

## **EVALUATION OF COMPETITION BY *HETERANTHERA DUBIA* WITH MORE PREVALENT NATIVE SUBMERGED AQUATIC VEGETATION IN THE UPPER SAN MARCOS RIVER**

### **PRELIMINARY SCOPE OF WORK**

This study will evaluate *Heteranthera dubia* growth, competition, and interference with native submerged aquatic vegetation (NSAV) found within the San Marcos River: *Zizania texana* (Texas Wild-rice), *Potamogeton* sp., *Ludwigia* sp. and *Sagittaria* sp. In addition, the Consultant will determine how much area would potentially be currently available and suitable for *H. dubia* without artificially increasing its historic range, or negatively impacting the NSAVs in the San Marcos River. It is anticipated that this study will have ex situ and in situ components.

### **Task 1. Methodology Development**

This task is divided into subtasks consisting of methodology development and Science Committee review. The Consultant shall discuss the process, approach, oversight, strategies, and budget requirements to complete each of the subtasks listed below:

#### Subtask 1.1 Develop Experimental Design and Detailed Methodologies

Consultant will conduct an extensive literature review on the historical range of *H. dubia* in the San Marcos River and its preferred habitat (depth, velocity, substrate, solar radiation, etc.), to include any history and location of natural co-existence with Texas wild-rice. In addition, the Consultant will review ex situ and in situ studies of submerged aquatic plant competition in the San Marcos River. The literature review will serve as the basis for developing the methodology and parameters for the study.

The Consultant will develop a statistically valid study to answer the study question and will be required to provide justification for the selection of the environmental variables and the methodologies selected to conduct the study.

#### Subtask 1.2 Present Literature Review and Methodologies to the Science Committee for Review

Once detailed methodologies have been developed, the Consultant will present these methodologies to the EAHCP Science Committee for review prior to the implementation of any activities in the field. The Consultant will give a 30-minute presentation and must be prepared to answer any questions that the members of the Science Committee have. Recommendations provided by the Science Committee should be considered for inclusion in final research methodologies. The Consultant will provide detailed written justification to the EAA for any recommendations they do not incorporate into their final methodology.

### **Task 2. Conduct Applied Research**

The Consultant will carry out experimentation consistent with the methodologies proposed in Task 1 and approved by the Science Committee. The Consultant will keep a project notebook containing a description of the assumptions and methodologies used in the study analysis. The notebook shall be organized in such a way as to allow replication of the steps, calculations, and procedures used by the Consultant to reach conclusions, described in the draft final report. The project notebook shall include a USB flash drive or other suitable electronic storage device containing all raw data collected during the project. The USB flash drive containing the project notebook and raw data will be submitted with the draft final report. In addition, the Consultant will take photographs of the experimentation (if applicable) throughout its various phases and make these photos available on the USB flash drive or other suitable electronic storage device and utilized in reports submitted to the EAA (where applicable).

### **Task 3. Draft and Final Reports**

The Consultant will include in the Draft and Final Report a section describing the assumptions and methodology used by the Consultant in generating the data, analysis and conclusions. The reports will include details of the statistical analysis and conclusions, and will provide recommendations to the EAA for potential future research (if applicable). The Draft Report must be submitted to the Authority in an expedient manner to allow review and to allow the Consultant to develop and submit the Final Report on time. The Final Report, along with all data and the project notebook, must be submitted in hard copy and on a USB flash drive or other suitable electronic storage device in a Microsoft Office, or other agreed upon, format.

### **Task 4. Meetings and Presentations**

The Consultant should budget for a minimum of two meetings with the Science Committee and when requested by the EAHCP Program Manager (1) to present the literature review and project methodologies, and; (2) to present the project results.