NORTH AMERICAN SUBBASIN
Groundwater Sustainability Plan

Public Draft

Section 9: Projects and Management Actions

PREPARED FOR:

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Sacramento Groundwater Authority GSA
South Sutter Water District GSA
Sutter County GSA
West Placer County GSA

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SGMA requires that a GSP establish a sustainability goal that results in the absence of undesirable results within 20 years, with 2042 being the applicable deadline in the NASb. As described in previous sections of this GSP, the NASb is not experiencing any undesirable results and it does not project to experience any in the 2042 planning horizon. This projection includes planned growth and land use changes. However, the NASb GSAs recognize that some sustainability risk in the form of modest groundwater overdraft of about 3,500 AFY may present itself when climate change is considered in the 50-year planning horizon. To avoid future potential undesirable results related to lowering of groundwater levels and depletion of groundwater storage, additional conjunctive use opportunities in the urban municipal supply distribution systems were identified as a combined project. As a result, urban water purveyors under the Regional Water Authority have been planning for the development of a groundwater bank, which will increase the effectiveness of the groundwater aquifers Subbasin as a storage reservoir as our other reservoirs (surface water reservoirs and the snowpack) evolve under climate change. Development of the Sacramento Regional Water Bank is presented as a management action below. Additionally, the NASb GSAs believe that improved well construction practices can help alleviate concerns that typically arise at a more local level and that improved coordination land use planning agencies can help ensure future sustainability. These are presented as management actions.

A description of current groundwater management activities, planned projects and management actions, and supplemental projects is provided below. Current groundwater management activities are those that are already ongoing and anticipated to continue. Planned projects and management activities (PMAs) are those that are intended to begin implementation within the 5-year horizon of this GSP and that the NASb GSAs believe will ensure the sustainability goal of the Subbasin is met and will allow us to respond to changing conditions in the Subbasin. Supplemental projects are those that are still generally at a feasibility level of planning, so detailed information is not presented in this GSP.

9.1 Current Groundwater Management Activities

The NASb GSAs recognize that groundwater sustainability is not guaranteed without active management. As noted in **Section 5 – Groundwater Conditions**, the northern portion of the NASb experienced significant decline in groundwater levels until surface water was introduced to practice conjunctive in agricultural areas. In the southern portion of the NASb, groundwater declines continued into the 1990s until a conjunctive use program was introduced into the more urban areas of the Subbasin. These and other PMAs that have brought the NASb to a point of sustainability are ongoing and warrant listing here. Additional information can be found at the referenced sections in this GSP.

- Continued conjunctive use urban and agricultural areas (*see* **Section 3.13 – Conjunctive Use Programs**)
- Continued demand management through:
    - Temporary conservation measures through water shortage contingency plans in Urban Water Management Plans that allow for water se reductions during periods of constrained supply (*see* **Section 3.10.5 – Urban Water Management Plans**)
    - Urban water use efficiency program (*see* **Section 3.10.6 – Urban Water Use Efficiency Program**)
    - Agricultural specific Efficient Water Management Practices (*see* **Section 3.10.7- Agricultural Water Management Plans**)
- Continued agricultural water reuse (*see* **Section 3.8.4 – Water Reuse**)
- Continued recycled water use (*see* **Section 3.8.3 - Recycled Water**)

9.2 Projects and Management Actions

One project and three management activities are described below that will help ensure meeting the NASb sustainability goal. For each PMA, SGMA-required detail is provided.

9.2.1 Project #1 - Regional Conjunctive Use Expansion – Phase 1

For more than two decades, municipal and industrial (M&I) water purveyors in the NASb have expanded conjunctive use operations that arrested past overdraft conditions and have resulted in generally increasing groundwater levels in the urban area. Additionally, M&I water purveyors in the South American Subbasin (SASb) have been expanding conjunctive use for the past decade that has also improved conditions south of the American River. In 2019, the Regional Water Authority completed a Regional Water Reliability Plan (RWRP) that identified additional conjunctive use operations that could be achieved with both existing facilities and with future water facilities improvements to expand upon successful conjunctive use.

Project Description:

This project identified additional conjunctive use that could be implemented in the near-term by reoperating existing water treatment and distribution facilities[1]. The conjunctive use program was closely coordinated with the SASb and was evaluated as part of a single modeling evaluation. The project will provide additional surface water during wet years to reduce existing d

[1] One exception is in the Rio Linda/Elverta Community Water District. Future demand projections are associated with the Elverta Specific Plan area, which is conditioned by Sacramento County to essentially implement a conjunctive use program if the development occurs. The model analysis assumed that the new demand would receive surface water in wet years and use groundwater in dry years to assess the long-term effects on the subbasin. If the assumed growth does not occur, the projected demand will not increase.

emand on groundwater. Some additional groundwater would be utilized during dry years, but average annual operations would result in a net decrease of groundwater extraction, resolving the deficit of 3,500 AF of projected overdraft with climate change. Agencies expected to participate include California American Water, Citrus Heights Water District, City of Lincoln, City of Sacramento, Golden State Water Company, Rio Linda/Elverta Community Water District, Sacramento County Water Agency, and Sacramento Suburban Water District.

Hydrologic conditions serve as the trigger criteria for implementing the project. For example, when wet conditions existed in 2019, M&I purveyors in the region preferentially used surface water as a percentage of supply. As dry conditions emerged in 2020 and continued into 2021, M&I purveyors have increasingly used groundwater as a percentage of supply.

Measurable Objective Expected to Benefit: The net reduction in groundwater extraction will benefit the measurable objectives for groundwater levels and, by extension, groundwater storage, and depletion of interconnected surface waters.

Project Status: The project is capable of proceeding immediately as hydrologic conditions warrant. Dry conditions in 2021 necessitate the preferential use of groundwater. Additional surface water use as a percentage of supply would increase when wet conditions return.

Permitting and Regulatory Process: The operations are within existing water rights, contracts, and authorized places of use, so no additional permitting or regulatory requirements are anticipated.

Public Noticing: The operations are within existing water rights, contracts, and authorized places of use, so no additional public noticing requirements are anticipated.

Expected Benefits: The project is expected to reduce long-term average pumping from the M&I area of in the NASb. This will fully mitigate the projected deficit of 3,500 AFY in average annual storage projected under future climate conditions described in **Section 6 – Water Budgets**.

How the Project will be Accomplished: The M&I purveyors involved have a history of working cooperatively together. While the project can already be implemented in the near-term, long-term operations of the conjunctive use program will likely require completion of planning of the Sacramento Regional Water Bank (described below), which will establish a framework for accounting of the storage and recovery of water from the groundwater subbasin.

Legal Authority: Each of the M&I purveyors have the legal authority to operate the public water systems needed to implement the project.

Estimated Costs and Funding Plan: Because of the complexity of variable water costs among the participants, an estimated operations cost cannot be determined. However, each of the M&I purveyors will fund the shifting of supplies between groundwater and surface water from their

existing operations and maintenance programs. Most of the infrastructure needed to implement the program is already in place. The only capital costs may be in some areas that will experience growth, which will primarily be funded through development fees.

Management of Groundwater Extractions and Recharge: The M&I purveyors have demonstrated a past ability to manage extractions and recharge to ensure subbasin sustainability. Additionally, The Sacramento Regional Water Bank (Management Action #1, described below) will establish when extractions and recharge should occur and a framework for accounting for the storage and recovery of water from the groundwater subbasin.

Project Evaluation: To evaluate the potential effects of proposed projects and management actions in meeting the sustainability goals of the NASb GSP, the regional conjunctive use program has been analyzed using the groundwater model developed jointly for the Cosumnes-South American-North American (CoSANA) subbasins. The CoSANA model is described in greater detail in the water budget section of GSP **Section 6 – Water Budgets**.

For consistency and to support more accurate effects of project implementation, including subsurface groundwater flow estimates between the subbasins, modeling included projects proposed for both the NASb and SASb. Near-term projects and management actions simulated in the SASb include the portion of the Regional Conjunctive Use Program within that subbasin, Sacramento Regional County Sanitation District's Harvest Water Program, which delivers recycled water for in-lieu recharge and for habitat use, and a groundwater recharge project proposed by Omochumne-Hartnell Water District (OHWD) near the Cosumnes River. Both the Harvest Water Program and the OHWD recharge project are on the opposite side of the SASb from the NASb and, while beneficial to the SASb, are expected to provide very limited benefits to the NASb. Because those two projects have limited effect on the NASb, they are not described further in this GSP.

The analysis below considers the proposed projects using the Projected Conditions Baseline (PCBL) in CoSANA with climate change. The Projected Conditions Baseline applies future land and water use conditions and uses the 50-year hydrologic period of WY 1970-2019, with modifications for the climate change analysis.

Specific assumptions used for the effects of implementing the NASb project modeling scenario include:

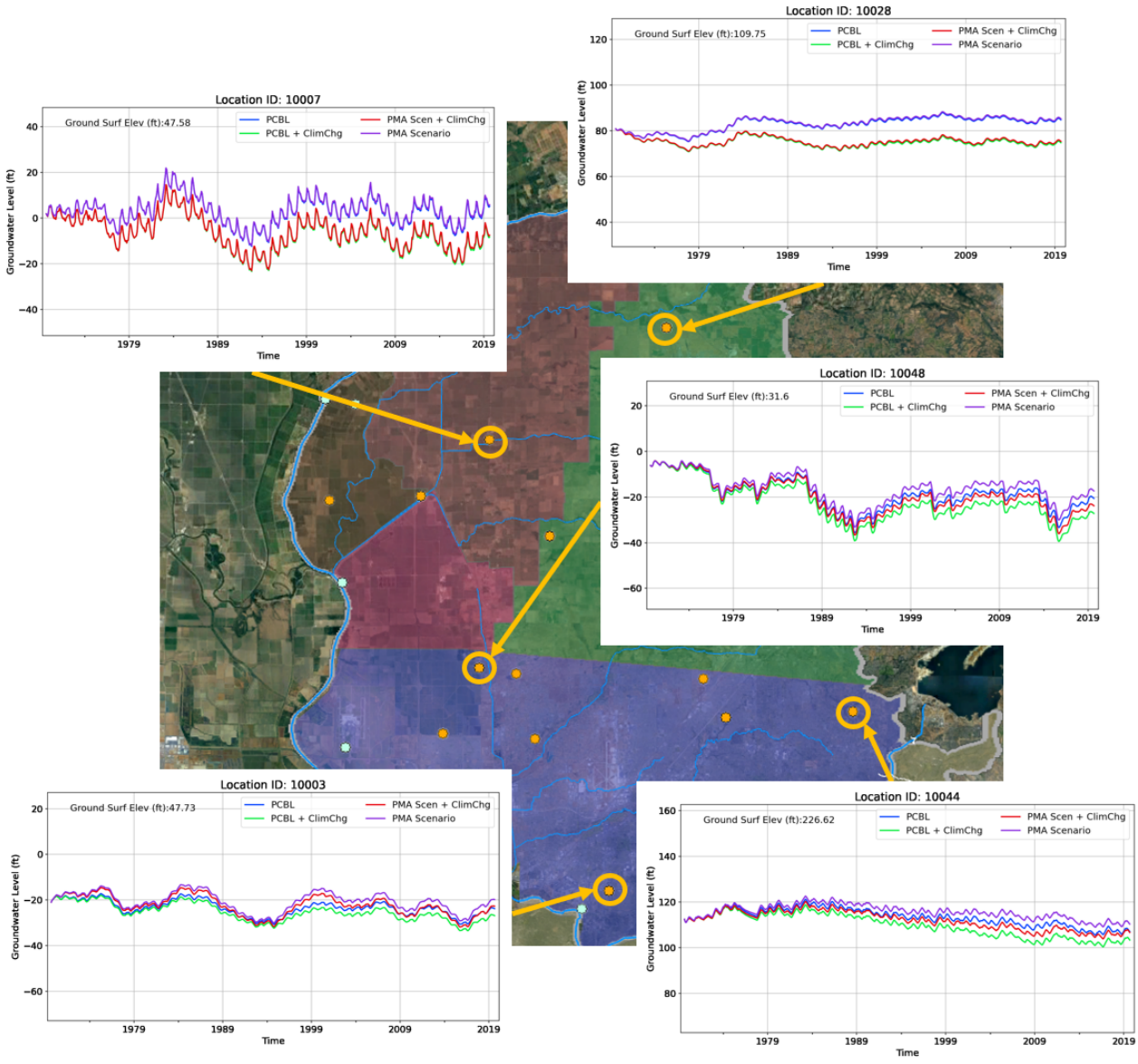
- The program is a comprehensive regional conjunctive use program, with participation by both NASb and SASb urban purveyors
- The program will be integrated with the Regional Water Reliability Plan (RWA, 2019)
- Project operations include delivery of wet year surface water supplies to reduce groundwater use and dry year groundwater pump back operations to move water between distribution systems to meet demands
- A summary of the regional conjunctive use scenario assumptions is shown in **Table 9-1**

The results of modeling the projects in both the NASb and SASb are shown on **Figure 9-1.** The figure shows the changes in groundwater level hydrographs in the NASb compared to the PCBL with and without climate change. The benefits of the project are seen primarily in the Sacramento County portions of the NASb, as that is the area where most of the increased conjunctive use occurs. Groundwater levels in these areas are typically improved to approximately 3 to 5 feet above the comparable baseline.

Table 9-1. CoSANA Regional Conjunctive Use Scenario Specifications

Entity	Projected Demand (AFY)	Wet Year Additional SW Supply (AFY)	Wet Year GW Pumping Reduction (AFY)	Long Term (50-Yr) Avg. Annual Pumping Reduction (AFY)	Dry Year GW Pump Back (AFY)
Cal Am - Antelope	5,225	2,174	2,174	739	0
Cal Am - Arden	1,606	0	0	0	0
Cal Am - Lincoln Oaks	6,213	4,681	4,375	1,487	0
Citrus Heights Water District	17,172	719	653	222	0
City of Sacramento - North	62,922	1,000	1,000	340	0
Rio Linda/Elverta CWD	7,745	5,000	5,000	2,400	0
Sac. Suburban WD - North	24,848	2,000	2,000	680	0
Sac. Suburban WD - South	16,456	4,800	4,800	1,632	4,000
City of Lincoln	20,568	1,013	762	259	0
Subtotal NASb	***162,755***	***21,388***	***20,764***	***7,760***	***4,000***
Cal Am - Parkway	16,604	5,351	5,351	1,819	0
Cal Am - Suburban Rosemont	13,227	6,902	6,885	2,341	0
Golden State WC - Cordova	19,752	6,177	6,108	2,077	0
City of Sacramento - South	101,306	1,000	1,000	340	0
Sac County WA - Laguna Vineyard	72,423	1,000	1,000	612	0
Subtotal SASb	***223,312***	***20,431***	***20,344***	***7,189***	***0***

Figure 9-2 shows the cumulative change in storage compared to the PCBL both with and without climate change over the 50-year simulation period. While the PCBL has an average annual change in storage of 5,400 AFY (increasing) without climate change, the PCBL with climate change has an average annual reduction in storage of about 3,500 AFY. Implementing this project results in an average annual change in storage of approximately 0 AFY. Therefore, this project provides an average annual benefit to the subbasin of about 3,500 AFY, in addition to the benefits provided to the surface water bodies and the neighboring subbasins.



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153 **Figure 9-1. Groundwater Level Hydrographs, PMA Scenario and Associated Baselines**

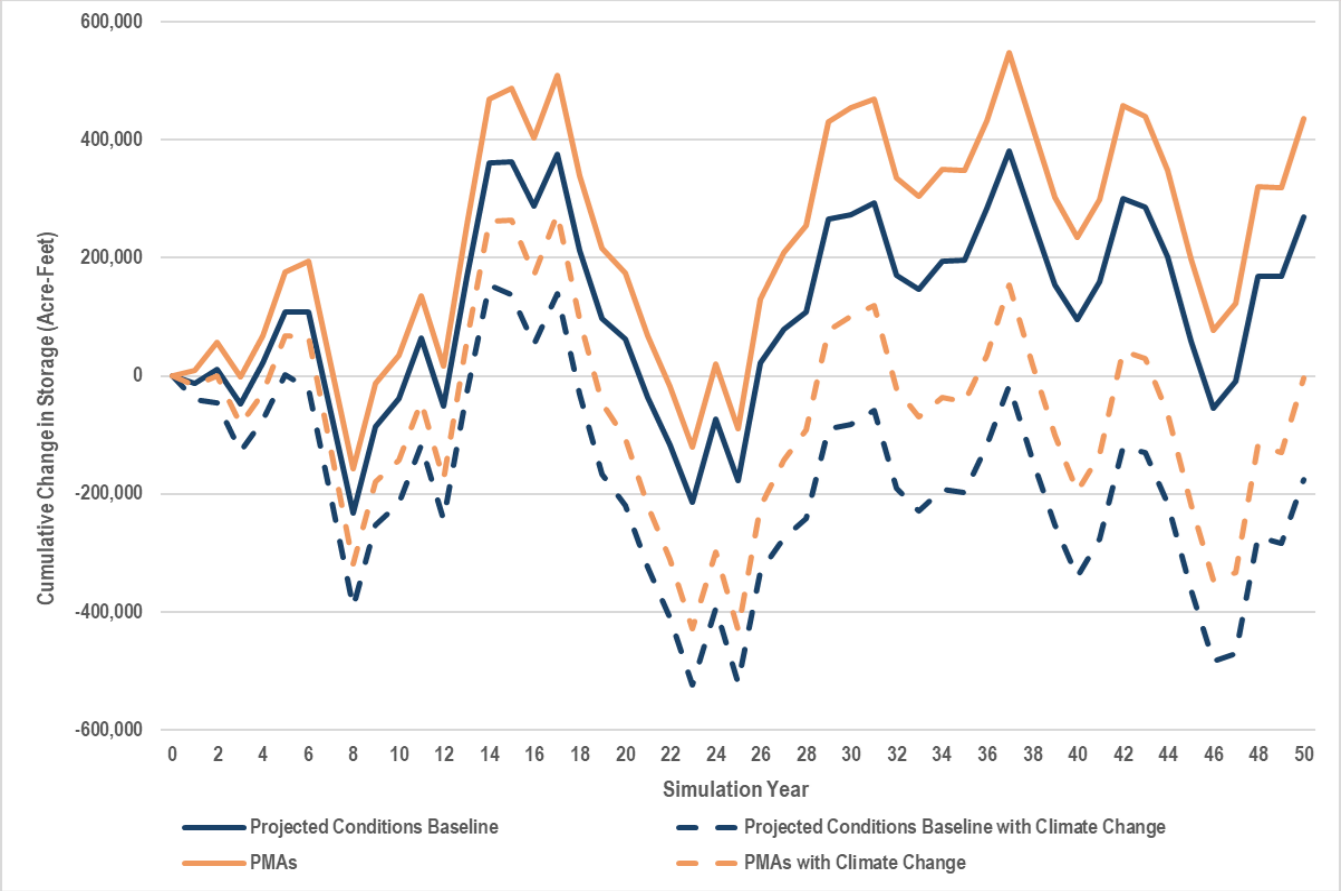

Figure 9-2. Cumulative Storage Change for the PMA Scenarios and Associated Baselines

9.2.2 Management Action #1 - Complete Planning for Sacramento Regional Water Bank

Management Action Description: As envisioned, the Sacramento Regional Water Bank (Water Bank) will consist of an institutional and legal framework for operating a sustainable storage and recovery program in the North American and South American subbasins. Participation in the Water Bank will be voluntary, but it is intended to provide an incentive for participants to expand conjunctive use operations in the subbasins that would also allow for future groundwater substitution transfers, which can provide funding to maintain, replace and improve water supply infrastructure. The primary goal of the Water Bank is to manage the groundwater subbasin sustainably and to enhance climate change resilience through expanded conjunctive use, while protecting all beneficial uses and users in the subbasins. To achieve this, banking and recovery operations will need to be developed and evaluated using the regional CoSANA model, which will assist in accounting for stored water including losses through groundwater outflow from the subbasins over time. A fundamental principle of the Water Bank is that water must be stored before it can be recovered and losses must be accounted for, so that operations will contribute to enhancement of subbasin conditions; operations of the Water Bank will not operate in a deficit manner. Operations of the Water Bank will require monitoring and mitigation to ensure protection of all beneficial users of groundwater in the Subbasin.

Measurable Objective Expected to Benefit: The net increase in storage in the NASb will benefit the measurable objectives for chronic lowering of groundwater levels and, by extension, groundwater storage by raising groundwater levels and reducing depletion of interconnected surface waters.

Project Status: As of mid-2021, the planning for the project has entered its second and final phase. With development of GSPs and ongoing drought conditions in 2021, the majority of the planning effort is expected to commence in 2022 and is expected to take up to two years to complete.

Permitting and Regulatory Process: Initial operations of the Water Bank include the use of existing water rights and contracts within the existing public water supply distribution system of the subbasins. For these existing water rights, the Water Bank would rely on the Department of Water Resources and United States Bureau of Reclamation (USBR) Water Transfer White Paper (2019) for transfer criteria and the State Water Board to approve temporary transfer of water rights to enable groundwater substitution transfers for recovery operations. Groundwater substitution transfers occurring in Sacramento County would also require a county permit. A county permit is not required in Placer or Sutter counties, but GSA approval of substitution transfers is required in all counties. Additionally, the Water Bank will seek to be able to store and recover Central Valley Project (CVP) contract water for those agencies with federal contracts. For the federal component, the Water Bank would comply with the USBR Groundwater Banking Guidelines for CVP Water (2019). Operations of the Water Bank that result in groundwater substitution transfers would require concurrence of the GSAs in which such activities would occur in each year that a transfer is proposed.

Public Noticing: Completion of the Water Bank will include California Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA) environmental documentation and analysis and will be appropriately publicly noticed. In addition, RWA as the project lead to complete Water Bank planning, has conducted extensive stakeholder outreach for the project and will continue to provide notice and input opportunities to local stakeholder interests as the Water Bank is developed. Among other means, RWA will provide notice to GSAs and caucuses of the Sacramento Water Forum.

Expected Benefits and Evaluation: The 2019 RWA RWRP identified the potential to increase surface water use in the exiting interconnected urban distribution systems in the region by up to about 60,000 AF as a means of storing water in the Water Bank. In dry years, the RWRP estimated the ability to increase groundwater extraction by about 60,000 AF to recover stored water. The operations would be roughly split in half between the NASb and the South American Subbasin. With system improvements (described under Supplemental PMA below), the RWRP estimated that both storage and recovery could be increased to about 90,000 AF in any given year, after completion of Phase 2 (refer to **Section 9.3 – Supplemental Projects**). Operations will be determined during the development of the Water Bank and evaluated using the CoSANA model used to develop the GSP. The evaluation will include determination of the volumes of

water that will need to remain in storage in the subbasins to ensure sustainability and support all beneficial uses and users of groundwater. Evaluation will include an analysis of future climate to ensure the risks changing hydrology and temperatures are accounted for.

How the Project will be Accomplished: Development of the Water Bank is being coordinated by RWA. RWA has developed a scope of work to complete planning and has launched a Sacramento Regional Water Bank Program to complete the effort. The participants will work cooperatively to develop and operate the Water Bank in a way that results in improved groundwater subbasin sustainability. Most of the current participants have worked together since the 1990s through the Sacramento Water Forum, so they have demonstrated their intent and ability to achieve outcomes that benefit the region's community and environment.

Legal Authority: The Water Bank participants possess the water rights and contracts and have the legal authority to operate the water systems required to store and recover water under the program.

Estimated Costs and Funding Plan: Estimated remaining planning costs are about $2.5 million. Of this, local participants have committed $1.4 million through the Water Bank Program under RWA, and USBR is providing $1.1 million in technical funding support for the Water Bank, which will include a feasibility determination.

Management of Groundwater Extractions and Recharge: The Water Bank itself is in part an institutional framework to ensure management of storage and recovery. It includes an accounting to track storage and recoverable volumes of water and requires an extensive monitoring and mitigation program. Participants will agree to restrict operations as needed to maintain proper accounting balances overall, while adjusting operations in real-time if monitoring exceeds parameters that will be established during Water Bank planning.

9.2.3 Management Action #2 - Explore Improvements with NASb Well Permitting Programs

Management Action Description: This management action will consist of exploring potential revisions to Placer, Sacramento, and Sutter counties' and the City of Roseville's well permitting programs. Areas of improvement to explore include:

- Minimum screen depth requirements to limit high-capacity wells from impacting shallow aquifers directly connected to surface water or that may support GDEs.
- Minimum spacing requirements for high-capacity wells to limit impacts to existing groundwater wells in the NASb.
- Consultations for new wells to be constructed near groundwater level representative monitoring wells to ensure effective future monitoring for the NASb.

The project will require development of technical information to support proposed modifications that may result to existing well programs.

Measurable Objective Expected to Benefit: This project is expected to benefit the water level objective associated with interconnected surface water by limiting direct connection of wells to rivers, canals, and creeks.

Project Status: The project is expected to commence upon submittal of the NASb GSP. Technical analysis and coordination with the respective well permitting programs are expected to take about two years to complete.

Permitting and Regulatory Process: Each well permitting agency would determine the necessary and appropriate permitting and regulatory requirements from any modifications that may result from this management action.

Public Noticing: Each well permitting agency is a public agency and will determine the necessary public noticing requirements from any modifications that may result from this management action. The GSAs will notice interested parties when the management action commences and will provide regular updates on any progress through nasbgroundwater.org.

Expected Benefits and Evaluation: The management action is intended to protect the most sensitive of the beneficial uses and users of the NASb, including, interconnected surface water, shallow domestic well owners, and GDEs. Benefits are expected to be evaluated using groundwater drawdown software and potentially field test of drawdown and recovery.

How the Project will be Accomplished: The NASb GSAs intend to work cooperatively with their respective well permitting agencies by proactively communicating the management needs of the beneficial uses and users of the subbasin and performing an appropriate technical analysis.

Legal Authority: The counties and city have land use management and planning authority granted through the State of California. This power allows cities and counties to establish land use and zoning laws that govern development. The well permitting agencies are authorized under California Water Code Section 13801.

Estimated Costs and Funding Plan: Costs to the local well permitting agencies to modify existing Code or Ordinances is unknown. The NASb GSAs have estimated $25,000 to conduct an analysis of well drawdowns and pumping spheres of influence at various capacities in an alluvial system. This will help inform recommended minimum screen depths in areas most sensitive to drawdown (e.g., interconnected surface water, GDEs) and to recommend spacing requirements for future wells to avoid impacts to existing groundwater users. The GSAs have committed to funding this activity in the Implementation Agreement in this GSP (*refer to* **Appendix A – MOA and Fiscal Budget**).

Management of Groundwater Extractions and Recharge: This management action is not intended to limit groundwater extraction. Rather, it is intended to put into place prudent practices intended to limit mostly localized impacts to beneficial uses and users in the Subbasin.

9.2.4 Management Action #3 - Proactive Coordination with Land Use Agencies

Management Action Description: This management action will help ensure that land use planning and GSP implementation will be better coordinated moving forward under SGMA. This GSP relied heavily on existing information from land use planning decisions that have already been made. The technical analysis performed for this GSP indicates that those planned land use practices have maintained sustainable conditions in the Subbasin. However, the analysis indicates that the system is only just in balance with current land use and approved development along with implemented GSP projects. Significant changes in land use from these assumptions could represent a potential risk to the Subbasin's sustainability. Therefore, the NASb GSAs desire to ensure that the respective city or county land use planning agencies are fully aware of these results as General Plans or other land use permitting occurs in the future. Areas for coordination include:

- Sharing groundwater modeling results specific to the areas covered by the respective land use planning agencies.
- Sharing of annual GSP implementation reports with monitoring results that are relevant to the area of each land use planning agency.
- Holding an annual meeting with each land use planning agency to share information on trends, upcoming projects, and upcoming planning efforts (e.g., General Plan update).

Measurable Objective Expected to Benefit: This management action is not expected to directly benefit a current measurable objective because the objectives were established based on the land use planning decisions that have already been made. Rather, the intent of the management action is to ensure that future decisions or plans do not impede the subbasin's sustainability.

Project Status: The project is expected to commence upon submittal of the NASb GSP and will be an ongoing annual activity.

Permitting and Regulatory Process: There are no permitting or regulatory processes required for this coordination.

Public Noticing: There is no public noticing requirement for this coordination. Land use planning agencies will follow their respective public noticing requirements for future land use planning and General Plan updates.

Expected Benefits and Evaluation: The expected benefit is that the subbasin will continue to be managed sustainably and locally to promote continued healthy economic growth for respective land use planning agencies.

How the Project will be Accomplished: The project will be accomplished by regular, cooperative coordination between NASb GSAs and local land use planning agencies.

Legal Authority: GSAs have legal authority to share information proactively with land use planning agencies. Land use planning agencies will maintain their authority for ultimately making land use planning decisions.

Estimated Costs and Funding Plan: There is no expected direct cost for this management action. The GSAs will participate with their in-kind time for meetings.

Management of Groundwater Extractions and Recharge: This management action is not intended to limit groundwater extraction. Rather, it is intended to proactively work with local land use planning agencies to ensure the Subbasin continues to be sustainable into the future.

9.3 Supplemental Projects

Groundwater management is a continuous ongoing process in the NASb whether SGMA is mandating sustainable management or not. The NASb GSAs have additional projects that are at a feasibility level and over the next several years many will likely be ready for implementation. **Table 9-2** provides a list of these supplemental projects that are in an ongoing planning process.

Table 9-2. Supplemental Projects

Supplemental Project No.	Project Sponsor	Project Description	Potential Benefit (AFY)	Potential Capital Cost ($ million)
1	Regional Water Authority	Expansion of the Sacramento Regional Water Bank – Phase 2 - implementation of the expanded conjunctive use program by constructing various system interties and booster pumps to increase in-lieu recharge; install aquifer storage and recovery (ASR) for direct recharge; install additional production wells to recover groundwater in dry years. The recharge potential and cost are "up to" amounts because the program is fully scalable.	30,000	250
2	Placer County Water Agency	RiverArc – a new treatment plant and pipeline would be constructed to bring Sacramento River water for municipal and industrial water supplies. Improves water supply security by having a water source from a different watershed and expands in-lieu conjunctive use by offsetting existing groundwater demands.	30,000	1,400
3	South Sutter Water District	Water System Conveyance System Improvements – enlarging of district laterals to allow greater surface water deliveries during wet years and a reduction of groundwater pumping to achieve in-lieu recharge.	TBD	TBD
4	Natomas Mutual Water Company	Service Area Expansion – annexation of about 2,300 acres and supplying the area with surface water reducing groundwater pumping. This area has previously been solely dependent on groundwater.	4,600	TBD
5	City of Lincoln	Conjunctive Use – expand use of recycled water to offset existing groundwater demand.	1,000	TBD
6	Placer County	Sustainable Agricultural Groundwater Recharge Program – this program will fund construction of recharge facilities in western Placer County. A funding mechanism has been established through developer fees.	TBD	TBD