

Selection Panel (Primary) Review

– **Fund** (a proposal recommended for funding at the amount sought or funding in part of selected project tasks or subtasks)

X Reconsider if Revised (a proposal that is a high priority but that requires some revision followed by additional review prior to being recommended for funding)

– **Not Recommended**

Amount Sought: \$513,281

Fund This Amount: \$513,281

Conditions recommended (Conditions that applicants would need to meet to obtain funds may be recommended for proposals suggested for either full or partial funding. For proposals recommended for partial funding, conditions that identify the funded tasks or subtasks must be recommended.)

Please provide a brief explanation of your rating, including an explanation of the reasons for any conditions that the panel recommends. Revisions required of proposals recommended for reconsideration should be outlined, together with a justification for the suggested revisions:

This proposal meets the applicable guidelines for evaluating effectiveness of restoration actions and addresses the essence of the PSP in terms of monitoring priority fish species. There is a long history of monitoring this site and it is a high priority stream and species. Previous efforts have been providing monitoring data crucial to making management decisions in other parts of the watershed. Although the proposed studies will provide valuable information for understanding spring run Chinook salmon (SRCS) and continue monitoring work established over 9 years, this project could provide considerably more information relevant to the efficacy of restoration actions if some improvements were made to the project as it is currently proposed. The current proposal suffers from a number of key details not being provided to the reviewers so they can properly evaluate the proposed work.

The selection panel recommends that this proposal be revised for reconsideration and address the proposal in light of all the technical review panel's comments. 1) Address the concerns from technical review regarding carcass washout and mortality of partially spawned adults and revise those methods if appropriate. 2) Describe the census methods better in a revised proposal so they can be peer reviewed 3) State the purpose of the tissue archiving and if it's for genetic analysis provide the long term plan for the tissue analysis and justification for the number of samples. 4) Provide details of the juvenile trapping efficiency so they can be peer

review. 5) The number of coded wire tagged fish needs to be justified in terms of the goals of the monitoring and their ability to use the tagged fish to estimate significant population parameter of SRCS. 6) A plan needs to be devised and clearly articulated for using the monitoring data to address the efficacy of restoration activities. 7) The budget should be properly justified, and other issues raised in administrative reviews should be addressed.

Technical Panel (Primary) Review

inadequate

Explanation Of Summary Rating

Two of the three external reviewers pointed out some significant issues with respect to sampling procedures, and they also questioned the basic assumption that adult escapement, by itself, provides the most cost-effective metric of restoration effectiveness. Additionally, we believe the proposal does not adequately address natural variability resulting from climate changes, nor does it properly account for other factors such as harvest affecting salmon survival outside Butte Cr. Nevertheless, the project apparently enjoys considerable local support and it does appear to be an important long-term monitoring program for one of the region's most important salmon populations. A revised proposal responding to the suggestions given above is worthy of consideration.

Review Form

Goals And Justification

The goals and objectives were moderately clear, but there were some aspects of the studies that did not appear to be clearly linked to the stated goals. The goal, as specified in the Executive Summary, is “to refine adult SRCS [spring-run Chinook salmon] escapement estimates”. However, the studies also include an ambitious coded wire tag (CWT) program for juveniles, juvenile Chinook salmon emigration estimates, adult fall-run Chinook escapement survey, and estimates of pre-spawning adult mortality. While these are all worthwhile investigations, their breadth suggests they have been squeezed into a rather expensive proposal to refine adult spring Chinook escapement estimates.

The justification for the proposal appears to be that accurate adult Chinook salmon escapement trends will provide the best single long-term metric for habitat restoration effectiveness in the Butte Cr. watershed. Because Butte Cr. contains the most intensively-studied stocks of wild Chinook salmon in the area (according to the proposal), improving the precision and accuracy of adult and juvenile surveys is needed to document recovery. The need for accurate adult escapement estimates cannot be questioned, for a number of reasons including habitat improvement and harvest planning; however, estimates of adult population size by themselves are notoriously uncertain indicators of actions influencing freshwater survival. Juvenile salmonid abundances are not adequately quantified in this proposal, particularly in relation to specific types of restoration actions. Based on the

interannual variation in adult salmon returns to mid-size watersheds, several authors have estimated that it would take decades, e.g., 30–50 years, to be able to detect all but the very largest improvements in freshwater survival because of the simultaneous, cumulative effects of factors operating in the estuary and marine environments. A better metric of restoration effectiveness would be trends in the production of juvenile emigrants from Butte Cr. expressed as the number of juveniles produced per adult female. This would be possible, given the monitoring elements in the proposal. However, the proposal would need to be modified to include quantitative estimates of juvenile populations.

Approach

The approach uses rather standard fisheries monitoring methods and the investigators appear to have plenty of experience (10 years at Butte Cr.) in carrying them out. As two of the external technical reviewers have pointed out, many important details are lacking from the proposal. For example, it would be helpful to know if the investigators can account for carcass wash-out and for mortality of partially-spawned adults. More details on CWT mark-recapture are needed, e. g., are tags recovered out of the basin included in the database? For what purpose were tissue samples of carcasses taken? How is the harvest rate figured? What is the efficiency of the juvenile traps? These details need to be provided in order to judge the adequacy of the proposal.

Given the ample opportunities for sampling (both adults and juveniles, as well as habitat), the study would benefit from including additional parameters such as genetic analysis to estimate effective population size and analysis of parentage, quantitative estimates of the number of juveniles leaving the Butte Cr. system, and climate and habitat-mediated changes in abundance, e. g., changes related to particularly wet or dry years. Additionally, it would be helpful to include quantitative information on physical habitats and flow, as these seem to be the focus of restoration efforts. It is important to include habitat measurements because accurate information on adult escapement will need to be related to equally accurate information on the Butte Cr. watershed if the objectives of the study are to be met.

Feasibility And Likelihood Of Success

In the long term, one of the most difficult problems will be partitioning the effects of habitat improvement projects on the escapement of adult Chinook salmon from other sources of mortality. The proposal does not address short-term (El nino/La nina) cycles or decadal cycles of ocean productivity. Given that a “regime shift” in the PDO cycle apparently occurred in the middle of the study and there have been two El nino events since 1995, ocean survival parameters could easily have shifted in a way that could significantly confound the study. Because the large investment in Butte Cr., it will be important to be able to consider these changes as well.

However, since the specific objective of this proposal is to refine the adult escapement estimate protocols, it would be useful to know more details about the proposed census methods. A substantial part of the budget appears to be devoted to increasing the CWT marks from about 100,000 to 400,000 fish. It was not quite clear how the 400,000 figure was calculated. What benefits to the project objectives will result from this increase? What is being done to quantify handling mortality related to CWT implants, as well as to trapping methods (most of the juvenile Chinook are very small and presumably fragile)? How will downstream emigrant trap efficiency be calibrated? Where are the CWT interrogation points (places where fish marked with coded wire tags can be sampled) and how will the data be used in reconstructing run size and harvest rates? Also, see other reviewers questions about the timing of adult snorkel surveys.

As currently formulated, this proposal will not be able to provide a reasonable, fairly unambiguous answer to the question "Are restoration actions resulting in increased spring-run Chinook salmon adults in Butte Cr.?" The sampling methods need to be carefully calibrated so their accuracy and precision are better understood, the influence of off-site (main river, estuary, marine influences) factors needs to be addressed, and loose ends of the proposal (e.g., why were tissue samples taken?) need to be tied up.

Performance Measures

The implied measure of performance is an increase in the precision and accuracy of adult Chinook salmon escapement estimates, but there does not appear to be a way of establishing the "true" count or returning adults because there is no complete fence or dam where all returning salmon can be counted. As one external reviewer suggested, it might be possible to obtain a more direct measure of adults using remote videography at a temporary fence, but even this approach is vulnerable to freshets and poor water clarity. The long-term record of wild salmon escapement to Butte Cr. is probably its most attractive feature and is a good argument for continuing to refine the estimates. If important improvements are identified as the outcome of this project, perhaps the older data can be corrected for known biases.

As two of the external reviewers noted, quantitative estimates of juvenile abundance (as opposed to just body size changes and migration timing) would be a very worthwhile addition to the study. As currently formulated, the juvenile sampling program will not adequately address the goals of the proposal without an improvement in quantification.

Products

Continuation of an important long-term database of at-risk wild Chinook salmon life history and adult escapement to an important tributary of the Sacramento River is clearly a priority for the region. Improvements in snorkel survey methodology will be very useful to others

assessing salmon populations in the Sacramento River basin. The CWT effort will help identify mortality rates during different life cycle periods, if enough tags are recovered at different points in the life cycle. All of these products are worthwhile. However, the central question of whether adult escapement is the method of choice for tracking restoration effectiveness will not be answered by the research in this proposal.

Capabilities

The long-term involvement of the principal members of the study team suggests that they have an intimate knowledge of the Butte Cr. watershed and its salmon populations. The publications to date have included only agency technical reports, and it would have been encouraging to have seen a peer-reviewed journal paper or two. The project might benefit from collaborations with (1) a geomorphologist, so that changes in flow and riverine habitats following restoration can be properly documented, (2) a population geneticist, so that genetic analysis of tissue samples can reveal something about the population's genetic structure, and (3) a fish behaviorist, so that changes in juvenile migration patterns in response to restoration can be interpreted.

Budget

Given the breadth of activities the budget seems reasonable, especially because the cost of increasing the CWT program to 400,000 fish is so expensive (and thus reinforces the need to justify this number). Presentation of the budget was hard to follow, however, because costs were not clearly itemized.

Regional Review

The regional review panel was strongly supportive of the project and gave it a "very high" ranking. They felt the proposal had extraordinary regional value because it provides critical information about one of the few surviving naturally-spawning Chinook populations in the Sacramento R. system.

Administrative Review

The prior-phase funding review revealed minor delays in submitting quarterly fiscal reports; otherwise, the project had achieved its fiscal objectives.

The environmental compliance review did not identify any significant problems.

The budget review noted that main and subcontractor costs were not partitioned nor were subcontractor rates identified – a condition that will need to be fixed to be in compliance with

state law. Equipment purchases were listed in the proposal but not included in the budget. No project management expenses were identified for any year, although the assumption is that the principal staff (currently salaried by CDFG) will perform these duties without cost to CALFED.

Additional Comments

One of the external technical reviewers provided a highly favorable review. His major suggestion was that the study should include a comprehensive analysis of water quality factors that could contribute to high pre-spawning mortality.

The other two external reviews were decidedly lukewarm. They were supportive of the long-term adult escapement monitoring efforts but questioned the efficacy of using adult salmon returns as the chief metric of restoration effectiveness. Additionally, they pointed out shortcomings or lack of needed detail in the description of the snorkel calibration and juvenile sampling elements, and they wondered what some samples (e.g., carcass tissue samples) would be used for.

Technical Review Panel's Overall Evaluation Rating:
inadequate

Sacramento Regional Review

Very High

Review:

1. Applicability to ERP goals and regional priorities.

All in all, the proposal responds to all questions in this section.

The proposal addresses spring-run Chinook salmon (SRCS) in Butte Creek, and therefore represents high priority for past investments (\$33 million to-date), as well as two of the ‘Big R’ species within the Sacramento Region (SRCS and Central Valley steelhead trout).

The proposed project is multifaceted because it addresses two major goals; (1) it is a continuation of an ongoing project (the Butte Creek SRCS Life History Investigation), and (2) it will assess multiple restoration activities that have already been completed (5 fish screens, 11 fish ladders, removal of 4 diversion dams, acquisition of 40 cfs dedicated for in-stream flow, etc).

The project continues previous funding from both CALFED ERP and CVPIA AFRP (over the past 9 years) to evaluate: (1) the onset of Butte Creek SRCS spawning, (2) timing and duration of Butte Creek SRCS juvenile emergence, (3) age at onset, and duration of juvenile migration, (4) the growth and residence time of juvenile SRCS in Butte Creek, (5) migration duration and resident time of juvenile SRCS in route through the lower river and Delta, (6) ocean distribution and harvest of Butte Creek SRCS, (7) inland escapement, age structure, and straying of Butte Creek SRCS, and (8) the evaluation of pre-spawn mortality of SRCS on Butte Creek.

The project addresses the ERP Draft Stage 1 Implementation Plan and Ecosystem Restoration Plan, Goal 1 (recovery of at-risk species), through its focus on SRCS (and to some extent Central Valley steelhead trout). Additionally, because SRCS Central Valley steelhead trout are designated as “R” in the Multi-Species Conservation Strategy (MSCS), it addresses milestones for the Region.

The proposed project is implementing CVPIA AFRP Evaluation #14 (juvenile life history of Butte Creek SRCS).

Finally, as stated in the submittal, the current proposal (which, if funded, will continue the ongoing project) has provided input for several recovery plans and management actions in the Central Valley, including: (1) NOAA Fisheries Central Valley Technical Recovery Team’s

effort in developing recovery plans for Central Valley SRCS, (2) the Interagency Ecological Program's Delta Operations Group Sacramento River SRCS Protection Plan, and (3) NOAA Fisheries-led workgroup developing management goals and recommendations to the Pacific Marine Management Council for potential amendments to the Pacific Coast Salmon Plan.

2. Links with other restoration actions.

Again, the proposed project appears to stand up well to the questions that are being asked in this section.

The project is strongly linked to multiple ongoing restoration activities in the Region, and it is the panel's understanding that most individuals within the anadromous fisheries community in the California Central Valley are aware of the project.

One important note is that on a weekly basis the project submits/exports all data associated with juvenile SRCS and steelhead out-migration (Task #2—rotary screw trap monitoring) to the Interagency Ecological Program (IEP) server in Sacramento, allowing all/most researchers access to the data on a real-time basis. Additionally, adult SRCS (and fall-run Chinook salmon) escapement data is provided to the ocean salmon project, and therefore is available/published for all parties through "Grandtab", which reports salmon escapement numbers for all runs in the Central Valley from 1952 to present.

3. Local Circumstances.

There are no foreseeable local circumstances that would effect this project's feasibility. Because the project is currently underway, all landowner agreements (i.e. access to project sites) appear to be in hand (although written permission was not included within the proposal). Additionally (according to the maps provided) the location of all tasks appears to be properly located within the watershed.

To the panel's knowledge (and according to the proposal), the project proponents have in the past utilized public funds to achieve research goals and have not defaulted on any deliverables.

CEQA/NEPA compliance is not applicable.

Permitting compliance for the 'Take' of SRCS and Central Valley steelhead trout (Task 2—Juvenile Monitoring utilizing rotary screw traps, and Task 3—Coded-wire tagging of juvenile SRCS) through the Federal Endangered Species Act (ESA) has been (and continues to be) in place through a Section 10 consultation with NOAA Fisheries.

4. *Local involvement.*

Public involvement and outreach is addressed in the proposal. First, the project involves the Chico Research Foundation (California State University, Chico) as its fiscal agent. The panel is aware that the project has employed university students in the past, some of whom (post-graduation) are still closely involved. Secondly, it is stated that project researchers (DFG personnel) regularly attend and give presentations to local stakeholder groups such as the Butte Creek Watershed Conservancy.

It is the panel's understanding that past restoration progress in Butte Creek would not have been as successful to-date, if close working relationships between government agencies, non-profit organizations, and local landowners (and other stakeholders) had not been as strong as they were. The panel has no information to suggest these working relationships are not still in place.

5. *Local Value.*

The proposed/ongoing project has very important restoration implications to the Region. With Butte Creek being one of only three streams in the Central Valley that still has a significant, self-sustaining population of wild SRCS, it is one of the Region's main anadromous restoration priorities. Past funding reflects this point.

The project has in the past (and states it will continue) synthesized data, drawn conclusions, and directed adaptive management decisions. Numerous organizations such as DFG, NOAA Fisheries, the Bay Delta Authority, and PG (just to name a few) have relied on the project's data and data analyses while making management decisions.

Restoration actions and research project results to-date are cited in the ERP Draft Stage 1 Implementation Plan as an example of one of three watersheds where significant progress is being made.

6. *Other comments:*

The panel would be surprised if anyone in the field of Central Valley anadromous salmonid research has not heard of this project. It has been ongoing for a decade, made significant progress, and has its eye on the 'light at the end of the tunnel' for the restoration of Butte Creek. However, while the state university system is efficient, the over-head rate is not as competitive as some non-profit organizations members of the panel have worked with.

Overall Ranking:

Very High

Provide a brief summary explanation of the committee's ranking:

Based on Sacramento Regional review criteria, the project is outstanding in all respects. It meets all the criteria and has extraordinary regional value.

External Technical Review

Goals And Justification

The goals of this project are basically to count, and re-count, Butte Creek spring chinook. This population seems to be of interest because it was down but not out, and is not apparently recovering. The assessment of adults is linked to various other investigations. One escapement method, snorkel surveys, has been employed for some time and it will be repeated, in conjunction with mark-recapture estimates, an assessment of pre-spawning mortalities, and coded wire tagging operations. Thus it is clear that this is largely a "service" project rather than a "hypothesis testing" project. The main question is whether the service is needed. In general, power analyses (e.g., Lichatowich and Cramer, and Bisson) have shown that adult escapement is the least sensitive measure of habitat restoration and population status. I therefore would have questioned the choice of this metric at the outset but there is clearly some "data inertia" here. Thus the data are worth continuing. The level of pre-spawning mortality was not stated in the proposal so it is hard to know how important these surveys really are.

Approach

In general the approach is straight-forward but quite a number of important details are omitted. In the snorkel surveys it is not clear how the date (mid-late July) was selected. Presumably this is a time period when all adults are in but few pre-spawning mortalities have taken place. The proposal would have been stronger if such data had been presented.

Pre-spawning mortality seems obvious enough, but in my experience it can be ambiguous. If a female is dead in July with a full belly of eggs then we can call it pre-spawning. However, if the surveys run up to the spawning season then there may be some partially spawned fish. There should be a specific protocol for estimating the number of retained eggs, and an "eyeball estimate" is not very accurate. I know – I have tried it.

It is not clear how the mark-recapture will be done. How will the fish be caught, how will they be marked, and how will they be recaptured? These very fundamental aspects of the process are not indicated, nor are we told why the tissue sampling will take place. What tissue, and for what purpose? Fin clips for DNA? For population genetics, parentage analysis, estimation of effective population size, etc.?, Other tissues, for other purposes? Physiology? Pathology?

The juvenile trapping operation sound reasonable, except that there is no indication of how "relative abundance" will be assessed. In order to make trapping operations like this (that do

not screen the whole river) quantitative, an estimate of the trapping efficiency has to be made regularly. There seems to be no provision for this, so all we will get will be catch per day. This is better than nothing, but far from quantitative.

The coded wire tagging also lacks details. Notably, will all the fish get a single tag code? This would seem to be a lost opportunity, as much more information could come if there were separate tag codes for different time periods and average body sizes.

Technical Feasibility

This project calls for implementation of rather standard practices and so there is no obvious reason why it cannot be done. However (unless I missed it), there was no description of Butte Creek itself (width, depth, accessible and useable length, flow variation, clarity, etc.) so it is hard to tell how the snorkel, screw trap and other operations will go. It is also not possible to determine what other approaches might be feasible. For example, a single snorkel survey is not a great way to count fish. Is there no way to rig up a fence, perhaps with a camera, for example?

Performance Measures

It seems that adult escapement has already been established as the performance measure. This would not generally be considered a good choice, but so be it. As long as you have cwt data then you can at least reconstruct the total run and make a brood table. The proposal does not discuss such issues as database management, and this would have been helpful. All the costs are in fieldwork, and it would fall to Ward and McReynolds to manage the data and the write reports, as well as supervise fieldwork.

The absence of quantitative juvenile sampling is a weakness – with all the money being spent on the project I do not see why this could not be done.

Products

The adult escapement data are, of course, complicated by variation in marine survival (over which CalFed has little control) and also exploitation in fisheries (which can at least be assessed). The coded wire tagged fish will serve multiple purposes, and the pre-spawning mortality and adult (spring and fall) assessments are useful.

Capabilities

We are given very little information about the team, other than the fact that they have done this here before, and have general salmonid experience. Their level of education,

peer-reviewed publications, and other credentials were not indicated. One might assume that they are competent because the work was done in the past, but the absence of certain kinds of information in the proposal suggests that a broader perspective might be useful.

Budget

Given that there are three people on this project already paid (e.g., for CDFG), and the absence of travel or equipment, the budget seems high to me. Admittedly, a lot of the costs are in the contract for coded wire tagging.

Additional Comments

It is somewhat difficult to review this proposal because it has an air of inevitability about it. It has been funded in the past, seems to be progressing more or less on track (though I did not review any progress reports), and so seems reasonable for continuation. I wish there had been (or could be) a bit more thought as to how to extract as much information as possible from the study. Without increasing costs significantly, the juvenile surveys could be quantitative, the coded wire tagging could include multiple groups, and pre-spawning surveys could indicate more about egg retention, etc.

External Technical Review

Goals And Justification

This proposal identifies thirteen different restoration actions (~\$33 million) that will be directly and indirectly monitored by this project. Two of these restoration actions are currently on-going. The proposal states that, “each restoration action has a specific individual measure of effectiveness”, but Spring run chinook salmon (SRCS) and Fall run chinook salmon (FRCS) escapement will be the overall "recovery metric".

It is clear that the main objective of this proposal is to continue monitoring key elements of the SRCS life history investigation. If successful, project investigators hope to refine and validate their recovery metric in order to measure the collective effectiveness of the entire Butte Creek watershed restoration.

The conceptual model presented in the “justification” section clearly orients the reader with the Butte Creek spring-run chinook salmon early life history and where the restoration actions may benefit certain life stages. This model does a good job simplifying ten years of research and informing the reader how the restoration projects fit into the larger picture of increasing escapement. This proposal details three main focus areas: adult escapement, juvenile monitoring and coded-wire tagging with numerous objectives for each topic. Each objective is clearly stated and presented with a short description of how it will be tested. Many of these sub-projects are on-going to better understand SRCS and FRCS early life histories, but several have been added as a result of findings from previous studies. The investigators go into sufficient detail in justifying why their current research will add to the chinook salmon general knowledge base and how other researchers may be able to benefit as well.

Approach

I am impressed with the ambitious approach of the SRCS life history investigation to adopt multiple methodologies to determine which metric is most effective to help answer the recovery goals that challenge Central Valley fishery managers. Two different methods (snorkel surveys and coded wire tag (CWT) mark-recapture) will be used to calculate escapement for SRCS, in addition to a FRCS mark-recapture study. The two different methods will be used to collect baseline data and a comparison will be made between the two techniques. While conducting surveys the investigators propose to collect tissue samples that will be archived for future analyses. Since the time is being taken to collect these samples, I feel that the investigators could incorporate either a genetic component or scale/otolith life-history study into this project. Too often the technicians spend a large amount of time

collecting this type of data, and nothing ever comes of it. Based on the amount of money that the investigators are asking for in this proposal, it would be appropriate to hire a technician to analyze these tissues in a timely manner. Something I feel that is missing from this section is the establishment of an a priori list of criteria to determine which approach is capable of providing the best estimate at the lowest cost. In the event that these two spawner survey techniques provide comparable figures, I feel that having the entire set of variables (training hours, field time, cost of supplies, etc.) readily available for comparison is crucial in making an unbiased assessment of the techniques.

One of the biggest strengths of this proposal is its ability to build on previous monitoring efforts. The Butte Creek chinook salmon life history investigation has been on-going for almost ten years. Without exception, each of the “Tasks” presented are supported by previous findings. An example of this is that there is no guess-work necessary for when and where the investigators should focus their efforts during the escapement surveys. Previously funded monitoring has determined that the spawning season lasts from Sept thru Oct and the majority of spawning activity is in upper 5.5 miles of the study area.

Even more importantly, after a decade of on the ground experience in this watershed these investigators have identified additional problems facing these species that weren’t apparent prior to the start of this investigation. One of these recent findings is that the threat of summer pre-spawning mortality may be a critical limiting factor effecting these salmon populations. During these stressful periods of elevated river temperatures, large numbers of adult fish (numbering in the 1000’s) have died. This proposal addresses this issue directly by coordinating a weekly survey of the 11-mile holding area. A good description of the sampling procedure is included and data will be collected to investigate the source of this unnaturally high mortality.

This proposal has numerous ways in which it can make significant contributions to the chinook salmon knowledge base. A benefit of the wide scope of the study spanning the entire life history is that investigators will have the potential to make comparisons between different cohorts and entire age classes of fish. Furthermore, it is the only project within the Central Valley that is developing large scale life history metrics derived from the evaluation of wild SRCS.

Potential Contributions: I. Standardize CDFG salmon escapement sampling methodology a. Significance – provide comparison and validation with carcass and snorkel survey techniques, should provide best available measure of restoration effectiveness II. Evaluation of SRCS pre-spawn mortalities a. Significance -- determine the scope of problem & what may be causing it, find potential ways to alleviate or prevent (e.g. timing of flow allocations) III. Assessment of FRCS straying a. Significance – determine if the pattern from previous years is the norm, or was an aberrant event, evaluate the impact on the wild genetic stock

Technical Feasibility

This project is fully documented and has been on-going for approximately nine years. A similar approach is being proposed to the previous monitoring which has proven effective in previous years. Rationale for further investigation of Butte Creek SRCS is justified in order to build a more rigorous recovery metric. Prior studies as part of the Butte Creek life history investigation have identified that this research is being conducted at the proper scale (encompassing all known spawning areas for both runs) to address SRCS and FRCS escapement estimates.

In regards to the feasibility of this project, it is necessary to individually evaluate the feasibility of each task presented. Task 1 is the broadest of the three different tasks, but also the most important to ensure the success of the project. Task 1 activities involve the different methods that will be used to collect escapement data for spring and fall run chinook salmon. Without the successful completion of the snorkel and the mark-recapture population estimates (Tasks 1a), the investigators will be unable to provide a comparison of the different methodologies being used. Task 1a involves a snorkel survey which is pretty straightforward and only involves 4 days to complete. Tasks 1c involve a mark-recapture study of adult salmon in which the fish were marked as juveniles, hence this objective should definitely be obtainable. Task 1b involves the recovery of pre-spawn mortalities. Apparently these mortalities do not occur every year, but in the event they do occur this task will adequately address the problem. I expected to see the mention of water quality monitoring as a component of this task, but it was not included. If funded, the investigators should be required to monitor all water quality parameters in addition to the collection of the fish carcass data to fully explore all possible causes of the mass mortality event.

Task 2 will involve juvenile salmon outmigrant trapping. Previous trapping experience as part of this project should ensure that fish traps are positioned in the most appropriate areas and how to make the necessary adjustments according to river flow. One variable that project investigators cannot control is the weather conditions, which is addressed in the proposal. Overall, the task is technically feasible with the only potential pitfall being that they do not collect their goal of 400,000 fish for tagging (Task 3).

Task 3 is the distribution of coded-wire tags to juvenile salmon. CDFG hires a sub-contractor to complete this task. The use of an outside contractor for large-scale tagging operations is a common practice commonly employed by state fish and game agencies (e.g. Oregon and Idaho). These individuals are much more qualified to efficiently mark large numbers of fish than a seasonal employee, who often need supervision and training. The 400,000 fish target is a lofty goal, but assuming enough juveniles are captured evenly throughout the emigration period this goal could be obtainable. A potential pitfall may be that if traps are removed due to high flow and debris, it is likely that large numbers of fish may be

missed as they migrate through the trapping corridor during the high flow event. Not fishing the traps during high flows is unavoidable in order to prevent damaging the traps. Based on the project having 10 years of trapping data, a graphic showing mean fish passage by calendar day (or lunar cycle) would have helped greatly in being able to assess the feasibility of this task. Using their near decade of Butte Creek migration knowledge, the researchers should be able to set ‘guidelines’ of how many fish need to be marked (by the peak of the run, or full/new moon) to best be able to representatively tag emigrants throughout the entire migration period without over- or undershooting their goal.

Performance Measures

This proposal includes various ways in which the applicant will monitor their project performance in accordance with project objectives. The data collected by the “Butte Creek spring–run chinook salmon life history investigation” has the potential to do just what the project title implies, as well as add to the knowledge base of what is known about the life history of FRCS. Obtaining a more precise escapement estimate for SRCS alone would be a major contribution in assessing the current status of Butte Creek chinook salmon as well as benefit other monitoring programs in the Central Valley. The ability of this project to establish its goal of a “recovery–metric” providing a measure of overall restoration effectiveness will depend in part on the refinement of the methods currently being used to measure escapement. Determining why the Schaefer (1951) method yields such a high estimate in comparison to the snorkel survey is a very important potential outcome of this project. It is not entirely clear how this will be determined since the proposal doesn’t indicate how the recovery–metric will be calculated. The experimental combination of using both escapement estimation techniques has already been in operation for four years, but this proposal does not provide any results as to how the Schaefer and snorkel count methodologies have matched up in recent years. The inclusion of this information seems to be rather important in support of this proposal, but it is unclear why it was omitted. Therefore, it is difficult to imagine just how the two methods will be compared in order to provide a more “reliable” escapement estimate. It is not clear which method will provide a more accurate estimate to which the other will be compared. In order to correctly calibrate their survey methodologies, they need a reliable count of the adult spawning population. To accomplish this they could construct a temporary weir below the FRCS spawning grounds to get an estimate of escapement for both SRCS and FRCS runs. In doing this, they would also be able to accurately measure what proportion of the spring run incurs pre–spawn mortalities.

Products

This proposal includes numerous deliverables targeted for both state and federal resource managers. Quarterly progress reports, comprehensive annual reports, and a project final report will be prepared and provided as performance measures to the funding agency for this

project. All data from previous findings of this project have been summarized in annual CDFG reports that are readily available. As a way to keep interagency personnel up to date with the project, data are exported weekly to the Interagency Ecological Program server in Sacramento. Participation at workshops, seminars and conferences will also play an active role in distributing study findings to the scientific community. Adequate measures are being taken by this project team to get their findings out to other scientists, including providing baseline data for recovery and management of other SRCS populations outside of the Butte Creek watershed. This on-going project has already contributed to NOAA Fisheries workgroups in developing recovery goals and recommendations. Based on the current study design, this project should continue to benefit the management of Pacific coast salmon.

Capabilities

CDFG Associate Fishery Biologist, Paul Ward, will be responsible for project management. He has experience overseeing large projects, as well as being the Principal Investigator on this project for the past 7 years. The project team, made up entirely of CDFG staff, is well-qualified to carry out the work described in this proposal. The project co-leaders combine for a total of 34 yrs experience working with anadromous salmonids. The project team has a good track record working together on fishery monitoring projects and has co-authored five project reports since 1998. The CDFG staff will hire two biologists and several field technicians to carry out project objectives. CDFG is the ideal candidate to carry out this study due to their familiarity with Butte Creek and watershed partners. No lands, easements or rights of way are needed for this proposal. All sampling permits, including a Section 10 and NOAA 4(d) authorization, have already been secured from previous work and will be renewed on an annual basis.

Budget

The budget seems pretty straightforward and appears to fairly represent the work described. It would be nice to see cost sharing partners identified in the budget (e.g. NOAA, PFMC, etc.) especially since multiple agencies are benefiting from this research.

Additional Comments

External Technical Review

Goals And Justification

The proposal sufficiently outlines the extensive number and diverse range of improvement programs that have been implemented in Butte Creek Watershed that directly affect fish and fish habitat. The proposal maintains internal consistency regarding the proposed objective: providing Butte Creek chinook salmon population monitoring data for the evaluation of the combined effect of all restoration actions.

The reasons for doing the work are reasonably clear – the escapement estimation program is an essential component of managing restoration actions and establishing the status of listed chinook salmon populations. However, further support would be helpful to justify the need and future use of the other life history data. The collection of other life history and stock assessment data (size, emergence timing, age structure, harvest rates) is extremely useful for monitoring population response but needs to be better justified for this case. This justification should spell out how the additional data leads to a deeper understanding of impacts and helps to support the weight of evidence regarding inferences about restoration and status of the listed species.

Approach

The general approach (i.e. using escapement as a population metric) is a typical approach for monitoring the response of salmon populations to habitat restoration or other management actions. It builds on what appears to be successful previous programs and has the intent of improving stock assessment methodologies.

However, the premise of using escapement data however, is widely considered to be an uncertain approach unless very large increases in the population abundance are expected. The proposal states that escapement is the most representative and easily measured metric to represent restoration actions but this statement is arguable as anadromous populations are significantly influenced by factors outside of the watershed and there appears to be no provision to quantify the major factor (i.e. ~45% harvest rate is noted in the proposal). Many researchers and managers believe juvenile output may be a more accurate and precise metric of population response. It is also unclear whether the proposed escapement monitoring will provide the precision to detect trends in chinook population abundance associated with restoration or status in relation to conservation targets. Additional justification of the selection of the population response metric is therefore warranted to ensure changes in population abundance are detectable and related to restoration activities.

Technical Feasibility

Task 1a Adult spring–run Chinook Snorkel escapement surveys

Completion of the snorkelling program in previous years has demonstrated that it is a technically feasible program to conduct. However, it is not expected that this approach can produce relative abundance estimates that can be reliably used to detect trends in abundance or spawning distribution.

A concern regarding the technical feasibility of the snorkel surveys providing useful information is the relative seasonal timing of the snorkel surveys relative to the run. Although not specified in the proposal index surveys are generally usually conducted at the peak of the run under the assumption that the peak of the run is proportional to the total run abundance. However, peak run timing is variable from year to year. If snorkel survey is done too early or too late then the methodology by definition introduces bias into the annual counts. How is this controlled for? Further explanation is required.

From the proposal snorkel escapement surveys appear to be redundant for estimating escapement. However the proposal later implies that snorkel counts are being conducted to help understand how the peak snorkel counts compare to the more accurate and precise weekly observations methods (Task 1b–1d). That is an important point that should be clarified. If that is not the case, a better justification why are the snorkels surveys being completed is required.

Task 1b Adult Spring Run pre–spawning mortality survey Task 1c Adult spring–run spawning escapement survey Task 1d Adult fall –run spawning escapement survey

The description for each of these three tasks is incomplete. While the objective is stated to be develop a 'standard methodology' for each program it should be possible to provide more information to describe intended methods, the intensity, intended precision, and design of the program. All three tasks appear to be typical weekly enumeration programs that would be conducted simultaneously and integrated to maximize cost effectiveness and continuity. However, each task is likely to be technically feasible and methods for these tasks are widely and successfully applied. The proposal would benefit a more detailed description and better integration of the methods from the three programs to help the reader better judge the likely feasibility/cost effectiveness of the program. Examples of things that crossed my mind that were not included were:

Caracas Wash–out –if there are sudden unpredictable changes in flow, such are common to regulated systems, how is that controlled for in the field program and analysis. Carcass Examination – Will the work should include careful examination and classification of the

reproductive condition of dead fish observed to determine what proportion did spawn before dying? Survey Timing – No dates were given. There is a need to know how these relate to expected run timing. Number of Crew – Crew size estimates are not given and are critical for judging technical feasibility and expected reliability. Precision Expectations and Goals – This is a critical consideration that needs attention to ensure the monitoring detects expected changes.

Task 2 Juvenile monitoring

Downstream trapping is proposed to help provide information to back calculate emergence; monitoring size at emigration, and to measure of relative abundance. This approach widely applied and demonstrated to be technically feasible.

One significant concern is worth noting. This concern relates to how fish size and flow conditions impact the on the proposed trapping gear (RST, IPT, Fyke nets) which may influence estimates of mean size of migrants (influences date of emergent back calculation) and relative abundance. For example a high river flows can significantly reduce trapping efficiency. Depending on when this occurs during the progression of the migration period, there will be negative bias introduced into estimates because fish will not be captured. Typically, mark recapture studies are used to investigate and correct for size/flow related trap efficiency. The need for trap efficiency evaluations needs to be judged on a case by case basis but there should be rationale why standard methods it has not been included in this case.

Task 3 Coded–Wire Tagging

CWT is a technically feasible, widely applied approach to tag anadromous salmon populations. It has wide application and will be an effective technique to tag juvenile chinook for identification later in life as required to meet the objectives of the escapement enumeration.

The proposal does not state the current rate of CWT recoveries but implies that past recoveries have been insufficient for management purposes (i.e. the rationale to increase tagging from 200,000 to 400,000). This reason should be made explicit to provide stronger justification for the increased cost.

Are there provision for CWT recovery in the fishery to enable run reconstruction? Will these tags help in estimating harvest rate to help support the escapement based evaluation of restoration success?

Performance Measures

No explicit performance measures were identified by the proposal.

The most appropriate performance measure for this type of investigation would be the precision of escapement produced by the program. This precision estimate is required to provide the necessary feedback to ensure the desired capability to evaluate the target population response to the restoration actions undertaken in Butte Creek.

Products

The products from this investigation will have a moderate to high probability lead to essential information required by resource managers to determine the population changes associated with restoration actions and the status of the listed species.

A reason for some concern, as stated throughout the review, is the expected relatively low precision of the escapement surveys and the potential for the escapement metric to be a misleading indicator of population response. It is a relatively widespread understanding that escapement is an unreliable indicator because of those issues associated with precision and the lack a capability to estimated influences of other mortality factors outside of the freshwater environment. This is not the case for all watersheds (see Bradford 1994; CJFAS 51:965–973) but in many cases this is likely true – see Pella and Myren (1974 Northwest Sci 48:132–144) or Korman and Higgins (1997, CJFAS 58:2058–2067). The bottom line is that careful consideration must be made on a case by case basis and the information to judge that is not provided in the proposal. The investigators must answer whether the 'signal will be detectable through the noise'

Capabilities

The identified team for the work appear qualified to competently complete the work.

Budget

The budget identified for this program appears reasonable and is consistent with scope of the work proposed at current market rates.

Additional Comments

Overall this program is an essential component of the restoration program for Butte Creek watershed and has a moderate to high probability of successful implementation. However, the

overall utility of the program is still uncertain. It is recommended that further consideration/justification be given to:

1) Determine whether escapement is the most reliable metric for assessing changes in freshwater habitats (i.e. are there other factors impacting the populations, are those as significant as the restoration actions, is harvest rate information available?). 2) Assessing the relative precision of estimates of the chosen population metric in relation to management requirements for detecting changes.

Budget Review

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

Yes.

If no, please explain:

Comments 1. Provide more detail &\$\$ breakdown on subcontractors (see add'l comments) 2. Labor, benefits all rolled up (see add'l comments) 3. Does not identify labor categories &their specific charges 4. Budget not clear which \$\$\$ are for applicant &which is for subs (see add'l comment)

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.

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

Note: No overhead or indirect rate charges on the equipment purchases should be allowed as part of the budget that shall be funded as a result of this PSP.

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.

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).

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

Yes.

If no, please explain:

Comments 1. Need add'l detailed info 2. Equipment purchases listed in narrative but not included in budget – this needs to be reconciled.

Same comments as Question #1.

Major Expenses – If the grant is awarded a detailed list of equipment purchases should be provided by the grantee so reviewers can better evaluate whether it is more cost effective for the state to purchase large dollar equipment items through the state procurement process. If the equipment list is available within the State inventory or stock, then purchase of some or all of the listed items may be provided, loaned, or leased by the state to the grantee. In the event, that the equipment is purchased by the grantee, the grantee shall maintain an inventory of major equipment for auditing purposes and potential use for future projects. Grantee shall follow State Contracting Manual [SCM] Section 7.61 thru 7.62 rules pertinent to equipment purchase, lease, etc.

3. Are project management expenses appropriately budgeted?

No.

If no, please explain:

No project mgmt \$\$ identified for any year.

Detailed budget breakdown is needed & all identified expenditures clarified. Same comment as Ques #1

4. Does the proposal clearly state the type of expenses encompassed in indirect rates or

overhead costs? Are indirect rates, if used, appropriately applied?

Yes.

If no, please explain:

Note: No overhead or indirect rate charges on the equipment purchases should be allowed as part of the budget that shall be funded as a result of this 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).

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

Yes.

If no, please explain:

Comments 1. Prior to award ensure rates for subs are reasonable & comparable to state rates. DIFFICULT TO DETERMINE THE WAY BUDGET IS PRESENTED.

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

No.

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

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?

Yes.

If no, please explain:

Applicant requests change in who/title who can bind applicant to agreement.

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:

Needs major budget clarification.

Other comments:

END OF REVIEW

Environmental Compliance Review

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

YES– NO~~X~~

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

YES– NO~~X~~

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

YES– NO– N/~~A~~~~X~~

Comments:

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

YES~~X~~ NO–

Comments:

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

YES– NO– N/~~A~~~~X~~

Comments:

6. Has the CEQA/NEPA document been completed?

YES– NO– N/~~A~~~~X~~

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

YES– NO– N/~~A~~~~X~~

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

YES– NO– N/~~A~~~~X~~

Comments:

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

YES~~X~~ NO– N/~~A~~–

Comments:

Applicant has already obtained ESA Section 10 permit. A State permit is not required because this work is being conducted by the Dept. of Fish and Game.

Identify those additional permits that may be needed by this project:

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– NO– Project is on public land/water or question is otherwise N/AX

Comments:

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?

YES– NOX

Comments:

Prior-Phase Funding Review

Project Title	Butte Creek, Big Chico, and Sutter Bypass Chinook Salmon and Steelhead Evaluation
CALFED Contract Management Agency	National Fish and Wildlife Foundation
Amount Funded	\$507,132
Date Awarded	2001/01/01
Lead Institution	California State University, Chico, Research Foundation
Project Number	#01-N49

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

Yes.

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.

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

No.

Invoices are good. Minor delay in submitting quarterly fiscal report. 12/31/04 report not received as of yet.

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?
Yes.

Other comments: