Coastal Branch

Water Management Strategies

December 17, 2021

HALLMARK GROUP

EST. 1968
PROVOST & PRITCHARD
CONSULTING GROUP
An Employee Owned Company

Table of Contents

Draft

Draft

Table of Figures

Table of Tables

Draft

Appendices

Appendix A Resource Documents

Appendix B Needs Assessment Summary

Appendix C Survey Results Table

Appendix D CALSIM Water Supply Summaries

Appendix E Model

Draft

Acronyms and Abbreviations

AFY Acre Feet per year

CCWA Central Coast Water Authority

CEQA California Environmental Quality Act

CESA California Endangered Species Act

DWR Department of Water Resources

EIS Environmental Impacts Statement

EIR Environmental Impacts Report

ESA Endangered Species Act

FESA Federal Endangered Species Act

FONSI Finding of No Significant Impacts

GSA Groundwater Sustainability Agency

GSP Groundwater Sustainability Plan

IRP Integrated Resource Planning

NEPA National Environmental Protection Act

NOAA National Oceanic and Atmospheric Administration

PPWTP Polonio Pass Water Treatment Plant

SBCFCWCD Santa Barbara County Flood Control and Water Conservation District

SGMA Sustainable Groundwater Management Act

SLO San Luis Obispo

SLOFCWCD San Luis Obispo County Flood Control and Water Conservation District

SWRCB State Water Resources Control Board

SWC State Water Contractors, Inc.

SWP State Water Project

USBR United States Bureau of Reclamation

Draft

Contract Terms

This report uses terms related to the SWP contract as defined below:

Allocated Table A or Table A refers to how much DWR allocates to the SWP Contractors. It is discussed as both a quantity (acre-feet when discussing a specific SWP Contractor and year) and percentage (of Annual Table A Amount when referencing broader context).

Annual Table A Amount is the amount of SWP water set forth in Table A of the Water Supply Contract and is defined in Article 1(l) of the contract. In summary, it is used to determine each SWP Contractor's share of SWP water service such as water supply allocations, access to conveyance, repayment for water services, etc. The word "Annual" is in the front of Table A Amount because there was a "build up" period whereby SWP Contractors did not have to pay for their ultimate share of the SWP during the early years of its construction and operation.

SWC refers to State Water Contractors, Inc. which is defined by the SWC website as an association formed of 27 of the public water agencies and represents the legal, policy and regulatory interests of the SWP Contractors, who are responsible for the capital and operations and maintenance costs of the SWP. The SWC works in partnership with other water organizations, and coordinates with Department of Water Resources on behalf of its members.

SWP Contractor is a Public Water Agency (PWA) that has entered into a long-term contract with DWR for water service from the SWP. To avoid confusion, this document uses the terms SWP Contractor(s) rather than the ambiguous term Contractor(s).

Coastal Branch Contractors are the two SWP Contractors on the Coastal Branch, specifically CCWA and SLOFCWCD. Their constituents are referred to in this study as Participants.

Water Supply Contract is defined as the water service contract between DWR and each individual SWP Contractor. The Water Supply Contract is officially titled as: "Water Supply Contract Between The State of California Department of Water Resources and …" followed by the name of the PWA.

Draft

1 Purpose

Evolving State Water Project (SWP) regulatory conditions and conveyance capacity availability in the SWP's Coastal Branch provide an opportunity to reevaluate how SWP allocations can be optimized to meet the needs of both Coastal Branch Contractors, Central Coast Water Authority (CCWA) and San Luis Obispo County Flood Control and Water Conservation District (SLOFCWCD). This report develops and evaluates potential water management alternatives such as storing, exchanging, and transferring SWP water and other supplies to optimize the yield of SWP water for Coastal Branch Contractors in both Santa Barbara and San Luis Obispo counties.

Since 2008, severe operational constraints on the SWP have resulted in limited periods of surplus water availability. These regulatory changes, such as the recently adopted Federal Biological Opinions, limit the availability of SWP water such that SWP water will be more available during wet periods and less available during dry periods, which will cause storage constraints in the San Luis Reservoir. Similarly, state and federal fish regulatory restrictions are anticipated to increase, thus constraining the SWP's delivery capability. Both CCWA and SLOFCWCD also store current year SWP allocation that has not been delivered in the SWP San Luis Reservoir as "carryover water" for subsequent years. However, anticipated storage limitations in the San Luis Reservoir mean that this carryover storage is at risk of being displaced and pose a challenge for both agencies. Additional projects and facilities associated with the SWP, such as the proposed "Delta Conveyance Project", are anticipated to further reduce the ability to use San Luis Reservoir for carryover storage.

While the periods of SWP water availability are limited, when they do occur, the quantities of available Article 21 Water or at-risk carryover water (Article 56 Water) can be relatively large and exceed the capability of Central Coast Contractors (defined here as SLOCFCWSD and CCWA Participants) to fully utilize their available supply. In recent years, occasional periods of wet conditions in the Sacramento-San Joaquin Delta, coupled with significant quantities of water carried over by Contractors in San Luis Reservoir, resulted in lost opportunities by Central Coast Contractors to take advantage of excess flows.

Several opportunities may exist to optimize the yield of SWP water for Central Coast Contractors such as exercising more management flexibility through the 2021 SWP Water Management Contract Amendment, maximizing retention of Table A amounts, using excess physical capacity in the Coastal Branch, potentially partnering on the benefits of the Delta Conveyance Project, and developing emergency interconnections between CCWA and SLOFCWCD.

The growing number of factors that will impact future SWP supplies require all SWP Contractors to constantly adapt their water management strategies. To assist with such adaptation, Department of Water Resources (DWR) and the SWP Contractors negotiated in 2018 to amend the SWP Service Contract (2021Water Management Tools Amendment) to increase water management flexibility and expand the range of options available for SWP Contractors and their member agencies. The SWP Water Management Tools Amendment allows additional management options, including one-year purchases and sales of SWP water, that were previously limited by the SWP water supply contracts.

Both Coastal Branch Contractors are interested in exploring how Table A amounts may be used to maximize their use of available SWP water. For example, SLOFCWCD has a total Table A amount of 25,000 AFY, but only has contracted conveyance capacity for this amount through Reach 31A of the Coastal Branch Phase I facilities, and only contracts with CCWA to treat and deliver 4,830 AFY through the Polonio Pass Water Treatment Plant (PPWTP.) CCWA has a current total Table A amount of 45,486 AFY and has considered reacquiring 12,214 AF that was suspended in the 1980s to bring a new total Table A amount to 57,700 AFY.

Concurrent with evolving SWP supply and regulatory conditions, operational experience with the Coastal Branch has identified frequent opportunities for more opportunistic use of the Coastal Branch conveyance. Other opportunities for optimizing allocation of water may include partnership between the agencies to receive

Draft

some of the benefits of the Delta Conveyance Project if SLOFCWCD decides to participate in it, and operational interconnections between the agencies. The additional conveyance capacity, together with the 2021 Water Management Tools Amendment, provides an opportunity to identify, evaluate and select water management strategies to meet the needs of the Coastal Branch Contractors, their Participants, and water users.

Draft

2 Executive Summary

The Coastal Branch Contractors seek to optimize their use of SWP supplies while meeting their overall water supply needs and financial goals. These Coastal Branch Contractors are the Central Coast Water Authority (CCWA) and San Luis Obispo County Flood Control and Water Conservation District (SLOFCWCD) which contract for SWP Table A water supplies on behalf of their constituent Participants in both San Luis Obispo and Santa Barbara counties. In the context of evolving State Water Project (SWP) regulatory conditions and additional conveyance capacity in the Coastal Branch, CCWA and SLOFCWCD, as the two Coastal Branch Contractors, are taking the opportunity to reevaluate how their SWP allocation can be optimized to meet their needs. This report develops and evaluates potential water management alternatives such as storing, exchanging, and transferring SWP water and other supplies to optimize the yield of SWP water for Coastal Branch Contractors in both San Luis Obispo and Santa Barbara counties.

This report was prepared under the direction of CCWA, representing SWP Participants in Santa Barbara County, and SLOFCWCD, representing SWP Participants in San Luis Obispo County. Coastal Branch Participants have been engaged as stakeholders in the development of this study through participation in a needs assessment survey as well as a series of five stakeholder meetings.

Chapter 1 describes the purpose of this study and Chapter 3 provides background on the entities, responsibilities, water supply goals, and water supply amounts of the entities involved in the Coastal Branch. Chapter 4 assesses, and documents regional water management needs gathered from the needs assessment survey of Coastal Branch Participants (stakeholders) including the needs of water supply, water storage options, conveyance capacity, water quality, cost control, and other unique needs of individual Participants. This needs assessment provides the basis for evaluating the ability of potential programs to meet identified needs

Chapter 5 summarizes rules and regulations of the SWP and other regulatory agencies affecting potential management actions. Management of State Water Project water by SWP Contractors, such as Coastal Branch Contractors within SLOFCWCD and CCWA, is subject to a variety of formal and informal regulatory constraints relating to water rights in the State of California, SWP Water Supply Contracts including different types of transfers, exchanges and how exchanges are impacted by the 2021 Water Management Amendment, storage and the implications of Article 56 on storage, and conveyance and delivery priorities identified in Article 12(f). SWP considerations and constraints are also described relating to use of conveyance, groundwater storage and environmental permitting including CEQA, NEPA, federal and state endangered species regulations and the Delta Plan.

Water management activities by SWP Participants in San Luis Obispo and Santa Barbara Counties (Central Coast Contractors) will frequently require use of conveyance capacity in the California Aqueduct and the Coastal Branch Aqueduct which are operated by different agencies, with different patterns of availability and different rules. Chapter 6 describes the conveyance facilities, their physical and operational capacities, constraints upstream and downstream of San Luis Reservoir, analyses of CALSIM-2 and historical capacities for the California Aqueduct, comparison of design capacity and historical deliveries for the Coastal Branch, and finally, presents a high-level summary of available capacity in various reaches.

Chapter 7 discusses SWP supply capability using CALSIM-2 studies in DWR's 2019 SWP Delivery Capability Report to estimate present SWP supply capability conditions and quantify available SWP supplies for both counties. The 2019 SWP DCR indicates that CCWA has available SWP Table A and carryover supplies of about 59% of its Table A contract amounts. SLODCWCD has slightly lower SWP Table A and carryover supplies of about 58% of its Table A contract amounts. Chapter 7 documents water supply quantities that the SWP is capable of providing for Coastal Branch Contractors.

The selection criteria for the identified water management strategies are intended to be utilized subjectively to guide decisions on how to best implement management measures that align with participant constraints and

Draft

goals. Chapter 8 first summarizes regional objectives from the Santa Barbara County and San Luis Obispo County IRWMPs and then identifies seven subjective selection criteria to determine if a management measure should be implemented. These selection criteria are water supply, water quality, ability to permit, cost, proximity, equity and reliability.

Chapter 9 identifies and evaluates several water management components to provide an initial indication of the water management capabilities available to the Central Coast area. This section begins by describing the scope and limitations of the Central Branch Integrated Resource Planning (CBIRP) Analysis Tool and application. A focused subset of nine water management components are described and then combined into five portfolios, each defining a reasonable range of potential actions and operations. Each portfolio is analyzed using the CBIRP Analysis Tool (Model) and then evaluated based on three selection criteria of water supply, cost and reliability. The report ends with a set of conclusions based on the analysis and a brief recommendations summary.

Draft

3 Background

The Central Coast Water Authority (CCWA) operates and manages the Coastal Branch and delivers water within both Santa Barbara County and San Luis Obispo County to Coastal Branch Participants (Figure 3-1). CCWA is the de facto SWP contract holder for SBCFCWCD because it provides operational and financial responsibility for Santa Barbara County's SWP contract. SLOFCWCD is the SWP contract holder for San Luis Obispo County.

According to the operational relationships and agreements between DWR, CCWA and SLOFCWCD, SLOFCWCD receives water supply and conveyance capacity from DWR but interacts with CCWA for water delivery requests. According to the 1963 original SWP Water Supply Contract, DWR owns the Phase II Coastal Branch conveyance facilities. The extent of the Phase II Coastal Branch conveyance facilities, which originally ran to the San Luis Obispo County line near Santa Maria, were adjusted to run through San Luis Obispo County to Tank 5 in northern Santa Barbara County in a 1992 SWP Contract Amendment (Figure 6-2). CCWA owns and operates the Polonio Pass Water Treatment Plant (PPWTP) in northeastern San Luis Obispo County and CCWA operates and maintains the conveyance systems for DWR between PPWTP and Tank 5. Due to the location of the PPWTP, all turnouts on the Phase II Coastal Branch conveyance facilities receive treated potable water.

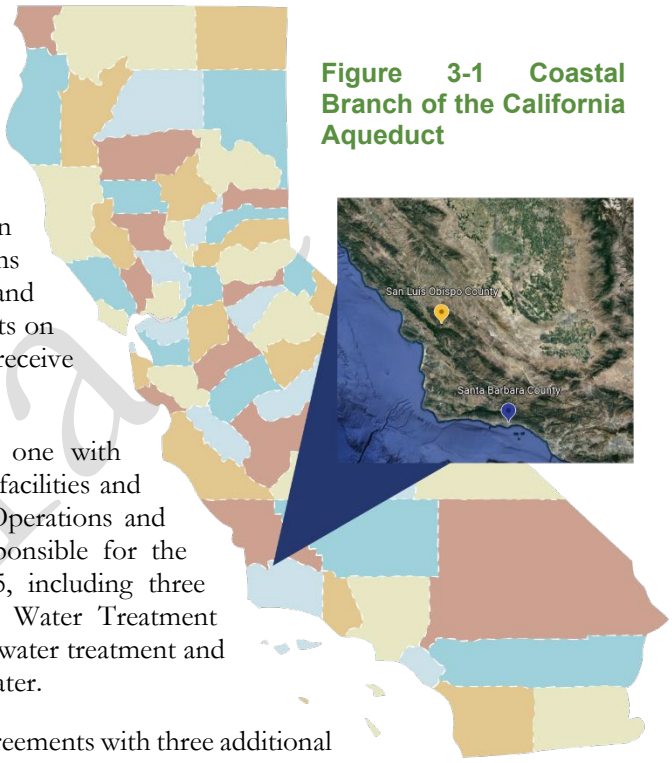


Figure 3-1 Coastal Branch of the California Aqueduct

CCWA has two agreements, one with DWR and one with SLOFCWCD for the operation and delivery of SWP facilities and water treatment on the Coastal Branch. Under the Operations and Maintenance Agreement with DWR, CCWA is responsible for the DWR pipeline from the PPWTP outlet to Tank 5, including three turnouts in San Luis Obispo County. The Master Water Treatment Agreement between SLOFCWCD and CCWA details water treatment and conveyance operations for San Luis Obispo County water.

CCWA has eight member agencies and water supply agreements with three additional agencies and two companies. The 13 SWP Participants represented by CCWA have a combined Table A amount of45,486 AF comprised of 39,078 AF base Table A amount, and drought buffers[1] of 6,408 AF.

The 11 water purveyors with contractual rights to SWP water from SLOFCWCD have a combined funded Table A amount of 4,830 AF, which is their Water Service Amount subscription, plus an additional drought buffer of 5,707 AFY for use in years when DWR's SWP water allocations to the SLOFCWCD are less than 100%. The maximum SWP allocation to SLOFCWCD is up to 25,000 AFY according to the 1963 long-term water supply contract with DWR. SLOFCWCD Participants pay for all SWP costs associated with their water service subscription and drought buffer amounts while the costs associated with the unsubscribed portion of their contract, 14,463 AFY of "excess allocation" is funded through the ad valorem tax on real property in the district.

[1] Drought buffers have limited conveyance and treatment capacity in Coastal Branch facilities

Draft

The agencies and companies receiving SWP water directly through CCWA are referred to in this study as CCWA Participants while those receiving SWP water through SLOFCWCD's contract are referred to in this study as SLOFCWCD Participants. In this study, Coastal Branch Participants refers in a general sense to entities which have agreements to take SWP water from either CCWA or SLOFCWCD. Additional entities could become Participants in the future.

The Integrated Regional Water Management Plans (IRWMPs) for both Santa Barbara County and San Luis Obispo County contain regional objectives for water supply, groundwater monitoring and management, ecosystems and watersheds, flood management, and water resource management (Table 8-1). Santa Barbara County's IRWMP objectives include protecting, conserving and augmenting water supplies by increasing reliability, maximizing storage capacity of existing surface reservoirs, maximizing conjunctive use of surface and groundwater, and strategically restoring or replacing water infrastructure.

San Luis Obispo County's IRWMP water supply goal includes improving water supplies and ensuring their long-term sustainability as well as optimizing regional use of SWP water. In addition to SWP facilities, major water related infrastructure in San Luis Obispo County includes the Nacimiento Water Project, Whale Rock Reservoir, Lopez Lake/Reservoir, Santa Margarita Lake/Salinas Reservoir, Chorro Reservoir, and desalination projects. San Luis Obispo County's IRWMP water management goal includes promoting open communications and regional cooperation in the protection and management of water resources, water allocations and other regional water resource management efforts.

Draft

4 Needs Assessment

The Central Coast State Water Project (SWP) Contractors (Central Coast Contractors) include a broad group of water users (Participants) who are seeking to optimize their use of SWP supplies through their contracts with CCWA and SLOFCWCD while meeting their overall water supply needs and financial goals. The Central Coast Participants include all existing or potential users of SWP Table A water in both San Luis Obispo and Santa Barbara counties. A thorough evaluation of both the variety of water management opportunities and the strategies available to the Central Coast Participants to achieve those opportunities begins with a Needs Assessment of the specific needs of each of the Participants. This initial Needs Assessment provides the basis for evaluating the ability of potential programs to meet identified needs.

4.1 General Categories of Needs

The specific needs of the Central Coast Participants fall into a number of categories including water supply, water storage and regulation, conveyance capacity, water quality, and other needs such as cost control. The following sections describe the general categories of needs that have been identified among the Central Coast Participants.

4.1.1 Water Supply: Access and availability of an amount of water

In a broad sense, the basic water supply need of each Central Coast Contractor is straightforward. Simply stated, each Central Coast Contractor needs to have sufficient water to meet the demands of their service area. However, the specific water supply needs of the Central Coast Participants are quite varied as they each seek to optimize the use of the groundwater and surface water supplies uniquely available to them to meet their local demand in the near term and the foreseeable future.

A common need among many SWP Contractors is to adapt to the decline in the long-term availability of the historic groundwater supplies that have provided a baseline supply for their service areas. This could be a result of several factors including implementation of Groundwater Sustainability Plans (GSP) under the Sustainable Groundwater Management Act (SGMA), adjudication decisions, or simply increased demand in the area resulting in groundwater extractions that exceed the safe yield of a basin.

Surface water supply needs relate to access and availability. Some Central Coast Participants have little or no access to surface water and are considering acquiring new or additional surface supplies to meet their demand shortfalls. Other Participants with substantial surface water supplies are considering programs that would increase their current access to surface water to meet demands.

There are also situations where a Participant has plenty of surface water to meet demands, but those supplies are not available at the same time they are demanded. For example, in a wet year, a Participant may have access to more SWP water than they can use in their service area. However, in a dry year, that same Participant could be short on SWP supplies because of low yield on the SWP.

4.1.2 Water Storage Options: Placed or programs to store or regulate surface water supplies

When assessed on an average annual yield basis, a Participant's access to SWP supplies may appear sufficient. However, when actual annual water supply variations are considered, the Participant will often have inadequate water supply in dry years. Participants facing these dry-year water supply shortages, who currently lack storage options, may need to develop new "homes" for their water in the wet years to provide supply regulation

Draft

between wet and dry years. These new "homes" for water allow for the wet-year water to be stored and then returned at a later date to meet future dry-year needs in the Participant's service area.

Water Storage Options (Homes) are places or programs to store or regulate surface water supplies. The most common water storage options are groundwater banks and surface water reservoirs. Both of these types of physical storage facilities require permitting, design, construction, and operation costs. Contractual arrangements, such as exchanges and transfers, can provide homes to surface water in much the same way as physical facilities. An exchange is a contractual arrangement where water is delivered from one SWP water Contractor to another SWP water Contractor for use within their service area. The receiving SWP Contractor then returns some agreed portion of that water in a future year. Transfer agreements can be used similarly, with water sold in wet years when it cannot be directly used and purchased in dry years when it is needed. Unlike physical facilities which require construction, these contractual regulation programs do not require construction of new physical facilities, however they do require permitting and can incur some operating costs.

4.1.3 Conveyance Capacity: Facilities and rights that enable water supply to be delivered on a desired schedule

Participants need assured access to sufficient capacity in the water conveyance facilities to deliver water to their service area or regulatory program facilities. This conveyance capacity is necessary whether they have sufficient surface water supplies to meet their demands or are considering programs to acquire additional surface water supplies. Some Participants may have sufficient rights to conveyance capacity in existing facilities to accommodate their future needs and to implement any necessary regulatory programs. Other Participants may need to acquire the conveyance capacity that they lack from other entities that have surplus capacity in those existing facilities. Participants may need to acquire the use of capacity in the California Aqueduct, the Coastal Branch, or existing local conveyance facilities.

Where capacity in existing conveyance facilities is insufficient or unavailable, those facilities may need to be expanded or new facilities may need to be constructed. Participants will need to evaluate the feasibility and cost effectiveness of these more capital-intensive options to meet their conveyance capacity needs.

4.1.4 Water Quality: Measure of factors relating to purpose of water

Some Participants rely on the relatively high quality of SWP water to improve the quality of water in local groundwater basins. These Participants need to be certain that such water quality improvements, realized through the importation and recharge of SWP supplies, continue into the future to ensure compliance with a variety of regulatory compliance programs.

The SWP supply is an important source of drinking water for a large portion of the Participants' service areas. Participants using the SWP to meet drinking water demands need to be certain that SWP deliveries will be of sufficiently high quality to meet their long-term drinking water demands without incurring inordinately high treatment costs.

4.1.5 Cost Control: Affordability and financial relief

Participation in the SWP, and supporting regional or local conveyance facilities, comes with significant costs to the participating Coastal Branch Participants. In some circumstances, individual Participants have had a difficult time paying current SWP costs and have identified an inability to absorb all the anticipated cost increases expected in the future. All Participants are concerned with the rate of cost increase for the development, operation, and maintenance of local water supply. There is a need to identify an implementable strategy for addressing such a financial shortfall in much the same fashion that a water supply optimization strategy is required for a supply shortfall.

Draft

4.1.6 Other Needs: Unique to individual Participants

While this needs assessment identifies the categories of needs that are common to all or a significant group of the Participants, the needs assessment recognizes that in addition to these common needs, there may be unique needs for individual Participants that must be considered in order to develop a SWP water supply optimization strategy that benefits each Participant. Those types of needs can be varied. Unique needs of individual Participants could include considerations such as unique regulatory compliance assistance or promotion of local stakeholder interests.

4.2 Stakeholder Needs Assessment

Each Participant was asked to complete a Needs Assessment survey. All completed surveys from responding Participants are included in Appendix C. In addition, a number of previous reports, studies and other documents were compiled into a summary of Participant Needs, which can be found in Appendix A. Appendix B presents a summary of the needs identified by the individual Participants (where a survey was completed by the Participant) or identified in the various resources listed in Appendix A. Key findings of the Needs Assessment review are summarized in the following sections of Central Coast Water Authority and San Luis Obispo County, each with three sub-sections.

4.2.1 Central Coast Water Authority

Since CCWA serves as a wholesaler of SWP water to its member agencies, it has no additional water supply demands apart from those of its Participants. Despite having no direct water supply needs, CCWA does share a common need with all of its Participants, which is the need for cost control. Like all water agencies, CCWA consistently looks for means to reduce costs to all of its stakeholders. Examining opportunities to increase affordability of SWP supplies and reduce costs for stakeholders will continue to be a need for CCWA, as well as for all CCWA Participants. The three subgroups of member agencies within CCWA are North County, Mid County, and South Coast.

North County: City of Santa Maria, Golden State Water Company, City of Guadalupe

The City of Santa Maria is the largest single Participant for SWP in CCWA. The City identified a significant need to protect or improve the quality of SWP water that is delivered to their service area. The City relies on the quality of the SWP supplies to enable it to comply with wastewater discharge permits and other regulatory requirements in their groundwater basin. The City of Guadalupe highlighted their need for cost control.

Mid County: City of Buellton, Santa Ynez RWCD Improvement District #1, City of Solvang (through SYRWCDID#1), Vandenberg Space Force Base.

In the Mid County portion of CCWA the Santa Ynez RWCDID#1identified a need for additional water supplies to meet demands during dry years. Participants that identified a similar need for dry year supplies were also assumed to have the need to consider the implementation of storage programs to meet that dry year supply need. Additionally, during recent summers when deliveries south of Coastal Branch Tank 5 are low, the State Water Project has had water quality issues of concern to users.

South Coast: Goleta Water District, City of Santa Barbara, Montecito Water District, Carpinteria Valley Water District, La Cumbre Mutual Water Company.

All Participants in the South Coast portion of CCWA also identified a need for dry year supplies.

Draft

4.2.2 San Luis Obispo County Flood Control and Water Conservation District

SLOFCWCD needs relate to addressing the needs of SLO participants, the needs of countywide taxpayers that are paying for the unallocated amount of Table A water, and the needs of potential future Participants in the county The three geographic subgroups of Participants within SLOFCWCD are North SLO, Central SLO/Chorro Valley Turn Out and South SLO/Lopez Turn Out.

North SLO: County of SLO C.S.A. No.16, I.D. #1 (Shandon)

The SLOFCWCD identified that it had adequate supplies to meet the long term demands within C.S.A. No. 16 and I.D. #1 (Shandon), however it did identify a need for cost control associated with the SWP supplies allocated to this area.

Central SLO/Chorro Valley Turn Out: California Men's Colony (State), County of SLO (Op Center and Reg. Park), City of Morro Bay, SLO Co. Comm. Coll District (Cuesta College)

All of the Participants in the Central SLO region of the SLOFCWCD have a need for additional water supplies during dry conditions and cost control.

South SLO/Lopez Turn Out: Avila Beach Community Services District, Avila Valley Mutual Water Company, Inc., Oceano Community Services District, City of Pismo Beach, San Luis Coastal Unified School District, San Miguelito Mutual Water Company

With the exception of Oceano Community Services District, all of the Participants in the South SLO region of the SLOFCWCD have a need for additional water supplies during dry conditions. All of the Participants in this region also share the same need as the rest of the Participants for cost control.

Countywide Taxpayers and Potential Future Participants

Countywide taxpayers need to be relieved of the cost of reserving the unallocated amount, ideally in a way that puts the unallocated water to use to meet needs in San Luis Obispo County. Potential new Participants are coming forward that are looking at State Water as an option to address the requirements of SGMA and/or other vulnerabilities in their existing water supply.

Draft

5 Rules and Requirements

This section provides an overview of rules and regulations affecting potential management actions. Management of State Water Project water by SWP Participants, such as agencies within SLOFCWCD and CCWA (Central Coast Contractors), is subject to a variety of formal and informal regulatory constraints. The purpose of this section is to summarize those constraints and provide references for specific language on applicable constraints and more detailed description. While the description here is generally applicable to water management actions involving use of SWP, it is recognized that additional constraints may occasionally apply to specific measures.

Although the focus of this discussion is on managing SWP water, optimizing water supplies for SWP Contractors also frequently involves use of water supplies or facilities outside of the SWP. The discussion below addresses the following topics:

- State of California Water Rights
- State Water Project Water Supply Contracts
- Environmental and Endangered Species Acts
- Groundwater Storage
- Use of Conveyance

5.1 State of California Surface Water Rights

In general, the rights to use surface water in the State of California are managed by the State Water Resources Control Board (SWRCB). The State of California holds water in the state in trust. A water right provides an assigned user the right to use some portion of the available water. Water rights that can be demonstrated to have been established prior to 1914 are not subject to SWRCB regulation and allow the water right holder broad discretion on the use and management of the water supplies that they receive. Water rights that were established after 1914 are assigned by the SWRCB based on formal applications for use in specific areas. Within the San Luis Obispo and Santa Barbara Counties study area, water rights to local streams are subject to specific water rights permits by the SWRCB, either directly or as part of a larger project. A landowner that has property adjacent to a waterway may use water for beneficial uses on that property without additional approval from the SWRCB. Such riparian water rights do not apply to other lands, owned by the landowner, that are not contiguous with those lands adjacent to the waterway.

When the SWP was being contemplated, the State of California Department of Water Resources (DWR) obtained permits from the SWRCB to store and divert water for the SWP. While DWR has many contractual constraints on water use by SWP Contractors (which are described below), its use of SWP water remains subject to SWRCB water rights jurisdiction. The practical effects of this continuing oversight are primarily related to the SWP Area of Use, which is defined in the SWP water rights. The SWP Area of Use includes the service area boundaries of all of the SWP Contractors, including San Luis Obispo and Santa Barbara Counties in their entirety as well as the neighboring counties of Kings, Kern and Ventura. The SWP Area of Use can affect a water transfer, exchange or storage program if a transfer, exchange or storage program partner agency is not located within the defined SWP Area of Use.

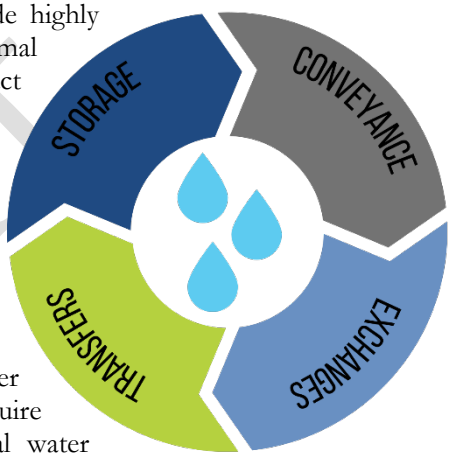
Transfers from the Sacramento or San Joaquin valleys are examples where SWP Area of Use could affect a water management action. Any water management action that requires the movement of water through the Sacramento-San Joaquin Delta will necessitate close coordination and cooperation of DWR (which owns and operates the SWP), United States Bureau of Reclamation (USBR) (which owns and operates the CVP), State Water Contractors Inc., (which performs many important management and facilitation functions for 27 of the

Draft

29 SWP contractors), and the San Luis-Delta Mendota Water Agency (which performs the same functions as the State Water Contractors Inc. for many CVP contractors). As such, all water transfers involving movement of water through SWP and CVP delta export pumping plants will require extensive preparation and coordination.

5.2 State Water Project Water Supply Contracts

Because this evaluation is focused on the SWP, there is also an emphasis on specific rules affecting use of SWP water supplies. As long as SWP water supplies are used within the SWP Area of Use, the primary regulations affecting their management are those that are described in the SWP Water Supply Contracts for the Coastal Branch Contractors. The SWP Water Supply Contracts contain constraints that affect water management actions involving other SWP Contractors. These constraints do not necessarily apply to actions amongst individual Participants within either Coastal Branch Contractor's Area of Use. Most Participant management actions would need approval by the primary SWP contract holder (either SLOFCWCD or CCWA) and would be subject to any conditions that their SWP Contractor would require.



DWR originally developed the SWP contracts in the 1960s to provide highly reliable supplies that would be available in all years, subject to defined minimal reductions during dry years. The original SWP water supply contract provided limited guidance on external water management actions, being either silent on the topic or providing very high level, general guidance. The need for such water management tools was not anticipated in the original 1960s era contracts because of the intended reliable water supply that would be provided. Due to delays in developing new SWP water supplies since the 1960s, SWP Contractors needed additional flexibility to manage SWP water supplies they receive to meet their needs. Today, individual SWP Contractors manage water supplies within their own service area without needing approvals from DWR. However, water management actions outside of a SWP Contractor's own service area require approval from DWR. In response to the increased need for local water management of SWP supplies, amendments to the SWP contracts have been enacted over the years.[2] These amendments have formalized typical DWR processes or agreements between DWR and SWP Contractors collectively on proposed activities.

As discussed below, the manner in which a contract amendment controls a water management action varies considerably. In many cases, the contract amendment provides only a general indication that an action can be taken, leaving DWR with considerable discretion in how it implements a potential action. In other cases, contract amendments specify conditions that apply to an action and DWR has less leeway in interpreting how an action can be approved. The SWP contractual or administrative policies apply to the following water management actions[3]: Transfer, Exchanges, Storage, and Conveyance.

[2] The most recent contract amendment is the SWP Water Management Amendment, which was negotiated between SWP contractors and DWR. Upon completing environmental documentation, DWR began implementation of this amendment in February 2021. This amendment is referred to as the "2021 Water Management Amendment" to distinguish it from prior amendments that may have included some water management provisions.

[3] All actions require some level of CEQA disclosure.

Draft

5.2.1 Transfers

Transfers are defined as the sale of SWP water either temporarily or permanently to another SWP Contractor. The sale of SWP water to a user outside of the SWP Contractors has not happened due to challenges and costs involved in completing these kinds of transfers[4] and transfer of SWP water to users outside of the SWP are not described here.

SWP water transfers are segregated into three categories that are subject to different constraints – permanent, multi-year and single year.

Permanent

A permanent water transfer involves the assignment of part or all of one SWP Contractor's SWP Table A amounts to another SWP Contractor. Table A of each SWP Contractor's contract specifies its share of the costs, water supplies and use of SWP facilities. Article 41 in the SWP Water Supply Contracts provides that an SWP Contractor may assign their rights to another agency only with the approval of DWR. A SWP Contractor may sell a portion of their Table A to another SWP Contractor permanently, with the buyer water agencies becoming responsible for future costs of their SWP supplies and receiving future water supply amounts. A permanent assignment, or water transfer, will require environmental documentation, such as California Environmental Quality Act (CEQA). [5] (Reference: SWP Water Supply Contract Article 41)

Multi-Year

Multi-year transfers would be an ongoing agreement for an agency to purchase SWP supplies from another SWP Contractor over a series of years. DWR's authority for such transfers is contained in general language in Article 7 and Article 15. While some permanent transfers and single year transfers have been subject to specific SWP contract language since 1996[6], no specific guidelines have been developed for multi-year SWP transfers. Due, in part, to uncertainty about the approval process for multi-year transfers, these types of transfers were only implemented in extreme drought circumstances (e.g., 2008-09, 2013-14) among SWP Contractors. (Reference: SWP Water Supply Contract Articles 7, 15 and 56(d))

Single Year

Since 1996, single year transfers have been prohibited by the SWP Water Supply Contract outside of the "Turnback Pool". Article 56 provided for a process for DWR to establish "Turnback Pool" for those SWP Contractors that do not have need for their water in a single year to transfer that water to other contractors. The pricing and allocation are explicitly identified in Article 56 and have limited

[4] Such a transfer would have to address the need for a possible water rights change in place of use. It would also need to be approved by DWR under broad authorities (such as Article 15) and is not provided for in the SWP Water Supply Contracts.

[5] Article 53, added in 1996, required that agricultural SWP contractors offer the permanent transfer of at least 130,000 acre-feet to urban SWP contractors, with the agricultural contractors having a first right of refusal for transfers offered under this provision. The 130,000-acre-foot requirement was satisfied in 2010 and would not apply to any future transfers.

[6] A package of SWP water supply contract amendments, including Articles 52, 53, 54, 55 and 56, implemented in 1996 was successfully challenged for lack of adequate CEQA documentation. DWR ultimately agreed to revisions to the environmental documentation and recertified the environmental documentation for the revised amendments in 2010.

Draft

flexibility in how they are applied; due to the low prices established in Article 56, there has been limited value for SWP contractors to transfer water supply through the Turnback Pool, and it has not been an effective water management tool in recent years.

For SWP Contractors that sign the 2021 Water Management Amendment (including CCWA and SLOFCWCD), the Turnback Pool is eliminated as the sole way to allow single year transfers among SWP Contractors and there is provision for single year sales of water on terms that are negotiated by SWP contractors.[7] Article 57, which is revised in the 2021 Water Management Amendment provides that DWR will approve one-year transfers subject to general provisions that the financial integrity of the SWP is maintained, that the transfer is transparent, that other SWP Contractors are not adversely impacted and that no significant adverse impacts are created in the participating SWP Contractors' service areas. (Reference: SWP Water Supply Contract Article 57)

5.2.2 Exchanges

An exchange is defined in this report as an ongoing agreement for one agency to provide water to another agency in exchange for the future return of some portion of the amount exchanged. An exchange will typically involve delivery of unneeded water in a wet year by an agency in exchange for return of some smaller portion of the exchanged water in a dry year. Monetary payments may also be involved in addition to the actual exchange to reflect different values of water in different year types as well as to address additional costs or avoided costs that occur.

The 2021 Water Management Amendment updates pre-existing SWP guidance on exchanges, which were defined as bona-fide exchanges in prior SWP contracts. The SWP contract language added by the 2021 Water Management Amendment provides for specified exchange ratios based on SWP allocation levels as follow:

- SWP allocation less than or equal to 15% - 5:1 specified exchange ratio
- SWP allocation greater than 15% and less than or equal to 25% – 4:1 specified exchange ratio
- SWP allocation greater than 25% and less than 50% – 3:1 specified exchange ratio
- SWP allocation greater than or equal to 50% – 2:1 specified exchange ratio

The current exchange provisions also include caps on exchange costs that are related to an agency's overall SWP contract charges to DWR. The SWP contract does not require payment of charges for exchange programs that use SWP facilities that a SWP Contractor already pays for, which is a condition of storage programs (as discussed below).

Over time, there has been a realization that exchanges almost always include an implied element of storage that can make them appear indistinguishable externally from a storage (or banking) program. (Reference: SWP Water Supply Contract Article 56(f))

[7] Between 1996 when Article 56 was implemented and in 2021 when the 2021 Amendment was added, single year transfers were limited to the Turnback Pool Program. The Turnback Pool Program was a limited means for a SWP contractor to for a quarter of the Delta Water Charge (for Pool B sales by March 15). Because of increasing SWP contractor demands and the low prescribed price for Turnback Pool sales, it has had limited participation since the early 2000s sell unneeded Table A allocations at a defined price. The Turnback Pool Program provided that a SWP contractor could sell into two Pools at relatively low prices defined as half of the Delta Water Charge (for Pool A sales by February 15)

5.2.3 Storage

While SWP Contractors have always been able to store water within their own service areas, either in surface reservoirs or groundwater, the original SWP contract did not provide for storage outside of a SWP Contractor's service area. With Article 56 (added in the SWP contract amendments of 1996), individual SWP contractors were allowed to store unused Table A amounts in either unused space of SWP facilities or in storage facilities within other SWP Contractors' service area.

Storage of unused SWP Table A amounts in SWP facilities is subject to availability of that space and can be reclassified as SWP project water ("spilled") in the event that SWP supplies become available that require use of the storage. Under Article 56, SWP Contractors can schedule water to be carried over on a long-term basis into subsequent years when their annual water supply requests are made. SWP Contractors may also carry over some of their allocated Table A for delivery in January through March of the following year if there is sufficient storage space in SWP facilities.

Article 56 also specifies rules limiting the amount of scheduled carryover water by a SWP Contractor. The scheduled carryover water is allocated by DWR and made available in San Luis Reservoir at the end of a calendar year. Any carryover water amounts can be retained in storage in San Luis Reservoir as long as the SWP does not need the storage, which can extend for multiple years. In the event that wet conditions occur and the SWP can fill San Luis Reservoir, a SWP Contractor is required to use their carryover water on relatively short notice or it will be converted to SWP water. There is no specific cost for storing water in SWP facilities, so this provision is very attractive to many SWP Contractors.

Prior to 2007, when new Endangered Species Act (ESA)-related Delta pumping restrictions began, San Luis Reservoir would very frequently fill and SWP Contractors were forced to manage their carryover or allow it to convert to the current year SWP water supply, effectively losing it for their use. Since 2007, the restrictions on SWP pumping in the Delta have greatly reduced the occurrence of filling San Luis Reservoir, thus allowing SWP Contractors to increase reliance on that carryover storage.

While storage in SWP facilities is a convenient and low-cost option, SWP Contractors have no control over when their water may be at risk of spilling. However, another important provision of Article 56 is the ability for SWP Contractors to store some, or all, of their carryover in storage programs outside of the SWP facilities. These external storage programs typically involve use of groundwater basins in the Area of Use of another SWP Contractor. The Semitropic Water Bank, operated by Semitropic Water Storage District (a member agency of the Kern County Water Agency) was an early implementer of this kind of program. More recently, other agencies within Kern County and in other SWP service areas, have developed similar programs or are in the process of developing such programs. The costs for storage access and any constraints on its use are subject to mutual agreement between a SWP Contractor and the entity offering the external storage arrangement.

Additionally, the SWP Water Supply Contract Article 56 defines constraints on a SWP Contractor's involvement in an external storage program, primarily addressing issues related to maintaining cost equity on the SWP for use of SWP facilities that are involved with moving the water to and from the external storage program. The most significant terms of an external storage program, however, are subject to mutual agreement with the SWP Contractor and the storage agency, and are not regulated by DWR. (Reference: SWP Water Supply Contract Article 56). External storage programs that use groundwater also need to adhere to any other statewide or local regulations, such as adjudication or GSA-related requirements.

5.2.4 Conveyance

SWP Contractors have contractual access to the use of SWP facilities (including the California Aqueduct) to deliver non-SWP water through SWP facilities. This access is subject to specified charges and the delivery priorities identified in Article 12(f). The priorities in Article 12(f) specify that various types of SWP water (e.g.,

Table A and Article 21 Water) have the highest priority. Non-project water, such as water transfers purchased by individual SWP Contractors from non-SWP sources, have lower priorities and can only be delivered after all SWP water is delivered. Use of SWP facilities is subject to actual pumping costs determined by DWR and can also be subject to a calculated "use of facilities charge" for SWP features that a SWP Contractor does not pay for.

DWR's Division of Operations and Maintenance operates the California Aqueduct to maximize flexibility for overall SWP purposes[8]. These purposes include using conveyance and storage capability along the Aqueduct to minimize energy costs to all SWP Contractors; however, avoiding loss of SWP water is a higher priority than energy costs. Non-SWP operations, such as transfers and exchanges, ride on top of the normal SWP operations. As a result, scheduling for water transfers and exchanges requires close coordination with DWR operators and can be challenging to schedule.

5.3 Environmental Permits

Actions, such as water management activities, that could potentially affect the environment are subject to the regular kind of environmental permitting needed by any project. These requirements will almost always include the California Environmental Quality Act (CEQA), which may involve DWR as a responsible agency. Actions affecting federal facilities (such as Cachuma Reservoir) or involving federal permits (such as Clean Water Act permits) will typically require evaluation of environmental impacts under the National Environmental Protection Act (NEPA). A general overview of CEQA and NEPA requirements is provided below, and other potential State and Federal permitting requirements are summarized later in this discussion.

5.3.1 Environmental Permitting

CEQA review begins with review of the proposed water management activity and evaluation of whether it qualifies as a project under CEQA. Some routine operational activities will be considered categorically exempt. A categorical exempt activity may not require additional analysis and can proceed with release of a Notice of Exemption. Activities with the potential for significant impacts to the environment will require preparation of an Initial Study, which is followed by a decision on the level of significance of environmental impacts. Projects with a low level of environmental impacts can proceed after preparation and public release of a Negative Declaration, with provisions for specified public review. Projects with higher levels of environmental impacts require preparation of an Environmental Impacts Report (EIR) with more comprehensive documentation of potential impacts. The EIR will need public release providing an opportunity for public comment. Ultimately, after closure of public review periods for either a Negative Declaration or an EIR, an agency can approve the document with a Record of Decision and proceed with the action.

The NEPA process has many similarities to the CEQA process and NEPA documentation will frequently be prepared in coordination with CEQA as joint documents. Activities identified as projects under NEPA would be triggered by the need for federal approvals. Projects will initially be evaluated with an Environmental Assessment, identifying the potential for environmental impacts. Projects with a low potential for environmental impacts can be approved by preparation of a Finding of No Significant Impacts (FONSI). Based on the Environmental Assessment, projects with a higher potential for environmental impacts will require preparation of an Environmental Impacts Statement (EIS). After public release of the EIS, an opportunity for public review, and any modification based on comments, the project may ultimately be considered for implementation which is documented by a Notice of Determination.

[8] There is additional discussion of DWR's management of conveyance in the Chapter on Conveyance Capability of this report.

Draft

In addition to the normal CEQA and NEPA evaluations, water management activities may be subject to permitting for the following processes. Note that this list is not comprehensive and there may be other permits or regulations requiring compliance for specific activities.

Federal Endangered Species Act

Activities that could involve impacts to federally listed endangered species may require permits from National Oceanic and Atmospheric Administration (NOAA) Fisheries or the U.S. Fish and Wildlife Service. Effects on streambeds in the Central Coast will sometimes involve habitat used by steelhead trout and may require Federal Endangered Species Act (FESA) permits. Land based activities affecting critical habitat for specifies such as the San Joaquin Kit Fox may also require ESA permits.

California Endangered Species Act

California Endangered Species Act (CESA) has separate permitting that is similar to the FESA. For the Central Coast area, CESA listed endangered species are likely to have similar identified ranges and permitting requirements. The CESA and FESA processes may be closely coordinated.

Delta Plan

The Delta Stewardship Council adopted the Delta Plan in 2013, which identifies requirements meant to avoid adverse impacts to the Sacramento-San Joaquin Delta. Some water management activities to the SWP could have effects traced back to the Delta and need to conform to the Delta Plan. The Delta Stewardship Council will consider projects for consistency with the Delta Plan and make a determination on whether the project is consistent.

5.4 Groundwater Basin Constraints

Storage of SWP water in groundwater basins will typically involve compliance with local groundwater storage constraints including any adjudications, ordinances, groundwater sustainability plans (GSPs) that regulate groundwater storage or less formal local agreements. For example, within the Central Coast area, the Santa Maria River Valley Basin has been adjudicated and future activities related to the use of the basin may be subject to its ongoing court supervised management. San Luis Obispo County implemented a permit requirement in 2014 for any groundwater exports from basins within the county or outside the county. In addition to local regulatory agreements, there are usually local operation agreements that provide oversight on the operation and management of groundwater storage programs to ensure that no third-party impacts occur. With or without any such local agreements, in-basin users retain their ability to legally challenge programs, including a groundwater banking program, that could adversely their groundwater use. Such legal challenges could lead to court ordered adjudications, which have frequently taken many years, or decades to complete.

With the passage of the Sustainable Groundwater Management Act (SGMA) in 2014, groundwater sustainability agencies (GSA) have been authorized with broad authorities to protect local beneficial uses that depend on groundwater. Under SGMA, beneficial uses of groundwater, including agricultural and municipal groundwater pumping, as well as environmental purposes such as groundwater dependent ecosystems, must be protected from significant and unreasonable impacts to sustainability indicators such as declining water levels, degraded water quality and land subsidence. SGMA provides GSAs management authorities that could apply to banking operations, including the authority to impose spacing requirements on groundwater well construction and to control groundwater extractions, or a GSA could implement a groundwater banking program if it could be operated in a way to help achieve sustainability. However, within the Central Coast area, the Paso Robles Basin GSAs completed a GSP in January 2020and it does not identify any particular projects related to banking. Instead, the Paso Robles GSP recommends that the County of San Luis Obispo's existing

Draft

groundwater export ordinance should be enforced and retained. Many other Central Coast groundwater basins are in the process of preparing their GSPs which are due in January 2022. While GSPs have the authority to implement groundwater banking programs, any water recharged in a GSA may be subject to legal challenge by a non-participant in the absence of an adjudication of the groundwater basin.

Draft

6 Conveyance Capacity

Water management activities by SWP Contractors in San Luis Obispo and Santa Barbara Counties (Central Coast Contractors) will frequently require use of conveyance capacity in the California Aqueduct and the Coastal Branch Aqueduct (Figure 6-2). These facilities are operated by different agencies, with different patterns of availability and different rules. The California Aqueduct and Coastal Branch reaches upstream of Polonio Pass, are operated by DWR as part of the overall SWP. The downstream portion of the Coastal Branch (below Polonio Pass) is operated by CCWA. The two operators – DWR and CCWA – have different operating rules, which affect use of their facilities by Central Coast Participants and other agencies.

Following the initial discussion of operations for both the California Aqueduct and Coastal Branch, descriptions of the facilities involved are presented along with information related to physical and operational capacities. This conveyance capability discussion touches on constraints upstream and downstream of San Luis Reservoir, analyses of CALSIM-2 and historical capacities for the California Aqueduct, and comparison of design capacity and historical deliveries for the Coastal Branch. Finally, a high-level summary of available capacity in various reaches is presented.

Overall, the summary identified major constraints in available capacity in summer months (generally June through September) in years of above average deliveries along the California Aqueduct east of Coalinga, due to historic subsidence. There are also lesser, but still often significant, limitations in capacity along most Coastal Branch reaches during the summer. Alternatively, there is plentiful available capacity in the October through May period in nearly all years in the conveyance facilities serving the Coastal Branch Contractors.

6.1 Conveyance Facility Operation and access by Outside Entities

DWR constructed and operates the California Aqueduct and Coastal Branch reaches through Polonio Pass for the SWP and their primary purpose is to deliver SWP water to its contracting water agencies. Although SWP Contractors are assigned a share of capacity (and associated costs) in the reaches of the facility providing their water supply, the SWP water supply projects do not give SWP Contractors direct rights to use that capacity. The Department of Water Resources (DWR) operates the SWP as a whole and does not instantaneously constrain SWP Contractor water supplies to their allocated share of capacity. SWP Contractors submit annual water delivery request schedules to DWR and DWR strives to meet their water supply needs to the extent possible by optimizing available capacity. DWR only limits contractor use of conveyance for SWP water to their assigned capacities under extreme circumstances. SWP Contractors, including CCWA and SLOFCWCD, have rights to move non-SWP water through available capacity under Article 55 of the water supply projects. Additionally, any entity has a right to use unused conveyance capacity with the payment of fair compensation under Water Code Section 1810.

The Coastal Branch downstream of Polonio Pass is operated by CCWA. CCWA's prime purpose in operating its portion of the Coastal Branch is also to deliver SWP water to its Participants on their requested schedule. CCWA does not have any defined provisions for allowing use of its facilities by member agencies or outside entities. As with any public agency conveyance facilities, Water Code Section 1810 provides for the use of unused conveyance capacity for an outside entity.

Draft

6.2 State Water Project Operational Features of the California Aqueduct and a Portion of the Coastal Branch Aqueduct

As described above, DWR operates the SWP, including California Aqueduct and a portion of the Coastal Branch Aqueduct. The configuration of SWP California Aqueduct and Coastal Branch Aqueduct is shown in Figure 6-2.

SWP Contractors, including CCWA and SLOFCWCD, are provided water by the SWP and are responsible for payment of assigned costs for their portion of the SWP. Table 1 shows the allocation of Central Coast Contractors' capacity in the State Water Project for upstream reaches of the California Aqueduct and the Coastal Branch. These capacities are used by DWR primarily for cost allocation purposes, but under extreme circumstances they could also be constraining in the event of continuing shortage in conveyance capacity.

Table 6-1 California Aqueduct: Capacity Provided for SWP Contractors, by Reach*

	CCWA Share	SLOFCWCD Share	Design Total	Current Estimated Total
Reach	Capacity (cfs)	Capacity (cfs)	Capacity (cfs)	Capacity (cfs)
1	72.03691	39.0471	10,300	10,300
2A	72.02638	39.04134	10,000	10,000
2B	71.61539	38.81848	10,000	10,000
3	71.48536	38.74804	13,100	13,100
4	71.34908	38.67414	13,100	13,100
5	71.17955	38.58213	11,800	11,800
6	70.9241	38.4437	8,350	6,900
7	70.84246	38.39943	8,100	6,900
8C	70.73959	38.34363	8,100	8,100
8D	70.73761	38.34264	8,100	8,100
31A	70.60034	38.26825	450	450
33A	70.06459	37.9774	71	71

*(Includes Consideration of Scheduled Outages and Operational Losses)

In addition to SWP project deliveries (including Table A amounts, Turnback Pool, Carryover Water and Article 21 Water), the California Aqueduct system is also commonly used for conveyance of other supplies on behalf of SWP Contractors (and potentially outside agencies). While DWR attempts to meet all SWP Contractor conveyance needs, in situations with extended periods of limited capacity, a SWP Contractor may be limited to their proportional share of remaining capacity after SWP project needs have been met.

Generally, limitations to conveyance availability are likely to occur in the summer months of high-delivery (wet) years. SWP facilities for SWP agricultural contractors were designed to meet water demands on an irrigation demand schedule, which has high peaks during summer months. Additional conveyance constrictions can occur

in Aqueduct reaches where SWP Contractors purchased additional Table A amounts or where outside factors (such as groundwater subsidence or facility outages) have limited operational capacity.

As an example, if the SWP is using 80 percent of the capacity in a reach for SWP purposes, Article 55 provides that the remaining 20 percent could be allocated among SWP Contractors proportional to each SWP Contractor's assigned capacity of that reach. Central Coast Contractors access to conveyance facilities for non-SWP purposes will normally be on an "as available" basis, subject to primary use by the SWP or by other project participants.

To address the potential for limited conveyance access on an "as available" basis, this discussion quantifies both the physical capacity of conveyance facilities and the primary facility use for purposes of delivering SWP water. The primary facilities described here are the California Aqueduct and the Coastal Branch Aqueduct. The overall approach used was to compare historical or projected Aqueduct use for representative Aqueduct reaches with physical capacities, and quantify the amounts of available, or unused, capacity. For purposes of this study, analysis is limited to available conveyance probabilities on a monthly basis, with totals indicated for annual potential conveyance. The approach to defining available conveyance capacity is different for each facility, as described below.

6.3 SWP Conveyance Constraints Upstream of San Luis Reservoir

The California Aqueduct begins at Clifton Court Forebay in the Sacramento-San Joaquin Delta and terminates in Southern California. For Reaches 1 through 4 (from Clifton Court Forebay to San Luis Reservoir), DWR has designated the California Aqueduct as having two purposes – conveyance (labelled "transportation"), for delivering water to meet SWP Contractor demands, and storage (labelled "conservation"), for delivering water to San Luis Reservoir for storage during wet periods for later use to meet SWP Contractor demand.

While Aqueduct Reaches 1-4 were designed with capacities of up to 10,300 cubic feet per second to provide for both direct SWP deliveries and storage of water at San Luis Reservoir, in actual operations that apparent high capacity is not usable to the SWP for a variety of reasons:

- A U.S. Army Corps of Engineers permit for Banks Pumping Plant (Reach 1) limits its use to 6,680 cfs, with provision for somewhat higher capacities under limited circumstances for limited periods, for reasons relating to levee protection.
- Fisheries and water rights permits for Banks Pumping Plant and Sacramento-San Joaquin Delta operations generally restrict allowable exports at Banks Pumping Plant for extended periods from November through June.
- Upstream California Department of Fish and Wildlife flow regulations limit the ability to increase Oroville Reservoir releases at times when permitted Banks Pumping Plant capacity is available.

As a result of these various regulatory and physical constraints at Banks Pumping Plant, constraints from water supply availability and upstream flow management limitations, there is essentially a four-month period (July through October) when unused capacity in Reaches 1-4 is available. While the physical capacity in Banks Pumping Plant and the California Aqueduct is 10,300 cfs, the capacity that is actually allowable considering applicable regulations is usually 6,680 cfs or less. In most wetter-than-average runoff years, the SWP normally uses all available permitting pumping capacity at Banks Pumping Plant (and Aqueduct Reaches 1-4) for filling San Luis Reservoir with available high Delta outflows and for conveying Oroville Reservoir releases to SWP Contractors. It is only in below-average runoff years that there is unused available capacity in Aqueduct Reaches 1-4. Even in those below-average runoff years, capacity can be limited, and its availability is frequently difficult to predict.

Draft

As described in the earlier water supply discussion, DWR allocates Table A amounts to SWP Contractors based on a combination of availability of water in the Delta (either from natural flows or from Oroville Reservoir releases), permitted pumping capacity at Banks Pumping Plant and water stored over the winter in San Luis Reservoir. The SWP's annual Table A allocation is the amount available for SWP Contractors after adjusting for the most limiting of available unregulated Delta flows, Oroville and San Luis Reservoir storage and ability to convey water to SWP Contractors on requested delivery patterns.

Considering the purpose of this discussion is to describe the potential for capacity use by Central Coast Contractors, unused capacity on the California Aqueduct upstream of San Luis Reservoir has not been quantified. While transfers of North of Delta water supplies are theoretically an option, their availability is uncertain as is the ability to deliver them through Aqueduct facilities south of the Sacramento-San Joaquin Delta. The underlying assumption for Central Coast water management is that water management measures would be limited to water that is already south of the Delta. The water available for Central Coast Contractor water management has been assumed to be limited to SWP Table A allocations (which are effectively made available to Central Coast Contractors by DWR at San Luis Reservoir) and other potential South of Delta water supply sources and management measures such as SWP Table A Transfers, exchanges with SWP or other water agencies and South of the Delta groundwater banking programs.

6.4 Analysis of SWP Conveyance Capacity Availability Downstream of San Luis Reservoir

To evaluate the impacts of California Aqueduct capacity constraints, a comparison of two analyses were conducted at Reach 7 (Check 21), Reach 31A (Badger Hill Pumping Plant), Reach 33A (Polonio Pass Pumping Plant). The first analysis reviews historical SWP deliveries compared to physical capacity. Where CALSIM-2 data is available, a second analysis relies on data extracted from CALSIM-2 model simulations of the California Aqueduct. The historical and CALSIM-2 projection analyses provide different types of information. While the historical analysis is a likely indication of actual operational practices for SWP and Central Coast Contractors, it does not account for factors that may change in the future. Factors such as Delta regulatory requirements, changes in upstream SWP facility operations and increased future use of contracted water supplies by downstream SWP Contractors are not represented in historical operations but are included in CALSIM-2 simulations. While CALSIM-2 operations studies are generally not as accurate in indicating the nuances of SWP Contractor actual operations, they have the advantage of considering known factors that can affect future availability of conveyance capacity. Next the two analyses are compared. Where historical and CALSIM-2 estimates of available capacity are similar, there can be strong confidence in the accuracy of their results. Where they differ, this summary offers an interpretation of which is more likely and provides a recommended outcome.

6.4.1 California Aqueduct Reach 7 (Check 21)

Conveyance capacity south of the San Luis Reservoir has been reduced from design amounts by subsidence. High groundwater pumping in the westside of the San Joaquin Valley along the California Aqueduct alignment has resulted in subsidence that has lowered local ground surface elevations. The decline in the ground surface has been uneven and has reduced gradients in many parts of the California Aqueduct, with corresponding reductions in conveyance capacity. A 2019 DWR analysis of ground surface declines to date and their impacts on the California Aqueduct, identified reductions in capacity that varied by reach of the Aqueduct. The analysis showed that California Aqueduct capacities remained at design levels through Pool 19 (generally, north of Huron). Aqueduct Pools 20 through 29 were identified as having some level of capacity reductions. The largest reduction in Aqueduct capacity was identified in Pool 20 of Reach 7, which lost 1,450 cfs of its design capacity of 8,350 cfs, leaving a reduced operational capacity of 6,900 cfs.

This historical analysis of SWP deliveries from 2005 to 2019 compared actual Aqueduct flows with the reduced 6,900 cfs capacity available in Aqueduct Reach 7, near Kettleman City.

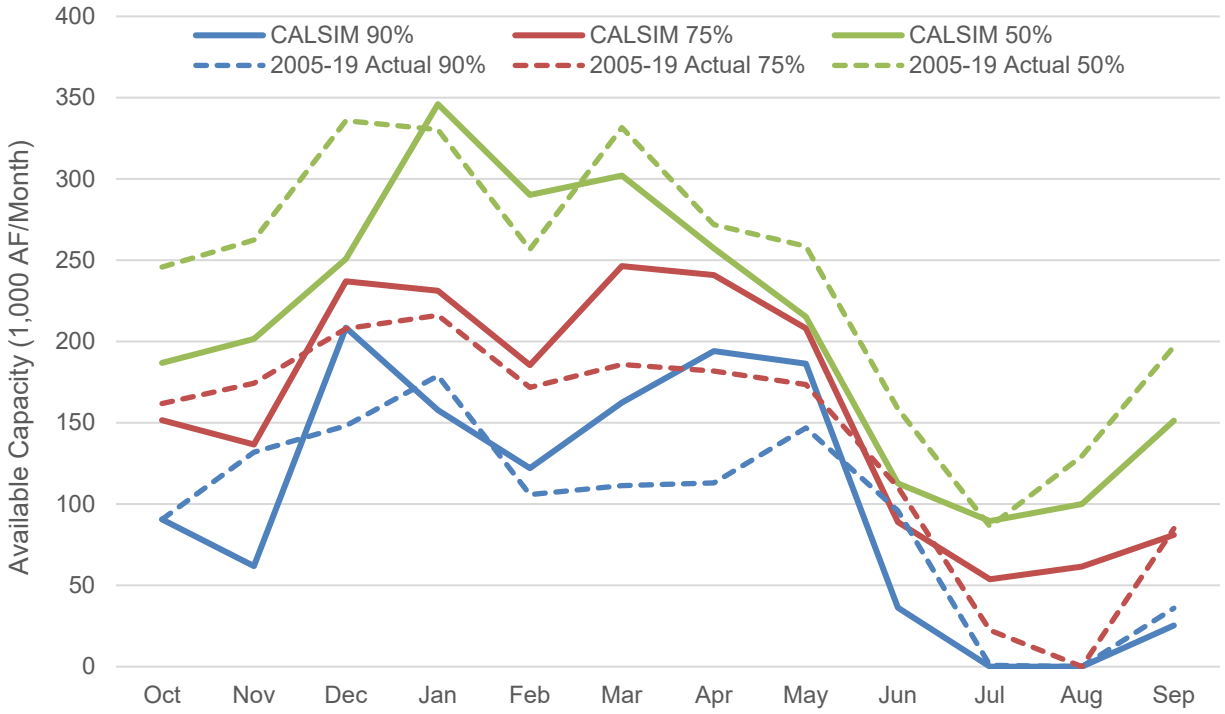


Figure 6-1 California Aqueduct Reach 7 (Check 21) Capacity Availability

The analyses for Reach 7 (Check 21) capacity show similar results based on both CALSIM-2 projections and actual historical operations. In both analyses, severe limitations on capacity are projected in wetter years (90-percentile usage) for the months of July and August, and lesser limitations are projected in the months of June and September. There is significant available capacity for the remainder of the months, October through May. For the 75-percentile usage, actual historical operations show significant constraints during the months of June through September, which are consistent with CALSIM-2 projections. For the 50-percentile and lesser use conditions, both historical and CALSIM-2 analysis indicates minimal capacity constraints year-round.

Overall, the actual historical operations are consistent with CALSIM-2 projections, with both showing significant constraints in available capacity during the June through September period for high use (90-percentile and 75-percentile) periods. There is significant available capacity in all year types October through May.

6.4.2 Coastal Branch Aqueduct Reach 31A

The Coastal Branch breaks off from the California Aqueduct at Avenal Gap, just south of Kettleman City. Aqueduct Reach 31A (shown as Coastal Branch Phase 1 and including Las Perillas and Badger Hill Pumping Plants, provides deliveries for CCWA, SLOFCWCD, Santa Clarita Valley Water District (for the former Devils Den Water District), Kern County Water Agency (for their member agency Berrenda Mesa Water District), and a potential future SWP Contractor. Figure 6-2 shows the alignment and major features of the Coastal Branch Aqueduct.

Figure 6-2 Diagram of Coastal Branch Aqueduct (2020 CCWA Urban Water Management Plan)

As with the California Aqueduct, 2005-2019 historical water flows for Badger Hill Pumping Plant were reviewed along with CALSIM-2 projections of a 1922-2003 long term period. As there are minimal SWP delivery turnouts until the end of Reach 31A, the Badger Hill Pumping Plant analysis is considered representative of Reach 31A. The design capacity for Badger Hill Pumping Plant is 454 cfs, which is equivalent to a monthly capacity of 27,000 to 29,000 acre-feet.

As with Reach 7 (Check 21) capacity analyses, Badger Hill Pumping Plant available capacity was consistent for both actual historical flows and CALSIM-2 projected flows. In both analyses, available capacity at Badger Hill Pumping Plant is limited during the months of June through September for the 90-percentile use level particularly, and, to a lesser extent, for the 75-precentile use level. Capacity is likely to be available for the remainder of the months, October through May, at the 90-percentile use level. Additionally, considerable capacity is available in essentially all months for the 50-percentile use level and drier conditions.

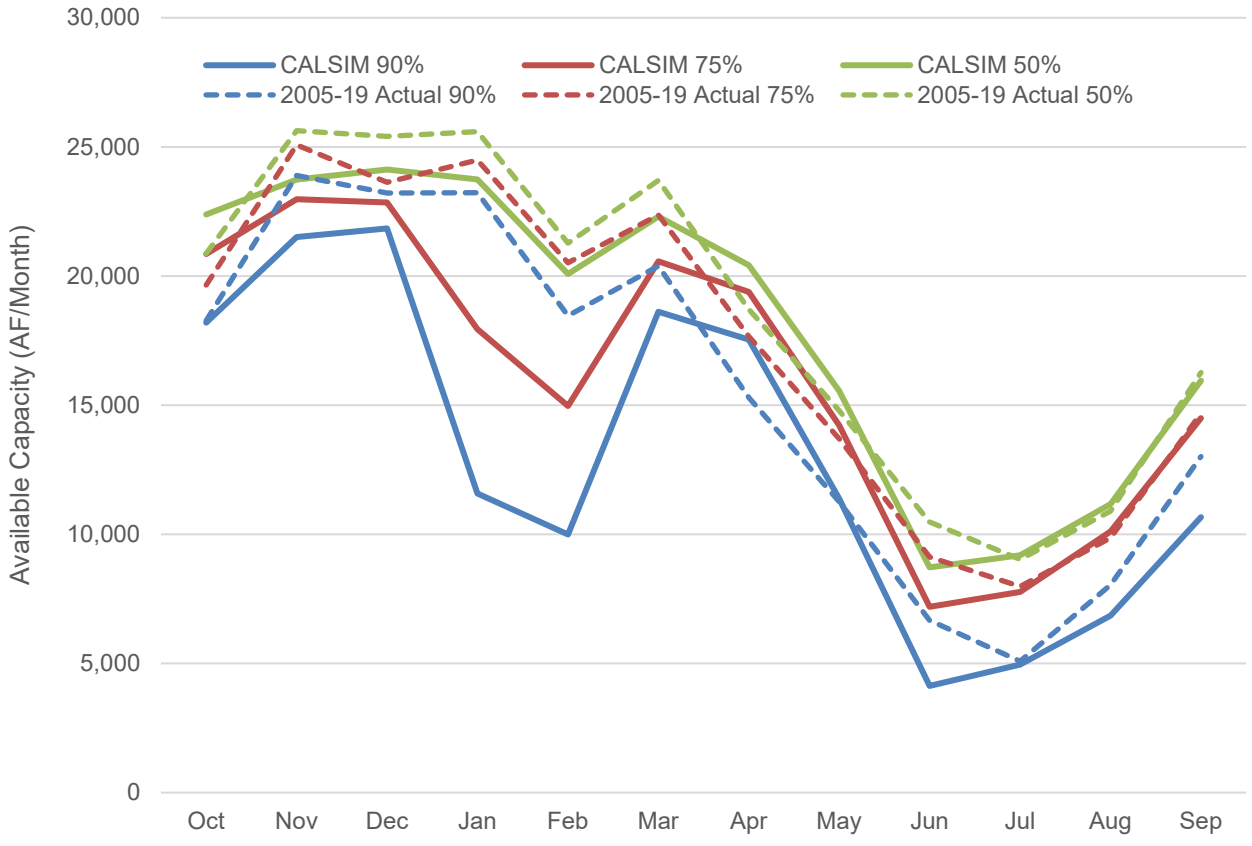


Figure 6-3 Coastal Aqueduct Badger Hill Pumping Plant Capacity Availability

6.4.3 Coastal Branch Aqueduct Reach 33A

The Coastal Branch has reduced capacity in Reach 33A with CCWA and SLOFCWCD being the only participant SWP Contractors. There are three pumping plants in Reach 33A: Devils Den, Bluestone and Polonio Pass. These three plants each have design capacities of 134 cfs (roughly 8,000 to 8,200 acre-feet per month), which were intentionally designed with higher capacities than needed for CCWA and SLOFCWCD. The purpose of the higher capacity is to allow for more energy efficient off-peak pumping operation. The

higher capacity would enable the SWP to pump water to Polonio Pass Water Treatment Plant during evenings and low power cost periods as a means to reduce overall SWP power costs.

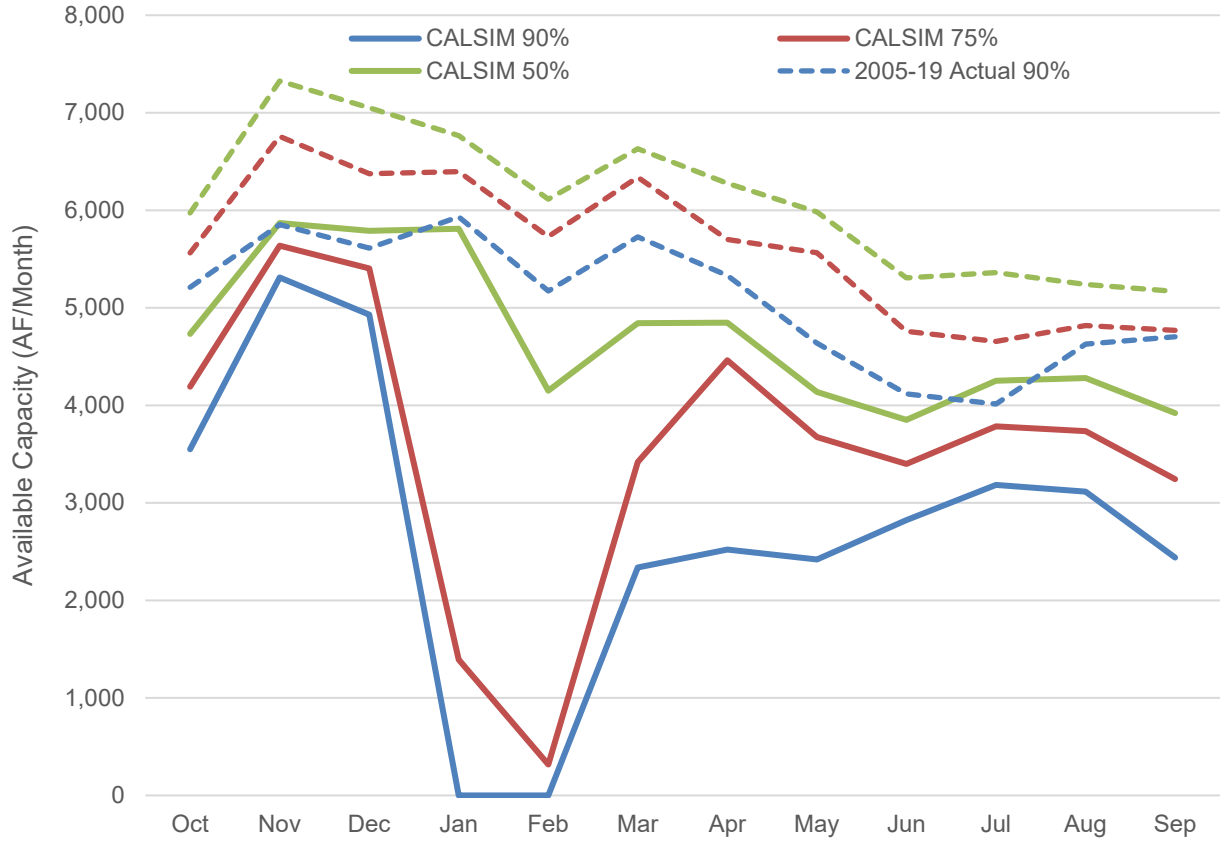


Figure 6-4 Coastal Aqueduct Polonio Pass Pumping Plant Capacity Availability

Figure 6-4 shows available capacity for Polonio Pass Pumping Plant using both actual historical operations data for 2005-2020 and CALSIM-2 projections. Unlike similar comparisons for Check 21 and Badger Hill Pumping Plant, the review of Polonio Pass Pumping Plant data shows significant differences between the CALSIM-2 projections and actual historical operations. The actual operations data shows essentially no periods of restricted capacity for any of the evaluated exceedances. There is essentially 50% available capacity (about 4,000 acre-feet per month) in even driest conditions. The CALSIM-2 projections included what are likely questionable assumptions about the delivery patterns for CCWA and SLOFCWCD that have high delivery amounts in the months of January and February in some of the higher delivery years (90-percentile and 75-percentile.) These delivery patterns resulted in low-capacity availability in high delivery years, which do not match historical experience and appears to be an unrealistic modeling artifact. The poor representation of Polonio Pass flows by CALSIM-2 is likely due to modeler's focusing on operational issues on the main California Aqueduct and minimal attention to operations on the Coastal Branch. For purposes of the current water management study, the CALSIM-2 data for Polonio Pass is being ignored and the capacity available in actual historical operations will be used instead. As noted, the actual historical data show essentially no limitations on available unused conveyance capacity based on likely potential use.

Based on the actual historical use data for Badger Hill and Polonio Pass Pumping Plants, there is limited available capacity in upstream reaches of the Coastal Branch in the summers (June through September) in most

high delivery years (any years above 50-percentile). In dry years and in non-summer months, there is good availability of capacity.

Continuing downstream of the California Aqueduct to the Coastal Branch Aqueduct, the remainder of this discussion focuses on the Coastal Branch design capacities, making a conservative estimate of actual operational capacity that could be available on a consistent basis.

6.5 Analysis of CCWA Conveyance Capacity Availability

At Polonio Pass, CCWA treats water at its Polonio Pass Water Treatment Plant (WTP). Downstream of the Polonio Pass WTP, CCWA operates remaining reaches of the Coastal Aqueduct. The operational capacity of Polonio Pass WTP is 48 million gallons per day (66.5 cubic feet per second), which can be a limiting factor for use of the Coastal Branch.

To evaluate the impacts of Coastal Branch capacity constraints, available Coastal Branch capacity on selected downstream reaches of the Coastal Branch was reviewed comparing historic delivery data for 1997-2020 provided by CCWA with the design capacities shown in Table 6-2. Note that no analysis of CALSIM-2 results was prepared, as CALSIM-2 does not include operation of the Coastal Branch downstream of Polonio Pass.

6.5.1 Coastal Branch Reach 33B

Design capacities for the Coastal Branch reaches are shown in Table 6-2. A 2011 hydraulic analysis conducted for CCWA identified modeled flow capacities for the Coastal Branch that were higher than design estimates. In Reach 33B, modeling indicated potential short term flow rates of up to 84.5 cfs. In Reaches 34, modeled flow capacity of up to 77 cfs was identified. While the hydraulic flow modeling indicates higher capacities than used for design, the higher capacities are considered a short-term peaking capability and it is uncertain that they could be maintained on a consistent basis. For the analysis here, the design rates are being used as representative of sustained flows that can be maintained under normal operations.

Table 6-2 Coastal Branch Design Capacity

Reach(s)	Upstream	Downstream	Design Capacity (cfs)
33B	Polonio Pass WTP	Chorro Valley TO	71
34	Chorro Valley TO	Lopez TO	68
35	Lopez TO	Guadalupe TO	64
37	Guadelupe TO	Southern Pacific RR	64
38	Southern Pacific RR	Tank 5	33
MH II	Tank 5	McLaughlin Rd	35/26
SY I	McLaughlin Rd	Santa Ynez PP	26
SY II	Santa Ynez PP	Cachuma Reservoir	22

During actual historical 1997-2020 CCWA delivery operations, the upstream reaches of the Coastal Branch (Reaches 1-4), with a design capacity of 71 cfs, had monthly availability as shown in Figure 6-5. This figure indicates the potential for limited availability capacity for the months of May through September. Available

Draft

monthly capacity during this May through September period was limited to less than 1,000 AF for the 90th-percentile high delivery year. Available capacity is also near 1,000 AF for the months of Jun through September at the 75th percentile. Conversely, available conveyance capacity of 1,500 AF or higher is regularly available for the months of October through April.

The maximum permitted operating capacity the PPWTP is 48 MGD (74 cfs, and equivalent to about 48,000 acre-feet per year), but the PPWTP may be permitted to operate as high as 52 MGD (96.6 cfs) under certain circumstances. Since the rated conveyance capacity of Reach 33B is 71 cfs, the PPWTP is not a limiting factor in terms of conveyance capacity for the Coastal Branch.

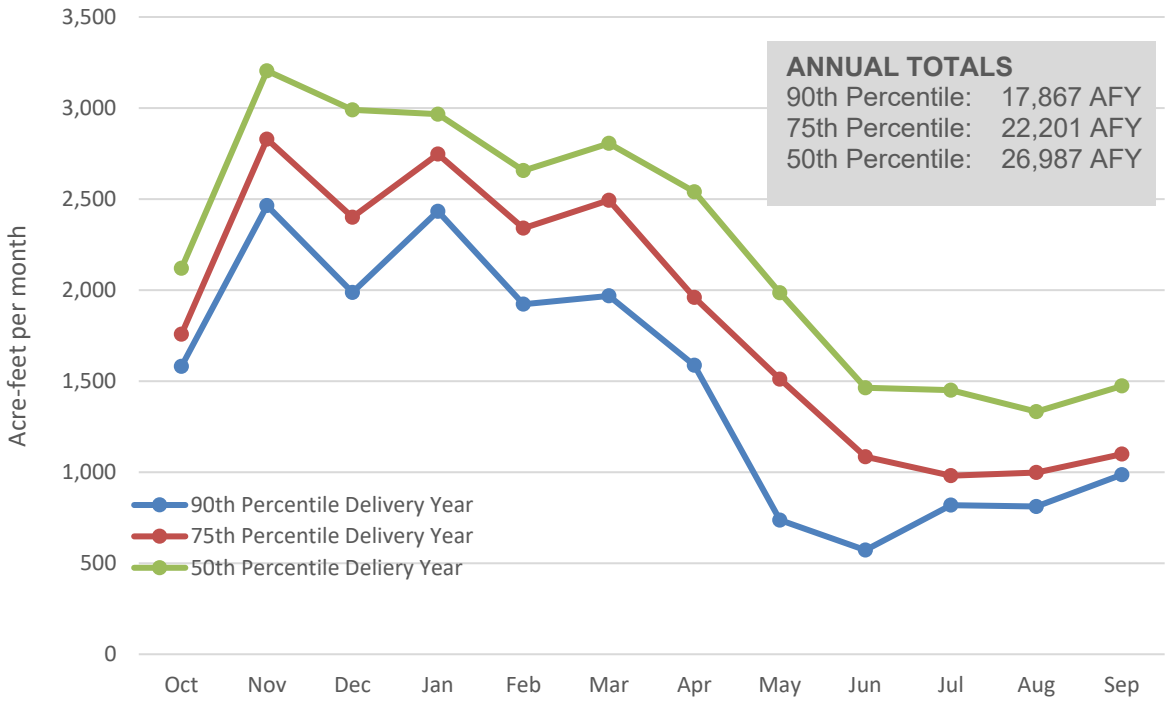


Figure 6-5 Coastal Branch 33B Historic (1998-2020) Capacity Availability

6.5.2 Coastal Branch Reach 34

Available capacity for Reach 34 of the Coastal Branch was computed based on the design capacity of 68 cfs. These reaches cover the Coastal Branch Aqueduct roughly from Santa Margarita to the San Luis Obispo County line. This review identified the available capacities shown in Figure 6-6, which are generally similar to those shown for Reaches 1-4. Available capacity is regularly limited during the months of May through September and is relatively open for the months of October through April.

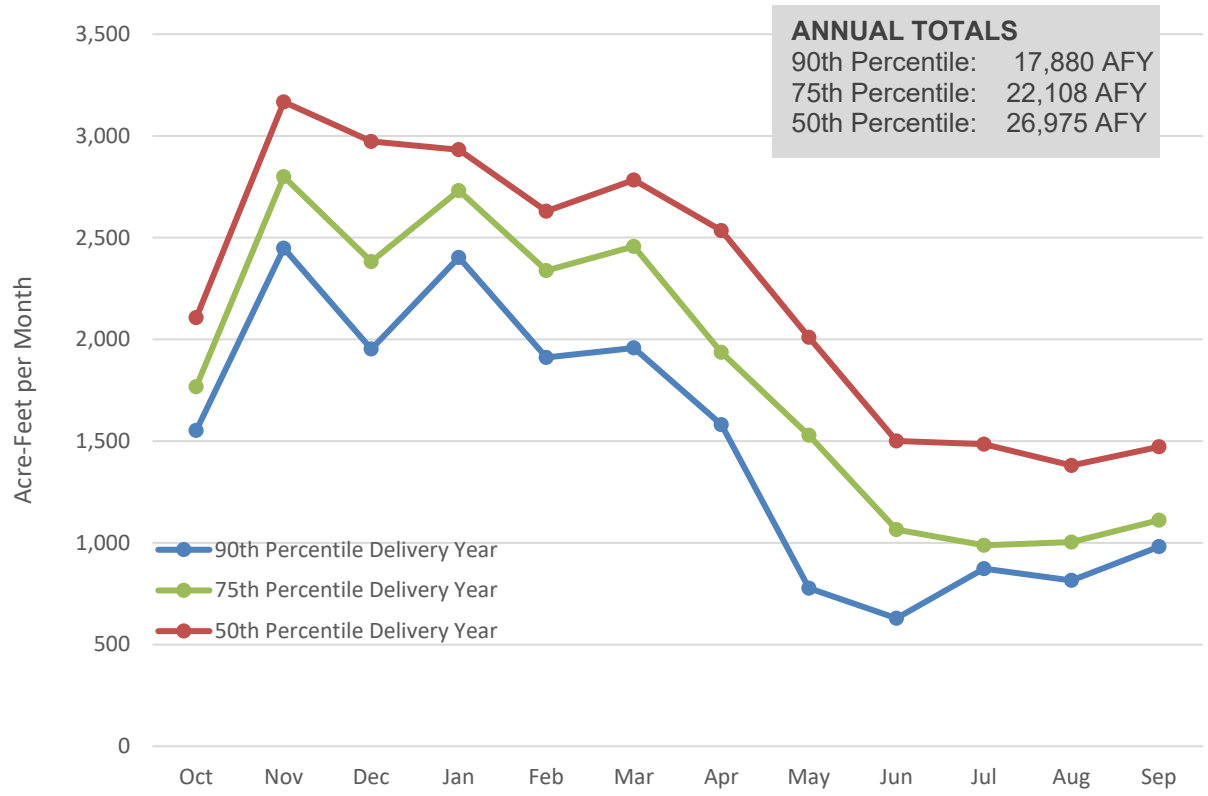


Figure 6-6 Reach 34 Historic (1998-2020) Capacity Availability

6.5.3 Coastal Branch Reach 38

Reach 38 is located south of the City of Santa Maria. This reach has a design capacity of 33 cfs, which is significantly lower than upstream reaches and reflects the high turnout capacity at the City of Santa Maria. Figure 6-7 shows very limited available capacity in the peak delivery season for high delivery years (greater than 75th percentile), with available capacities less than 500 AF for the months of May through September. During the remainder of the year (October through April), monthly capacities of 1,500 AF and greater are available.

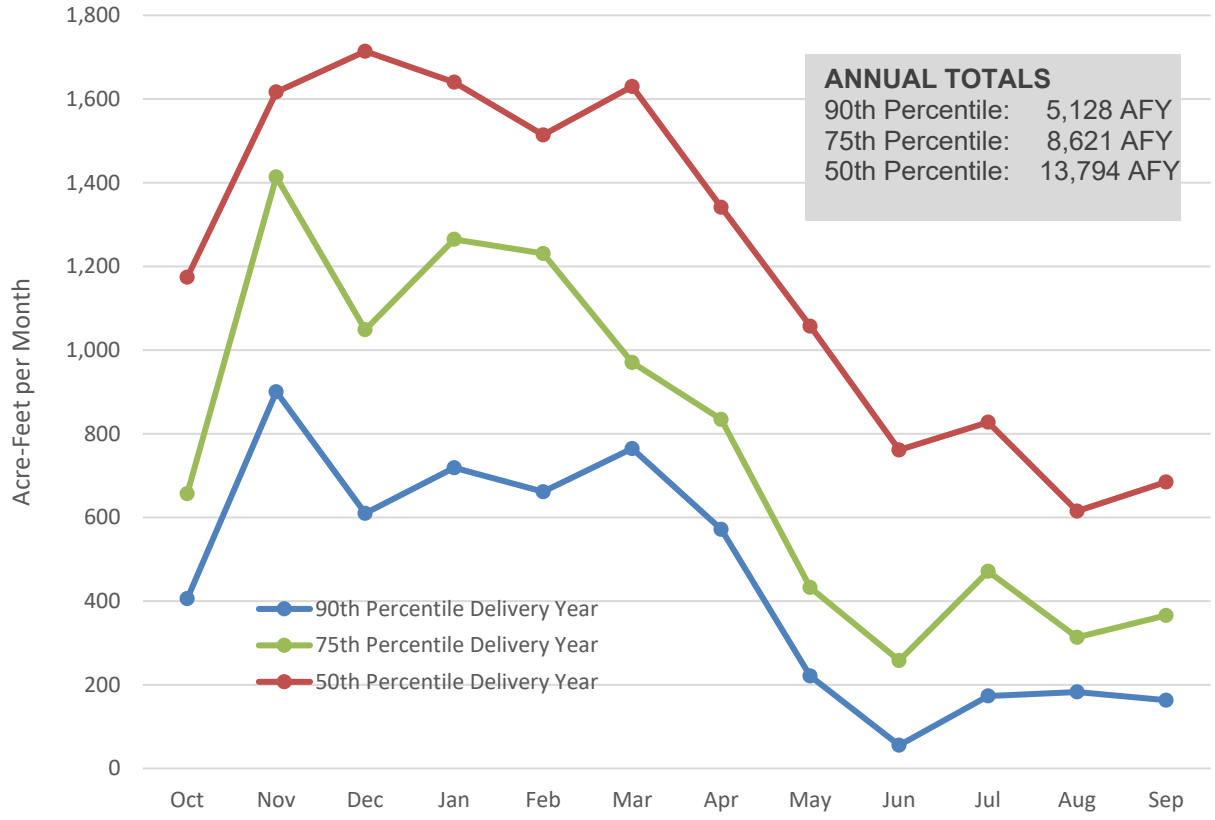


Figure 6-7 Reach 38 Historic (1998-2020) Capacity Availability

6.5.4 Coastal Branch SY II

The last reach of the Coastal Branch that is analyzed is Reach SY II, located downstream of the Santa Ynez Pump Station. This reach has a design capacity of 22 cfs, which (being the most downstream reach) is the lowest capacity on the Coastal Branch. Figure 6-8 shows very limited available capacity in the peak delivery season for high delivery years (greater than 90th percentile), with available capacities less than 200 AF for all but two months (November and March). In the 75th percentile delivery year and lower, there is consistent relatively high capacity available for the months of October through April.

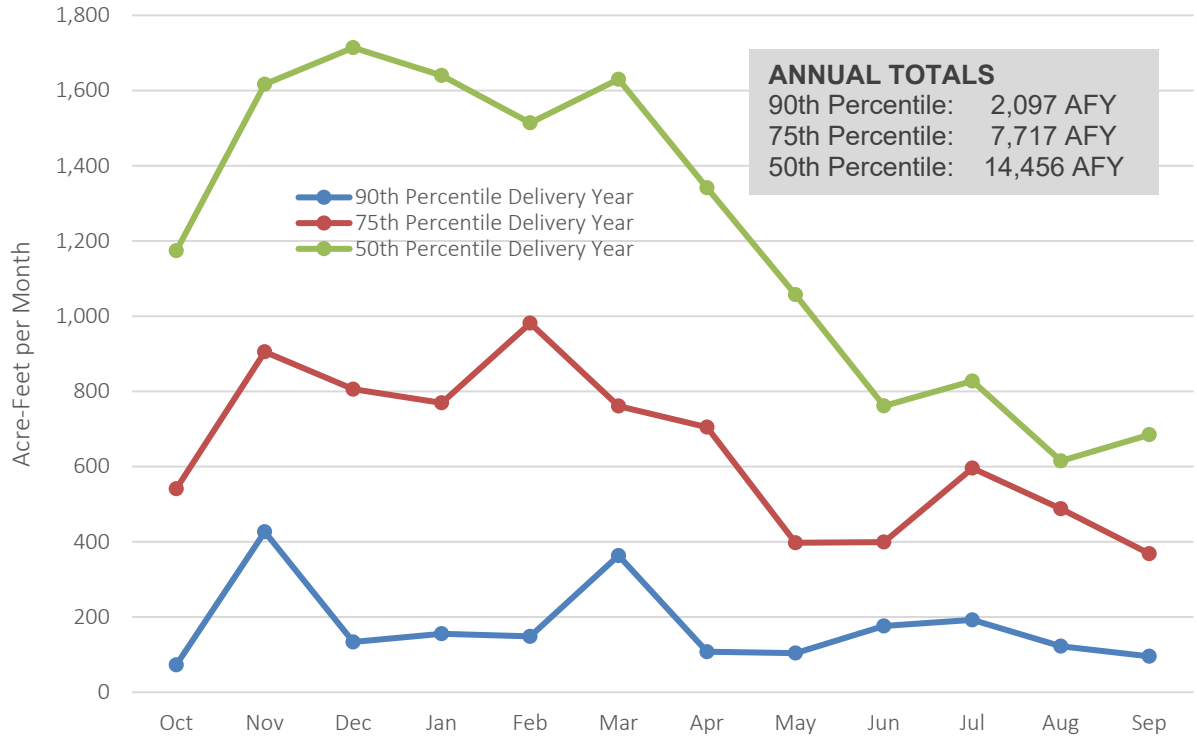


Figure 6-8 Reach SY II Historic (1998-2020) Capacity Availability

6.5.5 Conveyance Constraints Summary

The review of available capacity in the California Aqueduct between the San Luis Reservoir and the CCWA portion of the Coastal Branch indicates good availability of capacity in dry years and in non-summer months. At Reach 7 (Check 21) there is significant available capacity in all year types from October to May. At Reach 31A there is available capacity from October to May in high-use wet years and in all months in drier years (50th percentile and drier). At Reach 33A there are no limitations in available capacity even in the driest conditions. Historical actual data and CALSIM-2 modeling show similar capacity availability results at both Reach 7 and Reach 31A but differ for Reach 33A with historical actual data having more validity.

The review of available capacity in the Coastal Branch indicates that there is limited available capacity from May through September in high-use years for all reaches. Consistently high capacity is available for use by Coastal Branch Contractors in all years in the months of October through April as well as in low delivery years (less than 50th percentile) in all months.

7 State Water Project Supply Capability

This Central Coast Water Management Strategies discussion uses CALSIM-2 studies in DWR's 2019 SWP Delivery Capability Report (2019 DCR)[9] to estimate present SWP supply capability conditions and quantify available SWP supplies for both counties. The 2019 SWP DCR indicates that CCWA has available SWP Table A and carryover supplies of about 59% of its Table A contract amounts. SLOFCWCD has slightly lower SWP Table A and carryover supplies of about 58% of its Table A contract amounts. In addition to minor amounts of Article 21 water that are available on an interruptible basis, the supplies documented here are the quantities that the SWP is capable of providing for Coastal Branch Contractors. Subsequent analysis is described in Chapter 9 that indicates the amounts of these available water supplies that could actually be utilized by Coastal Branch Contractors.

7.1 CALSIM-2 Description

The California Department of Water Resources, in managing the State Water Project (SWP), develops a biennial SWP Delivery Capability Report, which estimates the water supply available for SWP Contractors, including CCWA and SLOFCWCD. The SWP water supply estimates are developed using their CALSIM-2 operations model[10]. In addition to evaluating SWP operations with hydrologic conditions in the Central Valley, CALSIM-2 incorporates the operations of the US Bureau of Reclamation (USBR) Central Valley Project (CVP) facilities and local water supply systems as these can affect the water supply available to the SWP. CALSIM-2 also represents water rights and regulatory constraints, which have changed over time and are subject to future revisions.

CALSIM-2 uses an historical period of 1922 through 2003, which contains hydrologic variations representing a range of water supply conditions and is run incorporating current regulatory and water demand conditions. The current hydrologic conditions represent an estimate of the long-term water supply variation of the 1922 through 2003 period, with adjustments to bring water use practices to current levels. DWR also runs CALSIM-2 using projections of future climatic effects on water supply and corresponding regulatory and demand assumptions.

For the 2019 SWP DCR, DWR prepared a CALSIM-2 study (Study 2020D09E) including current regulatory constraints on the SWP, including the Bay Delta Water Quality Control Plan, Biological Opinions of the National Marine Fisheries Service and the United States Fish and Wildlife Service, and the Coordination Operations Agreement between DWR and the USBR. CALSIM-2 results for SWP Contractors are presented in the 2019 DCR for three types of water supply – Table A Amounts, Carryover Water (Article 56) and Article 21 Water. The reported amounts of Table A represent SWP allocations that can be delivered on a schedule for use in a specific year. In years with high Table A allocations, SWP Contractors may request to carry over water in San Luis Reservoir for use in subsequent years. Once in San Luis Reservoir, the water can either be used in a drier following year or else it can be "spilled" if water supply conditions become wet and DWR needs to use the San Luis Reservoir storage space. The CALSIM-2 reported carryover amounts represent the quantities of Table A carryover supplies that were used in subsequent years. A third type of water, Article 21 Water, represents short term water supplies that are available relatively infrequently and can be taken on an instantaneous basis by SWP Contractors.

DRAFT

[9] https://water.ca.gov/Library/Modeling-and-Analysis/Central-Valley-models-and-tools/CalSim-2/DCR2019

[10] CALSIM-2 was used to perform the modeling simulations. https://water.ca.gov/Library/Modeling-and-Analysis/Central-Valley-models-and-tools/CalSim-2

7.2 2019 Delivery Capability Report Results

The projected Table A, Carryover and Article 21 water supply for CCWA and SLOFCWCD from the 2019 DCR CALSIM studies is presented as monthly tables of water supply in the Appendix D as Table D 1 - Table D 6. Summaries of the water supply are shown in Table 7-1. The water supplies summarized in Table 7-1 are also shown graphically in Figure 7-1 and Figure 7-2.

Draft

Table 7-1 Supply Capability

State Water Project Central Coast Area Water Supply																
Santa Barbara County Flood Control and Water Conservation District									San Luis Obispo County Flood Control and Water Conservation District							
	Off-Peak (Oct-Mar)				On-Peak (Apr-Sep)				Off-Peak (Oct-Mar)				On-Peak (Apr-Sep)			
Year	Table A	Carryover	Article 21 Water	Total	Table A	Carryover	Article 21 Water	Total	Table A	Carryover	Article 21 Water	Total	Table A	Carryover	Article 21 Water	Total
1922	13,164	0	0	13,164	18,088	0	0	18,088	6,560	0	0	6,560	6,310	0	0	6,310
1923	11,234	3,607	0	14,841	17,343	0	0	17,343	5,164	6,466	0	11,630	6,032	0	0	6,032
1924	5,961	769	0	6,730	3,327	1,025	0	4,352	2,960	1,913	0	4,873	1,494	2,551	0	4,045
1925	3,053	513	0	3,565	8,015	0	0	8,015	1,475	1,451	0	2,926	3,486	350	0	3,837
1926	4,539	0	0	4,539	12,153	0	0	12,153	2,350	331	0	2,682	4,877	662	0	5,539
1927	8,216	309	0	8,525	18,407	0	0	18,407	3,919	2,179	0	6,098	6,452	0	0	6,452
1928	9,048	4,073	0	13,121	19,080	0	0	19,080	4,382	6,720	0	11,101	6,621	0	0	6,621
1929	6,984	886	0	7,870	7,651	1,476	0	9,127	3,447	1,977	0	5,424	3,436	3,295	0	6,730
1930	5,513	0	0	5,513	4,398	0	0	4,398	2,664	37	0	2,701	1,913	74	0	1,987
1931	3,560	0	3,688	7,248	11,581	0	0	11,581	1,771	60	448	2,279	4,684	0	0	4,684
1932	4,667	95	0	4,762	7,865	190	0	8,054	2,441	693	0	3,134	3,424	1,386	0	4,810
1933	4,178	0	1,844	6,022	12,349	0	0	12,349	2,184	325	224	2,734	4,962	0	0	4,962
1934	4,604	102	0	4,706	4,850	170	0	5,021	2,417	721	0	3,137	2,113	1,201	0	3,314
1935	2,550	34	0	2,584	20,745	0	0	20,745	1,331	842	0	2,173	7,338	0	0	7,338
1936	8,988	1,854	0	10,842	16,294	0	0	16,294	4,206	1,019	0	5,225	6,620	0	0	6,620
1937	7,339	349	3,688	11,376	20,020	0	0	20,020	3,781	2,461	448	6,690	7,059	0	0	7,059
1938	11,596	4,724	1,844	18,164	22,470	0	3,688	26,158	5,400	7,095	224	12,719	7,872	0	448	8,320
1939	10,629	3,510	0	14,139	12,726	4,680	0	17,406	4,952	3,803	0	8,755	4,425	5,071	0	9,496
1940	1,995	157	0	2,152	17,807	0	0	17,807	6,101	86	0	6,188	6,254	0	0	6,254
1941	11,001	740	0	11,741	20,526	0	1,844	22,370	5,137	4,394	0	9,531	7,169	0	224	7,393
1942	12,401	9,817	0	22,217	16,928	0	0	16,928	5,624	10,637	0	16,261	5,895	0	0	5,895
1943	10,619	6,469	0	17,088	19,527	0	0	19,527	4,825	8,031	0	12,856	6,846	0	0	6,846
1944	6,924	1,245	0	8,170	11,972	2,491	0	14,462	3,314	684	0	3,998	4,927	1,369	0	6,296
1945	6,102	210	0	6,312	20,019	0	0	20,019	3,080	1,860	0	4,940	7,049	0	0	7,049
1946	11,452	3,253	0	14,705	16,185	0	0	16,185	5,358	6,277	0	11,635	5,603	0	0	5,603
1947	7,192	257	0	7,449	14,339	343	0	14,682	3,526	1,527	0	5,053	5,013	2,036	0	7,050
1948	8,238	157	0	8,395	14,657	0	0	14,657	3,694	86	0	3,780	6,317	0	0	6,317
1949	8,060	124	0	8,184	10,776	249	0	11,025	3,672	878	0	4,549	4,608	1,755	0	6,363
1950	4,714	64	0	4,779	15,984	0	0	15,984	2,484	1,465	0	3,949	6,438	0	0	6,438
1951	11,010	172	5,532	16,713	16,995	0	0	16,995	5,223	1,210	896	7,329	5,943	0	0	5,943
1952	11,120	5,661	0	16,781	20,213	0	3,688	23,901	5,032	7,598	0	12,631	7,074	0	448	7,522
1953	12,573	9,817	0	22,389	15,580	0	0	15,580	5,691	10,637	0	16,328	5,398	0	0	5,398
1954	9,715	771	0	10,485	17,789	0	0	17,789	4,507	4,577	0	9,084	6,200	0	0	6,200
1955	8,281	312	1,844	10,437	11,248	0	0	11,248	4,022	1,158	224	5,404	4,529	0	0	4,529
1956	10,074	138	5,532	15,744	18,451	0	0	18,451	4,651	971	672	6,294	6,449	0	0	6,449
1957	8,682	9,243	0	17,925	14,816	0	0	14,816	4,051	10,015	0	14,067	5,983	0	0	5,983
1958	9,739	386	1,844	11,969	22,790	0	3,688	26,478	4,673	2,719	224	7,616	8,030	0	448	8,478
1959	11,626	10,530	0	22,156	11,880	0	0	11,880	5,375	11,410	0	16,785	4,820	0	0	4,820
1960	4,793	116	0	4,909	16,192	231	0	16,423	2,542	815	0	3,357	6,519	1,629	0	8,149

State Water Project Central Coast Area Water Supply																
Santa Barbara County Flood Control and Water Conservation District									San Luis Obispo County Flood Control and Water Conservation District							
	Off-Peak (Oct-Mar)				On-Peak (Apr-Sep)				Off-Peak (Oct-Mar)				On-Peak (Apr-Sep)			
Year	Table A	Carryover	Article 21 Water	Total	Table A	Carryover	Article 21 Water	Total	Table A	Carryover	Article 21 Water	Total	Table A	Carryover	Article 21 Water	Total
1961	6,035	128	0	6,163	10,184	257	0	10,441	3,197	906	0	4,103	4,443	1,811	0	6,255
1962	4,985	0	0	4,985	16,269	0	0	16,269	2,593	1,236	0	3,829	6,555	0	0	6,555
1963	10,915	395	0	11,310	17,096	0	0	17,096	5,256	2,785	0	8,041	5,906	0	0	5,906
1964	9,762	389	0	10,151	16,568	778	0	17,346	4,652	1,689	0	6,340	5,721	3,377	0	9,098
1965	10,230	760	0	10,990	13,597	0	0	13,597	4,843	3,708	0	8,551	5,464	0	0	5,464
1966	10,223	180	3,688	14,090	17,169	0	0	17,169	4,796	1,266	672	6,734	6,002	0	0	6,002
1967	10,113	4,090	0	14,203	21,790	0	0	21,790	4,624	6,744	0	11,368	7,680	0	0	7,680
1968	12,543	10,113	0	22,656	16,698	0	0	16,698	5,726	10,958	0	16,684	5,809	0	0	5,809
1969	11,085	679	5,532	17,297	21,998	0	2,638	24,636	5,107	2,316	672	8,095	7,715	0	318	8,033
1970	12,738	6,986	5,532	25,257	17,044	0	0	17,044	5,757	6,370	672	12,799	5,954	0	0	5,954
1971	10,571	5,465	0	16,037	12,513	0	0	12,513	4,856	7,486	0	12,343	5,083	0	0	5,083
1972	9,403	377	0	9,780	17,445	0	0	17,445	4,504	2,656	0	7,160	6,059	0	0	6,059
1973	10,308	819	0	11,128	17,782	0	0	17,782	4,768	4,866	0	9,633	6,230	0	0	6,230
1974	11,507	3,869	0	15,376	18,703	0	0	18,703	5,241	6,612	0	11,852	6,545	0	0	6,545
1975	11,176	9,255	0	20,431	17,613	0	0	17,613	5,115	10,028	0	15,143	6,124	0	0	6,124
1976	10,170	1,319	0	11,488	17,310	2,198	0	19,508	4,814	2,218	0	7,033	5,951	3,697	0	9,648
1977	293	52	0	346	1,961	105	0	2,066	2,760	29	0	2,789	854	58	0	911
1978	3,944	0	0	3,944	19,242	0	0	19,242	1,752	250	0	2,003	6,798	0	0	6,798
1979	7,734	8,612	0	16,346	20,422	0	0	20,422	3,680	9,332	0	13,012	7,199	0	0	7,199
1980	11,275	2,208	3,688	17,171	19,489	0	0	19,489	5,266	5,027	448	10,741	6,852	0	0	6,852
1981	7,987	3,078	0	11,064	12,050	4,104	0	16,153	3,796	3,335	0	7,131	5,277	4,447	0	9,724
1982	10,441	2,209	0	12,650	22,420	0	1,844	24,264	4,308	2,310	0	6,618	7,843	0	224	8,067
1983	13,631	9,620	5,532	28,783	21,599	0	2,638	24,237	6,116	10,075	672	16,863	7,589	0	318	7,907
1984	12,945	6,381	5,532	24,858	16,758	0	0	16,758	5,833	6,037	672	12,543	5,853	0	0	5,853
1985	9,841	699	3,688	14,227	18,294	0	0	18,294	4,563	882	448	5,893	6,366	0	0	6,366
1986	8,070	4,129	0	12,199	19,503	0	0	19,503	3,778	4,415	0	8,193	6,919	0	0	6,919
1987	7,142	2,092	0	9,234	8,574	3,487	0	12,061	3,506	2,642	0	6,148	3,731	4,404	0	8,135
1988	3,425	697	0	4,122	3,302	0	0	3,302	1,829	1,238	0	3,067	1,435	715	0	2,150
1989	2,096	0	0	2,096	19,753	0	0	19,753	1,088	138	0	1,226	6,959	184	0	7,143
1990	392	52	0	444	4,079	105	0	4,183	1,342	29	0	1,371	1,776	58	0	1,833
1991	2,217	0	0	2,217	7,806	0	0	7,806	1,160	168	0	1,327	3,397	335	0	3,733
1992	3,262	0	0	3,262	5,217	0	0	5,217	1,740	321	0	2,061	2,272	642	0	2,914
1993	5,763	0	0	5,763	18,580	0	0	18,580	2,681	641	0	3,322	6,506	0	0	6,506
1994	7,423	427	0	7,850	9,026	854	0	9,880	3,677	1,713	0	5,390	3,946	3,426	0	7,372
1995	7,399	0	0	7,399	23,198	0	1,844	25,042	3,514	1,183	0	4,697	8,175	0	224	8,399
1996	13,073	6,383	0	19,456	18,487	0	0	18,487	6,002	3,508	0	9,509	6,446	0	0	6,446
1997	12,159	7,094	5,532	24,786	16,556	0	0	16,556	5,428	6,071	672	12,171	5,782	0	0	5,782
1998	10,695	6,301	3,688	20,685	22,369	0	3,688	26,057	4,804	7,720	448	12,973	7,892	0	448	8,340
1999	12,730	10,530	0	23,260	17,268	0	0	17,268	5,821	11,410	0	17,231	6,002	0	0	6,002
2000	9,883	2,953	3,688	16,524	17,984	0	0	17,984	4,573	5,434	448	10,456	6,295	0	0	6,295
2001	6,528	1,871	0	8,399	8,158	3,741	0	11,900	3,187	2,524	0	5,711	3,549	5,048	0	8,597
2002	5,263	0	0	5,263	12,611	0	0	12,611	2,649	339	0	2,988	5,071	678	0	5,749

State Water Project Central Coast Area Water Supply																
Santa Barbara County Flood Control and Water Conservation District									San Luis Obispo County Flood Control and Water Conservation District							
	Off-Peak (Oct-Mar)				On-Peak (Apr-Sep)				Off-Peak (Oct-Mar)				On-Peak (Apr-Sep)			
Year	Table A	Carryover	Article 21 Water	Total	Table A	Carryover	Article 21 Water	Total	Table A	Carryover	Article 21 Water	Total	Table A	Carryover	Article 21 Water	Total
2003	8,410	183	0	8,593	9,575	0	0	9,575	4,149	100	0	4,250	3,772	0	0	3,772
Average	8,267	2,450	877	11,594	15,196	323	312	15,831	4,010	3,462	112	7,584	5,585	613	38	6,236

Draft

7.3 Santa Barbara County

Figure 7-1 shows the CALSIM-2 hydrologic sequence of SWP supplies for Santa Barbara County (contractually the contract is between DWR and the Santa Barbara County Flood Control and Water Conservation District). The average SWP Table A and Carryover supplies that are available to Santa Barbara County are 26,000 acre-feet, with those supplies exceeding 22,000 acre-feet in about 70 percent of the years. The sequence of water supply availability shows three especially significant drought periods when deliveries are much lower than average – 1929-1934, 1976-1977, and 1987-1992. These dry periods have comparable SWP supply shortages to the recent 2012-2016 drought period, which is not included in the CALSIM-2 simulation. In addition to Table A and Carryover water that is delivered to SWP Contractors on a requested delivery schedule, the 2019 DCR also shows about 1,200 acre-feet of Article 21 Water being available. This water is available in less than 30% of the years and only during the months of January through May.

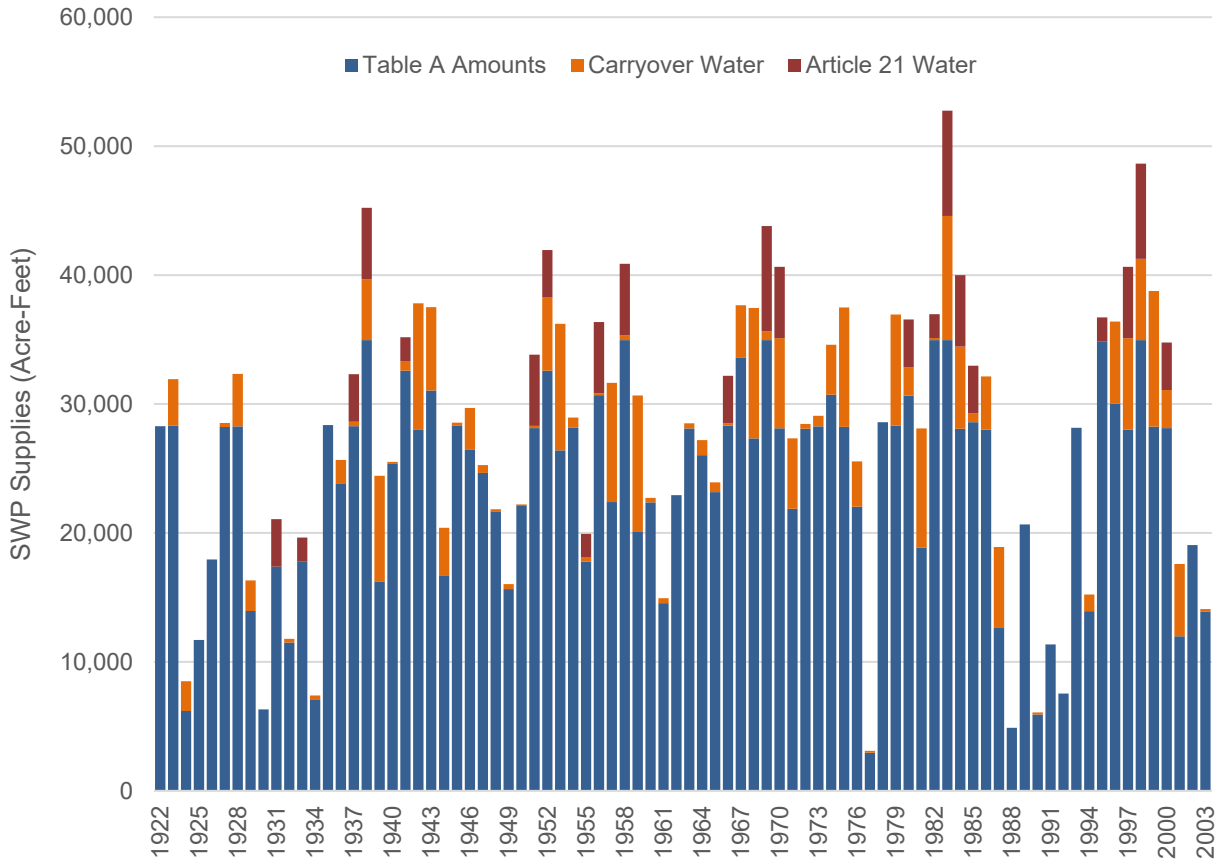


Figure 7-1 Santa Barbara County – SWP Available Supply Present Level

The water supplies shown in Figure 7-1 are the total SWP supplies that are available to Santa Barbara County and do not necessarily represent the amounts that could be used. In some wet years, there may not be water demands in the local service area, or local water supplies may be available making SWP Supplies unnecessary. As discussed elsewhere, in these types of wet years (either locally or in the SWP's Central Valley watershed source), other provisions may be needed for managing water supplies. Capacity on the SWP or in local conveyance facilities may also be a limiting factor, particularly in wetter years. Since the rated conveyance

capacity of Reach 33B is 71 cfs, which is lower than the permitted operating capacity of the PPWTP, the PPWTP is not a limiting factor in terms of conveyance capacity for the Coastal Branch.

7.4 San Luis Obispo County

A similar graph of SWP available supply for San Luis Obispo County (contractually, the SWP contract is between DWR and the San Luis Obispo County Flood Control and Water Conservation District) is shown in Figure 7-2. This figure is plotted on the same scale as that of Santa Barbara County and shows smaller quantities of SWP supplies, reflecting San Luis Obispo County's smaller amount of SWP Table A contracted supply. The 2019 DCR estimates that San Luis Obispo County would receive average Table A and carryover water deliveries of approximately 14,000 acre-feet, which is about 58% of the 25,000 acre-foot Table A contract amount. The percentage of Table A amounts estimated to be available to San Luis Obispo County is slightly lower than for CCWA due to different assumptions used by CALSIM-2 for San Luis Obispo County Table A demand levels and carryover requests. In addition to the Table A and Carryover Water, San Luis Obispo County also is projected to have about 100 acre-feet of Article 21 water available.

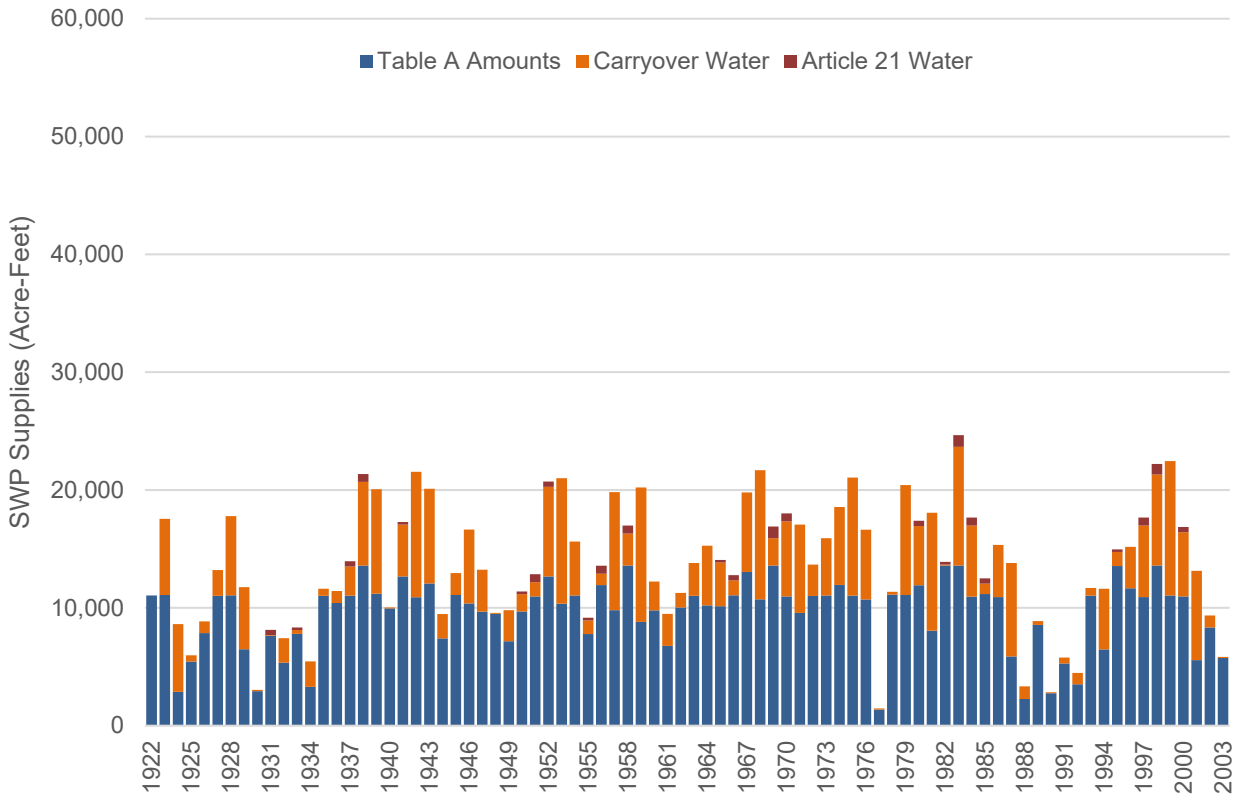


Figure 7-2 San Luis Obispo County -- SWP Available Supply Present Level -

7.5 Central Coast Contractors Allocations

The supplies summarized in Table 7-1 and shown in Figure 7-1 and Figure 7-2 represent a starting point in estimating locally available water supplies from the SWP. As discussed in later sections, factors such as local

water supplies, service area demands and SWP capacity can affect the portion of SWP supplies retained in each county.

Both Santa Barbara County and San Luis Obispo County have local agencies within their service areas that have contracted for portions of the SWP supply. The Table A contracted amounts for these agencies (referred to as the Central Coast Contractors) are shown in Table 7-2.

Table 7-2 CCWA and SLOFCWCD Table A Subcontracted Amounts (Acre-Feet per Year)

Central Coast Water Authority			
Participant	Table A Amount	CCWA and District Drought Buffer	Total Water Amounts
City of Buellton	578	58	636
Carpinteria Valley Water District	2,000	200	2,200
Goleta Water District	4,500	2,950	7,450
City of Guadalupe	550	55	605
La Cumbre Mutual Water Company	1,000	100	1,100
Montecito Water District	3,000	300	3,300
Morehart Land Company	200	20	220
City of Santa Barbara	3,000	300	3,300
Raytheon Systems Company	50	5	55
City of Santa Maria	16,200	1,620	17,820
Santa Ynez RWCD, Improvement District	2,000	200	2,200
Golden State Water Company	500	50	550
Vandenberg Space Force Base	5,500	550	6,050
TOTAL	39,078	6,408	45,486

San Luis Obispo County Flood Control and Water Conservation District			
Participant	Water Service Amount	Drought Buffer Amount	Total Water Amounts
CSA 16 (Shandon)	100	0	100
City of Morro Bay	1,313	2,290	3,603
CMC	400	400	800
County Ops Center	425	425	850
Cuesta College	200	200	400
City of Pismo Beach	1,240	1,240	2,480
Oceano CSD	750	750	1,500
San Miguelito MWC	275	275	550
Avila Beach CSD	100	100	200
Avila Valley MWC	20	20	40
San Luis Coastal USD	7	7	14
PARTICIPANT TOTAL [2]	4,830	5,707	10,537

[2] A remaining amount of 14,463 acre-feet of SLOFCWCD Table A amount is not under contract with a Participant

The SWP water delivery availability amounts indicated in Table 7-1 can be applied proportionately to individual Coastal Branch Contractors based on the Table A amounts shown in Table 7-1. For example, Cuesta College, with a Table A amount of 400 acre-feet[11], would have access to 1.6% (400 AF/25,000 AF) of the total San Luis

[11] While in this example, Cuesta College would have access to 400 acre-feet of Table A amounts for allocation purposes, it would only have access to 200 acre-feet of actual deliveries under the CCWA treatment/capacity agreement.

Obispo County supply amounts shown in Table 7-1. The CALSIM-2 SWP water supply estimate summarized above, as distributed to Coastal Branch Contractors, constitute the SWP supply available. Chapter 9 of this Water Management Strategy will evaluate approaches to maximize the use of these supplies to meet local water management needs cost effectively.

Draft

8 Selection Criteria

The selection criteria for the identified water management strategies are intended to be utilized subjectively to guide decisions on how to best implement management measures that align with participant constraints and goals.

Selection criteria were developed by considering both local needs and regional goals as identified in the Integrated Regional Water Management Plans (IRWMP). A summary of the regional objectives can be found in Table 8-1 Regional Objectives below. These proposed selection criteria address the key objectives below, with the exception of flood control, infrastructure maintenance and groundwater management, which are not related to the State Water Project (SWP). Groundwater management could be utilized as a tool or management measure but should not be as a selection criteria on its own.

Table 8-1 Regional Objectives

Objective/Goal	Santa Barbara County IRWMP	San Luis Obispo County IRWMP
Water Supply	Protect, conserve, and augment water supplies Maintain and enhance water and wastewater infrastructure efficiency and reliability storage capacity.	Maintain or improve water supply quantity and quality for potable water, fire protection, ecosystem health, and agricultural production needs; and cooperatively address limitations, vulnerabilities, conjunctive-use, and water-use efficiency.
Groundwater Monitoring and Management	Protect, manage, and increase groundwater supplies	Achieve sustainable use of the Region's water supply within groundwater basins through collaborative and cooperative actions.
Ecosystem and Watershed Goal	Practice balanced natural resource stewardship Protect and improve water quality Address climate change through adaptation and mitigation	Maintain or improve the health of the Region's watersheds, ecosystems, and natural resources through collaborative and cooperative actions; with a focus on assessment, protection, and restoration/enhancement of ecosystem and resource needs and vulnerabilities.
Flood Management	Improve flood management Improve emergency preparedness	Foster an integrated, watershed approach to flood management and improved storm water quality through collaborative community supported processes in order to ensure community health, safety, and to enhance quality of life.
Water Resources Management and Communications	Ensure equitable distribution of benefits	Promote open communications and regional cooperation in the protection and management of water resources, including education and outreach related to water resources conditions, conservation/water use efficiency, water rights, water allocations, and other regional water resource management efforts.

The selection criteria identified are subjective in nature and should be utilized to best determine if a management measure should be implemented. The criteria include water supply, water quality, the ability to permit, cost, proximity, and equity. When considering a management measure, these criteria should be prioritized to adhere to the participant's specific objectives and constraints. Table 8-2 Selection Criteria outlines the criteria and considerations for the selection of a specific management measure.

Table 8-2 Selection Criteria

Criteria	Measure	Considerations
Water Supply	Acre-feet Cubic feet per second	Does the amount of volume or flow satisfy the participant need under a particular condition?
Water Quality	Maximum level and Concentration	Is there a difference in resulting water supply; how well does water supply meet water quality needs? Are there any negative adverse water quality effects?
Ability to Permit	Weeks	How lengthy and difficult would permitting process be?
Cost	Dollars	Is it affordable for the short term? Long term?
Proximity	Yes or no	Is the measure local (vs. imported)? Will it shift supply to a more sustainable/long-term solution?
Equity	Yes or no	Do alternatives maintain or improve DAC and tribal access to adequate water supplies?
Reliability	More or less	Is the supply cost and availability probable? Focus on moderate or extreme dry years?

The criteria considered in the modeled analysis and recommendations (Chapter 9) are largely focused on water supply, cost, and reliability as these criteria can be assessed utilizing model analysis of empirical data. Other selection criteria are somewhat qualitative and would be factors that individual agencies could ultimately consider together with the modeling analysis.

8.1 Water Supply

In selecting a management measure based upon water supply, participants should consider factors such as required volume or flow, and year condition types. Since the amount of water needed will likely vary based on wet, average, or drought conditions, the implemented measure should satisfy the volume needed under the specific conditions for which it is required. The Integrated Resource Planning (IRP) Analysis Tool was used to evaluate and compare the relative water supply benefits for identified water management components.

8.2 Water Quality

Participants should ensure the management measure meets or exceeds water quality requirements for intended use and has no adverse impacts. It was expressed during the needs assessment that SWP water quality was a concern and management measures to improve water quality were of priority. For example, projects that reduce the total dissolved solids in a groundwater basin may be considered for implementation, even if they do not provide significant benefits in other factors.

8.3 Ability to Permit

If a management measure contemplates a project that would have environmental impacts or require local, state, or federal permitting, ability to permit should be considered in terms of time, cost, and likelihood of permit issuance. Some projects that may bring significant supply benefits could come at a substantial cost in terms of time, staff resources, and cost commitment just to gain approvals. These projects would also have a large element of uncertainty and permits might ultimately not be obtained, with the project not completed. Other projects may be easier to permit with a shorter timeline to address participant objectives and goals. In all cases these permitting risks should be considered.

8.4 Cost

Cost is an important factor in determining whether a management measure is implemented. Participants would assess cost in terms of risk management to address shortages during various year condition types and look at overall affordability in the context of near term and longer management projections to ensure objectives and goals are met. Costs were quantified for water management components evaluated by the IRP Analysis Tool which provide cost comparisons.

8.5 Proximity

Some management measures could be selected or screened out based on geographic proximity to the participants. If a measure it is local, it may be preferred over imported options. In other cases, a measure may contribute to a larger regional portfolio to increase sustainability and long-term water security by reducing reliance on water supplies from the Sacramento-San Joaquin Delta.

8.6 Equity

Another regional consideration in selecting management measures may be ensuring adequate water supplies to Disadvantaged Communities (DAC) or economically distressed areas. Many of these communities face unreliable water sources and are especially susceptible to adverse impacts during periods of drought. Measures that provide improvements to these communities may become a prioritized selection factor among alternatives.

8.7 Reliability

Both near term and long-term supply reliability is necessary in a successful water management plan and can be achieved through managed demand and supply development. Participants will need to consider the cost and probability that the supply will be available when it is needed most (i.e., moderate, or extreme dry years). The analysis provided in later sections contemplates historical availability of differing water year types to inform regional portfolio planning. The available water supply in key drought shortage periods – 1927-1933, 1959-1962, 1987-1993 and 2012-2016 – was used as a quantity indicating the reliability based on the Model developed for this study (CBIRP Analysis Tool).

Draft

9 Water Management Components

Several water management components have been identified and evaluated to provide an initial indication of the water management opportunities available to the Central Coast Contractors. This section begins by describing the scope of this evaluation and its limitations. The analysis described in this chapter evaluates five water management portfolios that are formed by combining individual water management components. The five SWP portfolios were evaluated using the Coastal Branch Integrated Regional Planning (CBIRP)Analysis Tool (referred hereafter as Model). Based on the modeling analysis as well as a cost review of the modeling results, the relative benefits of the water management components are compared, and recommended management approaches are identified. This section presents recommendations for management actions and future analysis, based on the water management component analysis.

9.1 Analysis Tool Description

Based on policy direction and study scope, a completely integrated analysis of all water supply and demand components was not conducted for this study. Instead, the focus of this effort is on the SWP role in meeting Central Coast water demands. The limited analysis conducted for this report is not a comprehensive integrated water resources management (IWRM). A comprehensive IWRM analysis should consider all local and imported water supplies and management tools available to water agencies, incorporate available conveyance facilities and reservoirs (including groundwater) in a time series review to indicate water supply adequacy to meet needs, and include measures to reduce water demand, such as water conservation and recycling.

The analysis using Model described here is less comprehensive in scope, focusses primarily on the role of the SWP in meeting Central Coast water management needs, and does not evaluate optimization opportunities for other non-SWP water supplies. Water management in the Central Coast has multiple local and regional water supply sources available, including water supplies from the Santa Ynez River, Santa Maria River, Salinas River and other local watersheds. Additionally, several large groundwater basins in the Central Coast provide long term storage and local supplies based on local recharge sources. The SWP provides a supplemental supply to the Central Coast, augmenting local water supplies and management measures.

The Model developed for this study centers on the SWP and, with one exception, does not directly consider the coordinated use of SWP and local water supplies. The Model specifically includes the Coastal Branch and SWP supplies available to Central Coast Participants. A schematic of the Model showing conveyance reaches and aggregated turnouts for the Coastal Branch is shown in Figure 9-1. The conveyance reach capacities, aggregated turnouts and the deliveries through these turnouts are summarized in Table 9-1. In addition to the SWP Coastal Branch, the Model also includes a representation of Cachuma Reservoir, which is closely integrated with SWP operations. The Model uses a semi-annual time step to evaluate the 98-year analysis period (1922-2019) with projected SWP supplies and Cachuma Reservoir inflows. The semi-annual time frame aggregates the October to April and the May to September period. This provides greater accuracy in evaluating sub-annual operations without creating an overly burdensome modeling effort.

The Model uses Network Flow Programming (NFP) to determine an optimal approach to manage different water management components to meet goals such as maximizing water deliveries and minimizing spills and costs. NFP is an Operations Research technique for computing minimum cost solutions for transportation and resource allocation issues and has been used extensively in solving water management problems. This approach optimizes operations while considering known future conditions, something that is not possible in real time water management. However, the results of this approach establish the best operating scenario able to be achieved and provides water managers with information that could be evaluated alongside potential water management strategies to minimize risks. For example, this approach could help with deciding how much water should be left in storage and placed at risk of spilling in one year to ensure there is sufficient supply to meet local demands in a future year.

Draft

Table 9-1 Model (CBIRP Analysis Tool) Demand and Capacity Assumptions, Acre-Feet

	San Luis Obispo County			Central Coast Water Authority		
Category	Oct-Apr	May-Sept	Annual	Oct-Apr	May-Sept	Annual
Capacity	3,362	2,426	5,788	26,494	19,120	45,614
Contract Amount			10,537			45,486
Deliveries – Max	2,586	2,685	5,271	18,725	18,334	37,059
Deliveries – Average	1,890	1,809	3,699	9,489	12,076	21,565

A full description of the Model, the data it includes, and key operational assumptions are provided in Appendix D. As described below, Appendix D also provides detailed summaries of the water management component analyses and their results.

9.2 Water Management Components

As defined here, water management components are individual management actions that a water agency can use to improve its overall water supply. A water management component is an action, either internal or external to an agency, that can improve the agency's water supplies. A water management agency will typically implement multiple water management components as part of an overall water management "portfolio". Several pre-existing and new water management components were described in the Rules and Requirements section of this report (Chapter 5). A selection of water management components is described below, which could be implemented separately or in combination by water agencies. Five combinations of water management components, defined as "portfolios", were identified that are subsequently analyzed using the Model.

9.2.1 Water Management Component Descriptions

Historic water management in the Central Coast has used some, but not all, water management components that are currently available. Defined restrictions to the application of some water management components were described in the Rules and Regulations section of this report (Chapter 5). The water management components that are identified in this report for Central Coast water management analysis include the following:

San Luis Reservoir Carryover Storage – Article 56 of the SWP Water Supply Contract was implemented in 1996 and provides that individual SWP Contractors have the ability to store a portion of their unused Table A allocations in a single year in SWP conservation storage facilities, primarily San Luis Reservoir. The contract provides that a SWP Contractor has limits to the amount that can be stored in a single year and, additionally, only has access to their proportional share of available storage in San Luis Reservoir.

Transfers between SLOFCWCD and CCWA – According to the new 2021 Water Management Amendment, annual transfers of Table A allocations (meaning water stored in SWP storage that is not needed by a SWP Contractor) are allowed between all the signatories to the Amendment. Individual SWP Contractors still have the discretion to limit their use of the SWP Water Management Amendment, and this component assumes a limited implementation of the SWP Water Management Amendment that is limited to transfers between the Coastal Branch Contractors. An obvious application of this component would be transfers of San Luis Obispo County's uncontracted Table A Amount (totaling 14,463 acre-feet) to Santa Barbara County. A defined transfer from San Luis Obispo

Draft

County to Santa Barbara County could be part of a package that might include increased use of Coastal Branch conveyance capacity by San Luis Obispo County.

Dry Year Purchase Program – The State Water Contractors, Inc. (SWC) organization has organized a water purchase program in dry years (referred to as the Dry Year Purchase Program) for one year water transfers from the Sacramento Valley. This program facilitates water transfers based on fallowing or groundwater substitution programs from the Sacramento Valley. The amounts of any available water transfers from the Dry Year Purchase Program are usually not adequate to meet the potential needs, therefore, shortfalls in supply are allocated proportionately to SWP Contractors' Table A amounts. As relatively small SWP Contractors, the Central Coast Contractors typically have low allocations of any available transfers. The Model assumes a dry year purchase program is a water management component that is available on an ongoing basis.

External Storage Program –Article 56 of the SWP Water Supply Contract provides SWP Contractors with the ability to store allocated Table A Amounts in storage programs within the service areas of other SWP Contractors. These programs are normally groundwater storage programs in developed groundwater banks. Some CCWA members participate in such programs and this water management component could provide for expanded use of such storage. For purposes of this analysis, it is assumed that external storage programs would be implemented external to the Central Coast area in total, and does not assume external storage within the Central Coast area. The capacity of external storage programs was assumed to be 10,000 acre-feet for San Luis Obispo County and 30,000 acre-feet for Santa Barbara County.

Internal Storage Program –Article 56 of the SWP Water Supply Contract would also apply to one Central Coast Contractor storing a portion of its SWP water within the other Central Coast Contractor's service area. Based on input from the Central Coast Contractors, no such programs were assumed in the Model to be available and this option has not been analyzed.

Increased SLOFCWCD SWP Contract Use – Currently, 14,463 acre-feet of San Luis Obispo County's Table A Amount is un-contracted and does not have an assigned use. Water agencies within San Luis Obispo County's service area, such as Groundwater Sustainability Agencies or agencies with access to storage in Lopez Reservoir, could potentially contract with SLOFCWCD for a portion of the unallocated Table A Amount. Conveyance capacity to deliver this additional supply would be a limiting factor for this component, and it might be limited to lower allocation years when capacity is available or might require an agreement with CCWA for access to additional capacity.

Coastal Branch Capacity – The CCWA participation agreements include defined capacities for access to treated water (at PPWTP) and conveyance in the Coastal Branch. The defined capacities are expressed as maximum Table A amounts but have equivalent capacity values for the Coastal Branch itself. The most obvious limitation in the agreements is that SLOFCWCD, with 25,000 acre-feet of maximum Table A Amounts, only participates in the Coastal Branch at an amount of 4,830 acre-feet.

Purchases of Table A Allocations, or Carryover Storage, from Other SWP Contractors – Single year or multi-year purchases of SWP Table A allocations, water stored in SWP facilities, or water stored in other SWP Contractors service areas are allowed by the 2021 SWP Water Management Amendment. These purchases could be a useful supply source in drought years. This component is assumed to rely on transfers from SWP Contractors outside of the Central Coast.

Sales of Table A Allocations, or Carryover, to other SWP Contractors. The 2021 SWP Water Management Amendment allows for sales of SWP water to other SWP Contractors. This component could be a useful water management tool in years of higher SWP allocation or years when local supplies are plentiful. Revenue from these sales can be used by local water agencies to pay for other, more critical, water management measures.

Draft

The list of water management components here is a partial list selected based on stakeholder workshop input and the consultants' previous water management experience. A selection of these components were included in various combinations in portfolios that are described below and subsequently analyzed by the Model.

9.2.2 Water Management Component Portfolios

Five water management portfolios, each comprised of combinations of water management components, have been identified for analysis of alternative SWP supply benefits. The five portfolios were chosen to define a reasonable range of potential actions and operations based on stakeholder input. For many of the portfolios, specific limits were identified for analysis that could be adjusted in the future based on stakeholder interest. Future analyses could be performed to refine the specific actions identified in the portfolios. For example, Portfolio 2 sets external storage for CCWA to 30,000 acre-feet; however, it may be decided later to investigate a larger or smaller size of external storage program for the Central Coast Contractor.

Each of the portfolios described below was analyzed using the Model. In addition to the portfolios reported here, some of the water management components not included in the portfolios below were analyzed separately and determined not to have important impacts on analysis results. Those are briefly described in the evaluation section (Section 9.3) below. As described earlier, the Model does a semi-annual analysis of long term (1922-2019) water supply conditions. Table 9-2 shows the water management components included in each of the analyzed water management portfolios:

Table 9-2 Water Management Component Portfolios

	Water Management Component Portfolio				
	1	2	3	4	5
	Baseline SWP Operations	Baseline with Ext Storage	Baseline with SLOFCWCD Add Use	Central Coast Integration	Water Management Amendment
Coastal Branch Capacity	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted
Dry Year Purchase Program	Available	Available	Available	Available	Available
External Storage Program	Unavailable	Available	Available	Available	Available
Internal Storage Program	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Increased SLOFCWCD Demands	No	No	Yes	Yes	Yes
External Table A Purchases	Unavailable	Unavailable	Unavailable	Unavailable	Available
External Table A Sales	Unavailable	Unavailable	Unavailable	Unavailable	Available

Portfolio 1 "Baseline SWP Operations" – Portfolio 1 approximately represents recent historical Central Coast SWP operations, providing a baseline for comparison with other portfolios. This portfolio provides for use of available conveyance capacity in the Coastal Branch for the Coastal Branch Contractors as well as availability of annual purchases through the State Water Contractors Inc. (SWC) Dry Year Water Purchase Program, however those amounts are relatively modest and provide very limited supply to the Coastal Branch Contractors. Transfers of SLOFCWCD's non-contracted Table A water to its Participants are also included in

this portfolio; however, this portfolio does not allow use of the new Water Management Amendment provisions and it assumes non-use of other existing SWP contract provisions such as external storage programs.

Portfolio 2 "Baseline with External Storage" – Portfolio 2 includes continued baseline (Portfolio 1) Coastal Branch operations, while providing for external storage programs. Although external storage programs are allowed under Article 56 of the SWP Water Supply Contract, there has been limited participation in such programs by the Coastal Branch Contractors. Use of external storage programs could increase the availability of SWP water supplies during critically dry periods through more efficient storage and reduced spills. For example, while the long-term allocation of Table A used in the modeling is 58% of contracted amounts, Portfolio 1 can only take advantage of 46% of the contracted amount. With the addition of 30,000 acre-feet of external storage for Santa Barbara County, Santa Barbara County could increase its utilization of its SWP water supplies by nearly 2% to 47.8% of the contracted amount. While that may not seem like a significant increase, the improvement in water supply primarily occurs in dry and critically dry years with an increase in the usable SWP water supply of 6% and 32% respectively.

Portfolio 3 "Baseline with SLOFCWCD Additional Use" – Portfolio 3 builds on Portfolio 2 by increasing SLOFCWCD's demands for SWP water. Portfolio 3 assumes 1,000 acre-feet of additional SLOFCWCD demand for supplemental recharge of the San Luis Obispo Groundwater Basin. This additional SWP water use is presented as an example that could be increased based on local interest and ability to pay for SWP water.

Portfolio 4 "Central Coast Integration" – Portfolio 4 includes Portfolio 3 operations and provides for transfer of water supplies between CCWA and SLOFCWCD. The primary tool available from this portfolio is explicit ability of Coastal Branch Contractors to purchase and sell SWP Table A amounts to each other on a one-year or multi-year basis. One-year transfers were formerly prohibited in the SWP Water Supply Contract and are being implemented as one of the actions in the SWP Water Management Amendment. Portfolio 4 would keep SWP water supplies within the Coastal Branch Contractors' service area and not allow transfers with other SWP Contractors. While this portfolio could broadly provide for local exchange or storage programs, no specific programs (such as possible San Luis Obispo Groundwater basin or Lopez Reservoir storage programs) are explicitly included.

Portfolio 5 "Water Management Amendment" – Portfolio 5 includes Portfolio 4 operations and expands the transfer capability to include sales to and purchases from other SWP Contractors outside of the Coastal Branch Contractors' service area. This portfolio allows the most ambitious management approaches that include the primary water management components available to the Coastal Branch Contractors.

9.3 Evaluation of Water Management Component Portfolios

The Water Management Component Portfolios described above were analyzed using the Model to evaluate their performance in improving Coastal Branch Contractor water supplies. The Model was also used separately to analyze various individual water management components or different analysis assumptions, which are briefly described in this section.

9.3.1 Portfolio Evaluation

As described in Section 8 on the Selection Criteria, the focus of the Water Management Component analysis is on three of the seven identified selection criteria – Water Supply, Cost and Reliability. The results of each portfolio are described individually, with a follow-up summary table showing how they compare with each other. Portfolio 1, which serves as a baseline indication, is described in more detail than the other four portfolios. The descriptions of subsequent portfolios are focused on changes from Portfolio 1.

Portfolio 1 "Baseline SWP Operations" – Portfolio 1 represents baseline Coastal Branch SWP operational conditions that generally match historical SWP water use. Each Coastal Branch Contractor controls the use of

Draft

its own SWP water supply. The Coastal Branch Contractors are assumed to have access to available Coastal Branch capacity that is not restricted to their contract shares.

The resulting SLOFCWCD water supply for Portfolio 1 is shown in Figure 9-1.

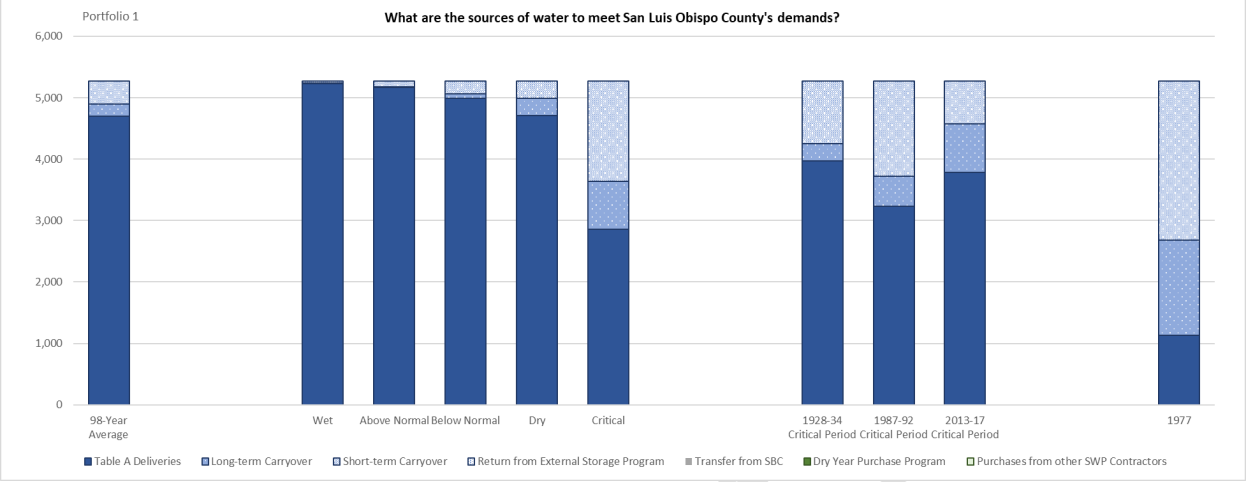


Figure 9-1 SWP Water Supply Deliveries to SLOFCWCD (includes all SWP water supply types)

Figure 9-1 shows that SLOFCWCD's small historical demand of 5,271 acre-feet (based on the maximum historical maximum deliveries to existing users) is met in all years, through either direct SWP Table A allocations or use of previous allocations that were carried over in San Luis Reservoir. Table A allocations, based on that portion of SLOFCWCD's Table A Amount of 25,000 acre-feet that has been contracted for by its Participants (10,537 acre-feet), meets demands in exactly half of the years in the 1922-2019 period and provides nearly 87% of deliveries for the entire analysis period. Approximately 8% of SLOFCWCD's Table A delivered directly within the year is from transfer of SLOFCWCD's non-contracted Table A to its Participants. Water supplies that are carried over in SWP facilities are sufficient to meet SLOFCWCD's demands in the remaining half of the years, providing about 13% of SLOFCWCD's SWP supply.

Figure 9-2 shows that CCWA'a higher demand cannot be met in critically dry years. Overall, CCWA deliveries of SWP water average 21,100 acre-feet, which is roughly 46% of its maximum Table A Amount of 45,486 acre-feet. This 46% delivered supply is considerably lower than the average SWP reliability of 59%, which would be achieved if all allocated SWP supplies were used. The lower delivery percentage for CCWA results from two factors: an inability to match demand to the available SWP allocation and inability to manage water in high supply years. The Model maximum demand of 37,059 acre-feet is less than CCWA's maximum Table A amount of 45,486 acre-feet. Additionally, the Model only provides water for CCWA's South Coast users in years when shortages from Lake Cachuma are imminent, which turns out to be about 15 years out of the 98-year analysis period. In more than 80% of the years, no water deliveries would be needed for South Coast users. In the years of non-delivery for the South Coast, the Model only delivers 21,472 acre-feet, which is the amount needed to meet the demands of North County and Mid County area users only. In addition to limited South Coast demands, the assumptions for Portfolio 1 limit CCWA's options for managing SWP supplies in high allocation years to carryover storage in San Luis Reservoir, which is subject to spillage and can result in delivery shortages in subsequent years. The computed overall shortage in the Portfolio 1 analysis is 2,100 acre-feet.

Draft

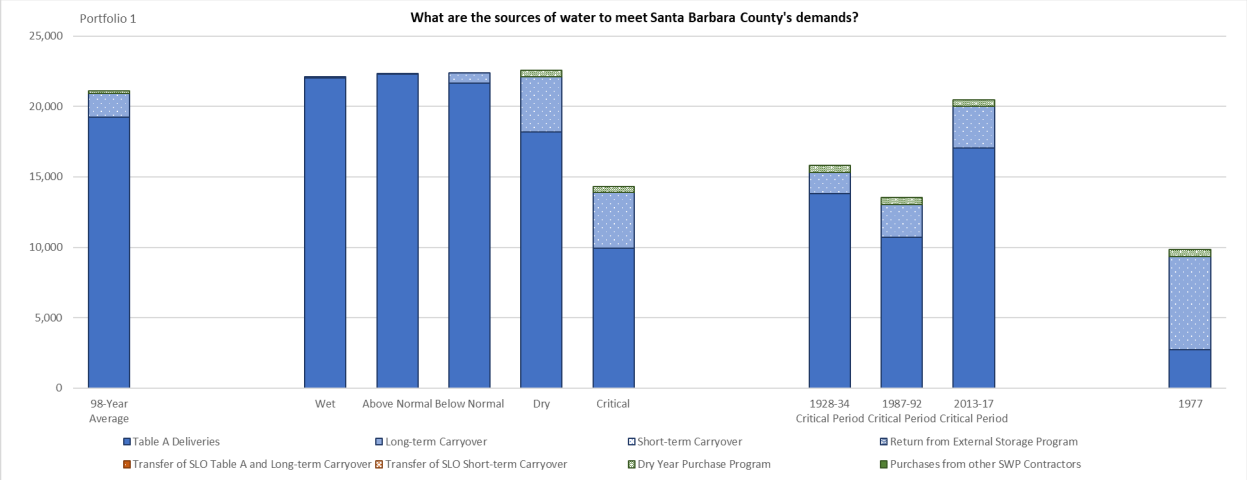


Figure 9-2 SWP Water Supply Deliveries to CCWA (Includes all SWP water supply types)

A breakdown of the CCWA deliveries by turnout for Portfolio 1 is shown in Figure 9-3. The Model shows CCWA deliveries to North County and Mid County users in all years, with occasional deliveries to South Coast users as supplemental supply to their Cachuma Project supplies. As noted above, the deliveries for South Coast users occur very infrequently and are used only during, or in anticipation of, shortage periods, primarily the recent 2012-2018 period and a 1947-1951 period when Cachuma Project inflows are low.

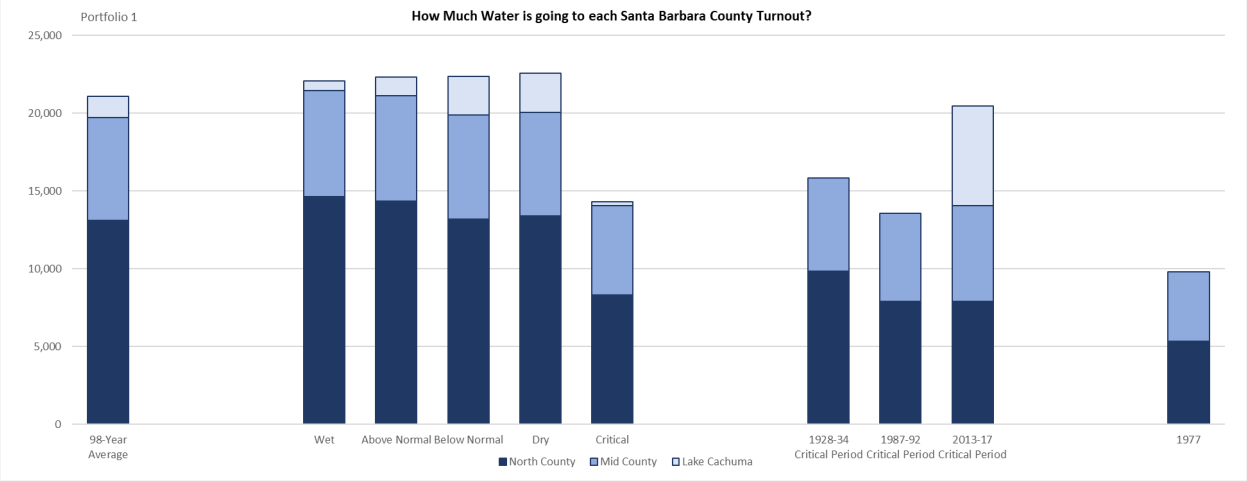


Figure 9-3 SWP Water Supply Deliveries to CCWA by Turnout Group

The Model projects spills of carryover as the SWP starts to use its full share of San Luis Reservoir, which are shown in Figure 9-4. In the Portfolio 1 analysis, the only management tool assumed is the use of short term and long-term carryover in the SWP San Luis Reservoir. Coastal Branch Contractors' unused SWP Table A Allocations are assumed to be stored in San Luis Reservoir, where they are subject to spillage if the reservoir's available storage capacity is exceeded, or their carryover storage exceeds the SWP Water Supply Contractor Article 56 allowable storage amounts. Spills of SLOFCWCD carryover averages 9,400 acre-feet, which is larger than its local demands and the spillage amounts to about 36% of SLOFCWCD's Table A Amount. As shown in Figure 9-4, SLOFCWCD would have very frequent spills from San Luis Reservoir, which is a result of its relatively low Portfolio 1 delivery demand of 5,271 acre-feet, as compared to its Table A Amount of 25,000 acre-feet. CCWA spills from San Luis Reservoir, while considerably lower than SLOFCWCD's proportion, are

5,470 acre-feet per year, which is about 12% of the CCWA Table A Amount. CCWA spills are projected to occur in wetter year sequences, when SWP Table A allocations are higher for several years.

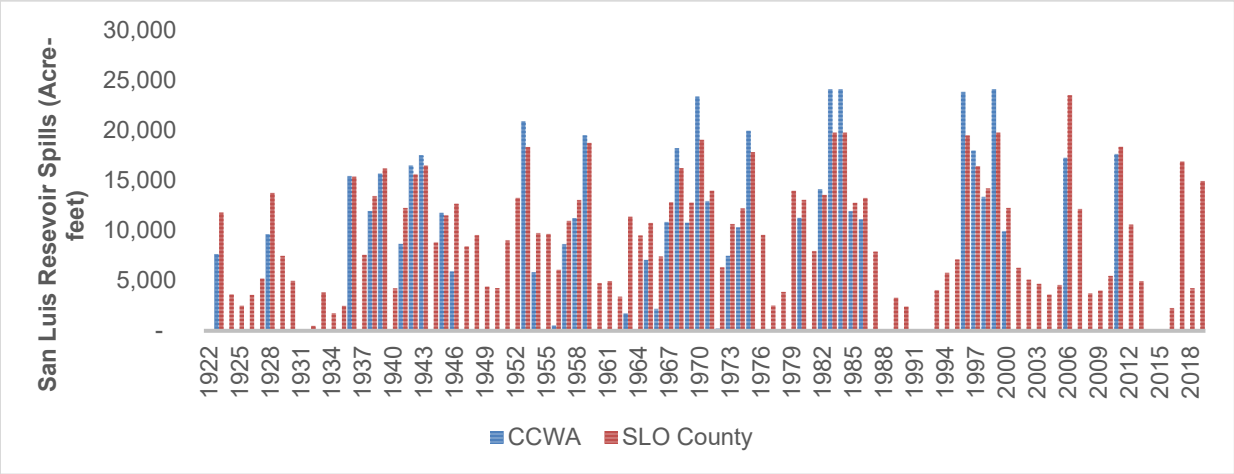


Figure 9-4 Coastal Branch Contractors Spills from San Luis Reservoir Storage

Portfolio 2 "Baseline with External Storage" – Portfolio 2 represents historical baseline operations for Coastal Branch Contractors, with the addition of external storage as provided for in Article 56 of the SWP Water Supply Contract. For analysis purposes, the total amount of external storage assumed in the Model was 10,000 acre-feet for SLOFCWCD and 30,000 acre-feet for CCWA. Since SLOFCWCD's limited demands were already being met in the Portfolio 1 baseline analysis, it did not receive any additional water supply as a result of Portfolio 2. SLOFCWCD's carryover spills also were not reduced significantly through use of the program. Portfolio 2 indicates that, in the absence of increased SLOFCWCD demands, there is no benefit for participating in an external storage program; the additional cost does not improve water supply conditions.

For CCWA however, Portfolio 2 improves water supplies, with SWP deliveries increasing slightly to 21,900 acre-feet. The increase of 800 acre-feet per year includes additional supply of 1,000 acre-feet per year from the external storage program, which is partially offset by reduced purchases as compared to the Portfolio 1 results. While the increased average delivery amounts are relatively small, they have relatively high benefits because they occur during critical drought periods when water is most valuable. Spills for CCWA decrease about 1,000 acre-feet per year, reflecting the improved ability to regulate allocation SWP Table A supplies with the external storage program.

Portfolio 3 "Baseline with SLOFCWCD Additional Use" – Portfolio 3 is a slight variation of Portfolio 2 which provides for increased demands within SLOFCWCD's service area for supplemental groundwater basin supply. Portfolio 3 includes an annual supply of 1,000 acre-feet for the San Luis Obispo Groundwater Basin, which was assumed in the Model as a constant demand in all years. This additional demand was identified as a placeholder for possible other uses of SLOFCWCD's Table A supplies to address unmet water supply needs in other groundwater basins in the county.

Based on Portfolio 3, the 1,000 acre-feet of supplemental demand for SLOFCWCD could be met in all years, without any shortages. Spills of carryover storage from San Luis Reservoir would correspondingly be reduced by 1,000 acre-feet per year. As with Portfolio 2, there is no benefit to SLOFCWCD deliveries from an external storage program.

Since there were no changes to water management components available to CCWA, Portfolio 3 results in essentially no water management changes as compared to Portfolio 2 for CCWA. CCWA deliveries, shortages and spills are not significantly changed for Portfolio 3 as compared to Portfolio 2.

Draft

Portfolio 4 "Central Coast Integration" – Portfolio 4 provides for a limited implementation of the 2021 Water Management Amendment to the SWP Water Supply Contract. With Portfolio 4, the water management components of Portfolio 3 are supplemented with a limited sales program between SLOFCWCD and CCWA. Sales are allowed between the two Coastal Branch Contractors based on an approximate schedule of transfer costs. As would be expected due to relatively low SLOFCWCD demands and lack of identified shortages, the Model identified sales only from SLOFCWCD to CCWA.

For the sales and purchases programs in Portfolio 4 and 5, assumptions were needed about the prices for any sales or purchases. The sales/purchase prices are the result of unique circumstances in each year and could fluctuate greatly depending on local water supply conditions throughout the SWP service area. Very uncertain estimates of the sales/purchase prices were estimated based on consultant observation of historical transactions, which are not necessarily indicative of future prices. Considering these factors, the following assumptions were used for sales or purchase prices based on Sacramento Valley water year type (Table 9-4).

Table 9-3 Purchase Price Estimation by Water Year Type

Water Year Type	Purchase Price Estimation
Wet	$200/AF
Above Normal	$500/AF
Below Normal	$1000/AF
Dry	$1,500/AF
Critical	$2,000/AF

Draft

Portfolio 4 does not provide any improvement in water supplies or shortages for SLOFCWCD, which were already being completely met in Portfolios 1, 2 and 3. SLOFCWCD does receive additional revenue of $920,000 per year which could be used to offset the fixed costs of its SWP supplies. The limited Central Coast sales program reduces SLOFCWCD's spills by 1,000 acre-feet per year as compared to Portfolio 3.

Portfolio 4 provides improved water supplies and reduced shortages for CCWA. Deliveries increase by an average of about 1,000 acre-feet per year and shortages are reduced significantly. The costs for the additional purchases averaged $920,000 per year. Spills of unused SWP Table A remain unchanged. Because of the significant amount of unused Table A allocation for the SLOFCWCD service area, this Portfolio represents the greatest improvement in water supply for CCWA. While both Portfolio 2 and 3 represent increased water supplies for CCWA by 3.7% (as compared to Portfolio 1), Portfolio 4 has a 8.3% increase in water supplies when compared to Portfolio 1 for CCWA.

Portfolio 5 "Water Management Amendment" – The final portfolio that was analyzed includes full implementation of the 2021 SWP Water Management Amendment, which provides for annual and multi-year sales of SWP Table A outside the Central Coast region, among other provisions. For SLOFCWCD, there is no change to deliveries, which were already fully met with the other portfolios. The primary benefit for SLOFCWCD is more revenue from the assumed sale of unused Table A allocations in many years. Having buyers outside of the Central Coast area provides more opportunity for sales, and revenues are increased to $930,000 per year. The portfolio analysis makes a conservative assumption that the price for the sales is the same externally as with the sales within the Central Coast region, but a larger market for sales would be very likely to obtain higher prices.

For CCWA, Portfolio 5 provides nearly the same supply as with Portfolio 4, with purchases potentially spread across a broader group of SWP Contractors than just SLOFCWCD, as is the case with Portfolio 4. Portfolio

5 increases the water supplies to CCWA by 8.5% when compared to Portfolio 1. Shortages for CCWA are reduced from 158 af/year in Portfolio 4 to 97 af/year. The major benefit for CCWA is a reduction in spills of carryover water, which result from the ability to sell unused Table A allocations. The sales of SWP water in mostly wet years provided an average of over $2 million per year, which could offset fixed SWP costs. Since the revenue from SWP sales is higher in drier year types than in wetter year types, most of the income from sales occurred in Dry and Critical years. While there was a relatively high volume of total sales in Wet and Above Normal year types (42% of the total volume) it provided a small amount of sale income (only 13% of the total). Conversely, sales in Dry and Critical year types provided a high proportionate share of revenue (57% of the total) for a relatively small share of the sale volume (32% of the total volume sold).

Portfolio Summary – As noted above, the review of the identified portfolios is focused on three of the identified Selection Criteria: Supply, Reliability and Cost. A summary of the results of the portfolio analysis is shown in Table 9-4.

Draft

Table 9-4 Summary of Portfolio Analysis Results

	Portfolios Average Annual Amounts for 1922-2019, SLOFCWCD				
	1	2	3	4	5
	Baseline SWP Operations	Baseline with Ext Storage	Baseline with SLOFCWCD Additional Use	Central Coast Integration	Water Management Amendment
SLOFCWCD Deliveries (AF)	5,300	5,300	6,300	6,300	6,300
SLOFCWCD Shortages (AF)	0	0	0	0	0
SLOFCWCD Spills (AF)	9,100	9,000	8,000	6,900	1,300
SLOFCWCD Shortage ($)	0	0	0	0	0
SLOFCWCD External Storage ($)	0	506,600	515,300	536,000	521,200
SLOFCWCD Purchases ($)	0	0	0	6,600	3,500
SLOFCWCD Sales ($)	0	0	0	504,200	838,400
	Portfolios **Average Annual Amounts for 1922-2019, CCWA**				
	1	2	3	4	5
	Baseline SWP Operations	Baseline with Ext Storage	Baseline with SLOFCWCD Additional Use	Central Coast Integration	Water Management Amendment
CCWA Deliveries (AF)	21,100	21,900	21,800	22,800	22,900
CCWA Shortages (AF)	2,100	1,000	1,000	200	100
CCWA Spills (AF)	5,400	4,400	4,400	4,500	0
CCWA Shortage ($)	1,433,700	662,900	662,800	129,800	67,000
CCWA External Storage ($)	0	1,646,400	1,646,400	1,644,300	1,636,100
CCWA Purchases ($)	79,900	57,400	57,400	543,600	610,700
CCWA Sales ($)	0	0	0	0	2,134,600

Draft

The Portfolio results that have been presented here can be very sensitive to the assumptions in the analyses. Some of the key assumptions made and the effects that they may have on the result include the following:

- Access to uncontracted-SLOFCWCD Table A – The analysis described above assumed that the current SLOFCWCD deliveries, with the possible addition of demand to replenish a groundwater basin within SLOFCWCD's service area, would have access to the portion of SLOFCWCD's allocations which has not been contracted for locally. If SLOFCWCD choses to limit current deliveries to the contracted portion of its Table A, then there would be more frequent shortages.
- Maximum Demands – The analyses presented here all used a target demand that was set to the maximum historical Coastal Branch turnout deliveries. The analyses assume that this target demand needs to be met in all years, which may not be an expectation for the Coastal Branch Contractors, specifically portions of their service areas with access to local groundwater such as the North County and Mid County areas of Santa Barbara County (CCWA).

In addition to the two assumptions indicated above, there are other specific assumptions that have been made that could change the results of the analyses and the conclusions that are reported below.

9.3.2 Individual Evaluation Summary

Provide overview description of evaluations of specific water management components or related features such as San Luis Reservoir carryover.

9.4 Water Management Conclusions and Recommendations

Conclusions:

1. SLOFCWCD has adequate SWP water supplies to meet its current Participant and simulated additional demands in all years under historic hydrologic patterns. This assumes that it can use available Coastal Branch conveyance capacity beyond its contracted share and historic hydrologic patterns remain the same in the future.
2. SLOFCWCD has unused SWP water supplies in most years that frequently spill from San Luis Reservoir and could be sold to CCWA or other SWP Contractors to reduce its overall SWP costs.
3. CCWA has frequent SWP supply shortages in dry years.
4. As with SLOFCWCD, CCWA cannot store its unused SWP water supplies during high SWP allocation years for later use during lower SWP allocation years. Thus, a significant amount of its unused SWP water will spill from San Luis Reservoir.
5. CCWA's unused SWP water could be sold to other SWP Contractors and would reduce its overall SWP costs.
6. The availability of annual or multi-year purchases with the SWP Water Management Amendment reduces shortages for CCWA.
7. There is conveyance capacity available in the Coastal Branch in most years.

Recommendations:

1. Explore a program to share conveyance capacity among the Coastal Branch Contractors.
2. Explore a program to transfer excess Table A between SLOFCWCD and CCWA. While a purchase program with other SWP Contractors would help CCWA reduce its shortages, the greatest benefit from a transfer program would likely occur if it can purchase unused Table A from SLOFCWCD.

Draft

3. Explore an external storage/exchange program for the Coastal Branch Contractors, particularly if there is increased demand for State Water Project supplies in the Coastal Branch, dry years become more extreme and storage reliability in San Luis Reservoir changes. External storage and exchange programs would not be subject to spill as carryover stored in San Luis Reservoir; thus, reducing the risk of water supply loss. In addition, some of the water stored in an external program could be exchanged with the banking partner to reduce the cost of using the storage.

4. Refine quantitative analysis of Model limitations if CCWA and SLOFCWCD do not fully implement the Management Tool Amendment or attempt to integrate their operations. The Model currently aggregates the operations for CCWA and SLOFCWCD into a single model. Additionally, it does not segregate contract rights for each of the Coastal Branch Contractors' member agencies; therefore, it may overestimate the capability to meet demands in some years. If there are limitations on how individual member unit water allocations can be used and stored, these limitations would need to be added to the model to fully investigate how they would impact water management decisions.

5. Explore alternative management of SLOFCWCD's uncontracted SWP Table A. Available options include entering into contracts with other entities for purposes such as groundwater basin supply augmentation, one-year or multi-year sale of unused Table A or permanent sale of a portion of SLOFCWCD's uncontracted SWP Table A Amount.

6. A small increment of increased supply for San Luis Obispo County groundwater basins was evaluated in Portfolio 3 which supplied SWP water for recharge in all years. As noted in the Portfolio 3 discussion, this kind of supplemental groundwater supply could be scaled up and used for supplemental supply to other Central Coast groundwater basins. Since a supplemental supply for groundwater basins is typically used to maintain long term sustainability, the SWP supplemental deliveries would not necessarily be needed in every year. Given the considerably higher value of SWP supplies through sales in drier years, an alternative approach for supplemental groundwater basin supply would be to provide higher amounts of water deliveries in wetter years and lower amounts (or none at all) in drier years. An intermittent SWP supply approach would likely be more cost effective for SWP supplies, but there would be a tradeoff from increased turnout and delivery facility costs for higher capacity deliveries and lower use factors.

Draft

Appendix A Resource Documents

Resource documents utilized to further inform the needs assessment are listed below:

1. Paso Robles Groundwater Subbasin Water Banking Feasibility Study 2008
2. San Luis Obispo County IRWM Plan 2019
3. San Luis Obispo County Flood Control and Water Conservation District SWP Water Delivery Operations – 2020 Update & 2021 Schedule
4. County of San Luis Obispo Regional Water Infrastructure Resiliency Plan
5. Draft Existing Data and Analysis Memorandum 2020
6. City of Solvang Integrated Water Supply Management Plan 2018
7. Santa Barbara County Integrated Regional Water Management Plan Update 2019
8. Paso Basin GSP Appendix I: Water Supply

Draft

Appendix B Needs Assessment Summary

The table below represents a summary of the regional needs as provided by survey response, and existing reports. Several areas, as noted below, did not provide sufficient information to include in the summary.

KEY:

- Information provided by survey response.
- Information derived from existing reports.
- Information not available.

	NEEDS													
	Supply				Storage and Regulation			Conveyance Capacity			Quality		Other	
	Groundwater	*Surface Water*	*Dry Year Supply*	*State Water Project*	*Groundwater Banking*	*Surface Water Storage*	*Exchange / Transfer*	*Aqueduct*	*Coastal Branch*	*Other*	*Groundwater*	*State Water Project*	*Cost Control*	*Others*
Central Coast Water Authority													✓	
North County														
City of Santa Maria				✓							✓	✓	✓	
Golden State Water Company	?	?	?	?	?	?	?	?	?	?	?	?	?	?
City of Guadalupe				✓									✓	
Mid County														
City of Buellton	?	?	?	?	?	?	?	?	?	?	?	?	?	?
Santa Ynez RWCD, Improvement District #1	?	?	?	?	?	?	?	?	?	?	?	?	?	?
City of Solvang			✓	✓	✓	✓	✓					✓	✓	
Vandenberg Air Force Base	?	?	?	?	?	?	?	?	?	?	?	?	?	?
South Coast														
Goleta Water District			✓	✓	✓	✓	✓						✓	
City of Santa Barbara			✓	✓	✓	✓	✓						✓	
Montecito Water District			✓	✓	✓	✓	✓						✓	
Carpinteria Valley Water District			✓	✓	✓	✓	✓						✓	
La Cumbre Mutual Water Company			✓	✓	✓	✓	✓						✓	
Other Potential CCWA Water Users	?	?	?	?	?	?	?	?	?	?	?	?	?	?
San Luis Obispo County Flood Control and Water Conservation District													✓	
North SLO														
County of SLO C.S.A. No. 16, I.D. #1 (Shandon)				✓									✓	
Central SLO/Chorro Valley Turn Out														
California Men's Colony (State)		✓	✓	✓	✓	✓	✓						✓	
County of SLO (Op Center & Reg. Park)			✓	✓	✓	✓	✓						✓	
City of Morro Bay			✓	✓	✓	✓	✓						✓	
SLO Co. Comm. Coll. District (Cuesta College)			✓	✓	✓	✓	✓						✓	
South SLO/Lopez Turn Out														
Avila Beach Community Services District		✓	✓	✓	✓	✓	✓						✓	
Avila Valley Mutual Water Company, Inc		✓	✓	✓	✓	✓	✓						✓	
Oceano Community Services District				✓									✓	
City of Pismo Beach		✓	✓	✓	✓	✓	✓						✓	
San Luis Coastal Unified School District			✓	✓	✓	✓	✓						✓	
San Miguelito Mutual Water Company		✓	✓	✓	✓	✓	✓						✓	
Other Potential SLO Water Users	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓

Appendix C Survey Results Table

Draft

Appendix D CALSIM Water Supply Summaries

Draft

Table D 1 CCWA – Table A Amounts (Acre-Feet) - Study 2020D09E

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1922	4,010.0	2,040.0	2,510.0	1,088.3	1,294.4	2,220.8	2,311.8	3,256.7	3,253.6	3,004.4	3,051.4	3,210.5	31,252.0	28,275.2
1923	2,644.6	1,287.5	1,651.1	1,634.2	1,884.0	2,132.7	2,218.7	3,184.7	3,161.4	2,889.8	2,898.6	2,989.6	28,576.9	28,317.2
1924	2,493.3	1,238.0	1,592.2	0.0	22.2	615.7	527.1	648.5	670.1	708.8	772.7	0.0	9,288.6	6,188.6
1925	1,051.0	541.0	631.5	23.8	4.5	800.9	916.0	1,285.9	1,328.9	1,405.6	1,532.3	1,546.5	11,068.1	11,707.5
1926	1,353.2	696.6	813.2	18.7	404.2	1,252.9	1,172.0	2,084.9	2,142.7	2,268.9	2,302.6	2,182.2	16,692.2	17,947.9
1927	1,929.4	981.6	1,207.7	696.6	1,130.5	2,270.0	2,278.2	3,305.2	3,309.8	3,067.8	3,129.9	3,316.4	26,623.1	28,223.6
1928	2,720.0	1,314.8	1,684.4	1,078.0	1,199.2	1,051.3	2,449.0	3,483.2	3,463.7	3,174.7	3,195.2	3,313.7	28,127.3	28,270.5
1929	2,754.2	1,360.2	1,748.0	0.0	26.3	1,095.5	1,130.1	1,510.2	1,560.6	1,650.7	1,799.5	0.0	14,635.2	13,951.3
1930	0.0	0.0	5,178.4	0.0	0.0	334.8	477.6	710.2	733.9	776.3	846.2	854.1	9,911.6	6,314.3
1931	747.4	384.7	449.1	174.8	420.9	1,382.7	1,433.4	1,922.2	1,976.0	2,092.2	2,130.9	2,026.2	15,140.3	17,379.4
1932	0.0	0.0	3,820.2	0.0	94.0	753.0	932.6	1,255.6	1,297.6	1,372.5	1,496.2	1,510.1	12,531.8	11,507.1
1933	1,321.3	680.1	794.0	1.9	112.1	1,268.1	1,493.2	2,061.2	2,118.3	2,243.0	2,276.4	2,157.3	16,527.0	17,803.3
1934	0.0	0.0	4,071.8	17.5	18.0	496.9	607.9	768.4	794.1	840.0	915.6	924.2	9,454.4	7,093.4
1935	808.6	416.2	485.9	23.8	66.6	748.9	1,975.6	3,579.8	3,671.3	3,529.0	3,755.3	4,233.6	23,294.7	28,361.8
1936	3,343.2	1,514.1	1,920.5	0.0	113.9	2,096.2	2,167.7	2,682.0	2,756.4	2,918.7	2,962.1	2,807.2	25,282.0	23,802.4
1937	2,482.0	1,262.7	1,553.6	0.0	327.7	1,712.9	2,530.1	3,548.1	3,564.8	3,321.0	3,409.1	3,646.5	27,358.5	28,278.3
1938	2,973.4	1,423.6	1,821.1	1,349.6	1,856.4	2,172.0	2,775.6	3,756.3	3,852.3	3,702.9	3,940.4	4,442.3	34,066.1	34,960.0
1939	3,508.0	1,588.7	2,015.2	1,002.4	1,151.7	1,362.5	2,466.3	3,548.6	3,513.4	3,197.8	0.0	0.0	23,354.7	16,242.7
1940	0.0	0.0	0.0	0.0	0.0	1,995.0	1,932.9	3,417.1	3,368.5	3,044.5	3,010.8	3,033.4	19,802.2	25,355.5
1941	2,567.2	1,303.9	1,682.2	1,404.7	1,895.1	2,147.8	2,201.2	3,495.1	3,584.5	3,445.5	3,666.4	4,133.4	31,527.1	32,591.2
1942	3,264.1	1,478.3	1,875.1	1,813.1	1,860.4	2,109.9	2,192.9	2,904.0	2,945.6	2,784.8	2,908.3	3,192.0	29,328.5	27,988.8
1943	2,562.0	1,194.2	1,521.6	1,290.9	1,918.6	2,131.7	2,412.1	3,264.3	3,347.8	3,217.9	3,424.3	3,860.5	30,145.9	31,048.6
1944	3,048.5	1,380.6	1,751.3	0.0	2.1	741.7	1,640.4	1,937.3	1,993.9	2,110.7	2,183.4	2,106.1	18,896.1	16,668.9
1945	1,856.6	947.7	1,148.9	274.5	186.5	1,687.6	2,552.1	3,625.8	3,615.8	3,329.4	3,369.8	3,526.3	26,121.2	28,340.3
1946	2,914.6	1,426.7	1,831.0	1,764.5	1,537.3	1,977.4	1,966.9	3,060.6	3,017.1	2,726.9	2,696.7	2,716.9	27,636.6	26,438.3
1947	2,299.4	1,167.9	1,506.7	550.8	470.0	1,197.3	2,223.7	3,224.0	3,178.2	2,872.5	2,840.7	0.0	21,531.2	24,658.9
1948	0.0	3,537.6	4,564.1	5.7	0.0	130.6	449.0	2,912.8	0.0	3,794.5	3,850.9	3,649.5	22,894.6	21,681.1
1949	3,226.8	1,641.6	2,019.8	60.8	61.1	1,050.0	1,431.4	1,712.3	1,767.0	1,869.6	2,003.2	1,993.0	18,836.4	15,653.8
1950	1,747.9	897.4	1,060.2	20.2	132.0	856.7	2,226.7	2,612.0	2,684.4	2,842.5	2,884.7	2,733.9	20,698.5	22,153.0
1951	2,417.2	1,229.7	1,513.0	1,899.1	1,864.7	2,086.0	2,190.0	2,957.8	2,986.6	2,804.2	2,905.2	3,150.9	28,004.4	28,129.0
1952	2,547.5	1,202.3	1,534.8	1,816.2	1,962.9	2,056.0	2,094.1	3,455.8	3,544.2	3,406.7	3,625.2	4,087.0	31,332.7	32,591.2
1953	3,227.4	1,461.6	1,854.0	2,107.1	1,838.0	2,084.5	1,856.6	2,954.0	2,912.0	2,631.9	2,602.7	2,622.3	28,152.3	26,410.0
1954	2,219.3	1,127.2	1,454.2	1,014.4	1,703.0	2,196.6	2,185.9	3,330.0	3,291.6	2,988.1	2,971.6	3,022.1	27,504.0	28,175.0
1955	2,542.7	1,279.9	1,649.2	656.6	876.2	1,276.1	1,322.9	1,884.3	1,936.5	2,050.6	2,081.1	1,972.2	19,528.3	17,778.9
1956	1,743.8	887.1	1,091.5	1,835.0	2,203.8	2,312.7	2,153.8	3,108.3	3,187.8	3,064.2	3,260.7	3,676.0	28,524.5	30,687.2
1957	2,902.9	1,314.7	1,667.6	698.0	751.0	1,348.3	2,064.0	2,421.2	2,488.3	2,634.8	2,674.0	2,534.2	23,498.9	22,396.8
1958	2,240.6	1,139.9	1,402.5	948.8	1,621.6	2,385.7	2,815.2	3,809.9	3,907.3	3,755.8	3,996.6	4,505.7	32,529.6	34,960.0
1959	3,558.0	1,611.4	2,044.0	1,071.9	1,474.8	1,866.0	1,654.9	1,941.3	1,995.1	2,112.6	2,144.0	2,031.9	23,506.0	20,127.6
1960	1,796.5	914.0	1,124.5	0.0	0.0	958.2	2,255.6	2,646.0	2,719.3	2,879.5	2,922.3	2,769.4	20,985.3	22,377.4
1961	2,448.7	1,245.7	1,532.7	0.0	49.9	758.0	1,331.8	1,603.5	1,657.1	1,752.7	1,910.6	1,928.4	16,219.0	14,561.8
1962	0.0	1,647.1	1,922.8	14.0	0.0	1,401.3	2,266.4	2,658.6	2,732.3	2,893.2	2,936.2	2,782.6	21,254.3	22,936.4
1963	2,460.3	1,251.6	1,540.0	1,803.2	1,815.2	2,045.1	1,838.1	3,267.5	3,226.3	2,923.7	2,901.0	2,939.3	28,011.4	28,104.9
1964	2,478.8	1,252.2	1,614.4	1,105.4	1,716.5	1,594.9	2,141.9	3,105.4	3,061.3	2,766.8	2,736.1	2,756.7	26,330.4	26,031.7
1965	2,333.1	1,184.9	1,528.8	1,609.9	1,843.4	1,729.7	1,894.2	2,222.0	2,283.5	2,418.0	2,454.0	2,325.6	23,827.2	23,169.8

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1966	2,056.3	1,046.1	1,287.1	1,870.0	1,870.6	2,092.8	2,178.1	3,071.8	3,076.2	2,851.3	2,909.1	3,082.6	27,391.9	28,318.2
1967	2,528.2	1,222.0	1,565.5	650.9	1,952.4	2,193.5	2,436.4	3,691.3	3,785.7	3,638.8	3,872.2	4,365.4	31,902.4	33,575.5
1968	3,447.3	1,561.2	1,980.4	1,516.1	1,896.0	2,142.2	2,158.6	3,129.6	3,085.2	2,788.4	2,757.5	2,778.2	29,240.7	27,338.0
1969	2,351.3	1,194.2	1,540.7	1,426.3	2,227.3	2,345.6	2,717.4	3,677.4	3,771.4	3,625.2	3,857.7	4,349.0	33,083.5	34,960.0
1970	3,434.4	1,555.4	1,972.9	1,817.7	1,868.3	2,089.7	2,193.7	2,976.0	3,002.0	2,814.2	2,910.2	3,147.7	29,782.2	28,116.1
1971	2,549.1	1,206.5	1,540.9	1,799.2	1,720.5	1,755.3	1,617.6	2,068.6	2,126.0	2,251.2	2,284.6	2,165.2	23,084.7	21,874.7
1972	1,914.4	973.9	1,198.3	1,522.9	1,639.6	2,154.3	2,255.2	3,269.8	3,223.3	2,913.3	2,881.0	2,902.6	26,848.6	28,076.0
1973	2,456.6	1,247.7	1,609.7	877.6	1,932.2	2,184.4	2,282.7	3,186.6	3,187.7	2,949.6	3,003.3	3,172.3	28,090.5	28,267.7
1974	2,606.9	1,264.1	1,620.2	1,819.5	2,068.5	2,128.0	2,068.5	3,172.7	3,253.8	3,127.6	3,328.2	3,752.2	30,210.3	30,726.2
1975	2,963.0	1,341.9	1,702.2	1,600.5	1,411.3	2,157.5	2,246.9	3,154.6	3,157.2	2,923.6	2,979.4	3,151.4	28,789.6	28,228.5
1976	2,587.5	1,253.0	1,605.6	1,486.7	1,359.5	1,877.4	2,237.8	3,244.5	3,198.4	2,890.8	2,858.7	2,880.2	27,480.0	22,034.0
1977	0.0	0.0	0.0	23.8	24.5	245.0	236.5	312.4	322.8	341.5	372.3	375.7	2,254.6	2,950.1
1978	328.8	169.2	197.6	0.0	1,044.9	2,203.5	2,343.7	3,222.9	3,305.3	3,177.1	3,380.9	3,811.5	23,185.5	28,592.1
1979	3,009.9	1,363.1	1,729.1	18.4	147.2	1,466.1	2,613.5	3,733.9	3,711.7	3,400.3	3,420.0	3,543.0	28,156.2	28,330.0
1980	2,946.7	1,456.8	1,872.4	759.2	1,914.5	2,324.9	2,407.4	3,258.0	3,341.3	3,211.7	3,417.7	3,853.0	30,763.8	30,656.4
1981	3,042.7	1,378.0	1,747.9	203.8	757.8	856.4	2,330.3	3,378.6	3,330.6	3,010.2	0.0	0.0	20,036.2	18,874.6
1982	0.0	5,007.0	0.0	1,516.5	1,797.3	2,120.2	2,743.3	3,753.0	3,848.9	3,699.7	3,937.0	4,438.4	32,861.3	34,960.0
1983	3,504.9	1,587.3	2,013.5	2,046.4	2,182.5	2,296.4	2,668.0	3,610.6	3,702.9	3,559.3	3,787.6	4,270.0	35,229.5	34,960.0
1984	3,372.0	1,527.1	1,937.1	2,211.0	1,839.7	2,058.5	2,161.1	2,909.9	2,940.4	2,763.8	2,867.0	3,115.4	29,703.0	28,079.9
1985	2,515.8	1,185.0	1,512.3	1,495.6	1,148.0	1,984.0	2,320.8	3,273.1	3,277.8	3,038.2	3,099.8	3,284.7	28,135.0	28,586.1
1986	2,693.9	1,302.1	1,668.1	0.0	0.0	2,406.1	2,441.3	3,373.6	3,418.2	3,226.4	3,363.1	3,680.8	27,573.6	28,016.1
1987	2,959.4	1,383.5	1,763.6	0.0	6.2	1,028.9	1,065.1	1,360.1	1,405.6	1,486.7	1,620.6	1,635.7	15,715.6	12,637.1
1988	0.0	1,397.1	1,631.0	5.7	25.9	365.4	361.9	532.5	550.3	582.1	634.5	640.4	6,726.7	4,884.2
1989	560.4	288.4	336.7	0.0	0.0	910.3	2,553.6	3,702.4	3,649.8	3,298.7	3,262.2	3,286.7	21,849.2	20,663.7
1990	0.0	0.0	0.0	10.3	30.7	351.0	469.6	653.7	675.6	714.6	779.0	786.2	4,470.7	5,926.1
1991	687.9	354.1	413.4	17.5	18.0	726.5	904.8	1,250.1	1,291.9	1,366.5	1,489.6	1,503.5	10,023.9	11,351.7
1992	1,315.5	677.2	790.5	14.5	15.0	449.0	616.1	833.5	861.3	911.0	993.1	1,002.3	8,479.0	7,551.4
1993	877.1	451.5	527.0	0.0	1,616.1	2,291.3	2,395.6	3,460.1	3,418.3	3,100.3	3,079.5	3,125.8	24,342.5	28,159.5
1994	2,633.1	1,327.9	1,711.5	371.0	393.6	985.6	1,180.3	1,421.1	1,468.6	1,553.4	1,693.3	1,709.1	16,448.7	13,940.1
1995	1,495.5	769.8	898.6	23.8	1,959.0	2,251.9	2,606.0	3,927.6	4,028.0	3,871.8	4,120.1	4,644.9	30,596.9	34,869.3
1996	3,668.0	1,661.2	2,107.1	1,748.3	1,826.9	2,061.9	2,185.4	3,109.3	3,188.8	3,065.1	3,261.7	3,677.1	31,560.7	30,011.3
1997	2,903.7	1,315.1	1,668.1	2,037.1	2,178.2	2,057.0	2,072.1	2,862.7	2,900.9	2,738.7	2,855.4	3,126.3	28,715.3	28,012.7
1998	2,513.0	1,174.4	1,496.9	993.5	2,126.4	2,391.2	2,763.2	3,739.4	3,835.0	3,686.3	3,922.7	4,422.3	33,064.4	34,960.0
1999	3,492.2	1,581.6	2,006.2	1,814.8	1,720.5	2,114.5	2,218.3	3,113.2	3,108.1	2,867.0	2,908.1	3,053.6	29,998.2	28,241.4
2000	2,518.5	1,228.6	1,576.1	760.5	1,591.9	2,206.9	2,316.0	3,132.7	3,162.4	2,968.1	3,073.5	3,331.1	27,866.4	28,134.7
2001	2,694.3	1,272.5	1,624.6	0.0	6.2	930.2	990.3	1,298.4	1,341.7	1,419.2	1,547.1	1,561.5	14,686.1	11,985.2
2002	1,366.3	703.3	821.0	610.1	879.0	883.5	1,756.7	2,060.8	2,117.9	2,242.6	2,276.0	2,156.9	17,874.1	19,054.5
2003	0.0	1,825.2	2,245.8	1,279.4	1,497.5	1,562.0	1,329.7	1,690.5	0.0	2,202.2	2,235.0	2,118.1	17,985.4	13,914.4
Avg.	**2,104.1**	**1,179.4**	**1,564.7**	**795.4**	**1,031.8**	**1,592.0**	**1,897.6**	**2,679.8**	**2,654.5**	**2,628.8**	**2,639.2**	**2,696.5**	**23,463.6**	**23,359.2**
Max	**4,010.0**	**5,007.0**	**5,178.4**	**2,211.0**	**2,227.3**	**2,406.1**	**2,815.2**	**3,927.6**	**4,028.0**	**3,871.8**	**4,120.1**	**4,644.9**	**35,229.5**	**34,960.0**
Min	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**130.6**	**236.5**	**312.4**	**0.0**	**341.5**	**0.0**	**0.0**	**2,254.6**	**2,950.1**

Table D 2 CCWA -- Carryover (Article 56) Water (Acre-feet) - Study 2020D09E

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1922	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1923	0.0	0.0	0.0	1,623.2	1,448.2	535.7	0.0	0.0	0.0	0.0	0.0	0.0	3,607.1	3,607.1
1924	0.0	0.0	0.0	256.3	256.3	256.3	256.3	256.3	256.3	256.3	0.0	0.0	1,794.1	2,306.7
1925	512.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	512.6	0.0
1926	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1927	0.0	0.0	0.0	139.1	124.1	45.9	0.0	0.0	0.0	0.0	0.0	0.0	309.0	309.0
1928	0.0	0.0	0.0	1,832.9	1,635.4	604.9	0.0	0.0	0.0	0.0	0.0	0.0	4,073.1	4,073.1
1929	0.0	0.0	0.0	295.3	295.3	295.3	295.3	295.3	295.3	295.3	295.3	0.0	2,362.1	2,362.1
1930	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1931	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1932	0.0	0.0	0.0	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6	31.6	284.3	284.3
1933	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1934	0.0	0.0	0.0	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	0.0	272.5	306.5
1935	0.0	34.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.1	0.0
1936	0.0	0.0	0.0	834.2	744.3	275.3	0.0	0.0	0.0	0.0	0.0	0.0	1,853.8	1,853.8
1937	0.0	0.0	0.0	184.4	164.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	349.0	349.0
1938	0.0	0.0	0.0	2,125.9	1,896.8	701.5	0.0	0.0	0.0	0.0	0.0	0.0	4,724.2	4,724.2
1939	0.0	0.0	0.0	1,170.0	1,170.0	1,170.0	1,170.0	1,170.0	1,170.0	1,170.0	0.0	0.0	8,190.0	8,190.0
1940	0.0	0.0	0.0	70.8	63.1	23.3	0.0	0.0	0.0	0.0	0.0	0.0	157.2	157.2
1941	0.0	0.0	0.0	333.0	297.1	109.9	0.0	0.0	0.0	0.0	0.0	0.0	740.0	740.0
1942	0.0	0.0	0.0	4,417.4	3,941.3	1,457.8	0.0	0.0	0.0	0.0	0.0	0.0	9,816.5	9,816.5
1943	0.0	0.0	0.0	2,910.9	2,597.2	960.6	0.0	0.0	0.0	0.0	0.0	0.0	6,468.7	6,468.7
1944	0.0	0.0	0.0	415.1	415.1	415.1	415.1	415.1	415.1	415.1	415.1	415.1	3,735.8	3,735.8
1945	0.0	0.0	0.0	94.4	84.2	31.1	0.0	0.0	0.0	0.0	0.0	0.0	209.7	209.7
1946	0.0	0.0	0.0	1,464.0	1,306.2	483.1	0.0	0.0	0.0	0.0	0.0	0.0	3,253.3	3,253.3
1947	0.0	0.0	0.0	85.7	85.7	85.7	85.7	85.7	85.7	85.7	0.0	0.0	600.1	600.1
1948	0.0	0.0	0.0	70.8	63.1	23.3	0.0	0.0	0.0	0.0	0.0	0.0	157.2	157.2
1949	0.0	0.0	0.0	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	373.3	373.3
1950	0.0	0.0	0.0	29.0	25.9	9.6	0.0	0.0	0.0	0.0	0.0	0.0	64.4	64.4
1951	0.0	0.0	0.0	171.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	171.6	171.6
1952	0.0	0.0	0.0	2,547.5	2,272.9	840.7	0.0	0.0	0.0	0.0	0.0	0.0	5,661.0	5,661.0
1953	0.0	0.0	0.0	4,417.4	3,941.3	1,457.8	0.0	0.0	0.0	0.0	0.0	0.0	9,816.5	9,816.5
1954	0.0	0.0	0.0	346.9	309.5	114.5	0.0	0.0	0.0	0.0	0.0	0.0	770.8	770.8
1955	0.0	0.0	0.0	155.9	155.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	311.8	311.8
1956	0.0	0.0	0.0	137.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	137.8	137.8
1957	0.0	0.0	0.0	4,159.4	3,711.1	1,372.6	0.0	0.0	0.0	0.0	0.0	0.0	9,243.0	9,243.0
1958	0.0	0.0	0.0	173.5	154.8	57.3	0.0	0.0	0.0	0.0	0.0	0.0	385.6	385.6
1959	0.0	0.0	0.0	4,738.5	4,227.8	1,563.7	0.0	0.0	0.0	0.0	0.0	0.0	10,530.0	10,530.0
1960	0.0	0.0	0.0	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	346.6	346.6
1961	0.0	0.0	0.0	42.8	42.8	42.8	42.8	42.8	42.8	42.8	42.8	42.8	385.3	385.3
1962	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963	0.0	0.0	0.0	177.7	158.6	58.6	0.0	0.0	0.0	0.0	0.0	0.0	394.9	394.9
1964	0.0	0.0	0.0	129.7	129.7	129.7	129.7	129.7	129.7	129.7	129.7	129.7	1,167.0	1,167.0
1965	0.0	0.0	0.0	341.9	305.0	112.8	0.0	0.0	0.0	0.0	0.0	0.0	759.7	759.7

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1966	0.0	0.0	0.0	179.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	179.5	179.5
1967	0.0	0.0	0.0	1,840.7	1,642.3	607.4	0.0	0.0	0.0	0.0	0.0	0.0	4,090.3	4,090.3
1968	0.0	0.0	0.0	4,550.8	4,060.4	1,501.8	0.0	0.0	0.0	0.0	0.0	0.0	10,113.0	10,113.0
1969	0.0	0.0	0.0	359.0	320.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	679.4	679.4
1970	0.0	0.0	0.0	4,738.5	2,248.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,986.5	6,986.5
1971	0.0	0.0	0.0	2,459.5	2,194.4	811.6	0.0	0.0	0.0	0.0	0.0	0.0	5,465.5	5,465.5
1972	0.0	0.0	0.0	169.5	151.2	55.9	0.0	0.0	0.0	0.0	0.0	0.0	376.6	376.6
1973	0.0	0.0	0.0	368.7	329.0	121.7	0.0	0.0	0.0	0.0	0.0	0.0	819.4	819.4
1974	0.0	0.0	0.0	1,741.0	1,553.4	574.5	0.0	0.0	0.0	0.0	0.0	0.0	3,868.9	3,868.9
1975	0.0	0.0	0.0	4,164.6	3,715.8	1,374.3	0.0	0.0	0.0	0.0	0.0	0.0	9,254.8	9,254.8
1976	0.0	0.0	0.0	439.5	439.5	439.5	439.5	439.5	439.5	439.5	439.5	0.0	3,516.3	3,516.3
1977	0.0	0.0	0.0	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	157.2	157.2
1978	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979	0.0	0.0	0.0	3,875.4	3,457.7	1,278.9	0.0	0.0	0.0	0.0	0.0	0.0	8,612.0	8,612.0
1980	0.0	0.0	0.0	1,167.0	1,041.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,208.3	2,208.3
1981	0.0	0.0	0.0	1,026.0	1,026.0	1,026.0	1,026.0	1,026.0	1,026.0	1,026.0	0.0	0.0	7,181.8	9,233.7
1982	0.0	2,051.9	0.0	70.8	63.1	23.3	0.0	0.0	0.0	0.0	0.0	0.0	2,209.2	157.2
1983	0.0	0.0	0.0	4,738.5	4,227.8	653.9	0.0	0.0	0.0	0.0	0.0	0.0	9,620.2	9,620.2
1984	0.0	0.0	0.0	4,738.5	1,642.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,380.8	6,380.8
1985	0.0	0.0	0.0	642.6	55.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	698.5	698.5
1986	0.0	0.0	0.0	1,858.1	1,657.8	613.2	0.0	0.0	0.0	0.0	0.0	0.0	4,129.0	4,129.0
1987	0.0	0.0	0.0	697.5	697.5	697.5	697.5	697.5	697.5	697.5	697.5	0.0	5,579.7	6,277.1
1988	0.0	0.0	697.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	697.5	0.0
1989	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990	0.0	0.0	0.0	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	157.2	157.2
1991	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1993	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	0.0	0.0	0.0	142.4	142.4	142.4	142.4	142.4	142.4	142.4	142.4	142.4	1,281.3	1,281.3
1995	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996	0.0	0.0	0.0	2,872.1	2,562.6	947.8	0.0	0.0	0.0	0.0	0.0	0.0	6,382.5	6,382.5
1997	0.0	0.0	0.0	4,067.8	3,026.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7,094.5	7,094.5
1998	0.0	0.0	0.0	2,835.6	2,529.9	935.7	0.0	0.0	0.0	0.0	0.0	0.0	6,301.2	6,301.2
1999	0.0	0.0	0.0	4,738.5	4,227.8	1,563.7	0.0	0.0	0.0	0.0	0.0	0.0	10,530.0	10,530.0
2000	0.0	0.0	0.0	1,560.7	1,392.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,953.1	2,953.1
2001	0.0	0.0	0.0	623.6	623.6	623.6	623.6	623.6	623.6	623.6	623.6	623.6	5,612.0	5,612.0
2002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003	0.0	0.0	0.0	82.3	73.4	27.1	0.0	0.0	0.0	0.0	0.0	0.0	182.8	182.8
Avg.	**6.3**	**25.4**	**8.5**	**1,132.0**	**942.8**	**334.6**	**67.1**	**67.1**	**67.1**	**67.1**	**36.2**	**18.3**	**2,772.5**	**2,772.5**
Max	**512.6**	**2,051.9**	**697.5**	**4,738.5**	**4,227.8**	**1,563.7**	**1,170.0**	**1,170.0**	**1,170.0**	**1,170.0**	**697.5**	**623.6**	**10,530.0**	**10,530.0**
Min	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Table D 3 CCWA -- Article 21 Water Acre-feet) - Study 2020D09E

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1922	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1923	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1924	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1925	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1926	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1927	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1928	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1929	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1930	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1931	0.0	0.0	0.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,688.0	3,688.0
1932	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1933	0.0	0.0	0.0	0.0	0.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	1,844.0	1,844.0
1934	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1935	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1936	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1937	0.0	0.0	0.0	0.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	3,688.0	3,688.0
1938	0.0	0.0	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	5,532.0	5,532.0
1939	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1940	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1941	0.0	0.0	0.0	0.0	0.0	0.0	1,844.0	0.0	0.0	0.0	0.0	0.0	1,844.0	1,844.0
1942	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1943	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1944	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1945	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1946	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1947	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1948	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1949	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1951	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	5,532.0	5,532.0
1952	0.0	0.0	0.0	0.0	0.0	0.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	3,688.0	3,688.0
1953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1954	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1955	0.0	0.0	0.0	0.0	0.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	1,844.0	1,844.0
1956	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	5,532.0	5,532.0
1957	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1958	0.0	0.0	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	5,532.0	5,532.0
1959	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1961	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1962	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1966	0.0	0.0	0.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,688.0	3,688.0
1967	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1968	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1969	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	1,844.0	794.0	0.0	0.0	0.0	0.0	8,170.0	8,170.0
1970	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	5,532.0	5,532.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	0.0	0.0	0.0	0.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	3,688.0	3,688.0
1981	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	0.0	0.0	0.0	0.0	0.0	0.0	1,844.0	0.0	0.0	0.0	0.0	0.0	1,844.0	1,844.0
1983	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	1,844.0	794.0	0.0	0.0	0.0	0.0	8,170.0	8,170.0
1984	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	5,532.0	5,532.0
1985	0.0	0.0	0.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,688.0	3,688.0
1986	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1993	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,844.0	0.0	0.0	0.0	0.0	1,844.0	1,844.0
1996	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	5,532.0	5,532.0
1998	0.0	0.0	0.0	0.0	1,844.0	1,844.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	7,376.0	7,376.0
1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	0.0	0.0	0.0	0.0	1,844.0	1,844.0	0.0	0.0	0.0	0.0	0.0	0.0	3,688.0	3,688.0
2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Avg.	**0.0**	**0.0**	**0.0**	**224.9**	**314.8**	**337.3**	**179.9**	**131.8**	**0.0**	**0.0**	**0.0**	**0.0**	**1,188.7**	**1,188.7**
Max	**0.0**	**0.0**	**0.0**	**1,844.0**	**1,844.0**	**1,844.0**	**1,844.0**	**1,844.0**	**0.0**	**0.0**	**0.0**	**0.0**	**8,170.0**	**8,170.0**
Min	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Table D 4 San Luis Obispo FCWCD – Table A Amounts (Acre Feet) – Study 2020D09E

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1922	1,750.0	1,440.0	1,380.0	495.7	583.3	911.2	982.1	1,029.2	1,056.4	1,096.9	1,103.1	1,042.7	12,870.6	11,056.0
1923	1,037.8	875.8	841.9	735.4	798.9	874.3	930.6	986.7	1,013.0	1,051.3	1,054.4	996.5	11,196.5	11,089.6
1924	997.0	841.9	809.6	0.0	9.8	301.4	274.3	294.2	301.8	314.1	309.5	0.0	4,453.5	2,876.0
1925	406.1	340.8	324.0	10.2	2.0	392.0	477.4	585.5	600.8	625.2	616.0	581.6	4,961.6	5,440.7
1926	587.7	493.3	469.0	8.0	178.4	614.1	611.1	834.5	848.9	882.2	873.8	826.0	7,227.0	7,854.2
1927	835.6	687.6	654.1	297.6	506.3	938.1	962.3	1,060.1	1,087.9	1,129.8	1,137.3	1,075.1	10,371.7	11,029.6
1928	1,068.0	901.1	866.1	488.8	540.5	517.1	1,029.8	1,080.9	1,109.7	1,151.8	1,156.0	1,092.6	11,002.4	11,066.6
1929	1,091.6	921.6	886.2	0.0	11.6	536.2	588.6	686.7	704.6	733.2	722.5	0.0	6,882.7	6,483.4
1930	0.0	0.0	2,500.0	0.0	0.0	163.8	249.1	323.8	332.3	345.8	340.7	321.7	4,577.2	2,934.4
1931	325.0	272.8	259.4	74.7	186.1	653.3	708.0	777.7	791.4	822.6	814.5	769.9	6,455.6	7,629.0
1932	0.0	0.0	2,030.6	0.0	41.5	368.7	486.3	571.6	586.5	610.3	601.4	567.8	5,864.9	5,347.5
1933	573.8	481.6	457.8	0.8	49.5	620.8	734.6	827.1	841.3	874.4	866.0	818.7	7,146.4	7,791.0
1934	0.0	0.0	2,157.8	7.5	8.0	243.2	317.0	349.4	358.5	373.1	367.6	347.1	4,529.3	3,296.4
1935	350.7	294.4	279.9	10.2	29.4	366.7	898.9	1,238.2	1,269.1	1,320.7	1,341.4	1,269.1	8,668.9	11,025.1
1936	1,238.2	1,042.1	1,000.9	0.0	50.2	874.6	995.7	1,100.5	1,119.3	1,163.4	1,152.2	1,089.2	10,826.4	10,416.2
1937	1,101.8	906.7	862.6	0.0	144.6	765.8	1,095.6	1,150.7	1,180.7	1,226.6	1,236.2	1,168.8	10,840.1	11,042.5
1938	1,158.1	976.7	938.7	634.5	808.4	883.4	1,216.0	1,280.0	1,312.0	1,365.3	1,386.6	1,312.0	13,271.6	13,590.0
1939	1,280.0	1,077.3	1,034.6	434.6	516.5	608.5	1,043.1	1,093.7	1,123.0	1,165.1	0.0	0.0	9,376.5	11,193.9
1940	0.0	0.0	5,209.4	0.0	0.0	892.1	881.5	1,040.4	1,068.6	1,108.2	1,108.2	1,047.0	12,355.4	9,947.2
1941	1,053.8	890.6	856.6	660.4	800.7	875.0	960.9	1,193.9	1,223.7	1,273.5	1,293.4	1,223.7	12,306.4	12,669.2
1942	1,193.9	1,004.9	965.1	802.5	793.6	864.4	919.6	958.5	983.0	1,022.0	1,033.9	977.8	11,519.2	10,905.9
1943	961.7	810.3	778.5	606.9	794.6	872.8	1,057.4	1,113.1	1,140.9	1,187.3	1,205.8	1,140.9	11,670.4	12,069.5
1944	1,113.1	936.9	899.7	0.0	0.9	363.0	773.9	811.3	827.2	860.1	850.6	803.8	8,240.5	7,416.2
1945	812.9	672.7	639.8	117.3	83.0	754.8	1,096.2	1,150.3	1,180.8	1,225.8	1,231.8	1,164.4	10,129.7	11,086.2
1946	1,160.5	979.6	941.7	794.0	672.5	809.8	821.2	925.9	951.1	986.3	986.3	931.8	10,960.8	10,371.9
1947	937.9	792.7	762.4	235.3	208.8	588.7	935.9	980.8	1,007.4	1,044.7	1,044.7	0.0	8,539.2	9,673.9
1948	1,364.8	1,153.4	1,109.4	2.4	0.0	63.9	234.7	1,190.0	1,210.4	1,258.0	1,245.9	1,177.9	10,010.9	9,487.9
1949	1,191.5	980.4	932.7	26.0	27.1	514.2	721.8	757.1	775.3	806.6	795.7	751.5	8,280.0	7,173.2
1950	759.6	634.7	603.5	8.6	58.3	419.6	1,013.0	1,061.5	1,079.7	1,122.2	1,111.4	1,050.7	8,922.8	9,694.4
1951	1,062.8	874.6	832.0	821.0	776.6	855.6	932.0	966.1	991.1	1,030.0	1,040.2	983.6	11,165.6	10,971.6
1952	970.7	818.3	786.3	803.2	813.8	839.7	916.2	1,184.2	1,213.8	1,263.2	1,282.9	1,213.8	12,106.4	12,669.2
1953	1,184.2	996.7	957.3	910.9	785.8	855.8	775.9	895.1	919.4	953.5	953.5	900.8	11,089.0	10,360.8
1954	906.7	766.3	737.1	443.0	750.3	903.6	919.0	1,022.1	1,049.7	1,088.9	1,090.2	1,030.1	10,707.0	11,045.6
1955	1,034.3	873.9	840.5	280.5	388.3	604.6	655.2	758.0	771.0	801.3	793.6	750.3	8,551.4	7,780.2
1956	758.9	624.5	594.1	813.4	914.3	945.3	941.3	1,059.2	1,085.7	1,129.8	1,147.5	1,085.7	11,099.7	11,929.1
1957	1,059.2	891.5	856.2	298.2	333.1	613.0	941.4	986.5	1,003.4	1,042.8	1,032.8	976.4	10,034.4	9,801.1
1958	987.7	812.7	773.2	405.3	715.2	979.0	1,240.5	1,305.7	1,338.4	1,392.8	1,414.6	1,338.4	12,703.4	13,590.0
1959	1,305.7	1,099.0	1,055.5	484.4	665.2	765.2	758.4	794.7	808.3	840.1	832.0	786.6	10,195.0	8,808.1
1960	795.7	654.7	622.9	0.0	0.0	468.9	1,025.7	1,074.9	1,093.3	1,136.3	1,125.4	1,063.9	9,061.6	9,792.6
1961	1,076.2	885.6	842.5	0.0	22.0	371.0	695.1	729.3	748.3	778.7	767.3	724.5	7,640.6	6,767.1
1962	0.0	989.8	940.9	6.0	0.0	656.6	1,031.3	1,080.7	1,099.3	1,142.5	1,131.5	1,069.7	9,148.4	10,037.3
1963	1,082.1	890.4	847.1	806.0	793.7	837.2	764.9	995.4	1,022.3	1,060.3	1,061.0	1,002.5	11,162.8	11,021.2
1964	1,007.6	851.4	818.9	509.2	753.9	710.6	892.3	935.1	960.5	996.1	996.1	941.1	10,372.7	10,212.4
1965	947.2	800.5	770.0	756.9	799.4	769.3	859.6	900.8	916.2	952.3	943.1	891.6	10,306.9	10,139.4

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1966	901.9	742.1	706.1	808.4	779.2	858.5	932.4	978.9	1,004.6	1,043.3	1,050.2	992.8	10,798.5	11,066.5
1967	986.2	832.1	799.8	278.0	822.2	905.2	1,074.5	1,270.3	1,302.1	1,355.0	1,376.2	1,302.1	12,303.6	13,051.8
1968	1,270.3	1,069.2	1,026.8	682.2	797.4	879.8	906.1	949.5	975.2	1,011.4	1,011.4	955.5	11,534.9	10,724.9
1969	961.7	812.8	781.8	670.6	922.9	957.6	1,191.7	1,254.4	1,285.8	1,338.1	1,359.0	1,285.8	12,822.1	13,590.0
1970	1,254.4	1,055.8	1,014.0	798.9	777.3	856.3	932.6	968.3	993.4	1,032.3	1,042.1	985.4	11,711.0	10,969.1
1971	973.3	820.5	788.5	803.4	753.9	716.6	743.3	849.2	863.7	897.7	889.1	840.5	9,939.6	9,572.6
1972	850.2	699.6	665.6	685.3	718.9	884.2	945.1	990.4	1,017.3	1,055.0	1,055.0	996.7	10,563.3	11,014.4
1973	1,003.2	847.9	815.5	374.9	826.2	900.2	970.2	1,015.8	1,042.5	1,082.7	1,089.3	1,029.8	10,998.1	11,049.6
1974	1,023.8	863.9	830.4	793.4	858.8	870.2	899.4	1,085.6	1,112.8	1,158.0	1,176.1	1,112.8	11,785.3	11,944.2
1975	1,085.6	913.8	877.6	720.2	636.1	881.3	953.1	998.5	1,024.8	1,064.2	1,071.0	1,012.5	11,238.8	11,033.1
1976	1,006.2	849.0	816.1	699.0	610.5	833.6	928.2	972.7	999.0	1,036.1	1,036.1	978.9	10,765.2	10,712.7
1977	985.2	0.0	1,633.6	10.2	10.9	120.0	123.3	142.1	145.8	151.7	149.5	141.2	3,613.5	1,371.0
1978	142.7	119.7	113.8	0.0	461.0	915.2	1,027.3	1,109.7	1,137.4	1,183.7	1,202.2	1,137.4	8,550.1	11,114.6
1979	1,109.7	934.0	897.0	7.9	65.0	666.5	1,120.3	1,175.2	1,206.5	1,252.2	1,256.7	1,187.7	10,878.7	11,090.8
1980	1,186.9	1,002.2	963.6	324.3	834.7	953.9	1,058.4	1,114.1	1,142.0	1,188.4	1,206.9	1,142.0	12,117.5	11,917.1
1981	1,114.1	937.7	900.6	87.1	334.9	421.4	985.1	1,032.4	1,060.4	1,099.6	1,099.6	0.0	9,072.8	8,066.8
1982	0.0	1,946.4	0.0	713.0	786.3	862.7	1,200.0	1,277.5	1,309.4	1,362.6	1,383.9	1,309.4	12,151.1	13,590.0
1983	1,277.5	1,075.2	1,032.6	884.7	906.2	939.6	1,172.3	1,234.0	1,264.9	1,316.3	1,336.9	1,264.9	13,705.1	13,590.0
1984	1,234.0	1,038.6	997.5	955.9	764.2	843.2	918.5	951.2	975.7	1,014.1	1,024.4	968.7	11,686.0	10,950.7
1985	955.5	805.4	773.9	703.2	512.9	811.9	988.9	1,038.3	1,065.5	1,106.6	1,113.9	1,053.1	10,929.1	11,171.2
1986	1,046.0	882.5	848.3	0.0	0.0	1,000.6	1,071.8	1,126.7	1,155.6	1,201.4	1,214.8	1,148.9	10,696.6	10,919.1
1987	1,130.9	953.0	915.6	0.0	2.8	503.5	554.8	617.9	634.0	659.8	650.1	613.9	7,236.2	5,872.7
1988	0.0	838.6	797.2	2.4	11.4	178.9	188.5	242.5	248.9	259.0	255.2	240.9	3,263.6	2,269.8
1989	243.5	204.3	194.3	0.0	0.0	445.5	1,085.4	1,137.5	1,168.3	1,211.6	1,211.6	1,144.7	8,046.6	8,556.7
1990	1,152.1	0.0	0.0	4.4	13.6	171.9	245.0	297.8	305.6	318.0	313.4	295.9	3,117.6	2,754.0
1991	299.0	250.9	238.6	7.5	8.0	355.6	471.8	569.3	584.1	607.8	598.9	565.5	4,556.8	5,275.3
1992	571.4	479.6	455.9	6.2	6.6	219.8	321.3	379.5	389.4	405.2	399.3	377.0	4,011.5	3,509.3
1993	381.0	319.8	304.0	0.0	730.2	946.1	1,014.1	1,063.0	1,091.7	1,132.4	1,133.4	1,070.9	9,186.6	11,041.2
1994	1,075.9	909.1	874.3	158.5	174.6	484.4	617.3	647.7	664.6	691.6	681.4	643.4	7,622.8	6,478.2
1995	650.2	545.7	518.8	10.2	857.8	931.3	1,149.0	1,351.1	1,384.9	1,441.2	1,463.7	1,384.9	11,688.9	13,554.8
1996	1,351.1	1,137.2	1,092.2	786.7	796.3	838.2	952.6	1,056.4	1,082.8	1,126.8	1,144.4	1,082.8	12,447.5	11,666.3
1997	1,056.4	889.1	853.9	880.7	904.5	843.5	895.6	941.6	965.7	1,004.0	1,015.2	960.2	11,210.3	10,917.5
1998	945.0	796.3	765.1	428.5	886.5	983.0	1,219.0	1,283.2	1,315.3	1,368.7	1,390.1	1,315.3	12,696.0	13,590.0
1999	1,283.2	1,080.0	1,037.2	801.8	754.5	864.0	933.0	979.3	1,005.1	1,043.6	1,049.2	991.7	11,822.7	11,044.5
2000	987.6	833.5	801.3	324.9	719.9	906.1	986.3	1,023.5	1,050.0	1,091.2	1,101.9	1,042.0	10,868.0	10,974.4
2001	1,028.5	867.0	833.2	0.0	2.8	455.2	515.9	590.2	605.6	630.2	621.0	586.3	6,735.9	5,569.7
2002	592.5	497.3	472.7	260.6	389.4	436.2	797.8	836.1	850.4	883.8	875.4	827.5	7,719.8	8,338.5
2003	0.0	1,117.8	1,063.4	601.5	673.4	693.0	600.3	682.7	0.0	850.4	842.3	796.2	7,921.0	5,739.8
Avg.	**873.7**	**770.8**	**880.8**	**354.4**	**445.5**	**684.9**	**842.1**	**931.4**	**945.6**	**993.1**	**981.6**	**891.4**	**9,595.3**	**9,539.6**
Max	**1,750.0**	**1,946.4**	**5,209.4**	**955.9**	**922.9**	**1,000.6**	**1,240.5**	**1,351.1**	**1,384.9**	**1,441.2**	**1,463.7**	**1,384.9**	**13,705.1**	**13,590.0**
Min	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**63.9**	**123.3**	**142.1**	**0.0**	**151.7**	**0.0**	**0.0**	**3,117.6**	**1,371.0**

Table D 5 San Luis Obispo FCWCD – Carryover Article 56) Water (Acre-Feet) – Study 2020D09E

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1922	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1923	0.0	0.0	0.0	2,909.5	2,595.9	960.1	0.0	0.0	0.0	0.0	0.0	0.0	6,465.6	6,465.6
1924	0.0	0.0	0.0	637.8	637.8	637.8	637.8	637.8	637.8	637.8	0.0	0.0	4,464.8	5,740.4
1925	1,275.7	0.0	0.0	58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3	58.3	1,800.8	525.1
1926	0.0	0.0	0.0	110.4	110.4	110.4	110.4	110.4	110.4	110.4	110.4	110.4	993.4	993.4
1927	0.0	0.0	0.0	980.7	875.0	323.6	0.0	0.0	0.0	0.0	0.0	0.0	2,179.3	2,179.3
1928	0.0	0.0	0.0	3,023.9	2,698.0	997.9	0.0	0.0	0.0	0.0	0.0	0.0	6,719.8	6,719.8
1929	0.0	0.0	0.0	658.9	658.9	658.9	658.9	658.9	658.9	658.9	658.9	0.0	5,271.5	5,271.5
1930	0.0	0.0	0.0	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	110.7	110.7
1931	0.0	0.0	0.0	59.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.5	59.5
1932	0.0	0.0	0.0	230.9	230.9	230.9	230.9	230.9	230.9	230.9	230.9	230.9	2,078.4	2,078.4
1933	0.0	0.0	0.0	108.5	108.5	108.5	0.0	0.0	0.0	0.0	0.0	0.0	325.5	325.5
1934	0.0	0.0	0.0	240.2	240.2	240.2	240.2	240.2	240.2	240.2	240.2	0.0	1,921.5	2,161.7
1935	0.0	240.2	0.0	270.9	241.7	89.4	0.0	0.0	0.0	0.0	0.0	0.0	842.1	601.9
1936	0.0	0.0	0.0	458.5	409.1	151.3	0.0	0.0	0.0	0.0	0.0	0.0	1,018.8	1,018.8
1937	0.0	0.0	0.0	1,300.6	1,160.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,461.0	2,461.0
1938	0.0	0.0	0.0	3,192.6	2,848.5	1,053.6	0.0	0.0	0.0	0.0	0.0	0.0	7,094.7	7,094.7
1939	0.0	0.0	0.0	1,267.8	1,267.8	1,267.8	1,267.8	1,267.8	1,267.8	1,267.8	0.0	0.0	8,874.4	8,874.4
1940	0.0	0.0	0.0	38.9	34.7	12.8	0.0	0.0	0.0	0.0	0.0	0.0	86.4	86.4
1941	0.0	0.0	0.0	1,977.4	1,764.3	652.5	0.0	0.0	0.0	0.0	0.0	0.0	4,394.2	4,394.2
1942	0.0	0.0	0.0	4,786.6	4,270.7	1,579.6	0.0	0.0	0.0	0.0	0.0	0.0	10,636.9	10,636.9
1943	0.0	0.0	0.0	3,613.9	3,224.4	1,192.6	0.0	0.0	0.0	0.0	0.0	0.0	8,031.0	8,031.0
1944	0.0	0.0	0.0	228.1	228.1	228.1	228.1	228.1	228.1	228.1	228.1	228.1	2,053.1	2,053.1
1945	0.0	0.0	0.0	836.9	746.7	276.2	0.0	0.0	0.0	0.0	0.0	0.0	1,859.8	1,859.8
1946	0.0	0.0	0.0	2,824.5	2,520.1	932.1	0.0	0.0	0.0	0.0	0.0	0.0	6,276.7	6,276.7
1947	0.0	0.0	0.0	509.1	509.1	509.1	509.1	509.1	509.1	509.1	0.0	0.0	3,563.7	3,563.7
1948	0.0	0.0	0.0	38.9	34.7	12.8	0.0	0.0	0.0	0.0	0.0	0.0	86.4	86.4
1949	0.0	0.0	0.0	292.5	292.5	292.5	292.5	292.5	292.5	292.5	292.5	292.5	2,632.6	2,632.6
1950	0.0	0.0	0.0	659.3	588.2	217.6	0.0	0.0	0.0	0.0	0.0	0.0	1,465.1	1,465.1
1951	0.0	0.0	0.0	1,210.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,210.4	1,210.4
1952	0.0	0.0	0.0	3,419.3	3,050.8	1,128.4	0.0	0.0	0.0	0.0	0.0	0.0	7,598.5	7,598.5
1953	0.0	0.0	0.0	4,786.6	4,270.7	1,579.6	0.0	0.0	0.0	0.0	0.0	0.0	10,636.9	10,636.9
1954	0.0	0.0	0.0	2,059.6	1,837.6	679.7	0.0	0.0	0.0	0.0	0.0	0.0	4,576.9	4,576.9
1955	0.0	0.0	0.0	578.8	578.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,157.7	1,157.7
1956	0.0	0.0	0.0	971.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	971.4	971.4
1957	0.0	0.0	0.0	4,507.0	4,021.2	1,487.3	0.0	0.0	0.0	0.0	0.0	0.0	10,015.5	10,015.5
1958	0.0	0.0	0.0	1,223.8	1,091.9	403.8	0.0	0.0	0.0	0.0	0.0	0.0	2,719.5	2,719.5
1959	0.0	0.0	0.0	5,134.5	4,581.1	1,694.4	0.0	0.0	0.0	0.0	0.0	0.0	11,410.0	11,410.0
1960	0.0	0.0	0.0	271.5	271.5	271.5	271.5	271.5	271.5	271.5	271.5	271.5	2,443.9	2,443.9
1961	0.0	0.0	0.0	301.9	301.9	301.9	301.9	301.9	301.9	301.9	301.9	301.9	2,717.1	2,717.1
1962	0.0	0.0	0.0	556.0	496.1	183.5	0.0	0.0	0.0	0.0	0.0	0.0	1,235.6	1,235.6
1963	0.0	0.0	0.0	1,253.2	1,118.2	413.6	0.0	0.0	0.0	0.0	0.0	0.0	2,785.0	2,785.0
1964	0.0	0.0	0.0	562.9	562.9	562.9	562.9	562.9	562.9	562.9	562.9	562.9	5,065.8	5,065.8
1965	0.0	0.0	0.0	1,668.5	1,488.6	550.6	0.0	0.0	0.0	0.0	0.0	0.0	3,707.7	3,707.7

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1966	0.0	0.0	0.0	1,266.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,266.0	1,266.0
1967	0.0	0.0	0.0	3,034.9	2,707.8	1,001.5	0.0	0.0	0.0	0.0	0.0	0.0	6,744.3	6,744.3
1968	0.0	0.0	0.0	4,931.2	4,399.7	1,627.3	0.0	0.0	0.0	0.0	0.0	0.0	10,958.1	10,958.1
1969	0.0	0.0	0.0	2,132.0	183.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,315.8	2,315.8
1970	0.0	0.0	0.0	5,134.5	1,235.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,369.9	6,369.9
1971	0.0	0.0	0.0	3,368.9	3,005.8	1,111.7	0.0	0.0	0.0	0.0	0.0	0.0	7,486.4	7,486.4
1972	0.0	0.0	0.0	1,195.2	1,066.4	394.4	0.0	0.0	0.0	0.0	0.0	0.0	2,656.1	2,656.1
1973	0.0	0.0	0.0	2,189.5	1,953.6	722.6	0.0	0.0	0.0	0.0	0.0	0.0	4,865.7	4,865.7
1974	0.0	0.0	0.0	2,975.3	2,654.6	981.8	0.0	0.0	0.0	0.0	0.0	0.0	6,611.8	6,611.8
1975	0.0	0.0	0.0	4,512.7	4,026.3	1,489.2	0.0	0.0	0.0	0.0	0.0	0.0	10,028.2	10,028.2
1976	0.0	0.0	0.0	739.4	739.4	739.4	739.4	739.4	739.4	739.4	739.4	0.0	5,915.1	5,915.1
1977	0.0	0.0	0.0	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	86.4	86.4
1978	0.0	0.0	0.0	112.6	100.5	37.2	0.0	0.0	0.0	0.0	0.0	0.0	250.3	250.3
1979	0.0	0.0	0.0	4,199.3	3,746.7	1,385.8	0.0	0.0	0.0	0.0	0.0	0.0	9,331.7	9,331.7
1980	0.0	0.0	0.0	2,656.7	2,370.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,027.1	5,027.1
1981	0.0	0.0	0.0	1,111.7	1,111.7	1,111.7	1,111.7	1,111.7	1,111.7	1,111.7	0.0	0.0	7,782.0	10,005.4
1982	0.0	2,223.4	0.0	38.9	34.7	12.8	0.0	0.0	0.0	0.0	0.0	0.0	2,309.8	86.4
1983	0.0	0.0	0.0	5,134.5	4,581.1	359.4	0.0	0.0	0.0	0.0	0.0	0.0	10,075.0	10,075.0
1984	0.0	0.0	0.0	5,134.5	902.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,037.1	6,037.1
1985	0.0	0.0	0.0	851.1	30.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	881.8	881.8
1986	0.0	0.0	0.0	1,986.9	1,772.7	655.7	0.0	0.0	0.0	0.0	0.0	0.0	4,415.2	4,415.2
1987	0.0	0.0	0.0	880.8	880.8	880.8	880.8	880.8	880.8	880.8	880.8	0.0	7,046.6	7,927.4
1988	0.0	0.0	880.8	119.1	119.1	119.1	119.1	119.1	119.1	119.1	119.1	119.1	1,953.1	1,072.3
1989	0.0	0.0	0.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	0.0	0.0	322.3	322.3
1990	0.0	0.0	0.0	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	86.4	86.4
1991	0.0	0.0	0.0	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	502.9	502.9
1992	0.0	0.0	0.0	107.0	107.0	107.0	107.0	107.0	107.0	107.0	107.0	107.0	963.2	963.2
1993	0.0	0.0	0.0	288.3	257.3	95.2	0.0	0.0	0.0	0.0	0.0	0.0	640.8	640.8
1994	0.0	0.0	0.0	571.0	571.0	571.0	571.0	571.0	571.0	571.0	571.0	571.0	5,138.7	5,138.7
1995	0.0	0.0	0.0	532.3	474.9	175.7	0.0	0.0	0.0	0.0	0.0	0.0	1,182.9	1,182.9
1996	0.0	0.0	0.0	1,578.4	1,408.3	520.9	0.0	0.0	0.0	0.0	0.0	0.0	3,507.6	3,507.6
1997	0.0	0.0	0.0	4,407.7	1,663.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,071.1	6,071.1
1998	0.0	0.0	0.0	3,573.2	3,188.1	958.9	0.0	0.0	0.0	0.0	0.0	0.0	7,720.3	7,720.3
1999	0.0	0.0	0.0	5,134.5	4,581.1	1,694.4	0.0	0.0	0.0	0.0	0.0	0.0	11,410.0	11,410.0
2000	0.0	0.0	0.0	2,871.9	2,562.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,434.4	5,434.4
2001	0.0	0.0	0.0	841.3	841.3	841.3	841.3	841.3	841.3	841.3	841.3	841.3	7,571.8	7,571.8
2002	0.0	0.0	0.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	1,017.0	1,017.0
2003	0.0	0.0	0.0	45.2	40.3	14.9	0.0	0.0	0.0	0.0	0.0	0.0	100.5	100.5
Avg.	**15.6**	**30.0**	**10.7**	**1,630.8**	**1,287.7**	**486.7**	**121.8**	**121.8**	**121.8**	**121.8**	**78.2**	**47.5**	**4,074.4**	**4,074.4**
Max	**1,275.7**	**2,223.4**	**880.8**	**5,134.5**	**4,581.1**	**1,694.4**	**1,267.8**	**1,267.8**	**1,267.8**	**1,267.8**	**880.8**	**841.3**	**11,410.0**	**11,410.0**
Min	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Table D 6 San Luis Obispo FCWCD - Article 21 Water (Acre-Feet) - Study 2020D09E

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1922	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1923	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1924	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1925	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1926	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1927	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1928	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1929	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1930	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1931	0.0	0.0	0.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	448.0	448.0
1932	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1933	0.0	0.0	0.0	0.0	0.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	224.0	224.0
1934	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1935	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1936	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1937	0.0	0.0	0.0	0.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	448.0	448.0
1938	0.0	0.0	0.0	0.0	0.0	224.0	224.0	224.0	0.0	0.0	0.0	0.0	672.0	672.0
1939	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1940	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1941	0.0	0.0	0.0	0.0	0.0	0.0	224.0	0.0	0.0	0.0	0.0	0.0	224.0	224.0
1942	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1943	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1944	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1945	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1946	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1947	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1948	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1949	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1950	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	224.0
1951	0.0	0.0	224.0	224.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	896.0	672.0
1952	0.0	0.0	0.0	0.0	0.0	0.0	224.0	224.0	0.0	0.0	0.0	0.0	448.0	448.0
1953	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1954	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1955	0.0	0.0	0.0	0.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	224.0	224.0
1956	0.0	0.0	0.0	224.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	672.0	672.0
1957	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1958	0.0	0.0	0.0	0.0	0.0	224.0	224.0	224.0	0.0	0.0	0.0	0.0	672.0	672.0
1959	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1960	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1961	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1962	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1963	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1964	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1965	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	224.0

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Water Year	Cal Year
1966	0.0	0.0	224.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	672.0	448.0
1967	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1968	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1969	0.0	0.0	0.0	224.0	224.0	224.0	224.0	94.0	0.0	0.0	0.0	0.0	990.0	990.0
1970	0.0	0.0	0.0	224.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	672.0	672.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	0.0	0.0	0.0	0.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	448.0	448.0
1981	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1982	0.0	0.0	0.0	0.0	0.0	0.0	224.0	0.0	0.0	0.0	0.0	0.0	224.0	224.0
1983	0.0	0.0	0.0	224.0	224.0	224.0	224.0	94.0	0.0	0.0	0.0	0.0	990.0	990.0
1984	0.0	0.0	0.0	224.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	672.0	672.0
1985	0.0	0.0	0.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	448.0	448.0
1986	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1993	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1994	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995	0.0	0.0	0.0	0.0	0.0	0.0	0.0	224.0	0.0	0.0	0.0	0.0	224.0	224.0
1996	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997	0.0	0.0	0.0	224.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	672.0	672.0
1998	0.0	0.0	0.0	0.0	224.0	224.0	224.0	224.0	0.0	0.0	0.0	0.0	896.0	896.0
1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000	0.0	0.0	0.0	0.0	224.0	224.0	0.0	0.0	0.0	0.0	0.0	0.0	448.0	448.0
2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Avg.	**0.0**	**0.0**	**5.5**	**27.3**	**41.0**	**38.2**	**21.9**	**16.0**	**0.0**	**0.0**	**0.0**	**0.0**	**149.8**	**149.8**
Max	**0.0**	**0.0**	**224.0**	**224.0**	**224.0**	**224.0**	**224.0**	**224.0**	**0.0**	**0.0**	**0.0**	**0.0**	**990.0**	**990.0**
Min	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Appendix E Model

Draft