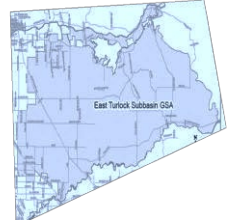


FACT SHEET

East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA) Adaptive Management of Groundwater Demand under the Turlock Subbasin Groundwater Sustainability Plan (GSP)



The Pumping Management Framework consists of five Management Actions that will be implemented in an adaptive manner as determined by the Turlock Subbasin GSAs to meet the Subbasin’s sustainability goal. Not all Management Actions may be needed or implemented by each GSA depending on their assessment of conditions and strategy effectiveness within their jurisdictional boundaries in the Subbasin. The Pumping Management Framework includes the following Management Actions:

- 1. Voluntary Conservation and/or Land Fallowing (Management Action 1).** This Management Action would assess options and develop a program to enact temporary or permanent voluntary conservation and/or fallowing strategies in close coordination and collaboration with landowners. Examples of this strategy could include the following: repurposing of lands growing lower value crops to be dry farmed, fallowed in rotation, or used for recreation, habitat restoration, groundwater recharge, solar power generation, or other land use or development options. Public programs to assist landowners to participate in such programs are available and may create incentives to repurpose, or convert, irrigated agricultural land to new uses that both reduce groundwater demand and provide other measurable benefits to the environment and/or broader community. Temporary or permanent land fallowing could also be combined with recharge projects through the application of surplus surface water supplies to the fallowed lands.
- 2. Conservation Practices (Management Action 2).** This Management Action would create a program to support the use of conservation practices in both the urban and agricultural sectors. Under Management Action 2, the GSA may choose to implement conservation practice programs similar to existing UWMPs or AWMPs to conserve groundwater in areas of the Subbasin that are not covered by UWMPs or AWMPs.
- 3. Groundwater Extraction Reporting Program (Management Action 3).** To facilitate implementation of pumping management, a reporting program is needed. Based on experience in other San Joaquin Valley subbasins, a voluntary program is likely to achieve significant response. Therefore, the reporting will be initially implemented on a voluntary basis and then a decision will be made how best to expand the program either through mandatory reporting or by supplementation using consumptive use estimates derived from analysis of remote sensing data.
- 4. Groundwater Allocation and Pumping Management Program (Management Action 4).** This Management Action consists of phased pumping reduction as needed based on adaptive management to the results of groundwater monitoring. Either GSA may implement pumping management within their jurisdictions. Four categories of pumping management will be defined and allocated to pumpers, including the following: Sustainable Pumping, Unsustainable Pumping (to be phased out over time to achieve the sustainability goal of the Subbasin), and Temporary Carry-Over Extraction (pumping in excess of the sustainability goal that is carried over from pumping below the sustainability goal in prior years or offset by pumping below the sustainability goal in subsequent years), and Pumping Credits (credit allowances for recharge enhancements on a property). Phased pumping reduction would be implemented to address the net groundwater sustainability gap remaining after implementation of the feasible projects and water conservation measures. Pumping reductions may be increased incrementally in response to monitoring data to meet the Subbasin Interim Milestones and Measurable Objectives.

5. **Groundwater Extraction Fee Program (Management Action 5).** This Management Action is a tiered groundwater extraction fee program. Under this program, fees would be assessed for Unsustainable Extraction and Temporary Carry-Over Extraction that is not offset. Fees assessed under this program could be used to fund projects or the procurement of replenishment water. The GSA may choose to develop and adopt this program to meet its management needs.
6. **Groundwater Pumping Credit Market and Trading Program (Management Action 6).** This Management Action allows carry over pumping above a pumper's allocated sustainable yield that is offset by less pumping in previous or subsequent years, and establishes a market-driven groundwater extraction credit/trading program. The program would allow the trading or sale of unused Sustainable Extraction or Temporary Carry-Over credits. It would allow increased operational flexibility and introduce the mediating effect of market forces and opportunities as Unsustainable Extraction allocations are scaled back.

Figure 1 illustrates conceptually how average Sustainable Pumping and Unsustainable Pumping are managed over time to achieve sustainable groundwater management over time. The graph illustrates the effect of implementing Group 1 and Group 2 projects along with pumping reductions. The values shown in the graph are consistent with current estimates, but are not certain because of the limitations and uncertainties inherent in the C2VSim-TM model, and are therefore presented in the graph for conceptual purposes and are subject to future refinement as data gaps are addressed and more monitoring data become available. It should also be noted that the actual values will vary from year to year based on climatic conditions, varying surface water availability and varying crop water demands and irrigation decisions. Long-term averages are shown for illustration purposes. The graph shows the following implementation phases for the Pumping Management Program:

- **Phase 1 (GSP Implementation Years 1 to 5).** During the first Phase of the Pumping Management Framework, information will be gathered to better assess Subbasin trends, water budget information and the basin response to hydrologic and climatic conditions and projects. In addition, water recharge projects will begin to be implemented and will offset a portion of the Unsustainable Extraction. The amount of the offset is dependent on the yield of the individual projects and their effectiveness to mitigate overdraft in different portions of the Subbasin. This information would be assessed to develop a Pumping Management Plan based on an adaptive management approach to sequentially phase in pumping reductions as needed to address overdraft and achieve sustainability goals. In Figure 1, only the Group 1 and Group 2 projects discussed earlier in this section are assumed to be implemented. The GSA may choose to begin implementation of pumping reduction during the latter part of this period.
- **Phase 2 (GSP Implementation Years 6 to 10).** During this period, pumping reductions would begin to be phased in or would be escalated based on comparison of monitoring data to the Interim Milestones established in Section 6. The Subbasin response to project, climatic and pumping conditions would continue to be monitored and adjustments would be made to the pumping reduction strategy as needed.
- **Phase 3 (GSP Implementation Years 11 to 15).** By Year 11, projects are assumed to be fully phased in, and the Demand Management Plan would be updated to include the final pumping reductions needed to maintain pumping within the sustainable yield of the Subbasin by the end of Year 15. The Subbasin response to project, climatic and pumping conditions would continue to be monitored and adjustments would be made to the pumping reduction strategy as needed.
- **Phase 4 (GSP Implementation Year 16 to 20).** The goal is for the Subbasin to be operating within its long-term average sustainable yield by Year 16. The groundwater level response to project, climate and pumping conditions would continue to be monitored and adjustments would be made to the pumping reduction strategy as needed.

Figure 1: Conceptual Demand Management Framework

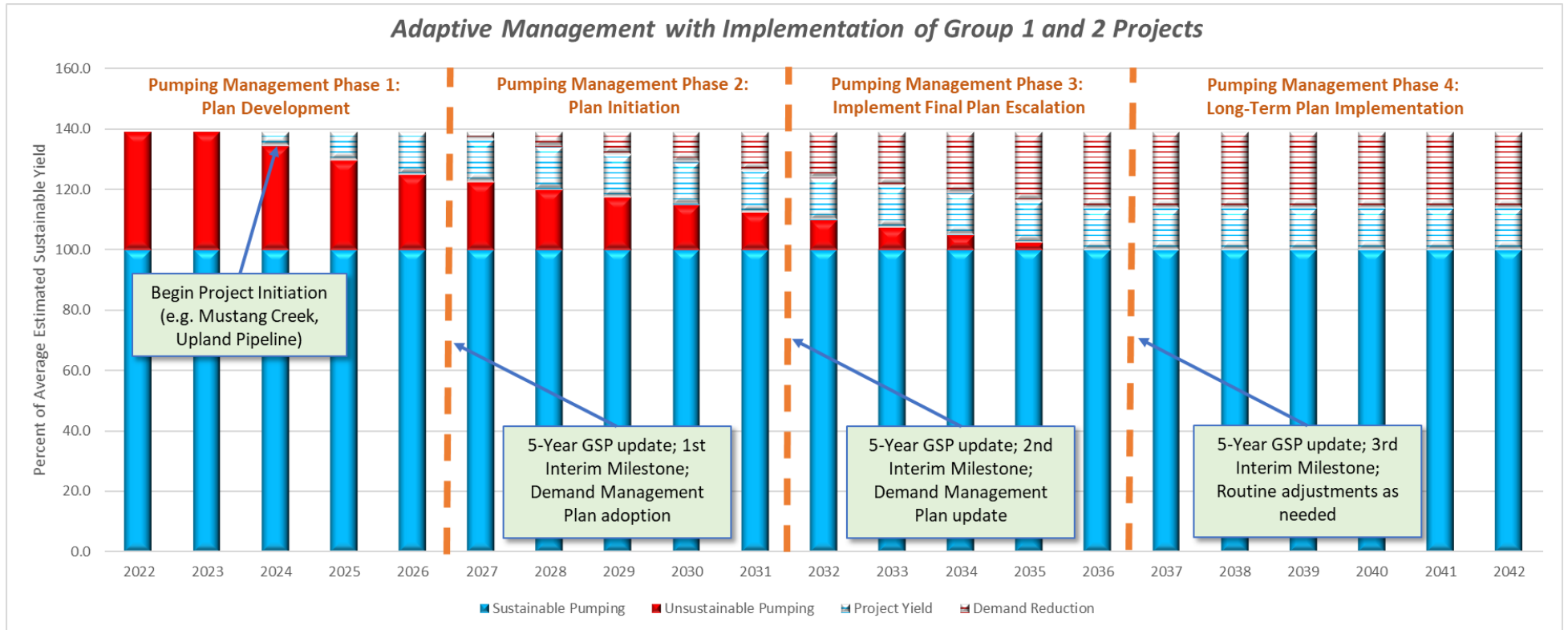


Figure 2, on the next page, shows the same general phases and implementation concepts as Figure 1; however, it also shows the effects of implementing Group 3 projects and the Demand Reduction Management Actions (Management Actions 1 and 2). As illustrated in the figure, the implementation of these additional recharge and water conservation measures could have a substantial impact by decreasing the amount of pumping reduction needed to achieve sustainability. As the increased effectiveness of the additional collective projects and management actions is realized and confirmed by monitoring, the adaptive management program would decrease pumping reduction in response to the effectiveness of these measures. The actual yield and effect of the projects and Demand Reduction Management Actions are not known at this time; however, they are expected to be measurable and significant, as illustrated in the conceptual graph, and would be documented by monitoring.

Figure 2: Conceptual Demand Management Framework Showing Adaptation to Increased Project Yield and Demand Reduction

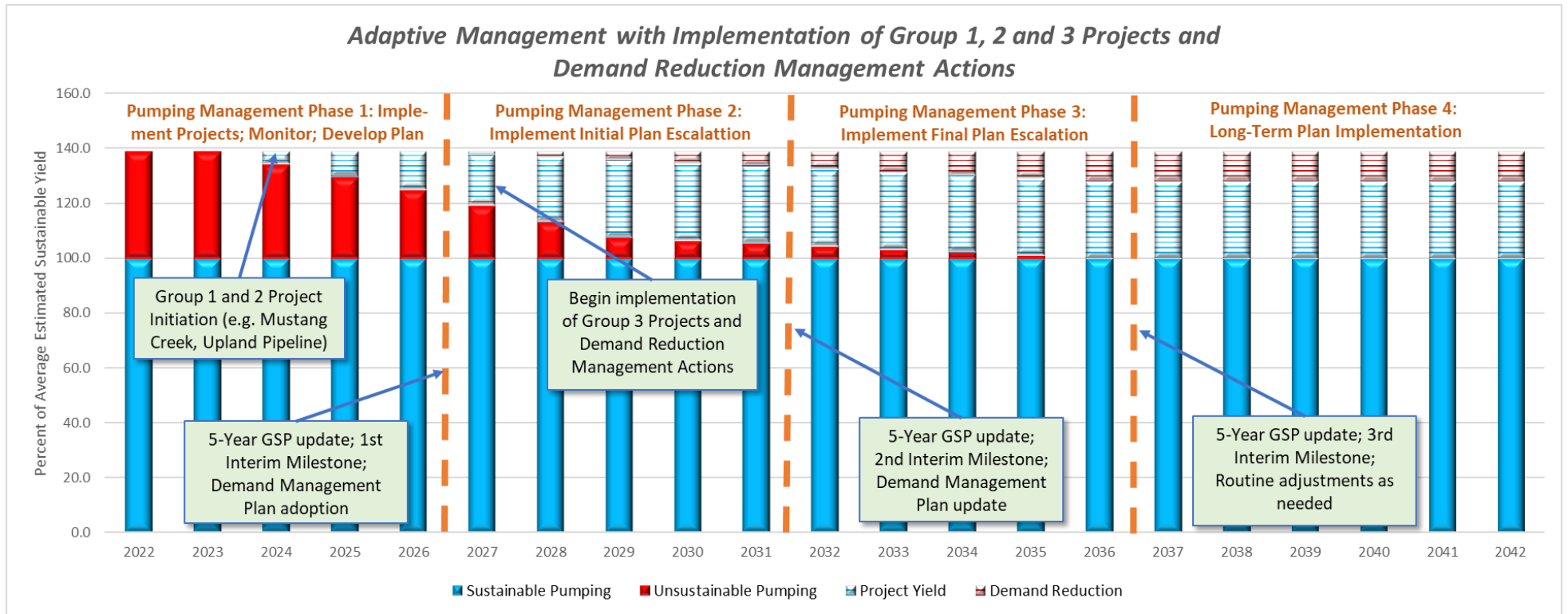


Figure 3 shows the conceptual application of Temporary Carry-Over Pumping, pumping credit markets and trading, and fees for unsustainable pumping. These are described below:

- **Carry-Over Pumping.** Figures 1 and 2 show constant sustainable yield pumping rates, but SGMA recognizes that sustainable pumping is the result of average demands over a period of years including both wet and dry intervals. In reality, due to climatic variability and other factors, the amount of irrigation demand of an agricultural operation will vary from year to year. Carry-over pumping is intended to allow groundwater pumpers operational flexibility to respond to these changes, and would allow pumping to exceed sustainability goals as long as it is offset by pumping less groundwater in prior or subsequent years. This concept is in the early development stages, and would begin with the adoption of carry-over pumping rules adapted to best serve the management of the basin. For example, carry over pumping could be balanced over a period of two year or three years, or carry-over pumping could be allowed for a percentage of the offset pumping.
- **Pumping Credits.** A program could be implemented to provide pumping credits to property owners that implement recharge projects on their land. These credits could be utilized on the property or sold or traded on the water markets discussed below, to serve as an incentive for a variety of recharge projects and measures. This concept is in the early development stages, and would begin with the adoption of credit rules adapted to best serve the management of the basin. For example, credits could be provided to growers that allow their property to be used as part of ETSGSA-sponsored recharge projects, or could be used to promote grower-implemented recharge projects or practices throughout the area.
- **Unsustainable Pumping Fees.** A fee structure could be applied to pumping over sustainability goals, or to carry over pumping that is not offset. Charging fees for unsustainable pumping would provide an incentive to pump less groundwater, and the funds obtained could be used to fund additional projects or procure replenishment water for recharge.
- **Markets and Trading.** Markets and platforms could be established for trading, exchange or sale of pumping allocations and credits to provide additional incentives for pumpers to decrease their groundwater demand, while providing operational flexibility to obtain additional pumping allocations when needed. Market forces would have a mediating effect on the reduction of unsustainable pumping over time.

The process of providing annual reports to DWR and five-year GSP updates will allow GSAs to update the Plan and adjust the implementation course as needed based on changing conditions.

Figure 3: Conceptual Demand Management Framework with Operational Flexibility and Market Incentives

