

Attachment D. Ledger Standard Operating Procedures

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ACRONYMS AND ABBREVIATIONS

Ad hoc Committee	Ad hoc Water Quality Committee
CVC	Cross Valley Canal
CVP	Central Valley Project
EC	electrical conductivity
FKC	Friant-Kern Canal
Friant Contractor	Friant Division long-term contractor
Friant Division	Friant Division of the Central Valley Project
FWA	Friant Water Authority
Guidelines	Friant-Kern Canal Water Quality Policy Guidelines
Ledger	Friant Kern Canal Water Quality Ledger
Policy	Friant-Kern Canal Water Quality Policy
Pool	Section of the Friant-Kern Canal between Check Structures
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RWA	Recovered Water Account
SJRRP	San Joaquin River Restoration Program
SOP	Standard Operation Procedures
URF	Unreleased Restoration Flow

PURPOSE

This document describes the proposed standard operating procedures for implementing the Friant-Kern Canal Water Quality Ledger (Ledger) that is associated to the Guidelines for Accepting Water into the Friant-Kern Canal (Guidelines). The concept for the Ledger was developed in late 2019 with the Ad hoc Water Quality Committee's (Ad hoc Committee) Small Workgroup during development of the Guidelines. The Ledger determines the required mitigation for introducing water of lesser quality in the Friant-Kern Canal (FKC). An initial, proof-of-concept version of the Ledger included a calculation of the pump-in mitigation percentage, total volume of mitigation water to be added to the FKC, and distribution of mitigation water to affected water users. As the Guidelines move toward implementation and the Ledger is fully developed, it is important that the defined Ledger process integrates with Friant Water Authority's (FWA) operations and accounting.

This Standard Operating Procedures (SOP) document for implementing the Ledger is intended to serve two purposes:

- 1) Define the complete process for pump-in project operations and agency (i.e., FWA and U.S. Department of the Interior, Bureau of Reclamation (Reclamation)) responsibilities relating to project approval, notification, mitigation water accounting, and reporting.
- 2) Document Ledger calculation assumptions.

PROCESS FOR IMPLEMENTING WATER QUALITY GUIDELINES

The Guidelines identify the need to develop standard operating procedures for a mitigation program and its administration. The processes and procedures for FWA implementation and management of the Guidelines will directly impact Ledger development, including the assumptions and calculations within the Ledger tool itself. The process for the implementation of the Ledger as part of the Guidelines includes:

- Approve pump-in projects.
- Measure, report, and track pump-in water quality.
- Collect pump-in project delivery data.
- Calculate preliminary mitigation water distribution.
- Final water accounting.
- Report volumetric deliveries and balance to Reclamation.

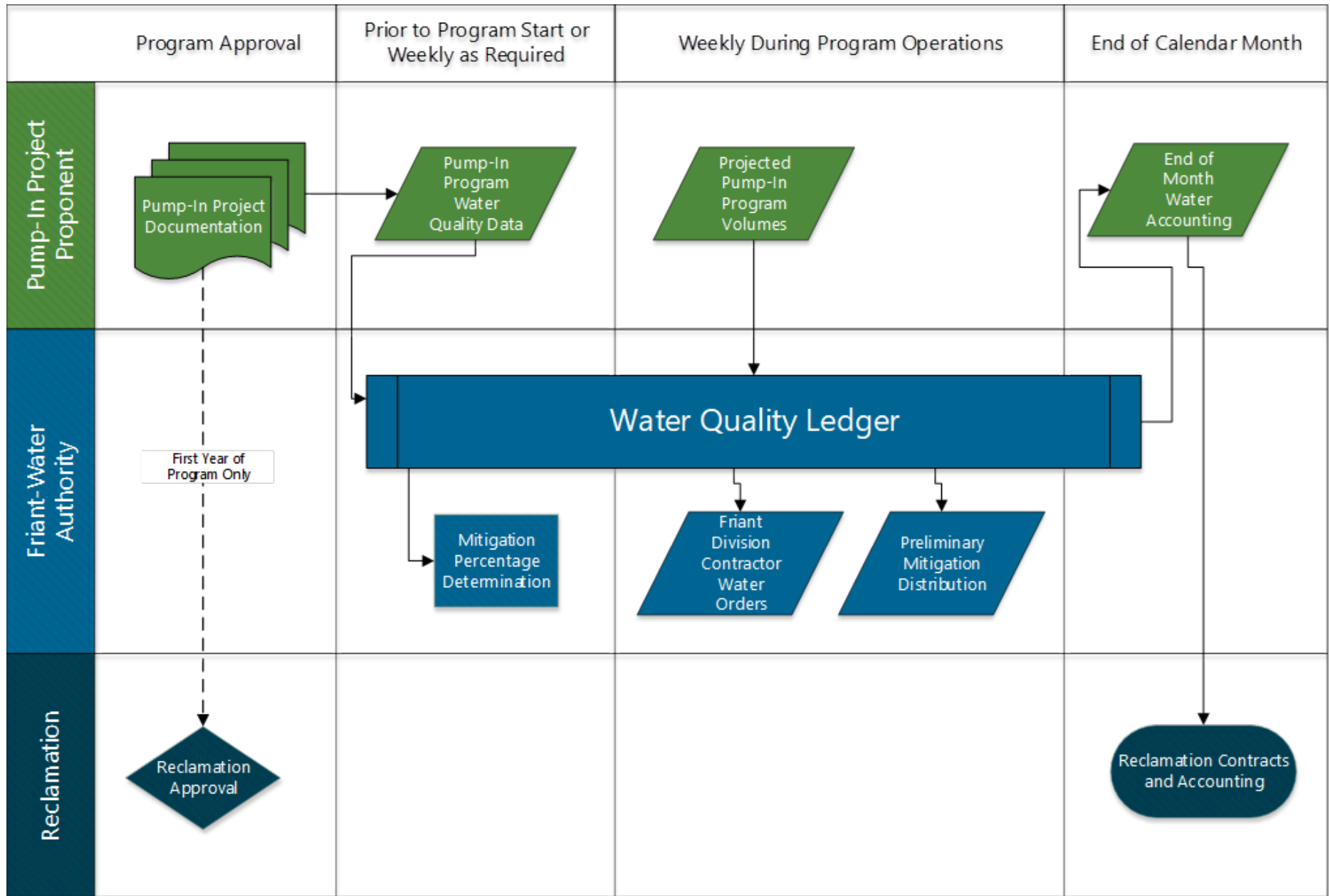


Figure 1. Water Quality Guidelines Implementation Process

PUMP-IN PROJECT APPROVALS

In consideration of the Ledger, a pump-in project (or program) is any project that introduces water into the FKC from a source other than Millerton Lake. Reclamation, with acknowledgement from FWA, provides the final approval for any pump-in project once the Warren Act Contract, other agreements, and environmental documentation is completed. Because the Warren Act Contract and environmental documentation for a pump-in project may have different effective durations, Reclamation will approve the necessary documentation to implement a pump-in project at the appropriate times. Each pump-in project will have a defined duration and maximum volume that can be introduced into the FKC. The pump-in project proponent will identify a point of contact who will work with FWA to coordinate required responsibilities outlined in the Guidelines.

PUMP-IN PROJECT WATER QUALITY

As described in Section B2 of the Guidelines, all waters discharged into the FKC must be tested at least annually. Pump-in projects that introduce a single source water quality and pump-in projects that bring water into the FKC via the Cross Valley Canal (CVC) will have different methods for collecting and reporting water quality data.

Mitigation Percentage Determination

Pump-in project water quality will be an input to the Ledger to determine the required mitigation water percentage and corresponding mitigation volume per pump-in project volume. Groundwater and CVC water quality are input to the Ledger at different frequencies as described below.

Single-Source Pump-In Projects via the FKC – Single-source pump-in projects include projects with Warren Act Contracts that introduce surface water or banked groundwater into the FKC. Before an approved pump-in project begins, FWA will work with the proponent to collect water quality data for the potential introduced surface water or groundwater to determine the required mitigation water percentage to be applied to the volume moved through the FKC. The determination of the required mitigation percentage will be calculated using the Ledger. Collection of the water quality data will follow requirements outlined in the Guidelines for Accepting Water into the FKC.

Pump-In Projects via the CVC - As described in Section B2 of the Guidelines, weekly water quality sampling will be performed by FWA during reverse flow pump-back operations and water quality data will be provided to Reclamation. Mitigation will be based on either the weekly average electrical conductivity (EC) concentrations measured continuously at the terminus of the FKC at the Kern River Check or the weekly grab samples collected from the CVC, whichever is deemed more appropriate by FWA. The CVC water quality conditions may represent multiple pump-in projects and will be updated in the Ledger at a greater frequency than once per year. FWA will coordinate with the pump-in project proponents regarding the required mitigation water percentage as determined by changes in water quality conditions.

The Ledger will document the water quality conditions for all pump-in projects and calculate the required mitigation percentage for each.

Ledger Calculations

As described above, pump-in project water quality data will be input to the Ledger. For each pump-in project, the Ledger will calculate the required mitigation water percentage. FWA will communicate this mitigation percentage to pump-in project proponents prior to operation and introduction.

Assumptions

- Water quality conditions for each pump-in project will be measured at least once per year or at a set frequency agreed to in the Guidelines and/or the Pump-In Project Approval and will determine the required mitigation water percentage.
- The Mitigation Percentage process follows the approach outlined in the Guidelines.

Friant-Kern Canal Water Quality Monitoring and Management

All pump-in projects must adhere to the water quality monitoring requirements stipulated in the Guidelines. FWA will implement continuous, real-time monitoring of in-prism water quality conditions in the FKC and at the FKC/CVC Intertie during reverse flow pump-back operations. Continuous, in situ measurements of EC will provide real-time data on incremental water quality changes and mixing in the FKC and will assist in water quality threshold management. If water quality thresholds are exceeded, FWA shall incrementally direct pump-in project proponents to cease operations of pump-in projects in order of greatest mass loading of the critical water quality constituent until the water quality drops below defined thresholds. Furthermore, if water quality monitoring results show an exceedance of 80% of the threshold for any water quality constituents, weekly monitoring will occur until four consecutive grab samples show consistent water quality results.

PUMP-IN PROJECT DELIVERY VOLUMES

During a contract year in which a pump-in project will be operated, FWA will work with the pump-in project proponent to implement the requirements stipulated in the Guidelines. This includes the addition of mitigation water to the FKC consistent with the pump-in project water quality conditions and quantity delivered. Pump-in project forecasted deliveries, calculated projected mitigation water, and all coordination related to pump-in project operations will be completed on a weekly basis.

Ledger Calculations

FWA will coordinate with pump-in project proponents to obtain an estimated volume of water to be introduced and conveyed in the FKC. The required mitigation water volume for the pump-in project is assumed to be included as part of that estimated volume. FWA will calculate losses, when appropriate, based on the total volume of water to be introduced into the FKC. The mitigation volume will be based on the total volume minus the calculated losses. The Ledger uses the mitigation water percentage for each pump-in project based on measured water quality and the net pump-in project volume to determine the projected mitigation volume requirement.

Assumptions

- Mitigation volumes are calculated based on projected weekly volume of a pump-in project and verified using measured volumes at the end of each month.
- Mitigation volumes are added to the FKC in real time with other pump-in project deliveries.
- FWA will have weekly volume, or weekly average flow, projections from pump-in project proponents.

PRELIMINARY MITIGATION DISTRIBUTION

The Ledger will be used to distribute mitigation water volumes to the impacted Friant Division long-term contractors (Friant Contractors). As described in the Pump-In Project Delivery Volumes section, mitigation water is introduced into the FKC simultaneously with the pump-in project volume introduction. FWA will add weekly water order data to the Ledger to distribute the mitigation volume based on volumetric proportioning. The preliminary, weekly mitigation distribution will be used by the FWA **for communication purposes only** (i.e., as the best available estimate of end-of-month mitigation requirements when communicating internally and with Friant Contractors). The mitigation water distribution will be updated at the end of each calendar month based on quality-controlled delivery data.

Ledger Calculations

The FWA will input water order data into the Ledger to be used in the mitigation water distribution calculations. The Ledger will determine the average weekly mixing interface position based on the weekly volumes for periods during FKC pump-back operations. An option to manually set the mixing interface position will also be available in the Ledger.

Assumptions

- Deliveries will be aggregated by Friant Contractor, and divided into pools, defined as the canal section between check structures.
- The division of deliveries by a Friant Contractor that has turnouts in multiple pools will be based on historical deliveries.
- Only Central Valley Project (CVP) (Class 1, Class 2, 215, and San Joaquin River Restoration Program (SJRRP) Recovered Water Account (RWA) and Unreleased Restoration Flow (URF)) deliveries for the Friant Contractors will be used to calculate the mitigation distribution.
- The interface, or location along the FKC that receives water from both gravity and reverse flow, will be determined using a weekly mass balance. An option will also be included to manually define the interface.
- The FKC Pool with the Interface will be assumed to be fully mixed with gravity and reverse flow.

END OF MONTH WATER ACCOUNTING

At the end of each month that a pump-in project is operating, the preliminary mitigation water distribution will be updated based on quality-controlled delivery data for both the pump-in project and Friant Contractors. The updated mitigation distribution volume will be shared with impacted Friant Contractors and included as part of their normal water accounting. The mitigation volume will be assumed to be the first water taken for their monthly deliveries. For pump-in project proponents that take more water than pump-in project delivery minus the mitigation volume, proponents will be assumed to make up that delivery with their CVP contract supply. For pump-in projects that end with water delivery to a Friant Contractor, adjustments for mitigation volumes are not needed.

For pump-in projects that do not end with delivery to a Friant Contractor, there is potential need for a mitigation volume adjustment. For these pump-in projects, FWA will track pump-in project water introduced into the FKC and deliveries to the non-Friant Contractor. If the volume of mitigation water is not equal to the expected volume, FWA will contact the pump-in project proponent to either increase the mitigation volume or increase their own delivery.

Ledger Calculations

FWA will add quality-controlled data to the Ledger at the end of each calendar month. The Ledger will replace the preliminary data and recalculate the mitigation water distribution to determine the monthly volumes of mitigation delivery, pump-in project delivery, and CVP delivery.

Assumptions

- Mitigation water delivery to impacted Friant Contractors is the first water to be delivered.
- If delivery to a pump-in project proponent exceeds pump-in project input to FKC minus the mitigation volume, the remainder will be accounted for as CVP delivery.

FINAL WATER ACCOUNTING

The end of the month water accounting will be provided to the Friant Contractors for confirmation and their use for accounting with Reclamation. Friant Contractors will clearly show mitigation on their accounting reports as a separate volume of water. As needed, Friant Contractors will work with Reclamation to revise reporting in a timely manner. Mitigation volumes should be rounded and reported as a whole number in acre-feet.

WATER QUALITY ANNUAL REPORTING

The water quality for each year will be maintained in a database by FWA. The mitigation curve developed for the Ledger, as part of the Guidelines, uses relationships between water quality constituents of concern and

in-prism measurements of EC. At the conclusion of each year, the relationships will be updated with new water quality data collected during the year. The updated relationship will be shared with the Friant Contractors. Reclamation may also propose and/or require modifications to the Guidelines in coordination with FWA. Additionally, the Guidelines may be re-evaluated if any of the following conditions occurs:

- A future regulatory cost or equivalent fee is imposed on Friant Contractors and a portion of such fee can reasonably be attributed to the incremental difference of water quality conditions in the FKC.
- When Friant Division Class 1 contract allocation is less than or equal to 25 percent, the Water Quality Advisory Committee will convene as outlined in Attachment A of the Guidelines. In these years, mitigation will be accounted for as presented in these Guidelines, but will be deferred to a mutually agreed to later date unless those responsible for the put and take mutually agree to put and take the mitigation in the critical year. All monitoring requirements will remain as presented in the Guidelines.
- There is a significant, regulatory change or scientifically based justification and three out of the following five Friant Contractors agree and work with the Water Quality Advisory Committee to recommend a change: (1) Arvin-Edison Water Storage District, (2) Shafter Wasco Irrigation District, (3) Delano-Earlimart Irrigation District, (4) South San Joaquin Municipal Utility District, and (5) Kern-Tulare Water District.