# Appendix A -
# Selected GSP Information Summaries
# By Hydrologic Region

# Appendix A1 -
# GSP Information Summaries for Sacramento River Hydrologic Region

**Table A-SV-1. Sacramento Valley Hydrologic Region GSP General Information**

| Name | Basin Status | Basin Priority | GSP Area (ac) | Plan Type | Approval Status | Author/Consultant | Model |
|---|---|---|---|---|---|---|---|
| Anderson | Not COD | Medium | 98,705 | Single | Approved | Jacobs | EAGSA model |
| Antelope | Not COD | High | 19,091 | Single | Incomplete | Luhdorff & Scalmanini | Numerical: Tehama IHM |
| Big Valley (127) | Not COD | Medium | 24,227 | Single | Approved | Luhdorff & Scalmanini, Stantec | Big Valley integrated Hydrologic Model (BVIHM); uses MODFLOW |
| Big Valley (95) | Not COD | Medium | 92,057 | Single | Incomplete | GEI, UCCE | Budget spreadsheet |
| Bowman | Not COD | Very Low | 122,532 | Single | In review | Luhdorff & Scalmanini | Numerical: Tehama IHM |
| Butte | Not COD | Medium | 265,500 | Single | Approved | Davids Engineering, Woodard & Curran, GEI | Butte Basin Groundwater Model, IWFM |
| Colusa | Not COD | High | 723,823 | Single | Incomplete | Davids Engineering, ERA, West Yost, Woodard & Curran, CSU Sacramento | C2VSimFG, Colusa IHM |
| Corning | Not COD | High | 207,335 | Single | Incomplete | Montgomery & Associates, Davids Engineering, CBI, Hydrolytics, Kearns & West, Westwater Research | C2VSimFG 1.0 |
| Enterprise | Not COD | Medium | 61,288 | Single | Approved | Jacobs | EAGSA, built from numerical model REDFEM |
| Los Molinos | Not COD | Medium | 99,414 | Single | Incomplete | Luhdorff & Scalmanini | Tehama IHM; Integrated SW & GW, SVSim. IWFM-2015 |
| North American | Not COD | High | 342,540 | Single | Approved | GEI | CoSANA - integrated model covering North American, South American and Cosumnes subbasins. IWFM 2015. |
| North Yuba | Not COD | Medium | 60,837 | Single | Approved | Woodard & Curran | Yuba Subbasin Groundwater Model, numerical gw and sw, IWFM, CalSim3, CVHM |
| Red Bluff | Not COD | Medium | 271,794 | Single | Incomplete | Luhdorff & Scalmanini | Tehama IHM - integrated gw and sw model, based on SVSim for Sac Valley |
| Sierra Valley | Not COD | Medium | 117,760 | Single | Approved | Larry Walker & Associates lead of large consultant team | Sierra Valley Hydrogeologic System Model developed by DS&A. Integrated model with 3 parts: Upper watershed model (PRMS); soil water budget model ad GW-SW model (MODFLOW). Note: different than model developed for Sierra Valley by UC Davis. |
| Name | Basin Status | Basin Priority | GSP Area | Plan Type | Approval Status | Author/Consultant | Model |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Solano | Not COD | Medium | 354,671 | Single | Approved | Luhdorff & Scalmanini | Solano IHM, Integrated GW and SW, based on SVSim, refined locally |
| South American | Not COD | High | 248,029 | Single | Approved | Larry Walker & Associates, Woodard & Curran, Kennedy Jenks, Stockholm Environment Institute, HDR | CoSANA numerical model for Cosumnes, S. American and N. American basins, using IWFM |
| South Yuba | Not COD | High | 109,020 | Single | Single | Woodard & Curran | Yuba Subbasin Groundwater Model, numerical, IWFM, CalSim3, CVHM |
| Sutter | Not COD | Medium | 285,803 | Single | Approved | Woodard & Curran | C2VSimFG-Sutter |
| Vina | Not COD | High | 184,917 | Single | Approved | Geosyntec | Butte Basin Groundwater Model, IWFM |
| Wyandotte Creek | Not COD | Medium | 59,382 | Single | Approved | Geosyntec | Butte Basin Groundwater Model, IWFM |
| Yolo | Not COD | High | 540,693 | Single | Approved | GEI | MODFLOW, IWFM, finite element numerical model using original Integrated Groundwater Surface-Water Model (IGSM) |

GSP = Groundwater Sustainability Plan

COD = Critically Overdrafted

**Table A-SV-2. Sacramento Valley Hydrologic Region Demand Reduction and Supply Augmentation Strategies**

| GSP Name | Existing (AFY) | | Planned (AFY) | | | |
|---|---|---|---|---|---|---|
| | Managed Recharge | Recycled Water | Recharge & Aquifer Storage and Recovery | Recycled Water | Fallowing | Pumping Restrictions |
| Anderson | There is no managed recharge in the subbasin. Recharge from unlined canals is estimated at 44,000 AFY. | None | None | None | None | None |
| Antelope | None | None | Several types planned as PMAs: multi-benefit recharge; direct groundwater recharge of stormwater and floodwater; rain-MAR; stormwater management improvements; levee setback and stream channel restoration. No specific locations, area, or amount provided. | General description of possibility of using tertiary treated water but no specific projects described. | Curtail and/or restrict groundwater extractions through a land fallowing program. Would be considered if other planned PMAs are insufficient to maintain sustainability. | Only considered if other PMAs are insufficient to reach sus yield. Curtail and/or restrict groundwater extractions through a groundwater extraction allocation program. |
| Big Valley (127) | None | None for land application or urban use. Some recycled water used for geothermal power production. | None. Investigating recharge locations; Tier 2 PMA only considered after Tier 1 PMAs. | None. Plans to expand recycled water capacity for power production. | None | None |
| Big Valley (95) | None | None | Researching and considering FloodMar or AgMAR on alfalfa/pasture grass. | None | None | None |
| Bowman | None | None | Multi-benefit recharge included as PMA developed for implementation, based on TNC guidelines, but no specific details about location or amount is given and is dependent on rainfall. | None | None | None |
| GSP Name | Existing (AFY) | | Planned (AFY) | | | |
| | Managed Recharge | Recycled Water | Recharge & Aquifer Storage and Recovery | Recycled Water | Fallowing | Pumping Restrictions |
| Butte | None | None | Multi-benefit recharge possible PMA in early planning stages. Estimated 100 ac would participate | None. Included only as an as needed PMA. | None | None |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | and benefit of 175 average annual AFY. | | | |
| Colusa | On-farm multi-benefit managed aquifer recharge and shorebird habitat program; Ongoing PMAs: Glenn-Colusa ID strategic winter water use for GW recharge and multiple benefits; Sycamore Marsh farm direct recharge project. | None | Colusa Subbasin multi-benefit GW recharge; Sycamore Slough GW recharge pilot projects. | None | None | None |
| Corning | None | None | California Olive Ranch GW Recharge Project (alternative project) - no estimate of benefit, feasibility analysis ongoing for use with 215 water; City of Corning Stormwater Recharge (conceptual); Recharge through unlined conveyance features (no estimate of expected benefit); groundwater recharge pond south of Corning (alternative project) - very small 2-4 AF; TNC multi-benefit recharge projects (alternative project); Thomes Creek flood water diversions to recharge (alternative project) | Recycled water use for crop irrigation (alternative project) - City of Corning permitted for 1.4M gpd effluent. | None | None |

| | **Existing (AFY)** | | **Planned (AFY)** | | | |
|---|---|---|---|---|---|---|
| **GSP Name** | **Managed Recharge** | **Recycled Water** | **Recharge & Aquifer Storage and Recovery** | **Recycled Water** | **Fallowing** | **Pumping Restrictions** |
| Los Molinos | None | None | Multi-benefit recharge programs - planned PMA - no specific description; possible use of Thomes Creek and Elder Creek Diversion for direct recharge. | None. Considered, but only conceptually. | None | None |
| Sierra Valley | None | None | GW recharge and MAR are Tier 2 PMAs, which are not prioritized. | Reuse is a Tier 1 management action that is ongoing. Considers | None | None |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | reuse of treated WW from Loyalton WWTP and former Loyalton Mill/Co-gen plant for crop irrigation. Will evaluate if additional opportunities for reuse exist. No specific estimated benefits. | | |
| Solano | None | None | Westside Streams Stormwater Capture Project (FloodMAR) - expect 1,200 ac with 2,100 AFY; Rain-MAR Demonstration Project with various suitable sites, sump and berm methods. All in Northwest Focus Area. Potential PMAs: City of Vacaville to investigated ASR. Various construction of private GW recharge basins, but not specified. Considering incentive-based recharge strategy for Flood MAR, Rain MAR and dedicated recharge basins. | Proposed City of Vacaville potable water offset of 2,830 AFY reused for landscape irrigation and industrial use. | None | None |

| | **Existing (AFY)** | | **Planned (AFY)** | | | |
|---|---|---|---|---|---|---|
| **GSP Name** | **Managed Recharge** | **Recycled Water** | **Recharge & Aquifer Storage and Recovery** | **Recycled Water** | **Fallowing** | **Pumping Restrictions** |
| South American | City of Roseville uses ASR; pilot program that conveys American River water through Folsom South Canal and discharges to the Cosumnes River at the canal crossing - anticipated to enhance recharge. | The Sacramento Regional County Sanitation District is the only recycled water purveyor - distribution is negligible and not included in water budget. | Near-term planned project: Omochumne-Hartness WD GW Recharge Project - IRWM grant in 2011 to RWA, off-season irrigation, up to 4K AFY diverted from Cosumnes River to 1,168-ac areas between Cosumnes River and Deer Creek, in future up to 6K AFY planned to be diverted. Investigating opportunities for ASR, surface spreading and constructed recharge basins (could used abandoned aggregate mining pits north and south of Jackson Highway); recharge potential along Cosumnes River. | Near-term planned project: Harvest Water will provide disinfected tertiary-treated recycled water for ag uses, delivering up to 50K AFY to irrigate 16K ac of ag and habitat conservation lands near Cosumnes River and Stone Lakes Wildlife Refuge, operational by 2025. Expected to raise GW levels up to 35 ft. within 15 yrs; expected to increase GW storage | None | None |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | volume by 245K AF within 10 yrs and 450K in 40 yrs. Supplemental Project: SAFCA Flood-MAR, Sac. Area Flood Control Agency modifications to the outlet works of the three largest non-federal dams in the American River Basin to create reservoir storage space for flood control when extreme atmospheric rivers are forecasted to occur in the American River Basin. Will safely contain flood with a 1 in 500 annual prob. of occurrence. | | |

| | **Existing (AFY)** | | **Planned (AFY)** | | | |
|---|---|---|---|---|---|---|
| **GSP Name** | **Managed Recharge** | **Recycled Water** | **Recharge & Aquifer Storage and Recovery** | **Recycled Water** | **Fallowing** | **Pumping Restrictions** |
| Sutter | None | None | Sutter Multi-benefit GW Recharge Project: planned and seeking grant funding; PMA to be implemented as needed: ASR. | None. PMA to be implemented as needed: Advanced treatment and water recycling. | None | None |
| Vina | None | None | FloodMAR, surface water supply and recharge (1,000 AFY/project), recharge from the Miocene Canal (2,000 AFY). | PMA expected benefit = 5,000 AFY. | Extend orchard replacement | None |
| Wyandotte Creek | None | None | FloodMAR. Conceptual PMA: ASR. | None | Conceptual PMA: extend orchard replacement | None |
| Yolo | ASR by City of Woodland; diverting Cache Creek into canal system, | City of Woodland WWTP - 0.5 MGD used as water source in model; City of Davis 33M GPY (to UCD) | Direct recharge and MAR planned - flood water and drain flows in Yolo Bypass, drain flows in Colusa Basin Drain, and over-application of irrigation Zamora area winter recharge from Cache Creek via China Slough (would need to rehabilitate China Slough); Hardwood Subdivision Recharge; Schaad Ranch/Buckeye Creek Recharge; new ASR well (City of | Woodland Recycled Water Utility Expansion Project Phases II and III; City of Davis Recycled Water Pump Station; City of Winters Recycled Water Utilization. | None | None |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Woodland); Madison Farmer Filed Stormwater Capture and GW Recharge; West Winters ASR; North of Winters 5,000-ac storm water retention pond; YCFC&WCD Winter Recharge; Rumsey and Guinda Ditch Winter Recharge; Dry well GW recharge on California Olive Ranch. | | | |

**Table A-SV-3. Sacramento Valley Hydrologic Region Historical Water Budget Data Collection Summary**

| GSP Identifiers | | | Land and Surface Water Budget Components (AFY) | | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSP ID | Name | Timeframe | Precipitation | Surface water supplies | Tail water return | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 83 | Anderson | 1999-2018 | 280,000 | 50,000 | ND | 73,000 | 160,000 | 111,000 | 247,000 | 128,000 | 309,000 | 156,000 | 23,000 | 0 |
| 134 | Antelope | 1990-2018 | 41,000 | 43,000 | ND | ND | 45,500 | 12,000 | 0 | 50,000 | 48,000 | 0 | 13,000 | 0 |
| 127 | Big Valley | 1988-2019 | 73,800 | 600 | ND | ND | 33,700 | 16,000 | 4,500 | 6,900 | 0 | 0 | 27,100 | 0 |
| 95 | Big Valley[1] | 1984-2018 | 137,300 | 75,800 | 5,000 | ND | 154,000 | 14,700 | 24,600 | 1 | 0 | 0 | 44,600 | 0 |
| 137 | Bowman | 1990-2018 | 290,000 | 81,000 | ND | ND | 174,700 | 52,600 | 43,000 | 0 | 0 | 88,000 | 9,100 | 0 |
| 98 | Butte | 2000-2018 | 501,000 | 1,926,800 | 21,600 | ND | 816,000 | 265,800 | 277,200 | 103,100 | 218,500 | 295,200 | 142,200 | 0 |
| 92 | Colusa | 1990-2015 | 1,210,000 | 11,747,000 | 96,000 | ND | 1,740,000 | 441,000 | 345,000 | 200,000 | 366,000 | 146,000 | 502,000 | 0 |
| 94 | Corning | 1974-2015 | 391,800 | 79,000 | ND | 214,900 | 328,600 | 161,200 | 51,100 | 99,800 | 84,200 | 84,800 | 135,900 | 0 |
| 82 | Enterprise | 1999-2018 | 199,000 | 42,000 | 0 | 28,000 | 97,000 | 70,000 | 161,000 | 84,000 | 265,000 | 30,000 | 21,000 | 0 |
| 139 | Los Molinos | 1990-2018 | 210,000 | 630,000 | ND | ND | 175,000 | 53,600 | 33,000 | 0 | 0 | 56,000 | 33,200 | 0 |
| 100 | North American | 2009-2018 | 551,000 | 307,800 | ND | ND | 791,900 | 177,500 | 151,000 | 54,600 | 44,400 | 10,500 | 296,400 | 0 |
| 53 | North Yuba | 1997-2017 | 112,200 | 183,500 | 26,000 | 241,100 | 178,600 | 36,200 | 36,500 | 31,100 | 28,800 | 17,800 | 57,600 | 0 |
| 140 | Red Bluff | 1990-2018 | 580,000 | 120,000 | ND | ND | 421,370 | 70,000 | 0 | 49,000 | 39,000 | 0 | 89,700 | 0 |
| 125 | Sierra Valley | 2001-2015 | 170,400 | 25,000 | ND | 33,900 | 21,800 | 16,100 | 7,400 | 3,700 | 21,800 | 0 | 9,100 | 0 |
| 117 | Solano | 1991-2017 | 580,000 | 28,000,000 | 7,900 | ND | 797,000 | 210,000 | 14,000 | 0 | 0 | 35,000 | 180,000 | 0 |
| 111 | South American | 2009-2018 | 399,000 | 131,700 | 500 | ND | 293,300 | 119,400 | 117,440 | 38,500 | 18,100 | 42,300 | 207,400 | 0 |
| 52 | South Yuba | 1997-2017 | 188,900 | 196,700 | 24,100 | 300,900 | 229,000 | 65,100 | 89,800 | 13,000 | 9,800 | 47,000 | 104,200 | 0 |
| 112 | Sutter | 1996-2015 | 455,000 | 572,000 | ND | ND | 604,000 | 189,000 | 179,000 | 88,000 | 224,000 | 100,000 | 139,000 | 0 |
| 86 | Vina | 2000-2018 | 400,900 | 493,800 | 2,600 | ND | 362,900 | 192,700 | 24,000 | 137,400 | 59,800 | 70,400 | 243,500 | 0 |
| 99 | Wyandotte Creek | 2000-2018 | 130,800 | 1,066,800 | 100 | ND | 87,100 | 70,700 | 34,000 | 24,900 | 36,300 | 26,000 | 47,100 | 0 |
| 96 | Yolo | 1971-2018 | 1,147,000 | 600,000 | 10,000 | 904,000 | 1,227,000 | 353,000 | 48,000 | 0 | 0 | 28,000 | 346,000 | 28,000 |

Notes: ND = No data. Groundwater recharge by surface water includes recharge from conveyance systems.

[1]The value of 1 for recharge by the subsurface was provided in the GSP.

**Table A-SV-3. Sacramento Valley Hydrologic Region Historical Water Budget Data Collection Summary**

| GSP Identifiers | | | Land and Surface Water Budget Components (AFY) | | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSP ID | Name | Timeframe | Precipitation | Surface water supplies | Tail water return | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 83 | Anderson | 1999-2018 | 280,000 | 50,000 | ND | 73,000 | 160,000 | 111,000 | 247,000 | 128,000 | 309,000 | 156,000 | 23,000 | 0 |
| 134 | Antelope | 1990-2018 | 41,000 | 43,000 | ND | ND | 45,500 | 12,000 | 0 | 50,000 | 48,000 | 0 | 13,000 | 0 |
| 127 | Big Valley | 1988-2019 | 73,800 | 600 | ND | ND | 33,700 | 16,000 | 4,500 | 6,900 | 0 | 0 | 27,100 | 0 |
| 95 | Big Valley[1] | 1984-2018 | 137,300 | 75,800 | 5,000 | ND | 154,000 | 14,700 | 24,600 | 1 | 0 | 0 | 44,600 | 0 |
| 137 | Bowman | 1990-2018 | 290,000 | 81,000 | ND | ND | 174,700 | 52,600 | 43,000 | 0 | 0 | 88,000 | 9,100 | 0 |
| 98 | Butte | 2000-2018 | 501,000 | 1,926,800 | 21,600 | ND | 816,000 | 265,800 | 277,200 | 103,100 | 218,500 | 295,200 | 142,200 | 0 |
| 92 | Colusa | 1990-2015 | 1,210,000 | 11,747,000 | 96,000 | ND | 1,740,000 | 441,000 | 345,000 | 200,000 | 366,000 | 146,000 | 502,000 | 0 |
| 94 | Corning | 1974-2015 | 391,800 | 79,000 | ND | 214,900 | 328,600 | 161,200 | 51,100 | 99,800 | 84,200 | 84,800 | 135,900 | 0 |
| 82 | Enterprise | 1999-2018 | 199,000 | 42,000 | 0 | 28,000 | 97,000 | 70,000 | 161,000 | 84,000 | 265,000 | 30,000 | 21,000 | 0 |
| 139 | Los Molinos | 1990-2018 | 210,000 | 630,000 | ND | ND | 175,000 | 53,600 | 33,000 | 0 | 0 | 56,000 | 33,200 | 0 |
| 100 | North American | 2009-2018 | 551,000 | 307,800 | ND | ND | 791,900 | 177,500 | 151,000 | 54,600 | 44,400 | 10,500 | 296,400 | 0 |
| 53 | North Yuba | 1997-2017 | 112,200 | 183,500 | 26,000 | 241,100 | 178,600 | 36,200 | 36,500 | 31,100 | 28,800 | 17,800 | 57,600 | 0 |
| 140 | Red Bluff | 1990-2018 | 580,000 | 120,000 | ND | ND | 421,370 | 70,000 | 0 | 49,000 | 39,000 | 0 | 89,700 | 0 |
| 125 | Sierra Valley | 2001-2015 | 170,400 | 25,000 | ND | 33,900 | 21,800 | 16,100 | 7,400 | 3,700 | 21,800 | 0 | 9,100 | 0 |
| 117 | Solano | 1991-2017 | 580,000 | 28,000,000 | 7,900 | ND | 797,000 | 210,000 | 14,000 | 0 | 0 | 35,000 | 180,000 | 0 |
| 111 | South American | 2009-2018 | 399,000 | 131,700 | 500 | ND | 293,300 | 119,400 | 117,440 | 38,500 | 18,100 | 42,300 | 207,400 | 0 |
| 52 | South Yuba | 1997-2017 | 188,900 | 196,700 | 24,100 | 300,900 | 229,000 | 65,100 | 89,800 | 13,000 | 9,800 | 47,000 | 104,200 | 0 |
| 112 | Sutter | 1996-2015 | 455,000 | 572,000 | ND | ND | 604,000 | 189,000 | 179,000 | 88,000 | 224,000 | 100,000 | 139,000 | 0 |
| 86 | Vina | 2000-2018 | 400,900 | 493,800 | 2,600 | ND | 362,900 | 192,700 | 24,000 | 137,400 | 59,800 | 70,400 | 243,500 | 0 |
| 99 | Wyandotte Creek | 2000-2018 | 130,800 | 1,066,800 | 100 | ND | 87,100 | 70,700 | 34,000 | 24,900 | 36,300 | 26,000 | 47,100 | 0 |
| 96 | Yolo | 1971-2018 | 1,147,000 | 600,000 | 10,000 | 904,000 | 1,227,000 | 353,000 | 48,000 | 0 | 0 | 28,000 | 346,000 | 28,000 |

Notes: ND = No data. Groundwater recharge by surface water includes recharge from conveyance systems.

[1]The value of 1 for recharge by the subsurface was provided in the GSP.

**Table A-SV-4. Sacramento Valley Hydrologic Region Current Water Budget Data Collection Summary**

| GSP Identifiers | | | Land and Surface Water Budget Components (AFY) | | | | Groundwater Recharge/Inflow (AFY) | | | | Groundwater Discharge/Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSP ID | Name | Timeframe | Precipitation | Surface water supplies | Tail water return | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 83 | Anderson | 2015-2018 | 321,000 | 50,000 | ND | 72,000 | 163,000 | 131,000 | 252,000 | 130,000 | 319,000 | 155,000 | 24,000 | 0 |
| 134 | Antelope | 2016-2018 | 42,000 | 43,000 | ND | ND | 47,790 | 11,000 | 0 | 37,000 | 38,000 | 0 | 17,000 | 0 |
| 127 | Big Valley | 2014-2019 | 75,700 | 400 | ND | ND | 32,100 | 15,300 | 5,100 | 6,600 | 0 | 0 | 28,600 | 0 |
| 95 | Big Valley[1] | 2019-2069 | 137,300 | 75,800 | 5,000 | ND | 154,000 | 14,700 | 24,600 | 1[2] | 0 | 0 | 44,600 | 0 |
| 137 | Bowman | 2016-2018 | 300,000 | 82,000 | ND | ND | 194,700 | 51,000 | 46,000 | 0 | 0 | 84,000 | 8,900 | 0 |
| 98 | Butte | 2015-2016 | 525,900 | 1,926,500 | 17,400 | ND | 822,700 | 268,000 | 355,400 | 110,700 | 154,800 | 417,700 | 162,800 | 0 |
| 92 | Colusa | 2013/2015 | 1,183,000 | 12,556,000 | 93,000 | ND | 1,790,000 | 416,000 | 379,000 | 203,000 | 349,000 | 149,000 | 499,000 | 0 |
| 94 | Corning | 2015/2018 | 389,500 | 46,200 | ND | 204,000 | 302,100 | 139,300 | 57,900 | 103,600 | 57,900 | 76,200 | 157,900 | 0 |
| 82 | Enterprise | 2015-2018 | 235,000 | 32,000 | 0 | 26,000 | 97,000 | 87,000 | 161,000 | 85,000 | 275,000 | 29,000 | 21,000 | 0 |
| 139 | Los Molinos | 2016-2018 | 230,000 | 820,000 | ND | ND | 170,200 | 51,000 | 64,000 | 0 | 0 | 71,000 | 27,800 | 0 |
| 100 | North American | 1970-2019 | 590,800 | 306,600 | ND | ND | 825,100 | 183,500 | 151,400 | 49,900 | 53,000 | 13,700 | 303,400 | 0 |
| 53 | North Yuba | 1997-2017 | 112,200 | 185,800 | 25,700 | 241,200 | 176,500 | 33,400 | 36,900 | 31,200 | 27,700 | 17,500 | 55,400 | 0 |
| 140 | Red Bluff | 2022-2072 | 590,000 | 120,000 | ND | ND | 441,660 | 65,000 | 0 | 58,000 | 21,000 | 0 | 98,700 | 0 |
| 125 | Sierra Valley | 2016-2020 | 257,500 | 30,300 | ND | 38,200 | 31,000 | 29,600 | 10,800 | 3,700 | 31,000 | 0 | 8,400 | 0 |
| 117 | Solano | 2014-2017 | 520,000 | 25,000,000 | 7,500 | ND | 796,000 | 160,000 | 69,000 | 0 | 0 | 55,000 | 170,000 | 0 |
| 111 | South American[1] | 1970-2019 | 411,100 | 138,700 | 600 | ND | 289,400 | 121,100 | 113,730 | 40,200 | 22,200 | 37,600 | 212,800 | 0 |
| 52 | South Yuba[1] | 1997-2017x3 | 188,900 | 213,200 | 25,700 | 307,600 | 227,300 | 61,700 | 88,700 | 11,900 | 10,100 | 48,700 | 94,400 | 0 |
| 112 | Sutter | 2013 | 417,000 | 629,000 | ND | ND | 627,000 | 203,000 | 166,000 | 83,000 | 212,000 | 104,000 | 155,000 | 0 |
| 86 | Vina | 2015-2016 | 421,700 | 533,300 | 1,900 | ND | 348,300 | 191,800 | 27,700 | 143,200 | 78,500 | 76,200 | 209,200 | 0 |
| 99 | Wyandotte Creek | 2015-2016 | 136,100 | 923,300 | 100 | ND | 82,500 | 69,600 | 37,400 | 22,500 | 32,000 | 26,700 | 43,100 | 0 |
| 96 | Yolo | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

Notes: ND = No data. Groundwater recharge from surface water includes recharge from conveyance systems.

[1]Current and projected conditions used same timeframe/baseline hydrology.

[2]This value has been verified and is provided in the GSP.

**Table A-SV-5. Sacramento Valley Hydrologic Region Projected Baseline Water Budget Data Collection Summary**

| GSP Information | | Water Budget Scenario | | Land and Surface Water Budget (AFY) | | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Name | Conditions | Timeframe | Precipitation | Surface water inflow | Tail water return | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 83 | Anderson | | 2019-2071 | 276,000 | 46,000 | ND | 65,000 | 137,000 | 119,000 | 242,000 | 127,000 | 308,000 | 155,000 | 27,000 | 0 |
| 134 | Antelope | Current land use | 2022-2072 | 43,000 | 43,000 | ND | ND | 47,200 | 11,000 | 0 | 42,000 | 38,000 | 0 | 16,000 | 0 |
| 134 | Antelope | Future land use | 2022-2072 | 43,000 | 43,000 | ND | ND | 46,820 | 11,000 | 0 | 33,000 | 28,000 | 0 | 15,000 | 0 |
| 127 | Big Valley | | 2020-2070 | 73,900 | 700 | ND | ND | 34,300 | 15,700 | 4,800 | 7,700 | 0 | 0 | 28,500 | 0 |
| 95 | Big Valley | | 2019-2069 | 143,700 | 77,048 | 5,072 | ND | 156,900 | 14,980 | 27,476 | 1 | 0 | 0 | 45,162 | 0 |
| 137 | Bowman | Current land use | 2022-2072 | 300,000 | 83,000 | ND | ND | 173,800 | 53,000 | 47,000 | 0 | 0 | 91,000 | 9,300 | 0 |
| 137 | Bowman | Future land use | 2022-2072 | 300,000 | 83,000 | ND | ND | 174,650 | 53,000 | 48,000 | 0 | 0 | 92,000 | 9,500 | 0 |
| 98 | Butte | | 2022-2072 | 525,900 | 1,931,200, | 18,300 | ND | 822,100 | 268,000 | 356,300 | 105,400 | 152,700 | 415,700 | 162,600 | 0 |
| 92 | Colusa | | 2016-2065 | 1,183,000 | 12,556,000 | 93,000 | ND | 1,790,000 | 415,000 | 379,000 | 203,000 | 349,000 | 149,000 | 499,000 | 0 |
| 94 | Corning | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 82 | Enterprise | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 139 | Los Molinos | Current land use | 2022-2072 | 220,000 | 650,000 | ND | ND | 170,500 | 51,800 | 55,300 | 0 | 0 | 86,000 | 28,300 | 0 |
| 139 | Los Molinos | Future land use | 2022-2072 | 220,000 | 650,000 | ND | ND | 170,300 | 51,000 | 59,000 | 0 | 0 | 89,000 | 27,000 | 0 |
| 100 | North American | | 50 yrs | 590,800 | 370,100 | ND | ND | 872,300 | 167,500 | 172,800 | 53,600 | 46,300 | 16,800 | 325,200 | 0 |
| 53 | North Yuba | | 50 yrs | 112,200 | 184,800 | 25,200 | 239,600 | 175,900 | 32,900 | 36,900 | 31,200 | 28,100 | 17,800 | 54,800 | 0 |
| 140 | Red Bluff | Current land use | 2022-2072 | 600,000 | 120,000 | ND | ND | 447,210 | 67,000 | 0 | 53,000 | 21,000 | 0 | 100,200 | 0 |
| 140 | Red Bluff | Future land use | 2022-2072 | 600,000 | 120,000 | ND | ND | 475,770 | 68,000 | 0 | 74,000 | 9,300 | 0 | 134,800 | 0 |
| 125 | Sierra Valley | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 117 | Solano | Current land use | 2022-2072 | 570,000 | 29,000,000 | 7,500 | ND | 795,000 | 210,000 | 27,000 | 0 | 0 | 74,000 | 170,000 | 0 |
| 117 | Solano | Future land use | 2022-2072 | 570,000 | 29,000,000 | 7,500 | ND | 795,000 | 210,000 | 32,000 | 0 | 0 | 69,000 | 170,000 | 0 |
| 111 | South American | | 50 yrs | 411,100 | 212,100 | 600 | ND | 322,700 | 122,200 | 125,930 | 44,900 | 20,100 | 39,000 | 234,200 | 0 |
| 52 | South Yuba | | 1997-2017x3 | 188,900 | 210,100 | 29,800 | 308,000 | 223,000 | 60,300 | 89,700 | 12,800 | 9,700 | 48,100 | 97,900 | 0 |
| 112 | Sutter | | 1996-2015x3 | 454,000 | 579,000 | ND | ND | 645,000 | 179,000 | 162,000 | 145,000 | 268,000 | 79,000 | 138,000 | 0 |
| 86 | Vina | | 2022-2072 | 421,700 | 532,000 | 1,900 | ND | 347,300 | 189,300 | 27,800 | 142,800 | 74,000 | 72,000 | 215,800 | 0 |
| 99 | Wyandotte Creek | | 2022-2072 | 136,100 | 923,400 | 100 | ND | 81,500 | 67,300 | 37,700 | 22,500 | 29,500 | 25,600 | 45,000 | 0 |
| 96 | Yolo | | 2030s-2070s | 1,147,000 | 618,000 | 10,000 | 888,000 | 1,274,000 | 308,000 | 62,000 | 0 | 0 | 40,000 | 320,000 | 16,000 |

Notes: ND=no data. Groundwater recharge from surface water includes recharge from conveyance systems.

**Table A-SV-6. Sacramento Valley Hydrologic Region Projected 2030 with Climate Change Water Budget Data Collection Summary**

| GSP Information | | Water Budget Scenario | | Land and Surface Water Budget (AFY) | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow (AFY) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Name | Conditions | Timeframe | Precipitation | Surface water inflow | Tail water return | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 134 | Antelope | Current land use | 2022-2073 | 44,720 | 44,720 | ND | ND | 49,088 | 12,000 | 0 | 31,000 | 38,000 | 0 | 17,000 | 0 |
| 134 | Antelope | Future land use | 2022-2072 | 44,720 | 44,720 | ND | ND | 48,693 | 11,000 | 0 | 31,000 | 27,000 | 0 | 16,000 | 0 |
| 127 | Big Valley | Wetter and warmer[1] | 2020-2070 | 94,400 | 700 | ND | ND | 36,200 | 19,400 | 1,400 | 9,200 | 0 | 0 | 30,100 | 0 |
| 137 | Bowman | Current land use | 2022-2072 | 320,000 | 92,000 | ND | ND | 180,000 | 51,000 | 48,000 | 0 | 10,000 | 89,000 | 9,800 | 0 |
| 98 | Butte | | 2022-2072 | 546,900 | 1,931,900 | 17,600 | ND | 836,500 | 269,700 | 361,000 | 105,700 | 137,200 | 411,300 | 189,400 | 0 |
| 92 | Colusa | | 2016-2065 | 1,198,000 | 12,597,000 | 92,000 | ND | 1,841,000 | 415,000 | 387,000 | 205,000 | 337,000 | 148,000 | 525,000 | 0 |
| 94 | Corning | | 2020-2070 | 400,000 | 46,200 | ND | 210,300 | 310,700 | 141,600 | 60,900 | 104,800 | 65,500 | 76,900 | 164,200 | 0 |
| 139 | Los Molinos | Current land use | 2022-2072 | 220,000 | 650,000 | ND | ND | 170,000 | 52,000 | 62,000 | 0 | 0 | 87,000 | 29,000 | 0 |
| 139 | Los Molinos | Future land use | 2022-2072 | 230,000 | 710,000 | ND | ND | 180,000 | 51,000 | 66,000 | 0 | 0 | 91,000 | 28,000 | 0 |
| 53 | North Yuba | | 50 yrs | 117,800 | 192,100 | 25,200 | 247,800 | 182,500 | 33,300 | 37,200 | 31,300 | 28,400 | 17,500 | 55,700 | 0 |
| 140 | Red Bluff | Current land use | 2022-2072 | 600,000 | 120,000 | ND | ND | 0 | 67,000 | 0 | 54,000 | 18,000 | 0 | 105,200 | 0 |
| 140 | Red Bluff | Future land use | 2022-2072 | 640,000 | 140,000 | ND | ND | 0 | 68,000 | 0 | 77,000 | 6,000 | 0 | 144,600 | 0 |
| 125 | Sierra Valley | | 2021-2070 | 207,900 | 30,600 | ND | 40,100 | 27,900 | 26,200 | 7,200 | 3,700 | 27,900 | 0 | 9,500 | 0 |
| 125 | Sierra Valley | Drier and extreme warming[1] | 2021-2070 | 217,700 | 29,800 | ND | 41,000 | 25,500 | 25,200 | 7,000 | 3,700 | 25,500 | 0 | 11,100 | 0 |
| 117 | Solano | Current land use | 2022-2072 | 610,000 | 29,000,000 | 7,500 | ND | 815,000 | 210,000 | 38,000 | 0 | 0 | 72,000 | 170,000 | 0 |
| 117 | Solano | Future land use | 2022-2072 | 610,000 | 29,000,000 | 7,500 | ND | 825,000 | 200,000 | 42,000 | 0 | 0 | 67,000 | 180,000 | 0 |
| 52 | South Yuba | | 1997-2017x3 | 198,300 | 221,600 | 30,000 | 320,600 | 230,300 | 60,900 | 90,800 | 12,800 | 9,900 | 48,400 | 99,000 | 0 |
| 86 | Vina | | 2022-2072 | 438,200 | 553,100 | 1,700 | ND | 358,200 | 194,500 | 27,800 | 144,600 | 72,000 | 70,700 | 225,900 | 0 |
| 99 | Wyandotte Creek | | 2022-2072 | 141,500 | 985,800 | 100 | ND | 84,100 | 69,900 | 38,500 | 22,100 | 28,500 | 27,600 | 46,600 | 0 |
| 96 | Yolo | | 2030s-2070s | 1,201,000 | 635,000 | 11,000 | 922,000 | 1,314,000 | 321,000 | 62,000 | 0 | 0 | 37,000 | 337,000 | 15,000 |
| 96 | Yolo | Drier and extreme warming[1] | 2030s-2070s | 1,530,000 | 657,000 | 11,000 | 931,000 | 1,326,000 | 424,000 | 43,000 | 0 | 29,000 | 79,000 | 325,000 | 24,000 |

Notes: ND=no data; Groundwater recharge from surface water includes recharge from conveyance systems.

Anderson, Big Valley (95), Enterprise, North American, South American, and Sutter GSPs did not include this scenario.

[1] Alternative condition to 2030 central tendency.

**Table A-SV-7. Sacramento Valley Hydrologic Region Projected 2070 with Climate Change Baseline Water Budget Data Collection Summary**

| GSP Information | | Water Budget Scenario | | Land and Surface Water Budget (AFY) | | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Name | Conditions | Timeframe | Precipitation | Surface water inflow | Tail water return | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 134 | Antelope | Current land use | 2022-2072 | 46,870 | 46,870 | ND | ND | 51,448 | 11,000 | 0 | 29,000 | 34,000 | 0 | 18,000 | 0 |
| 134 | Antelope | Future land use | 2022-2072 | 46,870 | 46,870 | ND | ND | 51,034 | 11,000 | 0 | 29,000 | 22,000 | 0 | 18,000 | 0 |
| 127 | Big Valley | Warmer and drier[1] | 2020-2070 | 75,100 | 700 | ND | ND | 35,500 | 16,100 | 5,200 | 7,700 | 0 | 0 | 29,300 | 0 |
| 95 | Big Valley | | 2019-2069 | 152,800 | 81,239 | 5,335 | ND | 165,800 | 15,802 | 30,515 | 1 | 0 | 0 | 47,500 | 0 |
| 137 | Bowman | | 2022-2072 | 320,000 | 92,000 | ND | ND | 180,000 | 51,000 | 49,000 | 0 | 0 | 90,000 | 9,900 | 0 |
| 98 | Butte | | 2022-2072 | 561,300 | 1,922,200 | 17,400 | ND | 862,800 | 269,600 | 363,200 | 104,200 | 123,500 | 405,000 | 210,500 | 0 |
| 92 | Colusa | | 2016-2065 | 1,258,000 | 12,715,000 | 90,000 | ND | 1,901,000 | 411,000 | 401,000 | 209,000 | 323,000 | 147,000 | 559,000 | 0 |
| 94 | Corning | | 2020-2070 | 413,700 | 46,300 | ND | 218,400 | 319,800 | 140,300 | 66,100 | 2,100 | 61,500 | 78,700 | 172,200 | 0 |
| 139 | Los Molinos | Current land use | 2022-2072 | 230,000 | 710,000 | ND | ND | 180,000 | 50,000 | 67,000 | 0 | 0 | 88,000 | 31,000 | 0 |
| 139 | Los Molinos | Future land use | 2022-2072 | 230,000 | 710,000 | ND | ND | 180,000 | 49,000 | 70,000 | 0 | 0 | 92,000 | 30,000 | 0 |
| 140 | Red Bluff | | 2022-2072 | 600,000 | 120,000 | ND | ND | ND | 64,000 | 0 | 56,000 | 12,000 | 0 | 115,500 | 0 |
| 125 | Sierra Valley | | 2021-2070 | 216,600 | 30,300 | ND | 40,400 | 28,300 | 27,500 | 5,900 | 3,700 | 28,300 | 0 | 10,000 | 0 |
| 125 | Sierra Valley | Wetter moderate warming[1] | 2021-2070 | 260,500 | 29,900 | ND | 38,700 | 35,700 | 36,100 | 4,700 | 3,700 | 35,700 | 0 | 8,800 | 0 |
| 117 | Solano | Current land use | 2022-2072 | 650,000 | 34,000,000 | 7,500 | ND | 846,000 | 200,000 | 51,000 | 0 | 0 | 68,000 | 180,000 | 0 |
| 117 | Solano | Future land use | 2022-2072 | 650,000 | 34,000,000 | 7,500 | ND | 856,000 | 190,000 | 55,000 | 0 | 0 | 62,000 | 190,000 | 0 |
| 112 | Sutter | | 1996-2015x3 | 480,000 | 578,000 | ND | ND | 690,000 | 174,000 | 174,000 | 152,000 | 263,000 | 79,000 | 157,000 | 0 |
| 86 | Vina | | 2022-2072 | 453,100 | 565,900 | 1,600 | ND | 371,400 | 196,800 | 27,400 | 145,500 | 66,600 | 67,800 | 238,000 | 0 |
| 99 | Wyandotte Creek | | 2022-2072 | 144,900 | 1,035,600 | 100 | ND | 86,500 | 70,700 | 39,300 | 22,200 | 26,600 | 29,900 | 48,700 | 0 |
| 96 | Yolo | | 2030s-2070s | 1,259,000 | 655,000 | 11,000 | 962,000 | 1,345,000 | 340,000 | 62,000 | 0 | 0 | 35,000 | 358,000 | 15,000 |
| 96 | Yolo | Wetter moderate warming[1] | 2030s-2070s | 1,530,000 | 657,000 | 11,000 | 931,000 | 1,326,000 | 424,000 | 43,000 | 0 | 29,000 | 79,000 | 325,000 | 24,000 |

Notes: ND=no data. [1]Alternative scenario to 2070 central tendency.

Anderson, Enterprise, North Yuba, South American and South Yuba did not model this scenario.

[1] This value has been verified and was provided in the GSP.

# Appendix A2 -
# GSP Information Summaries for
# San Joaquin River Hydrologic Region

**Table A-SJR-1. San Joaquin River Hydrologic Region GSP General Information**

| Name | Basin Status | Basin Priority | GSP Area (ac) | Plan Type | Approval Status | Author/Consultant | Model |
|---|---|---|---|---|---|---|---|
| Chowchilla | COD | High | 145,569 | Single | Inadequate | Davids Engineering, (Revised GSP), Luhdorff & Scalmanini (Revised GSP), ERA Economics, Stillwater Sciences, and California State University, Sacramento | Numerical, Integrated GW Flow Model MCSim based on C2VSim-FG. |
| Cosumnes | Not COD | Medium | 210,300 | Single | Approved | EKI | Numerical model for GW flow |
| Delta Mendota -Aliso | COD | High | 26,580 | Multi-plan | Inadequate | Provost & Pritchard | CVHM2 |
| Delta Mendota - Farmers | COD | High | 2,211 | Multi-plan | Inadequate | Luhdorff & Scalmanini | Numerical, MODFLOW-NWT |
| Delta Mendota - Fresno County | COD | High | 22,178 | Multi-plan | Inadequate | Luhdorff & Scalmanini | Numerical, MODFLOW-NWT |
| Delta Mendota - Grassland | COD | High | 104,212 | Multi-plan | Inadequate | Provost & Pritchard | Numerical, MODFLOW-NWT |
| Delta Mendota - North Central | COD | High | 315,887 | Multi-plan | Inadequate | Woodard & Curran, Provost & Pritchard | Central Valley Hydrologic Model 2 (CVHM2). Numerical flow model using MODFLOW-NWT |
| Delta Mendota -San Joaquin River Exchange Contractors | COD | High | 292,921 | Multi-plan | Inadequate | Luhdorff & Scalmanini | Numerical, MODFLOW-NWT |
| East Contra Costa | Not COD | Medium | 107,479 | Multi-plan | Approved | Luhdorff & Scalmanini | Numerical groundwater flow model. East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim). |
| Eastern San Joaquin | COD | High | 764,798 | Single | Approved | Woodard & Curran | ESJWRM. Eastern San Joaquin Water Resources Model |
| Madera – Gravelly Ford Water District | COD | High | 8,459 | Multi-plan | Approved | QK Engineering | Analytical water balance; overdraft calculated using specific yield and long-term average water level change over hydrologic base period. |
| Madera – Joint | COD | High | 325,067 | Multi-plan | Approved | Luhdorff & Scalmanini | MCSim based on C2VSim |

| Name | Basin Status | Basin Priority | GSP Area | Plan Type | Approval Status | Author/Consultant | Model |
|---|---|---|---|---|---|---|---|
| Madera – New Stone | COD | High | 4,181 | Multi-plan | Approved | Luhdorff & Scalmanini, Davids Engineering | Basin-wide numerical model |
| Madera – Root Creek Water District | COD | High | 9,631 | Multi-plan | Approved | Luhdorff & Scalmanini, Davids Engineering | Basin-wide numerical model. GSA-specific model. Some use of analytical model as well. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Merced | COD | High | 512,532 | Single | Approved | Woodard & Curran | Numerical integrated model, IWFM. Merced WRM (Water Resources Model) |
| Modesto | Not COD | High | 245,250 | Single | Incomplete | Todd Groundwater, Woodard & Curran | Numerical model adapted from C2VSimFG |
| Tracy | Not COD | Medium | 238,388 | Single | Approved | GEI | C2VSim-FG_v1.0 |
| Turlock | Not COD | High | 348,187 | Single | Incomplete | Todd Groundwater, Woodard & Curran | C2VSim-Turlock/Modesto |

GSP = Groundwater Sustainability Plan

COD = Critically Overdrafted

**Table A-SJR-2. San Joaquin River Hydrologic Region Demand Reduction and Supply Augmentation Strategies**

| | Existing (AFY) | | Planned (AFY) | | | |
|---|---|---|---|---|---|---|
| GSP Name | Managed Recharge | Recycled Water | Recharge & Aquifer Storage and Recovery (ASR) | Recycled Water | Fallowing | Pumping Restrictions |
| Chowchilla | 2 existing, 3,800 AF recharge in 2019. Recharge Basin (1,359 AFY). | None | Flood-MAR (5,836 AFY), Additional 1,000 ac of Recharge Basins (10,803 AFY), Madera County East Recharge (3,015 AFY), Madera County West Recharge Basins (27,953 AFY), SVMWC Recharge Basin (4,344 AFY), Eastside Bypass Flood Water / Redtop Joint Banking (TTWD Recharge Basins) (24,657 AFY). Total estimated benefit = 74,952 AFY. | None | Voluntary | County of Madera GSA: demand management program that will reduce demand by placing restriction on groundwater pumping. Total estimated benefit = 27,550 AFY. |
| Cosumnes | None | Harvest Water Program by Sacramento County Regional Sanitation District (now Sacramento Area Sewer District) recycled water project that will use 50,000 AFY for irrigating ag. | Omochumne-Hartnell WD (OHWD) Agricultural flood managed aquifer recharge (Flood-MAR). Cosumnes Groundwater Authority groundwater banking and sale, no estimate of benefit. | City of Galt recycled water project. Expected benefit of 300 AFY. | Voluntary (assuming 750 ac). Phase 1 benefit estimated at 2,700 AFY and Phase 2 benefit estimated at 6,300 AFY (full implementation). | None |
| Delta Mendota - Aliso | 230 ac of existing recharge basins (6,500 AFY) Chowchilla Bypass recharge facility, 80-ac, diverts 10,000 AF per wet year. | None | Cottonwood Creek Recharge Facility (2,500-10,000 AFY), Aliso Lateral as Linear Recharge Ponds, Recharge in Bypass, Recharge Water Outside of District, Groundwater Injection Wells, recharge amounts not provided. | None | Voluntary, unspecified benefit. | None. The (groundwater extraction) fee schedule would not be implemented provided that the district is able to achieve sustainability by other means. |
| Delta Mendota - Farmers | None | None | None | None | none | None. Pumping reduction plan has not been formally developed. |
| Delta Mendota - Fresno County | None | None | None | None | None | None |
| Delta Mendota - Grassland | North Grassland Water Conservation and Water Quality Control Project (NGWCWQCP). Floodwater Capture, recharge | North Valley Regional Recycled Water Program (NVRRWP). In 2018, the City of Modesto delivered about 14,700 acre-feet of recycled water through the Project facilities. | Flood Water Capture as future consideration; no estimate of benefit provided. | North Valley Regional Recycled Water Program for wetlands; 11,800 AFY. | None | None |

| | | | | | | |
|---|---|---|---|---|---|---|
| | amount not provided | | | | | |
| Delta Mendota - North Central | Orestimba Creek Recharge and Recovery Project (7,500 af/yr) | North Valley Regional Recycled Water Program (NVRRWP) – Modesto and Early Turlock Years. West Stanislaus Irrigation District Lateral 4-North Recapture and Recirculation Reservoir. | Little Salado Creek Groundwater Recharge and Flood Control Basin. Ortigalita Creek Groundwater Recharge and Recovery Project. Los Banos Creek Recharge and Recovery Project (200 AFY), City of Patterson Percolation Ponds for Stormwater Capture and Recharge (1,700 AFY), Little Salado Creek Groundwater Recharge and Flood Control Basin (489 AFY), Patterson Irrigation District Groundwater Bank and/or Flood-MAR (3,000 AFY), Ortigalita Creek Groundwater Recharge and Recovery Project (3,000 AFY). Total estimated benefit = 15,689 AFY. | Kaljian Drainwater Reuse Project (500 AFY). North Valley Regional Recycled Water Program for ag (30,000 AFY). Total estimated benefit = 30,500 AFY. | None | Revision to Tranquillity Irrigation District Lower Aquifer Pumping; lower aquifer pumping limits for minimizing subsidence. |
| Delta Mendota - San Joaquin River Exchange Contractors | Los Banos Creek Recharge and Recovery, Orestimba Creek Recharge and Recovery. | None | Los Banos Creek Recharge and Recovery Expansion (4,500 AFY), Orestimba Creek Recharge and Recovery Expansion (7,500 AFY), BB Limited Recharge and Recovery (1,500 AFY), Farmers Water District Recharge and Recovery (6,500 AFY). Total estimated benefit = 27,500 AFY. | None | None | Private well pumping for credits. |
| East Contra Costa | None | Ironhouse SD - 4,800 AFY; half for habitat and half released to SJV. Delta Diablo District - 9,000 AFY for cooling two power plants, and 50 AFY for City of Antioch. Recycled water supplies range 50 AFY to 500 AFY (less than 1 percent of total supply) from 2010 to 2019. | None | Diablo Water District Recycled Water up to 2,800 AFY; City of Brentwood up to 1,661 AFY more used citywide. | Potential PMA | None. Demand management program is considered "backstop" to other PMAs. At conceptual planning stage. Potentially includes allocation, allocation plus water market, land repurposing, and/or other financial incentives. |
| Eastern San Joaquin | Tracy Lake recharge project, Cal-Fed/Costa recharge project and Farmington recharge program. | NSJWCD Winery Recycled Water, 750 AFY. Recycled Water Transfer to Agriculture 5,193 AFY. SSJID Storm Water Reuse. 1,100 AFY. City of Escalon Wastewater Reuse 672 AFY. | Two planned projects are in-lieu. Potential, Not Planned: BNSF Railway Company Intermodal Facility Recharge Pond AF 1,000. South System Groundwater Banking with EBMUD AF 4,000. NSJWCD North System Modernization/ Lakso Recharge AF | None. Potential: White Slough Water Pollution Control facility expansion (115 AFY); recycled water transfer to ag from City of Manteca (5,193 AFY). | None | None |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | 2,600. Project 13: Manaserro Recharge Project AF 8,000. Tecklenburg Recharge Project AF 8,000.<br>Total estimated benefit = 47,000 AFY. Mobiling recharge opportunities - no estimated benefit. | | | |
| Madera – Gravelly Ford Water District | None | None | GFWD will develop recharge basins. Water will be diverted from Cottonwood Creek into basins where it will percolate into the deep aquifer. The size, location, and performance of the recharge basins depends on site-specific characteristics that are currently being assessed by GFWD. Possible 2,620 AFY. | None | None | None |
| Madera – Joint | Madera Irrigation District Recharge Basin Rehabilitation (5,029 AFY), Ellis Recharge Basin (243 AFY), Berry Recharge Basin (24 AFY), Allende Recharge Basin (1,045 AFY). | From dairies; no details | Madera Irrigation District Additional Recharge Basins (5,474 AFY by 2023; 21,894 AFY by 2040), Flood-MAR (1,686 AFY), Madera County Recharge of Millerton Flood Releases (7,059 AFY), Madera County Chowchilla Bypass Flood Water Recharge Basins (26,500 AFY). Total estimated benefit = 87,170 AFY. | None | Potential, voluntary or mandatory; incentivized through easement programs. | Demand management program may include allocations, water trading program, and easements to fund fallowing. Overall expected to decrease GW pumping by 90,000 AFY. |
| Madera – New Stone | None. Overdraft is minimal so recharge efforts assumed to offset. | None | In-lieu only, Chowchilla Bypass | None | Potential | None |
| Madera – Root Creek Water District | None | None | None (possible in-lieu only using holding contract). | None | None | None |
| Merced | Merced ID confirmed to have 2 intentional recharge facilities within GSP (near El Nido and Winton), but GSP does not document. | None | Planned Planada Groundwater Recharge Basin Pilot Project, Merquin County Water District Recharge Basin (no recharge estimates for either), LeGrand-Althone Water District Intertie and Recharge Project. No estimate of benefit. | None | None | None |
| Modesto | None | None | In-lieu - Waterford/Hickman Surface Water Pump Station and Storage Tank). | None | Voluntary Conservation and/or Land Fallowing | Groundwater Extraction and Surface Water Reporting Program. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tracy | None | City of Tracy ASR (3,000 AFY) | None (ASR - potential project for City of Tracy (3,000-16,000 AFY)). | None | None | No restrictions, but pumping planned to be reduced by 1,000 AFY from expanded BCID distribution facilities. |
| Turlock | None. | None | None. Several potentials noted: Dianne Storm Basin (22.5 AFY), Stanislaus State Stormwater Recharge (460 AFY), TID On-Farm Recharge Project (4,000 AFY), Agricultural Recharge Project (5,000 AFY), Mustang Creek Flood Control Recharge Project (600 AFY), Upland Pipeline Project (1,770 AFY). San Joaquin River Flood Diversions, La Grange Recharge Project, Additional TID Regulating Reservoirs, Recharge from TID Conveyance System, Rouse Lake Pipeline Project, Sand Creek Watershed Runoff Recharge, Diffused Stormwater Project, Dry Creek Watershed Recharge, Direct Recharge in Agricultural Areas. | None | Voluntary | Groundwater Allocation and Pumping Management Program. Groundwater Extraction Fee. Groundwater Pumping Credit Market and Trading Program. |

**Table A-SJR-3. San Joaquin River Hydrologic Region Historical Water Budget Data Collection Summary**

| GSP Identifiers | | | Land and Surface Water Budget Components (AFY) | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSP ID | Name | Timeframe | Precipitation | Surface water supplies | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 7 | Chowchilla | 2003-2012 | 15,500 | 10,000 | 85,800 | 70,700 | 28,800 | 44,600 | 21,300 | 0 | 11,100 | 85,800 | 0 |
| 12 | Cosumnes | 1989-2014 | 124,200 | 374,400 | 89,700 | 350,900 | 125,400 | 63,100 | 47,300 | 0 | 0 | 264,900 | 0 |
| 106 | Delta Mendota -Aliso | 1999-2014 | 315,200 | 34,000 | ND | 239,700 | 104,700 | 33,800 | 4,700 | 16,400 | 7,600 | 130,700 | 0 |
| 14 | Delta Mendota -Farmers | 2003-2013 | 1,860 | 121,520 | 125,360 | 4,660 | 3,678 | 3,470 | 4,260 | 0 | 2,520 | 7,020 | 0 |
| 20 | Delta Mendota -Fresno County | 2003-2012 | 18,600 | 1,041,500 | 529,450 | 23,300 | 29,000 | 0 | 51,818 | 0 | 65,000 | 17,500 | 0 |
| 38 | Delta Mendota -Grassland | 2003-2013 | 34,300 | 283,900 | 46,900 | 307,300 | 62,400 | 21,400 | 25,600 | 0 | 59,300 | 46,900 | 0 |
| 13 | Delta Mendota - North Central | 2003-2012 | 191,000 | 419,000 | ND | 615,000 | 58,000 | 0 | 78,000 | 0 | 96,000 | 108,000 | 30 |
| 15 | Delta Mendota - San Joaquin River Exchange Contractors | 2003-2012 | 34,300 | 283,900 | 404,900 | 307,300 | 83,300 | 0 | 25,600 | 0 | 59,300 | 46,900 | 0 |
| 120 | East Contra Costa | 1997-2018 | 127,417 | 151,823 | 198,278 | 235,474 | 90,069 | 38,262 | 3,236 | 0 | 8,500 | 46,455 | 74,833 |
| 47 | Eastern San Joaquin | 1996-2020 | 972,000 | 567,000 | 205,000 | 1,295,000 | 262,000 | 428,000 | 193,000 | 131,000 | 80,000 | 709,000 | 0 |
| 61 | Madera – Gravelly Ford Water District | 1989-2014 | 7,200 | 11,732 | ND | 18,100 | 6,900 | 6,200 | 5,200 | 0 | 4,100 | 15,900 | 0 |
| 21 | Madera – Joint | 1989-2014 | 298,500 | 425,800 | ND | 655,900 | 222,721 | 145,200 | 69,400 | 0 | 0 | 471,500 | 0 |
| 49 | Madera – New Stone | 2003-2012 | 3,300 | ND | 9,700 | 9,500 | 2,000 | 1,600 | 4,500 | 0 | 0 | 9,700 | 0 |
| 45 | Madera – Root Creek Water District | 1989-2014 | 8,400 | 4,800 | 24,800 | 24,900 | 5,400 | 0 | 17,200 | 0 | 11,000 | 20,000 | 0 |
| 9 | Merced | 2006-2015 | 506000 | 290000 | ND | 834000 | 316000 | 272000 | 75000 | 40000 | 92000 | 723000 | 0 |
| 85 | Modesto | 1991- 2015 | 27,100 | 290,000 | 513,000 | 487,000 | 272,000 | 89,000 | 80,000 | 100,000 | 73,000 | 311,000 | 0 |
| 122 | Tracy | 1974-2015 | ND | 148,000 | ND | ND | 173,537 | 110,007 | 100,608 | 103,997 | 109,868 | 167,378 | 0 |
| 110 | Turlock | 1991-2015 | 335,000 | 437,800 | 786,700 | 810,100 | 280,500 | 140,000 | 112,900 | 118,100 | 74,800 | 404,400 | 0 |

Notes: ND = No data. No values were provided for Tail Water Return. Groundwater recharge from surface water includes recharge from conveyance systems.

**Table A-SJR-4. San Joaquin River Hydrologic Region Current Water Budget Data Collection Summary**

| GSP Identifiers | | | Land and Surface Water Budget Components (AFY) | | | | Groundwater Recharge/Inflow (AFY) | | | | Groundwater Discharge/Outflow (AFY) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSP ID | Name | Timeframe | Precipitation | Surface water supplies | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 7 | Chowchilla | 1989-2014 | 124,300 | 374,400 | 89,300 | 398,000 | 123,000 | 62,100 | 0 | 0 | 0 | 307,600 | 0 |
| 12 | Cosumnes | 2015-2018 | 362,900 | 28,400 | ND | 239,500 | 104,700 | 38,100 | 5,300 | 16,300 | 6,000 | 133,100 | 0 |
| 106 | Delta Mendota -Aliso | 2003-2012 | 10,600 | ND | 103,471 | 76,000 | 36,300 | 44,500 | 21,300 | 0 | 0 | 103,271 | 11,100 |
| 14 | Delta Mendota -Farmers | 2013 | 1,100 | 160,000 | 163,100 | 3,200 | 3,700 | 3,700 | 9,900 | 0 | 6,600 | 10,500 | 0 |
| 20 | Delta Mendota -Fresno County | 2013 | 11,500 | 1,000,000 | 514,000 | 28,000 | 39,000 | 0 | 51,818 | 0 | 65,000 | 28,000 | 0 |
| 38 | Delta Mendota -Grassland | 2013 | 30,400 | 270,000 | 322,100 | 309,600 | 56,400 | 20,100 | 25,600 | 0 | 51,000 | 52,100 | 0 |
| 13 | Delta Mendota - North Central | 2013 | 149,000 | 413,000 | ND | 568,000 | 50,000 | 0 | 64,000 | 0 | 79,000 | 124,000 | 0 |
| 15 | Delta Mendota - San Joaquin River Exchange Contractors | 2013 | 30,400 | 270,000 | 521,000 | 309,600 | 76,500 | 0 | 25,600 | 0 | 51,000 | 52,100 | 0 |
| 120 | East Contra Costa | 2015 | 113,946 | 151,823 | 198,278 | 217,705 | 95,701 | 31,413 | 2,051 | 0 | 12,975 | 28,966 | 87,732 |
| 47 | Eastern San Joaquin | 1969-2018 | 984,000 | 493,000 | 204,000 | 1,449,000 | 272,000 | 475,000 | 212,000 | 109,000 | 47,000 | 851,000 | 0 |
| 61 | Madera – Gravelly Ford Water District | 2014 | 2,500 | ND | ND | 18,000 | 0 | 0 | 0 | 0 | 300 | 22,800 | 0 |
| 21 | Madera – Joint | 1989-2014 | 298,500 | 425,800 | ND | 715,800 | 225,500 | 144,900 | 0 | 0 | 0 | 533,100 | 0 |
| 49 | Madera – New Stone | 2017 | 3,600 | 270 | 9,670 | 9,800 | 2,500 | 1,600 | 4,500 | 0 | 0 | 9,400 | 0 |
| 45 | Madera – Root Creek Water District | 2015 | 9,100 | 6,300 | 25,000 | 25,400 | 6,300 | 0 | 17,200 | 0 | 11,000 | 19,000 | 0 |
| 9 | Merced | 2006-2015 | 506,000 | 290,000 | ND | 834,000 | 316,000 | 272,000 | 75,000 | 40,000 | 92,000 | 723,000 | 0 |
| 85 | Modesto | 2010 | 22,600 | 282,000 | 611,000 | 531,000 | 257,000 | 98,000 | 79,000 | 80,000 | 63,000 | 416,000 | 0 |
| 122 | Tracy | 2003-2013 | ND | ND | ND | ND | 178,805 | 123,275 | 105,141 | 96,702 | 120,006 | 178,281 | 0 |
| 110 | Turlock | 2010 | 278,800 | 448,600 | 810,100 | 807,000 | 261,000 | 154,800 | 118,500 | 93,300 | 65,400 | 414,300 | 0 |

Notes: ND=No data. No values were provided for Tail Water Return. Groundwater recharge from surface water includes recharge from conveyance systems.

**Table A-SJR-5. San Joaquin River Hydrologic Region Projected Baseline Water Budget Data Collection Summary**

| GSP Identifiers | | | Land and Surface Water Budget Components (AFY) | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSP ID | Name | Timeframe | Precipitation | Surface water supplies | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 7 | Chowchilla | 2040-2090 | 144,100 | 329,200 | 83,000 | 394,300 | 117,500 | 67,200 | 71,400 | 0 | 0 | 297,800 | 0 |
| 12 | Cosumnes | 50 yrs | 315,200 | 34,000 | ND | 239,700 | 108,000 | 35,200 | 5,500 | 17,900 | 4,200 | 256,600 | 0 |
| 106 | Delta Mendota - Aliso | 2014-2070 | 23,666 | 7,447 | 41,655 | 69,505 | 30,408 | 44,400 | 15,526 | 0 | 26,561 | 76,563 | 0 |
| 14 | Delta Mendota -Farmers | 2014-2070 | 1,811 | 215,830 | 200,840 | 1,740 | 5,600 | 3,930 | 5,156 | 0 | 2,121 | 11,789 | 0 |
| 20 | Delta Mendota -Fresno County | 2014-2070 | 17,849 | 899,474 | 458,452 | 32,787 | 41,316 | 0 | 0 | 0 | 0 | 17,781 | 0 |
| 38 | Delta Mendota -Grassland | 2014-2070 | 94,256 | 275,095 | 45,467 | 298,380 | 72,135 | 11,969 | 26,389 | 0 | 57,007 | 52,037 | 0 |
| 13 | Delta Mendota - North Central | 2014-2070 | 246,000 | 422,000 | 0 | 620,000 | 83,000 | 0 | 86,000 | 0 | 94,000 | 138,000 | 11,000 |
| 15 | Delta Mendota - San Joaquin River Exchange Contractors | 2014-2070 | 94,256 | 275,095 | 423,211 | 298,380 | 84,104 | 0 | 26,389 | 0 | 57,007 | 52,037 | 0 |
| 120 | East Contra Costa | 2019-2068 | 131,086 | 144,779 | 192,419 | 231,298 | 95,701 | 31,413 | 2,051 | 0 | 12,975 | 28,966 | 87,732 |
| 47 | Eastern San Joaquin | 1969-2020 | 985,000 | 528,000 | ND | 1,340,000 | 282,000 | 451,000 | 202,000 | 108,000 | 91,000 | 751,000 | 0 |
| 61 | Madera – Gravelly Ford Water District | 50 yrs | 7,200 | 13,800 | ND | 18,000 | 0 | 1,200 | 0 | 0 | 4,100 | 14,100 | 0 |
| 21 | Madera – Joint | 2040-2090 | 346,100 | 374,200 | ND | 704,800 | 217,100 | 162,000 | 108,200 | 0 | 0 | 548,000 | 0 |
| 49 | Madera – New Stone | 2040 | 3,600 | 2,600 | 12,300 | 8,600 | 2,000 | 1,600 | 4,500 | 0 | 0 | 7,000 | 0 |
| 45 | Madera – Root Creek Water District | 2040-2090 | 9,100 | 15,000 | 20,700 | 21,000 | 5,900 | 2,100 | 17,200 | 0 | 11,000 | 12,100 | 0 |
| 9 | Merced | 50 yrs | 506,000 | 274,000 | ND | 853,000 | 318,000 | 312,000 | 69,000 | 44,000 | 110,000 | 598,000 | 0 |
| 85 | Modesto | 50 yrs | 269,000 | 292,000 | 497,000 | 535,000 | 228,000 | 123,000 | 77,000 | 50,000 | 75,000 | 314,000 | 0 |
| 122 | Tracy | 2016-2065 | ND | ND | ND | ND | 180,334 | 139,714 | 107,290 | 93,446 | 129,538 | 199,549 | 0 |
| 110 | Turlock | 50 yrs | 340,600 | 439,500 | 777,800 | 834,100 | 252,700 | 194,800 | 110,300 | 71,000 | 80,300 | 414,100 | 0 |

Note: ND=No data. No values were provided for Tail Water Return. Groundwater recharge from surface water includes recharge from conveyance systems.

**NOTE: No GSPs in the San Joaquin River Hydrologic Region modeled CC 2030.**

**Table A-SJR-6. San Joaquin River Hydrologic Region Projected 2070 with Climate Change Water Budget Data Collection Summary**

| GSP Information | | Water Budget Scenario | | Land and Surface Water Budget Components | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Name | Conditions | Timeframe | Precipitation | Surface water inflow | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 12 | Cosumnes | CC 2070 | 50 yrs | 315,200 | 34,000 | ND | 239,700 | 101,500 | 37,900 | 5,100 | 16,100 | 1,100 | 168,400 | 0 |
| 12 | Cosumnes | CC 2070 DEW | 50 yrs | 315,200 | 34,000 | ND | 239,700 | 94,400 | 38,700 | 4,800 | 14,100 | 1,900 | 176,100 | 0 |
| 12 | Cosumnes | CC 2070 WMW | 50 yrs | 315,200 | 34,000 | ND | 239,700 | 120,300 | 36,700 | 6,800 | 20,800 | 8,100 | 262,200 | 0 |
| 120 | East Contra Costa | Future Land Use & Climate Change 2070 | 2019-2068 | 138,317 | 140,494 | 169,461 | 202,415 | 97,002 | 30,549 | 1,645 | 0 | 11,423 | 33,956 | 84,026 |
| 120 | East Contra Costa | Future Land Use, Climate Change 2070 & Sea Level Rise | 2019-2068 | 138,317 | 140,494 | 169,461 | 201,734 | 97,054 | 31,263 | 1,645 | 0 | 11,432 | 33,952 | 81,068 |
| 47 | Eastern San Joaquin | CC 2070 | 1969-2020 | 1,082,000 | 528,000 | 216,000 | 1,416,000 | 286,000 | 483,000 | 217,000 | 100,000 | 91,000 | 833,000 | 0 |
| 122 | Tracy | CC 2070 | 2016-2065 | ND | ND | ND | ND | 176,342 | 147,357 | 107,543 | 85,610 | 123,251 | 221,393 | 0 |

Note: Chowchilla, Delta Mendota (all GSPs), Madera (all GSPs), Merced, Modesto, and Turlock did not model this scenario. No values were provided for Tail Water Return. Groundwater recharge from surface water includes recharge from conveyance systems.

DEW – Drier with extreme warming

WMW – Wetter with moderate warming

# Appendix A3 -
# GSP Information Summaries for
# Tulare Lake Hydrologic Region

**Table A-TL-1. Tulare Lake Hydrologic Region GSP General Information**

| Name | Basin Status | Basin Priority | GSP Area (ac) | Plan Type | Approval Status | Author/Consultant | Model |
|---|---|---|---|---|---|---|---|
| Castac Lake Valley | Not COD | Very Low | 3,563 | Single | In Review | EKI | Analytical for historical and numerical - Castac Basin Groundwater Flow Model (CMGFM) for historical and projected |
| Kaweah - East Kaweah | COD | High | 117,257 | Multi-plan | Inadequate | Provost & Pritchard, Montgomery & Associates | Numerical, MODFLOW - Kaweah Subbasin Hydrologic Model (KSHM) |
| Kaweah - Greater Kaweah | COD | High | 219,696 | Multi-plan | Inadequate | 2020: GEI Consultants GSI Water Solutions 2022 Revisions: Provost & Pritchard Montgomery & Associates | Numerical model, MODFLOW - Kaweah Subbasin Hydrologic Model (KSHM) |
| Kaweah - Mid-Kaweah | COD | High | 104,122 | Multi-plan | Inadequate | 2020: GEI Consultants GSI Water Solutions 2022 Revisions: Provost & Pritchard Montgomery & Associates | Numerical model, MODFLOW - Kaweah Subbasin Hydrologic Model (KSHM) |
| Kern Co. - Buena Vista | COD | High | 51,048 | Multi-plan | Inadequate | GEI Consultants | C2VSim and analytical |
| Kern Co. - Henry Miller WD | COD | High | 26,058 | Multi-plan | Inadequate | Luhdorff & Scalmanini | C2VSIM |
| Kern Co. Kern River | COD | High | 232,489 | Multi-plan | Inadequate | Todd Groundwater | C2VSimFG-Kern numerical model, analytical, and "electronic subtraction of annual groundwater elevation contour maps". |
| Kern Co. Olcese | COD | High | 3,201 | Multi-plan | Inadequate | EKI Environment & Water | Combined approach utilizing numerical groundwater flow model (C2VSim-FG) and analytical approach |
| Kern Co. KGA | COD | High | 1,254,969 | Multi-plan | Inadequate | Todd Groundwater | C2VSimFG-Kern |
| Kern Co. - South of Kern River | COD | High | 214,499 | Multi-plan | Inadequate | EKI Environment & Water, Inc | C2VSimFG-Kern |
| Kings - Central Kings | COD | High | 160,667 | Multi-plan | Approved | Provost & Pritchard | Analytical |
| Kings - James | COD | High | 29,025 | Multi-plan | Approved | Todd Groundwater Ken Schmidt Provost & Pritchard | Analytical |
| **Name** | **Basin Status** | **Basin Priority** | **GSP Area** | **Plan Type** | **Approval Status** | **Author/Consultant** | **Model** |
| Kings - Kings River East | COD | High | 191,347 | Multi-plan | Approved | 4 Creeks | Analytical |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Kings - McMullin Area | COD | High | 120,557 | Multi-plan | Approved | Provost & Pritchard | Analytical |
| Kings - North Fork Kings | COD | High | 168,308 | Multi-plan | Approved | Ken Schmidt, Provost & Pritchard | Analytical |
| Kings - North Kings | COD | High | 310,763 | Multi-plan | Approved | Provost & Pritchard | Analytical |
| Kings - South Kings | COD | High | 160,667 | Multi-plan | Approved | Peters Engineering, Provost & Pritchard, Yamabe & Horn | Analytical |
| Pleasant Valley | Not COD | Medium | 48,196 | Single | Incomplete | Provost & Pritchard, KDSA | Analytical |
| Tulare Lake | COD | High | 535,872 | Single | Inadequate | Geosyntec | Tulare Lake Subbasin Hydrologic Model - MODFLOW |
| Tule - Alpaugh | COD | High | 14,376 | Multi-plan | Inadequate | Jacobs | Numerical; based on TH&Co 2020 groundwater flow model for Tule Subbasin & CalSim-II Model |
| Tule - Delano-Earlimart ID | COD | High | 64,758 | Multi-plan | Inadequate | 4Creeks | Numerical; based on TH&Co 2020 groundwater flow model for Tule Subbasin & CalSim-II Model |
| Tule - Eastern Tule | COD | High | 160,833 | Multi-plan | Inadequate | 4Creeks<br>R.L. Schafer<br>BSK Associates | Numerical; based on TH&Co 2020 groundwater flow model for Tule Subbasin & CalSim-II Model |
| Tule - Lower Tule River ID | COD | High | 105,307 | Multi-plan | Inadequate | 4Creeks | Numerical; TH&Co 2020 groundwater flow model for Tule Subbasin<br>& CalSim-II Model |
| Tule - Pixley ID | COD | High | 69,877 | Multi-plan | Inadequate | 4Creeks | Numerical; based on TH&Co 2020 groundwater flow model for Tule Subbasin & CalSim-II Model |
| Tule - Tri-County WA | COD | High | 61,683 | Multi-plan | Inadequate | Geosyntec | Numerical; based on TH&Co 2020 groundwater flow model for Tule Subbasin & CalSim-II Model |
| Westside | COD | High | 622,208 | Single | Approved | Luhdorff & Scalmanini | Westside Groundwater model, numerical, using USGS One-Water Hydrologic Flow Model 2.0. based on Farm Process (FMP) MODFLOW-2005 |
| White Wolf | Not COD | Medium | 107,546 | Single | Approved | EKI | White Wolf Groundwater Flow Model (WWGFM) numerical, MODFLOW-NWT |

Notes: GSP = Groundwater Sustainability Plan
COD = Critically Overdrafted

**Table A-TL-2. Tulare Lake Hydrologic Region Demand Reduction and Supply Augmentation Strategies**

| | Existing (AFY) | | Planned (AFY) | | | |
|---|---|---|---|---|---|---|
| GSP Name | Managed Recharge | Recycled Water | Recharge & Aquifer Storage and Recovery | Recycled Water | Fallowing | Pumping Restrictions |
| Castac Lake Valley | None | None | Aquifer Replenishment Project: estimated to add 70-100 AFY and up to 300 AFY certain years resulting in net increase of 30 AFY - would use imported SW from CA aqueduct. Cuddy Creek Bank Modifications Project for recharge in wet years. | Future Wastewater Reclamation Project: using WW from future TMV to maintain Castac Lake levels, would reduce demand for imported surface water. | None | None |
| Kaweah - East Kaweah | IID has 15 acres of recharge basins and 3 miles of creek used for recharge. | None | Lewis Creek Recharge (3,000 AFY), Cottonwood Creek Recharge (1,800 AFY), Yokohl Creek Recharge (1,800 AFY), Rancho de Kaweah Water Management, Recharge and Banking Project (9,000 AFY), Lindmore/Exeter Dry Wells (2,010 AFY), Lindsay Recharge Basin (150 AFY), Wutchumna Ditch Recharge (480 AFY) = 18,240 AFY total. | None | None | None |
| Kaweah - Greater Kaweah | Paregien Flood Control & Recharge Project (2,370 AFY) | None | Recharge basin improvement (1,600 AFY), New Recharge Basins (3,600 AFY), Kings River Floodwater Arrangement, Kings River Surplus water, On-Farm Recharge and Storage (1,900 AFY), Ketchum Flood Control & Recharge Project (300 AFY), Basin No. 4 Improvement Project (500 AFY), Peoples Recharge Expansion Project (300 AFY) Total estimated benefit = 21,370 AFY. | None | Planned fallowing program by KCWD & LIWD<br><br>WDs will develop program in their combined areas to lease 1,500 acres of ag land to fallow instead of irrigating a crop. Estimated benefit = 3,750 AFY. | Fee and incentive program. Estimated benefit not provided. |
| Kaweah - Mid-Kaweah | Cordeniz Recharge Basin (1,610 AFY), Okieville Recharge Basin (630 AFY) | None | Projects by Tulare ID, City of Tulare and City of Visalia. Total estimated benefit = 23,095 AFY. | None | None | None |
| Kern Co. - Buena Vista | Palms Groundwater and Banking and Recharge Project (25,000 AFY), Corn Camp Water Bank, McAllister Ranch Banking facilities | None | Direct recharge takes place through operation of BVWSD facilities including unlined irrigation canals, and dedicated groundwater recharge projects. Due to the nature of the BVGSA's soils and irrigation practices, deep percolation of applied irrigation water contributes little to aquifer recharge. Key recharge facilities within the BVGSA are presented in Figure 2-19 – Existing Recharge and Spreading Centers (Figure 2-19 – Refer to Figures Tab) = 25,000 AFY total. | None | 15K ac-ft or 12% of ETa; max 4K ac compensated. | Adaptive management alternative if other PMAs don't achieve sustainability. |
| Kern Co. - Henry Miller Water District GSA | Several ongoing recharge projects on permeable soils on Kern Fan. | None | GSA is a recharge participant in the Pioneer Project Banked Water Recovery. Project to optimize recovery. Expected benefit not provided. | None | None. Prior to SGMA, district tried to reduce permanent crop coverage in the area due to water supply and need for dry-year land fallowing; continued effort with the possibility of dry-year land fallowing as needed within the district. | None |

| | Existing (AFY) | | Planned (AFY) | | | |
|---|---|---|---|---|---|---|
| GSP Name | Managed Recharge | Recycled Water | Recharge & Aquifer Storage and Recovery | Recycled Water | Fallowing | Pumping Restrictions |
| Kern Co. KRGSA | Kern River water is used to recharge within Kern River channel. Unlined canals. Recharge basins and banking programs: Bakersfield 2800 Ac Project (13 recharge basins, capacity of>150K AFY - averaged | Recycled water is used for recharge. City of Bakersfield has >340 stormwater basins to capture and recharge (average 8,500 AFY). | Phase 1 Management Actions - phase 2 expansion of approximately 700 acres for construction of additional basins to increase recharge capacity as needed. | City of Bakersfield - increased use of recycled water within GSA from 2026 onward. Estimated benefit = 13,407 AFY. | Conversion to urban land. Expected benefit = 27,000 AFY. | None |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 37,606 AFY in 20-yr historical period), Berrenda Mesa spreading grounds (6 recharge basins, 20-yr average = 9,221 AFY), Kern Delta Water District groundwater banking facilities, stores up to 50K AFY with max of 250 AF. Note: water is banked within the subbasin for use outside the subbasin, and water banked outside the subbasin is used within the subbasin. | | | | | |
| Kern Co. Olcese | None (several projects in multi-GSA area). | None | None | None | None | None |
| Kern Co. KGA | On-Farm Recharge, RRID Recharge (5,000 AFY), Kimberlina Recharge Project (19,000 AFY), Stockdale East Groundwater Storage and Recovery Project (4,000 AFY), Recharge of Carrot Wash Water (300 AFY). | Secondary-treated municipal wastewater is from the North of the River Sanitary District is currently used for irrigation and infiltrated into groundwater within the Annex Area. The Taft WWTF currently produces undisinfected secondary effluent that is suitable for and applied to feed crops. | See note 5. | Irrigation with reclaimed water from Arvin and Bakersfield; Taft recycled water program; municipal ww from North of the River Sanitary District possible increase. Estimated benefit = 18,603 AFY. | Various programs including incentives for land conversion, voluntary land conversion, land acquisition, conversion of ag land to urban use, district fallowing program, rotational land fallowing program, reduction of irrigated acreage. Total estimated benefit = 31,693 AFY. | None |
| Kern Co. - South of Kern River | Have already begun developing new recharge basins, Recharge of Carrot Wash Water (300 AFY). Increase out of district banking operations (9,225 af/mo). | None | AEWSD Sunset Spreading Works (2,500 AFY), Private and Caltrans Basin Connections (275 AFY), On-Farm Recharge, Caliente Creek Rehabilitation Mitigation and Groundwater Recharge, On-Farm Recharge (2,000 AFY), In-district banking facilities (2,000 AFY), Conversion of Granite Quarry to Sycamore Reservoir (4,500 AFY) = 20,800 AFY total. | None | Not directly fallowing, but possible land conversion incentives to reduce demand.<br><br>Land Retirement program in Wheeler Ridge - would include the purchase and permanent fallowing of lands within the district. More of an adaptive management action in that it's a worst-case scenario action. | None |

| | Existing (AFY) | | Planned (AFY) | | | |
|---|---|---|---|---|---|---|
| **GSP Name** | **Managed Recharge** | **Recycled Water** | **Recharge & Aquifer Storage and Recovery** | **Recycled Water** | **Fallowing** | **Pumping Restrictions** |
| Kings - Central Kings | Natural recharge within streams/channels. Other recharge occurring within unlined canals, reservoirs, stormwater basins, recharge basins, and deep percolation via ag and landscape irrigation water. Not quantified. | 7,300 AFY<br><br>35% of city of Selma municipal water = effluent water sent to recharge basins. | Plans involve construction of ~2000 acres of recharge basins within the district, the 50k expected additional AFY is noted above. = 50,000 AFY total. | None | Planned | Planned |
| Kings - James | K-Basin Groundwater Recharge (1,125 AFY), Distribution System Recharge (2,400 AFY), Southwest Groundwater Banking (4,500 AFY), Fallow Land Recharge (500 AFY). | None | Basins 1 & 2 Storage and Recharge (520 AFY), Basin 3 Floodwater Capture and Recharge (180 AFY), Floodway Recharge and Spreading (1,000 AFY), City of San Joaquin Storm Water Pond Recharge (220 AFY), Carmichael Slough Recharge (468 AFY), James Main Canal Spreading (90 af/mo), Fresno Slough Recharge (27 af/mo), Mud Dam Spreading and recharge (540 af/mo), Distributed Recharge Basins (2,700 af/mo), James Ranch Recharge Basin (14,400 AFY). Total estimated benefit = 20,000 AFY total. | None | None | None (metering) |
| Kings – Kings River East | Primary sources of recharge include intentional recharge basins, no additional information. | None | Several projects with total estimated benefit = 57,800 AFY. | None | None | None |
| Kings – McMullin Area | See Note 4. | None | Fresno City Wastewater Treatment Plant Recharge Basins - FID Houghton Canal System (14,726 AFY) and Lower Dry Creek System (9,973 AFY), Southwest Groundwater Banking (2,625 AFY), Lassen Avenue Reverse Flow Recharge 93,000 AFY), James Bypass Surface Water Supply & Recharge Project (29,760 AFY), McMullin On-Farm Flood Capture Phase 2 and 3 (27,120 AFY), Houghton Wasteway Expansion Project (2,190 AFY), South | None | Planned; needed to reach sustainability, no details provided. | The GSA may consider a groundwater pumping restrictions management action encompassing policies related to the restriction of new groundwater exports, requiring new developments to prove sustainable water supply, pumping |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Sandridge Canal Water Supply & Recharge (4,800 AFY), Stinson North Canal Water Supply & Recharge Phase 2 (59,400 AFY), Stinson North Canal Water Supply and Recharge (39,670 AFY), Grantland Area Recharge (7,920 AFY), Upgradient Recharge Programs (15,360 AFY) = Total estimated benefit = 305,000 AFY. | | | restrictions during droughts, and moratorium on new production wells that are not replacement wells. |

| | Existing (AFY) | | Planned (AFY) | | | |
|---|---|---|---|---|---|---|
| **GSP Name** | **Managed Recharge** | **Recycled Water** | **Recharge & Aquifer Storage and Recovery** | **Recycled Water** | **Fallowing** | **Pumping Restrictions** |
| Kings – North Fork Kings | Basin 11 Improvement (1,420 AFY), Basin 11 Expansion (1,110 AFY) = 1,530 AFY total. | None | Laton Recharge Project (3,080 AFY), North Fork Regional Recharge Project (11,660 AFY), Zonneveld Pond Improvement Project (430 AFY), On-Farm Recharge (5,000 AFY), Cerini Recharge Project (6,500 AFY), Kamm Recharge Project (10,400 AFY), Terra Linda Recharge Project (1,560 AFY), Misc. Landowner Recharge Basins (4,180 AFY), Upgradient Recharge outside NFKGSA (4,500 AFY), Mussel Slough Recharge Project (4,730 AFY), Misc. Dry Well Recharge Systems (2,000 AFY), Laton North Phase 2 Recharge Project (3,080 AFY), Pires Recharge Project (550 AFY), North Fork Group Site 16 (130 AFY), North Fork Group Site 3 (320 AFY), North Fork Group Site 6 (150 AFY) Total estimated benefit = 65,380 AFY. | None | Fallowing would be implemented not GSA-wide but on the part of the individual landowner. No GSA-wide fallowing program. | "The GSA 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, moratorium on new production wells."<br><br>GW Allocation Management Actions: Notes possibility of utilizing a by-acre GW allocation approach in the future if needs require it. Would take into account water rights, DACs, community service districts and other components. |
| Kings – North Kings | Fresno Irrigation District Basin, Fresno Metropolitan Flood Control District Basin, City of Clovis Basin | None | Nielsen Recharge Facility (3,500 AFY), Biola Groundwater Recharge Project (150 AFY), Marion Recharge Basin Improvements (2,500 AFY), Lions Park Groundwater Recharge Project (195 AFY), Central Basin Recharge Project (2,592 AFY), Wagner Recharge Basin (2,300 AFY), Savory Pond Expansion (1,200 AFY), On-Farm Recharge Program (10,000 AFY), Ricchiuti Recharge Basin Project (150 AFY), Basin CF- Stormwater Recharge and Flood Protection Project (970 AFY), County of Fresno NKGSA Recharge Program (2,000 AFY) Estimated total benefit = 149,944. | City of Fresno dev. of tertiary tmt 5-MGD SW Reclamation Facility and 8-MGD SE Reclamation facility. Estimated benefit=13,367 AFY | None | None |
| Kings – South Kings | GSA does not have any dedicated recharge basins for diverting surface water. However, cities have ww treatment facilities that percolate effluent to recharge GW. SKGSA has approximately 31 ac of stormwater basins that may also act as dedicated recharge facilities in the future. | None | Numerous basins. Total benefit = 8,357<br><br>OD shared with Central Kings; several recharge projects all listed under potential projects but status description shows that some will start as soon as funding is acquired. | None | None | Pumping restrictions during droughts. Estimated benefit not provided. |
| Pleasant Valley | None | Small amount of treated WW from prison used for private ag irrigation. | Los Gatos Creek Gravel Pits Recharge Project (720 AFY), Zapato Chino Creek Instream Recharge Project (62.5 AFY), PV Water Banking Project (7,050 AFY). Potential: City of Coalinga WWTP Recharge, Los Gatos Creek in-Creek | None | Potential management action with incentives for growers | Plans to implement pumping allocations based on sustainable yield. P. 187. Refers to schedule, but not specified. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Recharge, Jacalitos Creek in0Creek Recharge, Flood-MAR, Intentional Recharge Basin, Dry Well Recharge. | | | Considering tiered costs for pumping exceedances. |

| GSP Name | Existing (AFY) | | Planned (AFY) | | | |
|---|---|---|---|---|---|---|
| | Managed Recharge | Recycled Water | Recharge & Aquifer Storage and Recovery | Recycled Water | Fallowing | Pumping Restrictions |
| Tulare Lake | See note 1. | There are a number of small to mid-sized wastewater treatment plants (WWTPs) throughout the Subbasin operated by, including but not limited to, various cities, municipalities, the Department of Defense, Native American facilities, and manufacturing plants. At most WWTPs, treated wastewater is discharged into seepage ponds, used as recycled water, or utilized for irrigation by local farmers. The ratio of WWTP seepage to re-use is not well documented and needs further investigation. | Mid-Kings River GSA - Rehab of existing recharge basins in Kings Co. WD (1,500 AFY); Cartrights Basin improvements, KCWD, Lakeside Irrig WD (650 AFY); recharge basin construction KCWD (44,444 AFY); South Fork Kings GSA - ASR (13,000 AFY); Kid-Kings Recharge basin (7,000 AFY) Total estimated benefit=181,344 AFY. | None | Mid-Kings River GSA - fallowing program (6,250 AFY); South Fork Kings GSA - Cropping/Fallowing program (13,300 AFY); El Rico GSA (15,000 AFY). Total estimated benefit = 19,250 AFY. | Demand reduction (undefined) in El Rico and Tri-County WA GSAs (15,000 AFY and undefined, respectively) Demand reduction may include SW delivery improvement, on-farm efficiency improvements, permanent or long-term fallowing and seasonal fallowing programs. |
| Tule - Alpaugh | None | None | None | None | 3100 ac-ft/yr | None |
| Tule - Delano-Earlimart ID | Existing in-district recharge/banking operations (4,535 AFY), existing out of district banking operations (1,727 AFY). | None | Increase in-district recharge/banking (6,151 AFY), increase out of district banking operations (recharge amount not provided). | None | None | No specifics provided. Only noted that they may be introduced, and if so, decisions will be based on best available data. |
| Tule - Eastern Tule | See note 2. | Increase of recycled water applied to ag. No details. Estimated benefit = 3,600 AFY | MAR and Banking (Expansion of Porterville Recharge Basins, Expansion of Irrigation District Recharge Basins, Development of Landowner and District Recharge Basins) recharge volumes not provided; estimated benefit = 17,867 AFY. | None | None | Pricing change - fee pumping. |
| Tule – Lower Tule River ID | See note 3. | None | Planned managed aquifer recharge and banking projects although recharge estimates not provided. District currently owns 4,516 ac of land for recharge and would like to develop additional district and landowner recharge basins. 1,900 AFY. | None | None | None |
| Tule - Pixley ID | Existing 940 ac of district recharge basins, recharge amount not provided; estimated 3,000 AFY | None | Managed Aquifer Recharge and Banking (Expansion of District recharge basins, development of landowner recharge basins), recharge amount not provided. | None | 20,000 ac. Estimated benefit = 73,700 AFY. | None |
| Tule - TCWA | None. Area, in general, not favorable for groundwater banking because of A-Clay and/or other fine-grained deposits. | None | Prosperity Farms Project (1,500 AFY). | None | Estimated benefit = 15,000 AFY. | None |

| GSP Name | Existing (AFY) | | Planned (AFY) | | | |
|---|---|---|---|---|---|---|
| | Managed Recharge | Recycled Water | Recharge & Aquifer Storage and Recovery | Recycled Water | Fallowing | Pumping Restrictions |
| Westside | Pasajero Ground Recharge Project - anticipated 10,800 AFY in wet year; 15 private ASR projects; 7 existing active or | None | Broadview ASR - expected 2,000 AFY in very wet years; 25 ASR, sublateral recharge and percolation projects have been approved - total recharge capacity of up to 600 AF/day. GW pilot credit program includes ASR - potentially for 12,300 AFY from 400 wells. | None | None | Allocation program will begin with the commencement of an 8 year transition period from 2022-2030(“transition period”) in which a uniform annual |

| | | | | | | |
|---|---|---|---|---|---|---|
| | approved basins totaling 1,804 ac. Others not documented in GSP, per Westside pers. Comm. | | | | | allocation is established at 1.3 AF per acre and then subsequently reduced each year by 0.1 AF until 2030. |
| WHITE WOLF | Grapevine Development (630 AFY). | TCWD recycled water. | WRMWSD Mettler Recharge Project (36,000 AFY) - built but not operational as of the GSP submittal, WRMWSD El Paso Creek Recharge Project (32,400 AFY). | If/when Grapevine is developed, all non-potable water demands will be met with treated recycled water. | None | Possible allocations. |

[1] Tulare Lake existing managed recharge: Kings County WD - intermittent intentional recharge operation in 25 basins totaling about 720 acres throughout the MKR GSA when water is available; operated a water bank on the Old Kings River channel since 2002. Approximately 73,600 AF of water has been recharged over this 17-year period via percolation through approximately 150 acres of ponds and approximately 48,500 AF have been recovered using five recovery wells since 2002. Kings River flood waters along the Old Kings River channel since the 1940s (referred to as Condition 8 water). Condition 8 water is surface water that naturally would have infiltrated along an approximately 7.75-mile reach of the Old Kings River channel during high river flow years had the river not been diverted for irrigation. Between 1990 and 2016, Condition 8 recharge has ranged from as little as 0 AF in most years and as much as 36,800 AF in flood years (1995) and averaged approximately 30,370 AFY in wet years. The Corcoran Irrigation District also owns and operates nine percolation basins totaling about 2,760 acres. Estimated percolation rates are about 0.25 ft/d. A review of aerial photographs suggests only one or two basins are typically utilized each year between March and September when surface water is available, percolating an estimated average of 23,500 AFY (Figure 3-43). During wet years, as much as 147,700 AF of water has been estimated to be percolated using these percolation basins. In the Chamberlain Ranch area (ER GSA), 640 acres has been utilized for percolation basins. In 2017, approximately 5,000 AF was recharged. Immediately adjacent to the eastern boundary of the ER GSA in the Tule Subbasin, there are recharge basins that are operated by ER GSA landowners. These recharge facilities are covered by a neighboring GSP.

[2] Eastern Tule existing managed recharge: Managed recharge water use is assigned to surface water specifically diverted to percolation ponds and banking facilities, and treated wastewater effluent that is recycled for groundwater recharge via percolation ponds. period of 1986/87-2016/17, an approximate average annual 14,600 acre-feet of groundwater was extracted for municipal purposes, of which an approximate annual average of 5,850 acre-feet was recycled and diverted to recharge basins where it either evapotranspiration, irrigated crops, or recharged the groundwater aquifer. Several groundwater recharge sites are maintained - recharge water from the Tule River, Deer Creek, Friant-Kern Canal, or from a treatment facility. City of Porterville currently maintains three primary recharge efforts: (1) percolation of treated wastewater effluent in six percolation ponds, (2) purchase and transfer local and imported surface water that is diverted into recharge basins, and (3) maintenance of ~25 stormwater detention basins that provide groundwater recharge. Estimated benefit = 5,800.

[3] Lower Tule River ID existing managed recharge: Several recharge ponds and groundwater recharge sites are maintained by the District. These sites generally recharge native surface water from the Tule River, and imported surface water from the FKC. Deer Creek Tule River Authority (DCTRA), a joint powers authority formed in 1994, has functioned to coordinate groundwater recharge efforts amongst several local water agencies, which includes the District. 10 recharge basins. Total 12,500 AFY.

[4]Fresno City Wastewater Treatment Plant Recharge Basins - FID Houghton Canal System (14,726 AFY) and Lower Dry Creek System (9,973 AFY), Southwest Groundwater Banking (2,625 AFY), Lassen Avenue Reverse Flow Recharge 93,000 AFY), James Bypass Surface Water Supply & Recharge Project (29,760 AFY), McMullin On-Farm Flood Capture Phase 2 and 3 (27,120 AFY), Houghton Wasteway Expansion Project (2,190 AFY), South Sandridge Canal Water Supply & Recharge (4,800 AFY), Stinson North Canal Water Supply & Recharge Phase 2 (59,400 AFY), Stinson North Cnal Water Supply and Recharge (39,670 AFY), Grantland Area Recharge (7,920 AFY), Upgradient Recharge Programs (15,360 AFY) = Total estimated benefit = 305,000 AFY

[5] Kern Co. Kern Groundwater Authority planned managed recharge: 212,078 AFY total estimated benefit: AEWSD Sunset Spreading Works(2,500 AFY), Caliente Creek Habitat Mitigation and Groundwater Recharge, Conversion of Granite Quary to Sycamore Reservoir (4,500 AFY), CWD Increase Groundwater Recharge and Banking Capacity (1,000 AFY), New Cawelo GSA Banking Partners (500 AFY), Out of Cawelo GSA Banking (2,550 AFY), NKWSD Banking Program Expansion (122,000 AFY), RRID Expanded Recharge (6,000 AFY), Bell Recharge Project (1,728 AFY), James Groundwater Storage and Recovery Project (3,000 AFY), Kern Fan Groundwater Storage Project (10,000 AFY), Ten Section Water Recharge Project (2,000 af/mo), SSJMUD In-District Spreading and Recovery Facility (2,800 AFY), SSJMUD Conversion of Dairy to Recharge Facility, SSJMUD On-Farm Recharge Activities, SWID On-Farm Groundwater Recharge, SWWD Enhanced Groundwater Recharge (20,000 AFY), Poso Creek MAR (1,200 AFY), Poso Spreading Grounds, Schuster Spreading Grounds, WRMWSD On-Farm Recharge (2,000 AFY), WRMWSD In-District Banking Facilities (2,000 AFY).

**Table A-TL-3a. Tulare Lake Hydrologic Region Historical Water Budget Data Collection Summary**

| GSP Identifiers | | | Land and Surface Water Budget Components (AFY) | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSP ID | GSP Name | Timeframe | Precipitation | Surface water inflow | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 67 | Castac Lake Valley | 1998-2017 | 3,410 | 1,090 | ND | ND | 2,040 | 0 | 1,390 | 570 | 2,070 | 1,530 | 0 |
| 58 | Kaweah - East Kaweah | 1981-2017 | ND | 99,200 | 249,900 | 1,700 | 67,600 | 10,900 | 62,500 | 0 | 12,900 | 153,900 | 0 |
| 30 | Kaweah - Greater Kaweah | 1997-2017 | 10 | 138,000 | 559,600 | 1,300 | 223,600 | 130,900 | 272,900 | 0 | 207,400 | 453,400 | 0 |
| 50 | Kaweah - Mid-Kaweah | 1997-2017 | 10 | 88,300 | 220,500 | 600 | 119,800 | 53,000 | 111,300 | 0 | 103,800 | 192,300 | 0 |
| 37 | Kern Co. - Henry Miller WD | 1995-2014 | 6,762 | 32,298 | ND | 35,803 | 6,908 | 17 | 0 | 0 | 0 | 7,220 | 0 |
| 54 | Kern Co. Kern River | 1995-2014 | ND | 327,786 | ND | ND | 71,527 | 248,355 | 0 | 0 | 0 | 321,871 | 0 |
| 44 | Kern Co. Olcese | 1995-2015; 1995-2014 | 1,008 | 655,460 | ND | 2,838 | 2,281 | 730 | 0 | 0 | 2,201 | 857 | 0 |
| 36 | Kern Co. KGA | 1995-2014 | ND | ND | ND | ND | 669,398 | 730,964 | 0 | 0 | 87,102 | 1,590,373 | 0 |
| 31 | Kings - James | 1997-2011 | 16,414 | 60,407 | ND | 68,562 | 4,603 | 19,191 | 9,087 | 0 | 22,141 | 15,501 | 0 |
| 23 | Kings - Kings River East | 1997-2011 | 199,300 | 252,300 | ND | 428,400 | 127,400 | 71,500 | 2,600 | 0 | 4,700 | 225,900 | 0 |
| 25 | Kings - North Fork Kings | ND | 116,600 | 175,300 | ND | 399,100 | 92,000 | 71,300 | 34,500 | 0 | 16,200 | 277,600 | 0 |
| 24 | Kings - North Kings | 1997-2011 | 304,900 | 507,000 | 852,400 | 555,200 | 213,500 | 227,800 | 0 | 0 | 122,000 | 345,400 | - |
| 26 | Kings – South/Central Kings | 1997-2011 | 141,600 | 281,900 | ND | 358,000 | 79,900 | 103,900 | 400 | 0 | 35,400 | 0 | 0 |
| 145 | Pleasant Valley | 1998-2010 | 28,200 | 6,200 | ND | 35,510 | 7,000 | 14,700 | 0 | 0 | 1,700 | 34,400 | 0 |
| 42 | Tulare Lake | 1990-2016 | 56,363 | 597,560 | ND | 1,018,558 | 142,093 | 177,934 | 118,312 | 0 | 136,525 | 386,272 | 0 |
| 48 | Tule - Alpaugh | 1987 - 2017 | 7,000 | 2,800 | ND | 30,200 | 6,700 | 800 | 46,000 | 0 | 26,000 | 27,200 | 0 |
| 63 | Tule - Delano-Earlimart ID | 1987 - 2017 | 38,000 | 111,900 | N/A | 166,000 | 13,300 | 26,700 | 46,000 | 0 | 66,000 | 55,700 | 0 |
| 43 | Tule - Eastern Tule | 1987 - 2017 | 129,000 | 221,000 | N/A | 357,050 | 53,300 | 59,900 | 92,000 | 0 | 67,000 | 206,600 | 0 |
| 56 | Tule - Lower Tule River ID | 1987 - 2017 | 64,000 | 122,200 | ND | 271,500 | 51,300 | 108,000 | 130,000 | 0 | 134,000 | 197,800 | 0 |
| 65 | Tule - Pixley ID | 1987 - 2017 | 39,000 | 25,600 | ND | 160,900 | 36,700 | 55,000 | 154,000 | 0 | 72,000 | 146,800 | 0 |
| 57 | Tule - Tri-County WA | 1987 - 2017 | 29,000 | 5,900 | ND | 78,100 | 14,400 | 1,800 | 124,000 | 0 | 71,000 | 73,000 | 0 |
| 8 | Westside | 1989-2015 | 389,000 | 841,000 | ND | 1,185,000 | 317,000 | 10,000 | 151,000 | 0 | 169,000 | 324,000 | 0 |
| 123 | White Wolf | 1995-2014 | 81,400 | 66,500 | ND | 142,400 | 47,800 | 8,700 | 100 | 0 | 8,900 | 43,900 | 0 |

Notes: ND = No data. No values were reported for Tail Water Return. Recharge from surface water includes recharge from conveyance systems.

Kern Co. – Buena Vista – Insufficient data; South of Kern River - Lands overlap other GSAs. See Table A-TL-4b for summary of Kern Subbasin change in groundwater storage for the historical scenario.

Kings McMullin – Multiple modeling methods and insufficient data to reconcile. See Table A-TL-3c for the Kings Subbasin water budget summary for the historical scenario.

**Table A-TL-3b. Change in Groundwater Storage for Water Budgets of Projected Scenarios in the Kern Subbasin**

| Scenario | C2VSimFG-Kern Model Results | Adjusted Model Results |
|---|---|---|
| | Change in Groundwater Storage (AFY) | |
| Historical | 277,114 | 277,114 |

**Table A-TL-3c. Summary of Current Water Budget for the Kings Subbasin in AFY**

| Description | Total | McMullin | North Fork Kings | North Kings | Central/South Kings | Kings River East | James ID |
|---|---|---|---|---|---|---|---|
| Total Supply | 3,547,400 | 379,500 | 616,200 | 1,167,200 | 614,700 | 677,500 | 92,300 |
| Consumptive Use Subtotal | 2,094,600 | 296,000 | 399,100 | 544,500 | 358,000 | 428,400 | 6,860 |
| Groundwater Recharge Subtotal | 1,362,500 | 239,800 | 202,300 | 460,900 | 216,100 | 210,400 | 33,000 |
| Nonrecoverable Subtotal | 631,200 | 31,900 | 65,500 | 325,000 | 110,400 | 76,300 | 2,210 |
| **Method 1** | | | | | | | |
| Estimated Annual Change in Groundwater Storage | -198,200 | -61,600 | -91,500 | -6,500 | -10,500 | -23,500 | -4,600 |
| Recharge | 1,362,500 | 239,800 | 202,300 | 460,900 | 216,100 | 210,400 | 33,000 |
| Pumping | 1,341,800 | 282,900 | 277,600 | 345,400 | 191,200 | 229,200 | 15,500 |
| Outflow | 200,400 | 0 | 16,200 | 122,000 | 35,400 | 4,700 | 22,100 |
| Other change in storage | 18,500 | 18,500 | 0 | 0 | 0 | 0 | 0 |
| **Method 2 – Calculated Annual Change in Groundwater Storage** | -134,000 | -18,000 | -59,000 | -24,000 | -17,000 | -11,000 | -5,000 |

Source: Kings Subbasin GSPs – Basin Setting Water Budgets

Notes: No units were provided with this table; assuming AFY.

**Table A-TL-4a. Tulare Lake Hydrologic Region Current Water Budget Data Collection Summary**

| GSP Identifiers | | | Land and Surface Water Budget Components (AFY) | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow (AFY) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSP ID | GSP Name | Timeframe | Precipitation | Surface water inflow | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping |
| 58 | Kaweah - East Kaweah | 1997-2017 | ND | 88,300 | ND | ND | 73,800 | 99,000 | 111,300 | 0 | 103,800 | 192,200 |
| 37 | Kern Co. - Henry Miller WD | 2015 | 2,757 | 29,329 | ND | 28,398 | 2,495 | 0 | 0 | 0 | 0 | 14,878 |
| 54 | Kern Co. Kern River | 2015 | ND | 437,780 | ND | ND | 61,792 | 101,312 | 0 | 0 | 0 | 401,177 |
| 31 | Kings - James | 2016-2017 | 16,414 | 59,891 | ND | 67,490 | 4,637 | 19,465 | 9,087 | 0 | 22,141 | 16,721 |
| 23 | Kings - Kings River East | 2017 WY | 199,300 | 252,300 | ND | 424,600 | 125,500 | 71,400 | 2,600 | 0 | 4,700 | 219,900 |
| 25 | Kings - North Fork Kings | 2017 | 116,600 | 175,300 | ND | 403,200 | 93,000 | 71,300 | 34,500 | 0 | 16,200 | 282,700 |
| 24 | Kings - North Kings | 2016-2017 | 304,900 | 507,300 | 795,500 | 504,200 | 202,500 | 227,300 | 0 | 0 | 122,000 | 288,200 |
| 26 | Kings - South Kings | 2014-2017 | 141,600 | 281,900 | ND | 350,300 | 79,400 | 103,900 | 400 | 0 | 35,400 | 0 |
| 145 | Pleasant Valley | 2020 | 28,200 | 10,600 | ND | 47,500 | 8,277 | 14,700 | 0 | 0 | 1,700 | 43,300 |
| 42 | Tulare Lake | 1998-2010 | 62,529 | 298,620 | ND | 1,018,558 | 145,617 | 189,742 | 114,532 | 0 | 138,827 | 365,350 |
| 48 | Tule - Alpaugh | 1987 - 2017 | 7,000 | 2,800 | ND | 30,200 | 6,700 | 800 | 46,000 | 0 | 26,000 | 27,200 |
| 63 | Tule - Delano-Earlimart ID | 1987 - 2017 | 38,000 | 111,900 | ND | 166,000 | 13,300 | 26,700 | 46,000 | 0 | 66,000 | 55,700 |
| 43 | Tule - Eastern Tule | 1987 - 2017 | 129,000 | 221,000 | ND | 357,050 | 53,300 | 59,900 | 92,000 | 0 | 67,000 | 206,600 |
| 56 | Tule - Lower Tule River ID | 2018 - 2070 | 65,000 | 100,500 | ND | 253,800 | 40,300 | 98,800 | 96,000 | 0 | 96,000 | 157,200 |
| 65 | Tule - Pixley ID | 2018 - 2070 | 39,000 | 31,800 | ND | 106,100 | 16,800 | 40,000 | 84,000 | 0 | 58,000 | 69,100 |
| 57 | Tule - Tri-County WA | 2018 - 2070 | 29,000 | 39,100 | ND | 75,800 | 5,800 | 8,800 | 103,000 | 0 | 89,000 | 33,300 |
| 8 | Westside | 2016 | 467,000 | 255,000 | ND | 1,081,000 | 186,000 | 0 | 239,000 | 0 | 175,000 | 558,000 |
| 123 | White Wolf | 2015-2019 | 84,500 | 46,800 | ND | 149,200 | 41,400 | 7,700 | 500 | 0 | 9,100 | 60,700 |

Notes: ND = no data. No values reported for Tail Water Return. Groundwater recharge from surface water includes recharge from conveyance systems. There were no data for subsurface drains for any GSP.

Castac Lake Valley – No data for this scenario.

Kaweah-Greater and Mid-Kaweah – No data for this scenario. See Table A-TL-4b for Kaweah Subbasin summary of the current water budget.

Kern Co. – Buena Vista - Insufficient data.

Kern Co. – Olcese – No data for this scenario.

Kern Co. – KGA – No data for this scenario.

Kern Co. – South of Kern River – Lands overlap other GSAs.

Kings – Central Kings was not used as the land overlaps South Kings and was included there.

Kings McMullin – Data was not used due to the methods not reconciling.

**Table A-TL-4b. Summary of Current Water Budget for the Kings Subbasin in AFY**

| Description | Total | McMullin | North Fork Kings | North Kings | Central/South Kings | Kings River East | James ID |
|---|---|---|---|---|---|---|---|
| Total Supply | 3,490,400 | 389,400 | 621,300 | 11,110,300 | 604,900 | 671,500 | 93,000 |
| Consumptive Use Subtotal | 2,043,000 | 303,800 | 403,200 | 493,600 | 350,300 | 424,600 | 67,500 |
| Groundwater Recharge Subtotal | 1,352,000 | 241,900 | 203,300 | 449,400 | 215,700 | 208,400 | 33,300 |
| Nonrecoverable Subtotal | 635,400 | 31,900 | 65,500 | 330,400 | 109,200 | 76,300 | 22,100 |
| **Method 1** | | | | | | | |
| Estimated Annual Change in Groundwater Storage | -119,400 | -69,400 | -63,100 | 39,200 | -1,100 | -19,500 | -5,500 |
| Recharge | 1,352,000 | 241,900 | 203,300 | 449,400 | 215,700 | 208,400 | 33,300 |
| Pumping | 1,285,000 | 292,800 | 282,700 | 288,200 | 181,400 | 223,200 | 16,700 |
| Outflow | 200,400 | 0 | 16,200 | 122,000 | 35,400 | 4,700 | 22,100 |
| Other change in storage | 14,000 | -18,500 | 32,500 | 0 | 0 | 0 | 0 |

Source: Kings Subbasin GSPs – Basin Setting Water Budgets

Notes: No units were provided with this table; assuming AFY.

**Table A-TL-5a. Tulare Lake Hydrologic Region Projected, Projected Climate Change 2030, and Projected 2070 Baseline Water Budget Data Collection Summary**

| GSP Identifiers | | Land and Surface Water Budget Components (AFY) | | | | | Groundwater Recharge/Inflow (AFY) | | | Groundwater Discharge/Outflow (AFY) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSP ID | Name | Timeframe | Precipitation | Surface water supplies | Applied water | ET | Deep percolation of irrigation and precipitation | Surface water | Subsurface | Surface water | Subsurface | Groundwater pumping | Subsurface drains |
| 67 | Castac Lake Valley | 50-yrs | ND | ND | ND | ND | 2,170 | 0 | 260 | 10 | 1,960 | 530 | 0 |
| 67 | Castac Lake Valley - CC 2030 | 50-yrs | ND | ND | ND | ND | 2,180 | 0 | 260 | 10 | 1,960 | 530 | 0 |
| 67 | Castac Lake Valley - CC 2070 | 50-yrs | ND | ND | ND | ND | 2,090 | 0 | 280 | 0 | 1,930 | 520 | 0 |
| 51 | Kern Co. - Buena Vista | 2030 | 20,600 | 10,070 | ND | 114,100 | ND | ND | ND | ND | ND | ND | ND |
| 51 | Kern Co. - Buena Vista - CC 2070 | 2070 | 21,100 | 9,642 | ND | 119200 | ND | ND | ND | ND | ND | ND | ND |
| 37 | Kern Co. - Henry Miller WD | 50-yrs | 3,290 | 27,482 | ND | 19,440 | ND | ND | ND | ND | ND | ND | ND |
| 37 | Kern Co. - Henry Miller WD - CC 2070 | 50-yrs | 3,290 | 25,681 | ND | 20,966 | ND | ND | ND | ND | ND | ND | ND |
| 44 | Kern Co. Olcese - CC 2070 | ND | 1,027 | 29 | ND | 2,287 | ND | ND | ND | ND | ND | ND | ND |
| 36 | Kern Co. KGA - CC 2030 | ND | ND | ND | ND | ND | 77,780 | 0 | 583,598 | 0 | 87,102 | 1,625,000 | 0 |
| 22 | Kings - Central Kings | 2040 | 145,900 | 281,900 | ND | 363,000 | 84,000 | 103,900 | 400 | 0 | 35,400 | 0 | 0 |
| 31 | Kings - James - CC 2040 | to 2040 | 16,414 | 66,669 | ND | 67,641 | 4,738 | 19,465 | 9,087 | 0 | 22,141 | 17,906 | 0 |
| 31 | Kings - James - CC 2070 | to 2070 | 16,263 | 66,292 | ND | 67,873 | 4,961 | 19,465 | 9087 | 0 | 22,141 | 19,191 | 0 |
| 23 | Kings - Kings River East | 2040 | 199,300 | 251,300 | ND | 435,000 | 130,100 | 66,500 | 2,600 | 0 | 4,700 | 236,400 | 0 |
| 28 | Kings - McMullin Area | 2040 | 92,700 | 1,900 | ND | 316,000 | 75,000 | 17,100 | 153,000 | 0 | 0 | 308,200 | 0 |
| 25 | Kings - North Fork Kings | ND | 116,600 | 175,300 | ND | 409,000 | 94,700 | 71,300 | 34,500 | 0 | 16,200 | 290,200 | 0 |
| 24 | Kings - North Kings | To 2040 | 305,900 | 510,356 | 922,556 | 560,400 | 261,700 | 234,500 | 0 | 0 | 122,000 | 412,200 | 0 |
| 26 | Kings - South Kings | to 2040 | 145,900 | 281,900 | ND | 363,000 | 84,000 | 103,900 | 400 | 0 | 35,400 | 0 | 0 |
| 145 | Pleasant Valley | 2020-2042 | 28,200 | 31,265 | ND | 50,200 | 9,560 | 14,700 | 0 | 0 | 1,700 | 23,336 | 0 |
| 63 | Tule - Delano-Earlimart ID | 2020 - 2070 | 38,000 | 119,300 | N/A | 151,900 | 8,100 | 25,800 | 26,000 | 0 | 42,000 | 28,900 | N/A |
| 43 | Tule - Eastern Tule | 2018 - 2070 | 128,000 | 273,700 | N/A | 303,150 | 41,100 | 73,900 | 59,000 | 0 | 56,000 | 113,000 | N/A |
| 56 | Tule - Lower Tule River ID | ND | ND | ND | ND | ND | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 65 | Tule - Pixley ID | 2018 - 2070 | 39,000 | 31,800 | ND | 106,100 | 16,800 | 40,000 | 84,000 | 0 | 58,000 | 69,100 | 0 |
| 8 | Westside | 2017-2020 | 404,000 | 726,000 | ND | 79,000 | 281,000 | 10,000 | 160,000 | 0 | 185,000 | 320,000 | ND |
| 8 | Westside - CC 2030 | 2017-2020 | 416,000 | 726,000 | ND | 79,000 | 281,000 | 10,000 | 160,000 | 0 | 183,000 | 313,000 | ND |
| 8 | Westside - CC 2070 | 2017-2020 | 423,000 | 523,000 | ND | 79,000 | 305,000 | 11,000 | 231,000 | 0 | 189,000 | 471,000 | ND |
| 123 | White Wolf | 2020-2072 | 81,400 | 66,500 | ND | 142,400 | 41,900 | 8,700 | 1,500 | 0 | 3,300 | 53,300 | 0 |
| 123 | White Wolf - CC 2030 | 2020-2072 | 81,400 | 66,500 | ND | 142,400 | 40,500 | 8,700 | 1,900 | 0 | 2,000 | 57,500 | 0 |
| 123 | White Wolf - CC 2070 | 2020-2072 | 81,400 | 66,500 | ND | 142,400 | 37,500 | 8,200 | 2,400 | 0 | 400 | 63,200 | 0 |

Note: No values were provided for Tail Water Return. Groundwater recharge from surface water includes recharge from conveyance systems.

Kaweah-East, Greater and Mid; Kern Co. – Kern River and South of Kern River; Tulare Lake, and Tule-Alpaugh did not have data for these scenarios. See Table A-TL-5b for Kaweah Subbasin summary of projected water budgets as provided in the Kaweah GSPs. See Table A-TL-5b for Kern Subbasin summary of projected water budgets as provided in the GSPs. See Table A-TL-5c for Kings Subbasin summary of projected water budgets as provided in the Kaweah GSPs

**Table A-TL-5b. Summary of Projected Water Balance under Baseline, 2030 and 2070 Conditions for the Kaweah Subbasin**

| | Annual Water Supply and Demand (TAFY) | | |
|---|---|---|---|
| | **Baseline** | **2030** | **2070** |
| **Changes in Primary Water Sources** | | | |
| Upstream Inflow into Kaweah Lake | 465 | 442 | 442 |
| Total CVP Friant-Kern Canal Diversions | 1,200 | 1,093 | 991 |
| Total Kings River Full Natural Flow | 1,751 | 1,733 | 1,731 |
| **Surface Water Supply in Kaweah** | | | |
| Rain Percolation (Cropland + non-ag) | 118 | 119 | 116 |
| Upstream Inflow Available for Kaweah | 365 | 347 | 347 |
| Imported Water CVP Friant-Kern Canal | 169 | 154 | 140 |
| Imported Water Kings River | 13 | 13 | 13 |
| Total Surface Supply in Kaweah | 672 | 625 | 603 |
| **Water Demand in Kaweah** | | | |
| Crop Water Demand | 1,004 | 1,036 | 1,086 |
| Municipal and Industrial Demand | 69 | 69 | 69 |
| Total Water Demand in Kaweah | 1,073 | 1,105 | 1,155 |
| Total Water Deficit in Kaweah | 408 | 472 | 539 |

Source: Table 37 in Kaweah Basin Setting Water Budget

**Table A-TL-5c. Change in Groundwater Storage for Water Budgets of Projected Scenarios in the Kern Subbasin**

| **Scenario** | **C2VSimFG-Kern Model Results** | **Adjusted Model Results** |
|---|---|---|
| | **Change in Groundwater Storage (AFY)** | |
| Projected Baseline | 324,326 | 324,326 |
| 2030 Climate Change (no PMAs) | 380,900 | 372,120 |
| 2070 Climate Change (no PMAs) | 489,828 | 472,336 |

**Table A-TL-5d. Summary of Projected Water Budget for the Kings Subbasin in AFY**

| **Description** | **Total** | **McMullin** | **North Fork Kings** | **North Kings** | **Central/South Kings** | **Kings River East** | **James ID** |
|---|---|---|---|---|---|---|---|
| Total Supply | 3,686,945 | 404,800 | 628,800 | 1,238,356 | 627,000 | 687,000 | 100,989 |
| Consumptive Use Subtotal | 2,139,841 | 297,500 | 409,000 | 547,000 | 365,000 | 435,000 | 67,641 |
| Groundwater Recharge Subtotal | 1,434,453 | 245,100 | 205,000 | 518,400 | 219,500 | 213,100 | 33,353 |
| Nonrecoverable Subtotal | 645,541 | 50,400 | 65,500 | 336,100 | 113,500 | 76,400 | 22,141 |
| **Method 1** | | | | | | | |
| Estimated Annual Change in Groundwater Storage | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Recharge | 1,434,453 | 245,100 | 205,000 | 518,400 | 219,500 | 213,100 | 33,353 |
| Pumping | 1,467,406 | 308,200 | 290,200 | 412,200 | 199,200 | 239,700 | 17,906 |
| Outflow | 200,441 | 0 | 16,200 | 122,000 | 35,400 | 4,700 | 22,141 |
| Other change in storage | 14,000 | -18,500 | 32,500 | 0 | 0 | 0 | 0 |

Source: Kings Subbasin GSPs – Basin Setting Water Budgets

Notes: No units were provided with this table; assuming AFY.