18. PROJECTS AND MANAGEMENT ACTIONS

> *§ 354.42. Introduction to Projects and Management Actions*
> *This Subarticle describes the criteria for projects and management actions to be included in a Plan to meet the sustainability goal for the basin in a manner that can be maintained over the planning and implementation horizon.*

Pursuant to the Sustainable Groundwater Management Act (SGMA) and Groundwater Sustainability Plan (GSP) Regulations, this section presents the Projects and Management Actions (PMAs) proposed to achieve the Sustainability Goal within the Cosumnes Subbasin (Basin) (23-California Code of Regulations [CCR] § 354.42):

> *The Sustainability Goal of the Cosumnes Subbasin is to ensure that groundwater in the Basin continues to be a long-term resource for beneficial users and uses including urban, domestic, agricultural, industrial, environmental and others. This goal will be achieved by managing groundwater within the Basin's sustainable yield, as defined by sustainable groundwater conditions and the absence of undesirable results.*

To the extent that information was available, the PMAs presented herein were developed by the PMA Committee under the direction of the Cosumnes Subbasin SGMA Working Group (Working Group). The PMA Committee is comprised of Groundwater Sustainability Agency (GSA) representatives (supported by technical consultants) that collaboratively identified the proposed PMAs and developed the necessary supporting information for inclusion in the GSP. The Working Group is in the process of developing a joint exercise of powers agreement (JPA) that establishes the Cosumnes Groundwater Authority (CGA) for the purpose of implementing the GSP, which includes implementating the PMAs.

The GSAs preliminarily considered feasibility, costs and benefits when finalizing the recommended list of PMAs. However, the PMAs will require further evaluation (e.g., engineering, economic, environmental, legal, etc.) as part of implementation and will be designed with the best available information and best available science. In addition to the PMAs presented herein, the GSAs in coordination with the CGA will conduct data gap filling activities as part of GSP implementation that may include, for example, validating the status of existing wells (i.e., active/inactive), performing feasibility studies, refining the Basin water budget parameters based on additional data and modeling, collecting additional data related to aquifer conditions and properties, and conducting additional data compilation and analysis of groundwater conditions information (see Section **Error! Reference source not found.**~~19.1~~ ***Error! Reference source not found.***~~*Plan Implementation Activities*~~).

This section presents the goals and objectives of the PMAs, including the guiding principles used to prioritize the PMAs, the relevant Sustainability Indicators they address, and the expected benefits from their implementation. A list of specific PMAs is presented and summarized in **Table PMA-*1***~~**Table PMA-1**~~

(PMA Information Forms are included in Error! Reference source not found.~~Appendix O~~) and groups the PMAs by benefit category and type. In addition, an explanation is provided for how the PMAs address the following:

- Sustainability Indicators and Undesirable Results (URs);
- Potentially applicable permitting and regulatory requirements;
- Status and implementation timeline;
- Expected benefits and/or how expected benefits will be evaluated;
- Description of the sources of water that will support PMA implementation;
- Legal authority required to implement the PMAs; and,
- A summary of estimated PMA costs and how the GSAs plans to fund PMA implementation.

18.1. Goals and Objectives of Projects and Management Actions

18.1.1. Guiding Principles

The PMAs are based on the following guiding principles:

- Groundwater Augmentation from Wet Year Supplies: Preference for supply sources available during wet years.
- Groundwater Augmentation from New Supplies: Preference for new supply sources over demand reduction (e.g., increase groundwater recharge preferred over fallowing agricultural lands).
- Offset Costs with Revenue-Generating PMAs: Develop PMAs to generate revenue and minimize the financial burden on Basin stakeholders. This principle includes potentially developing a water banking operation, wherein groundwater saved through a voluntary land fallowing program is stored in the Basin for sale later as supplemental dry year supply for other agencies. The money generated by the water sales can be used to fund GSP implementation.

In addition to these principles, the preferred PMAs are cost effective, provide multiple benefits (e.g., environmental, flood control, groundwater recharge, etc.), have a high probability for success, and maintain the viability of current beneficial uses of groundwater within the Basin.

18.1.2. Relevant Sustainability Indicators

Per the GSP Regulations, GSPs must include PMAs to address existing or potential future URs for relevant Sustainability Indicators (23-CCR § 354.44). As summarized in **Table PMA-1**~~Table PMA-1~~, each PMA addresses one or more of these applicable Sustainability Indicators.

Projected conditions for the Basin indicate Sustainable Management Criteria (SMCs) may be exceeded for Chronic Lowering of Groundwater Levels without active groundwater management efforts. Accordingly,

the PMAs are directed toward avoiding projected URs from the Chronic Lowering of Groundwater Levels, which is also protective of the Depletion of Groundwater Storage and Land Subsidence Sustainability Indicators.

Avoiding URs from lowering of water levels can also potentially protect against water quality changes that might occur due to alterations in vertical and horizontal groundwater-flow. Water quality changes from other factors, like increased deep percolation of applied water, are already regulated under the Central Valley Regional Water Quality Control Board's (RWQCB's) Irrigated Lands Regulatory Program (ILRP), and therefore also protective of water quality. Moreover, PMAs determined to potentially impact water quality can include focused monitoring and evaluation to prevent URs.

The shallow groundwater levels near interconnected surface water are influenced by stage, the exchange of surface- and groundwater, recharge and pumping. As a result, the shallow groundwater levels can be poorly correlated with the groundwater levels at greater depths and greater distances from surface water, and the protection of interconnected surface water relies on its own monitoring network and criteria.

18.1.3. Benefit Categories

The primary water management "tools" by which the GSAs can address conditions that may lead to URs for the applicable Sustainability Indicators pertain to management of water inflows (supplies) and outflows (demands). The expected benefits are groundwater augmentation, both from wet-year and new supplies, and to generate revenue to support GSP implementation. The PMAs can provide for one or more secondary benefits such as flood control, data gap filling, and so forth.

18.2. List of Projects and Management Actions

> *§ 354.44. Projects and Management Actions*
>
> *(b) Each Plan shall include a description of the projects and management actions that include the following:*
>
> *(1) A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent. The Plan shall include the following:*
>
> *(A) A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management actions, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*
>
> *(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.*

This section provides a list of the PMAs that have been preliminarily identified, and their approximate locations in the Basin are shown in Error! Reference source not found.~~Figure PMA-1~~. The PMAs were organized into three categories: (1) groundwater augmentation (wet year supplies), (2) groundwater augmentation (new supplies), and (3) revenue generation. Their descriptions and benefits determined by the Numerical Model are provided below, and in the summaries provided in **Table PMA-*1*~~Table PMA-1~~** (Sustainability Benefits and Implementation Process), **Table PMA-2~~Table PMA-2~~** (Expected Benefits, Water Source, and Costs), and the PMA forms provided by the GSAs are included in Error! Reference source not found.~~Appendix O~~.

18.2.1. Groundwater Augmentation from Wet Year Supplies

PMA #1 Omochumne-Hartnell Water District (OHWD) Agricultural Flood Managed Aquifer Recharge (Flood-MAR)

As part of the *OHWD Agricultural Flood-MAR* project, winter diversions will be applied on up to 1,800 acres of dormant vineyards, orchards, and other farmlands for recharge to increase groundwater levels and groundwater storage. Although the targeted farmlands are located directly north of the Cosumnes River (in the South American Subbasin [SASb]), as shown on Error! Reference source not found.~~Figure PMA-1~~, the resulting storage changes are expected to benefit groundwater levels and storage in the Cosumnes Basin.

During Phase 1 of project implementation (2022 - 2027~~anticipated to start in 2024~~), winter river flows from the Cosumnes River will be diverted at an anticipated average annual rate of 1,200 acre-feet per year

(AFY), and the water will be applied to approximately 1,200 acres of dormant fields to percolate and recharge the aquifer. Diversions will be based on minimum daily flows on the Cosumnes River measured at the Michigan Bar gauging station as follows:

- less than 76 cubic feet per second (cfs), no diversions;
- greater than 76 cfs but less than 175 cfs, 6.5 cfs can be diverted; and
- greater than 175 cfs, a maximum of 16 cfs can be diverted.

Using historical average daily flows measured at Michigan Bar and the diversion rule set above, the estimated average annual diversion would be almost 1,400 AFY. The estimated benefit~~s~~ to the Cosumnes Basin is ~~are~~ approximately 50 AFY.

During Phase 2 of project implementation (anticipated to start in 2028), additional winter flood water from ~~control releases of~~ the American River water ~~from Folsom Reservoir~~ will be delivered to the OHWD recharge area ~~Basin~~ from Folsom Reservoir via~~Basin~~ ~~by~~ the Folsom South Canal (FSC) to supplement the recharge from diversions under Phase 1. Hydrologic and reservoir operations modeling under a set of conservative assumptions and constraints indicate that, on average, more than 20,000 AFY of water could be available for spreading on up to 1,800 acres during mid-November through mid-March (MBK, written communication, March 22, 2021). For the purposes of this GSP, Phases 1 and 2 are assumed to operate until the end of the 50-year SGMA implementation period (2072).

Model-calculations indicate that the OH~~OH~~WD Flood-MAR project could reduce projected annual declines in groundwater storage within the Basin by almost 700 AFY. Implementation of this project will be led by the OHWD GSA and will be coordinated with other GSAs in the SASb. The project benefits will be routinely re-assessed as part of the Basin's adaptive management strategy.

PMA #2 Sacramento Area Flood Control Agency (SAFCA) Flood-MAR

The *SAFCA Flood-MAR* project includes augmenting Basin storage with excess winter American River flows released from Folsom Reservoir and delivered to the Basin by the FSC. Recharge operations will include "flooding" up to 2,000 acres of dormant fields and~~/or~~ passive injection from dry wells located along FSC (Error! Reference source not found.~~**Figure PMA-1**~~). During Phase 1 (2022~~4~~ to 2027) the GSAs will conduct pilot studies to assess the feasibility of performing~~-~~ aquifer recharge in various locations throughout the ~~b~~Basin. In addition, outreach to ~~farmers~~landowners ~~with pasturelands and other high water use crops~~ will be conducted to assess their~~the~~ interest in participating in the recharge program. ~~-~~Lastly~~identify and~~, ~~develop~~ agreements for water deliveries to participating farm fields will be secured.~~-~~ During this same time period, ~~our partner,~~ SAFCA~~,~~ will work with the Bureau of Reclamation, participants in the Sacramento Water Forum, the Regional Water Authority, and other interested stakeholders to reach agreement on implementing elements of the SAFCA Flood-MAR program. ~~-~~This includes storage of winter floodwater in the Folsom ~~Dam~~Reservoir, resolution of the water rights associated with this stored water, diversion of a portion of the stored water down the Folsom South Canal and other regional conveyance systems for infiltration ~~with the goal of delivering floodwater to~~in the South American and Cosumnes S~~s~~ubbasins, and

acquisition of ~~.. In addition, SAFCA will engage the Bureau of Reclamation to obtain~~ the right to place dry wells in the right of way of the Folsom South Canal. Water diversions will commence ~~D~~during~~During~~ Phase 2 (2028 to 2042). ~~), when implementation will begin. This will involve delivery of up to an average of 15,000 AFY of winter floodwater to farm fields and dry wells within the Cosumnes basin.s, the project will increase groundwater storage and groundwater levels in the Basin; however, t The benefit from this PMA depends on the amount of excess winter flood water available for recharge.~~ For the purposes of this GSP, Phase 2 is assumed to continue after 2042 continuously through the 50-year sustainability period required by SGMA (through 2072).

Hydrologic and reservoir operations modeling under a set of conservative assumptions and constraints project that, on average, more than 9,000 AFY of water could be available to the Basin during November through March for spreading, and almost 6,000 AFY of additional water could be available to the Basin from November through May for passive injection through dry wells (MBK, written communication, March 22, 2021). The former diversions would be applied up to 2,000 acres of ~~dormant~~ farm fields, and the latter diverted to about 50 dry wells for passive injection.

The Numerical Model was employed to analyze the benefits from the planned spreading and injection operations. Results indicated that the aquifer recharge~~spreading~~ operations would result in about 4,000 AFY decrease in projected storage decline in the Basin. Similarly, injection would result in more than 2,000 AFY for a total storage benefit of over 6,000 AFY.

18.2.2. Groundwater Augmentation from New Supplies

PMA #3 OHWD Cosumnes River Flow Augmentation

The *OHWD Cosumnes River Flow Augmentation* PMA releases water from the FSC into the Cosumnes River during late-October through December when the Cosumnes River typically does not flow continuously between reaches. The discontinuity in surface flows impedes fish migration and spawning. The introduction of additional instream flows will support fish requirements and provide additional flows to increase leakage from the river that will recharge the Basin. A pilot project was completed in 2005, and full implementation is contingent on securing a water source and funding.

During Phase 1 (20~~24~~22 – 2027), an agreement with the United States Bureau of Reclamation (USBR) for Central Valley Project (CVP) water (or other source) will be secured for release into the Cosumnes River from the FSC. During Phase 2 (2028-2042), project implementation will begin and 1,500 AFY to 5,000 AFY of CVP water (or other source) will be released from FSC into the Cosumnes River during late October through December.

For the purposes of this GSP, Phase 2 is assumed to release 1,000 AF per month during the period October through December (3,000 AFY) during the period 2028-2072.

Model calculated benefits were over 17 cfs of instream flow but the additional leakage increased

groundwater storage in the Cosumnes Basin by less than 100 AFY.

PMA #4 City of Galt Recycled Water Project

The City of Galt currently provides tertiary treated wastewater (recycled water) to more than 160 acres of nearby farmland for summer irrigation. The approximate location of farmlands and the wastewater treatment plant (WWTP) are shown on Error! Reference source not found.~~Figure PMA-1~~. This PMA will expand the program to apply more of the existing recycled water supply to Basin farmland year-round. During Phase 1 (2024~~2~~-2027) agreements will be secured with landowners to expand the area of fields that will receive recycled water and the discharge permit from the National Pollutant Discharge Elimination System (NPDES) will be modified to include year-round irrigation. The current RWQCB Central Valley Region NPDES Order R5-2015-0125 allows for secondary treated effluent irrigation to the designated areas. During Phase 2 (2028-2042), the application area will be expanded, and treated wastewater applied year-round. The winter applications are expected to increase recharge, and the summer growing season deliveries will decrease demands for groundwater. The model-calculated storage benefit of this PMA is approximately 300 AFY. For the purposes of this GSP, Phase 2 is assumed to continue after 2042 continuously through the 50-year sustainability period required by SGMA (through 2072).

18.2.3. Revenue Generation

PMA #5 Voluntary Land Fallowing

The *Voluntary Land Fallowing* PMA seeks to reduce groundwater extractions and use by agriculture. The *Fallowing* action decreases groundwater use by temporarily removing approximately between 750 and 1,000 acres of active farmland irrigated with groundwater ~~solely with groundwater~~ in Phase 1 (2024~~2~~4-2027) and as many as 2,000 acres during Phase 2 (2028-2042). For the purposes of this GSP, Phase 2 is assumed to continue after 2042 continuously through the 50-year sustainability period required by SGMA (through 2072). The potential candidate farmlands are shown on Error! Reference source not found.~~Figure PMA-1~~. The program will be voluntary, and participating landowners will be compensated by the GSAs for resting their land.

The *Voluntary Land Fallowing* PMA benefits were estimated by randomly retiring alfalfa and pasture irrigated with groundwater in the Basin. R~~The estimated benefit of r~~etiring 750 acres of active farmland in Phase 1 is estimated to ~~(2024-2027)~~ provide~~d~~ an average savings in terms of reduced groundwater consumption of about ~~5,8~~3,600~~800~~ AFY ~~for the 50-year planning period (~~with a net savings of about~~about~~ 2,700 AFY. ~~w~~When ~~when~~ fully implemented in Phase ~~1~~2, the net savings from voluntary fallowing would grow to~~,~~ ~~and~~ more than 6,300 AFY ~~when fully implement in Phase 2).~~. Commencing in Phase 2, ~~The~~this stored ~~The~~ water ~~retained in storage can~~could be extracted and sold as supplemental dry year supply. Assuming a recovery rate of 18,000 AFY during dry and critical dry years, the average annual volume available for extraction, ~~rate for~~ recovery, and sale is more than 5,000 AFY.

Commented [BW1]: Not sure what this means

PMA #6 Groundwater Banking and Sale

The *Groundwater Banking* PMA utilizes the available storage in the Basin to store fallowed water that, later, can be extracted and sold to out-of-Basin users for dry year supply augmentation. This PMA depends on demand for dry year water supply augmentation, a partnering urban water agency, construction of necessary pipelines and recovery wells.~~This PMA is expected to provide multiple benefits to the Basin.~~ Groundwater banking ~~First, the PMA~~ can generate significant revenue from water sales to support GSP implementation, thereby reducing the cost to landowners. The sale of fallowed water will only occur once external flood and/or recycled water ~~wastewaters~~ enter the Basin in sufficient amounts to offset the amount sold~~as part of PMA #2~~. ~~Secondly,~~ Exports will be guided by a ~~groundwater storage will benefit from implementation of a~~ leave-behind policy, whereby a set amount ~~percentage~~ of banked water can be sold only when a much larger amount of recharged water is left in the ~~is left in the~~ Basin. The basic principle guiding the leave behind policy is that there can be no negative impacts on groundwater storage associated with the sale of water. As a starting point, it has been suggested that for every 1 AF of fallowed water sold, 3 AF would be required to enter the basin to increase groundwater storage. Additional public input as well as GSA input is needed to formalize this policy.~~The criteria for the leave-behind policy will be established during the early implementation phase of the GSP (e.g., extraction of banked water limited to 90% or less of the water saved by fallowing, leaving 10% or more of the recharge behind to remain and benefit groundwater storage in the Basin). This PMA depends on demand for dry year water supply augmentation, a partnering urban water agency, construction of necessary pipelines and recovery wells, and reliable water accounting methods.~~

During Phase 1 (2022~~4~~-2027), the Cosumnes Groundwater Authority will ~~pursue a formal relationship will be developed with an interested water purveyor and local water management agencies whose flood and/or wastewater could be used to recharge the Basin. The CGA will~~ work with ~~the~~ basin landowners, GSA members, and regional stakeholders to vet~~flesh out~~ the ~~develop a~~ policies ~~y~~and~~-~~ procedures that define~~s~~ how the water banking and recharge program~~s described in the above PMAs~~ will be implemented. This will include~~ing , including~~ governance, groundwater monitoring, and establishment of a verifiable ~~and water~~ accounting system to track the amount of water entering the basin and the amount that is sold~~the terms and conditions under which stored water may be exported from the Basin (leave-behind policy).~~ -Once these policies and procedures are in place, and an interested urban water purveyor has been identified, banking and sale of water could commence ~~banking and recharge operations. The policy and procedures will include a reliable water accounting framework and the GSAs' monitoring and management responsibilities. This includes policy and procedure for reviewing and approving the groundwater transfers and water banking activities described in the above PMAs.~~

~~During Phase I, the CGA will also evaluate the potential to use recharge water as an offset for the banking and sale of water saved through voluntary fallowing. This evaluation will focus on the physical and institutional challenges associated with the groundwater banking activity. This activity would be expanded~~ in Phase 2 (2028-2042), after construction activities are complete and recharge of winter flood water has begun. For the purposes of this GSP, Phase 2 is assumed to continue after 2042

continuously through the 50-year sustainability period required by SGMA (through 2072). ~~Studies will be performed between 2022 to 2027 to evaluate the potential to use this recharge water as an offset for the banking and sale of water saved through voluntary fallowing. The studies will focus on the physical and institutional challenges associated with the groundwater banking activity, including the capacity of dry well and agricultural lands in the Basin to sufficiently infiltrate water. This activity would be expanded in Phase 2 (2028-2042), after construction activities are complete and recharge of winter flood water has begun. For the purposes of this GSP, Phase 2 is assumed to continue after 2042 continuously through the 50-year sustainability period required by SGMA (through 2072).~~

~~18.2.4.~~ Other PMAs

Other PMAs are also under consideration~~ by the PMA committee~~, but details are currently insufficient to estimate implementation costs and benefits. For example, consistent with existing law, the GSAs can implement agricultural water conservation and management practices, including conjunctive use, to reduce extraction volumes, increase groundwater recharge, and manage the Basin water budget. To accomplish these goals, the GSAs may develop programs and b~~B~~est m~~M~~anagement p~~P~~ractices (BMPs) to increase water use efficiency. For example, effective BMPs that reduce overall groundwater consumption could include improved irrigation practices, conversion of land uses from relatively high-water demand to lower water demand crops, improved water tracking and accounting methods, installing higher efficiency irrigation delivery and application systems, employ soil moisture sensors for more precise irrigation scheduling and application volumes, and promote other actions that can help reduce overall groundwater consumption. The GSAs may consider creating incentives or providing funding to promote these improvements in efficiency based upon available financial resources and landowner participation.

Other potential PMAs that may be considered by the GSAs include:

- Expand land fallowing (PMA #5) through voluntary incentives;
- ~~Develop a system to allocate use of existing groundwater between users;~~Explore off stream impoundments to store floodwater;
- Evaluate the use of a distributed system of dry wells on private lands throughout the Basin~~individual landowners property~~;
- Implement Low Impact Development practices in the City of Galt (including the use of dry wells to redirect stormwater runoff for recharge);
- ~~I~~mplement the Drought Resilience Impact Platform for verifying Basin pumping, conservation efforts and land retirement effectiveness;
-

- ~~P~~Participat~~ion~~ e in regional water supply and water banking projects, such as the Harvest Water Project[1]; ~~and,~~
-

R

- ~~*~~Review ~~Implement t~~The Deer Creek Hills Aquifer Storage and Recovery (ASR) project, initially proposed in 1997 as part of the water supply for the proposed Deer Creek Hills development, which utilizes high flows from the Cosumnes for ASR immediately north of the community of Rancho Murieta. Based on the initial application to appropriate water by permit with the SWRCB, 4,800 AFY of excess high flows (10 cfs max diversion rate) from the Cosumnes River (between November and June) would be diverted from the existing Rancho Murieta Community Service District Pump Station near Granlees Dam. The diversions are then injected into nearby private wells (consolidated aquifer) for storage and recovery at a later time. ~~Develop a system to allocate use of existing groundwater between users;~~

~~Develop a system to allocate use of existing groundwater among current users. If the institutional partnerships needed to implement the joint Flood-MAR program with SAFCA are not realized, more significant demand reduction practices will, out of necessity, need to be implemented.~~

- ~~and proposed wells in the Lopes well field (unconsolidated aquifer; located on 234 acres of undeveloped land between Dillard Road and the Cosumnes River).~~
- These additional PMAs provide flexibility to the Basin to adaptively address unforeseen conditions. For example, one or more of the additional PMAs may be implemented should projected climatic conditions be drier than represented in this evaluation.
- Recharge projects utilizing potentially available surface water from Amador County;
- Provide technical and financial support to landowners wanting to implement water use efficiency/conservation projects

Additional PMAs may also be needed should the expected benefits from the planned PMAs be unrealized, or unforeseen circumstances restrict implementation (e.g., failure to secure outside water sources).

Commented [AM2]: PMA Form Submitted by Amador GSA

Commented [AM3]: Important to list as this is an RCD type project that there are multiple funding opportunities for.

[1] The Harvest Water project is in the SASb, and implementation is similar in concept to the City of Galt Recycled Water Project (PMA #4) whereby groundwater irrigation is replaced by treated wastewater and the water is applied year-round. The combined reduction in groundwater use and greater recharge north the Basin is projected to increase groundwater levels, benefiting groundwater storage in the SASb and Basin, and reduce Cosumnes River depletions ("South Sacramento County Agriculture and Habitat Lands Recycled Water, Groundwater Storage, and Conjunctive Use Program, Integrated Groundwater and Surface Water Modeling Results Technical Memorandum," RMC, 2017).

- In particular, if the institutional partnerships needed to implement the SAFCA Flood-MAR program are not realized, and voluntary land fallowing in combination with the other PMAs described above cannot achieve the deficit reduction anticipated by the GSP, it may be necessary to adopt a system of allocations that caps the amount of available groundwater that individual landowners may use.

Commented [AM4]: Flagging for Working Group discussion.

Table PMA-1. Projects and Management Actions – Sustainability Benefits and Implementation Process[1]

PMA Name	Summary Description	Relevant Sustainability Indicators Affected			Circumstances for Implementation	Public Noticing Process	Permitting and Regulatory Process Requirements	Status	Timetable / Circumstances for Initiation
		Groundwater Levels	Groundwater Storage	Interconnected Surface Water					
Groundwater Augmentation (Wet Year Supplies)									
#1 OHWD Agricultural Flood Managed Aquifer Recharge	Phase 1 (20242-2027): 1,200 AF per year of winter diversions anticipated from Cosumnes River during high flows to flood 1,200 acres of dormant vineyards, orchards, etc. (Estimated benefit toward reducing the projected storage decline is less than 100 AFY). Phase 2 (2028-2042): Anticipated average annual diversions of 20,000 AFY excess American River winter water released from Folsom Reservoir and delivered to Basin by the FSC during the period November 15 – March 15 (See SAFCA Flood-MAR project described below). Diversion applied to 1,800 acres dormant vineyards, orchards, etc. (Estimated benefit toward reducing the projected storage decline is approximately 700 AFY).[2]	x	x		Phase I Underway. Phase 2 requires ~~Upon~~ secured agreement with SAFCA and grant funding	Dependent on Permitting and Regulatory Process Requirements	OHWD annual permits from SWRCB 20242-2027, 2028-2042; USBR (Still uncertain at the moment) CEQA, Neg Dec	Planning	Upon agreement with SAFCA; USBR: completion of infrastructure; and grant funding.
#2 SAFCA Flood Managed Aquifer Recharge	Phase 1 (20242-2027): Perform feasibility studies, ~~identify and dD~~ develop~~Develop~~ partnerships and agreements with multiple agencies for water deliveries and secure agreements with ~~to participating~~ landowners ~~farm fields~~ in the Bbasin for recharge. Phase 2 (2028-2042): Average annual diversions of more than 9,000 AFY excess American River winter water anticipated for release from Folsom Reservoir and delivered to Basin by FSC to up to 2,000 acres of dormant farm fields during the period November 15 -March 15. (Estimated benefit toward projected storage decline in Basin is approximately 4,000 AFY).[1] Average annual diversions of more than 6,000 AFY excess American River winter water released from Folsom Reservoir and delivered to Basin by FSC to dry wells during the period November 1 through May 31. (Estimated benefit toward reducing the projected storage decline is approximately 2,000 AFY).[2]	x	x		~~Upon~~Requires secured agreement with SAFCA and grant funding	Dependent on Permitting and Regulatory Process Requirements	CEQA; NEPA	Planning	Upon agreement with SAFCA; USBR; completion of infrastructure; and grant funding
Groundwater Augmentation (New Supplies)									
#3 OHWD Cosumnes River Flow Augmentation	Phase 1 (20242-2027): Secure agreement with Bureau of Reclamation for CVP water (or other source) to release from FSC into Cosumnes River. Phase 2 (2028-2042): Release 1,500 AFY- 5,000 AFY CVP water (or other source) from FSC into Cosumnes River during late Oct-Dec to improve flows for fish migration and increase recharge from river leakage. (Estimated benefit from releasing 3,000 AFY towards reducing the projected storage decline is less than 100 AFY).[2]			x	Upon contract for water supply	TBD	CEQA Neg Dec/NEPA	Pilot project completed	On-going

PMA Name	Summary Description	Relevant Sustainability Indicators Affected			Circumstances for Implementation	Public Noticing Process	Permitting and Regulatory Process Requirements	Status	Timetable / Circumstances for Initiation
		Groundwater Levels	Groundwater Storage	Interconnected Surface Water					
#4 City of Galt Recycled Water Project	Phase 1 (20242-2027): Secure agreements with landowners to expand area of fields that receive recycled water. Phase 2 (2028-2042): Expand existing summer irrigation of 164 acres with plant effluent to include year-round irrigation to a total of 640 acres. (Estimated benefit toward reducing the projected storage decline is approximately 300 AFY).[2]	x	x		Upon agreement with nearby farmers, completion of necessary infrastructure and completion of necessary permit modifications	None other than signage along perimeter of area to warn/preclude public from potential contact	Current RWQCB Central Valley Region Order R5-2015-0125 allows for secondary treated effluent irrigation to designated areas. Expansion of receiving area or tertiary treatment for winter use may require permit modification, CEQA	Planning	Project development and implementation
Revenue Generation									
#5 Voluntary Land Fallowing	Phase 1 (20242-2027): Incentivize farmers to voluntarily fallow up to ~1,000 acres to provide a net savings in groundwater consumption of about 2,700 AFY ~~(Estimated benefit toward reducing the projected storage decline is approximately AFY)~~ Phase 2 (2028-2042): Incentivize farmers to voluntarily fallow as many as 2,000 acres, to provide a net savings in groundwater consumption of about 6,300 AFY of which about 5,000 AFY would be available for extraction and sale (Estimated benefit toward reducing the projected storage decline is approximately 100 AFY)	x	x		Upon secured agreements with landowners	None	None	Planning	Secured agreements with landowners
#6 Groundwater Banking	Phase 1 (20242-2027): Develop relationships with local water management agencies and interested water purveyors and flesh out water banking and recharge policies and procedures including governance, groundwater monitoring and accounting, and terms and conditions for export of stored water (leave behind policy). ~~2027): Develop formal relationships with local water management agencies and a water purveyor to support storage and sale of fallowed water for dry year augmentation and initiate planning and construction activities.~~ Phase 2 (2028-2042): Initiate water banking and sale once SAFCA Flood-MAR construction activities are complete and recharge of winter flood water has begun~~Expand the groundwater banking program through participation in the SAFCA Flood-MAR project in order to secure sufficient winter flood water to support an increased amount of fallowing and sale~~.	x	x		Agreement with water purveyor; construction of infrastructure	Dependent on Permitting and Regulatory Process Requirements	CEQA Neg Dec	Planning	Agreement with water purveyor; construction of infrastructure

Notes:
(1) Summary table developed based off information provided by the Basin PMA Committee, see ***Error! Reference source not found.*** ~~*Appendix O*~~ for detail.
(2) Model estimated storage benefits include SASb PMAs (conservation, water bank, and Harvest Water).

Abbreviations:
AFY = acre-feet per year
CEQA = California Environmental Quality Act
CWC = California Water Code
DEW = Climate Change - Dry Extreme Warming
Flood-MAR= Flood-Managed Aquifer Recharge
FSC= Folsom South Canal
GSA = Groundwater Sustainability Agency
GSP = Groundwater Sustainability Plan

HC = Repeat of Historical Climate
OHWD= Omochumne-Hartnell Water District
Neg Dec= Negative Declaration
NEPA = National Environmental Protection Act
PMA = Project and/or Management Action
SAFCA= Sacramento Area Flood Control Agency
SWRCB = State Water Resources Control Board
TBD = to be determined
UR = Undesirable Result
USBR= United States Bureau of Reclamation
WWTP= Wastewater Treatment Plant

Table PMA-2. Projects and Management Actions – Expected Benefits, Water Source, and Costs

PMA Name	Timetable for Implementation	Timetable for Accrual of Expected Benefits	Expected Benefits: Primary: Groundwater Storage	Expected Benefits: Secondary: Flood Control	Expected Benefits: Secondary: Policy Project	Expected Benefits: Secondary: Develop New Supplies	Source(s) of Water, if applicable	Legal Authority Required	Estimated Costs: One-time Costs	Estimated Costs: Ongoing Costs (per year)	Estimated Costs: Potential Funding Source(s)
Groundwater Augmentation (Wet Year Supplies)											
#1 OHWD Agricultural Flood Managed Aquifer Recharge	Phase 1: 2042 - 2022 Phase 2: 2028 -2042	Upon project initiation	50 AFY 700 AFY	x		x	Phase 1: Cosumnes River Phase 2: American River via FSC	Phase 1: Consistent with OHWD's authority as a water district Phase 2: OHWD, USBR, SAFCA, and others TBD	Phase 1: Completed Phase 2: $20,000,000 (TBD)	$660,000 (TBD)	Sale of fallowed water
#2 SAFCA Flood Managed Aquifer Recharge	2028 - 2042	Upon project initiation	4,000 to 6,000 AFY	x		x	American River via FSC	Consistent with SAFCA's authority as the regional flood-control agency	$18,000,000 (TBD)	$1,980,000 (TBD)	Sale of fallowed water, Grants
Groundwater Augmentation (New Supplies)											
#3 OHWD Cosumnes River Flow Augmentation	2028	Upon Project initiation	<100 AFY			x	Imported CVP surface water or other source	Consistent with OHWD's authority as a water district	Completed	$100,000	Sale of fallowed water
#4 City of Galt Recycled Water Project	2028	Upon project initiation	300 AFY			x	Recycled water	Consistent with City of Galt	TBD	$50,000	Sale of fallowed water
Revenue Generation											
#5 Voluntary Land Fallowing	Phase 1: 2042 - 2027 Phase 2: 2028 -2042	Upon project initiation	_? AFY 100 AFY		x		NA	Consistent with Basin GSAs authority pursuant to CWC Section 10726.2(b)	N/A	$430,000 to $935,000	User fees and sale of fallowed water
#6 Groundwater Banking	2048	Upon project initiation			x		Imported Surface Water	Consistent with Basin GSAs authority pursuant to CWC Section 10726.2(b)	$1,000,000	$130,000	Banking revenue

Abbreviations:

AFY = acre-feet per year
CEQA = California Environmental Quality Act
CWC = California Water Code
DEW = Climate Change - Dry Extreme Warming
Flood-MAR= Flood-Managed Aquifer Recharge
FSC= Folsom South Canal
GSA = Groundwater Sustainability Agency
GSP = Groundwater Sustainability Plan
HC = Repeat of Historical Climate
OHWD= Omochumne-Hartnell Water District
Neg Dec= Negative Declaration
NEPA = National Environmental Protection Act
PMA = Project and/or Management Action
SAFCA= Sacramento Area Flood Control Agency
SWRCB = State Water Resources Control Board
TBD = to be determined
UR = Undesirable Result
USBR= United States Bureau of Reclamation
WWTP= Wastewater Treatment Plant

Note:

(1) Summary table developed based off information provided by the Basin PMA Committee, see ***Error! Reference source not found.*** ~~*Appendix O*~~ for detail.

18.3. Circumstances for Implementation

This section describes the circumstances under which PMAs will~~shall~~ be implemented, the criteria that would trigger implementation and/or termination of PMAs, and the process by which the GSAs confirm implementation has occurred. At this time, the GSAs anticipate that all six PMAs listed above are necessary to ensure sustainability of the Basin under the uncertainty of future climate and land use conditions.

This GSP will be the first adopted plan for coordinated Basin-wide management of the water resources. The GSP and PMA implementation efforts will require forging agreements between relatively newly-formed GSAs and creation of funding mechanisms to support GSP implementation. While the GSAs have proactively pursued the conceptual development of PMAs through participation in committee meetings, monthly Working Group meetings, conducting pilot projects, coordinating with potential partners, and initiating negotiations to secure relevant agreements, amongst other actions, considerable effort remains before PMA start-up occurs and the benefits measurably accrue in the Basin.

As indicated in **Table PMA-*1*~~Table PMA 1~~,** the PMA implementation will occur in phases, and as explained in Section 18.7 *Status and Implementation Timetable*~~*Status and Implementation Timetable*~~, the phased approach (or "glide path") will accommodate the necessary start-up period to address outstanding issues and begin accruing benefits to the Basin. Accordingly, PMA implementation will occur in two phases. ~~During~~ During Phase 1 (2022-20~~27~~27) a small number of PMAs will be implemented ~~includes a two-year start-up period, whereby agreements and funding mechanisms are put in place (2022-2024),~~ while the groundwork for implementing the full suite of the PMAs included in the GSP is established. ~~The~~ The trigger for this initial phase of the GSP will be the adoption of an updated fee structure ~~to~~which will replace the first year pre-GSP fee (2022)~~put in place~~, adopted by the GSAs in 2021. ~~The transition to full GSP~~ The transition to full GSP implementation will be ~~will be~~ triggered by the 5-year update of the GSP which will initiate Phase 2 (2028-2042) of the program. At that point, it is assumed that the institutional and legal relationships necessary to implement the SAFCA Flood-MAR project will be in place. This will allow the Cosumnes GSAs to incorporate groundwater banking and sale into the Phase 2 program and update and revise the funding mechanisms established in Phase 1 ~~as necessary~~as necessary to support this phase of the GSP.

The ~~Phase 1~~ PMAs that will be implemented in Phase 1 include ~~build off existing~~ the groundwater recharge ~~pilot~~ project currently underway in OHWD ~~sprojects~~ *(PMA #1 OHWD Flood-MA*R with Cosumnes River diversions) and the initial phase of voluntary land fallowing (PMA *#5 Voluntary Land Fallowing*). T~~,~~he Harvest Water project which is occurring in the South American Basin and is described above as an "other PMA" will also be implemented during this period. ~~secure permits and agreements for water sales and deliveries by way of the FSC *(#2 SAFCA Flood-MAR and #3 Cosumnes River Flow Augmentation*), expand existing land areas that will receive winter~~

~~flows of the existing recycled water supply (*#4 City of Galt Recycled Water Project*), initiate early volunteer participation in land fallowing programs (*#5 Voluntary Land Fallowing*), and develop formal relationships with interested local water management agencies and water purveyor *(#6 Groundwater Banking*).~~

The transition between Phase 1 and Phase 2 will be triggered when ~~be triggered after~~ agreements are in place with resource agencies to increase surface water sources, and additional landowner participation is secured to expand programs initiated in Phase 1. For planning purposes, this transition is expected to occur in connection with the 5-year update of the GSP ~~ese these agreements are assumed to be in place by the end of~~in 2027. The Phase 2 Water Supply Augmentation PMAs listed in **Table PMA-*1*~~Table PMA 1~~** will be triggered ~~triggered~~ after agreements are in place between SAFCA and the United States Bureau of Reclamation that enable the GSAs to purchase water released from Folsom Reservoir and have it delivered to the Basin by way of the FSC, and a separate water supply is negotiated to augment Cosumnes River flows. Essential to negotiating these complex arrangements is hiring an experienced Plan Manager for the CGA to guide GSP implementation.

The following Water Augmentation PMAs require agreements to be in place before shifting from Phase 1 to Phase 2 of implementation:

- *PMA #1 OHWD Flood-MAR* shifts from about 1,200 AFY of Cosumnes River flows on average to 20,000 AFY of excess American River winter water.
- *PMA #2 SAFCA Flood-MAR* acquires almost 10,000 AFY on average of excess American River winter flood water to percolate beneath dormant fields and an additional 6,000 AFY on average introduced into the Basin using dry wells.
- *PMA #3 OHWD Cosumnes River Flow Augmentation* acquires 1,500 to 5,000 AFY of CVP water (or other source) to release to Cosumnes River.

The Phase 2 Water Supply Augmentation PMA using existing recycled water available from the City of Galt (*PMA #4 City of Galt Recycled Water Project*) will be triggered ~~triggered~~ when agreements are in place with landowners, necessary infrastructure is in place to deliver the water (conveyance pipes and ditches, potential field leveling and berm construction, and so forth) and necessary NPDES permit modifications are completed.

The revenue generating PMAs (*PMAs #5 Voluntary Land Fallowing and #6 Groundwater Banking*) are essential to support GSP implementation including participation in the SAFCA Program. These PMAs will be initiated when efforts are made between the GSAs and potential partnering agencies like SAFCA and one or more urban water agencies. Phase 1 includes establishing formal relationships to plan and prepare for implementation of the banking operations. The trigger that transitions Phase 1 into Phase 2 is the establishment of the formal agreements necessary to support the SAFCA Flood-MAR Program, which is assumed to occur by 2027. The PMA will be considered in place when the agreements, infrastructure, and accounting methods are

completed to acquire, deliver, store, and extract the water.

The other PMAs discussed in Section 0~~18.2.4~~ *Other PMAs*~~*Other PMAs*~~ will be under consideration throughout GSP implementation and identified needs depending partly on the accrual of quantifiable benefits from the implemented PMAs, and their effectiveness for avoiding URs. Additional triggers include grant funding availability, feasibility study results, economic evaluations, and/or other relevant planning studies.

18.4. Public Notice Process

Public notice requirements vary for each PMA (see **Table PMA-*1*~~Table PMA-1~~**). Some PMAs that involve infrastructure improvements may not require specific public noticing (other than that related to construction). In general, the PMAs being considered for implementation will be discussed during regular CGA meetings, which are open to the public. They will also each be subject to California Environmental Quality Act (CEQA) review and other permitting process that are subject to public notice and review. Additional stakeholder outreach efforts will be conducted prior to and during PMA implementation by the project proponent(s), as needed and as required by law.

18.5. Addressing Overdraft Conditions

> *§ 354.44. Projects and Management Actions*
>
> *(1) Each Plan shall include a description of the projects and management actions that include the following:*
>
> *…*
>
> *(2) If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

As discussed in Section **Error! Reference source not found.**~~9.2~~ ***Error! Reference source not found.***~~*Change in Groundwater Storage*~~, the Basin shows a negative cumulative change in storage over the historical water budget period (i.e., Water Years 1999 through 2018). Most of the almost -11,000 AFY average annual decline in storage (>90%) has occurred in the Basin Plain portion of the Basin, where groundwater levels in wells have shown persistent decreasing trends over the available period of record (see Error! Reference source not found.~~**Figure GWC-6**~~). The projected rate of decline in storage decreases over the next 50 years to almost -2,000 AFY (assuming the past 50 years of rainfall and temperature repeat). The 50-year historical average rainfall is about 11% greater than the 1999-2018 average, contributing to 3,000 AFY of additional deep percolation. Groundwater inflow across the Basin boundaries increases (or groundwater outflows across Basin boundaries decrease) as Basin water levels continue to decline, resulting in an almost 4,000 AFY of additional recharge. The continuing decline in water levels reduces recharge from stream leakage by about -1,000 AFY. Lastly, the projected annual average future

pumping is almost -3,000 AFY less due partially to the differences in rainfall and temperature, and partially to changes in land and water use. These factors combine to reduce annual average depletion of storage in the Basin by about 9,000 AFY (see Error! Reference source not found.~~Table WB-10~~).

The projected conditions summarized above without PMAs show groundwater levels and storage changes stabilizing somewhat as the demand patterns change within the Basin. The annual changes in groundwater storage are influenced primarily by climate, whereas the long-term depletion of groundwater storage is influenced primarily by the consumption of extracted groundwater. Hence, uncertainty in future climatic conditions and its influence on recharge and pumping create the most uncertainty in future groundwater storage conditions. The Numerical Model was employed to evaluate the uncertainty in future Basin storage due to near and longer-term climate uncertainty, and model calculations indicated that future groundwater storage will continue to decline (see Error! Reference source not found.~~Table WB-10~~ and Error! Reference source not found.~~Figure WB-16~~) and under some climate change scenarios URs are projected to occur late in the scenario timeframes. The PMAs presented herein are expected to result in benefits (discussed below) to avoid URs within the range of uncertainty in future conditions, including climate change scenarios, and thus maintain sustainability in the Basin.

18.6. Permitting and Regulatory Process

> *§ 354.44. Projects and Management Actions*
>
> *(b) Each Plan shall include a description of the projects and management actions that include the following:*
>
> *…*
>
> *(3) A summary of the permitting and regulatory process required for each project and management action.*

As shown in **Table PMA-*1*** ~~**Table PMA-1**~~, the permitting and regulatory requirements vary for the different PMAs depending on whether they are recharge projects, developing new supplies, and so forth. The various types of permitting and regulatory requirements (not all applicable to every PMA) include the following:

1. Federal
    - National Environmental Policy Act (NEPA) documentation if federal grant funds are used;
    - United States Bureau of Reclamation permits to acquire stored water from Folsom Reservoir and access to the Folsom South Canal for water conveyance to the Basin.
2. State

- CEQA documentation, including one or more of the following: Categorical Exemption, Initial Study, Negative Declaration (Neg Dec), Mitigated Negative Declaration, and/or Environmental Impact Report (EIR); and /or
- State Water Resources Control Board (SWRCB) and Central Valley Regional Water Quality Control Board permits and regulations regarding water rights permits and recycled water use permits; and/or
- Right of Entry/Access permits – any physical work on State lands requires an agreement to access their property. Also required for Cosumnes River Preserve lands owned by The Nature Conservancy.

3. County/Local
   - Sacramento County Environmental Management Department well construction permit; and/or
   - Encroachment permits – Sacramento County Department of Transportation for public right aways; and/or
   - Sacramento County Groundwater and Surface Water Export permit if groundwater or surface water is proposed for transport outside of the County.

Specific, currently-identified permitting and regulatory requirements for each PMA are listed in **Table PMA-*1*~~Table PMA 1~~**. Upon initiation of each PMA, the regulatory and permitting requirements of the PMA will be re-examined. As with any PMA planned or implemented under SGMA, actions undertaken will remain in compliance with existing water rights constraints and processes under California and Federal law.

18.7. Status and Implementation Timetable

> *§ 354.44. Projects and Management Actions*
>
> *(b) Each Plan shall include a description of the projects and management actions that include the following:*
>
> *…*
>
> *(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

As discussed above in Section 18.3 *Circumstances for Implementation*~~*Circumstances for Implementation*~~, most PMAs will be developed, implemented, and expanded in phases. **Table PMA-*1*~~Table PMA 1~~** presents preliminary estimates of the time required to complete, and/or implement, each PMA and a timetable for accrual of expected benefits. Expected benefits are based on the PMAs estimated contribution toward reducing the projected annual average decline in groundwater storage, and their efficacy toward preventing URs as indicated by projected long-term water levels. These estimates will be refined, as necessary, upon further

evaluation and/or initiation of the PMAs.

18.8. Expected Benefits

> *§ 354.44. Projects and Management Actions*
>
> *(b) Each Plan shall include a description of the projects and management actions that include the following:*
>
> *…*
>
> *(5) An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

The different categories of expected benefits of each PMA are presented in **Table PMA-2**~~**Table PMA-2**~~. Below is a discussion of how the expected benefits will be evaluated. As stated previously, most PMAs have expected benefits related to water quantity. Once a PMA is implemented, it is important to evaluate and quantify the benefits resulting from a given PMA as part of monitoring and data collection activities. The specific ways in which PMA benefits are evaluated and/or quantified depends on the PMA.

The goals and objectives of PMA implementation are not necessary to achieve a certain water budget outcome, but rather to increase the likelihood that URs for relevant Sustainability Indicators are avoided by the end of the GSP implementation period (i.e., by 2042). For this reason, while the relative effectiveness of each PMA is based on benefits to the water budget, the success of the collective implementation of PMAs are ultimately determined by whether the Sustainability Goal for the Basin is achieved.

To assess the effects of PMA implementation, the Numerical Model was utilized to calculate the hydrologic responses to GSP implementation relative to proposed SMCs for Chronic Lowering of Groundwater Levels, Reduction in Groundwater Storage, and Interconnected Surface Waters. In all three, the criteria metrics are water levels. Where detailed information was available for each PMA, the modeled results of the PMAs were determined and used to assess the benefit of each PMA and is discussed in Section 18.2 *List of Projects and Management Actions*~~*List of Projects and Management Actions*~~ and summarized in **Table PMA-2**~~**Table PMA-2**~~. When details were limited, an estimated benefit was determined by an assessment of available information and potential benefits.

18.9. Source and Reliability of Water from Outside the Basin

> *§ 354.44. Projects and Management Actions*
>
> *(b) Each Plan shall include a description of the projects and management actions that include the following:*
>
> *…*
>
> *(6) An explanation of how the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Several of the PMAs discussed below and shown in **Table PMA-2**~~**Table PMA-2**~~ rely on additional water supplies from outside of the Basin. Water supply sources for each PMA is discussed below:

- *PMA #1 OHWD Agricultural Flood-MAR* depends on winter flow conditions of the Cosumnes River (2024-2027) and American River winter flood-control releases from Folsom Reservoir (2028-2042).
- *PMA #2 SAFCA Flood-MAR* depend on excess winter flood flows from the American River released from Folsom Reservoir (2028-2042).~~.~~

Both PMA #1 and PMA #2 depend on the availability of precipitation runoff from upgradient watersheds during wet years to create significant stormflow in the Cosumnes River. The PMAs also depend on precipitation runoff from the American River watershed and flood control operations. As runoff is naturally controlled by climate, the future frequency, volume and reliability of stormflows entering the system is uncertain.

- *PMA #3 Cosumnes River Flow Augmentation* relies on surface water imports, pending agreement for water and flow conditions. The reliability of said water will depend on the partner agency involved.
- *PMA #4 City of Galt Recycled Water Project* is fairly reliable because the community will produce wastewater year-round.
- *PMA #5 Voluntary Land Fallowing* does not rely on water from outside the Basin.
- *PMA #6 Groundwater Banking* depends on the volume of flood and/or wastewater entering the Basin to satisfy the leave-behind policy.

PMA #1 (Phase 1) depends on the availability of precipitation runoff from upgradient watersheds during wet years to create significant stormflow in the Cosumnes River. PMA #1 (Phase 2), PMA #2, and PMA #3 depend on precipitation runoff from the American River watershed and downstream flood control operations that determine the timing and volumes of downstream releases. As runoff is naturally controlled by climate, the frequency, volume and reliability of surplus water from these watersheds is uncertain. The effectiveness of these PMAs will be periodically assessed, and should imported and local surface water supplies become restricted in

the future, or be required for other beneficial uses, Basin conditions and the particulars of the implementation will be re-assessed at that time.

18.10. Legal Authority Required

> *§ 354.44. Projects and Management Actions*
>
> *(b) Each Plan shall include a description of the projects and management actions that include the following:*
>
> *…*
>
> *(7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

Per California Water Code (CWC) § 10725 through 10726.8, the Basin GSAs possess the legal authority to implement the supply augmentation and demand management PMAs described herein and will enforce these PMAs as necessary. Legal authority for each of the PMAs is detailed in **Table PMA-2**~~**Table PMA-2**~~; however, pending project implementation, authority may switch depending on the agencies involved.

18.11. Estimated Costs and Plans to Meet Them

> *§ 354.44. Projects and Management Actions*
>
> *(b) Each Plan shall include a description of the projects and management actions that include the following:*
>
> *…*
>
> *(8) A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Estimated costs for each PMA are presented in **Table PMA-2**~~**Table PMA-2**~~. These costs include "one-time" costs and ongoing costs. The one-time costs may include capital costs associated with construction, feasibility studies, permitting, environmental compliance (e.g., NEPA and CEQA), or any other costs required to initiate a given PMA. The ongoing costs are associated with operations and maintenance (O&M), water purchases, and/or costs to otherwise continue implementing a given PMA. Note that the one-time costs may or may not be incurred entirely at the beginning of the PMA, depending on the source and nature of funding; in some instances, grants or other financing options may allow for spreading out of "one-time" costs over time.

Potential sources of funding for PMAs one-time costs and ongoing costs are presented in **Table PMA-2**~~**Table PMA-2**~~. One-time costs are typically paid by partner agencies, like SAFCA, state and federal grant funding sources, or local agencies. On-going costs are expected to be paid by user fees and by revenue from the sale of fallowed water and from groundwater banking. The GSA

proposing the PMA will be responsible for securing funding for the PMA. Upon implementation of any given PMA, the available funding sources for that PMA will be confirmed.

18.12. Management of Recharge and Groundwater Extractions

> *§ 354.44. Projects and Management Actions*
>
> *(b) Each Plan shall include a description of the projects and management actions that include the following:*
>
> *…*
>
> *(9) A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

As stated previously in Section 18.5 *Addressing Overdraft Conditions*~~*Addressing Overdraft Conditions*~~, under historical conditions (Water Years 1999 – 2018), and under the Projected Conditions Baseline Scenario, there is a decline in the cumulative storage for the Basin. Historical long-term trends in groundwater levels and storage are decreasing and driven primarily by the extraction and consumption of groundwater. The scenarios used to project future water budget conditions show that, on average, groundwater storage is projected to decrease by about -1,400 AFY, but projected water levels do not exceed MTs and therefore do not indicate Undesirable Results. Of the climate change scenarios, URs were projected to occur in only the later years of the Projected Conditions American River Basin Study (ARBS) Central Tendency 2070 Climate Change Scenario and Projected Conditions DWR Extreme I (drier with extreme warming) 2070 Climate Change Scenario. The estimated benefits to groundwater storage summarized in **Table PMA-2**~~**Table PMA-2**~~ range from 100 to 6,000 AFY. Therefore, the Basin's PMA efforts are designed to increase the likelihood that groundwater level and storage declines during future drought periods will be offset, to the extent possible, by increases in groundwater levels and storage during other periods, especially during wet years.

As discussed in Section 0~~18.2.4~~ *Other PMAs*~~*Other PMAs*~~, additional PMAs provide flexibility to the Basin to adaptively address unforeseen conditions (e.g., failure to secure outside water sources and/or drier climatic conditions). The PMA committee has devised a ramp up on the Other PMAs to meet the Sustainability Goal. The ramp-up includes expanding the land fallowing, acquiring winter water from other sources for recharge, and/or developing a system to allocate use of existing groundwater between users.