

U. S. Bureau of Reclamation

**Criteria for Developing
Refuge Water Management Plans
2004**

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Bureau of Reclamation, Mid-Pacific Region

Criteria for Developing Refuge Water Management Plans

The Criteria for Developing Refuge Water Management Plans (Refuge Criteria) provides a common methodology, or standard, for efficient use of water by Federal Wildlife Refuges, State wildlife management areas and resource conservation districts that receive water under provisions of the Central Valley Project Improvement Act (CVPIA). They document the process and format by which Refuge Water Management Plans (Refuge Plan) should be prepared and submitted to Reclamation as part of the Refuge/District Water Supply Contracts and Memorandum of Agreements.

The Refuge Criteria refers to Refuges, wildlife areas and resource conservation districts as Refuges.

Who Must Prepare a Refuge Plan

Those Refuges that entered into water supply contracts with Bureau of Reclamation (Reclamation), as a result of the CVPIA and subsequent Department of the Interior (Interior) administrative review processes (Administrative Proposal¹) are required to prepare Refuge Plans using the Refuge Criteria.²

San Joaquin Valley

Grassland Water District (GWD)/-
Grassland Resource Conservation District (GRCD)
San Luis National Wildlife Refuge
Merced National Wildlife Refuge
Pixley National Wildlife Refuge
Kern National Wildlife Refuge
Volta State Wildlife Area
Los Banos State Wildlife Area
North Grassland State Wildlife Area
Mendota State Wildlife Area

Sacramento Valley

Sacramento National Wildlife Refuge
Delevan National Wildlife Refuge
Colusa National Wildlife Refuge
Sutter National Wildlife Refuge
Gray Lodge State Wildlife Area

When is the Refuge Plan Due

The initial 5-Year Refuge Plan is due 1 year after the Refuge Criteria is finalized and once every 5 years thereafter. Refuges are responsible for submitting the draft Refuge Plan, which has been developed according to the Refuge Criteria, to Reclamation's appropriate Area Office for review. Upon receipt, Refuges will receive, within 90 days, notification of Reclamation's acceptance or request for modification. Following notification by Reclamation that the Refuge Plan has conditionally met the requirements of the Refuge Criteria, Refuges will submit three copies of the complete Refuge Plan. In addition, GRCD will submit a resolution from the Board of Directors formally adopting the Refuge Plan. The status of the Refuge'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

¹ In 1995, Interior initiated a stakeholder process to address areas of concern related to the Implementation of CVPIA. To that end, Interior circulated for review, by interested parties, a draft Administrative Proposal on Refuge Water Supplies in July 12, 1996, and a revised draft on March 20, 1998.

² Pursuant to the provisions of the CVPIA, Central Valley Project agricultural and municipal and industrial water service and repayment contractors currently prepare and submit Water Management Plans in accordance with the Standard Criteria for Evaluating Water Management Plans.

received within 30 days, the review process will officially be complete. If public comments are received, additional changes may be required.

Refuges are also responsible for submitting Annual Updates to Reclamation. The Annual Update will address the actions taken in implementing the Refuge Plan for the previous year and forecast Implementation actions and proposed changes for the current year. The Annual Update is limited to reporting on Best Management Practices (BMPs). The final Refuge Plan and Annual Updates should be submitted to Reclamation at:

Bureau of Reclamation, Mid-Pacific Region
Water Conservation Office
MP-410
2800 Cottage Way
Sacramento, CA 95828

Non-Compliance

Article 17 of the Refuge Water Supply Contracts addresses Water Conservation. Article 17(a) requires the Refuge to complete the original Refuge Plan within 1 year of the establishment of the Refuge Criteria. Article 17(b) states that prior to the Refuge being afforded opportunities such as pooling and rescheduling of water supplies pursuant to Articles 3 and 6 of the water supply contract, the Refuge must be implementing a Refuge Plan. Continued pooling and rescheduling benefits are contingent upon continued Refuge Plan Implementation. Article 17(d) requires the Refuge to submit Annual Updates each year on the status of the previous year's Refuge Plan Implementation. If the Contracting Officer determines the Refuge is unable to implement its Refuge Plan due to circumstances beyond its control, the pooling and rescheduling of benefits can be continued so long as the Refuge diligently works with the Contracting Officer to begin Implementation as soon as the Refuge constraints have ceased. See the individual Refuge Contract for specific Contract language.

Key Terms: For the purposes of the Refuge Criteria, the following definitions will be used:

Annual Update - Yearly report documenting actual Implementation of a Refuge Plan for the previous year and forecast planned Implementation for the current year. The Annual Update is limited to reporting on the BMPs.

BMPs - A Policy, program, practice, or use of devices, equipment ,or facilities that meets Reclamation Refuge Criteria. BMPs are equivalent to "Effective Water Use Practices" in the June 1998 Interagency Coordinated Program Task Force Report.

CALFED - A State and 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.

CVP - Federally operated water management and Conveyance system that provides water for agricultural, urban, and industrial users, and fish and wildlife in portions of California.

CVPIA - Title XXXIV of the Federal Act of October 30, 1992.

Contract - Water Supply Contracts and/or Memorandum of Agreements.

Contracting Officer - Interior's duly authorized representative acting pursuant to the water supply contract.

Conveyance - A pipeline, canal, natural channel, or other similar facility that transports water from one location to another, typically to bring water to the Refuge (see Internal Distribution on Refuge water transport).

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.

District - The physical boundaries of the GWD/GRCD. For the purposes of the Refuge Criteria, the District is referred to as a Refuge.

Efficiency - Improved water management through Implementation of BMPs, including Water Conservation.

Estimated Cost - A projection of the cost of implementing a project or practice. In the Refuge Plan, Estimated Cost will be used primarily to project the cost benefit of a BMP.

Fiscal Year - Federal: October 1 through September 30, State: July 1 through June 30.

Five Year Refuge Plan Revisions - Refuges are required to re-evaluate and re-submit their Refuge Plan every 5 years. The Refuges will use the most recently adopted Refuge Criteria, as applicable.

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 Refuge staff to use good-faith efforts to optimize benefits from implementing BMPs.

Inflow - Water that enters the Refuge boundaries and is made available to meet planned habitat uses.

Interagency Refuge Water Management Team (IRWMT) - Article 6(b) of the Refuge Water Supply Agreement created an interagency team to work cooperatively on Refuge water management issues, including supply, Conveyance, and Efficiency. The IRWMT consists of representatives from Reclamation, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the GWD/GRCD (see the Contract for specific team tasks, such as allocating pooled water and developing the Refuge Criteria).

Internal Distribution - A pipeline, canal, natural channel, or other similar facility that transports water from one location to another within the Refuge boundary.

Internal Flow - Water that has entered the Refuge boundaries and is moved to one or more habitat units.

Outflow - Water that leaves the Refuge boundaries.

Policy - Usually a formal written statement adopted by the governing board or agency that specifies what action will be taken in certain situations.

Refuges - Lands in the units of the National Wildlife Refuge System in the Central Valley of California; the State wildlife management areas (Gray Lodge, Los Banos, Volta, North Grasslands, and Mendota); and the GWD/GRCD.

The term Refuge, as used in the Refuge Criteria, includes Federal and State Refuges and the private GWD/GCRD. Carries the same meaning as the term “Contractor” in the Water Supply Contracts.

Reverse Cycle Wetlands - Managed wetland units that are flooded during the spring and summer (typically for brood habitat) and dry during the fall and winter.

Riparian - Habitat within Refuge boundaries that is managed for Riparian vegetation.

Water Conservation - Improved water management through the Implementation of BMPs.

Water Inventory - An approach used in the Refuge Plan to identify and quantify Inflows, Outflows, and other uses of water from the Refuge in order to identify areas of potential improved water management.

Year Type - A water management plan contains data from a specified year. Refuges use a variety of Year Types to collect and maintain data. Year types include, but are not limited to, calendar year (January 1 to December 31), Federal Fiscal Year (October 1 to September 30), State Fiscal Year (July 1 to June 30), and Contract year (varies by Contract). When developing a Refuge Plan, determine the Year Type that is most appropriate for your agency and use data based on that Year Type consistently throughout the Refuge Plan.

Plan Content

Intent: The intent of the Refuge Plan is to describe general physical information about the Refuge in order to form a basis for developing improved water management practices, best known as BMPs.

Detail Expected in an Adequate Refuge Plan: The Refuge Plan should be prepared using the Refuge Plan Format. The Refuge Plans shall describe the Refuge water supplies, history, location and facilities, size, terrain and soils, environment, climate, operating rules and regulations, Inflow, Internal Flow and Outflow water measurements, water rate schedules and billing, and water shortage allocation policies.

Evaluation: In certain circumstances, specific information may not be available. In these circumstances, the section will be considered “adequately addressed,” if the Refuge Plan describes how the information will be obtained for the next Refuge Plan revision.

Section A. Background

Give an overview of the Refuge. Include the original size, historical water supplies, Contract information with Reclamation and others, and changes in Habitat Type. Describe the water use characteristics of the Habitat Types maintained at the Refuge. Define year (calendar, fiscal, Contract, etc.), and enter data based on this Year Type consistently throughout the Refuge Plan and its tables.

Section B. Water Management Related Goals and Objectives

Describe the Refuge mission relative to water management and specific habitat management objectives. Include pertinent information from other Refuge documents. Describe the strategies used to attain these objectives, constraints that prevent attainment of objectives and explain how the constraints effect operations. Describe the strategies used to remedy the constraints as they pertain to water management and/or habitat/species.

Section C. Policies and Procedures

Describe the Refuge policies/procedures on accepting agricultural drainage water as supply. Describe the Refuge policies/procedures on water pooling, transfers, reallocations, or exchanges. Describe the Refuge water accounting policies/procedures for Inflow, Internal Flow, and Outflow. Describe the Refuge water shortage policies/procedures. For GWD, describe water allocation Policy to customers, lead-time for water orders, policies for wasteful use of water, and pricing and billing policies.

Section D. Inventory of Existing Facilities

Attach existing facility's map(s) that show points of delivery, turnouts (Internal Flow), and Outflow (spill) points, measurement locations, Conveyance system, storage facilities, operational loss recovery system, ground water wells, and water quality monitoring locations. Describe in the body of the Refuge Plan the information contained in each attached map. Include information on the availability, quality, and potential for ground water use.

Section E. Environmental Characteristics

Describe the topography of the Refuge, and discuss the impact of topography on water operations and management. Attach a map showing major soil classifications, and discuss how soil characteristics affect water management. Discuss the impact of climate and any microclimates on the Refuge. Include historical information on average precipitation, maximum and minimum temperatures, and average evapotranspiration (ET).

If the Refuge has a Water Quality Monitoring Program, discuss the analyses performed, frequency of measuring, and concentration range and averages.

Section F. Transfers, Exchanges, and Trades

Provide information on water transfers, exchanges, and/or trades into or out of the Refuge.

Section G. Water Inventory

Include a description of the Refuge's surface water, ground water, other water supplies, water uses within the Refuge, Outflow from the Refuge, and a Water Inventory. Provide this information for the years specified in the tables.

Describe the monthly acre-foot amounts of surface water, ground water, and other water delivered to or used by the Refuge for the specified year. Describe the Internal Distribution system by component, including information on length and size, impacts of precipitation and evaporation, and the amount of seepage and spill. Describe the water-use characteristics of each Habitat Type at the Refuge. Include

information on size, water needs, impacts of precipitation and evaporation, seepage, and cultural practices. Complete a Water Inventory of the Refuge water supplies, uses, and Outflows. Provide a 10-year history of Refuge water supplies.

Sections H and I. - BMPs

Intent: To develop an Implementation plan for BMPs that will result in improved water management.

Detail expected in an adequate Implementation plan: Describe the program that the Refuge determines will best accomplish each BMP. Provide 5-year Implementation plans with schedules, budgets, and monitoring plans. This should include specific descriptions, estimates and types of projects, location, and size. The Refuge may need to study the most effective way to implement the BMP. If a BMP is to be studied, provide details and schedules of the study (see Non-Applicability (NA) of Exemptible BMPs section for information on NA) exemptible BMPs).

See Exemptions from BMPs Section for information on exemption requests.

Section H. Critical BMPs

Critical practices are those that every Refuge is expected to implement. These BMPs are considered the basic elements of good Refuge water management. Develop and implement a program for each BMP that will provide maximum benefit to the Refuge.

For each BMP, report on the proposed Implementation schedule for the next 5 years and the estimated direct and indirect costs. Where appropriate, report the location, size, reason, and anticipated benefit of the proposed improvements.

1. Management Programs

- a. Education - Describe the Refuge's proposed staff education programs and goals. Attach the program materials.
- b. Water Quality Monitoring - If the Refuge's supply includes ground water, upslope drain water, or poor quality surface water, describe the water source, controlling regulations, planned program, and participating agencies.
- c. Cooperative Efforts - Describe proposed cooperative water management efforts with Federal and State agencies, other Refuges, agricultural and urban Contractors, public interest groups, and neighboring landowners.
- d. Pump Evaluations - Describe the number and types of pumps and any Efficiency testing/replacement program.
- e. Policy Evaluation - Identify specific changes to the rules and regulations of the Refuge's water suppliers and/or conveying entities that would allow for more efficient water use, improved water quality, and operations.

- f. Provide Customer Services (GWD only) - Facilitate physical/structural improvements for member units; provide management service, and technical advice to raise funds for BMP Implementation.

2. *Water Shortage Contingency Plan*

Develop (or attach, if existing) a Water Shortage Contingency Plan that address ways to maintain habitat during reductions in normal supply of up to 50 percent. The Refuge Plans should contain criteria for prioritizing management units that provide the maximum amount of habitat considered critical during low rainfall periods. If a Water Shortage Contingency Plan is not complete for submission with the Refuge Plan, it should be completed and submitted with the initial Annual Update.

3. *Pricing Structure - Adopt a water pricing structure for customers based at least in part on quantity delivered (GWD only).*

Describe the proposed quantity-based water pricing structure, the cost per acre-foot, and when it will become effective.

4. *Plan to measure deliveries to customers (GWD only).*

Measure the volume of water delivered to each club or customer with methods or devices that assure a reasonable degree of accuracy, under most conditions within +/- 6 percent. Provide a map showing customer and management unit boundaries and all turnouts.

For each installation location, identify the type of measurement device, accuracy, cost, and date of planned installation.³

5. *Water Conservation Coordinator*

Designate an individual to develop and implement the Refuge Plan and develop progress reports. Include their name, title, address (if difference than the Contractor's address), phone number, and an e-mail address. Also, include the Contractor's web site address, if available.

Section I. Exemptible BMPs

For each exemptible BMP, report on the proposed Implementation schedule for 5 years and the estimated direct and indirect costs. Where appropriate, report the location, size, reason, and anticipated benefit of the proposed improvements. If the Refuge will study a BMP or conduct a pilot project, describe the projected program and timeline.

If any of the exemptible BMPs will not be implemented within 2 years of submitting this Refuge Plan, describe the projected program, timeline, and other relevant information.

³ Note: All water delivered to the Refuges (Contractor) pursuant to their Contract is to be measured at the Point(s) of Delivery to reflect the quantities of Level 2 Water Supplies and Incremental Level 4 Water Supplies delivered to the Contractor's boundary.

1. *Improve management unit configuration.*

Describe the proposed unit to be modified, current acres, reason for change, proposed acres, and the Estimated Cost and actions for each of the next 5 years. GWD - Assist customers.

2. *Improve Internal Distribution system.*

- a. New control structures - Describe any new control structures proposed for the distribution system, proposed location and type of structure, reason for new structure, and the Estimated Cost and actions for each of the next 5 years.
- b. Line/pipe sections of distribution system - Describe the proposed new reach or section, reason for new structure, and the Estimated Cost and actions for each of the next 5 years.
- c. Independent water control for each unit - Describe the proposed new control point, reason for new control point, and the Estimated Cost and actions for each of the next 5 years.
- d. New Internal Distribution sections to provide water to existing and new habitat units - Describe the proposed new section, units served, reason for new section, and the Estimated Cost and actions for each of the next 5 years. GWD - provide assistance to member units.

3. *Automate water distribution system.*

Describe the proposed automation location, type of improvement, reason for improvement, and the Estimated Cost and actions for each of the next 5 years.

4. *Plan to measure Outflow.*

Measure the volume of water leaving the Refuge with methods or devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 20%. Identify spill locations, prioritize spill locations by quantity of spill, determine best measurement method/cost, submit funding proposal, and provide the Estimated Cost and actions for each of the next 5 years.

5. *Incentive Pricing (GWD only).*

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

- a. More efficient water use at the Refuge level
- b. Conjunctive use of ground water
- c. Reduction in problem drainage
- d. Improved management of environmental resources
- e. Effective management of all water sources throughout the season by adjusting seasonal rates based on current conditions

6. *Construct and operate operational loss recovery systems.*

Describe proposed location, reason for improvement, and the Estimated Cost and actions for each of the next 5 years.

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

Describe the proposed production and/or injection well, anticipated yield, and the Estimated Cost and actions for each of the next 5 years.

8. *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 wildlife management goals.*

9. *Mapping*

Develop Geographic Information System-based maps of the distribution system and drainage system. Include the Estimated Cost and actions for each of the next 5 years.

10. *CALFED*

Provide a short narrative describing past, present, or future plans that address the CALFED Water Use Efficiency Program goals identified for this Refuge. Respond only to questions for your specific Refuge.

Sacramento and Delevan National Wildlife Refuges (NWRs)

1. Describe actions that reduce the salinity of surface return water. (Targeted Benefit (TB) 24)
2. Describe actions that reduce nonproductive ET. (TB 25)

Colusa and Sutter NWR's

1. Describe actions that reduce nonproductive ET. (TB 33)

Gray Lodge State Wildlife Area (WA)

1. Describe actions that reduce nonproductive ET. (TB 46)

North Grassland, Volta, and Los Banos WA's

1. Describe actions that reduce selenium concentration in the Grassland Marshes. Reduce selenium concentration to 5 ug/L in the Grassland Marshes. (TB 95)
2. Describe actions that reduce San Joaquin River selenium and boron concentrations. Reduce San Joaquin River selenium concentration to 5 ug/L and boron concentration to 2 mg/L from March 15 to September 15 and to 2.6 mg/L September 16 to March 14. (TB 98)
3. Describe actions that reduce salinity in the Grassland Marshes and Mud and Salt Sloughs. Reduce salinity in the Grassland Marshes and Mud and Salt Sloughs. (TB 102, 103)
4. Describe actions that reduce nonproductive ET. Reduce unwanted ET. (TB 107)

San Luis and Kesterson NWR's, Grassland Resource Conservation District

1. Describe actions that reduce salinity in the San Joaquin River, Grassland Marshes, and Mud and Salt Sloughs. (TB 95, 96, 98)
2. Describe actions that reduce salinity in the Grassland Marshes and Mud and Salt Sloughs. (TB 102, 103, 104) (All of these six contaminant TBs could be incorporated into one Refuge manager response, e.g. addressed through the Grassland Drainage Program).
3. Describe actions that reduce nonproductive ET. (TB 107)

Merced NWR

1. Describe actions that provide additional flow to San Joaquin River. (TB 148)
2. Describe actions that reduce salinity at Vernalis. (TB 154)
3. Describe actions that reduce nonproductive ET. (TB 157)

Mendota WA

1. Describe actions that reduce flows to salt sink. (TB 167)
2. Describe actions that reduce nonproductive ET. Reduce unwanted ET. (TB 168)

Kern NWR

1. Describe actions that reduce nonproductive ET. (TB 189)

Section J. BMP Exemption Process

For each BMP for which the Refuge is seeking an exemption, provide a detailed narrative and complete the summary table.

Some BMPs are not appropriate or possible for the Refuge to implement. To document an exemption, provide the basis, rationale, and details for excluding a BMP. For a BMP to be classified exempt it is necessary for the Refuge to document in a clear and concise manner the constraint to implementing the BMP. The exemption must document a specific legal, environmental, or economic issue that creates a constraint.

If the Refuge determines there is no way to remove the constraint, a clear justification must be provided. Opportunities to acquire funding or other relevant assistance should be identified (consider Federal, State, and local funding that recognizes regional benefits). An exemption must be updated every year - showing current actions to remove the constraint.

Section K. NA of Exemptible BMPs

To establish that a BMP is not applicable to the Refuge, the Plan should explain the reasons why the particular BMP does not apply to the Refuge. This justification must be consistent with Section A of the Refuge Criteria titled, Background. Examples of NA for exemptible BMPs are listed below. This list is not all-inclusive.

Exemptible BMPs

2. *Improve the Distribution System*

b. Line/pipe sections of distribution system

NA if the current system can distribute water effectively with regular maintenance and on-going improvements to open channels - thus maximizing habitat.

3. *Automate water distribution system*

NA if the Refuge has a completely piped system that has no delivery constraints.

6. *Construct and operate operational loss recovery systems.*

NA if system is completely piped and there are no spill points.

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

NA is there is no usable ground water

8. *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 wildlife management goals.*

NA is no recycled urban wastewater is available.