

# RECLAMATION

*Managing Water in the West*

## Water Management Planner

**Developed to meet  
the 2005 Standard Criteria  
for Evaluating Water Management Plans**



U.S. Department of the Interior  
Bureau of Reclamation  
Mid-Pacific Region

December 2005

## Introduction

The Bureau of Reclamation (Reclamation) developed this *Water Management Planner (Planner)* to assist its water service contractors (contractors) in the preparation and implementation of Water Management Plans (Plan) as required by the Reclamation Reform Act of 1982 (RRA) and the Central Valley Project Improvement Act of 1992 (CVPIA). The *Planner* is to be used by both agricultural and urban contractors of all sizes and complexities. The *Planner* can also be found on the Internet at [www.usbr.gov/mp/watershare/](http://www.usbr.gov/mp/watershare/).

The CD inside the front cover contains this *Planner* and working documents in Word and Excel that serve as format for your plan. There are also several publications that may be helpful to you while completing your Plan, such as The Methodologies for Evaluating Canal and Reservoir Lining Best Management Practices (BMP), along with BMP Implementation Calculators for urban contractors.

### **Chapter 1: Introduction.**

**Chapter 2: Guidebook.** Step-by-step instructions on completing a Plan. It also includes examples of how contractors have implemented BMPs.

**Chapter 3: Plan Format.** The Plan Format is provided in hard copy and on the CD (a Word document) so that Contractors can “fill-in-the-blanks” on the computer (preferably) or by hand. If you need additional information about how to complete the Plan, refer to the Guidebook.

**Chapter 4: Agriculture Water Inventory Tables and Instructions.** An essential part of a Plan is a set of Water Inventory Tables (Tables) that show water inflows, uses and outflows. Instructions that guide you while filling out the agricultural Tables are included. These Tables are found on the CD as an Excel spreadsheet. If you provide both agricultural and urban water, a set of Combined Tables is also included on the CD.

**Chapter 5: Urban Water Inventory Tables and Instructions.** An essential part of a Plan is a set of Water Inventory Tables (Tables) that show water inflows, uses and outflows. Instructions that guide you while filling out the urban Tables are included. These Tables are found on the CD as an Excel spreadsheet. If you provide both urban and agricultural water, a set of Combined Tables is also included on the CD.

**Chapter 6: Urban BMP Implementation Calculators.** Urban BMPs are implemented on a schedule determined by the number of connections you serve. Two Excel spreadsheets are provided on the CD to assist you to determine how many of each BMP actions your agency is expected to provide. Instructions that guide you while filling out the urban BMP Implementation Calculators are included.

**Chapter 7: 2005 Standard Criteria for Evaluating Water Management Plans (Criteria).** The Criteria, upon which the *Planner* is based, is included for your reference.

**Chapter 8: Plan Review Form.** The form, which USBR staff complete to determine whether a Plan meets the standards of the Criteria, is provided for your information.

**Chapter 9: Water Measurement.** This section includes information on water measurement devices.

**Chapter 10: Quantifiable Objectives (QOs) by Agency.** The CalFed Bay Delta Authority developed a set of actions (QOs) that agencies could implement to improve the quantity and quality of water flowing to the Delta. This is an alphabetical list of agencies with the appropriate QOs listed for each agency.

**Chapter 11: Other Useful Documents.**

**Chapter 12: Helpful Web Sites.**

The *Planner* is not the complete or final authority in water management planning. Reclamation will continue to look for new information and ways that will assist contractors with their Plans. Finally, Reclamation would like your suggestions for improving this planning tool.

Draft Plans (one paper copy and an electronic version) should be submitted to your local area office for review at the below listed addresses.

After Plans are reviewed and deemed adequate, the Mid-Pacific (MP) Regional Office (Regional Office) will request submission of final Plans to your local area office at the addresses below.

Bureau of Reclamation  
Central California Area Office  
Attention: Pete Vonich  
7794 Folsom Dam Road  
Folsom, CA 95630-1707

Bureau of Reclamation  
South-Central California Area Office  
Attention: David Woolley  
1243 N Street  
Fresno, CA 97321-1813

Bureau of Reclamation  
MP Construction Office - Willows  
Attention: Dennis Perkins  
PO Box 988  
Willows, CA 95988-0988

## **Criteria - 2005 Five-Year Plan Review Process**

The contractor submits the Plan to the appropriate Area Office water conservation specialist who performs the initial Plan review. Additional information may be requested from the contractor at this time.

After this initial review phase, the area office forwards the Plan to the Regional Office's Water Conservation Office for review. This review determines whether the Plan is adequate or needs additional work. If the Plan needs work, the Regional Office will call or send a letter to the contractor indicating the necessary changes and requesting submission of a revised plan to the Regional Office. The Regional Office will keep the Area Office informed of revisions and coordination with the contractor.

When the Plan is adequate, a letter will be sent to the contractor requesting that three paper copies and an electronic version of the Plan be sent to the Regional Office. Include a copy of the contractor's Board Resolution adopting the Plan. It is Reclamation's intention to complete this review process within 90 days. Once the Regional Office receives the complete Plan and the Board Resolution, a notice will be sent to the Federal Register advertising the Plan and requesting public comments. If there are no comments, the process is complete. If there are comments, the Regional Office will coordinate with the contractor regarding potential revisions to the Plan.

### **Annual Updates:**

The contractor submits the Annual Update on-line via the following websites.

Agriculture: [www.agwatercouncil.org](http://www.agwatercouncil.org)

Urban: [www.cuwcc.org](http://www.cuwcc.org)

The area office will review the Annual Update and determine if it is adequate or requires revision or additional information. If it needs work, the area office will call or send a letter to the contractor indicating the suggested changes and requesting submission of a modified Annual Update. When the Annual Update is adequate it is sent to the Regional Office.

### **MP Region:**

Contractors should use the Plan Format located in Chapter 3 in this *Planner* and on the enclosed CD. For assistance, please contact the water conservation specialist in your area. Contact information can found on the inside cover of the *Planner*.



## Who Should Use This Planner

Reclamation recommends that all contractors complete a Plan using this *Planner*. However, this *Planner* is much more useful if your Plan is subject to CVPIA Criteria. The Criteria are included in Chapter 7 of this *Planner* and apply to Plans submitted to Reclamation as required by applicable Central Valley Project (CVP) water delivery contracts or any other contracts that specifically invoke the Criteria.

**Exceptions.** The following contractors are excepted from the requirement to prepare a Plan using the Criteria:

- All contractors that receive **only** irrigation water from any Federal Reclamation project, and deliver water to less than 2,000 acres of land.
- All contractors that receive **only** municipal and industrial (M&I) (urban) water from any Federal Reclamation project, and provide water to fewer than 3,300 people.
- All contractors that receive less than an annual average of 2,000 acre-feet (AF) from any Federal Reclamation project.
- Contractors that do not receive water from the CVP, and the CVPIA Criteria are NOT a contractual condition of your contract.

## Flexibility and Coordination

The Criteria recognizes the differences between contractors, and have been written to be flexible enough to allow each contractor to develop and implement the types of programs that will best accomplish improved water management within their boundaries. In some cases, the contractors may choose to pool resources and implement joint programs. The Criteria not only allow, but also encourage, joint efforts toward program implementation.

## **2005 Guidebook**

### **Which USBR water contractors should use this guidebook?**

The preparation of a Water Management Plan is required by applicable Central Valley Project (CVP) water service contracts, settlement contracts, or any contracts that specifically invokes the Standard Criteria for Evaluating Water Management Plans (Criteria).

### **Exceptions.**

The following are exempted from the requirement to prepare a Plan using the Criteria:

- All Contractors that receive **only** irrigation water from any Federal Reclamation project, and deliver water to less than 2,000 acres of land.
- All Contractors that receive **only** municipal and industrial (urban) water from any Federal Reclamation project, and provide water to less than 3,300 people.
- All Contractors that receive a combination of irrigation and urban water amounting to less than an annual average of 2,000 acre-feet from any Federal Reclamation project.

## ***Definitions***

1. *Agricultural Water Management Council (AWMC)* - A consortium of agricultural water agencies and public interest groups to implement water conservation practices in California. This effort was formalized in a MOU signed in 1996. Signatory water suppliers agree to develop and implement comprehensive conservation BMPs using sound economic criteria.
2. *BMP* - A policy, program, practice, rule, regulation and/or ordinance, or the use of devices, equipment, or facilities that meet either of the following:
  - a. An established and generally accepted practice among districts that results in more efficient use, conservation/management of water, or
  - b. A practice for which sufficient data are available from existing water management projects to indicate that significant efficiency improvements or management related benefits can be achieved, that the practice is technically and economically reasonable and not socially or environmentally unacceptable, and that the practice is not otherwise unreasonable for most districts to carry out.
3. *CALFED* - State-Federal program formalized in June 1994 upon the execution of a Framework Agreement by State and Federal agencies having management and regulatory responsibility in the Bay-Delta Estuary. The mission of CALFED is to develop and implement a long-term comprehensive plan that will restore the ecological health of the Bay-Delta.
4. *CUWCC* - A consortium of urban water agencies and public interest groups to implement water conservation practices in California. This effort was formalized in a MOU signed in 1991. Signatory water suppliers agree to develop and implement comprehensive conservation BMPs using sound economic criteria.
5. *Conjunctive Use* - The planned and coordinated use of surface and ground water supplies to increase water supply reliability, as may be included in a Ground Water Management Plan or Banking Program.
6. *Contractor* - Entities that contract with Reclamation for urban and/or agricultural water.
7. *District* - The physical boundaries of the district service area.
8. *Five-Year Plan Revision* - The revision of a Plan using the most recently adopted Criteria. Under RRA, districts are required to re-evaluate and re-submit to Reclamation their respective Plans every 5 years.
9. *Ground Water Banking Program* - The intentional storage of supplies in subsurface aquifers beyond coincident irrigation needs with the expectation of subsequent retrieval for beneficial use. The district should have a reasonable rationale of how the district or customers will benefit when the water is retrieved for beneficial use. Ground water banking usually involves keeping an account of water input and the subsequent use by predetermined or specified parties. Ground water recharge alone is not a Ground Water Management Plan or a Ground Water Banking Program. An acceptable Ground Water Management Plan or Banking Program must have a

method of retrieval of such water for beneficial use.

10. Ground Water Management Plan - A set of practices and management actions that improve ground water conditions with the intent of protecting and/or increasing the benefits, including the sustainability of the ground water aquifer.

11. Ground water Recharge - The natural or intentional infiltration of surface water into the zone of saturation.

12. Implementation - Achieving and maintaining the staffing and funding necessary to achieve the level of activity called for in the descriptions of the BMPs and to satisfy the commitment by the district for a good-faith effort to optimize benefits from implementing BMPs.

13. Retailer - A district that sells water directly to the water user.

14. Riparian ET - ET from non-crop vegetation usually growing along the banks of water conveyance and storage facilities.

15. Water Conservation/Water Management - Use of less water to accomplish the same purpose(s) or the use of the same amount of water to provide additional benefits. An example of the latter is implementation of a BMP that results in increased total crop production using the same amount of water. Water management that results in the increased benefits of water can be achieved through the implementation of BMPs identified in the criteria. For the purpose of the Criteria, water conservation is considered the same as water management.

16. Wholesaler - A district that sells water to entities that resells the water, usually to multiple customers.

## Section 1: Description of the District

### *A. History*

Give a short (one page or less) historical overview of the district. Record significant historical events leading to the current state of the district and identify trends that appear likely to influence the district's future.

Enter the following information in Section 1 of the Plan Format

#### *1. Date district formed and original size*

Enter the date that the district was legally organized. Enter the date of the first contract with Reclamation. Enter the original size of the district in acres (there are 640 acres in a square mile). Enter the current year (the last complete calendar year, i.e., 2005) that will be the year of the data entered in the Plan and Tables.

#### *2. Size, population, and irrigated acres*

For the current year, enter the current size of the district (acres), urban population served (receives treated drinking water), and irrigated acres served.

#### *3. Water supplies received*

Enter the amount of water (in acre-feet) received by the district during the current year. Enter the actual amount of water received from each of the listed sources.

- Federal Urban Water - Water that is provided for municipal and industrial (M&I) use.
- Federal Agricultural Water - Water that is provided for agricultural use.
- State Water - Water from the California State Water Project.
- Other Wholesale – For example, water purchased from Santa Clara Valley Water District.
- Local Surface Water - Santa Barbara's Gibraltar Reservoir is an example.
- Upslope Drain Water – Drain or spill water that leaves the district service area and is used outside of the district service area. (applies only to agricultural districts).
- District Ground Water – Ground water that the district pumps and supplies to customers through its distribution system.
- Transferred Water - The amount of water the district bought, sold, or traded.
- Recycled Water - The amount of treated urban wastewater provided to district customers.
- Other Water – desalination water, etc.

#### *4. Annual entitlement under each right and/or contract*

Provide information on the district's entitlement or contractual amount from each source (Reclamation, SWP, ground water from adjudicated basins, drain water contracts, long-term transfer agreements, etc.). Please include each contract's identifying number and any contract restrictions that affect the districts water management. Examples of restrictions include time of



delivery or amount of water available per month. Add rows to the table as necessary.

### **5. Describe anticipated land-use changes**

Land use changes (i.e., agricultural to urban, etc.) that may affect water use type or quantity due to possible, proposed, or current-zoning changes should be addressed. Such changes might include: land annexation, increasing urbanization, or changes to the area's General Plan.

### **6. Cropping patterns (Agric only)**

Identify crops that are grown on 5 percent or more of the district's irrigated acreage and provide the total number of acres for each of those crops. If there are a number of crops grown on small acreage, combine them into one group, and list the combined acreage on the OTHER (<5%) row in the table. Detailing this information for the periods identified in the table provides a perspective on how the district's mix of crops is changing. Use the crop list provided in Attachment D of the Plan Format. Add rows to the table as necessary.

### **7. Major irrigation methods (Agric only)**

List the major irrigation methods used on most acreage within the district for each of the specified years. Combine the acreage of the other irrigation methods into one group and list the combined acreage on the "Other" line in the table. Quantifying this information for the periods provided in the table gives the reader perspective on how the district's mix of irrigation methods is changing. Identify the irrigation methods as listed in Attachment D of the Plan Format. Add rows to the table as necessary.

## **B. Location and Facilities**

Attach a district facilities map that shows points of delivery, turnouts (internal flow), and outflow (spill) points, measurement locations, conveyance system (identify pipelines, lined and unlined canals, etc.), storage facilities, operational loss recovery system, wells, water quality monitoring locations, the location of measuring devices, pumping stations, regulating reservoirs, etc.

### **1. Incoming measurement methods and locations**

Identify each incoming flow to the district (use same names as shown on facilities map), type of measurement device (flume, weir, propeller, acoustic, venturi, magnetic), and accuracy.

### **2. Current Agricultural Conveyance System**

Enter the length (i.e., 1.2 miles) of unlined and lined canals and laterals, pipe, and other types of distribution facilities (such as natural channels). There are 5,280 feet in a mile.

### **3. Current Urban Distribution System**

Enter the length (i.e., 1.2 miles) of asbestos concrete, steel, and cast iron pipe in the distribution

system. Combine the total length of other types of pipes (i.e., plastic) in the “Other” category.

#### ***4. List storage facilities***

Identify district storage facilities (use same names as shown on facilities map), including volume. Include tanks, reservoirs, etc.

#### ***5. Describe agricultural spill recovery system***

Describe the district’s spill recovery system – where and how distribution system spill water is collected and where it is re-used. Include spill locations on the facilities map.

#### ***6. Agricultural delivery system operation***

Describe how agricultural customers schedule water deliveries from the district. Identify whether the delivery system provides water:

- a. on demand (i.e., customers receive water at any time without notice).
- b. on request (i.e., customer requests start time, flow rate and quantity).
- c. on a rotation basis (i.e., customers get water every 10 days).
- d. some combination of methods.

#### ***7. Describe restrictions on the district's water source(s)***

If the district’s water supplies are constrained in some manner that limits water management and operations, explain. Restrictions might limit the amount of water or time of use. The cause of a restriction might be a contractual or physical limitation. Include information about operational constraints the restrictions impose on water management. Examples of operational constraints include receiving surface drainage from an upslope district with no control over quantity or timing, or the inability to supply the quantity of water needed by the growers due to insufficient canal capacity.

#### ***8. Describe proposed changes or additions to district’s facilities and operations for the next 5 years***

Examples include changes to service area, lining/piping of existing canals, and installation of measurement devices with improved accuracy, etc.

### ***C. Topography and Soils***

#### ***1. Describe topography of the district and its impact on water operations and management***

Describe the topography (e.g., hilly, flat, sloping to a watercourse) of the district. Discuss any impact of topography on district’s water management. An example of a topography impact would be if lower sections of a gravity piped water distribution system have excessive pressure while upper portions of the system have inadequate pressure. Topography also affects drainage

capture and reuse.

## **2. Describe district's soils associations (Agric only)**

Provide district's soil associations. An NRCS general soils map of the district service area will generally be the clearest way to present soils information. Provide as Appendix B.

*Where can soil classification information be obtained? <http://www.nrcs.usda.gov/>.*

*The NRCS (formally the Soil Conservation Service) has soil survey information for most agricultural regions in California. Recent surveys (within the last 25 years) contain a single map called the "General Soil Map." These maps group soils into what are called soil associations and are appropriate for this Plan. Soil groupings are made according to soil characteristic similarities, such as texture, depth, salinity, slope, flooding potential, impervious layers, etc. An awareness of these soil groupings can help target BMP programs - such as in areas where distribution canals might have high seepage rates or in areas of tailwater quality problems. Reclamation's soil classification system is based on projected economic return from different classes of soils and is NOT appropriate for this Plan.*

## **3. Describe limitations resulting from soil problems (Agric only)**

Describe any limitations resulting from soil problems (e.g., salinity, high water table, high or low infiltration rates, etc.) within the district. If the district provides water to an area that has a high water table or other water or drainage related problem, identify the problem, number of acres with that problem, and what impact the problem has on water use. District staff and customers will have knowledge of soil limitations and the resulting impacts on water management. For instance, crops grown on poor soils may require more water than crops grown on good soils. If the district can identify terrain and soils that use more than average amounts of water, these areas can be targeted for improved management programs.

## **D. Climate**

### **1. Describe the general climate of the district service area**

Describe the general climate of the district (available from the National Weather Service, etc.). Local newspapers or weather service companies may also provide a concise description of local weather patterns. For weather data, specify the period of record (30 years recommended) and reference (weather station) used. Historic weather data from the National Weather Service climatological stations provide all the requested data. Identify which station you selected and how many years of records were available. The web site address is: [www.wrcc.dri.edu/summary/](http://www.wrcc.dri.edu/summary/).

#### ***Average wind velocity.***

If this information is not available, please enter "Not available"

*Average annual frost-free days*

If this information is not available, please enter “Not available”

**2. *Impact of any microclimates on water management within the district***

Where appropriate, relate climate to water use. Are there special microclimates in the district that require more (or less) water? The impact of climate may be similar to the impact of soil and terrain.

**E. *Natural and Cultural Resources***

**1. *Identify natural resource areas within the district***

Identify natural resource areas, size of each (in acres), and describe. Examples of natural resources include wetlands, vernal pools, streams, and wildlife refuges. A map may be the clearest way to provide this information.

**2. *Describe management of these resources in the past or present by the district***

If the district provides water to natural resource areas or manages them, describe the district’s role. District staff probably works with the U.S. Fish and Wildlife Service, NRCS, U.S. Army Corps of Engineers, or the California Department of Fish and Game to identify natural resource areas and threatened and endangered species in the district.

**3. *Identify recreational and/or cultural resource areas***

Identify recreational and/or cultural resource areas, size of each in acres, and describe. Examples of recreational resources are sites used for rafting, water skiing, and fishing. Examples of cultural resources are archaeological and historical sites. A map may be the clearest way to provide this information.

**F. *Operating Rules and Regulations***

**1. *Attach a copy of the district's operating rules and regulations***

Attach only the rules and regulations that apply to water supply and use. Note: If the district supplies no agricultural water, write “No Ag” in Section F 2 to F 4 and skip to Section G.

**2. *Describe the district's agricultural water allocation policy***

Describe the district's agricultural water allocation policy. Identify the page number(s) of the relevant sections in the district’s rules and regulations (Appendix C).

**3. Describe official and actual lead times necessary for water orders and shut-off (Agric only)**

Describe the water ordering system. Identify the page number(s) of the relevant sections in the district's rules and regulations (Appendix C). Describe any differences between actual operations and the official rules, such as water delivery orders being filled in 12 hours when the rules say 24 hours is the minimum.

**4. Describe the district's policies regarding surface and subsurface drainage from farms**

Describe how the district deals with surface and subsurface drainage. Identify the page number(s) of the relevant sections in the district's rules and regulations (Appendix C).

**5. Describe the district's policy on water transfers by the district and its customers**

Describe the district approach to water transfers. Identify the page number(s) of the relevant sections in the district's rules and regulations (Appendix C).

**G. Water Measurement, Pricing, and Billing**

Accurate water delivery measurement is an effective water management tool because both the water user and the district are aware of quantity, timing, and location of water use.

**Agricultural Customers**

A customer is defined here as a farm. A farm may have multiple delivery points, different lessees during the year, and even multiple lessees farming subsections of a farm at one time. A turnout is a water delivery point. Farms may have multiple water delivery points. All turnouts have some method of controlling water flow, but measured turnouts are those which can accurately measure the quantity of water delivered (within plus or minus 6 percent).

**1. Provide total number of farms**

A farm would generally be an area of land with a county assigned Assessor Parcel Number (APN). Contiguous APNs with the same owner may constitute one farm.

**2. Provide total number of delivery points**

The point at which water leaves the district delivery system and enters the customer distribution system is the delivery point.

**3. Provide total number of delivery points serving more than one farm**

This is when the district has delivery points at which water leaving the district delivery system can enter two or more separate farm distribution systems. In this situation the customers are often



responsible for determining how much water each of them receives.

**4. *Provide total number of measured delivery points.***

A measured delivery point is one with a device that is operated and maintained to a reasonable degree of accuracy - under most conditions within +/- 6 percent. Three categories of measurement devices that may meet this criterion are devices with totalizers, standard flow measurement devices, and non-standard but calibrated devices.

**5. *Provide percentage of delivered water that was measured at a delivery point.***

Provide the percentage of delivered water that was measured at a delivery point within +/- 6 percent.

**6. *Complete measurement device table.***

Provide the number of each type of measurement device used by the district, the accuracy of that type of device, how often the device is read and the calibration and maintenance schedule.

The accuracy of the district's measurement devices may have been determined during installation, but periodic calibration is necessary to maintain accuracy. For the various devices, provide the maintenance interval that the district has determined necessary. (See Chapter 11 for information on the Calibration and Maintenance of Measurement Devices.)

**Urban Customers**

**1. *Provide total number of connections***

A connection is the point at which water leaves the district delivery system and enters a separate distribution system. For instance, a city park may have one or more connections.

**2. *Provide number of metered connections***

Determine the number of connections that have installed meters. Connections with meter boxes but no meters are not metered connections. All connections have valves to control water flow, but measured connections also have meters.

**3. *Provide number of connections not billed by quantity***

Determine the number of connections that are billed by quantity of water flowing through the meter. A City park which has a meter but which is not billed for water use is not billed by quantity.

**4. *Provide the percentage of water that was measured at delivery point***

This will require an estimate of the amount of water provided to unmeasured accounts.

**5. *Provide the percentage of water that was billed by quantity***

Some cities do not bill city departments (parks, sanitation, etc.) for water use. The quantity of water delivered but not billed should be determined and calculated as a percentage of the total.

**6. *Complete measurement device table***

Provide the number of each size of displacement meter used by the district, the accuracy of those meters, how often the device is read and the calibration and maintenance schedule. Identify the number of other types of meters (turbo, compound, etc.), size, accuracy, reading schedule and the calibration and maintenance schedule

The manufacturer has determined the accuracy of their meters, but periodic calibration is necessary to maintain accuracy. For the various devices, provide the maintenance interval that the district has determined necessary. Add rows to the table as needed.

**Agricultural and Urban Customers**

**1. *Describe the district's current year agriculture and/or urban water charges.***

Describe the district's current year urban and/or agricultural water charges, including dollar amounts for fixed/stand-by fees and quantity charges. Describe the rate structure for urban water deliveries (flat rate, tiered rate, seasonal rate, etc.). Describe the rate structure for agricultural water deliveries that are billed by quantity (i.e., first 3 AF per acre at \$30 per AF, additional AF per acre at \$36 per AF). Describe billing frequency and bill format.

Appendix C, Rules and Regulations should contain the current year water charge ordinance. Identify the page number where the current year rate ordinance can be found in Appendix C.

**2. *Annual charges collected from customers (current year data)***

Complete this table for the current year.

For fixed charges, identify the current year charge for each unit (per acre per year, 1” monthly meter charge, etc.) and how many “units were billed during the current year (acres, 1” meters times 12 months, etc.). Include the total dollar amount collected from each charge.

For volumetric charges, identify the current year charge for each unit (per acre foot, per HCF in tier 1, etc.) and how many “units were billed during the current year (acre feet, total HCF sold in tier 1, etc.). Include the total dollar amount collected from each charge.

**3. *Describe the district's water-use data accounting procedures.***

Describe the district water-use data accounting systems and procedures. Typical systems include standard computer software, district-specific software, and ledgers. The description of the accounting procedures should document how customers access their water-use history and how many years of historic data are available to them. Appendix D should contain examples of actual bills (for each customer category) and discuss how easy the bills are to understand and how they provide customers with current water-use data, comparative yearly-use data, and pricing signals.

## **H. Water Shortage Allocation Policies**

### ***1. Attach the district's current year water shortage policies.***

Include the district water shortage allocation plan as Appendix E. It should detail how reduced water supplies and hardship water will be allocated. If the district has different policies for various customer types (i.e., agricultural or urban), attach both plans.

Districts that deliver more than 2,000 AF of water are encouraged to have a water shortage contingency plan. For development of an urban Water Shortage Plan, assistance is available from DWR at [www.owue.water.ca.gov/urbanplan](http://www.owue.water.ca.gov/urbanplan) and from USBR at [www.usbr.gov/mp/watershare/](http://www.usbr.gov/mp/watershare/). Contact your local area office for assistance developing an agricultural water shortage plan.

### ***2. Attach the district's current year policies that address wasteful use of water.***

Identify rules and regulations that address wasteful use of water. Include information on enforcement methods. Identify the page number(s) of the relevant sections in the district's rules and regulations (Appendix C).

## Section 2: Inventory of Water Resources

*Note: If the requested information is not available, describe how that information will be obtained for the next Plan revision or state that the information is historical and cannot be reconstructed*

Information developed in this section will allow you to calculate a water inventory. A water inventory is a simplified water balance, quantifying how much water comes into the district, how that water is used within the district, and how much water leaves the district. Data entered should be for the current year - identified at the beginning of your Plan.

### ***A. Surface Water Supply***

#### ***1. Acre-foot amounts of surface water delivered to the district by each of the district's sources.***

In Table 1 of the Water Inventory Tables, quantify all district surface water supplies. Specify the type of water (i.e., urban, agricultural, class II, spill, etc.) and the quantity of each delivered to the district by month. If you do not receive State water, local surface water, or other surface water then those columns will be blank. In Table 8, quantify the amount of each type of surface water the district actually received in each of the last 10 years. If the district has sources of surface water that are not listed in the table, add the necessary columns.

### ***B. Ground Water Supply***

#### ***1. Acre-foot amounts of ground water pumped and delivered by the district.***

Quantify district ground water supplies in Table 2. Specify the monthly amount of ground water pumped by the district. The “Pumped by Customers” column asks only for an estimate of private ground water pumping – either by month or year. If the district and/or private parties do not pump ground water, these columns will be blank.

#### ***2. Ground water basin(s) that underlie the district.***

Information necessary to describe ground water basins can be found in California DWR Bulletin 118, which identifies ground water basins in California. Bulletin 118 describes the general boundaries of each basin and indicates if there is evidence of overdraft. You can use this Bulletin to identify the basin or basins that underlie your boundaries and their size, usable capacity, and safe yield. Large ground water basins underlie several districts. In a few cases, districts overlie more than one ground water basin.

#### ***3. Contractor operated wells and managed ground water recharge areas.***

The Plan should provide a map of the district that locates district ground water wells and any managed ground water recharge areas (Appendix F).

***4. If there is conjunctive use of surface and ground water, describe it.***

Information necessary to adequately describe ground water conjunctive use programs includes:

- a. Determination of the ground water quality (i.e., is the ground water quality adequate for direct use or is blending required?).
- b. The amount of ground water storage capacity currently available and how much additional storage could be available by extracting ground water for use.
- c. The location of existing and potential recharge sites (spreading basins, in-stream, or injection wells) and identification of the soil types and resulting recharge rates.
- d. Determination of hydraulic continuity between the possible recharge and extraction areas.
- e. Identification of possible sources of recharge water and the quantities, qualities, and period of availability for each source.
- f. For districts without district-owned wells, describe how the district receives compensation from the beneficiaries of the ground water recharge.

***5. For managed ground water basins, attach a copy of the management plan.***

If the district or its customers use ground water from a managed or adjudicated ground water basin, attach a copy of the Plan (Appendix G).

***6. For participation in ground water banking, attach a description of the banking plan.***

If the district participates in ground water banking, attach a description of when and how much water was banked, and when and how much is available for retrieval (Provide a copy of the banking plan (Appendix H)).

***C. Other Water Supplies***

*Acre-foot amounts of “Other” water used as part of the district’s water supply.*

All surface and ground water supplies should be identified and quantified in Tables 1 and 2. For instance, a desalinated or level 2 water that was delivered during the current year should be included as part of the year’s water supply. Quantify long-term “Other” water supplies in Table 1 and define in the header.

***D. Source Water Quality Monitoring Practices***

***1. Water quality problems.***

Describe any surface water or ground water quality problems and how the quality problems limit the use of the water or affect customer water-use decisions. For instance, if ground water is high in salts or expensive to pump, how does this impact the district surface water supply? If a potable supply is high in salts, do customers use home water softeners?



**2. Potable Water Quality (Urban only).**

Attach the current year Customer Water Quality Report (Appendix I) that is mailed to all customers. This report provides information on the quality of each of the district’s water sources. If there are water quality concerns and/or problems, describe how they affect the district’s water treatment process and its customers

**3. Agricultural districts.**

Indicate if the district has any surface or ground water quality issues that affect customer-use decisions.

Concerns      Yes \_\_\_\_\_      No \_\_\_\_\_

If there are water quality concerns and/or problems, describe the quality problems and how they affect the water’s use.

**4. Description of the water quality testing program and the role of each participant in the program.**

Describe the water quality testing program – which agencies are involved, how the program is funded, the frequency of each analysis, results of analyses, and identified problems or concerns.

**5. Current year water quality monitoring programs.**

If there are water quality concerns and/or problems, identify which agencies participate in the Water Quality Testing Program and which agency conducts the program.

For surface water, identify the analyses performed, the frequency of the tests and the results (concentration range and average).

For ground water, identify the analyses performed, the frequency of the tests and the results (concentration range and average).

If there are no water quality issues, enter N/A.

**6. Agricultural districts current year total dissolved solids (TDS) range for surface water and ground water.**

Surface water: \_\_\_\_\_ ppm

Ground water: \_\_\_\_\_ ppm

Enter the TDS range by source. This is requested due to its impact on the leaching requirement. Describe how the district’s customers are notified of changes in the quality of water they are receiving from the district, i.e., when delivered water TDS is above normal for your system.

## ***E. Water Uses within the District***

### ***1. Agricultural***

In the Water Inventory Tables, Table 5, list the crops grown (use the crop list provided in Attachment D of the Plan Format) in the district. For each crop, list the irrigated acres of the crop, crop ET, leaching requirement, water used for cultural practices (frost protection, pre-irrigation, etc.), and effective precipitation. The spreadsheet formulas will combine these values to determine the total water demand (AF) of each crop. You may wish to combine crops grown on less than 5 percent of the total irrigated acreage. To combine crops, determine an average crop ET, leaching and cultural requirement, and effective precipitation for this group of small acreage crops. The crop ET for crops in your area can be found in DWR California CIMIS Database, Cal Poly Irrigation and Training Research Center (ITRC) and Center for Irrigation Technology (CIT) Bulletin 113-3 (April 1975) or obtained from the DWR district office or the local farm advisor. The local UC Cooperative Exchange office can also provide information on crop ET and water used for leaching and cultural practices. Effective precipitation by crop must be determined locally or you may contact Reclamation for assistance.

### ***2. Types of irrigation systems used for each crop***

List the crops grown in the district and how many acres of each type of irrigation used on each crop. The types of irrigation systems used on each crop can help the district to target customer assistance programs, workshops, and educational materials. When the district collects information for the yearly Reclamation Crop Report, request information on the number of acres of different irrigation systems used on each crop. Expanding an existing report will minimize district and customer cost and paperwork. Use the five general irrigation system types – basin, furrow, sprinkler, low-volume and Combination (sprinkler and furrow, etc.).

### ***3. Urban***

Quantify the number of connections and yearly water use for each of the following customer account types.

- a. Single-Family - A connection that serves a single detached residence.
- b. Multi-Family - A connection that serves a building containing multiple dwelling units or an individual unit in a building containing multiple units.
- c. Commercial - A connection that serves businesses that provide or distribute a product or service, such as hotels, restaurants, office buildings, commercial businesses, or other places of commerce.
- d. Industrial - A connection that serves primarily manufacturers or processors of materials.
- e. Institutional - A connection that serves institutions dedicated to public service. This includes schools, courts, churches, hospitals, and government facilities. All public service facilities are to be considered institutional connections regardless of ownership.
- f. Landscape Irrigation - A connection that serves an urban landscaped area.
- g. Wholesale - A connection that provides water to a water agency.
- h. Recycled - A connection that provides recycled urban wastewater.

- i. Other (specify).
- j. Unaccounted - the quantity of water that is treated but not sold - lost through leaks, breaks, slow meters, fire fighting, line flushing, etc.

#### ***4. Urban Wastewater Collection and Treatment Systems serving the district service area***

Describe the wastewater collection and treatment systems serving the district service area. Include the level of treatment, quantity of water treated, and place of disposal of the treated water. Water providers that do not provide wastewater treatment services should request this information from the wastewater agency.

- a. Waste treatment plant - Provide the names of the wastewater plants serving the district service area.
- b. Treatment level (1, 2, 3) - If there are different treatment streams, quantify the AF treated to each level during the current year.
- c. Disposal to - Identify where the treated wastewater is discharged (i.e., ocean, river, percolation ponds, etc.) and how the recycled water is used (i.e., landscape, toilet flushing, etc)
- e. Total discharged to ocean/saline sink - Quantify the AF discharged to these areas during the current year.

#### ***5. Ground water recharge/management/banking***

Identify contractor operated ground water recharge areas (as identified in Section 2 B). List the quantity of water used for planned ground water recharge, including method of recharge.

A ground water recharge program uses surface water to recharge a ground water basin for later withdrawal or provides surface water to farmers that normally pump ground water (in lieu of recharge) so that the ground water is left in the ground. Describe each recharge location with respect to soil type, method of recharge, percolation or injection rate, and hydraulic continuity with the extraction areas. Include the AF recharged in the current year. Do not include incidental recharge, such as canal seepage or deep percolation resulting from excess irrigation, unless data relating to the above points has been developed.

If you participate in a defined ground water banking system, describe it here or attach a description. In order to participate in a ground water banking program, water must be able to be withdrawn at a later date. Describe how water that was percolated into the ground will be withdrawn for district or customer use.

#### ***6. Transfers and Exchanges***

*Transfers into or out of the district.*

Describe the source and quantity of water in any transfer, trade, exchange, reschedule to another year, purchase or sale, into or out of the district, and for what uses. Information on transfers and exchanges within the district is not requested. Transfers refer to water exchanges, sales, or other agreements that transfer or exchange water between water districts or users, such as:

- a. Agriculture to urban
- b. Urban to agriculture
- c. Agriculture to agriculture
- d. Urban to urban

### ***7. Wheeling or other transactions***

List wheeling or other transactions not covered above that involve moving water into or out of the district. Provide the following information for the current year: from whom to whom, acre-feet of each transaction and use.

### ***8. Any other uses of water***

If there were other uses of water not covered above, describe them (e.g. water for hydroelectric power, water used to meet water quality objectives, emergencies, environmental deliveries, etc.) and the quantities involved.

## ***F. Irrigation Drainage from the District***

If a district has drain water, but does not monitor quality of the surface and/or subsurface drain water, the Plan should state how this information would be collected in the future. If the district has no surface or subsurface drain water, state “None” and leave this section blank.

### ***1. Surface and subsurface drain/return flow.***

Identify the drains that carry drainage flows within and out of the district (show on the facilities map, Appendix A) and specify where drain flow is used within the district. If surface drain water leaves the district's service area and is reused, identify the general location and type of that reuse. For example, if the district surface return flow is discharged into the Sacramento River, the Plan should state that irrigation runoff and operational spills are returned to the Sacramento River. In this case, specific downstream uses would be unknown.

If subsurface drain water is collected and leaves the district's service area and is then reused, identify the general location, type of that reuse. If surface and/or subsurface drain water is used within the district for agriculture, wildlife refuges, M&I, or other purposes, do not describe.

### ***2. Identify which agency manages the drainage water quality testing program and describe the district role in the current year program.***

If the district conducts, participates, or funds any part of a drainage-testing program, please describe those activities.

### ***3. Drainage Water Quality Testing Program***

Include the information listed below:

- a. Analyses performed
- b. Concentration range
- c. Frequency range
- d. Average

**4. Usage limitation resulting from the drainage water quality.**

Describe the constituents in the drain water (i.e., selenium, boron, etc.) and the resulting limitations on use. For instance, excessive nitrates would limit the use of drain water for domestic consumption but not for agricultural use. High salt concentrations may limit the use of drain water for agricultural use.

*Contractors included in the drainage problem area, as identified in, A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990), should also complete Attachment A*

**G. Water Accounting (Inventory)**

Develop a water inventory for the district for the current year. The intent of the water inventory is for districts to quantify water supplies, uses, losses within the district and outflow.

Knowledge of the amount of water used for various purposes can lead to improved water management. A water inventory also identifies where a district lacks information. When analyzing BMPs, the water savings resulting from an individual practice can be estimated based on the water inventory. Completing Tables 1 through 8 provides all the water inventory data. If you have completed Tables 1 through 8, skip to the next section.

**1. Quantify districts water supplies.**

To complete this section, enter the necessary data in the listed tables

- a. Surface water supplies, imported and originating within the district, by month (Table 1, completed in Section 2 A).

Quantifying surface supplies by month will allow districts to show what supplies are used to meet water demands (including ground water recharge).

- b. Ground water extracted by the district, by month (Table 2, completed in Section 2 B).
- c. Effective precipitation by crop (Table 5).

The district will have to calculate this information based on when the crop was planted, the soil moisture profile and precipitation patterns and intensity. Information is available from ITRC and CIT. DWR district staff or local farm advisors may also have information on the effective precipitation amounts for the crops grown in your district.

d. Estimated annual ground water extracted by non-district parties (if records are not available, provide an estimate and basis for estimation) (Table 2, completed in Section 2 B).

Urban water wells are usually metered, and the information is generally available by contacting the pumpers. If the district does not have ground water production records for private agricultural ground water pumpers, use the following method to estimate the quantity pumped:

- (water needed for crop ET) + (water needed for leaching) - (effective precipitation) = (crop water need)
- (crop water need)/(irrigation efficiency) = (estimate of applied water)
- (estimate of applied water) - (amount of water delivered by the district) = (estimate of private ground water pumped)

A similar method can be used to estimate the private urban pumping.

e. Recycled water, by month (water originating from a municipal wastewater treatment plant) (Table 3, completed in Section 2 E 2).

Recycled water is urban wastewater that is treated and available for reuse.

f. Other supplies, by month (Table 1).  
To be defined by the district.

**2. Quantify water used.**

To complete this section, enter the necessary data in the listed tables.

a. Conveyance losses, including seepage, evaporation, and operational spills from canals; and (urban) leaks, breaks, fire, and flushing from pipes (Table 4)

Types of canal losses include seepage, evaporation, and operational spills. Losses from piped urban distribution systems results from leaks, breaks, flushing, and fire fighting.

Canal seepage is the most difficult to calculate. Seepage from unlined canals varies as soil characteristics change so the rate of loss per section requires ponding tests, good metering or some other technique. Evaporation can be calculated by determining the surface area of the canals and regulating reservoirs and applying the local evaporation rate. Operational spills can usually be calculated since the end of a canal is generally a weir or other structure that could be calibrated. Describe how the values were determined or estimated. See the Canal Lining and Reservoir Lining documents in Chapter 11.

Conveyance seepage is considered a loss of irrigation water, and sometimes, ground water recharge. For example, when the Friant Unit's class II water is available, conveyance seepage in some cases may be considered a ground water recharge method. However, when contract water is conveyed, seepage often results in loss of water intended for irrigation, increasing pumping costs and degrading water quality. Practices that reduce seepage can help districts use water more efficiently, but may require new methods and locations for ground water recharge.

Losses from urban distribution systems can be calculated by conducting a system water audit. The AWWA Water Audit Manual has complete instructions, worksheets, and examples.

b. Consumptive use by riparian vegetation (Table 6)

Estimate the annual consumptive water use by riparian vegetation inadvertently or intentionally provided with district water. Do not include riparian vegetation located at an environmental or recreational resource. Estimate the total acres of incidental riparian vegetation and an overall use (based on ET during the months when water is available) to obtain an estimate of consumptive use. Information may also be available from local farm advisors and neighboring districts.

c. Applied irrigation water, crop ET, water used for leaching and for cultural practices (e.g., frost protection, soil reclamation, etc.) (Table 5)

This section quantifies crop water need. Crop water need includes crop ET and water used for leaching and cultural practices. Determine the total crop water need for each crop.

ET requirements for different crops in different climates can be found in DWR Bulletin 113-3 (April 1975), Oregon State University Miscellaneous Publication 8530 (1992) and Nevada Department of Conservation and Natural Resources, Division of Water Planning, Miscellaneous Publications. Information is available from ITRC and CIT. DWR district staff or local farm advisors may also have information.

d. Urban water use.

Determine total water sales and other authorized uses. Do not include losses, fire fighting, and system flushing, as these were included in Table 4, Distribution System Losses.

e. Ground water recharge (Table 6)

Quantify water used by the district for the purposeful recharge of ground water, including recharge ponds and water injected for recharge. Purposeful ground water recharge is a program that determines when and where the water will be recharged and extracted – not just general deep percolation of surface water.

f. Water exchanges and transfers (Table 6)

Quantify inter-district water transfers.

g. Estimated deep percolation within the district (Table 6)

Deep percolation is usually estimated as the difference between applied water (minus any runoff leaving the district) and crop water use. Some deep percolation may be necessary for leaching. Excess deep percolation is considered an economic loss since unneeded ground water is purchased, ground water quality is degraded and energy is used for unnecessary pumping. Water

applied for intentional recharge is not deep percolation. Table 6 calculates an estimate of the current year's deep percolation.

h. Agricultural flows to perched water table or saline sink (Table 7)

Calculate, or if necessary, estimate the amount of deep percolation or drainage that flows to a saline sink (the ocean, Kesterson, etc.) or to a perched water table (within 5 feet of the soil surface).

i. Agricultural irrigation spills or drain water leaving the district (Table 6)

Calculate, or if necessary, estimate the total return flows (surface outflow) leaving the district.

j. Other (Table 6)

Quantify any other uses of water within the district. Include in the non-agri or non-urban row. This may be incidental urban use in an agricultural district or incidental agricultural uses in an urban district.

### **3. Overall water inventory.**

Compare total water estimated to be available for sale within the district with the total water actually sold by the district (Table 6).

Table 6 compares total water available for sale with total water sold. This water budget usually identifies areas where water management could be improved and thus helps the district to select and implement appropriate BMPs. Evaluation of the BMPs in Sections 3 and 4 requires an estimate of how much water may be conserved by each practice. Parts of this process are imprecise. For example, estimating water savings from education programs is very difficult. However, this process will help the district to estimate the amount of potential water savings and the costs of achieving those savings.



## Section 3: BMPs for Agricultural Contractors

Any Contractor that provides water to 2,000 farmed acres or more must complete this section.

However, if a primarily Urban Contractor provides some Agricultural Water, they are required to include Agricultural BMP 1 (Water Measurement) and BMP 4 (Pricing Structure) in their plan.

Once a Contractor provides water to 2,000 farmed acres or more they are required to address **all** the BMPs in Section 3, BMPs for Agricultural Contractors.

In this section, describe the water management program the district determines will best accomplish each BMP. The success of some of the practices will depend on cooperative work with other entities. Monitoring implementation activities and results will allow the district to modify planned programs that do not accomplish the practice as designed.

Some BMPs are considered universally applicable (critical) and others are considered “generally applicable” (exemptible). Under certain circumstances, one or more of the exemptible BMPs may not be appropriate for district implementation. The district will implement each exemptible BMP unless the district provides adequate documentation that supports an exemption or states the reason the BMP is not applicable in accordance with Attachment B.

Wholesalers must insure that their subdistricts have an adequate Plan found to meet the Criteria. Wholesalers may include subdistricts in a single Plan or require each retailer to prepare separate Plans. If subdistricts prepare their own Plans, the wholesaler should be involved to the extent necessary to insure it is found to meet the Criteria.

*Note: If the requested information is not available, describe how that information will be obtained for the next Plan revision or state that the information is historical and cannot be reconstructed.*

For each BMP, describe how the plan will be carried out, including actions and timelines, budgets, staff, and projected results (e.g., changes in water and energy use, chemical inputs, improved yields, increased habitat) for at least 3 years. Identify how each BMP will be monitored to see if it is achieving the projected results.

### ***A. Critical BMPs for Agricultural Contractors***

Critical BMPs are those that every Reclamation agricultural district is expected to implement. These BMPs are considered to be the basic elements of good water management. Select a program design for each critical BMP that will provide maximum benefit to the district and its customers.

#### ***1. Water measurement***

Measure the volume of water delivered by the district to each customer with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6

percent. Three categories of measurement devices that may meet this criterion are devices with totalizers, standard flow measurement devices, and non-standard but calibrated devices.

The **first category** includes devices with totalizers that measure volume: Propeller meters, Venturi meters, magnetic meters, and acoustic meters. These have a high level of accuracy with proper installation and periodic maintenance and calibration.

The **second category** includes standard flow measurement devices that measure flow rate and also require accurate measurements of water level and delivery time to determine volumes: Replogle and Parshall flumes; rectangular, trapezoidal (Cipolletti), and V-Notch weirs; and canal meter gates. These devices require proper installation; continuous or sufficiently frequent recording of water levels and flow rates; delivery beginning and ending times; adjustments for approach velocity in some cases; and regular maintenance and calibration for good accuracy.

The **third category** includes non-standard, calibrated flow measurement devices. This category includes special measurement devices developed by a district. Typically, there are no published standard dimensions or flow tables for such devices. Consistent dimensions and installations; accurate determination of delivery time; local calibration and a verification of accuracy, based on a representative sample number of devices measured over time; and a proposed schedule for maintenance and calibration would be necessary for acceptability. This category also includes calibrated pumps when the suction side water level fluctuation is small when compared to the lift (+/- 6 percent) and the discharge pressure is not changed.

*Refer to the Calibration and Measurement document, Chapter 11, for examples of installation, calibration, and maintenance of measurement devices that are described here*

Rough estimates of flow rate or volume, such as flow rate estimates at check structures, the sum of siphon tubes, or the use of occasional flow readings and multiplying by the time between readings (or other methods of measurement not specified here), are **NOT** acceptable as they do not provide a documented reasonable degree of accuracy.

Estimates of flow rate or volume based on one moment of time and assumed continuous over a period of more than an hour are **NOT** acceptable. Flow rate estimates at check structures or the sum of siphon tubes (or other methods of measurement not specified here), are **NOT** acceptable, as they do not provide a documented reasonable degree of accuracy.

- a. Provide total number of customer turnouts that are unmeasured or do not meet the standards listed above.
- b. Provide number of appropriate measurement devices installed last year.
- c. Provide number of appropriate measurement devices installed this year.
- d. Provide number of appropriate measurement devices to be installed next year.

Water measurement of each turnout has many benefits. When customers know how much water they use for incremental time periods (monthly, per irrigation, etc.), they are able to make informed economic decisions. The distribution system can be correctly sized and operated to provide the water quantities and timing that customers need. Contractor costs for pumping, canal

maintenance, and drainage can be controlled. Measurement devices (meters, flumes, weirs, sonic, etc.) should be selected based on the characteristics of the district's distribution system, water quality, and delivery requirements. It is important to implement a maintenance and/or replacement program in conjunction with the installation program, because measurement devices become less accurate over time.

Contractors that measure deliveries can provide customers with their historic water delivery records. Customers can then determine what quantities of water were applied to crops in previous years and evaluate their irrigation systems and operations.

An example of a measurement program is the one implemented by the Laguna Irrigation District. The Laguna Irrigation District delivers water to 32,000 acres of agricultural land. In 1988, the district began a project to install propeller meters on all district delivery turnouts. The goal of the project was to ensure that all growers in the district received an equitable share of the available water. There was no method of measuring water deliveries prior to this program.

When the Laguna Irrigation District implemented the metering program it had over 500 turnouts. To reduce cost, the district purchased 180 portable propeller meters of various sizes. Contractor personnel installed these meters at delivery turnouts when a grower received water and read the meters daily during a water delivery.

This program allowed the district to change from a rigid delivery schedule to an arranged demand system, which features flexible flow rates and shut off times. The new system ensures the equal distribution of available water.

The Laguna Irrigation District reports that flexible deliveries allow growers to irrigate crops according to crop need, increasing irrigation efficiency, and reducing deep percolation. It also helps growers to more closely monitor water application and identify high-use fields. A comparison of deliveries in 1987 (before metering) and 1991 (after metering) indicates that 8 percent less water was used in 1991.

The Laguna Irrigation District also purchased a computer and database software to compile the meter readings, a rack to store the meters, repair parts for the meters, and staff training courses. They hired a consulting agency to administer the program. Project cost was approximately \$260,000. The district customers are pleased with the metering/billing system.

## ***2. Designate a water conservation coordinator***

Provide the name, title, business mailing address, phone number and e-mail address of the district staff person responsible for Plan development and implementation. For small districts, this could be a part-time responsibility. For larger districts, this may be a full-time responsibility with additional staff.

If a consultant is hired to write this Plan, the district should designate a district staff member as conservation coordinator to manage the work and communicate with Reclamation.

Reclamation offers workshops to assist with Plan development and will provide technical assistance to the district during Plan preparation and implementation. When necessary, Reclamation area office staff will meet with a district's conservation coordinator to assist with the preparation, implementation, and evaluation of the Plan.

### ***3. Provide or support the availability of water management services to water users***

Develop and conduct individual programs or cooperative programs with other districts in regional programs. Some districts may want to arrange program delivery through consulting firms, cooperative extension, or other entities. The services should include, but not be limited to:

- a. On-farm evaluations
  - 1) On-farm irrigation and drainage system evaluations using a mobile lab type assessment

The Criteria states that districts shall provide or support on-farm irrigation system evaluations for their customers.

The BMP is intended to provide the water users with access to irrigation system performance information that will help them to improve their irrigation systems and management. Water users may or may not take advantage of this service. The districts are not required to offer these services free of charge.

The following are examples of adequate programs:

- a) Offer to district water users a rebate/discount of 25 percent off the fair market price of an evaluation.
- b) Annually provide evaluations to at least 5 percent of the district water users requesting this service.
- c) Actively advertise a district organized evaluation program to district water users.

This can be accomplished by providing financial support to mobile lab programs, consultants, university students, or others who can perform the evaluations. The district shall also make all district water users aware of the service through newsletters, bill stuffers, or other district publications. If the district can demonstrate that at least 5 percent of district customers currently have systems evaluations annually, the district does not have to provide the service. The district is still expected to maintain support for this service by providing information to district customers.

On-farm irrigation system evaluations provide information that growers need to make efficiency improvements to existing irrigation systems. Irrigation evaluations, such as those being provided by mobile labs and other consulting services, identify correctable problems such as worn nozzles, insufficient filtration, incorrect or irregular nozzle sizes, excessive run time, etc. Also, evaluations often identify when and where over- or under-irrigation are occurring.

In the Plan provide information on the number of farms and acres that are projected to receive irrigation system evaluations each of the next 3 years. Include:

- a) Total number of irrigated acres.
- b) Number of irrigated acres to be surveyed per year by on-farm irrigation evaluations.
- c) Total number of farms.
- d) Number of farms to be surveyed per year by on-farm irrigation / drainage evaluations.

For those districts with irrigation specialists on staff, on-farm evaluations could be part of the district's overall program, thus supplementing the efforts of other services or mobile labs. Mobile Lab Programs are available – contact your USBR Area Office Specialist for more information. Agricultural consultants may also be able to perform this service for district customers. Information on existing mobile labs can be obtained from DWR. If a mobile lab is not located in the local area, DWR can provide information on starting one.

## 2. Timely field and crop-specific water use information to the water user

There are several substantial benefits of accounting for water deliveries by crop and field. A water user having knowledge of the deliveries has real-time information on their individual irrigation events and the total of all irrigation on each field throughout the season. Comparison of per acre water usage of each crop by field within the district provides very meaningful water use information both to the water user and the district. Crop-specific and field-specific data allows development of a tiered water pricing system that is sensitive to crop type. It also provides accurate data for measuring the results of BMPs.

So that water users can compare their crops' specific water use with others within the district, the district can prepare an annual report that summarizes water use by crop and by field, computes the unit water use per acre, and sorts these data in several ways-by water user, field number, crop type, and unit water use. At the end of each year, these reports can either be mailed to district customers or posted at the district office.

These reports will also be the best source of information to identify anomalies in water use that are indicators of possible sources of excessive tailwater and deep percolation or inaccurate metering. Reclamation has examples of these reports.

- b. Normal year and real-time irrigation scheduling and crop ET information (i.e., CIMIS).

Describe the district's irrigation scheduling assistance program, including methods of data dissemination, and list any cooperating agencies.

ET calculations and irrigation scheduling information is available from the DWR CIMIS network (at no charge) and other irrigation service providers

To assist growers to develop crop irrigation schedules, districts can establish programs to:

- 1) Disseminate the data to interested district customers
- 2) Provide technical assistance and instruction on scheduling techniques

The CIMIS project uses computer and telecommunication technologies to collect and disseminate climatological data to districts, growers, irrigators, and others on a daily basis.

Climatological data is measured and collected constantly by a network of computerized climate stations. The data is transmitted to and stored in a centralized computer and is accessible to all interested parties within 24 hours. Hardware and software requirements to receive this data include a personal computer with Internet access.

If a district wants to establish an evaporation pan station, detailed discussions on the minimum standards for installation and application of the data in determining crop ET can be found in the California DWR Bulletins 113-3 and 113-4. Information is also available from ITRC and CIT. DWR district staff or local farm advisors may also have information. Contractors will have to establish a program to disseminate the data collected at these stations (newspapers, television, radio, telephone, e-mail, newsletter, etc.).

Historical climatological data can be used to develop normal year crop ET rates that can assist:

- 1) Contractors to determine approximate quantities of water that may be requested during any particular growing season.
- 2) Growers to estimate the growing season ET requirements of crops.

DWR Bulletin 113-3 also provides normal year ET rates, adjusted for effective precipitation, for selected crops.

For assistance in developing training workshops and seminars in irrigation scheduling, districts can contact local offices of the UC Cooperative Extension Farm Advisors. Consultants are also available to assist in the development of training courses or to provide direct technical assistance.

c. Surface, ground, and drainage water quantity and quality data

Describe the district's surface, ground, and drainage water quality monitoring program; include methods of data dissemination and list any cooperating agencies.

If the district has water sources with a range of qualities that affects how much water is needed for leaching, providing water quality information to customers when sources change can assist them to use an appropriate amount of water. When the quality of delivered water changes, districts should inform customers so that they can make appropriate irrigation adjustments (for leaching, etc.). Workshops can be designed to assist growers to make the best use of this information.

d. Agricultural water management educational programs and materials for farmers, staff, and public (soil moisture and salinity monitoring; in-school awareness programs; Agwater software; efficient irrigation techniques, crop water budget, and other approaches; program delivery via workshops, seminars, newsletters, field days, and demonstrations, etc.).

Describe the district proposed or supported educational programs and their goals. Attach the materials used in these programs (Appendix J).

The district should either sponsor or conduct educational seminars/workshops for district farmers and staff. Examples of workshop topics include: Information on weather, crop ET, soil moisture

holding capacity, crop characteristics, irrigation scheduling, and water-use planning. Input from customers, consultants, irrigators, and other technical experts will be important when determining the content of these seminars/workshops.

Educational seminars/workshops can serve districts in several ways. They can be used to:

- 1) Communicate the importance of implementing efficiency programs.
- 2) Describe conservation procedures that can be utilized by customers.
- 3) Provide a forum for growers, industrial users, and others to exchange ideas and experiences. These meetings also provide districts an opportunity to exchange ideas.

Information included in the Plan should include:

- 1) Name and description of each program
- 2) Co-funders (if any) of each program
- 3) Yearly participation targets

Various local, State, and Federal agencies (USDA's Agricultural Research Service, the UCCE, resource conservation districts, etc.) offer technical assistance and will work with the district to provide educational seminars and workshops to water users.

#### ***4. Pricing structure***

Adopt a water pricing structure for district water users based at least in part on quantity delivered.

Describe the proposed quantity-based water pricing structure and when it will become (or became) effective. Financial variables influence the way customers use water. For example, when agricultural customers pay for each AF of water received, they are more likely to order an amount closer to the actual crop water need. Ordering only what is needed can reduce demand on distribution system capacity, reduce tailwater, and increase supply reliability. Experience shows that urban customers reduce water use by 20 percent or more when charges are quantity based. This can result in substantial cost savings for potable and wastewater treatment costs.

#### ***5. Evaluate the need, if any, for changes in policies of the institutions to which the district is subject***

Identify changes to the rules and regulations of the district's water suppliers that would allow for more efficient water use and operations. Water projects (CVP, SWP, etc.) and wholesale water agencies provide water based on policies that sometimes make retail water management more difficult. For instance, policies that require payment for unused entitlement, or that limit carry-over of unused water, can encourage unnecessary water use. Identify any policies that reduce the district's ability to improve water management and provide suggestions for improvements.

As an example, Westlands Water District, through negotiations with Reclamation, was able to change their water year so that the end of the water year could coincide with the end of the rainy season. Now Westlands Water District's customers are better able to manage their water supplies to take advantage of effective precipitation.

## **6. Evaluate and improve efficiencies of district's pumps**

Describe the pump efficiency evaluation program and the role of the district and participating local utilities in the program.

Many districts operate booster pumps or ground water pumps as part of their delivery and spill recovery facilities. A program to evaluate and improve the efficiencies of such pumps may result in energy savings and peak load reductions, or reveal capacity limitations due to inefficient facilities. Over the long term, the district may be able to reduce operational costs and improve operational efficiency.

Provide information in the Plan on the district's pump testing program. Contact your local energy utility to determine if they offer pump-testing programs that can assist districts to minimize power costs.

### ***B. Exemptible BMPs for Agricultural Contractors***

Agricultural districts should implement the following BMPs unless the district demonstrates that the practice is not appropriate. Some districts may spend time studying the most effective way to implement a BMP or conduct a pilot study to determine if a BMP is appropriate for that district. For appropriate BMPs, provide a description of the implementation plan and include time schedules, budgets, and monitoring plans. If a BMP is to be studied, or a pilot study conducted, provide details and schedules of the study. These studies must be completed expeditiously and before the next Plan revision. The district should follow the exemption criteria (see Section 6) to justify exemptions and document the exemption in this section. Some Exemptible BMPs may not apply to the district. See Attachment B for examples of circumstances under which Exemptible BMPs are not applicable.

The purpose of preparing a Plan is for the district to implement the BMP programs developed during the planning process. Each year the districts report on the previous year's actual BMP activities, budget, and staffing. They also project expenditures and staffing levels for the coming year and provide information on planned activities.

Contractors should maintain regular records of BMP implementation activities to facilitate the completion of the annual update. The BMP records can be tracked in a variety of ways. Some methods are: conservation staff recording data by BMP on their time sheets, weekly schedules, and special BMP budget computer codes.

#### ***1. Facilitate alternative land use***

Facilitate alternative uses (voluntary, compensated) for lands with exceptionally high water duties or whose irrigation contributes to significant problems (such as drainage).



This BMP applies only to districts that have irrigated lands with the following characteristics:

- a. High water table (<5 feet)
- b. Poor drainage
- c. Ground water selenium concentration > 50 ppb
- d. Poor productivity

If a district does provide water to lands that have the above characteristics, describe the district program that will promote a voluntary, compensated change of use for those lands.

The decision to retire land usually includes other factors, such as alternative land-use demand. Also, it may not preclude the option of re-establishing irrigated agriculture, if circumstances should change.

In Arizona, recreation-oriented uses have been proposed for agricultural lands retired due to salinity problems. In other areas, golf courses and shooting ranges have been proposed. Reclamation and DWR are interested in working with districts to design such a program.

***2. Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils***

The use of recycled urban wastewater for agricultural irrigation provides an opportunity for use of an available water supply. Reuse of urban wastewater can be an important element in overall water management.

Identify the source of recycled water and the yearly quantity that is available. Provide the cost of the recycled water and describe its quality in relation to the crops the water will irrigate. Describe the program that will promote the use of the recycled water by agricultural customers and identify the district role in the program.

***3. Facilitate the financing of capital improvements for on-farm irrigation systems***

Identify district programs to facilitate and/or provide financial incentives for improved on-farm water management. Include information on the estimated amount of yearly financial assistance. Attach the funding information the district provided to water users.

Facilitating financial aid to farmers may include cataloging available funding sources and procedures or obtaining funding and administering the program or providing low-interest loans.

Often a grower can greatly improve water management if financing is available. For some growers, the ability to implement efficient management practices and install modern irrigation systems is hampered by the lack of capital. These individuals are willing to improve efficiency if long-term affordable financing is available.

***4. Incentive pricing***

Implement a pricing structure that promotes one or more of the following goals:

- a. Encourages more efficient water use at the farm level
- b. Supports planned conjunctive use of ground water
- c. Increases ground water recharge
- d. Reduces problem drainage
- e. Improves management of environmental resources

Describe the incentive pricing structures that were considered, which were selected for implementation, and when it will become effective.

Incentive pricing structures, such as increasing block rates, are those that encourage appropriate water use. Incentive rates encourage customers to accurately determine and apply only the water a crop needs, thus reducing over-irrigation and the resulting drainage.

Examples and explanations of agricultural rate schedules can be found in Reclamation's Incentive Pricing Handbook for Agricultural Water Districts, available from your Reclamation area office.

Several districts have implemented incentive pricing structures for irrigation water and drainage water disposal. Because of area specific management needs (such as leaching requirements, potential supply shortages, crop types, and soil and climatological conditions) districts incentive rate designs will vary.

The Broadview Water District implemented an increasing block-rate pricing structure for agricultural in 1989. The purpose of the program was to motivate growers to improve their on-farm irrigation operations and reduce the quantity of drain water collected in the subsurface drainage system.

The Broadview Water District's block-rate pricing structure was comprised of two components: crop-specific tier levels (percolation depths which determine the price of water) and field-level accounting of water deliveries. The crop-specific levels are required because the volume of drain water generated from the applied water varies by crop according to crop ET. Crops with higher ET requirements are permitted to receive additional irrigation water applications before higher prices become effective. Without these concessions, growers could be limited in crops selection. Field-level accounting of water deliveries encourages the growers to carefully monitor and apply their irrigation supplies.

The pricing structures for the 1989 growing season were established at 90 percent of the district-wide average irrigation depths for 1986 through 1988 for all crops. This approach incorporates locally relevant crop water requirements, soil characteristics, and irrigation practices. The 10 percent reduction in applied water was previously determined to result in a 15 percent reduction in drain water volume. Other incentive pricing structures can be as effective as this example.

### ***5a. Line or pipe ditches and canals***

Line or pipe the distribution system to increase distribution system flexibility and capacity and

decrease maintenance and seepage.

Describe the program to line or pipe the distribution system reaches with the greatest loss per foot or those that have the greatest negative impact on delivery flexibility and capacity. As water cost or demands increase, it will become cost effective to line/pipe more sections of the distribution system.

Seepage and evaporation losses in earthen canals and laterals can be minimized by replacement with pipelines or lining with bentonite clay, pour-in-place concrete or plastics/textile membranes. To reduce on-farm seepage losses, districts may wish to consider helping growers to line their ditches or install pipelines.

An example of a district that utilizes a pipeline distribution system is the Westlands Water District, whose permanent distribution system consists of a buried pipeline network which conveys irrigation water from the main supply canals to 160- or 320-acre land units totaling more than 550,000 acres. The distribution system was built between 1965 and 1979 and serves approximately 90 percent of the irrigable land in the district. Most of the remaining district lands are served by farmer-constructed temporary diversions, which are maintained by the farmers.

The district water supply is distributed through 1,034 miles of buried pipe, varying in diameter from 10 to 96 inches. Gravity and pumps feed 71 lateral pipelines.

In 1969, the Shasta View Irrigation District, located in the Klamath Falls area, converted from an unlined canal system to a piped water delivery system. A 65-year Rehabilitation and Betterment Act loan from Reclamation funded the \$3.2 million project.

Seventeen miles of buried pressure pipe replaced 21 miles of unlined canal, which eliminated eight small regulating reservoirs and 110 farm-pumping stations. The unlined canal system had lost approximately 30 percent of the district water supply through seepage. District losses are now less than 5 percent.

An additional benefit of the pipe system is the ability to deliver water to growers for frost protection. The elevation of the Klamath Basin is such that frost is a threat to the potatoes grown in the region. To protect against the affects of frost, growers sprinkle the potato fields to control air temperature. The unlined canal system could not deliver enough water to meet the demands for frost protection. The new pipe system was designed to operate at full pressure during frost periods, assuring growers of sufficient water to protect the potato fields.

### ***5b. Regulatory reservoirs***

Construct regulatory reservoirs to improve distribution system delivery flexibility. The construction and/or lining of regulatory reservoirs can provide improved system operation and distribution flexibility, additional supply storage, reduced operational losses, and increased flexibility in the reception of surface and/or aqueduct supplies.

The Imperial Irrigation District constructed six regulatory reservoirs as part of its program to

improve the operation efficiency of its distribution system. Although the combined storage capacity of these reservoirs is only about 2,300 AF, some of the more significant benefits of the reservoirs include:

- a. Storing water normally held with less efficiency in the district's canals and laterals or released to the Salton Sea (when growers are unable to use ordered water due to unexpected rainfall).
- b. The ability to meet customer water delivery requests
- c. Increased distribution system operational efficiency

**6. *Increase flexibility (within operational limits) in water ordering by, and delivery to, water users***

Modify distribution facilities and controls to increase the reliability, consistency, and flexibility of water deliveries.

Describe measures you plan to implement to: change from a rotation to an on-demand delivery system, and improve delivery flexibility and system capacity. Describe measures you plan to implement to increase delivery flexibility available to farmers, and describe obstacles for further flexibility improvements.

Many factors affect the effectiveness of irrigation. Among these are soil texture and uniformity, surface gradient, length of irrigation run, weed growth, debris from previous plant growth, irrigation water quality, root zone soil chemistry, depth of the unsaturated zone, wind velocity, humidity, air temperature, grower's expertise, and the design, condition, and operation of the irrigation system.

If all of the above factors are optimum, but the irrigation water is not available at the necessary time or in the appropriate quantities, irrigation effectiveness will be adversely affected. Weather unpredictability often does not allow a grower sufficient lead time to order water. Unlike urban water systems, agricultural districts often do not have systems that can provide water on demand.

The Broadview Water District at one time required a 48-hour notice for water orders and a 24-hour notice to end a water delivery. This was modified in 1990 to 2-hour notice in most cases to provide growers with more flexibility. Many growers now apply frequent, shallow irrigations instead of the deep, infrequent irrigations used prior to 1990. Growers have the ability to begin and end irrigations on short notice, often in the same day.

Increased flexibility allows growers to irrigate only when necessary, but growers must be sure that the water will be there when needed.

Provide a copy of a water order form (Appendix K)

**7. *Construct and operate district spill and tailwater recovery systems***

Construct facilities to capture and reuse district operational spills.

The design and operation of a district's conveyance system has a significant role in the quantity of annual operational spills.

A district should measure the annual spill from each canal and determine the percentage that could be captured for beneficial use. This data is essential to correctly site and size spill and tailwater recovery systems.

Interceptor systems can be designed to capture and transport operational spills throughout a conveyance system. One design adds lateral-connector canals. In this design, a secondary canal is constructed at the terminus point of a series of laterals to capture operational spill. The system is designed to either pump spills back into the laterals or transport them to a reservoir for storage.

The Imperial Irrigation District has a lateral interceptor, 5 miles in length, that captures operation spills from the terminus points of eight lateral canals and delivers the water to more than 22,000 acres of cultivated land. The interceptor has more than 90 automated drop leaf gates in addition to a 240 AF reservoir for storage of spill water. The interceptor annually conserves approximately 8,300 AF of water.

### ***8. Optimize conjunctive use of surface and ground water***

Increase planned conjunctive use of surface and ground water within the district.

Describe the potential for increased conjunctive use and identify programs to achieve this potential.

If feasible, districts should prepare and implement long-range plans to conjunctively use surface water and ground water to meet current and future demands. Conjunctive use programs store surplus imported and local surface water in ground water basins. When surface water is inadequate to meet demand, ground water is pumped and distributed.

The Arvin-Edison Water Storage District has an active conjunctive use program. The district utilizes two major spreading basins and a total of 55 recovery wells. During wet years, agricultural demand is adequately met with imported surface water. Surplus surface water is transported to the spreading basins and percolated into the ground water basin. During years when the district's imported surface water supply will not meet demand, the district pumps the stored ground water. This conjunctive use program began in 1966. As of 1991, the district had stored approximately 1 million AF of water in the ground water basin.

The costs to develop, implement, and maintain a conjunctive use program include funds to construct and maintain the spreading basins and to install and maintain the ground water extraction wells. If feasible, districts may wish to develop programs with neighboring districts.

### ***9. Automate canal structures***

Automation of canal structures may increase flexibility in water deliveries and increase district control over its water supplies; thereby, providing the opportunity to improve the efficiency of

water use.

Estimate annual operation spills by reach. Identify locations for automated canal structures and other distribution system improvements. Estimate annual water savings (AF/Y) resulting from the evaluated projects. Describe program to automate distribution system.

***10. Facilitate or promote water user pump testing and evaluation***

Describe the program to facilitate or promote customer pump testing and evaluation.

A district and the local utility can develop a cooperative pump testing service program for their customers. The program will benefit all involved parties by cutting down on energy demand while providing ground water or pressurized low-volume systems at the lowest possible price.

Utility companies may offer a free pump testing service to their customers. A pump test report discusses the condition of the pumps and provides improvement recommendations.

**C. Provide a 3-year Budget for BMPs**

(Current year and 2 projected future year budgets for all BMPs.)

**3-Year Budget Summary****1. Amount actually spent during current year**

<u>BMP #</u>	<u>BMP Name</u>	<u>Budgeted Expenditure (not including staff time)</u>	<u>Staff Hours</u>
A1	Measurement	\$0	0
2	Conservation staff	\$0	0
3	On-farm evaluations / water delivery info	\$0	0
	Irrigation Scheduling	\$0	0
	Water quality	\$0	0
	Agricultural Education Program	\$0	0
4	Quantity pricing	\$0	0
5	Policy changes	\$0	0
6	Contractor's pumps	\$0	0
B1	Alternative land use	\$0	0
2	Urban recycled water use	\$0	0
3	Financing of on-farm improvements	\$0	0
4	Incentive pricing	\$0	0
5	Line or pipe canals/install reservoirs	\$0	0
6	Increase delivery flexibility	\$0	0
7	District spill/tailwater recovery systems	\$0	0
8	Optimize conjunctive use	\$0	0
9	Automate canal structures	\$0	0
10	Customer pump testing	\$0	0
	Total	\$0	0

**2. Projected budget summary for the next year**

<u>BMP #</u>	<u>BMP Name</u>	<u>Budgeted Expenditure (not including staff time)</u>	<u>Staff Hours</u>
A1	Measurement	\$0	0
2	Conservation staff	\$0	0
3	On-farm evaluations / water delivery info	\$0	0
	Irrigation Scheduling	\$0	0
	Water quality	\$0	0
	Agricultural Education Program	\$0	0
4	Quantity pricing	\$0	0
5	Policy changes	\$0	0
6	Contractor's pumps	\$0	0

B1	Alternative land use	\$0	0
2	Urban recycled water use	\$0	0
3	Financing of on-farm improvements	\$0	0
4	Incentive pricing	\$0	0
5	Line or pipe canals/install reservoirs	\$0	0
6	Increase delivery flexibility	\$0	0
7	District spill/tailwater recovery systems	\$0	0
8	Optimize conjunctive use	\$0	0
9	Automate canal structures	\$0	0
10	Customer pump testing	\$0	0
	Total	\$0	0

**3. Projected budget summary for 3<sup>rd</sup> year.**

BMP #	BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A1	Measurement	\$0	0
2	Conservation staff	\$0	0
3	On-farm evaluations / water delivery info	\$0	0
	Irrigation Scheduling	\$0	0
	Water quality	\$0	0
	Agricultural Education Program	\$0	0
4	Quantity pricing	\$0	0
5	Policy changes	\$0	0
6	Contractor's pumps	\$0	0
B1	Alternative land use	\$0	0
2	Urban recycled water use	\$0	0
3	Financing of on-farm improvements	\$0	0
4	Incentive pricing	\$0	0
5	Line or pipe canals/install reservoirs	\$0	0
6	Increase delivery flexibility	\$0	0
7	District spill/tailwater recovery systems	\$0	0
8	Optimize conjunctive use	\$0	0
9	Automate canal structures	\$0	0
10	Customer pump testing	\$0	0
	Total	\$0	0



If your district is identified as being in the drainage problem area (see Attachment A) provide the information requested below.

**D. Drainage Problem Area Programs**

(for districts located in the drainage problem area, as defined in Attachment A)

*The following programs have been incorporated in the district water conservation programs to improve conditions in the drainage problem areas.*

<i>Activity</i>	<i>Program Description</i>	<i>Budget</i>	<i>Results</i>
<i>Source Control</i>			
<i>Land Retirement</i>			
<i>Drainage Water Treatment</i>			
<i>Drainage Water Reuse</i>			
<i>Shallow Groundwater Pumping</i>			
<i>Evaporation Ponds</i>			

*The following programs were not been implemented because:*

Most districts in the geographic area that drain to the San Joaquin Delta have a set of quantifiable objectives that were identified as applicable to their district. Please find your agency in Chapter 12 and provide the information requested below for each of the QOs listed for your agency.

**E. District Quantifiable Objectives (QOs)**

(QOs for each district are identified in the QO Agency document in Chapter 10 of the Water Management Planner, and as defined in Attachment C)

*Discussion of District participation in the QOs that apply to the District (see*

<i>Name of QO</i>	<i>Related BMP</i>	<i>Interest in Outside Funding</i>	<i>Agency Role</i>

## ***Section 4: BMPs for Urban Contractors***

Any Contractor that annually provides urban water to 3,300 people or more is required to complete this section.

However, if a primarily Agricultural Contractor provides some Urban Water, they are required to include Urban BMP 4 (*Metering With Commodity Rates for All New Connections and Retrofit of Existing Connections*) in their plan.

Once a Contractor annually provides water to 3,300 people or more, they are required to address **all** the BMPs in Section 4, BMPs for Urban Contractors.

These BMPs will be evaluated based on the CUWCC's current MOU Exhibit 1 (BMP Definitions, Schedules, and Requirements). Under certain circumstances, the generally applicable practices may not be appropriate for Contractor Implementation. Contractors will implement each BMP unless the Contractor provides adequate documentation for an exemption. BMP Number 4, Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections, is the only BMP that is not exemptible.

For each of the BMPs, please refer to the CUWCC MOU Exhibit 1 (Chapter 11), which is included in this document. Please check the CUWCC website ([www.cuwcc.org](http://www.cuwcc.org)) to verify that this is the current version. This document lays out the requirements for implementation, coverage, and documentation. Districts are required to complete the "CUWCC Coverage Calculators" for each BMP and may wish to complete the USBR BMP Target Form. These spreadsheets can be found at the USBR website and on the CD included in the *Planner*.

Wholesalers must insure that their retailers have Plans that meet the Criteria. Wholesalers may include their retail water districts in a single Plan or require each retailer to prepare a separate Plan. If retailers prepare their own Plans, the wholesaler should be involved to the extent necessary to insure all Plans meet the Criteria.

The purpose of preparing a Plan is for the district to implement the BMP water efficiency programs. Each year districts report on actual BMP activities during the previous year.

Districts should maintain records of BMP implementation activities to facilitate the completion of the Annual Update. The BMP records can be tracked in a variety of ways. Some methods are: conservation staff recording BMP data on their time sheets, weekly schedules, and special budget BMP computer codes.

The BMPs are intended to reduce long-term urban demands and improve water management in an effort to maximize the limited water resources available. These BMPs are in addition to programs that may be instituted during water supply shortages.

### *1. Water Survey Programs for Single-Family and Multi-Family Residential Customers*

2. *Residential Plumbing Retrofit*
3. *System Water Audits, Leak Detection, and Repair*
4. *Metering With Commodity Rates for All New Connections and Retrofit of Existing Connections*
5. *Large Landscape Conservation Programs and Incentives*
6. *High-Efficiency Washing Machine Rebate Programs*
7. *Public Information Programs*
8. *School Education Programs*
9. *Conservation Programs for CII Accounts*
10. *Wholesale Agency Assistance Programs*
11. *Conservation Pricing*
12. *Conservation Coordinator*
13. *Water Waste Prohibition*
14. *Residential ULFT Replacement Programs*

*Note: Annual reporting is completed on the Internet at <http://www.cuwcc.org/>.*

**C. Provide a 3-year Budget for BMPs (Current year and 2 projected future year budgets)**

**3-Year Budget Summary**

**Actual Current Year Expenditures**

Year	BMP #	BMP Name	Actual Expenditures (not including staff hours)	Staff Hours
	1	Residential Water Audits	\$0	0
	2	Residential Retrofit	\$0	0
	3	System Water Audit and Leak Detection	Not WC budget	
	4	Metering w/Commodity Rates	\$0	0
	5	Landscape Water Audits	\$0	0
	6	Washing Machine Rebates	\$0	0
	7	Public Information	\$0	0
	8	School Education Program	\$0	0
	9	CII Conservation Programs	\$0	0
	10	Wholesale Agency Programs	\$0	0
	11	Conservation Pricing	\$0	0
	12	Conservation Coordinator	\$0	0
	13	Water Waste Prohibition	\$0	0
	14	ULFT Program	\$0	0
		Total	\$0	0

**Projected Budget for Next Year**

Year	BMP #	BMP Name	Actual Expenditures (not including staff hours)	Staff Hours
	1	Residential Water Audits	\$0	0
	2	Residential Retrofit	\$0	0
	3	System Water Audit and Leak Detection	Not WC budget	
	4	Metering w/Commodity Rates	\$0	0
	5	Landscape Water Audits	\$0	0
	6	Washing Machine Rebates	\$0	0
	7	Public Information	\$0	0
	8	School Education Program	\$0	0
	9	CII Conservation Programs	\$0	0
	10	Wholesale Agency Programs	\$0	0
	11	Conservation Pricing	\$0	0
	12	Conservation Coordinator	\$0	0
	13	Water Waste Prohibition	\$0	0
	14	ULFT Program	\$0	0
		Total	\$0	0

**Projected Budget for 3<sup>rd</sup> Year**

Year	BMP #	BMP Name	Actual Expenditures (not including staff hours)	Staff Hours
	1	Residential Water Audits	\$0	0
	2	Residential Retrofit	\$0	0
	3	System Water Audit and Leak Detection	Not WC budget	
	4	Metering w/Commodity Rates	\$0	0
	5	Landscape Water Audits	\$0	0
	6	Washing Machine Rebates	\$0	0
	7	Public Information	\$0	0
	8	School Education Program	\$0	0
	9	CII Conservation Programs	\$0	0
	10	Wholesale Agency Programs	\$0	0
	11	Conservation Pricing	\$0	0
	12	Conservation Coordinator	\$0	0
	13	Water Waste Prohibition	\$0	0
	14	ULFT Program	\$0	0
		Total	\$0	0

## Section 5: Plan Implementation

Pursuant to water service and settlement contract terms, districts must report annually on Plan implementation.

Agricultural districts can complete an annual update by filling in the information for BMPs on the Agricultural Water Management Council web site at [www.agwatercouncil.org](http://www.agwatercouncil.org).

Urban districts can complete an annual update by filling in the information for urban BMPs on the CUWCC web site. Contractors who are signatories of the CUWCC MOU are currently submitting annual reports via the *CUWCC BMP Reporting Database* located on their web site at [www.cuwcc.org](http://www.cuwcc.org). Through an agreement with the CUWCC, Reclamation's urban non-signatories may now submit their annual reports through the CUWCC web site using "guest accounts." Urban BMPs are reviewed based on the CUWCC MOU (amended March 14, 2001).

## Section 6: Exemption Process

### Intent:

To demonstrate in a clear and concise manner that a BMP is not cost effective, not financially feasible, not legal, or not environmentally possible for a district to implement. For agricultural districts, only the BMPs in Section 3: BMPs for Agricultural Contractors, B. Exemptible BMPs are exemptible. For urban districts, all BMPs, except BMP 4 (metering), are exemptible.

### Evaluation:

Some BMPs are not appropriate or possible for a district to implement. To document an exemption, provide the basis, rationale, and details for excluding a BMP. Such documentation must address, as appropriate, cost effectiveness, financial feasibility, and environmental or legal constraints to BMP implementation. Reclamation will also consider exemption requests prepared using the final AWMC exemption process or the CUWCC exemption process (BMP Cost Effectiveness Calculators are available at CUWCC.org).

### Detail Expected in an Adequate BMP Exemption:

#### *Legal Restraints*

In order to justify a BMP exemption because it would not be legal for the district to implement, detail the following:

1. A list of any known laws, regulations, court decisions, or other legal constraints that make it illegal for the district to implement the BMP.
2. A list of the steps that would be required to remove these constraints.
3. A description of what steps the district has taken to remove these constraints.
4. Documentation of efforts by the district to work with other entities that would have the legal authority to carry out the BMP within the district's service area.

#### *Environmental Constraints*

In order to justify an exemption due to known adverse environmental impacts, the Plan must document the critical environmental issues and known (qualitative and/or quantitative) negative impacts of the BMP, and an explanation of why effective mitigation of these impacts is not possible. If mitigation of the environmental impacts is possible, the practice must be implemented unless it can be exempted by another exemption category. For example, if the mitigation costs make the project economically infeasible, a discussion of the mitigation plan and necessary mitigation costs should be included as a part of the economic analysis.

#### *Economic Constraints*

1. In order to justify an exemption due to economic constraints, the Plan must document the following:

A benefit-cost analysis that demonstrates the costs to the district outweighs the benefits to the district over the life of the measure. The district must perform the analysis by comparing the present value of all benefits to the present value of all



costs. Document the projected/estimated benefits and costs and the methodology for analysis (benefits and costs should be quantified to the extent possible). The analysis performed for each excluded BMP (from the district's perspective) must include, but is not limited to, the following benefits and costs:

### ***Benefits***

All avoided capital costs which include, but are not limited to, the costs associated with the development of new supplies (studies, construction, labor, etc.), transportation, the increase in storage, distribution capacity, waste water facilities, and treatment capacity, etc.

- a. Operation and maintenance costs associated with the decrease in the production and distribution of water or the treatment and disposal of waste water that include, but are not limited to, energy, labor, treatment, storage, drainage treatment and disposal, etc.
- b. Water purchases avoided by the district.
- c. Environmental costs avoided by the district.
- d. Environmental enhancements.
- e. Revenues from other entities that include but are not limited to, revenue from the sale of water made available by the BMP, financial incentives received from other entities, etc.
- f. Other benefits to the district customers that include, but are not limited to, hydropower, improved crop yields, improved crop quality, labor savings, fertilizer savings, increased farm income, etc

### ***Costs***

- a. Capital expenditures incurred by the district for Implementation of the BMP that include, but are not limited to, equipment, supplies, materials, construction, etc.
- b. Operation and maintenance costs to plan, design, implement, enforce, and evaluate the practice.
- c. Financial incentives to customers.
- d. Costs to the environment.
- e. Other costs to the district.

Several accepted benefit-cost analysis methodologies exist (California Energy Commission's Integrated Resource Planning Methodology, Generally Accepted Accounting Principles, Agricultural Water Management Council's Net Benefit Analysis, etc.). A district is considered to be the best suited to evaluate their own economic situation with an appropriate methodology.

2. A discussion and quantification, to the extent possible, of other benefits associated with the implementation of the BMP that may be of interest to potential partners, but are not the direct sole responsibility of the district.

### ***Financial Constraints***

In order to adequately justify an exemption due to financial constraints, the Plan must clearly document the following:

1. The benefits and costs of the BMP to the district.

2. The district's funding needed to implement the BMP.
3. A discussion regarding why the district cannot finance the BMP through rate adjustments, assessments, etc.
4. A discussion of the district's reasonable efforts to secure funding from other entities that include, but are not limited to, lending institutions and bonding authorities, and an explanation of why these entities would not provide funding.
5. The required amount of a grant or subsidy that would be needed to feasibly implement the BMP if financing or partnerships could not be obtained.

## **Section 7: Regional Criteria**

Regional Criteria have been developed for the Sacramento Valley River Contractors as a pilot project. No other Regional Criteria have been explored.

## **Section 8: Five-Year Plan Revision Procedure**

### *Revision Process*

Pursuant to water service and settlement contract terms, districts are required to submit revised Plans every 5 years. Contractors must use the most recently adopted Criteria for a new Plan or a 5-year Plan revision. The district must continue to file an Annual update every year to report implementation actions taken.

### *Review Process*

Contractors are requested to submit draft plans to the area office for review and forwarding to Reclamation's Regional Office. Once forwarded to the Regional Office, districts will receive, within 90 days, notification of Reclamation's acceptance or request for modification. Following notification by Reclamation that the Plan has conditionally met the requirements of the Criteria, districts must submit three copies of the completed Plan and a resolution by the district's Board formally adopting the Plan. The status of the district's Plan will then be noticed in the *Federal Register*, and the public is given 30 days in which to comment. Copies of the document will be available for review at the Regional Office and the appropriate area office. If no comments are received within 30 days, the review process will be officially complete. If public comments are received, additional changes may be required.

### **Signatories to the AWMC**

Contractors who are signatories of the AWMC should also submit the Plan to the AWMC after notification by Reclamation that the Plan has conditionally met the requirements of the Criteria. The AWMC will review the agricultural Plans using Reclamation's Criteria. The AWMC may provide comments to Reclamation within 30 days of receiving the agricultural Plan. Reclamation will review the AWMC comments as part of its concurrent review of the Plan. The goal is to have the district's Plan meet the requirements of both AWMC and Reclamation.

### **Consequences of Non-Compliance**

Under most conditions, an adequate Plan must be in place before Reclamation will consider extending any discretionary benefits. Discretionary benefits include, but are not limited to, funding through the Water Conservation Field Services Program or the Efficiency Incentive Program (except for Plan development), and assistance from Reclamation sponsored technical assistance programs.

## **Attachment A**

### *Information Required of Contractors Located in a Drainage Problem Area*

Contractor's included in the drainage problem area, as identified in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990), are listed, by sub-area, below. If future editions of the drainage report revise the boundaries of a drainage problem area or other factors used to determine which districts are in a drainage problem area, Reclamation will revise Attachment A to conform with the current drainage report.

1. Reclamation districts in the **Grasslands subarea**: Broadview Water District, Central California Irrigation District, Del Puerto Water District, Firebaugh Canal Water District, Mercy Springs Water District, Pacheco Water District, Panoche Water District, San Luis Canal Company, and San Luis Water District.
2. Reclamation districts in the **Westlands subarea**: James Irrigation District, Tranquillity Irrigation District, and Westlands Water District.
3. Reclamation districts in the **Tulare subarea**: Alpaugh Irrigation District, Atwell Island Water District, Lower Tule River Irrigation District, and Pixley Irrigation District.
4. Reclamation districts in the **Kern subarea**: Alpaugh Irrigation District.

Contractors listed above shall describe which recommendations prescribed in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990) have been incorporated in their water conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source Control
2. Land Retirement
3. Drainage Water Treatment
4. Drainage Water Reuse
5. Shallow Ground water Pumping
6. Evaporation Ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why.

**Attachment B**  
*Agricultural Exemptible BMPs*

To establish that a BMP is not applicable to the district, the Plan should explain the reasons why the BMP does not apply to the district. This justification must be consistent with Section 1 of the Criteria entitled, “Describe the District.” Examples of N/A for each exemptible BMP are listed below. This list is not all-inclusive.

***Section 3. B. Exemptible BMPs for Agricultural Contractors***

1. *Facilitate Alternative Land Use* - N/A could include: Districts without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems.
2. *Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils* - N/A could include: Completely piped systems that do not have delivery constraints.
3. *Facilitate the financing of capital improvements for on-farm irrigation systems* - None identified.
4. *Incentive pricing* - District that receives only class 2 water.
5. *a) Line or pipe ditches and canals* - N/A could include: Completely piped systems, unlined systems or sections or systems that are used as part of a planned conjunctive use program.  
  
*b) Regulatory reservoirs* - N/A could include: Completely piped systems that do not have delivery constraints.
6. *Increase flexibility in water ordering by, and delivery to, the water users within operational limits* - None identified.
7. *Construct and operate district spill and tailwater recovery systems* - N/A could include: Completely piped systems that do not have delivery constraints.
8. *Optimize conjunctive use of surface and ground water* - N/A could include: Districts that do not overlie a useable ground water basin and neither the district or its customers pump or use ground water.
9. *Automate canal structures* - N/A could include: Completely piped systems that do not have delivery constraints.

**Attachment C**

*Quantifiable Objectives*

*Assess Quantifiable Objectives.* CALFED is developing QOs that provide incentives for participation in implementing Water Management activities by water users including Contractors. These activities may or may not directly benefit the water user/Contractor. If there are CALFED QOs that apply to the geographic location of your district lands, identify the QOs that apply to the district and comment on potential for Contractor participation. Reclamation's Area Office and Regional Office will have the latest copy of QOs listed by Contractor. Evaluate and comment on any BMP or practice that is complementary, or could be complementary to the QOs in the District.

**Attachment D**

*Crop List*

barley	cabbage	berries (all kinds)
corn - field	carrots	cherries
oats	cauliflower	grapefruit
rice	celery	lemon / limes
sorghum	corn	oranges / tangerines
wheat	cucumbers	dates
other cereals	garlic	grapes
	greens	olives
alfalfa	lettuce	peaches
clover	melons	pears
irrigated pasture	onions	prunes / plums
other hay	peas	strawberries
silage	peppers	other fruits
other forage	potatoes	
	squash	almonds
cotton	tomatoes	pecans
hops	other vegetables	pistachios
safflower		walnuts
sugar beats	Sudan grass	other nut trees
soybeans	Bermuda grass	
other field crops	other grasses	ornamental nursery
		joboba
asparagus	apples	other
beans	apricots	
broccoli	avocados	

**Irrigation Methods List**

Level basin  
 Furrow  
 Sprinkler  
 Low Volume  
 Multiple (combination of two methods)

**(District Name)**  
**Water Management Plan**

**Date of first draft – (date)**  
**Date of final – (date)**



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# Section 1: Description of the District

District Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_ Title: \_\_\_\_\_

Telephone: \_\_\_\_\_ E-mail: \_\_\_\_\_

## A. History

1. Date district formed: \_\_\_\_\_ Date of first Reclamation contract: \_\_\_\_\_  
 Original size (acres): \_\_\_\_\_ Current year (last complete calendar year): \_\_\_\_\_

2. Current size, population, and irrigated acres

	Current Year
Size (acres)	
Population served	
Irrigated acres	

3. Water supplies received in current year

Water Source	AF
Federal urban water	
Federal agricultural water	
State water	
Other Wholesaler (define)	
Local surface water	
Upslope drain water	
District ground water	
Transferred water	
Recycled water	
Other (define)	
<i>Total</i>	

4. Annual entitlement under each right and/or contract

	AF	Source	Contract #	Contract Restrictions
USBR Urban AF/Y				
USBR Agriculture AF/Y				
Other AF/Y				
Other AF/Y				

5. Anticipated land-use changes

6. Cropping patterns (Agric only)

List of current crops (crops with 5% or less of total acreage can be combined in the 'Other' category).

<i>Original Plan</i>		<i>Previous Plan</i>		<i>Current Plan</i>	
<i>Crop Name</i>	<i>Acres</i>	<i>Crop Name</i>	<i>Acres</i>	<i>Crop Name</i>	<i>Acres</i>
<i>Other (&lt;5%)</i>		<i>Other (&lt;5%)</i>		<i>Other (&lt;5%)</i>	
<i>Total</i>		<i>Total</i>		<i>Total</i>	

(See Appendix C for list of crop names)

7. Major irrigation methods (by acreage) (Agric only)

<i>Original Plan</i>		<i>Previous Plan</i>		<i>Current Plan</i>	
<i>Irrigation Method</i>	<i>Acres</i>	<i>Irrigation Method</i>	<i>Acres</i>	<i>Irrigation Method</i>	<i>Acres</i>
<i>Other</i>		<i>Other</i>		<i>Other</i>	
<i>Total</i>		<i>Total</i>		<i>Total</i>	

(See Appendix C for list of irrigation system types)

**B. Location and Facilities**

Attachment A shows points of delivery, turnouts (internal flow), and outflow (spill) points, measurement locations, conveyance system, storage facilities, operational loss recovery system, wells, and water quality monitoring locations

1. Incoming measurement methods and locations

<i>Incoming Locations</i>	<i>Type of Measurement Device</i>	<i>Accuracy</i>

2. Current year Agricultural Conveyance System

<i>Miles Unlined - Canal</i>	<i>Miles Lined - Canal</i>	<i>Miles Piped</i>	<i>Miles - Other</i>

3 *Current year Urban Distribution System*

<i>Miles AC Pipe</i>	<i>Miles Steel Pipe</i>	<i>Miles Cast Iron Pipe</i>	<i>Miles - Other</i>

4. *Storage facilities*

5. *Description of the agricultural spill recovery system*

6. *Agricultural delivery system operation*

7. *Restrictions on water source(s)*

<i>Source</i>	<i>Restriction</i>	<i>Cause of Restriction</i>	<i>Effect on Operations</i>

8. *Proposed changes or additions to facilities and operations for the next 5 years*

**C. Topography and Soils**

1. *Topography of the district and its impact on water operations and management*

2. *District soil associations (Agric only)*

<i>Soil Association</i>	<i>Estimated Acres</i>	<i>Effect on Water Operations and Management</i>

See Attachment B, District Soils Map

3. *Agricultural limitations resulting from soil problems (Agric only)*

<i>Soil Problem</i>	<i>Estimated Acres</i>	<i>Effect on Water Operations and Management</i>

**D. Climate**

1. *General climate of the district service area*

	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>	<i>Annual</i>
<i>Avg Precip.</i>													
<i>Avg Temp.</i>													
<i>Max. Temp.</i>													
<i>Min. Temp</i>													
<i>ETo</i>													

*Weather station ID* \_\_\_\_\_ *Data period: Year* \_\_\_\_\_ *to Year* \_\_\_\_\_

*Average wind velocity* \_\_\_\_\_ *Average annual frost-free days:* \_\_\_\_\_

2. *Impact of microclimates on water management within the service area*

**E. Natural and Cultural Resources**

1. *Natural resource areas within the service area*

<i>Name</i>	<i>Estimated Acres</i>	<i>Description</i>

2. *Description of district management of these resources in the past or present*

3. *Recreational and/or cultural resources areas within the service area*

<i>Name</i>	<i>Estimated Acres</i>	<i>Description</i>

**F. Operating Rules and Regulations**

1. *Operating rules and regulations*

See Attachment C, District Rules and Regulations

2. *Agricultural water allocation policy*  
 See Attachment C, Page xx  
 Summary -

3. *Official and actual lead times necessary for water orders and shut-off (Agric only)*  
 See Attachment C, Page xx  
 Summary -

4. *Policies regarding surface and subsurface drainage from farms (Agric only)*  
 See Attachment C, Page xx  
 Summary -

5. *Policies on water transfers by the district and its customers*  
 See Attachment C, Page xx  
 Summary -

## **G. Water Measurement, Pricing, and Billing**

### *Agricultural Customers*

1. *Number of farms* \_\_\_\_\_
2. *Number of delivery points (turnouts and connections)* \_\_\_\_\_
3. *Number of delivery points serving more than one farm* \_\_\_\_\_
4. *Number of measured delivery points (meters and measurement devices)* \_\_\_\_\_
5. *Percentage of delivered water that was measured at a delivery point* \_\_\_\_\_

6. *Delivery point measurement device table (Agric only)*

<i>Measurement Type</i>	<i>Number</i>	<i>Accuracy (+/- percentage)</i>	<i>Reading Frequency (Days)</i>	<i>Calibration Frequency (Months)</i>	<i>Maintenance Frequency (Months)</i>
<i>Orifices</i>					
<i>Propeller meter</i>					
<i>Weirs</i>					
<i>Flumes</i>					
<i>Venturi</i>					
<i>Metered gates</i>					
<i>Other (define)</i>					
<i>Total</i>					

**Urban Customers**

1. Total number of connections \_\_\_\_\_
2. Total number of metered connections \_\_\_\_\_
3. Total number of connections not billed by quantity \_\_\_\_\_
4. Percentage of water that was measured at delivery point \_\_\_\_\_
5. Percentage of delivered water that was billed by quantity \_\_\_\_\_

6. Measurement device table

Meter Size and Type	Number	Accuracy (+/-percentage)	Reading Frequency (Days)	Calibration Frequency (Months)	Maintenance Frequency (Months)
5/8-3/4"					
1"					
1 1/2"					
2"					
3"					
4"					
6"					
8"					
10"					
Compound					
Turbo					
Other (define)					
Total					

**Agriculture and Urban Customers**

1. Current year agriculture and /or urban water charges - including rate structures and billing frequency  
See Attachment C, Page XX, for current year rate ordinance

2. Annual charges collected from customers (current year data)

Charges (\$ unit)	Charge units (\$/af), (\$/ acre), (\$/hcf), (\$/customer) etc.	Units billed during year (af, acres, hcf, customer) etc.	\$ collected (\$ times units)
Fixed Charges			

Volumetric charges			
<i>Charges (\$ unit)</i>	<i>Charge units (\$/af), (\$/ acre), (\$/hcf), (\$/customer) etc.</i>	<i>Units billed during year (af, acres, hcf, customer) etc.</i>	<i>\$ collected (\$ times units)</i>

3. *Water-use data accounting procedures*  
See Attachment D, District Sample Bills

## **H. Water Shortage Allocation Policies**

1. *Current year water shortage policies or shortage response plan - specifying how reduced water supplies are allocated*

See Attachment E, District Water Shortage Plan

2. *Current year policies that address wasteful use of water and enforcement methods*

See Attachment C, Page XX



## Section 2: Inventory of Water Resources

### A. Surface Water Supply

1. *Acre-foot amounts of surface water delivered to the district by each of the district sources*  
See Water Inventory Tables, Table 1

2. *Amount of water delivered to the district by each of the district sources for the last 10 years*  
See Water Inventory Tables, Table 8

### B. Ground Water Supply

1. *Acre-foot amounts of ground water pumped and delivered by the district*  
See Water Inventory Tables, Table 2

2. *Ground water basin(s) that underlies the service area*

<i>Name</i>	<i>Size (Square Miles)</i>	<i>Usable Capacity (AF)</i>	<i>Safe Yield (AF/Y)</i>

3. *Map of district-operated wells and managed ground water recharge areas*  
See Attachment F, District Map of Groundwater Facilities

4. *Description of conjunctive use of surface and ground water*

5. *Ground Water Management Plan*  
See Attachment G, Groundwater Management Plan

6. *Ground Water Banking Plan*  
See Attachment H, Groundwater Banking Plan

### C. Other Water Supplies

1. *“Other” water used as part of the water supply*  
See the Water Inventory Tables, Table 1

### D. Source Water Quality Monitoring Practices

1. *Surface water and/or ground water quality problems, and how the quality problems limit the use of that source or affect customer use decisions*

2. *Potable Water Quality (Urban only)*

See Attachment I – District Annual Water Quality Report

3. *Agricultural water quality concerns:*    Yes    \_\_\_\_\_    No    \_\_\_\_\_  
 (Describe)

4. *Description of the agricultural water quality testing program and the role of each participant, including the district, in the program*

5. *Current water quality monitoring programs for surface water by source (Agric only)*

<i>Analyses Performed</i>	<i>Frequency Range</i>	<i>Concentration Range</i>	<i>Average</i>

*Current water quality monitoring programs for groundwater by source (Agric only)*

<i>Analyses Performed</i>	<i>Frequency Range</i>	<i>Concentration Range</i>	<i>Average</i>

6. *Current year total dissolve solid range for surface water and ground water (Agric only)*  
*Surface water:* \_\_\_\_\_ ppm      *Ground water:* \_\_\_\_\_ ppm

**E. Water Uses Within the District**

1. *Agricultural*

See Water Inventory Tables, Table 5 - Crop Water Needs

2. *Types of irrigation systems used for each crop in current year*

<i>Crop name</i>	<i>Total Acres</i>	<i>Basin - acres</i>	<i>Furrow - acres</i>	<i>Sprinkler - acres</i>	<i>Low Volume - acres</i>	<i>Multiple methods -ac</i>


3. Urban use by customer type in current year

<i>Customer Type</i>	<i>Number of Connections</i>	<i>(AF)</i>
<i>Single-family</i>		
<i>Multi-family</i>		
<i>Commercial</i>		
<i>Industrial</i>		
<i>Institutional</i>		
<i>Landscape irrigation</i>		
<i>Wholesale</i>		
<i>Recycled</i>		
<i>Other (specify)</i>		
<i>Other (specify)</i>		
<i>Other (specify)</i>		
<i>Unaccounted for</i>		
<b>Total</b>		

4. Urban Wastewater Collection/Treatment Systems serving the service area – current year

<i>Treatment Plant</i>	<i>Treatment Level (1, 2, 3)</i>	<i>AF</i>	<i>Disposal to / uses</i>
	<b>Total</b>		
<b>Total discharged to ocean</b>	<b>and/ or saline sink</b>		

5. Ground water recharge / management / banking in current year (Table 6)

<i>Recharge Area</i>	<i>Method of Recharge</i>	<i>(AF)</i>	<i>Method of Retrieval</i>
	<b>Total</b>		

6. Transfers and exchanges into or out of the service area in current year (Table 6)

<i>From Whom</i>	<i>To Whom</i>	<i>(AF)</i>	<i>Use</i>

7. *Trades, wheeling, wet/dry year exchanges or other transactions in current year (Table 6)*

<i>From Whom</i>	<i>To Whom</i>	<i>(AF)</i>	<i>Use</i>

8. *Other uses of water in current year*

<i>Other Uses</i>	<i>AF</i>

**F. Irrigation Drainage from the Service area (Table 7) (Ag only)**

*Districts included in the drainage problem area, as identified in “A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990),” should also complete Section 3 D.*

See Facilities Map, Attachment A, for the location of surface and subsurface outflow points, outflow measurement points, outflow water-quality testing locations

1. *Surface and subsurface drain / return flows in current year*

<i>Drain Location</i>	<i>(AF)</i>	<i>Types of Uses</i>
Total		

2. *Description of the Drainage water quality testing program and the role of each participant in the program*

3. *Drainage Water (surface and subsurface) Quality Testing Program*

<i>Analyses Performed</i>	<i>Concentration Range</i>	<i>Frequency Range</i>	<i>Average</i>

4. Usage limitation resulting from drainage water quality

<i>Constituent</i>	<i>Usage Limitation</i>

**G. Water Accounting (Inventory)**

1. *Water Supplies Quantified*

- a. *Surface water supplies, imported and originating within the service area, by month (Table 1)*
- b. *Ground water extracted by the district, by month (Table 2)*
- c. *Effective precipitation by crop (Table 5)*
- d. *Estimated annual ground water extracted by non-district parties (Table 2)*
- e. *Recycled urban wastewater, by month (Table 3)*
- f. *Other supplies, by month (Table 1)*

2. *Water Used Quantified*

- a. *Agric. conveyance losses, including seepage, evaporation, and operational spills in canal systems (Agric. Table 4) or  
Urban leaks, breaks and flushing/fire uses in piped systems (Urban Table 4)*
- b. *Consumptive use by riparian vegetation or environmental use (Table 6)*
- c. *Applied irrigation water - crop ET, water used for leaching / cultural practices (e.g., frost protection, soil reclamation, etc.) (Table 5)*
- d. *Urban water use (Table 6)*
- e. *Ground water recharge (Table 6)*
- f. *Water exchanges and transfers (Table 6)*
- g. *Estimated deep percolation within the service area (Agric. Table 6)*
- h. *Flows to perched water table or saline sink (Agric. Table 7)*
- i. *Irrigation spill or drain water leaving the District (Agric. Table 6)*
- j. *Other*

3. *Overall Water Inventory*

- a. *Table 6*

## Section 3: Best Management Practices (BMPs) for Agricultural Contractors

### A. Critical Agricultural BMPs

1. *Measure the volume of water delivered by the district to each turnout with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6 percent*

*Number of turnouts that are unmeasured or do not meet the standards listed above:* \_\_\_\_\_

*Number of measurement devices installed last year:* \_\_\_\_\_

*Number of measurement devices installed this year:* \_\_\_\_\_

*Number of measurement devices to be installed next year:* \_\_\_\_\_

<i>Types of Measurement Devices Being Installed</i>	<i>Accuracy</i>	<i>Total Installed During Current Year</i>

2. *Designate a water conservation coordinator to develop and implement the Plan and develop progress reports*

*Name:* \_\_\_\_\_ *Title:* \_\_\_\_\_

*Address:* \_\_\_\_\_

*Telephone:* \_\_\_\_\_ *E-mail:* \_\_\_\_\_

3. *Provide or support the availability of water management services to water users*  
See Attachment J, Notices of District Education Programs and Services Available to Customers.

#### **a. On-Farm Evaluations**

- 1) *On farm irrigation and drainage system evaluations using a mobile lab type assessment*

	<i>Total in district</i>	<i># surveyed last year</i>	<i># surveyed in current year</i>	<i># projected for next year</i>	<i># projected 2<sup>nd</sup> yr in future</i>
<i>Irrigated acres</i>					
<i>Number of farms</i>					

- 2) *Timely field and crop-specific water delivery information to the water user*

*b. Real-time and normal irrigation scheduling and crop ET information*

*c. Surface, ground, and drainage water quantity and quality data provided to water users*

*d. Agricultural water management educational programs and materials for farmers, staff, and the public*

<i>Program</i>	<i>Co-Funders (If Any)</i>	<i>Yearly Targets</i>

See Attachment J for samples of provided materials and notices

*4. Pricing structure - based at least in part on quantity delivered*

*5. Evaluate the need for changes in policies of the institutions to which the district is subject*

*6. Evaluate and improve efficiencies of district pumps*

## B. Exemptible BMPs for Agricultural Contractors

(See Attachment B for examples of exemptible conditions)

### 1. Facilitate alternative land use

<i>Drainage Characteristic</i>	<i>Acreage</i>	<i>Potential Alternate Uses</i>
<i>High water table (&lt;5 feet)</i>		
<i>Poor drainage</i>		
<i>Ground water Selenium concentration &gt; 50 ppb</i>		
<i>Poor productivity</i>		

### 2. Facilitate use of available recycled urban wastewater that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils

<i>Sources of Recycled Urban Waste Water</i>	<i>AF/Y Available</i>	<i>AF/Y Currently Used in District</i>

### 3. Facilitate the financing of capital improvements for on-farm irrigation systems

### 4. Incentive pricing

#### 5. a) Line or pipe ditches and canals

<i>Canal/Lateral (Reach)</i>	<i>Type of Improvement</i>	<i>Number of Miles in Reach</i>	<i>Estimated Seepage (AF/Y)</i>	<i>Accomplished/Planned Date</i>

#### b) Regulatory reservoirs

<i>Reservoir Name</i>	<i>Annual Spill in Section (AF/Y)</i>	<i>Estimated Spill Recovery (AF/Y)</i>	<i>Accomplished/Planned Date</i>

### 6. Increase flexibility in water ordering by, and delivery to, water users

See Attachment K – District Agricultural Water Order form



7. *Construct and operate district spill and tailwater recovery systems*

<i>Distribution System Lateral</i>	<i>Annual Spill (AF/Y)</i>	<i>Quantity Recovered and reused (AF/Y)</i>
Total		

<i>Drainage System Lateral</i>	<i>Annual Drainage Outflow (AF/Y)</i>	<i>Quantity Recovered and reused (AF/Y)</i>
Total		

8. *Optimize conjunctive use of surface and ground water*

9. *Automate canal structures*

10. *Facilitate or promote water customer pump testing and evaluation*

See Attachment J, Notices of District Education Programs and Services Available to Customers

## C. Provide a 3-Year Budget for Implementing BMPs

### 1. Amount actually spent during current year.

<i>BMP #</i>	<i>BMP Name</i>	<i>Actual Expenditure (not including staff time)</i>	<i>Staff Hours</i>
A1	Measurement	\$0	0
2	Conservation staff	\$0	0
3	On-farm evaluations / water delivery info	\$0	0
	Irrigation Scheduling	\$0	0
	Water quality	\$0	0
	Agricultural Education Program	\$0	0
4	Quantity pricing	\$0	0
5	Policy changes	\$0	0
6	Contractor's pumps	\$0	0
B1	Alternative land use	\$0	0
2	Urban recycled water use	\$0	0
3	Financing of on-farm improvements	\$0	0
4	Incentive pricing	\$0	0
5	Line or pipe canals/install reservoirs	\$0	0
6	Increase delivery flexibility	\$0	0
7	District spill/tailwater recovery systems	\$0	0
8	Optimize conjunctive use	\$0	0
9	Automate canal structures	\$0	0
10	Customer pump testing	\$0	0
	<i>Total</i>	\$0	0

### 2. Projected budget summary for the next year.

<i>BMP #</i>	<i>BMP Name</i>	<i>Budgeted Expenditure (not including staff time)</i>	<i>Staff Hours</i>
A1	Measurement	\$0	0
2	Conservation staff	\$0	0
3	On-farm evaluations / water delivery info	\$0	0
	Irrigation Scheduling	\$0	0
	Water quality	\$0	0
	Agricultural Education Program	\$0	0
4	Quantity pricing	\$0	0
5	Policy changes	\$0	0
6	Contractor's pumps	\$0	0
B1	Alternative land use	\$0	0
2	Urban recycled water use	\$0	0
3	Financing of on-farm improvements	\$0	0
4	Incentive pricing	\$0	0
5	Line or pipe canals/install reservoirs	\$0	0
6	Increase delivery flexibility	\$0	0
7	District spill/tailwater recovery systems	\$0	0
8	Optimize conjunctive use	\$0	0

9	<i>Automate canal structures</i>	\$0	0
10	<i>Customer pump testing</i>	<u>\$0</u>	<u>0</u>
	<i>Total</i>	\$0	0

3. *Projected budget summary for 3<sup>rd</sup> year.*

<i>BMP #</i>	<i>BMP Name</i>	<i>Budgeted Expenditure (not including staff time)</i>	<i>Staff Hours</i>
A1	<i>Measurement</i>	\$0	0
2	<i>Conservation staff</i>	\$0	0
3	<i>On-farm evaluations / water delivery info</i>	\$0	0
	<i>Irrigation Scheduling</i>	\$0	0
	<i>Water quality</i>	\$0	0
	<i>Agricultural Education Program</i>	\$0	0
4	<i>Quantity pricing</i>	\$0	0
5	<i>Policy changes</i>	\$0	0
6	<i>Contractor's pumps</i>	\$0	0
B1	<i>Alternative land use</i>	\$0	0
2	<i>Urban recycled water use</i>	\$0	0
3	<i>Financing of on-farm improvements</i>	\$0	0
4	<i>Incentive pricing</i>	\$0	0
5	<i>Line or pipe canals/install reservoirs</i>	\$0	0
6	<i>Increase delivery flexibility</i>	\$0	0
7	<i>District spill/tailwater recovery systems</i>	\$0	0
8	<i>Optimize conjunctive use</i>	\$0	0
9	<i>Automate canal structures</i>	\$0	0
10	<i>Customer pump testing</i>	<u>\$0</u>	<u>0</u>
	<i>Total</i>	\$0	0

## **D. Drainage Problem Area Programs**

(for districts located in the drainage problem area, as defined in Attachment A)

*The following programs have been incorporated in the district water conservation programs to improve conditions in the drainage problem areas.*

<i>Activity</i>	<i>Program Description</i>	<i>Budget</i>	<i>Results</i>
<i>Source Control</i>			
<i>Land Retirement</i>			
<i>Drainage Water Treatment</i>			
<i>Drainage Water Reuse</i>			
<i>Shallow Groundwater Pumping</i>			
<i>Evaporation Ponds</i>			

*The following programs were not been implemented because:*

**E. District Quantifiable Objectives (QOs)**

(QOs for each district are identified in the QO Agency document in the Planner, Chapter 10)

*Discussion of District participation in the QOs that apply to the District (see*

<i>Name of QO</i>	<i>Related BMP</i>	<i>Interest in Outside Funding</i>	<i>Agency Role</i>

## Section 4: Best Management Practices for Urban Contractors

### 1. Water Survey Programs for Single-Family and Multi-Family Residential Customers

Program description –

*Enter the number of surveys conducted in passed years and the projected number for future years.*

<i>Residential type</i>	<i>yr target</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>
SF accts -								
MF units -								

### 2. Residential Plumbing Retrofit

Program description –

*Enter the number of showerheads distributed in the past and the projected number for future years*

<i>Residential type</i>	<i>yr target</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>
SF accts -								
MF units -								

### 3. System Water Audits, Leak Detection, and Repair

Program description –

*Enter the AF of water purchased and lost in the past and the projected amount in future years*

	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>
<i>Total Water AF</i>							
<i>Unaccounted for AF</i>							
<i>% UAW</i>							

### 4. Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections (NOT EXEMPTIBLE)

Program description –

*Number of unmetered connections* \_\_\_\_\_

*Number of connections not billed by quantity* \_\_\_\_\_

### 5. Large Landscape Conservation Programs and Incentives

Program description –

*Enter the number of landscape budgets/audits in passed years & the projected number for future years*

<i>irrigation type</i>	<i>yr target</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>
Dedicated meters -								

Mixed use meters -								
--------------------	--	--	--	--	--	--	--	--

6. *High-Efficiency Washing Machine Rebate Programs*

Program description –

*Enter the number of rebates paid in passed years & the projected number for future years*

\$ rebate	2003	2004	2005	2006	2007	2008	2009
\$							

7. *Public Information Programs (Attach samples)*

Program description –

8. *School Education Programs (Attach samples)*

Program description –

9. *Conservation Programs for CII Accounts*

Program description –

*Enter the number of surveys conducted in passed years & the projected number for future years*

Customer type	yr target	2003	2004	2005	2006	2007	2008	2009
Comm accts -								
Indust. accts -								
Instit. accts -								

10. *Wholesale Agency Assistance Programs*

Program description –

11. *Conservation Pricing*

Program description –

12. *Conservation Coordinator*

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ E-mail: \_\_\_\_\_

13. *Water Waste Prohibition*

Program description –

*14. Residential ULFT Replacement Programs*

Program description –

*Enter the number of toilets replaced in passed years and the projected number for future years.*

<i>Residential type</i>	<i>yr target</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>
<i>SF accts -</i>								
<i>MF units -</i>								

**Provide a 3-Year Budget for Expenditures and Staff Effort for BMPs**

***Actual Current Year Expenditures***

<i>Year</i>	<i>BMP Name</i>	<i>Actual Expenditures (not including staff hours)</i>	<i>Staff Hours</i>
<i>1</i>	<i>Residential Water Audits</i>	\$0	0
<i>2</i>	<i>Residential Retrofit</i>	\$0	0
<i>3</i>	<i>System Water Audit and Leak Detection</i>	<i>Not WC budget</i>	
<i>4</i>	<i>Metering w/Commodity Rates</i>	\$0	0
<i>5</i>	<i>Landscape Water Audits</i>	\$0	0
<i>6</i>	<i>Washing Machine Rebates</i>	\$0	0
<i>7</i>	<i>Public Information</i>	\$0	0
<i>8</i>	<i>School Education Program</i>	\$0	0
<i>9</i>	<i>CII Conservation Programs</i>	\$0	0
<i>10</i>	<i>Wholesale Agency Programs</i>	\$0	0
<i>11</i>	<i>Conservation Pricing</i>	\$0	0
<i>12</i>	<i>Conservation Coordinator</i>	\$0	0
<i>13</i>	<i>Water Waste Prohibition</i>	\$0	0
<i>14</i>	<i>ULFT Program</i>	\$0	0
	<i>Total</i>	\$0	0

***Projected Budget for Next Year***

<i>Year</i>	<i>BMP Name</i>	<i>Actual Expenditures (not including staff hours)</i>	<i>Staff Hours</i>
<i>1</i>	<i>Residential Water Audits</i>	\$0	0
<i>2</i>	<i>Residential Retrofit</i>	\$0	0
<i>3</i>	<i>System Water Audit and Leak Detection</i>	<i>Not WC budget</i>	
<i>4</i>	<i>Metering w/Commodity Rates</i>	\$0	0
<i>5</i>	<i>Landscape Water Audits</i>	\$0	0
<i>6</i>	<i>Washing Machine Rebates</i>	\$0	0
<i>7</i>	<i>Public Information</i>	\$0	0
<i>8</i>	<i>School Education Program</i>	\$0	0
<i>9</i>	<i>CII Conservation Programs</i>	\$0	0



10	<i>Wholesale Agency Programs</i>	\$0	0
11	<i>Conservation Pricing</i>	\$0	0
12	<i>Conservation Coordinator</i>	\$0	0
13	<i>Water Waste Prohibition</i>	\$0	0
14	<i>ULFT Program</i>	\$0	0
	<i>Total</i>	\$0	0

***Projected Budget for 3<sup>rd</sup> Year***

Year		Actual Expenditures	
BMP #	BMP Name	(not including staff hours)	Staff Hours
1	<i>Residential Water Audits</i>	\$0	0
2	<i>Residential Retrofit</i>	\$0	0
3	<i>System Water Audit and Leak Detection</i>	<i>Not WC budget</i>	
4	<i>Metering w/Commodity Rates</i>	\$0	0
5	<i>Landscape Water Audits</i>	\$0	0
6	<i>Washing Machine Rebates</i>	\$0	0
7	<i>Public Information</i>	\$0	0
8	<i>School Education Program</i>	\$0	0
9	<i>CII Conservation Programs</i>	\$0	0
10	<i>Wholesale Agency Programs</i>	\$0	0
11	<i>Conservation Pricing</i>	\$0	0
12	<i>Conservation Coordinator</i>	\$0	0
13	<i>Water Waste Prohibition</i>	\$0	0
14	<i>ULFT Program</i>	\$0	0
	<i>Total</i>	\$0	0

## **Attachment A**

### *Information Required of Contractors Located in a Drainage Problem Area*

Contractor's included in the drainage problem area, as identified in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990), are listed, by sub-area, below. If future editions of the drainage report revise the boundaries of a drainage problem area or other factors used to determine which districts are in a drainage problem area, Reclamation will revise Attachment A to conform with the current drainage report.

1. Reclamation districts in the **Grasslands subarea**: Broadview Water District, Central California Irrigation District, Del Puerto Water District, Firebaugh Canal Water District, Mercy Springs Water District, Pacheco Water District, Panoche Water District, San Luis Canal Company, and San Luis Water District.
2. Reclamation districts in the **Westlands subarea**: James Irrigation District, Tranquillity Irrigation District, and Westlands Water District.
3. Reclamation districts in the **Tulare subarea**: Alpaugh Irrigation District, Atwell Island Water District, Lower Tule River Irrigation District, and Pixley Irrigation District.
4. Reclamation districts in the **Kern subarea**: Alpaugh Irrigation District.

Contractors listed above shall describe which recommendations prescribed in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990) have been incorporated in their water conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source Control
2. Land Retirement
3. Drainage Water Treatment
4. Drainage Water Reuse
5. Shallow Ground water Pumping
6. Evaporation Ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why.

**Attachment B**  
*Agricultural Exemptible BMPs*

To establish that a BMP is not applicable to the district, the Plan should explain the reasons why the BMP does not apply to the district. This justification must be consistent with Section 1 of the Criteria entitled, “Describe the District.” Examples of N/A for each exemptible BMP are listed below. This list is not all-inclusive.

*Section 3. B. Exemptible BMPs for Agricultural Contractors*

1. Facilitate Alternative Land Use - *N/A could include: Districts without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems.*
2. Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils - *N/A could include: Completely piped systems that do not have delivery constraints.*
3. Facilitate the financing of capital improvements for on-farm irrigation systems - *None identified.*
4. Incentive pricing - *District that receives only class 2 water.*
5. a) Line or pipe ditches and canals - *N/A could include: Completely piped systems, unlined systems or sections or systems that are used as part of a planned conjunctive use program.*  
  
b) Regulatory reservoirs - *N/A could include: Completely piped systems that do not have delivery constraints.*
6. Increase flexibility in water ordering by, and delivery to, the water users within operational limits - *None identified.*
7. Construct and operate district spill and tailwater recovery systems - *N/A could include: Completely piped systems that do not have delivery constraints.*
8. Optimize conjunctive use of surface and ground water - *N/A could include: Districts that do not overlie a useable ground water basin and neither the district or its customers pump or use ground water.*
9. Automate canal structures - *N/A could include: Completely piped systems that do not have delivery constraints.*

**Attachment C**  
Quantifiable Objectives

*Assess Quantifiable Objectives(QOs).* CALFED is developing QOs that provide incentives for participation in implementing Water Management activities by water users including Contractors. These activities may or may not directly benefit the water user/Contractor. If there are CALFED QOs that apply to the geographic location of your district lands, identify the QOs that apply to the district and comment on potential for Contractor participation. Reclamation's Area Office and Regional Office will have the latest copy of QOs listed by Contractor. Evaluate and comment on any BMP or practice that is complementary, or could be complementary to the QOs in the District.

## **Attachment D**

### *Crop List*

barley  
corn - field  
oats  
rice  
sorghum  
wheat  
other cereals

alfalfa  
clover  
irrigated pasture  
other hay  
silage  
other forage

cotton  
hops  
safflower  
sugar beats  
soybeans  
other field crops

asparagus  
beans  
broccoli

cabbage  
carrots  
cauliflower  
celery  
corn  
cucumbers  
garlic  
greens  
lettuce  
melons  
onions  
peas  
peppers  
potatoes  
squash  
tomatoes  
other vegetables

Sudan grass  
Bermuda grass  
other grasses

apples  
apricots  
avocados

berries (all kinds)  
cherries  
grapefruit  
lemon / limes  
oranges / tangerines  
dates  
grapes  
olives  
peaches  
pears  
prunes / plums  
strawberries  
other fruits

almonds  
pecans  
pistachios  
walnuts  
other nut trees

ornamental nursery  
joboba  
other

### *Irrigation Methods List*

Level basin  
Furrow  
Sprinkler  
Low Volume  
Multiple (combination of two methods)

## “Ag Tables” Instructions

(These tables can be found on your CD in the spreadsheet folder.)

**In the supplied spreadsheet, enter data in the white cells. Shaded cells are locked and cannot be changed.**

**Start by entering the current year (last complete calendar year) in cell D1.**

**Table 1. Surface Water Supply** (requested in Criteria Section 2A and 2C).

The numbers in this table should be the best information available on how much surface water actually entered the District Distribution System. Make sure all the incoming surface water flows are represented. Water transferred in and small miscellaneous flows may be lumped together in the “Other” column. This table should not include urban recycled water or agricultural return water pumped back into the canals.

*Table 1*

### *Surface Water Supply*

2005 Month	Federal Ag Water (acre-feet)	Federal non- Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Other Water (define) (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
<b>Method</b>							
January	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0
October	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Measured numbers for the water quantities detailed in these tables are expected. Select a method below that best describes the measurement method for each supply. Fill in the row marked “Method” with the appropriate measurement method type. If two methods are used for one supply, select the predominant one. If there is no flow rate or volumetric measurement, fill in the appropriate estimation method.

<p><b>Method Definitions:</b></p> <p>M1 Measured summation from calibrated measuring devices, accurate to within +/- 6 percent</p> <p>M2 Measured summation from calibrated measuring devices</p> <p>M3 Measured summation from measuring devices</p> <p>C1 Calculated (more than summation) using information from calibrated devices (such as the difference between measurements upstream and down stream of diversion)</p> <p>C2 Calculated using information from measuring devices</p> <p>C3 Calculated using estimates from pump run-times and pump efficiency</p> <p>E1 Estimated using measured information from similar conditions</p> <p>E2 Estimated using historical information</p> <p>E3 Estimated using observation</p> <p>O1 Other (attach a note with descriptions of other methods used)</p>
---

**Table 2. Ground Water Supply** (requested in Criteria Section 2B).

The numbers in this table for district pumping should be measured or calculated. For private pumping, an estimate of the volume pumped is normally used. If a yearly total is the best estimate available, it should be distributed over the months based on experience. Choose the appropriate measurement method from the definitions provided on page 2-1, and fill in the row marked “Method”. The difference between district and private ground water is determined by how it was delivered. If the water is pumped from private wells into the District Distribution System, and sold by the district, then it should be included as district ground water.

**Table 2**  
**Ground Water Supply**

2005 Month	District Groundwater (acre-feet)	Private Groundwater *(acre-feet)
<b>Method</b>		
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>

**Table 3. Total Water Supply** (Criteria Section 2A, 2B, and 2C).

Except for “Recycled M&I Wastewater” the information in this Table was entered in Tables 1 and 2. If you are using the supplied spreadsheet, all the numbers previously entered are automatically copied to this table, as indicated by light gray boxes. The “Recycled M&I Wastewater” column should be filled out only for M&I recycled wastewater that is delivered into a District Distribution System. Fill in the measurement method type using the definitions provided on page 2-1.

**Table 3**

***Total Water Supply***

<b>2005 Month</b>	<b>Surface Water Total (acre-feet)</b>	<b>District Groundwater (acre-feet)</b>	<b>Recycled M&amp;I Wastewater (acre-feet)</b>	<b>Total District Water Supply (acre-feet)</b>
<b>Method</b>				
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



**Table 4. Distribution System** (requested in Criteria Section 2G, part 2).

The first column should have the name or number of part of the Distribution System, such as Canal T-2, or Section 4 laterals. In the “Length” and “Width” columns, enter the length and average width of those canals and the reservoirs and the surface area will be automatically calculated. In the “Spillage” column, enter the estimated amount of un-recovered spillage from those canals. Spillage is recovered if it re-enters the distribution system later.

*Table 4*

***Distribution System***

2005 Canal, Pipeline, Lateral, Reservoir	Length (feet)	Width (feet)	Surface Area (square feet)	Precipitation (acre-feet)	Evaporation (acre-feet)	Spillage (acre-feet)	Seepage (acre-feet)	Total (acre-feet)
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
??	0	0	0	0.0	0.0	0	0	0
TOTAL				0.0	0.0	0	0	0

Enter the monthly precipitation for the current year (cell D1) in the Precipitation Worksheet, column M rows 73-84. The “Precipitation” column in Table 4 will auto fill.

Enter the monthly evaporation for the current year (cell D1) in the Evaporation Worksheet, column R rows 73-84. The “Evaporation” column in Table 4 will auto fill.

Enter the estimated seepage per acre for those canals in column X rows 73-84. The “Seepage” column in Table 4 will auto fill.

	inches precip	inches evap	Seepage AF/ac seepage
Jan	0	0	
Feb	0	0	1.00
Mar	0	0	0.50
Apr	0	0	1.00
May	0	0	1.00
Jun	0	0	1.00
Jul	0	0	1.00
Aug	0	0	1.00
Sept	0	0	1.00
Oct	0	0	1.00
Nov	0	0	1.00
Dec	0	0	1.00
TOTAL	0	0	



**Table 6. District Water Budget** (requested in section 2G).  
 Much of the data for this table is copied from the previous tables.

Riparian ET - Estimate the annual consumptive use by riparian vegetation inadvertently or intentionally supplied with district water. Do not include riparian vegetation located at an environmental or recreational resource. Estimate the total acres of riparian vegetation and an average water-use rate to obtain an estimate of consumptive use (based on evapotranspiration [ET] during the months when water is available). Information may also be available from local farm advisors and neighboring districts.

Groundwater Recharge - Quantify water used by the contractor for the purposeful recharge of groundwater, including recharge ponds and water injected for groundwater recharge.

Transfers/exchanges/trades/wheeling – the amount of water the district bought, sold or traded outside the district service area.

Non-Agricultural Deliveries - Quantify water delivered that was not used for commercial agricultural practices. This includes deliveries to homes and ranches for residential use, deliveries for commercial and industrial uses, and deliveries to municipal water districts.

Actual Agricultural Water Sales - From district records, quantify the water that was delivered for application to the land. Compare this number with the “Water Available for Sale to Agricultural Customers” calculated on the previous line. If there is significant difference, look for data gaps.

Drain Water Outflow - Quantify the drainwater that leaves the district boundaries from surface ditches or through a drainpipe. While an estimate is acceptable, if the estimate exceeds 100 AF per year per outflow location, installation of an outflow measurement device is highly recommended. Reliable outflow data is one of the key components of an accurate water inventory. Districts are encouraged to begin planning for outflow measurement.

Percolation from Agricultural Land - a rough estimate of the amount of water applied to the land that continues down past the root zone (deep percolation).

**Table 6**

**2005 District Water Budget**

Water Supply	Table 3		0
Riparian ET	(Distribution and Drain)	minus	0
Groundwater recharge	(intentional - ponds, injection)	minus	0
Seepage	Table 4	minus	0
Evaporation - Precipitation	Table 4	minus	0
Spillage	Table 4	minus	0
Transfers/exchanges/trades/wheeling	(into or out of the district)	plus/minus	0
Non-Agri deliveries	(delivered to non-ag customers)	minus	0
Water Available for sale to agricultural customers			0
<i>Compare the above line with the next line to help find data gaps</i>			
2005 Actual Agricultural Water Sales	From District Sales Records		0
Private Groundwater	Table 2	plus	0
Crop Water Needs	Table 5	minus	0
Drainwater outflow	(tail and tile not recycled)	minus	0
Percolation from Agricultural Land	(calculated)		0

**Table 7. Influence on Ground Water and Saline Sink** (requested in section 2G).

The first part of this table compares the estimated influence on groundwater levels from the district with the actual change in the groundwater storage. There may be a large difference in the quantities. The comparison indicates the impact of district operation on groundwater.

The second part estimates the water that flows to a perched water table or saline sink and is no longer available for use. Examples are flows to evaporation ponds, saline groundwater, or perched water tables where the water is not reused. Implementing BMPs could minimize this “lost” water. In some cases, this “lost” water may be beneficial in some other way. Districts should provide a statement about how much of this “lost” water may be “savable” if improvements were funded. This statement will help Reclamation and the district find the most effective areas to apply conservation program funds.

*Table 7*

***Influence on Groundwater and Saline Sink***

2005

Agric Land Deep Perc + Seepage + Recharge - Groundwater Pumping = District Influence on Groundwater	0
Estimated actual change in ground water storage, including natural recharge)	
Irrigated Acres (from Table 5)	0
Irrigated acres over a perched water table	0
Irrigated acres draining to a saline sink	0
Portion of percolation from agri seeping to a perched water table	#DIV/0!
Portion of percolation from agri seeping to a saline sink	#DIV/0!
Portion of On-Farm Drain water flowing to a perched water table/saline sink	0
Portion of Dist. Sys. seep/leaks/spills to perched water table/saline sink	0
Total (AF) flowing to a perched water table and saline sink	#DIV/0!

**Table 8. Annual Water Quantities Delivered Under Each Right or Contract**  
(requested in section 2A and 2C).

Quantify the amount of each type of surface water the District actually received in each of the last 10 years. If the District has sources of surface water that are not listed in the table, add the necessary data in the “Other” column.

*Table 8*

***Annual Water Quantities Delivered Under Each Right or Contract***

Year	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Other Water (define) (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
Average	0	0	0	0	0	0	0

## “Urban Tables” Instructions

(These tables can be found on your CD in the spreadsheet folder.)

**In the supplied spreadsheet, enter data in the white cells. Shaded cells are locked and cannot be changed.**

**Start by entering the current year (last complete calendar year) in cell D1.**

**Table 1. Surface Water Supply** (requested in Criteria Section 2A and 2C).

The numbers in this table should be the best information available on how much surface water actually entered the District Distribution System. Make sure all the incoming surface water flows are represented. Water transferred in and small miscellaneous flows may be lumped together in the “Other” column. This table should not include urban recycled water.

*Table 1*

### *Surface Water Supply*

2005 Month	Federal Urban Water (acre-feet)	Federal Agric. Water (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Other Water (define) (acre-feet)	Total (acre-feet)
January	0	0	0	0	0	0
February	0	0	0	0	0	0
March	0	0	0	0	0	0
April	0	0	0	0	0	0
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	0	0	0
September	0	0	0	0	0	0
October	0	0	0	0	0	0
November	0	0	0	0	0	0
December	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0

**Table 2. Ground Water Supply** (requested in section 2B).

The quantities in this table for the district pumping should be measured or calculated. For private pumping, an estimate of the volume pumped is normally used. If a yearly total is the best estimate available, it should be distributed over the months based on experience.

**Table 2**  
***Ground Water Supply***

<b>2005 Month</b>	<b>District groundwtr (acre-feet)</b>	<b>Private groundwater (acre-feet)</b>
January	0	0
February	0	0
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	0	0
October	0	0
November	0	0
December	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>

\*normally estimated

**Table 3. Total Water Supply** (requested in section 2A, 2B, and 2C).

Except for “Recycled M&I Wastewater” the information in this Table was entered in Tables 1 and 2. If you are using the supplied spreadsheet, all the numbers previously entered are automatically copied to this table, as indicated by light gray boxes. The “Recycled M&I Wastewater” column should be filled out only for M&I recycled wastewater that is delivered into a District Distribution System.

**Table 3**

***Total Water Supply***

<b>2005 Month</b>	<b>Surface Water Supply (acre-feet)</b>	<b>District Groundwater (acre-feet)</b>	<b>Recycled M&amp;I Wastewater (acre-feet)</b>	<b>Total District Water Supply (acre-feet)</b>
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Recycled wastewater is treated urban wastewater that is reused





**Table 6. District Water Budget** (requested in section 2G).

Much of the data for this table is copied from the previous tables. Definitions are only provided for water uses that have not been entered previously.

Environmental Consumptive Use - The annual water delivered to an environmental or recreational resource.

Ground-Water Recharge - The water used for the purposeful recharge of groundwater, including recharge ponds and injection wells.

Water Exchanges or Transfers - The water delivered to, or received from other entities, not listed in Table 1.

Non-Urban (Agricultural) Deliveries - The water delivered to commercial agricultural customers. If 2,000 acre-feet a year or more is delivered to agricultural, the district is considered an agricultural water supplier and will also complete an agricultural water management plan and implement agricultural BMPs.

Actual M&I Water Sales - From district billing records, quantify the water that was sold as M&I. Compare this quantity with the “Water Supply Available for Sale” calculated on the previous line. If there is a significant difference, look for data gaps.

Inside Use - The water billed as M&I during the month of February multiplied by 12. Outside water use during February is assumed to be minimal. February usage provides an estimate of water use inside homes and businesses, and it is assumed to be very consistent regardless of season.

The final line on this table is an estimate of the amount of outdoor water use.

**Table 6**

**2005 District Water Budget**

<b>Water Supply</b>	Table 3		0
<b>Environmental Consumptive Use</b>		minus	0
<b>Groundwater Recharge</b>	(Perc ponds & recharge wells)	minus	0
<b>Water Exchanges or Transfers</b>	(into or out of the district)	minus / plus	0
<b>Flushing / Fire</b>	Table 4b	minus	0
<b>Distribution System Leaks &amp; Breaks</b>	Table 4b	minus	0
<b>Non-Urban (Agricultural) Deliveries</b>	<2,000 AF	minus	0
	<b>Water Supply Available for Sale</b>		0
<b>2005</b>			
<b>Actual M&amp;I Water Sales</b>		<b>From District Records</b>	0
<b>Inside Use</b>	Feb use x 12	minus	0
<b>Landscape / Outside Use</b>	(calculated)		0

**Table 8. Annual Water Quantities Delivered Under Each Right or Contract**  
(requested in section 2A and 2C).

Quantify the amount of each type of water the contractor actually received in each of the last 10 years. If the contractor has sources of surface water that are not listed in the table, add the necessary data in the “Other” column.

*Table 8*  
***Annual Water Quantities Delivered Under Each Right or Contract***

Year	Federal Urban Water (acre-feet)	Federal Agric. Water (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Other Water (define) (acre-feet)	Total (acre-feet)
1996	0	0	0	0	0	0
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0
1999	0	0	0	0	0	0
2000	0	0	0	0	0	0
2001	0	0	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	0
2004	0	0	0	0	0	0
2005	0	0	0	0	0	0
Total	0	0	0	0	0	0
Average	0	0	0	0	0	0

## **“BMP Target Form” Instructions**

(These tables can be found on your CD in the spreadsheet folder.)

**In the supplied spreadsheet, enter data in the white cells. Shaded cells are locked and cannot be changed.**

Start by entering the current year (last complete calendar year) in cell E1.

In the Connection and Water Use Data tables (rows 9 to 15) fill in the number of connections by customer type and the amount of water used by each customer type for the current year. Identify the number of metered and unmetered number of accounts by customer type. The Total AFY supplied in the current year should equal your water supply for the current year.

In the historic use table (rows 9-14, columns L & M) fill in the number of connections served in 1992 and 1998.

In the population table, enter the average number of residents per single-family home and per multi-family unit in the formulas in column D, rows 19 & 20. You can change the average number of residents in column E, rows 19 & 20 to inform the reader.

In cell E20 enter the average number of units per multi-family connection. For instance, if you serve the following 10 multi-family accounts the average number of accounts per connection is 13.

Multi-family account	Number of units
1	42
2	2
3	12
4	4
5	11
6	26
7	18
8	10
9	2
10	3
Total	130
Average	13

The BMP actual implementation table (rows 29-47) automatically calculates the target number of actions expected for each BMP. Column E (yr. target) has the annual number of BMP actions for your agency.

Enter the actual number of BMP actions taken for each BMP in column F.

For the future year tables, enter the number of projected / budgeted actions your agency plans to accomplish.

One of the future-year tables includes cells where budget information can be entered. This information could help you with the budgeting process.

Enter data year here  Enter data year here

Name of Agency  
2005 connection and water use data

Customer type	Number of connection	Number metered	Number unmetered	Metered AFY	Unmetered AFY	Total AFY
Single Family						-
Multifamily						-
Commercial						-
Industrial						-
Institutional						-
Landscape Irrigation (dedicated meter)						-
Losses/Fire/flushing						-
TOTALS	-	-	-	-	-	-

population	-
Single Family (3.5)	-
Multi-Family (2.5)	-
AFY	-
GPCD	#DIV/0!

units per  
connectio

1992 Connection
SF
MF

## Name of Agency

### 2005 CUWCC BMP actual implementation

BMP#	BMP name	Target	yr target	actual
1	Residential Water Use Surveys			
	Single Family	-	-	-
	Multi-Family (units)	-	-	-
2	Residential Plumbing Retrofit	-	-	
3	System Water Audit/Leak Repair	1	<10%	
4	Metering / # unmetered accts	-	-	
5	Large Landscape Programs			
	Landscape meters accounts	-	-	-
	CII mixed-use meter accounts	-	-	-
6	Washing Machine Rebates	-		-
7	Public Information	1	1	
8	School Education	1	1	
9	CII Conservation Program	-	-	-
10	Wholesale Agency Programs			
11	Conservation Pricing	1	1	
12	Conservation Coordinator	1	1	
13	Waste Water Prohibition	1	1	
14	Residential ULF Replacements			
	SF Rate-of-resale (2.5 per)	-	-	-
	MF Rate-of-resale (2 unit)	-	-	-

### 2006 CUWCC BMP implementation plan with budget calcs

BMP#	BMP name	Target	Yr target	Planned	Total*	Budget	\$ per
1	Residential Water Use Surveys						
	Single Family	-	-				#DIV/0!
	Multi-Family (units)	-	-				#DIV/0!
2	Residential Plumbing Retrofit	-	-				#DIV/0!
3	System Water Audit/Leak Repair	1	<10%				
4	Metering / # unmetered accts	-	-				#DIV/0!
5	Large Landscape Programs						
	Landscape meters accounts	-	-				#DIV/0!
	CII mixed-use meter accounts	-	-				#DIV/0!
6	Washing Machine Rebates	NA	NA				NA
7	Public Information	1	1				
8	School Education	1	1				
9	CII Conservation Program	-	-				#DIV/0!
10	Wholesale Agency Programs						
11	Conservation Pricing	1	1				
12	Conservation Coordinator	1	1				
13	Waste Water Prohibition	1	1				
14	Residential ULF Replacements	-					
	SF Rate-of-resale (2.5 per)	-	-				#DIV/0!
	MF Rate-of-resale (2 unit)	-	-				#DIV/0!

\$ -

## 2007 CUWCC BMP implementation plan

BMP#	BMP name	Target	Yr target	Planned	Total*
1	Residential Water Use Surveys				
	Single Family	-	-		
	Multi-Family (units)	-	-		
2	Residential Plumbing Retrofit	-	-		
3	System Water Audit/Leak Repair	1	<10%		
4	Metering / # unmetered accts	-	-		
5	Large Landscape Programs	-	-		
	Landscape meters accounts	-	-		
	CII mixed-use meter accounts	-	-		
6	Washing Machine Rebates	TBD			
7	Public Information	1	1		
8	School Education	1	1		
9	CII Conservation Program	-	-		
10	Wholesale Agency Programs				
11	Conservation Pricing	1	1		
12	Conservation Coordinator	1	1		
13	Waste Water Prohibition	1	1		
14	Residential ULF Replacements	-	-		
	SF Rate-of-resale (2.5 per)	-	-		
	MF Rate-of-resale (2 unit)	-	-		

## 2008 CUWCC BMP implementation plan

BMP#	BMP name	Target	Yr target	Planned	Total*
1	Residential Water Use Surveys				
	Single Family	-	-		
	Multi-Family (units)	-	-		
2	Residential Plumbing Retrofit	-	-		
3	System Water Audit/Leak Repair	1	<10%		
4	Metering / # unmetered accts	-	-		
5	Large Landscape Programs	-	-		
	Landscape meters accounts	-	-		
	CII mixed-use meter accounts	-	-		
6	Washing Machine Rebates	TBD			
7	Public Information	1	1		
8	School Education	1	1		
9	CII Conservation Program	-	-		
10	Wholesale Agency Programs				
11	Conservation Pricing	1	1		
12	Conservation Coordinator	1	1		
13	Waste Water Prohibition	1	1		
14	Residential ULF Replacements	-	-		
	SF Rate-of-resale (2.5 per)	-	-		
	MF Rate-of-resale (2 unit)	-	-		

## 2009 CUWCC BMP implementation plan

BMP#	BMP name	Target	Yr target	Planned	Total
1	Residential Water Use Surveys				
	Single Family	-	-		
	Multi-Family (units)	-	-		
2	Residential Plumbing Retrofit	-	-		
3	System Water Audit/Leak Repair	1	<10%		
4	Metering / # unmetered accts	-	-		
5	Large Landscape Programs				
	Landscape meters accounts	-	-		
	CII mixed-use meter accounts	-	-		
6	Washing Machine Rebates	TBD			
7	Public Information	1	1		
8	School Education	1	1		
9	CII Conservation Program	-	-		
10	Wholesale Agency Programs				
11	Conservation Pricing	1	1		
12	Conservation Coordinator	1	1		
13	Waste Water Prohibition	1	1		
14	Residential ULF Replacements	1			
	SF Rate-of-resale (2.5 per)	-	-		
	MF Rate-of-resale (2 unit)	-	-		

## 2010 CUWCC BMP implementation plan

BMP#	BMP name	Target	Yr target	Planned	Total	Projected # Short	Projected % Done
1	Residential Water Use Surveys						
	Single Family	-	-				
	Multi-Family (units)	-	-				
2	Residential Plumbing Retrofit	-	-				
3	System Water Audit/Leak Repair	1	<10%				
4	Metering / # unmetered accts	-	-				
5	Large Landscape Programs						
	Landscape meters accounts	-	-				
	CII mixed-use meter accounts	-	-				
6	Washing Machine Rebates	TBD					
7	Public Information	1	1				
8	School Education	1	1				
9	CII Conservation Program	-	-				
10	Wholesale Agency Programs						
11	Conservation Pricing	1	1				
12	Conservation Coordinator	1	1				
13	Waste Water Prohibition	1	1				
14	Residential ULF Replacements						
	SF Rate-of-resale (2.5 per)	-	-				
	MF Rate-of-resale (2 unit)	-	-				



The CUWCC Coverage Calculator is an Excel document and must be run on your computer in order to calculate your BMP targets. This document can be found at the CUWCC website (<http://www.cuwcc.org>) and on the USBR Water Management Planner CD.

USBR also provides an Excel spreadsheet for BMP Target calculation (BMP Target Form). This spreadsheet can be found at the USBR website and on the USBR Water Management Planner CD.

**ABOUT THIS TOOL...** Check Version

**What is this?**  
 This is a tool to help a water supplier calculate the coverage requirements for BMPs 1,2,4,5,9, and 14 according to the Requirements set forth in Exhibit 1 of the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). These calculators were developed by the California Urban Water Conservation Council.

**What this is not.**  
 These calculators are not designed to estimate an agency's BMP implementation relative to the coverage requirement. They only show the coverage requirement, given agency-determined parameters for each BMP. The results, however, can be used to determine if an agency's implementation of a BMP is on schedule to meet the coverage requirement within the time specified by Exhibit 1 of the MOU.

**General comments about using the calculators**  
 You can only enter data in cells with white backgrounds. Cells with yellow backgrounds are calculation cells determined by spreadsheet formulas. You cannot enter data into these cells, nor can you alter their contents. Some calculators also include drop-down lists and radio buttons. These allow the user to select various options or settings for the calculator. At the bottom of each calculator is a hyperlink that when clicked will open your web browser and take you to the CUWCC website page with information on the BMP's coverage requirement. This will only work if (1) you have a web browser that Excel recognizes and (2) you have an internet service provider. ANY CHANGES YOU MAKE TO THIS FILE WILL BE LOST UNLESS YOU SAVE YOUR CHANGES TO THE FILE. SAVE YOUR FILE OFTEN TO AVOIDED UNEXPECTED DATA LOSS.

**Your Agency's Base Year**  
 The calculator for BMP 1 requires you to enter the number of single-family and multi-family housing units for your agency's Base Year. Similarly, the calculator for BMP 9 requires you to enter the number of CII accounts for your agency's Base Year. Your agency's Base Year is as follows:  
 Agencies signing MOU Prior to 1997: Base Year = 1997  
 Agencies signing MOU After 1997: Base Year = Year Agency Signed MOU

**BMP Calculator Instructions**

**BMP 1**  
 1. Use the spinner to the right of "Year Agency Signed MOU" to set the year your agency signed the MOU. The calculator will then determine the latest year BMP 1 implementation is expected to commence.  
 2. Enter the number of single-family and multi-family housing units in your service area for the Base Year.

The calculator will determine the number of surveys your agency is expected to complete within 10 years from the date implementation is expected to commence. The calculator will also show the number of surveys that must be completed by each reporting period for your agency to be considered on schedule to meet the coverage requirement within 10 years.

**BMP 2**  
 1. Use the spinner to the right of "Year Agency Signed MOU" to set the year your agency signed the MOU. The calculator will then determine the latest year BMP 2 implementation is expected to commence.  
 2. Enter the number of single-family and multi-family housing units in your service area constructed prior to 1992.  
 3. Indicate whether an enforceable ordinance requiring the replacement of high-flow showerheads with low-flow showerheads is in effect in your agency's service area.  
 4. Indicate whether your agency has determined that 75% of the single-family and/or multi-family housing units in your service area are fitted with low-flow showerheads.

The calculator will indicate if and how many low-flow showerheads your agency is required to distribute each reporting period.

**BMP 4**  
 1. Use the spinner to the right of "Year Agency Signed MOU" to set the year your agency signed the MOU. The calculator will then determine the latest year BMP 4 implementation is expected to commence.  
 2. Enter the number of unmetered accounts in your service area as of the year indicated.

The calculator will determine the minimum number of meter retrofits required each reporting period to be considered on schedule to meet the coverage requirement in 10 years.

[Go to BMP 1 Coverage Calculator](#)  
[Go to BMP 2 Coverage Calculator](#)  
[Go to BMP 4 Coverage Calculator](#)

Introduction | BMP 1 Coverage Requirement | BMP 2 Coverage Requirement | BMP 4

The URL for the CUWCC website is <http://www.cuwcc.org>. Click on the “Technical Resources” link

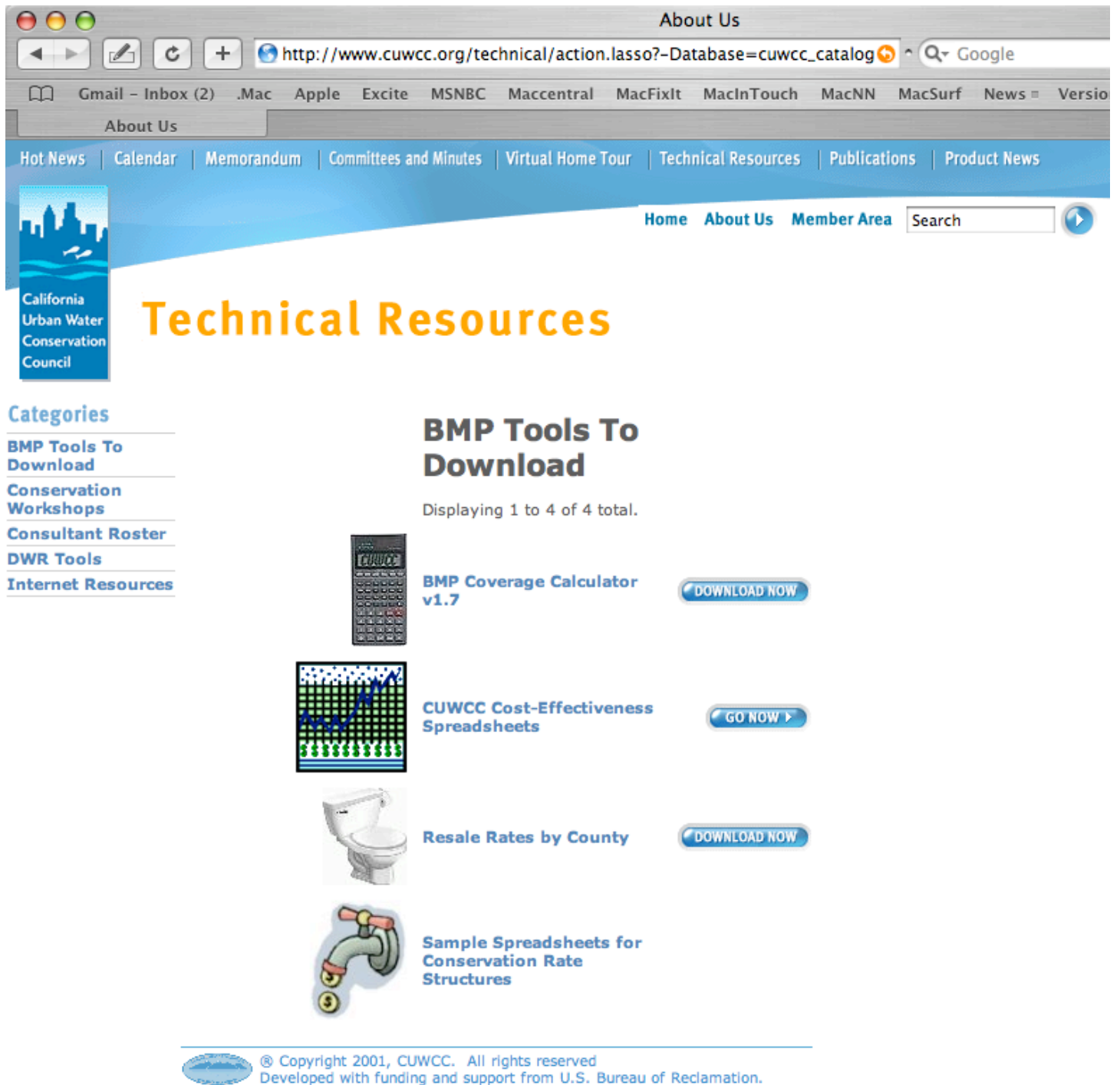
The screenshot shows a browser window titled "CUWCC - Welcome!". The address bar contains "http://www.cuwcc.org/home.html". The browser's menu bar includes "Gmail - Inbox (2)", ".Mac", "Apple", "Excite", "MSNBC", "Maccentral", "MacFixIt", "MacInTouch", "MacNN", "MacSurf", and "News". The page content is organized into several sections:

- Central Navigation:** A blue vertical bar with a city skyline and waves contains the text "California Urban Water Conservation Council".
- Left Column:** "Hot News", "Calendar", "Memorandum", "Committees & Minutes", "About Us".
- Right Column:** "Product News", "Publications", "Technical Resources", "BMP Reporting Database", "Membership".
- News Headlines:** A list of recent news items including "California Urban Water Conservation Council RFP", "Inefficient Showerhead Crackdown", "New National Water Efficiency Organization to be Based in...", "Mid-Pacific Region of USBR Water Conservation Grants", and "The Bureau of Reclamation's Southern California Area Office's (SCAO) RFP".
- Virtual Home Tour:** Features the "H<sub>2</sub>OUSE" logo and the text "Visit the Water Saver Home Now!". Below it, a graphic of water ripples is accompanied by the text: "Location Announced for New National Water Efficiency Organization! For details, click [HERE](#)."
- Search:** A search box with a "Find" button.
- Contact Us:** An email icon and the text "Contact Us: [webmaster@cuwcc.org](mailto:webmaster@cuwcc.org)".
- AB2717 Landscape Task Force:** A tree graphic with the text "Click [HERE](#) to learn about the Council's new Task Force."

At the bottom of the page, the text "PARTNERS FOR A WATER-EFFICIENT CALIFORNIA" is displayed in all caps.

The “Technical Resources” pages loads. . To download the “BMP Coverage Calculator” or “Resale Rates by County” click on the “Download Now” links.


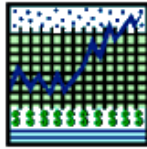


To access the CUWCC Cost-Effectiveness Spreadsheets click on the “Go Now” link.



Technical Resources

**BMP Tools To Download**

Displaying 1 to 4 of 4 total.

-  **BMP Coverage Calculator v1.7** [DOWNLOAD NOW](#)
-  **CUWCC Cost-Effectiveness Spreadsheets** [GO NOW](#)
-  **Resale Rates by County** [DOWNLOAD NOW](#)
-  **Sample Spreadsheets for Conservation Rate Structures** [DOWNLOAD NOW](#)


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The BMP Cost-Effectiveness page loads. Click on the Download link (i.e., bmp01\_simplece\_v3.xls) for each BMP you think might not be cost-effective for your agency.

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## BMP Cost-Effectiveness Models

The Council MOU sets forth Best Management Practices that the signatories believe are cost-effective to implement for the majority of water agencies statewide. However, there may be cases where a specific BMP may not be actually cost-effective for an agency. As an example, BMP 9, the Commercial, Industrial and Institutional Water Conservation BMP, may not be cost-effective for a water agency with primarily residential customers and very few CII customers. Determining the cost-effective level of implementation requires an analysis.

To help with this analysis, the MOU sets forth in Exhibit 3 specific principles to guide the preparation of a cost-effectiveness analysis. These principles were further discussed in the Council's publication, Guidelines for Preparing Cost-Effectiveness Analyses of Urban Water Conservation Best Management Practices. This document is published by the Council, is available for sale, and is also posted for download in the Members-Only section of the Council's web site.

In an effort to make these analyses easier for water agencies that don't have extensive planning departments or consulting assistance, the Council created a set of spreadsheets for those BMPs that were quantifiable as to water savings. These simple spreadsheets will help calculate the costs and benefits of BMP program implementation, and are a companion to the BMP Target Calculator, also available on the Council's website. Workshops were held in October 2002 discussing how to use the spreadsheets and how to file a cost-effectiveness exemption for a BMP to the Council. Additional workshops will be held in the future. We welcome your comments and suggestions.

Download [bmp01\\_simplece\\_v3.xls](#)

Download [bmp02\\_simplece\\_v3.xls](#)

Download [bmp03\\_leak\\_detection\\_v1.xls](#)

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# RECLAMATION

*Managing Water in the West*

**Mid-Pacific Region**

## **2005 Conservation and Efficiency Criteria**



**U.S. Department of the Interior  
Bureau of Reclamation**

**2005**

# **Bureau of Reclamation, Mid-Pacific Region**

## **Standard Criteria for Evaluating Water Management Plans**

The Standard Criteria for Evaluating Water Management Plans (Criteria) were developed by the Bureau of Reclamation (Reclamation) in response to the Central Valley Project Improvement Act of 1992 (CVPIA) and in accordance with the Reclamation Reform Act of 1982 (RRA).

**Who Must Use These Criteria.** The Criteria apply to any Water Management Plan (Plan) submitted to Reclamation as required by applicable Central Valley Project (CVP) water service contracts, settlement contracts, or any contracts that specifically invokes the Criteria.

**Exceptions.** The following are excepted from the requirement to prepare a Plan using the Criteria:

- All Contractors that receive **only** irrigation water from any Federal Reclamation project, and deliver water to less than 2,000 acres of land.
- All Contractors that receive **only** municipal and industrial (urban) water from any Federal Reclamation project, and provide water to less than 3,300 people.
- All Contractors that receive a combination of irrigation and urban water amounting to less than an annual average of 2,000 acre-feet from any Federal Reclamation project.

<u>Section</u>	<u>Title</u>
One	DESCRIPTION OF THE DISTRICT
Two	INVENTORY OF WATER RESOURCES
Three	BEST MANAGEMENT PRACTICES FOR AGRICULTURAL CONTRACTORS <ul style="list-style-type: none"><li>a. CRITICAL BEST MANAGEMENT PRACTICES</li><li>b. EXEMPTIBLE BEST MANAGEMENT PRACTICES</li></ul>
Four	BEST MANAGEMENT PRACTICES FOR URBAN CONTRACTORS
Five	PLAN IMPLEMENTATION
Six	EXEMPTION PROCESS
Seven	REGIONAL CRITERIA
Eight	FIVE-YEAR REVISIONS

If some data called for in the Criteria are not available, the Contractor shall include in its Plan how the Contractor will gather the data and have it available for the next Plan revision.

Contractors are strongly encouraged to submit Plans in an electronic format to the local Area Office for review. However, hard copy of Plans are acceptable. After Plans are reviewed and deemed adequate, the Regional Office will request submission of final Plans at the following address:

Bureau of Reclamation  
Water Conservation Office, MP-410  
2800 Cottage Way  
Sacramento, California 95825

## INTRODUCTION

### **Background And General Information**

The purpose of the Criteria are to promote the highest level of water-use efficiency reasonably achievable by Contractors using best available cost-effective technology and Best Management Practices (BMPs).

Section 210 of the RRA requires Contractors to prepare and submit Plans with definite goals, appropriate Water Conservation measures, and timetables. Contractors are to submit Plans every 5 years.

Section 3405 (e) of the CVPIA requires that the Secretary of the Interior establish Criteria to evaluate CVP Plans by April 30, 1993, and that the Criteria be reviewed at least every 3 years and be revised if necessary.

This law specifies that the Criteria identify BMPs including, but not limited to, efficient Water Management practices being developed according to California State law or reasonable alternatives.

Reclamation drafted and issued the initial “Criteria for Evaluating Water Conservation Plans” in April 1993. The Criteria were revised in September 1996 and renamed “Criteria for Evaluating Water Management Plans.” The Criteria were again revised in 1999 and 2002.

Reclamation developed and distributed a Water Management Planner detailing the type of information required in the Criteria. The Water Management Planner will be updated to conform to the revised Criteria.

**For the purposes of the Criteria only, the following definitions will be used:**

1. *Agricultural Water Management Council (AWMC)* - A consortium of agricultural water agencies, and public interest groups to implement Water Conservation practices in California. This effort was formalized in a Memorandum of Understanding signed in 1996. Signatory water suppliers agree to develop and implement comprehensive conservation BMPs using sound economic criteria.
2. Best Management Practice (*BMP*) - A policy, program, practice, rule, regulation and/or ordinance, or the use of devices, equipment, or facilities that meet either of the following:
  - a. An established and generally accepted practice among Contractors that results in more efficient use, conservation/management of water, or
  - b. A practice for which sufficient data are available from existing Water Management projects to indicate that significant efficiency improvements or management related benefits can be achieved; that the practice is technically and economically reasonable and not socially or environmentally unacceptable; and that the practice is not otherwise unreasonable for most Contractors to carry out.
3. *CALFED* - State-Federal program formalized in June 1994 upon the execution of a Framework Agreement by the State and Federal agencies having management and regulatory responsibility in the Bay-Delta Estuary. The mission of CALFED is to develop and implement a long-term comprehensive plan that will restore the ecological health of the Bay-Delta.
4. *California Urban Water Conservation Council (CUWCC)* - A consortium of urban water agencies and public interest groups to implement Water Conservation practices in California. This effort was formalized in a Memorandum of Understanding (MOU) signed in 1991. Signatory water suppliers agree to develop and implement comprehensive conservation BMPs using sound economic criteria.
5. *Conjunctive Use* - The planned and coordinated use of surface and ground-water supplies to increase water supply reliability, as may be included in a Ground Water Management Plan or Banking Program
6. *Contractor* - Entities that contract with Reclamation for urban and/or for agricultural water.
7. *District* - The physical boundaries of the Contractor's service area.
8. *Five-Year Plan Revision* - The revision of a Plan using the most recently adopted Criteria. Under the RRA, Contractors are required to re-evaluate and re-submit to Reclamation their respective Plans every 5 years.
9. *Ground Water Banking Program* - The intentional storage of supplies in subsurface aquifers beyond coincident irrigation needs with the expectation of subsequent retrieval for beneficial use. The Contractor should have a reasonable rationale of how the Contractor or customers will benefit when the water is retrieved for beneficial use. Ground-water banking usually involves keeping an account of water input and the subsequently use by predetermined or specified parties. Ground Water Recharge alone is not a Ground Water Management Plan or Banking Program. An acceptable Ground Water Management Plan or a Ground Water Banking Program must have a method of retrieval of such water for beneficial use.



10. Ground Water Management Plan - A set of practices and management actions that improve ground-water conditions with the intent of protecting and/or increasing the benefits including the sustainability of the ground-water aquifer.
11. Ground-Water Recharge - The natural or intentional infiltration of surface water into the zone of saturation.
12. Implementation - Achieving and maintaining the staffing, funding, and the priority levels necessary to achieve the level of activity called for in the descriptions of the various BMPs. And to satisfy the commitment by the Contractor to use good-faith efforts to optimize benefits from implementing BMPs.
13. Retailer - A Contractor who sells all water directly to the water user.
14. Riparian Evapotranspiration (ET) - ET from non-crop vegetation usually growing along the banks of water conveyance and storage facilities.
15. Water Conservation/Water Management - Use of less water to accomplish the same purpose(s) or the use of the same amount of water to accomplish additional benefits. An example of the latter is Implementation of a BMP that results in increased total crop production using the same amount of water. Water Management that results in the increased benefits of water can be achieved through the implementation of BMPs identified in these criteria. For the purpose of these Criteria, Water Conservation is considered the same as Water Management.
16. Wholesaler - A Contractor who sells water to entities who resell the water usually to multiple customers.

### **Flexibility and Coordination**

The Criteria recognize the differences between Contractors, and have been written to be flexible enough to allow each Contractor to develop and implement the types of programs that will best accomplish improved Water Management within their boundaries. In some cases, the Contractors may choose to pool resources and implement joint programs. The Criteria not only allow, but also encourage, joint efforts toward program Implementation.

## PLAN CONTENTS

### Section 1: Description of the District

#### **Intent:**

To describe general physical information about the District in order to form a basis for evaluating improvements by, and within, the District, as well as provide the reader with information about physical aspects of the District that may affect the potential for improved Water Management.

#### **Evaluation:**

In certain circumstances, specific information may not be available. In these circumstances, the section will be considered “adequately addressed” if the Plan describes how the information will be obtained for the next Plan revision.

#### **Detail Expected in an Adequate Plan:**

Plans shall describe the District history, location and facilities, size, terrain and soils, environment, climate, operating rules and regulations, customer water delivery measurements, water rate schedules and billing, and water shortage allocation policies. For data not available during the preparation of this Plan, the Contractor shall describe how the information will be obtained for the next Plan revision.

**A. History:** Give an historical overview of the District. Provide a timeline, which includes the formation of the District, date the District was formed, population served, original size, water supplies, contract information with Reclamation and others, and changes in land use. For agricultural Districts, describe changes in irrigated acreages, cropping patterns, and evolving irrigation methods.

**B. Location and Facilities:** Describe the District’s incoming flow measurement method and locations, water conveyance and delivery system (unlined canals, lined canals, pipelines, etc.) and storage facilities (reservoirs, regulating reservoirs, etc.). Agricultural Contractors should describe spill recovery systems, and whether the delivery system is on-demand (no lead time or scheduling necessary); scheduled (i.e., water order 24 hours in advance); rotation (i.e., farmer receives water every 10 days); or other. Describe any restrictions on the Contractor’s water source(s) and proposed changes that will be implemented in the next 5 years.

**C. Topography and Soils:** Describe the topography of the District (hilly, flat, sloping to a water course, etc.). Indicate the impact of topography on water operations and management within the District. Describe major soil classifications and corresponding acreages within the District and any soil limitations that affect the use of water (salinity or high-water table, high or low infiltration rates, etc.).

**D. Climate:** Describe the general climate of the District. Include average precipitation, maximum and minimum temperatures, average wind velocity, and frost-free days. If there are areas within the District known to have significantly different microclimates, describe how these affect Water Management decisions and operations. Include the source of the climate data.

**E. Natural and Cultural Resources:** Describe any known natural resources (wetlands, rivers, streams, lakes, fisheries, threatened plant and animal communities, spawning grounds, flyways, etc.) within the District. Indicate any management of these resources in the past or present by the Contractor. Describe any known recreational and/or cultural resources within the District.

**F. Operating Rules and Regulations:** Attach a copy of the Contractor's operating rules and regulations which describe information on water allocation policies, lead time necessary for water orders

and water shut-off, policies regarding return flows and drainage leaving the District, and policies related to water transfers into or out of the District (by farmer and Contractor).

**G. Water Measurement, Pricing, and Billing:** List the total number of customers/connections/ turn-outs, the number currently measured and the percentage of customer water deliveries measured. List the types and numbers of measurement devices (meters, calibrated gates, weirs, etc.), level of accuracy, frequency of calibration, and maintenance and reading schedule.

Describe the basis for water charges for agricultural and urban uses. If details are complex, provide an overview and reference the page of the Contractor's written operating rules and regulations that provides additional detail. Be sure the following can be found easily: Basis of charges for agricultural water (by quantity, by acre, by crop, by land assessment, by other charges, etc.) and/or for urban (by customer class, by quantity, flat rate, etc.).

For water use billed by quantity, describe the rate structure (declining, uniform or increasing block rate, etc.). Include the billing frequency (monthly, bimonthly, annually, etc.), a sample of each type of bill, and a description of the record management system.

**H. Water Shortage Allocation Policies:** Attach a copy of the Contractor's agricultural and/or urban water shortage policies, drought plan, or any similar document.

Describe how reduced water supplies, including hardship water, are allocated. Describe the Contractor's policies that address wasteful use of water and describe enforcement methods.

## Section 2: Inventory of Water Resources

### **Intent:**

To describe the quantity and quality of water resources (sources, uses, and discharges) available to the Contractor.

### **Evaluation:**

In certain circumstances, specific information may not be available. For these circumstances, the section will be considered adequately addressed if the Plan describes how the information will be obtained for the next Plan revision.

### **Detail Expected in an Adequate Plan:**

This section shall include a description of the Contractor's surface water supply, ground-water supply, other water supplies, source water quality monitoring programs, water uses within the District, agricultural drainage from the District, urban waste-water disposal, and a water budget. Provide this information for one of the last 2 years prior to preparation of each 5-year Plan revision. In addition to one of the last 2 years, a Contractor may submit data from a different year, or a combination of different years that is representative of their average water conditions. These data are intended to be used for planning purposes. For data not available during the preparation of this Plan, the Contractor shall describe how the information will be obtained for the next Plan revision.

**A. Surface Water Supply:** Describe the acre-foot amounts delivered to the Contractor by each of the Contractor's surface sources for the specified years. Describe any water quality limitations or management concerns associated with the identified water sources. Provide the amount of water received under each right and/or contract for each of the last 10 years.

**B. Ground Water Supply:** Describe the general characteristics of the ground-water basin(s) that underlie the District. Provide a map locating Contractor-operated water wells, and managed Ground-Water Recharge areas. If there is Conjunctive Use of surface and ground water, describe it. For managed ground-water basins, attach a copy of the Contractor's Ground Water Management Plan or a description of the Contractor's Ground Water Banking Program.

**C. Other Water Supplies:** Identify any long-term water supplies not described above (drainage from upstream Contractors, reclaimed urban waste water, local/water rights water, transfer agreements with adjacent or other Contractors, etc.).

**D. Source Water Quality Monitoring Practices:** Describe any surface water or ground-water quality problems, and how the quality problems limit the use of the water or affect customer use decisions. If water quality problems exist, describe the water quality testing program (frequency of measuring and analyses performed) and which agencies conduct the water testing. Also, describe the Contractor's role in the program.

## **E. Water Uses within the District:**

1. *Agricultural*: Describe the type and acreage of crops grown in the District; include seasonal ET amounts, water required for cultural practices, and the leaching requirement for each crop. List the types of irrigation systems used for each crop.

2. *Urban*: Describe the urban water use, by customer type, within the District. Describe, where applicable, the waste water collection and treatment systems, recycled water uses, and methods of disposal.

3. *Ground Water Management Plan/Banking Programs*: List the quantity of water used for planned and incidental Ground-Water Recharge, including method of recharge and method of retrieval.

4. *Transfers, Exchanges, Rescheduling, Purchases, or Sales*: Describe the source and quantity of water in any transfer, exchange, reschedule, purchase or sale, in or out of the District, and for what uses. Describe any other water transactions, such as trades, wheeling, wet year/dry year exchanges, etc. Reporting sales or purchase price or any other transaction cost is not required.

5. *Other*: Describe any other uses of water.

**F. Irrigation Drainage from the District**: Identify where surface and subsurface irrigation drainage goes (to beneficial reuse within the service area, discharged to a river or other water course, another District, saline sink, evaporation ponds, wildlife refuge, etc.). If drainage leaves the District and is reused, identify the location and type of that reuse, if known. Describe any water quality monitoring programs for surface or subsurface drainage water (frequency of measuring and analyses performed). Identify any constituents (selenium, pesticides, salinity, etc.) that limit reuse of the drainage water. Describe any usage limitation resulting from the drainage water quality.

Section 3405 of the CVPIA states that all new, amended, and renewed CVP contracts after October 31, 1992, shall provide that the Contractor or agency shall be responsible for compliance with all applicable State and Federal water quality standards applicable to surface and subsurface agricultural drainage discharges generated within its boundaries. Contractors included in the drainage problem area, as identified in “A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990),” should also complete Attachment A.

**G. Water Accounting**: Develop a water inventory for the Contractor based on one of the last 2 years prior to preparation of each 5-year Plan revision. If a Contractor chooses, a representative water supply year can also be included. The inventory should include the following:

### 1. *Quantify Contractors’ Water Supplies*

- a. Surface water supplies, imported and originating within the District, by month
- b. Ground water extracted by the District, by month
- c. Effective precipitation by crop

- d. Estimated annual ground water extracted by non-District parties (if records are not available, provide an estimate and basis for estimation)
- e. Recycled water by month (water originating from a municipal waste-water treatment plant)
- f. Other supplies by month

2. *Quantify Water Used*

- a. Conveyance losses, including seepage, evaporation, and operational spills
- b. Consumptive use by riparian vegetation
- c. Applied irrigation water, crop ET, water used for leaching and cultural practices (frost protection, soil reclamation, etc.)
- d. Urban water use
- e. Ground-Water Recharge
- f. Water exchanges, transfers and banking
- g. Estimated deep percolation within the District
- h. Flows to perched water table or saline sink
- i. Total urban waste water utilized within the system
- j. Irrigation spill or drain water leaving the District
- k. Other

3. *Overall Water Budget:*

Compare total water estimated to be available for sale within the District with the total water actually sold by the District.

### **Section 3: BMPs for Agricultural Contractors**

#### **Intent:**

To develop an Implementation plan for agricultural BMPs that have been proven to accomplish improved (more efficient) Water Management.

#### **Evaluation:**

Some BMPs are considered universally applicable (critical) and others are considered “generally applicable” (exemptible). Under certain circumstances, one or more of the exemptible BMPs may not be appropriate for Contractor Implementation. The Contractor will implement each exemptible BMP, unless the Contractor provides adequate documentation that supports an exemption or states the reason the BMP is not applicable in accordance with Attachment B.

#### **Detail Expected in an Adequate Plan:**

For the purposes of the Criteria, the Plan needs to describe the program that the Contractor determines will best accomplish each BMP. The success of some of the practices will depend on cooperative work with other entities. There may be constraints to successful Implementation of planned programs. Monitoring and updating will allow the Contractor to modify planned programs that do not accomplish the BMP as designed.

Wholesalers are responsible for their subcontractor’s Water Conservation compliance. Wholesalers may include subcontractors in a single Plan or require each retailer to prepare separate Plans. If retailers prepare their own Plan, the wholesaler should be involved to the extent necessary to insure it is found to meet the Criteria.

#### **A. Critical BMPs for Agricultural Contractors**

This section lists the BMPs that all Contractors will implement or are already implementing. Provide a description of the Implementation plan and include time schedules, budgets and monitoring, and maintenance plans for each BMP. The Contractor may need to study the most effective way to implement a BMP. If a BMP is to be studied, please provide details and schedules of the study. The Contractor must include in the Plan, a projected budget for Implementation of BMPs during the 3 years following Plan revision.

##### *1. Water Measurement*

Measure the volume of water delivered by the Contractor to each customer, except Class II water. Measure flows with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6 percent by volume. Three typical categories of measurement devices are: Devices with totalizers, standard flow measurement devices, and non-standard but calibrated devices.

The first category includes devices with totalizers that measure volume: Propeller meters, Venturi meters, magnetic meters, and acoustic meters. These have a high level of accuracy with proper installation and periodic maintenance and calibration. This category also includes calibrated pumps when the suction side water level fluctuation is small when compared to the lift (+/- 6 percent) and the discharge pressure is not changed.

The second category includes standard flow measurement devices that measure flow rate and also require accurate measurements of water level and delivery time to determine volumes: Replogle and Parshall flumes; rectangular, trapezoidal (Cipolletti) and V-Notch weirs; and canal meter gates. These devices require proper installation, continuous or sufficiently frequent recording of water levels and flow rates, delivery beginning and ending times, adjustments for approach velocity in some cases, and regular maintenance and calibration for good accuracy.

The third category includes non-standard, calibrated flow measurement devices. This category includes special measurement devices developed by a District. Typically, there are no published standard dimensions or flow tables for such devices. Consistent dimensions and installations; accurate determination of delivery time; local calibration and a verification of accuracy, based on a representative sample number of devices measured over time; and a proposed schedule for maintenance and calibration would be necessary for acceptability. This category also includes calibrated pumps when the suction side water level fluctuation is small when compared to the lift (+/- 6 percent) and the discharge pressure is not changed.

Rough estimates or instantaneous measurements of flow rate or volume are **not** acceptable since such measurements do not provide a documented reasonable degree of accuracy. Examples are, flow rate estimates at check structures, the sum of the flow in siphon tubes, the use of occasional flow readings and multiplying by the time between readings, or other methods of measurement not specified here.

2. *Designate a Water Conservation coordinator.* Designate an individual to develop and implement the Plan and develop progress reports. Include the coordinator's title, business address, business phone number, and business email address.

3. *Provide or support the availability of Water Management services to water users.* Develop and conduct individual programs or cooperative programs with other Contractors in regional programs. Some Contractors may want to contract or arrange program delivery through consulting firms, cooperative extension, or others. Services that qualify include, but are not limited to:

- a. On-farm evaluations
  - 1) On-farm irrigation and drainage system evaluations using a mobile lab type assessment, and/or
  - 2) Timely field and crop specific water use information to the water user.
- b. Normal year and real-time irrigation scheduling and crop ET information (i.e., California Irrigation Management Information System (CIMIS)).
- c. Surface, ground, and drainage water quantity and quality data.
- d. Agricultural Water Management educational programs and materials for farmers, staff, and public (soil moisture and salinity monitoring; in-school awareness programs; Agwater software; efficient irrigation techniques, crop water budget and other approaches; program delivery via workshops, seminars, newsletters, field days and demonstrations, websites, etc.).



4. *Pricing structure.* Adopt a water pricing structure for Contractor water users based at least in part on quantity delivered.

5. *Evaluate the need, if any, for changes in policies of the institutions to which the Contractor is subject.* Evaluate the policies of agencies that provide the Contractor with water to identify the potential for institutional changes to allow more flexible water deliveries and storage. Initiate necessary modification as practicable.

6. *Evaluate and improve efficiencies of Contractor's pumps.* Many Contractors operate booster pumps or ground-water pumps as part of their delivery facilities. A program to evaluate and improve the efficiencies of such pumps can result in energy savings or peak load reductions, or reveal capacity limitations due to inefficient facilities. Over the long term, the Contractor can reduce operational costs and improve operational efficiency.

## **B. Exemptible BMPs for Agricultural Contractors**

Each Contractor shall develop a program to implement the following BMPs unless the Contractor demonstrates that the practice is not appropriate for the Contractor to implement. The Contractor may spend time studying the most effective way to implement a BMP or whether a BMP is appropriate for a Contractor. For appropriate BMPs, provide a description of the Implementation plan and include time schedules, budgets, and monitoring plans. If a BMP is to be studied, provide details and schedules of the study. These studies must be completed expeditiously and before the next Plan revision. The Contractor should follow the exemption Criteria (see Section Six) to justify exemptions and document the exemption in this section or state the reason the BMP is not applicable in accordance with Attachment B.

1. *Facilitate alternative land use.* Facilitate alternative uses (voluntary, compensated) for lands with exceptionally high water duties, or whose irrigation contributes to significant problems such as drainage.

2. *Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils.* The use of recycled urban waste water for agricultural irrigation provides an opportunity for reuse of an available water supply. Reuse of urban waste water can be an important element in overall Water Management.

3. *Facilitate the financing of capital improvements for on-farm irrigation systems.* Financial aid to farmers may include cataloging available funding sources and procedures and/or obtaining funding, administering the program, and providing low-interest loans.

4. *Incentive pricing.* Implement a pricing structure that promotes one or more of the following goals:

- a) More efficient water use at the farm level.
- b) Conjunctive Use of ground water.
- c) Appropriate increase of Ground-Water Recharge.

- d) Reduction in problem drainage.
- e) Improved management of environmental resources.
- f) Effective management of all water sources throughout the season by adjusting seasonal rates based on current conditions.

5. *a) Line or pipe ditches and canals.* Line or pipe distribution systems to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage.

*b) Regulatory reservoirs.* Construct regulatory reservoirs to improve distribution system delivery flexibility.

6. *Increase flexibility in water ordering by, and delivery to, water users (within operational limits).* Modify distribution facilities and controls to increase the reliability, consistency, and flexibility of water deliveries.

7. *Construct and operate Contractor spill and tailwater recovery systems.* Construct facilities to capture and reuse District operational spills.

8. *Optimize Conjunctive Use.* Increase planned Conjunctive Use of surface and ground water within the District. Conjunctive Use usually includes a Ground Water Management Plan or Banking Program.

9. *Automate canal structures.* Automation of canal structures may increase flexibility in water deliveries and increase the Contractor's control over its water supplies; thereby, providing the opportunity to improve the efficiency of water use.

10. *Facilitate or promote water user pump testing and evaluation.*

## Section 4: BMPS for Urban Contractors

### Intent:

To develop an Implementation plan for urban BMPs that have been proven to accomplish improved (more efficient) Water Management.

### Evaluation:

These BMPs will be evaluated based on the CUWCC's current MOU Exhibit 1 (BMP Definitions, Schedules, and Requirements) . Under certain circumstances, the generally applicable practices may not be appropriate for Contractor Implementation. Contractors will implement each BMP unless the Contractor provides adequate documentation for an exemption. BMP Number Four, Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections, is the only BMP which is not exemptible.

### Detail Expected in an Adequate Plan:

This part of the Plan identifies Contractor-specific programs to accomplish the BMPs. It is understood that programs developed by wholesale agencies may not be implemented at the retail customer level, except within the Contractor's retail service area. For the purposes of the Criteria, the Plan needs to describe the program that the Contractor thinks will best accomplish the BMP. The development and Implementation of the BMPs in a wholesaler's plan is the responsibility of Reclamation's Contractors.

The success of some of the practices will depend on cooperative work with other entities. It is recognized that there may be constraints to successful Implementation of planned programs. Monitoring and updating will allow the Contractor to modify any planned programs that do not accomplish the BMP as designed.

Wholesalers are responsible for their subcontractor's Water Conservation compliance. Wholesalers may include subcontractors in a single plan or require each retailer to prepare separate plans. If retailers prepare their own plan, the wholesaler should be involved to the extent necessary to insure it is found to meet the Criteria.

### BMPs for Urban Contractors

This section lists the BMPs that the Contractor will implement or are already implementing. Provide a description of the Implementation plan and include time schedules, budgets, and monitoring plans.

1. *Water survey program for single-family residential and multi-family residential customers.*
2. *Residential plumbing retrofit.*
3. *System water audits, leak detection, and repair.*
4. *Metering with commodity rates, for all new connections and retrofit of existing connections (NOT EXEMPTIBLE).*
5. *Large landscape conservation programs and incentives.*
6. *High-efficiency washing machine rebate programs.*

7. *Public information programs.*
8. *School education programs.*
9. *Conservation programs for commercial, industrial, and institutional (CII) accounts.*
10. *Wholesale agency assistance programs.*
11. *Conservation pricing.*
12. *Conservation coordinator.*
13. *Water waste prohibition.*
14. *Residential ultra low flow toilet (ULFT) replacement programs.*

## **Section 5: Plan Implementation**

Water Management in general, and Water Management planning in particular, is an on-going process that starts with the preparation of a comprehensive Plan. The purpose of preparing a Plan is for the Contractor to implement the programs developed during the planning process. Implementation of programs identified in the Plan is critical to the success of Water Management within a District. The Criteria focus not only on what constitutes an adequate Plan, but also on the Implementation of the programs described in that Plan.

If there are CALFED Quantifiable Objectives (QOs) that apply to the geographic location of your district lands, identify the QOs that apply to the District and comment on potential for Contractor participation (see Attachment C for more information).

Pursuant to water service and settlement contract terms, Contractors must report on Plan Implementation annually.

Agricultural Contractors can complete an annual update by filling in the information for BMPs on the Agricultural Water Management Council site at <http://www.agwatercouncil.org/>.

Urban Contractors can complete an annual update by filling in the information for Urban BMPs on the CUWCC website. Contractors who are signatories of the CUWCC are currently submitting annual reports via the CUWCC's *BMP Reporting Database* located on their website at [www.cuwcc.org](http://www.cuwcc.org). Through an agreement with the CUWCC, Reclamation's urban non-signatories may now submit their Annual Reports through the CUWCC's web site using "guest accounts."

## **Section 6: Exemption Process**

### **Intent:**

To demonstrate in a clear and concise manner that a BMP is not cost-effective, not financially feasible, not legally, or not environmentally possible for a Contractor to implement. For Agricultural Contractors, only the BMPs in the exemptible section (B. BMPs) are exemptible. For Urban Contractors, all BMPs, except BMP 4 (Metering), are exemptible.

### **Evaluation:**

Some BMPs are not appropriate or possible for a Contractor to implement. To document an exemption, provide the basis, rationale, and details for excluding a BMP. Such documentation must address, as appropriate, cost-effectiveness, financial feasibility, and environmental or legal constraints to BMP Implementation. Reclamation will also consider exemption requests prepared using the final AWMC exemption process or the CUWCC exemption process.

### **Detail Expected in an Adequate BMP Exemption:**

#### **Legal Constraints**

In order to justify a BMP exemption, because it would not be legal for the Contractor to implement, detail the following:

1. A list of any known laws, regulations, court decisions, or other legal constraints that make it illegal for the Contractor to implement the BMP.
2. A list of the steps that would be required to remove these constraints.
3. A description of what steps the Contractor has taken to remove these constraints.
4. Documentation of efforts by the Contractor to work with other entities that would have the legal authority to carry out the BMP within the Contractor's service area.

#### **Environmental Constraints**

In order to justify an exemption due to known adverse environmental impacts, the Plan must document the critical environmental issues and known (qualitative and/or quantitative) negative impacts of the BMP, and an explanation of why effective mitigation of these impacts is not possible. If mitigation of the environmental impacts is possible, the practice must be implemented unless it can be exempted by another exemption category. For example, if the mitigation costs make the project economically infeasible, a discussion of the mitigation plan and necessary mitigation costs should be included as a part of the economic analysis.

## **Economic Constraints**

In order to justify an exemption due to economic constraints, the Plan must document the following:

1. A benefit-cost analysis that demonstrates the costs to the Contractor outweigh the benefits to the Contractor over the life of the measure. The Contractor must perform the analysis by comparing the present value of all benefits to the present value of all costs. Document the projected/estimated benefits and costs and the methodology for analysis (benefits and costs should be quantified to the extent possible). The analysis performed for each excluded BMP (from the Contractor's perspective) must include, but is not limited to, the following benefits and costs:

### **Benefits**

- All capital costs avoided by the Contractor which include, but are not limited to, the costs associated with the development of new supplies (studies, construction, labor, etc.), transportation, the required increase in storage, distribution capacity, wastewater facilities and treatment capacity, etc.
- Operation and maintenance (O&M) costs associated with the decrease in the production and distribution of water or the treatment and disposal of wastewater that include, but are not limited to, energy, labor, treatment, storage, drainage treatment and disposal, etc.
- Water purchases avoided by the Contractor.
- Environmental costs avoided by the Contractor.
- Environmental enhancements.
- Revenues from other entities that include, but are not limited to, revenue from the sale of water made available by the BMP, financial incentives received from other entities, etc.
- Other benefits to the Contractor customers that include, but are not limited to, hydropower, improved crop yields, improved crop quality, labor savings, fertilizer savings, increased farm income, etc.

### **Costs**

- Capital expenditures incurred by the Contractor for Implementation of the BMP that include, but are not limited to, equipment, supplies, materials, construction, etc.
- O&M costs to plan, design, implement, enforce, and evaluate the practice.
- Financial incentives to customers.
- Costs to the environment.
- Other costs to the Contractor.

Several accepted benefit-cost analysis methodologies exist (California Energy Commission's Integrated Resource Planning Methodology, Generally Accepted Accounting Principles, AWMC's Net Benefit Analysis, etc.). A Contractor is considered to be the best suited to evaluate their own economic situation with an appropriate methodology.

2. A discussion and quantification, to the extent possible, of other benefits associated with the Implementation of the BMP that may be of interest to potential partners, but are not the direct sole responsibility of the Contractor.

### **Financial Constraints**

In order to adequately justify an exemption due to financial constraints, the Plan must clearly document the following:

1. The benefits and costs of the BMP to the Contractor.
2. The Contractor's funding needed to implement the BMP.
3. A discussion regarding why the Contractor cannot finance the BMP through rate adjustments, assessments, etc.
4. A discussion of the Contractor's reasonable efforts to secure funding from other entities that include, but are not limited to, lending institutions and bonding authorities, and an explanation of why these entities would not provide funding.
5. The required amount of a grant or subsidy that would be needed to feasibly implement the BMP if financing or partnerships could not be obtained.



## **Section 7: Regional Criteria**

Regional Criteria have been developed for the Sacramento Valley River Contractors as a pilot project. No other Regional Criteria have been explored.

## **Section 8: Five-Year Plan Revision Procedure**

### **Revision Process**

Pursuant to water service and settlement contract terms, Contractors are required to submit revised Plans every 5 years. Contractors must use the most recently adopted Criteria for a new Plan or a 5-year Plan revision. The Contractor must continue to file an annual update every year to report Implementation actions taken.

### **Review Process**

Contractors are requested to submit draft Plans to the Area Office for review and forwarding to the Regional Office. Once forwarded to the Regional Office, Contractors will receive, within 90 days, notification of Reclamation's acceptance or request for modification. Following notification by Reclamation that the Plan has conditionally met the requirements of the Criteria, Contractors may submit three hard copies of the complete Plan, but are strongly encouraged to submit one electronic copy. A resolution by the Contractor's Board of Directors formally adopting the Plan must be submitted. The status of the Contractor's Plan will then be noticed in the *Federal Register*, and the public is given 30 days in which to comment. Copies of the document will be available for review at Reclamation's Mid-Pacific Regional Office and the appropriate Area Office. If no comments are received within 30 days, the review process will officially be complete. If public comments are received, additional changes may be required.

### **Signatories to the AWMC**

Contractors who are signatories of the AWMC should also submit the Plan to the AWMC after notification by Reclamation that the Plan has conditionally met the requirements of the Criteria. The AWMC will review the Plans using Reclamation's Criteria. The AWMC may provide comments to Reclamation within 30 days of receiving the Plan. Reclamation will review AWMC comments as part of its concurrent review of the Plan. The goal is to have the Contractor's Plan meet the requirements of both Reclamation and AWMC.

### **Consequences of Non-Compliance**

Under most conditions, an adequate Plan must be in place before Reclamation will consider extending any discretionary benefits. Discretionary benefits include, but are not limited to, funding through the Water Conservation Field Services Program or Efficiency Incentive Program (except for Plan development), and assistance from Reclamation sponsored technical assistance programs.

## **Attachment A**

### *Information Required of Contractors Located in a Drainage Problem Area*

The Contractor's included in the drainage problem area, as identified in "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)," are listed, by sub-area, below. If future editions of the drainage report revise the boundaries of a drainage problem area or other factors used to determine which Contractors are in a drainage problem area, Reclamation will revise Attachment A to conform with the current drainage report.

1. Reclamation Contractors in the **Grasslands Subarea**: Broadview Water District, Central California Irrigation District, Del Puerto Water District, Firebaugh Canal Water District, Mercy Springs Water District, Pacheco Water District, Panoche Water District, San Luis Canal Company, and San Luis Water District.
2. Reclamation Contractors in the **Westlands Subarea**: James Irrigation District, Tranquillity Irrigation District, and Westlands Water District.
3. Reclamation Contractors in the **Tulare Subarea**: Alpaugh Irrigation District, Atwell Island Water District, Lower Tule River Irrigation District, and Pixley Irrigation District.
4. Reclamation Contractors in the **Kern Subarea**: Alpaugh Irrigation District.

The Contractors listed above shall describe which recommendations prescribed in "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)" have been incorporated in their Water Conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source Control
2. Land Retirement
3. Drainage Water Treatment
4. Drainage Water Reuse
5. Shallow Ground-Water Pumping
6. Evaporation Ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how Implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why.

## **Attachment B**

### *Non-Applicability of Exemptible BMPs*

To establish that a BMP is not applicable to the Contractor, the Plan should explain the reasons why the BMP does not apply to the Contractor. This justification must be consistent with Section 1 of the Criteria titled, “Describe the District.” Examples of non-applicability (NA) for each exemptible BMP are listed below. This list is not all inclusive.

#### **Section 3: B. Exemptible BMPs for Agricultural Contractors**

1. *Facilitate alternative land use.* NA could include: Contractors without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems.
2. *Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils.* NA could include: Completely piped systems, which do not have delivery constraints.
3. *Facilitate the financing of capital improvements for on-farm irrigation systems.* None identified.
4. *Incentive pricing.* Contractor that receives only class 2 water.
5. a) *Line or pipe ditches and canals.* NA could include: Completely piped systems, unlined systems or sections or systems, which are used as part of a planned Conjunctive Use program.  
  
b) *Regulatory reservoirs.* NA could include: Completely piped systems, which do not have delivery constraints.
6. *Increase flexibility in water ordering by, and delivery to, the water users within operational limits.* None identified.
7. *Construct and operate Contractor spill and tailwater recovery systems.* NA could include: Completely piped systems, which do not have delivery constraints.
8. *Optimize Conjunctive Use.* NA could include: Contractors which do not overlie a useable ground-water basin and thus neither the Contractor nor its customers pump or use ground water, and the Contractor has no water supplies other than the contract supply.
9. *Automate canal structures.* NA could include: Completely piped systems, which do not have delivery constraints.

## **Attachment C**

*Assess Quantifiable Objectives.* CALFED is developing QOs that provide incentives for participation in implementing Water Management activities by water users including Contractors. These activities may or may not directly benefit the water user/Contractor. If there are CALFED QOs that apply to the geographic location of your district lands, identify the QOs that apply to the district and comment on potential for Contractor participation. Reclamation's Area Office and Regional Office will have the latest copy of QOs listed by Contractor. Evaluate and comment on any BMP or practice that is complementary, or could be complementary to the QOs in the District.

## *Evaluation Form for the USBR Water Conservation Plan 2005 Criteria*

Response categories: A = adequate, NA = not applicable, NP = next plan, MI = needs more information. Each of the items listed below must be rated A, NA or NP for a plan to be considered consistent with the criteria.

### **Section 1: Description of the District**

Contact information ..... A NA NP MI

#### **A. History**

Date district formed, first Reclamation contract, original size, current year ..... A NA NP MI

Current size, population, and irrigated acres ..... A NA NP MI

Water supplies received in current year ..... A NA NP MI

Annual entitlement under each right and/or contract..... A NA NP MI

Anticipated land-use changes ..... A NA NP MI

Cropping patterns (Agric only) ..... A NA NP MI

Major irrigation methods (by acreage) (Agric only) ..... A NA NP MI

#### **B. Location and Facilities**

Incoming measurement methods and locations..... A NA NP MI

Current year Agricultural Conveyance System..... A NA NP MI

Current year Urban Distribution System..... A NA NP MI

Storage facilities ..... A NA NP MI

Description of the agricultural spill recovery system ..... A NA NP MI

Agricultural delivery system operation..... A NA NP MI

Restrictions on water source(s)..... A NA NP MI

Proposed changes or additions to facilities and operations for the next 5 years ..... A NA NP MI

#### **C. Topography and Soils**

Topography of the district and its impact on water operations and management ..... A NA NP MI

District soil associations (Agric only)..... A NA NP MI

Agricultural limitations resulting from soil problems (Agric only) ..... A NA NP MI

#### **D. Climate**

Describe the general climate of the district ..... A NA NP MI

For weather data, specify the period of record and reference used. .... A NA NP MI

Average precipitation (by month and annual)..... A NA NP MI

Average temperature (by month and annual) ..... A NA NP MI

Maximum and minimum temperature (by month and annual)..... A NA NP MI

Wind velocity and frost free days..... A NA NP MI

Describe the impact of any microclimates on water management in district ..... A NA NP MI

#### **E. Natural and Cultural Resources**

Describe any known natural resources within the district..... A NA NP MI

Describe past or present management by district ..... A NA NP MI

List any known recreational / cultural resources within the district. .... A NA NP MI

#### **F. Operating Rules and Regulations**

Describe or attached rules and regulations..... A NA NP MI

Describe agricultural water allocation policy..... A NA NP MI

Describe lead times for orders and shut-off. .... A NA NP MI

Describe policies on surface and subsurface drainage.....	A	NA	NP	MI
Describe policies on transfers by District and it's customers.....	A	NA	NP	MI

**G. Water Measurement, Pricing, and Billing**

Number of farms, delivery points & points serving multiple farms.....	A	NA	NP	MI
Number of turnouts measured and % of delivered water measured.....	A	NA	NP	MI
Ag Measurement Device Table.....	A	NA	NP	MI
Urban # of connections, metered connections, connections not billed by quantity.....	A	NA	NP	MI
Urban % water measured @ delivery point, % of delivered water billed by quantity...A	A	NA	NP	MI
Urban Measurement Device Table:.....	A	NA	NP	MI
Describe Agric. water charges (rate structure, frequency & format).....	A	NA	NP	MI
Describe urban water charges (rate structure, frequency & format).....	A	NA	NP	MI
Annual charges collected from customers (fixed and volumetric).....	A	NA	NP	MI
Description of data accounting procedures and record keeping.....	A	NA	NP	MI

**H. Water Shortage Allocation Policies**

Current year Agric water shortage policies or shortage response plan.....	A	NA	NP	MI
Current year urban water shortage policies or shortage response plan.....	A	NA	NP	MI
Describe how reduced urban water supplies are allocated.....	A	NA	NP	MI
Describe district policies that address wasteful water use and enforcement.....	A	NA	NP	MI

**Section 2: Inventory of Water Resources**

**A. Surface Water Supply**

See tables

**B. Ground Water Supply**

Describe any ground water basin(s) that underlie the district.....	A	NA	NP	MI
Provide a map of district operated wells and ground water recharge area.....	A	NA	NP	MI
Describe any district conjunctive use programs.....	A	NA	NP	MI
Provide a copy of district's current ground water management plan.....	A	NA	NP	MI
Provide a copy of district's current water banking management plan.....	A	NA	NP	MI

**C. Other Water Supplies**

Identify any long-term water supplies not described above.....	A	NA	NP	MI
--	---	----	----	----

**D. Source Water Quality Monitoring Practices**

Describe any surface or ground water quality problems and limits on use of water.....	A	NA	NP	MI
Urban contractors – attach current Customer Water Quality Report.....	A	NA	NP	MI

**Agric. Contractors**

Water quality concerns.....	A	NA	NP	MI
Describe any water quality monitoring programs for surface water.....	A	NA	NP	MI
Describe any water quality monitoring programs for ground water.....	A	NA	NP	MI
Provide the current year TDS range for surface and ground water.....	A	NA	NP	MI

**E. Water Uses Within the District**

Agric irrigation systems by crop type and acre.....	A	NA	NP	MI
<i>Urban use by customer type in current year</i>				
Single Family           # of Connections           AF.....	A	NA	NP	MI
Multifamily           # of Connections           AF.....	A	NA	NP	MI

Commercial	# of Connections	AF	.....	A	NA	NP	MI
Industrial	# of Connections	AF	.....	A	NA	NP	MI
Institutional	# of Connections	AF	.....	A	NA	NP	MI
Landscape Irrig	# of Connections	AF	.....	A	NA	NP	MI
Wholesale	# of Connections	AF	.....	A	NA	NP	MI
Reclaimed	# of Connections	AF	.....	A	NA	NP	MI
Other	# of Connections	AF	.....	A	NA	NP	MI
Unaccounted		AF	.....	A	NA	NP	MI
Waste Water Collection/Treatment Systems.....				A	NA	NP	MI
Ground water recharge / management / banking in current year .....				A	NA	NP	MI
Transfers and exchanges into or out of the service area in current year.....				A	NA	NP	MI
Trades, wheeling, wet/dry year exchanges or other transactions in current year.....				A	NA	NP	MI
Other uses of water in current year .....				A	NA	NP	MI

**F. Irrigation Drainage from the Service area (Agric only)**

Surface and subsurface drain / return flows in current year.....	A	NA	NP	MI
Description of Drainage water quality testing program and role of participants .....	A	NA	NP	MI
Drainage Water (surface and subsurface) Quality Testing Program .....	A	NA	NP	MI
Usage limitation resulting from drainage water quality.....	A	NA	NP	MI

**G. Water Accounting (Inventory)**

Table 1	A	NA	NP	MI	Table 5	A	NA	NP	MI (ag only)
Table 2	A	NA	NP	MI	Table 6	A	NA	NP	MI
Table 3	A	NA	NP	MI	Table 7	A	NA	NP	MI (ag only)
Table 4	A	NA	NP	MI	Table 8	A	NA	NP	MI

Response categories: A = adequate, E = exemptible, NA = not applicable, MI = needs more information. Each of the items listed below must be rated A, E, or NA for a plan to be considered consistent with the Criteria.

**Section 3: Best Management Practices (BMPs) for Agricultural Contractors**

**A. Critical Agricultural BMPs**

1. # of turnouts not measured, # of devices installed last year and this year, # of devices to be installed next year. ....	A	NA	MI
2. Designate water conservation coordinator.....	A	NA	MI
3. Provide or support the following water management services (attach notices)...A	NA	MI	
a. 1. on-farm irrigation system evaluations (e.g., Mobile Labs) .....	A	NA	MI
2. crop & field water use info to customers .....	A	NA	MI
b. irrigation scheduling and crop ET information .....	A	NA	MI
c. surface, ground and drainage water quantity and quality data .....	A	NA	MI
d. education programs/materials for farmers, staff, public (attach samples) .....	A	NA	MI
4. Adopt a water pricing structure based on quantity.....	A	NA	MI
5. Evaluate policies and operational procedures.....	A	NA	MI
6. Contractor Pump efficiency evaluations.....	A	NA	MI

**B. Exemptible Best Management Practices for Agricultural Contractors**

1. Alternative land use.....	A	E	NA	MI
2. Facilitate use of recycled urban wastewater .....	A	E	NA	MI
3. Facilitate financing of on-farm irrigation improvements .....	A	E	NA	MI
4. Incentive pricing .....	A	E	NA	MI
5. a. Line or pipe ditches or canals .....	A	E	NA	MI

b. Construct regulatory reservoirs .....	A	E	NA	MI
6. Increase flexibility of ordering and deliveries.....	A	E	NA	MI
7. a. Construct/operate contractor spill and tailwater recovery systems .....	A	E	NA	MI
b. Drain system lateral .....	A	E	NA	MI
8. Optimize conjunctive use .....	A	E	NA	MI
9. Automate canal structures .....	A	E	NA	MI
10. Facilitate or promote customer pump testing and evaluation.....	A	E	NA	MI
<b>C. Provide a 3-Year Budget for Implementing BMPs.....</b>	A		NA	MI
<b>D. Drainage Problem Area Programs.....</b>	A		NA	MI
<b>E. District Quantifiable Objectives (QOs) .....</b>	A		NA	MI

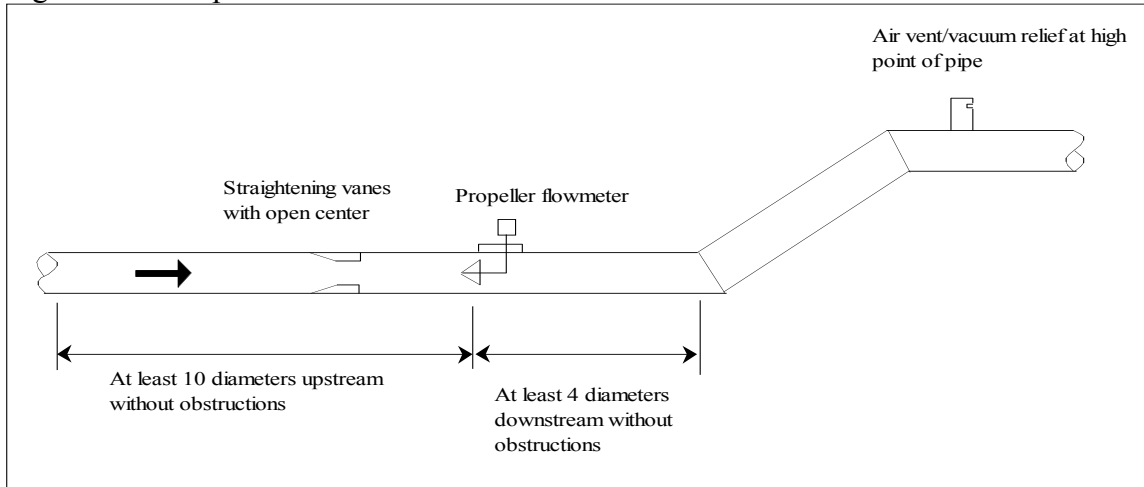
**Section 4   BMPS for Urban Contractors**

1. Water survey program for single and multi-family customers.....	A	E	NA	MI
2. Residential plumbing retrofit.....	A	E	NA	MI
3. System water audits, leak detection and repair.....	A	E	NA	MI
4. Metering with commodity rates for all connections .....	A	E	NA	MI
5. Large landscape conservation programs incentives.....	A	E	NA	MI
6. High-efficiency washing machine rebate program.....	A	E	NA	MI
7. Public information programs (attached samples) .....	A	E	NA	MI
8. School education programs (attached samples).....	A	E	NA	MI
9. Conservation programs for commercial, industrial and institutional.....	A	E	NA	MI
10. Wholesale agency assistance programs .....	A	E	NA	MI
11. Conservation pricing - water and sewer service.....	A	E	NA	MI
12. Conservation coordinator .....	A	E	NA	MI
13. Water waste prohibition .....	A	E	NA	MI
14. Residential ultra low flow toilet replacement program.....	A	E	NA	MI
<b>Provide a 3-Year Budget for Implementing BMPs .....</b>	A	E	NA	MI



Calibration and Measurement

Figure 1. Example of Volume Measurement Devices



1. Propeller Meter;
2. Venturi Meters
3. Magnetic Meters
4. Acoustic Meters

These have a high level of accuracy with proper installation and periodic maintenance and calibration.

Meters	Installation	Maintenance	Calibration
<i>Propeller Flow Meters</i>	When ordering a meter, it is very important to know the exact wall thickness and ID of the pipe (see Figure 2) in which it is to be placed (i.e., 11.9" vs. 12"). The meter must be exactly centered in the pipelines in order to be accurate. Units are typically not accurate at low velocities. Meters should be operated at greater than 1 foot/second.	When propeller meters are placed in locations with large amounts of algae and trash, remove the trash before it gets to the meter or frequently clean the propellers. Also, sand and normal wear can cause the propeller to not spin freely, as it should. The problem may show up as a more erratic needle movement.	Calibration is typically done by sending the unit back to the manufacturer on a regular maintenance cycle and having it checked. Field checks of meters can be done using a portable acoustic meter (transit time type).
<i>Venturi Meters</i>	Manufacturers of the Venturi Meters should be requested to furnish the rating tables for the unit purchased. Venturi Meters are susceptible to turbulence in the pipe.	The tubes used to measure the pressure can easily become plugged so they must be checked periodically.	Field calibration can be done using an insert pitot tube or done using a portable acoustic meter (transit time type).
<i>Magnetic Meters</i>	Spool type magnetic (see Figure 3) meters can be very	Low maintenance on spool meters. Insert meter	Field checks of meters can be done using a portable

Meters	Installation	Maintenance	Calibration
	accurate even with turbulence in the pipeline. Insert magnetic meters should follow propeller meter installation guidelines.	sensors must be periodically cleaned.	acoustic meter (transit time type).
<i>Acoustic Meters</i>	Acoustic meters can be used in both pipelines and channels. Acoustic meters should follow propeller meter installation guidelines.	Transducers (see Figure 4) must be periodically cleaned. It is important to avoid multipath interference and signal bending from solar heating.	For calibration by current-meter measurement or theoretical computation, it is essential to place device in a cross section that will not change significantly. If the transducers are placed out in the channel, the triangular side areas not measured must be accounted for in the calibration.

Figure 2. Inside Diameter (ID) of the Pipe

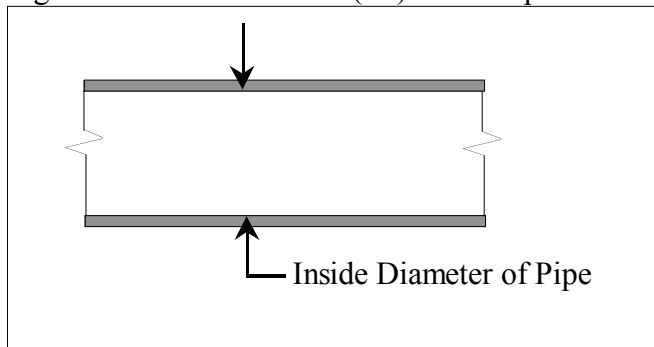


Figure 3. Magnetic Meters (Spool Type)

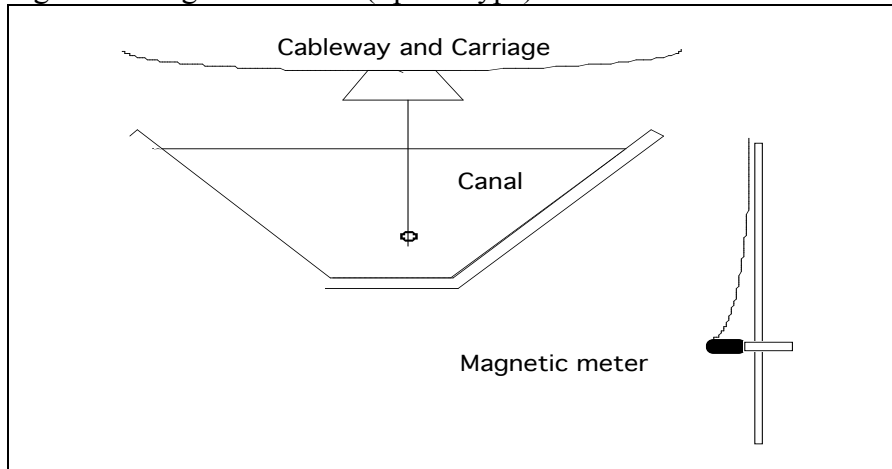
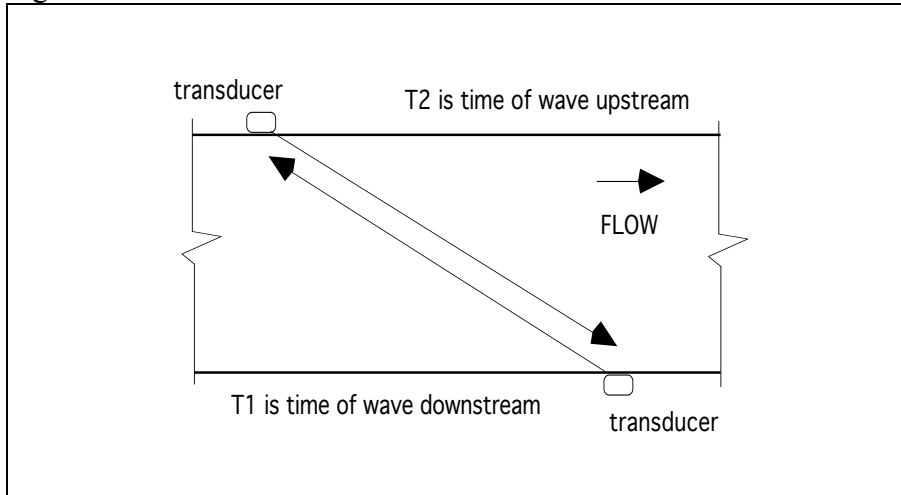


Figure 4. Acoustic Meter



The second category includes standard flow measurement devices that measure flow rate and also require accurate measurements of delivery time to determine volumes:

1. Replogle and Parshall flumes
2. Rectangular, Trapezoidal (Cipolletti), and V-Notch weirs
3. Canal meter gates

These devices require proper installation, regular recording of flow rates and delivery times, adjustments for approach velocity in some cases, and regular maintenance and calibration for good accuracy.

Flumes, Weirs and Gates	Installation	Maintenance	Calibration
<i>Replogle and Parshall Flumes</i>	It is essential that the entrance of the control section of the flume be level in the direction of the flow. Water must be moving “straight” toward the flume. The flume should be located about 10 times the average channel width downstream of checks, gates, or bends in the channel. Staff gauges set too high will underestimate the actual flow rate.	It is important to keep the stilling wells (see Figure 5) from being plugged or partially plugged. The surfaces of the flume must be kept relatively clear of moss and sediment build up. Limits of submergence should be checked at high and low-flow rates.	Can be calibrated with errors of less than 2 percent. The rating curve used for the flume can be field checked using a current meter.
<i>Rectangular and Trapezoidal Weirs</i>	It is important that the weir crest is horizontal or level and for the sides of the rectangular weir to be vertical, because the actual flow area of the water will not be correct. The water must be moving straight into the weir,	It is important to keep the stilling wells from being plugged or partially plugged. Flow into and out of the weir should be as smooth as possible. Sediment accumulation	Rating tables must be adjusted to account for the velocity of approach for calibration. Rating tables must be checked for the

<b>Flumes, Weirs and Gates</b>	<b>Installation</b>	<b>Maintenance</b>	<b>Calibration</b>
	and the face of the weir must be vertical.	below the weir crest should be removed.	correct weir (i.e., contracted weir vs. suppressed weir). Rating tables must be adjusted for submergence or slanted conditions.
<i>(Cipolletti), and V-Notch Weir</i>	Is important to determine which size of notch (how many degrees) is being used so that the correct flow-rate table can be used. It is also important to determine if there are any errors in the construction of the notch. The water must be moving straight into the weir, and the face of the weir must be vertical.	Same as the rectangular and trapezoidal weirs above.	Same as the rectangular and trapezoidal weirs above.
<i>Canal Meter Gates</i>	<ol style="list-style-type: none"> <li>1. "Zero" height (see figure 6) of the stem is when the flow starts to leak through the gate.</li> <li>2. Always pull up on shaft (by the turning wheel) before taking measurement.</li> <li>3. Keep the bottom of the gate entrance clean.</li> <li>4. A change in pipe material several diameters downstream of the gate will not affect the accuracy.</li> <li>5. A water level in the downstream pool is not the same as a water level measured in a whistle pipe (see Figure 7).</li> <li>6. Eddies at the gate entrance will generally cause an overestimation of the flow rate.</li> <li>7. The accuracy is poor if the gate is more than 70 percent open.</li> </ol>	Flow toward and into the structure should be as smooth as possible. Obstructions should be removed to improve the entrance conditions. Remove accumulations of sediment, because they may reduce the actual area of orifice. Debris, such as weeds, should also be removed.	Manufacturer's specifications must be followed precisely in order to obtain accurate flow rate measurements.

Figure 5. Stilling Well

A stilling well transfers the water level to another location. It "stills" the water level and allows for easy measurement of the head.

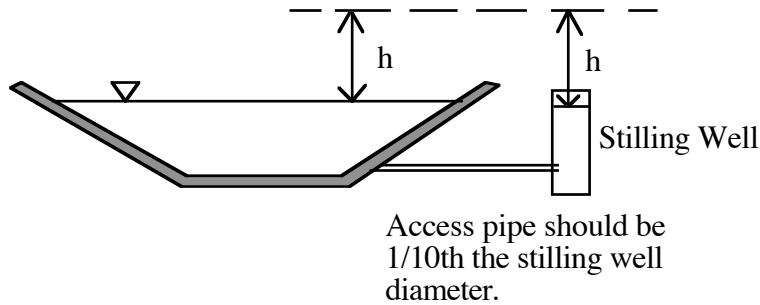


Figure 6. "Zero" Reference

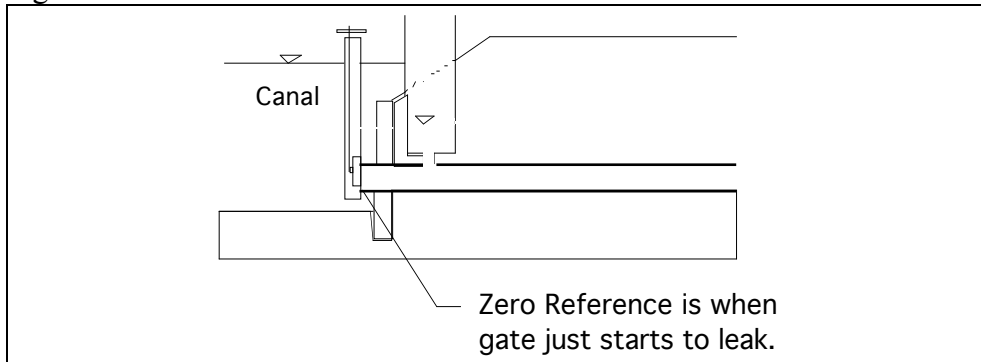
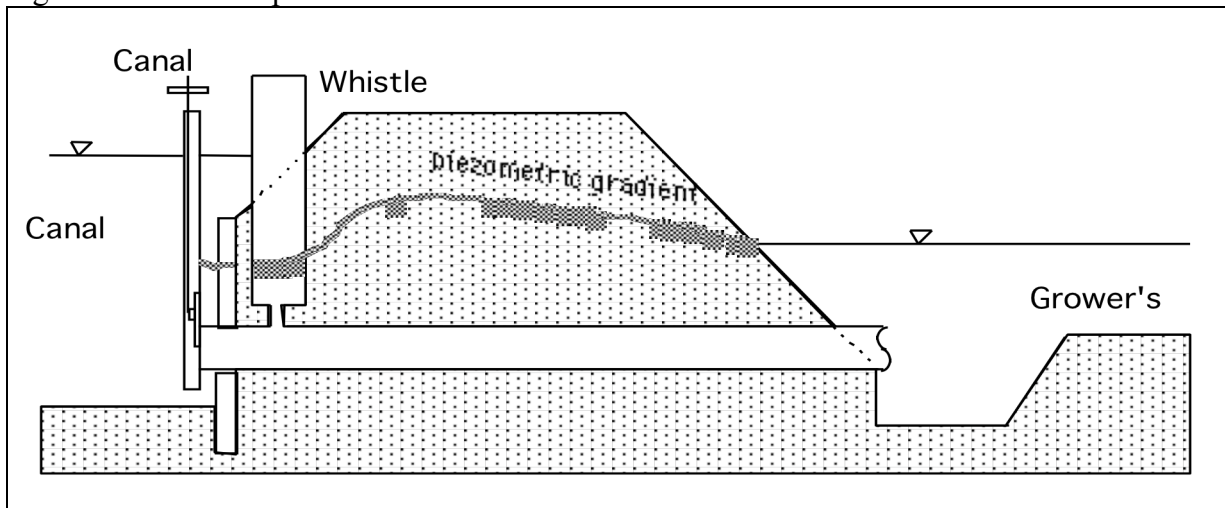


Figure 7. Whistle Pipe



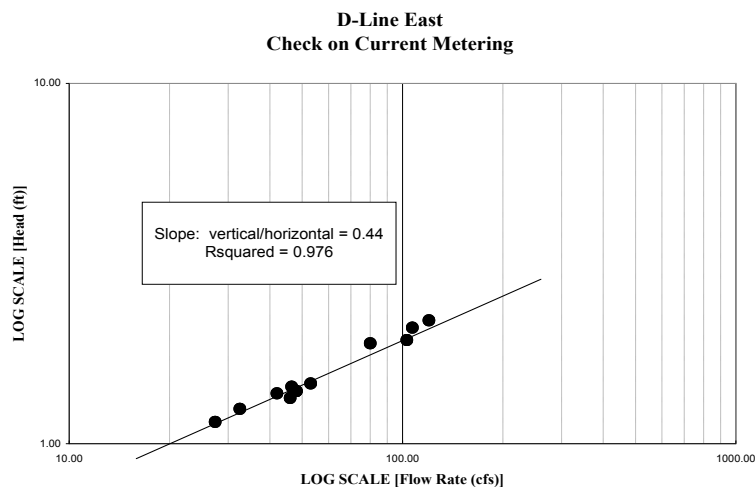
The third category includes non-standard, calibrated flow measurement devices. This category includes special measurement devices developed by a district. Typically, there are no published standard dimensions or flow tables for such devices. Consistent dimensions and installations; accurate determination of delivery time; local calibration and a verification of accuracy, based on a representative sample number of devices measured over time; and a proposed schedule for maintenance and calibration

would be necessary for acceptability.

The following steps can be used to calibrate a non-standard structure:

1. Use a current meter to calibrate the non-standard structures. The individuals who will perform the current metering need to demonstrate proficiency in the required skills to perform the measurements.
2. The individuals will need to use an established site such as a calibrated Replogle flume to verify their proficiency in making good current meter readings.
3. Non-standard structures have certain requirements that must be met in order to be calibrated. If these conditions cannot be met, it is useless to spend time calibrating the structure. These required conditions include:
  - a. Good entrance conditions with a low velocity.
  - b. If the device to be calibrated is located right next to a supply canal (within 10 feet or so), the supply canal must have a fairly constant velocity.
  - c. The staff gauge must be "zeroed."
  - d. There must be no moss build up. That is, the conditions must not change with time.
4. The recommended calibration procedure for a non-standard site that meets the above conditions is as follows:
  - a. A wide spread in the measured flow rate is required. At least a 2:1 ratio in the flow rates should be used to create the table.
  - b. A minimum of 10 values should be measured across the flow rate range.
  - c. Data should be plotted on a log-log scale graph. See the following figure. Such a graph is a standard option in programs such as Microsoft Excel.

Figure 8. Log-Log Plot of the Current Meter Data



- e. The data should plot out as a line (not a curve) with a slope between 0.4 and 0.67. A program such as Microsoft Excel can be used to determine the equation, and the equation should be of the form:  $H = KQ^x$ , where "x" is a value between 0.4 and 0.67
- f. The regression coefficient ( $r^2$ ) must be better than 0.97 to assure confidence in the results.

A fourth category is using rough estimates of flow rate or volume, such as flow-rate estimates at check structures or the sum of siphon tubes (or other methods of measurement not specified here). These approaches are NOT acceptable since they do not provide a documented reasonable degree of accuracy.

For more information and support on measurement and calibration, please contact the Cal Poly Irrigation Training and Research Center at (805) 756-2434.

*References:*

*Bureau of Reclamation Water Measurement Manual - 3<sup>rd</sup> Edition*

*Cal Poly Irrigation Training and Research Center - Flow Measurement (Fall 1999)*

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
ALPAUGH IRRIGATION DISTRICT (ID)	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	15	167
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Kern NWR (NWR)	19	191
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	15	170
	Provide flow to improve ecosystem conditions.	Battle Creek	1	1
	Provide flow to improve ecosystem conditions.	Bear Creek	1	2
	Provide flow to improve ecosystem conditions.	Clear Creek	1	3
	Provide flow to improve ecosystem conditions.	Cottonwood Creek	1	4
	Provide flow to improve ecosystem conditions.	Cow Creek	1	5
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	1	6
ARVIN-EDISON WATER STORAGE DISTRICT (WSD)	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	21	196
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	20	195
ATWELL ISLAND WATER DISTRICT (WD)	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	15	167
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	15	170
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	9	87
	Provide flow to improve ecosystem conditions.	Delta	9	74
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	9	75
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	9	90
	Provide short-term diversion flexibility to make water available to the EWA (EWA) in a timely manner.	All suitable lands	9	91
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain	Delta	9	77



**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
BANTA-CARBONA ID	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Delta	9	78
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	9	79
	Reduce nutrients to enhance and maintain beneficial uses of water.	Delta	9	81
	Reduce pesticides to enhance and maintain beneficial uses of water.	Delta	9	80
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	9	85
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento Slough	9	83
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	9	82
	Reduce salinity to enhance and maintain beneficial uses of water.	Delta	9	84
Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102	

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce temperatures to enhance and maintain aquatic species populations.	Delta	9	86
BELLA VISTA WD	Provide flow to improve ecosystem conditions.	Battle Creek	1	1
	Provide flow to improve ecosystem conditions.	Bear Creek	1	2
	Provide flow to improve ecosystem conditions.	Clear Creek	1	3
	Provide flow to improve ecosystem conditions.	Cottonwood Creek	1	4
	Provide flow to improve ecosystem conditions.	Cow Creek	1	5
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	1	6
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Panoche Creek	14	94

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
BROADVIEW WD	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Five Mile Slough	14	162
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce sediments to enhance and maintain beneficial uses of water.	Panoche Creek	14	105
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide flow to improve ecosystem conditions.	Merced River	12	130
	Provide flow to improve ecosystem conditions.	San Joaquin River	12	131
	Provide flow to improve ecosystem conditions.	Tuolumne River	12	132
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Merced NWR	13	159
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Merced River	12	133

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
CENTRAL CALIFORNIA ID	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Tuolumne River	12	135
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Merced River	12	136
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce pesticides to enhance and maintain beneficial uses of water.	Tuolumne River	12	138
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce temperatures to enhance and maintain aquatic species populations.	Merced River	12	141
	Reduce temperatures to enhance and maintain aquatic species populations.	South Joaquin River	12	142
	Reduce temperatures to enhance and maintain aquatic species populations.	San Joaquin River	12	156
	Reduce temperatures to enhance and maintain aquatic species populations.	Tuolumne River	12	143
CENTRAL SAN JOAQUIN WATER CONSERVATION DISTRICT	Provide flow to improve ecosystem conditions.	Calaveras River	8	66
	Provide flow to improve ecosystem conditions.	Cosumnes River	8	67
	Provide flow to improve ecosystem conditions.	Mokelumne River	8	68
	Provide flow to improve ecosystem conditions.	San Joaquin River	11	112
	Provide flow to improve ecosystem conditions.	Stanislaus River	11	113
	Provide flow to improve ecosystem conditions.	Tuolumne River	11	114
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	11	115
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Stanislaus River	11	116
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Tuolumne River	11	117
Reduce nutrients to enhance and maintain beneficial uses of water.	Harding Drain	11	118	

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
	Reduce pesticides to enhance and maintain beneficial uses of water.	Harding Drain	11	119
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	11	120
	Reduce pesticides to enhance and maintain beneficial uses of water.	Stanislaus River	11	121
	Reduce pesticides to enhance and maintain beneficial uses of water.	Tuolumne River	11	122
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	11	123
	Reduce temperatures to enhance and maintain aquatic species populations.	Calaveras River	8	69
	Reduce temperatures to enhance and maintain aquatic species populations.	Mokelumne River	8	70
	Reduce temperatures to enhance and maintain aquatic species populations.	San Joaquin River	11	124
	Reduce temperatures to enhance and maintain aquatic species populations.	Stanislaus River	11	125
	Reduce temperatures to enhance and maintain aquatic species populations.	Tuolumne River	11	126
CHOWCHILLA WD	Provide flow to improve ecosystem conditions.	Merced River	13	147
	Provide flow to improve ecosystem conditions.	San Joaquin River	13	148
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Merced NWR	13	159
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	13	161
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Merced River	13	149
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	13	150

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
	Reduce pesticides to enhance and maintain beneficial uses of water.	Merced River	13	151
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	13	152
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	13	154
	Reduce temperatures to enhance and maintain aquatic species populations.	Merced River	13	155
CLEAR CREEK COMMUNITY SERVICES DISTRICT	Provide flow to improve ecosystem conditions.	Battle Creek	1	1
	Provide flow to improve ecosystem conditions.	Bear Creek	1	2
	Provide flow to improve ecosystem conditions.	Clear Creek	1	3
	Provide flow to improve ecosystem conditions.	Cottonwood Creek	1	4
	Provide flow to improve ecosystem conditions.	Cow Creek	1	5
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	1	6
COELHO FAMILY TRUST	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	15	167
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	15	170
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide flow to improve ecosystem conditions.	Merced River	13	147
	Provide flow to improve ecosystem conditions.	San Joaquin River	13	148
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Merced NWR	13	159
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Merced River	13	149

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
COLUMBIA CANAL COMPANY	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Merced River	13	151
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce temperatures to enhance and maintain aquatic species populations.	Merced River	13	155
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	3	20
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Sacramento & Delevan NWR	3	28
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	3	29



**Quantifiable Objectives (QOs) by Agency**

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<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
COLUSA COUNTY WD	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Colusa Basin	3	21
	Reduce pesticides to enhance and maintain beneficial uses of water.	Colusa Basin	3	22
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	3	23
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	3	24
COLUSA PROPERTIES	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	4	30
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Colusa & Sutter NWR	4	36
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	4	31
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	4	32
CORNING WD	Provide flow to improve ecosystem conditions.	Antelope Creek	2	9
	Provide flow to improve ecosystem conditions.	Deer Creek	2	10
	Provide flow to improve ecosystem conditions.	Mill Creek	2	11
	Provide flow to improve ecosystem conditions.	Paynes Creek	2	12
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	2	13
	Reduce pesticides to enhance and maintain beneficial uses of water.	Elder Creek	2	14
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	2	15
	Reduce temperatures to enhance and maintain aquatic species populations.	Deer Creek	2	16
	Reduce temperatures to enhance and maintain aquatic species populations.	Mill Creek	2	17
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	9	87
	Provide flow to improve ecosystem conditions.	Delta	9	74

**Quantifiable Objectives (QOs) by Agency**

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Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
DEL PUERTO WD	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	9	75
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	9	90
	Provide short-term diversion flexibility to make water available to the EWA in a timely manner.	All suitable lands	9	91
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Delta	9	77
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Delta	9	78
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	9	79
	Reduce nutrients to enhance and maintain beneficial uses of water.	Delta	9	81
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento Slough	9	83
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	9	82
	Reduce salinity to enhance and maintain beneficial uses of water.	Delta	9	84
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce temperatures to enhance and maintain aquatic species populations.	Delta	9	86
DELANO-EARLIMART ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
EXETER ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
FEATHER WD	Provide flow to improve ecosystem conditions.	Butte Creek	5	37
	Provide flow to improve ecosystem conditions.	Feather River	5	38
	Provide flow to improve ecosystem conditions.	Yuba River	5	39
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Graylodge Wildlife Mgmt Area	5	49
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Feather River	5	40

**Quantifiable Objectives (QOs) by Agency**

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Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
	Reduce pesticides to enhance and maintain beneficial uses of water.	Feather River	5	41
	Reduce salinity to enhance and maintain beneficial uses of water.	Sacramento Slough near Verona	5	42
	Reduce temperatures to enhance and maintain aquatic species populations.	Butte Creek	5	43
	Reduce temperatures to enhance and maintain aquatic species populations.	Feather River	5	44
	Reduce temperatures to enhance and maintain aquatic species populations.	Yuba River	5	45
FIREBAUGH CANAL WD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Panoche Creek	14	94
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Five Mile Slough	14	162
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100

**Quantifiable Objectives (QOs) by Agency**

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Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce sediments to enhance and maintain beneficial uses of water.	Panoche Creek	14	105
FRESNO SLOUGH WD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	14	163
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	14	166
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Panoche Creek	14	94
	Reduce pesticides to enhance and maintain beneficial uses of water.	Five Mile Slough	14	162
	Reduce sediments to enhance and maintain beneficial uses of water.	Panoche Creek	14	105
GLIDE WD	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	3	20
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Sacramento & Delevan NWR	3	28
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	3	29
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Colusa Basin	3	21
	Reduce pesticides to enhance and maintain beneficial uses of water.	Colusa Basin	3	22
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	3	23
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	3	24

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
GRASSLAND WD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	HILLS VALLEY ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	17
Provide long-term diversion flexibility to increase the water supply for beneficial uses.		Salt affected soils	17	182
	Provide flow to improve ecosystem conditions.	San Joaquin River	16	171

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
INTERNATIONAL WD	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	16	172
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	16	173
IVANHOE ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
JAMES ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	14	163
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	14	178
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Panoche Creek	14	94
	Reduce pesticides to enhance and maintain beneficial uses of water.	Five Mile Slough	14	162
	Reduce sediments to enhance and maintain beneficial uses of water.	Panoche Creek	14	105
KANAWHA WD	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	3	20
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Sacramento & Delevan NWR	3	28
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	3	29
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Colusa Basin	3	21

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
	Reduce pesticides to enhance and maintain beneficial uses of water.	Colusa Basin	3	22
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	3	23
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	3	24
KERN-TULARE WD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
KIRKWOOD WD	Provide flow to improve ecosystem conditions.	Antelope Creek	2	9
	Provide flow to improve ecosystem conditions.	Deer Creek	2	10
	Provide flow to improve ecosystem conditions.	Mill Creek	2	11
	Provide flow to improve ecosystem conditions.	Paynes Creek	2	12
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	2	13
	Reduce pesticides to enhance and maintain beneficial uses of water.	Elder Creek	2	14
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	2	15
	Reduce temperatures to enhance and maintain aquatic species populations.	Deer Creek	2	16
	Reduce temperatures to enhance and maintain aquatic species populations.	Mill Creek	2	17
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	3	20
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Sacramento & Delevan NWR	3	28



**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
LA GRANDE WD	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	3	29
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Colusa Basin	3	21
	Reduce pesticides to enhance and maintain beneficial uses of water.	Colusa Basin	3	22
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	3	23
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	3	24
LAGUNA WD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
LEWIS CREEK WD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
LINDMORE ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
LINDSAY-STRATHMORE ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
LOWER TULE RIVER ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
	Provide flow to improve ecosystem conditions.	Antelope Creek	2	9
	Provide flow to improve ecosystem conditions.	Butte Creek	5	37
	Provide flow to improve ecosystem conditions.	Deer Creek	2	10

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
M AND T CHICO RANCH INC.	Provide flow to improve ecosystem conditions.	Feather River	5	38
	Provide flow to improve ecosystem conditions.	Mill Creek	2	11
	Provide flow to improve ecosystem conditions.	Paynes Creek	2	12
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	2	13
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	4	30
	Provide flow to improve ecosystem conditions.	Yuba River	5	39
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Colusa & Sutter NWR	4	36
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Graylodge Wildlife Mgmt Area	5	49
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Feather River	5	40
	Reduce pesticides to enhance and maintain beneficial uses of water.	Elder Creek	2	14
	Reduce pesticides to enhance and maintain beneficial uses of water.	Feather River	5	41
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	2	15
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	4	32
	Reduce salinity to enhance and maintain beneficial uses of water.	Sacramento Slough near Verona	5	42
	Reduce temperatures to enhance and maintain aquatic species populations.	Butte Creek	5	43
	Reduce temperatures to enhance and maintain aquatic species populations.	Deer Creek	2	16
Reduce temperatures to enhance and maintain aquatic species populations.	Feather River	5	44	

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
	Reduce temperatures to enhance and maintain aquatic species populations.	Mill Creek	2	17
	Reduce temperatures to enhance and maintain aquatic species populations.	Yuba River	5	45
MADERA ID	Provide flow to improve ecosystem conditions.	Merced River	13	147
	Provide flow to improve ecosystem conditions.	San Joaquin River	13	148
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Merced NWR	13	159
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	13	161
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Merced River	13	149
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	13	150
	Reduce pesticides to enhance and maintain beneficial uses of water.	Merced River	13	151
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	13	152
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	13	154
	Reduce temperatures to enhance and maintain aquatic species populations.	Merced River	13	155
MELVIN HUGHES	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	15	167
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	15	170
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
MERCY SPRINGS WD	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
MYERS-MARSH	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	3	20
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Sacramento & Delevan NWR	3	28
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	3	29

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
MUNICIPAL WATER DISTRICT (MWD)	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Colusa Basin	3	21
	Reduce pesticides to enhance and maintain beneficial uses of water.	Colusa Basin	3	22
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	3	23
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	3	24
OJI BROTHERS FARM INC.	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	4	30
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Colusa & Sutter NWR	4	36
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	4	31
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	4	32
OJI MASONOBU	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	4	30
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Colusa & Sutter NWR	4	36
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	4	31
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	4	32
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	3	20
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Colusa & Sutter NWR	4	36

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
OLIVE PERCY DAVIS	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Sacramento & Delevan NWR	3	28
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	3	29
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Colusa Basin	3	21
	Reduce pesticides to enhance and maintain beneficial uses of water.	Colusa Basin	3	22
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	3	23
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	4	31
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	3	24
ORANGE COVE ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	17	179
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	17	182
	Provide flow to improve ecosystem conditions.	Antelope Creek	2	9
	Provide flow to improve ecosystem conditions.	Deer Creek	2	10
	Provide flow to improve ecosystem conditions.	Mill Creek	2	11
	Provide flow to improve ecosystem conditions.	Paynes Creek	2	12
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	2	13

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
ORLAND UNIT WATER USERS ASSOCIATION	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Sacramento & Delevan NWR	3	28
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	3	29
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Colusa Basin	3	21
	Reduce pesticides to enhance and maintain beneficial uses of water.	Colusa Basin	3	22
	Reduce pesticides to enhance and maintain beneficial uses of water.	Elder Creek	2	14
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	2	15
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	3	24
	Reduce temperatures to enhance and maintain aquatic species populations.	Deer Creek	2	16
	Reduce temperatures to enhance and maintain aquatic species populations.	Mill Creek	2	17
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96



**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
PACHECO WD	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Panoche Creek	14	94

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
PANOCHE WD	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Five Mile Slough	14	162
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce sediments to enhance and maintain beneficial uses of water.	Panoche Creek	14	105
		Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10
Provide flow to improve ecosystem conditions.		San Joaquin River	12	131
Provide flow to improve ecosystem conditions.		Tuolumne River	12	132
Provide long-term diversion flexibility to increase the water supply for beneficial uses.		Salt affected soils	10	109
Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.		San Joaquin River	12	134
Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.		Tuolumne River	12	135

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
PATTERSON WD	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce pesticides to enhance and maintain beneficial uses of water.	Tuolumne River	12	138
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce temperatures to enhance and maintain aquatic species populations.	S. Joaquin River	12	142
	Reduce temperatures to enhance and maintain aquatic species populations.	Tuolomne River	12	143
	PIXLEY ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18
Provide long-term diversion flexibility to increase the water supply for beneficial uses.		Pixley NWR	18	186
Provide long-term diversion flexibility to increase the water supply for beneficial uses.		Salt affected soils	18	187
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	9	87

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
PLAIN VIEW WD	Provide flow to improve ecosystem conditions.	Delta	9	74
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	9	75
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	9	90
	Provide short-term diversion flexibility to make water available to the EWA in a timely manner	All suitable lands	9	91
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Delta	9	77
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Delta	9	78
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	9	79
	Reduce nutrients to enhance and maintain beneficial uses of water.	Delta	9	81
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	9	85
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento Slough	9	83
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Delta	9	84
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce temperatures to enhance and maintain aquatic species populations.	Delta	9	86
POND POSO IMPROVEMENT DISTRICT	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
PORTERVILLE ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
	Provide flow to improve ecosystem conditions.	Antelope Creek	2	9
	Provide flow to improve ecosystem conditions.	Deer Creek	2	10
	Provide flow to improve ecosystem conditions.	Mill Creek	2	11
	Provide flow to improve ecosystem conditions.	Paynes Creek	2	12

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
PROBERTA WD	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	2	13
	Reduce pesticides to enhance and maintain beneficial uses of water.	Elder Creek	2	14
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	2	15
	Reduce temperatures to enhance and maintain aquatic species populations.	Deer Creek	2	16
	Reduce temperatures to enhance and maintain aquatic species populations.	Mill Creek	2	17
RAG GULCH WD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
RECLAMATION DISTRICT 1606	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	15	167
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	15	170
ROBERTS DITCH COMPANY	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	4	30
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Colusa & Sutter NWR	4	36
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	4	31
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	4	32
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide flow to improve ecosystem conditions.	San Joaquin River	13	148
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Merced NWR	13	159

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
SAN LUIS CANAL COMPANY	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
SARTAIN MWC	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	4	30
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Colusa & Sutter NWR	4	36
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	4	31

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	4	32
SAUCELITO ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
SEMITROPIC WSD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
SHAFTER-WASCO ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	19	188
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Kern NWR	19	191
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	19	192
SMALLWOOD VINEYARDS	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
SOLANO ID	Provide flow to improve ecosystem conditions.	Cache & Putah Creeks	6	50
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	6	52
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183



**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
SOUTHERN SAN JOAQUIN MUNICIPAL UTILITY DISTRICT	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	9	87
	Provide flow to improve ecosystem conditions.	Calavaras River	8	66
	Provide flow to improve ecosystem conditions.	Cosumnes River	8	67
	Provide flow to improve ecosystem conditions.	Delta	9	74
	Provide flow to improve ecosystem conditions.	Mokelumne River	8	68
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	9	75
	Provide flow to improve ecosystem conditions.	San Joaquin River	11	112
	Provide flow to improve ecosystem conditions.	Stanislaus River	11	113
	Provide flow to improve ecosystem conditions.	Tuolumne River	11	114
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	9	90
	Provide short-term diversion flexibility to make water available to the EWA in a timely manner.	All suitable lands	9	91
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Delta	9	77
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Stanislaus River	11	116

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
STOCKTON-EAST WD	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Tuolumne River	11	117
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Delta	9	78
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	9	79
	Reduce nutrients to enhance and maintain beneficial uses of water.	Delta	9	81
	Reduce nutrients to enhance and maintain beneficial uses of water.	Harding Drain	11	118
	Reduce pesticides to enhance and maintain beneficial uses of water.	Delta	9	80
	Reduce pesticides to enhance and maintain beneficial uses of water.	Harding Drain	11	119
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	9	85
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento Slough	9	83
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	9	82
	Reduce pesticides to enhance and maintain beneficial uses of water.	Stanislaus River	11	121
	Reduce pesticides to enhance and maintain beneficial uses of water.	Tuolumne River	11	122
	Reduce salinity to enhance and maintain beneficial uses of water.	Delta	9	84
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	11	123
	Reduce temperatures to enhance and maintain aquatic species populations.	Calaveras River	8	69
	Reduce temperatures to enhance and maintain aquatic species populations.	Delta	9	86
Reduce temperatures to enhance and maintain aquatic species populations.	Mokelumne River	8	70	

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
	Reduce temperatures to enhance and maintain aquatic species populations.	San Joaquin River	11	124
	Reduce temperatures to enhance and maintain aquatic species populations.	Stanislaus River	11	125
	Reduce temperatures to enhance and maintain aquatic species populations.	Tuolumne River	11	126
STONE CORRAL ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	17	179
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	17	182
TEA POT DOME WD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
TERRA BELLA ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	9	87
	Provide flow to improve ecosystem conditions.	Delta	9	74
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	9	75
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	9	90
	Provide short-term diversion flexibility to make water available to the EWA in a timely manner.	All suitable lands	9	91

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
THE WEST SIDE ID	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Delta	9	77
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Delta	9	78
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	9	79
	Reduce nutrients to enhance and maintain beneficial uses of water.	Delta	9	81
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	9	85
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento Slough	9	83
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	9	82
	Reduce salinity to enhance and maintain beneficial uses of water.	Delta	9	84
	Reduce temperatures to enhance and maintain aquatic species populations.	Delta	9	86
THOMES CREEK WD	Provide flow to improve ecosystem conditions.	Antelope Creek	2	9
	Provide flow to improve ecosystem conditions.	Deer Creek	2	10
	Provide flow to improve ecosystem conditions.	Mill Creek	2	11
	Provide flow to improve ecosystem conditions.	Paynes Creek	2	12
	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	2	13
	Reduce pesticides to enhance and maintain beneficial uses of water.	Elder Creek	2	14
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	2	15

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
	Reduce temperatures to enhance and maintain aquatic species populations.	Deer Creek	2	16
	Reduce temperatures to enhance and maintain aquatic species populations.	Mill Creek	2	17
TULARE ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	18	187
TULARE LAKE BASIN WSD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	18	183
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Pixley NWR	18	186
WEST STANISLAUS ID	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100

**Quantifiable Objectives (QOs) by Agency**

*Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>*

<b>Water Supplier (1)</b>	<b>Description of the CALFED Objective (2)</b>	<b>Location (3)</b>	<b>Sub-Region Number</b>	<b>Targeted Benefit Number</b>
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
WESTLANDS WD	Decrease flows to salt sinks to increase the water supply for beneficial uses.	All affected lands	10	106
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	10	109
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	San Joaquin River	10	93
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Grassland Marshes	10	95
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	96
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	Panoche Creek	14	94
	Reduce native constituents (selenium, boron, molybdenum, organic carbon) to enhance and maintain beneficial uses of water.	San Joaquin River	10	98
	Reduce pesticides to enhance and maintain beneficial uses of water.	Five Mile Slough	14	162
	Reduce pesticides to enhance and maintain beneficial uses of water.	Mud Slough	10	97
	Reduce pesticides to enhance and maintain beneficial uses of water.	Orestimba Creek	10	100
	Reduce pesticides to enhance and maintain beneficial uses of water.	Salt Slough	10	99

**Quantifiable Objectives (QOs) by Agency**

Details are listed at: <http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml>

Water Supplier (1)	Description of the CALFED Objective (2)	Location (3)	Sub-Region Number	Targeted Benefit Number
	Reduce pesticides to enhance and maintain beneficial uses of water.	San Joaquin River	10	101
	Reduce salinity to enhance and maintain beneficial uses of water.	Grassland Marshes	10	102
	Reduce salinity to enhance and maintain beneficial uses of water.	Mud & Salt Slough	10	103
	Reduce salinity to enhance and maintain beneficial uses of water.	San Joaquin River	10	104
	Reduce sediments to enhance and maintain beneficial uses of water.	Panoche Creek	14	105
WESTSIDE WD	Provide flow to improve ecosystem conditions.	Sacramento River below Keswick	3	20
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Sacramento & Delevan NWR	3	28
	Provide long-term diversion flexibility to increase the water supply for beneficial uses.	Salt affected soils	3	29
	Reduce group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane [including lidane], endosulfan and toxaphene) to enhance and maintain beneficial uses of water.	Colusa Basin	3	21
	Reduce pesticides to enhance and maintain beneficial uses of water.	Colusa Basin	3	22
	Reduce pesticides to enhance and maintain beneficial uses of water.	Sacramento River	3	23
	Reduce salinity to enhance and maintain beneficial uses of water.	Colusa Basin	3	24

## Chapter 11

### Other BMP Documents

This chapter contains documents that you may find useful in preparing your Water Management Plan. The first page of each document is provided here. The complete documents are provided in a printable format on the included CD and on the USBR website ([www.usbr.gov/mp/watershare](http://www.usbr.gov/mp/watershare)).

1. Canal Lining
2. Crop Survey Form
3. CUWCC Memorandum of Understanding (MOU)
4. Incentive Pricing
5. Reservoir Lining



1. Canal Lining

## Methodology for Determining Applicability/Implementation of the Canal Lining/Piping

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The purpose of this methodology is to provide an analytical process for determining the applicability and potential implementation of the canal lining and/or piping as part of the *Lining/Piping* best management practice (BMP) for Central Valley Project (CVP) districts. The U.S. Bureau of Reclamation's (Reclamation) criteria for CVP Water Management Plans requires the consideration of lining or piping unlined conveyance systems as a water management practice.

Many of the districts in the CVP were formed for the purpose of providing surface water from major California river systems to over-drafted or water-short areas in California. The allocation of surface water to many of the districts is based on the practice of conjunctive use of surface water and groundwater supplies.

This methodology provides a streamlined analytical method for balancing the needs of CVP conjunctive use districts while giving due consideration to the canal lining and/or piping. This methodology has been developed to facilitate the evaluation of the *Lining/Piping* by the district and Reclamation's review, but there may be cases where additional information may be requested. This methodology provides one method of addressing canal lining/piping and does not invalidate or eliminate other acceptable methods.

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### **PART 1      *Level of Implementation***

YES    NO    *Is the district's distribution system already fully lined or piped?*

[If the district's distribution system is already fully lined or piped, this in itself is sufficient to justify canal lining/piping as being fully implemented. Lined sections of canals or pipelines that have aged or been damaged beyond their intended purpose should be considered equivalent to unlined canals. Supporting information should include a statement declaring that the district's distribution system is already fully lined or piped and in good repair.]

YES    NO    *Does the district already have an on-going canal lining/piping program?*

[If the district has already implemented a canal lining or canal-piping program, the district is already in compliance with requirements of this portion of the BMP. Supporting information should include a description of the program that has been implemented, the expected timeline of the program, and the estimated district costs]

If any of the answers above is YES, then provide supporting information. No further analysis of this methodology is required. The implementation of canal lining/piping is complete or ongoing if the district is currently implementing a canal lining or piping program, then the program is considered ongoing at an adequate level of implementation and reporting will be required in the annual update reports.

If all of the answers above are NO, then go to Part 2.

2. Crop Survey Form

Water District name

Street Name

City, CA 9xxxxx

Phone Fax Email

Name Joe Farmer

Date 21 March 2005

Address 000 Winchester Canyon Road

Acct # 700000

2005 CROP REPORT

Each water user is required to file a crop report each year. The 1999 Crop Report Form lists each field by APN and acreage as listed on your RRA Form. Please indicate each crop, irrigation method, the percentage of well water used (if any) and if a field was double cropped or fallowed. If you farm any land within the District that is not listed on the Crop Report Form please add it to the list. Please pick from the crop and irrigation system lists on the back of this page when completing the form.

APN	acres	crop	crop acres	irrigation method	% well use	double cropped acres
79-000-00	160.00	avocados	45.0	micro	0	0
		lemons	100.0	micro	0	0
		misc. (creek)	10.0	--	--	--
		roads, house	5.0	--	--	--
		TOTAL	160.0			0

3. CUWCC Memorandum of Understanding (MOU)

MEMORANDUM OF UNDERSTANDING  
REGARDING  
URBAN WATER CONSERVATION  
IN CALIFORNIA

*As Amended March 10, 2004  
(Except Section 4.5 & 4.6, Amended on March 9, 2005)*

*CHECK CUWCC WEBSITE ([WWW.CUWCC.ORG](http://WWW.CUWCC.ORG)) FOR CURRENT VERSION*

# **INCENTIVE PRICING BEST MANAGEMENT PRACTICE FOR AGRICULTURAL IRRIGATION DISTRICTS**

June 1998

Prepared by



**Resource Consultants**

## Methodology for Determining Applicability/Implementation of Reservoir Lining

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The purpose of this methodology is to provide a streamlined analytical process for determining the applicability and potential implementation of the reservoir lining as part of *Lining/Piping* best management practice (BMP) for Central Valley Project (CVP) districts. The U.S. Bureau of Reclamation's (Reclamation) criteria for CVP Water Management Plans requires the consideration of lining unlined reservoirs.

This methodology provides a streamlined analytical method for balancing the needs of CVP conjunctive use districts while giving due consideration to the reservoir lining. This methodology has been developed to facilitate the evaluation of the reservoir lining by the district and Reclamation's review, but there may be cases where additional information may be requested. This methodology provides one method of addressing the reservoir lining and does not invalidate or eliminate other acceptable methods.

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### **PART 1**      **Level of Implementation**

YES      NO      *Is the district's regulating system already fully lined?*

[If the district's regulating system is already fully lined, this in itself is sufficient to justify this element of the *Lining/Piping* BMP as being fully implemented. Lined reservoirs, which have aged or been damaged beyond their intended purpose should be considered equivalent to unlined reservoirs. Supporting information should include a statement declaring that the district's regulating reservoirs already fully lined and in good repair.]

YES      NO      *Does the district already have on-going reservoir lining program?*

[If the district has already implemented a reservoir-lining program, the district is already in compliance with requirements of this element of Lining/Piping BMP. Supporting information should include a description of the program that has been implemented, the expected timeline of the program, and the estimated district costs]

YES      NO      *Is the district's conveyance system fully piped and does the district experience very infrequent to no operational spills? (Reservoirs were constructed for and are used principally for groundwater recharge purposes.)*

[Many fully piped distribution systems do not require the use of a regulating reservoir except for infrequent use or under non-typical conditions. A groundwater recharge reservoir might be used during the low demand winter season to reverse flow water using gravity. Demands may be such that pumping costs could be substantially reduced by the use of an up-slope recharge basin to store water and reverse flow to meet irrigation demands. Recharge reservoirs may also be used to store water during a non-routine shutdown or de-watering of a main source canal.]

### Helpful Websites

Title	Address
Bureau of Reclamation Water Share	<a href="http://www.usbr.gov/mp/watershare">www.usbr.gov/mp/watershare</a>
Ag Annual Update	<a href="http://www.agwatercouncil.org">www.agwatercouncil.org</a>
Urban Annual Update	<a href="http://www.cuwcc.org">www.cuwcc.org</a>
Water Measurement Manual	<a href="http://www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/cover.html">www.usbr.gov/pmts/hydraulics_lab/pubs/wmm/cover.html</a>
Winflume (Repogle flume design)	<a href="http://www.usbr.gov/pmts/hydraulics_lab/winflume/index.html">www.usbr.gov/pmts/hydraulics_lab/winflume/index.html</a>
CIMIS ETo data	<a href="http://www.cimis.water.ca.gov/cimis/welcome.jsp">www.cimis.water.ca.gov/cimis/welcome.jsp</a>
Historic Weather Data	<a href="http://www.wrcc.dri.edu/summary/climsmnca.html">www.wrcc.dri.edu/summary/climsmnca.html</a>
Quantifiable Objectives(QO)	<a href="http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml">http://calwater.ca.gov/Archives/WaterUseEfficiency/WaterUseEfficiencyArchive.shtml</a>