

COVER SHEET (PAGE 1 of 2)

May 1998 CALFED ECOSYSTEM RESTORATION PROPOSAL SOLICITATION

Proposal Title: Genetic Conservation of Green Sturgeon
 Applicant Name: The Regents of the University of California
 Mailing Address: University of California, One Shields Ave., Davis, CA 95616
 Telephone: (530) 752- 2075
 Fax: (530) 752- 5432

Amount of funding requested: \$ 10,000 for 2 years

Indicate the Topic for which you are applying (check only one box). Note that this is an important decision: see page of the Proposal Solicitation Package for more information.

- Fish Passage Assessment
- Floodplain and Habitat Restoration
- Fish Harvest
- Watershed Planning/Implementation
- Fish Screen Evaluations - Alternatives and Biological Priorities
- Fish Passage Improvements
- Gravel Restoration
- Species Life History Studies
- Education

Indicate the geographic area of your proposal (check only one box):

- Sacramento River Mainstem
- Delta
- Suisun Marsh and Bay
- San Joaquin River Mainstem
- Landscape (entire Bay-Delta watershed)
- Sacramento Tributary: _____
- East Side Delta Tributary: _____
- San Joaquin Tributary: _____
- Other: _____
- North Bay: _____

Indicate the primary species which the proposal addresses (check no more than two boxes):

- San Joaquin and East-side Delta tributaries fall-run chinook salmon
- Winter-run chinook salmon
- Late-fall run chinook salmon
- Delta smelt
- Splittail
- Green sturgeon
- Migratory birds
- Spring-run chinook salmon
- Fall-run chinook salmon
- Longfin smelt
- Steelhead trout
- Striped bass

COVER SHEET (PAGE 2 of 2)

May 1998 CALFED ECOSYSTEM RESTORATION PROPOSAL SOLICITATION

Indicate the type of applicant (check only one box):

- | | |
|--|---|
| <input type="checkbox"/> State agency | <input type="checkbox"/> Federal agency |
| <input type="checkbox"/> Public/Non-profit joint venture | <input type="checkbox"/> Non-profit |
| <input type="checkbox"/> Local government/district | <input type="checkbox"/> Private party |
| <input checked="" type="checkbox"/> University | <input type="checkbox"/> Other: _____ |

Indicate the type of project (check only one box):

- | | |
|--|---|
| <input type="checkbox"/> Planning | <input type="checkbox"/> Implementation |
| <input type="checkbox"/> Monitoring | <input type="checkbox"/> Education |
| <input checked="" type="checkbox"/> Research | |

By signing below, the applicant declares the following:

- (1) the truthfulness of all representations in their proposal;
- (2) the individual signing the form is entitled to submit the application on behalf of the applicant (if applicant is an entity or organization); and
- (3) the person submitting the application has read and understood the conflict of interest and confidentiality discussion in the PSP (Section II.K) and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent as provided in the Section.

(Signature of Applicant)
Fay Yee
Contract & Grant Analyst

II. Executive Summary

a. Project Title

Genetic Conservation of Green Sturgeon

Applicant Names

Joseph G. Zinkl
University of California, Davis

Patrick J. Foley
University of California, Davis

b. Project Description and Primary Biological / Ecological Objectives

A small living collection of green sturgeon is currently being kept at the University of California, Davis (UCD). Larvae were collected in 1996 from the upper Sacramento River near Hamilton City and Red Bluff. This is the only known captive stock of green sturgeon in North America. This project aims to maintain and develop the collection as a repository of living genomic material.

c. Approach / Tasks / Schedule

Fish will continue to be reared at UCD. Alarm systems will be improved to alert animal resource managers and researchers of potential problems. Passive injectable transponder implants (PIT tags) will be used to identify individual animals. Funding is requested for two years.

d. Justification for Project and Funding by CALFED

In order to achieve the Ecosystem Restoration Program Plan (ERPP) objectives for green sturgeon more basic biological information will be needed. This proposal attempts to address that need at a relatively low cost with a unique existing collection. CALFED considers green sturgeon a

primary priority species. In addition, the species is designated a species of special concern by the California Department of Fish and Game (DFG) and a species of concern by the United States Fish and Wildlife Service (USFWS).

e. Budget Costs and Third Party Impacts

The amount requested over two years is \$10,000. No third party impacts have been identified.

f. Applicant Qualifications

Joseph G. Zinkl is a veterinarian and a professor in the School of Veterinary Medicine, Department of Pathology, Microbiology and Immunology, at UCD. He has 17 years of field, clinical and laboratory experience working with aquatic organisms.

Patrick Foley is a doctoral student in comparative pathology at UCD and has been involved in green sturgeon research since 1988.

g. Monitoring and Data Evaluation

Ecological and biological monitoring will not be necessary for this proposal. Any data generated will be available through program review presentations, quarterly reporting and a final report. Papers may be submitted to peer reviewed scientific journals.

h. Local Support / Coordination with other programs / Compatibility with CALFED objectives.

Initial larval collections were made by DFG and USFWS. The U.C. Genetic Resources Conservation Program funded an Imperiled Collection Proposal in 1997 (\$1800). The CALFED implementation objective to ensure the recovery of green sturgeon is addressed through preservation of genomic material in the form of a living collection.

III. Title Page

a. Title of Project:

Genetic Conservation of Green Sturgeon

b. Principle investigator:

Joseph G. Zinkl
VM: PMI
University of California
One Shields Avenue
Davis, CA 95616-8739

Voice: 530 946-752-7483
Fax: 530 946-752-3349
Email: jgzinkl@ucdavis.edu

Co-investigator:

Patrick J. Foley
VM: PMI
University of California
One Shields Avenue
Davis, CA 95616-8739

Voice: 530 946-752-7483
Fax: 530 946-752-3349
Email: pjfoley@ucdavis.edu

c. Type of Organization and tax status:

University / tax exempt

d. Tax Identification Number:

Not applicable

e. Participants / Collaborators in Implementation:

UCD Aquaculture and Fisheries Program (AFP)
U.C. Genetic Resources Conservation Program
CDFG and USFWS

IV. Project Description

a. Project Description and Approach

The goal of this project is to maintain and develop a collection of living genomic material for green sturgeon. Fish have been recovered from the wild as larvae by DFG and USFWS (1996) and are kept at UCD. Basic parameters like density, flow rate, dissolved oxygen, temperature, feeding rate, lighting, cleaning, prophylaxis and monitoring are provided by AFP.

Individual tank alarms will be installed on all tanks containing green sturgeon. Current alarm systems at UCD provide protection on a facility-wide basis only. Additional warning systems are needed to alert animal resource managers and researchers of potential problems within individual tanks. The proposed alarm system will consist of sensors for flow rates and temperature, telephone dialers and pagers.

Individual animals will be implanted with passive injectable transponders (PIT tags). With the help an electronic reader the tags will provide a useful tool for the identification of individuals. An inventory of the collection will be prepared. Length and weight of animals will be determined every three months with subsequent calculation of conversion rates.

b. Proposed Scope of Work

Task One: Animal Care. This will extend for the entire term of the proposal (two years). For funding purposes this is the first priority. The expected annual expenditure for tank space, food and prophylactics / medications is \$4000. The deliverable will consist of quarterly and final reports.

Task Two: Alarm System. This will be installed immediately after the project is funded. For funding purposes this is the second priority. The system will consist of sensors for flow rate and temperature, telephone dialers and pagers. The expected expenditure over two years is \$4000. Except for inclusion in quarterly and final reports no deliverable is applicable.

Task Three: Animal Identification. This will be initiated subsequent to installation of the alarm system. For funding purposes this is the third priority. A Destron-Fearing reader, PIT tags and an Animal Implanter with multiple needles will be purchased. The one-time expenditure is expected to be \$2000. Except for inclusion in quarterly and final reports no deliverable is applicable.

c. Location and / or Geographic Boundries of the Project

Green sturgeon larvae were collected in the Sacramento River Zone near the Glenn-Colusa Fish Screen Facility (Glenn County) and immediately below the Red Bluff Diversion Dam (Tehama County). However, green sturgeon cross multiple geographic boundries throughout their life history.

d. Expected Benefits

The collection has already proved to be invaluable for education and reseach. DFG wardens, including the entire Delta-Bay Enhanced Enforcement Patrol (D-BEEP), have come to UCD to see green sturgeon and to learn more about sturgeon biology. DFG and USFWS biologists have also visited UCD to expand their knowledge on the species. Tissue samples have been taken for genetic studies which have otherwise been unobtainable from wild sources. It is anticipated that future funding proposals will utilize animals in the collection. Lastly, a captive stock of wild spawned green sturgeon provides a genetic "safety net" should any unforseen

environmental catastrophe occur (toxic spills, disease epidemics, etc.).

e. **Background and Ecological / Biological / Technical Justification**

Green sturgeon is a rare species and limited basic biological information is available. In 1993, DFG sought help to specifically identify larval sturgeon which were being caught in rotary traps near the Glenn-Colusa Fish Screen Facility (GCFSF). Analysis of 72 formalin fixed larval sturgeon suggested that green sturgeon were present. Based on the lack of control material for larval sturgeon identification it was proposed to attempt rearing of wild caught sturgeon larvae for definitive identification. Therefore, the collection began in the spring of 1994 with 14 larval sturgeon collected from the Sacramento River by DFG personnel at GCFSF. In 1995, approximately 70 larval sturgeon were added by DFG personnel (GCFSF) and by USFWS personnel working immediately below the Red Bluff Diversion Dam. In 1996, approximately 40 larval sturgeon were added to the collection by the aforementioned sources. In all cases, the sturgeon larvae ranged from 1-4 cm at the time of capture and were later identified as green sturgeon. Due to space limitations and inadequate alarm systems only the animals collected in 1996 are alive.

Relevant Ecosystem Restoration Program Plan (EERP) Implementation Objective: "The implementation objective for white sturgeon and green sturgeon is to restore the distribution and abundance of the white sturgeon to historic levels in order to support a sport fishery, *and to ensure the recovery of green sturgeon, a DFG species of special concern.*" (ERPP, Volume 1, Species and Species Group Visions, White and Green Sturgeon, p. 148.). This proposal would contribute to the recovery of green sturgeon by providing a repository for living genomic material collected

from the Sacramento River. Future investigators would have access to a source of animals, of known origin, for genetic studies. One point is clear: ensuring the recovery of green sturgeon will require the collection of basic biological information in the wild and in controlled environments.

Relevant specific EERP Target: "Reduce the rate of illegal harvest." (ERPP, Volume 1, Species and Species Group Visions, White and Green Sturgeon, p. 148.). The collection has already been used to educate wardens and biologists about green sturgeon morphology, behavior and biology. Wardens have indicated that this has contributed to an increased awareness of sturgeon poaching and successful prosecution of illegal offenders.

f. Monitoring and Data Evaluation

Ecological and biological monitoring will not be necessary for this proposal. Any data generated will be available through program review presentations, quarterly reporting and a final report. Papers may be submitted to peer reviewed scientific journals.

g. Implementability

DFG granted permission for rearing green sturgeon at UCD through letter permits for each collection year. Animals are currently maintained under a UCD AFP Animal Care and Use Protocol.

V. Costs and Schedule to implement Proposed Project

a. Budget Costs

Task	Overhead Labor	Miscellaneous & Other Direct Costs	Total Cost
One	400	3600	4000
Two	400	3600	4000
Three	200	1800	2000
Total Cost	1000	9000	10000

No other budgeted costs are anticipated.

The U.C. Genetic Resources Conservation Program (GRCP) has provided \$1800 in funding. Additional funding will be investigated.

b. Schedule Milestones

The project start date is based on funding approval. However, the project has started under U.C. GRCP funding. Task two and Task Three will be completed shortly after funding approval.

c. Third Party Impacts

No third party impacts are anticipated.

VI. Applicant Qualifications

Joseph G. Zinkl is a veterinarian and a professor in the School of Veterinary Medicine, Department of Pathology, Microbiology and Immunology, at UCD. He has 17 years of field, clinical and laboratory experience working with aquatic organisms.

Patrick Foley is a doctoral student in comparative pathology at UCD and has been involved in green sturgeon research since 1988.

VII. Compliance with standard terms and conditions

No deviation from standard terms and conditions are requested. Item 3 from Attachment D is included.

Agreement No. _____

Exhibit _____

**STANDARD CLAUSES -
INTERAGENCY AGREEMENTS**

Audit Clause. For contracts in excess of \$10,000, the contracting parties shall be subject to the examination and audit of the State Auditor for a period of three years after final payment under the contract. (Government Code Section 8546.7).

Availability of Funds. Work to be performed under this contract is subject to availability of Category III funds through the State's normal budget process.

Interagency Payment Clause. For services provided under this agreement, charges will be computed in accordance with State Administrative Manual Section 8752.

Termination Clause. Either State agency may terminate this contract upon 30 days advance written notice. The State agency providing the services shall be reimbursed for all reasonable expenses incurred up to the date of termination.



Office of the Vice Chancellor for Research
410 Mrak Hall, One Shields Avenue
Davis, California 95616.8671

Telephone: 530.752.6839 / 530.752.6933
Facsimile: 530.752.5432
E-Mail: ffyee@ucdavis.edu
cgwilm@ucdavis.edu

2 July 1998

CALFED Bay-Delta Program Office
1416 Ninth Street, Suite 1155
Sacramento, California 95814

Dear Colleague:

Research Proposal Entitled
"Genetic conservation of Green Sturgeon"
Principal Investigator - Joseph G. Zinkl

We are pleased to present for your consideration the subject proposal in response to the *Species Life History Studies* program as detailed the May 1998 Proposal Solicitation Package.

For purposes of determining applicant type, please note The Regents of the University of California shall be classified as "Agency", therefore the resulting award shall include the terms and conditions as identified in Attachment D and Item 3 of the aforementioned solicitation package.

The University hereby takes exception to the following clauses as identified in Attachment D - Terms and Conditions for State (Calfed Funds): Clause 5 - Substitution, Clause 9 - Rights in Data, and Clause 9 - Indemnification. On behalf of The Regents of the University of California, we hereby reserve the right to negotiate said clauses should this proposal result in a subsequent award.

Please contact me or my assistant Charlene Wilm by telephone, facsimile or electronic mail should you have any administrative or contract-related questions or concerns pertaining to this project. We request that correspondence pertaining to this proposal and a subsequent award be sent to the Office of the Vice Chancellor for Research and to the Principal Investigator.

Sincerely,

Fay Yes
Contracts and Grants Analyst

Enclosures

c: D.M. Hyde
J.G. Zinkl

Proposal to:

**CALFED Bay-Delta Program
CALFED Bay-Delta Program Office
1416 9th Street, Suite 1155
Sacramento, CA 95814**

Submitting Organization:

**THE REGENTS OF THE UNIVERSITY OF CALIFORNIA
Office of the Vice Chancellor for Research
University of California
410 Mrak Hall
Davis, California 95616**

Title of Proposed Research:

Genetic Conservation of Green Sturgeon

Total Amount Requested:
\$10,000

Proposed Duration:
2 years

Desired Starting Date:
Oct. 1998

Principal Investigator:
Joseph G. Zinkl

Department:
**Pathology, Microbiology
and Immunology (Vet. Med.)**

Phone Number:
(530) 752-7483

Check Made Payable to:

The Regents of the University of California

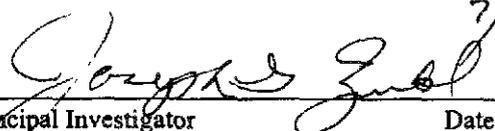
Send Check to:

UCD Cashier's Office, 173 Mrak Hall, University of California, Davis

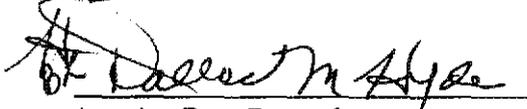
Send Award Notice to:

**Office of the Vice-Chancellor for Research, 410 Mrak Hall
University of California , One Shields Avenue
Davis, California 95616
530-752-2075; FAX 530-752-5432**

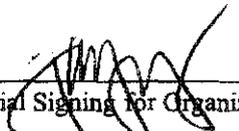
Approvals:


Principal Investigator 7/2/98
Date


Department Chair 7/2/98
Date


Associate Dean-Research 7/2/98
School of Veterinary Medicine Date

Other Endorsement Date
(if required)


Official Signing for Organization JUL 02 1998
Date

**Fay Yee
Contract & Grant Analyst
ffyee@ucdavis.edu**