DRAFT

FINAL 2024 KERN COUNTY SUBBASIN GROUNDWATER SUSTAINABILITY PLAN(S)

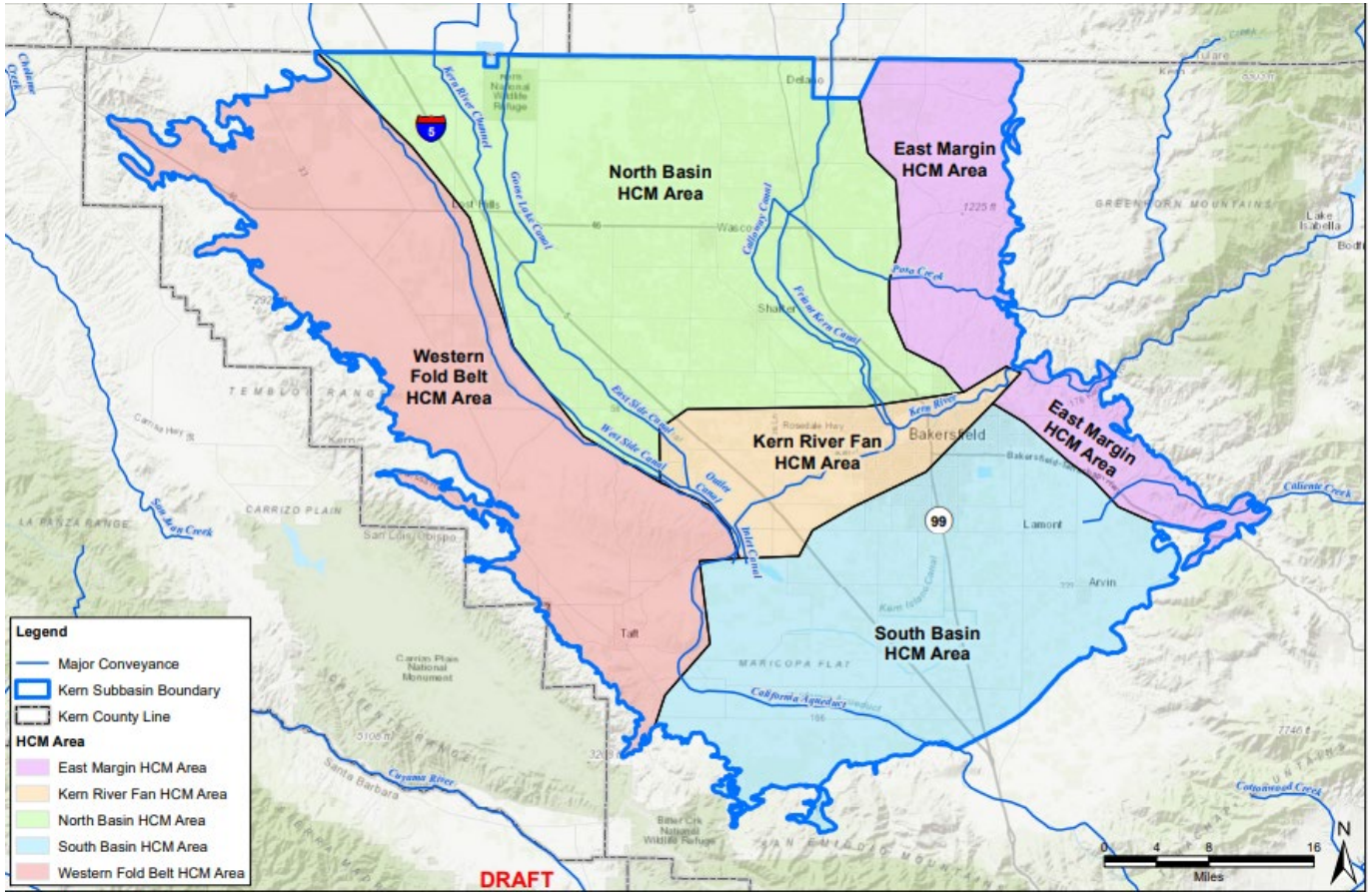
DECEMBER 2024

OVERVIEW

- Final 2024 Plan Format
- Overview of 2024 Plan Development Efforts (May-Dec 2024)
- Major revisions to the 2024 Plan
- Next steps

2024 PLAN: GUIDING PRINCIPLES

- Subbasin Coordination
- Five HCM Areas
- Subbasin Banking Programs
- Demand Management
- Protective of Beneficial Uses and Users



2024 PLAN OVERVIEW

7 almost identical GSPs +

1 Coordination Agreement make up the Amended GSP(s)

GSP Name	Area (acres)	Area (%)	GSA	GSP Content
Kern Subbasin GSP	1,205,482	67.6%	14 GSAs[1]	Kern Subbasin GSP
Buena Vista WSD GSA GSP	51,070	2.9%	Buena Vista WSD GSA	Kern Subbasin GSP Supplemental GSA information on **blue pages**
Henry Miller GSA GSP	26,063	1.5%	Henry Miller GSA	
Kern-Tulare Water District GSA GSP	11,344	0.6%	Kern-Tulare Water District GSA	
Olcese Water District GSA GSP	3,199	0.2%	Olcese Water District GSA	
Semitropic Water Storage District GSA GSP	224,350	12.6%	Semitropic Water Storage District GSA	
Westside District Water Authority GSA GSP	260,812	14.6%	Westside District Water Authority GSA	

[1]*Arvin GSA, Cawelo Water District GSA, Kern Groundwater Authority GSA, Kern River GSA, Kern Water Bank GSA, Greenfield County Water Districts GSA, North Kern WSD GSA, Pioneer GSA, Rosedale-Rio Bravo WSD GSA, Shafter-Wasco ID GSA, Southern San Joaquin MUD GSA, Tejon-Castac Water District GSA, West Kern Water District GSA, Wheeler Ridge-Maricopa GSA*

2024 PLAN OVERVIEW: SEPARATE GSP COMPONENTS

GSPs Coordination:

- Identical Executive Summary Crosswalk identifying Blue Pages content.
- All Blue Pages located at the end of each separate GSP.

GSP Name	Blue Page Locations
Buena Vista WSD GSA GSP	• Executive Summary • Section 7 • Section 12 • Section 13 • Section 14
Henry Miller GSA GSP	• Executive Summary • Section 5 • Section 8 • Section 9 • Section 14
Kern-Tulare Water District GSA GSP	• Executive Summary • Section 14 • Section 16
Olcese Water District GSA GSP	• Executive Summary • Section 7 • Section 8 • Section 9
Semitropic Water Storage District GSA GSP	• Executive Summary • Section 5 • Section 14
Westside District Water Authority GSA GSP	• Executive Summary • Section 6 • Section 8 • Section 13 • Section 14

SWRCB PROCESS (MAY-DEC 2024)

- Draft 2024 Plan submitted to SWRCB on 28 May 2024
- SWRCB released Draft Staff Report recommending the Subbasin for Probation in July 2024
- SWRCB workshops hosted 24 and 29 August 2024
- Subbasin hosted all SWRCB members and key staff on Subbasin tours in October 2024
- Subbasin representatives have held near-weekly policy and technical meetings with SWRCB staff since September 2024

PUBLIC ENGAGEMENT (MAY-DEC 2024)

- Draft GSP released for public review 28 May – 4 November 2024
  - Advertised the 2024 Plan for Public Comment through Water Association of Kern County, Kern County Farm Bureau, and SJV Water News
- Draft Stakeholder Communication and Engagement Plan (SCEP) released for public review 14 October – 4 November 2024
  - Several verbal and written comments received and responded to in 2024 Plan and SCEP
- 3 stakeholder workshops held on 3 October 2024
  - Provided an overview of the GSP with Spanish and Punjabi translations

PUBLIC ENGAGEMENT (MAY-DEC 2024)

- Kern Subbasin SGMA website updated (https://kerngsp.com/)
- Active engagement and targeted workshops with key stakeholder groups to develop Well Mitigation Program
- Developed promotional materials and GSA representatives handed out at public events, including Water Day at Kern County Fair

SWRCB STAFF "RED FLAG REVIEW"

1. Additional support for conceptualization of Basin Setting and designation of principal aquifers.
2. Confirmation of representativeness of the groundwater level monitoring network (RMW-WLs).
3. Additional justification/refinement of Groundwater Level Sustainable Management Criteria (SMCs).
4. Additional justification/refinement of the Subsidence SMCs.
5. Clarification needed on water quality, interconnected surface waters and water banking elements of Plan.
6. Desire for expanded Well Mitigation Program.

2024 PLAN: EXECUTIVE SUMMARY

2024 Plan is coordinated and *completely replace 2022 GSPs*

- Incorporates DWR and SWRCB staff feedback, new information and data, and the best available science
- Revised Subbasin Sustainability Goal
- Clear identification of where deficiencies have been addressed

Deficiency #1: The GSPs do not establish Undesirable Results (URs) that are consistent for the entire Subbasin.

Deficiency #2: The Subbasin's Chronic Lowering of Groundwater Levels Sustainable Management Criteria (SMCs) do not satisfy the requirements of SGMA and the GSP Regulations.

Deficiency #3: The Subbasin's Land Subsidence SMCs do not satisfy the requirements of SGMA and the GSP Regulations.

Additional Revision: Revision to incorporate new data or information or respond to DWR and SWRCB comments that were not identified as Corrective Actions.

2024 PLAN: ADDRESSING DWR AND SRWCB DEFFICIENCIES

- Describes the Subbasin coordination efforts to address DWR / SWRCB deficiencies
  - Summarizes feedback received during **SWRCB Technical Meetings, Workshops, and Draft Staff Report**, summary of 2024 Plan revisions, *and where the information can be found in the 2024 Plan*.
  - Summarizes **Major Plan Updates** and identifies the DWR deficiencies, corrective actions, summary of Plan revisions, *and where the information can be found in the 2024 Plan.*

- Identifies updates to the 2024 Plan to incorporate new information and data, and the best available science, *and where the information can be found in the 2024 Plan*

SWRCB CONSULTATION/RESPONSE (2023/2024)

Date	SWRCB Comment	Outcome	Revision in Amended GSP(s)
5/17/2023	Plan manager introduction and GSA questions	GSAs considered Plan structure, striving for the majority of the Subbasin to be included under one plan. GSAs initiated plans to expand demand reduction P/MAs.	**Section 5** **Section 14**
6/23/2023	Technical Meeting #1 Chronic Lowering of Groundwater Levels SMCs	Initiated well inventory to improve identification of beneficial users. Revised Undesirable Results (UR) definition to include dewatered drinking water wells.	**Section 5** **Section 13**
10/4/2023	Technical Meeting #2 Chronic Lowering of Groundwater Levels SMCs	Expanded justification for Chronic Lowering of Groundwater Levels SMCs to include a suite of 5 drinking water well impacts analyses and a "depletion of supply" calculation.	**Section 13**
11/1/2023	Technical Meeting #3 Chronic Lowering of Groundwater Levels SMCs	Initiated analysis to assess Chronic Lowering of Groundwater Level SMCs inter-relationship with Land Subsidence and Degraded Water Quality SMCs.	**Section 13**
12/13/2023	Technical Meeting #4 Land Subsidence SMCs	Clarified definitions for the potential causes of subsidence with the GSA's authority and outside the GSA's authority to manage. Established Land Subsidence SMCs across the entire Subbasin.	**Section 8** **Section 13**
1/24/2024	Technical Meeting #5 Degraded Water Quality SMCs	Expanded representative monitoring network for water quality. Expanded constituents with SMCs to include 1,2,3-TCP, nitrite, and uranium. Examined potential relationship between arsenic concentrations and land subsidence.	**Section 8** **Section 13** **Section 15**
3/6/2024	Technical Meeting #6 Well Inventory & Mitigation Program	Expedited timeframe for well mitigation program framework, to be operational by Jan 2025.	**Section 13** **Appendices**
4/3/2024	Technical Meeting #7 Monitoring Networks and SMCs Approach	Expanded representative monitoring network. Increased water quality sampling frequency to semi-annual. Revised UR definition for Degraded Water Quality. Expanded Depletions of Interconnected Surface Waters description to include ICONS dataset.	**Section 8** **Section 13** **Section 15** **Appendices**
4/23/2024	Technical Meeting #8 Water Budgets and P/MAs Approach	Summarized all planned P/MAs and expected benefits by category on the Subbasin level and moved GSA-specific details on P/MAs as supporting appendices.	**Section 9** **Section 14** **Appendices**
Today 5/29/2024	Technical Meeting #9 Amended GSP(s) Overview	GSAs presented highly-coordinated Amended GSP(s)	*N/A*

SWRCB CONSULTATION/RESPONSE (AUG-NOV 2024)

SWRCB Comment	Outcome	Revision in Amended GSP(s)
Additional support for conceptualization of Basin Setting and designation of principal aquifers.	Expanded presentation of information in the Basin Setting.	**Section 7**
Confirmation of representativeness of the groundwater level monitoring network (RMW-WLs).	Updated well inventory to improve identification of beneficial users. Conduced cell by cell analysis of water levels and well depths to confirm representativeness of RMW-WLs. Identified the need for 7 additional RMWs in the future.	**Section 13** **Section 15** **Appendices**
Additional justification/refinement of Groundwater Level Sustainable Management Criteria (SMCs)	Updated HCM Area trends with updated RMW-WL network. Added a cap to the MTs at 61 ft below recent historical lows and updated well impacts analysis. MTs now an average of 33 feet above the 2022 MTs and well impacts reduced to 260-307 in the worst-case scenario.	**Section 13** **Appendices**
Additional justification/refinement of Subsidence SMCs	Revised Land Subsidence SMCs and developed MT Exceedance Policy for subsidence.	**Section 13**
Clarification needed on water quality, interconnected surface waters and water banking elements of Plan	Expanded presentation of information in the relevant chapters.	**Section 8** **Section 13**
Expanded Well Mitigation Program	Developed detailed Well Mitigation Program to address impacts to water levels or water quality in drinking water wells as a result of GSA management.	**Appendices**

RESPONSE TO DWR DEFICIENCY #1

"The GSPs do not establish undesirable results that are consistent for the entire Subbasin."

"While the Coordination Agreement presents Subbasin-wide undesirable results, the Subbasin's fragmented approach towards establishing management criteria that define undesirable conditions in various parts of the Subbasin does not satisfy SGMA's requirement to use same data and methodologies."

Corrective Actions	Summary of Plan Revisions	Revision in Amended GSP(s)
1a) • "Explain how the undesirable results definitions are consistent with the requirements of SGMA and the GSP Regulations." • "Include descriptions of how the Plans have utilized the same data and methodologies to define the Subbasin-wide undesirable results and how the Plan has considered the interests of beneficial uses and users of groundwater." **1b)** • "Commit to comprehensively reporting on the status of minimum threshold exceedances by area in the annual reports and describe how groundwater conditions at or below the minimum thresholds may impact beneficial uses and users prior to the occurrence of a formal undesirable result." **1c)** • "Adopt clear and consistent terminology to ensure the various plans are comparable and reviewable by the GSAs, interested parties, and Department staff. This terminology should also adhere to the definitions of various terms in SGMA and the GSP Regulations including the understanding that undesirable results are conditions occurring throughout the Subbasin." • "Clearly document how all of the various undesirable results definitions and methodologies achieve the same common sustainability goal."	• Defined Subbasin-wide URs, MTs, and MOs using consistent data and methodologies. • Developed UR definitions in line with SGMA and GSP Regulations, reflecting feedback from SWRCB staff. • Revised the Chronic Lowering of Groundwater Levels UR definition to address direct impacts on drinking water wells and Subbasin-wide MT exceedances. • Conducted a robust Subbasin-wide well impacts analysis to quantify potential impacts to beneficial users, projecting fewer than 307 impacted drinking water wells by 2040 under the worst-case scenario. • Conducted a surface properties and land use assessment in which infrastructure was defined and categorized based on potential subsidence-related risk • Established a Subbasin-wide MT Exceedance Policy to trigger GSA action in the event of a MT exceedance. • Updated functionality of the Subbasin Data Management System (DMS) so that all GSAs are notified when an MT exceedance is uploaded. • Established a detailed Subbasin-wide Well Mitigation Program • Used common language and templates (and data and methodologies) for all 2024 Plan sections. • Used clear and consistent terminology for the Subbasin-wide definitions for URs, MTs, and MOs. • Defined and used consistent, Subbasin-wide terminology to establish Land Subsidence SMCs. • Revised the Sustainability Goal.	**Section 2** **Section 5** **Section 12** **Section 13** **Appendices**

RESPONSE TO DEFICIENCY #2

"The Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP regulations."

"The GSPs do not consistently and sufficiently document the effects of their selected minimum thresholds on beneficial uses and users in the Subbasin, nor explain how the minimum thresholds and measurable objectives that are set below historical lows will impact other applicable sustainability indicators…"

Corrective Actions	Summary of Plan Revisions	Revision in Amended GSP(s)
All GSPs: • "Demonstrate the relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the GSA has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." • "The GSAs should address the specific corrective actions identified for the various GSPs and management area plans, as well as the corrective actions that apply to all the GSPs identified in Table 2. Where addressing those corrective actions includes modifications to the respective GSPs minimum thresholds, the GSPs should evaluate whether the Subbasin's 'with-projects' modeling scenarios still indicate that implementation of the projects and management actions would avoid minimum threshold exceedances. If not, the GSAs should modify their projects and management actions accordingly."	• Established a Subbasin-wide methodology for setting MTs and MOs for Chronic Lowering of Groundwater Levels using an iterative process that considered more than 11 potential MT methodologies. • Conducted a robust Subbasin-wide well impacts analysis using the Subbasin well inventory, MTs and the quantitative criteria for URs. • Conducted a "depletion of supply" analysis to quantify the percentage of urban supply that may be impacted at MTs and the UR definition. • Identified potential impacts of lowered groundwater levels on other Sustainability Indicators. • Projected the extent of subsidence that would occur under groundwater level MTs and determined that groundwater level MTs are protective of URs for land subsidence. • Selected Representative Monitoring Wells (RMWs) in areas with a potential correlation between groundwater levels and water quality. • Estimated the reduction of groundwater storage that would occur at MT groundwater levels and determined this decline in storage is not significant relative to the volume of total usable storage in the Subbasin. • Coordinated with neighboring subbasins on SMCs. • Confirmed that the Subbasin's model results indicate that there are no instances where more than 25% of the RMW-WLs have MT exceedances over two consecutive years seasonal measurements from 2020 through 2070 based on the Projected-Future "With Project" scenario; this suggests that the Subbasin GSAs have sufficiently designed Projects and Management Actions (P/MAs) to improve the Subbasin conditions to avoid URs.	**Section 8** **Section 13** **Section 14** **Section 15** **Appendices**

RESPONSE TO DEFICIENCY #3

"The Subbasin's land subsidence sustainable management criteria do not satisfy the requirements of SGMA."

"The Plan lacks a Subbasin-wide, coordinated approach to establishing land subsidence sustainable management criteria."

Corrective Actions	Summary of Plan Revisions	Revision in Amended GSP(s)
Subbasin: • "Coordinate and collectively satisfy the requirements of SGMA and the GSP Regulations to develop the sustainable management criteria for land subsidence." • "Document the conditions for undesirable results for which the GSAs are trying to avoid, supported by their understanding of land uses and critical infrastructure in the Subbasin and the amount of subsidence that would substantially interfere with those uses." • "Identify the rate and extent of subsidence corresponding with substantial interference that will serve as the minimum threshold." • "Clearly identify the undesirable result parameters for each of the GSPs, management areas, and management area plans so it is clear how the various plans work together at the Subbasin level." • "Explain how implementing projects and management actions proposed in the various GSPs is consistent with avoiding subsidence minimum thresholds." • "If land subsidence is not applicable to parts of the Subbasin, provide supported justification of such."	• Referenced and discussed key findings from the six independent subsidence studies to fill data gaps. • Conducted extensive studies to explain InSAR time series methodologies to differentiate between subsidence caused by activities within and outside of the GSAs' authority to control. • SMCs are data driven, not risk-based • Developed Subbasin-wide definitions for Regional and GSA Area Critical Infrastructure. • The GSAs have committed to minimize GSA-related subsidence by 2040. • Established land subsidence SMCs based on a projection of the average historical subsidence rates. • Assessed the potential change in slope to confirm minimal impacts to land surface uses. • Assessed potential impacts on regional critical infrastructure from future GSA-related subsidence. • Coordinated with key beneficial users of regional critical infrastructure. • Updated the Subbasin-wide Land Subsidence monitoring network.	**Section 8** **Section 13** **Section 15** **Appendices**

2024 PLAN: SUSTAINABLE MANAGEMENT CRITERIA

Chronic Lowering of GW Levels

- Revised SMCs definition
  - MOs changed by +11 feet on average
  - MTs changed by +33 ft on average
  - Reduced number of impacted domestic wells from 390 to 260 (73 most likely)
- Subbasin-wide well impacts analyses
- MT Exceedance Policy

Land Subsidence

- Revised UR and SMCs definition
  - Data Driven, Site-specific SMCs established along Critical Infrastructure
  - SMCs established across the entire Subbasin, based on an average across the HCM Area.
- Subbasin-wide change in slope analysis along critical infrastructure
- MT Exceedance Policy

Seawater Intrusion

Unchanged from 2022 GSP

Degraded Water Quality

- COCs: Arsenic, nitrate, nitrite, nitrate+nitrite, TDS, 1,2,3-TCP, uranium
- Revised UR and SMCs definition
- Increased monitoring frequency to semi-annual
- Revised RMWs
- MT Exceedance Policy

Reduction of GW Storage

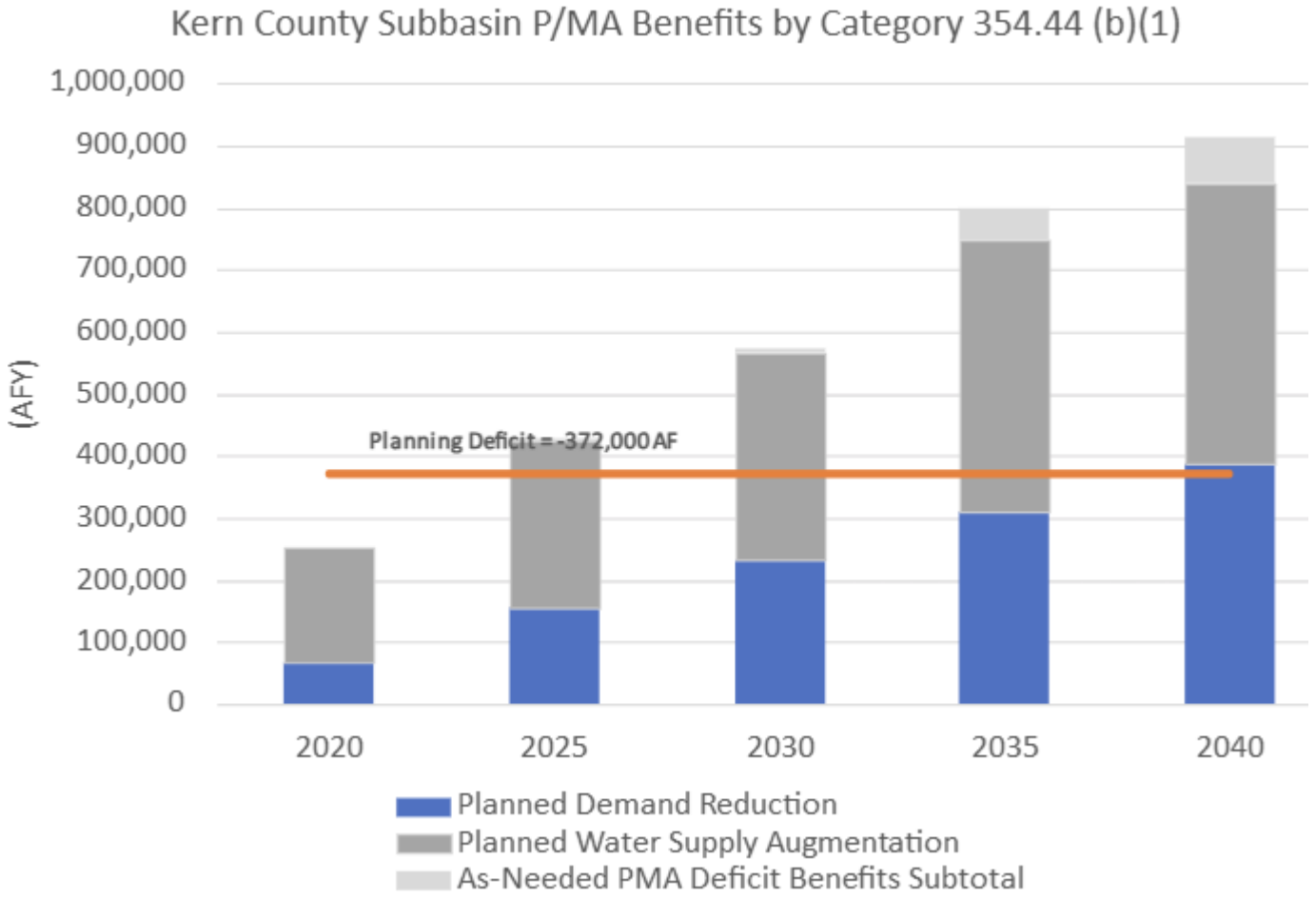
Unchanged from 2022 GSP

Depletions of Interconnected Surface Waters

Unchanged from 2022 GSP

2024 PLAN: PROJECTS & MANAGEMENT ACTIONS

- **840,000 AFY** of P/MAs have been identified by the GSAs
- **47%** of P/MAs already implemented
- **113%** of the projected deficit can be met through planned Demand Management actions alone



2024 PLAN: PROJECTS & MANAGEMENT ACTIONS

- KSB-1 Friant-Kern Canal Capacity Mitigation
- KSB-2 Coordination with Groundwater Regulatory Programs
- KSB-3 Exceedance Policy
- KSB-4 Coordination with Basin Study (Data Gaps)
- KSB-5 Domestic Well Mitigation Plan/Emergency Water Supply
- KSB-6 White Land Demand Management
- KSB-7 Well Registry
- KSB-8 Consumptive-Use Study
- KSB-9 Subsidence Action Plan
- KSB-10 RMW Data Gaps

2024 PLAN: IMPLEMENTATION

- Annual Reporting
- Monitoring and data collection
- Data gap filling
- Projects and Management Actions
- Technical/non-technical coordination activities
- Continued outreach and engagement with stakeholders
- Enforcement and response actions *(Exceedance Policy)*
- Evaluation and updates *(as required by periodic evaluations)*

SUSTAINABILITY INDICATOR	DATA	START DATE	FREQUENCY	REPORTING
Groundwater Levels	Field Measurements	WY 1993	Semi-annual	DMS, SGMA Portal, Annual Reports
Groundwater Storage	Calculated from water levels	WY 1995	Annual	Annual Reports
Subsidence	InSAR Benchmark Surveys	WY 2016	Annual	DMS, Annual Reports
Water Quality	Grab Samples	WY 2024*	Semi-annual	DMS, SGMA Portal, Annual Reports
Interconnected Surface Water	*Not Applicable*			
Seawater Intrusion	*Not Applicable*			

SUBBASIN EXCEEDANCE POLICY

- Establishes protocols and guidelines for GSAs to investigate exceedance of MTs at RMN sites following data collection identification of a MT Exceedance *(reported to GSAs through DMS)*
- Each GSA is responsible for: *monitoring GW conditions, complying with GSP requirements, coordinating with other agencies, entities, and beneficial users within their boundaries*
  - Requires GSAs to report MT Exceedances in Annual Reports
  - Reaffirms data collection protocols and policies
- Steps for identification, investigation, and involvement of the Subbasin Coordination Committee to consider actions to prevent continued exceedance

SUBBASIN WELL MITIGATION PROGRAM

- Subbasin worked with **Self-Help Enterprises** to develop a *Subbasin-wide Well Mitigation Program*
- Implementation by January 2025

KERN SUBBASIN MITIGATION PROGRAM

Mitigation Track

Emergency & interim supplies and a physical long-term solution

domestic (house) well owners

multi-use drinking water well owners

Administered by Self-Help Enterprises
Reimbursed by the GSAs

Technical Assistance Track

Up to $50,000 for technical assistance towards a long-term solution

municipal well owners

industrial well owners

small community well owners

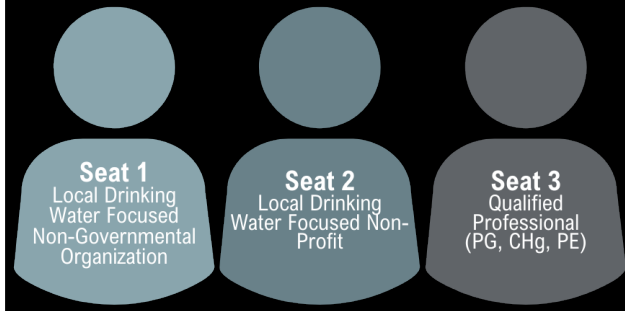
Administered by the GSAs

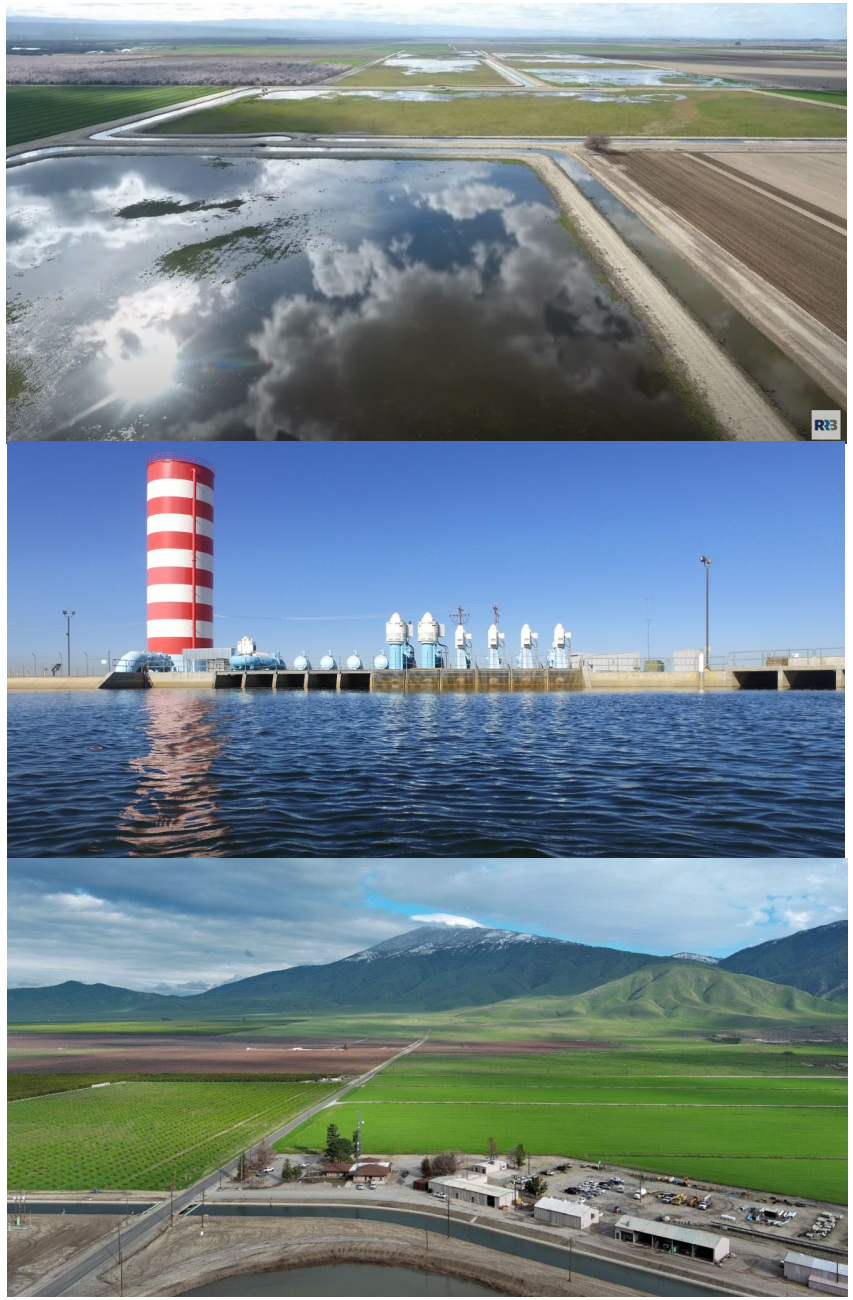
Qualification Criteria:

1. The impact occurred after January 1, 2015
2. The impact was caused by groundwater management activities

Evaluation of Eligibility:

1. Evaluation by a qualified professional
2. Evaluation by a three-member committee



NEXT STEPS

- Goal is to have 2024 Plan adopted and submitted to the SWRCB week of 16 December 2024
- Probation hearing scheduled for February 2025
- Final Staff Report expected 2 to 3 weeks ahead of hearing