

5 Projects and Management Actions to Achieve Sustainability

Legal Requirements:

§ 354.44. Projects and Management Actions

- (a) Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.
- (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.
 - (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.
 - (3) A summary of the permitting and regulatory process required for each project and management action.
 - (4) The status of each project and management action, including a timetable for expected initiation and completion, and the accrual of expected benefits.
 - (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.
 - (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.
 - (7) A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.
 - (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.
 - (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.
- (c) Projects and management actions shall be supported by best available information and best available science.
- (d) An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.

5.1 Introduction

Two primary tools for sustainable groundwater management are project development for water supply augmentation and management actions for data collection and demand reduction. The goal of the EKGSA is to first develop projects to augment and/or better use the surface water supply to overcome groundwater overdraft, however if project development alone is unable to achieve the desired goals (i.e. avoiding Undesirable Results and achieving Measurable Objectives), then management actions or programs will need to be employed. The projects described herein primarily focus on the capture, use, and recharge of available surface water supplies within the EKGSA to augment the water supply and reduce the impacts of groundwater pumping. The EKGSA considered many potential projects that could mitigate the groundwater overdraft within the EKGSA area and help achieve sustainability, but ultimately determined that not all of these potential projects are currently feasible for implementation. The EKGSA will continue to evaluate potential projects during implementation. Projects that are currently envisioned for implementation are discussed in [Section 5.2](#). The EKGSA, when necessary, will consider management actions that focus on several factors including, but not limited to, reducing water demand and associated reduction of groundwater pumping, increasing data collection, education and outreach, regulatory policies, incentive-based programs, and enforcement actions. The potential management actions that may be implemented following further investigation and analysis are discussed in [Section 5.3](#).

Projects and management actions may be implemented on different timelines. The EKGSA understands there are various levels of uncertainty with project and program implementation, and it is not unusual for it to take longer than originally estimated. In addition, some projects and management actions build upon others, and the accrual of expected benefits may take multiple years to be individually realized and vary substantially from year to year. Depending upon the success or failure of the initial GSP project and management action efforts to increase water supplies, reduce groundwater demands, and improve data collection, the proposed implementation timelines may vary over time and will be reevaluated each time this GSP is updated.

5.1.1 Public Notification

Successful implementation of this GSP over the planning horizon will require ongoing efforts to engage stakeholders and the general public in the sustainability process. This includes communicating the statutory requirement, the objectives of the GSP, and progress toward each identified measurable objective. In the context of this ongoing public communication, announcements of upcoming environmental hearings, project presentations, bid openings and project construction schedules will be made on a regular basis. Public forums will include opportunities for public comment and feedback, to be addressed in an appropriate manner by EKGSA staff and/or consultants. The EKGSA will provide notice to the public and other agencies through public meetings, newsletters, and the EKGSA website www.ekgsa.org as each project or management action is being considered, evaluated, and implemented.

5.1.2 Water Supply

The existing or new water supply most likely to be used for each surface water-dependent project is identified in the description of each of the projects. Due to the location of the projects, only certain surface water supplies might be available.

In California, permits, licenses, and registrations give the right to beneficially use reasonable amounts of water within a specific area or Place of Use. The EKGSA area is located within the Place of Use for the USBR Central Valley Project (CVP) and portions of the EKGSA are located within the Place of Use for the Kaweah River, called the Kaweah River Service Area. Therefore, entities could purchase surface water supplies from the Kaweah River and/or CVP and use them for beneficial uses within the EKGSA after going through the various regulatory and environmental processes for a water transfer if there was a willing seller.

The most likely CVP water that could be available in the future is Section 215 water, a federal designation for floodwater. Section 215 water is available when conditions cause Millerton Lake (on the San Joaquin River) to rise to the point that flood control releases are necessary, as mandated by the U.S. Army Corps of Engineers flood control criteria. Priority allocation for Section 215 water is made available to the Friant Division Long-Term and Cross Valley Canal Contractors. Section 215 water can then also be made available to other parties (Non-Long-Term Contractors) in accordance with Reclamation law and contractual requirements. Section 215 water has typically occurred between December and July, with historical data showing the most prolific months for water availability being March through July. Section 215 water is usually available approximately 2 years out of every 5 years. Some Section 215 has been purchased in the past by EKGSA members when available.

It should be noted that the San Joaquin River Restoration Program (SJRRP) can be expected to utilize flood releases when available prior to water being designated as Section 215 water. This program will have the effect of decreasing the amount of water available for use or recharge when Section 215 water does become available. Another option, albeit costlier, would be to purchase Class 1 or Class 2 supplies from Friant contractors, which is far more reliable than Section 215 water.

5.2 Projects

The EKGSA has identified potential projects for initial implementation to help achieve groundwater sustainability, and it is likely additional projects will be developed as GSP implementation proceeds. Agencies within the EKGSA have been doing some recharge for years, but additional projects are required to augment the water supply to help overcome the groundwater overdraft.

The EKGSA will maintain a list of proposed projects and their characteristics, along with their development status, and will use this list to prioritize and secure funding as opportunities become available. Projects discussed in this GSP will remain a part of the potential projects that the EKGSA may choose to implement; however, the projects list will be dynamic based on routine cost-benefit analyses. When multiple projects are considered for competing funds, they will be prioritized based on a weighted decision matrix and those deemed most beneficial considering a broad range of categories will be selected for execution. All projects will be supported by the best available information and the best available science.

Implementation through this first GSP will focus on bolstering data sets to fill data gaps, and then projects fully developed based on current and projected conditions. As a result, projects are presently developed to a conceptual level for general evaluation and comparison. Remaining details of projects, such as specific location, will be finalized later. The projects that are currently being considered would yield an estimated average annual volume of approximately 18,200 AF/year if fully implemented as envisioned, which is over 60% of the currently identified overdraft (28,000 AF/year) in the EKGSA. The remainder will be saved through projects yet to be developed and/or management actions, if necessary. The current projects are generally prioritized and summarized in **Table 5-1** and location within the EKGSA is shown in **Figure 5-1**. Detailed discussion is provided further in this section.

Table 5-1 EKGSA Currently Identified Projects

Project ID	Project Title	Project Type	Estimated Annual Benefits AF/yr.	Generalized Priority
EK1	Lewis Creek Recharge	Recharge	3,000	High
EK2	Cottonwood Creek Recharge	Recharge	1,800	High
EK3	Yokohl Creek Recharge	Recharge	1,800	High
EK4	Rancho de Kaweah Water Management & Banking Project	Recharge, Storage, Re-regulation, Banking	9,000	High
EK5	Lindmore/Exeter Dry Wells	Recharge	2,010	Medium
EK6	Lindsay Recharge Basin	Recharge	150	Medium
EK7	Wutchumna Ditch Recharge	Recharge	480	Medium
	Subtotal		18,240	AF/yr.

Ultimately, each of these projects and those to be developed will fall into at least one of three categories. There may be multiple projects of each type. Project types include:

1. *Recharge*
 - *Basin*
 - *Dry well*
 - *On-farm recharge*
 - *Flood delivery to existing channel*
2. *Existing conveyance facilities rehabilitation or expansion*
3. *Efficiency improvements*

The anticipated process for project implementation follows:

1. *Identify potential projects*
2. *Prepare conceptual level feasibility study and cost estimate*
3. *Prioritize potential projects based on EKGSA and Stakeholder goals*
4. *Obtain agreement with project partner(s)*
5. *Secure funding*
6. *Prepare environmental documents and obtain permit and regulatory approvals, as necessary*
7. *Design and prepare construction documents*
8. *Implement project construction*
9. *Operate and maintain project for sustainability*
10. *Evaluate actual project benefits compared to expected benefits*

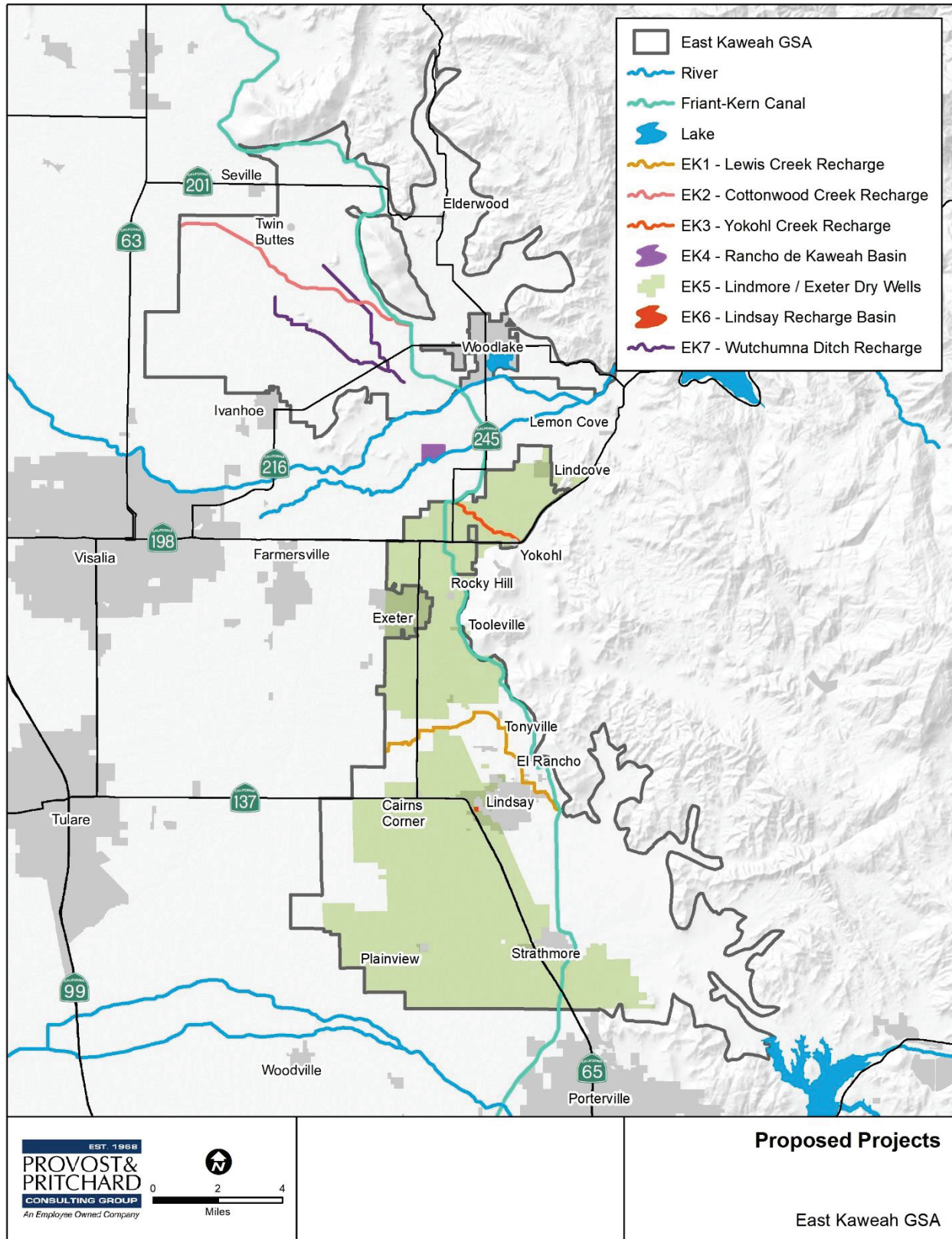


Figure 5-1 EKGSA Proposed Projects Location Map

5.2.1 Lewis Creek Recharge

The following describes the Lewis Creek Recharge Project, which will capture available surface water and recharge the aquifer through the creek bed. Eventually it may also facilitate in-lieu recharge through decreased use of groundwater wells by using the surface water for irrigation. The length of Lewis Creek expected to be used for recharge is shown in **Figure 5-2**.

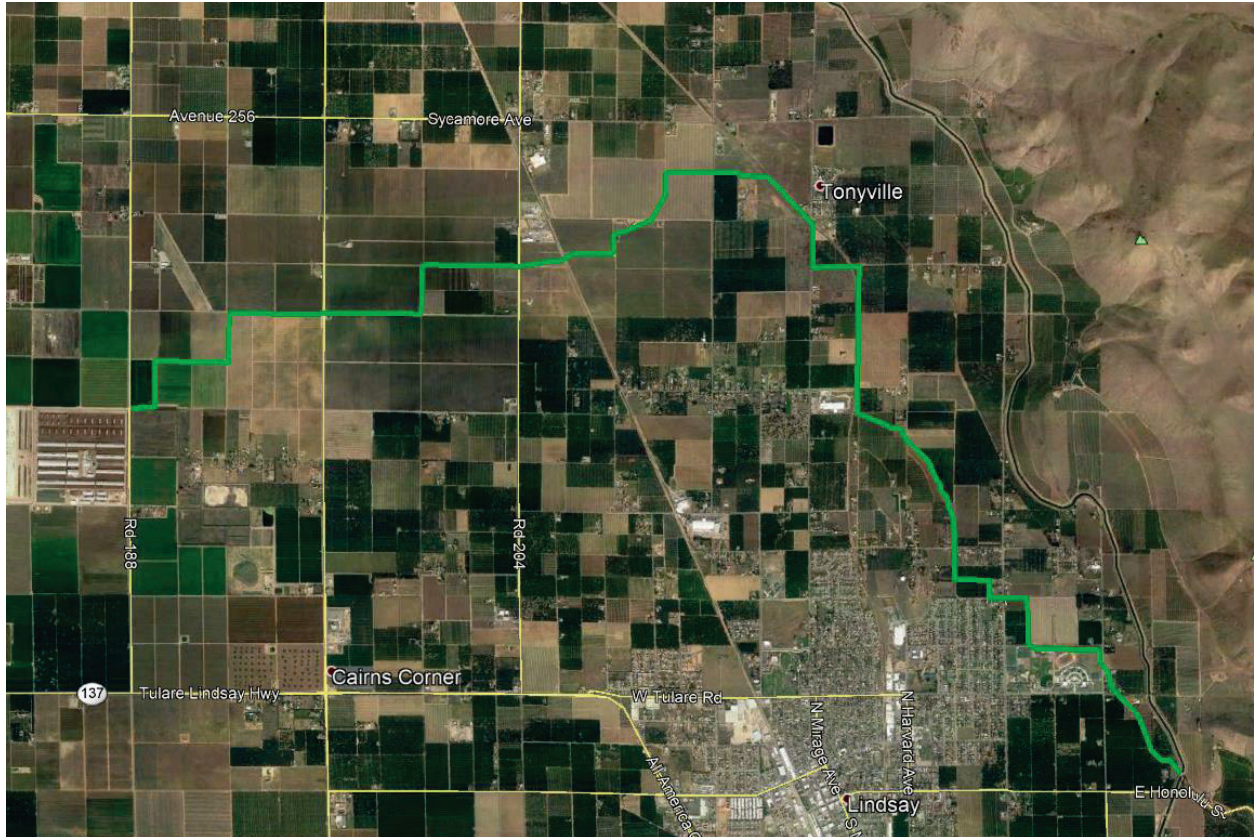


Figure 5-2 Lewis Creek Alignment within EKGSA

Project Title:	Lewis Creek Recharge	Project ID:	EK1
Project Type	Recharge (delivery to existing channel)		
Project Location	Lewis Creek from intersection at Friant-Kern Canal east of City of Lindsay and heading west along the channel to the western EKGSA boundary in Tulare County – T20S R27E, T19S R27E, and T19S R26E.		
Implementing Agency	Lindmore Irrigation District (LID).		
Project Description - 354.44(a)	The Lewis Creek Recharge Project will entail construction of a turnout from Friant-Kern Canal into Lewis Creek to capture CVP water supplies, when available, and recharge the underlying aquifer. The total length of the portion of the creek acting as a recharge facility is nearly 9 miles.		

Project Title: Lewis Creek Recharge	Project ID: EK1		
Measurable Objective(s) Addressed - 354.44(b)(1)			
<p>The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. Indirectly there could be secondary benefits of some groundwater quality improvement from high quality surface water, and reduction in land subsidence.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion – <i>not applicable</i> <input checked="" type="checkbox"/> Land Subsidence </td> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input checked="" type="checkbox"/> Depletion of Interconnected Surface Water </td> </tr> </table>		<input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion – <i>not applicable</i> <input checked="" type="checkbox"/> Land Subsidence	<input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input checked="" type="checkbox"/> Depletion of Interconnected Surface Water
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Circumstances and Criteria for Implementation - 354.44(b)(1)(A)			
<p>The Project is in the conceptual stage and no feasibility study work has begun. Infiltration is expected based on general knowledge of the soil characteristics in the immediate project area. Construction of the project would depend upon successful outcome of a feasibility study including geotechnical work to validate the capacity for percolation. Environmental clearance would be necessary under CEQA and NEPA. This is a high priority project because it utilizes a readily available recharge area to address several of the measurable objectives. It is viewed as an integral piece of the EKGSA's overall effort to reach sustainability.</p>			
Process to Provide Notice of Implementation - 354.44(b)(1)(B)			
<p>The EKGSA will have ongoing efforts to engage stakeholders and the general public in the sustainability process, communicating the statutory requirements, the objectives of the GSP, and progress toward each identified measurable objective. Neighboring landowners will be notified about the project prior to implementation and environmental documents will be available for public review.</p>			
Estimated Annual Project Benefits (AF/yr.) - 354.44(b)(2)			
<p>The actual recharge rate of the proposed project will be determined by the on-site soils. The project is expected to recharge approximately 3,000 acre-feet per year, on average. This is based on an anticipated delivery capacity of 100 AF/day and 30 days of CVP water available per year on average.</p>			
Permitting and Regulatory Requirements - 354.44(b)(3)			
<p>The project will complete all necessary permitting and regulatory requirements. It will require CEQA and NEPA documentation, and potentially a Dust Control Plan (DCP) and a Storm Water Pollution Prevention Plan (SWPPP). The project will utilize CVP water for groundwater recharge.</p>			
Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits			
<p>No set project schedule has been determined; however, it is the goal of the EKGSA to have this Project operating by 2022. The key steps that will dictate schedule will be funding, CEQA/NEPA compliance, and construction of a turnout from the FKC into Lewis Creek.</p>			
Evaluation of Benefits - 354.44(b)(5)			
<p>The volume of water delivered for recharge will be measured daily and summarized monthly by LID. The rate of accrual of benefits will depend on the frequency of water availability and the infiltration capacity of the soil. The water level of groundwater wells in the area will be measured and water quality in the vicinity of the project will be monitored. This data will be used to determine project impacts and benefits.</p>			
How will project be accomplished, and what is the water source? - 354.44(b)(6)			
<p>The project will be accomplished by LID with the support of EKGSA. The water source will be CVP supplies when available.</p>			

Project Title: Lewis Creek Recharge	Project ID: EK1
Legal Authority - 354.44(b)(7)	
LID has the legal authority to deliver CVP water to Lewis Creek for recharge since portions of the creek are within the District boundaries and is within the CVP Place of Use.	
Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF	
The estimated project capital cost is approximately \$350,000 and the annual cost over a 20-year return period is estimated to be \$12 to \$15/AF, including operational and capital costs.	
Funding Source - 354.44(b)(8)	
The funding source will likely be a combination of grant funding, EKGSA funds, and possibly LID funds.	
Management of Groundwater Extractions and Recharge - 354.44(b)(9)	
The project would be managed by LID with the oversight by the EKGSA. Recharge volumes will be measured and reported by LID. Groundwater extraction will be by landowners in the area within LID and to the western EKGSA area. Performance of the project would be a necessary part of the EKGSA's reporting requirements as well as evaluations of measurable objectives.	
Level of Uncertainty - 354.44(d)	
The level of uncertainty primarily involves funding availability, permeability of the intended recharge area, and frequency of high flow water. The overall level of uncertainty is moderate for the volume of recharge water indicated.	

5.2.3 Cottonwood Creek Recharge

The following describes the Cottonwood Creek Recharge Project, which will capture available surface water and recharge the aquifer through the creek bed. Eventually it may also facilitate in-lieu recharge through decreased use of groundwater wells by using the floodwater for irrigation. The length of Cottonwood Creek expected to be used for recharge is shown in **Figure 5-3**.

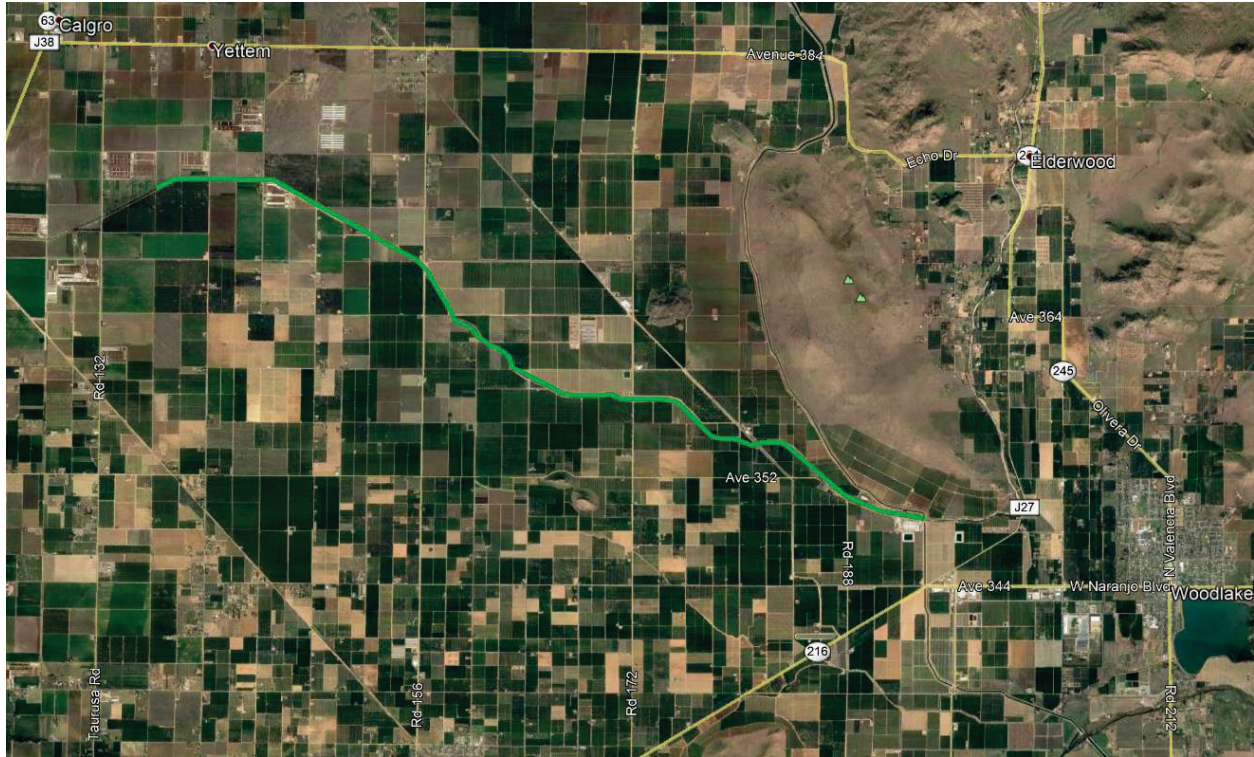


Figure 5-3 Cottonwood Creek Alignment within EKGS

Project Title: Cottonwood Creek Recharge	Project ID: EK2
Project Type	
Recharge (delivery to existing channel)	
Project Location	
Intersection of Friant-Kern Canal and Cottonwood Creek west to the GSA boundary. West of Woodlake and Northeast of Ivanhoe in Tulare County – T17S R26E and T17S R25E.	
Implementing Agency	
Stone Corral Irrigation District (SCID) & Ivanhoe Irrigation District (IID)	
Project Description - 354.44(a)	
The Cottonwood Creek Recharge Project will entail construction of a turnout from Friant-Kern Canal into Cottonwood Creek to capture CVP water supplies when available and recharge the underlying aquifer. The total length of the portion of the creek acting as a recharge facility is just over 8 miles.	

Project Title: Cottonwood Creek Recharge	Project ID: EK2
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Measurable Objective(s) Addressed - 354.44(b)(1)

The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. Indirectly there could be secondary benefits of some groundwater quality improvement from high quality surface water, and reduction in land subsidence.

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Circumstances and Criteria for Implementation - 354.44(b)(1)(A)

The project is in the conceptual stage and no feasibility study work has begun. Infiltration is expected based on general knowledge of the soil characteristics in the immediate project area. Construction of the project would depend upon successful outcome of a feasibility study including geotechnical work to validate the capacity for percolation. Environmental clearance would be necessary under CEQA and NEPA. This is a high priority project because it utilizes a readily available recharge area to address several of the measurable objectives. It is an integral piece of the EKGSA’s overall effort to reach sustainability and will be implemented after a feasibility study is completed and funding becomes available.

Process to Provide Notice of Implementation - 354.44(b)(1)(B)

The EKGSA will have ongoing efforts to engage stakeholders and the general public in the sustainability process, communicating the statutory requirement, the objectives of the GSP, and progress toward each identified measurable objective. Neighboring landowners will be notified about the project prior to implementation and environmental documents will be available for public review.

Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2)

The actual recharge rate of the proposed project will be determined by the on-site soils. The project is expected to recharge approximately 1,800 acre-feet per year, on average. This is based on an anticipated delivery capacity of 60 AF/day and 30 days of CVP water available per year.

Permitting and Regulatory Requirements - 354.44(b)(3)

The project shall complete all necessary permitting and regulatory requirements. It will require CEQA and NEPA documentation, a DCP, and a SWPPP. The project will utilize CVP water, when available, for groundwater recharge.

Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits

No project schedule has been determined, and a project feasibility study and analysis need to be completed, including a geotechnical study. Once a source of project funding is secured, a comprehensive schedule including environmental review, design, permitting and construction will be developed. Project construction and implementation is anticipated to occur within 5 to 10 years of GSP submittal.

Evaluation of Benefits - 354.44(b)(5)

The volume of water delivered for recharge will be measured daily and summarized monthly by Stone Corral and/or Ivanhoe IDs. The rate of accrual of benefits will depend on the frequency of water availability and the percolation capacity of the soil. The water level of groundwater wells in the area will be measured and water quality in the vicinity of the project will be monitored. This data will be used to determine project impacts and benefits.

How will project be accomplished, and what is the water source? - 354.44(b)(6)

The project will be accomplished by Stone Corral & Ivanhoe IDs with the support of EKGSA. The water source will be CVP water.

Project Title: Cottonwood Creek Recharge	Project ID: EK2
Legal Authority - 354.44(b)(7)	
Stone Corral & Ivanhoe IDs have the legal authority to deliver CVP water to the creek for recharge since the EKGSA area is within the Place of Use.	
Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF	
The estimated project capital cost is approximately \$200,000 and the annual cost over a 20-year return period is estimated to be \$11 to \$14/AF, including operational and capital costs.	
Funding Source - 354.44(b)(8)	
The funding source will likely be a combination of grant funding, Stone Corral ID, Ivanhoe ID, and/or EKGSA.	
Management of Groundwater Extractions and Recharge - 354.44(b)(9)	
The project would be managed by Stone Corral & Ivanhoe IDs under the oversight of the EKGSA. Recharge volumes will be measured and reported by Stone Corral & Ivanhoe IDs. Groundwater extraction will be by landowners in the area within Stone Corral ID, Ivanhoe ID, and the EKGSA area. Performance of the project would be a necessary part of the EKGSA's reporting requirements as well as evaluations of measurable objectives.	
Level of Uncertainty - 354.44(d)	
The level of uncertainty primarily involves funding availability, permeability of the intended recharge area, and frequency of available water. The overall level of uncertainty is moderate for the volume of recharge water indicated.	

5.2.4 Yokohl Creek Recharge

The following describes the Yokohl Creek Recharge Project, which will capture available surface water and recharge the aquifer through the creek bed. Eventually it may also facilitate in-lieu recharge through decreased use of groundwater wells by using the floodwater for irrigation. The length of Yokohl Creek expected to be used for recharge is shown in **Figure 5-4**.

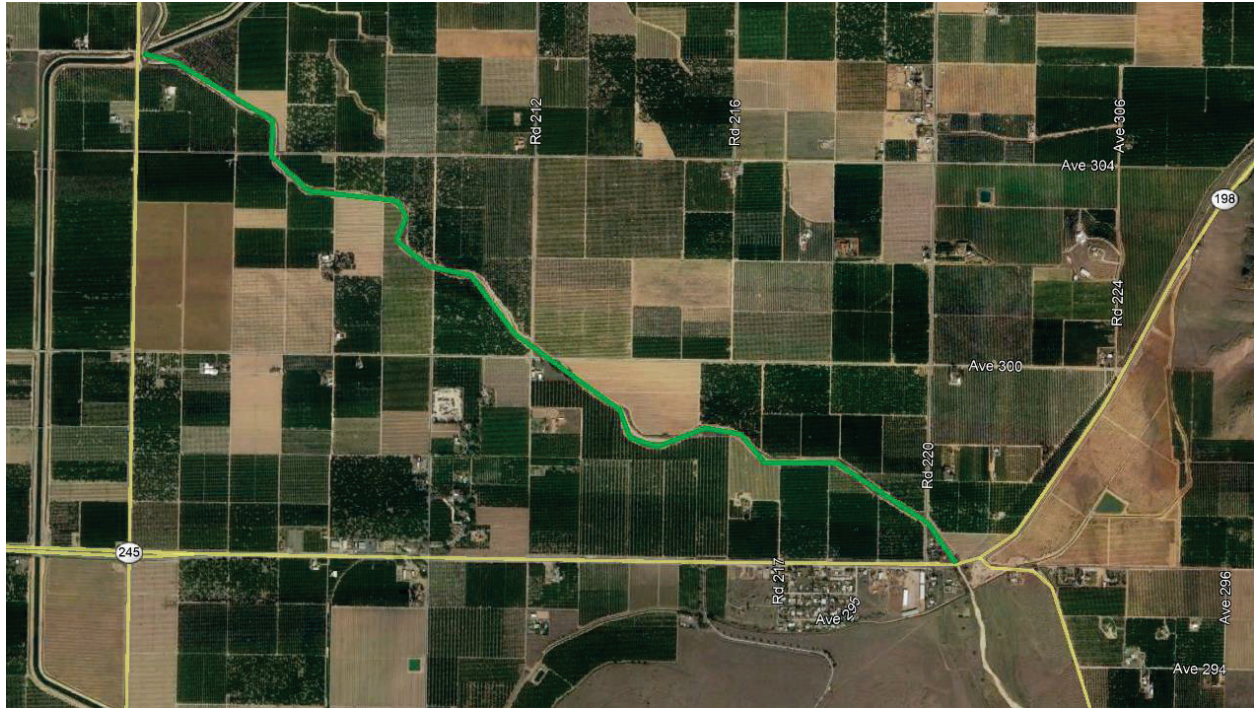


Figure 5-4 Yokohl Creek Alignment within EKGSA

Project Title:	Yokohl Creek Recharge	Project ID: EK3
Project Type	Recharge (delivery to existing channel)	
Project Location	Intersection of Yokohl Creek and Friant-Kern Canal to intersection of Yokohl Creek and HWY 198. North-Northeast of Exeter – T18S R26E and T18S R27E.	
Implementing Agency	Exeter Irrigation District (EID)	
Project Description - 354.44(a)	The Yokohl Creek Recharge Project will utilize existing EID turnout(s) to deliver CVP water supplies, when available, and recharge the underlying aquifer via the Yokohl Creek channel. The total length of the portion of the creek acting as a recharge facility will be nearly 3 miles.	

Project Title: Yokohl Creek Recharge	Project ID: EK3		
Measurable Objective(s) Addressed - 354.44(b)(1)			
<p>The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. Indirectly there could be secondary benefits of some groundwater quality improvement from high quality surface water, and reduction in land subsidence.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion – <i>not applicable</i> <input checked="" type="checkbox"/> Land Subsidence </td> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input checked="" type="checkbox"/> Depletion of Interconnected Surface Water </td> </tr> </table>		<input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion – <i>not applicable</i> <input checked="" type="checkbox"/> Land Subsidence	<input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input checked="" type="checkbox"/> Depletion of Interconnected Surface Water
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Circumstances and Criteria for Implementation - 354.44(b)(1)(A)			
<p>The EID system has existing connections to Yokohl Creek; however, this project is still in the conceptual stage and no feasibility study work has begun. Infiltration is expected based on general knowledge of the soil characteristics in the immediate project area. Initially, the EKGSA and EID would utilize these existing connections and, pending recharge results, construction to expand the delivery capacity can be considered in the future. This is a high priority project because it utilizes a readily available recharge area to address several of the measurable objectives. It is an integral piece of the EKGSA’s overall effort to reach sustainability and will potentially be implemented in 2020.</p>			
Process to Provide Notice of Implementation - 354.44(b)(1)(B)			
<p>The EKGSA will have ongoing efforts to engage stakeholders and the general public in the sustainability process, communicating the statutory requirement, the objectives of the GSP, and progress toward each identified measurable objective. Neighboring landowners will be notified about the project prior to implementation and environmental documents will be available for public review.</p>			
Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2)			
<p>The actual recharge rate of the proposed project will be determined by the on-site soils. The project is expected to recharge approximately 1,800 acre-feet per year, on average. This is based on an anticipated delivery capacity of 60 AF/day and 30 days of CVP water available per year.</p>			
Permitting and Regulatory Requirements - 354.44(b)(3)			
<p>The project shall complete all necessary permitting and regulatory requirements. The project will utilize CVP water for groundwater recharge.</p>			
Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits			
<p>No project schedule has been determined, however, given the existing facilities in place, this project could be implemented in 2020.</p>			
Evaluation of Benefits - 354.44(b)(5)			
<p>The volume of water delivered for recharge will be measured daily and summarized monthly by EID. The rate of accrual of benefits will depend on the frequency of water availability and the percolation capacity of the soil. The water level of groundwater wells in the area will be measured and water quality in the vicinity of the project will be monitored. This data will be used to determine project impacts and benefits.</p>			
How will project be accomplished, and what is the water source? - 354.44(b)(6)			
<p>The project will be accomplished by EID with the support of EKGSA. The water source will be CVP water.</p>			

Project Title: Yokohl Creek Recharge	Project ID: EK3
Legal Authority - 354.44(b)(7)	
EID has the legal authority to deliver CVP water to the creek for recharge since Yokohl Creek is within its boundary.	
Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF	
The estimated project capital cost, for potential capacity enhancement, is approximately \$135,000 and the annual cost over a 20-year return period is estimated to be \$5 to \$10/AF, including operational and capital costs.	
Funding Source - 354.44(b)(8)	
The funding source will likely be a combination of grant funding, EID, and/or EKGSA.	
Management of Groundwater Extractions and Recharge - 354.44(b)(9)	
The project would be managed by EID under the oversight of the EKGSA. Recharge volumes will be measured and reported by EID. Groundwater extraction will be by landowners in the area within EID and the EKGSA area. Performance of the project would be a necessary part of the EKGSA's reporting requirements as well as evaluations of measurable objectives.	
Level of Uncertainty - 354.44(d)	
The level of uncertainty primarily involves permeability of the intended recharge area, and frequency of CVP water available for recharge. The overall level of uncertainty is moderate for the volume of recharge water indicated.	

5.2.5 Rancho de Kaweah Water Management & Banking Project

The following describes the Rancho de Kaweah Water Management & Banking Project, which will manage available CVP and/or Kaweah River supplies from project participants and capture excess water in high flow years to recharge the aquifer, store, bank, or re-regulate supplies to help achieve sustainability in the Kaweah Subbasin and potentially benefit others based on participation. The project area is shown in **Figure 5-5**.



Figure 5-5 Rancho de Kaweah Project Area

Project Title:	Rancho de Kaweah Water Management & Banking Project	Project ID: EK4
Project Type	Recharge (basin), Banking, Recovery, and Re-regulation	
Project Location	The project site is located near Exeter Blvd. and the Lower Kaweah River in Tulare County – Portion of Sections 11, 14, 15, 22, and 23 T18S, R26E.	
Implementing Agency	Lindsay-Strathmore Irrigation District (LSID)	

Project Title: Rancho de Kaweah Water Management & Banking Project **Project ID:** EK4

Project Description - 354.44(a)

The Rancho de Kaweah Water Management & Banking Project will entail constructing recharge and recovery facilities on approximately 1,200 acres. It will provide water management including recharge, storage, re-regulation, and recovery of project participant's CVP and/or Kaweah River water supplies. A conveyance system will be constructed to the project site.

Measurable Objective(s) Addressed - 354.44(b)(1)

The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. The project may also re-regulate high flow supplies that would have been potentially underutilized and reduce groundwater pumping by delivering captured water during the irrigation season. Indirectly there could be secondary benefits of some groundwater quality improvement and reduction in land subsidence.

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| <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels | <input checked="" type="checkbox"/> Reduction of Groundwater Storage |
| <input type="checkbox"/> Seawater Intrusion – <i>not applicable</i> | <input checked="" type="checkbox"/> Degraded Water Quality |
| <input checked="" type="checkbox"/> Land Subsidence | <input checked="" type="checkbox"/> Depletion of Interconnected Surface Water |

Circumstances and Criteria for Implementation - 354.44(b)(1)(A)

The project is in the conceptual stage and no feasibility study work has begun. Infiltration is expected based on general knowledge of the soil characteristics in the immediate project area—the sandy soils present have a high capacity for percolation. Construction of the project would depend upon successful outcome of a feasibility study including a geotechnical investigation. Environmental clearance would be necessary under CEQA and/or NEPA depending upon the ultimate funding source. This is a high priority project because of the large potential recharge and will address several of the measurable objectives. It is an integral piece of the EKGSA's overall effort to reach sustainability and provide partnering ability within the Kaweah Subbasin.

Process to Provide Notice of Implementation - 354.44(b)(1)(B)

The EKGSA will have ongoing efforts to engage stakeholders and the general public in the sustainability process, communicating the statutory requirement, the objectives of the GSP, and progress toward each identified measurable objective. Neighboring landowners will be notified about the project prior to implementation and environmental documents will be available for public review.

Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2)

The actual recharge rate of the proposed project will be determined by the on-site soils and size of basin, but it is expected to be approximately 1 ft/day, which would result in approximately 300 AF/day if at least 300 acres of basin area is constructed. This would yield an average annual recharge volume of approximately 9,000 AF/year when Kaweah River water and/or CVP water is available (currently estimated at 30 days per year). Potential storage, recovery, and re-regulation volumes will be determined in the future during further project feasibility and design analysis.

Permitting and Regulatory Requirements - 354.44(b)(3)

The project will require CEQA and/or NEPA documentation, permits through the U.S. Army Corps of Engineers and California Department of Fish & Wildlife (CDFW), and construction permits (DCP and SWPPP). The project will likely utilize CVP and Kaweah River water when available. The project shall complete all necessary permitting and regulatory requirements.

Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits

No project schedule has been determined, and a project feasibility study and analysis need to be completed. Once a source of project funding is secured, a comprehensive schedule including environmental review, design, permitting and construction will be developed. Project construction and

Project Title: Rancho de Kaweah Water Management & Banking Project	Project ID: EK4
implementation is anticipated to occur within 5 to 10 years of GSP submittal. Basin recharge can occur after project construction whenever water is available from potential sources.	
Evaluation of Benefits - 354.44(b)(5)	
The volume of water delivered for recharge will be measured daily and summarized monthly. The rate of accrual of benefits will depend on the frequency of water availability and the percolation capacity of the soil. The water level of groundwater wells in the area is measured and water quality in the vicinity of the project is monitored. This data will be used to determine project impacts and benefits.	
How will project be accomplished, and what is the water source? - 354.44(b)(6)	
The project will be accomplished by LSID with the support of EKGSA and cooperation of GKGSA. The water source will be Kaweah River water and/or CVP water that may be available.	
Legal Authority - 354.44(b)(7)	
LSID, as the property owner, has the legal authority to construct the project upon receipt of applicable permits and has the authority to deliver Kaweah River water to the basin as well as CVP water since the area is within the CVP Place of Use.	
Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF	
The estimated project capital cost is approximately \$12,000,000 and the annual cost over a 20-year return period is estimated to be \$100 to \$150/AF, including operational and capital costs.	
Funding Source - 354.44(b)(8)	
The funding source will likely be a combination of grant funding, LSID, and/or EKGSA.	
Management of Groundwater Extractions and Recharge - 354.44(b)(9)	
The project would be managed by LSID under the oversight of the EKGSA and GKGSA. Recharge volumes will be measured and reported by LSID. Groundwater extraction will be by landowners who partner on the project within the Kaweah Subbasin. Performance of the project would be a necessary part of the EKGSA's reporting requirements as well as evaluations of measurable objectives.	
Level of Uncertainty - 354.44(d)	
The level of uncertainty primarily involves funding availability as this project is at the higher end of projected project costs.	

5.2.7 Lindmore/Exeter Dry Wells

The following describes the Lindmore/Exeter Dry Wells Project, which will capture and recharge water in above average years when surface water is available to help achieve sustainability in the EKGSA. The general project layout is shown in **Figure 5-6**.

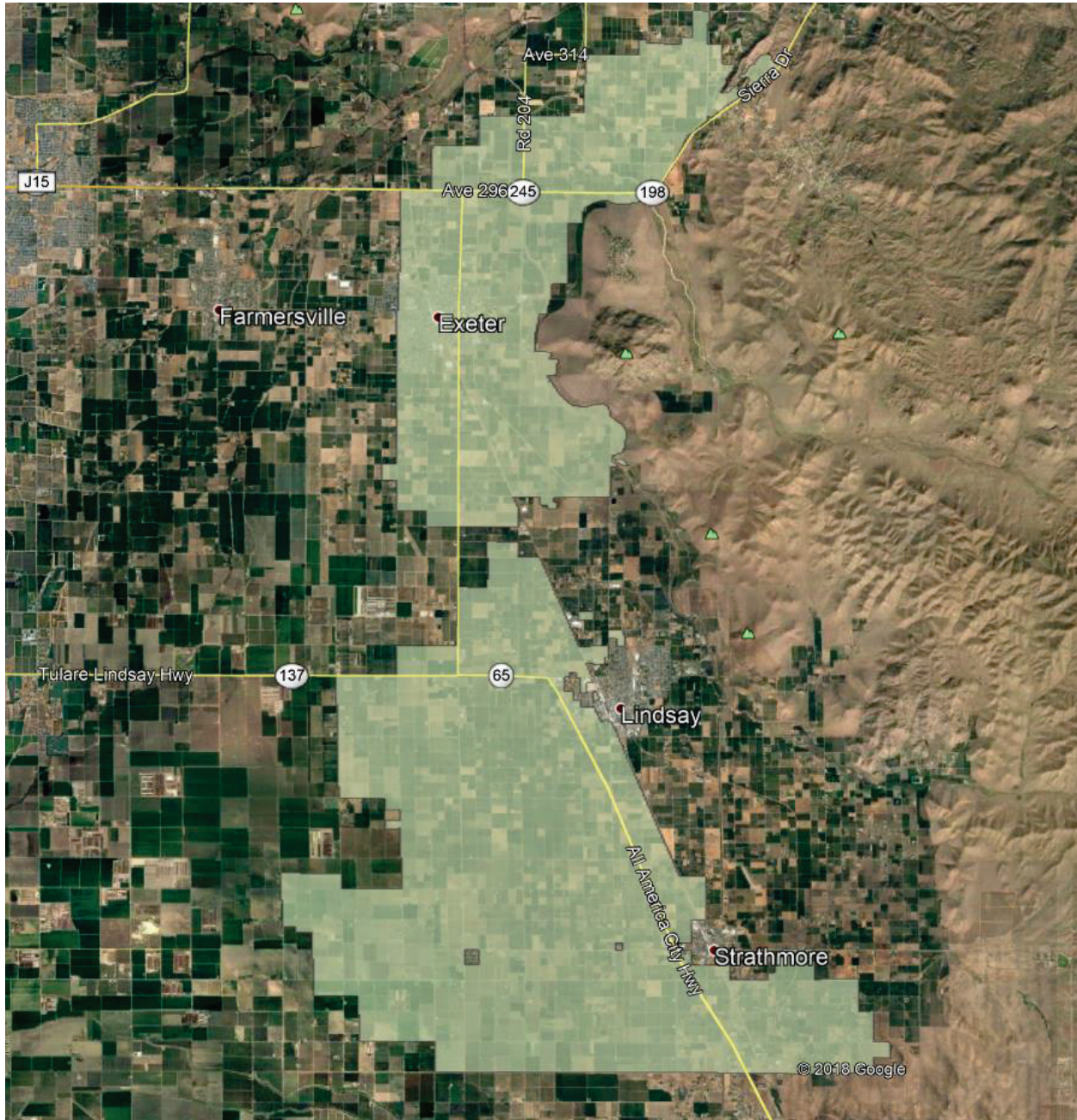


Figure 5-6 Exeter ID and Lindmore ID Boundaries

Project Title: Lindmore/Exeter Dry Wells	Project ID: EK5						
Project Type							
Recharge (dry well)							
Project Location							
The intent of the dry well projects is to spread multiple wells throughout the Exeter and Lindmore Irrigation Districts to provide recharge throughout the area with a smaller project footprint. Specific locations have not been selected, as they will require coordination with landowners within the two districts. The intent will be to place them near access to surface water connection (i.e. District distribution system) to develop widespread recharge.							
Implementing Agency							
Lindmore ID & Exeter ID							
Project Description - 354.44(a)							
The Lindmore/Exeter Dry Wells Project is still largely conceptual in nature and will entail the Irrigation Districts constructing multiple series of interconnected dry wells that could be used to achieve groundwater recharge when CVP supplies are available to the Districts. The dry well would be a standpipe filled with gravel that would allow water to infiltrate below the soil surface. The size and depth of the dry wells would be site dependent. The dry well recharge system would likely be the recharge method in areas where surface soils are not conducive to recharge and it is necessary to deliver water for recharge below shallow clay layers in the soil, or if recharge in an existing basin would be enhanced by delivering water deeper into the soil profile.							
Measurable Objective(s) Addressed - 354.44(b)(1)							
The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. Indirectly there could be secondary benefits of some groundwater quality improvement and reduction in land subsidence.							
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"><input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels</td> <td style="width: 50%;"><input checked="" type="checkbox"/> Reduction of Groundwater Storage</td> </tr> <tr> <td><input type="checkbox"/> Seawater Intrusion – <i>not applicable</i></td> <td><input checked="" type="checkbox"/> Degraded Water Quality</td> </tr> <tr> <td><input checked="" type="checkbox"/> Land Subsidence</td> <td><input type="checkbox"/> Depletion of Interconnected Surface Water</td> </tr> </table>		<input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels	<input checked="" type="checkbox"/> Reduction of Groundwater Storage	<input type="checkbox"/> Seawater Intrusion – <i>not applicable</i>	<input checked="" type="checkbox"/> Degraded Water Quality	<input checked="" type="checkbox"/> Land Subsidence	<input type="checkbox"/> Depletion of Interconnected Surface Water
<input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels	<input checked="" type="checkbox"/> Reduction of Groundwater Storage						
<input type="checkbox"/> Seawater Intrusion – <i>not applicable</i>	<input checked="" type="checkbox"/> Degraded Water Quality						
<input checked="" type="checkbox"/> Land Subsidence	<input type="checkbox"/> Depletion of Interconnected Surface Water						
Circumstances and Criteria for Implementation - 354.44(b)(1)(A)							
The project is in the conceptual stage and no feasibility study work has begun. Successful pilot projects must be conducted before significant implementation would occur. If proven feasible, the EKGSA and Districts would develop a program that could be implemented on a larger scale. This is a medium priority project because, while many dry wells are expected to be constructed, there are interim steps to be taken prior to large scale implementation. This project will be implemented after successful pilot projects demonstrate effectiveness and funding options are known.							
Process to Provide Notice of Implementation - 354.44(b)(1)(B)							
The EKGSA will have ongoing efforts to engage stakeholders and the general public in the sustainability process, communicating the statutory requirement, the objectives of the GSP, and progress toward each identified measurable objective. The EKGSA will provide information about the pilot program as part of SGMA outreach and education and will notify landowners about development of the program. Landowners that can and wish to participate will coordinate water delivery through their local agency.							
Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2)							
The number of dry wells that will be constructed for this project is unknown at this time, but an estimate of 150 dry wells could be implemented with an average recharge rate of approximately 0.5 AF/day. Based on the typical availability of CVP supplies, this would equate to an estimated average annual recharge							

Project Title: Lindmore/Exeter Dry Wells	Project ID: EK5
<p>volume of approximately 2,000 AF/yr. The recharge rate would be highly dependent on the size and depth of the dry wells and the infiltrating soil type.</p>	
Permitting and Regulatory Requirements - 354.44(b)(3)	
<p>Permits may need to be obtained from the County and/or the Regional Water Quality Control Board (RWQCB) depending on the size and depth of the dry wells. The recharge program still needs to be established by the EKGSA, and the program will likely need to go through CEQA compliance prior to implementation. The recharge program would have oversight by the EKGSA to assure proper water accounting and evaluate on-going impact (positive or negative) on groundwater quality.</p>	
Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits	
<p>No project schedule has been determined. It is anticipated that development of the recharge program would occur early on during the first 5 years of GSP implementation, and significant implementation and use of the wells may occur by the end of the first 5 years.</p>	
Evaluation of Benefits - 354.44(b)(5)	
<p>The volume of water delivered for recharge will be measured daily and summarized monthly by the local water delivery agency and/or landowner. The rate of accrual of benefits will depend on how many systems are installed, the recharge capacity of each, and the availability and frequency of high flow water.</p>	
How will project be accomplished, and what is the water source? - 354.44(b)(6)	
<p>The project will be accomplished by individual landowners that have fields that can access District supplies. The water source will be the District's CVP supplies.</p>	
Legal Authority - 354.44(b)(7)	
<p>The Districts have the legal authority to deliver CVP water to the landowner fields within their boundary. Once any necessary permits are obtained, there would be legal authority to construct a dry well.</p>	
Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF	
<p>The estimated project capital cost for constructing 150 wells is approximately \$2,500,000 and the annual cost over a 20-year return period is estimated to be \$70 to \$80/AF, including operation and capital costs.</p>	
Funding Source - 354.44(b)(8)	
<p>The funding source will likely be a combination of grant funding, LID, EID, and/or EKGSA.</p>	
Management of Groundwater Extractions and Recharge - 354.44(b)(9)	
<p>The project would be managed by the landowner and overlying district under the oversight of the EKGSA. Recharge volumes will be measured and reported by the District. Groundwater extraction will be by the landowner of the well. Performance of the project would be a necessary part of the EKGSA's reporting requirements as well as evaluations of measurable objectives.</p>	
Level of Uncertainty - 354.44(d)	
<p>The primary uncertainty involved with small recharge operations is the cost effectiveness. It is slightly decreased in this case due to economy of scale. The other chief uncertainty is the permitting process as this would be a newer recharge methodology in the area. The level of uncertainty for significant implementation is moderate.</p>	

5.2.8 Lindsay Recharge Basin

The following describes the Lindsay Recharge Basin Project, which will capture available surface water and recharge the aquifer to help achieve sustainability in the EKGSA area. The general project area is shown in **Figure 5-7**.

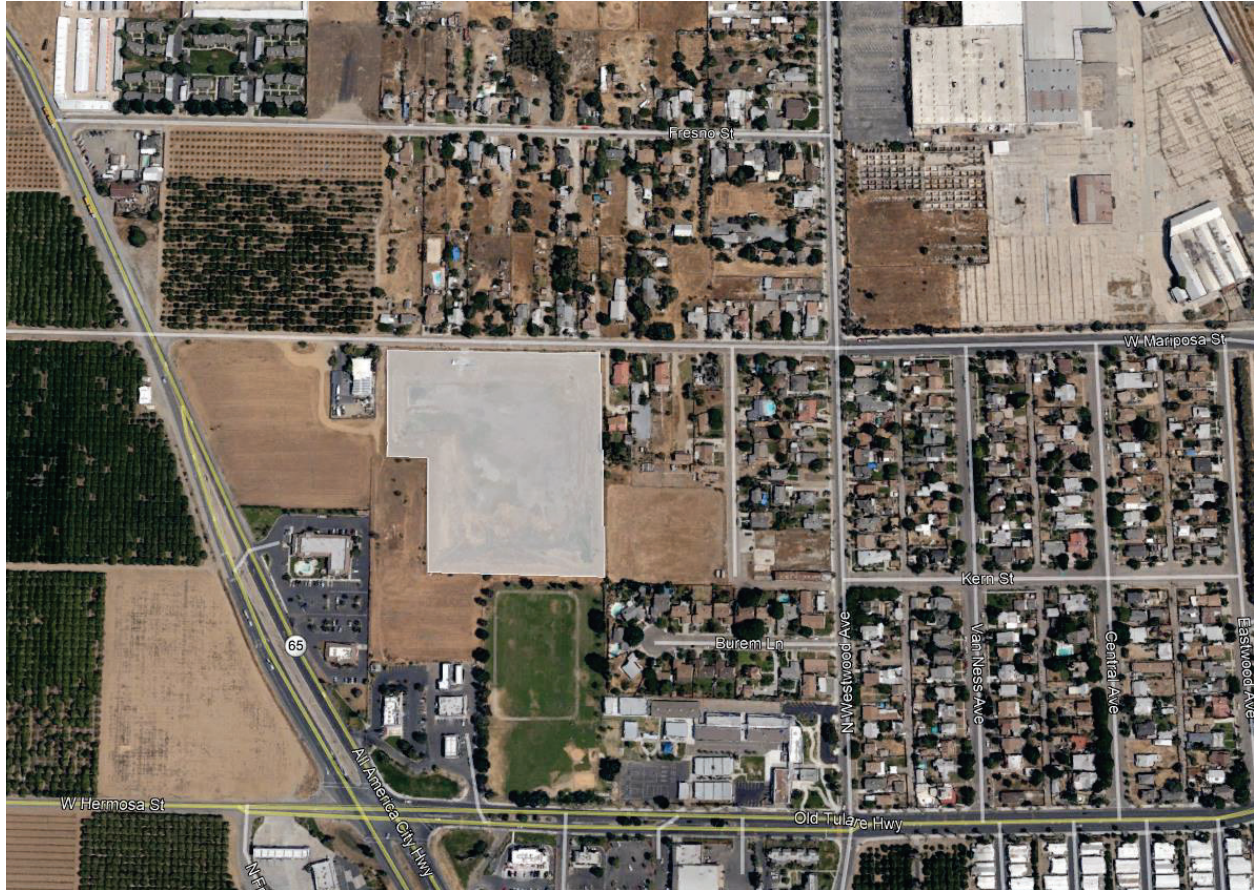


Figure 5-7 City of Lindsay Recharge Basin Site

Project Title:	Lindsay Recharge Basin	Project ID: EK6
Project Type	Recharge (basin)	
Project Location	The project site is located on APN 199-140-038 and -049 east of the intersection of Mariposa St. (Ave. 230) and Highway 65 in Tulare County – Section 12, T20S, R26E.	
Implementing Agency	Lindmore ID & City of Lindsay	

Project Title: Lindsay Recharge Basin	Project ID: EK6
Project Description - 354.44(a)	
The Lindsay Recharge Basin Project will entail improving recharge capability of an existing 8-acre basin and constructing conveyance facilities to improve capacity to the basin site. The basin will provide recharge when CVP water is available.	
Measurable Objective(s) Addressed - 354.44(b)(1)	
The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. Indirectly there could be secondary benefits of some groundwater quality improvement and reduction in land subsidence.	
<input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion – <i>not applicable</i> <input checked="" type="checkbox"/> Land Subsidence	<input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water
Circumstances and Criteria for Implementation - 354.44(b)(1)(A)	
The project is in the conceptual stage and no feasibility work has begun. Environmental clearance would be necessary under CEQA and/or NEPA depending upon the ultimate funding source. This is a medium priority project because, while there is existing infrastructure in place, the projected benefit is not as great as other proposed projects and the cost-benefit is lower.	
Process to Provide Notice of Implementation - 354.44(b)(1)(B)	
The EKGSA will have ongoing efforts to engage stakeholders and the general public in the sustainability process, communicating the statutory requirement, the objectives of the GSP, and progress toward each identified measurable objective. Neighboring landowners will be notified about the project prior to implementation and environmental documents will be available for public review.	
Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2)	
The actual recharge rate of the proposed project will be determined by the on-site soils and size of basin, but the intent is to improve the recharge capability of the existing basin to obtain an extra 5 AF/day and therefore yield an average annual recharge volume of 150 AF/year when CVP water is available.	
Permitting and Regulatory Requirements - 354.44(b)(3)	
The project will complete all necessary permitting and regulatory requirements such as CEQA documentation regarding potential impacts and construction permits (DCP and SWPPP). The program would utilize surplus CVP water when available.	
Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits	
No project schedule has been determined. Once a source of funding is identified, a comprehensive schedule including environmental review, design, and construction will be developed. Given there is an existing basin, Project implementation is anticipated to occur within the first 5 years of GSP Implementation. Basin recharge can occur after construction, whenever surplus CVP water is available.	
Evaluation of Benefits - 354.44(b)(5)	
The volume of water delivered for recharge will be measured daily and summarized monthly. The rate of accrual of benefits will depend on the frequency of water availability and the percolation capacity of the soil. The water level of groundwater wells in the area is measured and water quality in the vicinity of the project is monitored. This data will be used to determine project impacts and benefits.	

Project Title: Lindsay Recharge Basin	Project ID: EK6
How will project be accomplished, and what is the water source? - 354.44(b)(6)	
The project will be accomplished by LID and the City of Lindsay and with support by the EKGSA. The water source will be CVP water.	
Legal Authority - 354.44(b)(7)	
LID and the City of Lindsay are both Friant CVP contractors and have the authority to deliver CVP water within their boundary. Both entities also have the legal authority to construct the project components upon receipt of applicable permits and easements.	
Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF	
The estimated project capital cost is approximately \$250,000 and the annual cost over a 20-year return period is estimated to be \$100 to \$125/AF, including operational and capital costs.	
Funding Source - 354.44(b)(8)	
The funding source will likely be a combination of grant funding, LID, City of Lindsay, and/or EKGSA.	
Management of Groundwater Extractions and Recharge - 354.44(b)(9)	
The project would be managed by LID and/or the City of Lindsay under the oversight of the EKGSA. Recharge volumes will be measured and reported by LID. Groundwater extraction will be by landowners in the area. Performance of the project would be a necessary part of the EKGSA's reporting requirements as well as evaluations of measurable objectives.	
Level of Uncertainty - 354.44(d)	
The level of uncertainty primarily involves funding availability and improvement to the permeability of the intended recharge area. The overall level of uncertainty is low for the volume of recharge water indicated.	

5.2.10 Wutchumna Ditch Delivery

The following describes the Wutchumna Ditch Delivery project, which will capture available excess water in high flow years and recharge the aquifer through the ditch bed. Eventually it may also facilitate in-lieu recharge through decreased use of groundwater wells by using the surplus surface water for irrigation. The length of Wutchumna Ditch expected to be used for recharge is shown in **Figure 5-8**.



Figure 5-8 Wutchumna Ditch Spurs in EKGSA

Project Title:	Wutchumna Ditch Delivery	Project ID: EK7
Project Type	Recharge (delivery to existing channel)	
Project Location	Intersection of Wutchumna Ditch and Tulare ID turnout west of the FKC and running west into non-districted areas of the EKGSA in Tulare County –T17S, R25E and T17S, R26E.	
Implementing Agency	Wutchumna Water Company and Ivanhoe ID	

Project Title: Wutchumna Ditch Delivery	Project ID: EK7		
Project Description - 354.44(a)			
<p>The Wutchumna Ditch Delivery Project will entail environmental permitting and management agreements. There is an existing connection to FKC through a Tulare ID turnout. Wutchumna Ditch and spur ditches will be used to capture CVP water supplies when available and recharge the underlying aquifer. The total length of ditches acting as a recharge facility is nearly 10 miles.</p>			
Measurable Objective(s) Addressed - 354.44(b)(1)			
<p>The project will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. Indirectly there could be secondary benefits of some groundwater quality improvement from high quality surface water, and reduction in land subsidence.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion – <i>not applicable</i> <input checked="" type="checkbox"/> Land Subsidence </td> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water </td> </tr> </table>		<input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion – <i>not applicable</i> <input checked="" type="checkbox"/> Land Subsidence	<input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water
<input checked="" type="checkbox"/> Chronic Lowering of Groundwater Levels <input type="checkbox"/> Seawater Intrusion – <i>not applicable</i> <input checked="" type="checkbox"/> Land Subsidence	<input checked="" type="checkbox"/> Reduction of Groundwater Storage <input checked="" type="checkbox"/> Degraded Water Quality <input type="checkbox"/> Depletion of Interconnected Surface Water		
Circumstances and Criteria for Implementation - 354.44(b)(1)(A)			
<p>The project is in the conceptual stage and no feasibility study work has begun. Infiltration is expected based on general knowledge of the soil characteristics in the immediate project area. Implementation of the project would depend upon successful outcome of coordinating agreements and environmental clearance under NEPA. This is a medium priority project because it utilizes a readily available recharge area to address several of the measurable objectives, but agreements are needed on coordinating deliveries into the channel.</p>			
Process to Provide Notice of Implementation - 354.44(b)(1)(B)			
<p>The EKGSA will have ongoing efforts to engage stakeholders and the general public in the sustainability process, communicating the statutory requirement, the objectives of the GSP, and progress toward each identified measurable objective. Neighboring landowners will be notified about the project prior to implementation and environmental documents will be available for public review.</p>			
Estimated Annual Project Benefits (AF/yr) - 354.44(b)(2)			
<p>The actual recharge rate of the proposed project will be determined by the on-site soils. The project is expected to recharge approximately 480 acre-feet per year, on average. This is based on an anticipated delivery capacity of 16 AF/day and 30 days of CVP water available per year.</p>			
Permitting and Regulatory Requirements - 354.44(b)(3)			
<p>The project will complete all necessary permitting and regulatory requirements. It will require NEPA documentation to utilize CVP water.</p>			
Project Schedule - 354.44(b)(4) Anticipated Start & Completion, Timeframe to accrue benefits			
<p>No project schedule has been determined. Once a source of project funding is secured, a schedule including environmental review and agreements can be developed. Project implementation is anticipated to occur near the end of the first 5 years of GSP Implementation.</p>			
Evaluation of Benefits - 354.44(b)(5)			
<p>The volume of water delivered for recharge will be measured daily and summarized monthly by Wutchumna Water Company. The rate of accrual of benefits will depend on the frequency of water availability and the infiltration capacity of the soil. The water level of groundwater wells in the area will be measured and water quality in the vicinity of the project will be monitored. This data will be used to determine project impacts and benefits.</p>			

Project Title: Wutchumna Ditch Delivery	Project ID: EK7
How will project be accomplished, and what is the water source? - 354.44(b)(6)	
The project will be accomplished by Wutchumna Water Company with the support of EKGSA. The water source will most likely be CVP supplies and Kaweah River flood water when available.	
Legal Authority - 354.44(b)(7)	
The EKGSA is made up of Friant Contractors that have the legal authority to deliver CVP water. Coordination will be needed amongst the EKGSA and Wutchumna Water Company for delivery into the Wutchumna Ditch, which is within the CVP Place of Use.	
Project Cost - 354.44(b)(8) Estimated Capital Cost Estimated annual cost/AF	
The estimated project capital cost is approximately \$100,000 and the annual cost over a 20-year return period is estimated to be \$15 to \$20/AF, including operational and capital costs.	
Funding Source - 354.44(b)(8)	
The funding source will likely be a combination of grant funding and EKGSA landowners.	
Management of Groundwater Extractions and Recharge - 354.44(b)(9)	
The project would be managed by Wutchumna Water Company with the oversight of the EKGSA. Recharge volumes will be measured and reported by Wutchumna Water Company. Groundwater extraction will be by landowners in the area within the EKGSA area. Performance of the project would be a necessary part of the EKGSA's reporting requirements as well as evaluations of measurable objectives.	
Level of Uncertainty - 354.44(d)	
The level of uncertainty primarily involves permeability of the intended recharge area, and frequency of high flow water. The overall level of uncertainty is moderate for the volume of recharge water indicated.	

5.2.11 Additional Project Types

The EKGSA has preliminarily discussed other project concepts that may be utilized in the future, but currently haven't been fully vetted for potential implementation. Future Annual Reports or GSP updates will likely have additional detail on these project concepts.

5.2.11.1 On-farm Recharge and Private Recharge Facilities

On-farm recharge entails spreading excess surface water on operational agricultural fields to recharge the aquifer. The field soil type and crop type must be considered, along with the timing when the excess water is available. Compatibility with crops is necessary for these projects, as some crops tolerate saturated conditions better than others. Tillage operations vary for different crops as well and influence the rate of percolation. On-farm recharge provides a substantial flood control benefit while maintaining agricultural beneficial use of the land. It is anticipated that the program that is developed by the EKGSA may involve incentives to encourage landowners to participate.

The construction of these projects would depend upon successful outcome of a feasibility study including geotechnical work to validate the percolation rate. There would be no permitting or regulatory requirements since it essentially is just over-irrigation of a field. Ultimately, these projects will primarily help stabilize groundwater levels and increase the amount of groundwater in storage. Depending on the location of the on-farm recharge there could be some groundwater quality benefits and some impact on reducing land subsidence. These projects will need to be managed to minimize leaching of fertilizer through the root zone., which could have a negative impact on groundwater quality.

The amount of land that will participate in the program is unknown at this time but based on the SAGBI map of the area it is conservatively estimated that 10,000 acres could participate each year when water is available. The EKGSA will notify participating landowners each time high flow water is available. Landowners will coordinate water delivery through their local district, and the district will report use to the EKGSA. The Friant Districts have the legal authority to deliver surplus CVP water within their boundaries and the entire EKGSA is within the CVP Place of Use.

These projects will have minimal cost. Any improvements required to convey and distribute water on the fields will be paid by the landowner, possibly with assistance from their District, and/or the EKGSA. Performance of the projects would be a necessary part of the EKGSA's reporting requirements as well as evaluations of measurable objectives.

5.2.11.2 Existing Conveyance Facilities Rehabilitation or Expansion

The EKGSA may propose to support the rehabilitation or expansion of existing conveyance facilities, such as diversion systems, check structures, and conveyance facilities. The intent of these improvements is to increase the capacity of the districts to divert more surface water for irrigation as in-lieu recharge, direct on-farm recharge, or for groundwater recharge basins. These projects may require land acquisition or agreements where facilities are expanded. The EKGSA will seek to maximize use of periodic floodwater, which is highly variable.

The objectives of these projects are to use current systems to their full potential, or expand facilities, to increase groundwater storage on an average annual basis. The in-lieu recharge will mitigate groundwater depletion, which has been linked to several undesirable results. Groundwater levels and quality in the nearby area will be monitored before and after implementation of these projects to measure their impacts. Demand reduction will be based on the annualized volume of water delivered for irrigation as a direct result of the conveyance facility rehabilitation or expansion. Flow rates realized before project implementation will not be factored into demand reduction.

5.2.11.3 Efficiency Improvements

The EKGSA may develop programs to fund or incentivize projects that increase water use efficiency within the EKGSA area. Execution of these projects will be based upon funding availability and farmer willingness, and they will likely be implemented on a field or farm level. Project examples include installing higher efficiency irrigation systems and/or soil moisture sensors.

Increasing the efficiency of an irrigation system may mean converting from flood to spray, or from spray to drip or subsurface drip. Soil moisture sensors paint a more accurate picture of the moisture content through the soil profile and rootzone. The intent of efficiency improvements would be to refine the irrigation process and ultimately extract only enough groundwater to meet the crop demand, minimizing waste.

5.3 Management Actions

Some management actions, such as education and outreach, will be initiated early in the GSP implementation phase, while other management actions are envisioned to be employed to reduce water demand if project development is not proceeding sufficiently to achieve the sustainability required to reduced overdraft and meet the interim milestones. This section discusses a suite of management actions the EKGSA may consider during implementation of the GSP to achieve sustainability. They may not be implemented in a strictly linear fashion, as numbered below, as some management actions must be implemented before others can be achieved, and specific actions may not be implemented at all if sustainability is achieved through projects and other actions. In addition, the EKGSA could implement some management actions area-wide, while others would be developed by the EKGSA but would be implemented by individual landowners. In some cases, the landowner may need to choose which management action they want to implement, such as choosing between crop conversion and fallowing land, because it is an economic decision that affects the livelihood of the landowner and there may not be a consistent answer across the entire area. It is expected the EKGSA will further develop and craft management actions in response to stakeholder input on parallel timelines and adapt to the estimated schedules according to the best available information and best available science at any given time.

The legal authority and basis for the management actions described in this GSP are outlined in the SGMA legislation and related provisions. SGMA describes the powers and authorities - financial authority and enforcement powers - of GSAs in Chapters 5, 8, and 9, respectively. These EKGSA authorities include adopting regulations, regulating groundwater extractions, imposing fees, monitoring, enforcing programs, and more. Though SGMA grants GSAs these powers, the pursuit and implementation of the projects and management actions is each GSA's responsibility. A GSA must enforce their legal authority to the extent necessary to achieve sustainable groundwater management for all beneficial users within a GSA and a Subbasin. In the development of the management actions, the EKGSA intends to embody the lessons learned from other groundwater managed basins and strive to accomplish the following (if applicable):

- *Develop trust by being inclusive and transparent.*
- *Use a portfolio of approaches to achieve sustainability.*
- *Ensure efficient and accurate data collection.*
- *Devise a fair and equitable groundwater allocation.*
- *Potentially craft a groundwater trading structure that reflects local hydrologic conditions.*
- *Address concerns of funding EKGSA management actions.*
- *Assure performance through incentives, penalties, and enforcement.*

The Management Actions that may be considered by the EKGSA are discussed below and grouped into the following general topics:

- EO - Education and Outreach
- WH – Well Head Requirements
- GA – Groundwater Allocation
- GMT – Groundwater Marketing/Trading
- FI – Fees and Incentives
- GP – Groundwater Pumping Restrictions

5.3.1 Education and Outreach Management Actions

5.3.1.1 Notification of Annual Groundwater Use

EO-1 Regular Communication

Education and Outreach efforts will continue to educate all landowners within the EKGSA about SGMA and how implementation of the GSP will proceed to address the groundwater overdraft situation. The EKGSA will promote education and outreach to all beneficial users within the GSA as detailed in the **Chapter 1**. Specific to Projects and Management Actions, the EKGSA may adopt a program which provides groundwater users their approximate groundwater use in acre-feet on a per acre basis as an education tool every year. The program may be established before the EKGSA would consider enforcement action on an established groundwater allocation when an allocation is established in the future as discussed in **Section 5.3.3**. The goal is to provide ongoing correspondence to groundwater users and promote awareness of the overdraft condition in the EKGSA, particularly for those groundwater users who do not currently have metered wells. This correspondence may provide individual user information as well as aggregated EKGSA groundwater data for comparison purposes. The ongoing correspondence may contain the following information:

- Individual grower's estimated groundwater use amount in acre-feet/acre.
- Average crop demand in acre-feet/acre based upon published CIMIS evapotranspiration values specific to individual's location
- GSA average groundwater extraction amount for individual grower's crop in acre-feet/acre.
- GSA average groundwater overdraft in acre-feet/acre.
- Current status of GSA adoption of groundwater allocation per acre or groundwater allocation, if applicable, per **Section 5.3.3**.
- Detailed reminder of the EKGSA powers and authorities granted in SGMA.
- Current status of EKGSA adoption of any management actions

In order to determine the individual grower's groundwater extraction amount, the EKGSA may consider multiple quantification methods for a consistent determination of groundwater extraction per acre. The various quantification methods will be discussed further below in **Section 5.3.3**.

EO-2 Non-Routine Responses to Minimum Threshold Exceedances

In addition to regular correspondence, the EKGSA may also immediately notify individual growers of a Minimum Threshold (MT) exceedance as defined in **Chapter 3 Sustainable Management Criteria**. The notice of MT exceedance would alert the monitoring well owner and groundwater extractors within a defined Threshold Region or management area. The notification may contain the following information:

- Description and location of the MT exceedance.
- Notice of increased frequency of water level and/or water quality monitoring.
- The potential effects to the individual growers (i.e. their well potentially going dry).
- The planned EKGSA response (i.e. trigger of specific projects and managements actions).
- Current funding opportunities available through the EKGSA or other entities, which could be used on projects to combat the determinantal effects of the MT exceedance.
- A written reminder of how individuals can contact the EKGSA, find more information, and provide public input regarding the implementation of the GSP.
- A written reminder of the GSA powers and authorities granted in SGMA, as well as noting the potential for State intervention when Undesirable Results occur that are not reconciled by the GSA.

The regular correspondence and notice of MT exceedance may not generate a quantifiable groundwater demand reduction. However, they would serve as useful education and outreach tools which may change individual

pumping practices and encourage growers to implement water conservation Best Management Practices (BMPs) and/or other demand reduction solutions.

Measurable Objectives Addressed

The goal is to provide education and correspondence with groundwater extractors and promote awareness of the EKGSA overdraft condition particularly for those groundwater extractors who do not currently have metered wells. The measurable objectives would be the number of annual correspondence letters and MT exceedance notices that are mailed each year. In preparation of the quarterly or annual letters and immediate notices, the EKGSA would develop template letters and house a current mailing address database to expedite the notification process. In addition, other ancillary measurable objectives may include the increase of persons on the EKGSA’s Interested Person’s List, visits to the GSA website, and attendance at public meetings and events. If the education and outreach program did result in a reduction of groundwater extraction, the marginal amount would be estimated at 1-100 acre-feet/year.

Table 5-2 Education & Outreach Measurable Objectives Checklist

Groundwater Level	X
Storage Change	X
Groundwater Quality	X
Land subsidence	X
Surface Water-Groundwater Interconnection	X
Seawater Intrusion	NA

5.3.1.2 Circumstances for Implementation EO-1 - EO-2 (Sec. 354.44.b.1.A)

The education and outreach management action may be developed and implemented shortly after the adoption of the GSP. The policy would remain indefinitely and be reevaluated at least every 5 years. A trigger for the end of this management action may be that another EKGSA management action or program provides comparable annual education letters and outreach notices.

5.3.1.3 Process for Public Notification EO-1 - EO-2 (Sec. 354.44.b.1.B)

The process for public notification will be addressed by the consistent communication and outreach between the EKGSA and the groundwater extractor. The EKGSA will develop a system to initiate communication with the grower on a regular basis and will additionally respond to overdraft or non-compliance with minimum thresholds with escalating correspondence as deemed necessary. The cost associated with EKGSA correspondence will be assessed on an annual basis.

5.3.1.4 Permitting and Regulatory Process EO-1 - EO-2 (Sec. 354.44.b.3)

No permit or regulatory process is required for the EKGSA to adopt the policy. The management action may be accomplished by EKGSA policy adoption. This management action does not rely on water from outside the jurisdiction of the EKGSA.

5.3.1.5 Status and Schedule EO-1 - EO-2 (Sec. 354.44.b.4)

The education and outreach program with annual education letter and notice of MT exceedance has not been drafted. It is expected to commence shortly after the adoption of the GSP and be completed within 1 year. The initial focus will be the annual correspondence letter since the notices of MT exceedance may not occur for many years.

5.3.1.6 Benefit Realization and Evaluation EO1 - EO-2 (Sec. 354.44.b.5)

The EKGSA will use education and outreach opportunities to encourage active engagement, open lines of communication with interested and affected stakeholders, let them know the future opportunities for input, establish communication channels, and receive feedback on the GSP implementation process.

The expected benefits may mitigate overdraft by educating the public about the current use and quality of groundwater supplies. Groundwater extractors may see that their individual use exceeds published crop demand values, EKGSA average use, and/or EKGSA groundwater allocation. Without levying penalties, the EKGSA intends for all correspondence and mailed notices to educate extractors about the EKGSA's monitoring practices, procedures, and enforcement capabilities. Other program benefits include the transparent and expeditious communication of groundwater overdraft conditions, implementation of specific projects and managements actions, funding opportunities, and potential for State intervention if undesirable results occur.

5.3.1.7 How This Management Action Will Be Accomplished EO-1 - EO-2 (Sec. 354.44.b.6)

The annual correspondence and escalation letters can be accomplished by utilizing the in-house mailing database that the EKGSA will develop and maintain. All correspondence will be drafted by EKGSA staff and will be in accordance with the actions of the Board of Directors. Further detail regarding communication can be found in [Chapter 1](#).

5.3.1.8 Legal Authority EO-1 - EO-2 (Sec. 354.44.b.7)

The legal authority and basis for the management actions described in this Chapter are outlined in the SGMA and related provisions. The SGMA legislation describes the powers and authorities, financial authority, and enforcement powers of GSAs in Chapters 5, 8, and 9 respectively.

5.3.1.9 Costs EO-1 - EO-2 (Sec. 354.44.b.8)

The costs related to the education and outreach management action include one-time expenses and reoccurring annual expenses. The one-time expenses include the labor costs of the EKGSA Staff, Legal Counsel, and Consultant to prepare the formal program description and adopt the management action policy. The written policy would detail the specific content of the chosen correspondence method, the source of the data being reported, the frequency of the correspondence, mailing or delivery logistics, expected costs, and the intent of the policy. Through a Board resolution, the program would be incorporated into the EKGSA's policy manual for transparency. The database of current EKGSA mailing addresses and template letters would be created. These initial costs are estimated at \$20,000. The reoccurring costs for mailed correspondence would include the costs of printing, stuffing envelopes, labeling, and postage among. The GSA may contract with local businesses that perform these mail services. In terms of the content of all correspondence, the costs associated with the EKGSA's selected groundwater extraction quantification method are not to be included in this section; these options and costs will be described in Section 6.4.3. The estimated cost of ongoing correspondence and letter mailings GSA-wide is approximately \$10,000. The reoccurring costs associated with the mailing or delivery of MT exceedance notices are difficult to estimate at this time because there are multiple factors that would change the notice frequency. For example, MT exceedances may not start occurring for 10+ years, notices may only be mailed to affected portions, and exceedances may occur multiple times within a given year.

The estimated program cost/acre-foot yield would not potentially occur until after the one-time expenses of program development. The ongoing estimated program cost/acre-foot yield would be \$100-\$10,000/acre-foot depending upon the amount of water demand reduction (in acre-feet) and number of mailings.

5.3.2 Wellhead Requirements Management Actions

5.3.2.1 Well Metering and Sampling Requirements

The EKGSA recognizes that community involvement and outreach alone will not curtail groundwater overdraft if management actions must be implemented to reduce water demand. Additional well requirements may be required to more effectively manage and understand the dynamic groundwater conditions. Within the EKGSA, well construction permitting is managed by Tulare County Environmental Health Division (EHD) as detailed in **Chapter 1**. Obtaining a well permit is currently a ministerial process, not requiring discretionary action or CEQA. The intent of this management action is to have the EKGSA work cooperatively with the EHD to increase well requirements for new wells without disrupting the current ministerial permit process. Additionally, the EKGSA would promote constant communication with the EHD and would seek to maintain more monitoring responsibility. The EKGSA, in conjunction with EHD, may work to develop policy and/or procedures to augment the current well requirements set by the State/EHD and establish new criteria that collaborate with EKGSA and SGMA goals and include the EKGSA in review of all permit paperwork for non-de minimis extractors before EHD permit issuance. These policy and/or procedures may be applied to permits for constructing, deepening, destroying, reconditioning, and/or repairing a well. In order to increase data collection, reporting, and ongoing groundwater management efforts, additional well policy may contain the following information, if deemed appropriate:

- Registration of extraction facilities with the EKGSA to supplement and confirm information obtained from a well canvass of the area.
- Require the installation of flowmeters on all new or repaired wells, and installation of sounding tubes on all new wells.
- Require the well owner to self-report groundwater extraction volumes, static water levels, and water quality data.
- Restrictions on new well construction.

The EKGSA may consider separating the additional well requirements management action into multiple policies or be silent on various bulleted components until they have deemed them necessary. For example, the requirement of installing a flow meter on the pump discharge may be enacted before the requirement of installing a sounding tube.

The desired outcome of additional well permitting requirements is the ability to monitor groundwater extractions, water levels, and water quality in a thorough, accurate, and efficient manner across the GSA. The measurable objectives differ amongst the bulleted considerations.

WH-1 Registration of Extraction Facilities

As stated in SGMA Section 10725.6, “a GSA may require the registration of a groundwater extraction facility within the management area of the GSA.” The EKGSA may adopt this policy to hopefully improve and supplement the existing well records housed by the EHD and DWR and provide a complete record of the number of wells within the area. The EKGSA has greatly benefited from the current exchange of well information and use of the online DWR Well Completion Report Map Application tool found here: <https://dwr.maps.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37>.

However, through local outreach and research of the proposed well monitoring network, the EKGSA suspects many existing wells do not have the State and EHD well completion reports (the well driller documentation on the geology and well construction details) or the reports have not been entered into the DWR database and/or EHD records. Unfortunately, the historic well completion reports (especially the older ones) and available DWR 429 Forms (Well Data Form indicating the state well number and detailed well location information) often have insufficient information to confidently locate the exact position of an older well, which is necessary to match up water level and quality information with the area in which pumping is occurring. In recent decades,

the advances in technology, standardization of forms, and accessibility to GPS location have significantly improved the accuracy of well completion reports through better location identification and recordkeeping. The intent of registration of groundwater extraction facilities would be to complement existing well recordkeeping and ensure that the EKGSA can fully understand and quantify the potential impacts of groundwater decline. Coupled with the registration of extraction facilities, the EKGSA may invest in a complete well canvass study to verify the number of wells and presence or absence of a flow meter.

WH-2 Installation of Well Flow Meters

The EKGSA will investigate options for quantifying groundwater use by individual landowners as discussed in **Section 5.3.3** and may require the installation of a flow meter on all groundwater extraction facilities in the future to provide accurate quantities of groundwater extraction and serve as the nexus to other management actions. The policy would describe the acceptable types of flow measurement devices, installation standards and requirements, operation and maintenance requirements, and penalties for tampering, neglect, or misconduct. For example, the flow meter would be installed inline on the pump discharge before any other connections or discharge points in accordance with the meter manufacturer's specifications. The meter must accurately quantify the volume of extracted groundwater in acre-feet and be routinely maintained by the well owner. The policy for flow meter installation may require a meter equipped with telemetry for remote reading of the groundwater extraction by the EKGSA. Failure to comply with the policy may result in civil penalty or criminal fine in accordance with SGMA Section 10732. Once the meter installation was complete, a certification report would be submitted by the landowner documenting that the work was completed in accordance with the EKGSA policy.

WH-3 Installation of Sounding Tubes and Water Quality Sample Ports

The EKGSA may require the installation of a well sounding tube, airline, electric depth gauge, and/or other water level sensor in selected locations for the purpose of measuring water levels throughout the area, especially on new well installations. In addition, the EKGSA may require the installation of a sample port on the well discharge piping in selected locations for the purpose of potentially collecting water quality samples throughout the GSA. The accurate and widespread collection of water level and water quality data could be used to supplement the monitoring network information and provide the EKGSA with additional information to monitor the success/failure of the GSP against the established Sustainable Management Criteria in Chapter 4. The policy would describe the acceptable types of water level measuring devices and sample ports, installation requirements, and penalties for tampering, neglect, or misconduct. The installation must provide or allow for the accurate measurement of static groundwater level in feet below the ground surface and water sample collection. If applicable, the water level measurement device must be routinely maintained by the well owner. Once the installation was complete, a certification report would be submitted by the landowner documenting that the work was completed in accordance with the EKGSA policy.

WH-4 Self-Reporting of Groundwater Extraction

If the EKGSA selects flow meters as the method of quantifying groundwater extraction, and if the installed meters are not equipped with telemetry, then the GSA may require the well owner to self-report to the EKGSA the metered groundwater extraction volumes on a semi-annual basis. The policy would describe the frequency of reporting, various methods of reporting, due dates, and specific instructions for data submission. The EKGSA may provide extractors with self-addressed mailer for return mailing. The mailer may include information for reporting instructions such as the groundwater extraction volume in acre-feet and include the current flow meter totalizer reading. Other information requests may include self-reporting of static water level readings if the well is equipped with sounding tubes, along with instructions on how static water level measurements should be taken twice per year once water levels have stabilized after pump shutdown. If there is limited compliance with self-reporting, the EKGSA may elect to gather the appropriate data with their own staff. The policy would describe that the frequency of the reporting may be temporarily increased if minimum thresholds are exceeded.

WH-5 - Drinking Water Wells Protection Program

While on the path to achieving Subbasin-wide sustainability, there are regions of the EKGSA where domestic wells may be negatively impacted if water levels reach the proposed minimum thresholds. Recognizing that there are several communities and citizens that rely on groundwater through small system and private domestic wells within the region, the EKGSA may choose to create a program to protect impacts to water users dependent on groundwater for their drinking water supply. A Drinking Water Wells Protection Program (DWWPP) could include a combination of different strategies that provide solutions to gather critical data, protect groundwater quality and quantity, and provide safe and affordable drinking water to the residents of the EKGSA. Aspects of such a program may include:

- *Drinking Water Wells Monitoring Network*
 - Conduct a drinking water well vulnerability assessment to understand: (1) where drinking water wells that are more vulnerable to groundwater level changes are located, and (2) whether changes in groundwater levels may be exacerbated in specific areas by pumping volume or location.
 - Define drinking water wells monitoring network based on the drinking water wells assessment. This network would be used to assess impacts to drinking water caused by changes in groundwater levels and quality.
- *Adaptive Management System Development*
 - Develop a preventative warning system that alerts groundwater managers when groundwater levels are dropping to a level that negatively affects drinking water users. Such system may include quantitative threshold triggers between the measurable objective and the minimum threshold that can be used to assign levels of warning and recommend corrective action.
- *Drinking Water Well Impact Tool/Model*
 - Develop a model or tool from the monitoring network data and adaptive management framework to evaluate groundwater levels and predict potential groundwater impacts to drinking water wells.
- *Protection Measures*
 - Provide protection measures in response to potential groundwater impacts. Short-term solutions could include bottled water, bottled water paired with a water tank, or another combination. Long-term water supply solutions could include financial and/or technical support to lower a well pump, drill a deeper well, connect to an alternative water supply, and/or readjusting pumping to avoid impacts.
- *Funding*
 - If implemented, a secure and reliable source of funding for the DWWPP would need to be identified. Options could include land-based fee assessments, utilization of grant funding, and/or CV-SALTS project funding.

Table 5-3 Wellhead Measurable Objectives Check List

Groundwater Level	X
Storage Change	X
Groundwater Quality	X
Land subsidence	X
Surface Water-Groundwater Interconnection	X
Seawater Intrusion	NA

5.3.2.2 Circumstances for Implementation of WH-1 – WH-5 (Sec. 354.44.b.1.A)

The current situation of critical groundwater overdraft leading to the unsustainable management of groundwater resources justifies the implementation of additional well requirements and a DWPP. This policy requires the support and coordination of the EHD for successful implementation with any new wells. For existing domestic wells, this policy requires the support and coordination of resident beneficial users. The beneficial users within the EKGSA must be properly notified far in advance of the policy adoption especially because of the potentially for increased well owner costs and self-reporting efforts. For existing wells, there may be extenuating circumstances where the installation of a flow meter (if required) and/or sounding tube are not practical or financially advisable. These situations would need further analysis on a case-by-case basis. The policy would remain indefinitely or until another program serves the same purpose.

5.3.2.3 Process for Public Notification of WH-1 – WH-5 (Sec. 354.44.b.1.B)

The public will be notified of the proposed WH-1 – WH-5 through public meetings, correspondence, and EKGSA website. Educational correspondence regarding self-reporting of groundwater extractions would be accomplished through direct communication between the beneficial user and the EKGSA. This will take place in the form of self-reporting and the monitoring of water level and water quality which is then compiled and distributed through each mailing cycle of correspondence mailings. Should the Board of Directors choose to adopt policy addressing WH-1-WH-5, the public will be notified through established EKGSA correspondence methods as explained in Chapter 1.

5.3.2.4 Permitting and Regulatory Process WH-1 -WH-5 (Sec. 354.44.b.3)

The regulatory process would require EHD coordination and support to ensure new well permits issued within the EKGSA adhere to the EKGSA policy. No other environmental or regulatory permits would be required. Modifications to existing wells for installation of a flow meter do not require a permit. This management action does not rely on water from outside the jurisdiction of the EKGSA.

5.3.2.5 Status and Schedule WH-1 - WH-5 (Sec. 354.44.b.4)

The additional well requirements policy has not been drafted, nor has there been discussions with the County. DWPP policy has not been drafted and there would need to be discussions with stakeholder groups. Drafting the policy and County discussions may commence shortly after the adoption of the GSP. There currently isn't a timeline for completion.

5.3.2.6 Benefit Realization and Evaluation WH1 - WH-5 (Sec. 354.44.b.5)

The expected benefits would include a complete geo-database of groundwater extraction locations. Through the DWPP, a tool may be developed that evaluates potential drinking water well impacts. Requiring new well permits to provide accurate information on location, depth, perforated zone, and measured water use and level would allow for more accurate data analysis of groundwater extraction, storage change, and water table fluctuations. Policy requiring metered wells would also provide private owners with personal usage history and compliment other management actions discussed herein, including education and outreach, groundwater allocation, groundwater marketing and trading, fees and incentives, and pumping restrictions. The expected benefits of water quality sample ports and analytical testing would fill data gaps and provide extractors with useful information. The benefits of self-reporting include the avoidance of EKGSA staff or consultant time to individually collect data. The benefits of developing a DWPP include protecting the Human Right to Water within the EKGSA, balancing community and economic development needs, and improved understanding of potential impacts on drinking water quality. The evaluation of these benefits would be reviewed periodically and during the annual reporting cycle.

5.3.2.7 How This Management Action Will Be Accomplished WH-1 – WH-5 (Sec. 354.44.b.6)

The registration of Extraction Facilities (WH-1) will be accomplished by validating all documented extraction facilities and the EKGSA may authorize a complete well canvass study to verify the number of wells and presence of a flow meter. Additional review will take place in order to confirm the number of reported well permits and to verify the installation of meters, sounding tubes and sample ports (WH-2-WH-3). WH-4 will be accomplished by analyzing the received reports from each mailing cycle and assessing the data for accuracy. The development of WH-5 will be accomplished by bringing together a sub-committee of experts, local stakeholder representatives, and EKGSA representatives to explore and develop the policies required to successfully launch the DWWPP.

5.3.2.8 Legal Authority WH-1 – WH-5 (Sec. 354.44.b.7)

The legal authority and basis for the management actions described in this Chapter are outlined in the SGMA and related provisions. The SGMA describes the powers and authorities, financial authority, and enforcement powers of GSAs in Chapters 5, 8, and 9 respectively.

5.3.2.9 Costs WH-1 – WH-5 (Sec. 354.44.b.8)

The additional well requirements management action would not directly generate a quantification of demand reduction. However, the foundation for the mitigation of overdraft would be established for on-going monitoring of groundwater extractions, water levels, and water quality.

The costs related to the additional well requirements management action include one-time expenses and on-going monthly expenses. The one-time expenses include the labor costs of the EKGSA Staff, Legal Counsel, and Consultant to prepare the formal program description and adopt the management action policy. Through a Board resolution, the program would be incorporated into the EKGSA's policy manual for transparency. The database of extraction facilities would be created and include individual fields for owner, location, well construction information, EKGSA additional requirements (i.e. meter, sounding tube, etc.), and future measurement data. These initial costs are estimated at \$30,000. The online reporting tool may be developed for well owners to self-report their monitoring data; initial cost is estimated at \$15,000. If the EKGSA were to separate the additional well requirements management action into multiple policies, the one-time costs for program description and adoption may be duplicated, but coordination efforts with the EHD would be reduced.

The ongoing monthly costs include the database maintenance, reporting website support, self-addressed post cards, and data entry costs are estimated at \$75,000 annually. The adoption of this policy would have other resulting costs for the groundwater extractor including:

- Purchase and installation of the well meter, and potential sounding tube.
- For existing wells, pump discharge modifications to ensure proper meter installation per the manufacturer's specifications.
- Labor costs related to self-reporting.

The cost to develop a DWWPP will vary vastly based on the scope and depth of the program. Costs would include both one-time start-up expenses and on-going expenses. The one-time expenses include the labor costs of the EKGSA Staff, Legal Counsel, and Consultant to prepare the formal program description, host stakeholder engagement meetings, incorporate domestic beneficial users feedback, and adopt the management action policy. In addition, there are the one-time costs to canvass and locate drinking water wells within the EKGSA, develop the domestic well database, and build the appropriate modeling tool. These startup costs are estimated at \$100,000. The ongoing monthly costs include database maintenance, data entry costs, monitoring costs including field and analytical fees, and cost of sending outreach to community members, are estimated at \$50,000 annually.

The most volatile costs associated with the DWWPP will occur if protection measures for drinking water supply are needed. The length of time, population impacted, and geographic scope of the protection measures will greatly impact the overall magnitude of costs associated with the DWWPP. Short-term provisions of tank or bottled replacement water followed by the implementation of long-term solutions such as well pump lowering or connecting residences to another water provider could range in price from thousands to hundreds of thousands of dollars. Recognizing the enormous potential costs of such a program, the EGKSA is prepared to collaborate with grant programs and other available program funds (i.e. CV-SALTS) to offset the costs.

5.3.3 Groundwater Allocation Management Actions

5.3.3.1 Groundwater Allocations

GSAs experiencing annual groundwater overdraft may pursue individual groundwater allocations because the development of projects and new water supplies cannot solely offset the current groundwater demands and overdraft condition. Demand management will become increasingly more important because of the reduced reliability of imported and flood water supplies, especially when taking into consideration the historical drought periods, uncertain role of climate change, and increased competition for available water supplies.

GA-1 Development of Groundwater Allocation Per Acre

The EKGSA may adopt a policy which provides a groundwater allocation on a per acre basis for the GSA as a whole, or for sub-areas of the EKGSA. The policy would identify and forecast the demands associated with prior rights, domestic, community, and environmental uses. The sustainable yield and ultimate groundwater allocation would take into consideration the existing water rights holders, irrigation districts (IDs), disadvantaged communities (DACs), public utility districts (PUDs), and environmental uses. The EKGSA, through collaboration with its beneficial users, may consider whether an equal-, reduced-, or zero-allocation is given to lands with unexercised groundwater rights. The report *Groundwater Pumping Allocations under California's Sustainable Groundwater Management Act (Environmental Defense Fund et. al, 2018)* identifies several possible methods of establishing groundwater pumping allocations as shown in the following table excerpted from the 2018 report.

There are a myriad of advantages and disadvantages associated with each method of establishing groundwater pumping allocations. The “Comprehensive Allocation Method,” which establishes allocations based on a comprehensive consideration of California groundwater law to the extent practical and is recommended by EDF, is one possible approach that could be considered because it offers the important advantage of presenting to the Court an allocation methodology that tracks judicial precedent if an adjudication is ultimately initiated.

Table 1: Methods for Establishing Groundwater Pumping Allocations

Method	Description	Advantages and Disadvantages
Pro Rata Allocation per Overlying Acre	This approach divides the available groundwater between overlying landowners proportionate to property size. This system treats all landowners equally, irrespective of whether the landowner has developed groundwater resources.	<p>Approach Advantages</p> <ul style="list-style-type: none"> ▪ Recognizes the underlying correlative right of each overlying acre to share in the reasonable use of the water within the subbasin. ▪ Is simple in approach and calculation. <p>Approach Disadvantages</p> <ul style="list-style-type: none"> ▪ Does not recognize some of the legal limitations and nuances that affect groundwater rights in a subbasin such as prescription, public use, imported water to the subbasin (see Box 3), and others (or make adjustments to the allocations based upon such limitations and nuances). ▪ It allocates a portion of the sustainable yield to overlying lands that may have not yet exercised the right to use groundwater. This raises significant questions about how you provide water for such lands, if at all, and how allocations will be adjusted when, and if, such lands exercise the right to a share of the sustainable yield. ▪ It creates inequities between those who have invested nothing to develop the right and those who have invested heavily to utilize the right.
Pro Rata Allocation per Irrigated Overlying Acre¹⁰	This approach certifies all existing overlying groundwater use (e.g. irrigated acres) and develops an allocation proportionate to land use. In this approach, each irrigated acre would be given a specific quantity of groundwater (e.g. inches/acre per year) that can be applied to the land. This approach grandfathers in existing groundwater users but does not give differential allocations based on historic use. Further, any reductions in the allocations to reduce overdraft would be felt proportionately across all historic users.	<p>Approach Advantages</p> <ul style="list-style-type: none"> ▪ Acknowledges existing pumping by overlying landowners. ▪ Is reasonably simple in approach and calculations. <p>Approach Disadvantages</p> <ul style="list-style-type: none"> ▪ Does not address the unexercised pumping rights on some overlying lands (to the extent such rights have not been lost to prescription or subordination). ▪ Does not consider historic quantities of groundwater pumped, which could disproportionately impact users of high water demand crops grown on overlying acreage. ▪ Does not recognize some of the legal limitations to and nuances that affect groundwater rights in a subbasin such as prescription, public use, imported water to the subbasin and others (or make adjustments to the allocations based upon such limitations and nuances).

Table 1: Methods for Establishing Groundwater Pumping Allocations

Method	Description	Advantages and Disadvantages
<i>continued</i>		
Allocation Based Upon a Fraction of Historic Pumping¹⁴	This approach establishes allocations based off historic groundwater use, grandfathering in existing users and excluding those who have not yet developed groundwater resources. This method does not make necessary determinations as to whether historic pumping is supported by claims of overlying users.	<p>Approach Advantages</p> <ul style="list-style-type: none"> ▪ Can reduce conflict among existing pumpers. <p>Approach Disadvantages</p> <ul style="list-style-type: none"> ▪ Does not apply the law of correlative rights. ▪ Does not identify appropriative or prescriptive rights. ▪ Does not recognize potentially disproportionate impacts by pumpers on groundwater overdraft. ▪ Does not account for those who have surface water supplies and rely on groundwater only as a supplemental or dry-year supply. ▪ Treats all pumping, regardless of amount, the same and may be perceived as unfair by grandfathering in higher per-acre allocations. ▪ Requires baseline information about individuals' historic groundwater use, which may not exist.
Comprehensive Allocation Method (Recommended Method)	This approach establishes allocations based on a comprehensive consideration of California groundwater law to the extent practical. This approach preserves the relative priority of overlying, prescriptive, and appropriative users and can address the unexercised rights of overlayers. See Figure 1 for a decision tree graphic description of how this approach might be applied.	<p>Approach Advantages</p> <ul style="list-style-type: none"> ▪ This method would apply California groundwater law to the conditions existing in the subbasin and make allocations accordingly. ▪ If an allocation methodology is developed in this manner, it has a reasonable probability of surviving judicial scrutiny in the context of adjudication, especially if the majority of rightholders in the subbasin find the methodology acceptable. <p>Approach Disadvantages</p> <ul style="list-style-type: none"> ▪ The law is in many cases vague and ambiguous, and also requires the exercise of interpretation and judgment. ▪ The process for applying this method is complicated and requires information to undertake. ▪ Implementing this process leaves open the possibility that someone will disagree and consider triggering an adjudication.

GA-2 Groundwater Allocation “Ramp-Down” Gradual Decrease

Once an individual groundwater allocation is determined, the GSA may adopt a policy which provides a gradual “ramp-down” allocation decrease over time to arrive at the actual groundwater allocation to allow growers time to adjust to the concept of an allocation, which for some growers may result in a significant reduction in groundwater use. The policy would detail the number of years and amount of reduction each year. For example, if the pumping amount is currently 2.50 AF/ac and the groundwater allocation is established at 1.50 AF/ac,

then a 10% reduction over a 5-year period would achieve the “ramp-down” to a groundwater allocation of 1.50 acre-feet per acre as shown below:

Table 5-4 Example Ramp Down Scenario

Year	Groundwater Allocation (AF/ac)	Reduction at Year End (%)	Reduction at Year End (AF/ac)
1	2.50	10	0.25
2	2.25	10	0.23
3	2.02	10	0.20
4	1.82	10	0.18
5	1.64	8.5	0.14
6 Actual	1.50	0	0

The annual changes in groundwater allocation would be provided in the annual correspondence mailer described in the education and outreach management action above, as well as information presented on the EKGSA website.

GA-3 Groundwater Allocation “Adaptive Management” Approach

The EKGSA may adopt a policy which states an adaptive management approach, whereby the groundwater allocation may be reviewed, changed, and reestablished periodically or during extreme drought as necessary to achieve long term sustainability. It is prudent for the EKGSA to acknowledge the current level of uncertainty in the available data and existing data gaps by providing flexibility in initial groundwater allocations as more data is gathered and analyzed in the upcoming years. Adaptive management is an approach to resource management that “promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a ‘trial and error’ process, but rather emphasizes “learning while doing” (Environmental Defense Fund et al., 2017).

GA-4 Groundwater Quantification Methods

The EKGSA will evaluate various methods of determining groundwater use immediately following submission of this GSP. The EKGSA may adopt a policy to specify the approved method or methods to quantify the individual and aggregate groundwater extractions for the required SGMA annual reporting and to track groundwater allocation use. If adoption of the additional well requirements policy, specifically the installation of flow meters, takes years to fully implement, the EKGSA may consider a variety or combination of quantification methods. The report *Groundwater Trading as a Tool for Implementing California’s Sustainable Groundwater Management Act* (Environmental Defense Fund et. al, 2017) identifies several possible methods of quantifying groundwater use in-lieu of flowmeters as shown in this table excerpted from the 2017 EDF report.

There are various advantages, disadvantages, and costs to all of the stated quantification methods noted. The EKGSA may consider exploring some of these methods with neighboring GSAs and Subbasin-wide for an aggregated approach and mutual cost savings.

Comparison of groundwater quantification methods

Quantification method	Units	Description and enforcement method
Irrigated area	Irrigated area (acres)	Description: Certifying irrigated area is a coarse measurement for groundwater use, as it does not capture field-level variation in water use due to differences in crops, soils, technologies, practices, or other characteristics. Enforcement: Aerial flyovers or remote sensing
Irrigated area hybrid	Irrigated area (acres); Crop coefficients (acre-feet/acre)	Description: Irrigated acreage can be combined with crop coefficients, which more closely approximates field-level water use. This approach still cannot capture differences between irrigation strategies and technology, best management practices, soil types, and other field-level characteristics that influence water use. Enforcement: Annual crop survey alongside aerial flyovers or remote sensing
Calibrated energy records	Meter calibration (acre-feet/kWh); Energy use (kWh)	Description: Uses energy-use of pumps to estimate the volume pumped. Energy records by themselves can lead to large errors in estimating groundwater use, but can be improved with calibration. They also require that all groundwater pumps be hooked up to electricity, which is often not the case. Enforcement: Energy records and meter calibrations
Flow meters	Applied water (acre-feet)	Description: Flow meters are fairly straightforward, though are costly in terms of the equipment and, if not telemetered, the time spent for staff to conduct meter readings and periodic calibrations. Some flow meters are not tamper-proof. Use of pumped volume, through flow meters or other methods, does not account for the portion of applied water that may return to the groundwater through deep percolation. Enforcement: Meter readings
Remote Sensing	Evapotranspiration (acre-feet)	Description: Quantification of consumptive use, as a surrogate for actual pumping, can be done through methods that combine satellite imagery with ground-based weather data. Such methods are used routinely in some locations and may provide a viable mechanism for quantifying groundwater use. Some remote sensing platforms assume the full crop water requirement is met, which may lead to errors. If a field uses both surface water and groundwater, surface water volumes must be known to estimate groundwater use. Enforcement: Remote sensing

The goals of the groundwater allocation management action are to ensure a fair groundwater allocation, allow groundwater users time to adjust, provide future flexibility in allocation determinations, and to accurately and efficiently quantify groundwater extractions. The measurable objective is the volume of groundwater extraction in acre-feet GSA-wide and on a per acre basis.

The method of evaluation of groundwater extraction in acre-feet depends upon the EKGSA’s selected quantification method or combination of methods. The evaluation of various methods may consider a wide range of factors including cost, accuracy, reliability, timeliness, functionality, personnel required, and legal defense. Once the EKGSA has established a consistent quantification method, the evaluation of the “ramp-down” gradual allocation decrease could be analyzed in the annual comparison of groundwater extraction. Though the annual groundwater extraction amount would be affected by other factors such as weather and available surface water supplies, the total extraction amount could be normalized to an average water year for comparative purposes.

Table 5-5 Groundwater Allocation Measurable Objectives List

Groundwater Level	X
Storage Change	X
Groundwater Quality	
Land subsidence	X
Surface Water Groundwater Interconnection	
Seawater Intrusion	NA

5.3.3.2 Circumstances for Implementation GA-1 – GA-4 (Sec. 354.44.b.1.A)

The EKGSA may consider an investigative study to determine the current and future needs of the existing water rights holders, IDs, DACs, PUDs, and unexercised rights to determine the sustainable yield and groundwater allocation. The selection of groundwater extraction method may be implemented shortly after the adoption of the GSP for the purposes of the required SMGA annual reporting. The selected groundwater extraction quantification method may change over time, but the groundwater allocation would remain on-going.

5.3.3.3 Process for Public Notification GA-1 – GA-4 (Sec. 354.44.b.1.B)

All public notification will take place in the form of regular correspondence from the EKGSA, as well as any supplementary communication between the grower and the EKGSA as deemed necessary by the Board.

5.3.3.4 Permitting and Regulatory Process (Sec. 354.44.b.3)

The EKGSA is responsible to adhere to state water rights law. No permit or regulatory process is required for the EKGSA to adopt the groundwater allocation policy. The GSA may consider the advantages & disadvantages of the listed methods due to differing levels of accuracy and reliability. However, *SGMA 10725.4 (c)* allows GSAs to investigate property and extraction facilities, though encroachment permits, or access agreements may be necessary in some locations. This management action does not rely on water from outside the jurisdiction of the EKGSA.

5.3.3.5 Status and Schedule GA-1 – GA-4 (Sec. 354.44.b.4)

The policy for groundwater allocation per acre, ramp-down gradual decrease, adaptive management, and groundwater extraction quantification method (GA-1 – GA-4) have not been drafted, but development is expected to commence shortly after the adoption of the GSP and likely be completed within the first few years of GSP Implementation.

5.3.3.6 Benefit Realization and Evaluation GA-1 – GA-4 (Sec 354.44.b.5)

The expected benefits may mitigate overdraft by improving the EKGSA's knowledge of aggregate and individual groundwater extractions. The development of a groundwater allocation per acre may be based on the EKGSA's current understanding of the sustainable yield and may change as more information or knowledge is gained. The groundwater allocation management action alone may generate a negligible quantifiable demand reduction, but it would benefit Education and Outreach (See EO1-EO2) and serve as a prerequisite to other management actions including groundwater marketing and trading, fees and incentives, and pumping restrictions (GMT 1-5, FI 1-4) over the planning horizon and by 2040 at the latest.

5.3.3.7 How This Management Action will be Accomplished GA-1 – GA-4(Sec. 354.44.b.6)

The EKGSA will consider the option of a “Comprehensive Allocation Method” as detailed in the 2018 EDF report as a possible approach in addressing GA-1. The annual correspondence mailer will address any annual changes in groundwater allocation based from annual data reported to the EKGSA (GA-2). The EKGSA will consider utilizing an adaptive management approach in which allocations are assessed and changed as deemed

necessary by the Board of Directors in order to address GA-3. Lastly, the GSA will adopt necessary policy to assist in establishing quantification methods for obtaining data for the required SGMA reporting requirements.

5.3.3.8 Legal Authority GA-1 – GA-4 (Sec. 354.44.b.7)

The legal authority and basis for the management actions described in this Chapter are outlined in the SGMA and related provisions. The SGMA describes the powers and authorities, financial authority, and enforcement powers of GSAs in Chapters 5, 8, and 9 respectively.

5.3.3.9 Costs GA-1 – GA-4 (Sec. 354.44.b.8)

The costs related to the groundwater allocation management action include one-time expenses and reoccurring annual expenses. The one-time expenses include the labor costs of the EKGSA Staff, Legal Counsel, and Consultant to prepare the formal program description and EKGSA Board adopt the management action policy. The written policy would describe the groundwater allocation method, available source data, assumptions, groundwater allocation per acre, the gradual decrease to actual allocation, the adaptive management approach, the groundwater extraction quantification methods, expected costs, and the overall intent of the policy. Through a Board resolution, the program would be incorporated into the EKGSA’s policy manual for transparency. At this time, only preliminary discussions have been held regarding the potential policy.

The reoccurring costs associated with the EKGSA’s selected groundwater extraction quantification vary considerably depending upon the selected method and frequency of data collection.

1. Crop Coefficient Calculations – determined by annual crop survey and standard crop coefficients
 - a. \$5,000 labor coordination to and handling cropping information obtained from Agriculture Commissioner or another source.
 - b. \$20,000 for mapping and calculating groundwater demand
 - c. Estimated \$25,000 annually
2. Flow meters – determined by meter readings
 - a. Assumes meters are furnished and installed by well owner following specifications developed by the EKGSA
 - b. Assumes meter readings are self-reported or meters are telemetry
 - c. Estimated \$15,000 annual labor to collect, validate and input meter readings into EKGSA database. Does not include costs of “policing” meter use.
3. Remote sensing of evapotranspiration – determined by remote sensing
 - a. Data purchased from one of several vendors offering remote sensing service of acceptable accuracy for use in individual field water budgets – estimated \$120,000 annually
 - b. Field level water budget analysis tracking surface water deliveries and effective precipitation - estimated \$50,000 annually
4. Calibrated energy records – determined by energy records and meter calibrations
 - a. Bulk rate pricing of \$250/electric meter/year
 - b. Assumes 5,000 to 6,000 meters GSA wide (non-de minimis users).
 - c. Estimated \$1.5 million annually

It is not anticipated that the groundwater allocation management actions would directly result in a quantifiable demand reduction. However, the foundation for the mitigation of overdraft would be established for on-going monitoring of groundwater extractions.

5.3.4 Groundwater Marketing/Trading Management Actions

5.3.4.1 Groundwater Marketing and Trading

If a groundwater allocation policy including individual allocations and chosen quantification method is adopted, the EKGSA may pursue a groundwater market and trading program to provide beneficial users more flexibility in utilizing their allocation. This management action would detail a groundwater allocation carryover structure, banking program, water marketing strategy study, trading structure and related rules.

GMT-1 Groundwater Allocation Carryover Structure

The EKGSA may adopt a policy to define groundwater allocation carryover provisions year-to-year and/or allow multi-year pumping averages. The inter-annual flexibility may be useful to growers who could change cropping patterns or fallow acreage. Though there is a risk that extreme drought may induce exceptionally high pumping in a single year, groundwater extractors may be able to strategize and better manage their assets.

GMT-2 Water Marketing Strategy Study

The EKGSA may consider a study of water marketing strategies in an effort to acquire more surface water. The study may focus on the development of a groundwater banking/trading program and coordination with other agencies that could potentially market water into the EKGSA.

GMT-3 Groundwater Banking Program

The EKGSA may adopt a policy to define a groundwater banking program. The banking program would consider using surface water supplies when available in lieu of groundwater pumping. Though not feasible for all users, growers capable of surface water recharge on-farm may be able to percolate surface water, or other transferred water, for recharge credits. There are many complexities and considerations required to initiate and successfully manage a banking program. The EKGSA must acknowledge and discuss any other water bank/credit systems in existence. The EKGSA may approve past replenishment projects and determine the timeframe for any banking efforts that took place prior to banking program adoption. The EKGSA may consider adjusting banked credits if future changes in sustainable yield and/or groundwater allocation require adjustment. The EKGSA may define a "leave-behind" amount for groundwater migration and operational and evaporative losses, as well as to buffer against impacts to neighboring wells. The EKGSA may consider finite timelines or expiration dates on banked water or ongoing "leave-behind" amounts.

GMT-4 Groundwater Trading Structure

In addition to a groundwater banking program, the EKGSA may adopt a policy to define a groundwater trading structure. The report *Groundwater Trading as a Tool for Implementing California's Sustainable Groundwater Management Act* (Environmental Defense Fund et. al, 2017) identifies several possible groundwater trading structures. The GSA may consider a variety of structures including, but not limited to those shown in this table excerpted from the 2017 EDF report.

There are various advantages, disadvantages, and costs to all of the trading structures noted, and others may exist also. The EKGSA may consider exploring some of these options with the Subbasin GSAs for an aggregated approach and mutual cost savings. Trading may be executed through short-and long-term leases, permanent transfers, inter-annual water exchanges, or dry-year option contracts. The EKGSA may determine physical trade limitations such as distance, aquifer, soil conditions, or management areas.

Comparison of trading structures

Trading structure	Description	Administrator	Advantages and disadvantages	Participant costs
Bilateral contracts or “coffee shop” markets	The most common form of water transactions worldwide, no formal trading mechanism exists. Participants largely learn of one another by word of mouth.	None; informal and decentralized	Advantages <ul style="list-style-type: none"> • Costless to agency to implement Disadvantages <ul style="list-style-type: none"> • Difficulty identifying an interested party • Difficulty in price negotiation • Difficulty in regulatory compliance 	No third-party fees; high search and transactions costs
Brokerage	Representation of a buyer or seller in a water rights transaction.	Private sector	Advantages <ul style="list-style-type: none"> • Helps identify interested parties • Helps to negotiate price • Specialized agents help in regulatory compliance Disadvantages <ul style="list-style-type: none"> • Still somewhat decentralized • Pricing often favors the represented party 	Brokerage fee
Bulletin boards	A physical or electronic board where interested parties can list information about their water rights for others to get in contact with them.	Private sector, regulatory agencies	Advantages <ul style="list-style-type: none"> • Centralizes trading activity to a degree Disadvantages <ul style="list-style-type: none"> • Difficulty in price negotiation • Difficulty in regulatory compliance 	No third-party fees; moderate search and transactions costs
Auctions and reverse auctions	A physical or electronic system in which buyers outbid one another (auction) or sellers undercut one another (reverse auction) to trade water.	Private sector, regulatory agencies	Advantages <ul style="list-style-type: none"> • Centralizes trading activity to a degree Disadvantages <ul style="list-style-type: none"> • Asymmetric pricing: One side reaps the benefits or gains of trade • Difficulty in regulatory compliance 	Auction fee if privately run
Electronic clearing-houses or “smart markets”	Leverages the power of computer optimization and a tailor-made algorithm to match participants within the trading rules and by price points.	Private sector, regulatory agencies	Advantages: <ul style="list-style-type: none"> • Centralizes trading activity • Automates regulatory compliance • Includes price discovery mechanism Disadvantages: <ul style="list-style-type: none"> • Intensive startup costs to develop 	Trading fee, if privately run

GMT-5 Regulate Groundwater Allocation Transfers Outside of GSA

The EKGSA may adopt a policy to regulate groundwater allocation transfers outside of the EKGSA boundaries. Approval would need to be obtained if water is banked within the EKGSA area and the groundwater allocation is intended to be transferred out of the GSA, or if a common landowner intends on transferring his allocation from in the EKGSA to land he owns in another GSA. The EKGSA may assure performance by enforcing rigid penalties for illegal actions. The EKGSA may approve external transfers in limited quantities for emergency situations and levy fees for metering the transferred amount.

Table 5-6 Groundwater Market/Trading Measurable Objectives Checklist

Groundwater Level	X
Storage Change	X
Groundwater Quality	X
Land subsidence	X
Surface Water Groundwater Interconnection	X
Seawater Intrusion	NA

5.3.4.2 Circumstances for Implementation GMT-1 – GMT-5 (Sec. 354.44.b.1.A)

The carryover policy (GMT-1) may be implemented shortly after the adoption of the groundwater allocation per acre and, once adopted, likely remains indefinitely. With regards to the marketing study (GMT-2), the EKGSA can consider to implement at any time after the initial GSP submittal, however it is recommended to be completed with the first 5 years of GSP Implementation, as it would be critical in developing a groundwater market in the EKGSA. The remaining marketing/trading management action policies (GT-3 – GT-5) require other policies and/or decisions to be made prior to developing. Allocation and measurement policies are required to develop banking, trading, and/or transferring policy. Once these policies are in place, they are likely to remain in place indefinitely.

5.3.4.3 Process of Public Notification GMT-1 – GMT-5 (Sec. 354.44.b.1.B)

All public notification will take place in the form of regular correspondence from the EKGSA, as well as any supplementary communication between the grower and the EKGSA as deemed necessary by the Board.

5.3.4.4 Permitting and Regulatory Process GMT-1 – GMT-5 (Sec. 354.44.b.3)

No permit or regulatory process is required for the EKGSA to adopt policy on any of the groundwater market/trading management actions. However, once policy is in place, groundwater banking (GMT-3) and groundwater trading (GMT-4) will likely require conformance with CEQA. Management actions associated with groundwater banking, trading, and transferring outside the EKGSA may involve external sources of water, pending agreements and partnerships.

5.3.4.5 Status and Schedule GMT-1 – GMT-5 (Sec. 354.44.b.4)

The policy for these actions has not been drafted. It is expected to commence shortly after the adoption of the GSP and potentially implemented within the first 5 years of GSP Implementation.

5.3.4.6 Benefit Realization and Evaluation GMT-1 – GMT-5 (Sec. 354.44.b.5)

The expected benefits for groundwater allocation carryover, market strategy study, groundwater banking, and groundwater trading structure may include increased flexibility for groundwater users to manage supplies, improve water reliability, improve coordination with other users and agencies, and potentially encourage on-farm changes such as crop or irrigation method conversion. The policy for regulating groundwater allocation transfers outside the EKGSA may mitigate local overdraft and deepening cones of depression by ensuring groundwater supplies are consumed or retained within the EKGSA boundary. Emergency groundwater allocation transfers may be accounted and recorded by the EKGSA. Methods for evaluation may be resulting increased water supplies, demand reduction, and/or quantity of GSA transfer permits.

5.3.4.7 How This Management Action Will be Accomplished GMT-1 – GMT-5 (Sec. 354.44.b.6)

The EKGSA will evaluate and establish the policy to be implemented regarding defining groundwater allocation carryover provisions year-to-year and/or allow multi-year pumping averages (GMT-1). The EKGSA will address GMT-2 by considering a study of water marketing strategies. Such a study may focus on the

development of a groundwater banking/trading program and coordination with other agencies that could potentially market water into the area. The EKGSA will explore, analyze and possibly develop future policy to address groundwater banking and trading structures to be implemented. Lastly in order to address GMT-5 the EKGSA may adopt a policy to limit groundwater allocation transfers outside of the GSA or Subbasin.

5.3.4.8 Legal Authority GMT-1 – GMT-5 (Sec.354.44.b.7)

The legal authority and basis for the management actions described in this Chapter are outlined in the SGMA and related provisions. The SGMA describes the powers and authorities, financial authority, and enforcement powers of GSAs in Chapters 5, 8, and 9 respectively.

5.3.4.9 Costs GMT-1 – GMT-5 (Sec.354.44.b.8)

The costs related to the groundwater marketing/trading management action include one-time expenses and reoccurring annual expenses. The one-time expenses include the labor costs of the EKGSA Staff, Legal Counsel, and Consultant to prepare the formal program description and EKGSA Board adopt the management action policy. The written policy would describe the marketing and/or trading, available source data, assumptions, groundwater measurement methods, the adaptive management approach, potential fees and charges, and the overall intent of the policy. Through a Board resolution, the program would be incorporated into the EKGSA's policy manual for transparency. At this time, no discussions have been held regarding the potential policy.

The estimated costs associated with the EKGSA's selected groundwater marketing and trading management action options are estimated as follows:

1. Groundwater allocation carryover structure
 - a. \$10,000 labor and coordination to draft the policy
 - b. Estimated \$15,000 annually for administration and data management
2. Water Marketing Study
 - a. Estimated \$400,000 to perform study, based on other GSA efforts
 - b. Potential funding to 50% available through the USBR
3. Groundwater Banking Program
 - a. \$20,000 labor and coordination to draft the policy
 - b. On-going annual costs will vary pending program and management method selected
 - c. Fees and charges may be incorporated into the policy to cover on-going administrative costs or supplement funding for other projects or water purchases.
4. Groundwater Trading Structure
 - a. \$20,000 labor and coordination to draft the policy
 - b. On-going annual costs will vary pending program and management method selected
 - c. Fees and charges may be incorporated into the policy to cover on-going administrative costs or supplement funding for other projects or water purchases.
5. Groundwater transfer out of the GSA
 - a. \$10,000 labor and coordination to develop the policy
 - b. Fees and charges may be incorporated into the policy to cover on-going administrative costs or supplement funding for other projects or water purchases.

5.3.5 Fees and Incentives Management Actions

5.3.5.1 Fees and Incentives

The EKGSA will explore multiple financing options to cover its operational costs as detailed in the GSP Implementation (**Chapter 6**). Specific to Projects and Management Actions, the EKGSA may adopt policy to levy groundwater fees and/or provide individual incentives to groundwater users to reduce groundwater extractions. The EKGSA may consider an economic study to determine the best strategy for curbing groundwater overdraft while minimizing economic impact. Potential fee structures and/or incentives would affect groundwater users differently, so a combination fee or incentives structure may also be considered.

FI-1 Pumping Fees for Groundwater Allocations Exceedances

Once a groundwater allocation policy including individual allocations and chosen quantification method has been adopted, the EKGSA may adopt a policy to levy fees for pumping beyond the current groundwater allocation. The EKGSA realizes certain landowners will need or elect to utilize an amount of groundwater in excess of their annual allocation. In order to meet such demands, while minimizing overdraft conditions and sustaining the groundwater aquifer, the EKGSA must augment water supplies or manage demands. The pumping fee is proposed to fund the costs of augmenting water supplies and/or managing demands. It is likely there will be several fee structures developed throughout the State. The EKGSA may follow one of these examples or develop its own basis for a pumping fee.

FI-2 Pumping Fees for Groundwater Extractions

If an individual groundwater allocation per acre policy is not established or takes many years to adopt, the EKGSA may adopt a policy to levy tiered fees per acre-feet of pumped groundwater. The EKGSA must first adopt policy on groundwater quantification as described in **Section 5.3.3** to develop this type of policy. If pumping fees were not paid, the EKGSA may consider liens or cease and desist orders.

FI-3 Well Head Fees

An alternative approach independent of groundwater allocation per acre and quantification method of extraction, the EKGSA may adopt a policy to levy flat rate well head fees. To implement this policy the EKGSA would need to register groundwater extraction facility, such that the GSA can efficiently and accurately collect the well head fee. If well head fees were not paid, the GSA may consider liens or cease and desist orders.

FI-4 Incentives

The following examples provide basic information on possible incentive program structures should the EKGSA choose to adopt policy that establishes these programs to be implemented. The EKGSA may incentivize these, or other programs as deemed necessary, with Board approval.

Example 1 – May adopt a policy to incentivize groundwater extractors through incentives to construct canal or basin infrastructure to utilize available imported and flood waters.

Example 2 – May adopt a policy to incentivize groundwater extractors through incentives to change crop type to one with lower water demand.

Example 3 – May adopt a policy to incentivize groundwater extractors through incentives to rotate crops and temporarily fallow portions of their irrigated acreage to reduce water demand.

Example 4 – May adopt a policy to incentivize farmers to implement on-farm best management practices (BMPs) such as soil moisture sensors, high efficiency irrigation methods, metering to apply precise irrigation, and deficit irrigation.

Example 5 – May adopt a policy to incentivize farmers to retire or permanently fallow agricultural land.

Table 5-7 Fees & Incentives Measurable Objectives Check List

Groundwater Level	X
Storage Change	X
Groundwater Quality	
Land subsidence	X
Surface Water Groundwater Interconnection	
Seawater Intrusion	NA

5.3.5.2 Circumstances for Implementation FI-1 – FI-4 (Sec. 354.44.b.1.A)

The EKGSA may consider an investigative study to determine the most effective and equitable fee and incentive structure. Prerequisites of levying groundwater fees may include the installation of a flow meter or other quantification method for groundwater extractors (excluding de minimis extractors). Prerequisites to well head fees may be the registration of groundwater extraction facility and database creation.

5.3.5.3 Process for Public Notification FI-1 – FI-4 (Sec. 354.44.b.1.B)

The EKGSA would utilize continuous correspondence as discussed in EO-1-EO-2 to notify the public as to various opportunities to participate in these programs. Additionally, the EKGSA will utilize such correspondence to inform on policy development and/or implementation regarding fees and incentives.

5.3.5.4 Permitting and Regulatory Process FI-1 – FI-4 (Sec. 354.44.b.3)

No permit or regulatory process is required for the EKGSA to adopt these policies. The EKGSA has the power, through SGMA and related provisions, to adopt these ordinances. Specific canal or basin infrastructure may require CEQA compliance and potentially rely on external water sources.

5.3.5.5 Status and Schedule FI-1 – FI-4 (Sec. 354.44.b.4)

The policies regarding fees and incentives have not been drafted. It is expected to be evaluated during the first 5 years of GSP Implementation and potentially implemented within 2 years of policy adoption. Policy fees, associated non-payment penalties, and incentives amounts may be reviewed by the EKGSA annually.

5.3.5.6 How This Management Action Will be Accomplished FI-1 – FI-4 (Sec. 354.44.b.6)

Groundwater extraction fees and agricultural land conversion have great potential to significantly reduce the demand on groundwater supplies. The quantification of the possible water savings depends on the program pursued and the number of participants.

5.3.5.7 Benefit Realization and Evaluation (Sec. 354.44.b.5)

The expected benefits are potential mitigation of local overdraft by incentivizing groundwater extractors to reduce pumping or pump groundwater supplies in a sustainable fashion. The ancillary benefits include additional funds for the EKGSA to invest in other projects and management actions. The method of evaluation may be reviewing the effective fee structures, amounts and number of fees levied. The groundwater savings are estimated 0 - 30,000 acre-feet per year. It may vary significantly depending upon levied fees, water year, and available transfers/banked credits.

5.3.5.8 Legal Authority FI-1 – FI-4 (Sec. 354.44.b.7)

The legal authority and basis for the management actions described in this Chapter are outlined in the SGMA and related provisions. The SGMA describes the powers and authorities, financial authority, and enforcement powers of GSAs in Chapters 5, 8, and 9 respectively.

5.3.5.9 Costs FI-1 – FI-4 (Sec. 354.44.b.8)

The costs related to the fees and incentives management action include one-time expenses and ongoing annual expenses. One-time expenses include the labor costs of the EKGSA Staff, Legal Counsel, and Consultant to prepare the formal program description and adopt the management action policy. Through a Board resolution, the program would be incorporated into the EKGSA's policy manual for transparency. If the EKGSA were to separate the fees and incentives management action into multiple policies, the one-time costs for program description and adoption would be duplicated, but ongoing efforts would be reduced.

Fees: The one-time expenses are estimated at \$15,000 cost to draft and adopt the policy. The ongoing costs related to levying fees of any type include accounting, billing, and processing payments. These costs are estimated at \$25,000 annually. Once adopted, the levied fees will recoup these costs and generate revenue for the EKGSA to fund other projects and management actions.

Incentives: The one-time expenses are estimated at \$15,000 cost to draft and adopt the policy. Since the incentives program would be voluntary with an unknown number of participants, it is assumed the EKGSA would define a maximum budget account with each corresponding type of incentive and would define the parameters of the incentives program. In addition, there would costs associated with field verification prior to enrollment in the Incentives program. Ongoing costs may range from \$10,000 - \$1,000,000 annually.

5.3.6 Groundwater Pumping Restrictions Management Actions

5.3.6.1 Groundwater Pumping Restrictions

The EKGSA may consider a groundwater pumping restrictions management action encompassing policies related to the prohibition of new groundwater exports, requiring new developments to prove sustainable water supply, pumping restrictions during droughts, and moratorium on new production wells.

GP-1 Regulate Groundwater Exports

Though groundwater exports outside of the EKGSA are not currently a common practice, it is understood the changing water market conditions may entice beneficial users to seek financial gains by exporting groundwater. Thus, the EKGSA may adopt a policy to charge a fee for existing groundwater exports and/or prohibit new groundwater exports outside of the EKGSA boundary. The EKGSA may assure performance by enforcing rigid penalties for illegal actions. The EKGSA may approve external exports in limited quantities for emergency situations and levy fees for metering the exported amount. Policy fees and penalties may be reviewed by the EKGSA Board annually.

GP-2 Require New Developments to Prove Sustainable Water Supply

The EKGSA may adopt a policy to require new developments (non-de minimis extractors) to prove sustainable water supplies based upon the current groundwater allocation. The EKGSA may review and comment on all new development environmental documents to ensure water balance and corresponding mitigation measures are implemented. This policy requires the support and coordination of the County and/or City during their typical project permitting process.

GP-3 Pumping Restrictions

The EKGSA may adopt a policy to reduce or temporarily suspend groundwater pumping during specific intervals and/or in specific regions. Restrictions may be the result of minimum threshold exceedances. The EKGSA may consider significant penalties for violators of excessive abuse.

Table 5-8 Groundwater Pumping Restrictions Measurable Objectives Check List

Groundwater Level	X
Storage Change	X
Groundwater Quality	
Land subsidence	X
Surface Water Groundwater Interconnection	
Seawater Intrusion	NA

5.3.6.2 Circumstances for Implementation GP-1 – GP-3 (Sec. 354.44.b.1.A)

The groundwater pumping restrictions policy may have certain components that may be considered sooner than others. If groundwater export becomes a significant concern in the EKGSA, the EKGSA may act more quickly to develop a policy. Developing policy requirements for new developments will require coordination with the County and/or City.

5.3.6.3 Process for Public Notification GP-1 – GP-3 (Sec. 354.44.b.1.B)

The EKGSA will utilize the established methods of correspondence as described in EO-1-EO-2 to coordinate directly with the grower to address necessary actions associated with groundwater pumping restrictions. If deemed necessary, the EKGSA will adopt policy to, address, issue warnings and implement pumping restrictions if future circumstances require it. Certain circumstances and/or triggers of minimum threshold exceedances may expedite the policy adoption.

5.3.6.4 Permitting and Regulatory Process GP-1 – GP-3 (Sec. 354.44.b.3)

No permit or regulatory process is required for the EKGSA to adopt the policy describing the prohibition of native groundwater exports or pumping restrictions. No external water source is used.

The regulatory process to adopt the policy describing requirements for new developments to provide sustainable water supplies requires cooperation from the County/City to ensure the EKGSA reviewed and commented on the environmental documents prior to County/City approval. The regulatory process would require EHD coordination and support to ensure new well permits issued within the EKGSA adhere to EKGSA policy. This management action does not rely on water from outside the jurisdiction of the EKGSA.

5.3.6.5 Status and Schedule GP-1 – GP-3 (Sec. 354.44.b.4)

The policy has not been drafted. It is expected the EKGSA will evaluate these policy options within the first 5 years of GSP Implementation. During this evaluation and receiving input from stakeholders, the EKGSA will develop a more detailed schedule.

5.3.6.6 Benefit Realization and Evaluation GP-1 – GP-3 (Sec. 354.44.b.5)

The expected benefits may mitigate overdraft and minimum threshold exceedances by ensuring groundwater supplies are utilized in accordance with the groundwater allocation and consumed or retained within the EKGSA boundary. Emergency groundwater exports may be metered and recorded by the EKGSA. The method of evaluation may be reviewing the financial impact, number of new developments, and/or number of emergency export permits. Estimated 0 – 30,000 acre-feet per year may be retained within the EKGSA, which may vary significantly depending upon levied fees, water year, available transfers/banked credits, etc.

5.3.6.7 How This Management Action Will be Accomplished GP-1 – GP-3 (Sec. 354.44.b.6)

The EKGSA may adopt a policy to charge a fee for groundwater exports and/or prohibit groundwater exports outside of the EKGSA boundary in order to accomplish GP-1. Additionally, the EKGSA will be assessing

groundwater conditions and may adopt policy in which GP-2 and GP-3 would be directly addressed and could become implemented policy.

5.3.6.8 Legal Authority GP-1 – GP-3 (Sec. 354.44.b.7)

The legal authority and basis for the management actions described in this Chapter are outlined in the SGMA and related provisions. The SGMA describes the powers and authorities, financial authority, and enforcement powers of GSAs in Chapters 5, 8, and 9 respectively.

5.3.6.9 Costs GP-1 – GP-3 (Sec. 354.44.b.8)

The costs related to the groundwater pumping restrictions management action include one-time expenses and ongoing annual expenses. One-time expenses include the labor costs of the EKGSA Staff, Legal Counsel, and Consultant to prepare the formal program description and adopt the management action policy. Through a Board resolution, the program would be incorporated into the EKGSA's policy manual for transparency. The one-time expenses are estimated at \$15,000 cost to draft and adopt the policy. The ongoing costs related to managing groundwater pumping restrictions and coordinating with the County/City may be covered through a permit fee and/or pumping charge.