





**TITLE PAGE**

**Title of Project**

Evaluation of Hydroacoustics as a Management Tool for Central Valley Salmon-Producing Rivers and Streams

**Name of Applicant**

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**Participants and Collaborators**

Merced River Technical Advisory Committee (Merced TAC)  
Merced Irrigation District (Merced ID)  
California Department of Fish and Game (CDFG)  
U.S. Fish and Wildlife Service (USFWS)  
National Marine Fisheries Service (NMFS)  
Natural Resource Scientists, Inc. (NRS, Inc.)  
Acoustic Research and Technology (ART)  
Merced River Stakeholder Group

**Type of Organization and Tax Status**

Irrigation District organized and governed by the California State Water Code

Public Agency - Tax Exempt

**Tax Identification Number**

94-6000911

**EXECUTIVE SUMMARY**

**PROJECT TITLE:** *Evaluation of Hydroacoustics as a Management Tool for Central Valley Salmon-Producing Rivers and Streams*

**APPLICANT:** *Merced Irrigation District*

**PROJECT DESCRIPTION AND PRIMARY ECOLOGICAL/BIOLOGICAL BENEFITS:**

The evaluation described by this proposal addresses the management question of comparability and data quality of the technical performance of alternative methodologies for providing the ERPP's desired level of biological monitoring information for spawning salmon stocks in the Central Valley. Evaluation of biological and ecological response to conservation and restoration measures implemented as part of CalFed, CVPIA and AFRP, and other natural resource management programs is essential to successful adaptive management. Effective and reliable tools for salmon population assessment, particularly spawning stock enumeration, are currently limited for Central Valley streams. One of CMARP's research program goals is "to provide information useful in evaluating the effectiveness of existing monitoring protocols and the appropriateness of monitoring attributes". This proposal describes a demonstration project and evaluation of hydroacoustic and alternative methods for salmon stock assessment on a representative Central Valley stream, the Merced River. Salmon will be censused using hydroacoustic and alternative corroborative methods as fish first enter the Merced River. The value of a pilot effort on a representative Central Valley stream will include not only the comparison of methods and data value derived from each, but an opportunity to "work the bugs out" so as to contribute to *installation and operational efficiencies of future applications on other Central Valley salmon-producing streams*. Management tools that provide reliable and detailed spawning run timing and demographic information will be particularly useful for real-time harvest and hatchery supplementation planning and operations, as well as the protection of wild salmon stocks.

**COSTS AND THIRD PARTY IMPACTS:** The requested funding is \$731,535. This project will benefit all parties interested in the restoration of anadromous salmonids in the San Joaquin River basin and Bay-Delta. Impacts to third parties are not anticipated from this project. The proposal includes coordination and collaboration with the Merced TAC, including the CDFG, USFWS, and NMFS. In addition, Merced ID, as a key stakeholder in the recently established Merced River Stakeholder Process, will keep other Merced River stakeholders apprised on the activities on this project.

**APPLICANT QUALIFICATIONS:** At the request of the USFWS and the direction of the Merced River Technical Advisory Committee, Merced ID staff will manage the project and administer the budget. The CDFG, USFWS, and NMFS will provide technical assistance with data acquisition and resource guidance. Merced ID, as a member of the MRTAC will collaborate and coordinate with the latter three agencies throughout the project. NRS, Inc. will assist in the data acquisition and analyses, project coordination, the labor for daily project operations at the site on the lower Merced River, biological aspects of the project, and project reporting requirements, including technical report writing. Merced ID selected NRS, Inc. for this project because of the firm's expertise on Merced River aquatic resources and salmon stock assessment in the Central Valley. ART will provide the technical direction and oversight on the hydroacoustics aspects of the project, including QA/QC on the hydroacoustic data. Merced ID selected ART because of its comprehensive expertise in the development, design, and use of fishery sonar systems for assessment of salmon stocks and other fish populations.

**MONITORING AND DATA EVALUATION:** Comparative evaluation of the hydroacoustic census technique will utilize data from the fish counting weir and trap and the hydroacoustic system to document daily fish migration and run timing patterns. The numbers of adult salmon entering the Merced River will be compiled on a daily basis and analyzed to address the management questions of comparability and reliability of the fish censusing systems. This evaluation will include a cost-effectiveness analysis to provide a basis for application on other Central Valley salmon spawning streams. A final report, prepared by NRS, Inc., will be produced at the end of this evaluation presenting the results of these analyses along with data on daily fish counts, stream flow, water temperature, and other physical and environmental factors (e.g., rainfall, barometric pressure, other water quality parameters) that may affect fish migration.

**LOCAL SUPPORT/COORDINATION WITH OTHER PROGRAMS/COMPATIBILITY WITH CALFED:** This project is supported by the Merced River Technical Advisory Committee (refer to "Local Involvement" for details on this committee). Merced TAC will provide technical assistance, resource guidance, and peer review of data collected and draft technical reports. Since the objective of this proposed project is to improve spawning stock enumeration and monitoring, it will contribute toward general improvements in biological evaluation and management tools. This is integral to CalFed's Strategic Plan for Ecosystem Restoration. This is compatible with CalFed's overall adaptive management approach and does not impact CalFed's non-ecosystem objectives. This project will also provide a significant contribution to the USFWS's AFRP. Coordination will be maintained by Merced ID's participation in the Stakeholder Group process of the Merced River Corridor Restoration Planning Project of Merced County that was funded by CalFed during 1998.

## PROJECT DESCRIPTION

**Proposed Scope of Work:** Ongoing and proposed conservation and habitat restoration measures that improve ecological conditions have the potential to measurably improve chinook salmon production in Central Valley streams. It will be important to assess the biological response through reliable assessments of spawning stocks of chinook salmon. During the initial years of evaluation of various conservation and restoration actions in the Merced River, a concurrent assessment to verify reliability of existing spawning stock enumeration tools and to identify other effective management tools is proposed. Comparison of technical and biological reliability and cost efficiency is the objective of this proposed evaluation. The following tasks address evaluation of the efficacy of methodologies for assessment of spawning salmon stocks in a representative Central Valley stream, the Merced River.

**Task 1: Reconnaissance and site preparation for fish counting weir and hydroacoustic monitoring station.** Within three months prior to the first field season, reconnaissance and selection of potential sites suitable for installation of a fish counting weir and trap and a hydroacoustic monitoring station within the lower 5 miles of the Merced River (Figure 1) will be performed by representatives comprising the Merced TAC and the USFWS and NMFS. Once identified, access and site preparations for equipment installations will be performed by Merced ID, NRS, Inc., ART, and CDFG. Coordination of this task with Merced County and other Stakeholders will be maintained as necessary. This coordination will be facilitated by Merced ID through the ongoing Stakeholders Group meetings. Equipment necessary for this task will be purchased. At the end of the project, the equipment ownership (i.e., hydroacoustics equipment, boat, motor, and fish weir; collectively estimated at more than \$100,000 of equipment) will be transferred to the CDFG for application in the Central Valley at CDFG's discretion.

**Task 2: Construction and operation of a removable upstream migrant fish counting weir and trap and pilot hydroacoustic fish monitoring station.** The fish counting weir will be designed and installed to prevent delay or injury to upstream migrants. A weir similar in design to a resistance-board weir that can be operated over the range of flows occurring during the fall months would be installed. There are several benefits of such a weir design including: 1) can be installed with a minimum of streambed alteration, 2) readily passes large and small debris, and 3) easily incorporates upstream and downstream boat passage gates. The weir will incorporate a counting board over which passing fish can be counted and an upstream migrant trap. Fish trapping will not occur if riverine conditions (e.g., warm water) may harm adult salmon.

Depending on water clarity and physical constraints, the counting weir will allow enumeration of upstream migrating salmon on a daily basis during the fall flow augmentation and throughout the

entire spawning season. The efficacy of capturing and tagging upstream migrants will be assessed during operation of the counting weir. Tagging salmon at the weir, with subsequent observation upstream, will provide information relative to timing of salmon on the spawning grounds and could improve accuracy of annual escapement estimates.

A sonar-based fish counting project would be pursued as a pilot-level demonstration to determine applicability for Central Valley-wide salmon spawning stock assessment. This project will feature at least two transducers, one on each bank, insonifying the entire water column from bank to bank. The project will operate manned for 24h per day seven days per week for the duration of the field season. Data will be collated and processed in 24h increments. A given day's passage with associated confidence intervals will be available the following day. Cumulative daily passage estimates will yield seasonal passage estimates and run timing curves.

NRS, Inc. and ART will jointly perform the evaluations with technical assistance and direction of CDFG, USFWS, and NMFS. ART will provide all the technical support for the hydroacoustics system and NRS, Inc. will be in charge of the daily operations and biological aspects of the evaluation. The project will be staffed with two technicians on site whose primary functions will be to operate the fish counting weir, collect and preserve data acquired by the sonar system. In addition, they will perform upkeep and preventive maintenance on the weir, trap, and sonar system and associated support equipment. ART will be responsible for routine data processing, data QA/QC, analysis, dissemination and archiving of the hydroacoustic data. ART will train the technicians and troubleshoot system problems directly observed or identified by the technicians. The NRS, Inc. project senior scientist and project ecologist, and ART will be responsible for the technical integrity and statistical evaluation of the data at all levels. ART will also be responsible for maintaining the operational capabilities of the sonar system as well as the support equipment and facilities. The project team will be responsible for developing site-specific operational protocols.

Operations of the fish counting weir and hydroacoustics station are expected to be initiated during the first full fall salmon migration season after contracting and continue for 2 years. Several preliminary technical calibration procedures associated with the hydroacoustic system will be performed during the first season. These procedures briefly consist of two elements: 1) Technological elements; determination of instantaneous cross section for any given water level, effects of water quality (i.e. conductivity) on actual cross section insonified, etc., and 2) On and off-site daily data processing requirements; fish counts from the counting weir will be used to provide initial estimates of daily data processing loads, but this cannot be precisely determined until sonar-specific, real-time data are collected over the course of a season. Characteristics of fish species that effect the probability of detection will be determined so equipment can be

properly tuned, or adjusted, to site specific features. Data will be generated and archived by this task (Task 2) for analysis in Task 3.

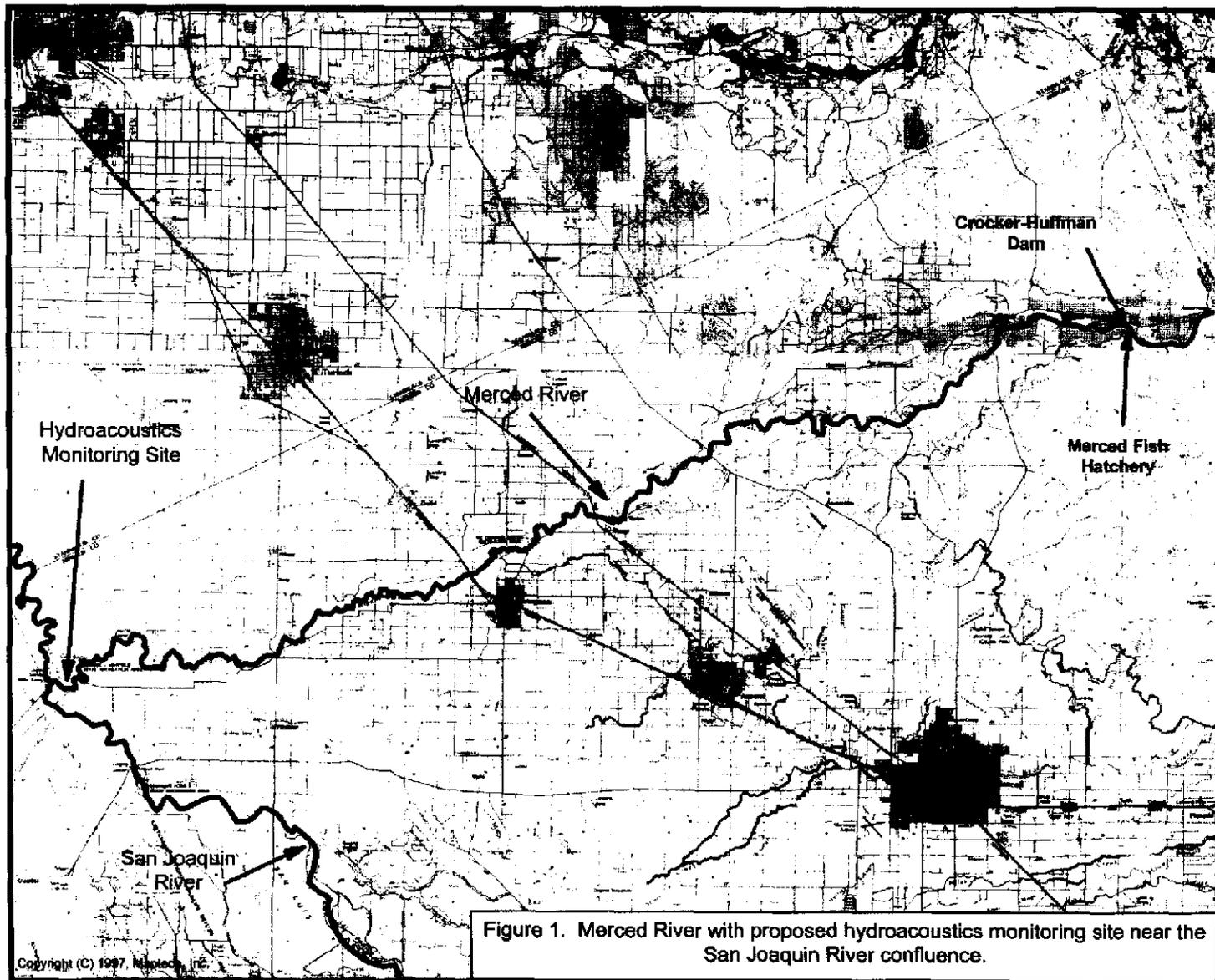
**Task 3: Data Analysis and Reporting.** Comparative evaluation of the hydroacoustic census technique will utilize data from the fish counting weir and trap and the hydroacoustic system to document daily fish migration and run timing patterns. This will be generally performed concurrent with Task 2. NRS, Inc. and ART will be responsible for this element. The numbers of adult salmon entering the Merced River will be compiled on a daily basis and analyzed to address the management questions of comparability and reliability of the fish censusing systems. This evaluation will include a cost-effectiveness analysis to provide a basis for application on other Central Valley salmon spawning streams. A final report, prepared by NRS, Inc., will be produced at the end of this evaluation presenting the result of these analyses along with data on daily fish counts, stream flow, water temperature, and other physical and environmental factors (e.g., rainfall, barometric pressure, other water quality parameters) that may affect fish migration.

**Task 4: Development of Detailed Monitoring Plan.** A detailed monitoring plan according to CalFed guidelines will be developed with CDFG, NMFS, and the USFWS prior to the first field season. Additional detail is provided in the "Monitoring and Data Collection Methodology" section. Development of the monitoring plan is included in this proposal's budget.

**Task 5: Project Management.** Merced ID will manage the project cost and schedule, administer grant funds, develop work plans, coordinate with other related activities, coordinate and oversee the activities of the project team, communicate with agency staff, and provide financial reports to CalFed or the CalFed contract administrator. The applicant will prepare quarterly reports summarizing degree of completion, activities during the reporting period, costs incurred, project milestones, and additional information described in the February 1999 CalFed Proposal Solicitation Package. The budget for project management is included in this proposal.

**Location and/or Geographic Boundaries of the Project:** This evaluation of adult salmon migration into the lower Merced River will focus on censusing and monitoring of the fall spawning migration as fish first enter the river. An appropriate location with access, security, and suitable channel configuration within the lower 5 miles of the Merced River near its confluence with the San Joaquin River will be selected for this study (Figure 1). Additionally, corroborative spawning grounds surveys along the lower Merced River up to Crocker-Huffman Dam (RM 52) will be performed by CDFG. Data from fish entering the Merced River Hatchery at Crocker-Huffman Dam will be included to corroborate census data. This project is located in the Merced River ecological management unit of the East San Joaquin Basin Ecological Management Zone. All work associated with this project will be performed in Merced County.

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## ECOLOGICAL/BIOLOGICAL BENEFITS

### **Ecological/Biological Objectives:**

Evaluation of biological and ecological response to conservation and restoration measures implemented as part of CalFed, CVPIA and AFRP, and other natural resource management programs is essential to successful adaptive management. Effective and reliable tools for salmon population assessment, particularly spawning stock enumeration, are currently limited for many Central Valley streams. Effective management of salmon stocks requires consistent and reliable census or estimation of the spawning populations. Associated spawning population characteristics such as run timing (i.e., phenology, duration, and temporal distribution) and run composition (i.e., age composition, hatchery and wild distributions) are also essential for the level of adaptive ecological management for Central Valley chinook salmon envisioned by the ERPP and AFRP. The evaluation described by this proposal addresses the management question of comparability and data quality of the technical performance of alternative methodologies for providing the desired level of biological monitoring information for spawning salmon stocks in an important representative Central Valley stream, the Merced River. The Merced River is considered a particularly suitable ecological management unit to serve as a pilot site for this evaluation due to the status and nature of the chinook population, a major San Joaquin River tributary consisting of both wild and hatchery spawning salmon, and the suite of ecological restoration and fishery management efforts that are proposed and currently underway.

### **Linkages:**

High quality spawning stock assessments will be a primary tool for measuring biological response of chinook salmon populations to management and restoration measures implemented as part of all Central Valley ecosystem adaptive management and watershed stewardship programs. A number of recent negotiations on the Merced River that will benefit chinook salmon include: Merced ID's participation and contributions to the San Joaquin River Agreement and VAMP, the agreement between Merced ID and CDFG for the Merced River Chinook Salmon Investigations including assessment of fall augmentation flows for improved adult salmon attraction, Category III funding for channel reconstruction to isolate gravel pits that are detrimental to juvenile salmon, and the CalFed funded Merced River Corridor Restoration Plan. Ultimately, each of these actions will require evaluation and monitoring data on salmon spawning populations at a level of detail that is not readily provided by currently employed techniques, but which would be the focus of our proposed comparative evaluation of the hydroacoustic stock assessment tool.

Additionally, one of CMARP's research program goals is "to provide information useful in evaluating the effectiveness of existing monitoring protocols and the appropriateness of monitoring attributes" (ERPP v.1, p. 9). This is the primary objective of our proposed project.

**System-Wide Ecosystem Benefits:**

Ultimately, the results from our proposed comparative evaluation of spawning stock enumeration techniques would provide a basis from which more informed decisions on appropriate techniques for application to the Merced River and other Central Valley streams can be made. The relative operational requirements and constraints, derived information value, and cost effectiveness among the alternative techniques as applied to a representative Central Valley stream would be provided by our proposed pilot effort.

The value of a pilot effort on a representative Central Valley stream will be not only the comparison of methods and data value derived from each, but an opportunity to "work the bugs out" so as to contribute to installation and operational efficiencies of future applications on other Central Valley salmon-producing streams. Management tools that provide reliable and detailed spawning run timing and demographic information will be particularly useful for real-time harvest and hatchery supplementation planning and operations, as well as protection of wild salmon stocks.

**Compatibility with Non-Ecosystem Objectives:**

There are no identified third party impacts that will result from this proposed study. All work will be coordinated between the Merced ID, CDFG, USFWS, and NMFS through the Merced TAC. Since the objective of this proposed project is to improve spawning stock enumeration and monitoring, it will contribute toward general improvements in biological evaluation and management tools. This is integral to CalFed's Strategic Plan for Ecosystem Restoration. This is compatible with CalFed's overall adaptive management approach and does not impact CalFed's non-ecosystem objectives.

**TECHNICAL FEASIBILITY AND TIMING**

The approaches to salmon stock enumeration that are the focus of this proposal have been successfully used outside the Central Valley. They offer state-of-the-science techniques for developing the capability within the Central Valley to collect biological monitoring data of the level of detail required by the ERPP. Cooperation and coordination for water resource management on the Merced River has been facilitated through several recent interagency

negotiations. All work will be coordinated between the Merced ID, CDFG, USFWS, and NMFS through the Merced TAC. Additionally, coordination with the parties currently funded through CalFed to develop a Merced River Corridor Restoration Plan, Merced County Planning and Community Development Department, will be accomplished through the Stakeholder Group process of that project and the Merced TAC. Any environmental permitting required for this project will be facilitated through CDFG, USFWS, and NMFS's participation on the Merced TAC.

The project team has the expertise and support services necessary to perform the proposed tasks within the proposed time line.

### **MONITORING AND DATA COLLECTION METHODOLOGY**

#### **Biological/Ecological Objectives:**

This assessment will provide a demonstration of alternative state-of-the-science stock enumeration techniques applied to a representative Central Valley salmon-producing stream. The primary objective of this study is to compare alternative techniques for obtaining reliable chinook salmon spawning stock data including accurate census data, seasonal timing, duration, and temporal distribution of the population composing the run. The level of detail on demographic data (e.g., size, sex, and age composition, wild and hatchery-origin composition) that can be obtained by the alternate methods will also be included.

#### **Monitoring Parameters and Data Collection and Evaluation Approach:**

This evaluation will collect data on fish counts as salmon first enter the Merced River and their size and sex. Environmental data including river flow, water temperature, weather conditions, operational notes will be concurrently collected. Data will be compiled on hourly and daily bases for various direct comparisons between fish census techniques. The level of data detail, data consistency, operational requirements and constraints, and costs will be the primary factors evaluated and compared in this study (Table 1). The Merced TAC will provide technical assistance, resource guidance, and peer review of data analyses and draft technical reports.

**Table 1. Data collection parameters and evaluation approach for evaluation of hydroacoustics as a management tool for Central Valley salmon-producing rivers and streams.**

Question to be Evaluated	Monitoring Parameters	Evaluation Approach	Data Priority
comparability of hydroacoustic and weir fish counts	weir and trap counts; hydroacoustic target count and density	direct comparison of hourly and daily time aggregation of counts collected by each alternative method	high
level of data detail for fish census methods	census numbers; size; age; sex; brood origin (hatchery/wild); time of passage; condition and disease; maturity level	direct comparison of hourly and daily time aggregation of counts collected by each alternative method.	high
migrational characteristics	river flow; water temperature; rainfall; barometric pressure; operational notes	hourly and daily fish census data will be subjected to correlative statistical analyses to assess associations with these factors	moderate/high

### LOCAL INVOLVEMENT

Merced ID and CDFG have jointly developed and agreed upon a 10-year study program to determine the potential factors that may limit salmon production in the Merced River. This program is designed to evaluate the habitats necessary for increased salmon production by assessing the needs for each freshwater salmon life stage (i.e., upstream migration, spawning, egg incubation, fry and juvenile rearing, and outmigration). The joint study program defines the objectives, basic experimental design, and the responsibilities for study implementation. The studies and instream flow scheduling will be coordinated with other studies throughout the San Joaquin basin and the Delta. Components of this program are presently underway. The completion of the 10-year program is intended to identify the long-term instream flow and other needs of salmon in the Merced River. To facilitate the studies, CDFG and Merced ID have established the Merced Management and Technical Advisory Committees; the latter committee establishes and coordinates study protocols, study amendments, funding issues, and information sharing and exchange. Merced ID and CDFG have been meeting as this committee over the past

two years. In addition, USFWS and NMFS have begun participating in the Merced Technical Advisory Committee in the past year on an ad-hoc basis until the committee is expanded and formalized to include a significantly broader stakeholder group. This committee has endorsed this proposed Evaluation of Hydroacoustics as a Management Tool for Central Valley Salmon-Producing Rivers and Streams. The USFWS recommended that Merced ID prepare this proposal for CalFed funding.

With funding from the U.S. Fish and Wildlife Service Anadromous Fish Restoration Program and the CalFed Bay-Delta Program, the Merced County Planning and Community Development Department, with cooperation from Merced Irrigation District, have embarked on a collaborative effort to develop a restoration strategy for the Merced River corridor. This program will seek to join input from community stakeholders with a scientifically-based understanding of current river conditions and processes to identify a feasible corridor restoration strategy. Public involvement will play a key role in the restoration planning process, and public coordination will continue through the life of the project. To establish this role, the County, with Merced Irrigation District's assistance, has convened a Merced River Stakeholder Group. The Stakeholder Group represents a broad array of public and private interests, including local business and property owners; state, local, and federal agencies; fish and environmental groups; and other groups or individuals. In addition to working with his Stakeholder Group, the County will also conduct regular workshops to keep the public informed of the project's progress. As a key stakeholder in this process, Merced ID will provide these groups with regular updates on the Evaluation of Hydroacoustics as a Management Tool for Central Valley Salmon-Producing Rivers and Streams. Merced ID has notified the Merced County Board of Supervisors (Lydia Beiswanger) and the County Planning Department (Bob Smith) of this proposal. Copies of these notification letters are attached to this proposal.

No third-party impacts are anticipated. Land use changes will not occur as a result of this project. Those parties who support restoration of San Joaquin fall-run chinook salmon that would benefit from the proposed project would also benefit.

**COST AND SCHEDULE**

**Budget:**

**Table 2. Total budget for evaluation of hydroacoustics as a management tool for Central Valley salmon-producing rivers and streams.**

Task	Direct Labor Hours	Direct Salary and Benefits	Service Contracts	Material and Acquisition Costs	Miscellaneous and other Direct Costs	Overhead and Indirect Costs	Total Cost
Task 1	125	\$6,250	\$24,525	\$110,000	----	\$1,000	\$141,775
Task 2	200	\$10,000	\$465,360	\$4,000	\$8,000	\$2,000	\$489,360
Task 3	40	\$2,000	\$82,400	----	----	\$500	\$84,900
Task 4	40	\$2,000	\$1,000	----	----	\$500	\$3,500
Task 5 Project Management	200	\$10,000	----	----	----	\$2,000	\$12,000

**Table 3. Quarterly budget for the evaluation of hydroacoustics as a management tool for Central Valley salmon-producing rivers and streams (in thousands of dollars).**

Task	Jul-Sep 2000	Oct-Dec 2000	Jan-Mar 2001	Apr-Jun 2001	Jul-Sep 2001	Oct-Dec 2001	Jan-Mar 2002	Apr-Jun 2002	Total Budget
1	134,275				7,500				\$141,775
2	35,510	186,860	22,310		35,510	186,860	22,310		\$489,360
3			31,200	11,250			31,200	11,250	\$84,900
4	3,500								\$3,500
5	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	\$12,000

**Schedule:**

The schedule for the *Evaluation of Hydroacoustics as a Management Tool for Central Valley Salmon-producing Rivers and Streams* is given in Table 4. None of these tasks are separable from the other tasks. Task 1 would be implemented within the first three-month period prior to field season operations; equipment purchases for the project would be initiated within one year prior to the field season. Task 2, field operations would be implemented over two salmon migration seasons: mid-September 2000 to mid-January 2001 and mid-September 2001 to mid-January 2002. Task 3 would be implemented at the onset of the first field season to the end of the second field season, followed by a final report. Task 4, development of a project monitoring plan, would be implemented within the first three months of the project. Task 5, Project Management would occur continuously for the duration of the entire project. Quarterly reports would be completed and submitted to CalFed each month following the quarterly periods.

**COST SHARING**

Merced ID will provide \$25,000 of in-kind contributions to this project. Merced ID will provide the personnel and heavy equipment to configure the site in the lower Merced River for installation of the weir and hydroacoustics equipment. *The contributions will also include Merced ID support staff work and overhead costs beyond that budgeted in this proposal.* Merced ID will provide the technical assistance to ensure that reservoir project operations minimize *potential adverse impacts on the weir and hydroacoustics equipment through regular communication to field staff of predicted river flows at the evaluation site.*

CDFG will provide the agencies assistance in any environmental permitting that may be necessary for installation of the weir and hydroacoustics equipment. Additionally, CDFG, USFWS, and NMFS will provide in-kind contributions through their technical assistance and resource guidance in the forum of the Merced River Technical Advisory Committee.

At the end of the project, the equipment ownership (i.e., hydroacoustics equipment, boat, motor, and fish weir; collectively estimated at more than \$100,000 of equipment) will be transferred to the CDFG for application in the Central Valley at CDFG's discretion.

A significant savings (approximately \$60,000) could occur if sharing of hydroacoustics equipment were to occur between the Mokelumne River and Merced River. A proposal to employ hydroacoustics for monitoring downstream migrant fish in the Mokelumne River has been submitted to CalFed in response to the February 1999 Proposal Solicitation Package. *Because this latter equipment is planned for seasonal operation from approximately mid-January*



to June, the same basic equipment could be used at sites on the Merced River and the Mokelumne River. The exception is the transducers which would require separate purchases at each site in the amount of \$10,000 to \$20,000.

### APPLICANTS QUALIFICATIONS

At the request and direction of the Merced River Technical Advisory Committee, Merced ID staff will manage the project and administer the budget. Merced ID selected NRS, Inc. for this project because of the firm's expertise on Merced ID's water project operations interrelationships with Merced River's aquatic resources and its expertise on chinook salmon investigations. Merced ID selected ART for this project because of the firm's expertise in use of hydroacoustics to monitor salmon migration.

#### **Edward C. Selb III, Project Manager**

*Merced ID Assistant General Manager, Water Resources  
B.S., Business Administration, California State University, Sacramento*

Mr. Selb will serve as Project Manager for this project because of his direct involvement in the Merced River Technical Advisory Committee, the Merced River Stakeholder Group, and his extensive direct knowledge and expertise in Merced ID's water project operations as it affects the downstream areas. Mr. Selb is the Assistant General Manager of Water Resources for MID and currently manages three major departments of the Merced Irrigation District: the Merced River Development Project (New Exchequer and McSwain dams, powerhouses and reservoirs), the engineering department and the irrigation operations department. With his 27+ years of experience in water resources with the District, Mr. Selb is very knowledgeable and familiar with all aspects of the District's water operations.

#### **David Vogel, Assistant Project Manager**

*Natural Resource Scientists, Inc. Senior Scientist  
M.S., 1979, Natural Resources (Fisheries), University of Michigan  
B.S., 1974, Biology, Bowling Green State University*

Mr. Vogel will serve as Assistant Project Manager for this project because of his expertise in salmon migration evaluations and his knowledge of the interrelationships of Merced ID's water project operations and fishery resources in the lower Merced River. Mr. Vogel specializes in aquatic resource assessments and resolution of fishery resource issues associated with land and water development. His 24 years of work experience in fisheries has included large-scale assessments in river systems, lakes and reservoirs, and estuaries. Mr. Vogel has worked as a

biological consultant for the U.S. Bureau of Reclamation to define interrelationships of salmon resources and Central Valley Project water project operations. Mr. Vogel has been working on Central Valley fishery resource research and management projects and interrelationships with water project operations for 18 years. He has more than 20 years of experience in salmonid research and has performed numerous scientific investigations on salmon migration in California and Washington.

**Keith R. Marine, Project Ecologist**

*Natural Resource Scientists, Inc., Aquatic Ecologist*

*M.S., 1997, Ecology, University of California, Davis*

*B.S., 1983, Wildlife and Fisheries Biology, University of California, Davis*

Mr. Marine will serve as Project Ecologist for this project because of his expertise on salmonid migration behavior and stock assessment developed over 15 years working on Central Valley streams. Mr. Marine has designed and conducted ecosystem-level investigations on fish migration and behavior associated with operation of large Central Valley Project facilities, including fish responses to project operations affecting fish passage and stream temperature alterations resulting from project operations. His expertise includes a comprehensive background in monitoring, salmon censusing, and stock assessment on the Sacramento and Mokelumne rivers. Mr. Marine has performed evaluations of fish populations and fishery management using research-grade hydroacoustics, mark-recapture, and harvest-effort techniques.

**Paul Skvorc, Hydroacoustic Scientist**

*Acoustic Research and Technology, Principal*

*Ph.D., University of Alaska*

*M.S., 1980 B.S., 1978*

Dr. Skvorc's sonar experience dates back to 1970, when he was a US Navy Sonarman aboard nuclear submarines. Dr. Skvorc has applied sonar technologies to fisheries for crappie, shad, and largemouth bass in Kansas reservoirs, and for arctic grayling, lake trout, and arctic char in alpine lakes of the coastal plains of Alaska. He was the first person to design, build, and demonstrate a sonar system capable of differentiating species of fish based on their frequency domain signature. Dr. Skvorc worked for the Alaska Department of Fish & Game for 11 years as the head of the Sonar and Technical Services Group, Division of Commercial Fisheries. He pioneered several new fisheries acoustics techniques and developed the first statistical methods for determining precision of riverine fisheries sonar. Dr. Skvorc was also the state of Alaska's expert in hydroacoustics on the Joint Technical Committee of the US/Canada Salmon Treaty negotiations. He has assisted the Canadian government with sonar fish censusing on the Yukon River,

N.W.T. for chinook salmon, the Arctic Red River, N.W.T. for broad white fish, and the Fraser River, B.C. for pink and sockeye salmon.

#### **COMPLIANCE WITH STANDARD TERMS AND CONDITIONS**

The terms and conditions discussed in Section 4.4 of the February 1999 CalFed Proposal Solicitation Package are acceptable to the applicant. Forms 4100 (Contracts with Public Entities) and 4099a (Additional Standard Clauses) are attached.

**MID** MERCED IRRIGATION DISTRICT

April 13, 1999

Bob Smith, Planning Director  
Merced County  
2222 "M" Street  
Merced, CA 95340

Re: Intent to Submit a Proposal for CALFED Funding

Dear Mr. Smith,

In February, 1999, the CALFED BAY-DELTA PROGRAM solicited proposals for ecosystem restoration programs and projects to improve the health of the Bay-Delta ecosystem. The proposal submittals are due on April 16, 1999.

In an effort to keep the Merced County Board of Supervisors informed of project applications of this nature, it is my great pleasure to announce that the Merced Irrigation District (MID) intends to submit a proposal for a proposed study to be performed in Merced County, entitled: "Evaluation of Hydroacoustics as a Management Tool for Central Valley Salmon-Producing Rivers and Streams".

If you have any questions, please feel free to contact MID Assistant General Manager, Water Resources, Ted Selb, who has been designated as Project Manager for this important study.

Sincerely,



Ross Rogers  
General Manager

cc: Ted Selb, Assistant General Manager, Water Resources  
Ken Robbins, MID General Counsel  
Dave Vogel, Natural Resource Scientist  
Marc Van Camp, Murray, Burns & Kienlen

# **MID** MERCED IRRIGATION DISTRICT

April 13, 1999

Lydia Beiswanger  
Merced County Board of Supervisors  
2222 "M" Street  
Merced, CA 95340

Re: Intent to Submit a Proposal for CALFED Funding

Dear Board Members,

In February, 1999, the CALFED BAY-DELTA PROGRAM solicited proposals for ecosystem restoration programs and projects to improve the health of the Bay-Delta ecosystem. The proposal submittals are due on April 16, 1999.

In an effort to keep the Merced County Board of Supervisors informed of project applications of this nature, it is my great pleasure to announce that the Merced Irrigation District (MID) intends to submit a proposal for a proposed study to be performed in Merced County, entitled: "Evaluation of Hydroacoustics as a Management Tool for Central Valley Salmon-Producing Rivers and Streams".

If you have any questions, please feel free to contact MID Assistant General Manager, Water Resources, Ted Selb, who has been designated as Project Manager for this important study.

Sincerely,



Ross Rogers  
General Manager

cc: Ted Selb, Assistant General Manager, Water Resources  
Ken Robbins, MID General Counsel  
Dave Vogel, Natural Resource Scientist  
Marc Van Camp, Murray, Burns & Kienlen

## STANDARD CLAUSES - CONTRACTS WITH PUBLIC ENTITIES

**Workers' Compensation Clause.** Contractor affirms that it is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and Contractor affirms that it will comply with such provisions before commencing the performance of the work under this contract.

**Non-discrimination Clause.** During the performance of this contract, the recipient, Contractor and its subcontractors shall not deny the contract's benefits to any person on the basis of religion, color, ethnic group identification, sex, age, physical or mental disability, nor shall they discriminate unlawfully against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, mental disability, medical condition, marital status, age (over 40), or sex. Contractor shall assure that the evaluation and treatment of employees and applicants for employment are free of such discrimination. Contractor shall comply with the provisions of the Fair Employment and Housing Act (Government Code Section 12900 et seq.), the regulations promulgated thereunder (California Administrative Code, Title 2, Sections 7285.0 et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Government Code Sections 11135 - 11139.5), and the regulations or standards adopted by the awarding State agency to implement such article. Contractor or recipient shall permit access by representatives of the Department of Fair Employment and Housing and the awarding State agency upon reasonable notice at any time during the normal business hours, but in no case less than 24 hours' notice, to such of its books, records, accounts, other sources of information and its facilities as said Department or Agency shall require to ascertain compliance with this clause. Recipient, Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement. The Contractor shall include the non-discrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

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

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

**Payment Retention Clause.** Ten percent of any progress payments that may be provided for under this contract shall be withheld per Public Contract Code Sections 10346 and 10379 pending satisfactory completion of all services under the contract.

**Reimbursement Clause.** If applicable, travel and per diem expenses to be reimbursed under this contract shall be at the same rates the State provides for unrepresented employees in accordance with the provisions of Title 2, Chapter 3, of the California Code of Regulations. Contractor's designated headquarters for the purpose of computing such expenses shall be: \_\_\_\_\_

**Drug-Free Workplace Certification.** By signing this contract, the Contractor or grantee hereby certifies under penalty of perjury under the laws of the State of California that the Contractor or grantee will comply with the requirements of the Drug-Free Workplace Act of 1990 (Government Code Section 8350 et seq.) and will provide a drug-free workplace by taking the following actions:

1. Publish a statement notifying employees that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying actions to be taken against employees for violations.
2. Establish a Drug-Free Awareness Program to inform employees about all of the following:
  - (a) The dangers of drug abuse in the workplace.
  - (b) The person's or organization's policy of maintaining a drug-free workplace.
  - (c) Any available counseling, rehabilitation and employee assistance programs, and
  - (d) Penalties that may be imposed upon employees for drug abuse violations.
3. Every employee who works on the proposed contract or grant
  - (a) Will receive a copy of the company's drug-free policy statement, and
  - (b) Will agree to abide by terms of the company's statement as a condition of employment on the contract or grant.

This contract or grant may be subject to suspension of payments or termination, or both, and the Contractor or grantee may be subject to debarment if the department determines that: (1) the Contractor or grantee has made a false certification, or (2) the Contractor or grantee violates the certification by failing to carry out the requirements noted above.

**Americans With Disabilities Act.** By signing this contract, Contractor assures the State that it complies with the Americans With Disabilities Act (ADA) of 1990, (42 U.S.C. 12101 et seq.), which prohibits discrimination on the basis of disability, as well as all applicable regulations and guidelines issued pursuant to the ADA.

**Former State Employees:** a) For the two-year period from the date he or she left State employment, no former State officer or employee may enter into a contract in which he or she engaged in any of the negotiations, transactions, planning, arrangements or any part of the decision-making process relevant to the contract while employed in any capacity by any State agency. b) For the twelve-month period from the date he or she left State employment, no former State officer or employee may enter into a contract with any State agency if he or she was employed by that State agency in a policy-making position in the same general subject area as the proposed contract within the twelve-month period prior to his or her leaving State service.

Agreement No. \_\_\_\_\_

Exhibit \_\_\_\_\_

**ADDITIONAL STANDARD CLAUSES**

**Recycled Materials.** Contractor hereby certifies under penalty of perjury that \_\_\_\_\_ (enter value or "0" here) percent of the materials, goods and supplies offered or products used in the performance of this Agreement meets or exceeds the minimum percentage of recycled material as defined in Sections 12161 and 12200 of the Public Contract Code.

**Severability.** If any provision of this Agreement is held invalid or unenforceable by any court of final jurisdiction, it is the intent of the parties that all other provisions of this Agreement be construed to remain fully valid, enforceable, and binding on the parties.

**Governing Law.** This Agreement is governed by and shall be interpreted in accordance with the laws of the State of California.

**Y2K Language.** The Contractor warrants and represents that the goods or services sold, leased, or licensed to the State of California, its agencies, or its political subdivisions, pursuant to this Agreement are "Year 2000 compliant." For purposes of this Agreement a good or service is Year 2000 compliant if it will continue to fully function before, at, and after the Year 2000 without interruption and, if applicable, with full ability to accurately and unambiguously process, display, compare, calculate, manipulate, and otherwise utilize date information. This warranty and representation supersedes all warranty disclaimers and limitations and all limitations on liability provided by or through the Contractor.

**Child Support Compliance Act.** For any Agreement in excess of \$100,000, the Contractor acknowledges in accordance therewith, that:

1. The Contractor recognizes the importance of child and family support obligations and shall fully comply with all applicable state and federal laws relating to child and family support enforcement, including, but not limited to, disclosure of information and compliance with earnings assignment orders, as provided in Chapter 8 (commencing with Section 5200) of Part 5 of Division 9 of the Family Code; and
2. The Contractor, to the best of its knowledge, is fully complying with the earnings assignment orders of all employees and is providing the names of all new employees to the New Hire Registry maintained by the California Employment Development Department.