Overview of the Texas Instream Flow Program for the Guadalupe-Blanco River Authority Clean Rivers Program Steering Committee

Clint Robertson – TPWD River Studies Program

TEXAS INSTREAM FLOW PROGRAM

TCEQ

TEXAS PARKS & WILDLIFE

TEXAS WATER DEVELOPMENT BOARD

TEXAS INSTREAM FLOW PROGRAM

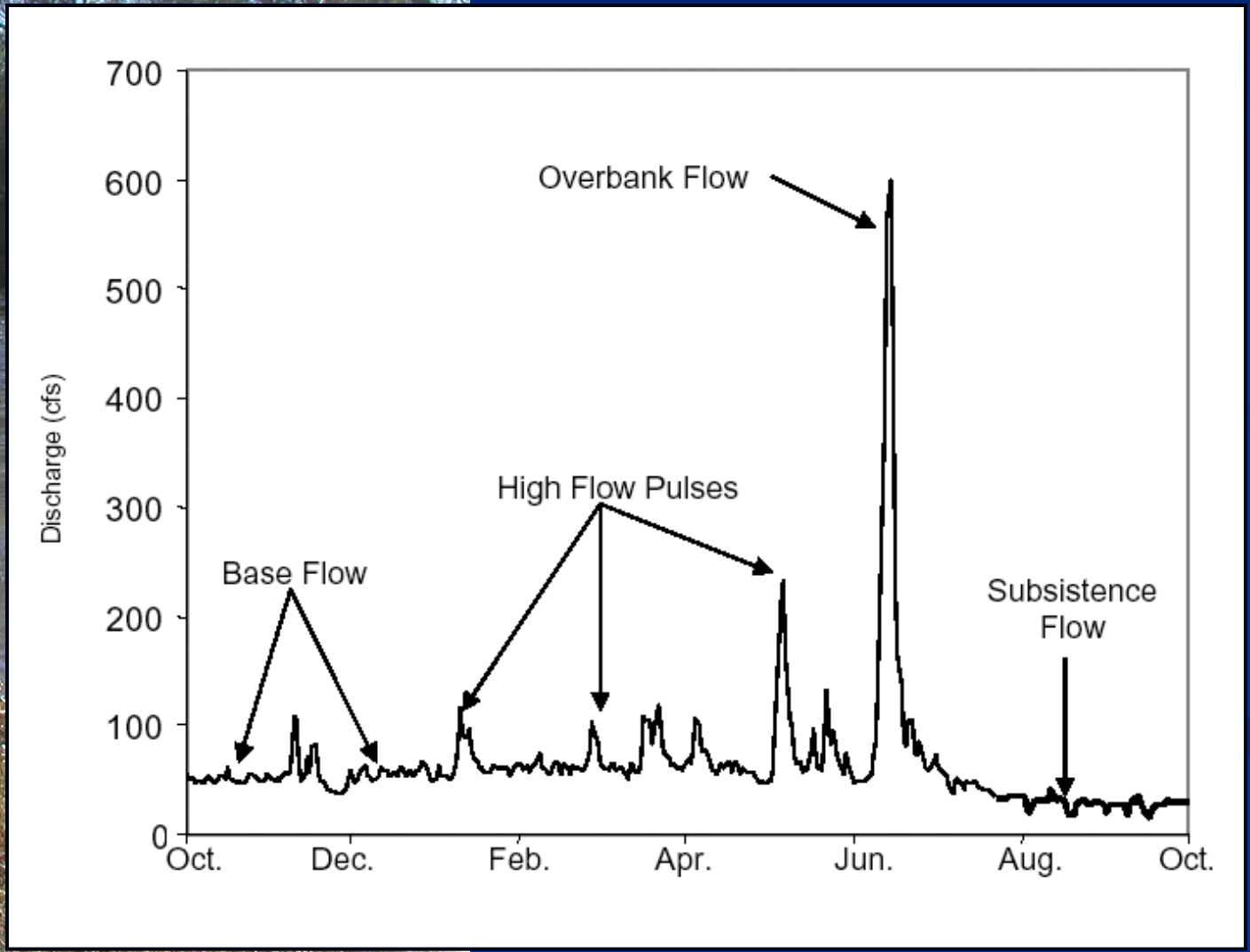
The Texas Instream Flow Program was created by the Texas Legislature in 2001 to assess how much water rivers need to remain healthy. TIFP is administered by 3 agencies:

- Texas Commission on Environmental Quality
- Texas Parks and Wildlife Department
- Texas Water Development Board

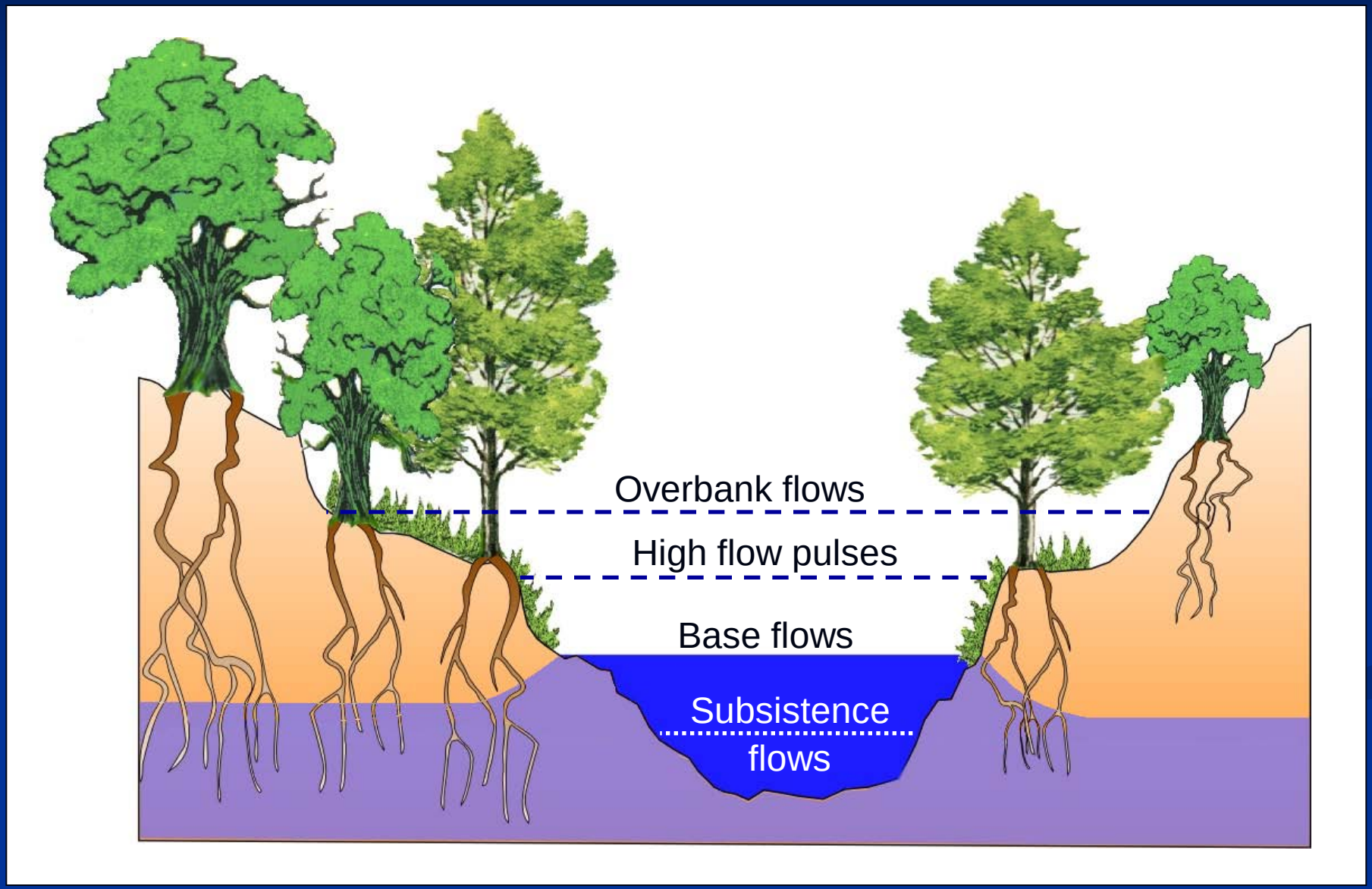
What is an Instream Flow?

An instream flow is the amount of water running in a river, usually measured by the volume moving down the channel in a specified amount of time. A variety of instream flows are required to maintain a healthy river.

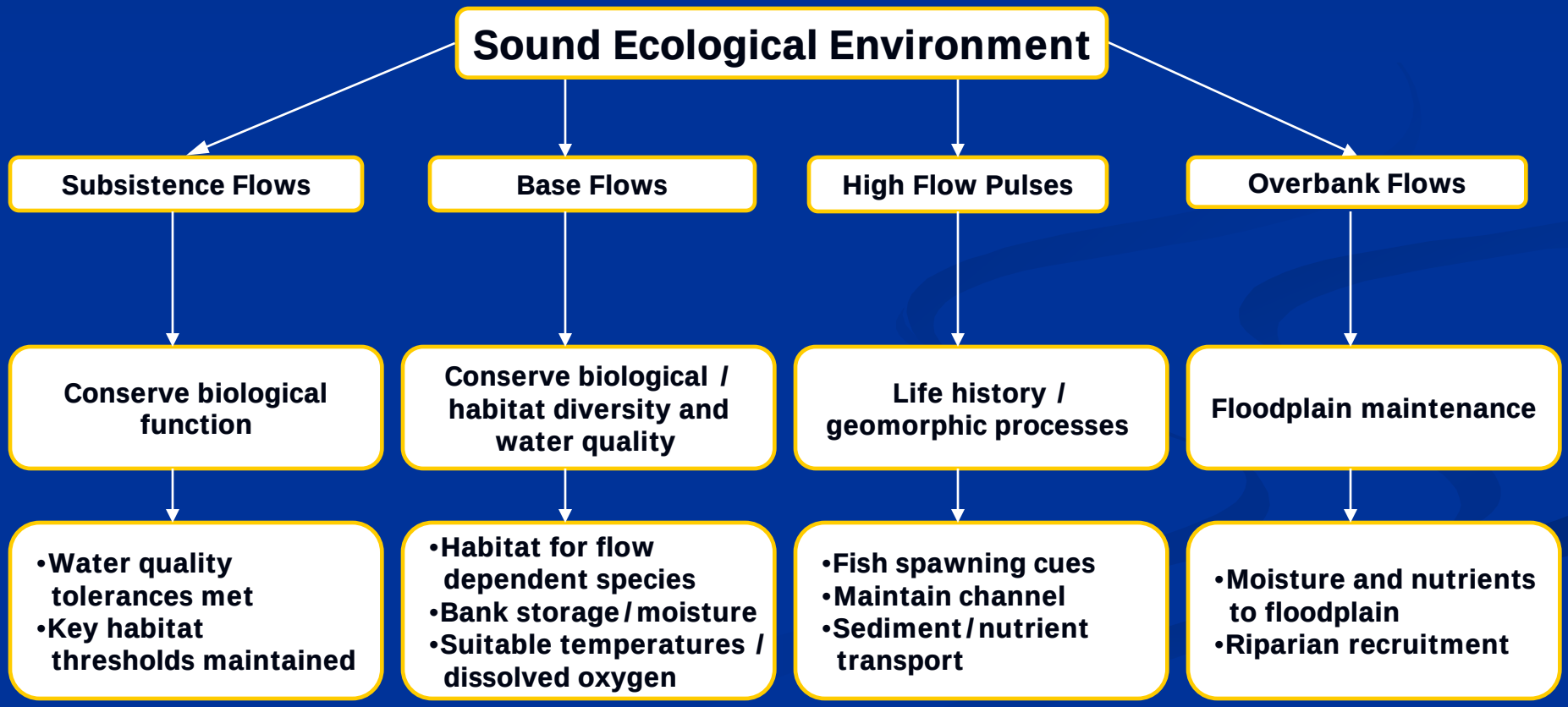
Flow Regime not Single Flow



Simple Conceptual Model

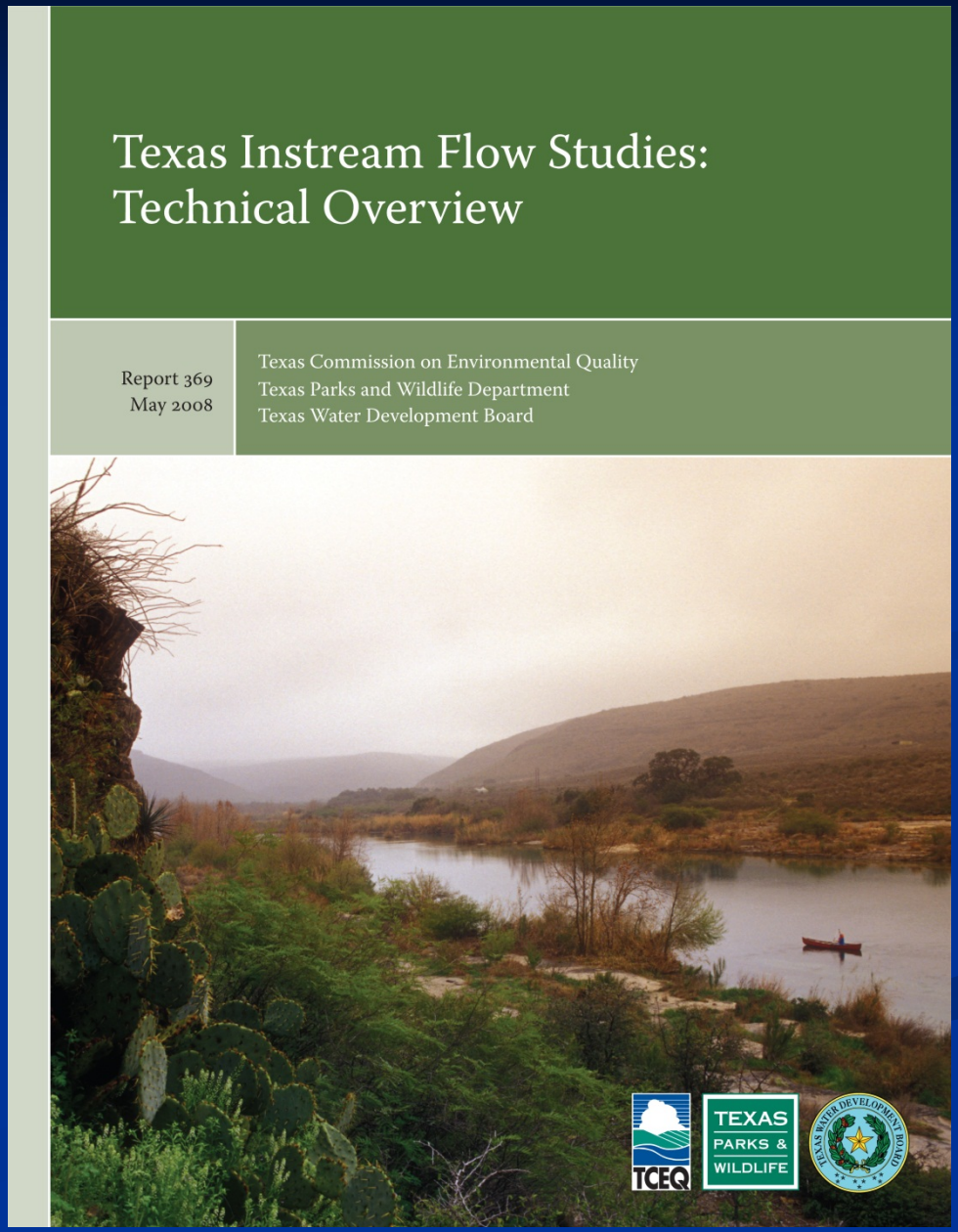


Simple Conceptual Model

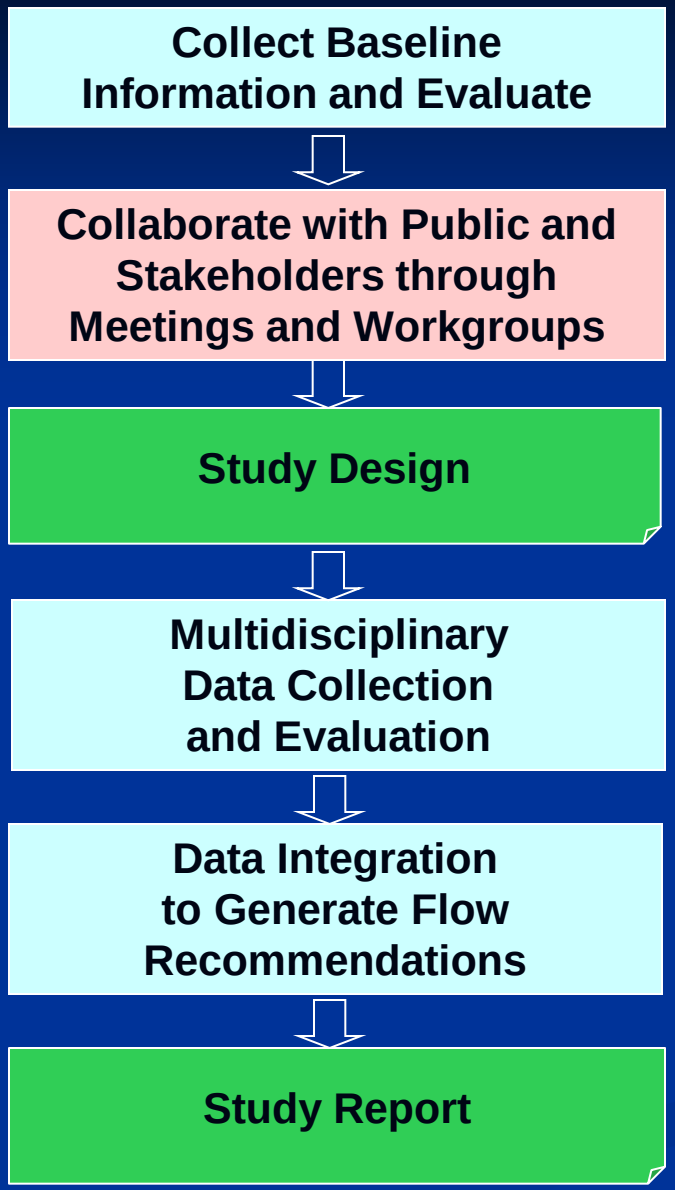


Technical Overview

- General description of study procedures and methods
- Revised in response to NRC and stakeholder comments
- Published in 2008



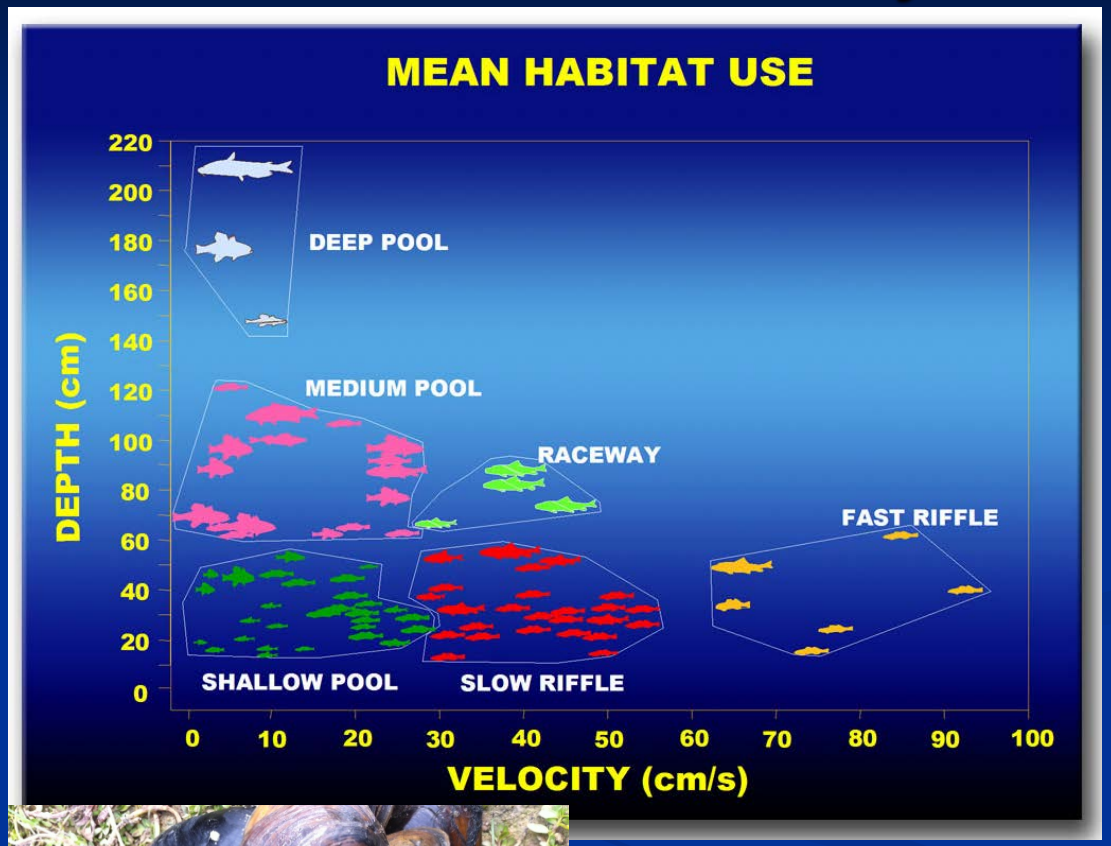
Synopsis of Study Process



Primary Disciplines

Biology

Habitat Diversity

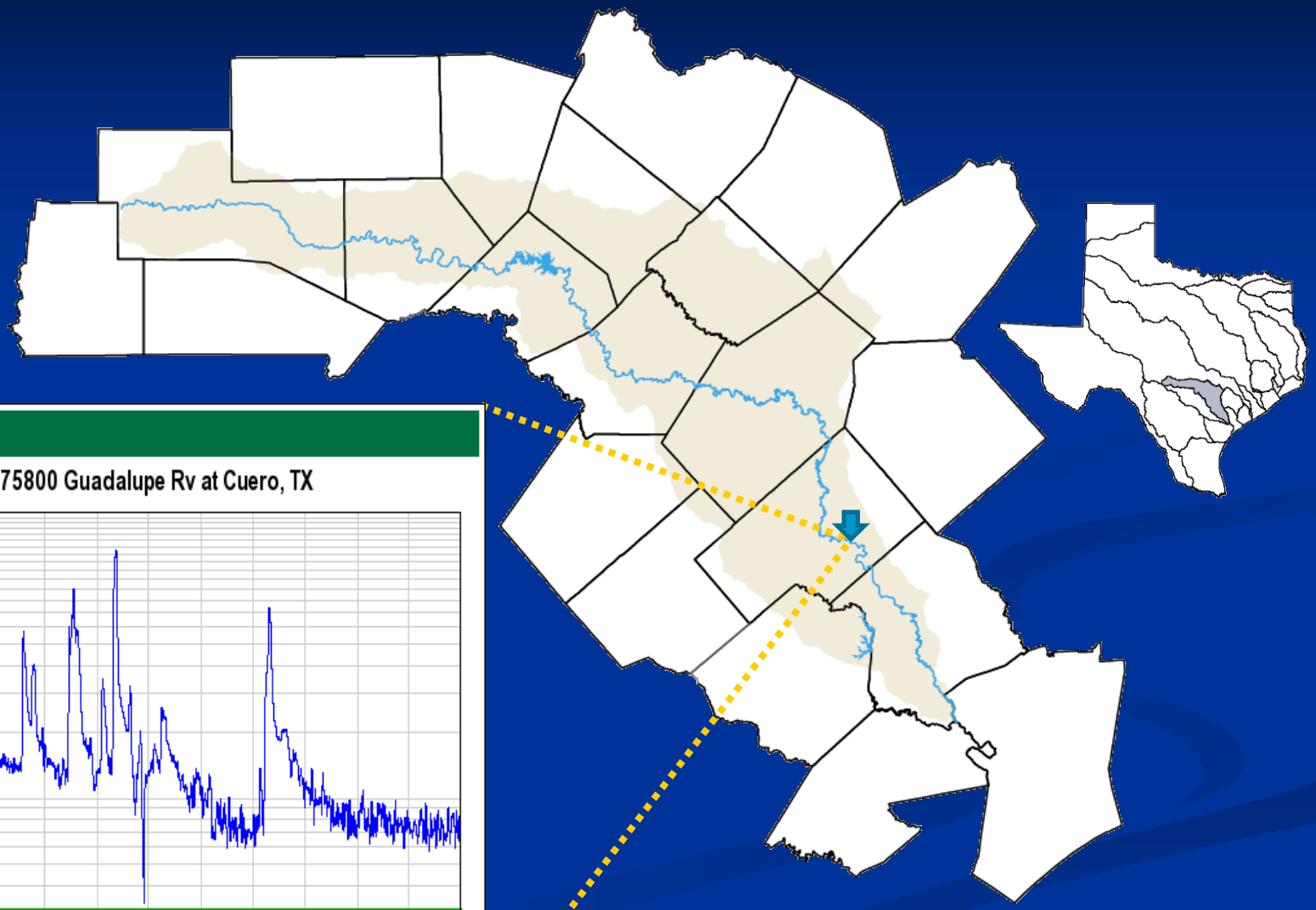


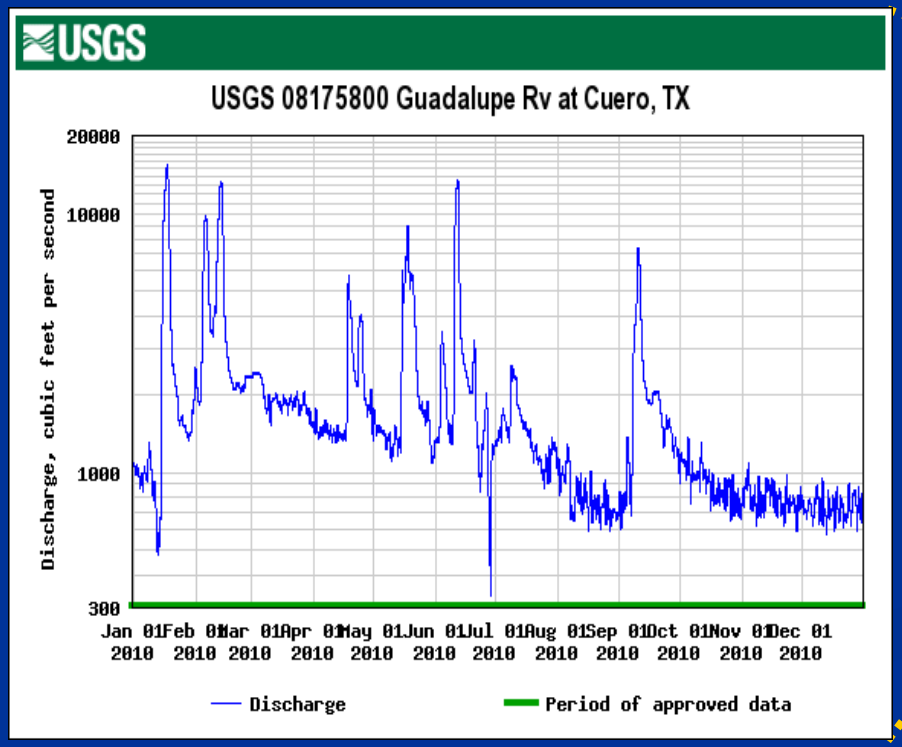
Biodiversity

Water Quality

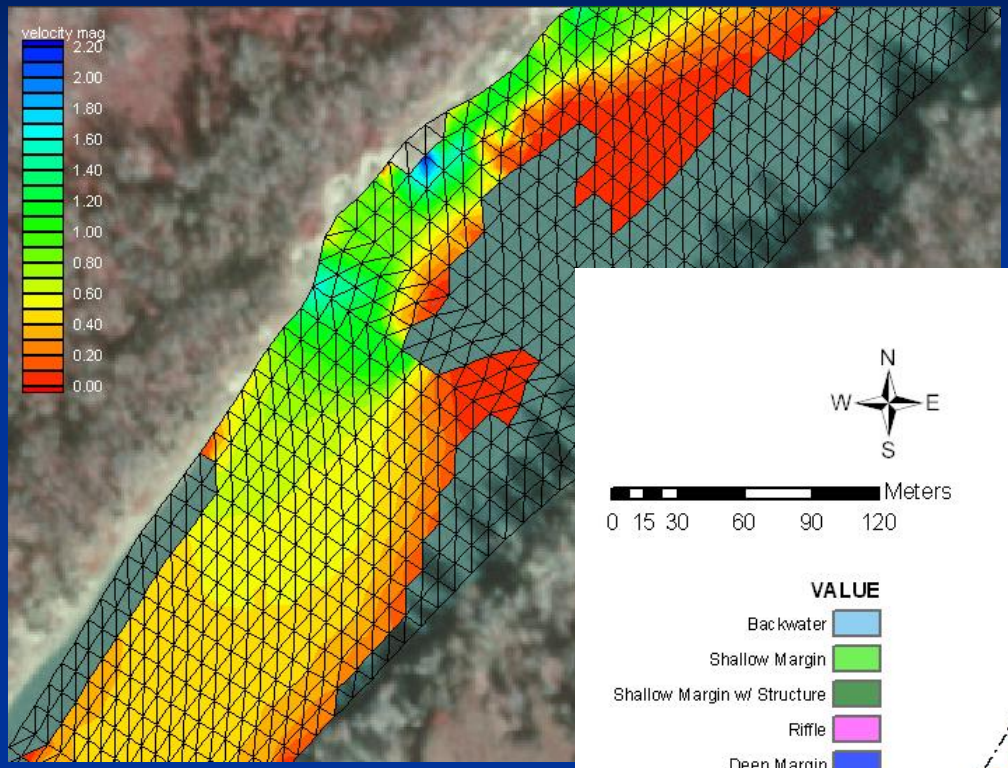
- Dissolved oxygen
- pH
- Temperature
- Total dissolved solids
- Turbidity/clarity
- Nutrients

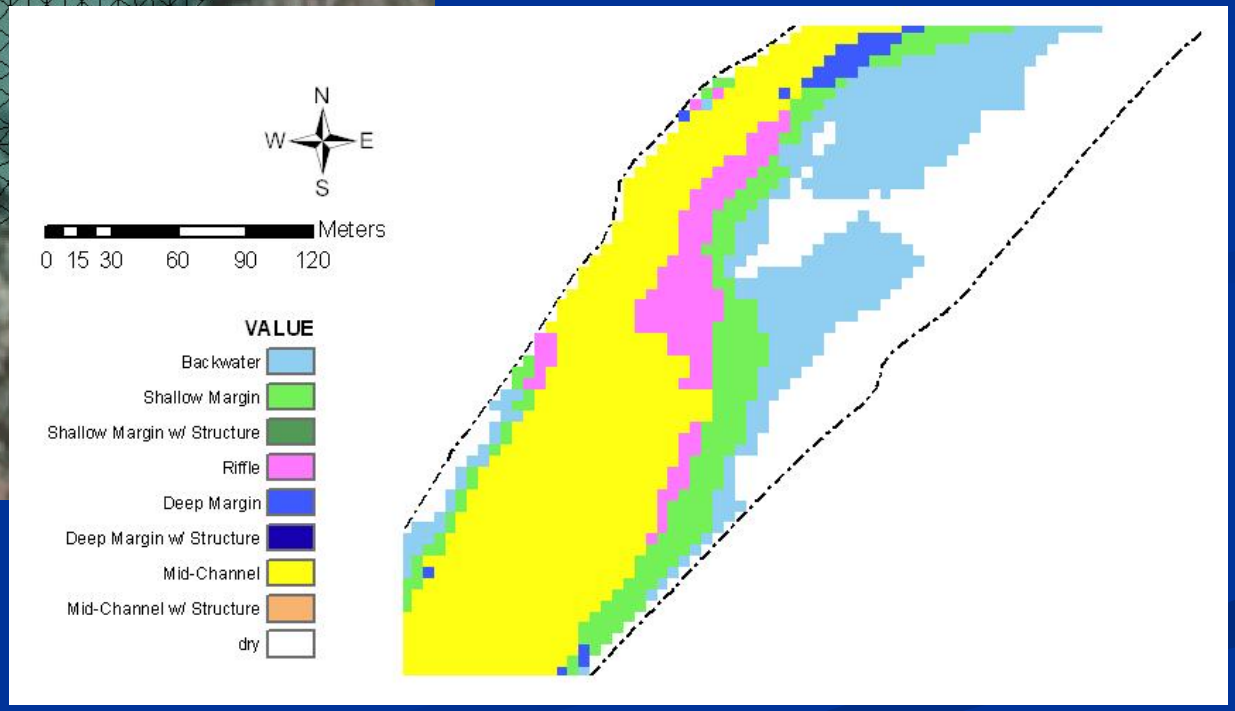
Hydrology and Hydraulics





Habitat Modeling





- **Evaluate habitat changes with flow**

Physical Processes (Geomorphology)

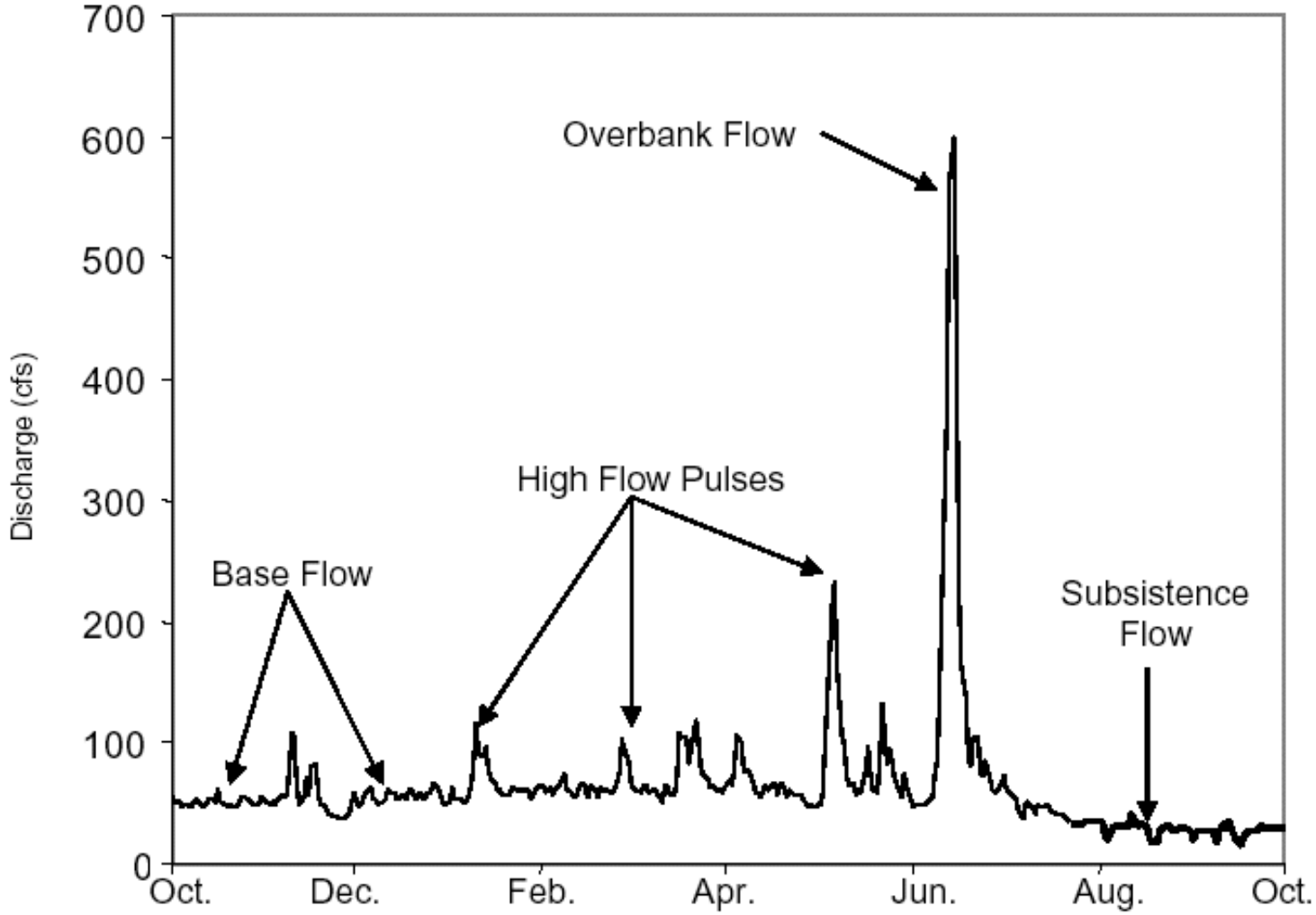
- Examine bed, banks, and floodplains
- Assess channel adjusting and overbank flow behavior
- Develop sediment budgets
- Identify habitat features

Connectivity

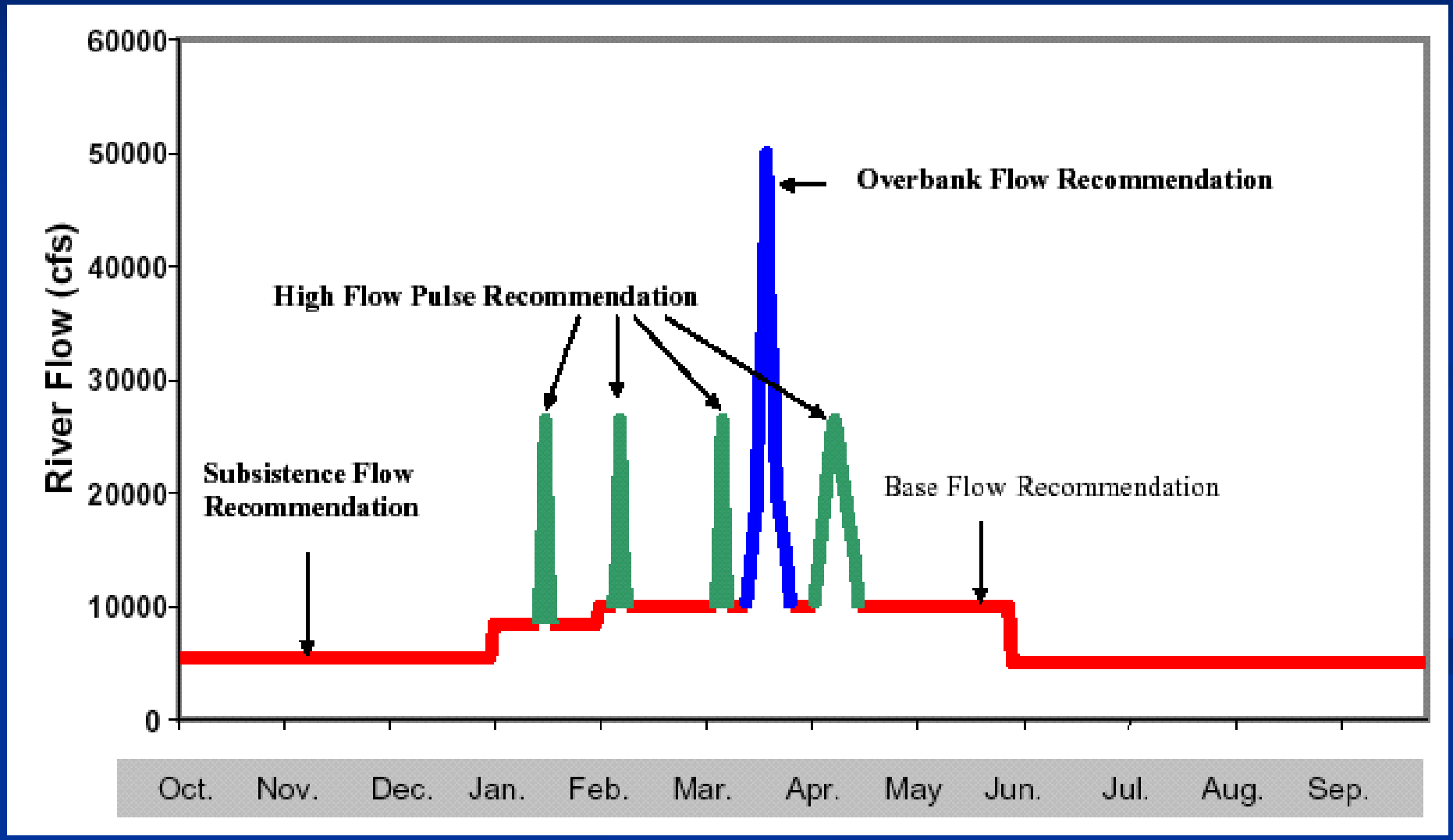
- Hydrologic connectivity
  - Upstream to down
  - Channel to floodplain
- Groundwater/surface water interactions

Instream Flow Components

(recommended by National Research Council 2005)



Integration to Generate a Flow Regime



Integration of Flow Components

- Wet year
- Average year
- Dry year

Overbank Flows	**4,000-10,000 cfs** for 2-3 days Once every 3-5 years Channel Maintenance Riparian Connectivity, Seed dispersal Flooplain habitat
High Flow Pulses	**700-1500 cfs** for 2-3 days 2-3 X per year every year Sediment transport Lateral connectivity Fish spawning **1800 cfs** for 2 days 1 X per yr every other year “Big River fish” spawning between Jul 15 - Aug 15
Base Flows	**300-450 cfs** maintain biodiversity and longitudinal connectivity **100-150 cfs** Fish habitat **150-300 cfs** Spring spawning **40-50 cfs** Fish habitat **90-100 cfs** Fish habitat
Subsistence Flows	**35 - 55 cfs** Maintain water quality (35 cfs) and key habitats in May (55 cfs)

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Lower Guadalupe River Study

- **What we've done**
- Evaluating historical fish data for trends
- Floodplain lake formation and dynamics
- Geomorphic segmentation
- Habitat requirements of Golden Orb
- Literature review (SB3 BBEST)
- Public meetings to assess values

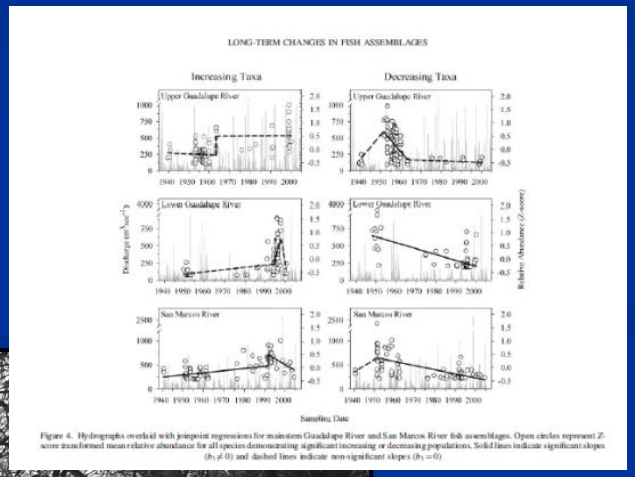
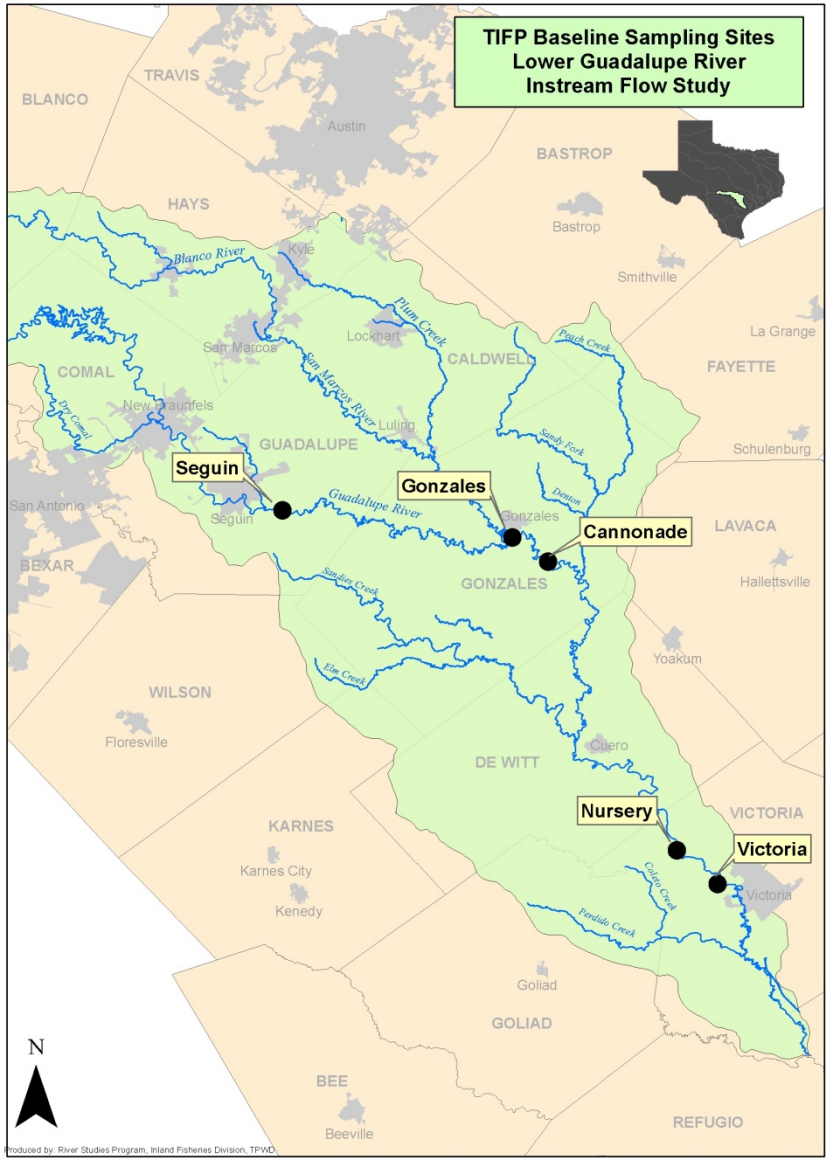


Figure 4. Hydrographs overlaid with joinpoint regressions for mainstem Guadalupe River and San Marcos River fish assemblages. Open circles represent Z-score transformed mean relative abundance for all species demonstrating significant increasing or decreasing populations. Solid lines indicate significant slopes ($b_1 \neq 0$) and dashed lines indicate non-significant slopes ($b_1 = 0$)

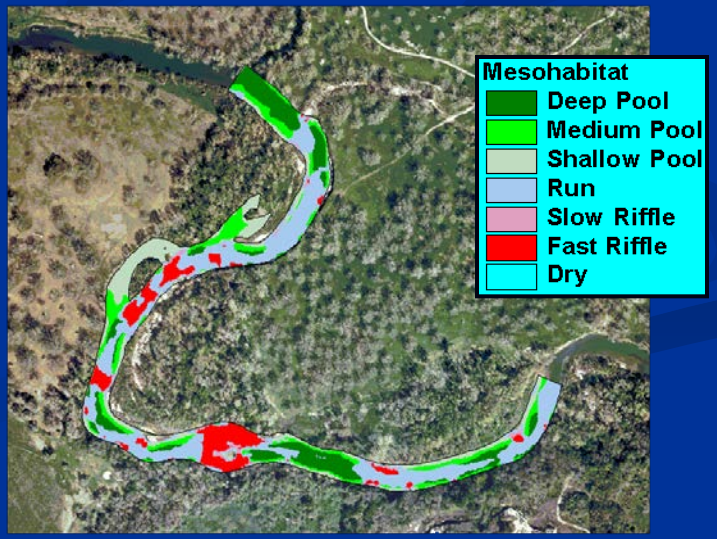
Lower Guadalupe River Study

- What we're doing
- Baseline fish sampling
- Sediment sampling
- Riparian evaluation
- WQ modeling


TIFP Baseline Sampling Sites
Lower Guadalupe River
Instream Flow Study
BLANCO
TRAVIS
Austin
BASTROP
Bastrop
Smithville
HAYS
Kyle
Blanco River
Plum Creek
Lockhart
San Marcos
San Marcos River
CALDWELL
Peach Creek
La Grange
FAYETTE
COMAL
New Braunfels
Dry Comal
Luling
Sandy Fork
GUADALUPE
Schulenburg
Seguin
Gonzales
Guadalupe River
Denius
San Antonio
Cannonade
LAVACA
BEXAR
Sandies Creek
GONZALES
Hallettsville
Yoakum
Elm Creek
WILSON
Floresville
Cuero
DE WITT
Nursery
VICTORIA
KARNES
Victoria
Karnes City
Kenedy
Coleto Creek
Perdido Creek
Goliad
GOLIAD
N
BEE
Beeville
REFUGIO
Produced by: River Studies Program, Inland Fisheries Division, TPWD

Lower Guadalupe River Study

- What's next
- Study Design workgroup meetings
  - Early April in Seguin
- Peer review of Study Design
- Fish/mussel habitat vs. flow studies
- Sediment transport studies
- Other studies (outcome of study design process)



Lower Guadalupe River Study

- Contact Information

Debbie Magin
Guadalupe-Blanco River Authority
DMagin@gbra.org

George Gable
Texas Commission on Environmental Quality
George.Gable@tceq.texas.gov

Kevin Mayes
Texas Parks & Wildlife Department
Kevin.Mayes@tpwd.state.tx.us

Mark Wentzel
Texas Water Development Board
Mark.Wentzel@twdb.texas.gov

TPWD Kills and Spills Team Regional Contacts

Alan Butler
Office (512)389-8612
Cell (512)422-8054
Email: alan.butler@tpwd.state.tx.us

24 Hour Hotline

Austin (512)389-4848
Houston (281)842-8100

TEXAS PARKS & WILDLIFE

Texas Parks and Wildlife Department
Kills and Spills Team

If you see dead or dying fish and wildlife, or pollution threatening fish and wildlife, call one of the regional biologists or 24 hour Communications Centers below immediately! Or call your local Game Warden.

24 Hour Communications Centers

Main:
(512) 389-4848
4200 Smith School Road
Austin, Texas 78744

Houston Area:
(281) 842-8100
117 East Avenue A.
La Porte, Texas 77751

Region 1

Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

Alan Butler
Office: (512) 389-8612
Mobile: (512) 422-8054
Fax: (512) 389-8160
Email: alan.butler@tpwd.state.tx.us

1601 East Crest Dr.
Waco, Texas 76705

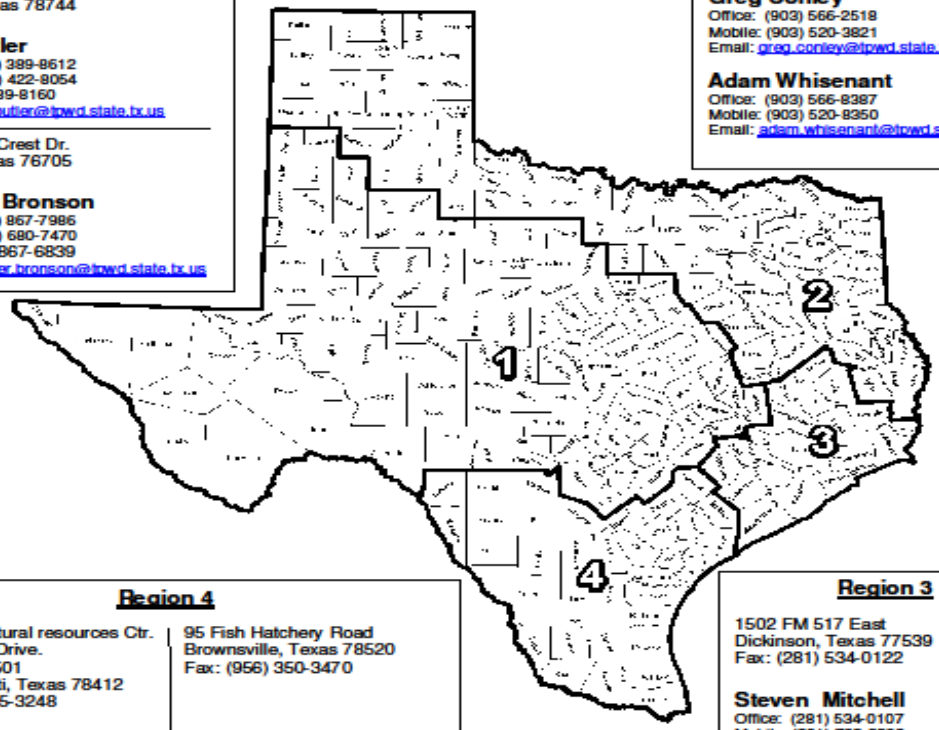
Jennifer Bronson
Office: (254) 867-7986
Mobile: (512) 680-7470
Fax: (254) 867-6839
Email: jennifer.bronson@tpwd.state.tx.us

Region 2

11810 FM 848, Tyler, Texas
Fax: (903) 566-2357

Greg Conley
Office: (903) 566-2518
Mobile: (903) 520-3821
Email: greg.conley@tpwd.state.tx.us

Adam Whisenant
Office: (903) 566-8387
Mobile: (903) 520-8350
Email: adam.whisenant@tpwd.state.tx.us



Region 4

TAMUCC Natural resources Ctr.
6300 Ocean Drive.
NRC Suite 2501
Corpus Christi, Texas 78412
Fax: (361) 825-3248

Alex Nuñez
Office: (361) 825-3246
Mobile: (361) 658-3181
Email: alex.nunez@tpwd.state.tx.us

95 Fish Hatchery Road
Brownsville, Texas 78520
Fax: (956) 350-3470

Willy Cupit
Office: (956) 350-4491
Mobile: (956) 465-9287
Email: willy.cupit@tpwd.state.tx.us

Region 3

1502 FM 517 East
Dickinson, Texas 77539
Fax: (281) 534-0122

Steven Mitchell
Office: (281) 534-0107
Mobile: (281) 705-5592
Email: steven.mitchell@tpwd.state.tx.us

Texas Administrative Code

Section 9.11(e)(1)(N) of Title 31 of the Texas Administrative Code states the following: "In accordance with Texas Parks and Wildlife Code, Section 12.301, a permittee or contractor is liable to the state for the value of the fish and wildlife taken, killed or injured by work under a permit". This agency is authorized by Sections 12.0011(b)(1) and 12.301 of the Texas Parks and Wildlife Code to investigate fish kills and any type of pollution that may cause loss of or injury to fish or wildlife resources, to identify the cause and parties responsible for the fish kill or pollution, and to seek restitution for these losses or injuries. [PRP name] could be asked to pay restitution for the resources lost or injured during the above referenced incident.

Restitution is not a penalty or fine, but the total calculated sum of the monetary value of the resources lost or injured plus the investigation/response costs incurred by TPWD. It is TPWD policy to use these funds to restore, replace, or complete studies on resources similar to those that were lost or injured.

Texas Administrative Code

66.003 PLACING EXPLOSIVES OR HARMFUL SUBSTANCES IN WATER.

(a) No person may place in the water of this state an explosive, poison, or other substance or thing deleterious to fish.

(b) Subsection (a) of this section does not apply to the use of explosives necessary for construction purposes when the use is authorized in writing by the department.

Texas Administrative Code

Stocking Permit Section 12.301

If any aquatic organisms are to be stocked or relocated within the State a Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters needs to be completed. The Aquatic Relocation Plan is a part of this permit process to ensure that best management practices are used.

Aquatic Resource Relocation Plans

Aquatic Resource Relocation Plans

Exact location.
Purpose of the activity.

Notification in advance to develop plan.

Method of collecting and moving the aquatic life.

Types and sizes of containers to be used.

Transportation methods and destination.

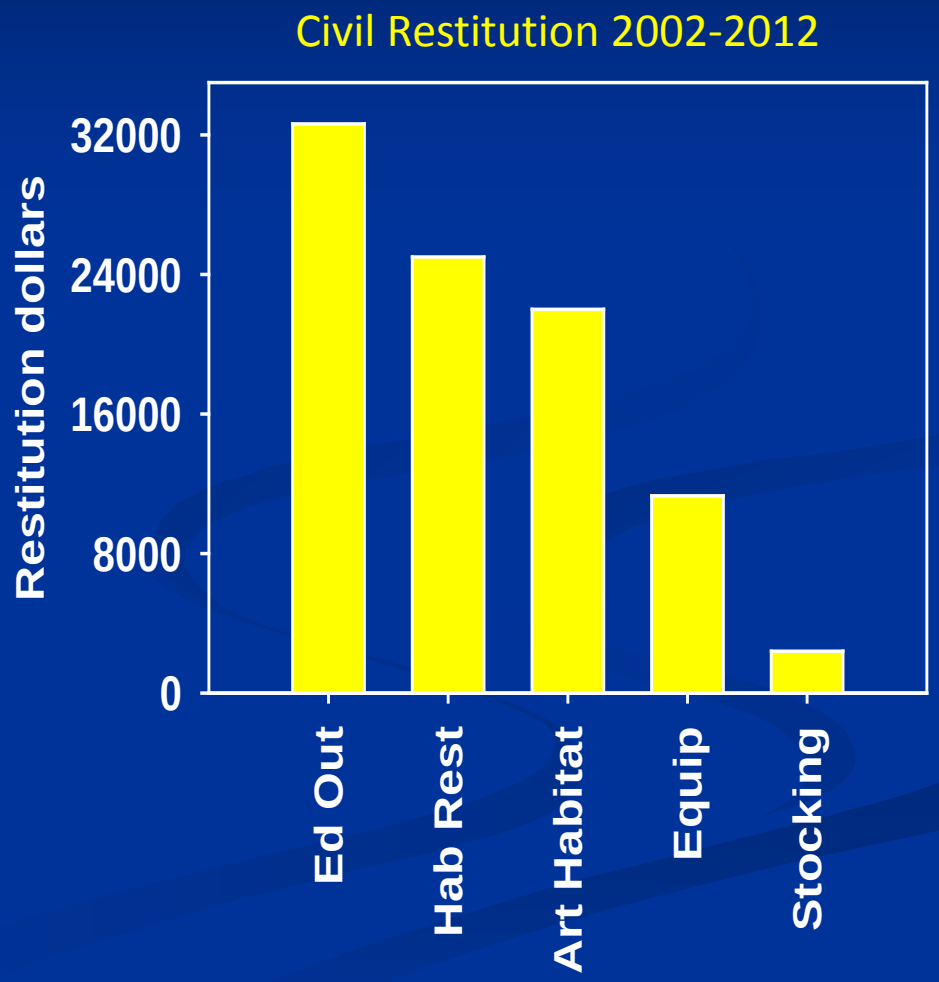
Documentation and disposal of dead and non-native fishes.

The best management practices (BMPs).

Estimation of the time expected to complete the fish and mussel removal operation.

Identify any state or federally threatened or endangered species that may occur.

Identify all freshwater mussels that may become stranded due to the operation. Explain what methods will be used to protect the mussels.

Restoration Priorities

- Compensation for impacts to resources.
- Restoration
- Project Enhancement