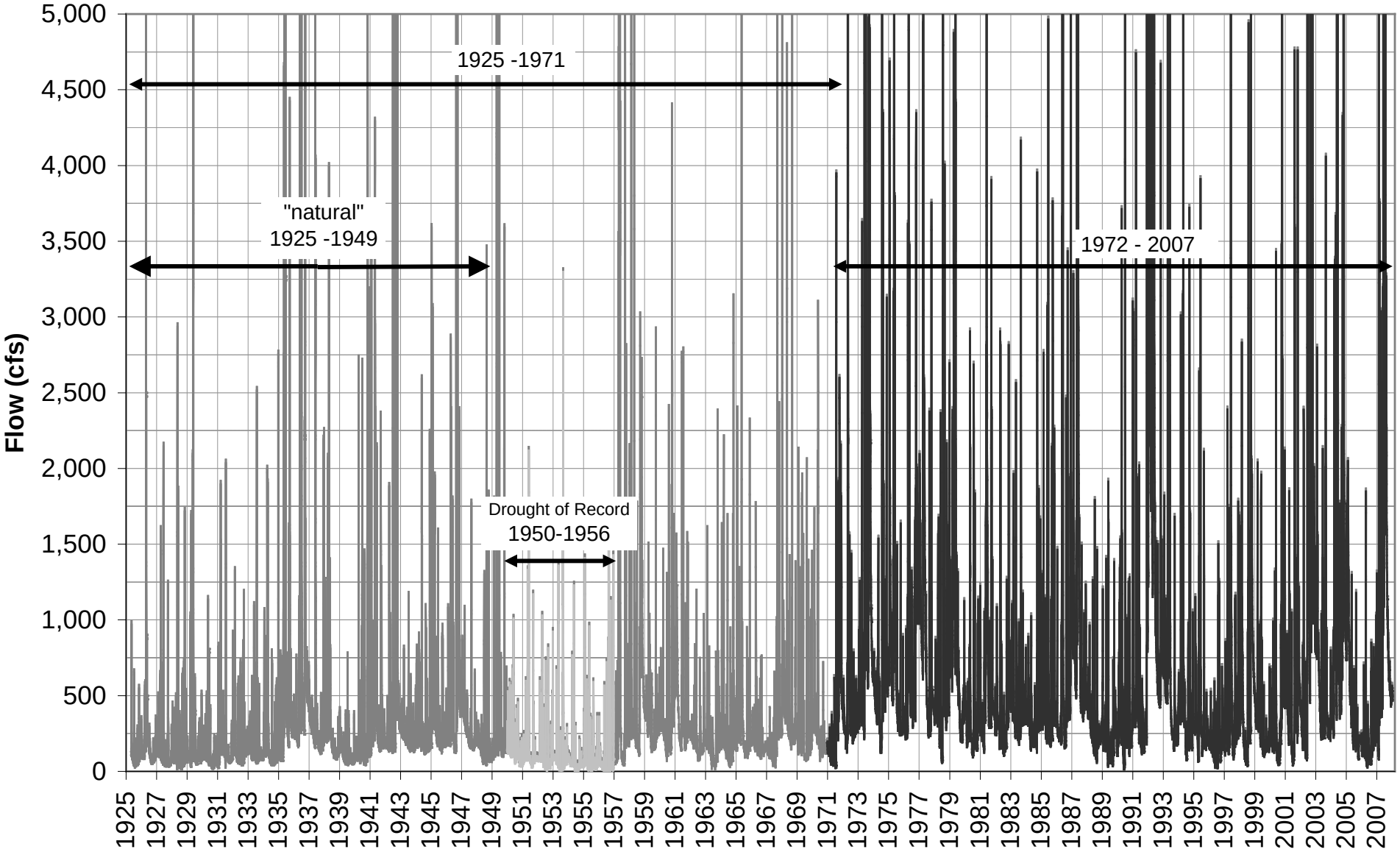
Fieldwork

Fieldwork

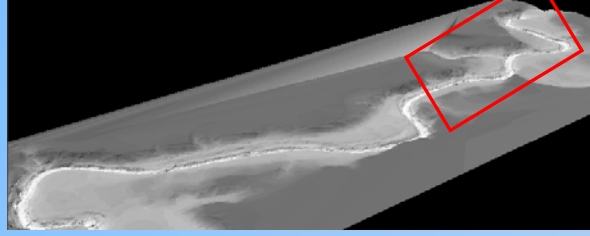
Data Reduction and Analysis

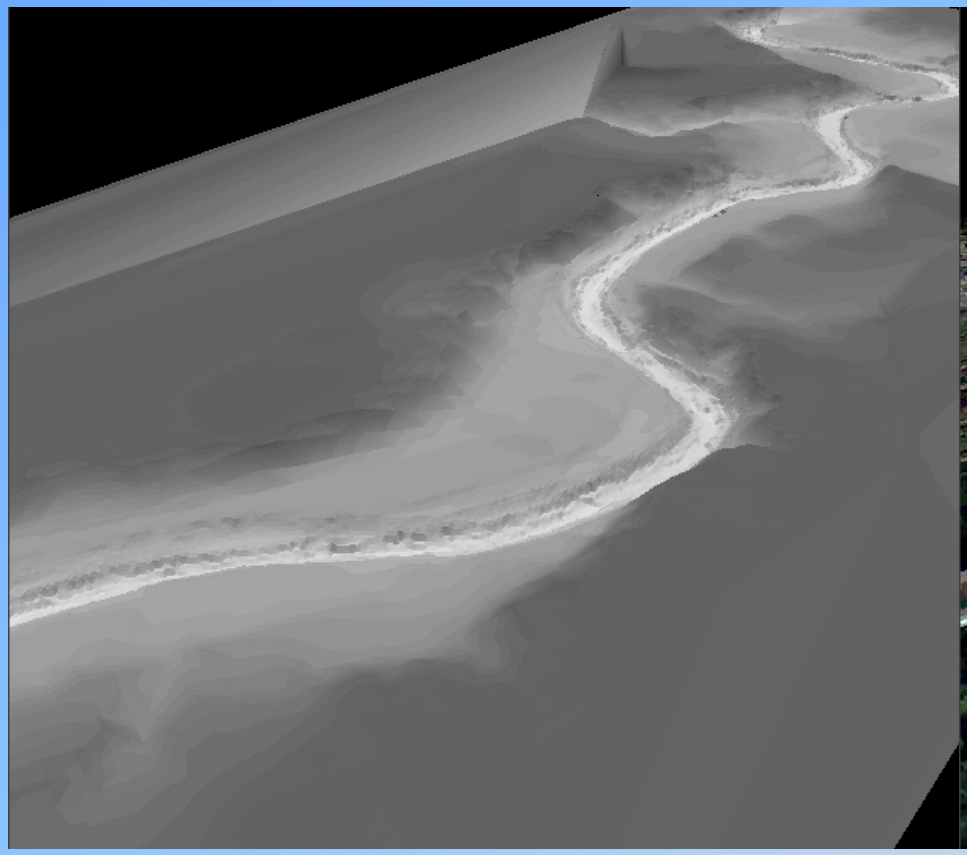
- Hydrologic Analysis
- Hydraulic Measurements
- Habitat and Substrate Mapping
- 2-D hydraulic models
- Habitat Suitability Criteria Development and habitat modeling
- Water Quality modeling
- Riparian Analysis
- Sediment transport modeling

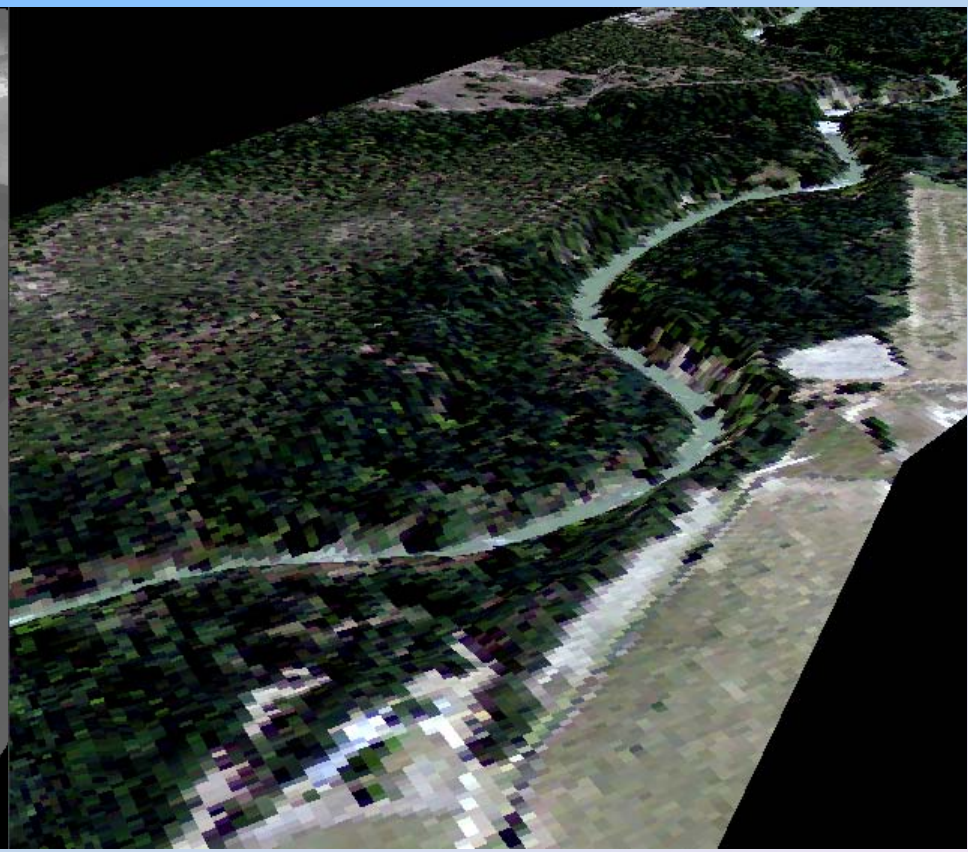
Hydrologic Time Series Analysis – Falls City Gage

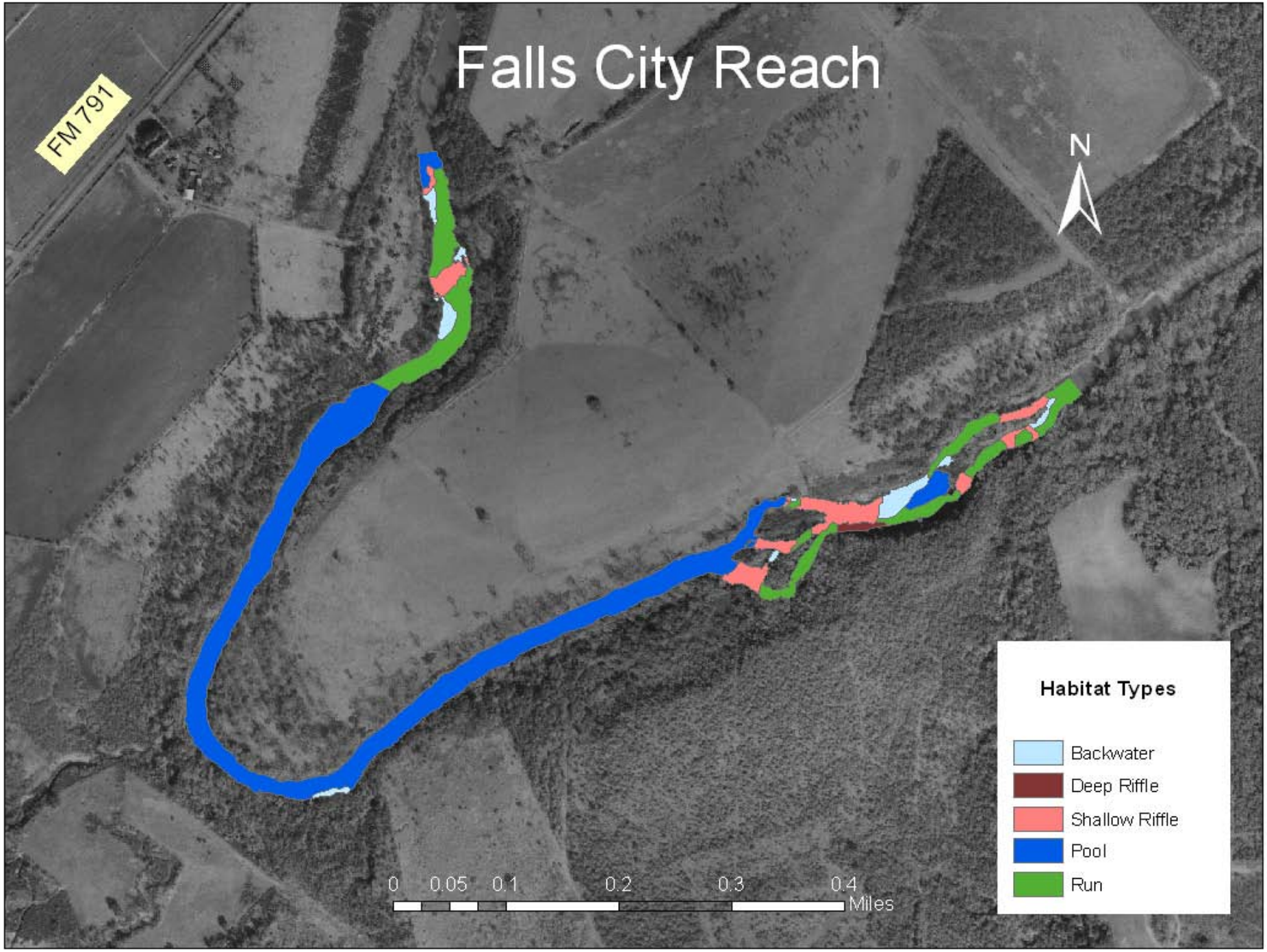


Digital Terrain Model

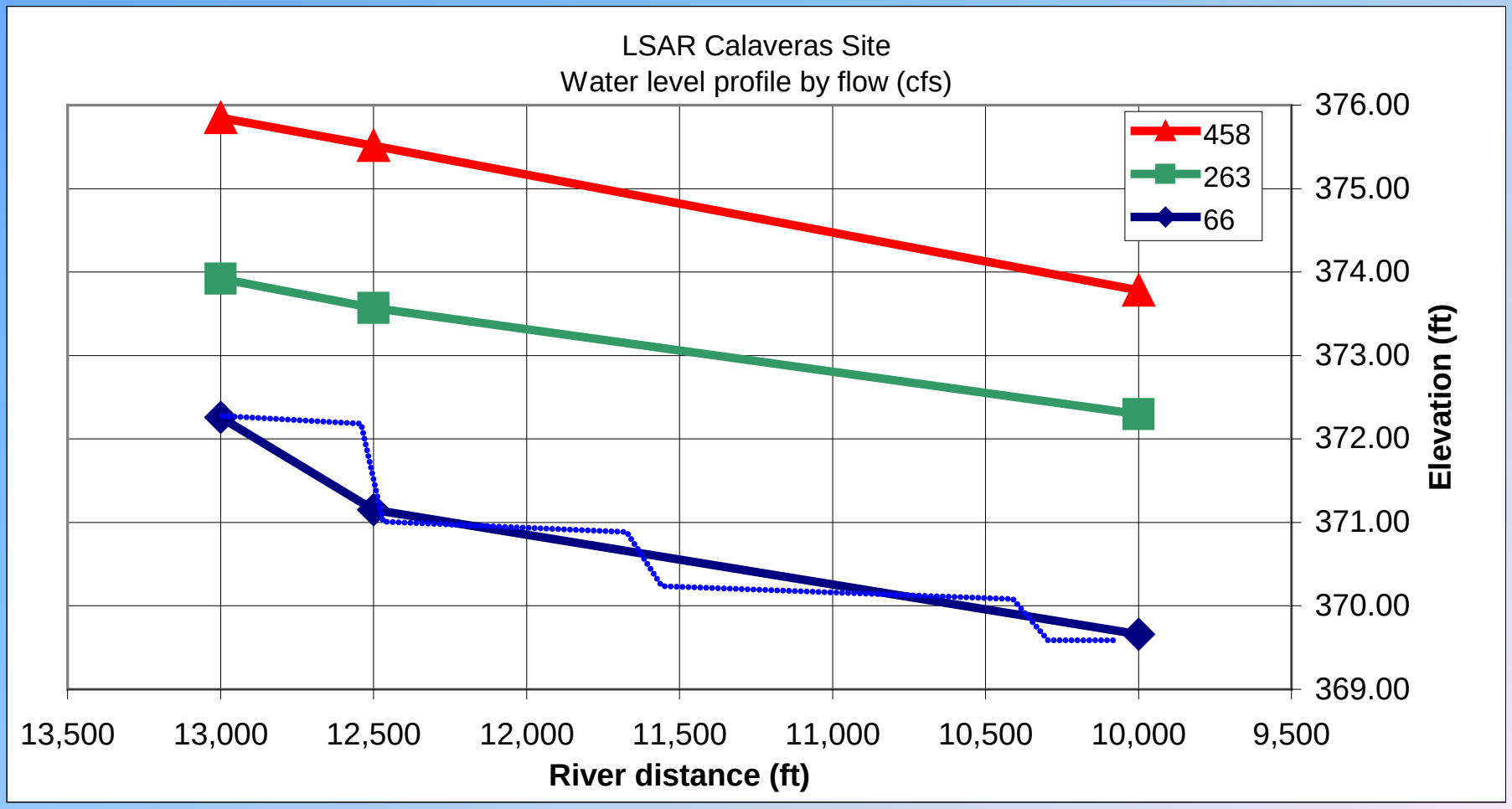




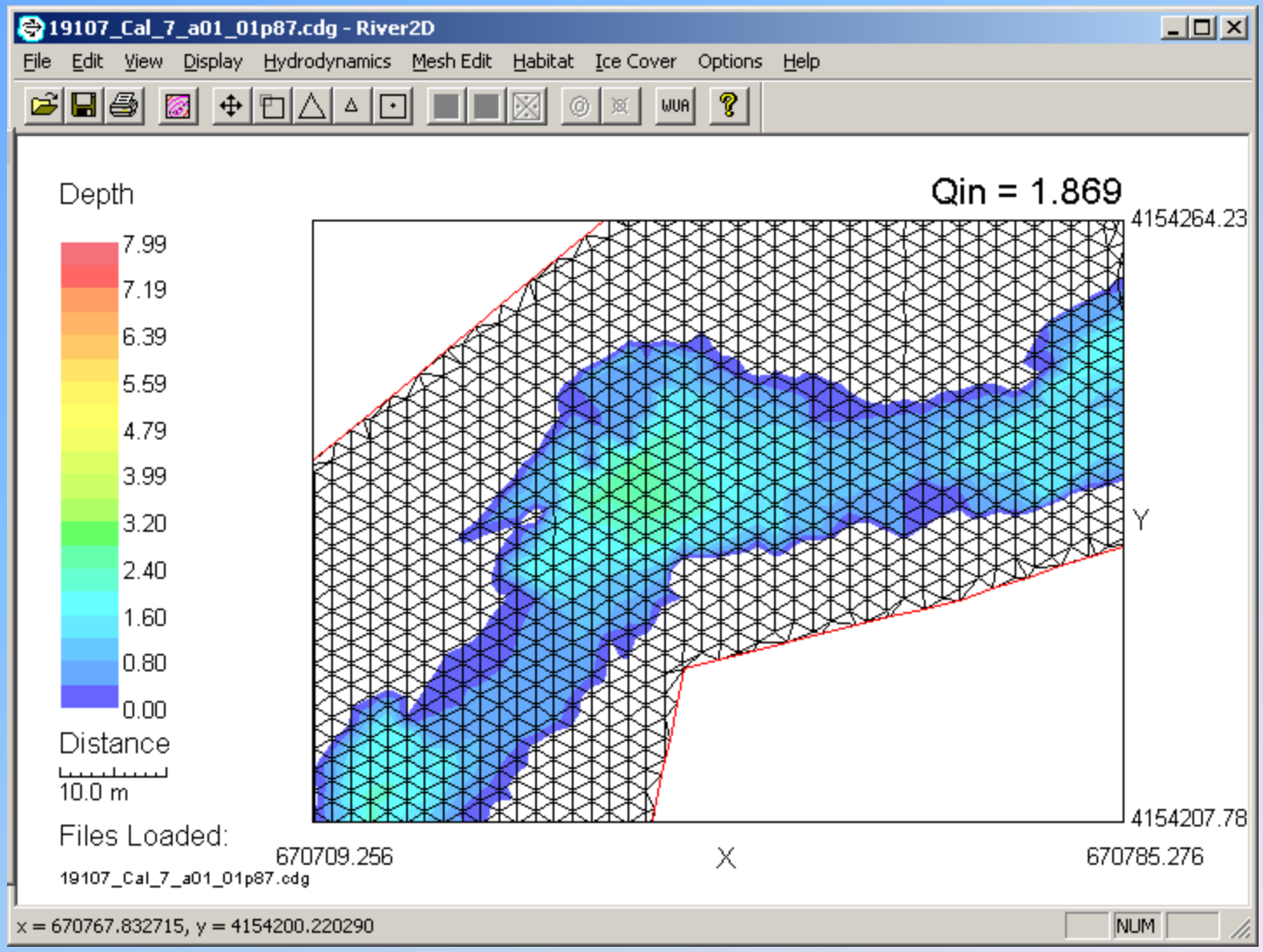



Falls City Reach
FM 791
N
Habitat Types
Backwater
Deep Riffle
Shallow Riffle
Pool
Run
0 0.05 0.1 0.2 0.3 0.4
Miles

Water Surface Profiles



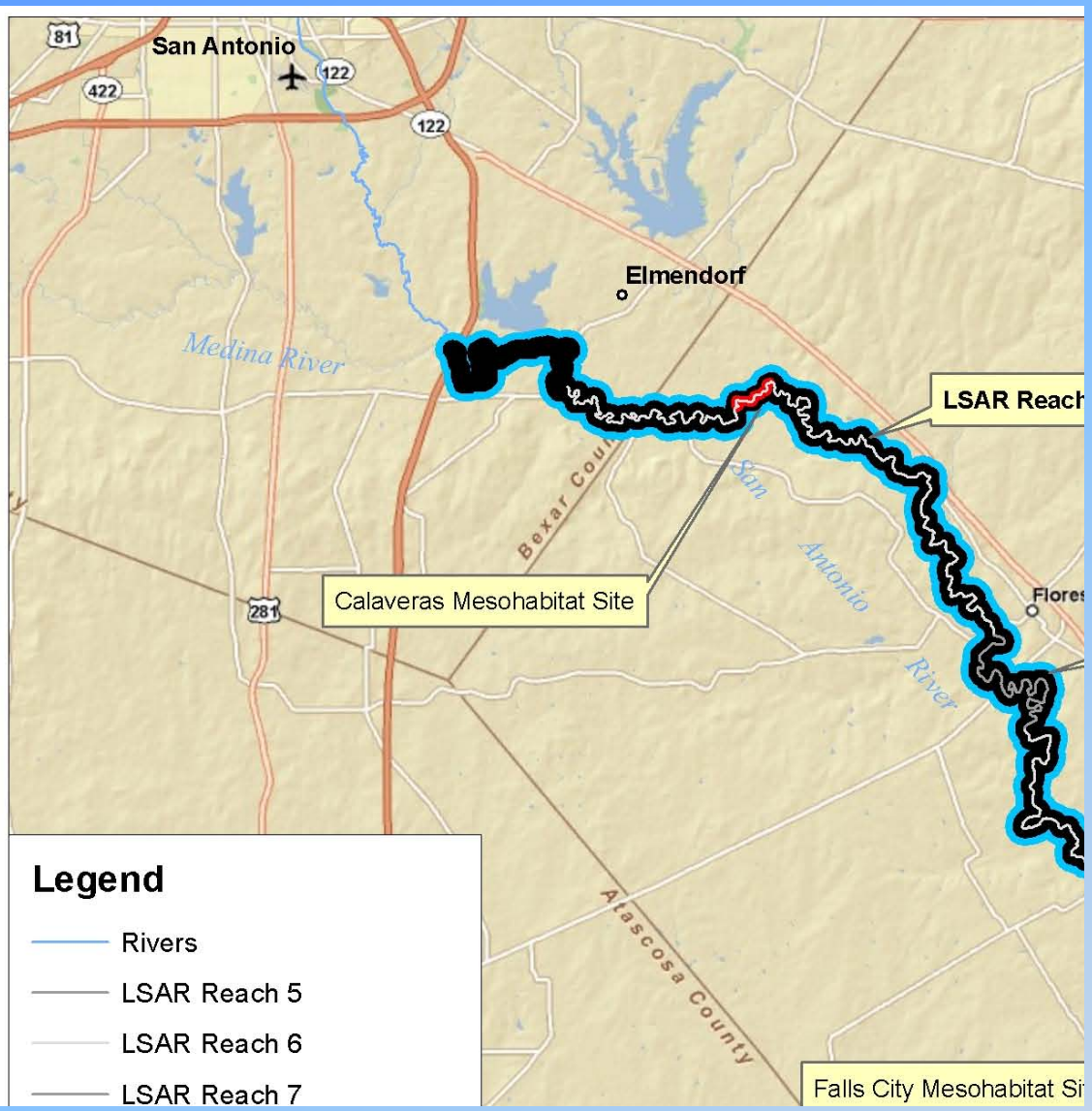
River2D model



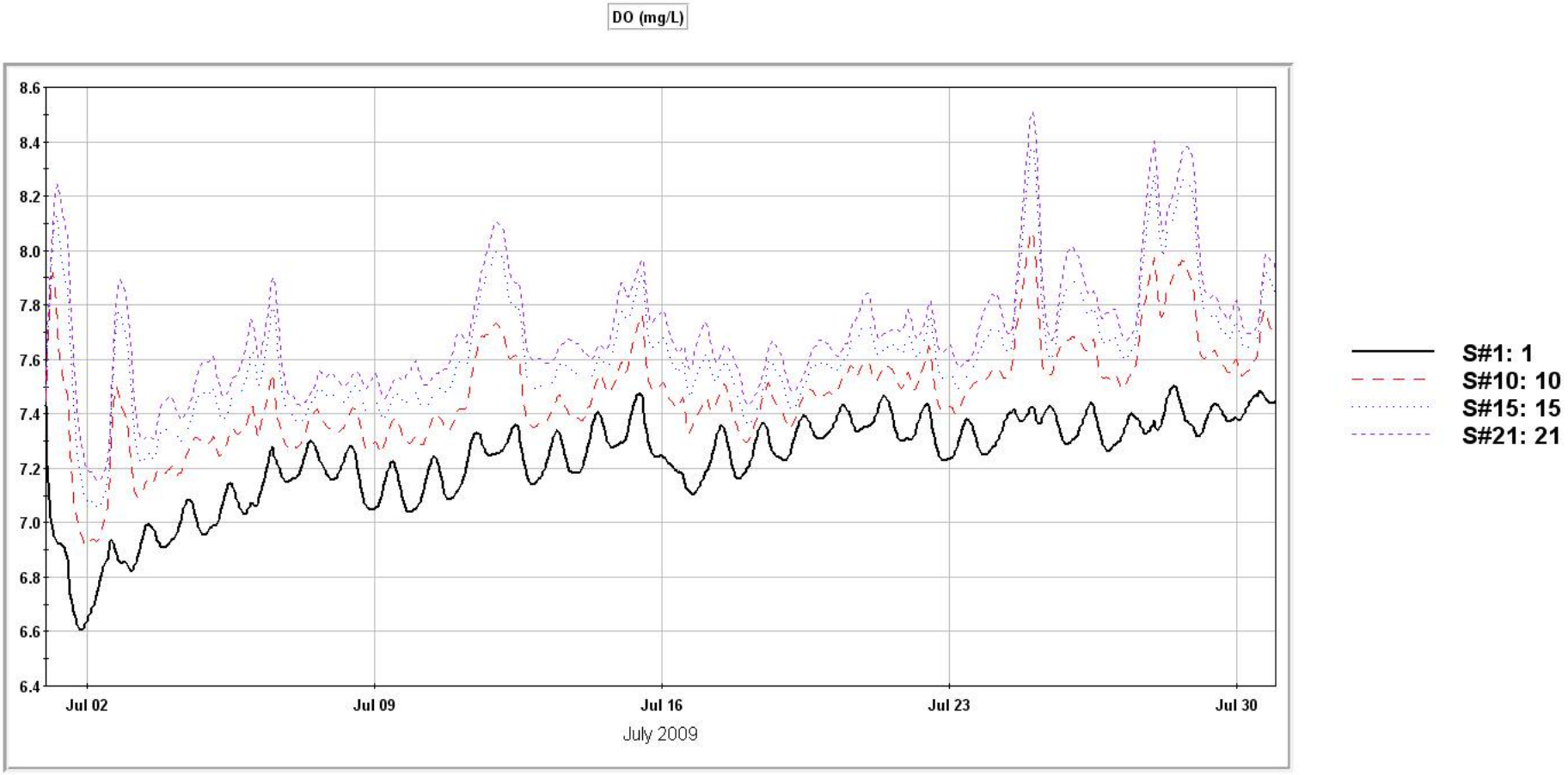
Habitat Suitability Criteria Development

- Fish Sampling
  - 249 sites
  - 23,722 fishes
  - 15 families, 43 species

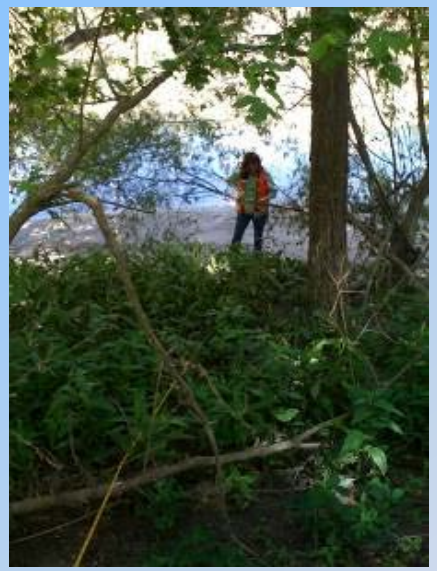
Existing WQ models


San Antonio
81
422
122
122
Elmendorf
Medina River
LSAR Reach
Bexar Coun
San
Antonio
River
Calaveras Mesohabitat Site
281
Flores
Atascosa County
Falls City Mesohabitat Si
Legend
Rivers
LSAR Reach 5
LSAR Reach 6
LSAR Reach 7

Mesohabitat Model - WASP



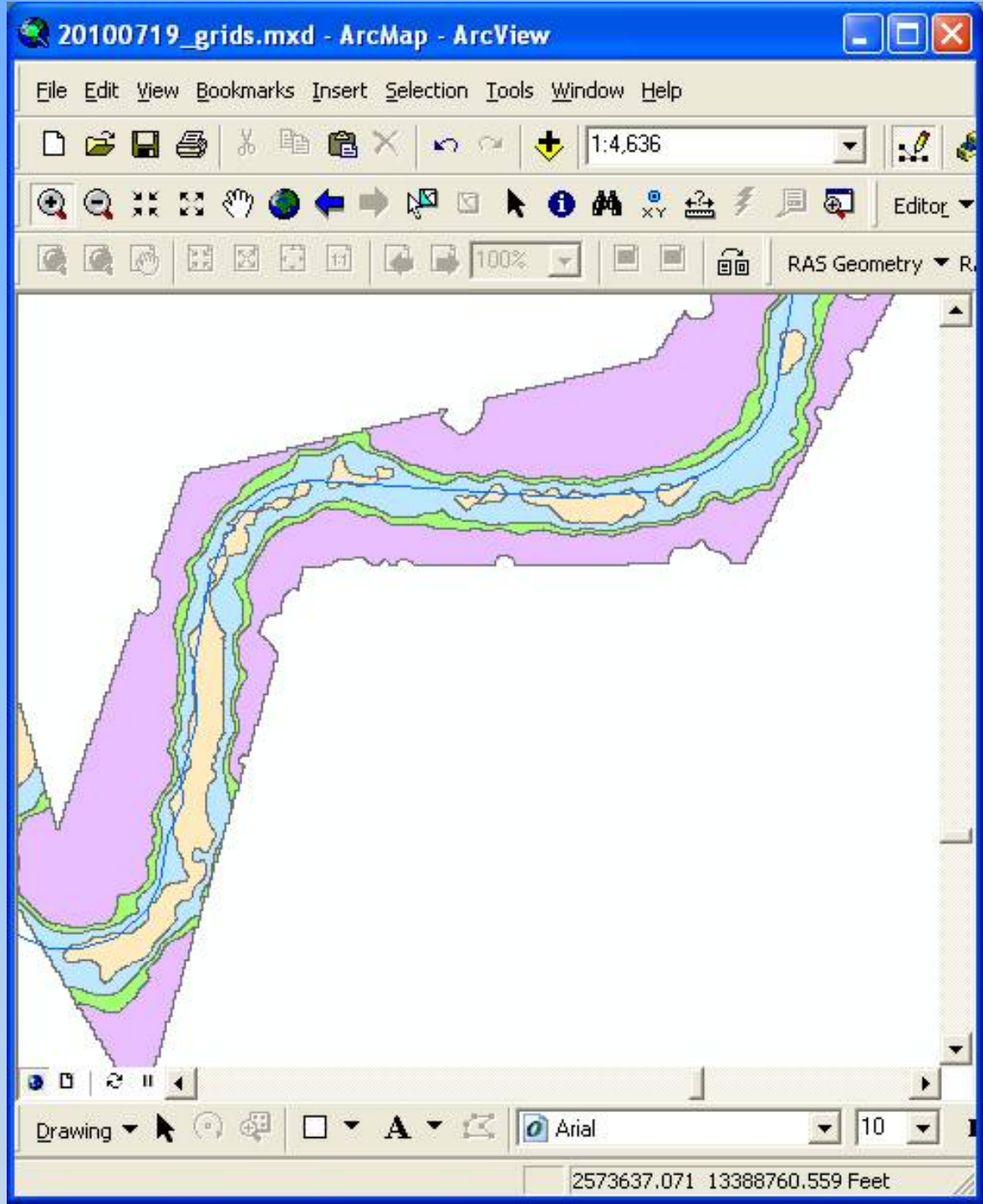
Calaveras Site Riparian Community



Calaveras Site Tree Species List

Black willow	***Salix nigra***
Box elder	***Acer negundo***
Cedar elm	***Ulmus crassifolia***
Chinaberry	***Melia azedarach***
Cottonwood	***Populus deltoides***
Green ash	***Fraxinus pennsylvanica***
Gum bumelia	***Bumelia lanuginosa***
Pecan	***Carya illinoensis***
Red mulberry	***Morus rubra***
Sugar hackberry	***Celtis laevigata***
Texas persimmon	***Diospyros texana***
Western soapberry	***Sapindus saponaria***

Riparian inundation



Bedload Analysis

Questions