WHAT QUANTITATIVE SAMPLING METHOD FOR THE COMAL SPRINGS RIFFLE BEETLE WILL PROVIDE RELIABLE, STATISTICALLY VALID DATA?

PRELIMINARY SCOPE OF WORK

Heterelmis comalensis (Comal Springs Riffle Beetle) is a federally-listed Elmid found in the Comal Springs system, and, to a lesser extent, in the San Marcos Springs system. Due to the relatively small size of the Comal Springs Riffle Beetle (CSRB) and to the difficulty of collection, the most reliable collection method identified to-date utilizes cotton-cloth lures (lures). While these lures have facilitated collection of CSRB adults and some larvae, this methodology may not be providing reliable, consistent quantitative data that may be used in habitat preference or population studies.

The Consultant will conduct a literature review on *in situ* quantitative sampling of Elmidae, *Heterelmis spp.,* and specifically, the Comal Springs riffle beetle (CSRB). This literature review will serve as the basis for developing the quantitative methodology and parameters to answer the study question. (Note: This is not a population or distribution study.)

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

The Consultant will develop at least three quantitative CSRB sampling methodologies for *in situ* comparison testing in the Comal Springs system. The methods selected for testing should create the least disturbance in the habitat, cause the least damage or mortality to the CSRB, and be the most labor efficient. Statistical analysis of the data collected from the *in situ* comparison studies of the three methodologies will be structured to select the most reliable, statistically valid data collection method for acquiring quantitative CSRB data that may be used in distribution and population studies. The Consultant will develop the validation and justification criteria that will be used to select the preferred collection method.

Subtask 1.2 Present Methodologies to the Science Committee for Review

Once the proposed methodologies, selection justification, and validity criteria have been developed, the Consultant will present them to the EAHCP Science Committee for review and comment 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 from the Science Committee. 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 "flash drive" or other suitable electronic media of all raw data collected during the project and 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 data "flash drive" or other suitable electronic media and utilized in reports submitted to the EAA (where applicable).

Task 3. Draft and Final Reports

The Consultant will provide a Standard Operating Procedure (SOP) for quantitative CSRB sampling. In addition, the Consultant will provide a Draft and Final Report with a section describing the assumptions and methodologies used by the Consultant in generating the data, analysis and conclusions. The reports will summarize observations regarding analysis, trends, conclusions, and will include recommendations to the EAA for potential future research (if applicable). The Final Report, along with all data and the project notebook, must be submitted in hard copy and on a "flash drive" or other suitable electronic media in a Microsoft Office, or other agreed upon format.

Task 4. Meetings and Presentations

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