NORTHERN DELTA-MENDOTA REGION PUMPING REDUCTION PLAN

October 2024

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Prepared for:

Northern Delta-Mendota Region Management Committee

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NORTHERN DELTA-MENDOTA REGION PUMPING REDUCTION PLAN

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1 INTRODUCTION

The Northern Delta Mendota Region Management Committee (Committee) has developed this Pumping Reduction Plan (PRP) in accordance with Section 16.1 of the 2024 revised Groundwater Sustainability Plan (GSP) for the Delta Mendota Subbasin (Basin). The PRP addresses the following six required components of the GSP:

(1) Monitoring and Data Collection Plan,
(2) Overdraft Mitigation Plan,
(3) Groundwater Level Minimum Threshold (GWL-MT) Avoidance Plan,
(4) Water Quality Minimum Threshold (WQ-MT) Exceedance Plan,
(5) Subsidence Avoidance Plan, and
(6) Groundwater Allocation Backstop.

This PRP is applied to the five groundwater sustainability agencies (GSAs) forming the Committee (member GSAs), namely the City of Patterson GSA (City GSA), DM-II GSA, Northwestern Delta-Mendota GSA (NW-DM GSA), Patterson Irrigation District and Twin Oaks GSA (PID GSA), and West Stanislaus Irrigation District (WSID GSA).

For applicable PRP components, specific triggers and procedures are defined. These include an entry trigger to activate the PRP, a zone of impact (ZOI) to determine where the PRP will be applied, a cutback approach to provide quantitative estimates of pumping reductions, an exit trigger to conclude the cutback once objectives are met, and enforcement measures to ensure successful implementation. Additional monitoring and reporting requirements are outlined in each component, aligning with the Monitoring and Data Collection Plan. Wells solely used to supply de minimis groundwater users[1] are not subject to pumping cutbacks required under this plan.

Although the Committee has worked diligently to create this plan in support of achieving the GSP sustainability goals, the PRP is designed as a living document. It will be updated and adapted as new data and information become available to better serve the Committee and the Basin in achieving its sustainability goal.

Each responsible GSA will implement this Pumping Reduction Plan (PRP), with coordination and oversight provided by the Committee and the Basin Coordination Committee as applicable, unless otherwise specified. The processes and protocols for monitoring, reporting, and data sharing follow what is outlined in the GSP and/or agreed upon in the Basin GSAs' Memorandum of Agreement (MOA), unless otherwise specified. Enforcement of the PRP will follow the agreements outlined in the MOA, unless otherwise specified.

[1] De minimis user is defined as a user that extracts two acre-feet or less per year of groundwater for domestic purposes.

2 MONITORING AND DATA COLLECTION PLAN

In accordance with Section 16.1 of the GSP, the Monitoring and Data Collection Plan developed by each GSA or GSA Group must include commitments and strategies for achieving the eight components outlined in Table 1. The Committee members have committed to meeting all these requirements as detailed in Table 1.

Table 1. Scheduled Compliance with the Requirements of the Monitoring and Data Collection Plan

Requirement	Commitment
Regular monitoring network(s) assessment	To be conducted on a regular basis, at least once annually, by the Committee
Quarterly groundwater level monitoring	To be implemented starting Fall 2024
Semiannual water quality monitoring	To be implemented starting Fall 2024
Well registration policy	All members will have adopted policies prior to January 2025
Well metering policy	
Well extraction reporting policy	To be measured and reported at least annually, or more frequently as needed by other plans, starting January 2025, and based on metered pumping starting January 2026
Provide well construction information for all monitoring wells	Committee is already in compliance
Replacing composite/production wells in the monitoring network with dedicated monitoring wells by 2030	Committed to complete by 31 December 2029, as-needed, and as appropriate and feasible.

3 OVERDRAFT MITIGATION PLAN

3.1 Objective and Requirement

Per Section 16.1.1.2 of the GSP, the member GSAs are required to reduce their average pumping, based on the overdraft evaluation period (Water Year [WY] 2003 to WY 2023), by approximately 9,000 acre-feet per year (AFY) in the Lower Aquifer by 2030. The GSP mandates achieving this reduction through an annual minimum of 20% of the total apportioned pumping cut, beginning in January 2025 and continuing each year for the following five years accomplishing the total minimum reduction by the end of 2030.

3.2 Implementation Approach

Each member GSA will reduce its pumping from the Lower Aquifer from the Model-estimated pumping for WY 2019-2023, as shown in Table 2. Pumping reduction under this plan may be adjusted and adapted based on model updates and the availability of additional data and measurements.

Table 2. Planned Lower Aquifer Pumping by 2030

Member GSA	Annual Pumping Reduction Starting in 2025 (AFY)	Target Pumping Reduction by 2030 (AFY)
City GSA	92	460
DM-II GSA	1,100	5,498
NW-DM GSA	194	968
PID GSA	83	417
WSID GSA	336	1,680
Total	**1,805**	**9,023**

3.3 Additional Monitoring and Reporting Requirements

Planned pumping reductions will be verified and adjusted through pumping estimation using evapotranspiration (ET) products in 2025 and metered pumping after, conducted according to the Monitoring and Data Collection Plan and GSA-adopted well registration, metering, and reporting requirements.

3.4 Enforcement

The Groundwater Allocation Backstop will be enforced in cases of implementation lapses. GSAs that fail to achieve their respective target pumping reduction will be subject to the groundwater allocation backstop per the GSP (Section 16.1.1.6) until the specific targets are met. If a GSA fails to meet its annual pumping reduction for any year, it is required to submit a report detailing the reasons for the shortfall and the corrective actions planned to return to the step-wise reduction targets. The Committee reserves the right to require the GSA to implement the groundwater allocation backstop if the failure is unjustified and/or the proposed corrective measures are insufficient until it is certain the annual reduction schedule can be met. Further actions governed by the dispute resolution mechanisms in the MOA.

4 GROUNDWATER LEVEL MINIMUM THRESHOLD AVOIDANCE PLAN

4.1 Objective and Requirements

Per Section 16.1.1.3 of the GSP, member GSAs are required to identify GWL-MT hotspots[2] based on defined triggers by the end of February each year for identified groundwater level representative monitoring wells (RMW-WL) within each principal aquifer and implement targeted pumping cutbacks, on an acre-foot per acre basis. These cutbacks will be applied at the rate and within an area determined by Zone of Impact (ZOI) and Cutback Approach (Section 4.3), accompanied by increased monitoring frequency, and adapted as required and justified under this plan.

4.2 Investigation Trigger

The occurrence of any of the following conditions at an RMW-WL triggers a GWL-MT investigation may lead to hotspot designation and require pumping reductions:

- Exceedance of the GWL-MT, determined by comparing the most recent seasonal low measurement (Fall) to the defined MTs (per GSP Section 16.1.1.3); OR
- Projected exceedance of the GWL-MT, based on the linear trend of the previous four Fall groundwater level measurements (using the seasonal average if multiple measurements are taken; per GSP Section 16.1.1.3); OR
- A seasonal high (Spring) groundwater level measurement lower than the RMW-WL-specific spring target level. If insufficient data exists to establish a spring target level, the February GWL from the last year without a GWL-MT exceedance will be used as a substitute.

If multiple measurements are taken during a season, the average will be used for comparison. Spring target levels are defined for each RMW-WL by adding the respective GWL-MTs to the average seasonal variation, which is calculated as the long-term average (typically more than six years) difference between seasonal highs and lows at the RMW-WL. A graphical demonstration of each trigger, using hypothetical hydrographs, is provided in Appendix A.

4.3 Investigation Approach

The investigation should focus on verifying the groundwater level measurement at the RMW-WL, ensuring it is not affected by pumping at the well, nearby wells, or any unusual management practices in the area. At a minimum, the investigation should include:

- Taking verification measurements after a sufficient shutoff period to allow groundwater levels at the RMW-WL to stabilize;
- Groundwater level measurements at nearby wells, as needed, for trend comparison; and
- Analysis of pumping activity around the RMW-WL to identify any significant deviations from typical practices.

[2] Per GSP, if groundwater levels at an groundwater level representative monitoring wells (RMW-WL) exceeds established trigger levels, or is projected to exceed an MT, an investigation is required to determine if the RMW-WL should be designated as MT hotspot and require an RMW-WL. This plan will designate an RMW-WL that exceeds any of the cutback entry triggers an MT hotspot.

The implementing GSAs should conduct the investigation within the same measurement season, not exceeding 30 days from the initial measurement, and report the results to the Committee. If the verification and investigation do not provide sufficient evidence to refute the projected exceedance of the trigger, the RMW-WL should be classified as a GWL-MT hotspot and follow the cutback requirements outlined in this policy.

4.4 Zone of Impact and Cutback Approach

The ZOIs around hotspot RMW-WLs will be delineated based on model simulations and validated through analytical calculations by a qualified professional (Professional Geologist, Professional Engineer, or equivalent). These zones represent areas where groundwater pumping directly influences water levels at the RMW-WL. The ZOIs may extend beyond GSA boundaries and are defined using a sensitivity threshold, which quantifies the change in GWL at the RMW-WL in response to pumping variations in different well clusters.

Sensitivities will be calculated as the rate of GWL change per unit of pumping reduction. To achieve the desired groundwater level recovery, defined as the difference between the measured GWL and the trigger target, a uniform acre-foot per acre pumping limit will be identified within the ZOI . The cumulative impact of the defined cutback across the ZOI will be assessed to estimate the overall recovery at the RMW using the estimated sensitivities. The objective is to minimize the total volume of pumping reduction while achieving the necessary groundwater level increase (An example process is provided in Appendix A). The estimations of the ZOI and the cutback serve as starting points and will be adaptive. Curtailment adaptation follows the 3-month rolling linear trend of groundwater levels, proportionally increasing or decreasing curtailment based on the difference between the slopes of the rolling 3-month trend and the trendline ending in Fall or Spring target levels.

Following the determination in February of each year, the uniform acre-foot per acre pumping limit will be implemented by the respective GSA(s) throughout the ZOI through communications with the applicable landowners/pumpers. Pumping within the ZOI and the need for any curtailment adaptation will be assessed by the respective GSA(s) on a quarterly basis to ensure compliance.

4.5 Cutback Exit Trigger

The pumping cutback may be exited upon occurrence of all of the following conditions:

- Cutbacks have been implemented for at least one water year (a period including consecutive Spring and Fall periods);
- Projected exceedance of GWL MT is projected to be avoided in the following year based on the linear trend calculated from the previous four Fall GWLs;
- An increasing spring level trend calculated based on the measurements made in the first quarter and Spring GWL has recovered to be above the Spring Target Level.

Following the determination that the exit trigger condition(s) have been met, the uniform acre-foot per acre pumping limit will be removed by the respective GSA(s) throughout the ZOI through communications with the applicable landowners/pumpers.

4.6 Additional Monitoring and Reporting Requirements

Per GSP Section 16.1.1.3, the GWLs and pumping within the ZOI will be measured monthly during the implementation of the pumping cutback. Measured data within the ZOI should be submitted to the

Committee within two weeks of collection. All data reported should also be imported into the Basin Data Management System (DMS) by the respective GSA(s). In the absence of metering, GSAs agree to report detailed surface water delivery data monthly, as applicable, and utilize Land IQ ET to estimate pumping.

4.7 Enforcement

The Groundwater Allocation Backstop will be enforced if a GSA fails to implement this plan within two quarters. Further actions will be governed by the dispute resolution mechanisms in the MOA.

5 WATER QUALITY MINIMUM THRESHOLD EXCEEDANCE PLAN:

5.1 Objective and Requirements

Per GSP Section 16.1.1.4, member GSAs are responsible for identifying exceedances or projected exceedances of a WQ-MT. If such exceedances are linked to Basin management (pumping or recharge), GSAs must investigate the cause and, if necessary, design and implement appropriate mitigation measures, including pumping cutbacks or other strategies, to prevent future WQ-MT exceedances caused by Basin management.

The WQ-MT Plan triggers pumping cutbacks only when a direct relationship or convincing linkage is established between changes in water quality concentrations exceeding or projected to exceed their MTs and management actions of the GSAs in the Basin or changes in groundwater levels. In the absence of such correlations or due to data gaps, continued monitoring and data collection are prioritized. When necessary, pumping cutbacks are implemented using the same approach outlined in the GWL-MT Plan. A general framework of this plan is illustrated in Figure 1.

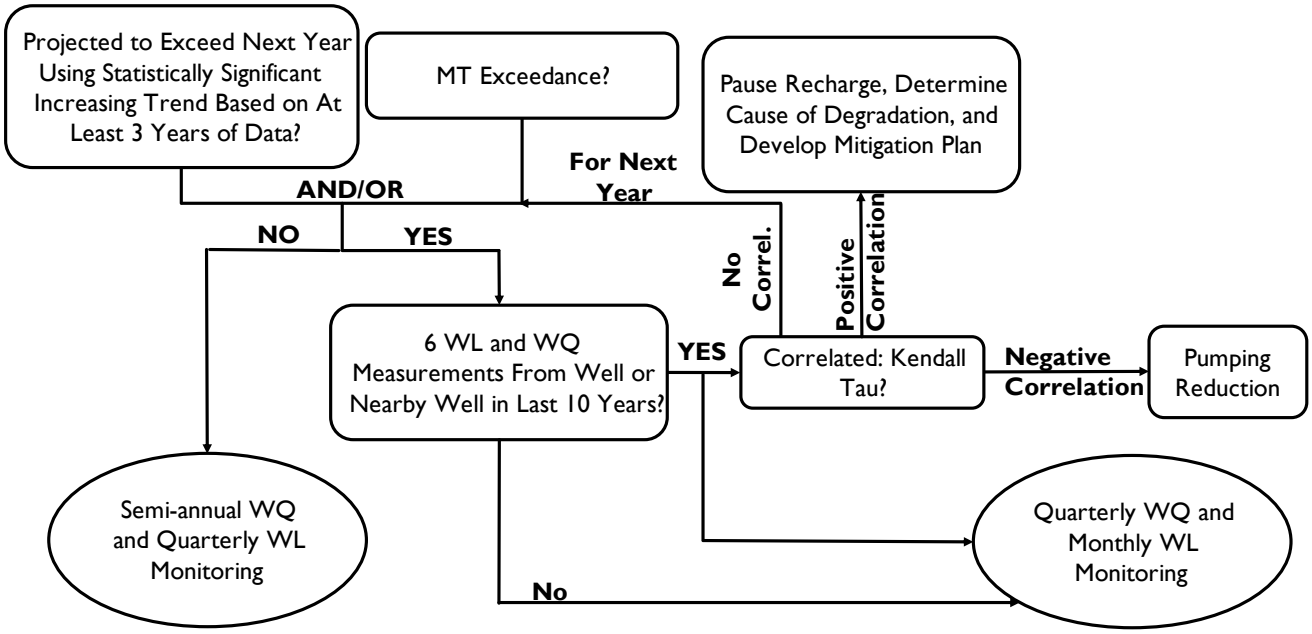

Figure 1. Investigation and Pumping Cutback Workflow for WQ-MT Plan

5.2 Investigation trigger

The occurrence of any of the following conditions at an identified groundwater quality representative monitoring well (RMW-WQ) triggers an investigation to assess the cause of the degradation and its correlation with groundwater level changes

- Exceedance of the WQ-MT, determined by comparing the most recent seasonal low measurement (Fall) to the defined MTs (per GSP Section 16.1.1.4); OR
- Projected exceedance of the WQ-MT, based on a statistically significant linear trend of the previous three Fall groundwater level measurements (using the seasonal average if multiple measurements are taken; per GSP Section 16.1.1.4).

The statistical significance of a linear trend is determined using the p-value of the linear model. A p-value of less than 0.05 is generally considered statistically significant, but this threshold can be adjusted based on sample size and professional judgment. It's important to note that the occurrence of an investigation trigger does not automatically necessitate the implementation of pumping cutbacks.

5.3 Investigation Approach

Respective GSAs are required to conclude an investigation within 60 days of reporting a WQ-MT investigation trigger and recommend next steps to be taken to the Committee. A Kendall Tau test[3] will be used to assess potential correlations between water quality (WQ) and GWLs at a triggered RMW-WQ site. At least six WQ/GWL sample pairs from the same or nearby wells are required, with pairs consisting of samples collected within the same year and season (e.g., Fall of a specific year) or within a sufficiently close timeframe.[4] If there are not enough samples, monitoring will continue until sufficient data is available. For groundwater management projects (e.g., recharge facilities) with known operational changes, additional case-specific investigations will be performed.

A significant correlation is identified when at least six WQ/GWL measurements, taken within the last decade—including at least one from the current year—yield an absolute Kendall Tau coefficient ($|\tau|$) of 0.6 or greater and a p-value of 0.05 or less.[5] If a statistically significant correlation is not found or if the sample size is insufficient, more frequent sampling is implemented until a re-evaluation is possible. Otherwise, mitigation is triggered for the RMW-WQ and it is assigned as a WQ hotspot. A correlation between declining GWL and WQ prompts a reduction in pumping, while any correlation between GWL and WQ for recharge projects will require actions related to project implementation.

5.4 Mitigation Approach

Following the requirements of the GSP Section 16.1.1.4, upon triggering mitigation, respective GSAs will have 90 days to propose a mitigation action plan to address increased concentrations of constituents of concern (COCs) and prevent future exceedances of WQ-MTs. The responsible GSA is required to notify groundwater pumpers within a three (3) mile radius of the RMW-WQ exceeding the trigger about the projected degradation and potential mitigation. The mitigation approach will depend on whether the trigger is caused by GWL declines due to pumping or by the implementation of projects and management actions (P/MAs), primarily recharge projects.

5.4.1 Mitigation for Degradation Due to Groundwater Level Decline

When WQ degradation is linked to GWL declines, a temporary GWL-MT hotspot is established at the RMW-WQ, or a nearby well with similar construction, to monitor and control conditions. The temporary

[3] The Kendall Tau Test is a non-parametric statistical method used to measure the strength and direction of association between two variables. It is particularly useful when the data does not meet the assumptions of normality, and it works well with small sample sizes, making it a flexible choice for assessing correlations in datasets with limited observations (Kendall, M. G. "A New Measure of Rank Correlation." Biometrika 30, no. 1/2 (1938): 81–93. https://doi.org/10.2307/2332226.).

[4] In the absence of sufficient data or at the beginning of implementation, more flexible thresholds may be necessary, and samples from different years could be considered as pairs for the Kendall Tau test.

[5] The p-value of less than 0.05 is a typical threshold for hypothesis testing and statistical significance. These correlations can be loosened by the GSAs on an as-needed basis and based on professional judgment. It is recommended that depending on sample size and data available, a larger p-value is considered to be sufficient when a clear correlation can be observed from hydrographs.

GWL trigger is set to the previous year's seasonal high (average Spring water level). Pumping cutback is implemented following the GWL-MT process, based on the temporary GWL trigger set at the well, acting as the target level and the most current seasonal high measurement. The uniform acre-foot per acre pumping limit will be implemented by the respective GSA(s) throughout the ZOI through communications with the applicable landowners/pumpers. Pumping within the ZOI and the need for any curtailment adaptation will be assessed by the respective GSA(s) on a quarterly basis to ensure compliance.

Upon achieving the GWL target, the conditions will be reevaluated. If cutback exit trigger is not met (WQ is not stabilized), the WQ/GWL correlation will be re-investigated. If a significant correlation persists, further cutbacks should be implemented.

5.4.2 Mitigation for Degradation Due to Recharge Projects

If it appears that the WQ-MT has been triggered by a recharge project, the investigation will determine if the degradation results from factors such as poor-quality recharge water, flushing of soil constituents, geochemical reactions, altered groundwater gradients, etc.

Following the requirements of the GSP Section 16.1.1.4, the respective GSA will submit a detailed mitigation plan to the Committee within the 90-day time frame. The recharge project must be paused during this period and until the exit trigger is met unless the GSA can justify successful mitigation through modified or continued operation. The plan should address the source of water quality degradation, identified in the investigation, and propose modifications to operations to mitigate incurred impacts. Throughout this period, WQ monitoring continues to ensure that any future triggers are addressed promptly. These actions aim to ensure a stable balance between groundwater recharge efforts and the protection of groundwater quality in the Basin, adapting as needed based on new data and observations.

5.5 Exit Trigger

Mitigation action (pumping cutback or mitigation plan) can be exited if any of the following occur:

- GWL target is met, and WQ at the hotspot RMW-WQ does not show a statistically significant increasing trend using the last three measurements; OR
- GWL target is met, and a significant correlation between WQ and GWL can no longer be established; OR
- Projected WQ at the RMW-WQ will not exceed the respective WQ-MT.

Following the determination that the exit trigger condition(s) have been met, the respective GSA(s) throughout the ZOI will communicate the removal of mitigation measures to the applicable landowners/pumpers.

5.6 Additional Monitoring and Reporting Requirements

Monitoring will be generally conducted as outlined under the Monitoring and Data Collection Plan. Following the requirements of the GSP Section 16.1.1.4, if an investigation is triggered but insufficient data is available to conduct meaningful investigation and statistical correlation, WQ monitoring at the triggered RMW-WQ, and at least one upgradient and one downgradient RMW-WQ well, will be increased to quarterly sampling for the specified COC. GWL measurement at the triggered RMW-WQ, the upgradient and downgradient RMW-WQ, and the identified nearby wells will be increased to monthly. For any recharge project, regardless of trigger status, a minimum of quarterly WQ monitoring should be conducted at least in one upstream and one downstream well. Pumping should be measured monthly

within the ZOI. All measurements and monitoring conducted under this plan should be reported to the Committee within two weeks. All data reported should also be imported into the Basin DMS by the respective GSA(s).

5.6.1 Enforcement

Enforcement of this plan is governed by the dispute resolution mechanisms in the MOA. When pumping cutbacks are implemented, enforcement mirrors the procedures used for GWL-MT violations. In such cases, failure to comply with implementation or a delay of more than two quarters will trigger the Groundwater Allocation Backstop.

6 SUBSIDENCE AVOIDANCE PLAN

6.1 Objective and Requirements

Per GSP Section 16.1.1.5, member GSAs are required to proactively address progressing land subsidence that does not or is not projected to comply with the requirements of the GSP. The Subsidence Avoidance Plan has two components that lead to different requirements. The Critical Infrastructure Component only applies to critical infrastructure and includes areas around the Delta Mendota Canal (DMC) and California Aqueduct (Aqueduct) in the Northern Delta Mendota Region (Region). The Hotspot Mitigation Component applies to the entire Basin and will correspondingly apply to the entire Region.

6.2 Cutback Entry Trigger

The pumping cutback under the Subsidence Avoidance Plan is triggered under the following conditions for each component, per GSP Section 16.1.1.5:

- **Critical Infrastructure Component**: the three-year average subsidence rate exceeds 0.2 feet per year (ft/year) within 0.5 miles of critical infrastructure (DMC and Aqueduct, shown in Figure 2)
- **Hotspot Mitigation Component:** The five-year linear trend established based on InSAR data indicates a projected subsidence of more than 2.0 feet by 2040 (MT), or more than 0.5 feet by 2030 (IM) or exceedance of any subsequent IM.

Triggers under both components will be based on subsidence caused by Basin management, or under conditions that such causality cannot be justifiably established. Appendix A provides examples of hypothetical cases of triggers under both components and applicable ZOIs and cutbacks under this plan.

6.3 Zone of Impact and Cutback Approach

6.3.1 Critical Infrastructure Component

Zone of exceedance is the area within 0.5 miles of the critical infrastructure where the three-year average subsidence rate exceeds 0.2 ft/year, symmetrically defined on both sides of the critical infrastructure. The ZOI will be identified as the zone of exceedance plus the areas where the three-year average subsidence rate exceeds 0.1 ft/year contiguous with such defined zone of exceedance.

Pumping cutback starts at 0.35 AFY/acre (approximately the estimated sustainable yield for the Lower Aquifer in the Region)[6] within the ZOI. Groundwater extraction over this estimated sustainable yield is considered likely to contribute to the projected exceedance of subsidence thresholds. The uniform acre-foot per acre pumping limit will be implemented by the respective GSA(s) throughout the ZOI through communications with the applicable landowners/pumpers. Pumping cutbacks are increased based on rolling annual average rates of subsidence to ensure reduction in subsidence. However, pumping cutbacks can only be decreased annually, based on rates calculated over the same period as the entry trigger. The adjustment to pumping cutbacks will be estimated by a qualified professional (Professional Geologist, Professional Engineer, or equivalent). Per GSP Section 16.1.1.5, no new Lower Aquifer or Composite Wells are permitted within the ZOI until the exit trigger is met.

[6] The Committee may adjust this limit upon availability of additional data and information.

6.3.2 Hotspot Mitigation Component

The ZOI is defined as a radius of 0.5 miles around any point that meets the cutback entry trigger. Pumping cutbacks are initiated at a rate of 0.35 AFY/acre (approximately the estimated sustainable yield for the Lower Aquifer in the Region)[7] and adjusted based on rolling annual average subsidence rates. The uniform acre-foot per acre pumping limit will be implemented by the respective GSA(s) throughout the ZOI through communications with the applicable landowners/pumpers. The adjustment to pumping cutbacks will be estimated by a qualified professional (Professional Geologist, Professional Engineer, or equivalent).

If ZOIs defined under different components intersect, the largest overlapping area is subject to the most stringent criteria under the Subsidence Avoidance Plan. Adjustments to the pumping cutback under both components should be made based on the ratio of cutbacks to reduced subsidence achieved.

6.4 Cutback Exit Trigger

Pumping cutback under the Subsidence Avoidance Plan may be relieved if the conditions defined under each respective component below are met:

- **Critical Infrastructure Component**:
    - the four-year average subsidence rate within the ZOI is smaller than 0.1 feet per year (ft/year), per GSP Section 16.1.1.5; OR
    - GSA(s) can provide justification in the form of a technical report from a qualified professional to sufficiently demonstrate that subsidence is not caused due to pumping within ZOI, using multiple years of pumping measurement data gathered after the trigger
- **Hotspot Mitigation Component:**
    - Subsidence due to Lower Aquifer Pumping attributable to Basin is eliminated, per GSP Section 16.1.1.5; OR
    - The five-year linear trend established based on InSAR data no longer indicates exceedance of cumulative MT or IMs; OR
    - GSA(s) can provide justification in the form of a technical report from a qualified professional to sufficiently demonstrate that subsidence is not caused due to pumping within ZOI, using multiple years of pumping measurement data gathered after the trigger.

Following the determination that the exit trigger condition(s) have been met, the uniform acre-foot per acre pumping limit will be removed by the respective GSA(s) throughout the ZOI through communications with the applicable landowners/pumpers.

6.5 Additional Monitoring and Reporting Requirements

Monthly pumping measurements and subsidence rates (if available) should be reported to the Committee within two weeks of collection. All data reported should also be imported into the Basin DMS by the respective GSA(s). If subsidence data is unavailable, quarterly reporting is sufficient. GWL measurements in the Lower Aquifer should be measured monthly within the ZOI and reported within two weeks of collection. The number of new Lower Aquifer or Composite wells within the ZOI should be reported

[7] The Committee may adjust this limit upon availability of additional data and information.

monthly. For the purposes of the Subsidence Avoidance Plan, composite wells are conservatively considered Lower Aquifer wells for calculating pumping cutbacks and complying with other requirements, unless detailed data and information are provided to support a more precise apportionment and decision-making process.

6.6 Enforcement

The Groundwater Allocation Backstop will be enforced if a GSA fails to implement policy within two quarters. Further actions will be governed by the dispute resolution mechanisms in the MOA.

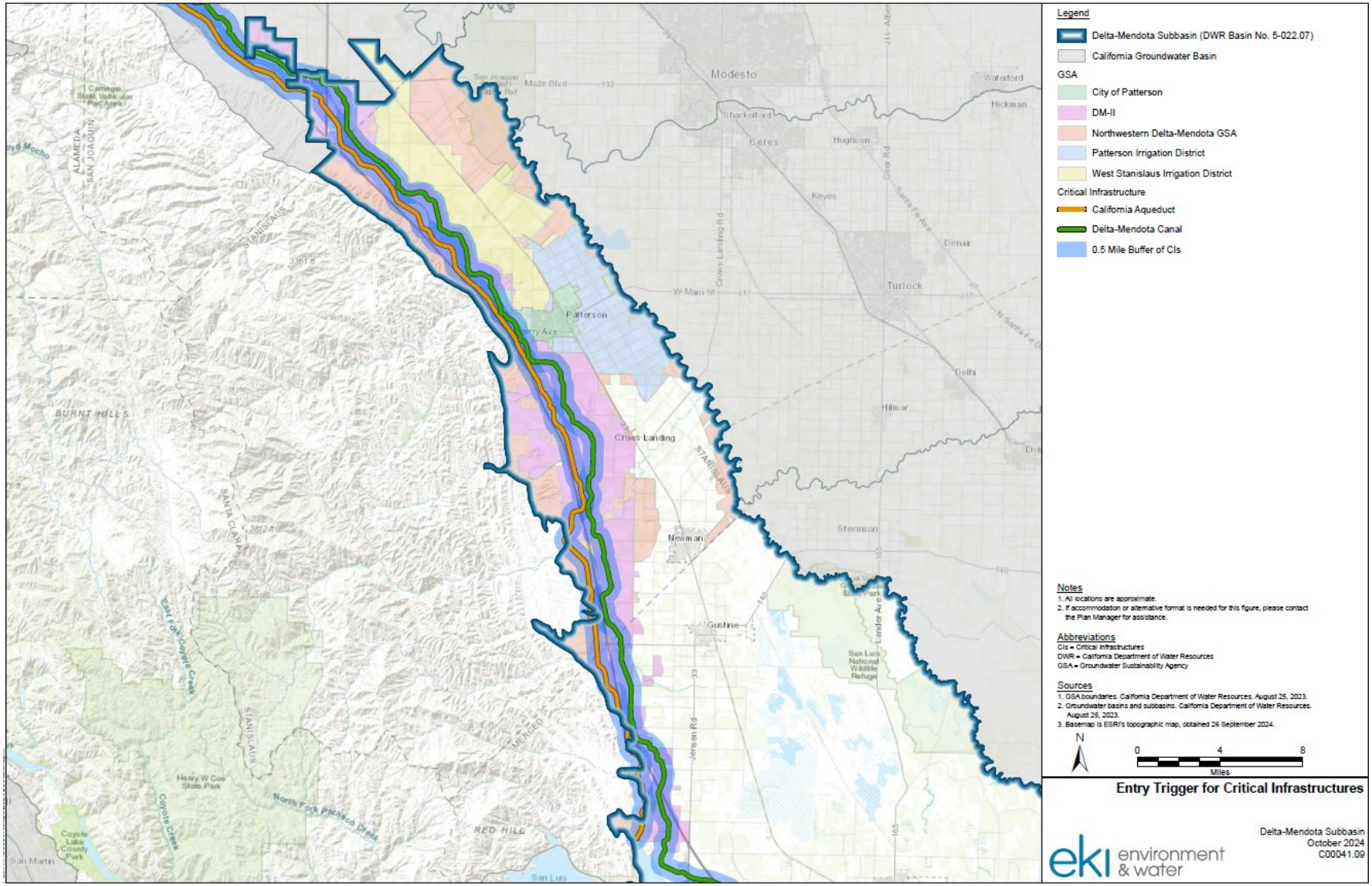

Figure 2. Area Around Critical Infrastructure Subject to Subsidence Avoidance Plan

7 GROUNDWATER ALLOCATION BACKSTOP

7.1 Objective and Requirements

Per GSP Section 16.1.1.6, and in accordance with Exhibit C of the MOA, GSAs are required to implement the groundwater allocation backstop plan if they cannot sufficiently meet the requirements of the GSP 2024.

7.2 Cutback Entry Trigger

The occurrence of any of the following conditions will result in groundwater allocation backstop:

- GWL-MT exceedances for 2 consecutive years; OR
- Failure to achieve allocated Overdraft Mitigation pumping reduction by 2030; OR
- Failure to comply with the GWL-MT or GWQ-MT requirements.
- Failure to comply with the Subsidence Avoidance Plan requirements.

7.3 Zone of Impact and Cutback Approach

This plan applies to the entire service area of the GSA subject to it. Pumping within the subjected GSAs will be limited to the estimated sustainable yield for the Basin and implemented through AFY/acre allocations. The uniform acre-foot per acre pumping limit will be implemented by the respective GSA(s) throughout the ZOI through communications with the applicable landowners/pumpers. GSAs may submit a request to the Committee to exit the groundwater allocation backstop when the triggering conditions are resolved. If approved by the Committee, groundwater allocation backstop can be exited by the subjected GSA(s).

7.4 Additional Monitoring and Reporting Requirements

Monthly pumping measurements should be reported to the Committee within two weeks of collection. All data reported should also be imported into the Basin DMS by the respective GSA(s).

7.5 Enforcement

Enforcement of the groundwater allocation backstop is governed by the dispute resolution mechanisms in the MOA.

Appendix A

Selected Slides from Presentations to the Northern Delta Mendota Region Management Committee Outlining Technical Approach to Implementation of PRP Components

OVERDRAFT MITIGATION PLAN

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(2) OVERDRAFT MITIGATION PLAN

- Target:
  - Reduce ~9,000 AFY of Lower Aquifer groundwater pumping by 2030
- High-level plan:
  - Reduce the amount by 20% per year between 2025-2030

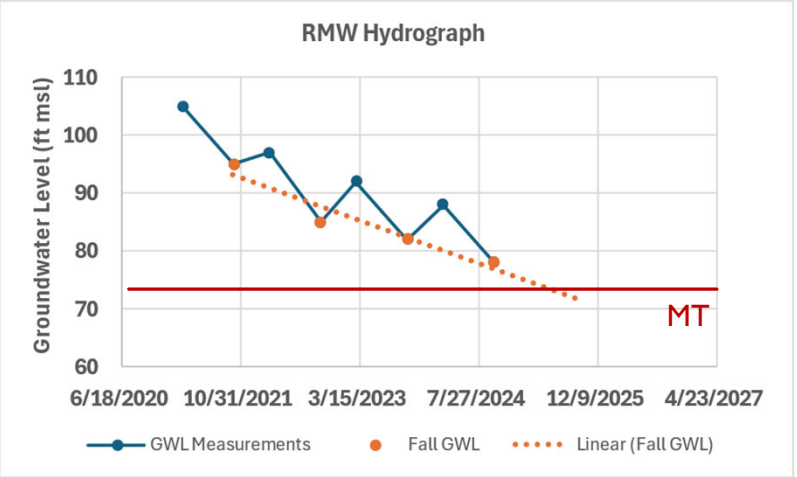
Member GSA	Annual Pumping Reduction Starting in 2025 (AFY)	Target Pumping Reduction by 2030 (AFY)
City GSA	92	460
DM-II GSA	1,100	5,498
NW-DM GSA	194	968
PID GSA	83	417
WSID GSA	336	1,680
Total	**1,805**	**9,023**

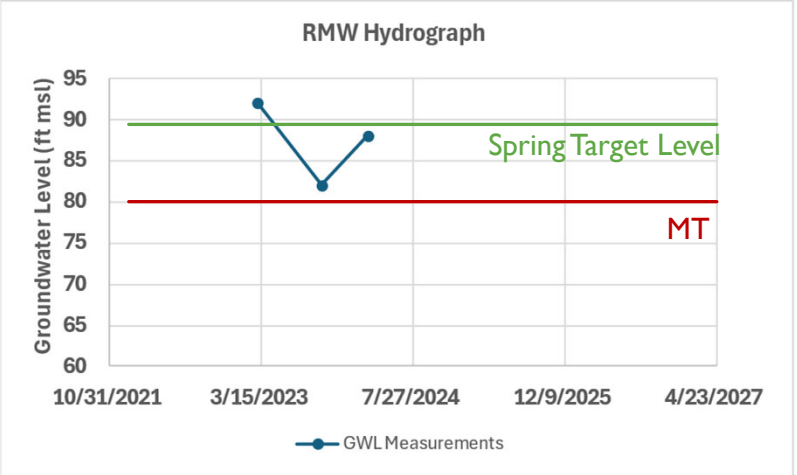
By Year End	City of Patterson GSA	DM-II GSA	NW-DM GSA	Patterson/Twin Oaks GSA	WSID GSA	Total
2026	92	1,100	194	83	336	1,805
2027	184	2,199	387	167	672	3,609
2028	276	3,299	581	250	1,008	5,414
2029	368	4,399	774	334	1,344	7,218
2030	460	5,498	968	417	1,680	9,023

GWL-MT AVOIDANCE PLAN

GWL-MT AVOIDANCE INVESTIGATION TRIGGER

- As described in Section 16.1.1.3 of Single GSP, exceedance of GWL MT or projected exceedance of GWL MT in a year following a four-year declining trend in Fall GWLs.
- Linear trend will be calculated based on the previous four Fall GWLs and extended for a year to assess the likelihood of MT exceedance.
- Compare the spring/winter level (February measurement) of the current year with established Spring target levels at each RMW.
  - Spring Target Level= MT + Average Seasonal Variation
  - If insufficient data to calculate average seasonal variation, the February level of last year will be substituted as the target level to be maintained.





Example investigation trigger illustration based on data availability

ESTABLISH CURTAILMENTS

- Curtailments will be established based on target GWL recovery and current February GWLs.
  - Target GWL Recovery

$$(GWLx)=Max\begin{cases}\text{Spring Target} - \text{Most Recent Spring Measurment}\\ \text{MT} - \text{Projected Fall Measurement Based on four year Trend}\end{cases}$$

- Zones of Impact and their respective sensitivities will be used to achieve the cumulative GWL recovery at the RMW, assuming superposition.
- This will lead to allocation/pumping reduction for each Zone of Impact.

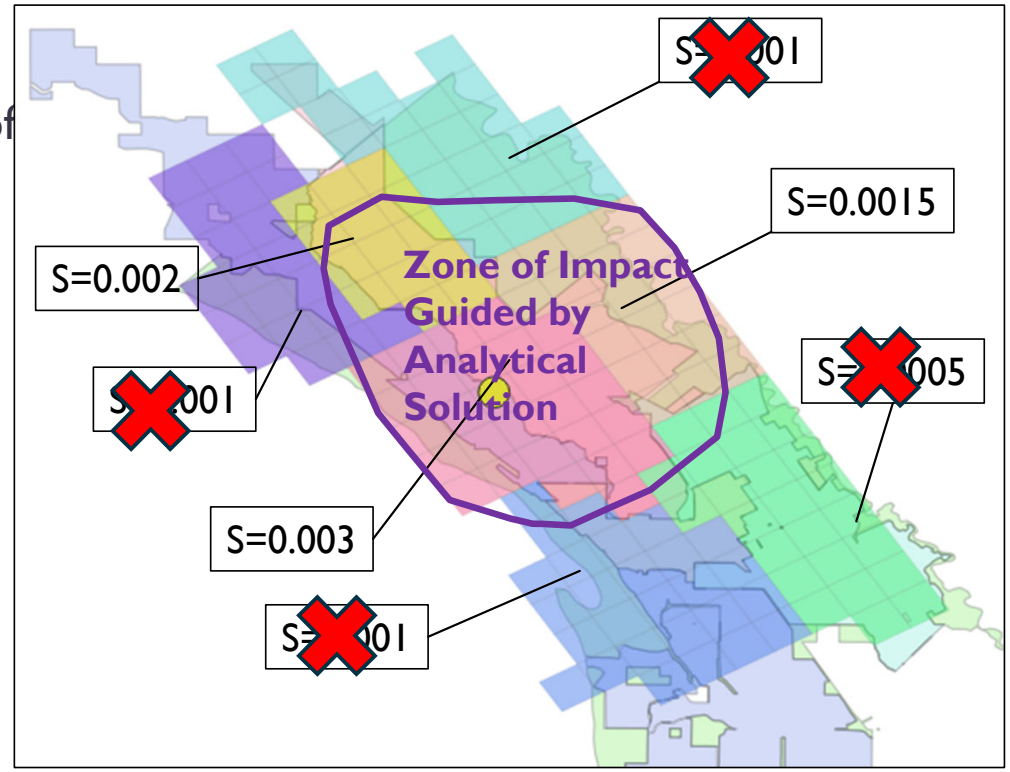
ESTABLISH CURTAILMENTS: EXAMPLE

- Sensitivities are defined for predefined clusters of cells:
  - Sensitivity: change in GWL at a specific RMW due to an incremental change in pumping at predefined clusters.
- Zone of Impact is defined based on a sensitivity threshold (ex. S>0.001), guided by analytical estimation.
- To achieve predefined GWL increase (GWLx):
  - $GWLx=PRP_{Zone\,1}*S_{Zone\,1}+\ldots+PRP_{Zone\,n}*S_{zone\,n}$

Subject to: Minimize (sum of PRP or AF/acre reduction)

Example:

2 (ft)=0.002*100+ 0.0015*100+550*0.003



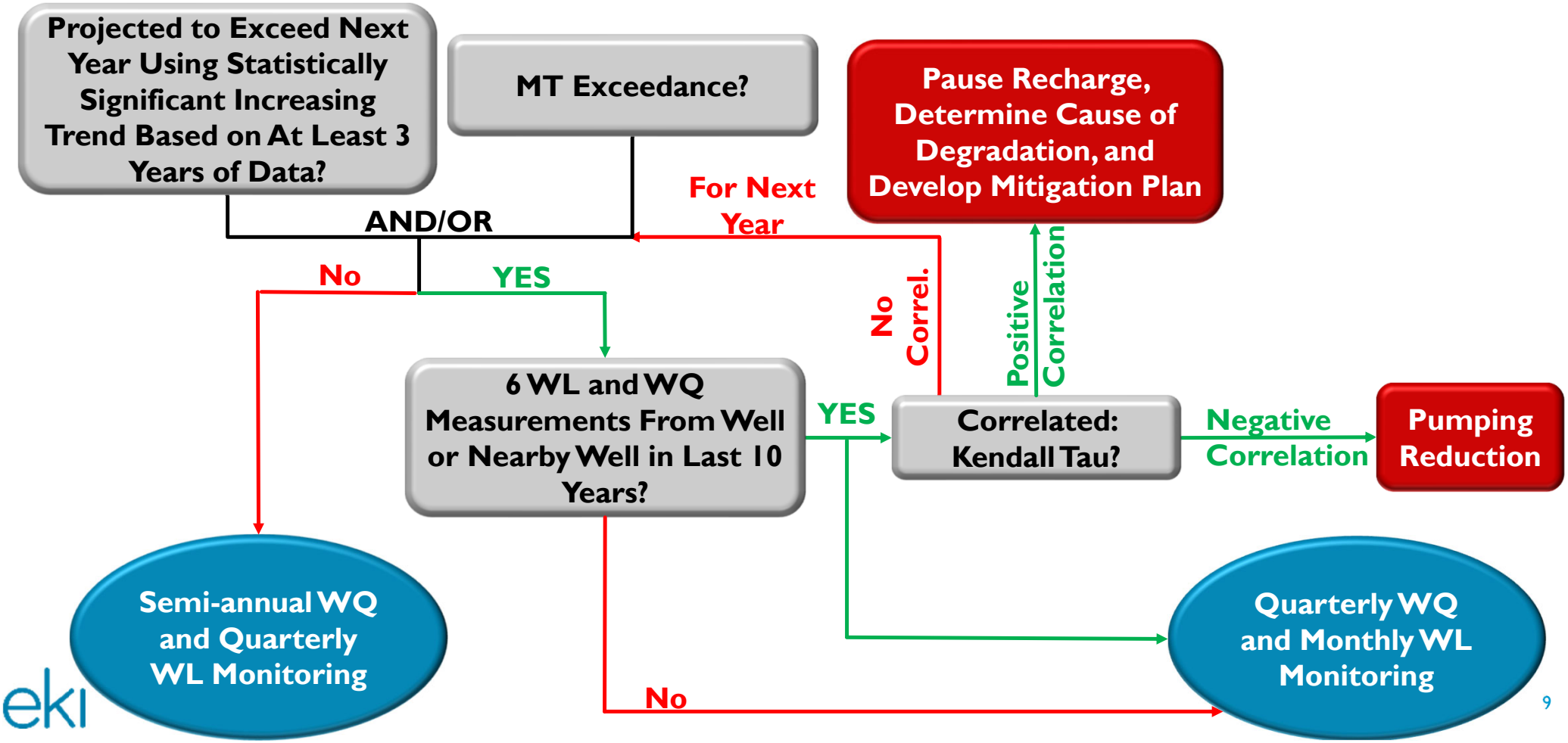
** Zones, selections, thresholds, and sensitivities are completely arbitrary and for illustration purposes.*

WQ-MT EXCEEDANCE PLAN

WQ-MT INVESTIGATION STEPS

- If at least 6 water level and concentration measurements have been taken within the last 10 years that can be used as pairs, including one in the current year:
  - Kendall Tau $|\tau| \geq 0.6$ and $p \leq 0.05$
  - Note that groundwater level and concentration measurements must occur in the same season as one another to serve as a data pair.
  - If correlation is not determined as significant, or there is not enough samples to conduct the test, continue more frequent sampling until re-evaluation is possible
  - To cover WQ impacts due to recharge projects under PRP, all recharge projects should include comprehensive monitoring at least as frequent as required under triggered PRP.
    - Data from upstream and downstream wells for the recharge project will be used to establish its impact on WQ degradation in nearby monitoring wells and the need for a mitigation plan.
- Check for declining water levels, increasing concentrations, or correlation in at least one upgradient and one downgradient well

PUMPING REDUCTION FOR WQ EXCEEDANCE



ESTABLISH ZONE OF IMPACTS AND CURTAILMENTS

- If caused by GWL declines due to pumping:
  - Deliver mitigation plan to Coordination Committee within 90 days:
    - Establish a temporary GWL MT hotspot at the well or a nearby well with similar construction
    - Temporary GWL trigger equals the previous year's seasonal high
    - Target GWL recovery in the first year
  - This will allow a re-evaluation of GWL/GWQ correlation at the well

DEGRADED WATER QUALITY DUE TO RECHARGE

- Pause recharge
- Deliver mitigation plan to Coordination Committee within 90 days:
  - Determines why recharge was degrading water quality
    - Poor quality recharge water (Recharge project monitoring data)
    - Flushing of constituents in soil (Recharge project monitoring data)
    - Geochemical reactions
    - Altered gradients
  - Mitigate impacts and/or provide sufficient additional data to reject the causality previously established.
- WQ quarterly monitoring should be conducted near the recharge site regardless of trigger as part of P/MA.

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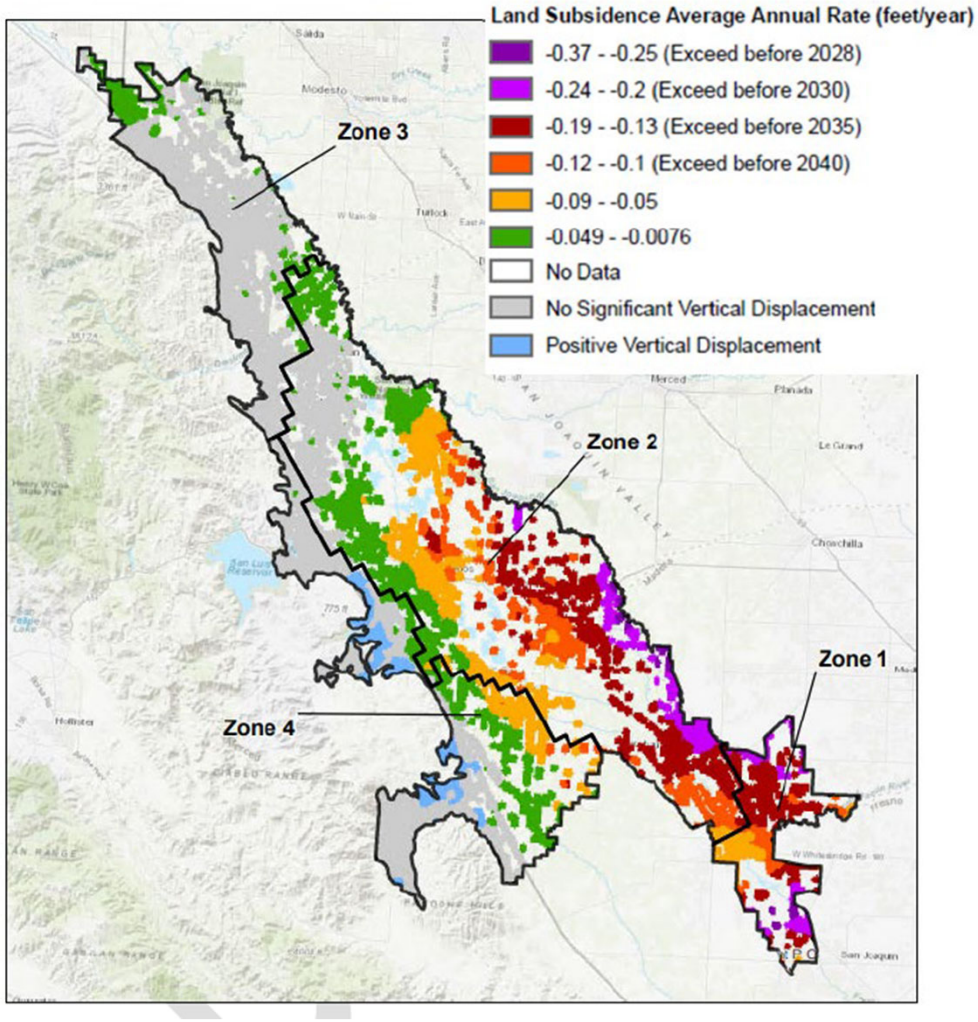
SUBSIDENCE MITIGATION POLICY

CUTBACK ENTRY TRIGGER

Triggers set in Section 16.1.1.5 of Single GSP:

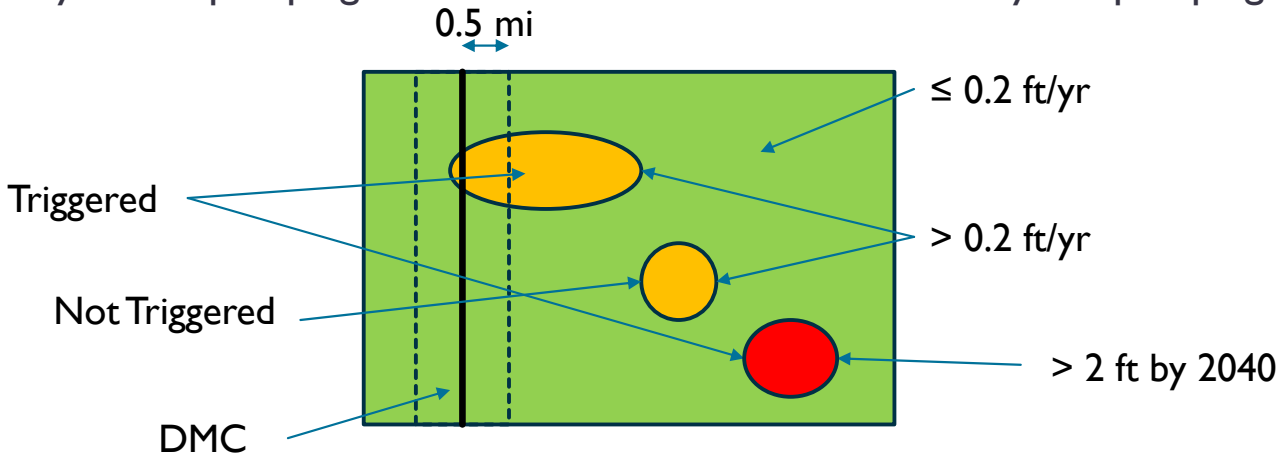
- Critical Infrastructure
  - 3-year average rate > 0.2 ft/year within 0.5 miles of critical infrastructure
- Hotspot
  - 5-year trend indicates > 2 ft by 2040 (MT) or > 0.5 ft by 2030 (IM)



CUTBACK EXIT TRIGGER

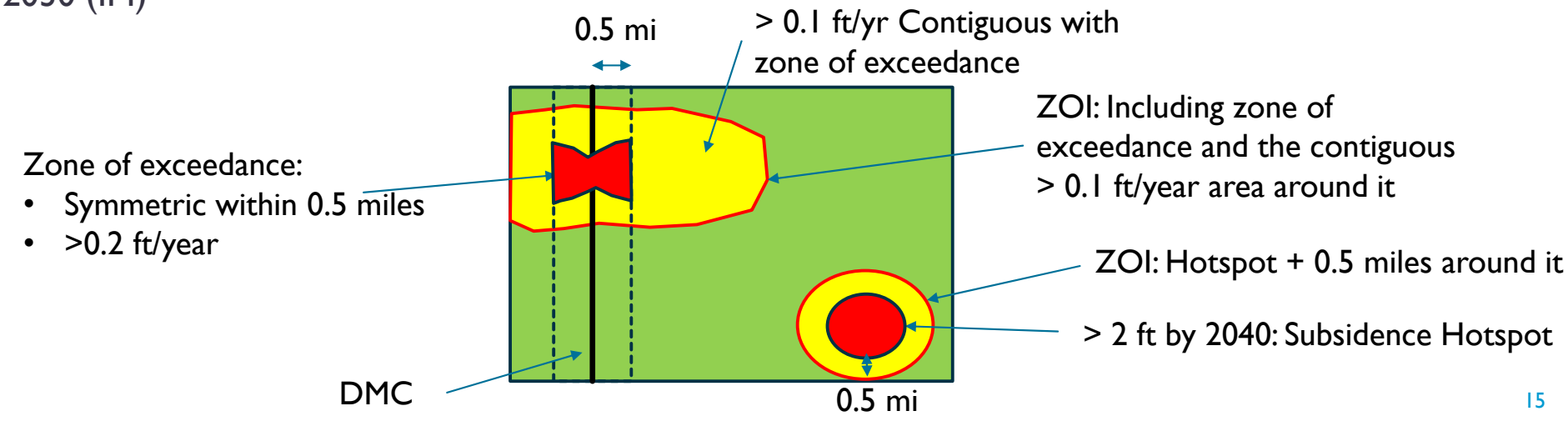
- Critical Infrastructure
  - 4-year average rate < 0.1 ft/year
  - GSAs can justify with multiple years of pumping data that subsidence is not caused by the pumping within ZOI.
- Hotspot Mitigation
  - Subsidence due to Lower Aquifer Pumping attributable to Basin is eliminated (PRP).
  - 5-year trend no longer indicates exceedance of cumulative 2 ft (MT) or 2030 IM.
  - GSAs can justify with multiple years of pumping data that subsidence is not caused by the pumping within ZOI.

Trigger Example



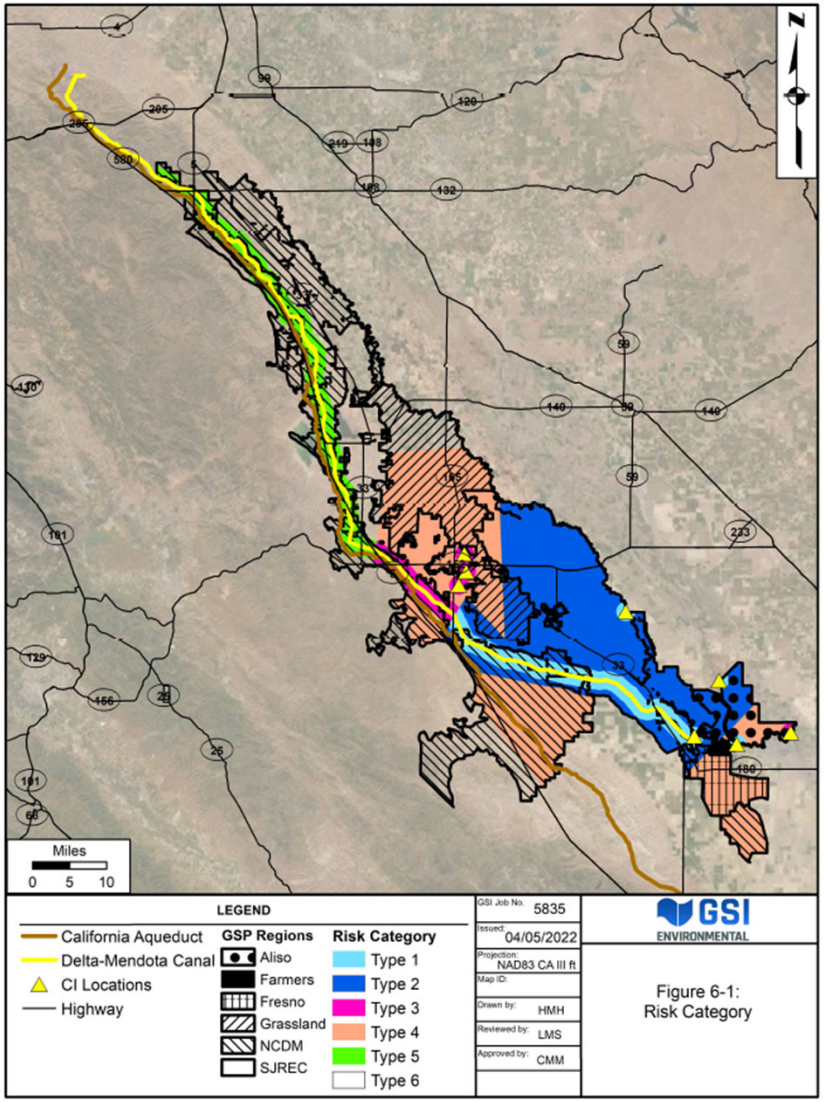
ESTABLISH ZONES OF IMPACT

- Critical Infrastructure
  - Zone of exceedance defined as anywhere with a 3-year average rate > 0.2 ft/year; symmetrically defined within 0.5 miles of critical infrastructure; and,
  - Areas with a 3-year average rate > 0.1 ft/year contiguous with the defined zone of exceedance above.
- Hotspot
  - Radius of 0.5 miles around any points that 5-year trend indicates > 2 ft by 2040 (MT) or > 0.5 ft by 2030 (IM)



ESTABLISH CURTAILMENTS

- NDM only includes zones 5 and 6 of the GSI masterplan.
- Critical Infrastructure
  - Start pumping reduction at 0.35 AFY/acre (Approximate SY for LA) within the Zone
  - Decrease pumping allocation based on rolling annual average rates.
  - Relieve pumping reduction only annually based on rates calculated over the same period as the trigger.
  - No new Lower Aquifer Wells within the zone until exit trigger is met.
- Hotspot Mitigation
  - Start pumping reduction at 0.35 AFY/acre within the Zone
  - Reduce or relieve based on annual rates
- Composite wells will be considered Lower Aquifer wells unless detailed data is provided on the well that facilitates dividing their pumping between the aquifers



Questions?