



## EXECUTIVE SUMMARY

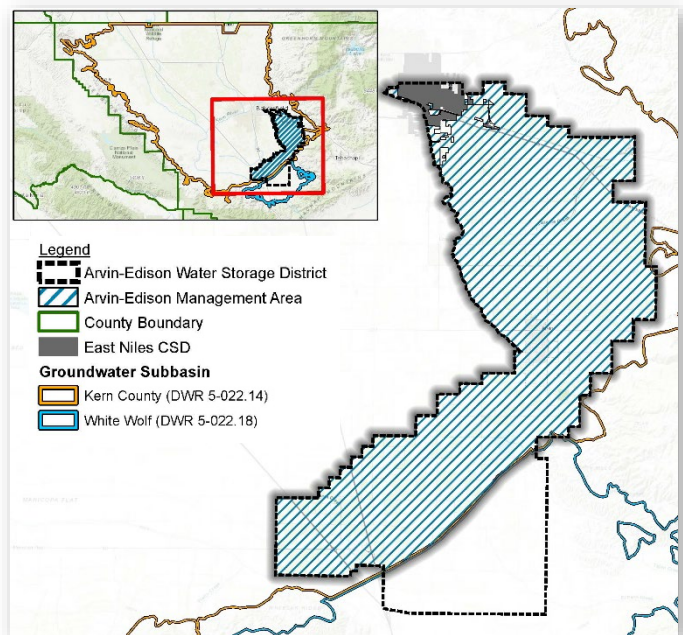
### ☑ 23 CCR § 354.4(a)

#### ES.1. Introduction

On 16 September 2014, the California legislature enacted the Sustainable Groundwater Management Act (SGMA) whose primary purpose is to achieve and/or maintain sustainability within the state’s high and medium priority groundwater basins. Key tenets of SGMA are the concept of local control, use of best available data and science, and active engagement and consideration of all beneficial uses and users of groundwater. As such, SGMA empowers certain local agencies to form Groundwater Sustainability Agencies (GSAs) whose purpose is to manage basins sustainably through the development and implementation of Groundwater Sustainability Plans (GSPs). Under SGMA, GSPs are required to contain certain elements, the most significant of which include: a Sustainability Goal; a description of the area covered by the GSP (“Plan Area”); a description of the Basin Setting, including hydrogeologic conceptual model, historical and current groundwater conditions, and a water budget; locally-defined sustainability criteria; monitoring networks and protocols for sustainability indicators; and a description of projects and/or management actions that will be implemented to achieve or maintain sustainability.

SGMA also requires a significant element of stakeholder outreach to ensure that all beneficial uses and users of groundwater are given the opportunity to provide input into the GSP development and implementation process.

This GSP Management Area Plan (“MA Plan”) has been jointly prepared by Arvin-Edison Water Storage District (AEWSD) and Arvin Community Services District (ACSD) and covers an area called the “Arvin-Edison Management Area” or “Management Area”. The Arvin-Edison Management Area underlies the AEWSD and ACSD service areas, excluding the area overlain by the East Niles Community Services District (within the Kern River GSA Management Area), and is located in the southern portion of the Kern County Subbasin of the San Joaquin Valley Groundwater Basin (Department of Water Resources [DWR] Basin No. 5-022.14; referred to herein as the “Kern Subbasin” or “basin”). The Kern Subbasin is one of 21 basins and subbasins identified by the DWR as being critically overdrafted, a designation that triggers an accelerated timetable for GSP development by 2020 and achievement of sustainability by 2040.



**Arvin-Edison Management Area**

The Kern Groundwater Authority (KGA) GSA, of which both AEWSD and ACSD are members, is the largest of the 11 GSAs that have been formed within the Kern Subbasin. The KGA GSA was formed in 2017 upon adoption of a Joint Powers Agreement by all members and is governed by a 16-member Board of Directors



that includes a representative of each member agency. The KGA GSA is preparing an “Umbrella GSP” that, in addition to providing content for the entire KGA GSA area, includes individual Management Area Plans that contain more detailed information for each member agency’s service area. Areas of the Kern Subbasin that are outside of the KGA GSA GSP are covered under five separate, coordinated GSPs that have been developed by other GSAs.

The KGA Umbrella GSP and this MA Plan for the Arvin-Edison Management Area have been developed to meet SGMA regulatory requirements<sup>1</sup> while reflecting local needs and preserving local control over water resources. Together, these documents provide a path to maintain the long-term sustainability of locally-managed groundwater resources now and into the future.

## ES.2. Sustainability Goal

The Sustainability Goal for the Arvin-Edison Management Area is to maintain an economically-viable groundwater resource that supports the current and future beneficial uses of groundwater (including municipal, agricultural, industrial, public supply, domestic, and environmental) by utilizing the area’s groundwater resources within the local sustainable yield. Long-term groundwater sustainability will be evaluated and maintained in compliance with locally-defined sustainability criteria. The Management Area will remain in compliance through the continued importation of surface water as well as implementation of projects and management actions to both increase water supplies and reduce demands within the Management Area. The District’s historical efforts to achieve a balanced and sustainable water supply for all lands, including to both the Surface Water Service Area and the Groundwater Service Area, and in an equitable manner, will continue under SGMA.

The local sustainability goal, above, is consistent with and in addition to the basin-wide sustainability goal being adopted by all GSAs in the Kern Subbasin.

## ES.3. Plan Area

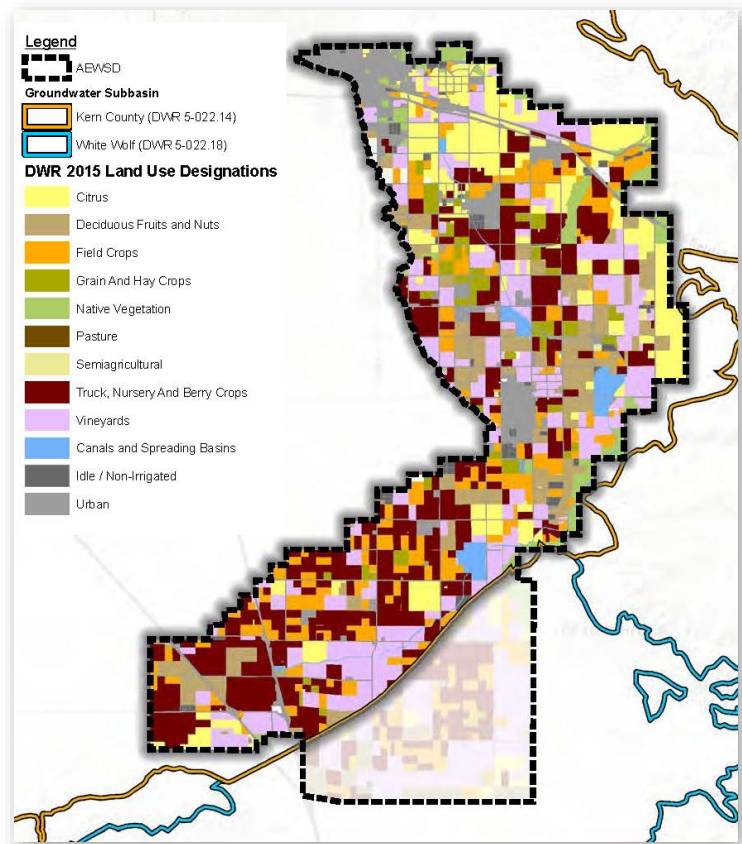
The Arvin-Edison Management Area covers 105,630 acres in the southeastern portion of the Kern Subbasin. Located at the southern end of the state’s Central Valley, the Kern Subbasin is the largest groundwater basin in the state and is bordered on the north by the Tulare Lake Subbasin, the Tule Subbasin, and the Kettleman Plain Subbasin and on the south by the White Wolf Subbasin. The Arvin-Edison Management Area (shown at right) is bordered on the north by the City of Bakersfield, on the west by Kern Delta Water District, on the southwest by Wheeler Ridge-Maricopa Water Storage District (WRMWSO) and on the east by Tejon-Castac Water District. To the northeast are unincorporated and “non-districted” lands, some of which have requested inclusion in this MA Plan and whose information is included in an Appendix hereto.

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<sup>1</sup> Regulations for GSP development are contained within Title 23 of the California Code of Regulations (CCR) Division 2 Chapter 1.5 Subchapter 2.



Most lands within the Management Area are developed for irrigated agriculture (see figure at right), which use a combination of imported surface water provided by AEWS and groundwater from AEWS and/or private wells as water supply. AEWS has a water supply contract with the Friant Division of the Central Valley Project and has invested considerably over the years in water management programs (additional supplies) and infrastructure to import, convey, recharge/recover, and distribute water to its customers and/or its partners. Through its conjunctive management of water supplies, AEWS has provided a substantial net benefit to groundwater conditions within its service area.<sup>2</sup>



2015 Land Use

The City of Arvin (population of approximately 21,000) is located in the west-central portion of the Management Area and is served with municipal and industrial (M&I) water supply by ACSD. The source for this M&I water supply is local groundwater. Several other small public water systems exist within the Management Area, most serving small populations of residents/customers or employees at various industrial/food processing facilities. Most of the Management Area is designated by the U.S. Census Bureau as Disadvantaged Community (DAC) or Severely Disadvantaged Community (SDAC). The City of Arvin is classified as an SDAC. The active participation of ACSD, whose customers are the residents of the City of Arvin, in the preparation of this MA Plan is just one key way in which the interests of DACs have been considered herein.

#### ES.4. Stakeholder Outreach Efforts

A Stakeholder Communication and Engagement Plan (SCEP) was completed to fulfill notice and communication requirements in order to achieve active engagement and input of all beneficial users of groundwater within the Arvin-Edison Management Area during the development and implementation of this MA Plan. The goal of the outreach efforts described in the SCEP is to encourage open and transparent engagement by diverse stakeholders. Public participation has been welcomed throughout the MA Plan development process. Venues for stakeholder engagement and input have included: Arvin-Edison Management Area SGMA Stakeholder Workshops, AEWS Board meetings, ACSD Board Meetings, KGA GSA Board Meetings, and KGA GSA-hosted Stakeholder Workshops and Meetings. Other outreach to

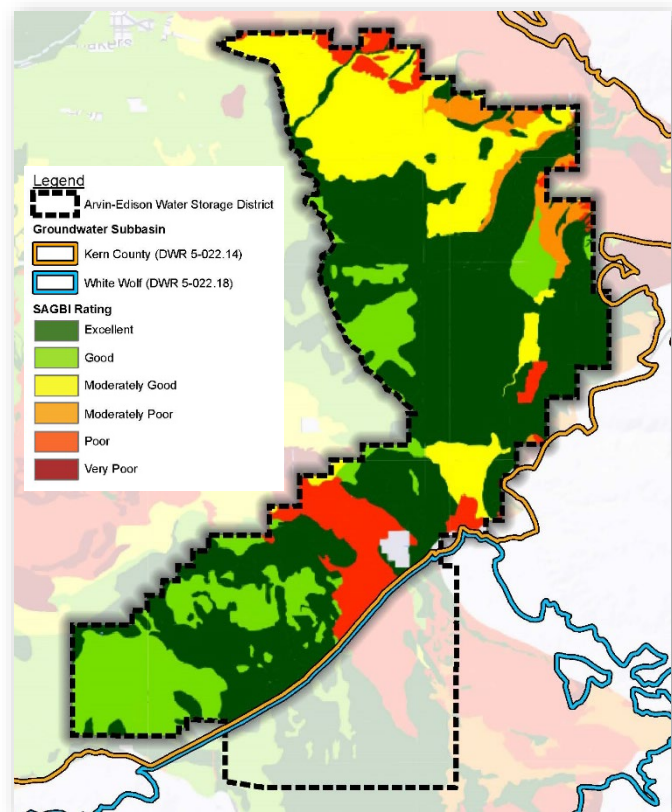
<sup>2</sup> A portion of the southern Arvin-Edison Management Area, known as the “AEWS/WRMWS overlap area”, receives imported water from Wheeler Ridge-Maricopa Water Storage District (WRMWS). WRMWS will continue to serve surface water to those lands within the overlap area that have contracts with and have historically received water from WRMWS.

Management Area stakeholders has included: distribution and collection of a Stakeholder Survey and an Agriculture-specific Stakeholder Survey, various letters from AEWS and KGA to landowners, and small group or one-on-one meetings between District staff and interested parties. AEWS and ACSD have also conducted extensive coordination with other KGA members and GSAs in the Kern Subbasin.

### ES.5. Hydrogeologic Conceptual Model

The Arvin-Edison Management Area is located in the southeastern portion of the Kern Subbasin, south of the Kern River. The Kern Subbasin occupies a large structural trough filled with thick sedimentary deposits of continental and marine origin. The local geology underlying the Management Area reflects its location near the edge of the basin, proximal to the Sierra Nevada Mountains which are a source for the sediments washed down into the basin (see figure below). The “principal aquifer” is defined in the Management Area as the aquifer materials encountered within the depths of production wells in the area and is comprised of fluvial and alluvial deposits of Miocene to Recent age. In the western portion of the Management Area, a regional clay layer (the “E”-Clay) is found at intermediate depths and creates more confined conditions in the underlying sediments. Aquifer conditions in general are more unconfined to semi-confined in the shallower and eastern areas and more confined in the deeper and western areas. Several faults are present in the Management Area, including the White Wolf Fault that forms the southern boundary of the Kern Subbasin and the Edison Fault near the northern boundary. Both faults appear to affect groundwater flow as evidenced by higher groundwater levels on their upgradient sides.

Due to its location near the edge of the basin, the Management Area has fairly coarse and permeable soils that are conducive to recharge from precipitation and excess applied water (see figure at right)<sup>3</sup>. AEWS operates four primary spreading basin facilities totaling approximately 1,350 acres to take advantage of these favorable recharge conditions. Over 2.2 million acre-feet have been recharged in these spreading basins since 1966.



**Soil Agricultural Banking Index (SAGBI)  
 Recharge Potential**

<sup>3</sup> Irrigation practices are generally highly efficient within the Arvin-Edison Management area; however, recharge of applied water includes some irrigation inefficiency as well as water applied for leaching purposes and other non-consumptive operational uses.

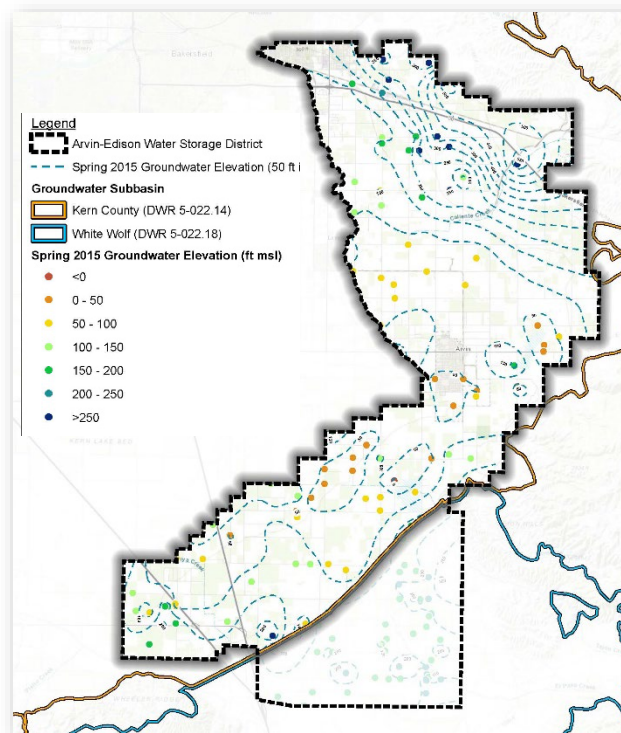


### ES.6. Existing Groundwater Conditions

Information on groundwater conditions within the Management Area is presented in this MA Plan with respect to the six “Sustainability Indicators” defined under SGMA, which include the following:

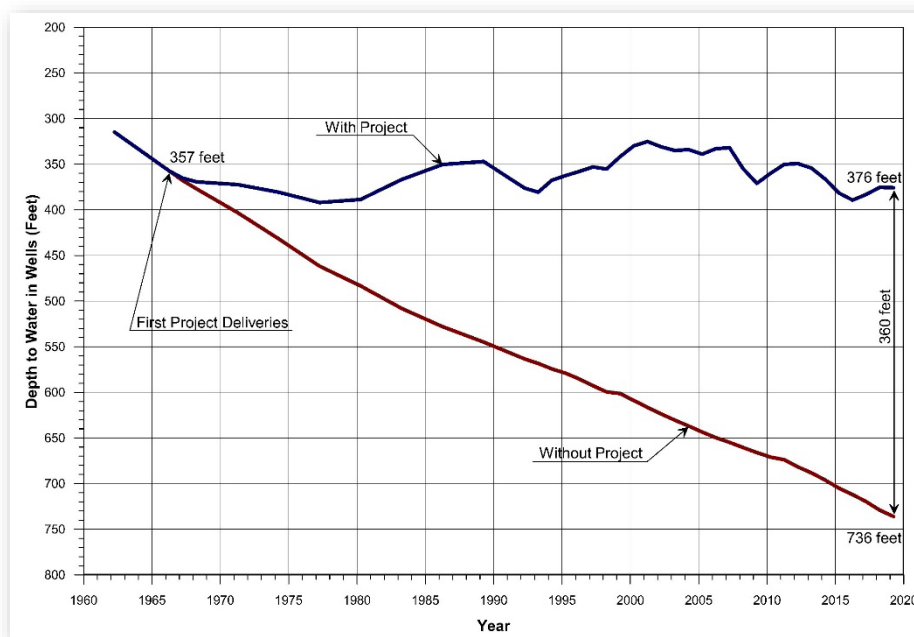
- Chronic lowering of groundwater levels
- Reduction in groundwater storage
- Seawater intrusion
- Degraded water quality
- Land subsidence
- Depletion of interconnected surface water

**Water Levels:** Groundwater levels within the Management Area are presented using contour maps depicting recent (2015) seasonal high (spring) and seasonal low (fall) conditions, as well as hydrographs from 15 representative wells throughout the Management Area that have extended historical records. In general, the available data indicate groundwater flow directions are generally from the surrounding uplands towards the basin, from south to north across the White Wolf Fault, and from west to east in the west/central portion of the Management Area (see figure below). Relative highs and lows appear to be controlled, at least in part, by



**Spring 2015 Groundwater Elevations**

the distribution of groundwater pumping versus surface water deliveries. Depths to groundwater in Spring 2015 range from approximately 150 to over 500 feet below ground surface (ft bgs), indicating that connections to surface water and the existence of groundwater dependent ecosystems (GDEs) are unlikely. Hydrographs show the long-term positive effects of AEWS’s surface water importation (i.e., the AEWS “Project”) in raising groundwater levels, tempered by the effects of the recent severe drought.



**Average Static Depth to Water with and without AEWS Project**

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**Groundwater Storage:** Changes in groundwater storage over selected time periods of interest were analyzed by comparing water levels at the beginning and the end of several different periods, and also show the positive impacts of AEWSD's surface water importation and the variability caused by wet and dry climate periods. Spatially, the changes in storage are more positive in the AEWSD Surface Water Service Area compared to areas that rely solely on groundwater for supply. During the historical water budget period (1994 through 2015), annual changes in groundwater storage between (February/March) seasonal highs were estimated using the water budget model (discussed below) and range from +155,000 acre-feet per year (AFY) to -185,000 AFY.

**Water Quality:** Agricultural use is the dominant beneficial use within the Management Area, and groundwater quality is generally suitable for agricultural uses. That being said, in some instances concentrations of nitrate, arsenic, total dissolved solids (TDS), boron, iron and manganese have been detected in groundwater (legacy and naturally-occurring) within or near the Arvin-Edison Management Area above drinking water standards and/or agricultural water quality goals. Future monitoring efforts will include routine collection of water quality data, which will fill the current water quality data gap for the area. These and data from nearby wells outside of the Management Area will be periodically reviewed and water quality trends will be evaluated as part of future GSP implementation efforts for the Management Area. Further, water quality issues related to potential constituents or concern are regulated separately under the Irrigated Lands Regulatory Program (ILRP), Central Valley-Salinity Alternatives for Long-term Sustainability (CV-SALTS), and the State Water Resources Control Board (SWRCB).

ACSD is actively addressing high arsenic levels in some of its production wells through its Arsenic Mitigation Project that involves replacing impacted wells. ACSD also provides arsenic-free water from filling stations at selected locations and has installed a treatment system for a well impacted by a newly-regulated chemical, 1,2,3-TCP. Ongoing and future water quality monitoring efforts throughout the Management Area will allow for further evaluation of these constituents and any possible connection between groundwater quality and levels.

**Land Subsidence:** Some amount of land subsidence has been documented within the Arvin-Edison Management Area over both historical (1949-2005) and recent (2014-2016) timeframes. Subsidence due to aquitard depressurization following groundwater withdrawal tends to be greater in the areas to the west that rely solely on groundwater for water supply and are underlain by a greater proportion of fine-grained deposits. Subsidence has the potential to affect critical infrastructure including gravity-driven water conveyance systems (canals) but has been actively managed by AEWSD to date.

**Interconnected Surface Waters:** Due to the great depth to groundwater in the principal aquifer (i.e., greater than 150 ft bgs), it appears that there are no interconnected surface water systems within the Management Area. Similarly, while the DWR dataset of Natural Communities Commonly Associate with Groundwater (NCCAG) shows some areas within the Management Area as NCCAG, due to the great depth to groundwater these areas do not appear to be GDEs.

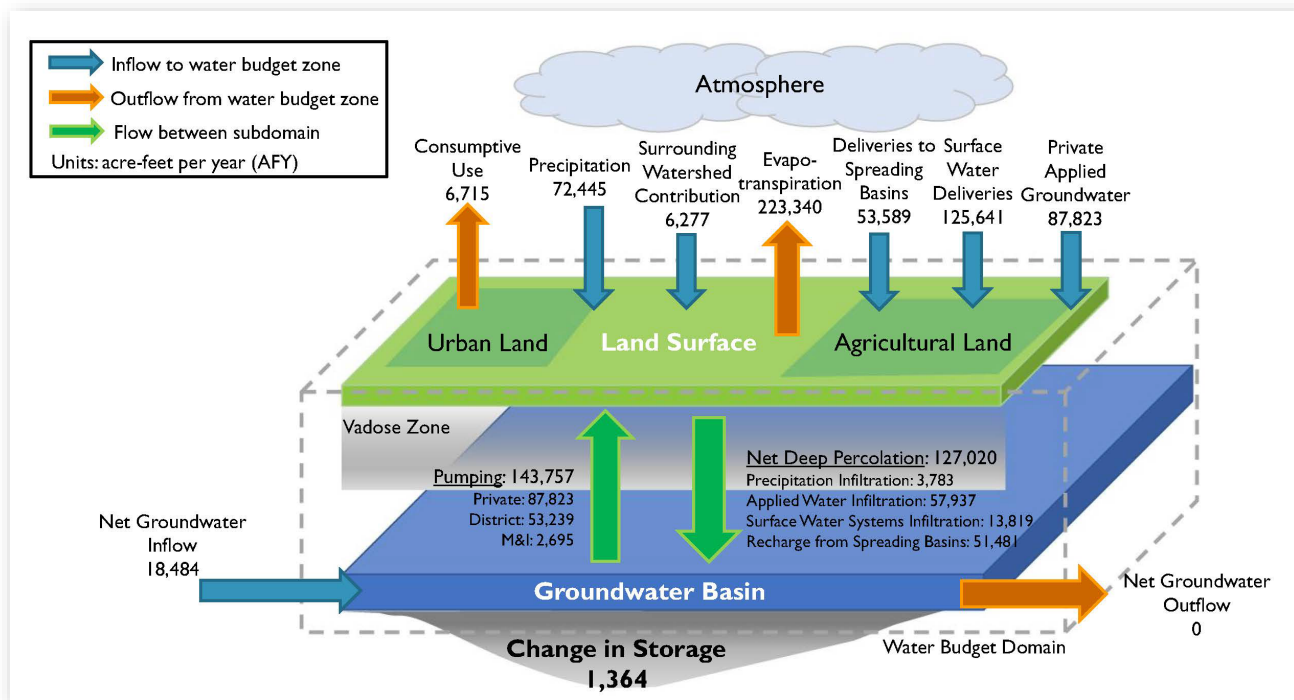
**Seawater Intrusion:** The Management Area is located far from coastal areas. As a result, seawater intrusion is not considered to be an issue for this area.

## ES.7. Water Budget

For the Kern Subbasin as a whole, the basin GSAs coordinated on two basin-wide water budget approaches, as described in the KGA Umbrella GSP: (1) development of a numerical model based on the



California Central Valley Groundwater/Surface Water Simulation Model (C2VSim) to estimate the basin-wide water budget, and (2) development of a “checkbook” water accounting approach that estimates supply, demand, and shortages using certain management assumptions. In addition, on a local Management Area basis, a spreadsheet water budget model was developed and calibrated to observed water level/storage changes to provide locally-refined water budget information. While the numerical model and “checkbook” water accounting approaches are described in the KGA Umbrella GSP, the calibrated spreadsheet model is the basis for the detailed historical and current water budget information presented herein (see figure below) but is not a determination of water rights. Based on the 1995 to 2014 historical water budget time period (DWR water years [WY] 1995 through 2014; October 1994 through September 2014), the sustainable yield for the Management Area is conservatively estimated to be, at a minimum, approximately 84,200 AFY under current supply and demand conditions (approximately 0.80 AFY/acre over the 105,630-acre Management Area). Because it is based on a calculation of pumping to achieve net zero decrease in groundwater storage, this sustainable yield is defined in such a way as to avoid the occurrence of Undesirable Results for relevant Sustainability Indicators (discussed further below), and is consistent with the current assumptions for basin-coordinated “native yield” (0.15 AFY/acre) and further addresses effective precipitation and the contribution to groundwater from recharge activities as well as return flow of applied imported surface water.



**Illustrated Historical Water Budget (WY 1995-2014)**

Over this historical period, the average annual change in groundwater storage in the Management Area was +1,364 AFY.

Water budget information under projected (future) conditions was also developed using the calibrated spreadsheet water budget model, with DWR-provided inputs for climate variables (i.e., adjusted precipitation and evapotranspiration) and water supply assumptions (i.e., changes to imported water supplies). The projected water budget assesses the magnitude of the net water supply deficit under future conditions that would need to be addressed through Projects and Management Actions (P/MAs) to



prevent Undesirable Results and achieve the Sustainability Goal. Consistent with the basin-wide efforts, three projected water budget scenarios were developed for this analysis: a Baseline Scenario, a 2030 Climate Change Scenario, and a 2070 Climate Change Scenario. For the Baseline condition, the long-term average change in groundwater storage was estimated to be +1,660 AFY for the analytical spreadsheet model, and -8,418 AFY for the basin-wide “checkbook” method (see table below). The projected deficit under the 2030 Climate Change Scenario (-31,586 AF) was used as the basis to develop P/MAs for the Management Area.

**Comparison of Change in Storage Estimates (AFY) from Three Water Budget Estimation Methods**

Period / Scenario	Basin-wide Numerical Model	Local Analytical Spreadsheet Model	Basin-wide “Checkbook” Water Accounting Approach
Historical Period (WY 1995 – 2014)	18,208	1,364	Not Applicable
Current Period (WY 2015)	-112,364	-164,385	Not Applicable
Projected Period (50 years; 2021 – 2070) Baseline with no Projects	<b>2,750</b>	<b>1,660</b>	<b>-8,418</b>
Projected Period (50 years; 2021 – 2070) 2030 Climate Change <u>with no Projects</u>	-782	-31,586	Not Applicable
Projected Period (50 years; 2021 – 2070) 2030 Climate Change <u>with Projects</u>	26,503	343	Not Applicable
Projected Period (50 years; 2021 – 2070) 2070 Climate Change <u>with no Projects</u>	-8,695	-56,333	Not Applicable
Projected Period (50 years; 2021 – 2070) 2070 Climate Change <u>with Projects</u>	17,855	28	Not Applicable

Each estimate presented above includes data gaps and has varying degrees of accuracy and/or reliability. As part of MA Plan implementation, these numbers will be refined as additional information is developed.

**ES.8. Sustainable Management Criteria**

Sustainable Management Criteria (SMCs) are the metrics by which groundwater sustainability is judged under SGMA. Key terms related to SMCs under SGMA include the following:

**Undesirable Results:** Undesirable Results are the significant and unreasonable occurrence of conditions, for any of the six Sustainability Indicators defined under SGMA, that adversely affect groundwater use in the basin. Definitions of Undesirable Results for the basin have been developed through a coordinated effort of the basin GSAs and are described in the KGA GSA Umbrella GSP. The basin-wide definitions of Undesirable Results allow for local definition Minimum Thresholds and the combination thereof that is considered significant and unreasonable. Therefore, the broad basin-wide Undesirable Results definitions





**Summary of Sustainable Management Criteria Evaluation**

Sustainability Indicator	Evaluation
Chronic Lowering of GW Levels	Initial MTs were calculated at each long-term hydrograph well site considering historical lows, recent 10-year groundwater level trends, and the variability or range in groundwater levels. Initial MOs were set based on Fall 2015 levels. These estimates were then generalized into four Sustainability Zones to allow flexibility for establishing the SGMA Monitoring Network. Undesirable Results are defined as 40% or more of monitoring sites exceeding MTs over a two-year period. Water levels will be monitored semi-annually within the Management Area. P/MAs will be implemented to maintain water levels above MOs/MTs.
Reduction of GW Storage	Over the basin-selected historical water budget period (WY 1995-2014) groundwater storage in the Management Area increased at approximately 1,360 AFY. MOs/MTs for lowering of groundwater levels will be used as a proxy for the reduction of groundwater storage.
Seawater Intrusion	No saltwater bodies are present near the Management Area. Therefore, no MOs/MTs have been developed for this indicator.
Degraded Water Quality	MTs/MOs for Degraded Water Quality are defined at one well in the ACSD well network (Well #14) for only Arsenic <sup>4</sup> . The SMCs are tied to regulatory water quality standards – the MT is set at the California MCL of 10 micrograms per liter (ug/L), and the MO is set to 75% of the MCL or 7.5 ug/L. In addition to the monitoring of water quality per Title 22, other representative wells will be monitored annually throughout the Management Area. If data suggest that water quality is being affected by groundwater management practices, MOs/MTs for water quality will be revisited.
Land Subsidence	MTs/MOs have been developed for a set of local survey benchmark locations along critical infrastructure (canal conveyance). The MT is the maximum rate of subsidence observed from 2014-2018, projected through 2040. The MO is set at the same rate, projected through 2030.
Surface Water Depletion	No interconnected surface waters are present in the Management Area. Groundwater is approximately 150 ft bgs or deeper. Therefore, no MOs/MTs have been developed for this indicator.

were refined locally for the Arvin-Edison Management Area to better reflect local groundwater conditions and beneficial uses.

**Minimum Thresholds:** Minimum Thresholds (MTs) are the numeric criteria for each Sustainability Indicator that, if exceeded in a locally-defined combination of monitoring sites, may constitute an Undesirable Results for that indicator. Where appropriate, the MTs for the Sustainability Indicators have been set using groundwater levels as a proxy.

**Measurable Objectives:** Measurable Objectives (MOs) are a specific set of quantifiable goals for the maintenance or improvement of groundwater conditions. MOs use the same units and metrics as the MTs and are thus directly comparable.

**Interim Milestones:** Interim Milestones are a set of target values representing measurable groundwater conditions in increments of five (5) years over the 20-year statutory deadline for achieving sustainability.

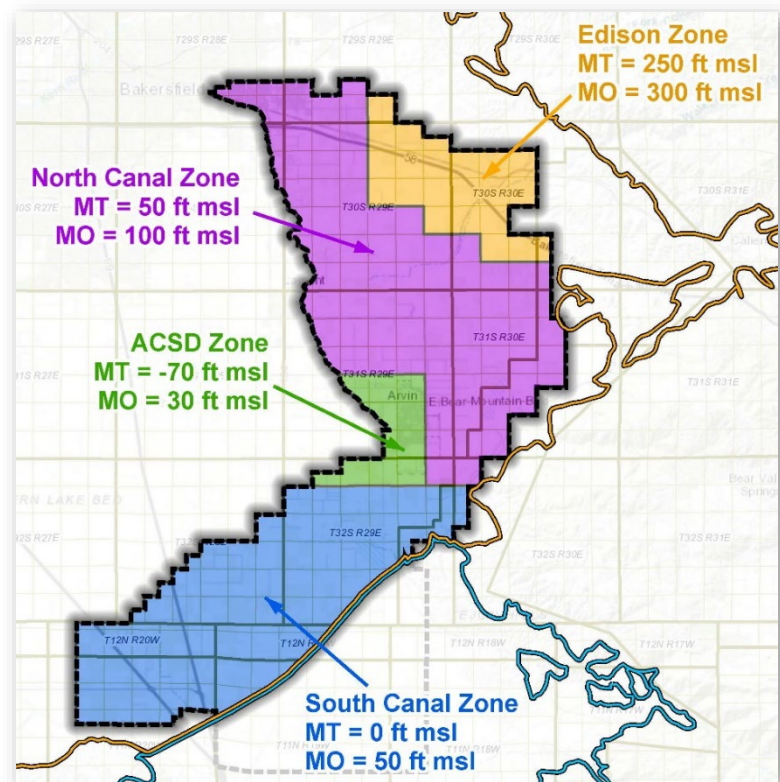
<sup>4</sup> SGMA does not empower GSAs to develop or enforce water quality standards; that authority rests with the State Water Resources Control Board (SWRCB) Division of Drinking Water and the County. Because of the limited purview of GSAs with respect to water quality, and the rightful emphasis on those constituents that may be related to groundwater quantity management activities, the only constituent of concern applicable within the Arvin-Edison Management Area is arsenic in the vicinity of the City of Arvin and ACSD. Furthermore, drinking water quality regulations for public water systems apply at the point of delivery to customers, not in the raw water source, and ACSD blends water from its various well sources.



Chronic Lowering of Groundwater Levels is arguably the most fundamental Sustainability Indicator for the Arvin-Edison Management Area, as it influences several other key Sustainability Indicators, including Reduction of Groundwater Storage and Land Subsidence. The SMCs for Chronic Lowering of Groundwater Levels were developed through temporal analysis of long-term groundwater level data at 15 representative wells with long-term records and generalized into four zones (see figure at right). These generalized MTs were evaluated against known well depths to assess potential impacts on existing wells (i.e., potential dewatering of shallow wells with attendant mitigation procedures). The process for developing the MTs and MOs and the results were presented on multiple occasions in public meetings to allow for stakeholder input.

Significant Groundwater Storage exists within the Arvin-Edison Management Area, and it is estimated that it would take 42 years of zero recharge to deplete the usable storage under current extraction rates. As such, it was determined to be sufficiently protective to define the SMCs for Reduction of Groundwater Storage based on the use of SMCs for Chronic Lowering of Groundwater Levels as a proxy.

SMCs for Degraded Water Quality are defined at one representative well in the ACSD well network (Well #14) for Arsenic. The SMCs are tied to regulatory water quality standards – the MT is set at the California MCL of 10 micrograms per liter (ug/L), and the MO is set to 75% of the MCL or 7.5 ug/L. Numerous other regulatory programs address water quality, in addition to SGMA (e.g., Irrigated Lands). Further, a causal nexus between measured constituent concentrations and water levels and groundwater management actions within the Management Area has not been established based on available data. On-going monitoring for all potential constituents of concern will continue, and if a nexus between these constituent concentrations and water levels and groundwater management actions is established, then the SMCs for water quality will be revisited.



**Minimum Thresholds (MT) and Measurable Objectives (MO) for Chronic Lowering of Groundwater Levels**

The SMCs for Land Subsidence are based on observed rates of subsidence from ground-based surveys between 2014 and 2018. The rationale is that such subsidence has been historically managed by AEWS through maintenance and improvements to its facilities (e.g., increasing additional freeboard to its canals), and AEWS could likely continue to manage/mitigate further subsidence if it were to occur at similar or lower rates. The MO is defined as the amount of land subsidence that would occur if the maximum observed subsidence rates (2014 – 2018) were to continue through 2030 and then cease. A basin-wide subsidence monitoring program is also being developed and will be implemented.

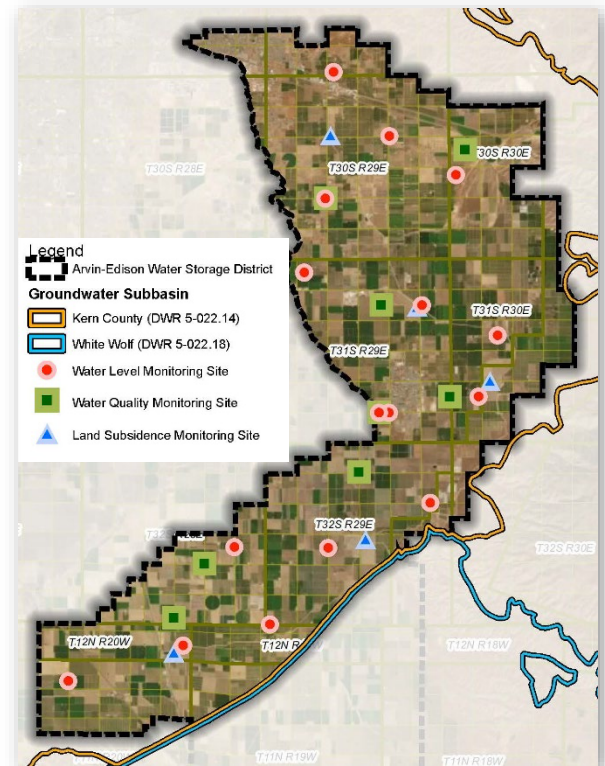
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As discussed above, Depletion of Interconnected Surface Water has not been observed within the Arvin-Edison Management Area and is not applicable due to the great depths to groundwater in the principal aquifer. Likewise, Seawater Intrusion does not exist within the Kern Subbasin. Therefore, no SMCs for both of these Sustainable Indicators are defined in this MA Plan.

### ES.9. Monitoring Network

The objective of the Arvin-Edison Management Area Monitoring Network is to (continue to) collect sufficient data to allow for assessment of the Sustainability Indicators relevant to the Management Area, and potential impacts to the beneficial uses and users of groundwater. The proposed Monitoring Network was developed to ensure sufficient spatial distribution and spatial density. The network consists of 16 representative monitoring sites for groundwater levels and (by proxy) groundwater storage, eight (8) sites for monitoring groundwater quality (although only one site, the ACSD Well #14, is for SGMA compliance purposes), and five (5) sites for monitoring land subsidence. The SGMA-compliance network for the Management Area supplements other monitoring networks and programs in the basin such as DWR California Statewide Groundwater Elevation Monitoring (CASGEM), Central Valley-Salinity Alternatives for Long-term Sustainability (CV-SALTS), Kern County Water Agency [KCWA] semiannual groundwater monitoring program, etc. and basin-wide monitoring networks related to SGMA compliance such as the KGA’s land subsidence network.



**Monitoring Networks for Groundwater Levels, Groundwater Quality and Land Subsidence**

Data collected from the SGMA-compliant Monitoring Network will be uploaded to the Data Management System (DMS) maintained for the basin and reported to the DWR in accordance with the Monitoring Protocols developed for the basin as described in the KGA Umbrella GSP or Coordination Agreement. In addition, local data will be stored and managed in an Arvin-Edison Management Area-specific DMS. Additional data collected as part of AEWS’s and ACSD’s other regular monitoring programs may be used in conjunction with data collected from the SGMA-compliant Monitoring Network to meet compliance with GSP Emergency Regulations regarding Annual Reporting or as otherwise deemed necessary for the Arvin-Edison Management Area.

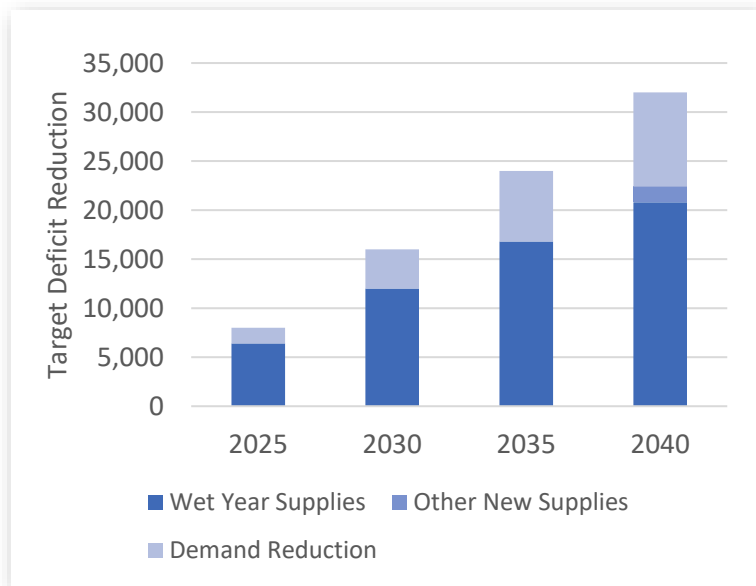


### ES.10. Projects and Management Actions

Achieving sustainability in the Arvin-Edison Management Area will require implementation of P/MAs to address projected water budget deficits and water quality impacts within the ACSD production well network. As such, AEWSD has developed a portfolio of P/MAs, each with specific expected benefits, implementation triggers, and costs. A preliminary “glide path” has been developed that results in closing of the currently identified future assumed “deficit”<sup>5</sup> of approximately -31,600 AFY by 2040. Accelerated implementation of P/MAs will be triggered if observed groundwater conditions deteriorate, as measured against defined SMCs at the representative monitoring sites.

The initial focus will be implementing a Project portfolio with supply augmentation as the primary expected benefit. These projects are grouped into the following categories:

- Projects to Enhance Recharge<sup>6</sup>;
- Projects to Expand or Develop New In-Lieu Areas;
- Projects to Manage and/or Capture Floodwater;
- Projects to Increase Surface Storage Capacity / Delivery Flexibility; and
- Projects to Develop New Supplies.



**“Glide Path” for P/MA Implementation**

The Management Actions listed below have water demand reduction as their primary expected benefit and are grouped into the following categories:

- Management Actions / Policies to Reduce Overall Water Demand; and
- Management Actions / Policies to Reduce Groundwater Pumping.

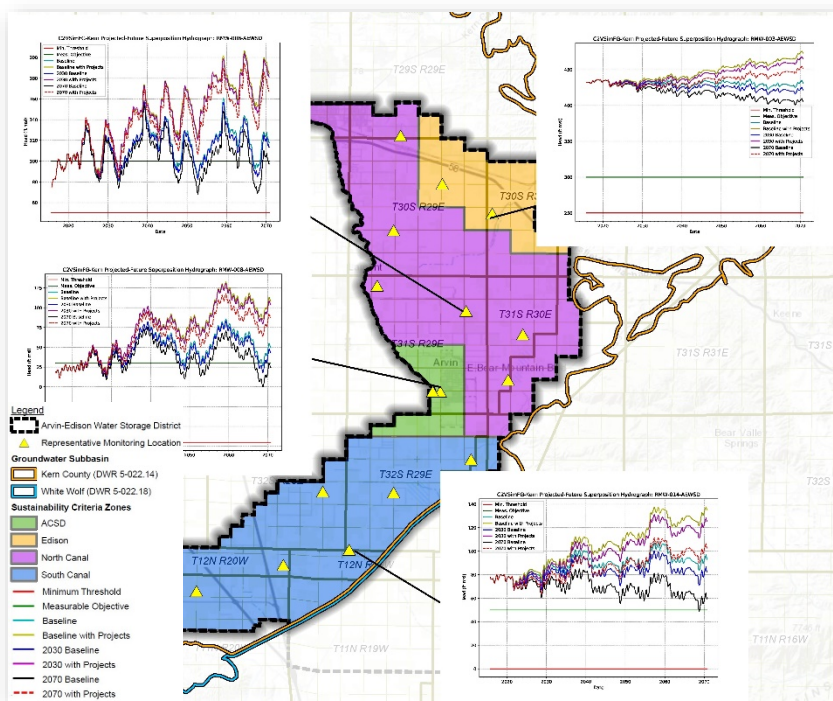
In addition to the above water quantity-related P/MAs identified by AEWSD, ACSD has developed and is implementing two (2) Projects to improve the quality of drinking water served by ACSD, including:

- ACSD Emergency 1,2,3-TCP Treatment at Well No. 13; and
- ACSD Arsenic Mitigation Project – Phase II

The supply augmentation and demand reduction P/MAs listed above comprise a diverse portfolio of options that can be implemented as necessary by AEWSD and ACSD to achieve sustainability from a total water quantity and water quality perspective, respectively. Simulation results from the projected P/MAs

<sup>5</sup> The net deficit to be addressed by the 2040 GSP implementation deadline is the estimated deficit under the 2030 Climate Change scenario.

<sup>6</sup> 150 acres of land that were previously planted as a vineyard in a part of AEWSD that has shown decreasing groundwater levels were recently purchased and are being developed into a new groundwater recharge facility. This project has both supply augmentation and demand reduction benefits.



**Simulated Hydrographs Showing Achievement of Sustainability with Planned P/MAs**

across the basin utilizing basin-wide numerical (C2VSim) model indicate that P/MA implementation along the planned glide path will successfully achieve sustainability and avoid Undesirable Results for Groundwater Levels (and by proxy for the other applicable Sustainability Indicators) (see figure at left). The glide path provides a general guide to how quickly these benefits are to be realized. However, the exact schedule and order of implementation is not known, and further analysis will be conducted to prioritize the P/MAs in consideration of factors including permitting, engineering feasibility, cost effectiveness and other factors. In general, P/MAs being

considered for implementation will be discussed during regular AEWSD Board Meetings, which are open to the public. Additional stakeholder outreach efforts will be conducted prior to and during P/MA implementation, as required by law.

**ES.11. GSP Implementation**

Key GSP implementation activities that will be performed by AEWSD and ACSD over the next five (5) years include:

- Monitoring and data collection;
- P/MA implementation and priorities thereof;
- Policy development to support GSP implementation;
- Technical and non-technical coordination with other water management entities in the basin;
- Continued outreach and engagement with stakeholders;
- Annual reporting;
- Enforcement and response actions, as necessary; and
- Evaluation and updates, as necessary, of the Arvin-Edison MA Plan as part of the required periodic evaluations (i.e., “five-year updates”).



## ES.12. GSP Implementation Costs and Funding

Costs to implement this MA Plan can be divided into several groups, as follows:

- Costs of local groundwater management activities;
- AEWSD's and ACSD's proportional share of costs for basin-wide groundwater management activities; and
- Costs to implement P/MAs, including capital/one-time costs and ongoing costs.

The estimated costs to AEWSD for local groundwater management activities is approximately \$270,000 per year, the estimated proportional share of costs for basin-wide groundwater management activities is approximately \$120,000 per year, and the estimated costs to implement P/MAs is approximately \$4.3 million per year in the first five years, decreasing to between approximately \$1.5 million to \$2.25 million per year in the subsequent 15 years; the P/MA costs will be further studied within the initial 5-year period. ACSD has estimated SGMA compliance costs to be approximately \$50,000 per year.

Sources of funding for SGMA compliance activities for both AEWSD and ACSD will include primarily regular fees and assessments from customers and rate payers. This primary source of revenue will be supplement to the greatest extent possible through loans and grants, and possibly by additional fees imposed as an incentive to discourage unsustainable water use practices. AEWSD and ACSD will likely need to raise revenue through fees and charges that will be conducted pursuant to applicable laws and regulations (e.g., Proposition 218 and related laws).

## ES.13. Conclusion

The passage of SGMA in 2014 ushered in a new era of mandatory groundwater management in California's most intensively used groundwater basins. The law was followed by promulgation of a robust regulatory framework for GSA formation, GSP development, and implementation thereof. The law and regulations emphasize the use of best available science, local control and decision making, and active engagement of affected stakeholders. Because of the breadth and scope of the groundwater sustainability problem in California and the legislative and regulatory response to it, SGMA presents significant challenges both for local implementing agencies and groundwater users alike. Achieving and maintaining sustainability in the face of uncertain future water supply conditions while addressing and balancing the needs of all beneficial uses and groundwater users will require significant effort, creative solutions, and unprecedented collaboration. As the implementing agencies within the Arvin-Edison Management Area, AEWSD and ACSD are committed to facing these challenges in a manner that upholds the interests of local landowners and constituents.