



Statement of Work TASK ORDER 4

Colorado River Flow Relationships to Aquatic Habitat and State Threatened Species: Blue Sucker

Submitted by:

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1. Overview and Study Objectives

The lower Colorado River basin supports a diverse ecological community that relies on the quality, quantity, and timing of water moving through the system. The LCRA-SAWS Water Project (LSWP) has the potential to alter characteristics of the flow regime for the lower Colorado River, including the possibility of using instream structures to facilitate the removal of water for off-channel storage facilities (OCSF). Because of these potential impacts, the Colorado River Flow Relationships to Aquatic Habitat and State Threatened Species: Blue Sucker Study was developed to assess potential impacts/benefits on the aquatic resources of the lower Colorado River with and without implementation of the project. An additional study objective is to quantify the condition of the aquatic environment under different flow scenarios to satisfy federal and state permitting requirements and ensure compliance with the environmental principles set forth for this project.

Two of the environmental principles incorporated into the LSWP contract relate directly to this study and state that before project implementation, studies must show that the project (1) “protects and benefits the lower Colorado River watershed and the LCRA Service Area, including municipal, industrial, agricultural, recreational, and environmental interests”; and (2) “provides for instream flows no less protective than those included in the LCRA Water Management Plan (LWMP) for the Lower Colorado River Basin, as approved by the Texas Commission on Environmental Quality.”

The BIO-WEST project team is conducting the Colorado River Flow Relationships to Aquatic Habitat and State Threatened Species: Blue Sucker study based on a combination of the original Detailed Study Plans (DSPs) developed for the LSWP, modifications recommended by the project team in the RFQ response, and modifications/enhancements recommended by the Science Review Panel and Advisory Group since the initiation of the study. The following Statement of Work is specific to the Fourth Task Order that extends from January 1, 2007 through December 31, 2007. A schedule with costs is included.

All Task Order 1 and 2 activities were completed on schedule and within budget which efficiently led into the 2006 Task Order 3 scope, budget, and schedule. All Task Order 3 activities are anticipated to be completed on schedule and within budget which efficiently leads into the 2007 Task Order 4 (TO4) scope, budget, and schedule outlined in this TO4 Statement of Work.

2. Team Members

The following table presents key BIO-WEST Project team members that will need continued access to the LCRA Project Web Site.

TABLE 1. BIO-WEST PROJECT TEAM MEMBERS

Name	Position on Project
Edmund Oborny (BW)	Project Manager
Dr. David Harkins (EC)	Senior Expert - Engineer
Tim Osting (EC)	Engineer III
Roy Frye (H&C)	Senior Expert - Scientist
Joe Trungale (TES)	Engineer II
Dr. Chris Bunt (Biotactic)	Telemetry Expert
Darren Olsen (BW)	Fluvial Geomorphologist
Melissa Romigh (BW)	Biologist II
Marty Heaney (BW)	Scientist II
Melissa Stamp (BW)	Hydrologist / Watershed Scientist
Sandra Turner (BW)	Senior Editor
Chimene Oborny (BW)	Administrative Assistant

3. Work Breakdown Structure

The major work elements (Tasks) are presented in Table 3.

TABLE 3. WORK BREAKDOWN STRUCTURE		
Task Number	Subtask Number	Name
TASK 1		PROJECT MANAGEMENT / MEETINGS
Subtasks	1.10	Contract / Project Management
	1.20	Task Coordination
	1.30	Meetings
TASK 2		FINAL BIOLOGICAL ASSESSMENTS
Subtasks	2.10	Field Collection, Biological Validation
	2.20	Data Reduction, Analysis, and Application
TASK 3		FINALIZE MODELS
Subtasks	3.10	River 2D Hydraulic Models
	3.20	Habitat and Recreation Models
	3.30	Sediment Transport Analysis
TASK 4		PROJECT ALTERNATIVE ANALYSIS
Subtasks	4.10	Preparation of Existing Conditions Section
	4.20	Alternatives Analysis
	4.30	Socioeconomic Team Interactions
TASK 5		PROJECT PERMITTING ACTIVITIES AND APPLICATION DEVELOPMENT
Subtasks	5.10	Support Design of Intake Facilities
	5.20	Permitting Team Interaction
TASK 6		PROJECT DATA ANALYSIS AND REPORT PREPARATION
Subtasks	6.10	Draft and Final Technical Report
	6.20	Long-term Monitoring Program

5. Statement of Work

Task 1: Project Management / Meetings

Subtask 1.10 – Contract / Project Management

Subtask 1.20 – Task Coordination

Subtask 1.30 – Meetings (CH2M Hill and LCRA/SAWS)

Description of Work: Project management, contracting, task coordination, and internal and external communication are included in this category. Communication of progress with LCRA/SAWS and the CH2M Hill Project Management Team is extremely important. As depicted in the schedule, four face-to-face meetings are proposed for 2007. Close coordination will be maintained with Martina Walker (LCRA) to ensure the project team is meeting the LCRA GIS standards, and if not, how corrections to the format can be achieved by the project team to ensure compatibility when final products are delivered during this task order. In addition, the BIO-WEST project team anticipates frequent communication via phone or email with the CH2M Hill Project Management Team.

Communication with the other study groups will also be a vital component in the success of the LSWP. The BIO-WEST project team will prepare for and participate in monthly Aquatic Habitat team conference calls and monthly project managers meetings. In addition, BIO-WEST will maintain frequent communication via phone/email or meetings with the other project teams to facilitate the proper coordination and integration of studies.

Key Assumptions:

- *Monthly Aquatic Habitat team conference calls.*
- *Four face-to-face meetings with CH2M Hill/LCRA/SAWS.*
- *GIS data will be modified, if necessary, in 2007 to ensure that it meets the project standards when submitted in final form.*
- *Monthly project manager meetings.*

Deliverables: Monthly Progress Narratives with invoices

Task Leader: Edmund Oborny

Quality Control/Quality Assurance Leader : Dr. Paul Holden

TASK 2 – Final Biological Assessments

Subtask 2.10 – Field Collection, Biological Validation

Description of Work: In the spring 2007, field validation efforts will be conducted to evaluate the suitability criteria developed during 2006. These field validation efforts will include spawning season surveys, focused larval evaluations, limited juvenile sampling, and migration assessments. These field activities will be completed by April 30, 2006. The assumption stated since early on in the development of this study that, *“The biological data collected for the blue sucker over a 2 ½ year time period will be sufficient to describe the habitat suitability requirements of the species for habitat modeling purposes.”* has been met for adult and

spawning blue suckers and will be strengthened further by the inclusion of the 2007 validation data.

The spring 2007 spawning surveys will focus on locations predicted by the habitat model to be suitable for spawning. These areas will be visually evaluated by trained fisheries biologists for spawning adults and evaluated for blue sucker eggs. During each site visit, measurements of potential triggering mechanisms (such as water temperature, flow, and available habitat [i.e. depth, velocity, substrate, and cover]) will be documented for each individual blue sucker that is observed spawning. To facilitate the spawning surveys, radio telemetry equipment will be used to locate individually tagged fish during spring 2007. Upon observation/confirmation of spawning, specific information documenting the timing, location, specific habitat conditions, water quality, and spawning activities (i.e. behavior) will be collected. A GPS unit will be used to document the location of each observed individual blue sucker. Standard water quality parameters (water temperature, conductivity, pH, and dissolved oxygen) will be measured along with a detailed habitat characterization including depth, velocity, substrate, and instream cover in the immediate area and adjacent to the observed spawning.

One assumption that has been violated to date is, "*The ability to capture ecologically meaningful numbers of larval/juvenile blue suckers.*" Ecologically meaningful is defined as multiple collections of the life-stage from multiple locations in the river. No larval or juvenile blue suckers have been collected in the lower Colorado River since the study inception (written December 1, 2006). Therefore, in 2007, a focused effort will be made to evaluate spawning success and subsequently locate larval blue suckers. An area with observed spawning activity and confirmed blue sucker eggs will be intensively monitored for a short-time following egg identification. Fine-mesh nets will be fixed over known blue sucker eggs and hatching and larval development will be evaluated. Upon successful hatching, larval seines will be pulled to evaluate possible settlement areas for blue sucker larvae in the immediate and downstream areas. If hatching proves successful, approximately one month after, a limited field effort will be conducted in these areas to locate juvenile blue suckers.

Key Assumptions:

- *The ability to capture ecologically meaningful numbers of larval/juvenile blue suckers.*

Internal Deliverable: Biological validation data.

Task Leader: Brad Littrell

Quality Control/Quality Assurance Leader : Edmund Oborny

Subtask 2.20 – Data Analysis and Suitability Criteria refinement

Description of Work: The biological data collected in spring 2007 will be reduced and analyzed. The new information gathered on blue sucker life stages during spring 2007 will be used to validate and/or refine the specific habitat suitability and/or habitat guild criteria developed in 2006. For adult blue suckers (rapids guild) and spawning blue suckers (own guild), if the data collected in 2007 fall within the established guilds validation of those guilds will have been met. However, should the data consistently fall outside of the guild boundaries a compilation of that data with previous years results will be conducted and refined guild boundaries established. Should data for larval or juvenile blue suckers be

collected in 2007, this information will be folded into the existing guild development. An evaluation will be conducted to determine which guilds they fall within and/or if refinement to existing guilds or development of additional guilds is warranted.

Key Assumptions:

- *None*

Internal Deliverable: Potentially refined habitat suitability criteria for blue sucker life stages and habitat guilds. A brief memo will be submitted to the program describing the status of findings and any costs or schedule implications.

Task Leader: Brad Littrell

Quality Control/Quality Assurance Leader : Edmund Oborny

Task 3 – Finalize Models

Subtask 3.10 – River 2D Hydraulic Models

Subtask 3.20 – Habitat and Recreation Models

Subtask 3.30 – Sediment Transport Analysis

Finalization of the River 2D hydraulic models, habitat models, and sediment transport analysis will be completed by summer 2007. River 2D hydraulic model and sediment transport analysis refinements and adjustments will be conducted in accordance with LCRA/SAWS, AG, and SRP review and comments. Habitat model refinements and adjustments will be conducted in accordance with LCRA/SAWS, AG, and SRP review and comments, continued analysis of collected data, and application of any pertinent adjustments based on biological data collected in spring 2007.

Recreation modeling will consist of using the final River 2D hydraulic models at each intensive site coupled with suitability criteria for recreational activities (swimming, wade fishing, boating, kayaking, and canoeing). Recreational suitability criteria are being compiled in 2006 from existing literature including peer reviewed articles, technical reports, and published books. Adjustments to the recreational suitability criteria will be conducted in accordance with LCRA/SAWS, AG and SRP review and comment.

Key Assumptions:

- *Recreational suitability criteria established in the literature is sufficient to address recreational activities for the lower Colorado River*
- *As the River 2D models and sediment transport analysis was completed in 2006 and no new data pertaining to these models is schedule for collection in 2007, refinements/adjustments in accordance with LCRA/SAWS, AG, and SRP review and comments are anticipated to be minor.*

Deliverables: Final River 2D models for each intensive site. The final River 2D models will meet the LSWP modeling standard and be posted to SISS upon completion. Final habitat model results, recreation model results, and sediment transport results. These results will be included in the alternatives analysis documentation (Task 4) and draft and final technical reports (Task 6) and used to evaluate potential refinements to the environmental flow guidelines developed in 2006.

Task Leader: Tim Osting

Quality Control/Quality Assurance Leader : Joe Trungale

Task 4 – Project Alternative Analysis

Subtask 4.10 – Preparation of Existing Conditions Section

Description of Work: This task involves the preparation of the lower Colorado River Aquatic Habitat existing conditions section to be included in the necessary environmental documentation for permitting. The aquatic habitat section will include discussions of aquatic organisms, channel conditions, riparian vegetation communities, and special aquatic habitat sites. Life history information on the fish used in the habitat guild analysis will be included as well as detailed life history information on the blue sucker (only listed [state-threatened] aquatic species on the lower Colorado River). Available aquatic habitat will be presented for all modeled fish species/guilds.

Key Assumptions:

- *Existing conditions flow regime for analysis will be determined by LCRA and available to meet proposed schedule.*

Deliverable: Aquatic Habitat Existing Conditions Section. A map including the shapefiles of the features described in 4.10 will be submitted with the narrative.

Task Leader: Edmund Oborny

Quality Control/Quality Assurance Leader : Brad Littrell

Subtask 4.20 – Alternatives Analysis

Description of Work: This task will involve a detailed evaluation of with and without project scenarios for impact assessment. The completed aquatic habitat tools (habitat and recreation model, sediment transport analysis, and environmental flow guidelines) will be used to evaluate the project scenarios provided by the SWA team. A decision on which two future years to analyze will be made with the concurrence of the SWA team and program management. It is anticipated that several iterations will be performed and close interaction will be maintained with the SWA team and Water Quality team. This task also includes the preparation of impact assessment environmental documentation as needed for the permit application. Potential mitigation opportunities will also be investigated should the preferred project alternative cause adverse impact to the riverine environment.

Key Assumptions:

- *Surface Water Availability team provides with and without project scenarios for comparison.*
- *Only two future years will be selected for with and without project analysis.*

Deliverable: Draft and final impact assessment results and documentation. Draft documentation will be posted to Confluence and final documentation will be uploaded to SISS.

Task Leader: Edmund Oborny

Quality Control/Quality Assurance Leader : Tim Osting

Subtask 4.30 – Socioeconomic Team Interaction

Description of Work: This task will include the coordination between the Aquatic Habitat team and the Socioeconomic team. Activities include reviewing and commenting on technical memorandums prepared by the Socioeconomic team, providing quantitative values of available aquatic habitat and recreation areas based on with and without project scenarios, and continued interaction. Please refer to the Socioeconomic 2007 SOW for a detailed description of socioeconomic team activities and team interactions.

Key Assumptions:

- *Surface Water Availability team provides with and without project scenarios for comparison.*

Deliverable: Final quantitative recreational and habitat impacts/benefits to be provided to the Socioeconomic team in 2007. Final results will be posted to SISS.

Task Leader: Edmund Oborny

Quality Control/Quality Assurance Leader : Brad Littrell

Task 5 – Project Permitting Activities and Application Development

Subtask 5.10 – Support Design of Intake Facilities

Description of Work: The project team will assist the Facilities Siting team with an evaluation of the placement and configuration of proposed instream structures and intake facilities. The assessment will include a review of information provided by the Facilities Siting team including project designs, cross-sectional dimensions of the existing channel at the three proposed locations (Wolf Pen Creek, Garwood, and Bay City) , and proposed flow regime past the structure/intake for the with and without project modeled scenarios. Upon location selection, the project team will conduct a limited field effort to evaluate the aquatic habitat and species present in the immediate area. Information gathered during the desk top analysis will be presented to the Facilities Siting team in a draft technical memorandum to assist that team in final selection of location. Upon completion of the field component, that information will be added to the technical memorandum to finalize that document and assist the Facilities Siting team in the final development, design, and placement of the necessary facilities.

Key Assumptions:

- *Flow scenarios over the three potential intake structures will be provided by the Surface Water Availability team.*
- *Specific locations and sizes of the three potential intake structures will be provided by the Facilities Siting team.*
- *Surface Water Availability team provides with and without project scenarios for comparison.*

Deliverable: Draft and Final Technical memorandum. Draft documentation will be posted to Confluence and final documentation will be uploaded to SISS.

Task Leader: Edmund Oborny

Quality Control/Quality Assurance Leader : Brad Littrell

Subtask 5.20 – Permitting Team Interaction

Description of Work: This task will include the coordination between the Aquatic Habitat team and the Permitting team. Activities will consist of providing information necessary for the completion of the permit application and resulting permit required environmental documentation. Coordination will be in the form of meetings, technical memorandum review and comment, permit application review and comment, and specific discussions.

Key Assumptions:

- *None*

Deliverable: None

Task Leader: Edmund Oborny

Quality Control/Quality Assurance Leader : Tim Osting

Task 6 – Project Data Analysis and Report Preparation

Subtask 6.10 – Draft and Final Technical Report

Description of Work: The BIO-WEST project team will complete the reduction and analyses of data collected as part of the multi-year Aquatic Habitat study. The project team will then prepare a technical report detailing the activities, methodologies, results, discussion, and conclusions of the Aquatic Habitat study. The report will include the biological validation data collected in the spring of 2007. The project team will write sections of the technical report in a manner consistent with EIS document preparation for ease of incorporating this documentation into the overall permit application as sections, chapters, or likely appendices.

Key Assumptions:

- *None*

2007 Deliverable: Draft and Final technical reports. Draft documentation will be posted to Confluence and final documentation will be uploaded to SISS.

Task Leader: Edmund Oborny

Quality Control/Quality Assurance Leader : Tim Osting

Subtask 6.20 – Long-term Monitoring Program

Description of Work: The project team will submit a separate technical memorandum describing different levels of long-term monitoring for consideration by LCRA/SAWS. Depending on the potential changes in the lower Colorado River flow regime and resulting impacts/benefits, a range of monitoring activities or some level of phased activity may be recommended. The evaluation will start with an assessment of how the current LCRA aquatic monitoring program might be adjusted to address LSWP long-term monitoring needs. The level of long-term monitoring will depend largely on the magnitude of

proposed changes in the flow regime and also if a new channel dam is placed in Colorado County. Interaction with the AG and SRP will be conducted during the development of this program.

Deliverable: Technical Memorandum – Long-term Monitoring Program. Draft documentation will be posted to Confluence and final documentation will be uploaded to SISS.

Task Leader: Edmund Oborny

Quality Control/Quality Assurance Leader : Tim Osting