

# STATEWIDE SYNTHESIS OF ENVIRONMENTAL FLOW STUDIES (2014 - 2017)

**Dr. Thomas Hardy (and Team)**

**Texas State University**

# Project Team

- **Dr. Thomas Hardy**, Texas State University and The Meadows Center for Water and the Environment
- **Dr. Kirk Winemiller**, Texas A&M University & Texas A&M AgriLife Research
- **Dr. Edward Buskey**, Professor and Associate Chair of the Department of Marine Science at the University of Texas at Austin's Marine Science Institute
- **Dr. George Guillen**, University of Houston - Clear Lake and Environmental Institute of Houston
- **Joe Trungale**, Trungale Engineering & Science
- **Thomas C. Annear**, Water Management Coordinator, Wyoming Game and Fish Department
- **Allan Locke**, President of Locke and Associates
- **Christopher Estes**, Chalk Board Enterprises, LLC

# Our Charge

The purpose of this Project is to evaluate the applicability of past environmental flow studies for meeting the goals of either validating or refining analyses, recommendations, or standards or identifying strategies to achieve environmental flows as part of the SB3 adaptive management process.

The purpose of this Project is **NOT** to recommend revisions to the adopted standards, but rather to **assist BBASCs** in their evaluation of adopted standards by:

- Determining whether past studies have produced adequate data to sufficiently inform such an evaluation
- Providing a synthesis of study findings
- The Project will also be useful in identifying future research priorities

# The evaluation and synthesis of environmental flow studies will be conducted in five basin-bay systems:

- (1) Trinity and San Jacinto Rivers and Galveston Bay,
- (2) Brazos River and Associated Bay and Estuary System,
- (3) Colorado and Lavaca Rivers and Matagorda and Lavaca Bays,
- (4) Guadalupe, San Antonio, Mission, and Aransas Rivers and Mission, Copano, Aransas, and San Antonio Bays,**
- (5) Nueces River and Corpus Christi and Baffin Bays systems.

The Project will focus on the evaluation of 33 studies supporting the SB3 adaptive management process.

However, we are incorporating both broader peer reviewed literature and gray literature work germane to the evaluation of environmental flow studies conducted in these basin-bay systems.

# **Studies in the Guadalupe, San Antonio, Mission, and Aransas Rivers And Mission, Copano, Aransas, And San Antonio Bays Basin**

- 1) Instream Flows Research And Validation Methodology Framework**
- 2) Guadalupe Bayou Flow And Inundation Study**
- 3) *Rangia* Clam Investigations**
- 4) Assessing The Effects Of Freshwater Inflows And Other Key Drivers On The Population Dynamics Of Blue Crab And White Shrimp Using A Multivariate Time Series Modeling Framework: Phase I**
- 5) Strategy Options For Meeting Attainment Frequencies For The Estuaries**
- 6) An Evaluation Of The Variability Of Sediment And Nutrient Loading Into San Antonio Bay From The Guadalupe/San Antonio River**
- 7) Continuation Of Instream Flows Research And Validation Methodology Framework**
- 8) Assessing The Effects Of Freshwater Inflows And Other Key Drivers On The Population Dynamics Of Blue Crab And White Shrimp Using A Multivariate Time Series Modeling Framework: Phase II**

# Task A: Evaluation of TWDB-funded Environmental Flow Studies

Each study (and components) will be assessed in terms of:

- Whether or not there was a clear statement of objectives and/or hypothesis
- Was adequate background information provided within the context of the open peer reviewed or gray literature
- A critical evaluation of the methodologies:
  - Study site(s) selection
  - Data collection methods
  - Analytical methods
  - Definitions of terms
  - Coherence between data analysis and results
  - Coherence between results and discussion with relevant linkage to previous work and open peer reviewed or gray literature
  - Coherence between results, discussion and summary of findings
  - Coherence of any recommendations given the specific study or other related studies

# Task B: Evaluation of BBASC Work Plan Status

Review existing BBASC workplans and associated SAC review/recommendations on a system by system basis (Vertical assessment)

Review existing BBASC workplans and associated SAC review/recommendations on a system wide basis (Longitudinal assessment)

Review study components that may be obsolete, require revision, identify new studies, monitoring or applied research elements not currently identified in the BBASC workplans (Vertical)

Recommendations will not only be system specific but also program wide to inform the adaptive management process in all systems (Longitudinal)

# Task C: Synthesis of TWDB-funded Environmental Flow Studies

Evaluation Criteria form a Matrix where Vertical Assessments are for specific studies in each Bay and Basin While Longitudinal Assessments examine consistency between Bay and Basin Studies

	Bay and Basin 1						Bay and Basin 2						Bay and Basin 3					
	Study 1	Study 2	Study 3	.	.	Study N	Study 1	Study 2	Study 3	.	.	Study N	Study 1	Study 2	Study 3	.	.	Study N
Evaluation Criteria																		
A																		
B																		
C																		
D																		
E																		
F																		
.																		
.																		
.																		
N																		

Vertical and Longitudinal comparisons are constrained to "Self-Similar" Studies

# Task D: Compilation of a bibliography of other studies

The Team has already compiled a large set of reference works:

Related basic life history research papers for multiple taxa,

Peer reviewed articles on flow-ecology relationships and

Flow validation studies

We will provide an Annotated Bibliography of the resource material that summarizes the content of each article or study and how it informs recommendations for studies, monitoring, or research supporting the adaptive management process related to existing or revised BBASC study plans.

# Task E: Stakeholder presentations

A summary workshop for each of the BBASC/BBEST Teams will be held where opportunities for input and feedback on the independent review results will be provided.

**NOTE:** Our independent review and recommendations **DO NOT REQUIRE BBASC/BBEST consensus.** We will however, provide a response to germane comments received as part of finalizing our review and recommendations.

The summative overview will include, where necessary, the identification of shortcomings in methodologies, data collected, analyses, result presentation, conclusions and study recommendations specific to each study and their implications on the validation of flow regimes.

The recommendations will be supported within the context of recognized state, national and international standards of practice and peer review literature within the context of the SB3 adaptive management process.

# Study Timeline: January 9, 2019 – August 31, 2020

Deliverables	Fiscal Year 2019			Fiscal Year 2020			
	Q2 (Dec-Feb)	Q3 (March – May)	Q4 (June-Aug)	Q1 (Sept-Nov)	Q2 (Dec-Feb)	Q3 (March-May)	Q4 (June-Aug)
Stakeholder webinars/meetings	✓	✓	As needed				✓
Quarterly Progress Reports	✓	✓	✓	✓	✓	✓	✓
Draft Final Report							✓
Final Report							✓