Salinas Valley: Upper Valley Aquifer Subbasin Groundwater Sustainability Plan

Chapter 9. Projects and Management Actions

Prepared for:

Salinas Valley Basin Groundwater Sustainability Agency

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

9 PROJECTS AND MANAGEMENT ACTIONS

9.1 Introduction

This chapter describes the projects and management actions that will allow the Subbasin to attain sustainability in accordance with §354.42 and §354.44 of the SGMA regulations.

This chapter includes a description of proposed projects and proposed groundwater management actions. In this GSP, projects are activities supporting groundwater sustainability that require infrastructure or physical change to the environment. Projects include green infrastructure projects that achieve benefits through alteration of vegetation or soils, such as removal of invasive species and floodplain restoration. The term groundwater management actions generally refer to activities that support groundwater sustainability without infrastructure.

The projects and management actions adopted in this GSP are designed to achieve a number of outcomes including:

- Achieving groundwater sustainability by meeting Subbasin-specific sustainable management criteria by 2042
- Providing equity between who benefits from projects and who pays for projects
- Providing a source of funding for project implementation
- Providing incentives to constrain groundwater pumping within limits

The projects and management actions included in this chapter outline a framework for maintaining sustainability, however, many details must be negotiated before any of the projects and management actions can be implemented. Costs will be additional to the agreed-upon funding to sustain the operational costs of SVBGSA and funding needed for monitoring and reporting.

This GSP is developed as part of an integrated effort by the SVBGSA to achieve groundwater sustainability in all 6 subbasins of the Salinas Valley under its authority. Therefore, the projects and actions included in this GSP are part of a larger set of integrated projects and actions for the entire Valley.

The projects and management actions are based on existing infrastructure and assumes continued operation of that infrastructure at current capacity. If current infrastructure is operated differently or other projects are implemented within the Valley that affect groundwater conditions, SVBGSA will adapt its consideration of projects and management actions accordingly.

Discussions and decisions regarding specific projects will continue throughout GSP implementation and be part of the adaptive management of the Subbasin. Members of the GSA

and stakeholders in the Subbasin should view these projects and management actions as a starting point for more detailed discussions. Where appropriate, details that must be agreed upon are identified for each project or management action.

As a means to compare projects, this chapter estimates the cost per acre-foot (AF) of water. The cost per AF is the amortized cost of the project divided by the annual yield. It is not the cost of water for irrigation or the domestic cost of drinking water for households on water systems. It is included to help compare projects; however, more refined cost analyses and future benefit analyses will be completed during GSP implementation.

The specific design for implementing management actions and projects will provide landowners and public entities flexibility in how they manage water and how the Subbasin achieves groundwater sustainability. Stakeholders will work collaboratively to determine which projects and management actions to implement to maintain sustainability and will pursue adaptive management if conditions change.

9.2 General Process for Developing Projects and Management Actions

9.2.1 Process for Developing Projects and Management Actions

The general process for developing the projects and management actions presented in this chapter included a combination of reviewing publicly available information, gathering feedback during public meetings including Subbasin Committee meetings, conducting hydrogeologic analysis, consulting with SVBGSA staff, and meeting with Advisory Committee and Board members.

Developing projects and management actions for this GSP involved building on, revising, and adding to the projects and management actions developed for the entire Valley as part of the 180/400-Foot Aquifer Subbasin GSP. This initial list of projects in the 180/400-Foot Aquifer Subbasin GSP was developed with stakeholder input, including a brainstorming workshop for stakeholders to propose and discuss their ideas. The list of projects and actions developed in this workshop were then narrowed down based on feasibility, likelihood of stakeholder acceptance, and ability to address groundwater conditions. These projects were included in the 180/400-Foot Aquifer Subbasin GSP. The projects that could benefit the Upper Valley Aquifer Subbasin were provided to the Subbasin Committee for consideration and refined for this GSP.

Building off the previously identified projects, SVBGSA undertook an iterative process at the subbasin level to develop the projects and management actions in this GSP. An overview of the purpose and types of projects and management actions was presented to the Subbasin Committee, and initial ideas were solicited. Subbasin Committee members completed a survey for feedback and further solicitation of ideas. After these ideas were gathered, a list of potential projects and management actions was presented to the Subbasin Committee and discussed.

Potential projects and management actions were also discussed in terms of meeting the SMC outlined in Chapter 8.

9.2.2 Cost Assumptions Used in Developing Projects

Assumptions used to develop projects and cost estimates are provided in Appendix 9A. Assumptions and issues for each project need to be carefully reviewed and revised during the pre-design phase of each project. Project designs, and therefore costs, could change considerably as more information is gathered.

The cost estimates included for each SVBGSA project are order of magnitude estimates. These estimates were made with little to no detailed engineering data. The expected accuracy range for such an estimate is within plus 50% or minus 30%. The cost estimates are based on perceptions of current conditions at the project location and reflect professional opinions of costs at this time and are subject to change as project designs mature.

For infrastructure projects capital costs include major infrastructure components, such as pipelines, pump stations, customer connections, turnouts, injection wells, recharge basins, and storage tanks. Capital costs also include 30% contingency for plumbing appurtenances, 15% increase for general conditions, 15% for contractor overhead and profit, and 9.25% for sales tax. Engineering, legal, administrative, and project contingencies was assumed as 30% of the total construction cost and included within the capital cost. For capital projects, land acquisition at $45,000/acre was also included within capital costs.

Annual operations and maintenance (O&M) fees include the costs to operate and maintain new project infrastructure. O&M costs also include any pumping costs associated with new infrastructure. O&M costs do not include O&M or pumping costs associated with existing infrastructure, such as existing Salinas Valley Reclamation Plant (SVRP) costs, because these are assumed to be part of water purchase costs. Water purchase costs are assumed to include repayment of loans for existing infrastructure; however, these purchase costs will need to be negotiated. The terms of such a negotiation could vary widely.

Capital costs were annualized over 25 years and added with annual O&M costs and water purchase costs to determine an annualized dollar per acre-foot ($/AF) cost for each project.

9.3 Overview of Projects and Management Actions

This GSP is part of an integrated plan for managing groundwater in all 6 subbasins of the Salinas Valley that are managed by the SVBGSA. This GSP includes focuses on the projects that directly help the Upper Valley Aquifer Subbasin reach its sustainability goals, but also includes Valley-wide projects outside the Subbasin that will likely benefit the subbasin and reduce the need for additional projects and management actions.

Projects and management actions currently being pursued by other agencies are considered sufficiently established and will be pursued independently of this GSP.

The following are the major types of projects that can be developed to supplement the Upper Valley Aquifer Subbasin's groundwater supplies:

- Direct recharge through recharge basins or wells
- Indirect recharge through decreased evapotranspiration (ET)
- Reoperation of reservoir releases to achieve greater or more regular recharge
- Demand management

The projects and management actions for this GSP are listed in Table 9-1.

Table 9-1. Projects and Management Actions

Project/ Management Action #	Name	Description	Project Benefits	Quantification of Project Benefits	Cost
A - RECHARGE PROJECTS (DIRECT AND INDIRECT)					
A1	Multi-benefit Stream Channel Improvements	Prune native vegetation and remove non-native vegetation, manage sediment, and enhance floodplains for recharge. Includes 3 components: 1. Stream Maintenance Program 2. Invasive Species Eradication 3. Floodplain Enhancement and Recharge	Groundwater recharge, flood risk reduction, returns streams to a natural state of dynamic equilibrium	Component 1: Valley-wide benefits not quantified Component 2: Valley-wide benefits of 2,790 to 20,880 AF/yr. of increased recharge Component 3: Upper Valley direct benefits of 400 AF/yr. from 4 recharge basins	<u>Component 1</u> Valley-wide Cost: $150,000 for annual administration and $95,000 for occasional certification; $780,000 for the first year of treatment on 650 acres, and $455,000 for annual retreatment of all acres <u>Component 2</u> Valley-wide Average Cost: $14,536,943 and $18,871,239 Unit Cost: $60 to $740/AF <u>Component 3</u> Upper Valley Cost: $4,464,000 Unit Cost: $930/AF
A2	Managed Aquifer Recharge with Overland Flow	Construct basins for managed aquifer recharge of overland flow before it reaches streams	Groundwater recharge, less stormwater and erosion	400 AF/yr. in increased recharge	Capital Cost: $4,128,000 Unit Cost: $870/AF
B - PROJECTS AND MANAGEMENT ACTIONS THAT RESULT IN REOPERATION OF THE RESERVOIRS					
B1	Winter Releases with Aquifer Storage and Recovery	Shift reservoir releases to winter months and inject winter releases into the 180/400-Foot Aquifer Subbasin for Aquifer Storage and Recovery to provide summer irrigation water to CSIP	More regular winter reservoir releases, greater groundwater recharge in the Upper Valley Aquifer Subbasin, and help reducing spread of Arundo; additional benefits for other subbasins	Analysis underway	Valley-wide Capital Cost: $172,141,000 Unit Cost for 12,900 AF/yr. ASR: $1,450/AF *(distribution of benefits throughout Valley will be determined through a benefits assessment)*

Project/ Management Action #	Name	Description	Project Benefits	Quantification of Project Benefits	Cost
B2	MCWRA Interlake Tunnel and Spillway Modification	Tunnel to transfer excess water from Nacimiento to San Antonio Reservoir	Greater surface water stored in reservoirs; more groundwater recharge	30,500 AF/yr. of increased groundwater recharge from the Salinas River throughout the Salinas Valley	Valley-wide Capital Cost: $118,503,000 Unit Cost: $393/AF *(distribution of benefits throughout Valley will be determined through a benefits assessment)*
B3	MCWRA Drought Reoperation	Establishment of the Drought Technical Advisory Committee (D-TAC) to develop a plan for how to manage reservoir releases during drought conditions	More regular winter reservoir releases; drought resilience	Unable to quantify benefits since drought operations have yet to be triggered	Minimal SVBGSA staffing costs for participation; No additional MCWRA costs since already formed
C – MANAGEMENT ACTIONS					
C1	Conservation and Agricultural BMPs	Promote agricultural best management practices and support use of evapotranspiration data as an irrigation management tool for growers	Better tools assist growers to use water more efficiently; decreased groundwater extraction	Unable to quantify benefits until specific BMPs are identified and promoted	Approximately $100,000 for 4 workshops, grant writing, and demonstration trials. Cost could be reduced if shared between subbasins.
C2	Fallowing, Fallow Bank, and Agricultural Land Retirement	Includes voluntary fallowing, a fallow bank whereby anybody fallowing land could draw against the bank to offset lost profit from fallowing, and retirement of agricultural land	Decreased groundwater extraction for irrigated agriculture	Dependent on program participation	$195-$395/AF if land is fallowed $810-$2,000/AF if land is retired
C3	SMC Technical Advisory Committee (TAC)	Establish technical TAC to review groundwater conditions and provide advice on projects and management actions	Potential for increased groundwater elevations, increased groundwater storage, decreased groundwater extraction, protection of water quality	Dependent on specific recommendations implemented	Staffing costs plus $10,000 per year (if TAC is triggered)

Project/ Management Action #	Name	Description	Project Benefits	Quantification of Project Benefits	Cost
D - IMPLEMENTATION ACTIONS					
D1	Well Registration	Register all production wells. Monitor flowmeters on all non- *de minimis* wells.	Better informed decisions, more management options	N/A – Implementation Action	Not estimated at this time
D2	Groundwater Extraction Management System (GEMS) Expansion	Update current GEMS program, by collecting groundwater extraction data from wells in areas not currently covered by GEMS and enhance data collection	Better informed decisions	N/A – Implementation Action	Not estimated at this time
D3	Local Groundwater Elevation Triggers	Develop a system for well owners to notify the GSA if their wells go dry. Refer those owners to resources to assess and improve their water supplies. Form a working group if concerning patterns emerge.	Support affected well owners with analysis of groundwater elevation decline	N/A – Implementation Action	Not estimated at this time
D4	Domestic Water Partnership	Form a working group for different agencies to discuss domestic water concerns	Better access to quality drinking water	N/A – Implementation Action	Not estimated at this time

9.4 Projects and Management Actions Planned to Reach Sustainability

The projects and management actions that are planned to reach sustainability were the most reliable, feasible, cost-effective, and acceptable to stakeholders. Descriptions of these project and management actions are included below and are not in order of priority. Generalized costs are also included for planning purposes. Components of these projects and actions may change in future analyses, including facility locations, recharge mechanisms, and other details. Therefore, each of the projects and management actions described in this GSP should be treated as a generalized project representative of a range of potential project configurations.

Recharge Projects

9.4.1 Project A1: Multi-Benefit Stream Channel Improvements

Over the past half century, the Salinas River has been impacted by the construction of the San Antonio and Nacimiento Dams and flood control levees intended to move water away from agricultural fields. These have changed natural river geomorphology, resulting in sediment build up and vegetation encroachment on the historically dynamic channels of the River. This alteration of natural floodplains and geomorphology has increased flood risk, decreased direct groundwater recharge, and contributed to increased ET through vegetation build-up. Targeted, geomorphically-informed stream maintenance and floodplain enhancement can improve stream function both morphologically and biologically.

This program takes a 3-pronged approach to stream channel improvements. First, it addresses vegetation growth and geomorphic conditions in the river channel by removing perennial native and non-native vegetation in designated maintenance channels (and removing *Arundo donax* (arundo) and *Tamarix sp.* (tamarisk) throughout the river corridor). Second, the program reduces the height of sediment bars that have been identified to meet criteria for impeding flow. Third, it enhances floodplains to increase groundwater recharge.

This 3-pronged approach increases flow by removing dense native and non-native vegetation, provides vegetation free channel bottom areas for infiltration, stabilizes stream banks and earthen levees by reducing downstream velocities, and reduces flood risk. This program's activities also benefit native species throughout the river ecosystem. By improving geomorphological function through vegetation and sediment removal activities, the coordinated efforts allow native species to reestablish in areas where invasive species have become dominant. River maintenance activities enhance groundwater recharge efforts through the streambed by providing additional open channel bed for infiltration, and floodplain enhancement can further recharge potential of high flows. Infiltration through the streambed accounts for a significant portion of the groundwater budget, and invasive species such as arundo, which can take up to 4 times as much

water as native riparian species, thereby negatively impacting both river flows as well as infiltration in to the subsurface through the streambed (Cal-IPC, 2011).

Surface water flows, and notably flood flows, can be impacted by the density of vegetation and whether the vegetation is comprised of native or non-native species. Native riparian species allow for dynamic action that scours the riverbed and resorts sediment in a manner that encourages natural infiltration and conveyance of flood waters in the broader active flood terraces in the river. This wider use of the floodplain by flood waters slows velocities and distributes flood waters over a broader spatial area of the riverbed.

Stream channel vegetation removes water from the river through ET. Water loss through ET from invasive species such as arundo can take up between 3.1 and 23.2 AF/yr. per acre, whereas ET from native vegetation can take up to 4 AF/yr. per acre (Melton and Hang, 2021; Cal-IPC, 2011). This illustrates the difference in water consumption between vegetation types and how these water consumptions can have major impacts on water in the river (Cal-IPC, 2011). The Salinas River is characterized by a braided channel in some areas of the floodplain and a confined channel in other areas. Plants can take root in channel locations that adversely impact the flow of water, resulting in either a channelized river or in creating directional velocities that can cause localized damages including levee failure. Poorly functioning sedimentation can also negatively impact water flow in drought and flood conditions, as well as impeded proper infiltration to the subsurface. Geomorphological processes are important to managing a natural riverbed and floodplain to enhance recharge, groundwater levels, and groundwater storage.

This program is not meant to restore the Salinas River to historical conditions, but rather to enhance geomorphological function through targeted maintenance sites for flood risk reduction and floodplain enhancement for increased recharge. The Monterey County Water Resources Agency (MCWRA) has developed a science-based approach to river management that recognizes the value of critical habitat, environmental resources, cost to landowners, and coordination among stakeholders (MCWRA, 2016). A key feature of this modified management approach is providing protection for critical habitats and water quality (MCWRA, 2016). One of the important functions of a river is to provide habitat for native species. In a poorly functioning river, invasive species have more opportunities to crowd out native species and in turn, further degrade the river conditions. Therefore, this program will result in flood risk reduction, increased recharge, and a multitude of benefits that address critical functions of the Salinas River.

This program includes 4 main types of tasks: vegetation maintenance, non-native vegetation removal, sediment management, and floodplain enhancement and recharge.

- **Vegetation Maintenance** – Vegetation, both native and non-native, will be removed within designated maintenance areas using a scraper, mower, bulldozer, excavator, truck or similar equipment to remove the vegetation above the ground and finishing by ripping roots to further mobilize the channel bottom. Vegetation maintenance includes pruning up to 25 percent of canopy cover and removing dead mass. Maintenance activities will not include disturbance of emergent wetland vegetation that provides suitable habitat for threatened California red-legged frogs or for the endangered tidewater gobies. In instances where native vegetation needs to be removed for site-specific conditions or tie-ins, these impacts can be compensated with replanting and revegetation in other areas as a form of mitigation offset for stream channel maintenance. Native trees will be planted during the rainy season to enhance their rate of success.

- **Non-Native Vegetation Removal –** Non-native vegetation removal primarily focuses on the arundo present in the region but may include tamarisk shrubs as well. Arundo is a grass that was introduced to the Americas in the 1800s for construction material and for erosion control purposes (Cal-IPC, 2011). In 2011, the California Invasive Plant Council determined that the Salinas Watershed had the second largest invasion with approximately 1500 infested acres. While arundo thrives near water, such as wetlands and rivers, it grows in many habitats and soil types. It requires a substantial amount of water, previously estimated making it one of the thirstier plants in a given region and outpacing the water demands of native vegetation. To manage this invasive species, arundo biomass is typically sprayed, sometimes mowed or hand cut if needed, and then treated with multiple applications of herbicide over several years. Permits allow arundo removal in the entire riparian corridor, including along the low-flow channel.

- **Sediment Management** – Sediment management includes channel bed grading and sediment removal. Sediment grading and removal may occur exclusively, or after vegetation maintenance activities described above. Sediment removal and grading activities help reestablish proper gradients to allow for improved drainage downstream, encourage preferential flow into and through secondary channels, and minimize resistance to flow (until dunes form) (MCWRA, 2016). Sediment removal will follow best practices to protect native species while producing maximum benefit for flood reduction and groundwater recharge.

- **Floodplain Enhancement and Recharge** – Floodplain enhancement restores areas along the River, creeks, and floodplains to slow and sink high flows and encourage groundwater recharge. Restored floodplain and riparian habitat can slow down the velocity of the River and creeks and encourage greater infiltration. Due to agricultural and urban encroachment, streams have become more highly channelized, and flow has increased in velocity, particularly during storm events. This flow has resulted in greater erosion and loss of functional floodplains. Floodplain restoration efforts could be focused

on lands directly adjacent to creeks, so as to not interfere with active farming. In addition, efforts to restore creeks and floodplains could be extended to the foothills to slow water closer to its source.

Program Components

This multi-benefit stream channel improvements program is implemented through various program components. These build off existing programs and permits to undertake the 4 main types of tasks. During GSP implementation, these components may be modified as needed to most efficiently accomplish the program goals.

Component 1: Stream Maintenance Program

The first component continues the Salinas River Stream Maintenance Program (SMP), which maintains the river corridor to reduce flood risk and minimize bank and levee erosion, while maintaining and improving ecological conditions for fish and wildlife consistent with other priorities for the Salinas River (MCWRA, 2016). It is a coordinated Stream Maintenance Program that includes MCWRA, the Resource Conservation District of Monterey County (RCDMC), and the Salinas River Management Unit Association representing approximately 50 landowner members along the river corridor. Project benefits include increased water availability, flood risk reduction, reduced velocities during high flows to lessen bank and levee erosion, and enhanced infiltration by managing vegetation and sediment throughout the river and its tributaries.

The SMP occurs along the area of the Salinas in Monterey County. The 92-miles of the river in Monterey County is broken into 7 River Management Units from San Ardo in the south to Highway 1 in the north. The management activities are focused on the secondary channels of the Salinas River located outside of the primary low-flow channel and are preferentially aligned with low-lying undeveloped areas that are active during times of higher flow (MCWRA, 2016). The SMP includes 3 main activities as part of stream maintenance: vegetation maintenance, non-native vegetation removal, and sediment management.

Component 2: Invasive Species Eradication

The second Component supports and/or undertakes removal of arundo and tamarisk done by the Resource Conservation District of Monterey County (RCDMC). RCDMC is the lead agency on an estimated 15 to 20-year effort to fully eradicate arundo from the Salinas River Watershed, working in a complementary manner with the SMP. This project focuses on removal of woody invasive species such as arundo, tamarisk (*Tamarix sp*.), and tree tobacco (*Nicotiana glauca*) along the Salinas River, as well as retreatments needed to keep it from coming back. It includes 3 distinct phases: initial treatment, re-treatment, and on-going monitoring and maintenance treatments. As of April 2021, estimated arundo under treatment was 850 acres. Original mapped

acreage had expanded by 20%, leaving 900 arundo acres remaining to be treated. The initial treatment phase includes mechanical and/or chemical treatment in all areas of the river that have yet to be treated. The re-treatment phase includes re-treatment of the approximately 850 acres that have already had an initial treatment and re-treatment of the remaining 900 acres done in stages, with each area treated over a 3- to 5-year period following initial treatment. The final phase is the ongoing monitoring and maintenance treatment phase. This phase requires monitoring for regrowth of the invasive species or new invasive species and chemical treatment every 3 to 5 years.

Component 3: Floodplain Enhancement and Recharge

The third component complements the first 2 by restoring floodplains to enable high flows to be slowed and directed toward areas where it can infiltrate into the ground. For this component, SVBGSA could partner with the Integrated Regional Water Management (IRWM) Group, Central Coast Wetlands Group (CCWG), and other organizations that are already undertaking creek and floodplain restoration efforts and encourage inclusion of features that would enhance recharge.

Restored floodplain and riparian habitat along creeks can slow down the velocity of creeks and encourage greater infiltration. Due to agricultural and urban encroachment, streams have become more highly channelized and flow has increased in velocity, particularly during storm events. This flow has resulted in greater erosion and loss of functional floodplains. Floodplain restoration efforts could be focused on lands directly adjacent to creeks, so as to not interfere with active farming. In addition, efforts to restore creeks and floodplains could be extended to the foothills to slow water closer to its source.

9.4.1.1 Relevant Measurable Objectives

Relevant measurable objectives benefiting from this project include:

- Groundwater elevation measurable objective - Removing the invasive species, better managing streams, and directing high flows into restored floodplains will facilitate more water infiltrating and percolating into the subsurface to raise groundwater elevations. This has the effect of adding water to the principal aquifer. Adding water to the principal aquifer will ultimately increase groundwater elevations or decrease their decline.
- Groundwater storage measurable objective - Adding water to the principal aquifer will ultimately have the effect of increasing groundwater in storage.
- Land subsidence measurable objective - Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces

saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.

- Interconnected surface water measurable objective - By removing vegetation pathways for ET, less interconnected groundwater and less surface water will be depleted, leaving more water available in the river for flows as well as for connection to the principal aquifer.

9.4.1.2 Expected Benefits and Evaluation of Benefits

The groundwater-related expected benefits are increased groundwater elevations in the vicinity of the river channel due to increased infiltration and percolation to the principal aquifers, increased groundwater in storage, better water quality, decreased depletion of interconnected surface water, and protection against any potential land subsidence due to groundwater extractions. In addition, the project provides habitat restoration, increased connectivity for wildlife, and flood risk reduction.

Increased storage of flood waters can increase groundwater elevations in the vicinity of the Salinas River. This typically will be seen as groundwater mounding subparallel to the river corridor. However, as more water infiltrates into the subsurface, more water will flow laterally, thereby expanding the zone of influence from the river outward and raise groundwater elevations laterally. Additionally, water stored underground is not subject to ET in the same way water stored above ground is. With annual removal of arundo, ET will decrease over time, allowing for more water to remain in the system. Arundo removal is coupled with identified native species removal where native species have encroached in high flow channels where they may not typically grow; however, there is significant uncertainty in the recharge benefits, as arundo and many native species draw both surface and groundwater.

Removal of arundo on 900 acres along the Salinas River will decrease ET by 2,790 to 20,880 AF/yr. throughout the Salinas Valley. This will enhance recharge from the Salinas River within the Upper Valley Aquifer Subbasin and leave more water in the River to get down to the Castroville Seawater Intrusion Project (CSIP), where surface water is used in lieu of groundwater to help address seawater intrusion and declining groundwater elevations. With this reduction of non-productive water consumption, less water can be released from the reservoirs to get the same amount of water downstream, which increases the Valley's sustainable yield and drought resilience. It also results in indirect recharge as removal reduces groundwater use by the plants.

Component 3 of this project includes various floodplain enhancement features and restoration activities. Preliminary project scoping includes the development of 4 recharge basins within the Upper Valley Aquifer Subbasin, each with a recharge capacity of about 100 AF/yr. However, greater analysis is needed to determine the exact number, size, and type of features. The combined benefit of the 4 recharge basins is expected to be 400 AF/yr. in increased recharge.

This program will also enhance streamflow by returning patterns of flow to a more natural state. Arundo infestation decreases the natural channel migration and complexity of sandy-bottomed streams by confining the channel to an armored, single stem with faster flowing water, which then becomes susceptible to erosion and incision. A narrowing channel with reduced capacity also heightens flood risk. Removing arundo will allow greater normalization of natural geomorphic processes and sediment transport by de-armoring low-flow channel banks and adjacent floodplain areas to enable channel migration and braiding.

Stream channel improvements will provide many additional ecosystem benefits, including:

Habitat restoration: This project will help restore riparian habitat. Results from 4 years of plant community monitoring of arundo sites initially treated in 2016 show that diversity and abundance of native plants have increased over this time period and this trend is expected to continue. Field biologists conducting pre-activity surveys have also observed increased wildlife activity post-arundo removal.

Increased connectivity for wildlife: Within the Central Coast region there are several mountain ranges, coastal areas, valley floors, and upland habitats that need to be connected to allow for the wildlife movement necessary for gene flow and healthy populations (Thorne *et al.* 2002). The Salinas River riparian area is an important linkage for wildlife movement between upland habitat via tributaries. Removal of dense arundo stands will reduce physical impediments to movement for wildlife species such as mountain lion, bobcat, deer, and American badger. RCDMC has documented this through wildlife camera monitoring, which has shown increased detections of large mammals such as deer, bobcat, and coyote after arundo removal. This project will promote habitat use and movement of wildlife by increasing availability of food and nesting resources.

Flood risk reduction: Stream maintenance has the societal benefit of reducing flood risk to neighboring lands, which are mostly agricultural fields. Arundo's dense structure creates increased surface roughness, thus backing up water and causing flooding during high flow events. When agricultural fields are flooded with river water, farmers lose crops and thus considerable income, and must leave their fields fallow for months after flooding due to food safety concerns. Flooding can also damage levees which then have to be repaired and bring weed seeds and propagules (including arundo) into fields which then have to be controlled.

Enhanced Conveyance and Infrastructure Protection: The work conducted in the SMP improves conveyance of storm, flood, and nuisance waters by keeping water in the stream channel and flowing freely rather than being blocked by the invasive species. The SMP protects city infrastructure by keeping water more in the channel rather than blocked and rerouted by arundo, which reduces the cost of infrastructure repairs to the City.

Changes in groundwater elevation will be measured with the groundwater level monitoring program detailed in Chapter 7. Subsidence will be measured using the DWR provided

subsidence maps detailed in Chapter 7. When data gaps are filled, interconnected surface waters will be measured through installed shallow groundwater wells and river flow, as is detailed in Chapter 7.

9.4.1.3 Circumstances for Implementation

The SMP and invasive species eradication are ongoing projects with MCWRA, the RCDMC, and the Salinas River Management Unit Association. Program administration is provided by the RCDMC and the Salinas River Management Unit Association. Landowners currently pay for all maintenance activities in the maintenance channels and for associated biological monitoring and reporting. SVBGSA could support the program, become an administrative partner in the program with other program partners, or fund maintenance and monitoring activities.

Floodplain enhancement will be implemented if additional water is required to reach sustainability. A number of agreements and rights must be secured before individual projects are implemented. Primarily, a more formal cost/benefit analysis must be completed to determine how many site options are preferable. Water diversion rights may need to be secured to divert stormwater, which may take a significant number of years.

9.4.1.4 Permitting and Regulatory Process

For Components 1 and 2, the permitting process has already been initiated by MCWRA and RCDMC and permits are in place until 2025 for the program. Invasive species eradication will be continued under existing permitting. All participants in the SMP must enter into an agreement with MCWRA and comply with all terms, conditions, and requirements of the permits and Program Guidelines.

These Components may require a California Environmental Quality Act (CEQA) environmental review process, and may require an Environmental Impact Report or a Mitigated Negative Declaration (the review could also result in a Negative Declaration or Notice of Exemption). Additionally, permits from a variety of state and federal agencies may be necessary, and any project that coordinates with federal facilities or agencies may require National Environmental Policy Act (NEPA) documentation.

Permits for all 3 components are detailed below.

Component 1 Permits:

- ***U.S. Army Corps of Engineers (USACE)***- The Department of the Army Regional General Permit (RGP) 20 for the Salinas River Stream Maintenance Program, Corps File No. 22309S, was executed on September 28, 2016 by the USACE. The RGP is authorized under Section 404 of the Clean Water Act (33 U.S.C. Section 1344) through November 15, 2021. The National Marine Fisheries Service (NMFS) and the U.S. Fish

and Wildlife Service (USFWS) concurred with the USACE determination that the project was not likely to adversely affect the federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*) and the federally threatened California tiger salamander (*Ambystoma californiense*), Monterey spineflower (*Chorizanthe pungens* var. *pungens*) and its critical habitat, the yellow-billed cuckoo (*Coccyzus americanus*), and the South-Central Coast (S-CCC) steelhead (*Oncorhynchus mykiss*). The USFWS issued a Biological Opinion on August 22, 2016 for the federally endangered least Bell's vireo (*Vireo bellii pusillus*) and tidewater goby (*Eucyclogobius newberryi*) and its critical habitat and the federally threatened California red-legged frog (*Rana draytonii*).

- ***National Oceanic and Atmospheric Administration (NOAA)***– The RCDMC also has a letter of concurrence in which NOAA supports USACE's decision that the SMP "is not likely to adversely affect species listed as threatened or endangered or critical habitats designated under the Endangered Species Act."
- ***State of California Regional Water Quality Control Board*** - The Clean Water Act Section 401 Water Quality Certification for Discharge of Dredged and/or Fill Materials, Certification No. 32716WQ02, was approved on August 31, 2016, and is set to expire on November 30, 2025. The Central Coast Water Board staff will assess the implementation and effectiveness of the SMP after 5 years and consider modifications to this Certification for the second 5 years of the permit term.
- ***California Department of Fish & Wildlife*** - The SMP is authorized under a Routine Maintenance Agreement (RMA) 1600-2016-0016-R4, approved October 14, 2016, and held by the RCDMC. The RMA was amended and restated on June 16, 2017 and subsequently amended on April 10, 2018. The RMA covers all impacts under the program from the original date of approval through December 31, 2026.
- ***California Natural Resources Agency*** – An Environmental Impact Report (EIR)was completed in compliance with the California Environmental Quality Act (CEQA).

Component 2 Permits:

- ***California Department of Fish & Wildlife*** – The invasive species eradication is authorized under a RMA 1600-2012-0154-R4, approved April 11, 2014 and held by the RCDMC. The RMA was amended on September 30, 2014. It covers all impacts under the program from the original date of approval through April 10, 2026.
- ***Environmental Protection Agency*** – National Pollutant Discharge Elimination System (NPDES) permit CAG990005 allows the Salinas River Arundo Control Program to apply pesticides to waterways.
- In addition, the Salinas River Arundo Control Program filed a CEQA Mitigated Negative Declaration, received a technical assistance letter from NOAA NMFS, completed a U.S.

Fish and Wildlife Service No Take Request, and received a technical assistance letter from U.S. Fish and Wildlife Service.

Component 3 Permits that may be required for floodplain enhancement include:

- ***United States Army Corps of Engineers (USACE)*** – A Regional General Permit may be required if there are impacts to wetlands or connections to waters of the United States.
- ***California Department of Fish and Wildlife (CDFW)*** – A Standard Agreement is required if the project could impact a species of concern.
- ***Environmental Protection Agency (EPA) Region 9*** – National Environmental Policy Act (NEPA) documentation must be submitted for any project that coordinates with federal facilities or agencies. Additional permits may be required if there is an outlet or connection to waters of the United States.
- ***National Marine Fisheries Service (NMFS)*** – A project may require authorization for incidental take, or another protected resources permit or authorization from NMFS.
- ***California Natural Resources Agency*** – Projects of a magnitude capable of having a demonstrable impact on the environment will require a CEQA environmental review process. Projects will require either an Environmental Impact Report, Negative Declaration, or a Mitigated Negative Declaration.

9.4.1.5 Implementation Schedule

The components of this program may be implemented on different schedules. The annual implementation schedule for Component 1 is outlined on Figure 9-1. About 40 new acres could be added to the program each year, taking about 10 years to add the remaining acres. Annual maintenance needs to be continued indefinitely. For Component 2, up to 100 of the remaining 900 acres of uncontrolled arundo can begin treatment each year, as shown on Figure 9-2. For Component 3, it is contingent on the first 2 components, but may be initiated shortly after Component 2. This schedule is shown on Figure 9-3.

Task Description	Dec 1	Mar 31	Sep 1	Nov 30
Phase I – Annual RMU report, Work Plan, and noticing				
Phase II – Pre-maintenance surveys				
Phase III – Maintenance activities				

Figure 9-1. Annual Implementation Schedule for Stream Maintenance

	Year												
Task Description	1	2	3	4	5	6	7	8	9	10	11	12	13
Treat and retreat first 100 acres													
Treat and retreat second 100 acres													
Treat and retreat third 100 acres													
Treat and retreat fourth 100 acres													
Treat and retreat fifth 100 acres													
Treat and retreat sixth 100 acres													
Treat and retreat seventh 100 acres													
Treat and retreat eighth 100 acres													
Treat and retreat ninth 100 acres													

Figure 9-2. Implementation Schedule for Invasive Species Eradication

	Year				
Task Description	1	2	3	4	5
Studies/Preliminary Engineering Analysis					
Agreements/ROW					
CEQA					
Permitting					
Design					
Bid/Construct					

Figure 9-3. Implementation Schedule for Floodplain Enhancement and Recharge

9.4.1.6 Legal Authority

MCWRA has legal authority over the Component 1 SMP for program administration and permitting. Private landowners and local cities who conduct maintenance in the permitted work areas must agree to permit conditions and execute an agreement annually with each agency. Private landowners and local cities currently pay for all maintenance activities including heavy equipment work and biological monitoring and reporting.

For Component 2 invasive species removal, the RCDMC has legal authority for program administration and permitting. The RCDMC obtains Landowner Access Agreements with property owners or managers (tenants) to allow them to do the work or to allow the RCDMC to oversee landowner-conducted work.

For floodplain restoration activities, the SVBGSA has the right to divert and store water once it has access to the appropriate water rights. Section 10726.2 (b) of the California Water Code provides GSAs the authority to, “Appropriate and acquire surface water or groundwater and surface water or groundwater rights, import surface water or groundwater into the agency, and conserve and store within or outside the agency” (CWC, 2014).

9.4.1.7 Estimated Cost

Component 1 program permits have been completed and are operational through 2026. Renewal of the 401 Certification with the Central Coast Regional Water Control Board will include a cost of $95,000 in the timeframe of 2024 to 2026. The annual administrative cost of Component 1 of this program is approximately $150,000. This cost does not include stream maintenance activities, required biological monitoring, and reporting, which are currently paid by program participants. These costs vary from year to year based on number of participants and work site conditions. This program could cover the costs of stream maintenance activities, biological monitoring, and/or reporting in order to reach higher participation rates from landowners and therefore increased project benefit. The cost for the vegetation management is approximately $1,200/acre for the first year and $700/acre for annual maintenance thereafter. This does not include the cost of sediment management, which can be costly. The cost estimate for stream maintenance activities, required biological monitoring, and reporting is included in Table 9-2, which may continue to be paid by participants, be funded by the GSA, or be funded through a different source. 254 acres have already received their first year of vegetation management.

Table 9-2. Cost Estimate of Vegetation Management

	Acres	First year of vegetation management ($1,200/acre)	Subsequent years of vegetation management ($700/acre)
Upper Valley	250	$300,000	$175,000
Forebay	263	$315,600	$184,100
180/400-Foot Aquifer Subbasin	137	$164,400	$95,900
Subtotal	**650**	**$780,000**	**$455,000**

For Component 2, the estimated capital cost is estimated at between $14,536,943 and $18,871,239. Annual O&M costs are anticipated to be approximately $165,200. The indirect projected yield for the invasive species eradication project is estimated at between 3.1 AF/yr. and 23.2 AF/yr. per acre of invasive species removed. With the range of costs and range of project benefits, the amortized cost of water for this project is estimated to range between $60/AF and $740/AF. See Appendix 9B for a cost estimate.

Component 3 includes the construction of 4 recharge basins, each with an expected benefit of 100 AF/yr. and a capital cost of $1,116,000 each, for a total of $4,464,000. Spread over 25 years and assuming a 6% discount rate, the annualized cost is $83,300 per recharge basin, including annual maintenance. The unit cost is $930/AF. These costs were estimated assuming that only one recharge basin would be built, but there may be economies of scale that lower the cost if more are built. These costs are approximate; exact costs will depend on site specifics.

9.4.1.8 Public Noticing

Component 1 implementation and permitting requires annual notification of potential program participants and this notification is announced via direct mail to program participants as well as announced on MCWRA website. Program related annual reporting as required and is published on the MCWRA website.

Component 2 public noticing practices and requirements of the existing RCDMC invasive species eradication programs will be continued as part of this project. This includes reaching out to specific landowners and tenants in areas of potential work and completing annual permit reports that are posted to the RCDMC website.

Component 3 public noticing will be conducted prior to any project initiates construction to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project
- The SVBGSA Board will notice stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve design and construction of the project.

In addition to the public noticing detailed above, all projects will follow the public noticing requirements required by CEQA.

9.4.2 Project A2: Managed Aquifer Recharge of Overland Flow

This program incentivizes development of groundwater recharge basins that recharge overland flow and stormwater runoff from the Coastal Ranges before they reach streams and the Salinas River. This program is structured similar to the program instituted in Pajaro Valley, whereby agricultural landowners dedicate a portion of their land to recharge ponds and direct overland flood flows into the ponds. This could include some type of incentive for recharge basins would be situated to collect runoff before it enters a local stream and allowed to infiltrate. It could also

be combined with Project A1 and include multi-benefit projects along the floodway to increase floodplain capacity, since floodplains generally have high recharge.

This program will require additional analysis on actual available runoff from each of the watersheds. It assumes that the stormwater is not being diverted upstream; however, many of the mountain ranges have diversion operations already occurring upstream in the watershed. Rain gauges and studies will be required to determine the true estimate of water available from each subwatershed.

Four recharge basins are planned, each with a recharge capacity of about 100 AF/yr. Their locations will be chosen based on site availability and suitability. Aquifer recharge potential is highest where there are areas of highly permeable soils, good connection to underlying aquifers, and topography that directs surface runoff toward retention/catchment areas. The SVBGSA will investigate where recharge ponds would yield the greatest amount of groundwater recharge, combining data on soil permeability, stratigraphy, and land use to map areas of high potential recharge.

The program would reach out to landowners to increase awareness of the benefits of recharge basins and work with local stakeholders to identify lands with high recharge capacity. It could also work with interested landowners to identify sites, undertake potential site analyses with cone penetration tests (push tests), and design recharge basins. This program will involve monitoring water quality and could potentially improve stormwater quality and reduce stormwater volume which is regulated under the Irrigated Lands Program. It could potentially include development of a permit coordination program for recharge projects. The program could also work with various organizations and government agencies to connect existing incentivization programs and funding to landowners interested in collaborative recharge projects that require land and access.

9.4.2.1 Relevant Measurable Objectives

Relevant measurable objectives benefiting from this project include:

- Groundwater elevation measurable objective - By routing stormwater and runoff from streams into recharge facilities and restored floodplains, there will be more water added to the principal aquifer. This water will be slowed down and allowed to infiltrate, which has the effect of addition water to the aquifer. Adding water into the principal aquifer will raise groundwater elevations over time.
- Groundwater storage measurable objective - Furthermore, adding water to the principal aquifer will ultimately have the effect of increasing groundwater in storage. Groundwater storage is also calculated from measured groundwater elevations. By raising groundwater elevations, the calculation of change in storage will be positive.

- Land subsidence measurable objectives - Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.

9.4.2.2 Expected Benefits and Evaluation of Benefits

This project will increase sustainable yield and groundwater elevations through enhanced infiltration of runoff. Runoff occurs when the rate of rainfall exceeds the soil infiltration rate. This runoff then flows over the land surface before accumulating into washes and streams as measurable stream flow. In the initial phases of overland flow, this water often infiltrates into the soils, which enhances soil moisture, and facilitates recharge to the aquifer. The benefits to increased soil moisture go beyond increased opportunity for recharge. Enhanced soil moisture contributes to erosion protection as well as near-surface temperature regulating processes (Rivas, 2006; Mittelbach *et al*., 2011). Four recharge basins are planned for this project with a combined benefit of about 400 AF/yr. in increased recharge.

Changes in groundwater elevation will be measured with the groundwater level monitoring program detailed in Chapter 7. Projects may include monitoring wells if they are not close enough to the existing monitoring network for the impacts to be measured. Additionally, various volumetric measurement methods may be installed along with either recharge basins or dry wells to assist in calculating increases to groundwater storage.

9.4.2.3 Circumstances for Implementation

The overland flow MAR project will be implemented if stakeholders determine it is necessary to reach or maintain sustainability. A number of agreements and rights must be secured before the project is implemented. Primarily, a more formal cost/benefit analysis must be completed to determine if the on-farm modifications will provide quantifiable benefits to the principal aquifer. Recharge basins installed as part of this project could be directly funded by the SVBGSA or grant funding, or SVBGSA could develop an incentive program. Funding must be approved by the SVBGSA Board of Directors.

9.4.2.4 Permitting and Regulatory Process

Projects described in this section may require a California Environmental Quality Act (CEQA) environmental review process, and may require an Environmental Impact Report or a Mitigated Negative Declaration (the review could also result in a Negative Declaration or Notice of Exemption). Additionally, permits from a variety of state and federal agencies may be necessary, and any project that coordinates with federal facilities or agencies may require National Environmental Policy Act (NEPA) documentation.

In addition, permits from the following government organizations that may be required for overland flow MAR projects include:

- ***United States Army Corps of Engineers (USACE)*** – A Regional General Permit may be required if there are impacts to wetlands or connections to waters of the United States.
- ***California Department of Fish and Wildlife (CDFW)*** – A Standard Agreement is required if the project could impact a species of concern.
- ***Environmental Protection Agency (EPA) Region 9*** – National Environmental Policy Act (NEPA) documentation must be submitted for any project that coordinates with federal facilities or agencies. Additional permits may be required if there is an outlet or connection to waters of the United States.
- ***National Marine Fisheries Service (NMFS)*** – A project may require authorization for incidental take, or another protected resources permit or authorization from NMFS.
- ***State Water Board Stormwater Pollution Prevention Plan (SWPPP)*** – A General Permit to Discharge Stormwater may be required depending on how stormwater is rerouted.
- ***California Department of Transportation (Caltrans)*** – An Encroachment Permit is required if any state highway will be obstructed.
- ***Monterey County Resource Management Agency (RMA)*** – A Use Permit may be required. A Grading Permit is required if 100 cubic yards or more of soil materials are imported, moved, or exported. An Encroachment Permit is required if objects will be placed in, on, under, or over any County highway.

9.4.2.5 Implementation Schedule

A proposed implementation schedule for this project is presented on Figure 9-4. The schedule will depend on whether programmatic permitting can be obtained or whether each individual project needs its own feasibility, permitting, and design.

	Year				
Task Description	1	2	3	4	5
Studies/Preliminary Engineering Analysis					
Agreements/ROW					
CEQA					
Permitting					
Design					
Bid/Construct					

Figure 9-4. Implementation Schedule for Overland Flow MAR

9.4.2.6 Legal Authority

Pursuant to California Water Code sections 10726.2 (a) and (b), the SVBGSA has the right to acquire and hold real property, and to divert and store water once it has acquired any necessary real property or appropriative water rights. Some right in real property (whether fee title, easement, license, leasehold or other) may be required to implement a recharge project. A permit to appropriate water may not needed to infiltrate overland flow if constructed on a parcel without a USGS blue line stream. If a blue line stream crosses the parcel, SVBGSA will evaluate whether a permit is needed. SVBGSA recognizes that this process takes several years to complete. If a permit is needed, SVBGSA will pursue a SWRCB 5-year temporary permit under the Streamlined Permit Process while it applies for the diversion permit.

9.4.2.7 Estimated Cost

This project proposes the construction of 4 recharge basins, each with an expected benefit of 100 AF/yr. and a capital cost of $1,032,000 for a total of $4,128,000. Spread over 25 years and assuming a 6% discount rate, the annualized cost is $86,700 per recharge basin, including annual maintenance. The unit cost is $870/AF. These costs were estimated assuming that only 1 recharge basin would be built, but there may be economies of scale that lower the cost if more are built. These costs are approximate; exact costs will depend on site specifics.

9.4.2.8 Public Noticing

Before construction is initiated on any project as part of GSP implementation, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- GSA staff will bring an assessment of the need for the project to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project
- The SVBGSA Board will notice stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether or not to approve design and construction of the project.

In addition to the public noticing detailed above, all projects will follow the public noticing requirements per CEQA.

After approval, SVBGSA will provide annual notification via an announcement on the SVBGSA website and mailing lists.

Projects that Result in Reoperation of the Reservoirs

Multiple projects under consideration would alter reservoir releases for groundwater benefits and other purposes. Three projects are considered here: winter releases with aquifer storage and recovery, the inter-lake tunnel and spillway modification, and drought reoperation. All 3 of these projects rely on infrastructure owned by MCWRA and implementing any one of these is a cooperative effort between the 2 agencies. These projects will affect the entire Salinas Valley, and the analyses of these projects must consider the impact on all subbasins. This GSP is primarily concerned with project benefits that achieve groundwater sustainability. However, ancillary benefits and relative costs must also be addressed and carefully evaluated.

This GSP prioritizes the 3 reservoir reoperation projects based on our current assessment of each project's ability to achieve Valley-wide groundwater sustainability and that some portion of the project augments groundwater in the Upper Valley Aquifer Subbasin. However, each project should be retained and further evaluated during GSP implementation.

Stakeholders in the Salinas Valley are investigating opportunities for additional winter reservoir releases independent of the ASR system. This program has not been reviewed adequately by SVBGSA to include in this GSP. However, this program will be considered when it is more fully developed and will be assessed for its Valley-wide ability to both provide additional winter releases during dry years and provide sufficient water for summer releases to fulfill CSIP needs. A complete benefits assessment will be required to fully determine all groundwater balances and seasonal demands coupled with seasonal deliveries.

9.4.3 Project B1: Winter Releases from Reservoirs, with Aquifer Storage and Recovery in the 180/400-Foot Aquifer Subbasin

This project entails modifying reservoir releases for the MCWRA's Conservation Program and Salinas River Diversion Facility (SRDF) diversions to store at least a portion of these releases during winter in the 180-Foot and 400-Foot Aquifers. This winter storage would reduce or eliminate the need for Conservation Program summer releases and increase annual carryover in the reservoirs, allowing for more consistent winter releases. This winter release water would be recharged through Aquifer Storage and Recovery (ASR) injection wells in the winter and later extracted during peak irrigation season demands for use through the CSIP system. ASR is a

critical component of this project because it enables summer releases for CSIP to be shifted to winter releases; however, a benefits assessment will be done to assess differing levels of benefits.

Under this project, water released from Nacimiento and San Antonio Reservoirs would be diverted from the Salinas River using the existing SRDF at a maximum flow rate of 36 cfs. Water would then be pumped to an expanded surface water treatment plant where it would be treated to the standard necessary for groundwater injection and conveyed to new injection wells in the 180/400-Foot Aquifer Subbasin.

The existing SRDF facilities have a maximum diversion flow of 36 cfs, or 16,000 gpm. Based on an injection rate of 1,000 gpm per injection well, 16 new injection wells would be installed. New injection well facilities will include wells completed in both the 180- and 400-Foot Aquifers, back-flush facilities including back wash pumps and percolation basins for water disposal into the vadose zone, electrical and power distribution, and motor control facilities.

Some potential constraints on this project are clarifying water rights, establishing compliant reservoir operation rules, needing to alter the permit from the Division of Safety of Dams to allow the SRDF diversion structure to operate outside it current window of April-October, possibly modifying the infrastructure capable of operating during higher flow events. The SRDF is funded by a Proposition 218 Special Assessment that identified special benefits. Use of this structure would require additional analysis of rights and technical operations.

In addition to direct injection for groundwater recharge, winter releases could be used for direct delivery for municipal supply. Under direct delivery use, this water would act as in-lieu recharge by reducing the need for pumping from municipal wells, resulting in less winter groundwater demand. The water left in the aquifers through this in-lieu recharge can be pumped in the summer to meet CSIP demands. As with ASR injection, winter released surface water would need to be treated prior to delivery. Other important considerations for direct use of winter releases include water quality differences between groundwater and surface water, timing and availability of flows compared to municipal demand schedules, and other infrastructure needs. Direct delivery of winter releases may be a less expensive option but will need further analysis to determine its viability.

9.4.3.1 Relevant Measurable Objectives

Relevant measurable objectives benefiting from this project include:

- Groundwater elevation measurable objective – The project releases more water in dry years than under current reservoir operations. These dry-year releases will add more water to the principal aquifers in the Upper Valley Aquifer Subbasin and maintain adequate groundwater elevations during dry years.
- Groundwater storage measurable objective - The project releases more water in dry years than under current reservoir operations. These dry-year releases will add more water to

the principal aquifers in the Upper Valley Aquifer Subbasin, increasing the amount of groundwater in storage.

- Land subsidence measurable objective - Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- Interconnected surface water measurable objective - Increasing winter releases from the reservoirs will be add more surface water in the river during the winter, when environmental flow needs are the greatest. This increase in surface water will diminish any impacts on important surface water users by existing rates of surface water depletion.

9.4.3.2 Expected Benefits and Evaluation of Benefits

Groundwater storage benefits are in the process of being estimated for the Upper Valley Aquifer Subbasin using the SVOM. Subbasin-specific estimates will be refined during preparation of the Habitat Conservation Plan (HCP). While the HCP is not scoped to estimate groundwater recharge, this project does need to work in accordance with the HCP.

The main groundwater-related expected benefits for the Upper Valley Aquifer Subbasin include:

- Increased annual carryover in the reservoirs, allowing for more consistent winter releases. Eliminating most summer reservoir releases would allow more water to be retained in Nacimiento and San Antonio reservoirs. This increased amount of water in the reservoirs can be used to ensure more consistent annual winter releases during droughts, with higher volume releases as a result of increased storage.
- Reduced summer water supporting invasive species in riparian zones. Eliminating most summer reservoir releases will result in less shallow water supporting invasive species such as arundo or tamarisk.

In addition, this project has benefits to other subbasins, including:

- Improve the ability to maximize annual diversions at the SRDF. Diversions at the SRDF no longer rely on large summer reservoir releases, of which less than 10% get to the SRDF. Winter releases can be coordinated with environmental releases.
- More water available for CSIP or other beneficial users. The consistent diversions provide a more reliable supply to CSIP. Additionally, any water not used by CSIP can be extracted for beneficial use by other groundwater pumpers, such as municipalities as a form of efficiency as well as cost-sharing for this benefit.

- A reduction in, or reversal of, seawater intrusion. Providing more water for extractors reduces seawater intrusion. The groundwater from natural recharge that occurs in addition to the injection may be able to mitigate seawater intrusion by minimizing native groundwater extraction and altering the hydraulic gradients to reverse inland flow of saline waters.

The intended benefit of this project for the Upper Valley Aquifer Subbasin is reservoir reoperation that allows for more regular, annual releases, including during dry years. Initial simulations are being run to quantify the regular annual releases and their respective groundwater recharge benefits to the Upper Valley Aquifer Subbasin. This simulation reduces summer releases in order to increase carryover in the reservoirs for subsequent regular winter release.

Changes in groundwater elevation will be measured with the groundwater level monitoring program detailed in Chapter 7. Projects may include monitoring wells if they are not close enough to the existing monitoring network for the impacts to be measured. Additionally, various volumetric measurement methods may be installed along with either recharge basins or dry wells to assist in calculating increases to groundwater storage.

9.4.3.3 Circumstances for Implementation

This project will be implemented in coordination with MCWRA and will require agreements between MCWRA and SVBGSA. Winter recharge will be implemented only if the existing water rights permits allow or are modified to allow for additional reservoir releases and subsequent diversions between November and March.

This project will likely be subject to new flow restrictions and reservoir operations resulting from the planned HCP. This project will not proceed until the water rights and flow prescriptions from the HCP have been determined.

9.4.3.4 Permitting and Regulatory Process

Permits that might be required for this project include:

- ***Environmental Protection Agency (EPA)*** – All ASR projects, like this one, must register with the EPA's Underground Injection Control program.
- ***National Marine Fisheries Service (NMFS)*** – Projects that potentially affect flows in any surface water under NMFS jurisdiction must get approval from NMFS. NFMS may set conditions that will be included in the State Water Resources Control Board permit.
- ***State Water Resources Control Board (SWRCB)*** – All ASR projects must submit an Underground Storage Supplement as part of the application to receive either a Temporary

Permit, a Standard Permit, or a Streamlined Permit from SWRCB. A modification to MCWRA's existing water right or re-diversion permit may be necessary.

- ***Division of Safety of Dams (DOSD)*** – The existing DOSD permit may need to be modified to allow the SRDF diversion structure to operate outside its current window of April-October.
- ***California Department of Fish and Wildlife (CDFW)*** – Any project that diverts water from a river, stream, or lake, or that has the potential to affect fish and wildlife resources, must obtain a Land and Streambed Alteration Agreement from CDFW.
- ***Regional Water Quality Control Board (RWQCB)*** – General Waste Discharge Requirements paperwork must be filed with RWQCB to comply with its General Order that governs the injection of water to recharge aquifers.
- ***Monterey County Health Department (MCHD)*** – Well construction permits must be obtained from MCHD.
- ***Monterey County Resource Management Agency (RMA)*** – A Use Permit may be required. A Grading Permit is required if 100 cubic yards or more of soil materials are imported, moved, or exported. An Encroachment Permit is required if objects will be placed in, on, under, or over any County highway.

9.4.3.5 Implementation Schedule

The annual implementation schedule after initial agency agreements and any permitting or water rights alterations is presented on Figure 9-5.

Task Description	Year 1	Year 2	Year 3	Year 4	Year 5	Annually
Phase I – Agreements, CEQA, Permitting						
Phase II – Treatment Facilities and ASR well Construction						
Phase III – Winter Releases						

Figure 9-5. Implementation Schedule for Winter Releases from Reservoirs with ASR Project

9.4.3.6 Legal Authority

The SVBGSA has the right to divert and store water once it has access to the appropriate water rights. Section 10726.2 (b) of the California Water Code provides GSAs the authority to, "Appropriate and acquire surface water or groundwater and surface water or groundwater rights, import surface water or groundwater into the agency, and conserve and store within or outside the agency" (CWC, 2014). MCWRA is the legal authority for some of this project's facilities, therefore SVBGSA will work collaboratively to use existing structures and water rights.

9.4.3.7 Estimated Cost

Costs for the injection of winter flows from the SRDF were estimated based upon the assumption that the diversion will take advantage of the existing SRDF facilities at an original calculated rate of 12,900 AF/yr. Most of the costs are for the construction of the injection wells. Capital costs are estimated to be $172,141,000 for construction of an ASR injection well field consisting of 16 wells, construction of a 4-mile conveyance pipeline between the SRDF site and the injection well system, and a filtration and disinfection plant. These costs include engineering, overhead, and contingencies.

Annual O&M costs are estimated at $5,223,000 for the operation of the ASR injection well field, including a 20% contingency. Total annualized cost is $18,690,000. Based on the calculated project yield of 12,900 AF/yr., the unit cost of water is $1,450/AF. This unit cost does not include additional benefits received from recharge from the Salinas River, including in the Upper Valley Aquifer Subbasin. This unit cost is not necessarily the cost of the project to stakeholders in the Upper Valley Aquifer Subbasin. As part of this project, benefits analysis will be undertaken to determine the zones of benefit and assessments.

9.4.3.8 Public Noticing

Before SVBGSA initiates construction on any project as part of GSP implementation, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built. The general steps in the public notice process will include the following:

- SVBGSA staff will bring an assessment of the need for the project to the SVBGSA Board and the MCWRA Board in publicly noticed meetings. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed project
    - An estimated cost and schedule for the proposed project
    - Any alternatives to the proposed project
- The SVBGSA Board will notice stakeholders in the area of the proposed project and allow at least 30 days for public response.
- After the 30-day public response period, the SVBGSA Board will vote whether to approve design and construction of the project. Additionally, the MCWRA Board will vote whether or not to approve the project concept. The boards will work cooperatively moving forward with this project.

The permitting and implementation of change to releases from the reservoirs will require notification of stakeholders, beneficiaries, water providers, member lands adjacent to the river, and subbasin committee members as well as all permit and regulatory holding agencies such as DWR, CEQA, NOAA, USACE, and others.

9.4.4 Project B2: Interlake Tunnel and Spillway Modification

The proposed Interlake Tunnel project consists of design, permitting, construction, and maintenance of a tunnel for diversion of water from the Nacimiento Reservoir to the San Antonio Reservoir. The San Antonio and Nacimiento Reservoirs have storage capacities of 335,000 and 377,900 AF, respectively; however, the Nacimiento River watershed produces nearly 3 times the average annual flow of the San Antonio River watershed. Consequently, more available storage capacity must be maintained in Nacimiento Reservoir to prevent downstream flooding during storm events than must be maintained in San Antonio Reservoir. The proposed Interlake Tunnel project would divert this flood control water from Nacimiento Reservoir to San Antonio Reservoir. This would increase the total volume of water in storage and could increase water available for conservation releases to the Salinas River between April and October. Any additional conservation releases would be diverted at the SRDF for irrigation within the CSIP area.

The proposed Interlake Tunnel concept was developed by MCWRA and is described in the July 6, 2018 Project Status Report (MCWRA, 2018). According to the Project Status Report, the proposed project consists of a 10,940-foot-long, 10-foot diameter concrete lined tunnel with an intake structure in Nacimiento Reservoir and an exit structure in San Antonio Reservoir. The intake at Nacimiento Reservoir would include a fish screen and water would flow by gravity due to the 55-foot planned elevation difference between the intake and outfall. The outfall at San Antonio Reservoir would include an energy dissipator to reduce velocity and prevent erosion.

MCWRA modeled the Interlake Tunnel project benefits using a draft version of the SVOM during the project planning stages prior to development of the GSP. Based on historical precipitation and storm events, the proposed tunnel would have been used approximately 68% of years in the historical record (MCWRA, 2021). On average, 49,400 AF/yr. would have been transferred through the tunnel from Nacimiento to San Antonio Reservoir (MCWRA, 2021). The modeled tunnel transfer would increase the average total water in storage in the reservoirs by 39,000 AF/yr. by increasing the average stage in San Antonio Reservoir by 30 ft and decreasing the average stage in Nacimiento Reservoir by 16 feet (MCWRA, 2018). The lower stage in Nacimiento Reservoir would reduce total flood control releases from the reservoirs by an average of 25,600 AF/yr. (MCWRA, 2021).

Greater reservoir storage capacity with the tunnel would allow for an increase in total reservoir releases from the dams, which would maintain more water in the Salinas River for a longer

portion of the year. The modeled average annual conservation releases with implementation of the Tunnel Project would increase by 34,300 AF/yr. (MCWRA, 2021). The project is intended to primarily increase releases from the reservoirs between April and October. Releases in these warmer months are subject to ET losses. The additional conservation releases would result in approximately 30,500 AF/yr. of additional groundwater recharge from the Salinas River in the basin (MCWRA, 2021). However, the additional storage capacity generated by the project would not guarantee that flood control releases would be available every winter.

The project benefits could be enhanced with additional modifications to raise the elevation of the San Antonio Dam Spillway and performance of other deferred maintenance on both reservoirs. However, the spillway modifications and deferred maintenance are being addressed by a Proposition 218 vote and are not considered in the project description for the GSP.

The Interlake tunnel project is currently at the 60%.design phase. One constraint on the project is that it requires a modification to the existing water rights for the Nacimiento reservoir.

9.4.4.1 Relevant Measurable Objectives

The measurable objectives benefiting from outreach and education include:

- Groundwater elevation measurable objective – By increasing storage and subsequently increasing conservation releases, there will be more water added to the principal aquifer. Recharge to the principal aquifer is highly dependent on surface flows in the river infiltrating into the subsurface through the streambed. Adding water into the principal aquifer will raise groundwater elevations over time.
- Groundwater storage measurable objective - Furthermore, adding water to the principal aquifer will ultimately have the effect of increasing groundwater in storage. Groundwater storage is also calculated from measured groundwater elevations. By raising groundwater elevations, the calculation of change in storage will be positive.
- Land subsidence measurable objective - Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.
- Interconnected surface water measurable objective – By increasing releases from the reservoirs, there will be more surface water in the river. This increase in surface water will allow for the interconnected surface waters to be supported. Additionally, as the principal aquifer is recharged, the level of interconnection will also be protected.

9.4.4.2 Expected Benefits and Evaluation of Benefits

The Interlake Tunnel project benefits were modeled and presented to the MCWRA Board of Directors. According to this model simulation, the project would increase groundwater recharge throughout the Salinas Valley due to greater volumes of water in the Salinas River. A portion of the total conservation flows and groundwater recharge would benefit the Upper Valley Aquifer Subbasin. The groundwater benefits to the Upper Valley will be evaluated during GSP implementation.

Model results show over 30,000 AF/yr. increase in recharge for 2 variations on the project, as shown in Table 9-3. The benefits shown in Table 9-3 are for the entire Valley. The benefits and impacts on groundwater recharge specific to the Upper Valley will be evaluated with the SVOM during the GSP implementation period.

Table 9-3. Initial Estimated Water Savings
(MCWRA, 2021)

Interlake Tunnel Modeling Results		
	Tunnel Only	Tunnel + 7-foot spillway modification
Increase in average water storage	39,002 AF	54,265 AF
Increase in conservation release	34,256 AFY	35,945 AFY
Reduction in flood release	-25,628 AFY	-28,138 AFY
Reduction in flood release	-32%	-35%
Additional SRDF days	32 days	34 days
Increase in recharge	30,536 AFY	32,073 AFY

The main groundwater-related expected benefits for the Upper Valley Aquifer Subbasin include:

- Increased annual carryover in the reservoirs, allowing for more consistent releases for all beneficial uses. Any carryover would allow for more water to be retained in Nacimiento and San Antonio reservoirs. This increased amount of water in the reservoirs can be used to ensure more consistent releases during droughts, with higher volume releases as a result of increased storage.

In addition, this project has benefits to other subbasins, including:

- Improve the ability to maximize annual diversions at the SRDF based on more coordinated releases from more water in storage. The additional storage allows more releases to the SRDF for either CSIP use or other beneficial users such as municipalities.
- A reduction in, or reversal of, seawater intrusion. Providing more water for extractors reduces seawater intrusion. The groundwater from natural recharge that occurs from more recharged water in the whole Basin may be able to mitigate seawater intrusion by

minimizing native groundwater extraction and altering the hydraulic gradients to reverse inland flow of saline waters.

- Changes in groundwater elevation will be measured with the groundwater level monitoring program detailed in Chapter 7. Projects may include monitoring wells if they are not close enough to the existing monitoring network for the impacts to be measured. Additionally, various volumetric measurement methods may be installed along with either recharge basins or dry wells to assist in calculating increases to groundwater storage.

9.4.4.3 Circumstances for Implementation

MCWRA has been investigating the Interlake Tunnel project since it was first formally described in the 1991 *Water Facilities Capital Plan* prepared by Boyle Engineering for MCWRA (Boyle, 1991). MCWRA has held numerous public meetings on the timeline, benefits, and costs for the project (MCWRA, 2021). The Interlake Tunnel planning, permitting, design, and construction, is divided into 3 phases:

1. Project feasibility, including preliminary engineering and water rights requirements analysis – completed

2. Pre-construction tasks, including environmental review, permit applications, geotechnical and final design, right-of-way acquisition and financing arrangements

    a. 60% Tunnel design completed

    b. 30% Spillway raise design completed

    c. Environmental Impact Report in progress, scheduled for completion 2022, and

3. Tunnel final design and construction – Scheduled for late 2023 start

MCWRA, with approval of the Monterey County Board of Supervisors, proceeded to contract with a Program Manager in 2014 to complete project feasibility and pre-construction tasks. The project proceeded to Phase 2 described above in March 2020. The project would require Proposition 218 or other funding for construction.

This project will likely be subject to new flow restrictions and reservoir operations resulting from the planned HCP. This project will not proceed until the water rights and flow prescriptions from the HCP have been determined.

9.4.4.4 Permitting and Regulatory Process

The Interlake Tunnel project requires several permitting and regulatory steps to be completed prior to construction. MCWRA began a draft EIR to fulfill CEQA requirements and water rights

amendment in March 2020. According to the Program Manager presentation at the August 13, 2020 SVBGSA Board of Directors meeting, the Nacimiento Reservoir Water Rights Permit needs to be amended to allow the San Antonio Reservoir as a place for storage. This process may take the SWRCB 2 to 5 years to complete. After the water rights permit is amended, the other regulatory permitting requirements can be fulfilled.

9.4.4.5 Implementation Schedule

The implementation schedule for the Interlake Tunnel is divided into 4 phases. Those that are yet to be completed are shown on Figure 9-6. Phase I, Project Feasibility, including preliminary engineering and water rights requirements analysis, is already completed. During GSP, MCWRA was in the process of completing Phase II. MCWRA aims to have the Nacimiento Water Rights permit amended by June 2022. The Program Manager estimated the EIR could be completed and CEQA approved as a precedent to water rights permit amendment approval by the SWRCB. Construction permit applications could be filed concurrently with finalization of the EIR. The Proposition 218 election can be held after CEQA and permit approval. Following completion of an Engineers Report in early 2023, construction could begin in third quarter 2023. Final design and construction is estimated to take 2 years.

Task Description	Year 1	Year 2	Year 3	Annually
Phase II – Water Rights Amendment, EIR, CEQA, Engineering Design, other permits, and Proposition 218 election				
Phase III – Tunnel design and construction				
Phase IV – Tunnel operation				

Figure 9-6. Implementation Schedule for Interlake Tunnel and Spillway Modification Project

9.4.4.6 Legal Authority

MCWRA is undertaking the Interlake Tunnel project and has the legal authority to do so subject to the provisions of the California Constitution on a benefit assessment.

9.4.4.7 Estimated Cost

Estimated costs for the Interlake Tunnel project were presented at the August 13, 2020, SVBGSA Board Meeting. The costs are rough estimates that will be refined during final design of the project. The estimated costs are summarized below:

- Project development: $12,876,000
- Capital costs for tunnel construction: $105,627,000
- Management and administrative costs for tunnel operation: $13,203,000
- Capitalized O&M costs: $19,984,000

- Capital equipment replacement fund: $5,784,000; and
- Contingency: $15,844,000.

The total estimated cost of the project is $173,319,000. A DWR grant of $10 million was awarded to fund project development. The total annualized cost for 30 years is estimates at $12 million per year. Based on a project yield of 30,500 AF/yr. for groundwater recharge benefits, the unit cost of water is $393/AF. The cost for the Upper Valley will be estimated with the MCWRA benefit assessment.

9.4.4.8 Public Noticing

Before any project initiates construction, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on projects before they are built.

The permitting and implementation of change to releases from the reservoirs will require notification of stakeholders, beneficiaries, water providers, member lands adjacent to the river, and subbasin committee members as well as all permit and regulatory holding agencies such as DWR, CEQA, NOAA, USACE, and others.

9.4.5 Management Action B3: Drought Reoperation

MCWRA formed a Drought Operations Technical Advisory Committee (D-TAC) to provide, when drought triggers occur, technical input and advice regarding the operations of Nacimiento and San Antonio Reservoirs. The D-TAC developed Standards and Guiding Principles to be used in the development of a proposed reservoir release schedule triggered under specific, seasonally defined conditions. This management action would result in decisions on reservoir operation and flow releases during a drought.

The proposed reservoir release operations schedule triggered under specific, seasonally defined conditions of drought will be developed based on the best available scientific knowledge, data, and understanding of the environmental biology, hydrology and hydrogeology of the Salinas Valley; under the technical expertise of the members of the D-TAC. The proposed reservoir release schedule will be implemented based on specific tools and templates made available to the D-TAC. These are discussed further in the Implementation Procedures section. The proposed reservoir release schedule will acknowledge, address, and balance the water needs of various stakeholders for limited resources during a drought.

The D-TAC will use a MCWRA provided template when developing the release schedule. The specific actions will also be described in a narrative form to expound upon the actions taken for each month shown in the release schedule. Reservoir releases will be made under direction of the MCWRA Board of Directors or Board of Supervisors through the adoption of a reservoir release

schedule or dry winter release priorities, to be executed by MCWRA staff. Appendix 9C outlines the D-TAC Standards, Guiding Principles, and Implementation Procedures.

Summary Actions

The Standards and Guiding Principles Document and any recommended release schedule prepared by the D-TAC will first be received by the Reservoir Operations Advisory Committee. The Reservoir Operations Advisory Committee will meet to discuss the Standards and Guiding Principles or release schedule and will solicit information, data, and public comment regarding appropriate MCWRA operations during droughts. Following receipt of public input regarding the Standards and Guiding Principles or any subsequent release schedule, the Reservoir Operations Advisory Committee will then prepare a written recommendation regarding reservoir operations which will be transmitted to the MCWRA Board of Directors for consideration and action. Any interested party that dissents from the Reservoir Operations Committee's recommendation may submit separate written comments to the MCWRA Board of Directors. The MCWRA Board of Directors will determine, in accordance with applicable law, whether MCWRA will adopt and implement the Standards and Guiding Principles or release schedule, provided the MCWRA General Manager may, in his sole discretion, refer the question of whether MCWRA should adopt and implement the Standards and Guiding Principles or a release schedule to the MCWRA Board of Supervisors for final determination. In the event the MCWRA General Manager elects not to refer the question of adoption and implementation of Standards and Guiding Principles or a release schedule to the MCWRA Board of Supervisors, the decision of the MCWRA Board of Directors regarding such questions shall constitute final agency action for all purposes. The MCWRA Board of Directors (or MCWRA Board of Supervisors, if applicable) will retain full discretion and authority to accept or reject, in whole or in part, the written recommendations of the Reservoir Operations Advisory Committee.

9.4.5.1 Relevant Measurable Objectives

The measurable objectives benefiting from outreach and education include:

- Groundwater elevation measurable objective - Continuing to release some water from the reservoirs even during droughts should help ensure annual groundwater recharge in the Upper Valley, which will help prevent lowering of groundwater elevations.

- Groundwater storage measurable objective - Continuing to release some water from the reservoirs even during droughts should help ensure annual groundwater recharge in the Upper Valley, which will increase the amount of groundwater in storage.

- Land subsidence measurable objective - Increasing both groundwater elevations and groundwater storage will have the added benefit of preventing any potential land subsidence. Maintaining and adding water in the subsurface will keep pore spaces

saturated with positive pressure and inhibit land surface collapse associated with groundwater depletion.

9.4.5.2 Expected Benefits and Evaluation of Benefits

The D-TAC will help develop a release schedule aimed at mitigating negative effects from droughts, including from surface water flows and groundwater recharge. The proposed reservoir release schedule will be based on scientific data and will acknowledge, address, and balance the water needs of various stakeholders for limited resources during a drought. The proposed reservoir release schedule will avoid, to the extent possible, consecutive years where only minimum releases are made from the reservoirs. Annual reservoir releases will help recharge the aquifer in the Upper Valley, which will help prevent declines in groundwater elevations and storage during drought periods. Subsequently, although subsidence is not likely in this Subbasin, this will help reduce the risk of subsidence and prevent water quality degradation.
This GSP is unable to quantify the benefits at this time because the D-TAC decisions will be different each time it convenes. Drought conditions have not been triggered to cause the D-TAC to convene.

9.4.5.3 Circumstances for Implementation

The D-TAC is already established. Its convening will occur when conditions trigger it on an annual basis.

9.4.5.4 Permitting and Regulatory Process

This management action follows the ongoing permitting and regulatory process used by MCWRA for reservoir operations.

9.4.5.5 Implementation Schedule

The D-TAC is already established. Its convening will occur when conditions trigger it on an annual basis.

Annually, the D-TAC will meet any time a "drought trigger" occurs to develop a recommended release schedule for Nacimiento and San Antonio Reservoirs. MCWRA presents the annual reservoir release schedule at the October meeting of the MCWRA Reservoir Operations Advisory Committee. If the December 1 forecasted combined reservoir storage volume is below 220,000 acre-feet and the San Antonio Reservoir forecasted storage is below 82,000 acre-feet, the D-TAC release schedule process will begin. MCWRA will schedule a D-TAC meeting to occur no earlier than February 15 and the D-TAC will meet as needed through March 31. The release schedule will be developed for April through December of the current year. If significant inflow occurs during this period, then modifications to the release schedule will be made through existing MCWRA protocols. The D-TAC will develop a recommended release schedule

consistent with its Standards and Guiding Principles. The D-TAC's Standards and Guiding Principles and any subsequent release schedule will be presented to the MCWRA Board of Directors and/or Board of Supervisors for consideration and decision.

9.4.5.6 Legal Authority

MCWRA, who owns and operates the reservoirs, is implementing the D-TAC. Since MCWRA is a member of the SVBGSA, it benefits one of the SVBGSA members. The SVBGSA will participate in and work in cooperation with MCWRA on the Drought TAC. No additional legal authority is needed.

9.4.5.7 Estimated Cost

This management action is already underway. MCWRA is already funding costs associated with facilitation of the D-TAC. SVBGSA costs include staff participation in the D TAC.

9.4.5.8 Public Noticing

As this management action is already underway, MCWRA has already completed initial public noticing. Public noticing will occur for the October Reservation Operations meeting that activates the D-TAC, and when the reservoir release schedule developed by the D-TAC goes to Reservation Operations and/or the Board of Directors for consideration.

Management Actions

9.4.6 Management Action C1: Conservation and Agricultural BMPs

This would be a program to incentivize and/or assist with conservation and agricultural Best Management Practices (BMPs) to reduce groundwater pumping. SVBGSA acknowledges that BMPs are being developed as part of Ag Order 4.0 and will work to complement and not replicate those efforts. Potential practices that will be part of a program include:

- EVAPOTRANSPIRATION (ET) DATA
  ET data indicate crops' theoretical water needs as determined by crop type and weather conditions. Some ET data sets are 100% automated, relying on satellite imagery and weather stations to provide affordable data for large areas of land. Other ET data sets are generated automatically, but then subjected to expert verification, resulting in higher quality data at higher cost. The incorporation of ET data with soil moisture sensors, soil nutrient data and flow meter data can help inform more efficient irrigation practices. The GSA could support the development and utilization of these tools through securing funding or coordinating with existing local agricultural extension specialists who conduct research and provide technical assistance to growers.

- EDUCATION AND OUTREACH
  SVBGSA will support existing local agricultural extension specialists with their education and outreach on BMPs that would increase water conservation and decrease pumping. Effective implementation of BMPs would require buy-in from growers. SVBGSA will work with local agricultural extension specialists and growers to understand preferred BMPs and those that could yield the greatest water savings. SVBGSA can partner with existing organizations or technical assistance providers to help growers identify which BMPs they could pursue and analyze the potential savings from their implementation. Technical workshops and professional referrals can be utilized with partners to accomplish outreach effectively and efficiently with growers.

9.4.6.1 Relevant Measurable Objectives

The measurable objectives benefiting from outreach and education include:

- Groundwater elevation - This measurable objective, depending on the location of the land retirement, will benefit from BMPs that promote less pumping that will result in higher groundwater levels.

- Groundwater storage - This measurable objective is based on the amount of groundwater in storage when groundwater elevations are held at their measurable objective, therefore BMPs that reduce pumping contribute to increasing groundwater elevations. In turn, groundwater in storage will also increase and will help achieve long-term sustainable yield.

- Land subsidence - This measurable objective, depending on the location of the land retirement, will benefit from BMPs that reduce the pumping stress on the local aquifer(s) and thereby reduce any potential for subsidence.

9.4.6.2 Expected Benefits and Evaluation of Benefits

The primary benefit of implementing this management action is to provide the latest technologies and opportunities to modify agricultural practices that would allow farmers to reduce pumping needs but realize the same crop yields. This program could also be a mechanism for grant opportunities, funded through the SVBGSA to identify pilot programs and other innovative technological advancements that could provide an overall groundwater basin benefit.

Improving ET data allows for improved modeling and sets more accurate expectations for climate change impacts on crops. This in turn is translated into expected water demand for the crops. With more accurate data and information, pumpers can work with the SVBGSA to improve water extractions and potentially keep more water in the ground. This would result in protected groundwater elevations and storage. Furthermore, education and outreach activities can

help inform farmers about cutting-edge technology that would help maximize irrigation efficiency. This would also improve groundwater elevations and storage. Benefits cannot be quantified until specific BMPs are identified and promoted.

9.4.6.3 Circumstances for Implementation

The circumstance for implementation is for willing farmers to participate in an education and outreach program and to work with the SVBGSA to identify opportunities. No other triggers are necessary or required.

9.4.6.4 Permitting and Regulatory Process

No permitting or regulatory processes are necessary for an education and outreach program.

9.4.6.5 Implementation Schedule

The option for an outreach and education program will begin immediately after the GSP is submitted. This program will be ongoing.

9.4.6.6 Legal Authority

No legal authority is needed to promote outreach and education.

9.4.6.7 Estimated Cost

The Conservation and Agricultural BMP activities would be conducted as an ongoing program funded annually. This would cost approximately $100,000 to promote opportunities for education seminars, grant writing tasks, demonstration projects, etc. focused on best management practices in the agricultural industry.

9.4.6.8 Public Noticing

The SVBGSA will endeavor to have the broadest possible public noticing of educational and outreach activities to inform stakeholders, interested parties, landowners, and agricultural interests of conservation and agricultural BMPs.

9.4.7 Management Action C2: Fallowing, Fallow Bank, and Agricultural Land Retirement

To reduce groundwater extraction temporarily or permanently, this management action includes 3 actions to reduce irrigated land. These provide options for voluntary fallowing and land retirement that can be targeted to specific locations that have declining groundwater elevations or recharge potential, such as floodplains. It could be implemented on an as-needed basis. However,

greater analysis of the incentive to growers and funding for these actions needs to be undertaken. The following could be included under the same overarching program:

- **Rotational fallowing**: Participating growers fallow some percentage of land or fallow on a rotating basis. This could be modified to require partial fallowing, such as growing fewer crops per year instead of completely fallowing land.

- **Fallow bank**: Growers could contribute to a fallow bank whereby anybody fallowing land could draw against the bank to offset the lost income from fallowing. This could be combined with other fallowing plans. The specific design of a fallow bank will be developed during GSP implementation, including options such as exempting growers from rotational fallowing if they contribute a certain amount of money to the fallow bank.

- **Agricultural land retirement**: SVBGSA could develop a system for voluntary agricultural land retirement or pay to retire agricultural land, effectively reducing the amount of groundwater used in the Subbasin. The benefit from this program depends on identifying willing participants.

9.4.7.1 Relevant Measurable Objectives

The measurable objectives benefiting from reduced groundwater extraction include:

- Groundwater elevation - This measurable objective will benefit from reduced groundwater extraction that promote less pumping that will result in higher groundwater levels.
- Groundwater storage - This measurable objective is based on the amount of groundwater in storage when groundwater elevations are held at their measurable objective, therefore reduced groundwater extraction that reduces pumping contributes to increasing groundwater elevations. In turn, groundwater in storage will also increase and will help achieve long-term sustainable yield.
- Land subsidence - This measurable objective will benefit from reduced groundwater extraction that reduce the pumping stress on the local aquifer(s) and thereby reduce any potential for subsidence.

9.4.7.2 Expected benefits and Evaluation of Benefits

The primary benefits expected for this project is reduced Subbasin pumping. This management action is costed for saving 1,000 AF/yr.; however, it could be scaled to any size. The less water that is extracted from the principal aquifer, the more water is in storage. Depending on the location of fallowing and land retirement, benefits may include halting the decline of or raising groundwater elevations and avoiding any potential subsidence in specific areas. Because it is

unknown how many landowners will willingly enter the land retirement program, it is difficult to quantify the expected benefits at this time.

The primary benefit from this series of management actions is reduced overall pumping. Quantification of benefits depends on extent of fallowing and land retirement, and analysis of benefits is underway. Reductions in groundwater pumping will be measured directly where possible and estimated where no prior metering and reporting exists. Changes in groundwater elevation will be measured with the groundwater elevation monitoring program detailed in Chapter 7. Subsidence will be measured using the DWR provided subsidence maps detailed in Chapter 7. A direct correlation between agricultural land retirement and changes in groundwater elevations is likely not possible because this is only one among many management actions and projects that may be implemented in the Subbasin.

9.4.7.3 Circumstances for implementation

Agricultural land retirement relies on willing participants, be it for participation or land sale. No other triggers are necessary or required. The circumstance for implementation is for SVBGSA to identify the need for the management action and identify willing participants and secure their participation.

9.4.7.4 Permitting and Regulatory Process

While no permitting or regulatory processes are necessary for buying land or securing agreements with landowners for fallowing or land retirement, the SVBGSA will secure and record as appropriate, the necessary agreements or deed restrictions to implement the management action.

9.4.7.5 Legal Authority

California Water Code § 10726.2 provides GSAs the authority to purchase, among other things, land, water rights, and privileges.

9.4.7.6 Implementation Schedule

The option for fallowing and land retirement will be developed when conditions warrant implementation. The process and GSA incentives for fallowing and/or land retirement will be developed over 2 years. The development of a fallow bank may take additional time. Although the program will be ongoing, it is reliant on willing participants and may be implemented intermittently or on an as-needed basis.

9.4.7.7 Estimated Cost

The cost of voluntary fallowing and land retirement depends on the extent of fallowing and land retirement. The cost of fallowing land sufficient to reach 1,000 AF/yr. water conserved are shown in Table 9-3, which could be scaled to the amount desired.

Table 9-4. Estimated Cost of Fallowing and Agricultural Land Retirement

Annual Fallowing	Low Estimate	High Estimate	Description
Annual rent (cost/acre)	$1,000	$3,500	Rent for row crops in Monterey County (ASFMRA, 2020)
Unit cost/AF water conserved	$419	$1,226	Based on vegetable water use in the Upper Valley (MCWRA, 2019), cover crop water usage (RCDSCC, 2018), and cover crop cost (Highland Economics, 2017)
Acres fallowed annually to conserve 1,000 AF/yr.	323 acres	323 acres	
Annual cost to conserve 1,000 AF/yr. through fallowing	$135,276	$395,421	
Agricultural Land Retirement	**Low Estimate**	**High Estimate**	**Description**
Land value per acre	$27,500	$75,000	Cost per acre row crops in Monterey County (ASFMRA, 2020)
Unit cost/AF water conserved	$810	$2,000	Using cover crop value as annual O&M, 6% interest, and annualized over 25 years

9.4.7.8 Public Noticing

All appropriate documentation for any agricultural land retirement achieved through a land sale, agreement or deed restriction will be recorded with the County of Monterey Assessor – Clerk – Recorder's Office. All agricultural land retirement by any means through the GSA will be recorded and publicly accessible.

9.4.8 Management Action C3: Sustainable Management Criteria Technical Advisory Committee

This management action establishes the Sustainable Management Criteria Technical Advisory Committee (SMC TAC) to give valuable science-based information and advice to the Subbasin Planning Committee to manage groundwater resources sustainably. This is a technical-based committee that may include outside experts.

The SMC TAC will be established during the first 2 years of GSP implementation. SVBGSA will work with the Subbasin Committee to determine membership, which will include professional and scientific experts. The SMC TAC will initially meet to develop guiding principles, triggers, and the decision-making process. The triggers are groundwater condition levels that trigger the need for projects and management actions according to the SMC. Over the course of GSP implementation, the SMC TAC will also review the data required for decision

making to ensure needed data is being collected to monitor the 5 sustainable management criteria potentially present in the Upper Valley Aquifer Subbasin. TAC members will work with SVBGSA to develop recommendations to correct negative trends in groundwater conditions and continue to meet the measurable objectives.

After the meetings associated with its establishment, the SMC TAC will convene annually in April, and subsequently as needed, to:

- Review the Upper Valley Aquifer Subbasin Annual Report and whether conditions trigger the need for projects or management actions to maintain or reach sustainability.
- Recommend implementation of specific projects and management actions to the Subbasin Committee for approval by the Board for final implementation.
- Review data and make recommendations on data acquisition and analysis needed.

The SMC TAC will consider and recommend SVBGSA projects and management actions. These could include:

- Recharge projects, such as stream channel improvements or managed aquifer recharge (MAR) of overland flow.
- Demand management, such as voluntary or mandatory pumping restrictions depending on spatial and temporal conditions, voluntary fallowing, or other demand management strategies.
- Projects and management actions that mitigate groundwater quality degradation from GSA actions.

In addition, the SMC TAC may analyze how non-SVBGSA projects will affect reaching or maintaining sustainability, in the Upper Valley, primarily regarding projects that modify reservoir operations at Nacimiento and San Antonio; in the future there may be other projects that need to be analyzed upstream or downstream on the Salinas River south of the Upper Valley boundaries.

This management action relies on monitoring data that covers the entire Subbasin. Therefore, the GEMS Expansion management action and other monitoring tasks identified in Chapter 10 are critical to collect the data the SMC TAC needs for decision making.

The MCWRA D-TAC, described in Management Action B3, convenes and develops a schedule for releases from the Nacimiento and San Antonio reservoirs during drought periods. The D-TAC and SMC TAC are unique but complimentary, as the D-TAC's determination of reservoir

releases affect stream flow and therefore groundwater recharge, and the SMC TAC advises on groundwater status.

Through this approach, the Subbasin will be able to react in real time with hydrological situations derived from additional data, provided by a robust SVBGSA monitoring program that includes other local agencies that interface with the Upper Valley.

9.4.8.1 Relevant Measurable Objectives

The measurable objectives benefiting from the SMC TAC management action include:

- Groundwater levels - This measurable objective will benefit from actions the TAC recommends to maintain groundwater elevations at or above the measurable objectives.
- Groundwater storage - This measurable objective will benefit from actions the TAC recommends to maintain groundwater storage at or above the measurable objectives.
- Groundwater quality - This measurable objective will benefit from actions the TAC recommends to maintain groundwater quality at or above the measurable objectives.
- Land subsidence - This measurable objective will benefit from actions the TAC recommends to prevent any potential land subsidence from occurring based on groundwater conditions.
- Interconnected Surface Water - This measurable objective will benefit from actions the TAC recommends to maintain shallow groundwater elevations at or above the measurable objectives near areas of interconnected surface water.

9.4.8.2 Expected benefits and evaluation of benefits

The primary benefits for this management action are that there will be a stakeholder-accepted, science-based process to assess the Annual Report and recommend actions as needed to maintain or return to sustainability. Recharge projects and management actions will increase groundwater elevations and storage. Demand management actions will reduce groundwater extraction. Groundwater quality projects will mitigate groundwater quality degradation from GSA action. The specific projects and management actions implemented will determine whether the groundwater benefits expected are related to groundwater elevations, groundwater storage, groundwater quality, land subsidence, and/or interconnected surface water. Because future conditions are unknown and the actions recommended and taken depend on those conditions, it is difficult to quantify the expected benefits at this time.

In addition to helping the Subbasin meet SMC measurable objectives, the SMC TAC provides a process to assist the Subbasin Committee in responding to drought impacts to groundwater.

The SMC will be monitored through the monitoring networks established in Chapter 7.

9.4.8.3 Circumstances for implementation

The SMC TAC can be established at any time. Subbasin stakeholders plan to establish it within the first 2 years of GSP implementation. After it is established, the TAC will meet annually in April and subsequently if needed.

9.4.8.4 Permitting and Regulatory Process

The GSA Board of Directors will need to authorize the establishment of the SMC TAC. If the TAC recommends pumping restrictions, the development and implementation of pumping restrictions is a regulatory activity and would be embodied in a GSA regulation. The regulation could be established to provide for automatic implementation upon existence of specific criteria or to require the vote of the Board to implement.

9.4.8.5 Legal Authority

California Water Code §10726.4 (a)(2) provides GSAs the authorities to control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells or extractions from groundwater wells in the aggregate (CWC, 2014).

9.4.8.6 Implementation Schedule

The SMC TAC will be established within the first 2 years of GSP implementation, as shown on Figure 9-7. After it is established, it will convene at least annually unless the development of pumping restrictions is triggered.

Task Description	Year 1	Year 2	Annually
Establish TAC (membership, guiding principles, and decision-making process)			
Convene annually and meet additionally as needed			

Figure 9-7. Implementation Schedule for SMC TAC

9.4.8.7 Estimated Cost

The costs of convening and supporting the SMC TAC will be staff time and any additional analyses requested by the TAC. Development of the Annual Report occurs independent of the TAC and therefore does not incur any additional costs. The cost to provide technical support to the SMC TAC is estimated at $10,000/year when additional analyses are needed.

9.4.8.8 Public noticing

As part of the approval of the establishment of the SMC TAC, it will go through a public notice process to ensure that all groundwater users and other stakeholders have ample opportunity to comment on it. The general steps in the public notice process will include the following:

- GSA staff will bring an assessment of the need for the project to the SVBGSA Board in a publicly noticed meeting. This assessment will include:
    - A description of the undesirable result(s) that may occur if action is not taken
    - A description of the proposed management action
    - An estimated cost and schedule for the proposed management action
    - Any alternatives to the proposed management action
- The SVBGSA Board will notice stakeholders in the area of the proposed project and allow at least 30 days for public response.

After the 30-day public response period, the SVBGSA Board will vote whether or not to approve the project.

9.5 Implementation Actions

Implementation actions include actions that contribute to groundwater management and GSP implementation but do not directly help the Subbasin reach or maintain sustainability. Four included here for the Upper Valley are well registration, GEMS expansion, local groundwater elevation trigger, and domestic water partnership.

9.5.1 Implementation Action D1: Well Registration

All groundwater production wells, including wells used by *de minimis* pumpers, will be required to be registered with the SVBGSA. If the well has a meter, the meter must be calibrated on a regular schedule in accordance with manufacturer standards and any programs developed by the SVBGSA or MCWRA. Well registration is intended to establish a relatively accurate count of all the active wells in the Subbasin. Well metering is intended to improve estimates of the amount of groundwater extracted from the Subbasin. SGMA does not allow metering of *de minimis* well users, and therefore well metering is limited to non-*de minimis* wells. The details of the well registration program, and how it integrates with existing ordinances and requirements, will be developed during the first 2 years of GSP implementation.

9.5.2 Implementation Action D2: GEMS Expansion

SGMA requires Groundwater Sustainability Agencies (GSAs) to manage groundwater extractions within a basin's sustainable yield. Accurate extraction data is fundamental to this management. The Monterey County Water Resources Agency's (MCWRA) Groundwater Extraction Monitoring System (GEMS) collects groundwater extraction data from certain areas in the Salinas Valley. The system was enacted in 1993 under Ordinance 3663 and was later modified by Ordinances 3717 and 3718. The MCWRA provides the Salinas Valley Basin GSA (SVBGSA) annual GEMS data that can be used for groundwater management.

Most of the Upper Valley Aquifer Subbasin's estimated groundwater extraction data is derived from MCWRA's GEMS Program, which is only implemented in Zones 2, 2A, and 2B. There are limited data on groundwater extraction within the Upper Valley Aquifer Subbasin outside of MCWRA Zones 2, 2A and 2B.

SVBGSA will work with MCWRA to expand the existing GEMS Program to cover the entire Upper Valley Subbasin, which would capture all wells that have at least a 3-inch internal diameter discharge pipe. Alternatively, SVBGSA could implement a new groundwater extraction reporting program that collects data outside of MCWRA Zones 2, 2A, and 2B. The groundwater extraction information will be used to report total annual extractions in the Subbasin and assess progress on the groundwater storage SMC as described in Chapter 8. Additional improvements to the existing MCWRA groundwater extraction reporting system may include some subset of the following:

- Developing a comprehensive database of extraction wells
- Expanding reporting requirements to all areas of the Salinas Valley Groundwater Basin
- Including all wells with a 2-inch discharge or greater
- Requiring automatically reporting flow meters
- Comparing flow meter data to remote sensing data to identify potential errors and irrigation inefficiencies.

9.5.3 Implementation Action D3: Local Groundwater Elevation Trigger

The GSA could develop or support the development of a program to assist well owners (domestic or small water systems) whose wells go dry due to declining groundwater elevations. The program could include a notification system whereby well owners can notify the GSA or relevant partner agency if their well goes dry, such as the Household Water Supply Shortage System (DWR, 2021). The information collected through this portal is intended to inform state and local agencies on drought impacts on household water supplies. It could also include referral to assistance with short-term supply solutions, technical assistance to assess why it went dry,

and/or long-term supply solutions. For example, the GSA could set up a trigger system whereby it would convene a working group to assess the groundwater situation if the number of wells that go dry in a specific area cross a specified threshold. A smaller area trigger system would initiate action independent of monitoring related to the groundwater level SMC. The GSA could also support public outreach and education.

9.5.4 Implementation Action D4: Domestic Water Partnership

Drinking water access and quality is a critical issue throughout the Upper Valley Aquifer Subbasin. Numerous agencies at the local and State levels are involved in various aspects of domestic water provision. For example, at the State level, the Division of Drinking Water's Safe and Affordable Funding for Equity and Resilience (SAFER) program is designed to meet the goal of safe drinking water for all Californians. At the local level, the County of Monterey Health Department Drinking Water Protection Service is designed to regulate and monitor water systems and tests water quality for new building permits for private wells. Both the State and the County have committed to a Human Right to Safe Drinking Water. SGMA outlines a specific role for GSAs related to beneficial users, including drinking water. This implementation action reflects a unique role for the SVBGSA, not related to specific sustainability metrics.

Under this implementation action, SVBGSA will play a convening role by developing and coordinating a domestic water partnership (Partnership). The Partnership will review data regarding domestic water supplies, identify data gaps, and coordinate agency communication. The Partnership will include local agencies and organizations, water providers, domestic well owners, technical experts, and other stakeholders. The goal of the Partnership will include documenting agency actions to address domestic water concerns.

This Partnership could also work together with the local groundwater elevation trigger implementation action through which SVBGSA will assist well owners whose wells go dry.

9.6 Other Groundwater Management Activities

Although not specifically funded or managed by this GSP, a number of associated groundwater management activities will be promoted and encouraged by the GSAs as part of general good groundwater management practices.

9.6.1 Continue Urban and Rural Residential Conservation

Existing water conservation measures should be continued, and new water conservation measures promoted for residential users. Conservation measures may include the use of low flow toilet fixtures, or laundry-to-landscape greywater reuse systems. Conservation projects can reduce demand for groundwater pumping, thereby acting as in-lieu recharge.

9.6.2 Promote Stormwater Capture

Stormwater and dry weather runoff capture projects, including Low Impact Development (LID) standards for new or retrofitted construction, should be prioritized and implemented. The SWRP outlines an implementation strategy to ensure valuable, high-priority projects with multiple benefits. While not easily quantified and therefore not included as projects in this document, stormwater capture projects may be worthwhile and benefit the basin.

9.6.3 Watershed Protection and Management

Watershed restoration and management can reduce stormwater runoff and improving stormwater recharge into the groundwater basin. While not easily quantified and therefore not included as projects in this GSP, watershed management activities may be worthwhile and benefit the basin.

9.7 Mitigation of Overdraft

The Upper Valley Aquifer Subbasin has not historically been in overdraft. Based on the water budget components, the historical sustainable yield of the Subbasin is on the order of 110,000 – 130,000 AF/yr., as summarized in Table 6-10. The historical sustainable yield incorporates historical reservoir releases, and therefore is not the natural safe yield. From 1980 to 2016, the basin was in overdraft during only 5 years. Therefore, the calculation of the mitigation of overdraft is not needed at this time. However, given that the Subbasin's extraction is currently close to the sustainable yield, this chapter includes a robust set of potential projects and management actions that could be undertaken if needed. These results are provisional and uncertain and are subject to change in future GSP updates after the SVIHM is released by the USGS.

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