

**Bureau of Reclamation  
Mid-Pacific Region**

**Criteria for Developing  
Refuge Water Management Plans  
2010**

**July 2010**

# **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 the Bureau of 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 Reclamation and currently receive water, as a result of the CVPIA and subsequent Department of the Interior administrative review processes (Administrative Proposal<sup>1</sup>) are required to prepare Refuge Plans using the Refuge Criteria.<sup>2</sup>

#### San Joaquin Valley

San Luis National Wildlife Refuge  
Kern National Wildlife Refuge  
Merced National Wildlife Refuge  
Pixley National Wildlife Refuge<sup>3</sup>  
Los Banos State Wildlife Area  
Volta State Wildlife Area  
North Grassland State Wildlife Area  
Mendota State Wildlife Area  
Grassland Resource Conservation District (GRCD)

#### Sacramento Valley

Sacramento National Wildlife Refuge  
Delevan National Wildlife Refuge  
Colusa National Wildlife Refuge  
Sutter National Wildlife Refuge<sup>3</sup>  
Gray Lodge State Wildlife Area

### **When is the Refuge Plan Due**

The initial 5-Year Refuge Plan was due in 2005 and updated plans once every 5 years thereafter. Refuges are responsible for submitting an electronic draft version of their 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 a final electronic copy of the complete Refuge Plan. In addition, for GRCD, the final electronic copy of its complete Refuge Plan shall include 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*

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<sup>1</sup> 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.

<sup>2</sup> 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.

<sup>3</sup> As of December 1, 2009, neither Pixley nor Sutter National Wildlife Refuges receive Federal water.

*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, the appropriate Area Office, and at Reclamation's WaterShare Web site at [www.usbr.gov/mp/watershare/](http://www.usbr.gov/mp/watershare/). 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.

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 your Reclamation Area Office.

### **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** are defined in the Guidebook.

### **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 best management practices, 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 and procedures on accepting agricultural drainage water as supply. Describe the refuge policies and procedures on water pooling, transfers, reallocations, or exchanges. Describe the refuge water accounting policies and procedures for inflow, internal flow, and outflow. Attach a copy of the refuge's shortage policies, drought plan, or any similar document. For GRCD, 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, list the analyses performed, frequency of measuring, and concentration range and averages and any exceedance of standards.

### **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 Section K, NA of Exemptible BMPs). See Section J – BMP Exemption Process 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 for the next three years. 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 water efficiency 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 or current testing program, constituents tested, frequency and results, 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 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 (GRCD only) - Facilitate physical/structural improvements for member units; provide management services and technical advice to raise funds for BMP Implementation and provide customers with water efficiency education programs.

## 2. *Pricing Structure (GRCD only)*

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

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

## 3. *Plan to measure deliveries to customers (GRCD 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.<sup>4</sup>

## 4. *Water Management Coordinator*

Designate an individual to develop and implement the Refuge Plan and develop progress reports. Include their name, title, address (if difference than the refuge address), phone number, and an e-mail address. Also, include the refuge web site address, if available. In the budget tables, quantify the water management budget and staff hours not related to any specific BMP.

## **Section I. Exemptible BMPs**

For each exemptible BMP, report on the proposed implementation schedule for 5 years and the estimated direct and indirect costs for 3 years. 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.

### 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. GRCD - Assist customers to improve management unit configurations.

### 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.
- b. Line/pipe sections of distribution system - Describe the proposed lining or piping, reason for the improvement, and the estimated cost and actions.
- c. Independent water control for each unit - Describe the proposed new control point, reason for new control point, and the estimated cost and actions.

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<sup>4</sup> 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.

- 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. GRCD - Provide assistance to member units to improve internal distribution.

### *3. Develop a Water Use Schedule*

The water use schedule should indicate the planned floodup sequence including: the floodup dates for each habitat unit/cell, the number of acres to be flooded in each unit/cell, and a running total representing the percentage of total wetland acres that are flooded by certain dates. In addition, similar information could be included for spring drawdown, as well as for planned irrigations during the spring and summer months. If such schedules already exist as part of a larger management document, just include schedule summary pages (floodup, drawdown and irrigations) in the Refuge Water Management Plan.

### *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 percent. 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.

### *5. Incentive Pricing (GRCD 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.

### *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.

### *8. Facilitate Use of Available Recycled Urban Wastewater that*

- a. otherwise would not be used beneficially;
- b. meets all health and safety criteria; and
- c. 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.

## 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

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

### Colusa and Sutter National Wildlife Refuges

- Describe actions that reduce nonproductive ET (TB 33)

### Gray Lodge State Wildlife Area

- Describe actions that reduce nonproductive ET (TB 46)

### North Grassland, Volta, and Los Banos Wildlife Areas

- Describe actions that reduce selenium concentration in the Grassland Marshes. Reduce selenium concentration to 5 ug/L in the Grassland Marshes (TB 95)
- 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)
- 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)
- Describe actions that reduce nonproductive ET. Reduce unwanted ET (TB 107)

### San Luis National Wildlife Refuge and Grassland Resource Conservation District

- Describe actions that reduce salinity in the San Joaquin River, Grassland Marshes, and Mud and Salt Sloughs (TB 95, 96, 98)
- 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)
- Describe actions that reduce nonproductive ET (TB 107)

### Merced National Wildlife Refuge

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



## Mendota Wildlife Area

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

## Kern and Pixley National Wildlife Refuge

- Describe actions that reduce nonproductive ET (TB 189)

### **Section J. BMP Exemption Process**

For each Exemptible BMP (Section I) 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 an Exemptible BMP (Section I) 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.

#### *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 if 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 if there is no recycled urban wastewater available.