



Wholesale Water Management and Reliability Study

FINAL STUDY REPORT | OCTOBER 2016



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List of Abbreviations and Acronyms

AF	acre-feet	PS	pump station
ARPS	American River Pump Station	RDCP	Regional Drought Contingency Plan
ASR	aquifer storage and recovery	Reclamation	U.S. Department of the Interior, Bureau of Reclamation
Cal-Am	California American Water Company	RLECWD	Rio Linda/Elverta Community Water District
CHWD	Citrus Heights Water District	RW	recycled water
CoR	City of Roseville	RWA	Regional Water Authority
CVP	Central Valley Project	RWRP	Regional Water Reliability Plan
CWD	Carmichael Water District	SGA	Sacramento Groundwater Authority
District	San Juan Water District	SGMA	Sustainable Groundwater Management
DPMWD	Del Paso Manor Water District	SCWA	Sacramento County Water Agency
FOWD	Fair Oaks Water District	SJWD	San Juan Water District
GSWC	Golden State Water Company	SSWD	Sacramento Suburban Water District
GW	groundwater	Study	Wholesale Water Management and Reliability Study
ID	Identification	Subbasin	North American Groundwater Subbasin
MFP	Middle Fork Project	SW	surface water
mgd	million gallons per day	TAF	thousand acre-feet
N/A	not applicable	WCA	Wholesale Customer Agency
NF	North Folsom	WTP	water treatment plant
NS	transfer/exchange	WWTP	wastewater treatment plant
O#	Option #		
OVWC	Orange Vale Water Company		
PCWA	Placer County Water Agency		
POU	place of use		

Acknowledgement:

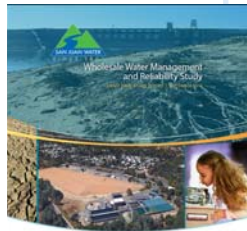
The study team would like to thank the active engagement and guidance of the San Juan Water District Board of Directors and Water Supply and Reliability Committee throughout the intensive study development. The valuable input received from the Wholesale Customer Agencies and other regional water agencies and partners were also appreciated.

INTRODUCTION

The Wholesale Water Management and Reliability Study (Study) is a reconnaissance-level study initiated by the San Juan Water District (District) to identify a pathway to long-term water supply reliability for both the District and its Wholesale Customer Agencies. The Study describes the challenges facing the District; and includes development and evaluation of a comprehensive array of water management options ranging from facility improvements to operational agreements and regional collaboration to governance and institutional arrangements. The District intends to leverage Study findings to guide its participation in regional collaborative efforts, and to develop a long-term implementation plan.

This Study is the first step in the District’s evaluation and development of a program to achieve long-term water supply reliability.

Wholesale Water Management and Reliability Study



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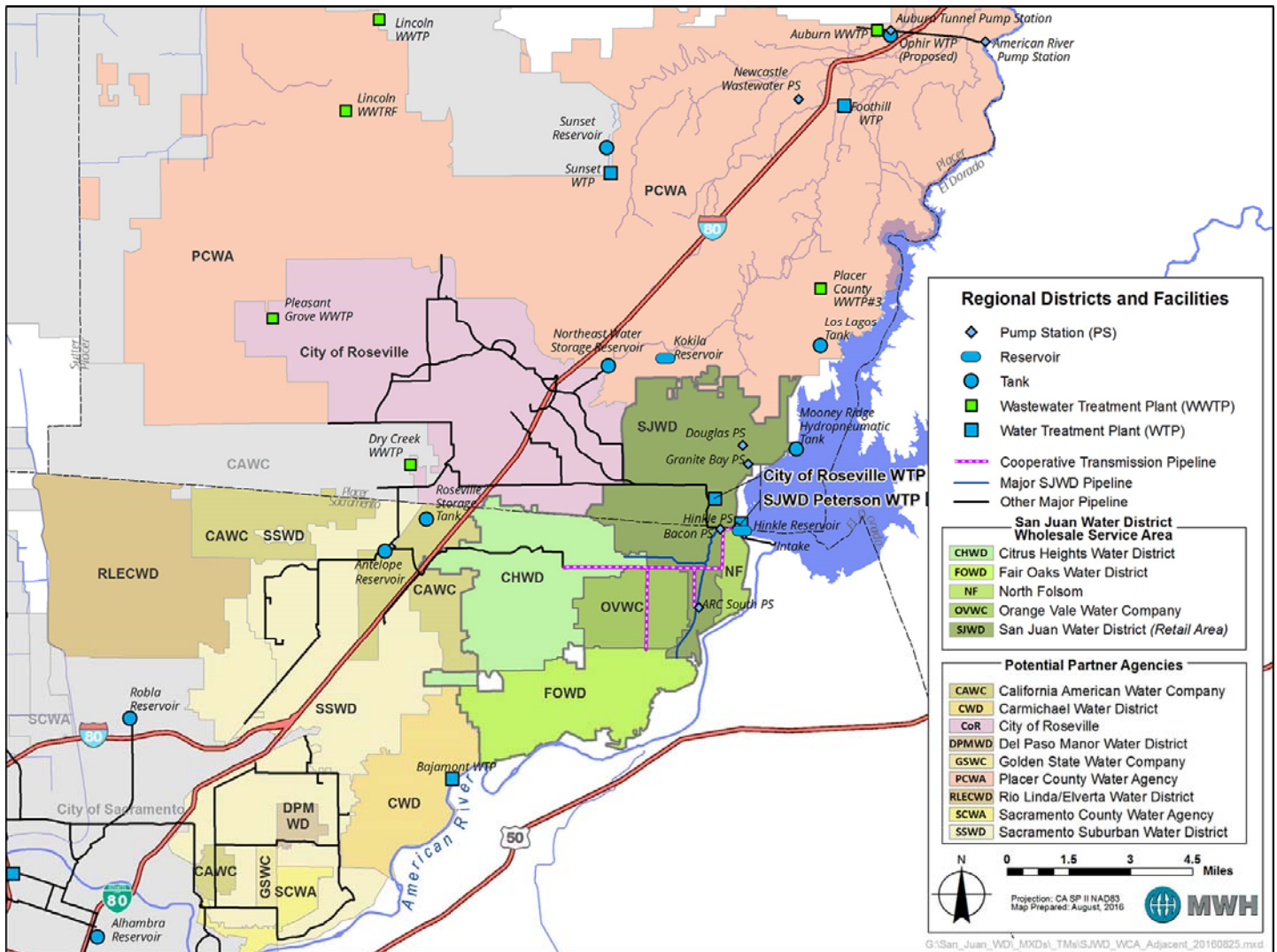
Located adjacent to Folsom Reservoir, the District diverts, treats, and delivers reliable, high-quality surface water service to about 160,000 retail and wholesale customers in eastern Sacramento and southern Placer counties. The District retails treated water in portions of Sacramento and Placer Counties, and wholesales treated water to Citrus Heights Water District, Fair Oaks Water District, Orange Vale Water Company, and the City of Folsom (for the Ashland area north of the American River). These agencies are collectively referred as to the Wholesale Customer Agencies or WCAs. In addition, the District treats surface water for Sacramento Suburban Water District (SSWD) when both plant capacity and SSWD’s supply from Folsom Reservoir are available.

With its roots tracing back to the Gold Rush era, the District holds a healthy measure of water rights and contract entitlements from the American River relative to its demands. The District holds a pre-1914 appropriative water right of 26,400 acre-feet per year and an appropriative water right of 6,600 acre-feet per year, both from the American River. The senior water right status prompted the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) to enter into an agreement with the District upon construction of Folsom Reservoir, setting the District’s maximum diversion under its water rights to 33,000 acre-feet per year at a rate of 75 cubic feet per second. The District also has the following contractual water entitlements:

BACKGROUND

San Juan Water District (District or SJWD) is a community services district established by a vote of the citizens in 1954, formed under Section 61000 et seq., Title 6, Division 3 of the California Government Code Water Code, Section 3000.

District's Retail and Wholesale Service Area and Potential Regional Partners



To help alleviate the health and safety concerns during California's ongoing historic drought, the District implemented two projects in 2015 to provide access to emergency supplies:

- Antelope Booster Pump Station Pump Back Project that provides up to 14.4 million gallons per day (MGD) of groundwater from SSWD to SJWD.
- Barton Road Emergency Intertie and Pump to expand intertie capacity with PCWA's treated water system to 3 MGD.

(1) a Central Valley Project (CVP) water supply contract for 24,200 acre-feet per year; and (2) a water supply contract with Placer County Water Agency (PCWA) for 25,000 acre-feet per year. The District has an existing Warren Act Contract with Reclamation to wheel non-CVP water supply through federal facilities, such as Folsom Reservoir and the intake facilities that connect to the District's water treatment plant (WTP).

CHALLENGES AHEAD

The historic drought that unfolded over the last several years severely tested the robustness and resiliency of California's water management systems. The District, which has long enjoyed a reliable surface water supply from Folsom Reservoir, is no exception. On December 5, 2015, storage in Folsom Reservoir reached a record low level of 135,000 acre-feet, surpassing the prior low of 140,600 acre-feet which occurred during the 1977 drought. As a precautionary measure, Reclamation recently completed construction of a series of temporary pumps that could draw water out of the reservoir even if levels fall below the municipal intake—the intake for the District and other water users in Sacramento-Placer region. Further drops in reservoir level could force the District and other water users to rely heavily on alternative water sources (e.g., groundwater), even with high levels of conservation. This scenario has come very close to reality several times recently.

The 2000 Water Forum Agreement and subsequent 2003 American River Basin Cooperating Agencies Regional Water Master Plan outlined a conjunctive use program to serve as a water supply reliability strategy for both the District and the region. This program was intended to make use of the District's 82,200 acre-feet



Folsom Reservoir reached a record low of 135,000 acre-feet on December 5, 2015, threatening water supplies to the District and many other water agencies in the Sacramento-Placer region.

per year of surface water supplies in most hydrologic years to build up groundwater storage, reserving groundwater to supplement surface water supplies in dry years to compensate for reduced surface water diversions on the Lower American River due to hydrologic conditions and environmental protection. However today, all WCAs rely primarily on surface water, and full potential of the conjunctive use program has not been realized due to infrastructure limitations and required partnership and operating agreements.

The District's long-term water supply reliability challenges are reflected in several different ways.

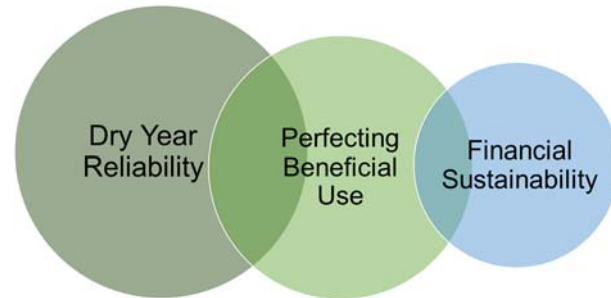
- When surface water is extremely limited, the District does not have sufficient facilities to provide a redundant water supply to its retail and wholesale customers from groundwater or alternate sources.
- The District does not currently possess storage rights in Folsom Reservoir, nor does it own large surface water storage facilities to hold water in normal and wet years.
- The District does not have, or have access to, groundwater banking capacity through collaboration with partners, either in or outside the wholesale service area, that could be used to store surplus surface water supplies in normal and wet years for use during dry years.
- The District's water rights and contract entitlements may be at risk if it cannot put them to use in their entirety, further reducing reliability in the face of increasing regulatory requirements and competition for uses throughout the system.

REGIONAL CONTEXT

This Study is being conducted concurrent with the Regional Water Authority's (RWA) Regional Drought Contingency Plan (RDCP) and Regional Water Reliability Plan (RWRP). The intent of the RDCP is to increase the resiliency of the region's water resources in the face of future climate and drought conditions. The RWRP aims to further advance regional collaboration towards full realization of the envisioned regional conjunctive use program, including the development of a federally-recognized groundwater bank, which would facilitate banking of the District's (and others') CVP water supplies. Study findings will allow the District to refine its strategic long-term plan and better position it to align and integrate with both the RDCP and RWRP.

APPROACH

The District's long-term focus is on providing increased water supply reliability to its retail and wholesale customers during dry years, and that can be best accomplished by integrating surface water and groundwater resources to fully leverage the District's water rights, contract entitlements, and available and planned facilities, all in a financially responsible and sustainable manner.



STUDY GOAL AND OBJECTIVES

The Study goal is to identify, analyze, and assess opportunities and potential projects to better utilize and integrate management of surface water and groundwater resources within the District's wholesale service area, and potentially outside the District's current service area, through collaboration, consolidations, or other actions improve its water supply reliability.

The three specific objectives of this Study are as follows:

1. Increase water supply reliability to the District's retail customers and WCAs during dry years by integrating surface water and groundwater storage.
2. Increase and enhance the use of the District's water rights, contractual entitlements, and facilities.
3. Provide long-term financial benefits to District ratepayers, and provide regional and, potentially, statewide benefits.

PLANNING PRINCIPLES

The following planning principles provided guidance on how the Study was developed and evaluations were conducted. Planning principles were necessary to aid in development and efficient screening of proposed water management options:

- Consider the full range of options within the District's maximum allowable authority.
- Maintain and improve current water supply reliability to WCAs.
- Maintain consistency with new and emerging regulations, such as the Sustainable Groundwater Management Act (SGMA).
- Maintain consistency with Water Forum Agreement, and consider regional setting and legal considerations.
- Maximize potential financial assistance for implementation.
- Conduct a structured, inclusive, and transparent planning process.

STUDY PROCESS

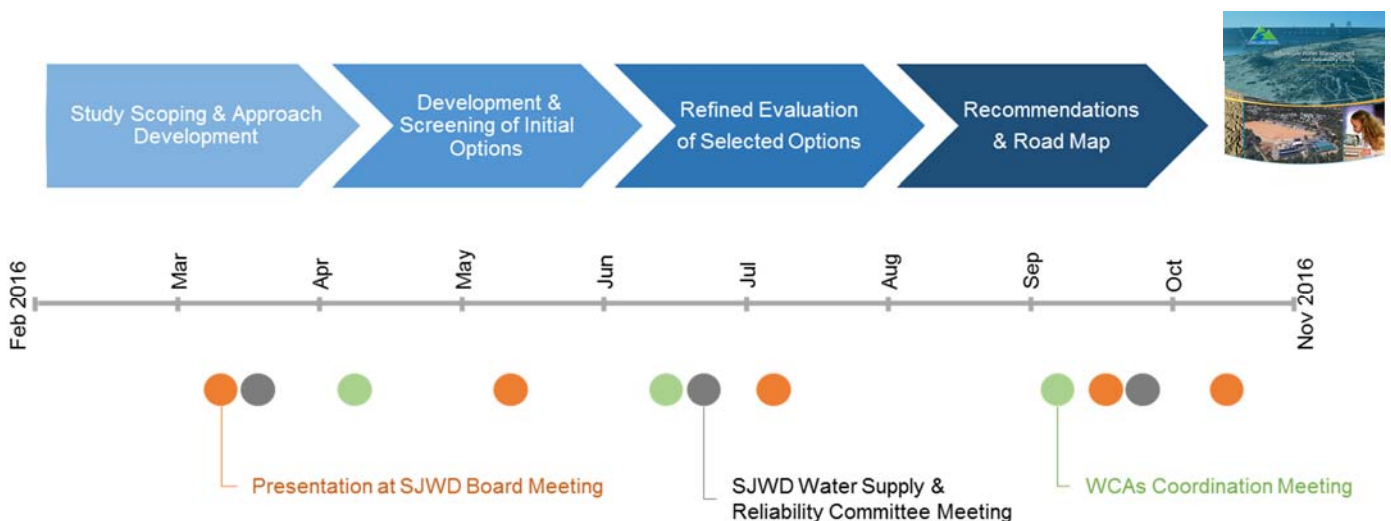
The Study process reflected a streamlined approach, where incremental findings from discrete tasks were documented in technical memoranda. It included the following activities:

- Study Scoping and approach development
 - Development of the Study goal, objectives, and planning principles.
 - Collection and review of existing information.
 - Development of screening criteria and metrics.
- Development and screening of initial water management options.
- Refined evaluation of selected water management options.
- Recommendations and Road Map
 - Development of a detailed scope for next phase of the Study.
 - Development of recommendations and a Study Final Report.

The Study process also included regular workshops and meetings with the District Water Supply and Reliability Committee, District Board of Directors, WCA representatives, and WCA Boards of Directors. All workshops and meetings were open to the public.

Study Process and Engagement

The four-step process provides a systematic approach to derive the final recommendations with efficient advisory communications within established venues, allowing additional transparency and public involvement opportunities in the short study timeframe.

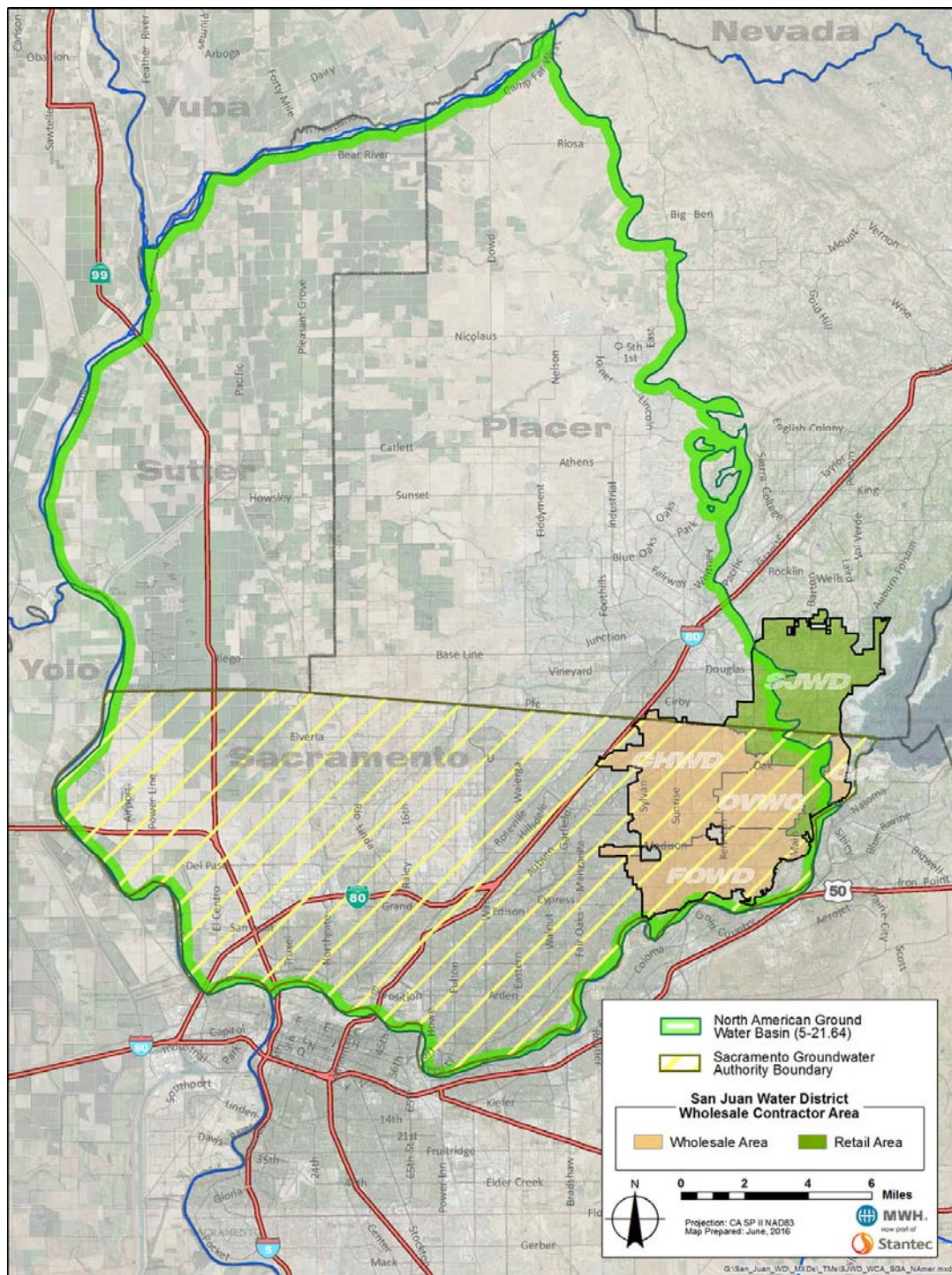


Study Report and Associated Technical Memoranda

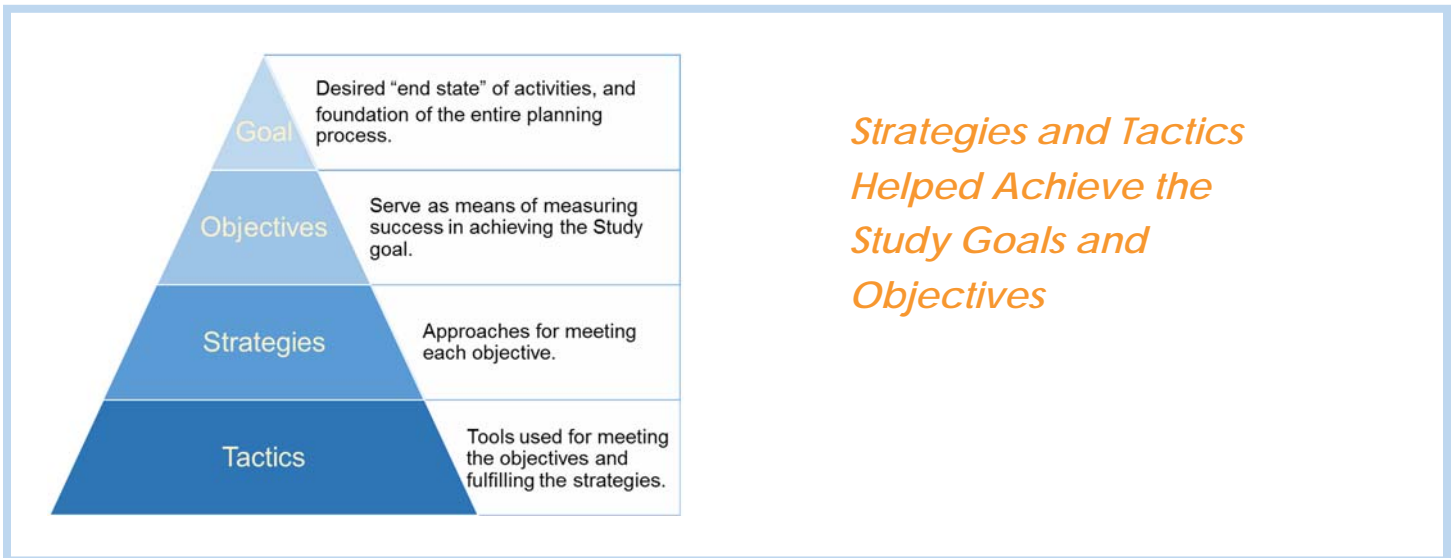
This Study Report summarizes the planning and technical efforts undertaken throughout conduct of the Study. A series of 6 TMs were prepared to document findings from discrete tasks, representing “snapshots in time” during the intensive Study process.

- **TM1: Purpose, Goals, and Objectives**—This TM sets the direction for the broader Study process by defining the purpose, goals, objectives, and planning constraints. It also describes the process and schedule, and roles and responsibilities for conducting the Study.
- **TM2: Review of Existing Information**—This TM summarizes the compilation and review of existing information required for completing the Study. It contains:
 - Descriptions of the categories of data and information needed to support the Study
 - Overview of the status and high-level assessment of the existing data and information
 - Recommendations and next steps
- **TM3: Screening Criteria and Methodology**—This TM presents the Study criteria, methods, and approach. It contains:
 - Description of the evaluation criteria and metrics developed to support evaluation, comparison, and prioritization of identified water management options (option)
 - Overview of the approach for screening the initial options using the developed evaluation criteria and metrics to identify which options should be retained for further evaluation
 - Overview of the approach for prioritizing the retained options using the results of a more detailed evaluation of each retained option and applying the same evaluation criteria and metrics to provide a consistent framework for evaluation, comparison, and prioritization of the options
- **TM4: High-Level Evaluation and Screening of Water Management Options**—This TM contains:
 - Identification and screening of the initial options
 - Results from the screening of the initial options using the developed evaluation criteria and metrics to identify which options should be retained for further evaluation
 - Overview of the approach for prioritizing the retained options
- **TM5: Evaluation of Retained Water Management Options**—This TM contains:
 - Review of the identification, screening, and evaluation of the initial options including the evaluation criteria and metrics used in the process
 - Grouping of the retained options by theme into a set of 5 combined options
 - Evaluation and comparison of the 5 combined options
 - Key findings on the combined options
 - Next steps in the Study
- **TM6: Feasibility Study Scope of Work**—This TM contains the scope of work for the next step in developing and evaluating the 5 combined options; the detailed Wholesale Water Management and Reliability Program Feasibility Study (Feasibility Study). It includes including task descriptions, a preliminary budget, and preliminary schedule.

These 6 TMs are available at the District office. Contact Keith Durkin at 916.791.0115 or kdurkin@sjwd.org.



Most of the District's service area is in the North American Groundwater Subbasin (Subbasin). This Subbasin is bounded on the south by the American River, on the north by the Bear River, on the west by the Sacramento River, and by bedrock foothills to the east. It covers an area of 351,000 acres and includes portions of Sacramento, Placer, and Sutter counties.



STUDY STRATEGIES AND TACTICS

In order to meet the Study objectives, several strategies were developed. These strategies and associated potential tactics for achieving the strategies are as follows:

1. **Increase use of District’s water rights and contract entitlements** – Would help meet Objectives 2 and 3 of increasing and enhancing beneficial use and providing long-term financial benefits, respectively. To implement this strategy, the following tactics could be taken:
 - a. **Groundwater recharge** – Would increase surface water supply use by recharging the groundwater basin during wet years, within or outside of the District service area, providing both increased utilization of water supplies and potential revenue from additional sales.
 - b. **Expansion of District’s service area** – Would increase demand for District’s surface water supplies and increase revenue from additional sales.
 - c. **Water transfers/exchanges** – Would increase use of District’s surface water supplies during wet years by transferring supplies to another agency, and increase District revenue.

2. **Develop alternative access to surface water** – Would help meet Objectives 1 and 2 of increasing water supply reliability, and increasing and enhancing beneficial use, respectively. To implement this strategy, the following tactics could be taken:
 - a. **Surface water storage** – Would increase use of surface water supplies in wet years by storing water when available. Consequently, would increase stored surface water for later use when surface water supplies are reduced or may not be available.
 - b. **New point of diversion or intertie connection** – Would decrease sole reliance on Folsom Reservoir. Unlikely to increase and enhance beneficial use unless paired with another option such that in wet years, the District would be able to increase its use of its surface water supplies.

3. **Diversify water supply portfolio** – Would help meet Objective 1 of increasing water supply reliability. To implement this strategy, the following tactics could be taken:

- a. **Groundwater extraction** – Would provide the District with another source of water aside from surface water supplies. During extreme drought conditions, when access to surface water supplies from Folsom Reservoir may be unavailable, the District would have access to groundwater.
- b. **Recycled water use** – Would provide the District with another source of water aside from surface water supplies. During extreme drought conditions, when access to surface water supplies from Folsom Reservoir may be unavailable, the District would have access to recycled water.

EVALUATION CRITERIA

A mix of qualitative and quantitative screening criteria were used to support evaluation, comparison, and ranking of water management options. The four evaluation criteria are as follows:

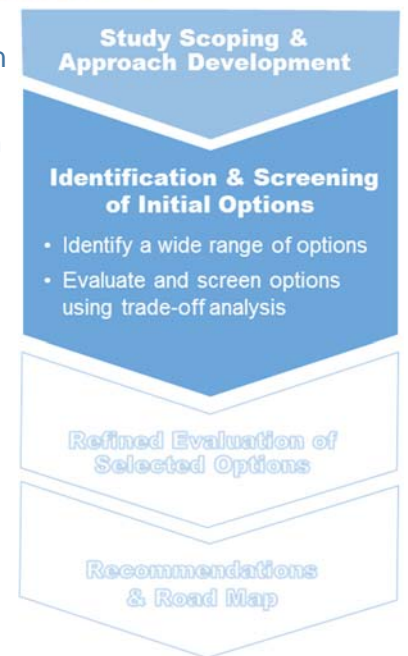
1. **Cost-effectiveness** – Quantitatively measured the cost-effectiveness of an option’s water supply benefits (yield) relative to its costs at a conceptual or pre-appraisal level.
2. **Contribution to objectives** – Quantitatively and qualitatively assessed an option’s contribution to each of the Study objectives listed below.
 - a. Increase water supply reliability to the District’s retail customers and WCAs by integrating surface water and groundwater storage for (1) improving reliability during dry years, and (2) mitigating extreme drought conditions (i.e., improving the District’s ability to receive water supplies during an extreme drought when the access to the District’s current water rights and contract entitlements is highly restricted).
 - b. Increase and enhance the use of the District’s water rights, contractual entitlements, and facilities.
 - c. Provide long-term financial benefits to District ratepayers, and provide regional and statewide water management benefits.
3. **Implementation complexity** – Qualitatively assessed the likelihood that an option would be implemented within a reasonable timeframe to achieve its potential benefits. Implementation complexity considered factors such as water rights and contract approvals, permitting, environmental compliance, land acquisition, public support, and institutional requirements.
4. **Uncertainty** – Qualitatively assessed level of confidence in the definition of the option, in both its benefits and costs.

The four evaluation criteria reflect the District’s priorities and objectives in this study and its management policy



INITIAL WATER MANAGEMENT OPTIONS AND EVALUATION

The comprehensive approach for the Study was to develop a holistic plan of actions to achieve long-term sustainability and stewardship in water resources management by conducting a reconnaissance-level evaluation of a broad spectrum of potential options. Evaluation criteria were then applied which resulted in selected options that were retained for further development and evaluation.



DEVELOPMENT OF INITIAL OPTIONS

Prior to Study initiation, 13 options for improving management of groundwater and surface water were identified by the District’s Water Supply and Reliability Committee. During the Study, an additional 15 options were identified through input provided during project workshops and meetings, and review of available technical documents.

Using the Study evaluation criteria and associated metrics, scores were assigned to each of the criteria and metrics for each initial option based on the results of assessment. These scores were then used to conduct a trade-off analysis to support screening of the initial options.

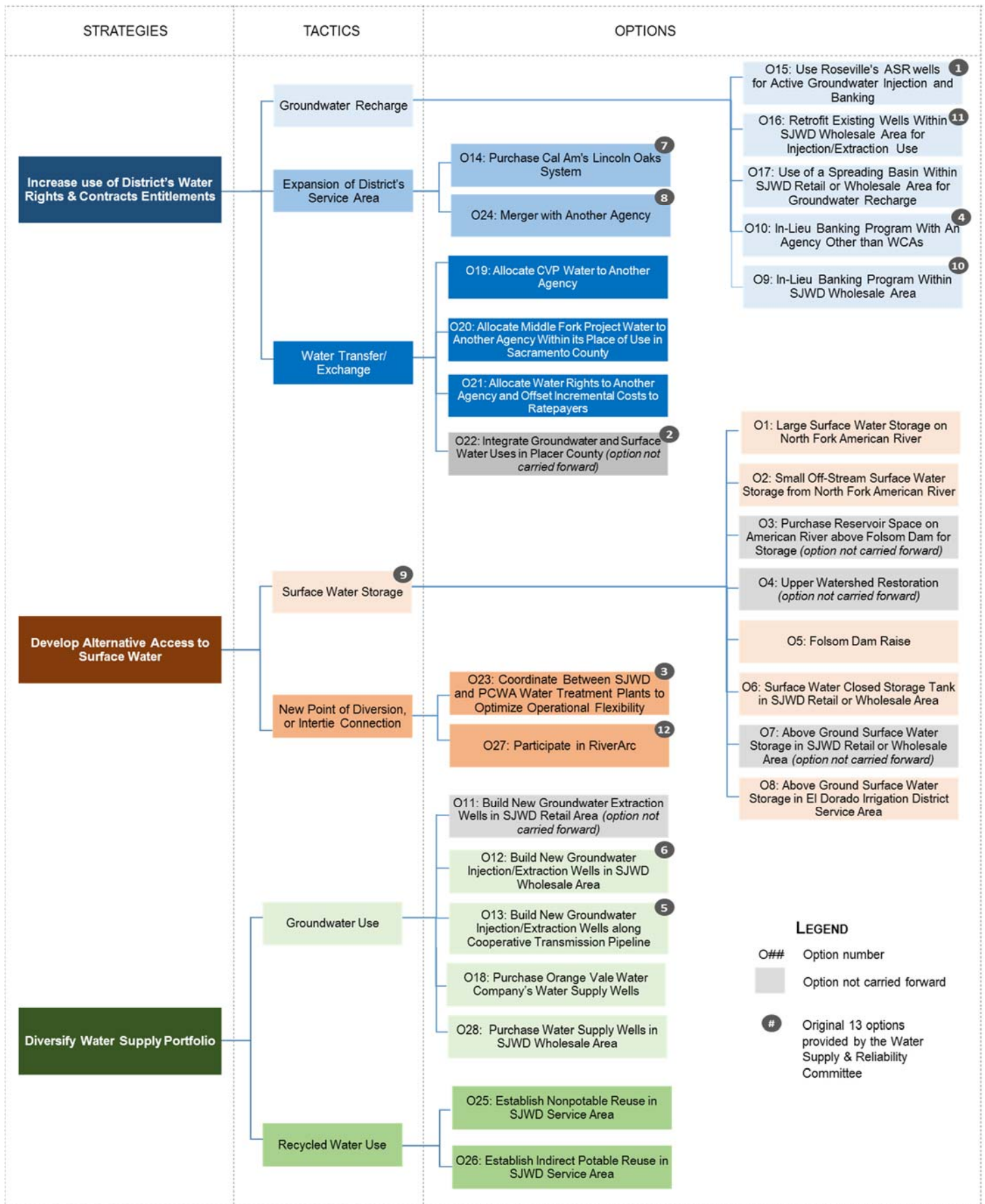
SCREENING OF INITIAL OPTIONS

The trade-off analysis investigated how the options ranked across two or more criteria. It allowed for identification of options that scored well across multiple criteria as well as those that scored well on some criteria, but not on others. The following three trade-offs were evaluated:

- **Cost-Effectiveness and Contribution to Objectives Trade-off** – Options were ranked according to cost-effectiveness and overall contribution to objectives scores. Higher ranking options had lower cost per acre-foot and higher overall contribution to objectives scores.
- **Cost-Effectiveness and Implementation Complexity Trade-off** – Options were ranked according to cost-effectiveness and implementation complexity scores. Higher ranking options had lower cost per acre-foot and higher overall implementation factors scores (i.e., easier to implement).
- **Contribution to Objectives and Implementation Complexity Trade-off** – Options were ranked according to contribution to objectives and implementation complexity scores. Higher ranking options had higher overall contribution to objectives and higher overall implementation factors scores (i.e., easier to implement).

The findings of this trade-off analysis were used to identify options that consistently ranked more highly for desirable outcomes and those that consistently ranked with less desirable outcomes. The more desirable occurred where the two trade-off criteria achieved their best values, while the less desirable occurred where both criteria were at their worst values.

Initial Water Management Options Grouped by Strategy and Tactic



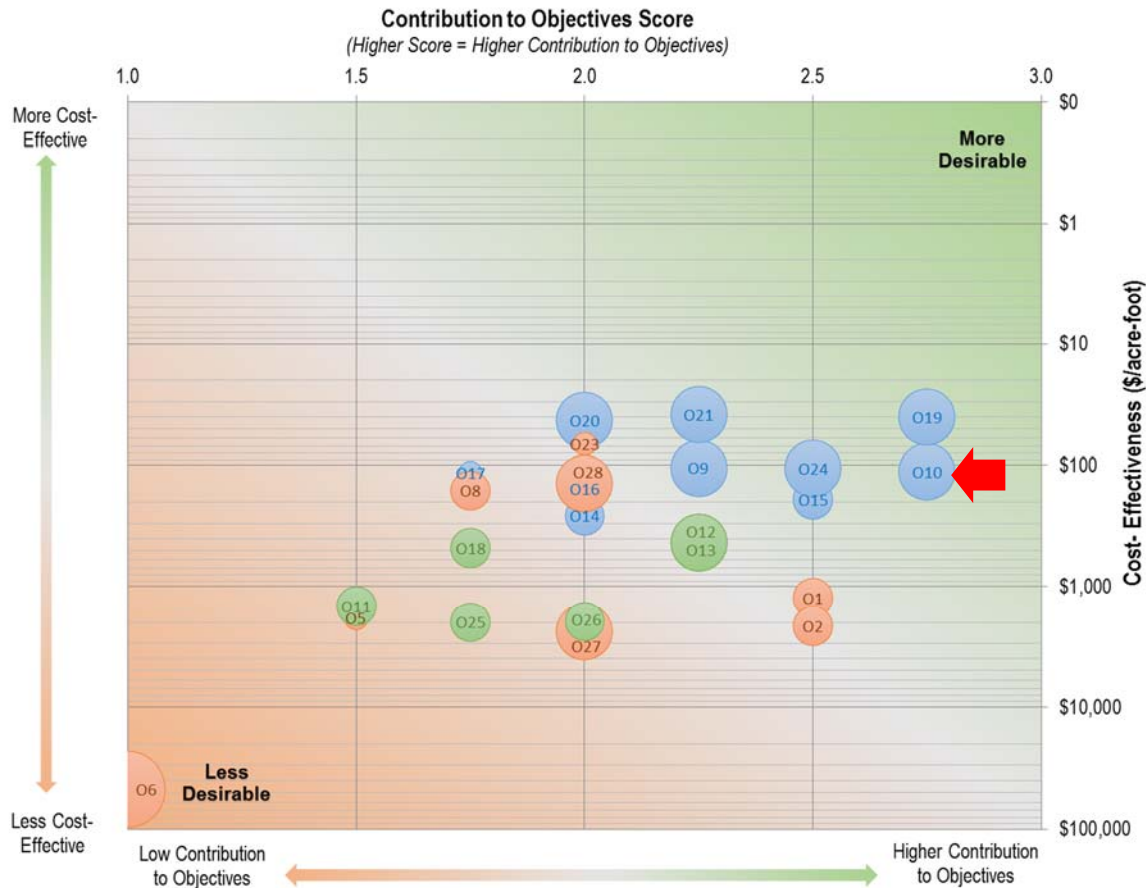
LEGEND

O## Option number

(grey box) Option not carried forward

Original 13 options provided by the Water Supply & Reliability Committee

Trade-off Analysis of the Initial Options using the Four Evaluation Criteria



LEGEND

○# Numbers correspond to Option ID

Option Type

- Increase use of District's Water Rights & Contracts Entitlements
- Develop Alternative Access to Surface Water
- Diversify Water Supply Portfolio

Bubble Size

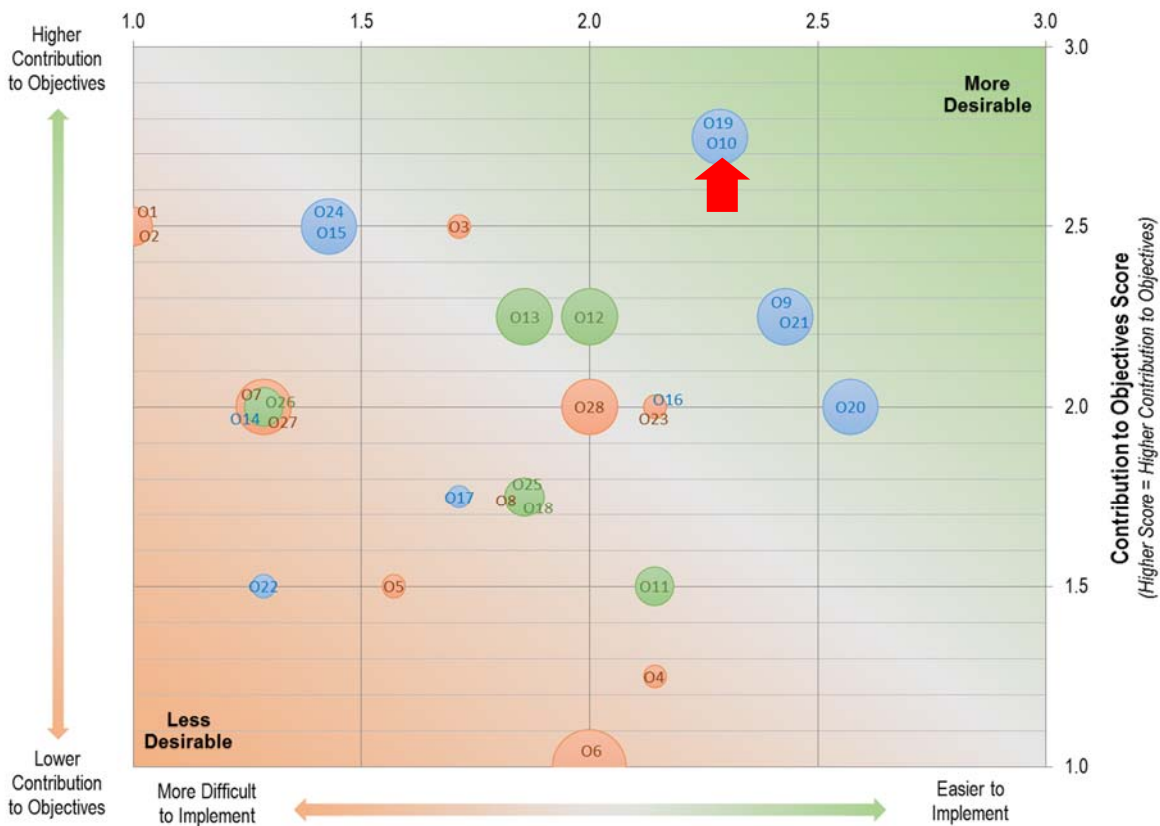
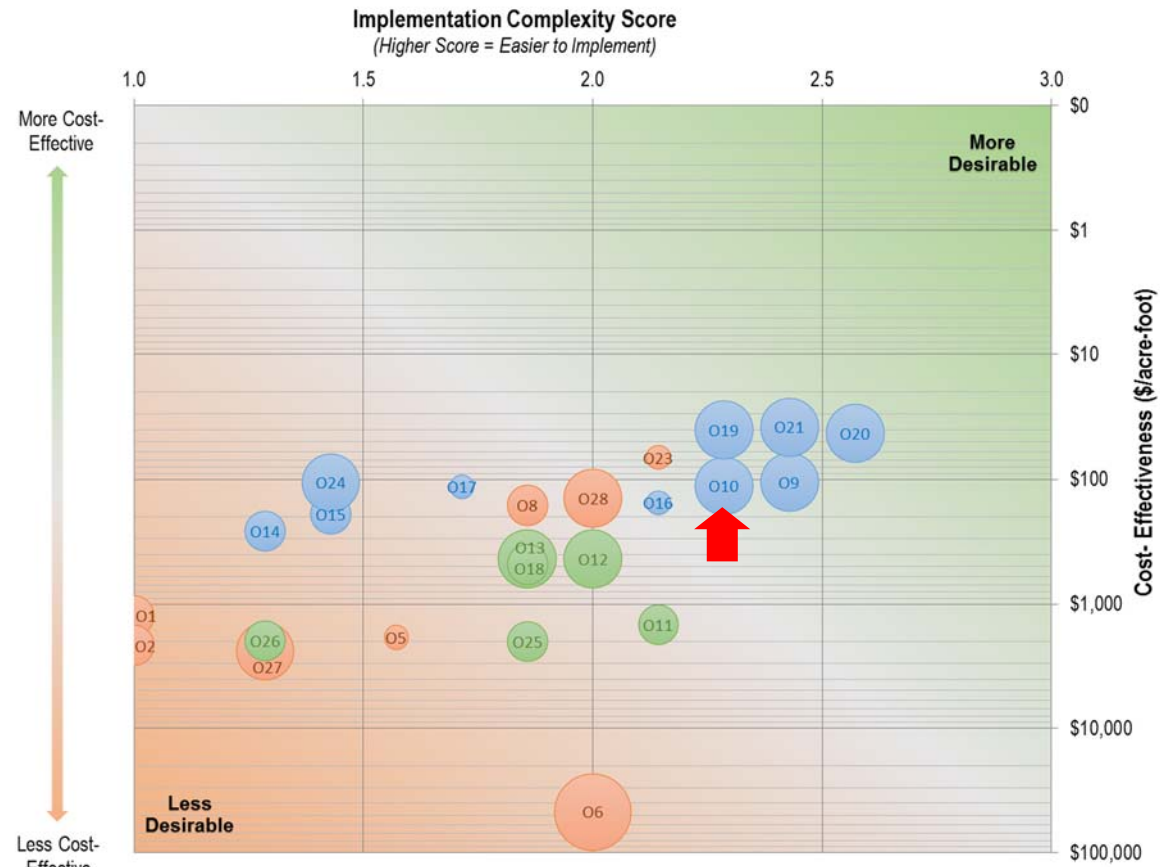
○ ○ ○ Bubble Size Represents Level of Uncertainty (Bigger Size = More Certainty; Smaller Size = more Uncertainty)



Example – Option O10 “In-Lieu Banking Program with an Agency Other than the WCAs”

Option's relative ranking is depicted in each of the three trade-offs:

- Moderately cost-effective with a high contribution to objectives (above)
- Easy to implement and moderately cost effective (upper right)
- Easy to implement with a high contribution to objectives (lower right)



Summary Evaluations of the 28 Initial Management Options and their scores under the four evaluation criteria and related metrics

Option Information				Cost-Effectiveness			Contribution to Objectives				Implementation Complexity						Uncertainty		Relative Scores						
ID	Name	Type	Water Source	Yield - Long-term Average (TAF/year)	Total Cost (\$million)	Overall Cost-Effectiveness (\$/AF)	Improve Dry Year Reliability	Perfect Beneficial Use	Provide Financial Benefit	Extreme Drought Conditions	Environmental Compliance	Permitting Requirements	Water Rights/Contracts	Institutional & Coordination	Land Acquisition	Public Acceptance & Support	Schedule	Costs	Yield & Reliability	Cost-Effectiveness Score	Objectives Score	Implementation Complexity Score	Uncertainty Score	Grouping	
																									O1
O2	Small Off-Stream Surface Water Storage from North Fork American River	SW	OTHR	17	\$ 1,012	\$ 2,139	●●●	●●●	●	●●●	●	●	●	●	●	●	●	●	●	●	0.96	2.50	1.00	1.50	C
O3	Purchase Reservoir Space on American River above Folsom Dam for Storage	SW	OTHR	0	\$ -	\$ -	●●●	●●●	●	●●●	●	●	●	●	●	●	●	●	●	●		2.50	1.71	1.00	x
O4	Upper Watershed Restoration	SW	OTHR	0	\$ -	\$ -	●	●	●	●	●	●	●	●	●	●	●	●	●	●		1.25	2.14	1.00	x
O5	Folsom Dam Raise	SW	OTHR	2	\$ 87.0	\$ 1,840	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.96	1.50	1.57	1.00	C
O6	Surface Water Closed Storage Tank in SJWD Retail or Wholesale Area	SW	OTHR	0	\$ 17.0	\$ 47,102	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.00	1.00	2.00	2.50	C
O7	Above Ground Surface Water Storage in SJWD Retail or Wholesale Area	SW	OTHR	0	\$ -	\$ -	●●●	●	●	●	●	●	●	●	●	●	●	●	●	●		2.00	1.29	1.00	x
O8	Above Ground Surface Water Storage Basin in El Dorado Irrigation District Service Area	SW	APPR	1	\$ 1.3	\$ 161	●	●	●	●	●	●	●	●	●	●	●	●	●	●	1.00	1.75	1.86	1.50	C
O9	In-Lieu Banking Program Within SJWD Wholesale Area	GW	OTHR	1	\$ 0.1	\$ 105	●	●	●	●	●	●	●	●	●	●	●	●	●	●	2.32	2.25	2.43	2.00	A
O10	In-Lieu Banking Program With an Agency Other than the WCAs	GW	OTHR	21	\$ 5.2	\$ 113	●●●	●●●	●	●	●	●	●	●	●	●	●	●	●	●	2.27	2.75	2.29	2.00	A
O11	Build New Groundwater Extraction Wells in SJWD Retail Area	GW	OTHR	0	\$ 1.0	\$ 1,459	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.97	1.50	2.14	1.50	x
O12	Build New Groundwater Injection/Extraction Wells in SJWD Wholesale Area	GW	OTHR	5	\$ 27.0	\$ 432	●●●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.99	2.25	2.00	2.00	B
O13	Build New Groundwater Injection/Extraction Wells along Cooperative Transmission Pipeline	GW	OTHR	5	\$ 27.0	\$ 432	●●●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.99	2.25	1.86	2.00	B
O14	Purchase Cal Am's Lincoln Oaks System	GW	OTHR	17	\$ 50.0	\$ 260	●	●●●	●	●	●	●	●	●	●	●	●	●	●	●	1.00	2.00	1.29	1.50	C
O15	Use Roseville's ASR wells for Active Groundwater Injection and Banking	GW	OTHR	2	\$ 0.3	\$ 191	●	●●●	●	●	●	●	●	●	●	●	●	●	●	●	1.00	2.50	1.43	1.50	B
O16	Retrofit Existing Wells Within SJWD Wholesale Area for Injection/Extraction Use	GW	OTHR	13	\$ 1.0	\$ 154	●	●●●	●	●	●	●	●	●	●	●	●	●	●	●	1.00	2.00	2.14	1.00	B
O17	Use of a Spreading Basin Within SJWD Retail or Wholesale Area for Groundwater Recharge	GW	OTHR	1	\$ 0.3	\$ 115	●	●	●	●	●	●	●	●	●	●	●	●	●	●	2.26	1.75	1.71	1.00	B
O18	Purchase Orange Vale Water Company's Water Supply Wells	GW	OTHR	0	\$ 1.0	\$ 478	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.99	1.75	1.86	1.50	B
O19	Allocate CVP Water to Another Agency	NS	CVP	10	\$ 1.0	\$ 40	●●●	●●●	●●●	●	●	●	●	●	●	●	●	●	●	●	2.74	2.75	2.29	2.00	A
O20	Allocate Middle Fork Project Water to Another Agency Within its Place of Use in Sacramento County	NS	MFP	7	\$ 1.0	\$ 43	●	●●●	●●●	●	●	●	●	●	●	●	●	●	●	●	2.72	2.00	2.57	2.00	A
O21	Allocate Water Rights to Another Agency and Offset Incremental Costs to Ratepayers	NS	APPR	17	\$ 1.0	\$ 38	●	●●●	●●●	●	●	●	●	●	●	●	●	●	●	●	2.75	2.25	2.43	2.00	A
O22	Integrate Groundwater and Surface Water Uses in Placer County	SW	MFP	0	\$ -	\$ -	●	●	●	●	●	●	●	●	●	●	●	●	●	●		1.50	1.29	1.00	x
O23	Coordinate Between SJWD and PCWA Water Treatment Plants to Optimize Operational Flexibility	SW	MFP	12	\$ 15.0	\$ 67	●	●	●	●	●	●	●	●	●	●	●	●	●	●	2.57	2.00	2.14	1.00	A
O24	Merger with Another Agency	NS	OTHR	17	\$ 2.0	\$ 106	●	●●●	●●●	●	●	●	●	●	●	●	●	●	●	●	2.31	2.50	1.43	2.00	A
O25	Establish Nonpotable Reuse in SJWD Service Area	RW	OTHR	3	\$ 51.0	\$ 1,989	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.96	1.75	1.86	1.50	C
O26	Establish Indirect Potable Reuse in SJWD Service Area	RW	OTHR	6	\$ 98.6	\$ 1,956	●●●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.96	2.00	1.29	1.50	C
O27	Participate in RiverArc	SW	OTHR	1	\$ 64.3	\$ 2,376	●	●	●	●	●	●	●	●	●	●	●	●	●	●	0.95	2.00	1.29	2.00	C
O28	Purchase Water Supply Wells in SJWD Wholesale Area	GW	OTHR	11	\$ 8.2	\$ 141	●	●●●	●	●	●	●	●	●	●	●	●	●	●	●	2.09	2.00	2.00	2.00	B

Key: AF = acre-feet, ASR = aquifer storage and recovery, Cal Am = California American Water Company, CVP = Central Valley Project, ID = Identification, O## = Option number, PCWA = Placer County Water Agency, SJWD = San Juan Water District, TAF = thousand acre-feet, WCA = Wholesale Customer
 Type: SW = Surface Water, GW = Groundwater, NS = Transfer/Exchanges, RW = Recycled Water

Water Source: APPR = Pre-1914 and senior appropriative water rights, CVP = CVP Entitlement, MFP = Middle Fork Project Entitlement from Placer County Water Agency, OTHR = Other or multiple water supplies

Assessment Value score: ● = 1 (less desirable), ●● = 2 (moderate), ●●● = 3 (more desirable)

Grouping Designations: A = high potential, B = moderate potential, C = low potential, x = not computed because of lack of quantitative information or option not carried forward

Note Grey shaded options were not carried forward.

Cell shading corresponds to assessment values. Better performing metrics (e.g., lower cost-effectiveness or higher relative score) are shaded green, while lower performing metrics are shaded red. Moderate performing metrics are shaded yellow.

Organizing the 28 options into three groups—Group A (high potential), Group B (moderate potential), Group C (low potential)—provided a means for identifying those options with a greater chance of achieving Study goals and objectives in a cost-efficient manner, within a reasonable timeframe, and with a high degree of confidence.

7 options were included in Group A, 6 in Group B, and 10 in Group C. Note that 5 options were not carried forward for further evaluation as they were deemed unviable or unfavorable at this time either because (1) the opportunity to implement the potential action had already passed (e.g., purchase surface water storage space on the American River above Folsom Reservoir), or (2) the potential action would be significant in nature and therefore, the District would not initiate the action alone but would likely participate with other regional partners or authorities (e.g., O4: Upper Watershed Restoration). These 5 options were not included in Groups A, B, or C.

11 options were selected for further evaluation as retained options:

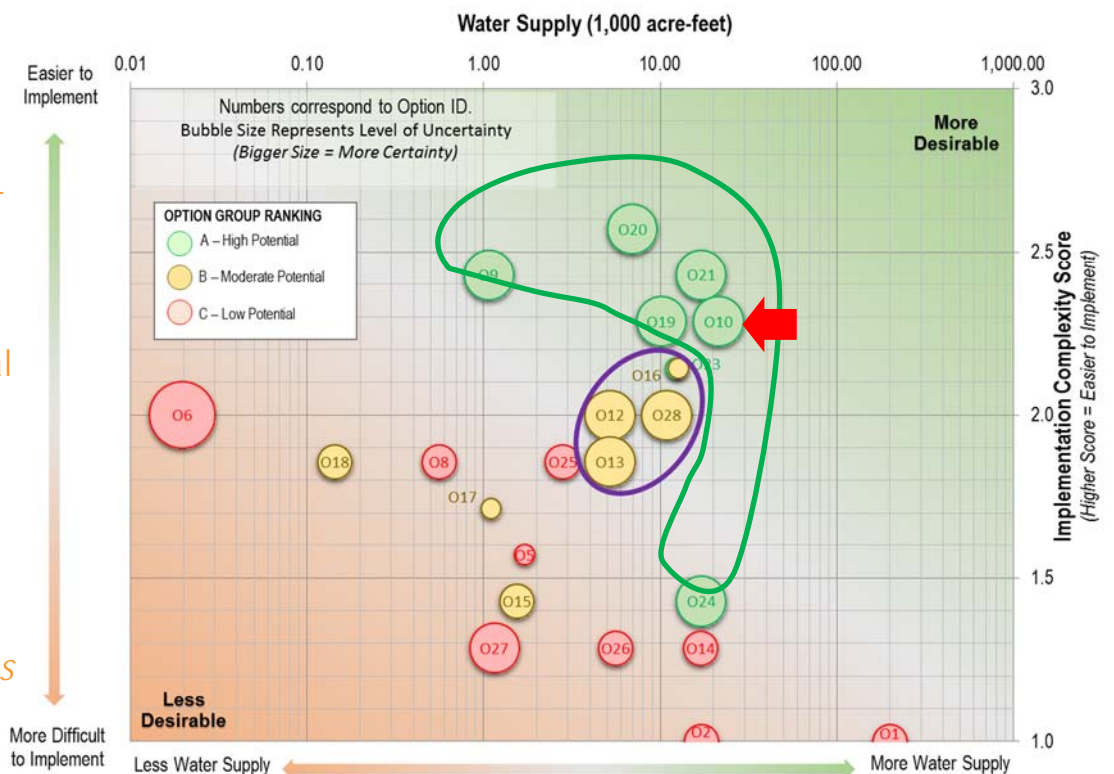
- 7 options in the high potential grouping (Group A)
- 4 options in the moderate potential grouping (Group B) that each had relatively high water supply benefits and only moderate implementation complexity

The District Board has the discretion, and ultimate responsibility, to select individual options or combine options to develop future reliability solutions. Ranking of options, due to changing conditions, may become more feasible in the future than at the time of this analysis.

Initial Options Grouped According to their Relative Ranking, and Options Retained for Further Analysis are Identified

11 Initial Options were retained for future consideration and/or additional feasibility studies:

- 7 Group A Options
- 4 promising Group B Options



REFINED WATER MANAGEMENT OPTIONS AND EVALUATION

The 11 retained options were grouped into 5 combined options based on their similarities with respect to (1) how they might achieve the District’s objectives, and (2) potential implementation requirements. Additional refinements were also made to each combined option to better contrast the effects of the corresponding water management strategies included in that combined option. A key consideration in the development and evaluation of the combined options was the need to observe the terms and conditions of water right permits and water service contracts, including corresponding places of use (POUs) and contract service areas.

An option presented herein is not necessarily a discrete and complete alternative that would fully achieve all Study objectives, meaning that the District would likely not choose one option and implement it individually. Rather, the combined options highlight and contrast the advantages and limitations of the different water management strategies.



Option A	Full Utilization of Water Supplies	019 020 021
Option B	In-lieu Banking Program	010 09
Option C	Aquifer Storage & Recovery Program	012 013 016 028
Option D	SJWD and PCWA Coordination	023
Option E	Merger with Another Agency	024

OPTION A: FULL UTILIZATION OF WATER SUPPLIES PROGRAM

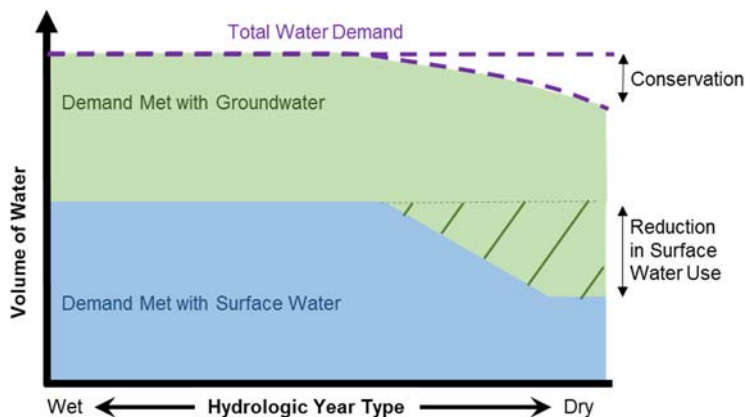
This option aims to more fully utilize the District's water rights and contract entitlements thereby improving dry-year water supply reliability. When fully developed, the District would be able to better integrate management of all of its available water supplies.

Under this option, the District would pursue institutional arrangements with one or more water agencies using a combination of (1) short- and long-term transfers with agencies outside the District's existing wholesale service area, and (2) new wholesale agreements. This would allow the District to serve additional demands outside its wholesale service area during Water Forum wet/average years to facilitate full utilization of available water supplies. The initial focus would be on water agencies inside the Sacramento Groundwater Authority (SGA) area (i.e., the area within the North American River Groundwater Subbasin and south of the Sacramento-Placer county line) because of proximity to the District. Depending on the water agency, additional infrastructure improvements may be required.

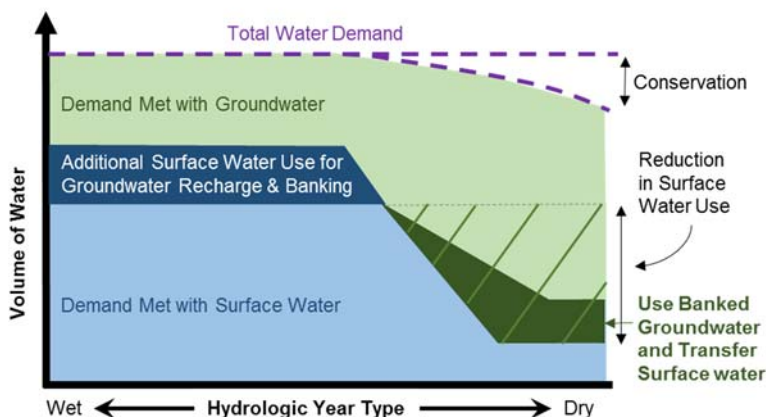
All water transfers or sales outside of the existing wholesale service area under this option were assumed to be transactional in nature. In other words, the District would not retain rights to the water after the transfer or sale. The District and existing WCAs would have priority on use of available water supplies prior to a transfer or sale. The resulting additional CVP contract water use would increase the District's dry-year supply compared to current conditions.

It is likely that with PCWA's consensus, Middle Fork Project (MFP) water would be used first in the initial implementation of this option. Should a wholesale agreement be established with another agency, it would provide justification for the District to request that Reclamation adjust its CVP contract service area to allow further flexibility of use. Note that the District may consider using water rights water for single-year sales. This tactic may be useful for near-term implementation of this option, prior to consideration of an agency potentially becoming a new WCA.

Conceptual Diagram for In-lieu Groundwater Recharge and Banking in the Context of Surface Water Diversions under the Water Forum Agreement, and the Related Opportunity for Groundwater Substitution Transfer



Typical Water Supplies in Conjunctive Use Operation



Groundwater Banking to Increase Reliability and Support Groundwater Substitution Transfers

OPTION B: IN-LIEU BANKING PROGRAM

Through in-lieu recharge, this option aims to develop water banking operations outside of the District's existing service area.

Under this option, the District would enter into a banking agreement with one or more agencies in the SGA area, but outside of the District's existing retail and wholesale service areas, to receive surface water in Water Forum wet/average years for use in-lieu of existing groundwater use. (In-lieu recharge opportunities in the wholesale service area are not included in this option because the quantity of water that could be banked would be small in comparison to the banking opportunities outside the wholesale service area.) The District would retain the right to the banked water for dry-year protection and for potential groundwater substitution transfers with other parties.

In a dry year when surface water supplies may be limited, the banked groundwater could be extracted and delivered to the District's retail or wholesale customers. In addition, a groundwater substitution transfer could be facilitated by a banking partner reverting back to groundwater use and extracting from the banked groundwater account. This would allow the District to redirect an equal amount of surface water and make it available for purchase by others. Depending on the banking partner(s), additional infrastructure improvements (e.g., interties, conveyances, and pumps) may be required.

The District and existing WCAs would have priority on use of available water supplies prior to delivery to a banking partner. The resulting additional CVP contract water use would increase the District's dry-year supply compared to current conditions.

It is likely that with PCWA's consensus, MFP water would be used first in the initial implementation of this option. Water rights supplies could be considered for



Conservation is an important element in District's long-term water management toolbox. However, more active management actions are required for securing long-term water supply reliability.

banking purposes because under this option, the District would retain the right to the banked water. Should the District's CVP contract service area change, the District could have additional flexibility for use of water supplies. However, it is not clear if a banking operation would be sufficient for Reclamation to take action to change the District's CVP contract service area; therefore, CVP water was considered in the

evaluation but the option's performance could be reduced if that water could not be used for banking purposes.

OPTION C: AQUIFER STORAGE AND RECOVERY PROGRAM

This option aims to employ aquifer storage and recovery (ASR) in the District's existing service area to increase water supply benefits and dry-year protection.

Under this option, during Water Forum wet/average years, treated surface water would be injected into the groundwater aquifer for short-term (less than a year) or long-term (more than a year) storage within the District's wholesale service area. In dry years, this stored water would then be recovered using the same or different groundwater wells in the District's wholesale service area to meet consumptive demands. The District could also make the stored water available for purchase by others through groundwater substitution. This option would involve developing additional operational agreements with WCAs, and installing new and/or retrofitting existing groundwater wells to allow for the injection and corresponding extraction needs.

All District surface water supplies could be considered in this option because the ASR program would be established in the existing wholesale service area.

OPTION D: SJWD AND PCWA COORDINATION

This option aims to provide emergency supplies and operational flexibility by working with PCWA to improve redundancy and dry-year protection by establishing alternative access to some District supplies.

If Reclamation's reservoir operations resulted in severely low storage and water elevation, the District's access to water supplies from Folsom Reservoir could be significantly restricted or become unavailable even though it still had the legal right to divert from the reservoir. Under this option, emergency supplies could be provided using available treatment capacities at the District's Peterson WTP, PCWA's Foothill WTP, and PCWA's future Ophir WTP.

Under this condition, PCWA would divert the District's MFP supply through PCWA's American River Pump Station upstream of Folsom Reservoir and treat it for delivery to the District's retail service area in Placer County (i.e., Granite Bay area). Treatment could occur at the PCWA's Foothill WTP or its future Ophir WTP, where more capacity would be available. Expansion of existing interties and other conveyance may be required to facilitate delivery of the treated water. While this operation would also be possible beyond emergency conditions, it would not be recommended because the District currently has ample capacity at its Peterson WTP.

The District could also provide PCWA with emergency supplies and operational flexibility from Folsom Reservoir, if the situation warranted.

The water supplies for this option would be limited to the MFP water for PCWA to divert at its American River Pump Station.

OPTION E: MERGER WITH ANOTHER AGENCY

This option aims to create a consolidated governing body of the District and one or more other water agencies in the region to enhance administrative and operational efficiencies, while increasing overall water supply reliability and operational flexibility.

Under this option, the District would pursue a merger agreement through a consensus-based process with an agency(ies) in the SGA area that currently uses groundwater as the primary source of supply. This arrangement would (1) facilitate the District's ability to deliver more of its available surface water in the combined service area thereby maximizing its beneficial use, and (2) provide the District with reciprocal access to groundwater for drought protection and operational flexibility, thereby increasing conjunctive use opportunities. Implementation of this option may involve construction of new and/or expansion of existing interties, conveyance, and pumping facilities, in addition to legal and institutional arrangements that would be unique to this option.

In a potential merger, all the District's water rights and CVP water supplies could be applied in a combined service area, assuming the approval of a boundary change in the District's CVP service area. MFP water would be used within its authorized POU or the combined service area, whichever was less.



Refined Evaluation and Comparison of the Five Combined Options (Recommended to Proceed)

ATTRIBUTE		Option A Full Utilization of Water Supplies	Option B In-lieu Banking Program	Option C ASR Program	Option D SJWD and PCWA Coordination	Option E Merger with Another Agency
Geographic Focus		Outside WSA ⁽¹⁾	Outside WSA ⁽¹⁾	WSA	Placer County	Outside WSA ⁽²⁾
Institutional Requirements		Short- & long-term Water sales	Wholesale Agreement	Water Banking Agreement	ASR Partnership Agreement	Emergency Operation Agreement
Water to be Used						
Retain Right to Water after Transaction		No	Yes	Yes	N/A	Yes
CONTRIBUTION TO OBJECTIVES						
1. Increase water supply reliability to the District's retail customers and WCAs during dry years.	Increase CVP Contract Use & its Dry-Year Allocations	✓	✓	✓		✓
	Expand Conjunctive Use & Groundwater Banking		✓	✓		✓
	Expand Emergency Interties				✓	
2. Perfect the beneficial use of the District's water rights, contractual entitlements, and facilities.	WSA					
	MFP Extended POU					
	SGA Area					
3. Provide long-term financial benefits to ratepayers, and provide regional and statewide benefits.	Support Groundwater Substitution Transfers	Enables for separate water sales with agencies outside the SGA Area	✓	✓		✓
	Upfront Costs		Varies ⁽²⁾ 			Varies ⁽³⁾

Key
ASR = Aquifer Storage and Recovery
MFP = Middle Fork Project
N/A = not applicable

PCWA = Placer County Water Agency
SJWD = San Joan Water District
SGA = Sacramento Groundwater Water Authority
WSA = Wholesale Service Area

CVP Contract
 MFP Contract
 Water Rights

Notes:

- ⁽¹⁾ Focused on agencies outside WSA, but within SGA area for cost and institutional considerations.
- ⁽²⁾ Costs will depend on partner agency and required facilities upgrade to facilities in-lieu operations.
- ⁽³⁾ Costs will depend on partner agency, and would include costs for operation, financial, administrative, and staff integration requirements.

EVALUATION OF COMBINED OPTIONS

The figure on the facing page shows the Study objectives to which each option would contribute. All options would increase water supply reliability during dry years. Options A, B, C, and E would also contribute to the other two objectives of helping increase and enhance the use of the District's water supply, and providing a long-term financial benefit to existing ratepayers. How each of these combined options would contribute to the specific objectives is also shown in the figure.

Increasing water supply availability during dry-years

Options A, B, C, and E would increase the use of CVP contract supplies (i.e., establish a historical record of beneficial use) which would provide the District with a higher CVP allocation during dry-years. Options B, C, and E would all focus on conjunctive use and could provide the District with access to groundwater supplies during dry years. Option D would provide an alternate access point to the District's MFP contract water should water be unavailable from Folsom Reservoir during extreme drought conditions.

Increasing and enhancing the use of the District's water supply

Currently, the District maximizes use of its water right and uses portions of both its MFP and CVP contract entitlements. Depending on the partner agency(ies) and location(s), the District could increase its beneficial use of certain surface water supplies. For example, the District would be able to use only water right or MFP water for groundwater banking if a partner agency was in

the MFP water right extended POU in Sacramento County. For existing WCAs, all of the District's available supplies could be used for groundwater banking. In comparison, a partner agency outside of the MFP water right extended POU would be limited to using the District's water rights, requiring the District to supply water right water to the partner agency and to backfill in its service area by serving CVP or MFP water. CVP water would only be available to a partner agency if it merged with the District due to the defined service area. Option D would not increase the beneficial use of supplies and is therefore left blank in the figure.

Long-term financial sustainability

All of the options (less Option D) would provide the District with the opportunity to engage in groundwater substitution transfers. However, there are important clarifications related to the nature of the required institutional arrangements under each option. Option A would be a transactional arrangement, so groundwater substitution transfers would need to be negotiated separately. Option B would essentially be a paid service for banking the District's available water supplies, where the District would retain the right to the banked water but with certain financial arrangements. Under Option C, there would also be additional financial costs for structuring a groundwater substitution transfer with the WCAs.

While most of these options would provide long-term financial benefits to ratepayers, there would be upfront costs associated with implementing any option that would likely offset some or all of the near-term financial benefits.

*Antelope Booster Pump
Station Pump Back
Project provides up to
14.4 MGD of
groundwater from SSWD*



KEY FINDINGS

In early March 2016, just 4 months after reaching its lowest recorded level, water was being released from Folsom Reservoir for flood control purposes. Climate change will exacerbate such significant hydrological swings and related management challenges. Consequently, this evaluation by the District of its options for developing a more robust water supply portfolio and implementation strategy to secure improved long-term water supply reliability and increased financial sustainability is critical to its mission.



Through comprehensive review of the water management and reliability options, key findings were identified that are important for District consideration and in formulating recommended next steps (feasibility studies and implementation).

1. The District's water reliability challenges include the exclusive reliance on surface water from Folsom Reservoir, and the undeveloped capacity to leverage its rich water rights and contract capacity to provide dry-year protection.

In severe drought conditions when surface water diversion is extremely limited from Folsom Reservoir, the District has limited options to provide redundant water supplies from alternative sources to maintain adequate service to its retail and wholesale customers. Although the District has approximately 21,300 acre-feet per year of currently unused surface water supplies available during wet years, this unexercised diversion does not contribute to dry-year protection, and the District is at risk of further reductions in its reliability under changing regulatory conditions and Reclamation's current shortage policy.

2. Achieving the District's long-term goals hinges upon providing, in a financially responsible and sustainable manner, increased water supply reliability during dry years to its retail and wholesale customers, which can be best accomplished by integrating surface water and groundwater resources to fully leverage the District's water rights, contract entitlements, and available and planned facilities.

Addressing the District's long-term water supply reliability challenges requires the integrated and balanced application of three key water management strategies: (1) increasing beneficial use of the District's available surface water supplies, (2) diversifying the District's water supply portfolio by integrating groundwater use, and (3) establishing alternative locations for the District to receive its surface water supplies (in addition to Folsom Reservoir).

3. The District’s investment priorities to increase water supply reliability must be guided by an implementation strategy that focuses on delivering efficient and practical outcomes while reacting to future regulatory mandates, adjusting to changing regional institutional relationships, and taking advantage of evolving statewide water policies. The District recognizes that evolving statewide policies make its resource assets even more valuable and likely put it at even greater risk than it is under today.

The range of options with a greater chance of achieving the District’s goals and objectives, in a cost-efficient manner, within a reasonable timeframe, and with higher degree of confidence, include: (1) increasing utilization of available water supplies through water sales and exchanges, (2) expanding groundwater banking through regional collaboration, (3) expanding emergency interties in the region, and (4) increasing utilization of available water supplies through a merger or new wholesale agreements.

Other important regional and statewide water management options for water supply reliability include water reuse and surface water storage development. Although these strategies can contribute to overall regional and statewide benefits and stewardship, they are ineffective in addressing the District’s water supply reliability challenges because of the high relative costs, high levels of implementation complexity, and/or questionable technical feasibility.

4. The key to the District’s long-term water supply reliability is the expansion of areas where the District can apply its available water supplies to enhance both utilization and management flexibility.

The increased flexibility in MFP water use and increased use of CVP water are important to the District’s overall strategy for long-term water supply reliability. This requires (1) collaboration with regional partners to integrate groundwater use into drought protection measures and groundwater

storage and banking opportunities, and (2) institutional arrangements and possible administrative considerations to remove unnecessary restrictions on water use. For example, the District’s current Warren Act Contract with Reclamation is for water use in Placer County only, which is more limited than what the District’s MFP contract allows.

Maximizing use of CVP contract water is critical to improving dry-year reliability. Reclamation’s current shortage policy specifies that the CVP allocation be based on contract usage in the preceding few years. Therefore, increasing the use of CVP contract directly translates into increased CVP allocations during dry years.

Maintaining high utilization of MFP contract water is also strategically important to preserve these supplies for use in the region. The District and PCWA should continue to coordinate on achieving maximum utilization of these supplies while increasing contract flexibility to allow for concurrent maximization of CVP contract utilization. Addressing financial implications of this increased flexibility is also important to long-term financial sustainability.

5. Many of the water management options considered in this study are not new; however, past implementation efforts have experienced differing levels of success.

The District and water agencies in the region face a challenging future in water management planning under changing regulations for water right administration and environmental protection, and implementation of SGMA. A higher level of conjunctive management in this region cannot occur without significant collaboration throughout the region.

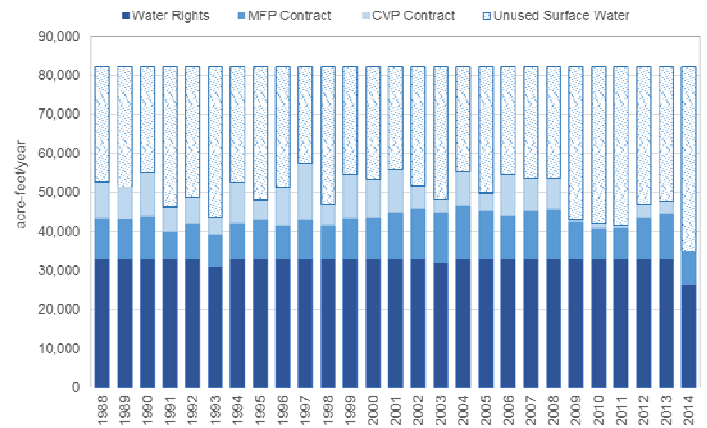
An agency merger can be an effective strategy to leverage regional assets and create administratively and financially efficient management entities. However, this type of action is often nuanced and time consuming. Alternatively, improving water supply reliability for agencies in the region can be further advanced through interagency agreements with conditions and protocols that facilitate long-term regional partnerships rather than short-term transactional gains.

Available Surface Water Supplies and Facility Capacities

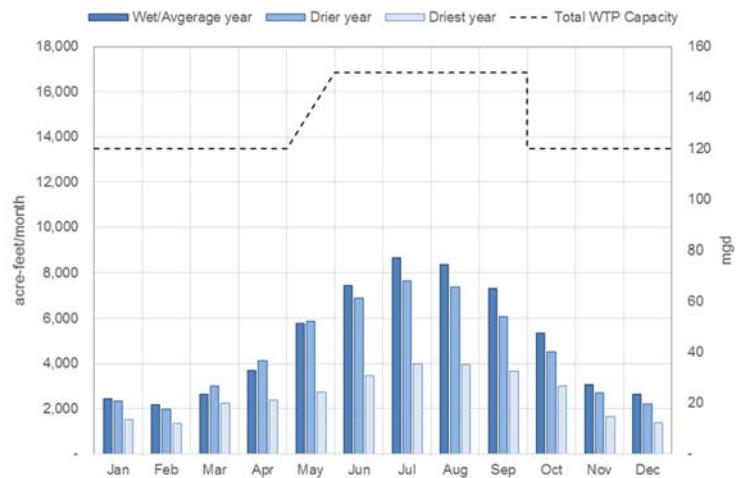
Of the District's 82,200 acre-feet per year of surface water supplies, approximately 21,300 acre-feet per year are available for other beneficial uses during Water Forum wet/average years.

The District's Peterson Water Treatment Plant (WTP) has unused capacity that can support expanded deliveries of surface water to other agencies in the region.

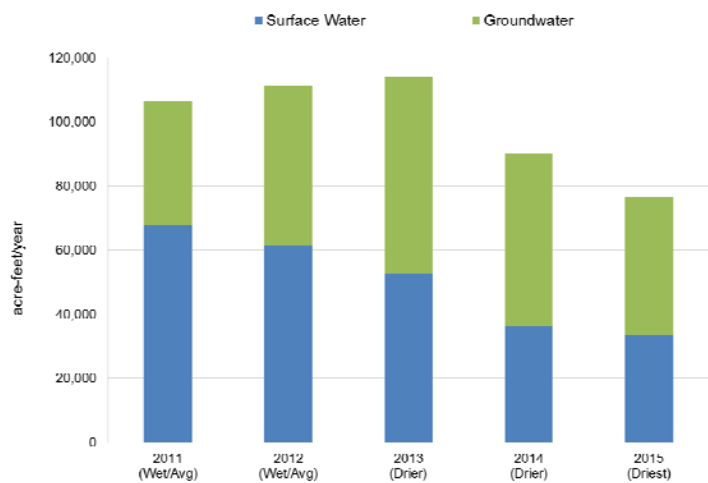
There are opportunities to expand surface water deliveries to existing groundwater users in the Sacramento Groundwater Authority (SGA) area that do not currently receive surface water in wet/average years.



District's Annual Surface Water Use by Source



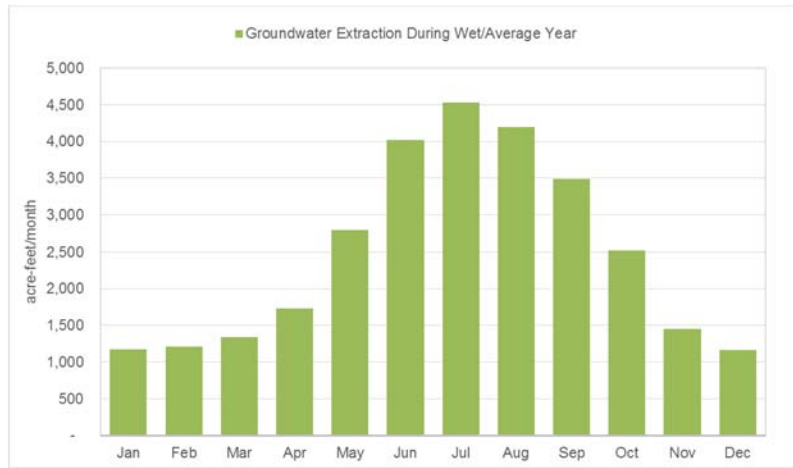
Peterson WTP Average Monthly Utilization Compared to Maximum Capacity



Surface Water and Groundwater Use in SGA Area

.... Can Facilitate Groundwater Banking via In-Lieu Recharge and/or Aquifer Storage and Recovery

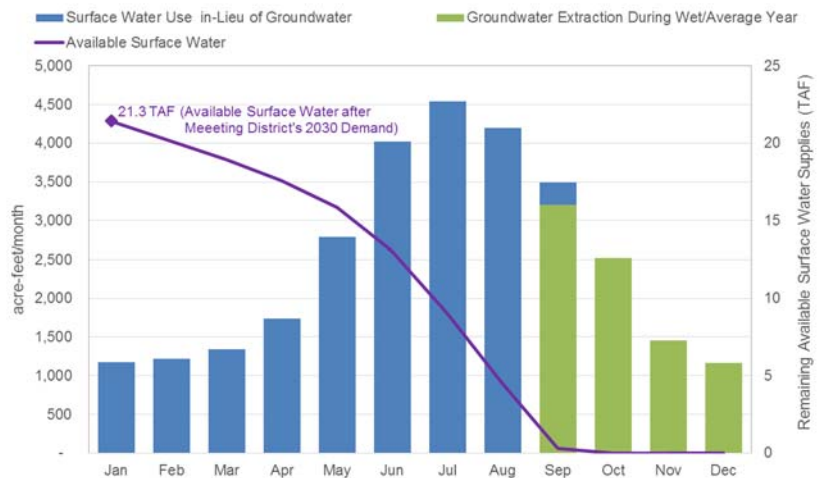
In the SGA area and MFP place of use, groundwater pumping during wet/average years is approximately 33,000 acre-feet per year.



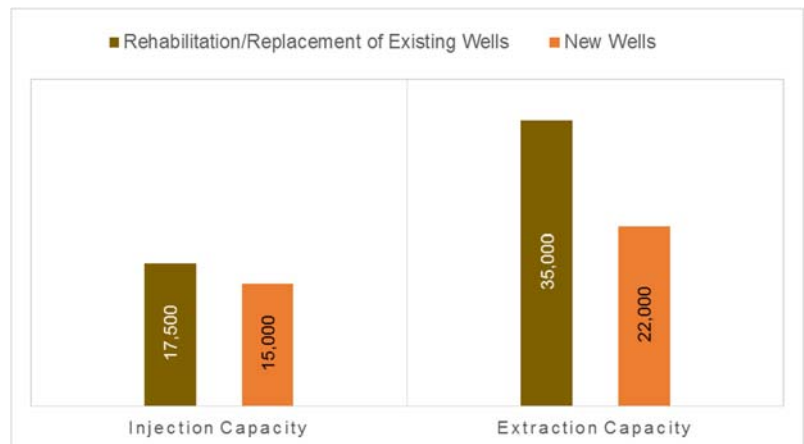
In-lieu Recharge using the District's Available Surface Water Supplies and Available Capacity at Peterson WTP



With participation of agencies in the SGA area, expanded groundwater banking via in-lieu recharge has the potential to put to beneficial use all of the District's available surface water supplies.



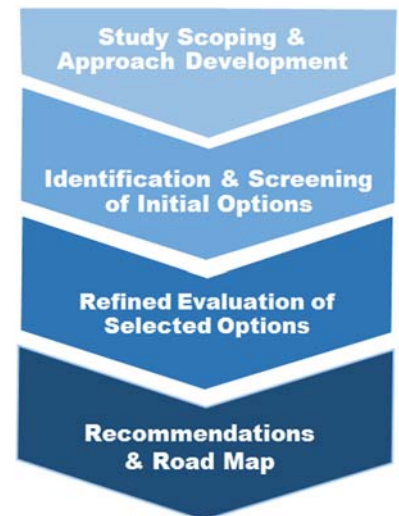
Expanded groundwater banking via Aquifer Storage and Recovery (ASR) in the District's wholesale service area also has the potential to put to beneficial use all of the District's available surface water supplies.



Potential Extraction/Injection Capacity of Existing Wells and New Wells in the Wholesale Service Area

RECOMMENDATIONS AND ROAD MAP

The various water management options presented in this study are not distinct alternatives that are mutually exclusive. Rather, they present a collection of tactics that support each other along the District's path toward long-term sustainable water supply reliability. As a multi-faceted approach to achieving a healthy water supply portfolio and providing necessary dry year protection, a road map was prepared for the District to delineate the general focus and schedule of the next steps in the District's evaluation and development of a program to achieve long-term water supply reliability.



1. The District should institute a Wholesale Water Management and Reliability Program to coordinate the implementation of various components of the recommended actions, and maintain the District's participation in regional initiatives consistent with its corresponding roles and benefits.

- a. The District should initiate a feasibility study for the recommended water management options—expanded water sales, groundwater banking, and an ASR program—to further explore institutional, technical, and infrastructure needs; regulatory compliance requirements; and business case evaluations and financial viability.
- b. The District should work with PCWA on its water supply infrastructure development schedule and a strategy to establish additional emergency interties to diversify the District's options for dry

year protection and emergency operations. Viable options are likely associated with the future expansion of Ophir WTP and expansion of conveyance and intertie capacities.

- c. The District should capitalize on regional opportunities when available. It should actively collaborate with the RWA and water agencies in the Sacramento-Placer region on potential water management actions that may be beneficial to the region, but not appropriate for the District to take the lead in development.
- d. In the longer-term, the District should continue to explore merger opportunities with other water agencies as a merger could bring forth an expanded service area, increase use of available water supplies in a flexible manner, and strengthen the District's overall position in regional and statewide water management negotiations and stewardship.

2. The District should review and amend, as needed, the relevant policies, contracts, and practices to support the Wholesale Water Management and Reliability Program.

- a. The District may consider instituting a formal groundwater replenishment demand in response to SGMA and dry-year protection needs. The formalization of such a demand could facilitate a groundwater banking practice for dry-year protection purposes. This formal replenishment demand would also be reflected in shortage policies and other management practices such as its Urban Water Management Plan.
- b. The District should obtain PCWA's concurrence on its desired flexible use of MFP water as part of the strategy for water supply reliability, and amend its Warren Act Contract with Reclamation to allow for MFP water delivery to Sacramento County areas in MFP water right extended POU.
- c. The District should consult with Reclamation on expanding the CVP contract service area to include MFP water right extended POU in Sacramento County, to the extent possible. The District's petition could be more effective with the establishment of a new long-term wholesale relationship to serve planned growth or replace existing groundwater use. Since the MFP water right extended POU in Sacramento County is completely in Reclamation's CVP water right POU, the amendment would likely be a administrative change that could be easily executed.
- d. The District should consider establishing clear but adaptive rules of engagement for exploring potential water sales and groundwater banking options with other water agencies in the Sacramento-Placer region to promote long-term partnerships. This would include, but not be limited to (1) a cost allocation strategy for infrastructure use and improvements, (2) ownership of new infrastructure and their operations, and (3) ownership of and accounting for banked groundwater.

3. The District should engage other water agencies in potential water sales and groundwater banking partnerships with a near-term focus on an “early win.”


Water sales and groundwater banking partnerships could expand the District's service area for using available water supplies, establish new wholesale agreements to support a CVP contract service area change, and realize groundwater banking operations for dry-year protection and/or transfers resulting in revenue to offset infrastructure investments. The District is equipped to immediately implement a short-term water sale with or without banking options using water rights—an opportunity for “proof-of-concept” implementation. Water sales based on the District's water rights are not recommended for long-term implementation; rather, long-term implementation should focus on the use of MFP and CVP water. In addition, when all the necessary contract service area changes are completed and consistent, the District would then be able to institute more flexible accounting procedures and water management.

4. The District should implement a long-term advocacy and public outreach campaign to support the Wholesale Water Management and Reliability Program.


In addition to the District's vision for long-term benefits sustainability practices, the importance of continued education, advocacy, and outreach in a consistent and well-thought manner cannot be over-emphasized. These activities would not be limited to the future feasibility studies related to infrastructure planning and implementation; rather they would enhance overall transparency and improve support throughout Program implementation. Customization for targeted audiences would be required for development and implementation of specific Program elements, including WCAs, water agencies in the Sacramento-Placer region, non-governmental organizations and regulatory agencies, and potential water transfer partners outside the region.

Road Map for Implementing the Study Recommendations

2016 – 2017	2017 – 2018
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POLICIES AND PROTOCOLS 



- Define scope of policy amendments and rules of engagement for study implementation

POLICIES AND PROTOCOLS 

- Develop and adopt policy amendments and formalize rules of engagement

MAXIMIZE WATER USE IN MFP EXTENDED POU  




- Seek PCWA’s concurrence on flexible use of the MFP contract water
- Explore regional interest in becoming a WCA

GROUNDWATER ACCOUNTING FRAMEWORK  




- Develop initial concept of District’s accounting framework based on SGA’s existing framework

MAXIMIZE WATER USE IN MFP EXTENDED POU  



- Develop a pilot application for flexible use of MFP contract water with regional partner(s)
- Develop new WCA agreement(s)

GROUNDWATER BANKING   



- Develop conceptual groundwater banking business cases to assess financial outlook in different banking operations and financial criteria for success
- Identify initial transfer partner(s) for exploratory discussions and possible pilot project

GROUNDWATER BANKING   



- Implement a pilot project for demonstration purposes
- Develop specific banking projects for development, approval, and implementation, focusing on near-term success
- Confirm initial transfer partner(s) for interest and potential agreements for implementation

ASR PLAN WITHIN DISTRICT SERVICE AREAS  

- Complete scoping in conjunction with policy considerations
- Develop implementation principles and guidance

ASR PLAN WITHIN DISTRICT SERVICE AREAS  

- Coordinate with WCAs on assessing the feasibility of ASR for integrated surface water and groundwater management in District’s wholesale service areas

EXPAND INTERTIES WITH PCWA  

- Coordinate with PCWA on concept development for expanded interties and use of American River Pump Station and Ophir WTP capacity

REGIONAL COORDINATION AND COLLABORATION  

- Coordinate on activities and collective interests
- Collaborate on water management initiatives complementary to District’s actions and interests

TYPE OF ACTION:

 Administrative
  Agreements
  In-lieu Recharge
  ASR
  Conveyance & Interties

Task 1 – Develop Policies & Protocols
 Task 2 – Develop Reliability Program & Implementation Plans
 Task 3 – Regional Coordination & Collaboration

2018 – 2019

2019 and Beyond

POLICIES AND PROTOCOLS

- Integrate amended policies and protocols for consistent application in District operations
- Amend policies and protocols as needed to adapt to changed conditions, if necessary

GROUNDWATER ACCOUNTING FRAMEWORK

- Formalize District's accounting framework
- Participate in regional efforts for implementation of groundwater accounting framework consistent with SGMA and relevant regional agreements related to implementation

MAXIMIZE WATER USE IN MFP EXTENDED POU AND SGA AREA

- Demonstrate ability to fully utilize water rights, CVP contract entitlement, and MFP contract entitlement, even if not on an annual basis
- Modify the CVP service area through administrative actions by Reclamation based on new WCA(s)

MERGER

- Engage in merger discussions with willing partner(s); when completed, modify the CVP contract service area accordingly and reassess need for continued implementation of roadmap components

GROUNDWATER BANKING

- Expand banking project development, approval, and implementation, focusing on long-term sustainable practice and governance
- Enhance regional coordination on banking operations, consistent with SGMA and other regional frameworks

GROUNDWATER BANKING

- Expand banking project development, approval, and implementation, focusing on expanding portfolio of transfer partners, if necessary
- Participate in regional water banking operations and other related regional common practices and protocols

ASR PLAN WITHIN DISTRICT SERVICE AREAS

- If ASR is feasible and mutual interest exists, coordinate with partner(s) to develop a detailed plan for approval and implementation agreement(s)

ASR PLAN WITHIN DISTRICT SERVICE AREAS

- Construct/retrofit facilities
- Incorporate ASR into long-term operations, and adapt as needed

EXPAND INTERTIES WITH PCWA

- Develop intertie expansion plan for feasibility and approval; develop operation agreement with PCWA

EXPAND INTERTIES WITH PCWA

- Implement intertie expansion and operation agreement

KEY:

ASR = Aquifer Storage and Recovery
CVP = Central Valley Project
MFP = Middle Fork Project

POU = Place of Use
PCWA = Placer County Water Agency
SGA = Sacramento Groundwater Authority

SGMA = Sustainable Groundwater Management Act
WCA = Wholesale Customer Agency
WTP = Water Treatment Plant



Wholesale Water Management and Reliability Study

FINAL STUDY REPORT | OCTOBER 2016

