SAN JOAQUIN RIVER
RESTORATION PROGRAM

WATER MANAGEMENT GOAL INVESTMENT STRATEGY

Final Report

March 2015

Water Management Goal

Investment Strategy

Final Report

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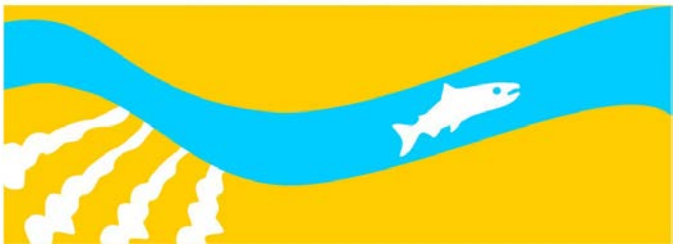
RESTORATION PROGRAM



March 2015

Executive Summary

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) initiated the Investment Strategy in support of the San Joaquin River Restoration Program (SJRRP) Water Management Goal. The purpose of the Investment Strategy is to identify projects that, in conjunction with other activities, could cost-effectively reduce or avoid water supply impacts to the Friant Division long-term contractors (Friant Contractors) as a result of releasing Restoration Flows. The objective of the Investment Strategy is to develop, evaluate, and prepare a prioritized set of implementable projects that could help achieve this goal.

Reclamation, in collaboration with the Friant Contractors, identified, screened, developed, evaluated, and ranked over 500 project concepts to form a list of approximately 60 projects. Of these, approximately 20 projects were further evaluated as ready-to-implement Priority Projects.

The Investment Strategy Report provides the following information and tools:

- A list of Priority Projects evaluated at an appraisal level that support the Water Management Goal of the SJRRP. Each project document includes implementation requirements, as well as appraisal-level cost estimates and designs, which will allow Reclamation and project proponents to quickly advance these projects when funding opportunities arise.

- Detailed evaluation criteria and metrics that represent a structured, repeatable, and scalable planning framework to evaluate projects of varying types and scales at different stages of development. The criteria and metrics are used to assess a project's cost-effectiveness, ability to reduce Friant Contractors' Recovered Water Account balances, implementation complexity, completeness in definition, and contribution to multi-purpose benefits.

When Federal or other funding opportunities become available, Reclamation will consult the Investment Strategy for projects that could be implemented in whole or in part. Sources of Federal funds could include SJRRP Part III funds, other Reclamation funds, other Federal agency funds, state funds, and other opportunistic sources. Priority Projects that best meet the specific funding objectives and requirements will be selected; therefore, the Priority Projects will not necessarily be implemented in the order of their ranking. Should a Priority Project proponent decide to apply for a Reclamation- or self-identified funding opportunity, Reclamation will assist with the preparation of funding applications, as appropriate and practicable.

The Investment Strategy is a living document that Reclamation will maintain and update. As projects are completed, they will be removed from the Priority Project list. A project may be removed, added, or updated per project proponent request at any time provided it is consistent with the Investment Strategy approach and evaluation criteria. Reclamation will perform an annual, high-level review and a comprehensive update every five years to ensure the Investment Strategy continues to be relevant and consistent with the priorities and needs of the SJRRP Water Management Goal.

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List of Abbreviations and Acronyms

CVP	Central Valley Project
Delta	Sacramento-San Joaquin River Delta
DMC	Delta-Mendota Canal
Friant Contractors	Friant Division long-term contractors
FKC	Friant-Kern Canal
ID	irrigation district
Plan	plan for recirculation, recapture, reuse, exchange or transfer of Restoration Flows
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RWA	Recovered Water Account
Secretary	Secretary of the Interior
Settlement Act	San Joaquin River Settlement Act
Settlement	Stipulation of Settlement in *NRDC, et al., v. Kirk Rodgers, et al.*
SJRRP	San Joaquin River Restoration Program
TAF	thousand acre-feet
TBD	to be determined
WCD	water conservation district
WD	water district
WMA	Water Management Area
WSD	water storage district

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1.0 Introduction and Background

This report documents the 2015 Investment Strategy for the San Joaquin River Restoration Program (SJRRP) that supports the Water Management Goal of the Stipulation of Settlement in the *Natural Resources Defense Council, et al., v. Kirk Rodgers, et al*. (Settlement) and San Joaquin River Restoration Settlement Act (Title X of Public Law 111-11) (Settlement Act).

1.1 Purpose

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) initiated the Investment Strategy to support the Water Management Goal. The purpose of the Investment Strategy is to identify projects that, in conjunction with other activities, could cost effectively reduce or avoid water supply impacts to the Friant Division long-term contractors (Friant Contractors) as a result of releasing Restoration Flows. The objective is to develop a prioritized set of implementable projects ranked on their cost-effective ability to help achieve this goal. Reclamation will consult the Investment Strategy Report to identify projects that could be implemented in whole or in part when Federal or other funding opportunities become available.

This report has the following purposes:

1. Describe the process to identify, evaluate, and score proposed projects that can help achieve the SJRRP Water Management Goal.

2. Document the evaluation process of and findings from the 2015 Investment Strategy.

3. Describe the intended use of the Investment Strategy, and next steps for implementing and maintaining the Investment Strategy.

The Investment Strategy was developed through a three-step evaluation process. This process included (1) initial project screening, (2) preliminary evaluation and initial scoring, and (3) appraisal evaluation and refined scoring. Reclamation designed the Investment Strategy as a sequential process that includes project evaluations at progressive levels of detail; it was also designed as an open process that allows new projects to be introduced as the Investment Strategy progresses. This approach was selected to provide an opportunity for projects that develop more slowly to continue to be considered and evaluated.

1.2 Background

Upon initiation of Interim Flow releases from Friant Dam in October 2009, Friant Contractors began to experience the effects of reduced water supplies and have been working with Reclamation to reduce or avoid adverse water supply impacts in accordance with the Water Management Goal. Interim Flow releases were constrained because of limited channel capacity in the San Joaquin River and, as a result, water delivery reductions were relatively low in comparison to the anticipated effects that would result from the release of full Restoration Flows. Through coordination with the Friant Contractors and other water entities in the Central Valley, Reclamation applied nonstructural measures to reduce water supply impacts resulting from the release of Interim Flows (such as agreements for water transfer and exchanges to facilitate recapture and recirculation). It is expected that the application of nonstructural measures to help achieve the Water Management Goal will continue into the future to the greatest extent practicable.

Restoration Flows, which were initiated in January 2014, have also been constrained by downstream channel capacity limitations similar to the Interim Flow releases. Reclamation and the other Implementing Agencies have prepared a Framework for Implementation (SJRRP, 2012) that identifies projects to be achieved during the next several years that will incrementally increase San Joaquin River capacity. When the capacity of the San Joaquin River is increased to enable the conveyance of full Restoration Flows, it is estimated that long-term average annual water deliveries to Friant Contractors will be reduced by approximately 185,000 acre-feet per year.

To achieve the Water Management Goal, the Settlement calls for the following to be developed and implemented:

1. A plan for recirculation, recapture, reuse, exchange, or transfer of Restoration Flows (Plan)

2. A Recovered Water Account (RWA) and program to reduce or avoid impacts to water deliveries to all of the Friant Contractors caused by the Restoration Flows

The Plan, as specified in the Settlement, must include provisions for funding necessary measures to implement the Plan. The RWA program monitors and records reductions in water deliveries to Friant Contractors occurring as a direct result of Restoration Flows that have not been replaced through the Plan. In addition to the Settlement, Part III of the Settlement Act authorizes and directs the Secretary of the Interior (Secretary) to conduct additional Water Management Goal actions including capacity restoration of the Friant-Kern and Madera canals, reverse-flow pump facilities on the Friant-Kern Canal, and a program to provide Federal funding to help improve groundwater banking and exchanges that offset water supply impacts to Friant Contractors. The Investment Strategy provides information to assist in identifying measures and funding requirements to implement the Plan, the RWA program, and Part III of the Settlement Act.

The SJRRP recognize that continued implementation of nonstructural measures to address water supply impacts from the release of Restoration Flows is necessary, and that structural actions would benefit this activity and improve the ability to further reduce or avoid water supply impacts as a result of releasing Restoration Flows. The Investment Strategy identifies and evaluates structural and nonstructural projects that could be implemented to help achieve the Water Management Goal, and identifies the next steps for their implementation.

1.3 Authorization

Authorization to prepare and implement the Investment Strategy is provided through provisions of the Settlement related to implementation of the Water Management Goal. Relevant provisions of the Settlement include Paragraph 16 (both Subparagraphs 16(a) and 16(b)), as follows:

> *16. In order to achieve the Water Management Goal, immediately upon the Effective Date of this Settlement, the Secretary, in consultation with the Plaintiffs and Friant Parties, shall commence activities pursuant to applicable law and provisions of this Settlement to develop and implement the following:*
>
> > *(a) A plan for recirculation, recapture, reuse, exchange or transfer of the Interim Flows and Restoration Flows for the purpose of reducing or avoiding impacts to water deliveries to all of the Friant Division long-term contractors caused by the Interim Flows and Restoration Flows. The plan shall include provisions for funding necessary measures to implement the plan. The plan shall:*
> >
> > > *(1) ensure that any recirculation, recapture, reuse, exchange or transfer of the Interim Flows and Restoration Flows shall have no adverse impact on the Restoration Goal, downstream water quality or fisheries;*
> > >
> > > *(2) be developed and implemented in accordance with all applicable laws, regulations and standards. The Parties agree that this Paragraph 16 shall not be relied upon in connection with any request or proceeding relating to any increase in Delta pumping rates or capacity beyond current criteria existing as of the Effective Date of this Settlement;*
> > >
> > > *(3) be developed and implemented in a manner that does not adversely impact the Secretary's ability to meet contractual obligations existing as of the Effective Date of this Settlement; and*
> > >
> > > *(4) the plan shall not be inconsistent with agreements between the United States Bureau of Reclamation and the California Department*

> *of Water Resources existing on the Effective Date of this Settlement, with regard to operation of the CVP and State Water Project.*
>
> *(b) A Recovered Water Account (the "Account") and program to make water available to all of the Friant Division long-term contractors who provide water to meet Interim Flows or Restoration Flows for the purpose of reducing or avoiding the impact of the Interim Flows and Restoration Flows on such contractors. In implementing this Account, the Secretary shall:*
>
> *(1) Monitor and record reductions in water deliveries to Friant Division long-term contractors occurring as a direct result of the Interim Flows and Restoration Flows that have not been replaced by recirculation, recapture, reuse, exchange or transfer of Interim Flows and Restoration Flows or replaced or offset by other water programs or projects undertaken or funded by the Secretary or other Federal Agency or agency of the State of California specifically to mitigate the water delivery impacts caused by the Interim Flows and Restoration Flows ("Reduction in Water Deliveries").*

1.4 Organization of this Report

This document describes the 2015 Investment Strategy and focuses on the process and findings for developing, evaluating, and prioritizing projects for further consideration. The document is organized as follows:

- **Chapter 1** provides background for the Investment Strategy.
- **Chapter 2** describes the process to determine whether potential projects should be included in future updates to the Investment Strategy. This process identifies, evaluates, and prioritizes projects that help implement the Settlement by contributing to the Water Management Goal by reducing RWA balances.
- **Chapter 3** summarizes the findings of the 2015 Investment Strategy, and the proposed rankings.
- **Chapter 4** describes the intended use of the Investment Strategy, and next steps for implementing, maintaining, and funding the Investment Strategy.

2.0 Evaluation Guidelines

This chapter describes the process that Reclamation and project proponents followed to identify, evaluate, and score projects considered in the Investment Strategy. The same process should also be followed for future Investment Strategy updates. This evaluation process includes three steps: (1) initial project screening, (2) preliminary evaluation and initial scoring, and (3) appraisal evaluation and refined scoring. After completion of each step, the projects are collectively examined and assessed to determine whether or not a particular project should be carried forward, developed to a greater level of detail, and evaluated in the proceeding step (see Figure 2-1).

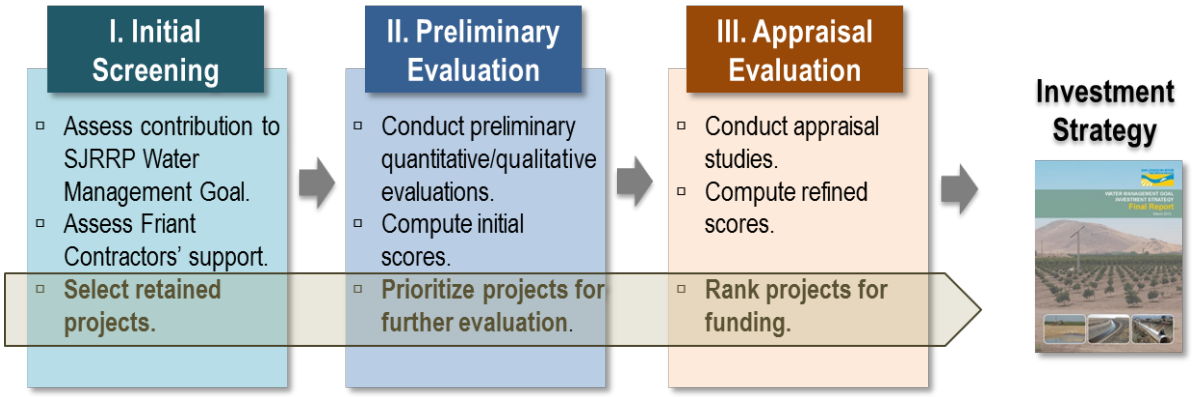

Figure 2-1.
Investment Strategy Evaluation Process

2.1 Initial Project Screening

Identified project concepts are screened using the following set of broad screening criteria:

- **Contribution to the Water Management Goal** – Projects must show potential to reduce RWA balances for Friant Contractors or to produce new water supplies for the Friant Division. Projects with a limited potential yield that would present challenges in tracking their long-term benefits should not be carried forward.

- **Identified Project Proponent** – Projects must have either participation by one or more Friant Contractors or an interest by Reclamation.

- **Location Relative to the Friant Division** – Projects located outside of the Friant Division must provide regional benefits that reduce RWA balances of Friant Contractors through direct deliveries or exchanges.

- **Duplicate Projects** – Projects with similar or identical features and objectives should be consolidated and duplicate entries removed from consideration.

- **Limited Project Scope or Definition** – Projects will not be carried forward if the scope is too limited or the projects are not defined adequately to determine the potential to reduce RWA balances (e.g., groundwater well testing, feasibility reports, an initial phase or portion of a project that does not by itself result in the reduction of RWA balances).

2.2 Preliminary Evaluation and Initial Scoring

Projects that meet all of the initial screening criteria then undergo preliminary quantitative and qualitative evaluation and initial scoring.

2.2.1 Preliminary Evaluation Criteria and Metrics

The following four evaluation criteria and associated metrics provide a consistent framework for evaluating, comparing, and scoring of the projects:

- **Performance and Cost** – Quantitatively measures the water supply benefits (yield), ability to reduce the project proponent's RWA balance, and project costs at a conceptual or pre-appraisal level. Project performance and cost are summarized by two metrics:

    1. Overall cost-effectiveness ($ per acre-foot):[1] Annualized total cost of the project divided by yield

    2. Federal cost of RWA benefit ($ per acre-foot): Annualized Federal cost of the project (total cost minus any cost-share or non-Federal funding) divided by RWA benefit (RWA balance reduction proposed by project proponent; depends on yield)

- **Implementation Complexity** – Qualitatively assesses how likely a project is to achieve its potential benefits once the project is implemented relative to the following six implementation factors (rated high, moderate, or low):

    1. Environmental compliance requirements

    2. Permitting requirements

    3. Water right/contracts requirements

    4. Institutional requirements

    5. Land acquisitions requirements

    6. Timeframe for implementation

[1] Note: this metric is not used in the scoring and ranking of proposed projects. It is for informational purposes only.

- **Completeness of Project Definition** – Qualitatively assesses project definition with respect to the following three areas (rated high, moderate, or low):

    1. Facilities and costs
    2. Yield and RWA reduction approach
    3. Finance (i.e., cost-sharing arrangement)

- **Other Potential Benefits** – Qualitatively assesses the potential contribution to other related benefits including the following (rated high, low, or none):

    1. Groundwater overdraft reduction
    2. Hydropower
    3. Flood damage reduction
    4. Recreation
    5. Ecosystem
    6. Water quality

2.2.2 Initial Scoring

Table 2-1 shows the range of scores assigned to each metric. For the qualitative metrics, scores are developed based on each project's assigned assessment value. To develop the scores for the quantitative Federal Cost of RWA Benefit metric, the dollars per acre-foot are normalized to a standard range (1 to 3). Structural and nonstructural projects are separated when normalizing the range of scores, because of the large differences in project costs between these types of projects. The structural project with the highest cost-effectiveness (lowest cost per acre-foot) receives a score of 3, while the structural project with the lowest cost-effectiveness (highest cost per acre-foot) receives a score of 1. All other structural projects are assigned scores based on a linear relationship between 1 and 3. The same method applies to the nonstructural projects.

The individual metric scores are then weighted to develop the composite weighted score using the criteria and metric relative weights shown in Table 2-2. The composite weighted score reflects the relative importance of the four evaluation criteria and their associated metrics. This composite score is used to rank and prioritize the projects relative to one another.

Table 2-1.
Project Evaluation Criteria and Metrics

Criteria	Metrics	Assessment Value	Score
I. Performance and Cost	1. Federal Cost of RWA Benefit *(*Annualized *Federal cost-share ÷ RWA balance reduction)*	$/acre-foot	Normalized 1 to 3
II. Implementation Complexity	1. Environmental Compliance Requirements	High, Moderate, or Low	1, 2, or 3
	2. Permitting Requirements	High, Moderate, or Low	1, 2, or 3
	3. Water Rights/Contract Requirements	High, Moderate, or Low	1, 2, or 3
	4. Institutional Requirements	High, Moderate, or Low	1, 2, or 3
	5. Land Acquisition Requirements	High, Moderate, or Low	1, 2, or 3
	6. Timeframe for Implementation	Long, Moderate, or Short	1, 2, or 3
III. Completeness of Project Definition	1. Facilities and Costs	Low, Moderate, or High	1, 2, or 3
	2. Yield and RWA Reduction Approach	Low, Moderate, or High	1, 2, or 3
	3. Finance	Low, Moderate, or High	1, 2, or 3
IV. Other Related Benefits	1. Groundwater Overdraft Reduction	None, Low, or High Potential	0, 1, or 3
	2. Hydropower	None, Low, or High Potential	0, 1, or 3
	3. Flood Damage Reduction	None, Low, or High Potential	0, 1, or 3
	4. Recreation	None, Low, or High Potential	0, 1, or 3
	5. Ecosystem	None, Low, or High Potential	0, 1, or 3
	6. Water Quality	None, Low, or High Potential	0, 1, or 3

Key:
RWA = Recovered Water Account

Table 2-2.
Relative Weights for the Evaluation Criteria and Metrics

Criteria and Metrics	*Metric Relative Weight*	*Overall Criteria Relative Weight*
Performance and Cost		**50%**
Federal Cost of RWA Benefit ($/acre-foot)	100%	
Performance and Cost Score (1 to 3)	$Score\ X\ Metric\ Relative\ Weight$	
Implementation Factors		**25%**
Environmental Compliance Requirements	15%	
Permitting Requirements	15%	
Water Rights/Contracts Requirements	30%	
Institutional Requirements	10%	
Land Acquisition Requirements	20%	
Timeframe for Implementation	10%	
Subtotal	100%	
Implementation Complexity Score (1 to 3)	$\sum_{1}^{6} Score\ X\ Metric\ Relative\ Weight$	
Completeness of Project Definition		**15%**
Facilities and Costs	40%	
Yield and RWA Reduction Approach	50%	
Finance	10%	
Subtotal	100%	
Project Definition Score (1 to 3)	$\sum_{1}^{3} Score\ X\ Metric\ Relative\ Weight$	
Other Related Benefits		**10%**
Groundwater Overdraft Reduction	20%	
Hydropower	15%	
Flood Damage Reduction	15%	
Recreation	15%	
Ecosystem	20%	
Water Quality	15%	
Subtotal	100%	
Related Benefits Score (0 to 3)	$\sum_{1}^{6} Score\ X\ Metric\ Relative\ Weight$	
	Total	**100%**
Composite Weighted Score (1 to 3)	$\sum_{1}^{4} Score\ X\ Overall\ Criteria\ Relative\ Weight$	

Key:
RWA = Recovered Water Account

2.3 Appraisal Evaluation and Refined Scoring

Based on the initial scoring, projects that have a relatively high composite weighted score are then evaluated at an appraisal-level of detail. Appraisal evaluations include the following activities:

- More detailed project description regarding operations, water supply availabilities, and infrastructure needs to allow for a more refined operations analysis to better estimate project yield and potential RWA benefits
- Refined information on project location and site-specific details to allow for a more thorough assessment of environmental compliance and permitting requirements
- Appraisal-level engineering designs and cost estimates for structural features
- Development of high-level project implementation schedules
- Analysis of the effect of competition for water supplies and conveyance when multiple projects are implemented

2.3.1 Appraisal Evaluation Criteria and Metrics

The four evaluation criteria and associated metrics described in Section 2.2.1 and shown in Table 2-1 remain applicable to provide a consistent framework for evaluation, comparison, and prioritization of the projects at the appraisal level, except for the timeframe for implementation metric. As part of the appraisal studies, quantitative high-level project implementation schedules (in months) are developed instead of the qualitative long, moderate, or short designations.

2.3.2 Refined Scoring

The refined scoring of the projects are based on the composite weighted score of all four of the evaluation criteria (see Section 2.2.2). As mentioned above, the timeframe for implementation metric must also be normalized to a standard range (1 to 3) based on project type (structural versus nonstructural) to be consistent with the range for the other criteria. This is the same normalization process used for the Federal Cost of RWA Benefit metric. The project with the shortest quantitative timeframe for implementation is assigned a score of 3, while the project with the longest quantitative timeframe for implementation is assigned a score of 1. All other projects are assigned scores based on a linear relationship between 1 and 3.

2.3.3 Water Supply and Conveyance Competition

The yield of a project depends on factors such as available water supply, demands, physical capacity constraints, and water allocation methods/priorities. Because of the finite quantity of supplies and conveyance capacities, projected yields of some projects that compete for the same supply sources may be limited and projected RWA balance reductions may not be realized. Information on how the limited water supplies would be allocated in the future

to potentially competing projects is difficult to forecast because the timing and sequence of project implementation are uncertain.

To consider the effects of competition on project yield, a water supply and conveyance competition analysis is conducted. The analysis involves computing the potential range of the project yield expected under different water supply allocation and conveyance priorities. This analysis assesses the yield sensitivity of a project given varying priority to available supplies (i.e., how much the yield will be reduced if a project is moved from first priority to last priority for a given water supply source). As projects are implemented, the remaining Priority Projects that share the same water supply sources may need to be reevaluated to adjust their anticipated yield and RWA benefits. This may result in reducing the estimated project cost-effectiveness.

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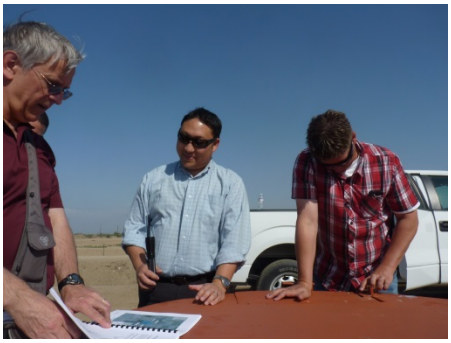
3.0 2015 Investment Strategy Findings

This chapter describes development and findings of the 2015 Investment Strategy, including the stakeholder engagement efforts and the project identification, development, evaluation, and prioritization process.

3.1 Stakeholder Engagement

Stakeholder engagement played a large role in developing the 2015 Investment Strategy. Reclamation held numerous briefings starting in December 2012 to inform Friant Contractors about the objectives of the Investment Strategy and to solicit input on the process and potential projects. Site visits and meetings with individual project proponents were also conducted to refine project-specific details and complete the appraisal studies that informed subsequent scoring/ranking. Table 3-1 lists the dates and types of stakeholder engagement performed to date. In addition to in-person meetings, the Friant Contractors were provided earlier drafts of this Investment Strategy report and project-specific documents for review and comment throughout this process. This Final Investment Strategy Report reflects the feedback provided through the stakeholder engagement process.



Site Visit with Tulare Irrigation District (March 2014)

SJRRP Water Management Work Group Technical Feedback Meeting (January 2015)

3.2 2015 Investment Strategy Development Process

Figure 3-1 shows the process used to develop the 2015 Investment Strategy, including the number of projects considered throughout this evaluation process, the schedule, and the interim documents that were developed.

Table 3-1.
Investment Strategy Meetings

Mid-Pacific Region Water Users Conference
January 23, 2013 – Briefing
January 22, 2014 – Briefing
January 22, 2015 – Briefing
Water Users Workshops
March 4, 2013 – Fresno and Chowchilla Rivers; Kings River regions
March 5, 2013 – Kern River; Poso Creek regions
March 6, 2013 – Tule River; Kaweah River regions
Association of California Water Agencies Conferences
December 5, 2013 – Briefing
May 7, 2014 – Individual Meetings with City of Fresno; Lower Tule River ID; Delano-Earlimart ID; Porterville ID/Saucelito ID/Terra Bella ID; Shafter-Wasco ID
December 2-4, 2014 – Individual Meetings with Fresno ID; Tulare ID; Kaweah Delta WCD; Lower Tule River ID; Delano-Earlimart ID; Porterville ID/Saucelito ID/Terra Bella ID; Friant Water Authority; Patterson ID
SJRRP Water Management Work Group Technical Feedback Meetings
December 13, 2012 – Briefing
April 12, 2013 – Briefing
August 23, 2013 – Briefing
October 18, 2013 – Briefing
January 22, 2014 – Briefing
April 18, 2014 – Briefing
July 18, 2014 – Briefing
September 19, 2014 – Briefing
November 21, 2014 – Briefing
January 22, 2015 – Briefing
Site Visits / Meetings with Project Proponents
March 24-26, 2014 – Fresno ID; Orange Cove ID; Ivanhoe ID; Kaweah Delta WCD; Tulare ID; Friant Water Authority; Shafter-Wasco ID; Arvin-Edison WSD
June 12, 2014 – Lower Tule River ID
June 25, 2014 – City of Fresno
July 10, 2014 – Madera ID
July 17, 2014 – Patterson ID; West Stanislaus ID; Banta-Carbona ID
October 1, 2014 – Patterson ID; West Stanislaus ID; Banta-Carbona ID

Key:
ID = irrigation district
SJRRP = San Joaquin River Restoration Program
WCD = Water Conservation District
WSD = Water Storage District

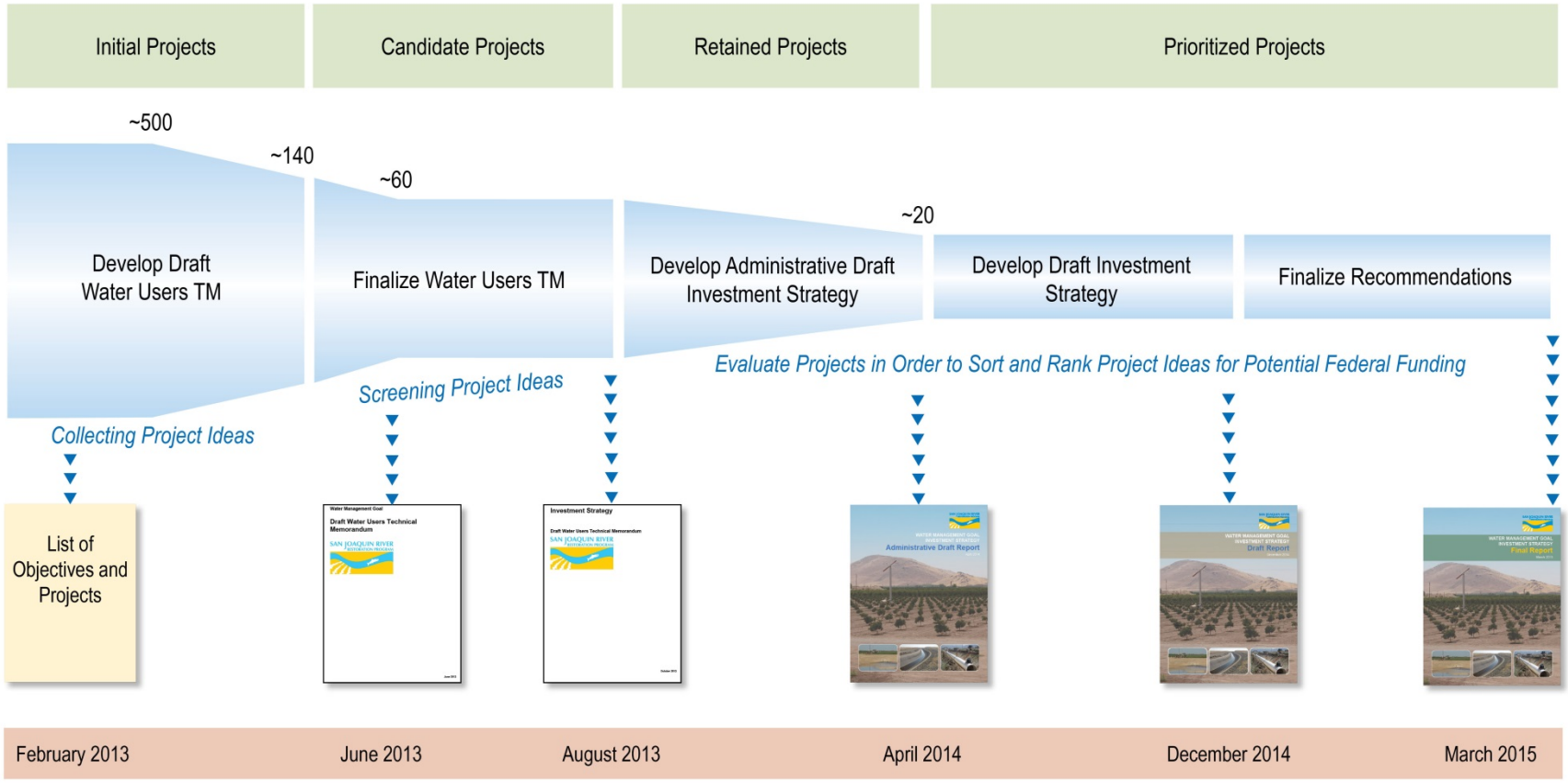


Figure 3-1.
2015 Investment Strategy Development Process

3.3 Initial Project Screening

Nearly 500 **Initial Projects** were identified from previous studies and reports, and regional planning documents, as well as through discussions with Friant Contractors. These Initial Projects were reviewed and screened using the set of broad criteria described in Section 2, which included contribution to the Water Management Goal, location relative to the Friant Division, and likely interest from Friant Contractors, among others. This initial screening and consolidation of project concepts resulted in approximately 120 Candidate Projects (Refer to Water Management Goal Water User Technical Memorandum, 2013; Produced Water in the San Joaquin Valley 2014).

These **Candidate Projects** were further evaluated using input from the Friant Contractors through a series of six regional workshops (Water Users Workshops) held during March 2013. Each Candidate Project on this list of approximately 120 projects was discussed in detail during the regional workshops to determine if it could contribute to the Water Management Goal and to gauge the Friant Contractor's interest in supporting development of the project for that purpose. During and after the workshops, Friant Contractors recommended about 20 additional Candidate Projects to be considered. In total, approximately 140 Candidate Projects were screened to identify those with proponents within the Friant Division, assess the potential for RWA benefits, consolidate duplicate project concepts, and remove those with limited project scope or definition.

As the Candidate Projects were further screened, a list of approximately 60 **Retained Projects**, including both local and regional projects, were retained for further consideration. Local Retained Projects were generally in-district projects, with the potential to enhance Friant Division water supply management, support recapture and recirculation of Restoration Flows, and develop local water supplies. Regional Retained Projects spanned multiple Water Management Areas (WMAs) and/or were located outside the WMAs, with the potential to recapture Restoration Flows from the San Joaquin River, facilitate regional recapture and recirculation, and develop other regional water supplies. Figure 3-2 shows the location and boundaries of the SJRRP WMAs 1 through 7. Figure 3-3 shows the geographical distribution by SJRRP WMAs of projects during the project identification and screening process. It should be noted that projects that spanned multiple WMAs were categorized as WMA 8 and projects outside of the WMAs were categorized as WMA 9. Projects categorized as "other" did not have enough information to be assigned a WMA.

As described above, of the approximately 500 Initial Projects, 140 were considered further as Candidate Projects, and ultimately only about 60 Retained Projects were selected for further evaluation (shown as solid bars on the Figure 3-3). The majority of Initial Projects were located in WMA 7, but after the screening process, the geographic distribution of projects was more evenly spread throughout the WMAs.

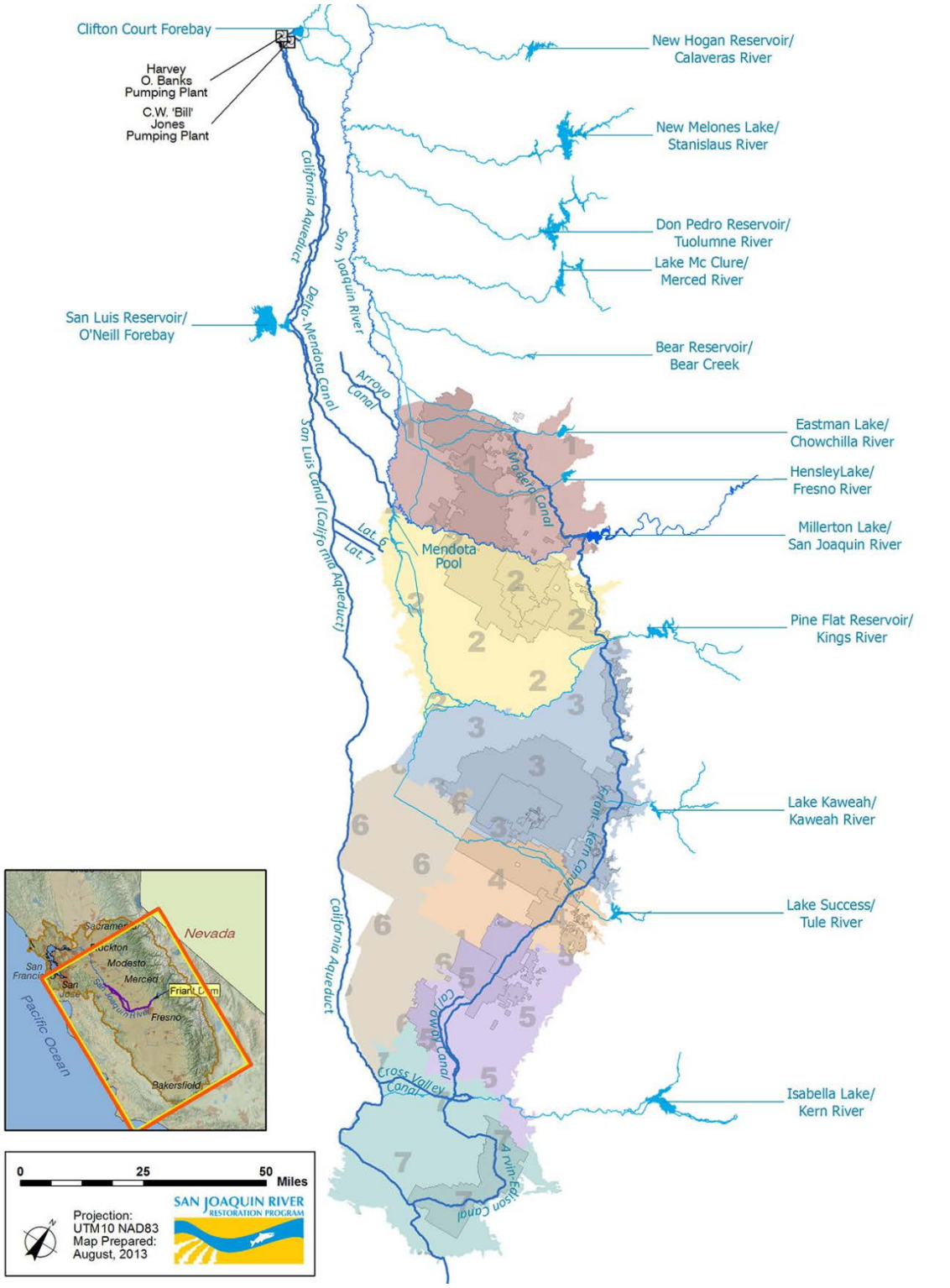
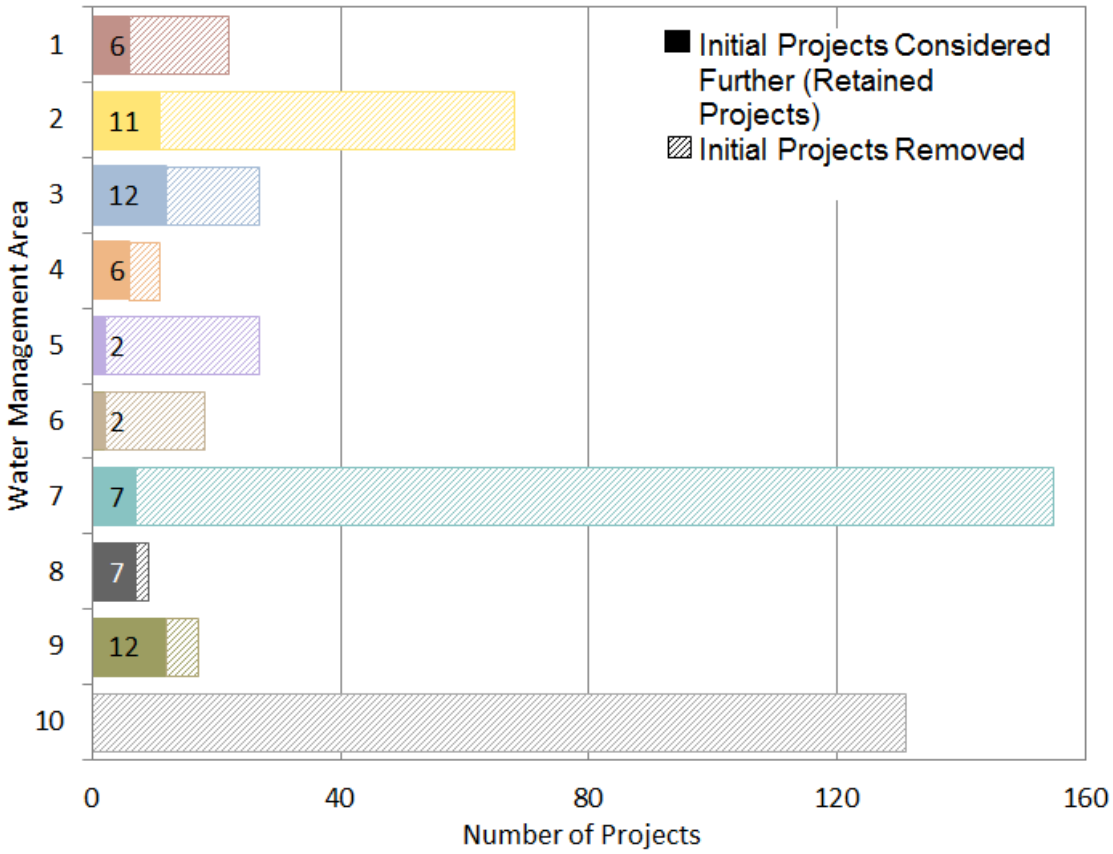


Figure 3-2.
Water Management Areas and Friant Contractor Boundaries



Note: Water Management Area (WMA) 8 means the project spans multiple WMAs. WMA 9 means the project is outside of the WMAs. "Other" means the project does not have enough information to categorize.

Figure 3-3.
Geographical Distribution of Screened Initial Projects and Retained Projects

3.4 Preliminary Evaluation and Initial Scoring

To support evaluation, comparison, and prioritization of the Retained Projects, the following four criteria and associated metrics were evaluated for each project using available information:

- Performance and Cost
- Implementation Complexity
- Completeness of Project Definition
- Other Potential Benefits

Figure 3-4 shows the location of each project that was fully evaluated and given initial scores. Note that only 49 of approximately 60 Retained Projects were fully evaluated. Some projects were screened and removed as additional information became available,

while other projects were split into standalone projects or combined with other projects in an effort to develop complete projects for evaluation (Administrative Draft Investment Strategy Report, 2014).

Once the initial scoring was completed for all projects, the evaluation criteria and associated metrics were then used to prioritize the projects according to four prioritization scenarios. The four prioritization scenarios were developed to assess the sensitivity of project scores based on different criteria and to make sure that projects moving forward had relatively high scores across all or most of the prioritization scenarios. The four prioritization scenarios are as follows:

- **Scenario 1: Cost-Effectiveness Only** – Projects were ranked according to the performance and cost metric of the Federal cost of RWA benefit. Projects with lower costs per acre-foot of RWA benefit were ranked higher.

- **Scenario 2: Cost-Effectiveness and Implementation Complexity Trade-off** – Projects were ranked according to their Federal cost of RWA benefit and the implementation complexity score. Projects with lower cost per acre-foot of RWA benefit and higher overall implementation factors scores were ranked higher.

- **Scenario 3: Cost-Effectiveness and Completeness of Project Definition Trade-off** – Projects were ranked according to their Federal cost of RWA benefit and the overall project definition score. Projects with lower cost per acre-foot of RWA benefit and higher overall project definition scores were ranked higher.

- **Scenario 4: Composite Weighted Score of all Four Evaluation Criteria** – Projects were ranked according to their composite weighted score which reflects the relative importance of the four evaluation criteria and their associated metrics. This was computed using the same process for normalizing scores described in Section 2.2.2 and weights from Table 2-2.

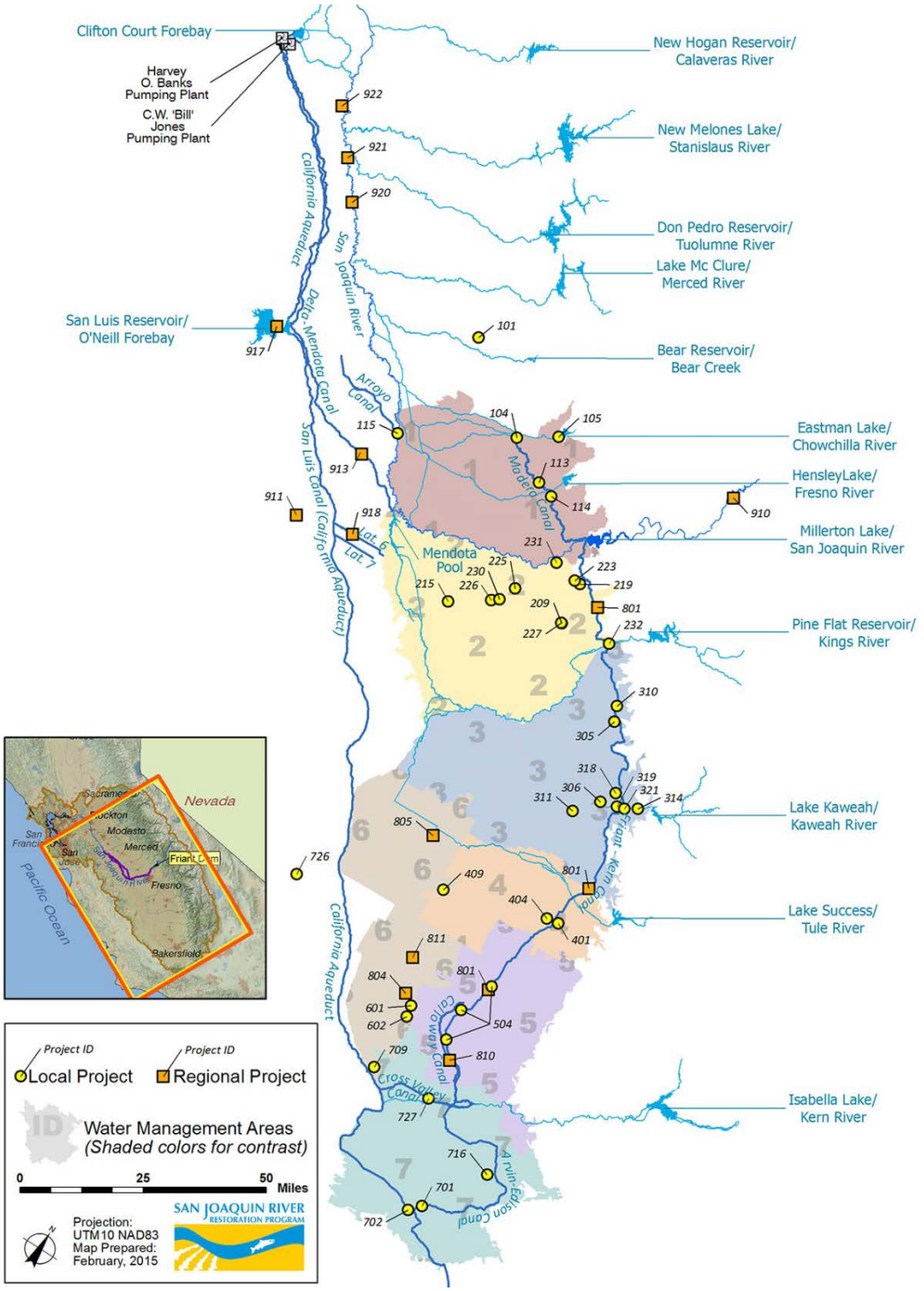


Figure 3-4.
Locations of Retained Projects Evaluated During the Preliminary Evaluation Phase

For each of the four prioritization scenarios, the projects were ranked into three groupings (A, B, and C), representing the top third, middle third, and bottom third ranked projects. A project that consistently ranked high across all (or most) of the four prioritization scenarios was selected to be carried forward (see Figure 3-5). This approach provided a means for identifying those projects with a greater chance of achieving the Water Management Goal in a cost-efficient manner, within a reasonable timeframe, and with higher confidence.

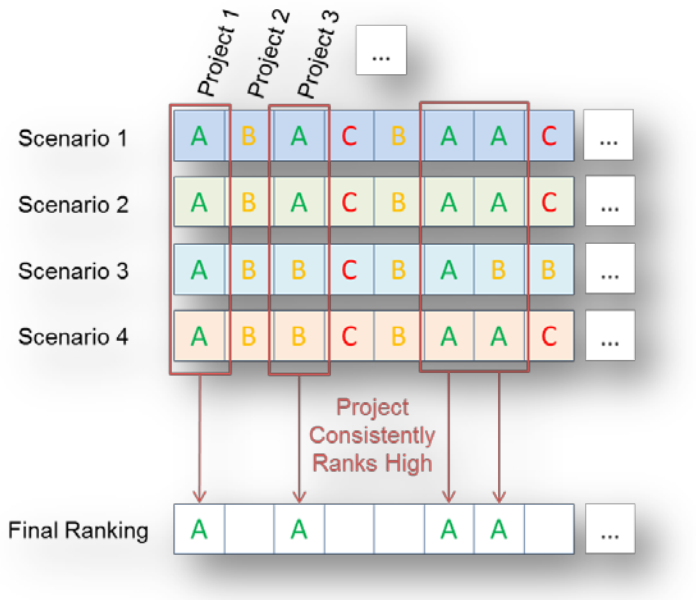


Figure 3-5.
Process for Selecting Priority Projects

3.4.1 Priority Projects

From the evaluation and prioritization of the Retained Projects, 21 Priority Projects were identified. A list of the Priority Projects, their proponents, and relative rankings under the four prioritization scenarios are shown in Table 3-2, and a synopsis of each project is included in Attachment 1 Priority Project Synopses of this Final Report. Figure 3-6 shows the general locations of the Priority Projects, which are geographically distributed throughout the WMAs. The Priority Projects include the following diverse set of project types:

- Groundwater recharge
- Groundwater in-lieu recharge
- Local improvement
- Nonstructural
- Recapture
- Regional conveyance
- Surface storage

Table 3-2.
Priority Projects Identified for Further Evaluation

ID	Title	Type	Proponent/ Beneficiary	Scenario 1 Ranking	Scenario 2 Ranking	Scenario 3 Ranking	Scenario 4 Ranking
115	Recapture and Exchange of Restoration Flows to Red Top		Madera ID	A	A	A	A
223	Modify Big Dry Creek Reservoir for Long-Term Storage		City of Fresno/ Fresno ID	A	A	B	A
227	Fresno Groundwater Recharge Facility		City of Fresno	A	B	B	A
232	Gould Canal – Friant-Kern Canal Permanent Intertie		Fresno ID	A	A	B	A
305	Orange Cove ID In-District In-Lieu Groundwater Management		Orange Cove ID	A	A	A	A
306	Tulare ID Diversion Capacity Expansion Project		Tulare ID	B	A	A	B
311	Tulare ID Recharge Basin Complex		Tulare ID	A	B	A	A
314	McKay Point Reservoir		Tulare ID	A	B	A	A
318	Wutchumna Pumping Plant Improvements		Ivanhoe ID	B	A	A	A
321	Hannah Ranch Project		Kaweah Delta WCD	A	B	A	A
401	Deer Creek Recharge Basin		Deer Creek & Tule River Authority	A	A	B	A
409	Lower Tule River ID Water Exchange and Direct Delivery Program		Lower Tule River ID	A	B	B	A
504	Reverse Flow Pump-Back Facilities on the Friant-Kern Canal		Friant Division / Reclamation	B	A	A	A
602	Shafter-Wasco ID Madera Avenue Intertie		Shafter-Wasco ID	B	A	A	A
702	Arvin-Edison WSD Long-Term Exchange		Arvin-Edison WSD	A	A	A	A
709	Kern River Water Exchange Project		Friant Division / Reclamation	A	A	B	A
716	Arvin-Edison WSD In-Lieu Banking Program		Arvin-Edison WSD	B	A	A	A
810	Calloway Canal Improvements and Groundwater Recharge		Shafter-Wasco ID	A	B	B	A
920	SJR Recapture at Patterson ID Conveyed through Delta-Mendota Canal to San Luis Reservoir		Friant Division / Reclamation	A	A	B	A
921	SJR Recapture at West Stanislaus ID Conveyed through Delta-Mendota Canal to San Luis Reservoir		Friant Division / Reclamation	B	A	B	A
922	SJR Recapture at Banta-Carbona ID Conveyed through Delta-Mendota Canal to San Luis Reservoir		Friant Division / Reclamation	B	A	A	B

Key:

 groundwater recharge

 groundwater in-lieu recharge

 local improvement

 nonstructural

 recapture

 regional conveyance

 surface storage

ID = Irrigation District
SJR = San Joaquin River
WCD = Water Conservation District
WSD = Water Supply District

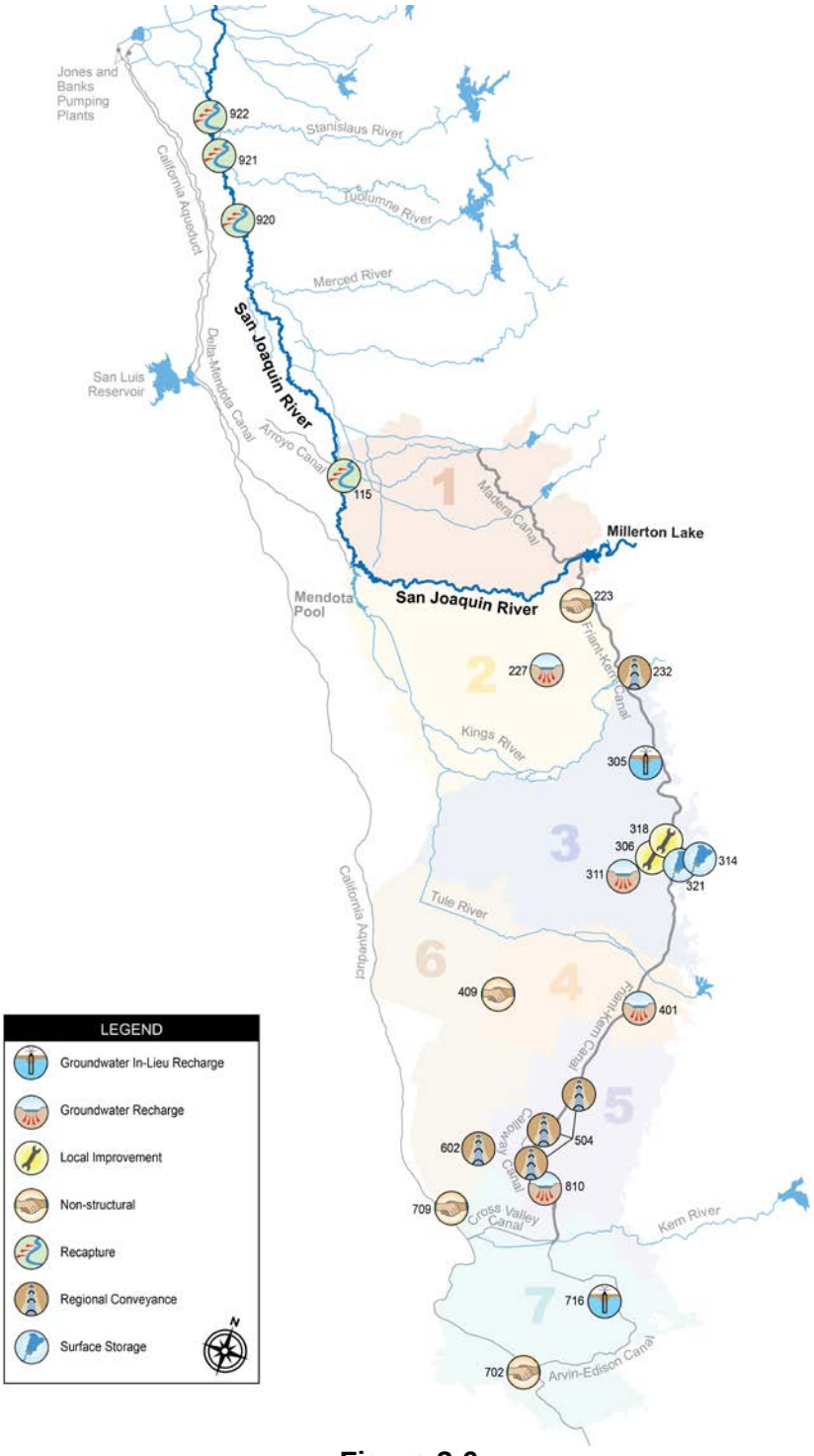


Figure 3-6.
Location of Priority Projects with Corresponding Project Types

3.4.2 Projects not Evaluated Further

Table 3-3 lists the Retained Projects that did not rank high relative to the Priority Projects. These projects are not evaluated further in the Investment Strategy. Regardless, these projects have the potential to improve water supply management for Friant

Contractors, and many of these projects are being pursued and developed separately by Friant Contractors and/or Reclamation through other efforts. It is likely that these projects will be considered in future updates to the Investment Strategy if the Friant Contractors and/or Reclamation refine the projects and develop new information.

Table 3-3.
Retained Projects Not Evaluated Further in the Investment Strategy

ID	Title	Proponent/ Beneficiary
101	Chowchilla-Merced Intertie	Chowchilla Water District
104	Chowchilla WD Madera Canal Surface Storage Reservoir	Chowchilla WD
105	Eastman Lake Enlargement	Chowchilla WD
113	Madera Canal Capacity Restoration	Chowchilla WD & Madera ID
114	Madera Canal Capacity Expansion	Chowchilla WD & Madera ID
209	Fresno Southeast Growth Area Greenbelt	City of Fresno & Fresno ID
215	Southwest Flood Water Protection and Utilization Project (Phase 2)	Fresno ID
219	Big Dry Creek Recharge Project Upstream of Reservoir	Fresno ID
225	City of Fresno Regional Groundwater Banking Facility	City of Fresno
226	Groundwater Bank off San Joaquin River	City of Fresno
230	Urban Recycled Water Use at Fresno/Clovis Regional Wastewater Reclamation Facility	City of Fresno
231	North Fresno Wastewater Reclamation Facility Expansion	City of Fresno
310	City of Orange Cove Raw Water Storage	City of Orange Cove
319	Long-term Exchange with Consolidated Peoples' Ditch Company	Exeter ID
404	Saucelito ID Groundwater Recharge Basin	Saucelito ID
601	Shafter-Wasco ID Kimberlina Road Intertie	Shafter-Wasco ID
701	Arvin-Edison WSD Intertie Pipeline Booster Plant	Arvin-Edison WSD
726	Coastal Aqueduct Storage	TBD
727	Cross-Valley Canal Expansion	TBD
801	FKC Capacity Enlargement	Friant Division
804	Trans-Valley Canal Multi-District Alignment	TBD
805	Trans-Valley Canal Tulare Alignment	TBD
811	Trans-Valley Canal Poso Creek Alignment	Friant Division/Reclamation
910	Mammoth Pool Expansion	TBD
911	New/Expanded Surface Storage Alternatives: Panoche Creek	TBD
913	Reverse Flow of DMC/Mendota Pool Exchange	TBD
917	Enlarge San Luis Reservoir	Friant Division / Reclamation
918	Increase Size of Laterals 6 & 7 in Westlands to Recapture Additional Flows at Mendota Pool	TBD

Key:
DMC = Delta-Mendota Canal
FKC = Friant-Kern Canal
ID = Irrigation District
TBD = to be determined
WD = Water District
WSD = Water Storage District

3.5 Appraisal Evaluation and Refined Scoring

Appraisal evaluations were conducted for each of the **Priority Projects,** and included the following activities (Draft Investment Strategy Report, 2014):

- Site visits to verify proposed facilities and operations
- Refined operations analysis to better estimate project yield and potential RWA benefits
- A more thorough assessment of environmental compliance and permitting requirements
- Appraisal-level engineering designs and cost estimates for structural features
- Development of high-level project implementation schedules
- Comparison and ranking of Priority Projects using the result of the appraisal evaluation
- Analysis of the effect on yield from competition for water supplies and conveyance when multiple Priority Projects are implemented

Tulare ID's Kaweah River Siphon

Fresno ID's Gould Canal

3.5.1 Appraisal Evaluation

The criteria and metrics used for appraisal evaluations were consistent with those used to evaluate and prioritize the Retained Projects, as summarized in Section 3.4. In addition to refined assessment values for the metrics, the appraisal evaluations resulted in quantitative high-level project implementation schedules (in months) instead of the qualitative designations (long, moderate, or short).

3.5.2 Scoring and Ranking

To rank the Priority Projects, the composite weighted score was used. As described in Section 2.2.2 and Section 3.4 (Scenario 4), the composite weighted score is an overall measure of performance under the four criteria, while also reflecting the relative importance of each the four criteria and their associated metrics. To develop the weighted score, the qualitative metrics were normalized based on project type (structural versus nonstructural) because of the large differences in project costs and schedules between

structural and nonstructural projects. Hence, both the Federal Cost of RWA Benefit and Timeframe for Implementation metrics were normalized to a standard range (1 to 3) to be consistent with the range for the other criteria.

Figure 3-7 summarizes the results of the appraisal evaluations of the Priority Projects and compares the results to those from the preliminary evaluation phase. The figure displays the cost-effectiveness, implementation complexity, and project definition criteria scores for each of the Priority Projects using the metric relative weights shown in Table 2-2. The y-axis represents the Federal cost of the project of RWA benefit, and the x-axis is the overall Implementation Complexity score. Each project is represented by a bubble that varies in size based on its overall Project Definition score. A project represented by a large bubble located in the upper right corner of the figure would be more efficient, easier to implement, and better defined; therefore, it would be more desirable than a project represented by a smaller bubble located in the bottom left corner of the figure.

The insert in Figure 3-7 shows the results of the preliminary evaluations of Retained Projects. plotted on identical axes and scales .The insert shows a wider scatter of projects during the preliminary evaluation phase compared to the results of the appraisal evaluations of Priority Projects. The Priority Projects are clustered within a narrow region, reflecting the comparable effectiveness and efficiency of the Priority Projects in achieving the desired goals of reducing RWA balances in a timely fashion. In addition, the Priority Projects are represented with bubbles of relatively similar sizes but larger than those during the preliminary evaluation phase, reflecting overall improved project definition through the appraisal evaluation process.

Figure 3-8 shows the ranking of the Priority Projects using the composite weighted scores, and Table 3-4 lists cost-effectiveness and prioritization scenario scores. Note that the structural and nonstructural projects are grouped separately. This is because of the unique issues involved with implementation of nonstructural projects related to the required institutional and legal agreements. These agreements would require negotiations and coordinated actions by multiple willing partners to make these proposed projects viable. The appraisal studies evaluated the potential of nonstructural project concepts to contribute to the SJRRP Water Management Goal, but additional follow-up discussions between concerned parties would still be needed.

Figure 3-9 shows the estimated project costs and the high-level implementation schedules for the Priority Projects. The majority of the Priority Projects is expected to be complete within two to three years after their start date and can be started as soon as funding becomes available. This similar timeframe for implementation across most projects is also represented in Figure 3-8 where the scores for implementation schedule are generally the same.

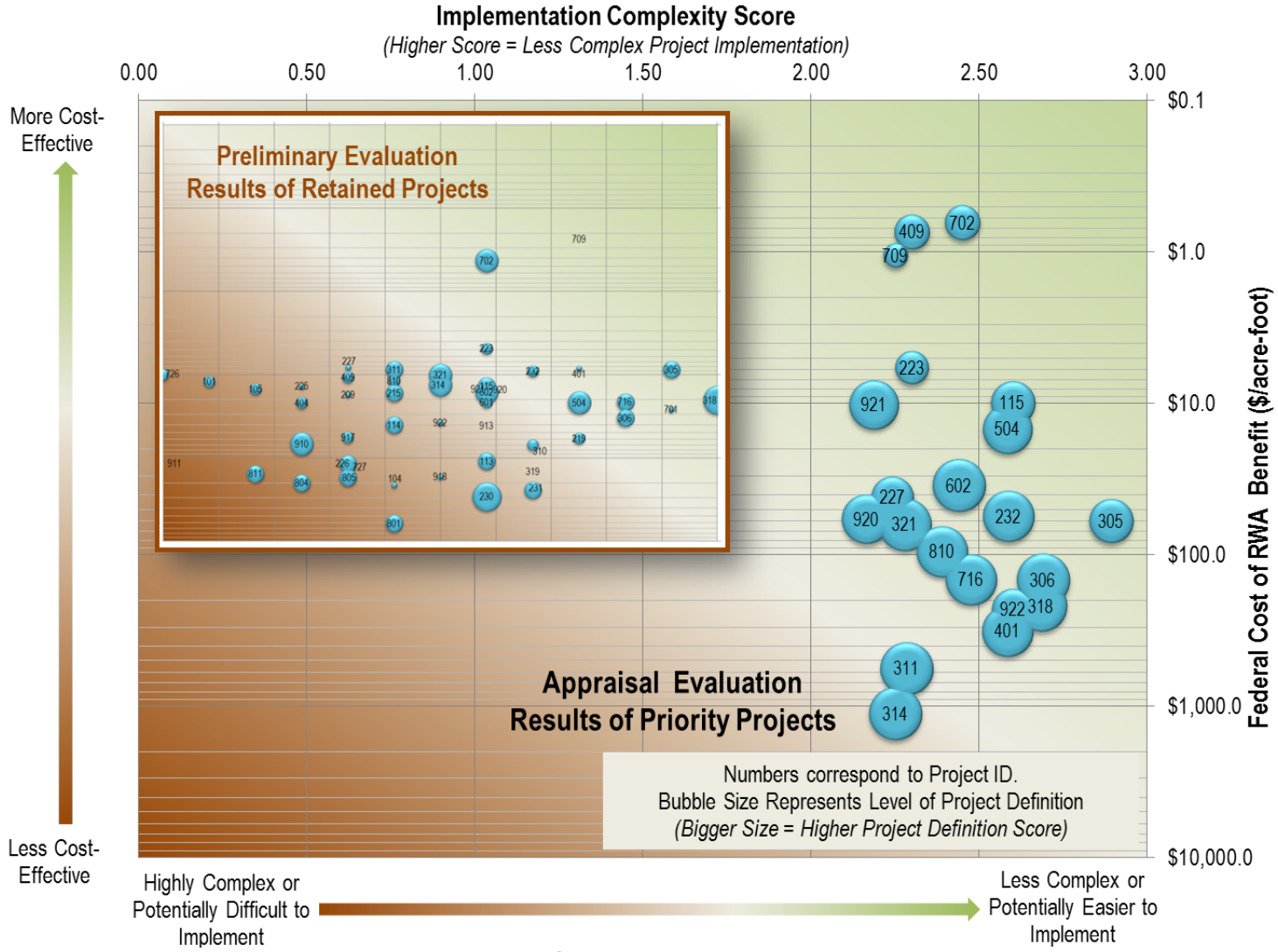


Figure 3-7.
Summary of Priority Project Evaluation Results, Compared to the Preliminary Evaluation Results

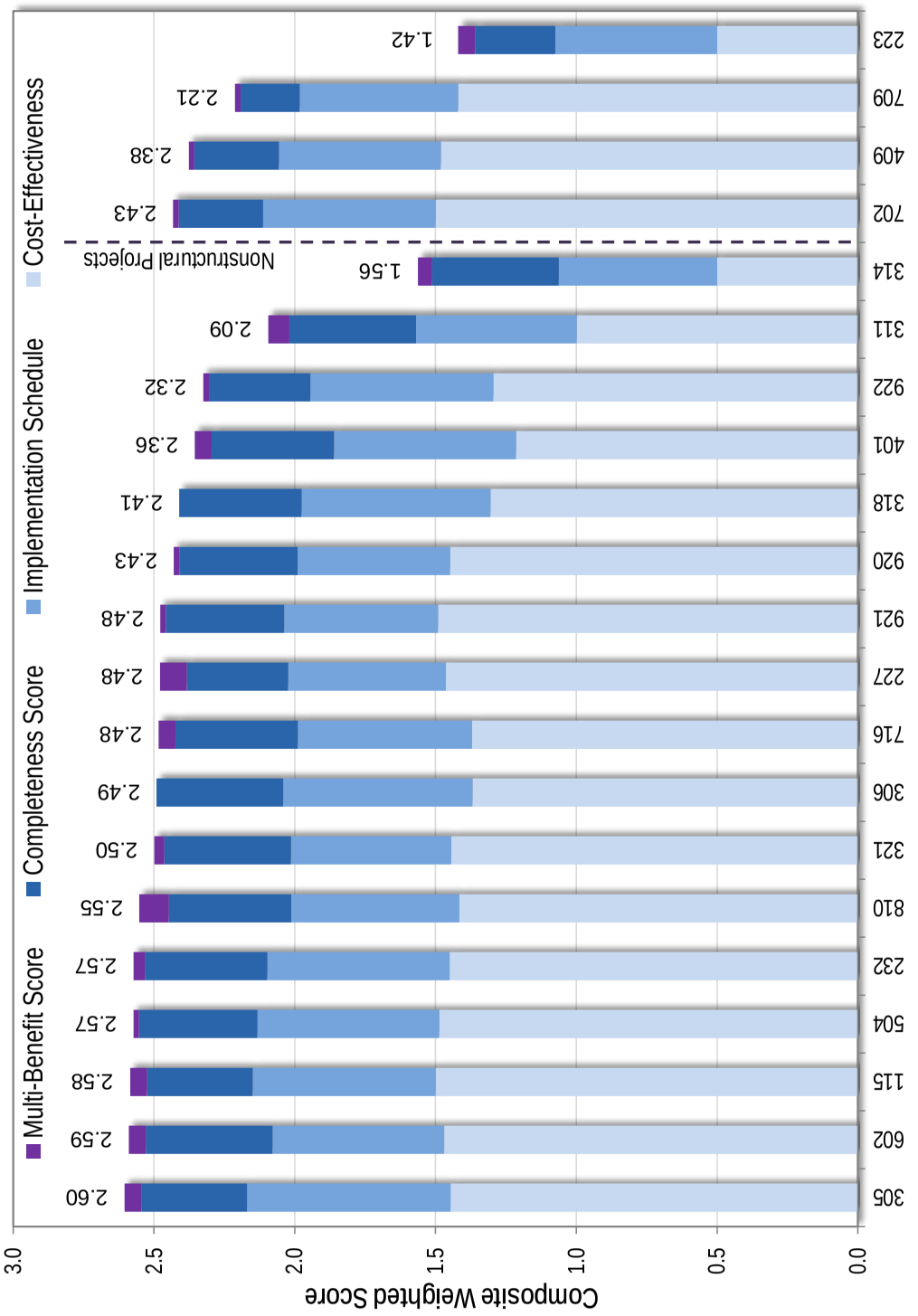


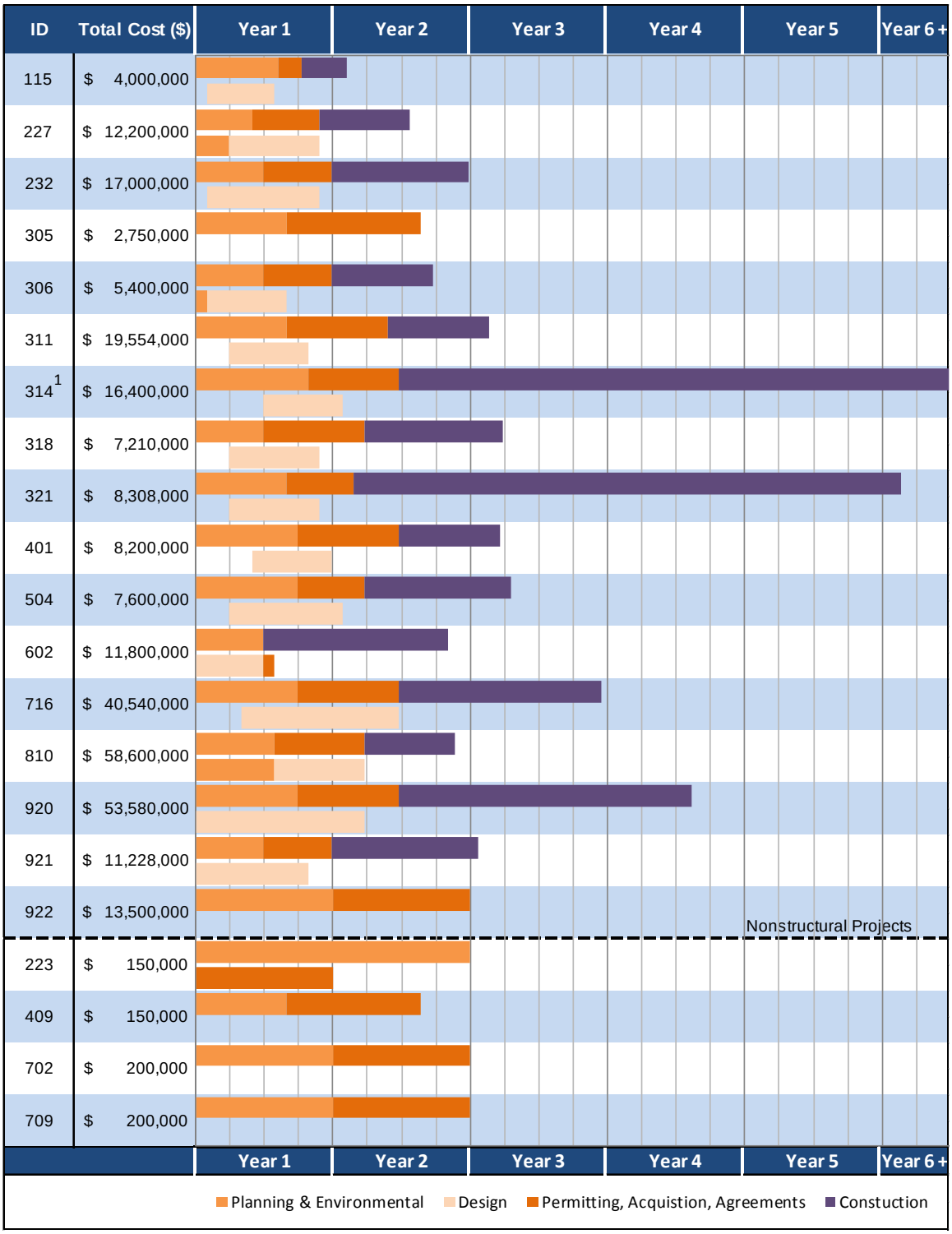
Figure 3-8.
Priority Projects Rankings using the Overall Composite-Weighted Score

Table 3-4.
Summary of Priority Projects and Scores

ID	Type	Yield (1,000 acre-feet)	Cost ($ million)	Federal Cost of RWA Benefit ($/acre-foot)	Cost-Effectiveness Score	Implementation Complexity Score	Project Definition Score	Related Benefits Score	Composite Weighted Score	Overall Rank*
115		11.0	$ 4.0	$ 10	3.0	2.6	2.5	0.6	2.6	3
227		8.0	$ 12.2	$ 41	2.9	2.2	2.4	1.0	2.5	10
232		8.3	$ 17.0	$ 56	2.9	2.6	2.9	0.4	2.6	5
305		2.5	$ 2.8	$ 60	2.9	2.9	2.5	0.6	2.6	1
306		2.2	$ 5.4	$ 147	2.7	2.7	3.0	0.0	2.5	8
311		2.9	$ 19.6	$ 560	2.0	2.3	3.0	0.8	2.1	16
314		2.3	$ 16.4	$ 1,115	1.0	2.3	3.0	0.5	1.6	17
318		0.9	$ 7.2	$ 218	2.6	2.7	2.9	0.0	2.4	13
321		3.6	$ 8.3	$ 63	2.9	2.3	3.0	0.4	2.5	7
401		0.7	$ 8.2	$ 318	2.4	2.6	2.9	0.6	2.4	14
504		14.0	$ 7.6	$ 15	3.0	2.6	2.8	0.2	2.6	4
602		8.0	$ 11.8	$ 35	2.9	2.4	3.0	0.6	2.6	2
716		7.6	$ 40.5	$ 145	2.7	2.5	2.9	0.6	2.5	9
810		16.8	$ 58.6	$ 95	2.8	2.4	2.9	1.1	2.6	6
920		25.0	$ 53.6	$ 58	2.9	2.2	2.8	0.2	2.4	12
921		30.0	$ 11.2	$ 10	3.0	2.2	2.8	0.2	2.5	11
922		3.2	$ 13.5	$ 229	2.6	2.6	2.4	0.2	2.3	15
223		1.4	$ 0.15	$ 5.8	1.0	2.3	1.9	0.6	1.4	21
409		11.1	$ 0.15	$ 0.7	3.0	2.3	2.0	0.2	2.4	19
702		17.0	$ 0.20	$ 0.6	3.0	2.5	2.0	0.2	2.4	18
709		10.3	$ 0.20	$ 1.1	2.8	2.3	1.4	0.2	2.2	20

Note: * Overall rank based on composite weighted score.

Key:
 groundwater recharge
 groundwater in-lieu recharge
 local improvement
 nonstructural
 recapture
 regional conveyance
 surface storage
ID = Irrigation District
RWA = Recovered Water Account



Key:

1. Project 314 has a total schedule of 16.5 years, but the project is not expected to start for at least 10 years.

Figure 3-9.
Implementation Costs and Schedules for Priority Projects

3.5.3 Water Supply Competition and Conveyance Analysis

The yield analysis conducted for individual projects did not consider the competition for water supplies and conveyance capacities from future planned projects. However, because of the finite quantity of supplies and conveyance capacities, projected yields could be curtailed and projected RWA balance reductions would then not be realized.

The four water supplies proposed for use in multiple Priority Projects are as follows:

- Surplus San Joaquin River flows (i.e., unused snowmelt and rain flood releases from Millerton Lake) that would require the use of the Friant-Kern Canal for delivery
- Kaweah River flows
- Restoration Flows recaptured downstream from the Merced River confluence and upstream from the Delta that would require the use of the Delta-Mendota Canal, San Luis Reservoir, and California Aqueduct for delivery and storage
- Restoration Flows recaptured at the Delta that would require the use of the San Luis Reservoir and California Aqueduct for delivery and storage

Projects that proposed using local eastside streams and enhancing their use of existing Class 1 and 2 supplies were not considered in the competition analysis because those supplies would either come from different local streams (including Big Dry Creek and Kings River) or would already be allocated to a specific district. Table 3-5 shows the water supply sources for the Priority Projects. Figure 3-10 is a schematic of the sources of water and conveyance pathways used for each Priority Project.

A water supply and conveyance competition analysis was conducted to assess the impact of project implementation order on estimated yield of these Priority Projects. Available water supplies and conveyance capacities were allocated to projects using assigned delivery priorities. To identify projects with potential constraints on yield due to competition, yield for each project was estimated using multiple permutations of delivery priorities to develop a range of potential yields. For example, projects 920, 921, and 922, which would compete for recaptured Restoration Flows downstream from the Merced River confluence and upstream from the Delta, would require six delivery priority permutations to assess all the potential scenarios for future project implementation. In one permutation, project 920 would receive first priority, second priority in another, last priority in another, and so on for projects 921 and 922.

Table 3-5. Water Supply Sources for Priority Projects

ID	Name	Type	Recaptured Restoration Flows Upstream from Delta	Recaptured Restoration Flows Downstream from Delta	Surplus San Joaquin River Flows	Kaweah River Flows	Local Eastside Streams	CVP Class 1 & 2
115	Recapture and Exchange of Restoration Flows to Red Top			💧!				
227	Fresno Groundwater Recharge Facility				💧		💧	
232	Gould Canal – Friant-Kern Canal Permanent Intertie			💧	💧			
305	Orange Cove ID In-District In-Lieu Groundwater Management							💧
306	Tulare ID Siphon Replacement Program							💧
311	Tulare ID Recharge Basin Complex				💧	💧		
314	McKay Point Reservoir				💧	💧		
318	Wutchumna Pumping Plant Improvements					💧		
321	Hannah Ranch Project				💧	💧		
401	Deer Creek Recharge Basin				💧			
504	Reverse Flow Pump-Back Facilities on the Friant-Kern Canal			💧!				
602	Shafter-Wasco ID Madera Avenue Intertie			💧	💧			
716	Arvin-Edison Water Storage District In-Lieu Banking Program			💧	💧			💧
810	Calloway Canal Improvements and Groundwater Recharge			💧!				
920	SJR Recapture at Patterson ID Conveyed through Delta-Mendota Canal to San Luis Reservoir		💧!					
921	SJR Recapture at West Stanislaus District ID Conveyed through Delta-Mendota Canal to San Luis Reservoir		💧!					
922	SJR Recapture at Banta-Carbona ID Conveyed through Delta-Mendota Canal to San Luis Reservoir		💧!					
223	Modify Big Dry Creek Reservoir for Long-Term Storage						💧	
409	Lower Tule River ID Water Exchange and Direct Delivery Program			💧!				
702	Arvin-Edison Water Storage District Long-Term Exchange			💧!				
709	Kern River Water Exchange Project			💧!				

Key: groundwater recharge; groundwater in-lieu recharge; local improvement; nonstructural; recapture; regional conveyance; surface storage

💧 = Water supply source proposed for use by project. Project yield not anticipated to be constrained for this source.

💧! = Project yield could be constrained by competition for water supplies and delivery capacities.

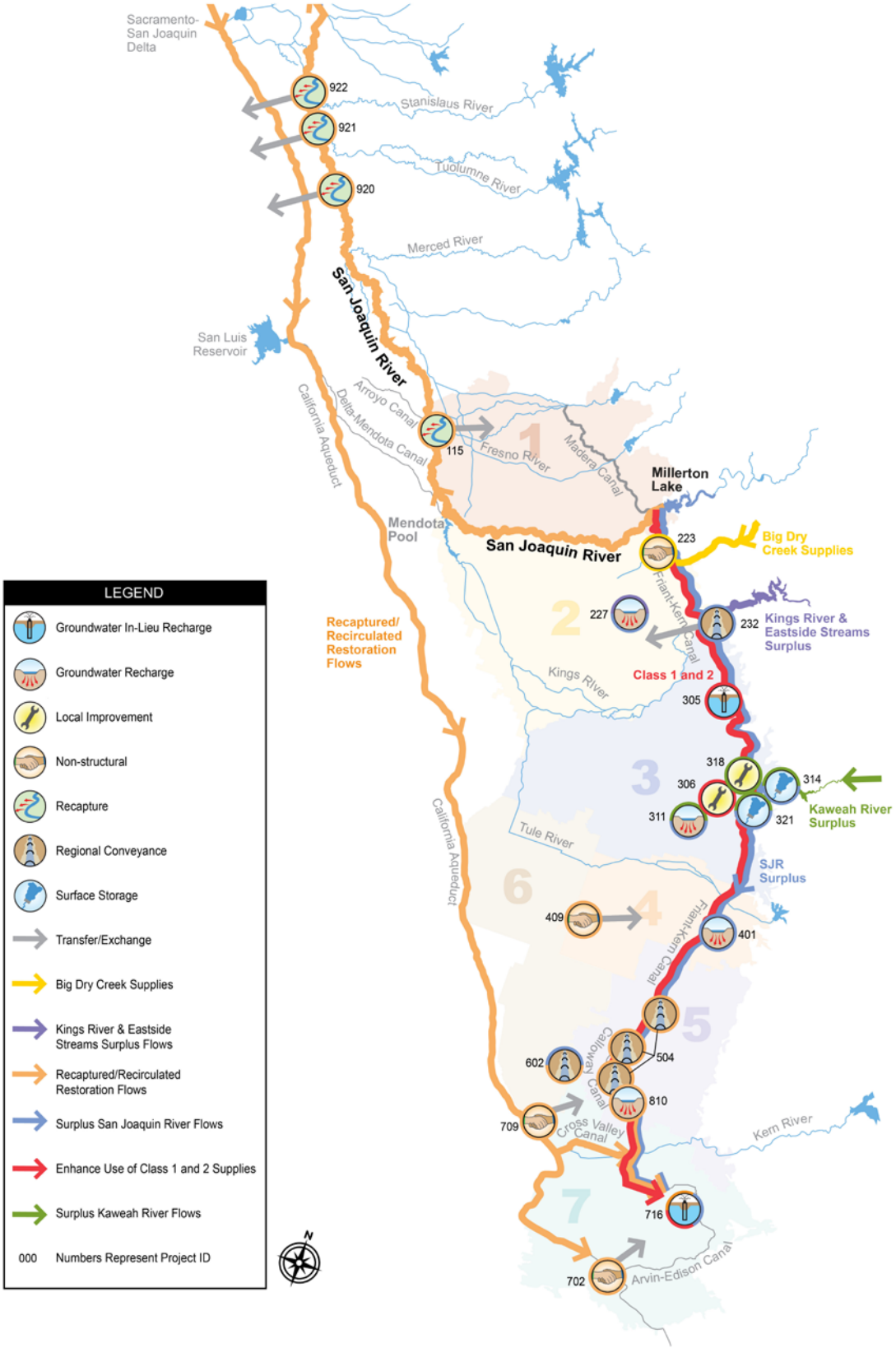


Figure 3-10.
Priority Projects Water Supply and Delivery Schematic

Figure 3-11 summarizes the results of the competition analysis. It shows that there would be no yield constraints for projects using surplus San Joaquin River flows because the demand from these projects would be small compared to available surplus supplies during wet periods. Projects that rely on surplus Kaweah River flows would experience some constraints due to competition; however, because all but one of these projects could also use surplus San Joaquin River flows, the competition constraints on their yield was considered to be limited.

Figure 3-11 shows strong competition for recaptured Restoration Flows. However, , projects that could use both recaptured Restoration Flows and surplus San Joaquin River flows would experience limited to no yield constraints. Overall, only projects that would solely use recaptured Restoration Flows would have some limitations on their yields due to competition from other projects. These projects are highlighted in Table 3-6.

This analysis shows that for projects with competing water sources and/or conveyance facilities, the order of project implementation will impact actual project yields. The results of the competition analysis are not currently reflected in the Priority Project rankings. However, as Priority Projects are implemented, the effect the order of completion on project yields and, therefore, cost-effectiveness should be considered.

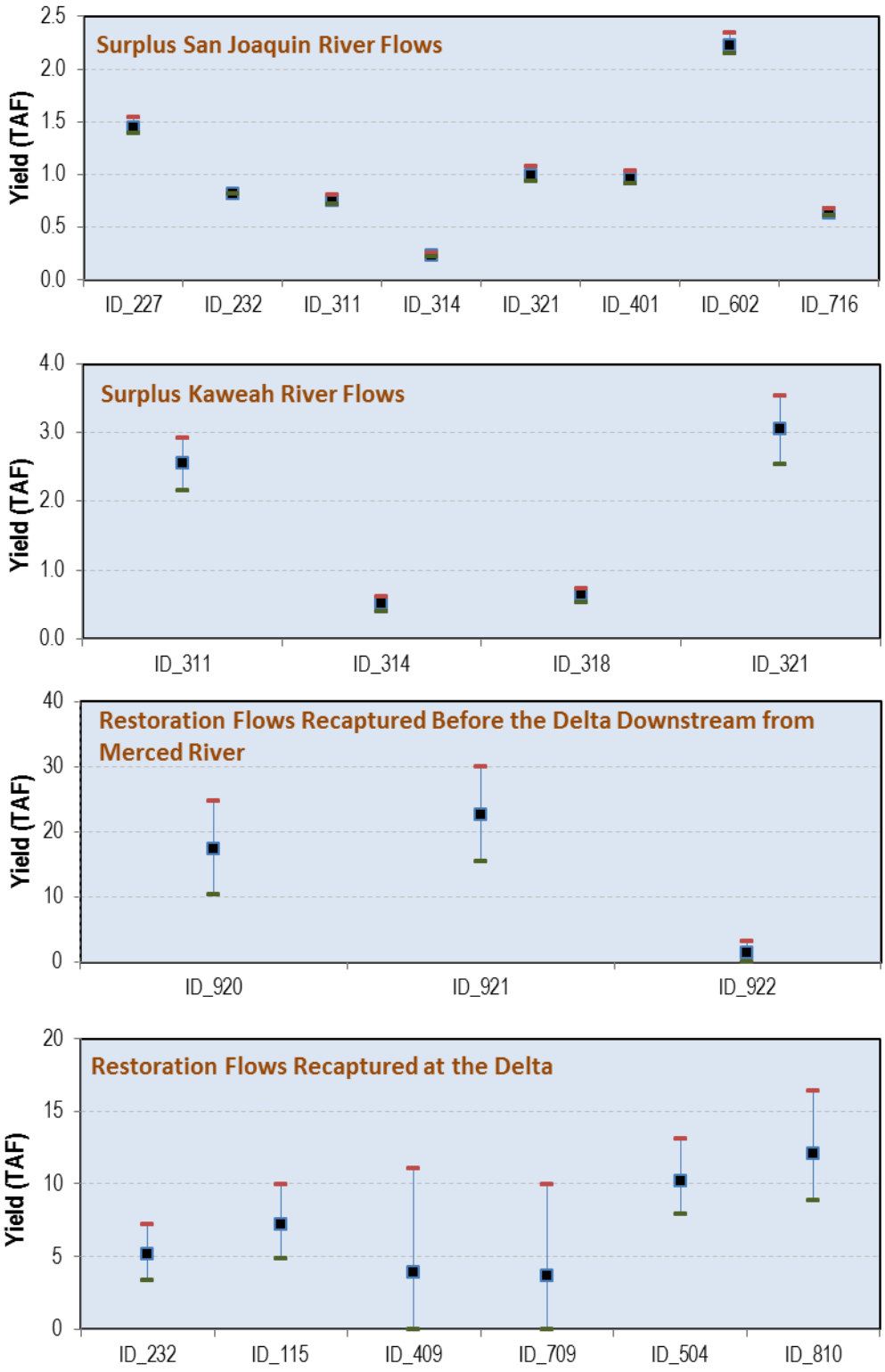


Figure 3-11.
Range of Expected Project Yields When Considering the Effect of Competition for Water Supplies and Conveyance from Other Priority Projects

3.6 Findings

Key findings of the 2015 Investment Strategy include the following:

- Local and regional projects could contribute to the SJRRP Water Management Goal by reducing RWA balances by recapturing and recirculating more Restoration Flows, increasing the ability to capture and use surplus flows on the San Joaquin River and other Eastside tributaries, improving water management flexibility within districts, and improving the ability to exchange between districts.

- There is strong interest by project proponents to implement the identified Priority Projects and meet cost-sharing requirements. Note that for this analysis a cost-share of 50 percent was assumed. Some proponents have invested their own funds to further advance the design and permitting of these projects.

- The identified Priority Projects present a set of cost-effective actions to reduce RWA balances and contribute to the SJRRP Water Management Goal. Overall, they have the potential to produce a water supply yield of approximately 150 thousand acre feet per year (without considering competition) for a total cost of $300 million and average cost-effectiveness of $195 per acre-foot (Table 3-6).

Table 3-6.
Summary of Priority Projects Yield, Cost, and Cost-Effectiveness

	Yield (TAF/year)	*Total Cost ($ million)*	*Overall Cost-Effectiveness ($/acre-foot)*
Total	150	$300	-
Average	7.2	$14	$195*
Range	0.1 ~ 30	$0.15 ~ $59	$20 ~ $637*

Note:
* Excludes nonstructural projects, and does not reflect the effect of competition for water supplies and conveyance facilities.

Key:
TAF = thousand acre-feet

- Nonstructural projects would be a cost-effective approach and could provide potentially high yields. Yet, these would require additional institutional work to develop exchange agreements and modify existing operational practices. Reclamation could play an important role in facilitating these agreements, with the active cooperation of involved parties.

- When implementing multiple projects using recaptured Restoration Flows, competition among these projects must be considered based on the timing and availability of supplies. Estimated yields, and therefore cost-effectiveness, would need to be adjusted for some of these projects.

- Unused surplus San Joaquin River flows available during wet periods have the potential to reduce competition for limited supplies from other sources within the Friant Division. The use of these supplies could require additional facility improvements for storage, recovery, and delivery.

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4.0 Next Steps for Investment Strategy Implementation

This chapter describes the next steps for implementing the Investment Strategy. It describes the intended use of the Investment Strategy, the process for updating and maintaining the Investment Strategy documents, and potential funding opportunities.

4.1 Intended Use of the Investment Strategy

Reclamation developed the Investment Strategy to help identify projects and measures that can help contribute to the SJRRP Water Management Goal, thereby supporting implementation of the Settlement. The Investment Strategy's project evaluation process helps identify a set of structural and nonstructural projects that can cost-effectively contribute to the reduction of the RWA balances of the Friant Division Contractors.

The Investment Strategy provides the following information and tools:

- Friant Division Priority Projects that can support Settlement implementation, and identification of the magnitude of funding needs and project-specific implementation requirements.

- A menu of key actions that can support the SJRRP's Recapture and Recirculation Program. This is a long-term program for recirculation, reuse, exchange, or transfer of recaptured Settlement Flows for the purpose of reducing or avoiding impacts to water deliveries to all of the participating Friant Contractors with supplies that may be impacted by Restoration Flows.

- A highlight of water management challenges being faced by the Friant Division. This information helps identify how these water supplies can best be managed at a local-level and what assistance may be needed from Reclamation (e.g., assistance with environmental permits/planning, and funding).

- A framework of formalized criteria and metrics for project screening, evaluation, and ranking that are scalable to the level of available information and project details. The framework allows for a structured and transparent scoring and ranking process for Reclamation to allocate funding to support SJRRP Water Management Goal activities and Friant Division water management initiatives.

- A List of Priority Projects, associated costs, and project-specific implementation requirements to enable Reclamation to take advantage of funding as it becomes available for projects that support the Water Management Goal.

4.2 Maintaining and Updating the Investment Strategy

The Investment Strategy will be maintained and updated on a regular basis, including ad hoc addenda, high-level annual reviews, and five-year updates.

4.2.1 Ad Hoc Addendum

Conditions that would trigger an ad hoc addendum include the following:

- Requests for updates from the Friant Contractors (project proponents), such as:
  - **Completion of a project** – If a project is built and implemented, the project proponent from the Friant Division should inform Reclamation to remove this project from the Investment Strategy list.
  - **Changes to a project** – If details regarding a project (e.g., scope, size, location, cost, yield) are updated by the project proponent such that the project scoring would significantly change, then this information should be provided to Reclamation such that the Investment Strategy project evaluations can be updated.
  - **Identification of a new project** – If a Friant Contractor identifies a new project that meets the criteria specified in this report (see Section 2), the Friant Contractor should provide this information to Reclamation. In order for this project to be comparable to other projects in the current list, the project should be developed to an appraisal-level of detail as described in Section 2.3. If an appraisal-level of detail cannot be developed for the project or assistance is needed from Reclamation, the Friant Contractor should inform Reclamation.
- Major changes occur (e.g., changed conditions or SJRRP priorities, new laws, and regulations) that affect current projects or criteria/metrics.

4.2.2 Annual Reviews

The high-level annual review is the same as the ad hoc addendum process, except that Reclamation intends to send e-mails to each of the project proponents to verify that the project information contained in the current Investment Strategy remains applicable and relevant. If the project proponent provides updated details on a project, Reclamation will update the Investment Strategy accordingly.

4.2.3 Five-Year Updates

In addition to quick annual reviews, it is anticipated that the Investment Strategy will be updated at least every five years. For this five-year update, Reclamation will do the following:

- Re-evaluate the current Investment Strategy criteria and metrics to determine if they remain applicable, and make changes as necessary.

- Solicit input from all Friant Contractors to determine whether the original projects remain applicable and the information is current, or if there are new projects. For projects that are new or have been modified, project proponents will follow the evaluation process described in Section 2 and perform appraisal-level evaluations for those that score relatively high. Projects that have since been completed will be removed from the Priority Project list. Reclamation may assist in updating or preparing new appraisal studies for the project proponents similar to the 2015 Investment Strategy.

- Re-evaluate the Priority Project list using any new information provided.

4.2.4 Summary

These three methods of updating the Investment Strategy will help Reclamation ensure that the list and evaluations of Priority Projects are up-to-date, such that Reclamation can efficiently assist the project proponents in implementing the projects should funding opportunities arise.

Reclamation will also consider developing an Investment Strategy Progress Report in the next three to four years to assess the status of implementing the Investment Strategy, obtain feedback on the process to-date, and list recommendations to incorporate in the five-year update.

4.3 Funding Investment Strategy Projects

The Investment Strategy will be used by Reclamation to quickly link proposed projects with funding opportunities as they arise. Funding sources include, but are not limited to: SJRRP Part III funding,[2] other Reclamation funding, other non-Reclamation Federal funding (e.g., Environmental Protection Agency),[3] and State funding. The specific funding requirements, such as cost-sharing and reporting will vary depending on the funding available sources.

Reclamation intends to work with the project proponents to identify available funding sources and to assist project proponents with funding applications where appropriate. Currently, Reclamation is researching funding sources available to implement the proposed projects and will inform project proponents when a source of funding is identified. It is expected that the project proponents will also take an active role in identifying potential funding sources and advancing their project to the extent possible independent of Reclamation's efforts under the Investment Strategy.

It is anticipated that if Federal funding becomes available, Reclamation will review the necessary requirements for implementing each Priority Project, identify options for applying available funding to advance Priority Projects identified in the Investment

[2] http://www.federalgrants.com/San-Joaquin-River-Restoration-Program-Part-III-of-Title-X-Subtitle-A-of-Public-Law-111-11-40319.html

[3] http://www.grants.gov/web/grants/home.html

Strategy, and determine which projects could apply for funding depending on current SJRRP priorities, needs, conditions, and constraints. As such, it is important to note that Reclamation will not necessarily implement the Priority Projects in the order of their ranking. In addition, SJRRP-specific funding would likely require RWA commitment and other reporting requirements that would be determined as funding becomes available.

Regardless of the funding source, when a project is implemented, it will be added to the Restoration Flow Guidelines (SJRRP, 2013) and the RWA credit reduction will be calculated using the procedure identified in the Restoration Flow Guidelines (SJRRP, 2013).

5.0 References

San Joaquin River Restoration Program (SJRRP). 2012. Third Party Working Draft Framework for Implementation. June.

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Attachment 1

Priority Project Synopses

Final

Water Management Goal – Investment Strategy

SAN JOAQUIN RIVER
RESTORATION PROGRAM

March 2015

Table of Contents

Abbreviations and Acronyms

cfs	cubic feet per second
CVP	Central Valley Project
DCTRA	Deer Creek and Tule River Authority
Delta	Sacramento-San Joaquin River Delta
DWR	California Department of Water Resources
FMFCD	Fresno Metropolitan Flood Control District
Friant Contractors	Friant Division long-term contractors
ID	Irrigation District
M&I	municipal and industrial
O&M	operations and maintenance
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
SJRRP	San Joaquin River Restoration Program
SWP	State Water Project
TAF	thousand acre-feet
WCD	Water Conservation District
WD	Water District
WSD	Water Storage District

1.0 Introduction

This attachment provides brief descriptions of the Priority Projects included in the 2015 Investment Strategy Report. For additional information, refer to individual project appraisal-level studies located in Attachment 3 of the Draft Final Investment Strategy Report.

1.1 Project ID 115 – Recapture and Exchange of Restoration Flows to Red Top

The area between Madera ID and Chowchilla ID and the San Joaquin River is collectively known as the Red Top area. Madera ID has Fresno River water rights and is responsible for delivery of this water to specific landowners in the Red Top area, but currently, the infrastructural capacity is inadequate to deliver their full allocations. With the exception of a few landowners who have local surface water access, the Red Top area is supported entirely on groundwater, causing extreme subsidence and damaging regionally important water infrastructure, such as the Delta-Mendota Canal and Sack Dam. For this project, Madera ID, in coordination with the San Joaquin River Exchange Contactors, proposes to install a new turnout structure on the Poso Canal, an approximately 40 cfs capacity pumping facility, and a pipeline network to the Red Top area. This infrastructure will convey recaptured Restoration Flows to the Red Top area via the Delta-Mendota Canal in exchange for Fresno River water contracts. This project helps 1) increase surface water use in the Red Top area to address subsidence concerns and 2) fulfill Madera ID's obligation to deliver Fresno River water to Red Top.

1.2 Project ID 223 – Modify Big Dry Creek Reservoir for Long-Term Storage

This project would modify the operations of Big Dry Creek Reservoir to more effectively use and recharge available Big Dry Creek supplies. Big Dry Creek is an Eastside Stream that flows through the City of Fresno (City) and Fresno ID that is controlled by Big Dry Creek Dam. The dam is owned and operated by Fresno Metropolitan Flood Control District (FMFCD) and is located northeast of the City and Fresno ID. Both the City and Fresno ID can access water along Big Dry Creek downstream from the dam from numerous canals. Currently, the dam is operated mainly for flood control purposes, discharging excess water into the San Joaquin River as soon as practicable, and has no operational allowance for long-term storage. This nonstructural project would focus on changing operations of the reservoir so that 1) water can be stored and released down Big Dry Creek for beneficial use by the City or Fresno ID and 2) stored water would naturally recharge the groundwater. The reservoir area is generally sandy, and FMFCD has an ongoing project to address seepage concerns.

1.3 Project ID 227 – Fresno Groundwater Recharge Facility

This recharge facility project will allow the City of Fresno (City) to increase its ability to more efficiently use available surface water (surplus flows from the Kings River, San Joaquin River, and Eastside Streams) and recharge its groundwater basin. The City's Groundwater Recharge Facility is expected to be 60 to 120 acres, and will 1) capture and recharge surplus flows for future use, and 2) serve as a detention basin to provide operational flexibility to the City for routing surface and flood waters within the area's extensive network of canals. The banked groundwater would be extracted at existing and nearby City wells downgradient of the recharge basin. The City has performed regional groundwater banking studies to evaluate potential facility locations and appropriate recharge technologies. Project implementation is dependent on identifying willing sellers of land suitable for groundwater recharge operations.

1.4 Project ID 232 – Gould Canal – Friant-Kern Canal Permanent Intertie

In addition to CVP supplies, Fresno ID has rights to the Kings River, which is stored in Pine Flat Reservoir and conveyed to Fresno ID via the Gould Canal. Fresno ID's Gould Canal – Friant-Kern Canal Permanent Intertie project involves construction of gravity-run 200 cfs capacity pipelines that will connect the Gould Canal with the Friant-Kern Canal, allowing diversion of Kings River water into the Friant-Kern Canal. This project creates opportunities for other Friant Contractors that have downstream intakes off the Friant-Kern Canal to exchange their CVP supplies for Kings River water stored in Pine Flat Reservoir. Fresno ID could either directly use the exchanged CVP water or store it for future use via groundwater recharge. Interested districts could also identify other partners and form agreements to exchange recaptured Restoration Flows in the California Aqueduct with Kings River water, and Fresno ID could wheel this water via the intertie down the Friant-Kern Canal. A temporary pump installation facilitated similar exchanges between Kings River water and unreleased Restoration Flows in 2014.

1.5 Project ID 305 – Orange Cove Irrigation District In-District In-Lieu Groundwater Management

Orange Cove ID serves both M&I customers and agricultural landowners growing predominately permanent crops. CVP Class 1 water is Orange Cove ID's only surface water supply, and private landowners additionally pump groundwater from the Kings River groundwater subbasin. The southern portion of the district west of the Friant-Kern Canal overlies reliable groundwater resources, but groundwater access in the remaining areas of Orange Cove ID is limited and unreliable, especially in drier years. Historically, the district has not used its entire CVP water allocations, because landowners with reliable groundwater have foregone portions of their allocated surface water deliveries in favor of cheaper groundwater. With this project, Orange Cove ID would provide landowners with financial incentives to decrease surface water costs during wet years so

that available groundwater would be preserved for dry years. During dry years, these landowners would forgo the limited surface water supplies to be served to other portions of the district. The program also provides assistance for necessary groundwater pumping and distribution system upgrades so that the system has sufficient infrastructure capacity to fulfill landowners' demands during dry years.

1.6 Project ID 306 – Siphon Replacement Program

Tulare ID's Main Intake Canal conveys much of its surface water supplies, consisting of CVP water and Kaweah and St. Johns rivers water, into the district. Currently, the Main Intake Canal siphons at the Kaweah and St. Johns river crossings are operated at very high velocities during summer months of peak demand, and the siphons show evidence of scour and leakage. In addition, Tulare ID resorts to using local dry creek beds with high conveyance losses to deliver water to meet remaining peak demand. Tulare ID's Siphon Replacement Program retrofits the aging siphons while increasing total surface water supply conveyance capacity on the Main Intake Canal. This project provides for construction of adjacent parallel concrete pipelines at both the St. Johns and Kaweah river siphons, so that 1) the Main Intake Canal's reliability is improved, and 2) water conveyance efficiency during peak season is increased. The capacity expansion will eliminate the need to use other local creeks and eliminates conveyance losses.

1.7 Project ID 311 – Tulare Irrigation District Southwest Tulare Basin Complex

Land use in the Tulare ID is predominantly agricultural, and irrigation demand is met by combination of groundwater and surface water. Groundwater levels have been declining within the district since the 1950s, and land has subsided in the western portion of the district. Tulare ID currently manages approximately 1,250 acres of recharge basins and prices surface water competitively with groundwater pumping costs, but further investment in groundwater recharge projects are needed. This project involves construction of a recharge basin complex of approximately 200 acres to recharge surplus San Joaquin River and Kaweah River flows into the aquifer underlying the district. This water will be extracted by existing, privately-owned wells. Land within the district is generally sandy and well suited for recharge basins, but project implementation is dependent on identifying willing sellers.

1.8 Project ID 314 – McKay Point Reservoir

Tulare ID owns and operates Terminus Dam, which stores Kaweah River water. When Terminus Dam releases water for irrigation or flood control, Tulare ID is required to prioritize use and conveyance of this water to decrease flood risk to downstream communities. The McKay Point Reservoir project involves construction of a 200-acre, 4,000 acre-feet reservoir downstream of Terminus Dam to be jointly owned by Tulare ID,

Consolidated Peoples Ditch Company, and Visalia and Kaweah Water Company. The reservoir would enable Tulare ID to 1) regulate flood control releases from Terminus Dam, and 2) reregulate irrigation releases so that more surface water can be optimally routed to the district for beneficial use and groundwater recharge. The additional operational flexibility from temporary storage of Kaweah River water would allow Tulare ID to also take increased delivery of surplus San Joaquin River flows and to increase hydropower generation at Terminus Dam.

1.9 Project ID 318 – Wutchumna Pumping Plant

Ivanhoe ID operates the Wutchumna Pumping Plant on the Wutchumna Ditch, which conveys Kaweah River water to the district. Currently, Ivanhoe ID is unable to take full delivery of its Kaweah River allocations, due to the small capacity of the Wutchumna Pumping Plant and its inability to store its Kaweah River flows behind Terminus Dam. Unused allocations are currently exchanged for a smaller quantity of CVP water with Tulare ID. The current situation results in landowners resorting to groundwater pumping to meet demand, even in normal and wet years. For this Wutchumna Pumping Plant project, Ivanhoe ID proposes structural improvements to the existing pumping facilities on Wutchumna Ditch to increase the capacity from 25 cfs to 50 cfs. The project would also increase the size of laterals from the pumping station, enlarge an existing holding reservoir, and construct outlets so that water can be stored and delivered from the enlarged holding reservoir. This project will improve Ivanhoe ID's use of available Kaweah River water supplies.

1.10 Project ID 321 – Hannah Ranch Project

Kaweah Delta WCD receives deliveries from the CVP and the Kaweah River, including surplus Kaweah River flows that are unused by other water rights/contract holders. Kaweah Delta WCD operates numerous recharge basins, but currently lacks detention facilities to fully utilize, control, and recharge this unused surplus Kaweah River flows. Additional operational spills occur from the Friant-Kern Canal at the Kaweah River choke point, which could also be put to beneficial use. With this project, Kaweah Delta WCD is proposing to construct a 1.5 TAF, 380-acre detention basin within the district to capture surplus Kaweah River flows, surplus San Joaquin River flows, and operational spills from the Friant-Kern Canal. The district will route these flows to downstream recharge basins as capacity becomes available. The project also includes reconstruction of a riparian corridor adjacent to the Kaweah River. Thus far, this project has received partial funding from Proposition 1E from DWR.

1.11 Project ID 401 – Deer Creek Recharge Basin

Saucelito ID is a member of the Deer Creek and Tule River Authority (DCTRA), a joint powers authority comprised of seven local water districts. DCTRA facilitates collective

management of the Tule Basin groundwater aquifer. DCTRA's Deer Creek recharge basin complex is Saucelito ID's principle way to offset its groundwater pumping and to ensure dry year water supply reliability. With this project, Saucelito ID is proposing to increase its groundwater recharge capacity by constructing a new 160-acre recharge basin complex adjacent to the existing one at the intersection of Deer Creek and the Friant-Kern Canal. The project includes a new 50 cfs earthen ditch turnout from the Friant-Kern Canal so that Saucelito ID can use surplus San Joaquin River flows. Two extraction wells and associated conveyance within Saucelito ID will additionally be retrofitted.

1.12 Project ID 409 – Lower Tule River Irrigation District Water Exchange and Direct Delivery Program

Lower Tule River ID's water supplies consist of Friant CVP water, the Tule River, groundwater pumped by private irrigators, and exchange agreements to augment its surface water supply. This Lower Tule River ID's nonstructural project provides for a study that will assess the opportunity for exchange of recaptured Restoration Flows with districts along the California Aqueduct that also have existing rights on the Kings, Kaweah, and Tule rivers. A two-way exchange would be possible with districts with Tule River water rights and access to the California Aqueduct, while a three-way exchange would be necessary for Lower Tule ID to benefit from exchanges involving Kings and Kaweah river waters. Project/exchange agreement partners must still be identified, but the district has historically formed similar exchange agreements, which involved, for example, Tulare Lake Basin WSD, a district with access to the California Aqueduct, Kings River, and Tule River. Another previous agreement included one with City of Fresno, which has Kings River water rights. The project will also determine any necessary infrastructural upgrades or construction to facilitate such exchanges.

1.13 Project ID 504 – Reverse Flow Pump-Back Facilities on the Friant-Kern Canal

Currently, the Friant-Kern Canal has limited pump-back operational capacity, which is used occasionally to deliver north the water from the Cross Valley Canal or water extracted from water banks on the Kern River fan. This project installs permanent pump-back facilities with higher capacities along the southern portion of the Friant-Kern Canal: 200 cfs at the Shafter-Wasco Check Structure, 75 cfs at the Lake Woollomes Check Structure, and 75 cfs at the Deer Creek Check Structure. The project would directly provide recaptured Restoration Flows via the Cross Valley Canal to Arvin-Edison WSD, Shafter-Wasco ID, Southern San Joaquin Municipal Utility District, Delano-Earlimart ID, Lower Tule River ID, Saucelito ID, Terra Bella ID, Tea Pot Dome WD, and Porterville ID. Restoration Flows can be conveyed into the Friant-Kern Canal in two ways: 1) form an agreement and use Arvin-Edison WSD's intertie between the Friant-Kern Canal and the Cross Valley Canal or 2) construct a new connection between the Friant-Kern Canal and the Calloway Canal, owned and operated by North Kern WSD. North Kern WSD recently completed a Cross Valley Canal-Calloway Canal intertie.

1.14 Project ID 602 – Shafter-Wasco Irrigation District Madera Avenue Intertie

Shafter-Wasco ID is located west of the Friant-Kern Canal and immediately east of Semitropic WSD, a regional water bank with access to the California Aqueduct. Shafter-Wasco ID's service area is divided into two separate systems, north and south, and each has its own turnout off the Friant-Kern Canal. There is one existing pipeline intertie between the Shafter-Wasco ID's north service area and Semitropic WSD to facilitate water banking, exchange, wheeling, and sales arrangements between the two districts. This Madera Avenue Intertie project proposes to provide similar opportunities to the south service area by constructing bi-directional pipelines and a booster pump station for up to 50 cfs capacity. Specifically, this interconnection will increase Shafter-Wasco ID's operational flexibility by 1) allowing banking of surplus San Joaquin River and available CVP water, and 2) allowing access to and banking of recaptured Restoration Flows via the California Aqueduct into Semitropic WSD. Currently, Shafter-Wasco ID is investigating acceptability of the quality of extracted groundwater.

1.15 Project ID 702 – Arvin-Edison Water Storage District Long-Term Exchange

Arvin-Edison WSD has access to both flows from the Friant-Kern Canal and CVP and SWP water in the California Aqueduct via the bidirectional Cross Valley Canal and South Canal. For this project, Arvin-Edison WSD proposes facilitating a long-term exchange of its Friant CVP water to increase recapture and exchange of Restoration Flows. A westside CVP contractor with access to Restoration Flows on the lower San Joaquin River below the Merced River confluence would divert Restoration Flows in exchange for increased westside CVP supplies to Arvin-Edison WSD. In return, Arvin-Edison WSD would make available its Friant CVP water behind Friant Dam to another Friant Contractor or Reclamation. This nonstructural project requires agreement to address Arvin-Edison WSD's water quality concerns. Project partners must still be identified, but the district has historically facilitated similar exchange agreements.

1.16 Project ID 709 – Kern River Water Exchange Project

This nonstructural project proposes forming an exchange agreement(s) for Kern River water to facilitate recapture, exchange, and use of Restoration Flows. Located downstream along the Kern River and adjacent to the California Aqueduct, Buena Vista WSD has access to both the Kern River and SWP supplies. The proposed project would establish an exchange contract, where Buena Vista WSD would deliver Kern River supplies during wet periods to Friant Contractors via the Cross Valley Canal. In exchange, Buena Vista WSD would receive recaptured Restoration Flows during drier periods via the California Aqueduct and SWP facilities. In particular, Arvin-Edison WSD and Kern-Tulare WD have existing contracts for Kern River water and have opportunities to form

more direct exchange agreements with Buena Vista WSD. Additional Friant Contractors could benefit from this project if pump-back facilities are installed on the Friant-Kern Canal (Project 504).

1.17 Project ID 716 – Arvin-Edison Water Storage District In-Lieu Banking Program

Arvin-Edison WSD overlies the Kern groundwater basin, which is in a state of overdraft. Arvin-Edison WSD actively recharges its groundwater via 1,500 acres of spreading ponds, located along the North and South canals within the district. For this project, Arvin-Edison WSD proposes to construct new facilities as well as expand the existing North Canal Spreading Works to act as a detention basin. The facilities will capture and convey recaptured Restoration Flows, unused surplus San Joaquin River flows, and unused Class 2 contract supplies to an area within the district that relies solely on groundwater. The proposed project would construct new bidirectional pipelines to serve this water to 800 to 3,200 acres of crop lands, facilitating in-lieu groundwater banking. The district will use this banked groundwater supply when surface water is in short supply. The participating landowners will be expected to assist Arvin-Edison WSD in extracting banked groundwater using their private wells and delivering it to the district's canal system.

1.18 Project ID 810 – Calloway Canal Improvement and Groundwater Recharge

Shafter-Wasco ID does not own or operate any water storage or groundwater recharge facilities, relying on neighboring districts, namely Semitropic WSD and North Kern WSD for groundwater recharge/banking and water supply conveyance and distribution flexibility. The Calloway Canal, owned and operated by North Kern WSD, runs adjacent to Shafter-Wasco ID and has the capacity to convey recaptured Restoration Flows via the Cross Valley Canal. However, there are no existing direct turnouts to Shafter-Wasco ID from the canal. For this project, Shafter-Wasco ID proposes 1) to line approximately one mile of the Calloway Canal to reduce seepage losses in an area with contaminated groundwater and 2) to construct a new turnout on the Calloway Canal and a 320-acre recharge basin within the district along Kimberlina Road. With this infrastructure, there would be additional opportunities to recharge, for example, Kern River water with an agreement with North Kern WSD, further diversifying Shafter-Wasco ID's water supply portfolio and improving reliability.

1.19 Project ID 920 – San Joaquin River Recapture at Patterson Irrigation District Conveyed Through Delta-Mendota Canal to San Luis Reservoir

Patterson ID is located just downstream from the San Joaquin River and Merced River confluence and has existing facilities that can convey limited water between the San Joaquin River and the Delta-Mendota Canal. Patterson ID has senior San Joaquin River water rights, and it is the first district downstream of the SJRRP Restoration Area capable of recapturing Restoration Flows. With this project, Reclamation and Friant Contractors propose to 1) assist Patterson ID modernize and expand its cross district conveyance facilities to a capacity of 195 cfs and 2) to facilitate water conveyance or exchange agreements between Friant Contractors and Patterson ID so that recaptured Restoration Flows can be stored via the Delta-Mendota Canal in San Luis Reservoir for future direct delivery and/or exchange to benefit Friant Contractors. Modernization of district facilities will also allow Patterson ID to more reliably meet its demands. Importantly, this project creates a venue for recapture of Restoration Flows before it enters the Delta, where operations are uncertain and losses of Restoration Flows are expected to be large, limiting recapture opportunities.

1.20 Project ID 921 – San Joaquin River Recapture at West Stanislaus Irrigation District Conveyed Through Delta-Mendota Canal to San Luis Reservoir

West Stanislaus ID is located downstream from the San Joaquin River and Tuolumne River confluence and has an existing Main Canal that can convey limited water between the San Joaquin River and the Delta-Mendota Canal. West Stanislaus ID has senior San Joaquin River water rights, and it is the second district downstream of the SJRRP Restoration Area capable of recapturing Restoration Flows. With this project, Reclamation and Friant Contractors propose to 1) assist West Stanislaus ID modernize and expand the Main Canal to a capacity of 310 cfs and install a fish screen, and 2) to facilitate water conveyance or exchange agreements between Friant Contractors and West Stanislaus ID so that recaptured Restoration Flows can be stored via the Delta-Mendota Canal in San Luis Reservoir for future direct delivery and/or exchanges to benefit Friant Contractors. Importantly, this project creates a venue for recapture of Restoration Flows before it enters the Delta, where operations are uncertain and losses of Restoration Flows are expected to be large, limiting recapture opportunities.

1.21 Project ID 922 – San Joaquin River Recapture at Banta-Carbona Irrigation District Conveyed Through Delta-Mendota Canal to San Luis Reservoir

Banta-Carbona ID is located downstream from the San Joaquin River and Stanislaus River confluence and has existing facilities that can convey 60 cfs of water between the

San Joaquin River and the Delta-Mendota Canal. Banta-Carbona ID has senior San Joaquin River water rights, and is capable of recapturing Restoration Flows. This project consists of an agreement where Reclamation/Friant Contractor(s) would pay Banta-Carbona ID a fixed fee for every acre-foot of Restoration Flows recaptured and conveyed through Banta-Carbona ID's canal. This fee will cover pumping costs and O&M for use of district facilities, and may vary over the project life to reflect inflation and power. No improvements to existing system facilities would be performed. Conveyed recaptured Restoration Flows can be stored via the Delta-Mendota Canal in San Luis Reservoir for future delivery and/or exchanges to benefit Friant Contractors. Importantly, this project creates a venue for recapture of Restoration Flows before it enters the Delta, where operations are uncertain and losses of Restoration Flows are expected to be large, limiting recapture opportunities.

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