Experimental Channel: Operational and Applied Research Plan

Introduction
The Comal Springs Experimental Channel System (CSECS) is a unique facility located at the San Marcos National Fish Hatchery and Technology Center in San Marcos Texas. The Facilities intended use is for cooperative research between the Edwards Aquifer Authority (EAA) and its partners that facilitates the conservation of Edwards Aquifer (EA) water and habitat while simultaneously conserving or enhancing Endangered Species Act (ESA)-listed species.

The mission of the CSECS, as stated in the Edwards Aquifer Recovery Implementation Program (EARIP) habitat conservation plan (HCP), deal primarily with the Comal riffle beetle and fountain darter and specifically outline the following areas to be examined:

1) Determine habitat requirements and responses to changes in habitat for both species,
2) How does low flow directly affect both species, and
3) How does the timing, frequency, and duration of multiple low flow events effect both species where data collected can be used for model validation.

To accomplish the mission, the CSECS shall have two tiers of research plans. Under Tier One, advanced scientific research shall be reviewed and conducted to understand the fundamentals of the mechanisms that result under low spring flows. Under Tier Two, operational and applied research shall be reviewed and conducted to develop improve the conservation or enhancement of the habitat and EA ESA-listed species.
Staging area for experimental organisms brought on station.

Research Facilities at CSECS
1) (insert number, dependent on final design) artificial spring orifices
2) (insert number, dependent on final design) artificial spring runs
3) (insert number, dependent on final design) artificial lake habitats
4) (insert number, dependent on final design) artificial stream habitats
5) Wet lab to quarantine experimental organisms, chilled, filtered and treated EA well water

Operational and Applied Research
The CSECS has activities designated by the EARIP HCP recognized and approved by the EARIP Scientific Panel. The existing review procedures are used to consider research activities. Types of research that will reviewed and considered for Operational and Applied Research may include, but are not limited to:

1) Assessment and evaluation of low spring flow dynamics on ESA-listed species.

2) Developing improved breeding, culture and release practices which may improve post release survival and minimize impacts on wild stocks.
3) Identifying marking techniques that can be used in studies of natural spawning behavior of ESA-listed organisms, migration, mortality, etc.
4) Conducting experiments on transportation to minimize stress and improve holding and post-release survival.

Research results may be published in peer reviewed journal and/or internal reports, and workshop and conference presentations.

Operational and Applied Research Review and Approval Procedures
Research proposals can be submitted at any time for consideration. Proposals shall be submitted to the CSECS Facility Manager (i.e. San Marcos National Fish Hatchery and Technology Center Director), an assigned member of the Scientific Panel (Senior Scientist), and an assigned member of the EARIP Implementing Committee in the first instance.

Individuals or groups interested in conducting research at the Center are strongly encouraged to initiate discussions with the Senior Scientist, the Facility Manager and appropriate member of the EARIP Implementing Committee. The Senior Scientist will review each proposal together with CSECS Facility Manager, and the designated EARIP Implementing Committee member.

The Senior Scientist will bring each proposal to the Implementing Committee with a recommendation for further consideration or rejection. The Advisory Committee, acting through the Research Sub-Committee (a small group of the Scientific Committee selected to review research proposals), will review each proposal and the accompanying recommendation of the Senior Scientist. The Research Sub-Committee will inform the Senior Scientist of their recommendations on each proposal, and will discuss these with the Senior Scientist to reach a final decision on each proposal.

The operational and applied research proposals must satisfy all the following requirements before they can be considered for implementation at the CSECS:

1) Animal Care and Fish Health
All research proposals must satisfy the appropriate review panel(s) for care, holding, transportation and treatment of animals and follow appropriate standard operating procedures.

All proposals must be reviewed by CSECS Facility Manager and USFWS Fish Health, and appropriate measure will be taken to avoid contamination of other stocks at the facility, pathogen amplification, transmission, etc. All state and federal rules and regulations must be followed while using chemicals and drugs for disinfection and/or disease treatment.

2) Funding
Funding to support the proposed research must be identified in the research proposal. Funding may be in the form of fish feed and supplies and/or staff time. If fish health exams are to be performed frequently or on large numbers of fish, funds must be identified to cover travel and staff time.

3) Facility Availability and Access
Approval of specific research projects will require close consultation with the Senior Scientist, CSECS Facility Manager and the Research Sub-Committee to ensure that space and facilities will be available for the proposed research.
Timing and length of the proposal will be coordinated with other ongoing projects. For the best utilization of the facilities, collaborative research programs are always encouraged.

Operational-Applied Research Proposal Review Procedure:
The following two- step process will be applied to all Research Proposals. Step 1 utilizes the Decision Matrix Table. Step 2 utilizes the Scientific Screening Table, in that sequence.

Step 1.
I. Submission of Proposal by Applicant to CSECS Facility Manager and Senior Scientist

II. Consideration, Review and Comment on proposal by CSECS Facility Manager, Senior Scientist (and if deemed necessary by the Senior Scientist, will also be done by a selection of someone approved by the Implementing Committee) within 30 days of submission (see Step 1 below)

III. If Proposal Meets Criteria for Step 1

IV. Forward research proposal by Senior Scientist to Research Sub-Committee for review.

V. Comments provided from Research Sub-Committee to Senior Scientist and CSECS Facility Manager.

VI. If needed discussion and consensus between Research Sub-Committee, Senior Scientist and CSECS Facility Manager to reach a final decision on proposal

VII. Communication of decision to research applicant by Senior Scientist

A decision on a research proposal will normally be reached within 60 days of initial submission.

The following scoring and review process will be applied to all Operation and Applied Research Proposals.

Review
Operational and Applied Research Proposals will be judged by the following Criteria. As much as possible, research proposals will be scored as "positive" or "negative" for each criterion. The conclusion will be a simple sum of positive and negative scores. Depending on that combination of scores and priorities, the decision can be made to reject the proposal and not proceed.

Step 1.

Decision Matrix Table				
Criterion	**Item**	**Positive**	**Negative**	**Comment**
1	**Research Mission**			
2	**Research Goals**			
3	**Funding (feed, supplies, organisms, staff)**			
4	**Animal Care/Fish Health (Approval/Review)**			
5	**Space & Facilities, Personnel Available (Schedule/Timing)**			
6	**Practicality**			
7	**Collaboration: complimentary with other projects)**			

8	**Summary Presentation Plan (Publication, internal report, Conference/workshop, etc)**			

Step 2.
Research Proposals that pass screening by Step 1 will then be considered for Scientific Screening. Research Proposals will be judged by the following Criteria. As much as possible, Research Proposals will be scored as "positive" or "negative" for each criterion. The conclusion will be a sum of positive and negative scores, **PLUS** consideration of "Comments" for any criteria. Comments may be extensive in some cases, and may include detailed assessment of proposals, reference to published literature, or opinions from Research Sub-Committee or other external personnel.

Scientific Screening Table				
Criterion	**Item**	**Positive**	**Negative**	**Comment**
1	Objectives			
2	Relevance of Study			
3	Experimental Design			
4	Publication Plan			
5	Applicant Resume			
6	Lilihood of Informative Results: Research			
7	Collaboration: complimentary with other projects)			
8	Practical Application to Mission			
9	Cost Effectiveness			

Criteria for Decision Matrix Table 2 (Scientific Screening Table)

1. Objectives – preference will be given to Research Proposals with clearly stated objectives (scientific hypotheses) and testable predictions

2. Relevance – each Research Proposal should clearly state the relevance of the objectives (hypotheses) to the CSECS Mission

3. Experimental design

- **a. Sample sizes –** each Research Proposal should include specific numbers of animals required in all components of the study, with sufficient detail to allow estimation of power and experiment-wise error (or other relevant criteria)
- **b. Data analysis –** each Research Proposal should have explicit statements of any statistical analyses of experimental data

4. Publication plan – each Research proposal should include a proposed schedule for publication of the results of the study, with suggested journals or other outlets for publication

5. Applicant resume – each Research Proposal should include a summarized personal resume for all Principal Investigators, with a list of recent publications and presentations at scientific meetings

6. Likelihood of informative results - applicants should indicate their estimate of the certainty (or uncertainty) of the proposal (e.g., new techniques yet to be established vs. application of established techniques)

7. Potential application – applicants should indicate the relevance, if any, of the Research Proposal to either practical fisheries management or hatchery operations

8. Cost effectiveness – applicants should estimate relative expenditures ("costs" = space, equipment, facilities, personnel) and outcomes ("effects" = new knowledge, critical test of important hypothesis, etc.)