

Real-Time Flow Monitoring

john p clements

Initial Selection Panel Review

Not Recommended

Amount Sought: \$330,000

Fund This Amount: \$0

Brief explanation of rating:

This proposal provides funding to continue monitoring of stream flow in Big Chico, Butte, Deer, and Mill Creeks. All of these streams support important anadromous fish populations and have significant restoration investments. This project has been funded in the past by the Ecological Restoration Program and the Anadromous Fish Restoration Program. Although the Technical Review Panel rated the project as adequate, the Selection Panel is concerned that the proposal does not articulate how it relates to measures of performance of past restoration actions. It merely provides funding to continue important gage station operations. The panel also agrees with the Technical Review Panel that the full range of flows should be monitored. The panel recognizes the importance of gathering these data, however, the panel does not recommend funding from this PSP. If the project is funded from other sources, the panel recommends that the project be responsive to the comments of the Technical Review Panel and also incorporate water quality monitoring.

The selection panel felt that certain types of monitoring efforts for fish counts (Projects 28, 56, and 88) and flow monitoring (Project 131) provide critical data for assessment, but they are not directly linked to an ERP effort. The selection panel encourages funding through an appropriate means of these types of efforts. If funded, every effort should be made to maximize the data collected. For example, temperature and salinity measurements could easily be added to Project 131 for a very minimal cost increase.

Technical Panel Review

Technical Review Panel's Overall Evaluation Rating:

Adequate

Explanation Of Summary Rating

The proposal received an adequate rating; however, it needed a stronger data evaluation component, which could consist of annual reports available on the real-time flow website. It would have received a higher rating if the investigators had proposed to measure flows over the complete discharge range and include other water quality parameters in addition to temperature.

Goals And Justification

The goals of the proposal were very clear - to maintain or upgrade a network of 13 flow monitoring stations on several eastern tributaries of the Sacramento River that support wild Chinook salmon. The principal role of the gauging stations is to document year-round base flows in order to verify that minimum discharge requirements have been met, and to document increases in base flows as a result of water right acquisitions. Some, but not all, of the gauging stations are also equipped with temperature loggers to record thermal changes. The stations would be maintained by the California Department of Water Resources.

Justification for the proposal is generally adequate, but there are a few unanswered questions. In several places the proposal states that historic flow monitoring on the streams (Big Chico Cr., Butte Cr., Deer Cr., and Mill Cr.) has been insufficient to determine whether flow needs for fish are being met. However, the reasons for this inadequacy are not specified nor are we given reasons why the new monitoring network represents a significant improvement. The assumption

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is that the new stations are in better locations (to assess water acquisition effects on flow) and possess more accurate monitoring equipment, but comparisons between the new and old methods are lacking. A second question has to do specifically with the location of the current gauging stations. Are they located in such a way that they can accurately measure the discharge changes resulting from water acquisitions? Many of the stations appear (from the rather hard to read map) to be located at the base of the foothills of the Sierra Nevada, but these locations may be upstream from some agricultural water acquisition sites. Are there sufficient flow stations downstream from these areas to document discharge increases or decreases? Finally, it was not clear why temperature was not monitored at all gauging stations (three sites will not have temp. sensors), or for that matter, why other water quality parameters that could affect fish migration (e.g., dissolved oxygen) were not included in the study. At the very least, such data would be valuable to other restoration efforts.

The project does not really involve conceptual modeling or hypothesis testing, nevertheless, flow data are a critical information need for recovery of salmon and other ecosystem attributes in these tributaries.

Approach

The approach represents a continuation of existing flow monitoring. The equipment upgrades requested in the proposal are to improve discharge measurement accuracy and link to real-time data storage and retrieval. Overall, the approach is straightforward and uses standard USGS hydrologic methods.

It would be very helpful if discharge was monitored over the entire range of flow conditions, not just base flows. This would add greatly to the ecological value of the data.

Feasibility And Likelihood Of Success

The proposal is adequately documented and technically feasible. Although the scale of the project (number of gauging stations) appears to be consistent with the objectives, it

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might be very worthwhile to add more sites, e.g., lower Deer Cr., lower Big Chico Cr., and lower Butte Cr. More flow stations would increase the likelihood of documenting the effects of water acquisitions, and the stations are not that expensive to run - ca. \$8-10 K per year.

Performance Measures

Measurements of base flows and temperatures in the four tributaries constitute the only performance measures for this proposal. These will surely be valuable data for a variety of restoration projects in Sacramento R. tributary systems. In some ways, it is unfortunate that the flow monitoring will only be for "base flow", which we interpret to mean that their discharge curves will not be calibrated at high flows. However, high flow data can be valuable too, as these events have a bearing on egg survival, availability of floodplain habitats, and other factors. We therefore strongly recommend that the full range of flows be monitored at these stations.

Products

The real-time flow data will be collected, stored, and summarized in acceptable ways, and they should be easily available to interested parties and organizations. A little more information could have been given about the temperature loggers, i.e., their nominal accuracy and the frequency of calibration.

As stated above, it would be very worthwhile to add other water quality parameters to the monitoring capability. With the advent of multi-channel data loggers, this could be achieved at a relatively low cost, considering the potential benefits.

It is very important that annual reports be prepared, discussing the results of flow changes observed during the previous hydrologic year. As additional water for instream flow is acquired, it will be essential for the senior investigators to summarize and interpret changes in baseflows. These reports, as well as the flow data themselves, should be

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available on their website.

Capabilities

CDWR staff members seem well-qualified to conduct the work. They appear to have ample experience and a good record of completing assignments.

Budget

In general the budget seems reasonable. Perhaps the most unusual aspect of the manpower costs is the use of the "average labor rate" for CDWR staff time, which according to the proposal is about \$83/hr, and includes a 100% overhead rate. One of the external technical reviewers pointed out that the average cost per station of \$8,500/yr in this proposal is typical of gauging stations costs in the region.

Regional Review

The regional panel rated the proposal "high". They were very supportive of the work, agreed that it provided critical streamflow information to other projects (e.g., Butte Cr.), and saw no major barriers to achieving the project's objectives.

Administrative Review

Review of prior-phase funding showed no significant glitches, nor did the environmental compliance review. The budget review suggested that indirect costs should be itemized (not a major problem) and that the proposal should make clear how the USGS is paid for its share of the work.

Additional Comments

All three technical reviewers supported the proposal and stated that it should be funded.

Sacramento Regional Review

Sacramento Regional Panel's Overall Ranking:

High

Summary:

The committee rated the proposal as HIGH.

The proposed project would supply much needed flow data; however, by itself would not determine the minimum instream flows required to sustain SRCS or Central Valley steelhead trout, which was stated as one of the project's goals.

At approximately \$100,000/year, the project is viewed as relatively inexpensive compared to the data generated.

The data generated would benefit multiple restoration activities, including several recent water acquisitions on Mill, Deer, and Butte creeks.

1. Applicability To ERP Goals And Regional Priorities.

The proposal is for an ongoing stream flow monitoring project implemented by the California Department of Water Resources that supplies data for multiple agencies, stakeholders, and organizations to determine appropriate instream flows for four eastside Sacramento River tributaries (Big Chico Creek, Butte Creek, Deer Creek, and Mill Creek). The project specifically addresses CALFED Ecosystem Restoration Strategic Goal #1 (At Risk Species), as well as Goal #4 (Habitats). It also addresses the Central Valley Project Improvement Act (CVPIA) priority focus on actions for recovery of Sacramento River spring-run Chinook salmon (SRCS), and Central Valley steelhead trout. Therefore, Multi-Species Conservation Strategy (MSCS) milestones are also addressed.

Although the project by itself does not provide all the necessary components for successful Central Valley salmonid

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restoration, by adding additional flow monitoring stations to the aforementioned streams, the project does/will provide information on two 'Big R' species (SRCS, and Central Valley steelhead trout), and their habitat requirements. Other ongoing projects stand to benefit from this project's goals and objectives, and it addresses streams in which ERP has made substantial investments (Butte Creek).

2. Links With Other Restoration Actions.

Although flow monitoring stations have been operated on each of the creeks addressed, it is stated that the data are inadequate to determine or manage minimum base flows. The project should provide needed data to address the impact of several recent water acquisition projects (ground water exchanges on Mill and Deer creeks, water exchange and water right purchase on Butte Creek, and a diversion removal on Big Chico Creek). Additionally, the project should/could provide real-time monitoring and assurance that fish passage structures are functioning properly.

The project has been funded in the past through the CVPIA AFRP program (1996, 1997, and 2000), and CALFED (2001).

Real-time data will be made public through the California Data Exchange Center (CDEC).

3. Local Circumstances.

CEQA/NEPA do not apply.

Concerning feasibility, the project is sound. If there are any concerns it would be the access and installation of flow monitors on private property. Although no written permission from private property owners was submitted with the proposal, it is stated that all access agreements have been made.

The project managers at DWR have vast experience in their field, and the panel can see no reason the project would not be successful in supplying real-time flow data for the aforementioned creeks on CDEC

Sacramento Regional Review

4. Local Involvement.

Project proponents engage in public outreach by participating in, and supplying data, to local stakeholder groups such as the Mill Creek Watershed Conservancy, Deer Creek Watershed Conservancy, Butte Creek Watershed Conservancy, and the Big Chico Creek Watershed Alliance. Additionally the project will provide needed information to a number of ongoing restoration projects, as well as supply real-time data to CDEC, allowing all interested parties an opportunity to access the information.

5. Local Value.

It is the panel's belief that the proposed project supplies much needed information to a number of ongoing restoration projects within the aforementioned creeks. Although the project's products (real-time flow and water temperature data) do not directly restore SRCS and Central Valley steelhead trout habitat, they do provide numerous researchers with the data required to do so. The project's data also allows the evaluation of a number of recent restoration activities (water acquisitions and exchanges) on streams that contain listed species (SRCS and Central Valley steelhead trout). The evaluation and long-term operation of these flow monitoring stations will allow the addition, removal, or relocation of other flow monitoring stations (i.e. Adaptive management) as better flow management information is obtained.

6. Other Comments:

Based on the questions the panel has been requested to address, we believe this is a worthy project.

External Technical Review #1

Goals And Justification

This proposal seeks, and should be awarded, funding for the continued operation of stream gages on four streams with at-risk spring Chinook and steelhead populations. The existing flow monitoring system permits adherence to minimum fish protecting stream flows and has been instrumental in securing beneficial water management agreements. By helping to provide and maintain minimum passage flows for adult and juvenile salmonids, the proposal clearly identifies goals and objectives of restoration actions and how they will be monitored. The stated hypotheses are broad but appropriate for a long term monitoring effort. The network of real-time sensors has also provided managers with data for projects beyond the four watersheds and will likely encourage new research hypotheses.

Approach

The applicant, California Department of Water Resources, has extensive experience designing and operating stream gages, has operated this network of stations since 1996, adheres to standard USGS stream gaging methods, and has consulted extensively with cooperating agencies to manage the network adaptively and address fisheries concerns. The proposed additions and or modifications to the network are responses to water management agreements that were facilitated by data collected during previous years of the program. Because the network of gages can accurately monitor minimum flows, managers and stakeholders will be able to track the effectiveness of these agreements. Biologists and fish passage engineers can monitor the effectiveness of structures at specific flows and relate long term population trends to flow during critical life history periods.

Technical Feasibility

The project is well established and has been providing continuous real-time as well as finalized data for a number of years. I am not familiar with the project watersheds but the list of cooperators and accomplishments suggest the scope is appropriate for the objectives.

Performance Measures

Because the proposal involves collection of monitoring data that serves a variety of restoration efforts beyond the project's immediate scope of work, it is difficult to assess specific performance measures. However, the project will determine the efficacy of using gage records to monitor compliance with water management agreements and can be managed adaptively to suite long term recovery goals.

Products

Real-time flow data is fundamental information for anadromous fisheries management in regulated or heavily appropriated streams. Data is available on the California Data Exchange Center website - one of the most widely used references for natural resource professionals in the state. Stations will be maintained by professional hydrographers, data will be checked for accuracy by hydrologists, and published with summaries for each water year.

Capabilities

Professional engineers, hydrographers, and hydrologists will operate the network and certify the accuracy of the data. The CDWR team has successfully operated the current system for 8 years and is uniquely qualified to continue and expand the program.

Budget

The use of an average labor rate for project employees is

External Technical Review #1

unusual but the budget seems reasonable and is based on prior experience maintaining the network of gages and sensors. Cooperating agencies are providing some cost sharing funds. Because the system is established, anticipated equipment expenditures are a small portion of the budget.

Additional Comments

This project should receive funding because it has a successful track record, provides fundamental data, adheres to numerous CALFED goals, and will benefit spring Chinook and steelhead recovery efforts.

External Technical Review #2

Goals And Justification

Yes, the proposal clearly identifies low streamflow support projects in salmonid streams as the restoration actions whose outcomes will be monitored. The thrust of this monitoring proposal is that continuous flow data are necessary to determine whether low-flow augmentation efforts are worthwhile or effective. This proposal seeks funds to either install, maintain, or monitor 13 flow and temperature gaging stations on four salmonid-bearing tributaries of the Sacramento River. Various flow acquisition projects have been implemented to improve low-flow conditions on these tributaries. The proposed monitoring will directly support assessments of the streamflow support projects.

Approach

The approach is straightforward - to install, maintain, and monitor flow and temperature gaging stations to provide continuous flow and temperature records to support habitat analysis and decision making. The techniques are standard methods developed and published by the United States Geological Survey (USGS)

Technical Feasibility

Yes, the project is feasible. The project team has already shown its ability to conduct the proposed monitoring.

Performance Measures

Yes, the data will allow evaluation of restoration activities. While plans for statistical data analyses are not documented, it is necessary to have flow data to assess the value and efficacy of flow acquisition/augmentation programs. Temperature data will also directly assist in such assessments.

Products

Yes, the flow and temperature data will be useful and necessary for decision-makers analyzing flow acquisition/augmentation projects on these tributaries of the Sacramento River (Big Chico Creek, Butte Creek, Deer Creek, and Mill Creek).

Capabilities

Yes, the project team is qualified to carry out the proposed monitoring. This has been demonstrated by their apparent success in past monitoring.

Budget

The budget basically works out to \$8,500 per gage per year, which is very reasonable and probably adequate.

Additional Comments

If flow acquisition/augmentation projects are considered important for these Sacramento River tributaries, then this project is crucial to assessing the need for and effectiveness of such projects.

External Technical Review #3

Goals And Justification

The proposal is monitoring stream flows and temperatures in relation to instream flow requirements for steelhead and salmon.

The goals and objectives are generally clear and internally consistent. The proposal states that historical stream flow monitoring by agencies was inadequate but does not specifically describe how. It would be more convincing if a brief description of this shortcoming was provided and it would also help focus the proposal because it would be even more clear (although it is generally intuitive) what gaps the new stream gages fill.

The conceptual model and hypothesis are clear and intuitive.

The hypothesis is justified because efficient and accurate management of stream flows relies entirely upon the ability to accurately measure stream flows.

Approach

The approach sounds well designed and is primarily a continuation of previous works. It would be more convincing if a more detailed description of the role of each gage was provided. How were gaging locations determined? What specific knowledge gap does each gage fill? Why are temperature loggers placed on some gages but not others? This is not to say that the approach is not solid. I believe it is. But the authors apparently relied on the intuitiveness of their proposal rather than providing intimate detail to convince us of the specific need for each installation. The reason it is useful to identify the specific use of each gaging station is that clearly stated goals help clarify needs. It could eventually come to light that certain gages don't fulfill their intended use as well as is necessary and that a station should be moved or additional stations should be installed. The proposal

External Technical Review #3

mentions constant reappraisal of the utility of installations but does not describe the process or what sort of changes have been made or what priorities are paramount.

The project builds very well upon previous works.

Flow and temperature data are the knowledge base. Without accurate and comprehensive information on stream flows and water temperatures, there is only speculation. There is no reason to do additional scientific research if it cannot be applied efficiently and accurately due to ignorance of stream flows and water temperatures.

Technical Feasibility

The project is definitely feasible because it is ongoing and the scale is consistent with the objectives.

Performance Measures

The performance criteria are qualitative. In truth, performance criteria for this proposal should be:

1. Base flows are measured accurately throughout the year at all installations.
2. Water temperatures are measured accurately throughout the year at all installations.
3. Base flow and water temperature data are processed efficiently, accurately, and in a timely manner and made available to the public.

These criteria are inherent in the proposal but not specifically stated. If they are met, they will potentially allow the qualitative criteria listed in the proposal to also be met.

Products

The products will be critical for resource managers, decision makers, and scientists.

Data access is critical and the internet is the appropriate outlet, along with the necessary reports.

Data handling is consistent with USGS methodology, which is a very successful and useful approach.

Capabilities

The team is well qualified and has already completed the same work that is proposed.

Budget

The budget appears reasonable and adequate.

Additional Comments

I am not sure why temperature loggers are not installed at every station but assuming that the cost of loggers is not great and each installation will be visited monthly whether a logger is present or not, I recommend a temperature logger at every station. If nothing else, this would provide data from locations where temperature is not a great concern for comparison with data from locations where temperature is a great concern.

Budget Review

1. Does the proposal include a detailed budget for each year of the requested support?

Yes.

2. Does the proposal include a detailed budget for each task identified?

Yes.

3. Are project management expenses appropriately budgeted?

No.

If no, please explain

2 hours per month? Seems too low.

Task and Deliverables - Grantee must provide detailed information for all work including subcontractor work for each specific task, services, and work to be performed with the appropriate and corresponding deliverable or end product for each task(s) and/or sub-task(s). Costs associated with each task and deliverable should be evaluated based on what is considered to be reasonable costs for performing similar services.

4. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs? Are indirect rates, if used, appropriately applied?

No.

If no, please explain

Indirect included in \$83.00/hr

No mention of overhead.

Budget Detail/Administrative Overhead Fees - Budget detail combines the labor rates with the direct overhead rate. The labor rate, benefits and indirect rate should be itemized in the format provided by the PSP to enable reviewers to better evaluate and ensure that proposed labor rates are comparable to state rates.

Budget Review

If proposal is funded, a detailed list of items included in the indirect cost rate should be provided by the grantee. Grantee must provide itemized and detailed information included and charged as part of Indirect Rates (IDC) charges.

5. Does the budget justification adequately explain major expenses? Are the labor rates and other charges proposed reasonable in relation to current state rates?

No.

If no, please explain:

Sub contracting to USGS unclear.

Subcontracting - Proposals for work to be performed by subcontractors or other entities in excess of the 25% of the total project dollars the grantee is required to provide a justification for subcontracting services. If subcontractors are pre-selected and identified in the proposals as part of the project team, the grantee should provide a justification on how each subcontractor was selected. Grantee shall identify labor rates and indirect costs rates paid to each identified subcontractor to ensure that labor rates are comparable to State rates.

The Subcontracted work should be identified with a rate and hours and attributed to each task and deliverable for each year. A performance evaluation is also recommended for subcontractors that receive more than 50% of the grant funds. If the subcontractor has not been identified, a position description complete with education level, experience, and abilities be submitted and the rate and hour associated with that position will be attributed to a task, and deliverable. The grantee must also comply with the State competitive bidding process as stated in the PSP.

The Grantee should charge a reduced indirect cost rate to the state for services that will be subcontracted by the grantee. (Researching SCM Section 3.06 B).

6. Are other agencies contributing or likely to contribute a share of the projects costs?

Yes.

Budget Review

If yes, when sufficient information is available, please sum the amount of matching funds likely to be provided:

CDWR \$24,000 USGS \$48,000 PG \$8,000

Cost Sharing - Grantee shall provide information regarding its financial capability and stability as well as its level of commitment for any proposed cost share funds. A detailed budget of the project's proposed cost share funds should be provided prior to grant funds being awarded. A financial evaluation is recommended for grant agreements that state/claim over 30 % or \$250,000 (which ever is less) of matching funds. The evaluation will avoid likelihood of the grantee requesting an amendment to increase project funding due to lack of or miscalculation of matching funds to complete the project.

7. Does the applicant take exception to the standard grant agreement's terms and conditions? If yes, are the approaches the applicant proposes to address these issues a reasonable starting point for negotiating a grant agreement?

No.

If no, please explain:

The proposer states that they will accept Table D-1 of CALFED 2001 PSP.

Contract Language Exceptions - Proposals submitted by grantees which identify exceptions to State of California's standard contract language provisions as provided in the 2004 PSP; and/or submit alternative contract language in lieu of the State's standard contract language should be carefully reviewed prior to awarding grant funds. Review will initially be conducted by the funding agency's contract office and referred to the legal department as needed.

8. Are there other budget issues that warrant consideration?

Yes.

If yes, please explain:

Budget Review

It doesn't explain how USGS will get paid for their services,
by CBDA or CDWR?

Environmental Compliance Review

1. Is compliance with California Environmental Quality Act (CEQA) required for this project?

No.

2. Is compliance with National Environmental Policy Act (NEPA) required for this project?

No.

3. Does this project qualify for an Exemption or Exclusion under CEQA and NEPA, respectively?

Does not apply.

4. Did the applicant correctly identify if CEQA/NEPA compliance was required?

Yes.

5. Did the applicant correctly identify the correct CEQA/NEPA document required for the project?

Does not apply.

6. Has the CEQA/NEPA document been completed?

Does not apply.

7. If the document has not been completed, did the applicant allot enough time to complete the document before the project start date?

Does not apply.

8. If the document has not been completed, did the applicant allot enough funds to complete it?

Does not apply.

9. Did the applicant adequately identify other legal or regulatory compliance issues (Incidental Take permits, Scientific Collecting permits, etc.) that may affect the project?

Does not apply.

10. Does the proposal include written permission from the owners of any private property on which project activities are proposed or, if specific locations for project activities are not yet determined, is it likely that permission for access can be obtained?

Yes.

Environmental Compliance Review

11. Do any of these issues affect the project's feasibility due to significant deficiencies in planning and/or budgeting for legal and regulatory compliance or access to property?

No.

Prior-Phase Funding Review

List the CALFED or CVPIA funded phases of this project for which your agency manages contracts:

Project Title	Real-Time Flow Monitoring
CALFED Contract Management Agency	CA DWR
Amount Funded	\$418,000
Date Awarded	2001/01/01
Lead Institution	CA DWR
Project Number	ERP-01-C02

3. Have negotiations about contracts or contract amendments with this organization proceeded smoothly, without persistent difficulties related to standard contract terms and conditions?

Yes.

Under a agreement with DWR

4. Are the status, progress, and accomplishments of the organization's current CALFED or CVPIA project(s) accurately stated in the proposal?

Yes.

5. Has this organization made adequate progress towards these project(s)' milestones and outcomes, without unreasonable divergences from project schedules or poor-quality deliverables?

Yes.

The information is publicly available

6. Is the applicant's reporting, record keeping, and financial management of these projects satisfactory?

Yes.

Could be better managed from CBDA side.

7. If this application is for a next phase of a project whose contract your agency currently manages, will the project(s) be ready for next-phase funding to monitor and evaluate project outcomes in fiscal year 2005/6, based on its current progress and expenditure rates?

Prior-Phase Funding Review

Yes.

They've already received two amendments to keep the work going.

Other comments:

This is viewed as critical information that needs to be gathered continuously. It needs someone from CBDA to track it more closely.

