

Revised Modesto Subbasin Groundwater Sustainability Plan

May 29, 2024, Water Advisory Committee

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Important Milestones

- GSA formation deadline was June 30, 2017
- GSP was adopted by the Stanislaus County Board of Supervisors on December 7, 2021
- GSP was adopted by the Stanislaus River Groundwater Basin Association GSA and submitted to the Department of Water Resources, (DWR) as required for high priority groundwater subbasins on January 30, 2022.
- DWR completed reviews for 17 GSPs for high and medium priority groundwater basins. Of these, 7 plans were determined incomplete including the Modesto and Turlock Subbasin GSPs.
- June 25, 2024, Public Hearing for Stanislaus County GSP Adoption

Incomplete Determination

- The GSP is missing information that DWR needs to determine compliance with SGMA and the GSP regulations.
- GSP deficiencies must be corrected, and a revised plan submitted within 180 days and by July 16, 2024.
- If the deadline is missed, or if the DWR determines the revised plan is not adequate the State Water Resources Control Board will intervene with enforcement and can implement mandatory well metering, reporting, well registration fees of up to \$300 per non-exempt well, up to \$40 an acre foot of pumped water and implementation of an interim plan.

DWR Identified Deficiencies

- Deficiency #1: The GSP does not provide sufficient information to support the selection of sustainable management criteria for chronic lowering of groundwater levels and clearly identify the impacts to beneficial uses.
- Deficiency #2: The GSP does not include sufficient details of projects and management actions to mitigate overdraft in the Subbasin or provide a feasible path to achieve sustainability.

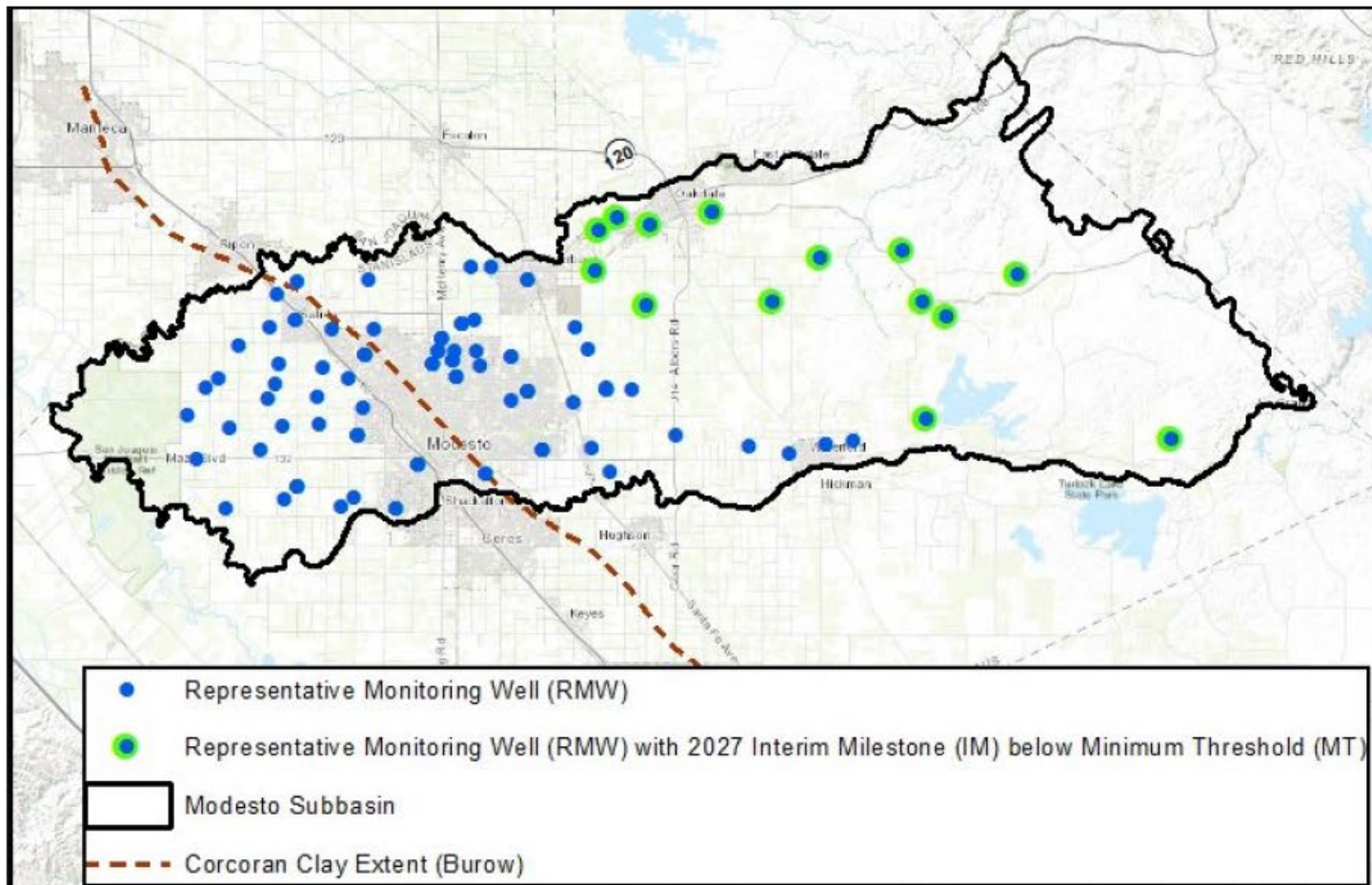
Corrective Action Number 1

- The GSP is being updated to include an analysis of the effects on beneficial users of groundwater from lowering the groundwater levels below the minimum thresholds (MTs) to the interim milestones, (IMs). Additional analysis was completed to determine well impacts and to further evaluate impacts on other sustainability indicators, (subsidence, water quality and interconnected surface waters).
- To mitigate the impacts of dry wells the GSAs and member agencies must commit to development, funding and implementation of a domestic well mitigation program.

Corrective Action Number 2

- The GSP is being revised to include specific details of implementing feasible projects and management actions. This includes establishing triggers, timelines, and committing to taking robust actions required to ensure that declining trends in groundwater levels are stopped and reversed before reaching the projected IM levels.

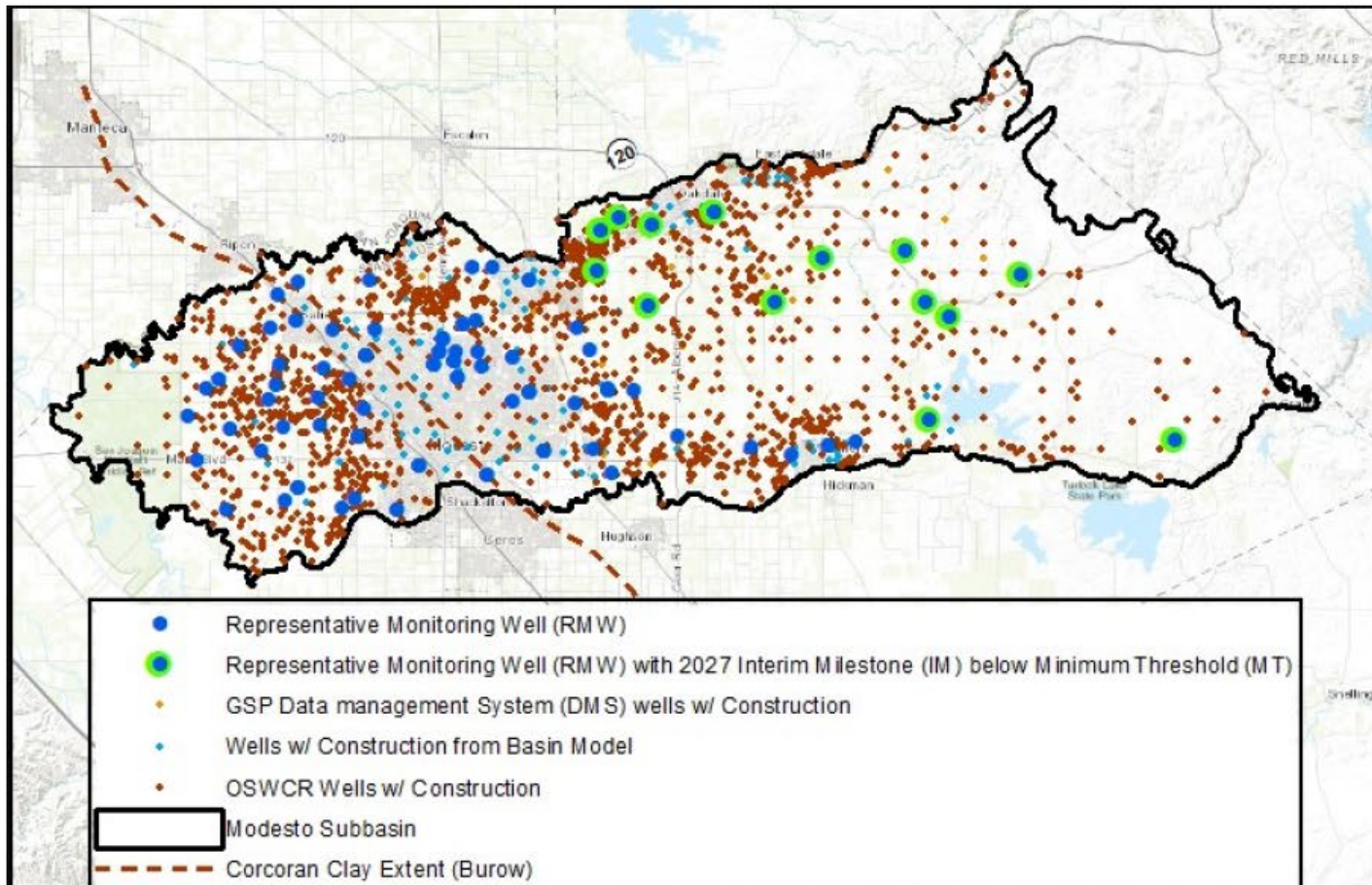
REPRESENTATIVE MONITORING WELL LOCATIONS



Representative monitoring wells with water level minimum threshold (MT), highlighted to show those with 2027 interim milestone (IM) below the MT

Source Todd Groundwater, Woodard and Curran. 5/22/24 STRGBA Meeting

AVAILABLE EXISTING WELL INFORMATION



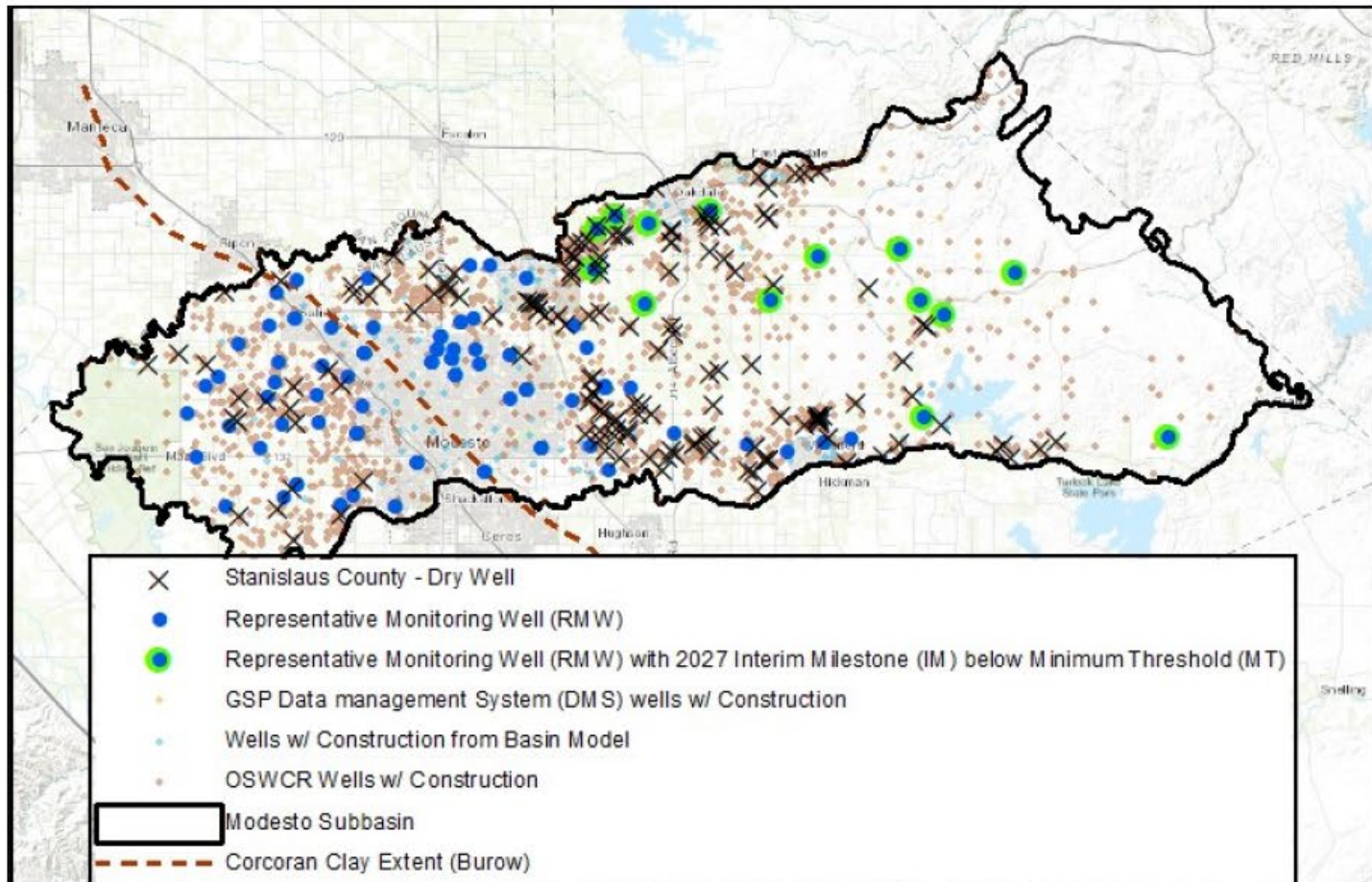
4,563 existing wells with construction included in this analysis.

Well information from:

- GSP data management system (DMS) (82 wells)
- Recent model updates (162 wells)
- DWR OSWCR (4,319 wells)

Source Todd Groundwater, Woodard and Curran. 5/22/24
STRGBA Meeting

HOUSEHOLD WATER SUPPLY SHORTAGE REPORTS

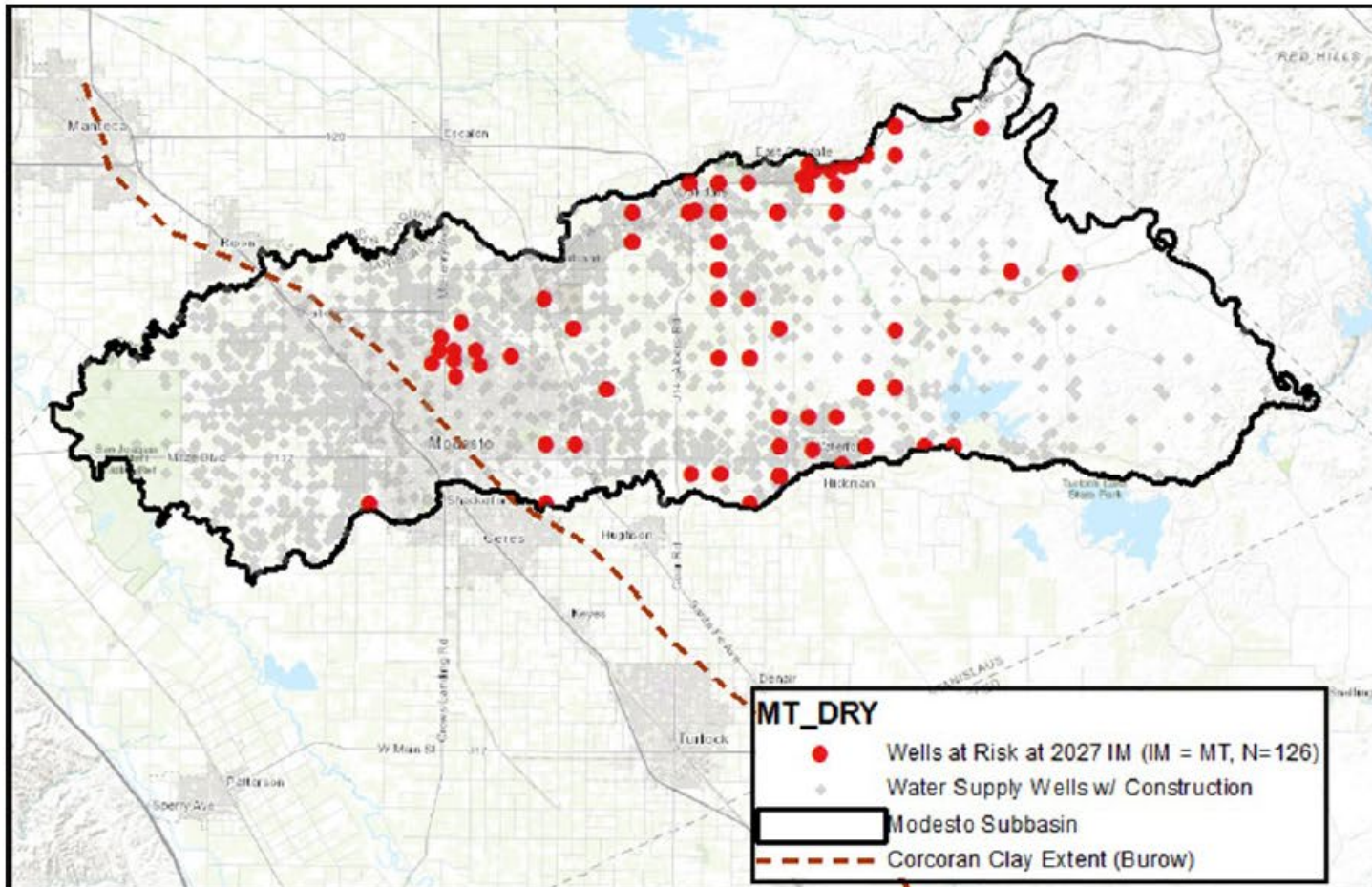


These datasets provide coverage of Household Water Supply Shortage Report locations between 2014 and 2017:

- 159 dry wells

Source Todd Groundwater, Woodard and Curran. 5/22/24 STRGBA Meeting

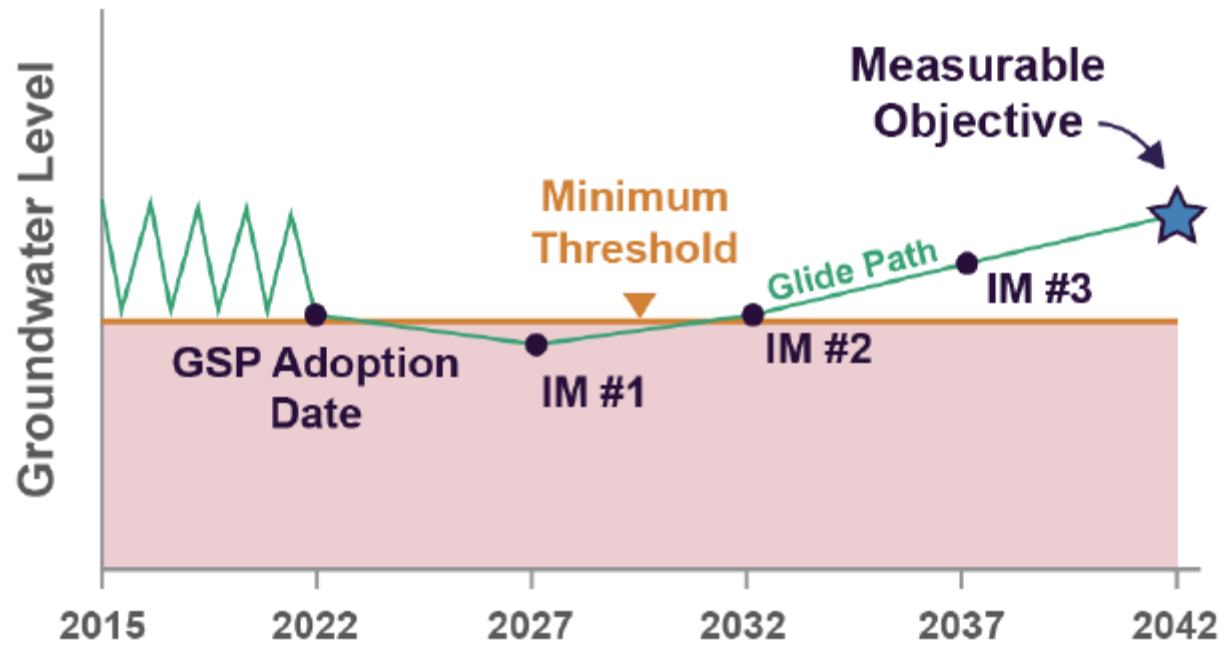
WELLS PROJECTED DRY AT MINIMUM THRESHOLD



- Well considered dry if depth to MT is below the total depth of the well
- 126 wells with construction likely went dry at the MT
- 126 of 4,563 wells = 2.8%

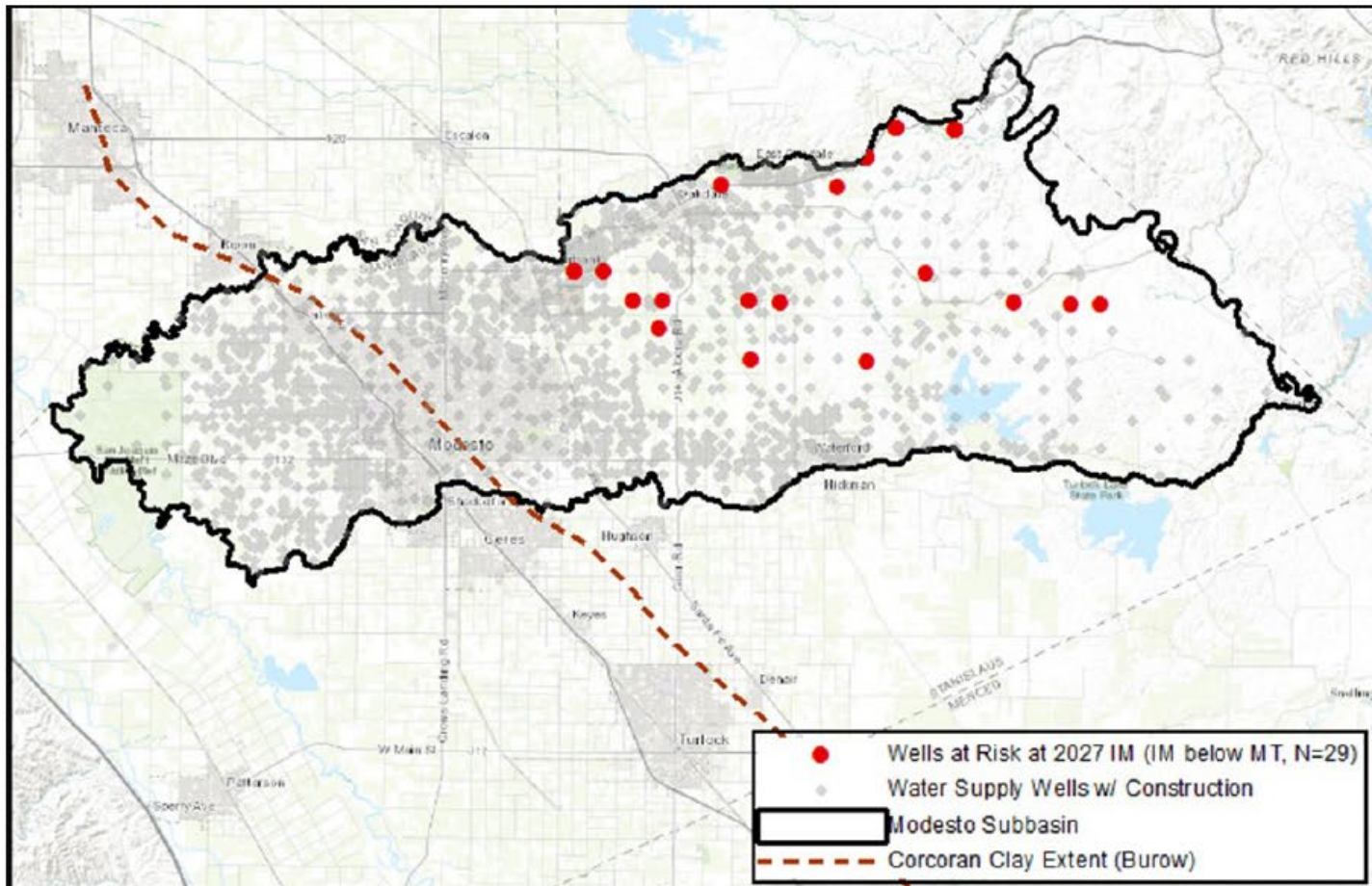
Source Todd Groundwater, Woodard and Curran. 5/22/24
STRGBA Meeting

Interim Milestones



Source: Department of Water Resources

WELLS PROJECTED DRY AT INTERIM MILESTONE



- Well considered dry if depth to IM is below the total depth of the well
- If groundwater elevations are lowered from the MT to the IM (where the IM is below the MT):
 - 29 additional wells at risk of going dry
 - 0.6 % of additional existing wells with construction

Source Todd Groundwater, Woodard and Curran. 5/22/24
STRGBA Meeting

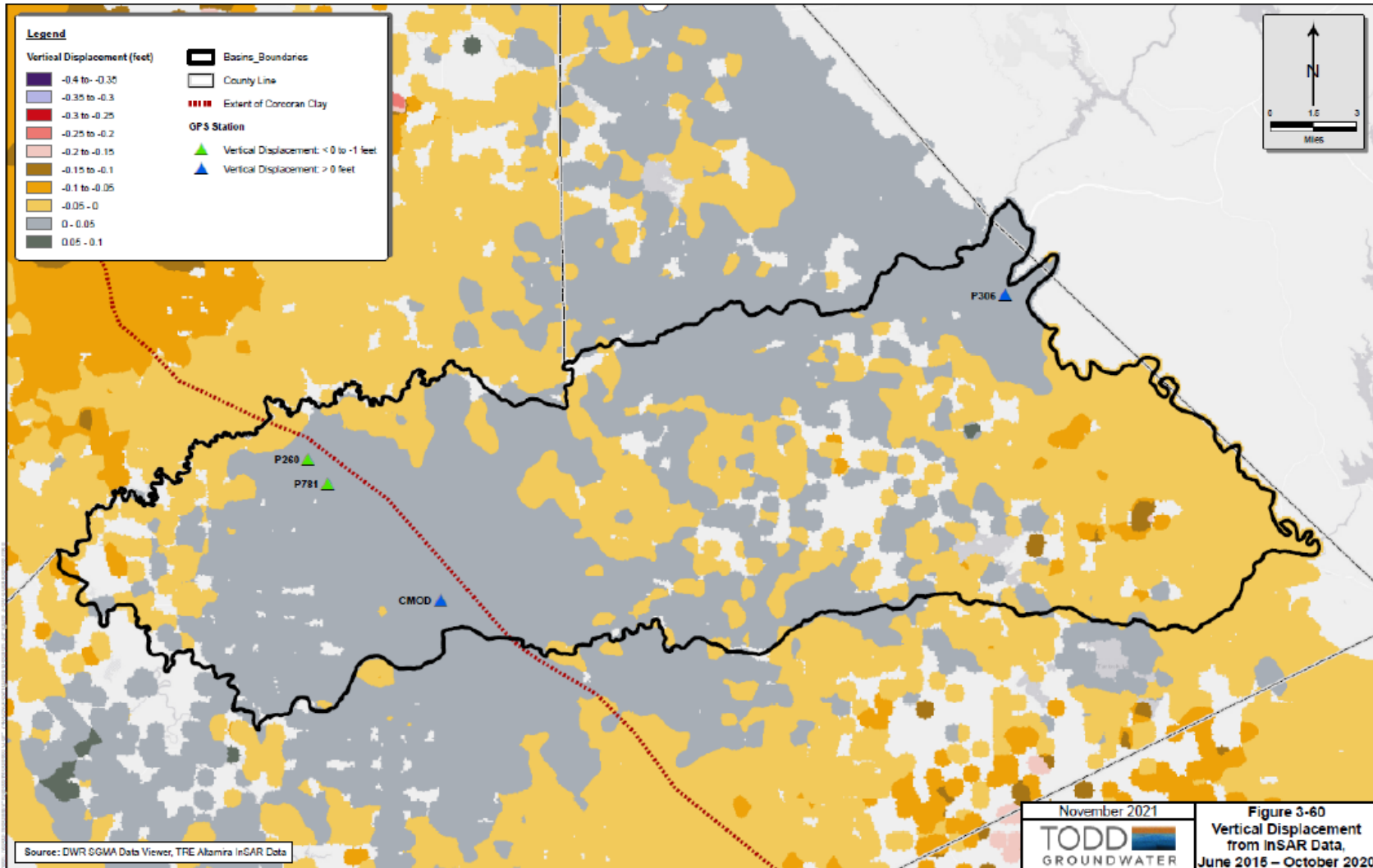
ATTRIBUTES OF AT-RISK WELLS (2027 IM BELOW MT)

- Well age is known for most of the impacted wells (23 of 29)
- Potentially impacted wells are older and shallower than average:
 - Average age:
 - 32 years for all wells
 - 46 years for impacted wells
 - Average depth:
 - 219 feet for all wells
 - 162 feet for impacted wells

		All Analysis Wells	Additional Wells Dry at IM
Count	Number of Wells	4,563	29
	Number of Wells with Age	3,626	23
Age (years old)	Oldest	76	67
	Mean Age	32	46
	Median Age	34	47
	Youngest	1	10
Depth (ft BGS)	Shallowest Well Depth	20	96
	Mean Depth	219	162
	Median Depth	187	163
	Deepest Well Depth	1512	236

Source Todd Groundwater, Woodard and Curran. 5/22/24
STRGBA Meeting

SUBSIDENCE – WHAT DOES THE GSP SAY?



Source Todd Groundwater, Woodard and Curran.
5/22/24 STRGBA Meeting

SUBSIDENCE ANALYSIS

- RMWs with 2027 IMs below the MTs are located within the Oakdale Irrigation District and Non-District East Management Areas.
- These RMWs are within the Eastern Principal and far from the edge of the Corcoran Clay.
- Lowering groundwater levels from the MT to the IM at these RMWs will not affect water levels at the Corcoran Clay boundary.
- There are no RMWs with 2027 IMs below the MTs within the Corcoran Clay (Western Upper and Western Lower Principal Aquifers).

Source Todd Groundwater, Woodard and Curran.
5/22/24 STRGBA Meeting

CONCLUSION

- Lowering groundwater elevations to the IMs will not result in groundwater elevations declining to below the top of the Corcoran Clay.
- Therefore, it is unlikely that groundwater elevations at the 2027 IMs, where below the MT, will have a significant impact on land subsidence.

INTERCONNECTED SURFACE WATER – WHAT DOES THE GSP SAY?

- Data gaps exist for monitoring and management of interconnected surface water along the river boundaries.
- A management action to improve the monitoring network provides for additional shallow monitoring wells to be installed along the rivers over time.

RESULTS

- There are two RMWs along the Stanislaus River where both the MT and IM elevations are below the nearest stream invert elevation.
- Both RMWs are more than a mile from the Stanislaus River.
- The difference between the MT and the IM elevations in these two RMWs are 13 and 14 feet.

Question: Will lowering groundwater levels 13 or 14 feet more than a mile from the Stanislaus River significantly increase streamflow depletion?

Answer: Uncertain. Depends on river stage and local hydrogeology. A data gap along the rivers will need to be filled to help answer this question.

WATER QUALITY ANALYSIS

Goal

What are the potential impacts on the degradation of water quality sustainability indicator of lowering groundwater levels from the MTs to the 2027 IMs, where 2027 IMs are below the MTs?

RESULTS

- A clear relationship between COC concentrations and groundwater levels at RMWs was not apparent.
- Nitrate:
 - At most GAMA wells, nitrate was the only COC with sufficient data
 - No clear correlation between nitrate concentrations and groundwater levels
- Arsenic: several GAMA wells had arsenic detections, no clear trends
- Several wells in Western Lower Principal Aquifer had increasing uranium, TDS and nitrate trends. But lack of nearby RMWs with water level data made comparison impossible.

CONCLUSIONS

- The absence of clear relationships between declining groundwater levels and COC concentrations suggests that lowering groundwater levels from the MTs to the 2027 IMs, where the 2027 IMs are below the MTs, should not affect the degradation of water quality sustainability indicator.

CORRECTIVE ACTION #2

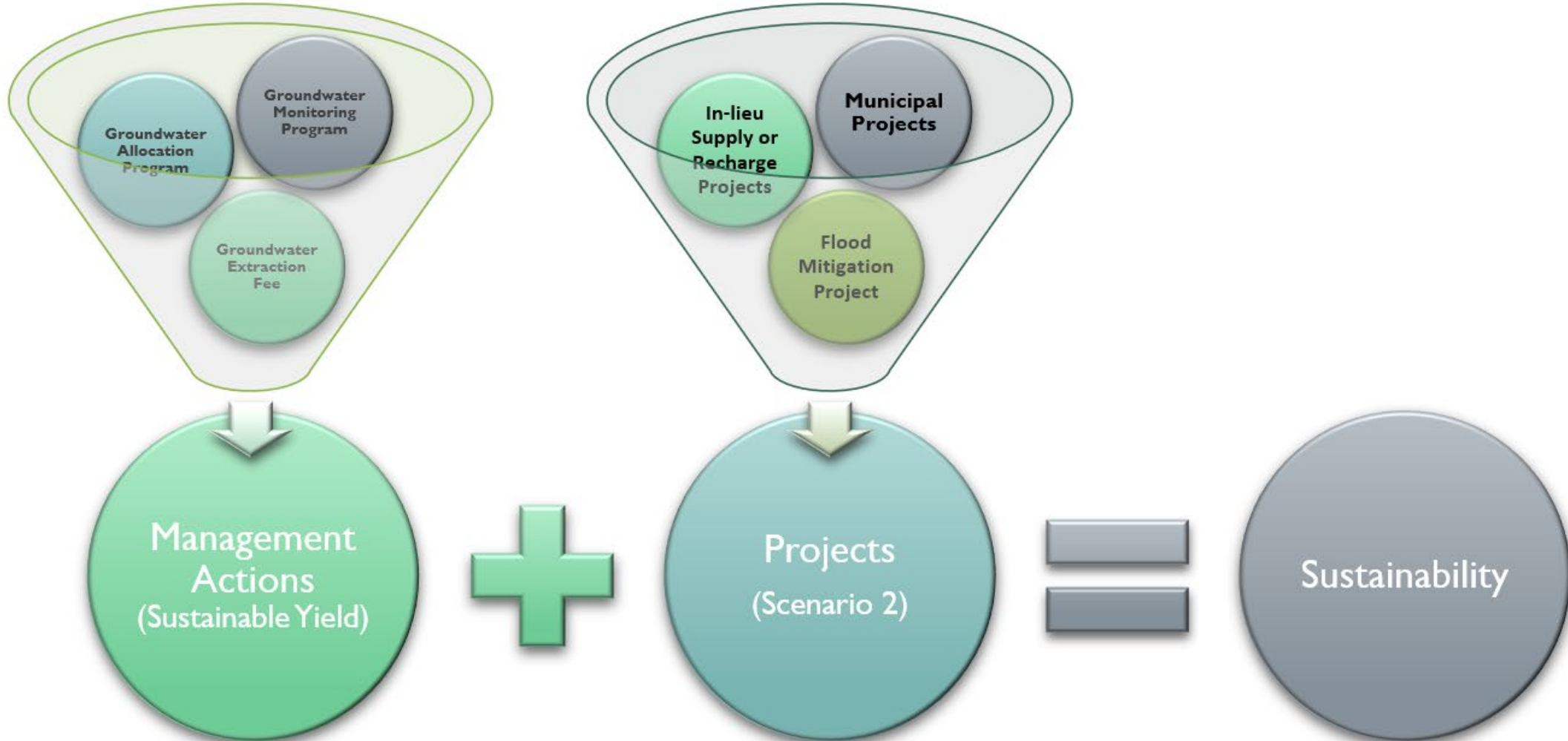
KEY TAKEAWAYS FROM DWR DETERMINATION

- The GSA needs the tools to manage if groundwater conditions are unsustainable and/or if projects do not perform as expected
- Paradigm Shift:
 - Management actions as *primary* tool to *guarantee* sustainability.
 - Actions will empower the STRGBA GSA to act effectively and efficiently.
 - Used as a backstop to account for uncertainty (hydrology, implementation, etc).
 - Shall present methods, triggers, impacts, and escalating contingencies.
 - Will be offset with projects, dependent on implementation and effectiveness.

MANAGEMENT ACTIONS

- Present a commitment in Revised GSP, highlighting progress towards project implementation and a dedication to sustainability regardless of hydrologic uncertainty or project timeline/outcome.
- Refinement of Existing Projects and Management Actions
 - Develop and prioritize robust management actions (such as demand management) that could be readily implemented as needed, along with existing projects, to ensure sustainability regardless of hydrologic uncertainty or project outcome.
 - “**commit** to take these actions...**provide details** clarifying when any particular GSA’s adaptive management approach would **trigger** increased actions...”
 - “...present **detailed tasks**, **milestones**, and **timelines** depicting how these projects will be completed and implemented...”

SUSTAINABILITY PATH



Revised GSP Approach – Management Actions

- The GSAs must commit to developing and implementing a robust demand reduction-based management program.
 - Example: Management Action X will be implemented in the Subbasin if and when groundwater levels at X locations reach X elevations or annual groundwater storage changes over X period reaching X AF. If continued X conditions are observed, then **Management Action Y would begin implementation.**

DWR Deficiency #2 - Feasible Path to Achieve Sustainability

GW level decline needs to be arrested before 2027 IMs

Proposed GSA Action:

- Draft Resolutions for STRGBA GSA and Tuolumne County GSA, committing to the development of a Well Mitigation Plan and Management Actions in the subbasin.
- Resolutions provided to STRGBA GSA members with the next GSA Meeting Agenda. Member agencies need to be prepared to take action at 6/12/24 GSA Meeting.
- Approved & signed resolutions to be included as an attachment in the GSP along with member agency Board/Council resolutions adopting the final Revised GSP.

Resolution/MOU Content & Requirements

Resolution will show firm commitment by the STRGBA GSA before water levels reach the 2027 IMs to develop and implement:

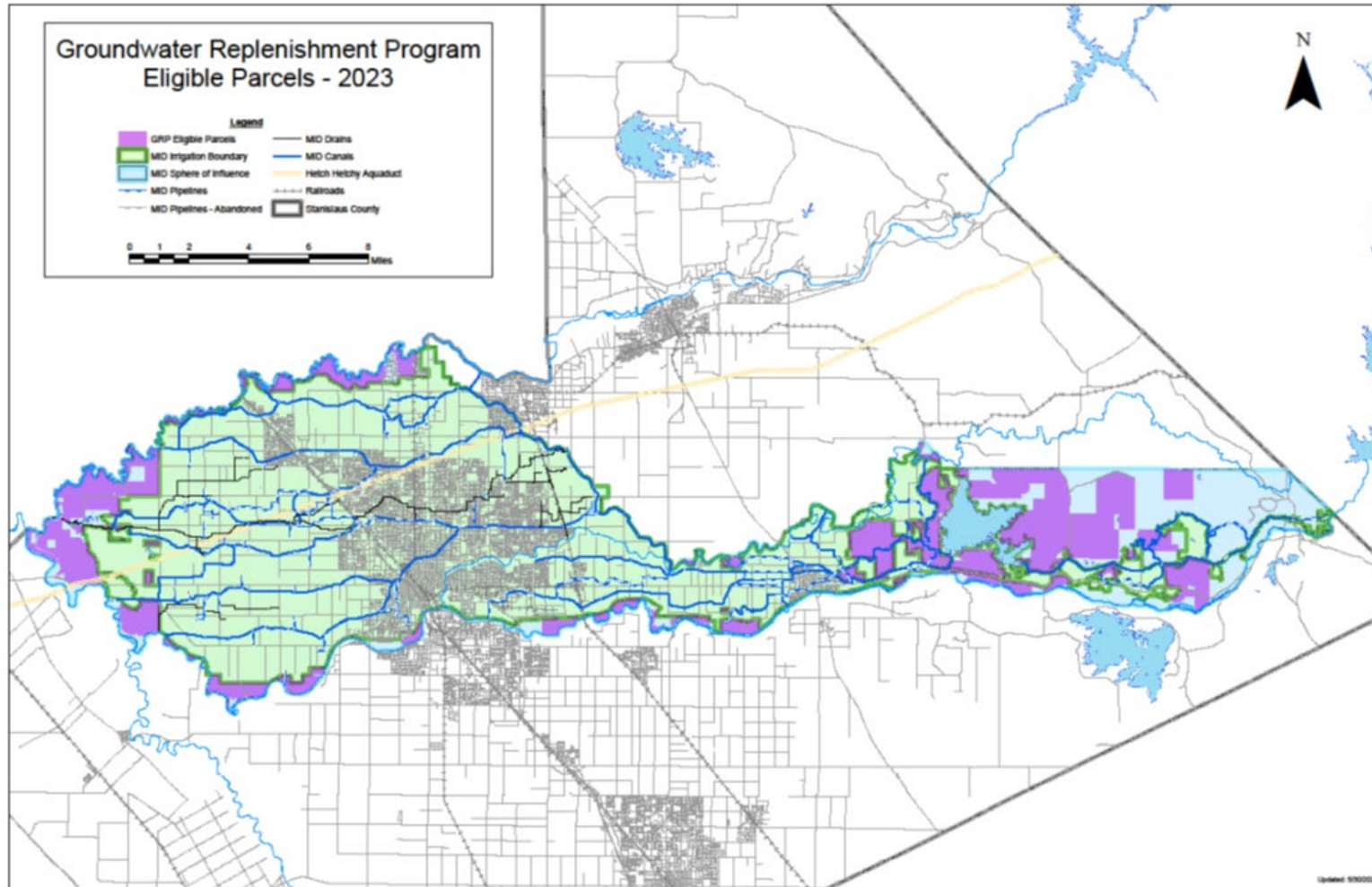
- Well Mitigation Plan
 - Funding - Amount and Source(s)
 - Implementation Deadline/Threshold – January 31, 2026?
- Management Actions
 - Demand Reduction Measures
 - Funding – Amount TBD and Source(s)
 - Implementation Deadline/Threshold – January 31, 2026?

Management Actions as noted in the GSP may include, but are not limited to:

- Groundwater allocations and pumping management program
- Groundwater extraction and surface water reporting program
- Groundwater extractions fees
- Groundwater pumping credit market and trading program
- Voluntary conservation/land following program
- Conservation practices

Questions?

Long-Term Groundwater Replenishment Program- Modesto Irrigation District



Source: Modesto Irrigation District
October 27, 2023, Water Advisory Committee