Sierra San Joaquin Jobs Draft Investment Plan

'One Water' – Watershed Management

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1 Problem Statement, Opportunity, & Area Overview

The San Joaquin Valley Water Collaborative Action Program (CAP) is providing water investment recommendations for the One Water portion of the Sierra San Joaquin (S2J2) Jobs Initiative, which are outlined in this document. The CAP, a coalition of over 80 leaders from agriculture, water agencies, safe drinking water advocates and technical assistance providers, environmental organizations, local governments, academia, and state and federal agencies, is dedicated to identifying actions that, when implemented, have the potential to create a more resilient water and land future for the region, offering hope for an improved economy, healthy ecosystems, sustained agriculture, and an overall better quality of life for all residents. The recommendations in this document have the support of the five CAP caucuses: Safe Drinking Water Advocates and Technical Service Providers, Environmental Organizations, Water Agencies, Agricultural Organizations, and Local Government.

The eight-county San Joaquin Valley is facing unprecedented change due to water shortages, climate change, and economic market conditions. There is a high degree of uncertainty about the region's future, and its landscape will undoubtedly change over time. Agriculture is a major land use and economic driver, on which many communities depend. Landowners, especially farmers, face many difficult choices to address changing market conditions and less available water. The recommended investments in this document are intended to provide a range of viable options for landowners, the region's communities, and the environment to achieve a sustainable and healthy future.

The San Joaquin Valley is the ancestral homeland of the Northern Valley Yokuts and Southern Valley Yokuts. The S2J2 geographic scope is the four-county area encompassing Fresno, Tulare, Kings, and Madera counties. The CAP is focused on the entire San Joaquin Valley which includes the four S2J2 counties plus Merced, Stanislaus, San Joaquin, and Kern counties. In several places, information is provided for both geographic scales and identified accordingly.

1.1 Problem Being Addressed

The water challenges facing the region can be grouped into five broad categories:

1. Lack of Safe, Reliable, and Affordable Drinking Water
2. Water Scarcity and Increasing Demand
3. Loss of Functional Habitats
4. Inadequate Infrastructure and Unsustainable Land Use
5. Inconsistent Policies at the Local, State, and Federal Level and the Burden on Local Government

1.1.1 Many Valley Residents Lack Reliable, Safe, Affordable Drinking Water

The S2J2 region has a population of about 1.78 million with over 60 percent of the census tracts designated as "disinvested,"[1] compared to 29 percent of census tracts statewide. The average household income in the S2J2 region is more than 30 percent lower than the California average and 44 percent lower in "disinvested" areas. Nearly 1 in 5 people live below the poverty line in the S2J2 region, compared to 1 in 8 in the rest of the state. In disinvested areas, the poverty rate increases to 1 in 4 (Urban Institute, 2023). In the San Joaquin Valley, many households and communities experience dry wells, drinking water contamination, and unaffordable drinking water costs. When experienced first-hand, these drinking water crises lead to physical, emotional, and financial hardship for families. Declining water levels, groundwater contamination, and insufficient and incomplete drinking water infrastructure have left tens of thousands of Valley residents without access to safe, affordable, and reliable drinking water in their homes.

Estimates indicate that approximately 93 of the 353 public drinking water systems in the S2J2 region violate safe drinking water standards and have pending enforcement actions due to high levels of contaminants. Drinking water contamination disproportionately impacts disadvantaged communities[2] in the Valley. Sixty-four disadvantaged unincorporated communities – containing approximately 64,000 residents – received unsafe drinking water in 2018, and this number does not include residents on private domestic wells. Arsenic, uranium, and other natural and human-made compounds are present in many parts of the aquifers in the Valley, leading to violations of drinking water standards. Historic and continued nitrogen fertilizer and manure use has resulted in higher levels of nitrates and salts relative to naturally occurring levels in some parts of the Valley making water unsafe to drink in those areas. There are also extensive areas of groundwater contamination from industrial chemicals, most notably 1,2,3-TCP (trichloropropane).

Many homes are currently at risk of having no on-going supply of water. During the 2020-2022 drought about 1,500 domestic wells in the S2J2 region were reported dry. Private domestic wells are particularly at risk of running dry because of their shallow depth. Approximately 70,000 Valley households rely on domestic wells for drinking water. Wells serving private homes continue to go dry even in non-drought years, and falling groundwater levels are anticipated to impact up to 12,000 more wells in the next two decades.

Fixing drinking water infrastructure is costly, and this burden is disproportionately borne by low-income households and communities in the Valley, as well as taxpayers through state

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[1] 'Disinvested' is a term used by the California Jobs First Initiative and includes the following factors: i) Census tracts identified as "disadvantaged" by the California Environmental Protection Agency (CalEPA); ii) Census tracts with median household incomes at or below 80 percent of the statewide median income; iii) "High poverty area" and "High unemployment area" as designated by the California Governor's Office of Business and Economic Development California Competes Tax Credit Program; and iv) California Native American Tribes as defined by the Native American Heritage Commission (NAHC) Tribal Consultation Policy (Urban Institute, 2023). Valley CERF Regional Plan Part 1

[2] A community with an annual median household income that is less than 80 percent of the statewide median household income (Water Code §79505.5).

assistance programs. The costs to treat contaminated water, dig new wells, and operate and maintain drinking water infrastructure are expensive. Many small communities cannot afford these investments. For homes with private domestic wells, digging a new well – depending on location – is estimated to cost up to $60,000, which is unaffordable for low-income households. Installing water filters and purchasing bottled water are not acceptable long-term solutions for residents to pay when experiencing contaminated water. For small community water systems, replacing new wells, installing treatment systems, and operating and maintaining distribution lines and meters are just some of the high costs that communities bear. In addition, the lack of adequate investment in safe, reliable, and affordable drinking water access for low-income communities of color and the lack of equitable representation in water management decisions means that disadvantaged community members, who often are not included in the decision process, are disproportionately affected by drinking water issues.

Solutions are urgently needed to ensure access to safe, reliable, and affordable water for all homes in the region.

1.1.2 The Gap Between Water Demand and Supply is Substantial

The balance between available local water supplies and demand in the Valley has driven conflict in California water management for decades. Most portions of the Valley do not have sufficient water supply available from local streams, rivers, and groundwater to meet current demands without further depleting groundwater aquifers. In much of the Valley, water agencies have relied upon surface water contracts for imported water from the Sacramento-San Joaquin Delta and its tributaries through the Central Valley Project and State Water Project, to meet a portion of demands – particularly in the western and southern regions of the Valley. Many small cities and towns have relied on groundwater as a primary source of drinking water. Other regions on the east side of the Valley have historically had better access to local water resources, capturing water from the major rivers and streams originating in the Sierra Nevada Mountain range, south of the Delta. Still, other regions known as “white areas or “undistricted areas” have little access to local streams and rivers and little to no access to imported water supply from the Delta or storage.

Climate change is expected to contribute to the Valley’s water supply challenges. Although average annual total precipitation amounts are not expected to change significantly across the Sierra Nevada range, more precipitation is expected to fall as rain instead of snow. As a result, one of California’s most important water storage assets, the Sierra Nevada snowpack, is projected to be diminished. Climate change is also expected to result in longer, more severe drought episodes punctuated by shorter periods of heavy precipitation. Rain events can further stress surface and stormwater management systems, and reduced snowpack may reduce summer surface water flows and groundwater recharge. Climate change may result in less reliable and more volatile water supply and greater risks from both droughts and flood events, impacting Valley cities, towns, and farms.

The California Department of Water Resources designates overdrafted groundwater basins in California. The majority of the critically overdrafted basins are in the Valley. In a 2019 report, the Public Policy Institute of California estimated that over the last two decades there has been an average annual overdraft of 2.4 million-acre-feet (MAF) in the San Joaquin Valley. During the 2012-16 drought, the overdraft was estimated to be more than 8 MAF.

Under current policies and programs, land fallowing would become the dominant means of balancing water demand and supply. It is estimated that 500,000 - 900,000 acres of productive farmland would have to come out of production in the San Joaquin Valley to balance demand (Hanak et al.). In the S2J2 region, the annual overdraft is 1.5 MAF based on the PPIC study. The California Department of Water Resource estimates climate change could cause a 50 percent increase in demand which would translate to an estimated 2.3 MAF of overdraft if demand is unchanged. The California Department of Conservation estimates that, in a worst-case scenario, over 900,000 acres would need to be fallowed just in the four-county area to balance demand. Without any intervention and planning, this could lead to catastrophic impacts on the Valley's economy, ecosystems, and communities.

This large gap between water demand and supply does not include the water necessary to support improved Valley ecosystems. As stakeholders in the region work to improve ecosystem function and connectivity, additional demands are anticipated.

1.1.3 Existing Natural Areas are Not Adequate to Sustain Fish and Wildlife

Today, of the 17 million acres that make up the 8-county San Joaquin Valley, less than ten percent of the functional habitat remains, and many habitat areas are disconnected "islands" – too small to support sustainable populations of many fish and wildlife species. Significant quantities of water have been diverted from wetlands and floodplains by extensive water supply and flood control infrastructure to provide for farmland, grazing, and residential and commercial developments for people, displacing fish and wildlife habitat. Levees channelize floodwater towards the coast, bypassing and degrading important ecosystems in the Valley. Dams and other water diversion facilities are a vital part of the Valley's water supply and flood control systems and have some benefits in regulating flow and temperature, but they also directly block fish passage and reduce instream flows at various times that can influence fish life cycles.

In addition to habitat loss and disconnection, fish and wildlife are facing similar climate change induced stress from increased temperatures and weather severity, along with a decrease in water availability. These challenges are especially acute for the 18 endangered species and 27 at-risk species that call the San Joaquin Valley home, along with the millions of birds that use the Valley as an important resting place on the Pacific Flyway.

Importantly, reduced habitat availability does not only negatively impact wildlife; it also removes places and opportunities for people to interact with the outdoors and nature. Studies have indicated that greater outdoor recreation opportunities benefit the physical, mental, and emotional health of all ages.

Management of the remaining habitat in the Valley is the responsibility of a combination of federal, state, and private entities. There are examples of collaborative habitat restoration and water supply projects that have been completed, and more are under way with constructive partnerships between farmers, local water agencies, and environmental organizations. These partnerships are critical to meeting the Valley's ecological needs. One example of such a partnership is River Partners' Dos Rios project, a collaboration across diverse interests. It is the largest public-private floodplain restoration project in California, a leading example of "green infrastructure" that lowers flood risk, increases groundwater recharge capacity and brings life back to the San Joaquin Valley to protect endangered

species. This type of activity needs to occur on a broader scale to help expand floodplains, wetlands, riparian, upland, and other habitat.

1.1.4 Infrastructure is Out of Date

Most of the infrastructure that provides flood control benefits and stores and conveys water to Valley communities and agricultural lands is well over 70 years old. Current built infrastructure needs to be repaired, replaced, and expanded to deliver safe drinking water to Valley communities, support sustainable levels of agriculture, replenish groundwater basins, and expand environmental habitat areas. Infrastructure rehabilitation and expansion is needed to deliver water for agricultural and domestic uses. Domestic uses include residents who rely on both small and large community water systems as well as households on domestic drinking water wells. Infrastructure improvements will also be required to address the hydrologic impacts of climate change so that the capacity of conveyance and storage facilities can better take advantage of high flow events to mitigate the effects of prolonged dry periods.

Unsustainable groundwater withdrawal exacerbates infrastructure problems and, in some areas, has caused land subsidence. Land subsidence occurs when groundwater is extracted in excess of natural or managed replenishment. The ground compacts and sometimes permanently sinks as the groundwater table declines. This compaction can damage roads, bridges, canals, buildings, and other infrastructure. Subsidence reduces conveyance and storage capacity, impacting these systems' ability to deliver water for consumptive uses, habitat restoration, and groundwater replenishment. In the San Joaquin Valley, all the major conveyance systems – the California Aqueduct, the Delta Mendota Canal, and the Friant Kern Canal – have experienced diminished capacity due to subsidence. Subsidence also diminishes the aquifer's ability to store and recharge groundwater in the future, further increasing the gap between water demand and supply in the Valley.

1.1.5 Inconsistent Policies at the Local, State, and Federal Level and Lack of Capacity

Various government policies and programs have tried to address water quality, supply, and access issues, along with environmental concerns, but are not producing the magnitude of success needed to address current or future challenges. Many of the current policies and programs lack flexibility and are oriented toward different objectives and administered by different agencies and levels of government. Although some funding is available through state and federal programs to help address these challenges, local governments and nonprofit organizations that support the necessary actions typically lack adequate staff capacity or resources to actively manage funding to allow them to complete the work themselves. Additional planning and technical assistance for local entities, disadvantaged communities (DACs), and landowners is critical to accelerating success in this area.

In addition, economic instability is at the forefront of communities' concerns. Local government property tax and sales tax revenues are likely to be reduced as more agricultural acreage goes out of production and shifts to other uses that require less water. It is unclear whether or what other revenue sources might offset that decline.

Implementing the “One Water” Investment Plan will require working closely with all levels of government and the private sector, especially local governments, where the rubber often meets the road in natural resource policy. Valley local governments are overwhelmed, and changes in water policy have imposed many unfunded mandates on them. They simply do not have the resources to fully do what is being asked of them. Ensuring that local counties, cities, and Groundwater Sustainability Agencies (GSAs) have the resources and capacity to do their part in implementing a sustainable and comprehensive water management program will be essential for success. This need to increase the capacity to engage and do the necessary work is critical for disadvantaged communities, state and federal agencies, and the private sector.

1.2 The Vision / Opportunity

The CAP “One Water” Investment Plan identifies four priority areas for necessary investment to support the long-term sustainability of the region’s residents, ecosystems, and economies:

1. Safe Drinking Water Investments
2. Ecosystem Restoration Investments
3. Water Supply Investments
4. Multi-benefit Land Repurposing and Demand Reduction Investments

1.2.1 Safe Drinking Water Investments

The State Water Resources Control Board’s “California Drinking Water Needs Assessment” served as the guiding document for identifying needed investments in infrastructure and other physical and administrative solutions to advance the goal of providing safe and reliable drinking water to all residents by 2025. The “California Drinking Water Needs Assessment” was updated in the spring of 2024 to reflect current cost estimates for required projects to provide drinking water to failing or at-risk public water systems and address water supply reliability challenges faced by domestic well owners and users. This chapter builds on the Assessment based on the local knowledge of CAP participants. The data and information outlined in the Assessment is also supplemented with the needs identified through other water quality programs like CV-SALTS and the work required of Groundwater Sustainability Agencies.

1.2.2 Ecosystem Restoration Investments

There is a wealth of studies and reports identifying the ecosystem restoration and enhancement needs that were used to inform the development of these investment recommendations. Participating organizations provided expertise to identify the overall need and near-term investments to advance a regional landscape with increased habitat areas to support an array of species and healthy aquatic ecosystems, including floodplain, riparian, wetland, on-farm, and upland habitat.

1.2.3 Water Supply Investments

Participating water agency members and other stakeholders have built on existing work to identify the categories of investments that can improve the conveyance and storage of water, mitigate environmental impacts, and provide benefits for the Valley communities, agriculture, and ecosystems. These include in-valley recharge, improving inter-valley conveyance, and increasing flexibility to move water across the region. These investment categories are based on projects included in Integrated Regional Water Management Plans, Groundwater Sustainability Plans, and other compiled sources.[3] These investments and projects do not include changes to regulations governing Delta export operations, the Delta Conveyance Project, or surface storage projects supported by the Water Storage Investment Program under Proposition 1.

1.2.4 Multi-Benefit Land Repurposing and Demand Reduction Investments

It is estimated that hundreds of thousands of acres of farmland will need to come out of production in order to comply with SGMA, eliminate groundwater overdraft, and adjust to climate driven water scarcity. Because of this, programs to manage the changing agricultural landscape due to reducing demand, such as the Multi-benefit Land Repurposing Program (MLRP), have broad support amongst participating members. This strategy builds upon the existing work of MLRP and related programs to identify a high-level estimate of the long-term need to fund repurposing of previously irrigated agricultural land in response to water scarcity. These lands are proposed to be repurposed to a range of new uses that require little to no water, including wildlife-friendly recharge basins, dryland crops, renewable energy, community buffers, and habitat. Importantly, these efforts are aimed to support the long-term viability of agriculture and the overall health and well-being of communities in the region.

These collective investments make significant progress towards:

- All San Joaquin Valley (Valley) residents will have timely access to safe, reliable, and affordable drinking water, regardless of hydrologic conditions.
- Sustainable water supplies support a diverse economy, thriving ecosystems, access to safe, reliable, and affordable drinking water for all Valley residents, and sustainable agricultural production.
- Ecosystem restoration increases the Valley's habitat areas to support an array of species and healthy aquatic ecosystems, including floodplain, riparian, wetland, on-farm, and upland habitat.
- Reliable, safe, and secure food and fiber with industry-leading protections for workers, in-valley communities, and the environment. The Valley continues to be a major

[3] Referenced Plans include Groundwater Sustainability Plans (GSPs) for the Kaweah, Tulare Lake, Tule, Madera, Chowchilla, Delta-Mendota, Westside, and Kings Subbasins, Integrated Regional Water Management Plans (IRWMPs) for the Poso Creek, Tule, Kaweah River Basin, Kings Basin Water Authority, Westside-San Joaquin, and Madera IRWM Regions, and projects associated with implementation of the south-of-delta drought plan advanced by the United States Bureau of Reclamation, Friant Water Authority, San Luis & Delta-Mendota Water Authority, and the San Joaquin River Exchange Contractors Water Authority. Projects contained within these aggregated documents had varying levels of detail, and further analysis will be required for project level support by SJV CAP.

agricultural region by preserving as many acres of sustainable farmland as possible, while being a good neighbor to communities and ecosystems.

- Sufficient public funds invested to support a) the necessary natural and constructed infrastructure to increase supply, b) demand reduction strategies, including land repurposing, and c) other investments to accomplish the Desired Outcomes.
- State and federal policies and funding are aligned to advance the outcomes.
- Investments provide organizations with adequate resources, staffing, and the capacity necessary to play a vital role in the transition to sustainable water resources management in the Valley.
- Investments are based on the best available and independent science possible. Adaptive management with monitoring, deployment of the best available technology, and outcome accountability will be necessary to maximize the effectiveness of resource decisions.

2 Investment Strategies

At this stage in the S2J2 process, the recommended investments below, unless otherwise noted, attempt to indicate the ultimate need for that particular investment category. Investment categories include Safe Drinking Water, Ecosystem Restoration, Water Supply Infrastructure, Multibenefit Land Repurposing, and Demand Reduction. In some cases, the current recommended investments overlap and could be using the same acreage for different purposes (i.e., habitat restoration, solar, water supply infrastructure, etc.). At the same time, some investments are only qualitatively described because there is insufficient information to estimate the magnitude of the need. Collectively, the current recommended investments provide an overall sense of the magnitude of investment needed, though there are additional refinements needed. Following the S2J2 Sprint, an integrated strategy will need to be developed that synthesizes the level of investments across categories, resulting in holistic water management. The synthesis of investments must demonstrate how it meets the ongoing water needs using the available supply, as well as other constraints.

Flood hazard reduction is a major need in the S2J2 region. There are several major waterways and drainages that flow through mountains and foothill areas and onto the Valley floor. Both urban and rural communities benefit from investments in flood risk reduction. At this point, the CAP has not quantified all of the necessary investments for flood risk reduction.

2.1 Collaborative Action Program Principles of Investment

2.1.1 Preamble for the Investments Recommended to S2J2

The points listed below provide the context guiding the CAP recommendations for investments.

1. Recommended investments are based on past studies, reports, and estimates extrapolated based on example projects or programs.
2. An investment recommendation must be consistent with the CAP Term Sheet (**Appendix**) and investment criteria to be included in this Investment Plan.
3. Supporting an investment category does not indicate support for any project or collection of projects.
4. Funding for investments will come from various public and private sources, including state, federal, user-placed, foundations, and others.
5. The investment must not have disproportionate, unmitigated impacts on any beneficial use or user.
6. The suite of investments provides the water needed in a manner that achieves the outcomes of the Term Sheet for safe drinking water, ecosystem restoration, sustainable agriculture, and a robust economy.

7. An updated system of financing water investments is needed to achieve the magnitude of funding for success and address participation and other issues experienced by Valley residents. Although the CAP, at this point in the process, does not identify what funding sources are appropriate for specific investments, when it evaluates projects in the future, it will consider what sources are available to fund specific projects and how they would improve equity between water users.

8. Investment projects should incorporate current climate modeling consistent with environmental permitting requirements.

2.1.2 Criteria for Determining CAP Support for an Investment

A. The investment will seek to achieve multiple benefits but, at a minimum, advances one or more CAP "Desired Outcomes."

1. **Safe Drinking Water**: All San Joaquin Valley residents will have timely access to safe, reliable, and affordable drinking water, regardless of hydrologic conditions. This means prioritizing both interim and long-term water supply and water quality challenges for all residents, including those faced by small communities and domestic well users.

2. **Sustainable Water Supplies**: Sustainable water supplies support a diverse economy, thriving ecosystems, access to safe, reliable, and affordable drinking water for all Valley residents, and sustainable agricultural production.

3. **Ecosystem Health**: Ecosystem restoration increases the Valley's habitat areas to support an array of species and healthy aquatic ecosystems, including floodplain, riparian, wetland, on-farm, and upland habitat.

4. **Sustainable Agriculture**: Investments provide reliable, safe, and secure food and fiber with industry-leading protections for workers, in-region communities, and the environment. The Valley continues to be a major agricultural region by preserving as many acres of sustainable farmland as possible, while being a good neighbor to communities and ecosystems.

5. **Public Investment**: Sufficient public funds will be invested to support a) the necessary natural and constructed infrastructure to increase water supply, b) demand reduction strategies, including land repurposing, and c) other investments to accomplish the Desired Outcomes.

6. **Consistent Policies**: State and federal policies and funding will be aligned to advance the Desired Outcomes. Expedited permitting and regulatory review processes will be available for qualified multi-benefit projects and other actions to achieve the Desired Outcomes.

7. **Local Government Resources.** Investments provide local governments with adequate resources, staffing, and capacity necessary to play a vital role in the transition to sustainable water resources management in the Valley.

8. **Sound Science**: Investments are based on using the best available and independent science possible. Adaptive management with monitoring,

deployment of the best available technology, and outcome accountability will be necessary to maximize the effectiveness of resource decisions.

B. If an investment has a potentially significant impact on other Term Sheet "Desired Outcomes," it should include elements to avoid or mitigate the impacts.

C. Drinking Water Specific Criteria

1. The project ensures the creation of direct and measurable benefits to residents of the disadvantaged community that would not materialize without its implementation. The benefits are not incidental, indirect, or speculative.
2. The project protects or enhances the disadvantaged community's sources of drinking water in terms of water supply, water quality, and/or water affordability.
3. The project protects or enhances the disadvantaged community's resources and quality of life regarding air pollution, noise pollution, or other negative impacts identified by the community.
4. The project actively involves, gives agency to, and secures support from the disadvantaged community during its development. The demonstrated benefits directly address the community's expressed needs. Examples of affirmative demonstration of community support include, but are not limited to, community benefits agreements, community-signed affidavits, letters of support from the community, and evidence of opportunities to opt-out or otherwise veto the project.
5. The project does not harm the community, and if inadvertent harm occurs, it has a predefined mechanism and commitment to remediation.

D. Ecosystem Specific Criteria

1. Create assets for Valley communities through the robust rehabilitation, protection, and enhancement of native ecosystems, which will benefit the public and improve community health.
2. Protect, enhance, and recover wildlife populations and habitats, habitat corridor connectivity, and priority habitat in critical locations.
3. Use locally adapted ecotypes of native plants for restoration.
4. Prioritize the establishment of self-sustaining vegetation communities that minimize the costs of continued maintenance and management over time.
5. Promote early detection and rapid response to infestations of problematic invasive weeds in waterways and uplands; build coordinated efforts to treat weeds using durable methods.
6. Connect broken migration pathways benefitting insects and pollinators, terrestrial animals, fish, and birds.
7. Build off and expand existing and planned wildlife areas managed by local, state, and federal land management agencies.

8. Protect and make judicious use of freshwater to ensure that stream flows are augmented in a functional framework (such as California Environmental Flows Framework[4]), managed wetlands are protected and adaptable to changing climate conditions, and groundwater and surface water interactions are supported and bolstered by ecosystem restoration projects.

E. Water Supply Specific Criteria

1. The investment is consistent with maintaining and diversifying sustainable water supplies for one or more beneficial uses of water in the San Joaquin Valley.
2. The investment increases the flexibility to store or convey water for beneficial use.
3. Surface and groundwater storage and conveyance investments maximize conjunctive use and long-term sustainability for beneficial water users. The investment allows the Valley to better respond to climate extremes, including expanding the capacity to capture and efficiently store water during wet periods.
4. Surface water conveyances and improvements should strive to maximize the beneficial use of water across uses when possible, and costs should be distributed across those uses according to the "beneficiary pays" principle, with recognition that public funds may be used to increase benefits or reduce costs to one or more beneficial use type(s), consistent with law.
5. Projects supported by the investment should:
    a. Have or be able to secure the water rights for the intended use within a reasonable time frame.
    b. Meet all environmental requirements and other regulatory requirements before implementation.
    c. Incorporate climate modeling, using best available science, that is consistent with environmental permitting requirements.
    d. Be analyzed and prioritized by maximizing the benefits provided by the project, including improved public safety, water supply reliability to DACs, and the ability of water supply to support the reliability of water supply for Municipal and Industrial (M&I) and DAC uses.
    e. Projects supported by CAP that have a Central Valley Project Municipal and Industrial component will be consistent with the Bureau of Reclamation policy, including the Central Valley Project Municipal and Industrial Water Shortage Policy Guidelines and Procedures.[5]
    f. Partnerships should be encouraged, where possible, for the development of long-term conjunctive use water supply solutions that involve utilizing

[4] https://ceff.ucdavis.edu/

[5] https://cawaterlibrary.net/wp-content/uploads/2017/10/miwsp-guidelines.pdf

abundant supplies when available to improve groundwater quality and supply for dry years when surface supply is unavailable.

2.2 Safe Drinking Water Investments

Terms and Definitions

Administrator Assistance: Appointment of an administrator made by the State Water Board to assist in providing an adequate supply of safe drinking water. The 2023 Revised Administrator Policy Handbook[6] provides more information on this program.

At-Risk Public Water System: A community water system with up to 30,000 service connections or 100,000 population served and K-12 schools and is confronting circumstances which threaten its ability to continue to meet one or more key *Human Right to Water* goals: (1) providing safe drinking water; (2) accessible drinking water; (3) affordable drinking water; and/or (4) maintaining a sustainable water system. (State Water Resources Control Board)

At-Risk State Small Water Systems (SSWS) and Domestic Wells (DW): State Small Water Systems and Domestic Wells located in areas where groundwater is threatened by: (1) encroaching contaminants which are likely to lead to concentration levels that exceed safe drinking water standards; (2) water shortage risk; and/or (3) socioeconomic risk. This definition may be expanded in future assessments as more data becomes available. (State Water Resources Control Board)

Centralized Treatment: Water treatment methods instituted by the water purveyor that address water quality concerns prior to distribution of water to customers.

Consolidation: The joining of two or more public water systems, state small water systems, or affected residences into a single public water system, either physically or managerially. For the purposes of this report, consolidations may include voluntary or mandatory consolidations. (Health & Saf. Code, § 116681, subd. (e).)

Decentralized Treatment: Water treatment methods such as Point-of-Use (POU) or Point-of-Entry (POE) devices installed at individual homes or businesses that can be used to address water quality concerns following distribution to the consumer rather than upstream of the distribution system by the water purveyor.

Domestic Wells (DW): Groundwater extraction wells that serve 1-4 individual connections that can be isolated in remote areas or in clusters/communities where multiple individual wells serve homes in close proximity. Permitting of well construction is regulated by the County.

Failing: The inability of a public water system to provide an adequate and reliable supply of drinking water which is at all times pure, wholesome, and potable (Health & Saf. Code, § 116555).

Operations and Maintenance (O&M): Collective term for the materials, functions, duties, and labor associated with the daily operations, normal repairs, replacement of parts and

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6 https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/2023/administrator-policy-handbook-2023-revision.pdf

structural components, and other activities needed to preserve a water system's capital assets so that it can continue to provide safe drinking water.

Other Essential Infrastructure (OEI): A category of necessary costs modeled in the Needs Assessment that estimates the fees to upgrade and replace aging infrastructure for public water systems. These needs can include the following:

- Metering all un-metered service connections.
- Backup source of water supply (new well) for systems with a single source that is a well.
- Backup power to ensure continuous operation during a power failure.
- Fire flows.
- Sounder device to measure static well levels.
- Replace well pump and motor.
- Adding additional storage.
- Adding SCADA (supervisory control and data acquisition) and electrical upgrades.

Public Water Systems (PWS): Most water systems that are regulated by the state. About half of the state's counties still serve as local primacy agencies, which means that they oversee systems with 15-200 connections. These fall into three categories, generally:

1. Community (CWS) – a public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 of the same persons over six months per year (Health & Saf. Code, § 116275, subd. (i).) Examples include homes, mobile home parks, etc.

2. Non-Transient - Non-Community (NTNC) – A Public Water System that is not a Community Water System and regularly serves at least 25 of the same persons for six months or more during a given year, such as a school. (Health & Saf. Code, § 116275, subd. (k).) Examples include schools, churches, and daycare centers.

3. Transient Non-Community (TNC) - A non-community water system that does not regularly serve at least 25 of the same persons over six months per year. (Health & Saf. Code, § 116275, subd. (o).) Examples include businesses, parks, rest stops, etc.

State Small Water Systems (SSWS): Water systems that are regulated by the local county government. Consists of 5-14 service connections.

Technical Assistance (TA): Technical, managerial, and financial capacity assistance provided to address the drinking water and wastewater needs of small, disadvantaged communities and domestic well and septic tank users in California.

2.2.1 Strategy-Specific Problem Statement

Nearly 800,000 people in the S2J2 region live in DAC or SDAC communities, with at-risk or failing public water systems[7] or are served by a state small water system that is at risk of failing. Additionally, nearly 4,000 domestic wells in the S2J2 region were reported as dry through the statewide reporting interface between 2012 to July of 2024. This total only accounts for those dry wells that were reported. The true number of dry wells is acknowledged to be larger. Nearly 20,000 domestic wells providing drinking water to households in the S2J2 region are at-risk of failing. Domestic well risk assessments are only

[7] Population served by water systems with a DAC or SDAC status from the 2023 Risk Assessment data

capable of quantifying wells that are known to the agencies completing these assessments. In many areas there are wells that are unknown to regulatory agencies and may not be included in these risk assessments, likely indicating that there are more domestic wells at risk than are quantified here, including those fractured rock wells in foothill and mountain communities that are not included in groundwater discussions in the San Joaquin Valley. The critical investments outlined in this plan are intended to address the deficiencies and lack of security for household water supply sources to provide safe and reliable drinking water to these nearly one million residents.

To quantify this investment need, the CAP relied on the existing work of the State Water Resources Control Board ("SWRCB" or "Water Board") Safe and Affordable Funding for Equity and Resilience (SAFER) Program. In particular, the CAP considered the 2024 Drinking Water Needs Assessment (Needs Assessment) "Cost Assessment" component which was released in June 2024.[8] The Cost Assessment is a model that utilizes decision criteria, cost assumptions, and calculation methodologies to estimate a statewide cost for implementing long-term and interim solutions for Failing Public Water Systems, At-Risk Public Water Systems, At-Risk State Small Water Systems and Domestic Wells. The 2024 Drinking Water Needs Assessment "Cost Assessment Component" model includes proposed updates from the original 2021 model.

2.2.1.1 Failing and At-Risk Public Water Systems

The SAFER program completed a 2024 Cost Assessment that considered the status of Public Water Systems, based on criteria described in greater detail in the report. **Table 1** summarizes the "Failing" and "At-Risk" Public Water Systems as identified by the *2023 Drinking Water Needs Assessment and accessed from the SAFER Dashboard*[9]. The 2024 Cost Assessment model utilized various inputs and considerations to generate anticipated costs to address the needs of these systems.

Table 1: Summary of Public Water System SAFER Status in S2J2 Region

County	Failing	At-Risk	Total
Fresno	29	33	62
Kings	3	5	8
Madera	28	20	48
Tulare	33	36	69
		Grand Total	187

[8] https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/needs.html

[9] https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/saferdashboard.html

2.2.1.2 State Small Water Systems and Domestic Wells

The SAFER program maintains a "Risk Assessment" dashboard[10] for State Small Water Systems (SSWS) and Domestic Wells (DWs) based on the results of the corresponding "Risk Assessment." The current version of the dashboard provides data from the "2024 Risk Assessment." The updated Cost Assessment utilizes an updated model from the previous 2021 Cost Assessment that now includes Other Essential Infrastructure, Administrative Needs, and updated Interim Solutions. This Cost Estimate also identifies needs for SSWS and DWs, based on the "Risk Assessment" results. **Table 2**, below, identifies the number of SSWS and DWs that are estimated to be located in each of the S2J2 counties and how many of those SWSS and DWs are located in "at-risk" areas.

Table 2: Summary of State Small Water Systems Modeled as Suitable for Consolidation in S2J2 Region

County	SSWS	At-Risk SSWS	Domestic Well	At-Risk Domestic Wells
Fresno	19	2	19,400	10,000
Kings	5	2	2,200	2,000
Madera	17	9	10,200	4,000
Tulare	44	19	7,100	3,700
Total	85	32	38,900	19,700

2.2.1.3 Municipal Wastewater and Stormwater Management

The State Water Resources Control Board has adopted resolutions "recognizing Californians' equal and human right to sanitation and that safe wastewater management is critical to human and environmental health." The Water Education Foundation estimates that Californians generate around four billion gallons of wastewater per day. The state has nearly 100,000 miles of sewer lines and 900 utility providers and treatment plants. In California's rural communities, many homes rely on individual septic systems that may not adequately address the sanitation needs of individuals and communities.

2.2.2 Outline of Proposed Strategy

2.2.2.1 Long-Term and Interim Solutions

Long-Term Solutions are those that permanently address system deficiencies relating to water quality or quantity. The extent of complexity of these solutions is dependent on the risk associated with the system, current regulations, and site-specific conditions. The modeled long-term solutions in the Cost Assessment include physical consolidation, centralized

[10]https://gispublic.waterboards.ca.gov/portal/apps/experiencebuilder/experience/?id=ece2b3ca1f66401d9ae4bfce2e6a0403&page=Homepage

treatment, decentralized treatment, a new well, other essential infrastructure (OEI), and managerial assistance.

Interim Solutions are those that continue to offer reliable and safe drinking water while long-term solutions are developed or implemented. These include bottled water and decentralized treatment. Only failing systems, as modeled for the Cost Assessment, are included in this analysis as “At-Risk” systems are still in compliance, and customers do not require an alternative potable water source. The 2024 model reduced the duration of modeled interim solutions. For decentralized treatment needs, the duration is modeled at three years for failing systems and state smalls and two years for domestic wells. For interim bottled water assistance, the duration is modeled at three years for failing systems and state smalls and two years for domestic wells. The solutions address different risks associated with the systems and can vary based on parameters. These costs are estimated based on the results of ongoing SAFER work and reflect the conditions derived from the 2024 Risk Assessment.

The Cost Assessment Model used by the State Water Resources Control Board considers various components for different types of systems and levels of risk. For estimating costs, the model looks at system needs and conditions and determines which solution set is most appropriate. The costs are then estimated for those actions and consolidated. These parameters are defined below:

Failing & At-Risk Public Water Systems

The model uses a four-step approach for determining the best long-term modeled solution for Failing Public Water Systems with water quality violations. Step 1 considers if physical consolidation is a viable solution. If not, Steps 2 and 3 consider if centralized treatment and then decentralized treatment are viable options. Step 4 considers other infrastructure, administrative, technical assistance, and interim needs (additional needs). Managerial consolidation is an additional component that would be considered under the intersecting consolidation pathway.

At-Risk Public Water Systems are modeled through a two-step approach. Step 1 considers if physical consolidation is a viable solution. If not, the other essential infrastructure, administrator, technical assistance, and interim needs costs are considered (additional needs).

Within the model there are distance criteria for determining if physical consolidation is viable based on the distance between the joining and receiving systems. There are three general pathways for consolidation to occur: (1) intersect, where a joining system, state small water system, or domestic well is physically located within the service area boundary of a potential receiving system; (2) route, where the joining system is physically located within a maximum distance from the service area boundary of a potential receiving system along a street; and (3) route intersect, where the joining state small water system or domestic well is along the modeled route of a potential public water system physical consolidation. Distance requirements only pertain to route and route intersect consolidation strategies. For a Public Water System consolidation, the maximum route distance is defined at three (3) miles. For State Small Water Systems consolidation, the maximum route distance is defined as 0.38 miles, and for route intersect consolidations the system must intersect a viable public water system physical consolidation route. For Domestic Well consolidation, the maximum distance

from the system is 0.38 miles and for route intersect consolidations the well must be within a 1-mile section that intersects with a public water system consolidation route. Additional information on the physical consolidation cost estimate methodology can be found in the Supplemental Appendix to the Cost Assessment.[11]

State Small Water Systems and Domestic Wells

The methodology within the Cost Assessment model considers State Small Water Systems (SSWS) and Domestic Wells using one of two methods, depending on the risk type associated with the system: either high water quality related risk, or high water shortage risk. For High water quality risk SSWS and Domestic Wells, Step 1 considers if physical consolidation is a viable option. If not, Step 2 considers if decentralized treatment is a viable option. If not, Step 3 selects bottled water as the appropriate long-term solution for the system. For High Water Supply Risk SSWS and Domestic Wells, Step 1 considers if physical consolidation is a viable option. If not, Step 2 selects construction of a new well as the appropriate long-term solution.

It should be noted that bottled water solutions do not address contaminants like 1,2,3-Trichloropropane (TCP) which can be absorbed through the skin.

Please see the **Construction of Recharge Basins for Disadvantaged Communities** below for further consideration of localized water supply solutions for disadvantaged communities.

Provide Necessary Investments for Long-Term and Interim Solutions to Address the Needs of "Failing" and "At-risk" Public Water Systems ($1.1 Billion): The investment needs for Public Water System solutions are calculated using different variables. **Table 3** summarizes the investment needs for Failing and At-Risk Public Water Systems based on the 2024 update of the *Drinking Water Needs Assessment* and Cost Assessment update. These costs include a variety of long-term assistance types, including consolidation, centralized treatment, and new private wells. The costs also include temporary solutions, bottled water, and decentralized treatment.

Table 3: Modeled Cost Estimates for Long-Term and Interim Solutions (in millions of dollars)

County	Failing	At-Risk	Total
Fresno	$256.74	$157.48	$414.22
Kings	$70.11	$51.23	$121.34
Madera	$96.34	$68.74	$165.09
Tulare	$255.14	$151.01	$406.15
Grand Total	$658.33	$428.46	$1,106.8

[11]https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/2024/2024costassessment-physical-consolidation.pdf

Provide Necessary Investments for Long-Term and Interim Solutions to Address the Needs of High-Risk State Small Water Systems (SSWS) and Domestic Wells (DWs) ($1.3 Billion to address current need): The long-term and interim investment needs for At-Risk State Small Water Systems and Domestic Wells solutions are calculated using different variables. **Table 4** summarizes the investment needs for At-Risk SSWS and DWs based on the 2024 update of the Drinking Water Needs Assessment and Cost Assessment update. These costs include a variety of long-term assistance types, including consolidation, centralized treatment, and new private wells. The costs also include temporary solutions, bottled water, and decentralized treatment. These investments are anticipated to address the needs of SSWS and DWs throughout the S2J2 region, not just those on the Valley floor.

Table 4: Modeled Cost Estimates for Long-Term and Interim Solutions (in millions of dollars)

County	SSWS	DW	Total
Fresno	$2.02	$666.33	$668.35
Kings	$0.73	$75.32	$76.05
Madera	$6.20	$311.52	$317.72
Tulare	$18.77	$208.88	$227.65
Grand Total	**$27.72**	**$1,262.05**	**$1,289.80**

2.2.2.2 Funding Operations and Maintenance

Ongoing Operations and Maintenance for the Public Water Systems in the Four-County Region ($4,000,000,000 for a twenty-year period): Public Water Systems face challenges of aging infrastructure and require ongoing operations and maintenance and capital improvements to maintain adequate service to customers. Operations and maintenance are frequently delayed and underfunded because these systems are not able to raise rates to adequately fund these improvements because of the limited means of their customer base, particularly in Disadvantaged Communities (DACs) or Severely Disadvantaged Communities (SDACs). Systems are limited by their service connections and customers and, depending on size, may struggle or be unable to achieve an economy of scale that makes operations and maintenance funding feasible. This cost is estimated by taking the number of service connections for DACs in the four-county region and applying an assumed annual cost of $1,100 per connection (based on average cost per connections for DAC and SDAC drinking water systems). Operations and maintenance are also required for State Small Water Systems and Domestic Wells, but the CAP has not generated an estimated investment need based on the complexity of their regulation and reporting.

2.2.2.3 Organizational Capacity

Provide Funding for Technical Assistance (TA) Providers for Adequate Assistance During Project Implementation ($75,000,000 - twenty-year total): Public Water Systems and domestic well users often rely on technical assistance to move through the necessary technical and administrative processes to successfully implement projects. Projects often

take 10 to 15 years to reach completion, generally less for domestic well consolidations, and assistance is required at all points throughout the process. Full-time specialized staff are needed to provide this assistance. This project timeline and level of assistance assumes that the TA provider will be involved throughout the duration of the project from community engagement and education for project scoping, drafting of an engineering report and selecting consultants, preparing funding applications, signing agreements, and construction and project start up. This investment need assumes that a staff level specialist can support a workload of 10 projects and would have a full-time equivalent cost of $125,000. It also assumes that there are 250 projects requiring technical assistance, which would necessitate 25 specialized staff. The cost for technical assistance could be significantly reduced if the funding is front loaded for drinking water system improvement projects, there is strong local support, and the bureaucratic process is streamlined.

2.2.2.4 System Operator Training

Expand the Institutional Capacity for Career and Technical Education Training for Water Treatment Operators in the San Joaquin Valley (No Estimated Cost; Programmatic): There is a recognized lack of water treatment and distribution operators to serve the systems in the San Joaquin Valley. Operators are certified through the State Water Resources Control Board Division of Financial Assistance. Experience and education are means of advancing to higher grade treatment facilities, which often comes with better pay. This leads to operators leaving smaller systems once they have the necessary experience to advance. Training programs, such as those at Clovis Community College and an education program by the Environmental Defense Fund, would provide greater accessibility to community members and add to the available workforce of treatment and distribution operators. In addition, systems are becoming more advanced over time as more constituents are regulated. As systems are upgraded, operators may require additional training to advance to higher grades. Local governments and other water providers can consider developing incentive programs to support ongoing education and encourage operators to remain employed at the current system.

In addition to the training of operators, organizations like the Rural Community Assistance Corporation (RCAC) organize leadership development programs for interested community leaders to gain experience in the project implementation process. This can assist community advocates in understanding the processes involved in water systems upgrades, maintenance, improvements, consolidation, etc. It is also recommended that local school districts incorporate curriculum to expose students to potential careers in water and wastewater treatment and distribution.

2.2.2.5 Groundwater Sustainability Agency Domestic Well Mitigation

Adequately Fund Domestic Well Mitigation Programs as Proposed by Groundwater Sustainability Agencies ($200,000,000 – Cost for five of seven subbasins): Groundwater Sustainability Agencies (GSAs) are required to mitigate impacts to domestic wells that result from declining groundwater levels. GSAs in the various subbasins are in the process of developing or starting to implement domestic well mitigation programs, or larger mitigation programs to address other potential impacts. GSAs are in varying stages of identifying the estimated costs required to implement these mitigation programs. There are limitations in

these estimates as the full extent of potential impacts are unknown, and estimates are currently based on models or best available science. The development of domestic well mitigation programs, or broader mitigation programs under SGMA, are ongoing. The development of programs that generate adequate revenue and propose sufficient mitigation activities will be critical for the successful implementation of SGMA. Several organizations have been working with the Department of Water Resources to develop a mitigation program framework that can assist GSAs in developing fully supportive mitigation programs.[12] This work should continue to provide resources and guidance.

2.2.2.6 Nitrate Management Zones

Consider Necessary Investments in Nitrate Treatment Systems in Areas Where it is the Most Cost-Effective Solution to Provide Long-Term Safe Drinking Water. (No Estimated Cost; Cost per Public Supply Well ranges from $1 Million - $75 Million): The Central Valley Regional Water Quality Control Board (CVRWQCB) adopted regulations in 2018 to implement the CV-SALTS Nitrate Control Program. There are currently five active “Priority 1” Management Zones in the San Joaquin Valley in six groundwater subbasins: Modesto, Turlock, Chowchilla, Kings, Kaweah, and Tule. Management Zones provide interim water supplies for those drinking water users who have demonstrated nitrate exceedances at their homes, from domestic wells. At the time of preparation of this report, the Priority 1 Management Zones are distributing clean drinking water to 1,538 households in the planning areas, with 989 households in the S2J2 planning region. The figure below displays the Management Zone areas and total number of households for each zone that is receiving interim water supplies.

[12] Framework for a Drinking Water Well Impact Mitigation Program - Draft 2022

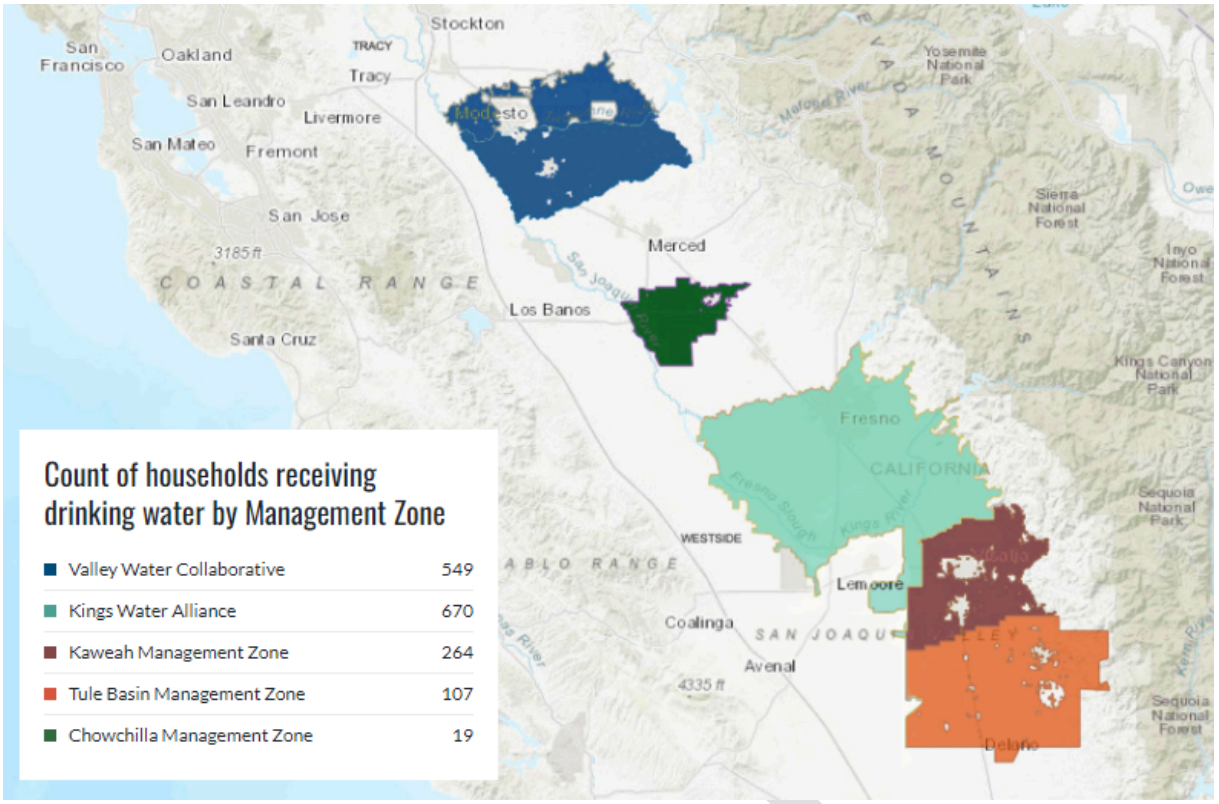

Figure 1: Nitrate Management Zone Assistance [Source: https://cvsalts.mljenv.com/ (retrieved July 15, 2024)]

In 2023 these Management Zones submitted "Management Zone Implementation Plans" (MZIPs) which are intended to end nitrate exceedances in the underlying groundwater. As MZIP preparation coincided with the implementation of SGMA, many MZIP projects are derived from the submitted Groundwater Sustainability Plans (GSPs) project and management actions of the coincident subbasins. Investments to support the project and management actions from these GSPs will be crucial for addressing the requirements of the priority Management Zones. In addition to these project and management actions, MZIPs may also consider the need to implement nitrate treatment at surface water treatment facilities. Depending on numerous conditions including treatment plant property size, treatment type, size, permitting, engineering, construction, etc., the anticipated capital cost for nitrate treatment for an individual public supply well ranges from $1,000,000-$75,000,000. These investments may not be necessary for every system, and individual assessments of return on investment compared to other nitrate management methods should be considered.

2.2.2.7 Sanitation Needs

Critical Investments are Needed for Sanitary Sewer, Septic Systems, and Stormwater in the San Joaquin Valley, and Statewide (No Estimated Cost): The CAP recognizes that investments in these categories are critical for the long-term health and well-being of Valley communities but does not have the information necessary to recommend a specific investment amount, at this point. The State Water Resources Control Board is in the process of completing a "Wastewater Needs Assessment" that will better define the needs and anticipated costs in this area.

2.2.3 Barriers and Potential Mitigation Pathways

Funding and Contracting - The current institutional structure and process for funding and contracting are significant barriers, as are administrative burdens for the construction of long-term solutions to address failing and at-risk water systems for disadvantaged communities.

Rural Nature of Counties - The rural nature of the communities in areas of County responsibility adds cost and implementation challenges for drinking water projects. The distance between these communities and systems and potential receiving systems can be physically impossible or financially infeasible.

Consolidation - The process of consolidating community water systems is complicated and time-consuming. It requires agreement between the community and the potential water system provider. Currently, systems with drinking water quality or quantity issues must go through a lengthy process to receive financial assistance to resolve issues. The current funding process includes applying for planning funds (feasibility study and design), applying for construction funding, and, ultimately, building the project. This process, at best, takes five years and more often, a decade or longer. Costs only rise with each passing year, and the exorbitant expense of interim solutions is compounded. The interim water solutions offered to failing water systems are costly and overly burdensome when extended for five to ten years.

A comprehensive evaluation of the current process and restructuring to accelerate the pace and results are needed. Also, additional incentives for water providers to consolidate with a community that has a failed or at-risk system are needed.

Education - The level of awareness for the causes, risks and potential solutions to failed or at-risk water systems varies within and across communities. These differences in understanding create challenges for achieving community agreement to select and implement the best solution. An education program tailored to affected communities is needed.

Financial Assistance - Many disadvantaged community members do not have the financial resources to pay their monthly water bill. Financial assistance is needed to support the full cost of providing water to the community.

2.3 Ecosystem Restoration Investments

2.3.1 Strategy-Specific Problem Statement

2.3.1.1 Ecosystem Loss and Degradation

In the greater Central Valley less than ten percent of the historical wetland habitat remains, in addition to more than half of the historical grassland and oak savannah habitat being lost.[13] Of that, many areas exist in disconnected fragments that are too small to support sustainable populations of fish and wildlife species. In addition, water diverted from these habitat areas for the development of agricultural, commercial, and urban development has led to degraded

[13] Central Valley Joint Venture 2020 Implementation Plan

habitat quality. The ecosystem restoration investments outlined in this plan are specifically focused on the Valley floor of the S2J2 region. Some upland and foothill habitats are considered but no mountain areas are included in this chapter.

2.3.1.2 Impacts of Gray Infrastructure on Ecosystem Health

Levees and dams constructed to support human development have impacted the health of habitats and ecosystems. Levees channel floodwaters towards the coast and disconnect critical riparian floodplains habitats from their source rivers. Dams and water diversion facilities are critical pieces of water supply and flood control systems, but they often block fish passage and reduce instream flows.

2.3.1.3 Lack of Existing Capacity to Support Habitat Management

Implementing restoration activities is dependent on the capacity of the responsible agencies and the project proponents to successfully finance and implement the strategies that make meaningful transitions to the target habitat type(s).

Agencies and Organizations

The following organizations or organization types are recognized as critical for capacity building in being able to ensure that these investments are adequately made and maintained.

- Conservation Organizations
  - Resources Legacy Fund
  - River Partners
  - Sequoia Riverlands Trust
  - California Rangeland Trust
  - San Joaquin River Parkway and Conservation Trust
  - The Nature Conservancy
  - The Trust for Public Land
  - Tule Basin Land and Water Conservation Trust
  - Kings River Conservancy
  - Local community organizations
  - Local restoration organizations
- State Agencies
  - California Natural Resources Agency (CNRA)
    - Department of Conservation (DOC)
    - Department of Fish and Wildlife (CDFW)
    - Department of Parks and Recreation
    - Department of Water Resources (DWR)
    - Central Valley Flood Protection Board (CVFPB)
    - San Joaquin River Conservancy
  - California Environmental Protection Agency (CalEPA)
    - State Water Resources Control Board (SWRCB)
- Federal Agencies
  - Bureau of Reclamation
  - National Marine Fisheries Service
  - US Department of Fish and Wildlife
  - US Army Corps of Engineers
- Local Agencies
  - Groundwater Sustainability Agencies

- Local wetland managers
- Water and Irrigation Districts
- Flood Control Agencies
- Counties

To advance ecosystem restoration goals in the San Joaquin Valley, the following capacity limitations need to be addressed:

Agency Staffing and Funding

Many restoration projects depend on grant funding to finance some or all of their costs. Funding agencies need adequate staffing to administer grant programs. Without adequate staffing, contracting delays, invoicing delays, and other administrative delays can hinder the implementation of habitat restoration projects. In addition, those organizations that implement projects on the ground require adequate staffing and funding to administer and carry out projects.

Permitting

Obtaining the permits required to implement restoration projects can be a complex and expensive process and result in significant delays in project implementation. Requirements are frequently designed for more traditional development projects, rather than projects with long-term environmental benefit. The state launched the “Cutting the Green Tape” initiative to help streamline permitting for projects that are beneficial to habitat or ecosystem restoration. However, ecosystem restoration projects, such as floodplain restoration, often involve permitting requirements from multiple state and federal agencies that may not be active participants in this initiative or who have not fully implemented or embraced efficient permitting for restoration. Since permits are required from all relevant agencies to proceed, this can result in slowdowns on the path to project implementation.

Land repurposing projects may also receive criticism or opposition from neighboring landowners or project proponents who are concerned that restored habitat may put them at risk of violating endangered species protection laws. Landowner assurances of “safe harbor” may alleviate these concerns and increase participation.

Seed Collection

Native seed collection is an under-resourced component of ecosystem restoration and can pose a significant delay in project implementation or limitations to the scope of restoration. Seed collection and maintenance of native vegetation have fewer commercial applications and are not readily available like other species that have more widespread production value.

State Invoicing Process

Many restoration projects seek grant funding from state agencies. The state process for receiving, processing, and approving invoices is a major limitation for grantees who do not have the financial means to balance program or project costs between repayments. In addition, many grant programs only operate on a reimbursement model, meaning grantees must be able to cover the interim costs as they are incurred.

Once invoices are received, it often takes months for an invoice to be approved by the state agency. Once approved, the invoices are sent to the State Controller's office for checks to be cut and distributed.

2.3.2 Outline of Proposed Strategy

Important note: To achieve healthy, sustainable ecosystems, the strategy must be holistic and address the geographic scale and connectivity of habitats in order to provide the functions and processes required for the species that the habitats support. There are several geographic areas used in the information below:

- *San Joaquin Basin is the watershed that drains to the San Joaquin River on an annual basis.*
- *Tulare Basin is the watershed that formerly drained to Tulare Lake.*
- *San Joaquin Valley – includes the San Joaquin River Basin and the Tulare Basin*
- *S2J2 four-county area (Fresno, Kings, Madera, and Tulare) which includes parts of the Tulare and San Joaquin Basins.*

The hydrologic system in the San Joaquin Valley is very complex with water flowing in different directions depending on the level of rainfall and human infrastructure. The estimates for habitat restoration are based on scientific information in various technical reports and plans. The S2J2 four-county area crosses over parts of different habitats and drainage systems. The investment needs for the S2J2 area are estimated dividing in half the estimates for San Joaquin Valley. The four-county S2J2 planning region accounts for about 52 percent of the landmass in the eight-county San Joaquin Valley. Dividing the eight-county total in half provides an order of magnitude for the need. However, when the investments are implemented, a more sophisticated approach will be required to ensure the habitats are restored to provide the habitat processes and functions necessary.

2.3.2.1 Restoration and Protection of Acreage Targets

Restore and Protect Various Habitat Types in the San Joaquin Valley ($13.6 Billion for S2J2 region): The CAP relied largely on existing plans and studies to inform the targeted acreage and pace of ecosystem restoration required to establish or maintain adequate habitat to support fish and wildlife. These estimates only reflect ecosystem restoration needs on the Valley floor and in some portions of the foothills. This estimate is based on the restoration of 715,000 acres, rounded up from the 707,900 total acres identified in **Table 6** below.

To translate the acreage needs identified within the previously identified plans, cost estimates were based on the experience of restoration organizations that are participating members of the CAP. The estimated cost identified for this investment area includes the cost for land acquisition (based on recent experience) and the cost for performing restoration activities. The cost of land acquisition, per acre, is summarized in **Table 5**. Acquisition is assumed to include orchard properties with access to surface water, irrigated row crops with access to surface water, and irrigated agricultural land that is groundwater dependent, and costs range from $13,000 per acre to $27,000 per acre. The cost to perform restoration activities on this

acquired land is assumed to be an average of $18,000 per acre, based on the extensive practical experience of restoration organizations that are participating members of the CAP. This per-acre estimate includes costs associated with design, permitting, seed collection/propagation, land preparation, planting, and three years of post-planting weed control.

Table 5: Land Acquisition Acres and Assumed Costs for Habitat Restoration in the Entire Valley (eight counties)

Acquisition	Acres	$/ac
Orchard w/ surface water	180,000	$27,000
Row crop w/ surface water	320,000	$21,000
Ag land with GW only	215,000	$13,000
	715,000	

Habitat restoration acreage needs are typically quantified by specific habitat types and are often separated by basin or planning region. For the purposes of the CAP and this S2J2 Investment Plan, the San Joaquin River and Tulare Lake basins are considered to best encompass the four-county region within hydrologic planning boundaries. The targets identified below are inclusive of the eight-county[14] region that makes up the San Joaquin Valley. For purposes of S2J2, the total identified need will be proportional to the four counties in the S2J2 planning region, which the recommended investment reflects. The broader needed investment for the entire San Joaquin Valley is estimated at $27,245,000,000 for land acquisition and restoration of 715,000 acres.

To quantify this investment need, the CAP used the Central Valley Joint Venture-identified, anticipated restoration targets for habitat types in the San Joaquin Valley, by hydrologic region. As with the estimated investments, these habitat targets are inclusive of the entire San Joaquin Valley. The summary of required restoration or enhancement acreage is derived from the *Central Valley Joint Venture*, the *Tulare Basin Riparian and Wildlife Corridor Conservation Report*, and the *Central Valley Flood Protection Plan Conservation Strategy* - 2022 update.

The overall summary of habitat restoration acreage needs for the entire valley is summarized in **Table 6**. The habitat restoration acreages are further broken down in **Table 7**, by more specific habitat type needs.

Table 6: Summary of Habitat Acreage Needs for the Entire San Joaquin Valley

	San Joaquin Basin (acres)	Tulare Basin (acres)
Aquatic Habitat Needs	239,800	219,100
Upland Habitat Needs	32,000	217,000

[14] Kern, Kings, Tulare, Fresno, Madera, Merced, Stanislaus, and San Joaquin counties.

Total	271,800	436,100
Grand Total	707,900	

Table 7: Habitat Acreage Needs by Habitat Type in the entire San Joaquin Valley

Habitat Type	San Joaquin Basin (acres)	Tulare Basin (acres)
Inundated Floodplain	28,500	-
River Meander Potential	6,400	-
Riparian	95,000	115,000
Wetland	30,000	30,000
Semi-Permanent Wetland	73,000	71,000
Summer-Flooded Seasonal Wetland	1,000	1,200
Winter-Flooded Seasonal Wetland	5,900	1,900
Upland[15]	32,000	217,000
Total	271,800	436,100

Developing wildlife corridors and expanding access to valuable habitat areas for fish species is an important component of this ecosystem restoration work. Roughly 75 percent of salmon habitat exists above major fish passage barriers, like dams. Supporting restoration efforts should explore opportunities to reconnect access to these habitat areas for anadromous fish species.

Provide Adequate Funding the San Joaquin River Restoration Program to Implement the Provisions of the Settlement ($758 Million[16]): The CAP has identified the implementation of the San Joaquin River Restoration Program ("SJRRP" or "Program"), through the fulfillment of the "Restoration" and "Water Management" goals outlined in the associated cases and legislation, as a critical investment for the San Joaquin Valley. In 2018, the Program released the "Funding Constrained Framework for Implementation" (Framework) which proposes a funding framework to achieve as many of the "Restoration" and "Water Management" goals as possible with limited funding. The Framework proposes a multistage approach to achieve the goals and third-party protections. The Program is currently in the implementation process of Stage 1, which is primarily focused on reestablishing the spring-run and fall-run Chinook Salmon between Merced River and Friant

[15] The upland habitat total in the Tulare Lake Basin is much higher due to the protection and restoration acreages identified in the Tulare Basin Riparian and Wildlife Corridor Conservation Report.

[16] The total funding required to complete Phase 1 is estimated to be $1.021 billion, but the Restoration Fund currently has a remaining $264 million, so the outstanding need is the $758 million identified above.

Dam. This goal is meant to be accomplished by establishing volitional fish passages, habitat, and sufficient flows for maintaining temperature. Stage 1 is meant to be implemented between fiscal year (FY) 2017 through 2024. Stage 1 defines three activities: flow related activities, restoration goal activities, and water management goal activities. These include both the construction of projects and management activities. The following funding activities have been identified in the Framework:

1. Program Staffing
2. Flow Actions
3. Channel and Structural Improvements
4. Fish Reestablishment
5. Water Management Goals and Friant Division Improvements

The total estimated costs of implementing these programs in Stage 1 (Fiscal Year 2017-2024) was estimated to be $643,255,000. These estimated costs reflect implementation through a deficit of about $15,000,000. Through ongoing work and planning the SJRRP has concluded that funding will be required beyond the initial estimate included in the Framework. The proposed investment in this plan reflects the updated anticipated costs to implement Stage 1. This proposed investment would expand the capacity of the SJRRP and allow the program to continue to accomplish the “Restoration” and “Water Management” goals.

The following activities are anticipated to be funded through this investment:

- Flow Related Activities
  - — Conservation Strategy and Flow-related Mitigation Measures
  - — Flow Management and Monitoring
  - — Seepage Actions
- Restoration Goal Activities
  - — Phase I Projects:
    - › Mendota Pool Bypass, Fish Screen, and Reach 2B Levees
    - › Reach 4B/ESB/MB Channel and Structural Improvements
    - › Arroyo Canal Fish Screen and Sack Dam Fish Passage
  - — Passage at Key Barriers to Migration
  - — Phase II Projects:
    - › Gravel Pit Filling and/or Isolation
  - — Fishery Recolonization Activities
  - — Water Management Goal Activities

Additionally, the opportunity to add value for the communities near the Program’s implementation areas should be considered. These past and future activities have secured properties for the public near the cities of Mendota and Firebaugh, both of which are considered underserved. By funding outdoor recreational facilities and staffing to local or

state agencies, additional benefits, leveraged from otherwise required funding, would facilitate local community economic gains.

2.3.2.2 Address Water Quantity Needs

Restored Habitat Water Needs (No Estimated Cost): Restored habitat requires water at least for several years for plants to establish. Some types of habitats, like new wetlands, may need water on an ongoing basis. The amount of water, the cost of the water, or the infrastructure needed are not estimated. In areas where habitat is restored on land that is currently farmed, there will, in most cases, be water savings. These water savings could total several hundred-thousand acre-feet. Riparian and floodplain habitats require sufficient in-stream flows to support ecological processes and functions. There are existing programs and initiatives in discussion or implementation that are intended to increase the viability of in-stream flows for ecosystem health.

Make Specific Investments in Water Supply Projects to Generate an Additional 58,500 AF Annually for the Central Valley Project Improvement Act (CVPIA) Wildlife Refuges ($25 Million for infrastructure, does not include any needed cost for the water): Wetland areas in the San Joaquin Valley rely on reliable water supplies to maintain adequate habitat conditions. Certain wetland areas have adequate water supplies in years of wetter hydrology to support best management practices. In other areas there are inadequate water supplies, or no water supplies, which leaves these areas dry and with long-lasting impacts (CVJV, pg. 52). The Central Valley Project Improvement Act (CVPIA) directs the U.S. Department of Interior and the State of California to provide adequate and reliable water supplies to 19 refuges in the Valley, 14 of which are within the San Joaquin Valley (CVJV, Pg. 52). The Central Valley Joint Venture 2020 Implementation Plan has identified that water supplies required under the CVPIA have never been fully delivered to the refuges because of physical and institutional challenges (CVJV, p. 52). Citing the work in an unpublished report by E. Wehr et al, from 2017, the 2020 Implementation Plan Update estimate that the 14 refuges in the San Joaquin Valley have an average unmet water need of 56,000 AF per year, or 64,400 AF when considering an assumed 15 percent carriage loss across the conveyance system.

2.3.2.3 Expand Agency and Organizational Capacity

Adequately Fund the Creation of 20 Full-Time Equivalent Positions within the Relevant State and Federal Agencies to Handle the Increased Workload of Permitting 100,000 Acres of Habitat Restoration ($60 Million; 20-year period): Ecosystem restoration projects require administrative support from state and federal agencies to process permits and other required documentation. In addition, many ecosystem restoration projects are funded through public grant programs which require adequate staffing to administer.

Expand the Capacity of Native Seed Farming Operations to Meet the Demand of Restoration Projects ($10 Million capital investment): Restoration projects require native seed in order to restore appropriate vegetation. To support the proposed habitat restoration projects, the capacity of native seed propagation must be expanded.

Invest in the Governance, Administration, Consultation, and Community Engagement Capacity for Tribes and Disadvantaged Communities ($40 Million – 20-year period):

Tribal consultation and community engagement are required for certain projects but are components that can also be considered more broadly. These entities will benefit from capacity-building support which will also increase the efficiency with which they can provide consultation on proposed projects.

Expand the Available Workforce for the Implementation of Restoration Projects by Funding Workforce Development Programs that Support Skilled Labor, Project Management, Seed Collection/Propagation, and Restoration Design ($40 Million – 20-year period): In order to support the implementation of the recommended habitat restoration projects, an expanded workforce with specific skill sets will be required. This proposed investment is intended to triple the amount of available skilled labor applicable to these projects.

Invest in the long-term land management of restored habitat areas ($100 Million – 20-year period for 100,000 acres): This recommended investment is based on the land management costs for California Department of Fish and Wildlife and United States Fish and Wildlife Service National Wildlife Refuges, system wide. This is a rough approximation and does not consider specific project components or requirements.

Establish a Prepayment or Rapid Repayment Process for Grant Invoices (No Estimated Cost; Programmatic): Ecosystem restoration projects are often undertaken by organizations that do not have the cashflow or overhead resources to support undertaking large projects that will require large capital at the outset of project implementation. Allowing for prepayment or by quickly repaying grant invoices, these organizations would be better suited to facilitate the implementation of ecosystem restoration projects.

Continue to Advance Programmatic Permitting and Other Changes to Reduce the Regulatory Requirements for Restoration Projects (No Estimated Cost; Programmatic): In recent years, there have been successful efforts for agencies and interested parties to work together to develop regulatory pathways that reduce the time and cost associated with permitting for restoration projects. For example, a more efficient authorization pathway was signed in 2018 by the National Marine Fisheries Service for expedited permitting of habitat restoration projects through the Sacramento and San Joaquin River watersheds and Delta. In addition, two statewide authorizations for beneficial aquatic and riparian restoration projects have been developed for the State Water Resources Control Board and the US Fish and Wildlife Service, which also covers projects with multiple benefits. These authorizations are intended to provide cost-efficient and faster avenues for project implementation for both project proponents and regulatory agencies.[17] The expansion of these strategies to a variety of multi-benefit project types would allow for more rapid and cost-effective project implementation.

2.4 Water Supply Investment

2.4.1 Strategy-Specific Problem Statement

Most of the infrastructure that provides flood control benefits and stores and conveys water to Valley communities and agricultural lands is well over 70 years old. Current built infrastructure needs to be repaired, replaced, and expanded to deliver safe drinking water to

[17] Sustainable Conservation - Simplified Permitting to Accelerate Restoration

Valley communities, support sustainable levels of agriculture, replenish groundwater basins, and expand environmental habitat areas. Infrastructure rehabilitation and expansion is needed to connect residents in the S2J2 region who rely on the 336[18] small water systems, as well as the nearly 40,000[19] households on domestic drinking water wells, to large community water systems or to develop other safe drinking water solutions. Infrastructure improvements will also be required to address the hydrologic impacts of climate change.

Unsustainable groundwater withdrawal exacerbates infrastructure problems by causing subsidence. Land subsidence occurs when groundwater is extracted in excess of natural or managed replenishment and the ground compacts and permanently sinks as the groundwater table declines. Subsidence reduces conveyance and storage capacity, impacting these systems' ability to deliver water for consumptive uses, habitat restoration, and groundwater replenishment. In the San Joaquin Valley, all the major conveyance systems – the California Aqueduct, the Delta Mendota Canal, and the Friant Kern Canal – have experienced diminished capacity due to subsidence. Subsidence also diminishes the aquifer's ability to store and recharge groundwater in the future, increasing the gap between water demand and supply in the Valley.

Historic droughts over the last several decades placed extreme strain on California's groundwater basins and people. Additionally, climate change continues to reduce California's snowpack, which serves as a natural storage reservoir.

2.4.2 Outline of Proposed Strategy

Participating water agency members and other stakeholders have built on existing work to identify the categories of investments that can improve the conveyance and storage of water, mitigate environmental impacts, and provide benefits for the Valley communities, agriculture, and ecosystems. These include in-valley recharge, improving inter-valley conveyance, and increasing flexibility to move water across the region. These investment categories are based on categories of projects included in Integrated Regional Water Management Plans, Groundwater Sustainability Plans, and other compiled sources.[20] Where projects outside of the San Joaquin Valley have transfer and exchange benefits that can support the CAP Desired Outcomes, they have been considered, particularly for projects planned in the Diversified Supply Development category. These investments and projects do not include changes to regulations governing Delta export operations, the Delta Conveyance Project, or

[18] Identified from SAFER Dashboard for systems with 3,300 connections or fewer

[19] Identified from SAFER Risk Assessment Dashboard

[20] Referenced Plans include the California Water Supply Strategy and associated work performed by the State Water Resources Control Board and agencies under the California Natural Resources Agency. Groundwater Sustainability Plans (GSPs) for the Kaweah, Tulare Lake, Tule, Madera, Chowchilla, Delta-Mendota, Westside, and Kings Subbasins; Integrated Regional Water Management Plans (IRWMPs) for the Poso Creek, Tule, Kaweah River Basin, Kings Basin Water Authority, Westside-San Joaquin, and Madera IRWM Regions; and projects associated with implementation of the south-of-delta drought plan advanced by the United States Bureau of Reclamation, Friant Water Authority, San Luis & Delta-Mendota Water Authority, and the San Joaquin River Exchange Contractors Water Authority. Projects contained within these aggregated documents had varying levels of detail, and further analysis will be required for project level support by SJV CAP.

surface storage projects supported by the Water Storage Investment Program under Proposition 1.

2.4.2.1 Interregional and Regional Conveyance Investments

Invest in a Portfolio of Interregional and Regional Conveyance Projects ($4.2 Billion): New regional water conveyance systems and repairs of existing facilities, including levees, weirs, bypasses, canals, and other flood protection facilities, will be essential to create a more resilient water infrastructure system. Many local and regional conveyance upgrades and repairs are needed throughout the State to maintain and create access to new and existing water sources, provide emergency backup conveyance, or convey floodwaters to beneficial use. These needs are intended to be addressed by potential projects under this project category.

2.4.2.2 Surface and Groundwater Storage Opportunities

Invest in a Portfolio of Surface and Groundwater Storage Projects ($6.8 Billion): In response to the passage of the Sustainable Groundwater Management Act (SGMA), local agencies have proposed a significant number of new groundwater recharge projects that, if built, could result in substantial additional water storage capacity to divert flood flows in future wet years, like 2023, with sufficient investments to advance these projects. The State should invest in additional surface water storage infrastructure to capture and store rainfall for utilization during dry periods and to optimize groundwater recharge opportunities. Importantly, the interconnectedness of the State Water Project and Central Valley Project provide an opportunity for projects located outside of the San Joaquin Valley to provide in-Valley benefits through a number of mechanisms, including water transfers and exchanges. The Governor's Water Supply Strategy identifies the need to develop over 4-million-acre feet of new storage facilities, with other estimates placing the need much higher.

2.4.2.3 Diversified Supply Development

Invest in a Portfolio of Diversified Water Supply Development Projects ($3.4 Billion): The State has set a statewide target of 1.8 million acre-feet of new recycled water by the year 2040.[21] In addition, the State has set a target of expanding brackish groundwater desalination by 84,000 acre-feet per year by 2040[22],[23]. Both ocean and brackish groundwater and surface water desalination can play an important role in communities' water supply planning processes to enhance drought resilience both inside and outside the San Joaquin Valley. Importantly, and similar to storage improvements, the interconnectedness of the State Water Project and Central Valley Project provides an opportunity for projects located outside

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[21] California Water Supply Strategy, Aug. 2022, https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Water-Resilience/CA-Water-Supply-Strategy.pdf

[22] Id.

[23]https://www.waterboards.ca.gov/water_issues/programs/recycled_water/docs/2024/brackish-GW-write-up.pdf

of the San Joaquin Valley to provide in-Valley benefits through a number of mechanisms, including water transfers and exchanges.

2.4.2.4 Water Conservation Investment Strategies

Invest in a Portfolio of Water Conservation Strategies ($500 million): From 2013 to 2016, statewide per capita residential water use declined 21 percent and has remained 16 percent below (on average) 2013 levels. Public water agencies continue to invest in water conservation projects and programs that increase conservation efforts, such as turf replacement programs, water loss projects, and other water-use efficiency upgrades. Similarly, there are significant infrastructure projects at agricultural irrigation districts that can yield water savings, like canal linings, drip irrigation conversions and other system efficiencies. Importantly, and similar to storage improvements, the interconnectedness of the State Water Project and Central Valley Project provides an opportunity for projects located outside of the San Joaquin Valley to provide in-Valley benefits through a number of mechanisms, including water transfers and exchanges.

The exploration of residential water conservation program development for smaller water systems could generate meaningful incentives for domestic water consumers to reduce their consumption of water throughout the home by providing rebates. This could include rebates and incentives for low-flow toilets, water efficient washing machines and appliances, etc. Water conservation programs are often self-funded, and many of these small systems struggle to charge rates and collect on rates that can adequately fund operations and maintenance. Other means of generating and funding these potential rebate and incentive programs would allow for these programs to be implemented without the need to raise rates on consumers. Unfortunately, because water conservation is self-funded by agencies, Valley residents served by small community water systems do not have the access to opportunities to reduce their water use and therefore their cost of water.

2.4.2.5 Groundwater Recharge Investments

Expand the Flood-MAR Watershed Studies to the Tulare Basin ($13.2 Million – One-time): The California Department of Water Resources (DWR) is close to completing five San Joaquin Valley watershed models, which will help the state prepare for the watershed-level impacts of the state's drought and deluge cycles. For example, in the Merced Subbasin, a six-fold increase in peak flows is expected resulting from climate change. Flood-Managed Aquifer Recharge (Flood-MAR), forecast-informed reservoir operations (FIRO), and additional infrastructure can mitigate up to 65% of these flood impacts and reduce groundwater overdraft by up to 63%. The costs to implement each of these mitigation strategies (Flood-MAR, FIRO, and infrastructure) were not estimated as part of the studies. DWR should complete a watershed study of the remaining San Joaquin Valley watersheds in the Tulare Basin, which would cost approximately $13.2 million. This cost is only to study the Tulare Basin watersheds. It does not include the implementation costs.

Technical Assistance to Support Implementation of San Joaquin River Watershed Flood-MAR Study Findings ($10 million; Recurring): As a state, we need to implement and scale recharge activities identified through DWR Watershed Studies and pilot projects. Funding is needed to support expanded technical assistance for groups including but not limited to irrigation districts, groundwater sustainability agencies, counties, reservoir

operators, groundwater-dependent communities and ecosystems, and the agricultural industry to plan Flood-MAR operations. Technical assistance includes support for water rights permitting, regulatory compliance, development of recharge programs, monitoring and enforcement, site suitability and prioritization, and more. Technical assistance for the initial phase of implementing the watershed study findings is approximately $10 million and would support funding for DWR and its contractors to work with local entities.

Flood-MAR recharge project implementation of on-farm recharge ($91 Million – Recurring): Identification of projects is currently being done by the CAP project team based on projects identified by GSAs, irrigation districts, and flood managers. That analysis is still under way and not represented in this section. The scope of these projects may expand as findings from the Watershed Studies become available, and additional Flood-MAR technical planning assistance is provided to local entities.

GSPs don't typically include the cost of on-farm recharge (OFR) on private land, but covering costs is important to incentivizing individuals to participate. NRCS estimates costs of $130 per acre of OFR. Scaling to 700,000 acres of readily-rechargeable farmland (those that would not require new conveyance infrastructure) would cost $91 million per wet year for OFR.

Construction of Recharge Basins for Disadvantaged Communities ($150 Million – total capital cost for an assumed 75 projects): Implementing recharge for community drinking water is a promising approach for communities dependent on groundwater. Recharge for drinking water requires special attention to potential water quality impacts that could occur by mobilizing contaminants in the soil. The potential of recharge to improve water quantity and reduce water quality risk can be most efficiently managed by dedicating recharge basins located in optimal locations to benefit community drinking water supplies.

As an example of costs incurred, the 20-acre recharge basin in Okieville had $1.3 million of construction costs. Land acquisition costs are assumed to be $20,000 per acre, totaling $400,000 for a 20-acre project. Planning and design are estimated at $300,000, based on recent project design experience. Therefore, the one-time costs to construct a 20-acre recharge basin are approximately $2 million, based on recent project experience. The total investment amount assumes that 75 DACs in the San Joaquin Valley would benefit from a recharge basin, by having access to surface water supplies (<1,600 m), land to construct a basin, and reasonably adequate soil conditions.[24] These assumptions result in a total of $150 million for one-time construction costs. Recurring operation and maintenance costs are not included in this investment item but discussed below. Note, that this cost may fluctuate based on the necessary conveyance infrastructure.

Recharge Basin that Also Serves as a Park for Disadvantaged Communities ($2.8 million per basin/park): Recharge basins can be constructed with multiple purposes in mind, such as serving as a community park in the dry season. This could provide recharge in

[24] Fernandez-Bou, A. S., Rodríguez-Flores, J. M., Guzman, A., Ortiz-Partida, J. P., Classen-Rodriguez, L. M., Sánchez-Pérez, P. A., Valero-Fandiño, J., Pells, C., Flores-Landeros, H., Sandoval-Solís, S., Characklis, G. W., Harmon, T. C., McCullough, M., & Medellín-Azuara, J. (2023). Water, environment, and socioeconomic justice in California: A multi-benefit cropland repurposing framework. *Science of the Total Environment*, *858*, 159963. https://doi.org/10.1016/j.scitotenv.2022.159963

the wet season (and potentially reduce local flooding) while also serving as a public community space with amenities.

For a single 5-acre basin/park with amenities construction costs are estimated at $2.5 million. Land acquisition costs are estimated at $20,000 per acre, totaling $100,000. Robust community engagement is key to this type of project, so this should also be included for an additional $200,000, The total one-time costs to construct the basin/park total $2.8 million. Annual basin/park maintenance is estimated at $32,000 per year, a recurring cost. It is not known how many basins/parks are needed in the SJV.

Operations & Maintenance Fund for DACs and Ecosystems ($48 million for 20-year period): Projects benefiting Disadvantaged Communities (DACs) and ecosystems need O&M funding in addition to initial design and construction costs. For example, a recharge basin requires short-term O&M such as weed and rodent control, as well as long-term O&M such as silt removal, discing, and other basin maintenance. A fund dedicated to O&M for such projects would ensure the long-term success of these projects while also potentially providing ongoing skilled job opportunities. Based on the assumptions above of $32,000 per year and approximately 75 communities implementing projects, an estimate of $4,000,000 per year.

2.5 Land Repurposing Investments

2.5.1 Strategy-Specific Problem Statement

2.5.1.1 Land Transition Necessity under SGMA

The implementation of the Sustainable Groundwater Management Act (SGMA) and climate driven water scarcity will necessitate a shift away from the current irrigated agriculture acreage in the San Joaquin Valley. The Public Policy Institute of California (PPIC) estimates that by 2040 average annual water supplies available could decline by 20 percent, primarily driven by SGMA but also driven by the impacts of climate change. In a worst-case scenario PPIC estimated at least 900,000 acres of farmland may need to be fallowed in the San Joaquin Valley, resulting in the loss of around 50,000 jobs and reduced regional economic activity of 2.3 percent.

2.5.1.2 Continued Overdraft of Groundwater

Achieving SGMA compliance requires eliminating groundwater overdraft, either by bringing in new supplies of surface water or reducing the extraction of groundwater. The California Department of Water Resources (DWR) estimates that the average annual overdraft in the S2J2 region is at least 1.4 million acre-feet (MAF).

2.5.2 Outline of Proposed Strategy

2.5.2.1 Expansion of Multibenefit Land Repurposing Program Funding

Fund the Mutli-benefit Land Repurposing Activities ($13.6 Billion for land repurposing that focus on habitat restoration, plus added costs for lower water use crops, multibenefit groundwater recharge, and utility-scale solar projects): Several recent studies, including those by the Public Policy Institute of California (PPIC) (e.g., Hanak et al., 2023), have outlined opportunities to augment water supplies and manage existing water supplies more flexibly. However, reductions in groundwater extraction for irrigated agriculture will be unavoidable to achieve groundwater sustainability and to adjust to climate driven water scarcity. By 2040, it is estimated that nearly 900,000 acres of land may need to be taken out of irrigated agriculture — approximately 720,000 acres in order to meet SGMA requirements and 150,000 additional acres in response to climate change driven reductions in water supply in the San Joaquin Valley (Escriva-Bou et al. 2023; Hanak et al. 2019). In the S2J2 four-county area, the worst-case scenario is a need to repurpose 900,000 acres.

Multi-benefit land repurposing works to transition land to new uses in ways that reduce groundwater extraction and provide public benefits, such as improving community well-being, promoting renewable energy development, sustaining agriculture, restoring habitat and/or increasing resilience to the effects of climate change. Through the Multibenefit Land Repurposing program, administered by the California Department of Conservation, lands must be repurposed a minimum of ten years and in perpetuity. Given the scale of land use transition that will be needed over the next two decades, it is crucial to consider how best to maximize benefits to the region's economy, environment, and communities in a cost-effective manner.

Repurposing activities will occur on privately owned land. A brief definition of each repurposing activity is provided here.

- **Rangeland.** Land is converted to non-irrigated rangeland or pasture.
- **Repurposing Lower Water Crop**. Land remains in agricultural production; however, water use must decrease, which could be achieved by switching to a lower water use crop (e.g., alfalfa to safflower), deficit farming, water-limited agriculture, and/or dryland farming.
- **Habitat.** Land is restored to a state similar to its ecological condition prior to agricultural use (i.e., riparian/floodplain, wetland or upland).
- **Multi-benefit Recharge**. Land is developed into groundwater recharge sites that also provide additional benefits (e.g., habitat, flood control, etc.).
- **Open Space**. Land is purchased by a public entity for public benefit and then restored to a state similar to its ecological condition prior to agricultural use (i.e., riparian/floodplain, wetland or upland).
- **Park Space.** Land is purchased by a public entity and restored for public benefit, which could include habitat restoration and/or additional amenities (e.g., hiking trails, parking lot, public restrooms).

- **Solar.** A solar array is installed on the land for use by an individual or community solar project.
- **Other repurposing activities** may be viable in concert with solar (e.g., grazing, managed aquifer recharge).

The investment needs for land repurposing will vary based on the final scenario and the ultimate mix of different land uses. For the S2J2 recommendations, the need will include habitat restoration, transition to lower water use crops, multibenefit groundwater recharge basins, and utility-scale solar projects and community recreational spaces and buffers.

2.5.2.2 Solar Investments

Invest Funds and State Resources in Expanding Energy Transmission Infrastructure (No Cost Estimate): Renewable energy projects must be strategically sited near energy transmission infrastructure to convey the energy from the Valley to where it is needed most (i.e., major urban centers). PPIC and others have identified that the current energy transmission infrastructure level is inadequate to address the State's energy consumptive needs or its 2045 objectives. California should increase (a) State funding and improve the permitting process for energy transmission infrastructure development and construction and (b) cooperation between the California Energy Commission (CEC), California Public Utilities Commission (CPUC), California Independent System Operator (CAISO), Department of Water Resources (DWR), electric utilities, developers, communities, and land use planning agencies for coordinated planning of energy transmission infrastructure and strategic siting that is compatible with priority habitat areas and prime agricultural lands. The CAISO and CPUC should also study the opportunity to maximize the existing transmission infrastructure in the Valley to unlock renewable energy projects in areas identified as compatible with the values described above. *Please see the S2J2 Clean Energy and Fuels investment plan*.

Reinstatement of Williamson Act Subvention Funds (No Cost Estimate): Landowners with Williamson Act contracts face difficult decisions when considering whether a utility scale solar project is a financially suitable alternative land use for their property, as certain counties have determined that utility-scale solar is incompatible with the Williamson Act. The result of this county-by-county approach is that property taxes increase in some Valley counties when agricultural land is repurposed for utility-scale solar projects, thereby disincentivizing those wishing to utilize the property to meet the State's clean energy objectives. At the same time, counties struggle with the revenue implications of retaining the Williamson Act on land repurposed for utility-scale solar. The result is that the solar development community faces inconsistency on a county-by-county basis, and landowners and counties find themselves in conflict over property taxes. The State should reinstate subvention funds to supplement lost tax revenues in counties impacted by repurposing farmland to utility-scale solar. The intent is for this form of land repurposing to be revenue-neutral to the counties.

2.5.2.3 Alternative Agricultural Land Uses

Continue to Research the Economic Viability and Support the Implementation of Alternative Agricultural Land Uses (No Estimated Cost; Programmatic): The agricultural footprint of the San Joaquin Valley has largely transitioned to permanent deciduous crops that require ongoing water supplies to sustain the crop and support the initial investment

made in planting the trees. A strategy that is growing in popularity is the transition to crops that have a lower water demand, rotational cropping to only farm when water is available for irrigation, or to grow cover crops or other low- to no-water crops.

2.6 Demand Reduction Investments

2.6.1 Strategy Specific Problem Statement

2.6.1.1 Continued Overdraft of Groundwater

Achieving SGMA compliance requires eliminating groundwater overdraft, either by bringing in new supplies of surface water or reducing the extraction of groundwater. As noted above, the California Department of Water Resources (DWR) estimates that the average annual overdraft in the S2J2 region at 1.4 million acre-feet (MAF).

2.6.2 Outline of Proposed Strategy

2.6.2.1 Allocation Program Support

Support Groundwater Sustainability Agencies (GSAs) in the Implementation of Groundwater Allocations or Pumping Caps (No cost estimate): Implementing a groundwater allocation requires a GSA to have the ability to monitor groundwater extractions or consumptive use. There are available technologies that allow for the tracking of water use but deploying them at subbasin or agency scale requires capital investments, education, and ongoing technical and administrative support to ensure that all participating landowners are operating within their allocations and managing resources appropriately. The costs associated with the development of an allocation program include supporting adequate GSA staffing/consulting support, deploying measurement/monitoring technologies, outreach and education to landowners, and other necessary operational costs.

2.6.2.2 Demand Reduction Grant Funding

Renew and Expand the Funding of the LandFlex Grant Program ($1 Billion): The Department of Water Resources (DWR) developed the LandFlex Grant Program (LandFlex) to provide immediate drought relief to drinking water wells in drought-stricken communities and limit unsustainable groundwater pumping in critically overdrafted (COD) basins. Limiting overdraft groundwater pumping means more water left in the ground and available for drinking water wells in California's most vulnerable communities.

For the LandFlex program, the range of payment per acre is based on a number of components for row crops and permanent. For all three components of LandFlex, the repayment amounts were:

- $6,500 (row crop) per acre
- $9,000 (permanent crop) per acre.

- Dollar amount per ac-ft based on estimated water savings is approximately $250-260 per ac-ft water. This includes immediate savings plus long-term permanent water savings.

It is assumed for $1 Billion estimate that the primary acreage will be permanent crops which would allow for 100,000 acres enrolled. DWR has not finalized their analysis of the 2023 pilot program. It will be essential to ensure the program meets its primary purpose to protect vulnerable drinking water wells.

3 Funding Models & Sources

An updated system of financing water investments is needed to achieve the magnitude of funding for success and address participation and other issues experienced by disadvantaged community residents. Although the CAP, at this point in the process, does not identify what funding sources are appropriate for specific investments, the CAP will soon turn to both considering specific projects to implement and the appropriate funding sources. Additionally, support is needed from financial experts who can help consider comprehensive funding approaches, as opposed to project-by-project funding only. The region would benefit from comprehensive, creative funding systems that blend public grants and low-cost financing, philanthropic investments, below-market capital sources, and revenue-based financing mechanisms that enable "landscape-scale" investments to be made. Other considerations include:

1. Reforming Proposition 218 to ensure assessments can be approved to pay for pass-through mandates such as SGMA and Flood Control. Reform is also needed to ensure affected parties, including disadvantaged communities, are part of the rate-setting process.
2. Funding rate assistance for low-income customers.
3. Financing structures to enable disadvantaged communities to work in coordination with landowners to determine locations for local groundwater recharge, including the acquisition of lands for this purpose.

4 Tribes and Stakeholders

Engagement of tribes and stakeholders is required for successful implementation of the recommended investments for sustainable water and land management.

4.1 Tribes

The legacy of political actions, such as colonization, relocation, and termination toward California Tribes has perpetuated a practice of leaving them out of the discussion in developing State legislation. The exclusion of Tribes in State policies and plans has limited their ability to control and access water in accord with their asserted Indigenous and aboriginal rights. As a result, it has prevented Tribes from continuing their cultural, spiritual, and sustainability practices. Tribes must be offered the opportunity to genuinely participate in statewide and regional water planning, to voice their concerns and have them heard and respected, and to shape water policy. (California Water Plan - 2023 Update)

4.2 Stakeholders

Essential stakeholders for implementation of water investments include:

1. Disadvantaged communities, organizations, and service providers for disadvantaged communities.
2. Farmers and agricultural organizations
3. Water supply agencies
4. Local, state, and federal government agencies
5. Environmental and conservation organizations
6. Affected local communities

4.3 Tailored Engagement and Education is Needed to Involve Disadvantaged Communities in Implementing Drinking Water Solutions

Engagement and educational efforts cost time and money. Below are examples of activities or methods to provide outreach to the affected communities.

- **Public Workshops** – Workshops need to be informative and engaging, not just one-time meetings to provide information but opportunities to provide supported learning and build capacity. The number and extent of public workshops should vary by project. A simple infrastructure project requires less community engagement than a policy or regional water management project/effort. Example: when it comes to consolidation projects, Prop 13 elections, domestic well connections to a nearby PWS, etc., where people (voters) need to be educated/engaged, the level of need greatly increases in contrast to a simple well replacement in a community PWS.
- **Translation** – Provide verbal and written in Spanish and other languages relevant to region.
- **Stipends** – Consider providing stipends to support community members' transportation, travel, child-care, lost wages for a workday, etc.

- **Meals –** Provide food and refreshments if workshops are all day.
- **Venue Rental** – Community spaces or meeting halls may have rental fees associated with them.
- **Educational Opportunities** – Tours are a great educational tool, but time consuming to develop & implement, expensive for buses, etc.
- **Staff Time** – Agency staff time is required to participate and facilitate the listening, documenting input, and translating between community members and decision-making bodies.
- **Promotional Materials** – Flyers, social media, radio, door to door outreach.

Support for community members attempting to engage in water management decisions that impact their drinking water is needed.

- How to participate in public meetings via public comment, written public comment, or general member of the audience.
- How to serve, and stay engaged, as an advisory committee or board member.
- Supported opportunities for community members and decision-makers to engage in dialogue via structured engagement sessions, support at meetings, etc.

4.3.1 TMF Capacity Building (Technical, Managerial, Financial)

Geared more toward individuals serving on local boards, managing the governance and financial and compliance efforts of a public water system.

- Continual training for volunteer boards is needed, to stay compliant with new/revised regulations, for new board members, to seek new funding sources, etc. Training is often minimal for board members because of lack of funds and/or access. The trainings cost money, often occur during workdays, and are very rarely accessible geographically.
- Financial support for bookkeeping, bills, audits, state compliance, etc. It has become extremely difficult to find auditors for small CSDs. The requirements and liabilities have become onerous and therefore expensive to small water systems. Highly informed bookkeepers are very difficult to find and retain for small systems.

Domestic Well User

There is no widespread, comprehensive education plan or effort currently in the SJV for domestic well users. Education is needed on the following:

- How and when to prepare to replace a well
- How to monitor “time left” until the well might dewater
- How to provide interim water for the home if the well dewaters
- How to secure a legitimate well driller
- How to prepare financially (potential cost)

- How to determine what depth to pay for and other construction options for longevity and contamination mitigation
- Knowledge of known contamination in the community
- How to mitigate, including pump level setting, seals, etc. in new/existing wells
- Filters and/or home treatment options, including O&M
- Much education is needed to provide accessible and trusted information to domestic well owners on consolidation or connection to nearby public water systems, or establishment of a new public water systems.

5 Barriers, Path to addressing, & Policy Updates

Barriers have been identified in the overall problem statement and for each investment category. Common barriers across the investment categories include:

- Capacity for agencies, organizations and communities to engage and implement the necessary actions.
- Bureaucratic processes and requirements that unnecessarily limit the pace and increase the administrative burden for needed projects.
- The lack of funding and funding structures that support the magnitude of need and the certainty needed for making long-term investments.

6 Path Forward

The CAP is an existing group formed in 2021 and is committed to being a part of the S2J2 Initiative for the next two years. An essential next step is to develop a scope of work to synthesize the recommended water investments into a cohesive strategy for implementation. The scope will require the expertise of professional engineers, climate scientists, public and infrastructure finance experts, and others to identify the specific projects, funding structures, and other tools necessary to achieve sustainable land and water management. In addition, the CAP will develop programmatic recommendations needed for governmental programs and policies to accelerate the implementation of the recommended investments.

7 Appendix – San Joaquin Valley Water Collaborative Action Program (CAP) Term Sheet – Approved 11/22/22

Mutually Beneficial Gains

The overall guiding principle of CAP is that the goals of the caucuses will be achieved on a mutual basis. All caucuses will share benefits as the program moves forward. No caucus can advance its interests at the expense of others. CAP's governance is designed to assure mutually beneficial outcomes. Each caucus can object to and stop a CAP action from moving forward. This means that each caucus knows that its goals and concerns must be respected and each caucus benefits from working to advance the interests of the other caucuses.

CAP Desired Outcomes

1. **Safe Drinking Water**. By 2035, all San Joaquin Valley (Valley) residents will have access in a timely manner to safe, reliable, and affordable drinking water no matter the hydrologic conditions. This means prioritizing both interim and long-term water supply and water quality challenges for all residents, including those faced by small communities and domestic well users.
2. **Sustainable Water Supplies**. Sustainable water supplies will be available to support a diverse economy, thriving ecosystems, access to safe, reliable, and affordable drinking water for all Valley residents, and a sustainable level of agricultural production.
3. **Ecosystem Health**. The Valley landscape will increase its habitat areas to support an array of species and healthy aquatic ecosystems, including floodplain, riparian, wetland, on-farm, and upland habitat.
4. **Sustainable Agriculture**. California will continue to provide reliable, safe, and secure food and fiber with industry-leading protections for workers, in-Valley communities, and the environment. The Valley will continue to be a major agricultural resource by preserving as many acres of sustainable farmland as possible while being a good neighbor to communities and ecosystems.
5. **Public Investment in Desired Outcomes**. Sufficient public funds will be invested to support a) the necessary natural and constructed infrastructure to increase supply, b) demand reduction strategies including land repurposing, and c) other investments to accomplish the Desired Outcomes.
6. **Consistent Policies**. State and federal policies and funding will be aligned to advance the Desired Outcomes. Expedited permitting and regulatory review processes will be available for qualified multi benefit projects and other actions to achieve the Desired Outcomes.
7. **Local Government Resources**. Local governments will have adequate resources, staffing, and capacity necessary to play a vital role in the transition to sustainable water resources management in the Valley.
8. **Sound Science**. Decisions will be made using the best available and independent science possible. Adaptive management with monitoring, deployment of the best

available technology and outcome accountability will be necessary to maximize the effectiveness of resource decisions.

CAP Solutions Elements

1. **Safe Drinking Water**. Support state and local agencies and communities in efforts to address data gaps, fund emergency solutions (such as bottled water delivery and well replacement), ensure strong local well mitigation programs, and promote long-term solutions such as consolidation and targeted recharge projects.
2. **Sustainable Water Supplies**. Eliminate the demand-supply gap and long-term overdraft with co-equal efforts to reduce demand and increase supply by prioritizing projects that will benefit multiple stakeholders.
    a. **Reduced Demand.** Reduce demand via responsible groundwater management and incentivizing landowners to voluntarily repurpose irrigated agricultural lands to other beneficial uses that require little or no water, with compensation to landowners for creating public benefits and water rights reserved by landowners, consistent with applicable GSPs, with a priority for groundwater demand reduction programs where they benefit those reliant on shallow groundwater resources without hindering the ability to replenish aquifers for sustainable agriculture and other beneficial uses.
    b. **Increase Supply**. As available, increase supply for sustainable agriculture primarily by managing in-Valley and through-Delta flood flows for use and aquifer replenishment.
    c. **The Delta**. In partnership with Delta interests and stakeholders, conduct a science-based assessment of the Delta with independent scientific experts to:
        i. Determine how much additional water can be diverted from the Delta during high flow events while protecting ecosystem health and Delta communities, consistent with PPIC May 16, 2022, Policy Brief (PPIC Report).[1] As of the above date, the PPIC Report confirms the availability of increased Delta exports in wet years. CAP will support conducting an assessment of increased Delta exports during high flow events in other year types.
        ii. Assess the reduction of non-flow stressors in the Delta (e.g., predation, invasive plants, urban effluent, agricultural runoff, disease/competition, changes in food etc.). CAP will support the review of existing studies on non-flow stressors to decide next steps and best investment in further research.
        iii. Explore reservoir reoperation that takes into account leading edge forecasting technology to serve multiple benefits.
3. **Ecosystem Restoration**. Create one of the largest restoration programs, in part, through voluntary land repurposing of a portion of the Valley's irrigated land to create a range of habitats.
4. **Coordinated Changes in Land Use**. Ensure Valley-wide land use change helps accomplish CAP goals by working through the California Multibenefit Land Repurposing Program and related state programs, while also leveraging federal

sources of funding. Ensure outreach and protections for communities and locally defined small farmers through this program. Explore supportive programs for farmworkers who are displaced by land use changes.

5. **Effective Implementation**. Work through the politically diverse CAP coalition to align state and federal policies and funding as informed by units of local government. Implementation measures should ensure additional funding and staffing resources for local governments so that they can play a vital role in transitioning the Valley to sustainable water resource management.

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[1] PPIC Policy Brief: Tracking Where Water Goes in a Changing Sacramento–San Joaquin Delta, May 16, 2022: "Increasing the amount of water stored during wet periods—whether by taking more water out upstream of the Delta, or making the best use of export facilities—has to be done with care for the environment and other water users. But it is possible to do a better job of storing water during wet years—both above and below ground—without doing harm. Improving the management of wet-year supplies is a critical climate change adaptation strategy. This will require identifying cost-effective investment options and adapting operations and regulatory approaches to facilitate capturing more water in wet times."

WE WANT TO HEAR FROM YOU!

Share your thoughts on the Spring Sprint process and the DRAFT Plan through the Feedback Survey. The feedback period will be open from Friday, July 26 to Tuesday, August 13 at 4:59 p.m. PST. All comments received will be included in the "Community Voice" section in the DRAFT submission to the state."