Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form I - Project Information

1. **Proposal Title:**(there is no limitation on the number of characters)

   Lower American River Temperature Reduction Modeling Project (formerly the Lake Natoma Temperature Curtains Pilot Project)

2. **List all proposal applicants.**

First Name	Last Name	Organization
Leo	Winternitz	The Water Forum
Tim	Washburn	Sacramento Area Flood Control Agency

3. **Corresponding Contact Person:** (Show name of primary contact person even if they are already listed in question 2. The corresponding contact person should be the individual to whom award letters will be sent.)

   First Name: Leo

   Last Name: Winternitz

Organization: The Water Forum

Address: 660 J Street, Suite 260, Sacramento, CA 95814

Phone: (including area code) (916) 264-1999

Email: lwinternitz@sacto.org

4. **Project Keywords**- Please select three keywords to describe your project. Different browsers handle mutiple select lists differently. In general, PC users should use CTRL + left mouse button; Mac users should use the Command + mouse button.

   Anadromous salmonids

   Hydrodynamics

   Modeling

5. **Type of project** (*choose the one that best fits your overall project*):

- Research / Modeling XXX

- Monitoring

Restoration

- Planning (Restoration or Engineering)
- Implementation: Pilot/Demo
- Implementation: Full Scale

- Education

- Fish Screen/Ladder Construction

6. **Does the project involve land acquisition, either in fee or through a conservation easement?**

- Yes **-XX** No

If yes, is there an existing <u>specific</u> restoration plan for this site? N/A

- Yes - No

7. **Topic Area** *(check only one box)*

- At-Risk Species Assessments
- Importance of the Delta for Salmon
- Diversion Effects of Pumps
- Fish Screens
- Natural Flow Regimes
- X2 Relationships
- Decline in Productivity
- Channel Dynamics and Sediment Transport
- Riparian Habitat
- Floodplains and Bypasses as Ecosystem Tools
- Shallow Water, Tidal and Marsh Habitat
- Uplands and Wildlife Friendly Agriculture
- Fish Passage
- Non-Native Invasive Species

XX- Ecosystem Water and Sediment Quality

- Environmental Education

8. **Type of applicant** *(check only one box)*

- **Local Agency**

Landowner - Private non-profit - Private for profit - Tribe

XXXXXXX

- University - Joint Venture - State Agency - Federal Agency

9. **Location - GIS coordinates** *(Provide geographic coordinates (northing/easting in latitude/longitude (decimal degrees)) for your project's centroid.) If you do not have a GPS or GIS to find the coordinates of the centroid of your project, you may use the TIGER Map Service.*

Provide the following information for your proposed project. Leave lat/long boxes blank if your project fits the "Multi-region (independent of specific site) Code 15: Landscape" category shown under Question 10 Location - Ecozone. For projects in multiple adjacent Ecozones, please provide your best estimate of the approximate center point. Please do not add any directional characters (e.g. N, S, E, W). Please enter numbers only.

Latitude: (example: 38.575; must be between 30 and 45) 38.632

Longitude: (example: -121.488; must be between -120 and -130) -121.216

Datum (e.g., NAD27, NAD83) (if known--leave blank if unknown) unknown

Describe project location using information such as water bodies, river miles, road intersections, landmarks, and size in acres.

The project location is in the Sacramento Region, Ecological Management Zone 9.2; 38° 38' 982", 121° 11' 599". The site encompasses Lake Natoma and Folsom Reservoir in Sacramento County. Considered part of the Lower American River Watershed, Lake Natoma is located approximately 23 miles upstream of the River's confluence with the Sacramento River. Folsom Lake is situated immediately upstream of Lake Natoma, approximately 30 miles from the American River's confluence with the Sacramento River.

10. **Location - Ecozone**

9.2 Lower American River

11. **Location - County** *(check all that apply)*

- Alameda - Alpine - Amador - Butte

- Calaveras - Colusa - Contra Costa - Del Norte

- El Dorado	- Fresno	- Glenn	- Humboldt
- Imperial	- Inyo	- Kern	- Kings
- Lake	- Lassen	- Los Angeles	- Madera
- Marin	- Mariposa	- Mendocino	- Merced
- Modoc	- Mono	- Monterey	- Napa
- Nevada	- Orange	- Placer	- Plumas
- Riverside	**XX** Sacramento	- San Benito	- San Bernardino
- San Diego	- San Francisco	- San Joaquin	- San Luis Obispo
- San Mateo	- Santa Barbara	- Santa Clara	- Santa Cruz
- Shasta	- Sierra	- Siskiyou	- Solano
- Sonoma	- Stanislaus	- Sutter	- Tehama
- Trinity	- Tulare	- Tuolumne	- Ventura

- Yolo

- Yuba

Other: **-**

12. **Location - City**
Does your project fall within a city jurisdiction?

- Yes **-XX** No

If yes, please list the city:

13. **Location - Tribal Lands**
Does your project fall on or adjacent to tribal lands? **-** Yes **-XX** No
If yes, please list the tribal lands:
14. **Location - Congressional District** #4
Please show the congressional district where the project will take place. If you need help in finding this information, check the website provided by the United States House of Representatives.
15. Location - California State Senate District & California Assembly District
Please show the California State Senate District and California Assembly District Numbers where the project will take place. If you need help in finding this information, check the website provided by the California State Senate. Both the senate district and the assembly district locations will be given to you at the same time.
California State Senate District Number (e.g., 4) **#1**

California Assembly District Number (e.g., 22) **#5**

16. How many years of funding are you requesting? (You may request up to 3 years of funding.) **3 years**
17. **Requested Funds:** *(If the answer to 17a is yes, provide State overhead rate and corresponding Total State Funds, and Federal overhead rate and corresponding Total Federal funds. Leave the remaining two boxes of 17a blank. If the answer to 17a is no, provide the Single overhead rate and Total requested funds. Leave the first four boxes of 17a blank.)*
    - Are your overhead rates different depending on whether funds are state or federal?

- Yes **-XX** No

    - If yes, list the different overhead rates and total requested funds.

State overhead rate (%):

Total State Funds:

Federal overhead rate (%):

Total federal funds:

- If no, list single overhead rate and total requested funds.

Single overhead rate 1.6759%:

Total requested funds: $466,082

- Do you have cost share partners already identified? **-** Yes **-XX** No
If yes, list partners and amount contributed by each:

Partner Amount Contributed

- Do you have potential cost share partners? **-** Yes **-xx** No
If yes, list partners and amount contributed by each:

Partner Amount Contributed

- Are you specifically seeking non-federal cost share funds through this solicitation?

- Yes **-xx** No

If yes, list total non-federal funds requested:

- If the total non-federal cost share funds requested above does not match the total state funds requested in 17a, please explain the difference:

18. **Is this proposal for next-phase funding of an ongoing project funded by CALFED? -** Yes **-XX** No
If yes, identify project number(s), title(s) and CALFED program (e.g., ERP, Watershed, WUE, Drinking Water).

Have you previously received funding from CALFED for other projects not listed above? - XX Yes **-** No
If yes, identify project number(s), title(s) and CALFED program.

Number	**Title**	**Program**
99-N21	River Corridor Management Plan	Ecosystem Restoration

19. **Is this proposal for next-phase funding of an ongoing project funded by CVPIA? -** Yes **- XX** No
If yes, identify project number(s), title(s) and CVPIA program (e.g. AFRP, AFSP, b(1) other).

Have you previously received funding from CVPIA for other projects not listed above? - Yes **-XX** No
If yes, identify project number(s), title(s) and CVPIA program.

20. **Is this proposal for next-phase funding of an ongoing project funded by an entity other than CALFED or CVPIA?**
- Yes **- XX**No
If yes, identify project number(s), title(s) and funding source

21. **Please list suggested reviewers for your proposal.** (optional)

Name	**Organization**	**Phone**	**Email**

Bruce Oppenheim	National Marine Fisheries Service	(916) 930-3603	Bruce.oppenheim@noaa.gov
Perry Johnson	Consultant	(303) 697-1989	MKPLJ@aol.com
Russ Brown	Jones & Stokes Associates	(916) 737-3000	russb@jsanet.com

22. Comments.

If you have questions, please contact the UC Davis CALFED Proposal Review Office:

Email: calfed@ucdavis.edu

Phone: (866) 752-2434

Fax: (916) 914-2043

login: nimbustemperaturecurtains
2002-11-13 12:35:00 PST

[Welcome] [Log On] [View Proposals] [Draft Stage 1 Implementation Plan and 2002 PSP]
[System Requirements] [System Overview] [Registration] [Q&A]

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form II - Executive Summary

Proposal Title: Lower American River Temperature Reduction Modeling Project

Please provide a brief but complete (about 300 words) summary description of the proposed project; its geographic location, project type, project objective, approach to implement the proposal, hypotheses and uncertainties, expected outcome and relationship to CALFED ERP and/or CVPIA goals.

Fall-run Chinook salmon and steelhead production in the lower 23-miles of the American River is believed to be limited, in large part, by high water temperatures in spawning and rearing habitat during critical stages of the species' freshwater residency. As a result, managing the temperature of water flowing into the lower American River upstream from Nimbus Dam has become a critical component to restoring healthy anadromous salmonid populations. As part of the Central Valley Project Improvement Act (CVPIA), the Anadromous Fish Restoration Program (AFRP) set a goal of at least doubling the natural (i.e. fish not produced in hatcheries that reach adulthood) production of anadromous salmonids, including fall-run Chinook salmon, over the 1967-1991 baseline period.

The lower American River provides critical habitat that can aid the AFRP's doubling goal. Lower American River fall-run Chinook salmon spawning contributed approximately 21% of the total fall-run Chinook salmon spawning in the Central Valley Project's Sacramento Valley river system, including the Sacramento River and its tributary rivers and creeks during the 1967-1991baseline period. However, high water temperatures are one, if not the most limiting factor to natural anadromous salmonid fish production in the lower American River

The goal of the Lower American River Temperature Reduction Modeling Project (Modeling Project) is to increase natural steelhead and fall-run Chinook salmon production and survival in the lower American River (LAR) by reducing water temperatures. To achieve this goal, the Modeling Project will develop predictive tools to assist in identifying and evaluating the potential of specified structural improvements to reducing late summer/fall water temperatures in the LAR. The modeling results will provide information deemed critical to eliminating uncertainties in the performance of the potential improvements, in order to support recommendations as to the development and implementation of these actions.

The project location for the modeling study is in the Sacramento Region, Ecological Management Zone 9.2, 38° 38' 982", 121° 11' 599". The site encompasses Lake Natoma and Folsom Reservoir in Sacramento County. Considered part of the Lower American River Watershed (LARW), Lake Natoma is located approximately 23 miles upstream of the River's confluence with the Sacramento River. Folsom Reservoir is situated immediately upstream of Lake Natoma, approximately 30 miles from the American River's confluence with the Sacramento River

The Modeling Project Team will use state-of-the-art numerical models to develop a model of the Folsom/Natoma Reservoir system in order to eliminate uncertainties in the performance of the Identified Actions aimed at reducing water temperatures in the LAR. The Lake Natoma Temperature

Reduction Modeling Project will contribute to improvements that address CALFED's ERP Goals 1, 2, 3, and 4.

The outcome of the Modeling Project will be an evaluation of the expected performance of the Identified Actions sufficient to support a recommendation as to the development and implementation of one or more of these Actions. It is the Modeling Project Team's intent, assuming modifications are determined to effectively reduce lower American River temperatures, to then pursue efforts to implement the operational or structural modifications. Additionally, data and other evaluation material gathered as part of the Modeling Project will be available for daily operations, planning, and salmon and steelhead habitat studies by project operators and other stakeholders. The Water Forum will provide such material on its website.

If you have questions, please contact the UC Davis CALFED Proposal Review Office:

Email: calfed@ucdavis.edu

Phone: (866) 752-2434

Fax: (916) 914-2043

login: nimbustemperaturecurtains
2002-11-13 13:32:05 PST

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form III - Environmental Compliance Checklist

Successful applicants are responsible for complying with all applicable laws and regulations for their projects, including the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

Any necessary NEPA or CEQA documents for an approved project must tier from the CALFED Programmatic Record of Decision and Programmatic EIS/EIR to avoid or minimize the projects adverse environmental impacts. Applicants are encouraged to review the Programmatic EIS/EIR and incorporate the applicable mitigation strategies from Appendix A of the Programmatic Record of Decision in developing their projects and the NEPA/CEQA documents for their projects.

1. **CEQA or NEPA Compliance**
   a. Will this project require compliance with CEQA?

   - Yes **-XX** No

   b. Will this project require compliance with NEPA?

   - Yes **-XX** No

   c. If neither CEQA or NEPA compliance is required, please explain why compliance is not required for the actions in this proposal. **Project is modeling only.**

2. **If the project will require CEQA and/or NEPA compliance, identify the lead agency(ies). Please write out all words in the agency title other than United States (use the abbreviation US) or California (use the abbreviation CA). If not applicable, put None.**

   CEQA Lead Agency: None
   NEPA Lead Agency (or co-lead:) None
   NEPA Co-Lead Agency (if applicable): None

3. **Please check which type of CEQA/NEPA documentation is anticipated.**

   CEQA
   - Categorical Exemption
   - Negative Declaration or Mitigated Negative Declaration
   - EIR
   X none

NEPA
- Categorical Exclusion
- Environmental Assessment/FONSI
- EIS
X none

If you anticipate relying on either the Categorical Exemption or Categorical Exclusion for this project, please specifically identify the exemption and/or exclusion that you believe covers this project.

4. **CEQA/NEPA Process**
   a. Is the CEQA/NEPA process complete?

   - Yes - No - Not Applicable

   b. If the CEQA/NEPA process is not complete, please describe the dates for completing draft and/or final CEQA/NEPA documents.
   c. **If the CEQA/NEPA document has been completed, please list document name(s):**

5. **Environmental Permitting and Approvals**

Successful applicants must tier their project's permitting from the CALFED Record of Decision and attachments providing programmatic guidance on complying with the state and federal endangered species acts, the Coastal Zone Management Act, and sections 404 and 401 of the Clean Water Act. The CALFED Program will provide assistance with project permitting through its newly established permit clearing house.

Please indicate what permits or other approvals may be required for the activities contained in your proposal and also which have already been obtained. Please check all that apply. If a permit is *not* required, leave both Required? and Obtained? check boxes blank.

LOCAL PERMITS AND APPROVALS	Required?	Obtained?
Conditional use permit	-	-
Variance	-	-

Subdivision Map Act	-	-
Grading Permit	-	-
General Plan Amendment	-	-
Specific Plan Approval	-	-
Rezone	-	-
Williamson Act Contract Cancellation	-	-
Other	-	-

STATE PERMITS AND APPROVALS	Required?	Obtained?
Scientific Collecting Permit	-	-
CESA Compliance: 2081	-	-
CESA Compliance: NCCP	-	-
1601/03	-	-
CWA 401 certification	-	-
Coastal Development Permit	-	-

Reclamation Board Approval	-	-
Notification of DPC or BCDC	-	-
Other	-	-

FEDERAL PERMITS AND APPROVALS	Required?	Obtained?
ESA Compliance Section 7 Consultation	-	-
ESA Compliance Section 10 Permit	-	-
Rivers and Harbors Act	-	-
CWA 404	-	-
Other	-	-

PERMISSION TO ACCESS PROPERTY	Required?	Obtained?
Permission to access city, county or other local agency land. Agency Name:	-	-
Permission to access state land. Agency Name:	-	-
Permission to access federal land. Agency Name:	-	-

Permission to access private land. Landowner Name:	-	-

6. **Comments.** If you have comments on any of the above questions, please enter the question number followed by a specific comment. **Project is modeling only, requiring no CEQA, NEPA or permitting.**

If you have questions, please contact the UC Davis CALFED Proposal Review Office:

Email: calfed@ucdavis.edu

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login: nimbustemperaturecurtains
2002-11-13 13:32:31 PST

Land Use Checklist

Lower American River Temperature Reduction Modeling Project

1. **Does the project involve land acquisition, either in fee or through a conservation easement?**

No

2. **Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal?**
No
3. **Do the actions in the proposal involve physical changes in the land use?**
No
If you answered no to #3, explain what type of actions are involved in the proposal (i.e., research only, planning only). **Research only**.
4. **Comments.**

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form V - Conflict of Interest Checklist

Please list below the full names and organizations of all individuals in the following categories:

- Applicants listed in the proposal who wrote the proposal, will be performing the tasks listed in the proposal or who will benefit financially if the proposal is funded.
- Subcontractors listed in the proposal who will perform some tasks listed in the proposal and will benefit financially if the proposal is funded.
- Individuals not listed in the proposal who helped with proposal development, for example by reviewing drafts, or by providing critical suggestions or ideas contained within the proposal.

The information provided on this form will be used to select appropriate and unbiased reviewers for your proposal.

Applicant

The applicants entered on the Project Information form will be used.

Subcontractor

Are specific subcontractors identified in this proposal?

- Yes **- XX**No

If yes, please list the name(s) and organization(s):

Name Organization

Helped with proposal development

Are there persons who helped with proposal development?

- XX Yes **-** No

If yes, please list the name(s) and organization(s):

Name	**Organization**
Paul Bratovich	Surface Water Resources, Inc.
Sarah Foley	The Water Forum
Rod Hall	U.S. Bureau of Reclamation
Dianne Simondynes	Surface Water Resources, Inc.
Laura Svendsgaard	Consultant
Tim Washburn	Sacramento Area Flood Control Agency
Leo Winternitz	The Water Forum
Tracy Vermeyen	U.S. Bureau of Reclamation

Russ Yarworksy U.S. Bureau of Reclamation

Comments

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form VI - Budget Summary

To print this page, you will need to change your page setup setting to print the page landscape.

Budget Form Instructions

Please provide a detailed budget for each year of requested funds, indicating on the form whether the indirect costs are based on the Federal overhead rate, State overhead rate, or are independent of fund source.

- Federal Funds - State Funds - Independent of Fund Source

Year 1												
Task No.	**Task Description**	**Direct Labor Hours**	**Salary** ***(per year)***	**Benefits** ***(per year)***	**Travel**	**Supplies & Expendables**	**Services or Consultants**	**Equipment**	**Other Direct Costs**	**Total Direct Costs**	**Indirect Costs**	**Total Cost**
1	Folsom/Natoma Reservoir temperature & operations data collection/monitoring	110	$3,520	$581	$414	0	0	0	0	$4,515	$5,899	$10,414
2	CE-QUAL-W2 model development and calibration for Lake Natoma	580	$18,560	$3,062	$2,183	0	0	0	0	$23,805	$31,105	$54,910
3	CFD modeling in addition to SAFCA funding already in place	490	$15,680	$2,587	$1,844	0	0	0	0	$20,111	$26,278	$46,389
4	CE-QUAL-W2 model development for Folsom Lake	308	$9,856	$1,626	$1,159	0	0	0	0	$12,641	$16,518	$29,159
5	USBR proj mgmt &	70	$2,800	$462	$500	$500	0	0	0	$4,262	$1,680	$5,942

	admin											
6	Water Forum adm., billing & reporting	55	$2,015	$395	0	0	0	0	0	$2,410	0	$2,410
	Year 1 Total	**1,613**	**$52,431**	**$8,713**	**$6,100**	**$500**	**0**	**0**	**0**	**$67,744**	**$81,480**	**$149,224**

Year 2

Task No.	Task Description	Direct Labor Hours	Salary *(per year)*	Benefits *(per year)*	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Cost
7	Folsom/Natoma reservoir temperature and operations data collections/monitoring	120	$3,917	$646	$402	0	0	0	0	$4,965	$6,564	$11,529
8	CE-QUAL-W2 Lake Natoma model validation and simulation of 4 alternatives	904	$29,507	$4,869	$3,027	0	0	0	0	$37,402	$49,450	$86,852
9	CFD modeling	384	$12,534	$2,068	$1,286	0	0	0	0	$15,888	$21,005	$36,893
10	Folsom W2 model calibration	424	$13,839	$2,283	$1,420	0	0	0	0	$17,543	$23,193	$40,736
11	LAR W2 model development	208	$6,789	$1,120	$696	0	0	0	0	$8,605	$11,378	$19,983
12	USBR proj mngmnt & adm	70	$2,856	$471	$500	$500	0	0	0	$4,327	$1,714	$6,041
13	Water Forum adm, billing and reporting	85	$3,114	$610	0	0	0	0	0	$3,724	0	$3,724
14	Website update	10	$281	$46	0	0	0	0	0	$328	0	$328
	Total Year 2	**2,205**	**$72,837**	**$12,114**	**$7,331**	**$500**	**0**	**0**	**0**	**$92,782**	**$113,304**	**$206,088**

Year 3

Task No.	Task Description	Direct Labor Hours	Salary *(per year)*	Benefits *(per year)*	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Cost
15	CE-QUAL-W2 modeling for Natoma and Folsom Lakes	303	$10,087	$1,664	$1,957	0	0	0	0	$13,708	$16,905	$30,613
16	CE-QUAL-W2 for three water bodies (Folsom/Natoma/LAR)	293	$9,754	$1,609	$1,892	0	0	0	0	$13,255	$16,347	$29,602
17	Technical Service Center analysis, reports & presentations	363	$12,084	$1,994	$2,344	$5,000	0	0	0	$21,422	$20,252	$41,674
18	USBR proj mngmnt & adm	70	$2,913	$481	$500	$500	0	0	0	$4,394	$1,748	$6,142
19	Water Forum adm, billing & reporting	55	$2,015	$395	0	0	0	0	0	$2,410	0	$2,410
20	Website update	10	$281	$46	0	0	0	0	0	$328	0	$328
	Total Year 3	**1,094**	**$37,135**	**$6,189**	**$6,693**	**$5,500**	**0**	**0**	**0**	**$55,517**	**$55,251**	**$110,770**
	Grand Total	**4,912**	**$162,404**	**$27,016**	**$20,124**	**$6,500**	**0**	**0**	**0**	**$216,044**	**$250,035**	**$466,082**

Grand Total= $466,082

Comments.

Tasks 5, 12, 18: USBR Salary = $40.00/hr increased 2% per year.

Tasks 1, 2, 3, 4, 7, 8, 9, 11, 15, 16, 17: USBR Salary = $32.00/hr increased 2% per year.

USBR/federal benefits = 16.5% of salary

Tasks 9, 16: Sacramento federal per diem rate is $121/day

Tasks 6, 13, 19: Salary = $35,64/hr plus City of Sacramento benefits of 19.58%

Tasks 14, 20: Salary = $28.14/hr plus City of Sacramento benefits of 16.43%

Bottom of Form

Ecosystem Restoration Program - 2002 Proposal Solicitation Package (PSP): Form VII - Budget Justification

Budget Form Instructions

Direct Labor Hours. Provide estimated hours proposed for each individual.

Tasks 5, 12, 18 = 210 direct labor hours by individual #1. Tasks 6, 13, 19 = 195 direct labor hours by individual #2. Tasks 14, 20 = 20 direct labor hours by individual #3.

The remaining tasks (1, 2, 3, 4, 7, 8, 9, 10, 11, 15, 16, 17) = 4,487 direct labor hours will be performed by the best qualified individuals available at the time the project commences.

Salary. Provide estimated rate of compensation proposed for each individual.

Tasks 5, 12, 18 salary is $40.00/hr increased 2% per year. Tasks 6, 13, 19 salary is $36.64/hr with no established provision for increase. Tasks 14, 20 salary is $28.14/hr with no established provision for increase. The remaining tasks salary is $32.00/hr increased 2% per year.

Benefits. Provide the overall benefit rate applicable to each category of employee proposed in the project.

Federal benefit rate for individual #1 and "remaining tasks" is 16.5% of salary.

City of Sacramento benefit rate for individual #2 is 19.58% of salary.

City of Sacramento benefit rate for individual #3 is 16.43% of salary.

Travel. Provide purpose and estimate costs for all non-local travel.

USBR's Sacramento Federal per diem rate is $121/day. U.S. Bureau of Reclamation's modeling facility is based in Denver, Colorado. A majority of the travel costs relate to Denver staffs' travel to Sacramento for the purpose of gathering of additional data necessary to calibrate and verify riverine and reservoir conditions.

Supplies & Expendables. Indicate separately the amounts proposed for office, laboratory, computing, and field supplies.

$5,000 for U.S. Bureau of Reclamation's Technical Service Center analysis, reports, presentation materials and supplies. $1,500 for general office, printing, and supplies associated with this project.

Services or Consultants. Identify the specific tasks for which these services would be used. Estimate amount of time required and the hourly or daily rate.

No consultants are anticipated with this project.

Equipment. Identify non-expendable personal property having a useful life of more than one (1) year and an acquisition cost of more than $5,000 per unit. If fabrication of equipment is proposed, list parts and materials required for each, and show costs separately from the other items.

U.S. Bureau of Reclamation will utilize existing equipment for this project.

Project Management. Describe the specific costs associated with insuring accomplishment of a specific project, such as inspection of work in progress, validation of costs, report preparation, giving presentations, reponse to project specific questions and necessary costs directly associated with specific project oversight.

Project Management lies with individuals #1 and #2. Individual #1 (total cost $18, 125) will oversee the modeling project, monitor progress, manage and validate costs, develop technical reports and give presentations. Individual #1 would respond to project specific questions and will coordinate with

Individual #2. Individual #2 (total cost $8,544) will manage and monitor grant compliance, prepare and submit billings, and prepare grant related reports. Individual #3 (total cost $656) will develop and periodically update website reports on the modeling data.

Other Direct Costs. Provide any other direct costs not already covered.

There are no other direct costs.

Indirect Costs. Explain what is encompassed in the overhead rate (indirect costs). Overhead should include costs associated with general office requirements such as rent, phones, furniture, general office staff, etc., generally distributed by a predetermined percentage (or surcharge) of specific costs. *[CORRECTION: If overhead costs are different for State and Federal funds, note the different overhead rates and corresponding total requested funds on Form I - Project Information, Question 17a. On Form VI - Budget Summary, fill out one detailed budget for each year of requested funds, indicating on the form whether you are presenting the indirect costs based on the Federal overhead rate or State overhead rate. Our assumption is that line items other than indirect costs will remain the same whether funds come from State or Federal sources. If this assumption is not true for your budget, provide an explanation on the Budget Justification form.]* Agencies should include any internal costs associated with the management of project funds.

Indirect costs of 1.6759% of salary are calculated for all U.S. Bureau of Reclamation costs. These costs include equipment, laboratory and other facilities and services at both USBR's Sacramento and Denver locations. The City of Sacramento has elected to consider their indirect costs as in-kind contributions.

If you have questions, please contact the UC Davis CALFED Proposal Review Office:

Email: calfed@ucdavis.edu

Phone: (866) 752-2434

Fax: (916) 914-2043

login: nimbustemperaturecurtains
2002-11-13 13:35:39 PST

Lower American River Temperature Reduction Modeling Project

A. Project Description: Problem Statement, Goal, Location, Hypothesis, Scope of Work and Objectives

1. Problem Statement

Fall-run Chinook salmon and steelhead production in the lower 23-miles of the American River is believed to be limited, in large part, by high water temperatures in spawning and rearing habitat during critical stages of the species' freshwater residency. As a result, managing the temperature of water flowing into the lower American River upstream from Nimbus Dam has become a critical component to restoring healthy anadromous salmonid populations. As part of the Central Valley Project Improvement Act (CVPIA), the Anadromous Fish Restoration Program (AFRP) set a goal of at least doubling the natural (i.e. fish not produced in hatcheries that reach adulthood) production of anadromous salmonids, including fall-run Chinook salmon, over the 1967-1991 baseline period.

The lower American River provides critical habitat that can aid the AFRP's doubling goal. Lower American River fall-run Chinook salmon spawning contributed approximately 21% (i.e., 41,040 fish) of the total fall-run Chinook salmon spawning (i.e., 197,740 fish) in the Central Valley Project's Sacramento Valley river system, including the Sacramento River and its tributary rivers and creeks (SWRI 2002, unpublished data), during the 1967-1991baseline period. However, high water temperatures are one, if not the most limiting factor to natural anadromous salmonid fish production in the lower American River.

Surveys conducted by the California Department of Fish and Game over the last 10 years show that fall-run Chinook salmon do not begin spawning until temperatures decrease to 60^{o} F or less during fall (October/November). Numerous laboratory studies conducted throughout the West Coast also shows that Chinook salmon embryo incubation success declines when constant water temperatures increase to above 56^{o}. Therefore, the index temperatures for the LAR (at Watt Avenue) are 60^{o}F or less for spawning fall-run Chinook salmon, and 56^{o}F or less for Chinook salmon embryo incubation.

The real impacts of high water temperatures can best be conveyed with a summary of the LAR's 2001 fall-run Chinook salmon spawning activity. It is estimated that over 160,000 Chinook salmon returned to the LAR in late summer/early fall. However, water temperatures during the fall of 2001greatly exceeded the 60^{o} temperature suitable for pre-spawning adults. As a result, National Marine Fisheries Service (NMFS) has preliminarily estimated that as much as 80% of the returning run perished before spawning.

Temperature model simulation exercises were recently conducted using data to reflect 2001 conditions. The purpose of the exercises was to determine what temperature reduction impacts, if any, might occur if some of the structural modifications referenced in this application had occurred and Folsom's cold water volume was increased. It is estimated that if a set of modifications resulted in a reduction of 1.5 degrees in Nimbus Dam releases during the summer, the end of September 2001 cold-water pool volume (volume below 60° F) in Folsom Lake could have been increased approximately 16 thousand acre feet (TAF). A 16 TAF increase in the cold-water pool would have allowed Reclamation to achieve Nimbus Dam releases at, or below, 60 degrees about 2 weeks earlier, thereby reducing the amount of pre-spawning mortality.

Taking the temperature model simulation exercises one step further, using LAR 2001 temperature and spawning distribution data, it is estimated that if favorable spawning temperatures had occurred 2-weeks earlier (early November), pre-spawning mortality may have decreased by as much as 30%, or spawning may have increased from 32,000 to approximately 41,600. (These numbers are extrapolated from spawning distribution curves.)

High water temperatures within the LAR also negatively affect steelhead. The NMFS issued a Biological Opinion for the operation of the CVP during the period of April 1, 2002 to March 31, 2004, which includes an objective of not exceeding a daily average water temperature of 65^{o}F for maintenance of steelhead habitat for all life stages.

The challenge this project seeks to address is that when ambient air temperatures rise, the desired water temperature conditions in the LAR are maintained through careful management of the cold water stored in Folsom Reservoir. These stores are often insufficient to maintain the targeted temperatures during fall-run Chinook salmons' spawning season. As a result, the LAR's ability to sustain higher numbers of naturally spawned salmon and steelhead is diminished.

A major contributor to the depletion of cold-water stores in Folsom Reservoir is having to offset the warming of the Folsom releases as they flow through Lake Natoma. Lake Natoma receives releases from Folsom Dam that vary rapidly in response to peak hydropower demands on the Folsom Powerplant and serves to regulate the delivery of water to the LAR. However, because of Natoma's relatively shallow depth (less than 40 ft.), water passing through Natoma may warm by as much as 5^{o} to 6 ºF before it is released to the LAR.

As a result, several operational and structural actions have been identified by the Lower American Task Force's Fisheries Working Group (see Section E, *Local Involvement*), and have been preliminarily researched and identified as likely to reduce temperatures in the LAR. These operational and structural actions include all of the following that are collectively herein referred to as **Identified Actions**:

1. Install a temperature control curtain immediately upstream from the Nimbus Dam;
2. Install a temperature control curtain at Lake Natoma's plunge point;
3. Remove a debris wall at Nimbus Dam,
4. Modify the channel in Lake Natoma, and
5. Modify Folsom Powerplant's peak flow operation.

Goal: The goal of the Lower American River Temperature Reduction Modeling Project (Modeling Project) is to increase natural steelhead and fall-run Chinook salmon production and survival in the lower American River (LAR) by reducing water temperatures. To achieve this goal, the Modeling Project will develop predictive tools to assist in identifying and evaluating the potential of the Identified Actions to reducing late summer/fall water temperatures in the LAR. The modeling results will provide information deemed critical to eliminating uncertainties in the performance of the Identified Actions, in order to support recommendations as to the development and implementation of these actions.

Location: The project location for the modeling study is in the Sacramento Region, Ecological Management Zone 9.2, 38° 38' 982", 121° 11' 599". The site encompasses Lake Natoma and Folsom Reservoir in Sacramento County. Considered part of the Lower American River Watershed (LARW), Lake Natoma is located approximately 23 miles upstream of the River's confluence with the Sacramento River. Folsom Reservoir is situated immediately upstream of Lake Natoma, approximately 30 miles from the American River's confluence with the Sacramento River.

The LARW originates in California's central Sierra Nevada. The North and Middle Forks of the American River join near the city of Auburn before emptying into Folsom Reservoir. The South Fork of the American River also discharges into Folsom Reservoir, where flows are impounded by Folsom Dam. Folsom Dam releases enter Lake Natoma, and are impounded by Nimbus Dam (located approximately 7 miles downstream from Folsom Dam) before being discharged into the lower American River.

The lower American River includes 23 river miles (RM) between Nimbus Dam and the river's confluence with the Sacramento River. Flood protection levees begin at the confluence with the Sacramento River and extend upstream to approximately RM 14 on the north bank and RM 11 on the south bank.

Hypothesis: Preliminary studies indicate that the Identified Actions could improve the transport of cold water through Lake Natoma, thereby lowering the temperature of water released to the LAR, and increasing the number of naturally spawning fall-run Chinook salmon in the river. The proposed Modeling Project will serve as the tool for validating this hypothesis.

Temperature curtains have been shown to be an effective means of reducing downstream water temperatures at Lewiston and Whiskeytown Lakes in northern California. In addition, preliminary analysis also indicates that removal of the debris wall immediately upstream from Nimbus Dam, lowering of particularly shallow portions of the bottom of Lake Natoma, and modifying the release strategy (baseline release versus power demand release) at Folsom Powerplant, could also benefit temperature reduction.

However, the analyses and review of these measures are neither conclusive nor do they reveal whether a single or combination of alternatives would bring about the most effective temperature reductions. In addition, significant differences exist between Whiskeytown and Lake Natoma that could impact (either positively or negatively) the proposed curtains' effectiveness and efficiency. For example, Whiskeytown curtains were installed in locations with depths greater than 90 ft; the maximum depth in Lake Natoma is about 40 ft.

Consequently, the Water Forum and its partners seek funding to conduct appropriate modeling studies to determine which operational and/or structural actions, if any, might effectively reduce water temperatures in the lower American River, thereby benefiting naturally spawning steelhead and fall-run Chinook salmon production and survival. (See Figure 1)

Scope of Work: The Modeling Project will adapt, calibrate and verify existing thermodynamic and hydrologic mathematical models for application at Folsom Reservoir, Lake Natoma and the lower American River. The models will then be used to assess the effectiveness of the Identified Actions

individually and in combination in order to support a recommendation as to the development and implementation of one or more of the Identified Actions for the purpose of reducing temperatures in the lower American River.

In order to assess proposed temperature reduction structural modifications to Nimbus and Folsom Dams, or changes to reservoir operations for Lake Natoma and Folsom Reservoirs, a model of the complex hydraulic system is needed. We propose using a laterally averaged (vertical layers with longitudinal segments) two-dimensional fully hydrodynamic unsteady flow and dynamic water quality model called CE-Qual-W2 (W2) to model temperatures and other significant water quality parameters in Folsom Reservoir, Lake Natoma, and the lower American River. CE-QUAL-W2 will be used in conjunction with historical modeling data sets for a wet, an average, and a dry year to calibrate the hourly response of Lake Natoma to hourly changes in Folsom Powerplant release operations.

The W2 model is a multiple branch model that allows long-term simulation of both riverine and reservoir conditions. W2 was developed by the U.S. Army Corps of Engineers (Vicksburg Mississippi) and is public domain software. W2 has been used successfully to evaluate a variety of concerns including minimal pools for fish refuge volume seasonal nutrient loading reductions, flushing alternatives, and to estimate the effects of operational, structural, and remediation measures on flow and water quality, including thermal stratification and longitudinal variation of temperature. W2's selective withdrawal algorithms can calculate the vertical extent of the withdrawal zone based on multiple outlet geometry, outflow, and density. The latest version of CE-QUAL-W2 allows linking of multiple rivers and reservoirs in series with steeply sloping riverine sections connecting two or more reservoirs. Vertical grid spacing can vary in thickness between water bodies. An internal weir algorithm for submerged or skimmer weirs, vertical turbulence algorithms more appropriate for rivers, and numerical algorithms for pipe, weir, and pump flow are now included.

The W2 model(s) output will be coupled with a Computational Fluid Dynamics (CFD) model of the existing power plant intake at Nimbus Dam to compare three prospective structural changes for the purpose of providing colder releases downstream. In addition, the CFD model will be used to study the near-field hydraulics of the proposed curtain sites and other proposed structural modifications to Nimbus Dam. Software named Flow-3D by Flow Science Inc. will be used for the CFD modeling. The model will be validated using existing temperature and reservoir operations data collected by Reclamation and the LAR temperature monitoring network. Initial work on this modeling effort is being conducted by Reclamation through a cost sharing agreement between Reclamation and SAFCA. To date, a CFD model of the Nimbus Dam intake structure is being developed to determine if removing a section of the debris wall will access cooler water.

Objectives: The objectives of the Modeling Project are to develop predictive tools that will:

1. Reduce to the extent possible the uncertainties in the performance of identified temperature control actions that could be implemented to improve the management of cold water resources in the Folsom/Natoma Reservoir system and the lower American River, and

2. Be available for daily operations, planning, and salmon and steelhead habitat studies by other project operators and other stakeholders.

2. Justification

a. A schematic explanation and rational for the proposed Modeling Project is presented in Figure 1.

b. The numerical models developed and employed as part of the proposed Modeling Project will reduce the uncertainties associated with identified temperature control actions.

The Uncertainties Include:

1. Will temperature curtains work in a shallow reservoir like Lake Natoma, and what location would be most effective?

2. Will channel modifications reduce warming in Lake Natoma?

3. Will removal of the debris wall at Nimbus Dam enable colder water to flow into the LAR?

Uncertainties 1, 2 and 3 will be evaluated using W2 coupled with the CFD models.

4. How will peak demand power releases at the Folsom Powerplant reduce the effectiveness of the temperature curtains at Lake Natoma?

5. How much would it cost to abandon peak demand operation in favor of baseline release at the Folsom Powerplant and go to baseline releases to maximize curtain effectiveness?

The W2 model will be used to address uncertainties 4 and 5.

c. The Modeling Project is a Targeted Research project and a necessary first step in a process leading to the development and implementation of effective temperature control actions for the Natoma/Folsom Reservoir system. Testing, data collection, evaluation, modification, and re-evaluation will be a continuing aspect of the Modeling Project until the highest and best temperature reduction strategy is achieved. It is anticipated that one or more of the Identified Actions will be recommended for development and implementation by the Project Team.

d. Through an Adaptive Management Process, the Fisheries Working Group explored numerous structural, operational and policy alternatives for reducing LAR water temperatures. Preliminary research and analysis of the structural and operational Identified Actions that will be tested in the Modeling Project, suggests that one, all or a combination of the five Actions being considered can achieve temperature reductions that will benefit steelhead and salmon. However, the Modeling is needed in order to assess the variables and determine if one, all or a combination of measures will achieve enough temperature reduction to extend the availability of cold water into late summer and early fall, and result in a higher percentage of naturally spawning fall-run Chinook salmon in the LAR.

Consideration of Other Measures: The draft "Ecosystem Restoration for Fisheries/Aquatic Resources through Water Temperature Reduction in the Lower American River" was released in July 2001. The report was prepared under contract with Sacramento Area Flood Control Agency by Jones & Stokes, with technical assistance from Surface Water Resources, Inc., and HDR Engineering. Ten temperature control measures were considered for restoring fisheries/aquatic habitat in the LAR, including the Identified Actions. Other measures under consideration included: shutter modifications, upstream

water purchases, cold-water isolation, and bypass turbines. However pursuit of these other measures is anticipated to be far more costly to implement and will require many more years of research and development. Consequently, preliminary studies indicate that the Modeling Project's Identified Actions offer the most immediate and economically feasible temperature reduction alternatives.

Recreational Issues: Deployment of a temperature curtain across the mid-section of Lake Natoma, where changes in lakebed depth create a temperature plunge zone, could have potential negative impacts on recreation safety and access. Lake Natoma is a popular recreation site, hosting year-round boating, fishing and swimming activities. Members of the project team have met with recreation providers and community interest groups to discuss the measures for reducing impacts associated with temperature curtain deployment. While a curtain at Nimbus Dam is not anticipated to impact recreationalists, a curtain in the upstream plunge zone curtain will require design elements that allow the passage of boats, along with signage and safety lighting. The Modeling Project includes an assessment of curtain configurations that may minimize recreation impacts while retaining the efficiency of deployment in the upstream plunge zone.

3. Approach

The Modeling Project Team will use state-of-the-art numerical models to develop a model of the Folsom/Natoma Reservoir system in order to eliminate uncertainties in the performance of the Identified Actions aimed at reducing water temperatures in the LAR. Additional details have been provided under *Scope of Work*.

Initially the Lake Natoma CE-QUAL-W2 model would only include Lake Natoma as a single water body. The W2 model will be calibrated for temperature and conductivity using historical reservoir profile and dam release data for a wet, an average, and a dry year. Sensitivity analysis will be used if data deficiencies exist. During the second stage of model development, a Folsom Reservoir model will be added as a separate waterbody to the modeling framework. The last stage of modeling will add the 23-miles of the lower American River below Nimbus Dam.

4. Feasibility

Temperature curtains have been proven to be an effective means of reducing release water temperatures at Lewiston and Whiskeytown reservoirs in northern California. In addition, preliminary analysis indicates that removal of the debris wall immediately upstream from Nimbus Dam, and lowering of particularly shallow portions of the bottom of Lake Natoma may also result in cooler tailwater temperatures. However, preliminary review of these Identified Actions are not conclusive nor do they reveal whether a single or combination of alternatives would achieve the most effective temperature reductions. The Modeling Project will determine the feasibility of the proposed alternatives using state-of-the-art tools.

Cooperation and coordination, coupled with the expertise of the partnering agencies will help guide and assure that the Modeling Project is conducted to the highest standards. The Water Forum by its very nature has a solid working relationship with SAFCA and the U.S. Bureau of Reclamation, and will work closely with Reclamation to ensure adequate design/engineering and overall project guidance. The California Department of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service and SAFCA will also provide guidance on fishery response to temperature reduction in the LAR. The Project Team (see Biographies) has the expertise and support services necessary to perform the tasks within the proposed timeline.

The Project Team is comprised of Water Forum, SAFCA and U.S. Bureau of Reclamation staff. Tracy Vermeyen, P.E., with the Bureau is considered a leading authority on temperature curtain applications and has worked closely with The Water Forum in the assessment and development of this project.

No permits are required for the proposed Modeling Project.

5. Performance Measures

The Folsom/Natoma CE-QUAL-W2 Lake Natoma model will be used to explore thermal responses to particular operational and/or structural modifications, including controls on thermal discharges, seasonal changes in thermal load, selective withdrawal, and changes in reservoir operation. Model sensitivity simulations will be used to provide information in developing management alternatives. Four alternative simulations will be run to generate information necessary to identify a desired set of temperature management alternatives. The primary performance metric will be the reduction in temperature of water released from Nimbus Dam into the lower American River. Other performance metrics include, quantifying the amount of warm water entrainment in Lake Natoma and improved management of cold water storage in Folsom Reservoir.

6. Data Handling and Storage

All modeling data will be managed and stored by appropriate professional staff under the direction of the U.S. Bureau of Reclamation. Data will be analyzed and evaluated to determine the viability of the proposal's operating hypotheses. Results of the analysis will be posted on The Water Forum's website for easy access. The website's URL is http://www.waterforum.org.

7. Expected Products/Outcomes

The outcome of the Modeling Project will be an evaluation of the expected performance of the Identified Actions sufficient to support a recommendation as to the development and implementation of one or more of these Actions. It is the Modeling Project Team's intent, assuming modifications are determined to effectively reduce lower American River temperatures, to then pursue efforts to implement the operational or structural modifications.

Additionally, data and other evaluation material gathered as part of the Modeling Project will be available for daily operations, planning, and salmon and steelhead habitat studies by project operators and other stakeholders. The Water Forum will provide such material on its website.

8. Work Schedule

The Tasks Timeline for the Modeling Project is provided in Figure 2.

B. Applicability to ERP and Science Program Goals and Implementation plan and CVPIA Priorities.

B. 1. ERP, Science Program and CVPIA Priorities.

The Lake Natoma Temperature Reduction Modeling Project will contribute to improvements that address CALFED's ERP Goals 1, 2, 3, and 4. Structural improvements that are the subject of the modeling studies are aimed at:

a) Reducing water temperatures in the LAR,
b) Improving natural processes and aquatic habitats, and
c) Enhancing populations of selected, at-risk native species dependent on the Bay-Delta estuary and its watershed with minimal ongoing human intervention.

The Modeling Project will also further the long-term goal of the Science Program, adding to the progressive body of knowledge aimed at improving the effectiveness of restoration actions. Specifically, the modeling studies will:

1) Provide *analyses of adaptive management* strategies aimed at better management of water temperatures and more efficient use of cold water stores;
2) *Advance process understanding* by expending our understanding of how depth, flows and other variables impact the temperature reduction strategies being proposed at Lake Natoma;
3) Aide efforts to *compare relative effectiveness of different restoration strategies;*
4) *Advance the scientific basis of regulatory activities;*
5) *Coordinate and extend existing monitoring; and*
6) *Take advantage of existing data.*

A goal of the 1992 Central Valley Project Improvement Act is to double (from 1967 to 1991 baseline period) the natural production of anadromous fish in the Central Valley, including the LAR. The impact of high water temperatures on the production and survival of steelhead and salmon has been well documented. The Temperature Reduction Modeling Project is directly related to efforts to significantly increase the natural production of anadromous fish in the Central Valley.

B. 2. Relationship to Other Ecosystem Restoration Projects.
This proposal is submitted with the support of, and compliments, other proposed improvements recommended in the draft River Corridor Management Plan for the Lower American River (RCMP). The RCMP addresses the Water Forum's objectives as described in the Water Forum Agreement. In addition, the RCMP builds on prior efforts to manage the river for multiple beneficial uses, including the Sacramento Area Flood Control Agency's *Floodway Management Plan for the Lower American River*'s *Ecosystem Restoration Program Plan*, the Central Valley Project Improvement Act, the U.S. Fish and Wildlife Service's Anadromous Fish Restoration Program, and the California Department of Fish and Game's *steelhead Restoration and Management Plan for the Lower American River.*

B. 3. Requests for Next-Phase Funding.
Based on results of the Modeling Project, The Water Forum may seek to develop and implement additional funds to develop and implement Identified Actions found to be the most effective in reducing water temperatures in the lower American River.

B. 4. Previous Recipients of Program or CVPIA funding.
In January 2000, CALFED awarded Contract #99-N21, in the amount of $250,000 to the Water Forum. The funds were allocated for development of a River Corridor Management Plan (RCMP) for the Lower American River consistent with water management and flood control plans. The RCMP was completed in the fall 2001 and is currently being implemented by federal, state and local agencies with jurisdiction in the lower American River.

B. 5. System-Wide Ecosystem Benefits.
Data derived from this project will enable The Water Forum and its project partners to more efficiently and effectively institute water temperature reduction improvements. Once instituted, the modeled improvements will provide system-wide benefits by improving steelhead and salmon habitat during critical stages of their life cycles.

B. 6. Information for Proposals Containing Land Acquisition.
Not Applicable

C. Qualifications

The Water Forum and SAFCA will serve as the lead agencies and administer the project budget. The U.S. Bureau of Reclamation, Sacramento Office, has agreed to manage and coordinate the project. USBR staff at the Denver research facility will conduct the modeling and analyze the data.

Leo H. Winternitz, Project Administrator
Executive Director, Sacramento City-County Office of Metropolitan Water Planning (Sacramento Water Forum)
M.S., 1992, Environmental Management (Water Resources), University of San Francisco
B.A., 1975, Biology, Gonzaga University, Spokane, Washington

As Executive Director of the Water Forum, Mr. Winternitz plans and manages the activities of the City-County Office of Metropolitan Water Planning on behalf of the Water Forum, a diverse group of 40 stakeholder organizations representing business, agriculture, citizens groups, environmentalists and water managers who have collaboratively negotiated a regional water supply and environmental protection agreement to the year 2030. Prior to this position, Mr. Winternitz served as Assistant to Chief Deputy Director of the California Department of Water Resources**.** In that capacity he advised and assisted the Chief Deputy Director in developing and implementing Department policies and programs in areas that included project operations, environmental management, Program development, and human resources management. Mr. Winternitz's other work responsibilities have included developing the Program's Environmental Water Account; developing the Program's Comprehensive Monitoring, Assessment and Research Program; and managing the water quality and Interagency Ecological Program's offices within DWR's Environmental Services Office. Mr. Winternitz has also worked for the Water Resources Control Board, serving as the staff specialist on Bay-Delta water quality and water right issues.

Timothy N. Washburn
Sacramento Area Flood Control Agency, Agency Counsel
J.D. 1986, University of California, Davis, King Hall School of Law
B.A. 1983, History, University of California, Berkeley

Mr. Washburn was an attorney from Weintraub, Genshlea, Hardy, Eirich and Brown from 1986 to 1988; served as Deputy City Attorney for the City of Sacramento from 1988 to 1990; and has been Agency Counsel for the Sacramento Area Flood Control Agency since 1990. As counsel for SAFCA, Mr. Washburn oversees numerous planning, environmental review, acquisition, development and collaborative projects relating to land and water resources within Sacramento's flood plain areas. Projects include levee improvements, river and stream bank protection, habitat restoration, and

acquisitions. Mr. Washburn has also overseen the development of numerous studies, including the American River Watershed Investigation, the River Corridor Management Plan for the Lower American River

Roderick Hall, Project Manager
U.S. Bureau of Reclamation, Environmental Specialist
M.S. 1970, Mechanical Engineering (Ocean Engineering), University of Miami
B.S. 1965, Mechanical Engineering, University of Maryland

Mr. Hall has over 30 years in the field of water resource management with the Department of the Interior, developing expertise in program management and administration, and environmental planning, policy, and compliance. As an Environmental Specialist for the Bureau of Reclamation since 1982, Mr. Hall has developed a strong working knowledge and expertise in the analysis and implementation of projects relating to flow and temperature issues specifically to the lower American River. He has managed large studies leading to construction of a temperature control device on the Municipal and Industrial water supply intake on Folsom Dam, and is presently overseeing the replacement of the fish diversion structure at the Nimbus Fish Hatchery. Mr. Hall is founder and chair of the American River Operations Group, which continually evaluates the operations of the lower American River. He is also the Bureau's representative on the Water Forum and the LAR Task Force. Mr. Hall's experience in coordinating multi-agency projects, assessing and monitoring environmental compliance, coupled with his working knowledge of the issues affecting Lake Natoma, the lower American River and anadromous salmonids, renders him ideally suited to the management of this project.

Merlynn D. Bender, P.E., Modeler/Environmental Engineer
U.S. Bureau of Reclamation, Land Suitability and Water Quality Group (D-8570)
M.S. 1990, Environmental Engineering, University of Tennessee, Knoxville
M.S. 1986, Civil Engineering (Water Resources and Hydraulics), University of Minnesota St. Anthony Falls Hydraulic Laboratory, Minneapolis
B.S. 1984, Civil Engineering, North Dakota State University, Fargo
Registration: Professional Engineer, Civil/Sanitary/Structural, Colorado #28861

Mr. Bender has over eighteen years of professional experience or contracting oversight in water resources. He specializes in riverine and reservoir flow and water quality modeling with models such as CE-QUAL-W2. For over two years he worked as a research assistant for the Saint Anthony Falls Hydraulic laboratory doing mostly physical modeling. For over six years he modeled flow and water quality in reservoirs and streams of wet systems for Tennessee Valley Authority. For over ten years, he modeled in mostly dry systems for Reclamation. His academic and professional experience includes both physical and mathematical modeling and is well suited for bridging the gap between the two approaches.

Russ Yaworsky, Modeler/Hydraulic Engineer
U.S. Bureau of Reclamation, Mid-Pacific Region, Division of Planning
B.S., 1978, Geological Sciences, Pennsylvania State University

Mr. Yaworsky has 22 years of federal work experience in water resources. Most of his experience (20 years with the Corps of Engineers) has been associated with flood hydrology and reservoir operations

in California, Nevada, and the upper Colorado River basin. As a member of the American River Operations Work Group for the past year and a half, Mr. Yaworsky has performed periodic water temperature forecasts for the lower American River. He has also performed annual temperature forecasts for the Stanislaus and Feather Rivers, and has had limited experience with temperature forecasting for the Sacramento River below Shasta Dam, as a participant in the Sacramento River Temperature Task Group. He is involved with the CALSIM II modeling effort, a water resources model under joint development by the California Department of Water Resources (DWR) and the Bureau of Reclamation, Mid-Pacific Region. The model is being developed for water resources planning and management applications of the State Water Project and Central Valley Project.

Tracy Vermeyen, P.E., Hydraulic Engineer
U.S. Bureau of Reclamation, Water Resources Research Laboratory, Denver, Colorado
M.S., 1986, Hydraulic Engineering, Civil Engineering, Colorado State University
B.S., 1985, Civil Engineering, Colorado State University

Mr. Vermeyen is a hydraulic engineer with the Water Resources Research Laboratory at Reclamation's Technical Service Center in Denver, Colorado. Since joining Reclamation in 1989, Mr. Vermeyen has been involved with hydraulic modeling, design evaluation of selective withdrawal structures, application of acoustic flow measurements systems, and development of alternative methods for providing emergency spillway capacity for embankment dams. Some of the many professional papers and reports authored or co-authored by Mr. Vermeyen include: Application of Flexible Curtains to Prevent Mixing and Allow Withdrawal in Reservoirs, IAHR, Proceedings from the 5th International Symposium on Stratified Flows, Vancouver, Canada, July 2000; "Review of Past Studies and Data Related To Temperature Management Options for the Columbia River Below Grant Coulee Dam, Washington," Memorandum Report, U.S. Bureau of Reclamation, Technical Service Center, Denver, Colorado, March 2000; "Use of Temperature Control Curtains to Modify Reservoir Release Temperatures – Prototype Observations," Proceedings, ASCE's First International Conference on Water Resources Engineering, San Antonio, Texas, August 1995; and "A Flexible Curtain Structure for Control of Vertical Reservoir Mixing Generated by Plunging Inflows," American Society of Civil Engineers National Hydraulic Engineering Conference, San Francisco, California, 1993.

James A. Higgs, P.E., CFD Modeler/Hydraulic Engineer
U.S. Bureau of Reclamation, Water Resources Research Laboratory, Denver, Colorado
B.S., 1986, Civil Engineering, Utah State University.
M.S., 1988, Civil Engineering, Utah State University,

Mr. Higgs has 12 years of experience in Hydraulics and Computational Fluid Dynamics. He has performed physical model studies including a study on the Friant Dam spillway. He has performed several CFD studies involved with fish passage, spillways, outlet works, underflow gates, and reservoirs. He has made extensive modifications to Flow-3D (a CFD package) in order to generate specific boundary conditions for thermally stratified flows for the Shasta Dam Temperature Control Device.

D. Cost

D. 1. Budget.

Total estimated project cost is $466,082 over three years. Total costs for the project in: Year 1 = $149,224, Year 2 - $206,088, and Year 3 - $110,770. Please see Form VI for details.

D. 2. Cost-Sharing

U.S. Bureau of Reclamation (USBR) has contributed funding, staff resources and equipment for use in monitoring and assessing water temperatures within the Project area. In addition, The Water Forum, SAFCA, USBR, and other stakeholders involved in the collaborative Lower American River Task Force's Fisheries Working Group have committed considerable staff and other resources in order to strategically compile, review and assess the viability of the Identified Actions for the purpose of improving steelhead and fall-run Chinook salmon production and survival in the LAR.

E. Local Involvement

The Water Forum is comprised of a diverse group of over 40 water management and other stakeholder agencies and groups who have joined together to develop and implement a comprehensive package of linked actions that will achieve two coequal objectives:

1. Provide a reliable and safe water supply for the region's economic health and planned development by the year 2030; and
2. Preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River.

For over seven years environmental agencies and citizens groups have been working on behalf of the Forum to develop, analyze, and implement measures that will provide a reliable and safe water supply for the region's economic health and planned development, and preserving the fishery, wildlife, recreational and aesthetic values of the lower American River. Numerous agencies and citizens groups have participated in developing and/or reviewing the reports and analyses that led to this proposal. Of primary significance is involvement and support from the Lower American River Task Force's Fisheries and In-Stream Habitat Work Group, and a work group created specifically for this project comprised of Lake Natoma recreation providers and interest groups. Members of the Project Team have also met with recreation stakeholders and have received unanimous support from those groups.

F. Compliance with Standard Terms and Conditions

The terms and conditions as described in Attachment D of the Ecosystem Restoration Program 2002 Proposal Solicitation Package are acceptable to the applicant. Applicant further accepts applicable State of California standard clauses as set forth in Table D-1.

G. Relevant Past Studies and References

Brown, R.T., Yates, G., Johnson, P.L., Physical and 2-D Computer Models of Skimmer Curtain Effects on Lewiston Reservoir and Outlet Temperatures, Hydraulic Engineering Proceedings for Water Forum 1992, ASCE.

Johnson, P., Vermeyen, T., and O'Haver, G., 1995. "Managing Water Temperatures Below Hydroelectric Facilities," *Hydro Review*, Vol. 14 No. 3, May 1995.

Johnson, P.L., and Vermeyen T.B., 1993. "A Flexible Curtain Structure for Control of Vertical Reservoir Mixing Generated by Plunging Inflows," American Society of Civil Engineers National Hydraulic Engineering Conference, San Francisco, California.

Jones & Stokes. April 2000. Draft Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River.

Jones & Stokes. July 2001. Draft Ecosystem Restoration for Fisheries/Aquatic Resources through Water Temperature Reduction in the Lower American River.

Jones & Stokes, in partnership with the California Center for Public Dispute Resolution, and Surface Water Resources, Inc. July 2001. Draft River Corridor Management Plan for the Lower American River.

Surface Water Resources, Inc. June 2001. Draft Initial Fisheries and Aquatic Habitat Management and Restoration Plan for the Lower American River.

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Figure 1

Conceptual Model and Hypotheses for the Lower American River Temperature Reduction Modeling Project

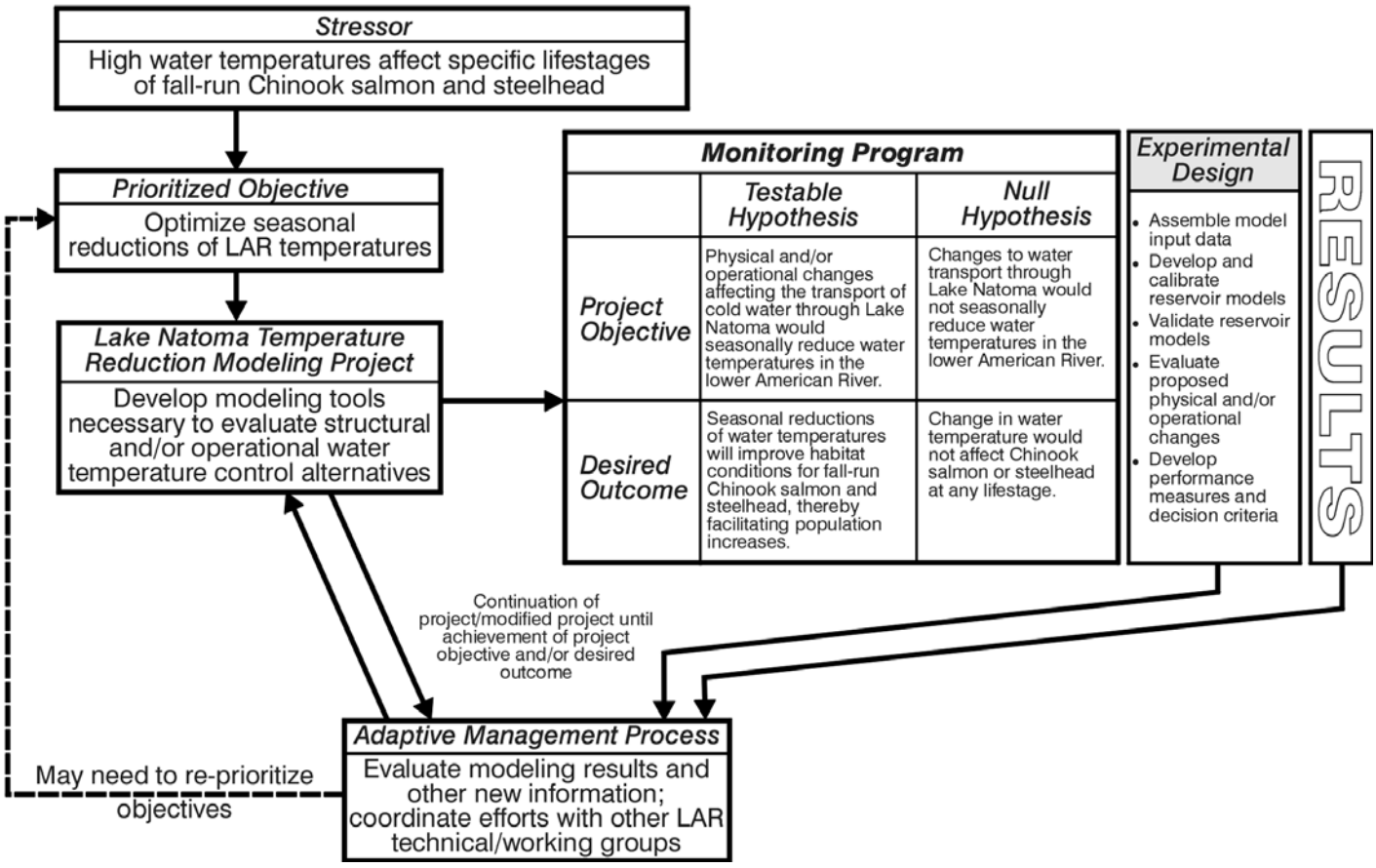

Figure 2

Tasks Timeline

Tasks	Description	Timeline
Year 1		
1	Folsom/Natoma Reservoir Temperature and Operations data collection/monitoring	12 months
2	CE-QUAL-W2 model development and calibration for Lake Natoma	4 months
3	CFD Modeling in addition to SAFCA funding already in place	3 months
4	CE-QUAL-W2 model development for Folsom Lake	2 months
5, 6	Project administration and management	12 months
Year 2		
7	Folsom/Natoma Reservoir temperature and operation data collection/monitoring	12 months
8	CE-QUAL-W2 Lake Natoma model validation & simulation of 4 alternatives	6 months
9	CFD modeling	2.5 months
10	Folsom W2 model calibration	3 months
11	LAR W2 model development	1.3 months
12, 13, 14	Project administration, management and public outreach (website)	12 months
Year 3		
15	CE-QUAL-W2 modeling for Natoma and Folsom	2 months
16	CE-QUAL-W2 modeling for three water bodies (Folsom/Natoma/LAR)	2 months
17	Technical Service Center analysis, reports & presentations	3 months
18, 19, 20	Project administration, management and public outreach (website)	12 months