**Table 4-1 Existing or Ongoing Projects and Management Actions for Sierra Valley** [to be updated based on work group discussions]

| Title | Description | Near-Term Actions | Comments, Considerations, Unintended Consequences |
|---|---|---|---|
| Inventory and Metering | **Current MA**: SVGMD maintains a list of large-capacity wells in the Subbasin, including active metered wells and inactive wells. All large-capacity agricultural wells are fitted with flow meters owned and read by SVGMD. **MA Enhancement**: Continue and enhance inventory and metering efforts to support groundwater management. | • Continue existing metering and data collection program<br>• Refine well inventory & registry program, including GPS coordinates for each<br>• Install, reinstall, repair, calibrate, and replace flowmeters as needed | • Consider adding some form of domestic, commercial, industrial and stock well inventory and use estimation<br>• Investigate telemetry implementation options and cost |
| Data and Modeling | **Current MAs**: SVGMD collects water usage data from large-capacity agricultural wells as well as usage data from municipal well operators in the Subbasin. SVGMD and DWR collect water-level data in monitoring wells around the Subbasin, with DWR data posted in CASGEM and SVGMD data reported in public board meetings. Water quality data has been sporadically collected by DWR and more regularly collected by County Environmental Health Departments (and operators?) for public supply wells (confirm) **MA Enhancement**: Expand data collection to inform management decisions in the Subbasin and support updates of the hydrogeologic conceptual model. | • Continue existing water level and water use monitoring<br>• Expand water level monitoring network, as needs are identified (does this fit here or next row?)<br>• Discuss frequency of updates and recalibration of model | |
| Monitoring and Reporting | **Current MA**: SVGMD reads flowmeters on large-capacity agricultural wells monthly during the growing season and sounds monitoring wells for groundwater levels periodically. DWR measures groundwater levels in the Subbasin twice per year and posts results in CASGEM. The Sierra Valley Watermaster collects stream flow data in the Subbasin, which is not published publicly. **MA Enhancement**: Expand or implement monitoring networks and data gathering, sharing, and analysis for: groundwater, surface water, subsidence and GDEs/ISW. | • Install surface water stream gauges<br>• Perform groundwater-dependent ecosystem (GDE) monitoring (describe)<br>• Implement subsidence monitoring<br>• Develop comprehensive, streamlined, easy-to-use reporting systems to comply with SGMA and to support management decisions<br>• Include groundwater quality monitoring plan | • Surface water stream gauges are quite expensive, external funding needed or implementation by state/federal agencies<br>• Describe what GDE and ISW monitoring would involve and what it would achieve Add something on GW quality – practices SVGMD will undertake to ensure GW quality is not degraded by groundwater use or management; check on data regarding Dissolved Oxygen |

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| Education and Outreach | **Current MA**: SVGMD and UCCE have conducted periodic workshops to update stakeholders on topics related to water management.<br>**MA Enhancement**: Expand current education and outreach programs to cover additional topics related to sustainable groundwater management and on-farm best management practices (BMPs) for landowners. | • Host quarterly educational workshops | • Identify other options besides quarterly workshops – e.g., support current annual workshops and supplement with additional educational materials and information sharing as appropriate<br>• Continue outreach on GSP and groundwater conditions to all parties |
| Well Permit Ordinances | **Current MA**: SVGMD has enacted ordinances that:<br>• Require meters on all high-capacity wells (82-03);<br>• Require review of water availability for new development applications (83-01)<br>• Restrict installation of new high-capacity agricultural wells in specific areas of the Subbasin (18-01 §3a)<br>**MA Enhancement**: Continue existing protections and adjust as-needed (see comments) | • Develop a decision-making process for review of requests to reactivate registered inactive large-capacity wells | • There should be something here about the decision-making / review process for permitting large-capacity wells outside the restricted zone and developing monitoring strategies to launch if other areas of the Subbasin become active with high-capacity groundwater pumping. |
| Reuse | **Current MA:** Reuse of treated wastewater from Loyalton for alfalfa irrigation<br>**MA Enhancement**: Repair leaks in Loyalton sewer pipes (confirm) | • | • |

**Table 4.2 Potential Projects and Management Actions for Sierra Valley [to be updated based on work group discussions]**

Overarching Comment: A comprehensive, system-wide assessment of all impacts and changes is needed in evaluating and implementing any PMA, to eliminate or minimize adverse impacts elsewhere.

| Title | Description | Near-Term Actions | Comments, Considerations, Unintended Consequences |
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| Aquifer characterization, pumping test | Coordinate with parties that have large capacity wells to conduct aquifer characterization studies throughout the Subbasin. | | • This can provide a better characterization of the aquifer, enhance evaluation of existing wells and as-needed provide recommendations for well replacement |
| Agricultural efficiency improvements | Various equipment and operational improvements designed to reduce overall water demand. | • Install soil moisture sensors<br>• Fix leaking irrigation pipes<br>• Convert to low-profile (near ground-level) sprinkler applicators, as appropriate<br>• Manage irrigation time of day~~ing~~ to reduce evaporative and wind drift losses<br>• Reduce use of end guns on center pivots<br>• Convert flood irrigation to sprinkler<br>• Convert wheel lines to center pivot systems<br>• ~~Line or pipe open ditches used to convey groundwater~~<br>• Line ditches and improve turnouts and field water distribution of groundwater (for flood irrigation) There may be modest amounts of unlined ditches. Perhaps a few hundred yards. It is very modest that needs to be explicitly stated. At a few locations there could be minor improvements in conveyance.<br>• These seem like no-brainers, what is the incentive for voluntary actions? Landowners would have to cover about half the cost for equip.<br>These actions would help, we have to start somewhere and the costs would not be that great. | • How common are some of these irrigation systems or issues? Tailored ~~recommendations~~ water conservation plans can be developed for, and adopted by, for specific ranches. Actions, that are not regional in scope, don't seem to qualify as PMAs for the GSP itself<br>• Support cost-share funding for improving irrigation efficiencies<br>• Ditch water and related seepage may produce benefits such as supply for near-surface groundwater and marshy areas; the lining of ditches should not occur unless ***thoroughly*** vetted<br>• Some support at a feasibility level: to be vetted further as possible opportunities. Level of costs, amount of benefit, specific actions and where funds might be available.<br>• Developing a list of menus and developing potential pilot projects.<br>• Any estimate on level of benefit? The sense is that there might be a 10% reduction in pumping. The end sprinklers are the least |

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| | | It has to work from the system perspective. There are economic and paperwork costs. How can the irrigators get more from the system they already have.<br>There are not many leaky pipes. There may leaks around the pivots or the well. Changing nozzle or pressure could make a difference. | efficient and would have to be removed. It could result in 1,000 AF across the valley per year. Tightening the system might reduce available sitting water. |
| Reoperation of, or adjustments to, surface water supplies | | • Modify surface water rights delivery from Frenchman Lake and Little Last Chance Creek for more efficient use of surface water<br>• Divert some Lake Davis water into Sierra Valley<br>• Gain benefit from winter spills from Frenchman Lake and winter runoff from other streams by winter diversions to pasture (icing)<br>• Evaluate feasibility of increasing capacity of Frenchman Lake (long-term project) | • Describe the proposed modification of surface rights delivery (what modification is proposed?) and what that process of modification would involve<br>• Does this include moving irrigation start date back from March 15 to March 1? |
| Off-stream storage | Develop off-stream surface water storage projects | • Increase on-farm storage of surface water (Smithneck and Little Last Chance)<br>• Store flood water for later use through catchments, tanks | • Be aware of potential off-stream ponding consequences, such as invasive species and possible stranding of important species |
| Drought mitigation & planning | Drought mitigation planning and identification of drought triggers tied to precipitation, runoff, and other factors. | • Develop Drought Mitigation Plan | • This is a critical consideration and should inform ALL of the PMAs. Who determines the drought status; how do tiers of drought trigger different PMAs and adjustments? |

| Title | Description | Near-Term Actions | Comments, Considerations, Unintended Consequences |
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| Water Conservation and Demand Management | Develop a water conservation program to reduce water demand to offset ground and surface water pumping. | • Develop voluntary water conservation agreements (e.g., only going to irrigate to crop ET, foregoing a fourth cutting, cutting back pumping by x %)<br>• Develop pilot program for implementation of water use ~~efficiency practices~~conservation agreement<br>• Develop an approach for limiting groundwater extractions, ~~consistent with the enabling act (SB 1319, Stats. 1980)~~ – that would be available if and as needed – to incrementally reduce the permitted pumping amount, allowing for transfers and flexibility ~~during drought conditions~~.<br>• Don't see how the deficit can be made up without some level of restrictions. At some point it will cost too much to pump groundwater. How will the allocations be done fairly? Not penalizing small landowners or those who have maximized efficiencies.<br>• Restrictions are the most economically painful to the valley. | • Voluntary water conservation agreements are burdensome and difficult to enforce.<br>• Water conservation programs<br>• Also for requests to reactivate inactive high-capacity wells<br>• How to respond to requests to drill new high-capacity wells outside of the restricted area.<br>• Will the District have confidence in the model, and updates – how much will it costs to run a model simulation of what might happen? This would be one of the best uses of the model – it won't produce exact numbers. Will give a sense of impact to the Valley.<br>• A component of the implementation financial analysis is the cost of updating the model.<br>• The simplest and most difficult to implement.<br>• The Board understands there is a problem. This needs to be included, without it being figured out for the GSP.<br>• What is the amount to be "made up"?<br>• Other recommendations would provide context for why the Board might want to work on a contingency option (i.e., likely not to be enough) |
| Watershed Management and Restoration | Implement multi-benefit projects that enhance precipitation retention and infiltration (i.e., reducing runoff), reduce fuel loads, and support ecosystem services such as reducing peak flood flows and enhancing summer baseflows | • Watershed management<br>• Upland management (forest / meadow restoration, road improvements or removal, soil decompaction)<br>• Enhance wetlands and meadows to better retain water in GDEs<br>• Planning study with pilot program | • Look at using data from Grismer and Hogan (Tahoe Basin) to determine benefits vs costs, and where, how, etc. of precipitation capture, retention and infiltration<br>• Multi-benefit projects (recharge, soil water reservoir, erosion management, carbon capture, fuels mgmt., increasing forage |

| Title | Description | Near-Term Actions | Comments, Considerations, Unintended Consequences |
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| | | • Compacted soils hold 5-10% water, 40% for healthy soils; deep groundwater recharge happens on the margins (from water held in the upper watershed) Residence timeframes.<br>• Are there studies looking at the increased in recharge? Yes, but there are challenges at a watershed scale.<br>• NRCS: Clover Valley and Perazzo Meadows (off Webber Lake) – involves ponding, diverts water going downstream. These were restoration projects for meadows. Didn't seem to work with ponding but rather filling in the stream.<br>• Thinning is another consideration. Benefits aren't huge (about 1 – 3 %) | functions) can leverage multiple funding sources<br>• Implementation partners include the USFS, with less cost to the GSA. The results can be quantified. Restoring old roads to single track trails (mtn. bike trails) which contributes to the local economy. There is funding for multi-benefit projects.<br>• Forest roads – if they run off into the roads, it gets retained. Where it crosses roads, it gets diverted.<br>• |
| Voluntary Managed Land Repurposing | This includes a wide range of voluntary activities that make dedicated, managed changes to land use (including crop type) on specific parcels in an effort to reduce consumptive water use in the Subbasin | • Support alternative crop conversion (e.g., alfalfa to grain) There are limits to what can be grown. Early freezes affect what is planted in the fall. Alfalfa will survive the early freezes. Most of the producers use grain as part of their alfalfa production cycle.<br>• Develop terms contracts through a Conservation Reserve Program (need more details) this would involve marginal lands – might be a benefit to wildlife. This is for dryland cultivated land. Would not generally be applicable, raising more concerns than benefit.<br>• Develop crop rotation program<br>• Develop irrigated margin reduction<br>• Conservation easements and tax considerations. Mason Valley and Sierra Valley. Easements also protect landscapes from development. Ag lands and tax base re: Williamson Act. | • Crop conversions should be considered as appropriate and feasible<br>• Is this the NRCS Conservation Reserve Program that takes agricultural lands out of production?<br>• Evaluate impacts to rural economy<br>• What is the incentive for voluntary actions? It would be useful to have a list of potential lower water usage crops that could be planted IF water levels continue to drop. Further we need to know how much less water those crops use (such as hemp, or others.)<br>• Land sales to conservation organizations reduces tax base Conservation agreements might be an option – there are broader implications than just water. |

| Title | Description | Near-Term Actions | Comments, Considerations, Unintended Consequences |
|---|---|---|---|
| Groundwater Recharge | Develop aquifer recharge projects to store and augment water supply. | • Planning/GIS study on feasibility of Managed Aquifer Recharge in SV Subbasin<br>• Spreading Subbasins / flood agricultural fields<br>• Injection wells<br>• Distributed stormwater collection and MAR | • Pilot projects are likely needed to obtain approvals from the Water Board to quantify and describe excess flows that can be used as source water for groundwater recharge |

Follow up on fatal flaws.

Frenchman is part of DWR's State Water Projectt, with water rights. Built as an agricultural lake, now 40% agricultural. Might be able to contain an additional 2' of water. Lots lost in evaporation.

David, Antelope and Frenchman built because of recreation lake.