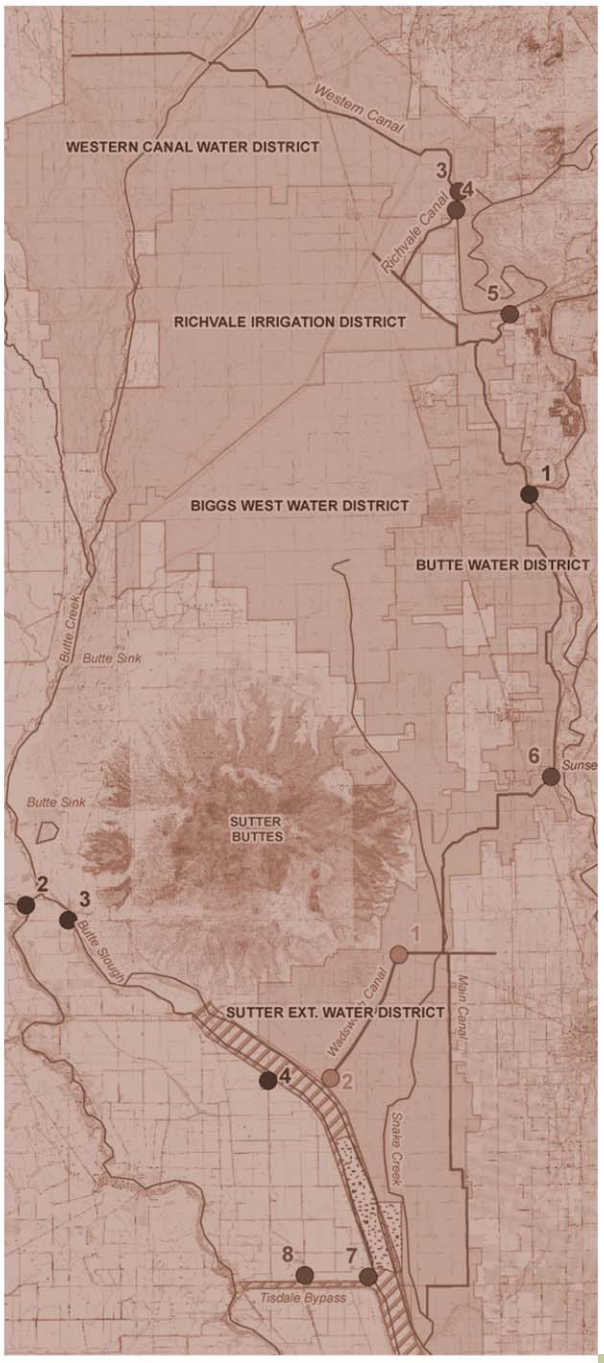

2004 Water Use Efficiency Proposal Solicitation Package

REGIONAL WATER MEASUREMENT PROGRAM

Biggs-West Gridley Water District

January 11, 2005

Submitted to: California Department of Water Resources
Office of Water Use Efficiency

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Project Information Form

Applying for:	❑ Urban	X Agricultural
1. (Section A) **Urban or Agricultural Water Use Efficiency Implementation Project**	❑(a) implementation of Urban Best Management Practice, #_____ ❑ (b) implementation of Agricultural Efficient Water Management Practice, #_____ ❑ (c) implementation of other projects to meet California Bay-Delta Program objectives, Targeted Benefit # or Quantifiable Objective #, if applicable _____ ❑ (d) Specify other: _____	
2. Section B) **Urban or Agricultural Research and Development; Feasibility Studies, Pilot, or Demonstration Projects; Training, Education or Public Information; Technical Assistance**	X (e) research and development, feasibility studies, pilot, or demonstration projects ❑ (f) training, education or public information programs with statewide application ❑ (g) technical assistance ❑ (h) other	
3. Principal applicant (Organization or affiliation):	Biggs-West Gridley Water District	
4. Project Title:	Regional Water Measurement Program	
5. Person authorized to sign and submit proposal and contract:	Name, Title	Gary Justensun, Board Chairman
	Mailing Address	1713 W. Biggs Gridley Road Gridley, CA 95948
	Telephone	(530) 846-3317
	Fax	
	E-mail	mhaury@bwgwater.com
6. Contact person (if different):	Name, Title	Bernoy Bradford, General Manager
	Mailing Address	1713 W. Biggs Gridley Road Gridley, CA 95948
	Telephone	(530) 846-3317
	Fax	
	E-mail	
7. Grant funds requested (dollar amount): (from Table C-1, column VI)		$270,459
8. Applicant funds pledged (dollar amount):		$73,500

9. Total project costs (dollar amount): *(from Table C-1, column IV, row n)*	$343,959
10. Percent of State share requested (%) *(from Table C-1)*	79%
11. Percent of local share as match (%) *(from Table C-1)*	21%
12. Is your project locally cost effective? *Locally cost effective means that the benefits to an entity (in dollar terms) of implementing a program exceed the costs of that program within the boundaries of that entity.* *(If yes, provide information that the project in addition to Bay-Delta benefit meets one of the following conditions: broad transferable benefits, overcome implementation barriers, or accelerate implementation.)*	❑ (a) yes X (b) no
13. Is your project required by regulation, law or contract? If no, your project is eligible. If yes, your project may be eligible only if there will be accelerated implementation to fulfill a future requirement and is not currently required. *Provide a description of the regulation, law or contract and an explanation of why the project is not currently required.*	❑ (a) yes X (b) no
14. Duration of project (month/year to month/year):	24 months
15. State Assembly District where the project is to be conducted:	2
16. State Senate District where the project is to be conducted:	4
17. Congressional district(s) where the project is to be conducted:	2
18. County where the project is to be conducted:	Sutter and Butte Counties
19. Location of project (longitude and latitude	Lat: 39.36 N Long:-121.77 W
20. How many service connections in your service area (urban)?	None
21. How many acre-feet of water per year does your agency serve?	160,000 acre-feet

22. Type of applicant (select one):

❑ (a) City
❑ (b) County
❑ (c) City and County
❑ (d) Joint Powers Authority
X (e) Public Water District
❑ (f) Tribe
❑ (g) Non Profit Organization
❑ (h) University, College
❑ (i) State Agency
❑ (j) Federal Agency
❑ (k) Other
- ❑ (i) Investor-Owned Utility
- ❑ (ii) Incorporated Mutual Water Co.
- ❑ (iii) Specify _____

Section 2 - Signature Page

By signing below, the official declares the following:

The truthfulness of all representations in the proposal;

The individual signing the form has the legal authority to submit the proposal on behalf of the applicant;

There is no pending litigation that may impact the financial condition of the applicant or its ability to complete the proposed project;

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant;

The applicant will comply with all terms and conditions identified in this PSP if selected for funding; and

The applicant has legal authority to enter into a contract with the State.

Signature	Name and title	Date
	Chairman	12/28/04

Statement of Work: Relevance and Importance

Project Overview

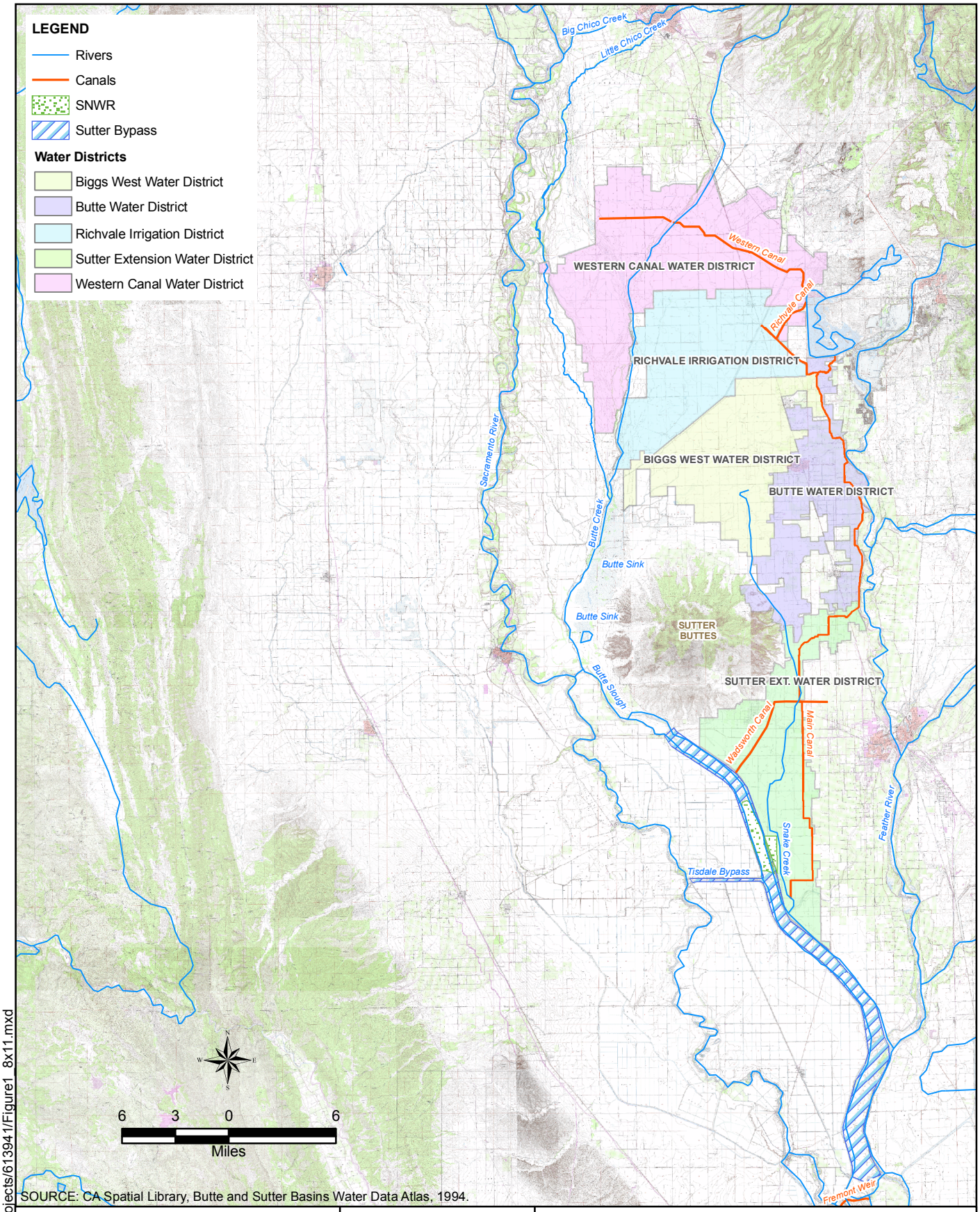
The Regional Water Measurement Program (Program) described in this grant application will be used to develop a water balance to assess the efficiency of water use in the region defined by the service areas of the five districts diverting Feather River water from the Thermalito Afterbay and at the Sunset Pumps. These five districts are:

- Biggs-West Gridley Water District
- Butte Water District
- Richvale Irrigation District
- Sutter Extension Water District
- Western Canal Water District

In addition to receiving water from the Feather River, outflows from the five districts follow common flow paths to Butte Creek and the Sutter Bypass. Outflows from the five districts are then diverted from Butte Creek, Butte Sink, and the Sutter Bypass by downstream water users. Therefore, the study region covered by the program and included in the water balance will encompass both the service areas of the five districts and the downstream area that receives their outflows. Figure 1 shows the location of the five districts and the rivers and streams in the region. The Program is designed to develop a comprehensive measurement system for inflows to and outflows from this region.

Major functions of the Program will be to:

- Design a regional water balance structure that will account for major inflows to and outflows from the region during the irrigation season
- Quantify inflows into the region
- Quantify outflows from the region
- Estimate the extent of water reuse within the study region
- Estimate agricultural water consumption and the proportion of crop water use that is met by precipitation.
- Examine flows at key measurements locations within the region, such as points where major canals and drains cross district boundaries



SOURCE: CA Spatial Library, Butte and Sutter Basins Water Data Atlas, 1994.

Regional Water Measurement Program	Bookman-Edmonston A Division of GEI Consultants	LOCATION MAP
Sutter and Butte Counties, California		JANUARY 2005 FIGURE 1

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- Apply the water balance to compute and document water use efficiency within the region and as a tool to identify and explore opportunities to improve regional water management

Project Description

Biggs-West Gridley Water District (BWGWD, or District) is requesting funding to support the Regional Water Measurement Program on behalf of the five districts listed above.

The central objective of this project will be to document the efficiency of water use in the region through measurement of inflows and outflows during the irrigation season and construction of a water balance to provide a framework for analyzing these measurements. Because evaluation of recycling water is an important component of regional water management, it is expected that the regional water balance will present a perspective on efficiency of use that is different from that revealed by smaller scale water balances that are less able to capture the extent of water recycling.

As well as documenting the efficiency of water use under present management practices, the Program, and the resulting water balance, will also provide tools for identifying instances where water use efficiency can be increased or where coordinated use of alternative sources of water could reduce demands on the Feather River system and may provide opportunities for water transfers to other water users.

The analyses used to estimate water use efficiency and to examine existing and alternative water management strategies will be performed as part of the Program. In addition, data collected during the program could be used in the future in Agricultural Water Management Plans developed either by individual districts or as a regional effort. This planning framework offers an established methodology for exploring agricultural water management practices and for identifying the benefits and costs of adopting new approaches.

In addition, the project will enable the accumulation and dissemination of valuable information concerning patterns of water use within the region that will enable district managers to better coordinate water usage.

Key project outcomes will include:

- Improved measurement capabilities in the service area of the five districts
- Improved ability to manage water measurement data
- Computation of the regional water use efficiency
- Estimation of the degree of water reuse within the region
- Capacity to identify opportunities to improve efficiency of water use
- Capacity to identify water transfer opportunities.

Need for Improved Water Delivery Measurement

The California Bay-Delta Program has identified the need for improved water measurement. The August 2000 CALFED Record of Decision called for legislation requiring the appropriate measurement of all water uses in California. One of the first steps toward that goal was the formation of a panel of independent experts to help define appropriate agricultural water use measurement. The findings of the panel's report were presented in the *Independent Panel on Appropriate Measurement of Agricultural Water Use–Final Report* (Final Report) issued in September 2003.

The Final Report identified the four primary objectives from agricultural water use measurement at the state and federal level:

- State and Federal Water Planning – To anticipate and plan for changes in supply and demand of water resources.
- Water Allocation – To fulfill water contract obligations and ensure appropriate use of water.
- Water Transfers – To implement valid water transfers.
- Water Use Efficiency – To comply with various regulatory and policy driven water use efficiency programs.

In addition, this information can be used to support water management at the local level.

In order to meet these objectives, seven specific locations for potential improvements to appropriate water measurement were identified:

- Surface water diversions,
- Groundwater use,
- Crop consumption
- Return flows
- Water quality monitoring sites,
- In-stream flows
- Farm-gate deliveries

The Final Report identified three different levels of measurement:

- **Basic**- The basic level of measurement is estimated to be accurate to ±15 percent. Improving the data collection and management standards to the "basic" level of measurement can yield some benefits to state and federal water agencies involved in the guidance and tracking of water efficiency investments for planning purposes.

- **High** – The high level of measurement is estimated to be accurate to ±6 percent. Increasing to the "high" level can provide additional benefits if volumetric water pricing or water use efficiency practices which require more accurate measurements are used.

- **Highest Technically Practicable –** The highest technically practicable level of measurement is estimated to be accurate to ±3 percent.

It is the goal of this project to develop a methodology for a water measurement program to support a regional water budget for the regional area. This includes developing data for:

- Surface Water Diversions
- Groundwater Use
- Crop Consumptive Use
- Return Flows
- In-stream Flows

As part of this project, data for the regional water budget will be developed at the "basic" level measurement. At some later time, it will be determined whether this information needs to be developed at a higher level of detail.

Project Need for Local and Regional Issues

The purpose of the Program is to collect regional water measurement data and use this information to develop a regional water budget. This information can then be used to provide local and regional benefits to:

- Improve measurement capabilities in the service area of the five districts
- Improve ability to manage water measurement data
- Compute the regional water use efficiency
- Estimate the degree of water reuse within the region
- Identify opportunities to improve efficiency of water use
- Identify water transfer opportunities.

Project Need for Bay-Delta Issues

The goals of the California Bay-Delta Program's Water Use Efficiency Program (WUEP) include in-stream flow and timing, water quantity, and water quality improvements that directly or indirectly provide benefits to the Bay-Delta. The WUEP includes the following objectives:

- Reduce existing irrecoverable losses
- Achieve multiple benefits
- Preserve local flexibility
- Use incentive-based over regulatory actions
- Build on existing water use efficiency programs

While this project by itself will not generate water savings, the information developed in this Program can be used to:

- Identify opportunities to improve water use efficiency with diminishing agricultural productivity.
- Enhance regional operational flexibility by allowing local water managers to implement a water measurement program that extends over the entire area.

Project Need for State and Federal Issues

The data collected and analyzed in the Regional Water Management could possibly be used to improve water management planning at the state and federal levels, including the ability to:

- Forecast and verify water supply needs
- Prepare and coordinate contingency plans for different water-year types
- Update the State Water Plan
- Develop integrated water resources planning of groundwater and surface water supplies.

Consistency with Local or Regional Water Management Plans

The Sacramento Valley Water Management Plan is a grassroots, collaborative effort to increase water supplies for farms, cities and the environment. Most notably, this regional program for the Sacramento Valley, which is built upon local partnerships in the Sacramento Valley, has led to unprecedented collaboration with parties throughout California, including Southern California, the San Joaquin Valley, the Central Coast and certain parts of the Bay Area.

To implement the SVWMP, Northern California water districts and companies have proposed more than 50 projects that will be part of both short and long-term work plans that are being developed by a team of leading hydrologists and engineers. These projects will protect Northern California water rights and provide water to the Bay-Delta, and they include groundwater planning and monitoring projects, providing for unmet demands in the

Sacramento Valley, system improvement and water use efficiency measures, conjunctive management, and surface storage projects.

This project is part of the SVWMP short-term monitoring program. This project may lead to improved water management at the district and regional level that would extend the available water supply to meet a larger portion of the in-district water requirement.

Importance of Project Implementation on Current Water Management Activities or Initiation of New Activities

This project is important to the project participants because it will establish both a baseline water budget and a measurement program. The information collected in the measurement program will allow the districts to implement more efficient water management practices. Project participants may develop an individual or a regional Agricultural Water Management Plan (AWMP). Western Canal Water District currently has a draft AWMP.

Statement of Work: Technical/Scientific Merit, Feasibility

The following statement of work describes how the Regional Water Measurement Program will be implemented. It includes many of the project details, which define the methods and procedures used to collect data, and which equipment and facilities will be used.

Feasibility and Technical Adequacy of the Approach

Technical Feasibility

This is a technically feasible project that will use readily available information. Additional data collection will be completed using standard procedures and methods. Much of the inflow and outflow data are available from gages monitored by the U.S. Geological Survey or DWR. Land use data are available from DWR as well as the Districts. Rehabilitation of some other data sites would be required to obtain needed data from the Program.

Technical Approach

Use standard techniques and data sets to establish the background data. For example, DWR land use data will be used to establish land use and corresponding water use for the area.

Statement of Work

The tasks listed below describe specific work that will be performed as part of the Regional Water Measurement Program.

Task 1: Define Study Region

The first activity will be to meet with selected staff from the involved districts to further define the Study Region. This will include both the five districts listed previously and water users who benefit from the use of outflow from the five-district service area. After the study area (region) is clearly defined, all inflow at outflow stations from the study area will be identified. In general, the study region is expected to encompass the following areas:

- The five districts
- Areas of riparian water use on Little Chico Creek downstream of the gaging station (see location map)
- Areas of riparian water use on Butte Creek downstream of the gaging station (see location map)
- Areas irrigated by diversions from Butte Sink

- Areas irrigated by diversions from the Sutter Bypass
- The Sutter National Wildlife Refuge

Activities

This task will focus on defining the study region boundaries and identifying all inflow and outflows from the area. The sources of available data on regional water management and land use will be identified. An inventory of these sources will be developed from the existing information to assist in the development and refinement of the study region. In addition, a Technical Coordination Committee will be formed from members of the five districts that will serve as the main project working group for the consultants and the districts.

This is expected to be a straightforward task, which will be initiated during the project kickoff meeting and will be followed by production of a technical memorandum that explicitly defines the boundaries of the study region and designates water users within the region.

Task 2: Development of Water Balance

The foremost objective of the Program is to develop data that can be used to construct a water balance for the study region. The regional water balance will be designed to analyze water use during the irrigation season in the study region defined in the preceding task.

Identification of existing and prospective sites will be followed by a site inventory and assessment to evaluate the resources that will be required to compile existing data and, if necessary, to install or rehabilitate measurement and recording facilities. This assessment of resource requirements, together with an evaluation of the importance and quality of data from each site, will be used to rank the sites. Based on this evaluation and ranking, a plan will be developed for obtaining reliable records of inflows.

Additional flow locations may be recommended for inclusion in the measurement program to account for inflow to areas such as Butte Sink and the Sutter Bypass. In instances where these locations have established measurement sites, inclusion will be considered based on the value of data from the site. In instances where the location would require installation of a new measurement facility or rehabilitation of an existing site, cost will be a factor in determining whether site development is worthwhile.

The development of the water balance and the identification and collection of existing data is described in the tasks presented below.

Task 2.1: Develop Water Balance Structure

A draft water balance will be constructed showing inflow and outflow paths and rating the relative importance of each flow path. Staff from the participating districts will review this draft balance prior to developing the final water balance structure. In designing the water balance and reviewing options for generating data to be used in the balance, an indexing

system will be applied to compare the significance of each flow path with the reliability of data available to represent that flow path. Highly reliable data will be desirable for major flow paths, while less reliable data may be adequate to represent minor inflows and outflows. This regional balance will focus on flows entering and leaving the study region and will not capture water deliveries and other flow paths internal to the districts. For this reason, the balance structure is expected to be simple.

A site inspection of each of the measurement points included in the water balance will be completed to verify their usefulness. Gaging locations that need additional instrumentation or rehabilitation will be identified at this time.

Completion of this task rests on the assumption that a regional water balance structure can be based largely on previously developed reports and on data obtained from active flow measurement stations. Where needed, existing flow measurements will be supplemented by measurement sites developed specifically for this program.

Task 2.2: Inflow Measurement

Development of inflow records from the Feather River is expected to be a straightforward task because of the availability of inflow data and of previous studies of the hydrology and operations of the region. Figure 2 shows the location of some potential inflow measurement points. The actual inflow measurement points included in this analysis will be identified in Task 1.

Water from the Feather River enters the region from the Thermalito Afterbay and the Sunset Pumps. Therefore, the inflow measurement program will focus on the following locations:

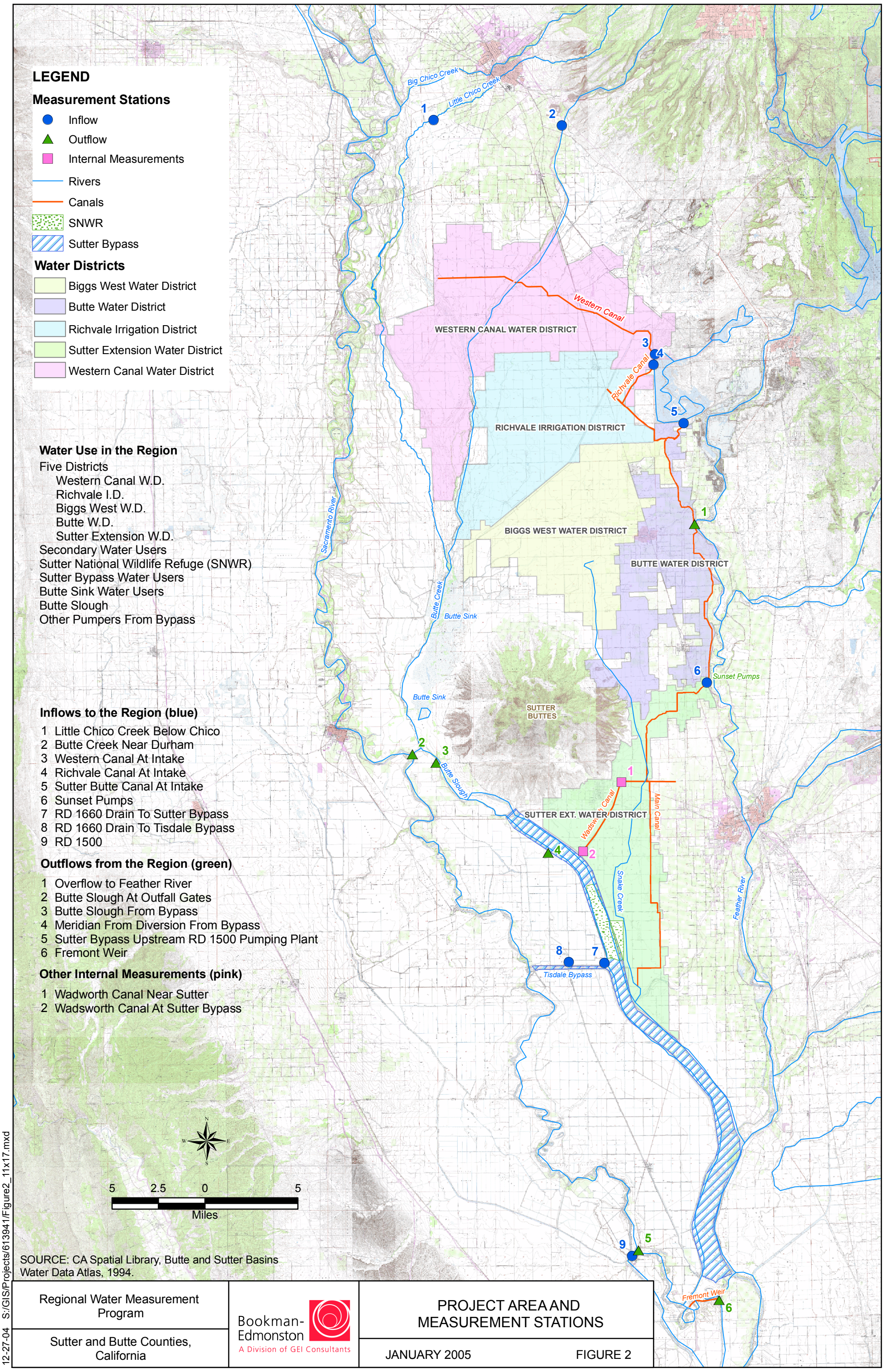
- Western Canal
- Richvale Canal
- Sutter Butte Canal (Main Canal)
- Sunset Pumps

Department of Water Resources (DWR) documents indicate that good measurement sites exist at the intakes to each of these canals and at the Sunset Pumps. It is anticipated that this data can be used directly in construction of the water balance.

In addition to measuring inflows from the Feather River, flow records on Butte Creek and Little Chico Creek will be used to account for these sources of inflow. Data on diversions from these creeks into the region will also be incorporated into the water balance. Flows from RD 1660 to Tisdale Bypass and to the Sutter Bypass and outflows from RD 1500 to the Sutter Bypass should also be included.

Measurement sites identified by DWR that may be used in this effort include:

- Big Chico Creek below Chico



Regional Water Measurement Program

Sutter and Butte Counties, California

Bookman-Edmonston
A Division of GEI Consultants

PROJECT AREA AND MEASUREMENT STATIONS

JANUARY 2005 FIGURE 2

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- Butte Creek near Durham
- Little Chico Creek below Chico
- RD 1500 outflow to Sutter Bypass
- RD 1660 outflow to Tisdale Bypass
- RD 1660 outflow to Sutter Bypass
- Other sources (to be identified in Task 1)

Activities: It is anticipated that most inflow measurements can be assembled from data recorded at existing measurement sites. An early activity will be to inspect existing measurement sites and to assess the adequacy of data recorded at each location.

Groundwater usage will be estimated from land use data.

Completion of this task is based on the assumption that a record of inflows adequate for construction of the water balance can be assembled from data recorded at existing measurement. The rehabilitation or installation of new data collection locations will be included as part of the Task 3 (Development and Implementation of the Consolidated Measurement Plan) budget.

Task 2.3: Internal Measurements

The primary purpose of the Regional Water Measurement Program is to enable construction of a regional water balance that will provide a foundation for analysis of regional water management practices. Due to its regional emphasis, the measurement study will generally concentrate on defining flows at the boundaries of the region and not on measurement of water deliveries and other flow paths internal to the districts. However, some internal measurements may also be needed to better understand water recycling within each district and also to account for the water use within the sphere of influence of the districts.

In addition, to enable the five districts to better account for flows at shared boundaries, the program will include a component to measure flows at locations where canals or drains convey water from one district to another.

Candidate measurement sites include those where the main canal divides or crosses district boundaries and locations where important drains cross district boundaries.

Inflow measurements to Butte Sink that have been identified from DWR documents include:

- Butte Creek near Gridley
- Cherokee Canal near Gridley
- Biggs-West Gridley Main Drain at Cherokee Canal

- Little Dry Creek at Butte Creek

Activities. This component of the measurement program will begin by determining where effective measurement sites now exist and by identifying locations where establishment of new sites or improvement of existing facilities would provide useful data.

Identification of existing and prospective sites will be followed by a site inventory and assessment to evaluate the resources that would be required to install or rehabilitate measurement and recording facilities and to determine the value of the information that would be obtained. This assessment will be used to rank each of the sites and to develop a plan for improving flow measurements among the districts.

The completion of this task is based on the assumption that records of flows across internal boundaries within the region are generally available from the Districts, and are adequate for construction of the water balance. The rehabilitation or installation of new data collection locations identified as part of this task will be included as part of the Task 3 (Development and Implementation of the Consolidated Measurement Plan) budget.

Task 2.4: Surface Water Outflows

Measurement of outflows is expected to be more challenging than measurement of inflows or of internal flows for two reasons.

- Outflows to drains and spills are commingled with flows from other sources; therefore, careful selection of measurement locations will be necessary. For example, tailwater from the Western Canal Water District flows to Butte Creek at various locations. Therefore, one of the challenges in developing the outflow measurement plan will be to estimate the monthly or seasonal volume of tailwater discharged from WCWD to Butte Creek.

- Outflows locations are numerous and many do not have operational measurement sites. Therefore, it is anticipated that a substantial number of new or rehabilitated measurement sites will be required.

Key existing outflow locations that have been identified in DWR documents include:

- Cox Spill (to the Feather River)
- Butte Slough Outfall (to the Sacramento River)
- Butte Slough Diversions
- Meridian Diversions
- Butte Sink (to the Sutter Bypass—both left and right channels)
- Wadsworth Canal (to the Sutter Bypass)
- Sutter Bypass upstream of RD 1500 Pumping Plant

- Sutter Bypass at Fremont Weir

An important element of outflow measurement will be partitioning all sources of flow to Butte Sink and Sutter Bypass into the proportion that originated from tailwater outflows within the study region and the proportion that originated from other sources. This may be accomplished by measuring flows in Butte Creek near Durham and assuming these flows represent inflows to Butte Sink that originated from sources upstream of the region. Figure 2 shows the location of some potential outflow measurement points.

Activities. An early element in program implementation will be meeting with staff of the five districts to identify locations where surface water leaves the districts, to describe the sources of water discharged at these locations, and to assess whether new or upgraded facilities are needed to generate data of the required quality.

Candidate measurement locations will be ranked based on the potential value of data from the site in construction of the water balance and the costs of making necessary improvements to measurement facilities. This assessment will be used to rank each of the sites and to develop a plan for generating outflow data adequate to construct a reliable water balance.

It is anticipated that new sites may be required to distinguish outflows originating within the study region from outflows from outside sources. The rehabilitation or installation of new data collection locations identified as part of this task will be included as part of the Task 3 (Development and Implementation of the Consolidated Measurement Plan) budget.

Task 3: Development and Implementation of the Consolidated Measurement Plan

Measurement plans developed for defining inflows, internal flows, and outflows will be combined to produce a Consolidated Measurement Plan. This plan will be a two-year program for inclusion of existing records into the water balance and for rehabilitation or installation of measurement facilities needed to supplement available data.

Hardware, software, and staffing requirements for implementation and operation of the Consolidated Measurement Plan will be based primarily upon the assessments of existing and potential measurement sites and determination of the measurement and recording facilities required at each site. New measurement and recording facilities are likely to be divided into two categories.

- Weirs or flumes that can be rated to allow computation of outflow based on water level elevations recorded in an adjacent stilling well

- Pipes or other structures where devices such as acoustic flow meters can be used to record velocity through a section of known dimensions.

Both of these types of flow measurement are well accepted and the suitability of any particular installation will be governed by conditions at the site. The Western Canal Water District Tailwater Recovery Feasibility Study and the *Sacramento River Basinwide Water*

Measurement Plan – Sub-basin-level Water Measurement Study provide useful guidance for the evaluation of measurement sites and selection of measurement and recording equipment.

During the early period of program operation, it is recommended that data be recorded onto data loggers housed at each site, if possible. Sites will be inspected frequently to download data, to observe the condition of the site, and to perform any needed maintenance and recalibration.

Flow data from each of the sites will be stored in a centralized database developed specifically for the Water Measurement Program. This database will permit generation of periodic reports and will provide a platform for the computations used to construct the water balance.

The budget allocation for procurement and installation of measurement and recording devices and for development of the database for storing and processing data will be supported from CALFED funds. The budget allocation for this task is based on an allowance for rehabilitation of up to six existing measurement sites and installation of up to four new sites, as needed for the specific purpose of improving measurement within the region.

The districts will provide staff to assist in identifying and evaluating measurement sites. Consultants, funded by CALFED, will be responsible for collecting data from new and existing sites, entering this data into the database, and generating routine reports. Flow data will be collected and analyzed for the two-year project study period. The results of this task will be summarized in a technical memorandum.

Task 4: Estimation of Crop Water Use and Effective Precipitation

Crop Water Use

The main purpose for water use within the study region is irrigation. DWR land use data from the region and district cropping records will be used to determine the number of acres devoted to various crops. This will provide a baseline for application of crop water use and climatic data available from the California Irrigation Management Information System (CIMIS) and other sources to compute monthly and seasonal evapotranspiration. Because rice is a primary crop and because the number of cropped acres is relatively stable, the fact that DWR land use data are generally available at five-year intervals should not compromise its utility as a reliable basis for estimating crop water requirements.

This process for development of crop water requirements is widely used in adopted Agricultural Water Management Plans. Therefore, the estimates produced in this task will be directly transferable to regional or District-level Agricultural Water Management Plans.

Effective Precipitation

Data from CIMIS stations used to compute evapotranspiration will be applied for computation of precipitation. Techniques such as DWR's methodology for estimating effective precipitation (the proportion of precipitation that is stored in the root zone and is available to satisfy crop consumptive demands) will be reviewed and an appropriate

technique will be applied. Estimation of effective precipitation will be used to partition evapotranspiration into a proportion that is met by precipitation and a proportion that is met from applied water.

Activities. Estimation of crop water use will focus on using DWR GIS-based land use mapping of the study region to compute the acreage in various crops for the five districts and other water users. These district-level maps will be checked against district cropping records to confirm that land usage is accurately represented. After verification, the district-level land use data will be combined to create a regional database that will be used for computation of water demands. To estimate the proportion of applied water that is used to meet crop demands, data on water deliveries and information from other sources will be used to estimate field-level irrigation efficiencies.

Completion of this task is based on use of one year of DWR land use data and adjustment of data using the District's annual crop production reports for the two-year study period. Crop water use estimates will be performed either using the procedures outlined above or using soon-to-be-released DWR software that provides an integrated platform for performing these estimates.

Task 5: Determination of Downstream Conditions

The process that was described previously to compute regional water consumption will be applied to compute consumption in the downstream areas. As noted above, the proportion of consumption assigned to reuse of drainage from upper portions of the study region will have been computed in the previous task. In addition, diversion records from users withdrawing water from the Sutter Bypass will be estimated using land use data if diversion records are unavailable. The proportion of diverted water attributed to upstream areas will be used to estimate the degree to which return flows contribute to satisfying demand in the downstream area.

Activities. Diversion records will be requested from downstream users for a five-year period, if available, and analyzed to assess patterns in historical diversions and to evaluate the accuracy that should be associated with these records. Diversion records that correspond with the period of record used in the water balance will be used as inputs to the balance. The proportion of diverted water attributed as return flow from upstream areas of the study region will be determined from examination of measurements of inflow to the Sutter Bypass.

Budgeting assumes that adequate records will be available to develop a representative record of diversions from the Sutter Bypass and other surface water sources identified in the downstream portion of the study region. Determination of the proportion of flow in the Sutter Bypass originating from return flows from the upper portion of the study region will be made based on the inflow and outflow records collected and analyzed in previous tasks.

Task 6: Completion of Water Budget and Analysis of Results

Data collected or calculated in the preceding tasks will be used to complete the water balance. The completed balance will then be used to compute the regional efficiency of

water use, to assess opportunities for water conservation, and to identify linkages between conservation potential and water transfer opportunities.

Activities. This task will entail consolidating all relevant data into the water balance structure, checking the balance for closure, and developing a draft technical memorandum describing preliminary results of the balance. This memo will be reviewed and circulated to ensure that the balance has produced reasonable results.

After making any necessary refinements, a final technical memorandum will be completed describing the construction of the water balance, presenting findings from the water balance on regional water use efficiency, the extent of water reuse within the region, and other key outcomes.

Completion of this task is intended to provide adequate development and testing of the balance, review of balance results, and use of the balance as an analytical tool for exploring key water management issues within the region.

Task 7: Prepare Project Report

The information collected and developed during this project will be documented in the project report, which will be prepared as part of this task.

Activities. This task will include developing a draft and final project report describing the results of the water budget analysis and the development and implementation of the Regional Water Measurement Program. Ten copies of the draft report will be circulated for review and comment. Ten copies of the final report will be prepared after reviewing and incorporating comments on the draft report.

Task 8: Project Management and Coordination

Activities. Activities of the project consultants and the staff and management of the five districts will be closely coordinated to develop a program that is responsive to the objectives of the districts' management and is based on sound science. The necessary coordination will be provided through meetings, formal communication (e.g., monthly reports), and frequent, informal communication. The five districts will establish a Technical Coordination Committee that will serve as the main project-working group for the consultants and the districts.

The project management and coordination includes the preparation of eight quarterly reports and preparing and attending eight project meetings. Preliminary dates for the project meetings and quarterly reports are shown on the project schedule.

Project Deliverables

The project deliverables identified in the statement of work listed above are summarized below.

- Technical memorandum defining the boundaries of the study region and designating water users within the region (Task 1).
- Technical memorandum documenting the Consolidated Measurement Plan (Task 3).
- Database to store, manage, analyze, and report on field data (Task 3)
- Technical memorandum documenting the Regional Water Balance (Task 6).
- The project report summarizing continuing regional water measurement resulting from this project (Task 7).
- General project management, including quarterly reports to DWR and coordination with project team and other stakeholders (Task 8).

Project Schedule

The proposed project schedule is included in Figure 3. It assumes a start date of January 2006, and an ending date of December 2007. The duration of each task is included on the schedule, as well as the approximate dates for project meetings and quarterly reports to DWR. The project will take 24-months to complete after the contract is signed.

Environmental Documentation

The Project may include the instrumentation of measurement locations or the rehabilitation of measurement locations along district-owned canals and drainage facilities. In compliance with applicable environmental guidelines under the California Environmental Quality Act (CEQA), the District has reviewed the proposed project and its potential adverse affects under CEQA. The proposed project has been deemed Categorically Exempt from CEQA under the CEQA Guidelines, Section 15061 (b)(3). The proposed project is exempt based upon Section 15301 (Class 1, Existing Facilities) and Section 15306 (Class 6, Basic Data Collection):

- Section 15301 – Categorical exemption for operation, repair, maintenance, or minor alteration of existing structures or facilities not expanding existing uses.
- Section 15306 – Categorical exemption for basic data collection, research, experimental management, and resource evaluation activates that do not result in major disturbances to an environmental resource.

Figure 3
Regional Water Measurement Program
Schedule

Task		Quarterly Progress Reports		Final Report	
Summary		Technical Memorandum			
Meetings		Draft Report			

Project: Regional Water Meas Schedule 1-10-05
Date: Mon 1/10/05

Bookman-Edmonston
A Division of GEI Consultants

Statement of Work: Monitoring and Assessment

The six components of the Project Monitoring and Assessment Plan listed in the PSP are listed here as they relate to the RWMP and are briefly described below.

- Description of Pre-project Conditions and Data Baselines
- Monitoring Methodologies and Data Collection
- How Collected Data Will Achieve Project Goals and Objectives
- Potential Impact of External Conditions
- Data Management and Dissemination
- Estimated Costs Associated with Implementation of Monitoring and Evaluation Plan

Description of Pre-Project Conditions and Data Baselines

Pre-Project Conditions and Data Baselines

Some monitoring of flows and diversions takes place in the region, but there is currently no coordinated monitoring and analysis of the water inflows and outflows to the region. The project will develop a measurement program that can be used to develop a regional water budget and develop an initial set of water measurement data.

Project Assumptions

Implementing the RWMP includes the following assumptions.

- This project will provide a regional perspective of inflows and outflows to the Study Area.
- Some data are available from Agricultural Water Management Plans.
- Some flow data are available for selected locations from current monitoring efforts.
- District staff will participate in the measurement program as well as provide access to all measurement sites.

Anticipated Accuracy of Data to Be Produced

Several different types of data will be collected and analyzed as part of this project, and each data set may have different levels of accuracy. As mentioned, some of the data for the

primary water balance components is based on available USGS or DWR data, which have quality control and quality assurance processes in place to ensure the accuracy of the data for the purposes of this study. Secondary water balance components may be estimated or measured using newly installed or rehabilitated measurement facilities.

Hypothesis/Background of Additional Research/Monitoring and Assessment Methodologies

The monitoring and assessment methodologies applied to this project are not designed to support a hypothesis but to enable the project team to understand and control the accuracy of the flow measurements entered into the water balance and applied in various analyses. This effort will enable analyses to be conducted at the highest level of confidence that the data will allow and to be interpreted in ways that account for unavoidable uncertainties in the data.

Monitoring Methodologies and Data Collection

Flow measurement and data collection and analysis are at the heart of this project. Therefore, project monitoring will emphasize the development of Quality Assurance/Quality Control procedures designed to determine the level of accuracy to be assigned to each measurement location and to confirm that reported flows fall within the expected levels of accuracy.

The objective of this effort will be to:

- Identify and eliminate erroneous data – These anomalies typically result from equipment failures or carelessness.
- Adjust for systematic errors (consistently high or low measurements) – These errors result from equipment that is operating correctly but is out of calibration.
- Specify random error at each of the measurement sites – Random errors result from the inherent limitations of measurement devices that are operating correctly and are well calibrated. Literature review and standard USBR methodologies will be applied to describe the expected error of the measurement structures and instrumentation used in this project.

How Collected Data Will Achieve Goals and Objectives

Water measurement data collected during the life of the project will provide the foundation for constructing a regional water balance and for subsequently analyzing regional water use. Development of a network to systematically collect flow data and the analysis of that data are the primary objectives of the project.

Therefore monitoring, assessment, and quality control of the data collection, entry, and analysis procedures will be fundamental for ensuring the integrity of the project's findings.

Potential Impacts of External Conditions

This project does not anticipate being impacted by changes in the weather, cropping, or social conditions. This study will develop the initial set of water measurement data based on the approach described above. Changes in project conditions due to changes in weather or cropping patterns may result in changes in the regional water balance and measured data. Depending on the magnitude of the change, the measurement program may be able to quantify these differences on a regional basis.

Data Management and Dissemination

All the project data related to the measurement program will be stored in a database. This includes information related to:

- The location and physical characteristics of the monitoring locations
- The historical and measured water level and flow data associated with the project
- Pictures of the monitoring locations included in the project

The database will also assist in the analysis of the measurement program by having the capability to automatically generate reports of flows at individual locations. This information will be readily available for District use and will to be provided to DWR.

DWR will be informed of the project's progress through quarterly reports. As described in the PSP, these reports will be provided to DWR on January 15, March 15, July 15, and October 15. A final progress report will be produced at the end of the project. The project schedule shown in Figure 3 shows the approximate dates of the progress reports.

Estimated Costs Associated with Implementation of Monitoring and Evaluation Plan

The PSP states that applicants will be asked to reevaluate the project cost/benefit as part of the final report. This project will not directly conserve water, so the cost/benefit will not be immediately apparent from this project alone. The benefit of this project will come as additional data is collected to determine the impact of various on-farm management programs on the overall water delivery. It will help quantify the water savings for other projects. This project does not include a reevaluation of the cost/benefit of the project at the end of the project.

Because the benefits of the project are not quantifiable and the costs of measurement after the two-year life of the project will be borne by the districts, no formal post-project monitoring has been proposed. The project will emphasize the use of existing measurement facilities wherever possible. Any new instrumentation by the project will be turned over to DWR after project completion to enhance its flow measurement program.

Qualifications of the Applicants and Cooperators

Mr. Bernoy Bradford, General Manager of Biggs-West Gridley Water District, will be the Project Manager. He has over 30 years of experience as the general manager of agricultural water districts in the Sacramento Valley. For the last 12 years, Mr. Bradford has been the general manager of the Biggs-West Gridley Water District. His duties include managing, operating, and maintaining the District and regularly coordinating with other districts including Sutter Extension Water District, Richvale Water District, and Butte Water District and the Joint Board.

Mr. Bradford will provide overall project coordination with DWR, including budget tracking, submitting invoices, and progress reports. He will also work closely with the consultant, and act as liaison with the project participants and other interested parties. His resume is included in Appendix A.

Identify and Describe the Role of Any External Cooperators

A qualified water resources consultant will complete most of the technical analysis. The selected consultant will have knowledge of the District and region including hydrology and project operations, and agricultural practices in the Sacramento Valley.

Describe Briefly Any Previous Water Use Efficiency Grant Project in Which the Applicant Has Participated

Biggs-West Gridley Water District has not participated in previous water use efficiency grant projects.

Disadvantaged Community Status

As part of the development of this application, the Study Area was analyzed to determine if it qualified for disadvantaged community status. Using a weighted tract-block analysis the Median Household Income data from Table P53 of the 2000 Census, it was determined that the median household income was greater than $38,000 for the area served for the Study Area. Based on this information, this project does not qualify for disadvantage community status.

Outreach, Community Involvement, and Acceptance

This proposed water measurement project is being submitted by Biggs-West Gridley Water District on behalf of the project participants, which include Butte Water District, Sutter Extension Water District and Richvale Irrigation District and Western Canal Water District. These districts interact regularly, and they will be included in this project through the outreach and community involvement process. In addition, the regional water management groups will be kept informed of the project's progress. This section describes how each of these organizations will be included in this project.

Biggs-West Gridley Water District

The District will be the lead agency for this project, and Mr. Bradford, General Manager, will serve as the project manager. He will manage the consultant's work and coordinate with DWR. The consultant will provide the project information to the District staff and management for review and comment.

Joint Board and its Member Agencies

The Joint Board (composed of the chairman/president of Sutter Extension Water District, Butte Water District, Richville Irrigation District, and Biggs-West Gridley Water District) will be kept informed of the progress of the project by the project manager at the monthly Joint Board meeting.

The Joint Board members are currently involved in the Conveyance System Improvement Pre-Feasibility Study to improve water delivery reliability on the Main Canal. These districts are actively investigating ways to improve their overall water management in part to improve their water supply reliability. The Northern California Water Association (NCWA), DWR, Bay-Delta Program, and the U.S. Fish and Wildlife Service are all project participants in the Conveyance Study.

Northern California Water Association

Project information will be regularly provided to NCWA to keep it aware of the project's progress and potential benefit to other Sacramento Valley water users.

Sacramento Valley Water Management Plan

Information obtained and knowledge gained by the Program will be shared with others in the Sacramento Valley, including participants in the Sacramento Valley Water Management Plan. They will be kept informed of the project through the meetings and the District's participation in the plan.

Department of Water Resources

Quarterly progress reports will be provided to DWR to monitor progress. In addition, technical information will be provided to track the project. DWR staff will be invited to participate in project meetings. Copies of the technical memoranda and final reports will be provided to DWR. Electronic versions of the report will also be provided to DWR. The database with the project data will be provided to DWR.

Innovation

This regional program provides the initial opportunity to develop a coordinated water measurement program and utilizing the data collected to develop a regional water budget for this area. This innovative project will rely on the existing gages and infrastructure and a relatively low level of technology to develop and analyze water measurement data.

While much of the existing infrastructure is in place for the measurement program, additional effort is needed to implement the measurement program at key points to complete the water budget. This is the first local effort to develop this type of measurement program. The Technical Report discussed earlier identified the five primary objectives of agricultural water measurement, which included benefits to:

- State and Federal Water Planning,
- Water Allocation
- Water Transfers
- Water Use Efficiency
- Local Planning

This RWMP includes five of the seven identified measurement locations identified in the Technical Report, and directly utilizes this information into the regional water budget. Collectively, the project participants divert over 800,000 acre-feet from the State Water Project through Thermalito Afterbay, and an additional 65,000 acre-feet annually from the Sunset Pumps on the Feather River. Other water users divert from the local rivers and streams, and pump groundwater to supplement their supplies.

Benefits and Costs

The cost for this project totals $343,959, as shown in Table1. The grant application requests funding of $270,459. The local cost-share totals $73,500 (21 percent of the total project cost). The project costs include a 5 percent contingency. This information is presented on Table C-1. The costs and benefits of this project are presented below.

Project Costs

A qualified consultant with experience and knowledge of the local hydrologic setting will complete much of the work associated with this project. District management and staff will guide the consultant with the project. The estimated project costs for the consultant and local cost share are described below.

Consultant Costs

The consultant labor costs total $232,180. These labor costs cover technical analysis, fieldwork and data collection, report writing, attending meetings, and project management.

The consultant expenses are estimated at $25,400. These costs include travel expenses to meetings and for field work and data collection, report reproduction, and expenses associated with the installation and rehabilitation and instrumentation of measurement sites.

The consultant costs include a 5 percent contingency on labor and expenses (totaling $12,879) for a total cost of $270,459. This is the amount being requested in the grant application.

Local Cost-Share

The five districts participating in this program plan to provide in-kind services totaling $73,500 that represents about 21 percent of the total cost of the project. The local cost-share is provided to guide the consultant in this project by providing data, reviewing reports, and attending project meetings. The local cost share also includes overall project management including reviewing invoices and preparing quarterly reports.

Project Benefits

Based on the descriptions in the PSP, this is a research/pilot study project. The regional water measurement program by itself does not directly generate water savings, but will provide additional information to the farmers, the BWGWD, the other four water districts, and DWR.

Future water measurement programs, along with improved on-farm water management may result in quantifiable water savings associated with the improved water management

Table 1
Regional Water Measurement Program - Project Costs

		Consultant													
		Principal Executive Engr	Principal Engineer	Managing Senior Engr	Engineer	Staff Engineer	Technician	AA & Clerical	Total hours	Total Labor Costs	ESTIMATED EXPENSES (including travel)	Total Consultant Costs	Local Cost Share	Total Project Cost	Funding Request
PHASE AND TASK	TASK DESCRIPTION/ BILLING RATE	$190	$170	$140	$95	$85	$95	$65							
Task 1	Define Study Region	0	4	12	16	0	0	0	32	$3,880	$0	$3,880	$5,000	$8,880	$3,880
Task 2	Development of Water Balance	8	16	68	120	0	0	0	212	$25,160	$200	$25,360	$20,000	$45,360	$25,360
Task 2.1	*Develop Water Balance Stucture*	*2*	*4*	*12*	*16*	*0*	*0*	*0*	*34*	*$4,260*	*$200*	*$4,460*	*$5,000*	*$9,460*	*$4,460*
Task 2.2	*Inflow Measurements*	*2*	*4*	*16*	*40*	*0*	*0*	*0*	*62*	*$7,100*	*$0*	*$7,100*	*$5,000*	*$12,100*	*$7,100*
Task 2.3	*Internal Measurements*	*2*	*4*	*16*	*24*	*0*	*0*	*0*	*46*	*$5,580*	*$0*	*$5,580*	*$5,000*	*$10,580*	*$5,580*
Task 2.4	*Surface Water Outflow Measurements*	*2*	*4*	*24*	*40*	*0*	*0*	*0*	*70*	*$8,220*	*$0*	*$8,220*	*$5,000*	*$13,220*	*$8,220*
Task 3	Development and Implementation of Consolidated Measurement Plan	16	34	136	180	480	340	48	1234	$121,180	$22,000	$143,180	$10,000	$153,180	$143,180
	Development of Consolidated Measurement Plan	*16*	*8*	*24*	*40*	*0*	*0*	*24*	*112*	*$13,120*	*$0*	*$13,120*	*$2,000*	$15,120	$13,120
	Rehabilitation of measurement sites (up to 6 sites)	*0*	*6*	*24*	*60*	*0*	*180*	*0*	*270*	*$27,180*	*$6,000*	*$33,180*	*$6,000*	$39,180	$33,180
	Installation of new sites (up to 4 sites)	*0*	*12*	*24*	*80*	*0*	*160*	*0*	*276*	*$28,200*	*$12,000*	*$40,200*	*$2,000*	$42,200	$40,200
	Development of database	*0*	*4*	*24*	*0*	*80*	*0*	*0*	*108*	*$10,840*	*$0*	*$10,840*	*$0*	$10,840	$10,840
	Data collection and data entry	*0*	*4*	*40*	*0*	*400*	*0*	*24*	*468*	*$41,840*	*$4,000*	*$45,840*	*$0*	$45,840	$45,840
Task 4	Estimation of Crop Water Use and Effective Precipitation	0	4	24	60	0	0	0	88	$9,740	$0	$9,740	$0	$9,740	$9,740
Task 5	Determination of Downstream Conditions	0	8	36	60	0	0	0	104	$12,100	$0	$12,100	$0	$12,100	$12,100
Task 6	Completion of Water Balance and Analysis of Results	16	4	40	48	0	0	40	148	$16,480	$0	$16,480	$0	$16,480	$16,480
Task 7	Complete Project Report	8	16	40	0	24	0	24	112	$13,440	$2,000	$15,440	$5,000	$20,440	$15,440
Task 8	Project Management and Coordination	80	40	40	0	0	0	40	200	$30,200	$1,200	$31,400	$30,000	$61,400	$31,400
	TOTALS	128	126	396	484	504	340	152	2130	$232,180	$25,400	$257,580	$70,000	$327,580	$257,580
		$24,320	$21,420	$55,440	$45,980	$42,840	$32,300	$9,880							
									Project Cost			$257,580	$70,000	$327,580	$257,580
									Contingency (5 percent)			$12,879	$3,500	$16,379	$12,879
									Total Project Cost			$270,459	$73,500	$343,959	$270,459

Applicant: Biggs-West Gridley Water District - Regional Water Measurement Program

Table C-1: Project Costs (Budget) in Dollars)

	Category (I)	Project Costs $ (II)	Contingency % (ex. 5 or 10) (III)	Project Cost + Contingency $ (IV)	Applicant Share $ (V)	State Share Grant $ (VI)	Life of investment (years) (VII	Capital Recovery Factor (VIII)	Annualized Costs $ (IX)
	Administration								
	Salaries, wages	$18,000	5	$18,900	$18,900	$0	0	0.0000	$0
	Fringe benefits	$12,000	5	$12,600	$12,600	$0	0	0.0000	$0
	Supplies	$0	0	$0	$0	$0	0	0.0000	$0
	Equipment	$0	0	$0	$0	$0	0	0.0000	$0
	Consulting services	$31,400	5	$32,970	$0	$32,970	0	0.0000	$0
	Travel	$0	0	$0	$0	$0	0	0.0000	$0
	Other	$0	0	$0	$0	$0	0	0.0000	$0
(a)	Total Administration Costs	$61,400		$64,470	$31,500	$32,970			$0
(b)	Planning/Design/Engineering	$181,900	5	$190,995	$36,750	$154,245	0	0.0000	$0
(c)	Equipment Purchases/Rentals/Rebates/Vouchers	$0	0	$0	$0	$0	0	0.0000	$0
(d)	Materials/Installation/Implementation	$18,000	5	$18,900	$0	$18,900	0	0.0000	$0
(e)	Implementation Verification	$0	0	$0	$0	$0	0	0.0000	$0
(f)	Project Legal/License Fees	$0	0	$0	$0	$0	0	0.0000	$0
(g)	Structures	$0	0	$0	$0	$0	0	0.0000	$0
(h)	Land Purchase/Easement	$0	0	$0	$0	$0	0	0.0000	$0
(i)	Environmental Compliance/ Mitigation/Enhancement	$0	0	$0	$0	$0	0	0.0000	$0
(j)	Construction	$0	0	$0	$0	$0	0	0.0000	$0
(k)	Other (Specify)	$0	0	$0	$0	$0	0	0.0000	$0
(l)	Monitoring and Assessment	$45,840	5	$48,132	$0	$0	0	0.0000	$0
(m)	Report Preparation	$20,440	5	$21,462	$5,250	$16,212	0	0.0000	$0
(n)	**TOTAL**	$327,580		$343,959	$73,500	$270,459			$0
(o)	Cost Share -Percentage				21	79			

Applicant: **Biggs-West Gridley Water District - Regional Water Measurement Program**

Table C-5 Project Annual Physical Benefits (Quantitative and Qualitative Description of Benefits)

	Qualitative Description - Required of all applicants[1]				**Quantitative Benefits - where data are available [4]**
	Description of physical benefits (in-stream flow and timing, water quantity and water quality) for:	Time pattern and Location of Benefit	Project Life: Duration of Benefits	State Why Project Bay Delta benefit is Direct[2] Indirect [3] or Both	Quantified Benefits (in-stream flow and timing, water quantity and water quality)
Bay Delta	The Regional Water Measurement Program improves the regional understanding of regional water use and reuse in the Sacramento Valley.	The water measurement program and water balance will be completed for the irrigation season, March through October.	The project duration is two years. The benefits included an improved water measurement program and better understantanding of water use efficiency and water recylcing in the Sacramento Valley. These benefits do not expire, they supplement the existing knowledge regional water management.	Improved water use efficiency and increased water recycling can improve local water supply reliability	
Local	This project develops a regional water measurement program and regional water balance. It provides the opportunity to determine the regional water use efficiency and estimate the amount of water recycling.	The regional water measurement and water balance is focused on the Sutter County and Butte County areas that receive Feather River water. The water balance will be completed for the irrigation season, March through October.	The knowleged gained from this project will provide continuing benefits to the local water users regarding current water use efficiency and water recycling . This can improve future water management decisions.	**Not applicable.**	

[1] The qualitative benefits should be provided in a narrative description. Use additional sheet.

[2] Direct benefits are project outcomes that contribute to a CALFED objective within the Bay-Delta system during the life of the project.

[3] Indirect benefits are project outcomes that help to reduce dependency on the Bay-Delta system. Indirect benefits may be realized over time.

[4] The project benefits that can be quantified (i.e. volume of water saved or mass of constituents reduced) should be provided.

Applicant: **Biggs-West Gridley Water District: Regional Water Measurement Program**

Table C-8 Applicant's Cost Share and Description

Applicant's cost share %: (from Table C-1, row o, column V)	**21**
Describe how the cost share (based on relative balance between Bay-Delta and Local Benefits) is derived. (See Section A-7 for description.)	
Provide Description in a narrative form.	

techniques. This information can then be used to identify the most cost-effective water use efficiency techniques that can be implemented in the District and other areas.

Comparison of Cost to Benefits

This project will establish a regional water measurement program, and use the information to develop a regional water budget. The Bay-Delta Program has identified the need for this type of project in Final Report described earlier, and it also identified the benefits to state and federal water planners.

The project scope is appropriate for the level of current information and information that can be collected in the measurement program and is consistent with the recommendations in the Final Report. This project is a worthwhile investment in appropriate water measurement for the region, and may contribute to improved on-farm water management and significant water savings in the future.

Appendix A

Project Manager Resume

BERNOY BRADFORD

P.O. Box 205 **Princeton, CA 95970** **916-439-2381**

PROFESSIONAL EXPERIENCE

Mr. Bernoy Bradford has over 30 years of experience as the general manager of agricultural water districts in the Sacramento Valley. As general manager, he is responsible for all agency activities including administration, project design and construction, finance, operations, maintenance, record keeping, and customer service.

For the last 12 years, Mr. Bradford has been the general manager of the Biggs-West Gridley Water District. His duties include managing, operating, and maintaining the District and regularly coordinating with other districts including Sutter Extension Water District, Richvale Water District, and Butte Water District and the Joint Board.

Mr. Bradford represents the District in the Multi-Objective Regional Conveyance Feasibility Study with other Joint Board members. This goal of this project is to formulate a plan for the local diverters to improve the supply reliability of the Main Canal.

1993 – Present: Biggs-West Gridley Water District, General Manager
1973 – 1993: Princeton-Codora-Glenn Irrigation District, General Manager.

PROFESSIONAL MEMBERSHIPS

During his 30-year career as an agricultural water manager in the Sacramento Valley, Mr. Bradford has participated in numerous local and regional projects and management organizations. He is currently participating in several regional programs, including:

- Northern California Water Association- Managers Committee
- Butte Basin Water Users Association – Vice Chairman
- Butte County Basin Management Objectives Water Advisory Committee Member.

Additional professional memberships Mr. Bradford has held in the past include:

- Association of California Water Agencies Groundwater Committee
- Association of California Water Agencies Finance Committee
- Glenn County Groundwater Committee
- Colusa County Groundwater Committee
- Princeton Waterworks District, Director - Secretary/Treasurer
- AB3616 Committee, Agricultural Sector Representative
- Princeton Volunteer Fire Department

SPECIAL TRAINING/LICENSES

- Association of California Water Agencies Convention - 30 years
- U. S. Bureau of Reclamation Water User Conferences – 20 years
- Central Valley Project Water Contractors Conferences – 20 years
- Pesticide Training Seminars - 20 hours yearly for 30 years
- California agricultural pest control adviser
- California qualified pesticide applicator
- Pest Control Advisor, California Department of Agriculture
- Qualified Applicators Certificate, California Department of Agriculture

Appendix B

Letters of Support

January 5, 2005

Ms. Debra Gonzalez
California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, California 94236-0001

RE: Endorsement of the Regional Water Measurement Program for the Feather River Service Area

Dear Ms. Gonzalez

The Joint Board supports and endorses the development of a regional water measurement program for Feather River Service Area (FRSA) and encourages the California Department of Water Resources to fund this exemplary project. Biggs-West Gridley Water District is submitting this Water Use Efficiency Grant Application on behalf of the water districts of the FRSA.

The Joint Board reviewed and approved this project at the December 16, 2004 Board meeting. The Board recognizes the importance of regional water measurement and developing a regional water balance. A grant from DWR will help us undertake this project; a project designed to better manage our precious water resources. We strongly encourage your support in funding this project.

Sincerely,

Doak Cotter

Doak Cotter, Manager
Joint Board

DIRECTORS:
ROBERT WALLER
GREGORY CORREA
JOE BOZZO
STEPHEN PANTALEONI
RONALD GIOVANNETTI

BUTTE WATER DISTRICT

MARK ORME
SECRETARY-MANAGER

PHONE 530-846-3100
735 VIRGINIA STREET
GRIDLEY, CALIFORNIA 95948

January 5, 2005

Ms. Debra Gonzalez
California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, California 94236-0001

RE: Endorsement of the Regional Water Measurement Program for the Feather River Service Area

Dear Ms. Gonzalez

Butte Water District supports and endorses the development of a regional water measurement program for Feather River Service Area (FRSA) and encourages the California Department of Water Resources to fund this exemplary project. Biggs-West Gridley Water District is submitting this Water Use Efficiency Grant Application on behalf of the water districts of the FRSA.

The proposed regional water measurement program will develop a water balance to assess the efficiency of the water use in this region. This assessment will be used to examine existing and alternative water management strategies that may be incorporated into future individual or regional agricultural water management plans.

The BWD Board has reviewed and approved this project. Our Board recognizes the importance of regional water measurement and developing a regional water balance, as well as the benefits that it provides to the well being of the residents and the economic interests of the communities in this portion of Sutter and Butte Counties. A grant from DWR will help us undertake this project; a project designed to better manage our precious water resources. We strongly encourage your support in funding this project.

Sincerely,

Mark Orme

Mark Orme, General Manager
Butte Water District

DIRECTORS
HOMER LUNDBERG
KEN ANDERSON
LANCE TENNIS
MILT LAMALFA
ERIC LARRABEE

WESTERN CANAL WATER DISTRICT

OFFICERS
GENERAL MANAGER & SECRETARY
TED TRIMBLE

ATTORNEY
JEFFREY MEITH
MINASIAN LAW FIRM

January 6, 2005

Ms. Debra Gonzalez
California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, California 94236-0001

RE: Endorsement of the Regional Water Measurement Program for the Feather River Service Area

Dear Ms. Gonzalez

Western Canal Water District (WCWD) supports and endorses the development of a regional water measurement program for the Feather River Service Area (FRSA) and encourages the California Department of Water Resources to fund this exemplary project. Biggs-West Gridley Water District is submitting this Water Use Efficiency Grant Application on behalf of the water districts of the FRSA.

The proposed regional water measurement program will develop a regional water balance to assess the efficiency of the water use in this region. As part of this program, a comprehensive measurement system tracking the inflows and outflows from this region will be developed for the service areas and the downstream areas receiving and using their discharges. This analysis will be used to estimate the water use efficiency and to examine existing and alternative water management strategies that may be incorporated into future individual or regional agricultural water management plans.

The WCWD Board has reviewed and approved this project. The Board recognizes the importance of regional water measurement and developing a regional water balance, as well as the benefits that it provides to the well being of the residents, the environment, and the economic interests of the communities in this portion of Sutter and Butte Counties. A grant from DWR will help us undertake this project; a project designed to better manage our precious water resources. We strongly encourage your support in funding this project.

Sincerely,

Ted Trimble, General Manager

P.O. Box 190
Richvale, CA 95974 | P [530] 342-5083 | F [530] 342-8233 | E WESTERNCAN@AOL.COM

SUTTER EXTENSION WATER DISTRICT
4525 FRANKLIN ROAD
YUBA CITY, CALIFORNIA 95993
AREA CODE 530 673-7138
FAX 530 673-7194

January 5, 2005

Ms. Debra Gonzalez
California Department of Water Resources
Office of Water Use Efficiency
P.O. Box 942836
Sacramento, California 94236-0001

RE: Endorsement of the Regional Water Measurement Program for the Feather River Service Area

Dear Ms. Gonzalez

Sutter Extension Water District supports and endorses the development of a regional water measurement program for Feather River Service Area (FRSA) and encourages the California Department of Water Resources to fund this exemplary project. Biggs-West Gridley Water District is submitting this Water Use Efficiency Grant Application on behalf of the water districts of the FRSA.

The proposed regional water measurement program will develop a water balance to assess the efficiency of the water use in this region. As part of this program, a comprehensive measurement system tracking the inflows and outflows from this region will be developed for the service areas and the downstream areas receiving their discharges. This analysis will be used to estimate the water use efficiency and to examine existing and alternative water management strategies that may be incorporated into future individual or regional agricultural water management plans.

The SEWD Board has reviewed and approves of this project. The Board recognizes the importance of regional water measurement and developing a regional water balance, as well as the benefits that it provides to the well being of the residents, the environment, and the economic interests of the communities in this portion of Sutter and Butte Counties. A grant from DWR will help us undertake this project; a project designed to better manage our precious water resources. We strongly encourage your support in funding this project.

Sincerely,

Paul Russell

Paul Russell, General Manager
Sutter Extension Water District