

EKI TECHNICAL PRESENTATION

WHITE WOLF TECHNICAL COMMITTEE

6 FEBRUARY 2024



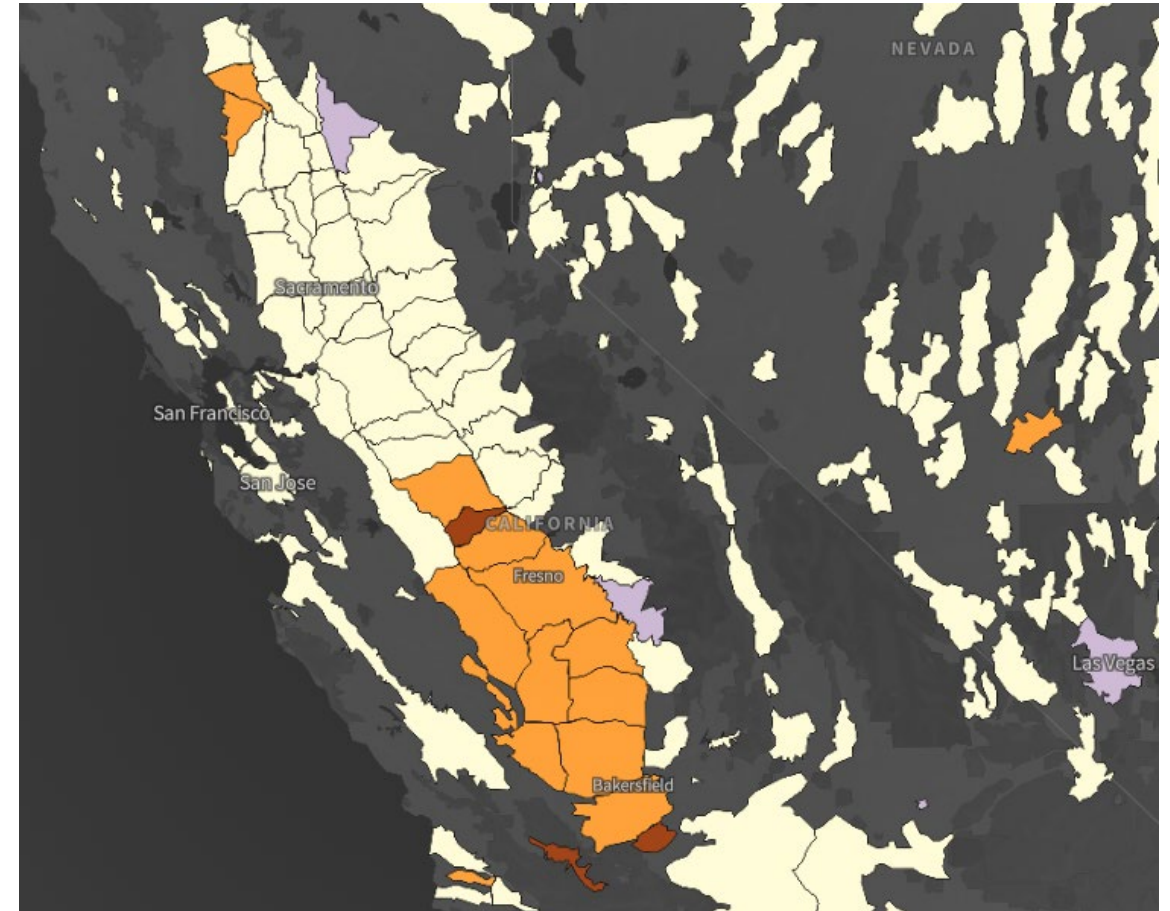
OUTLINE

- Proposed 2024 goals
- GSP implementation updates
 - December and January groundwater levels
 - Annual report preparations
- Projects/Management Actions (P/MAs) updates
 - Recharge programs contributions
 - Leave behind considerations and preliminary estimate
- Dedicated monitoring well siting

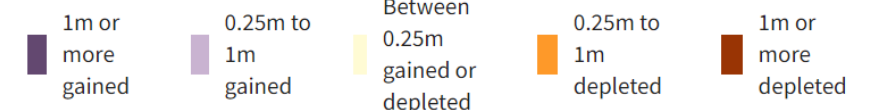
PROPOSED 2024 GOALS FOR THE WHITE WOLF GSA

CONTEXT AND MOTIVATION

- Recent news articles:
 - Nature
 - Cal Matters featured in Maven's Notebook
- 1,693 aquifer systems ranked based on median annual change in groundwater levels through 2022
- White Wolf ranked 52nd fastest declining aquifer globally between 2000-2022



Median annual change in groundwater basin levels (meters):



Jasechko, S., Seybold, H., Perrone, D. et al. Rapid groundwater decline and some cases of recovery in aquifers globally. *Nature* 625, 715–721 (2024). <https://doi.org/10.1038/s41586-023-06879-8>

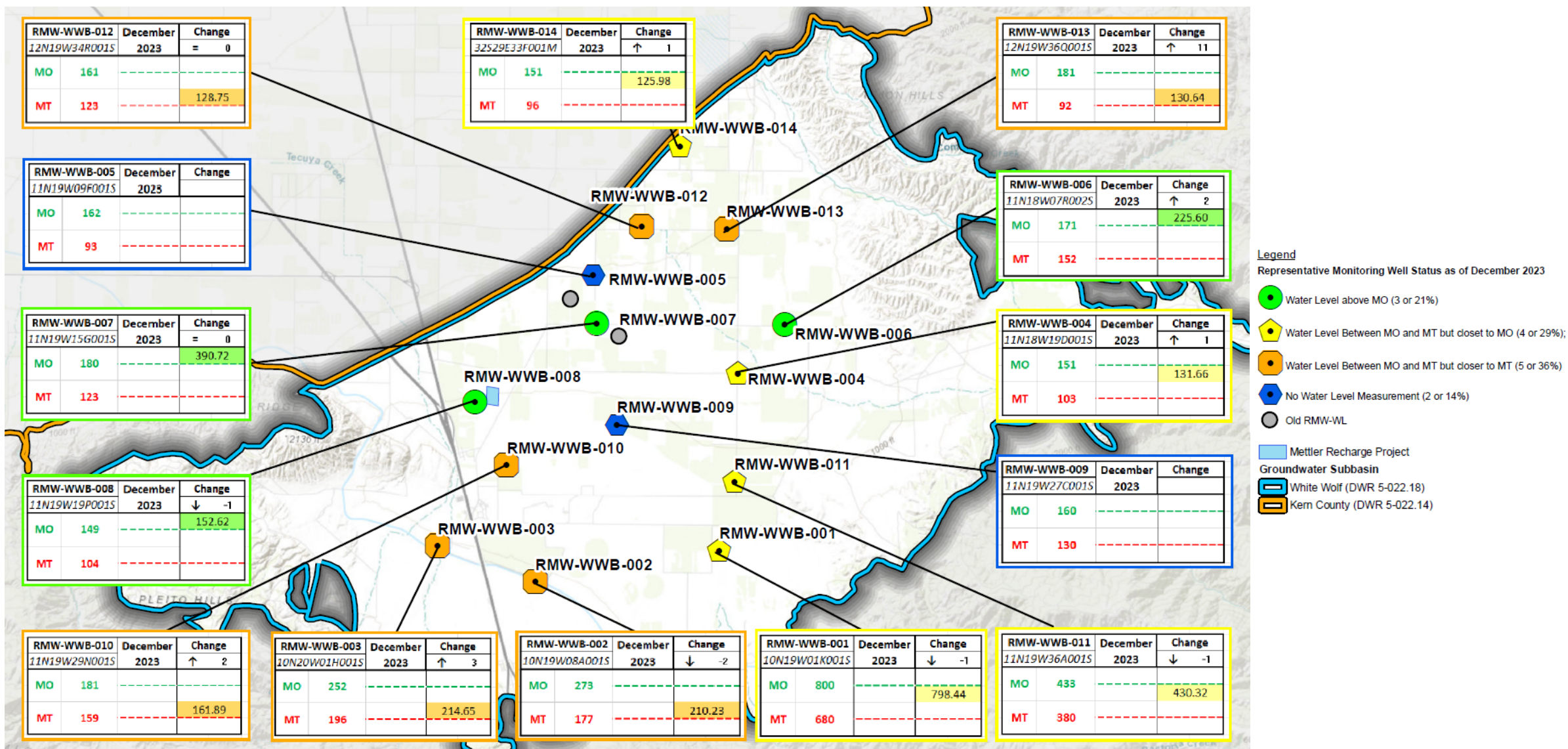
[CAL MATTERS: California ranks high worldwide for rapidly depleted groundwater – MAVEN'S NOTEBOOK | California Water News Central \(mavensnotebook.com\)](#)

PROPOSED 2024 GOALS

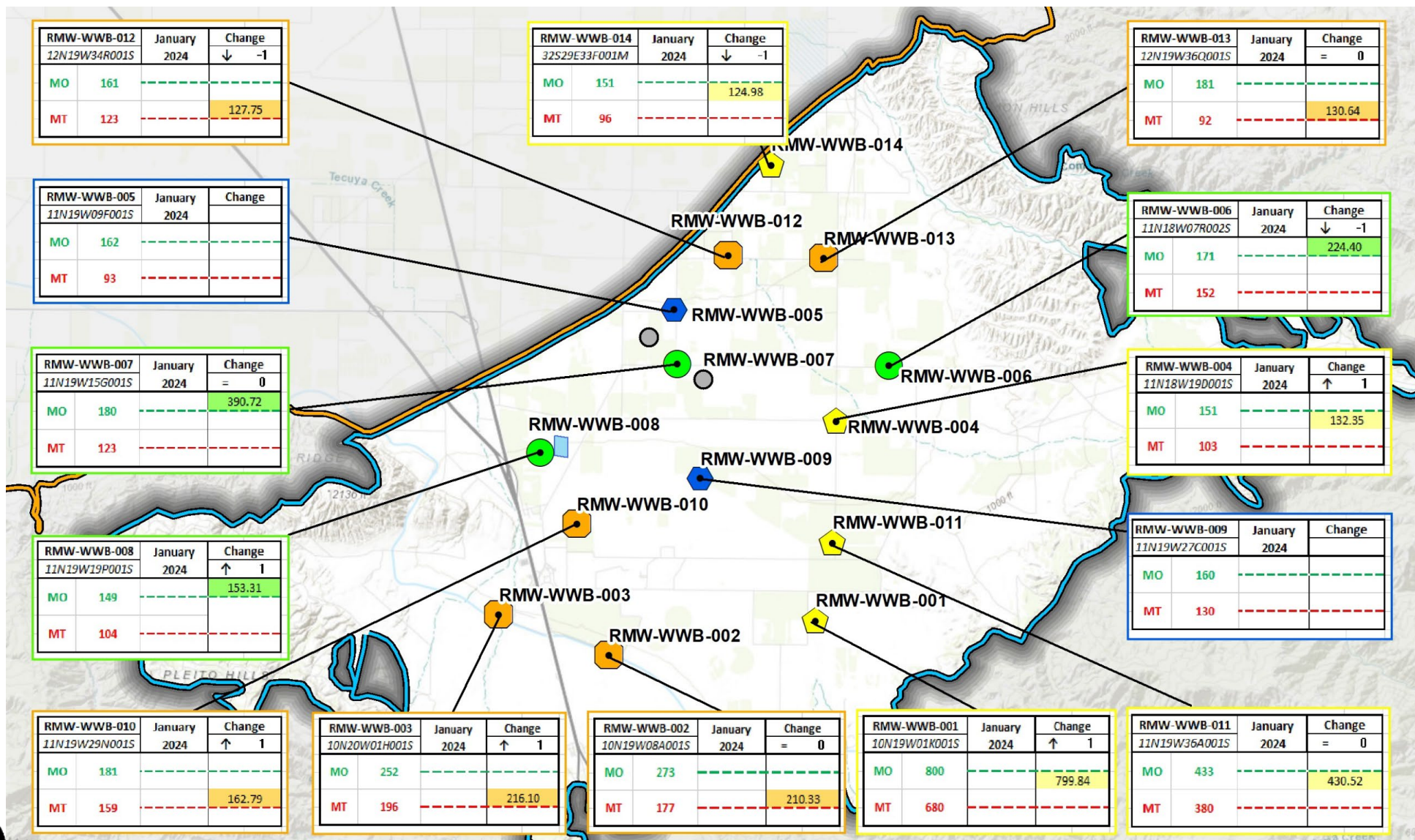
1. Develop a strategy and approach for collecting metered groundwater pumping data.
2. Finalize and adopt a landowner recharge / recharge project leave behind policy.
3. Site and install a dedicated replacement well for RMW-WWVB-009.
4. Establish a demand reduction target for 2024, 2025, and 2026 that will ensure the GSA stays on track to meet the 2027 demand reduction target of 2,700 AFY.

GSP IMPLEMENTATION UPDATES

DEC. 2023 MEASUREMENTS COMPARED TO SMCs



JAN. 2024 MEASUREMENTS COMPARED TO SMCs



Legend

Representative Monitoring Well Status as of January 2024

- Water Level above MO (3 or 21%)
- Water Level Between MO and MT but closer to MO (4 or 29%)
- Water Level Between MO and MT but closer to MT (5 or 36%)
- No Water Level Measurement (2 or 14%)
- Old RMW-WL

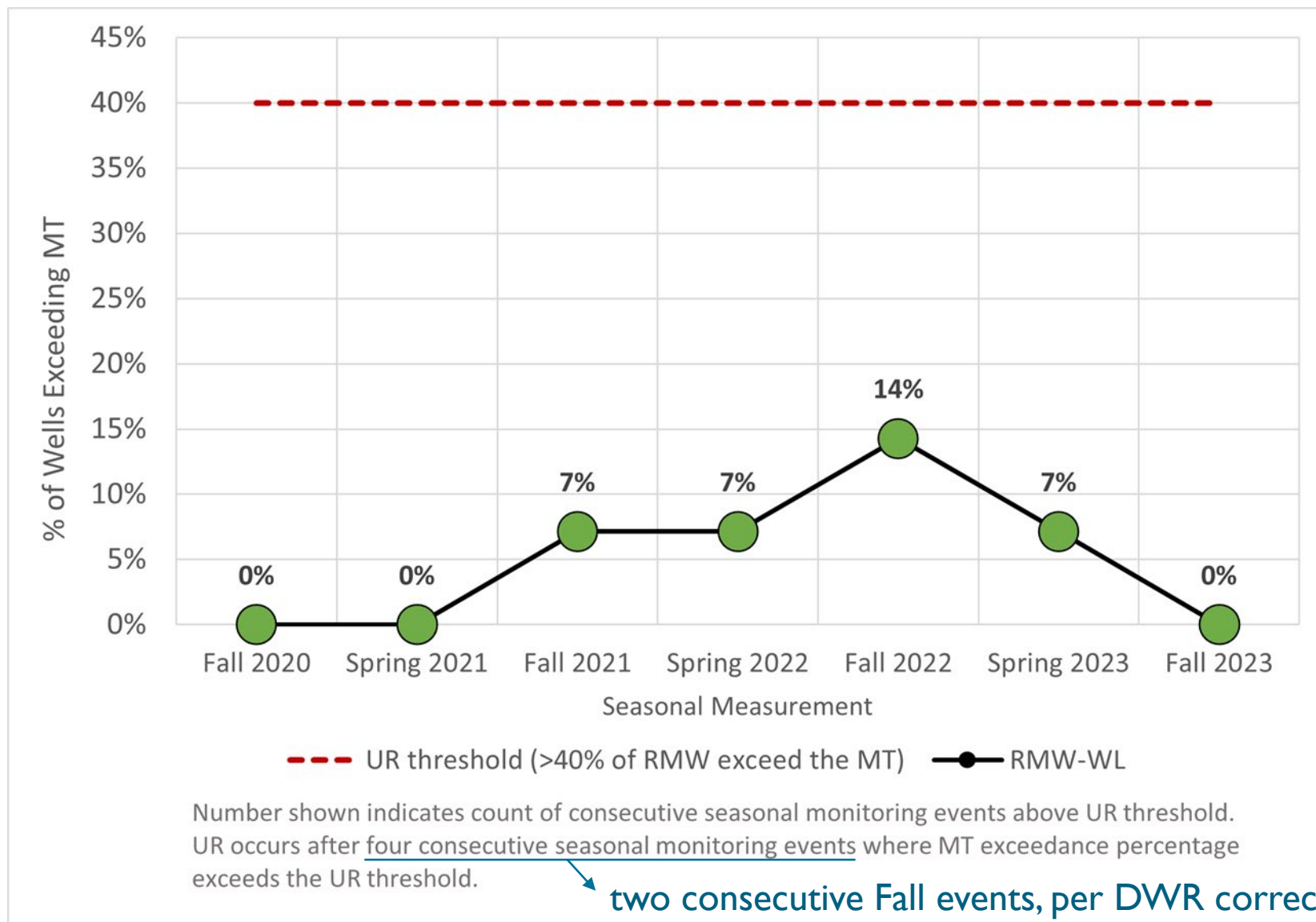
Mettler Recharge Project

Groundwater Subbasin

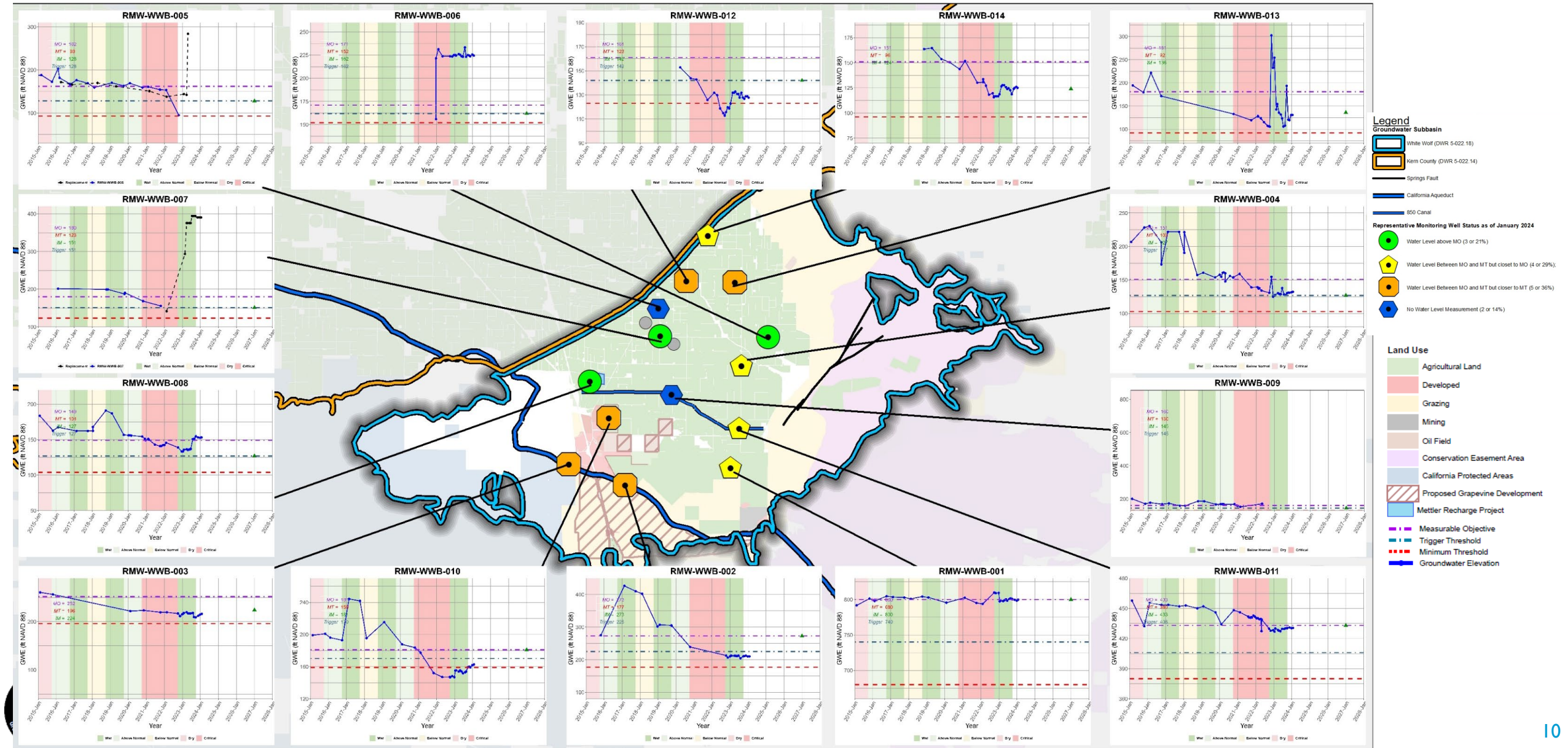
- White Wolf (DWR 5-022.18)
- Kern County (DWR 5-022.14)



UR CHART (UPDATED TO FALL 2023)

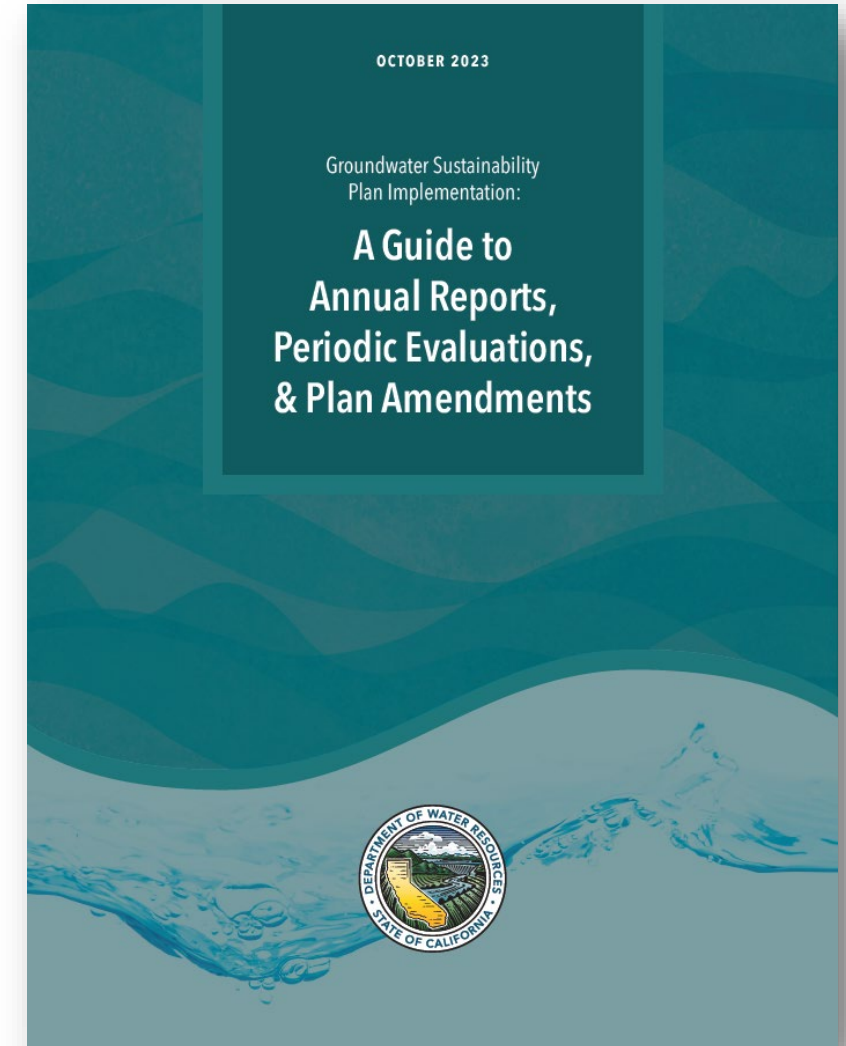


RMW-WL HYDROGRAPHS



ANNUAL REPORT WILL BE MODIFIED BASED ON DWR'S IMPLEMENTATION GUIDE

- Key updates/changes for the **Annual Report** include:
 - Potentially restructure tables to match those presented in the Guide
 - Describe improvements to metering measurements
 - Expand on P/MA descriptions, including discussion of any adverse impacts on various sustainability indicators, adjacent groundwater basins, or beneficial uses and users of the Basin
 - Add new section to discuss progress made on addressing corrective actions in DWR's determination letter



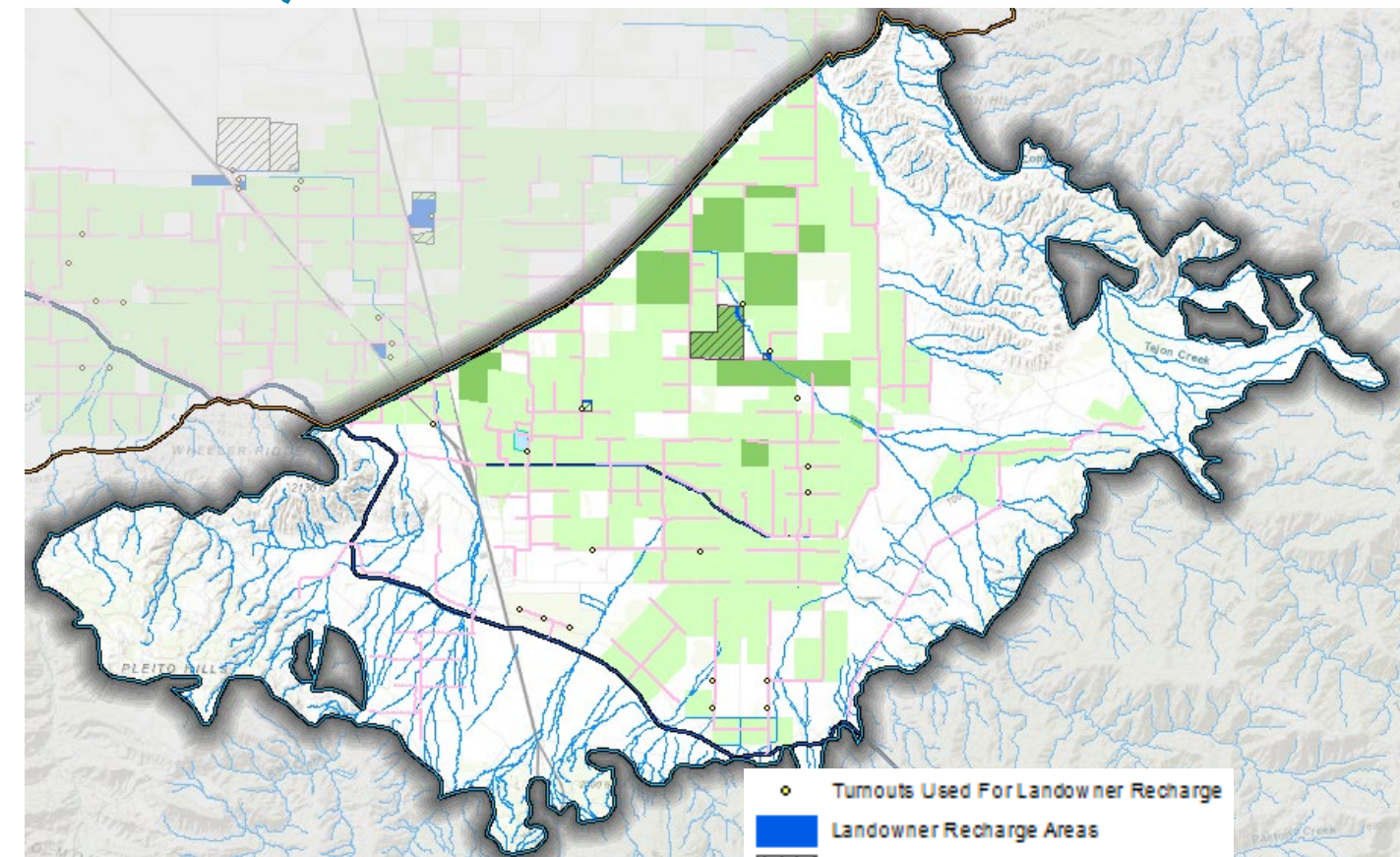
ANNUAL REPORT PREPARATION UPDATES

- Fall 2023 groundwater levels uploaded to DWR portal on 12/11/2023
- Extending the White Wolf Groundwater Flow Model (WWGFM) through Water Year 2023 (October 2022 – September 2023)
- Water Year 2023 Annual Report modifications per new guidelines and updates to summarize WY 2023 underway (due to DWR 4/1/24)

P/MAS UPDATES

LANDOWNER RECHARGE PROGRAMS APPLIED

>12,800 AF IN 2023

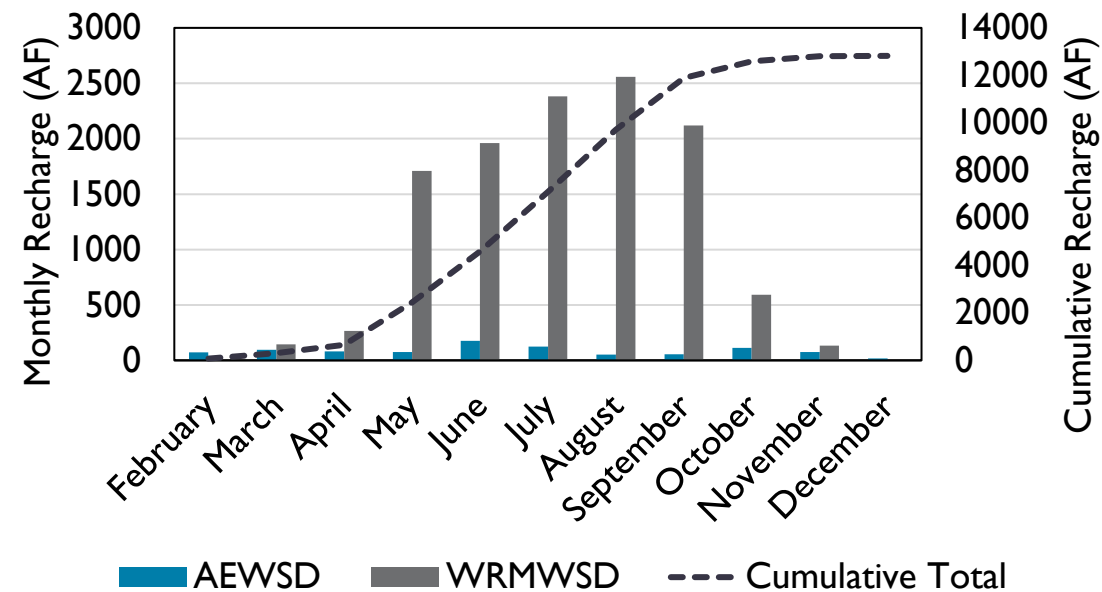


- Turnouts Used For Landowner Recharge
- Landowner Recharge Areas
- Landowner Recharge Parcels
- Pipeline
- California Aqueduct
- Mettler Recharge Facility
- Surface Water Service Area
- New In-Lieu Service Area

Legend

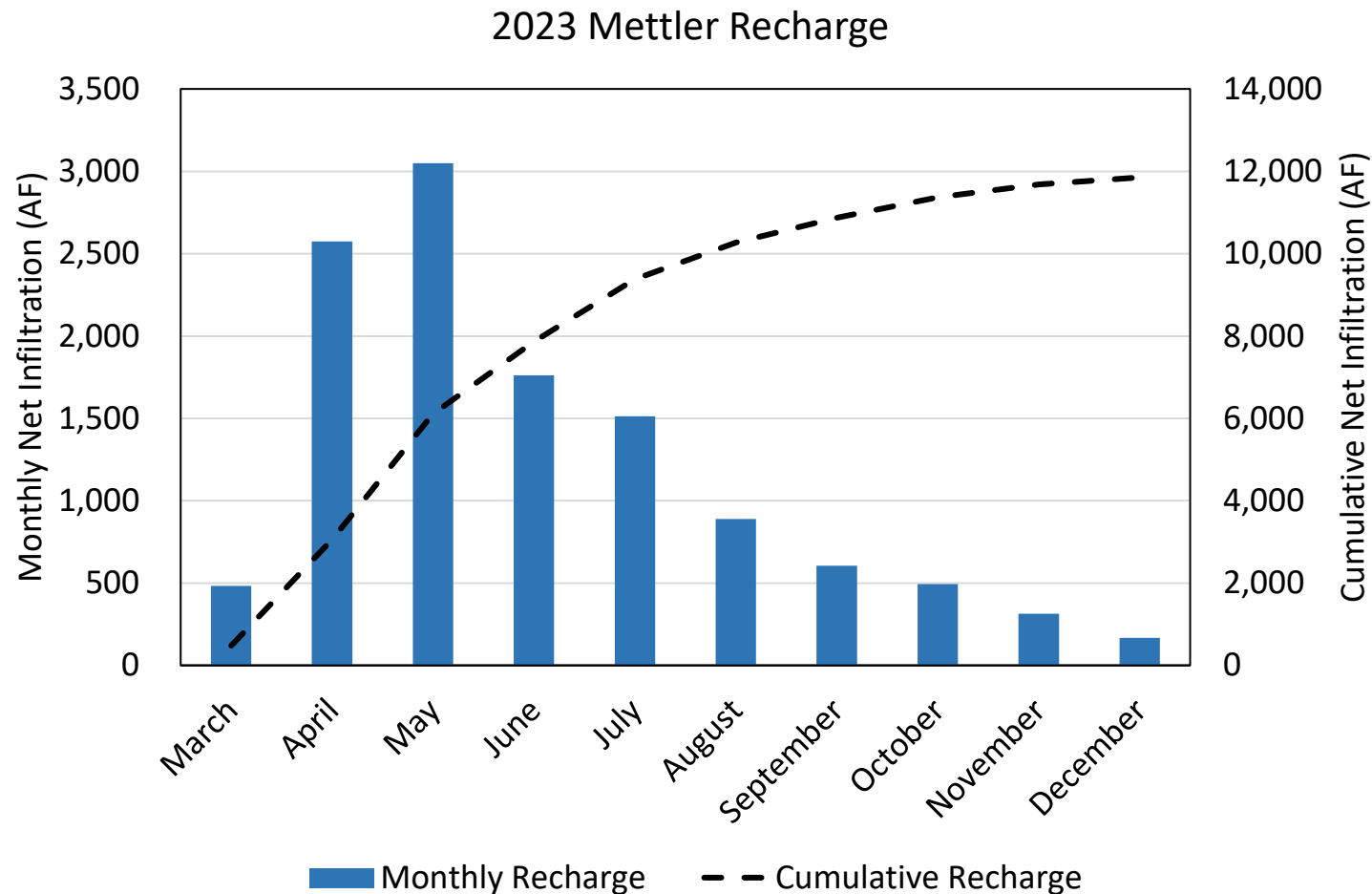
- Groundwater Subbasin**
- Kern County (DWR 5-022.14)
- White Wolf (DWR 5-022.18)

2023 Landowner Recharge in White Wolf

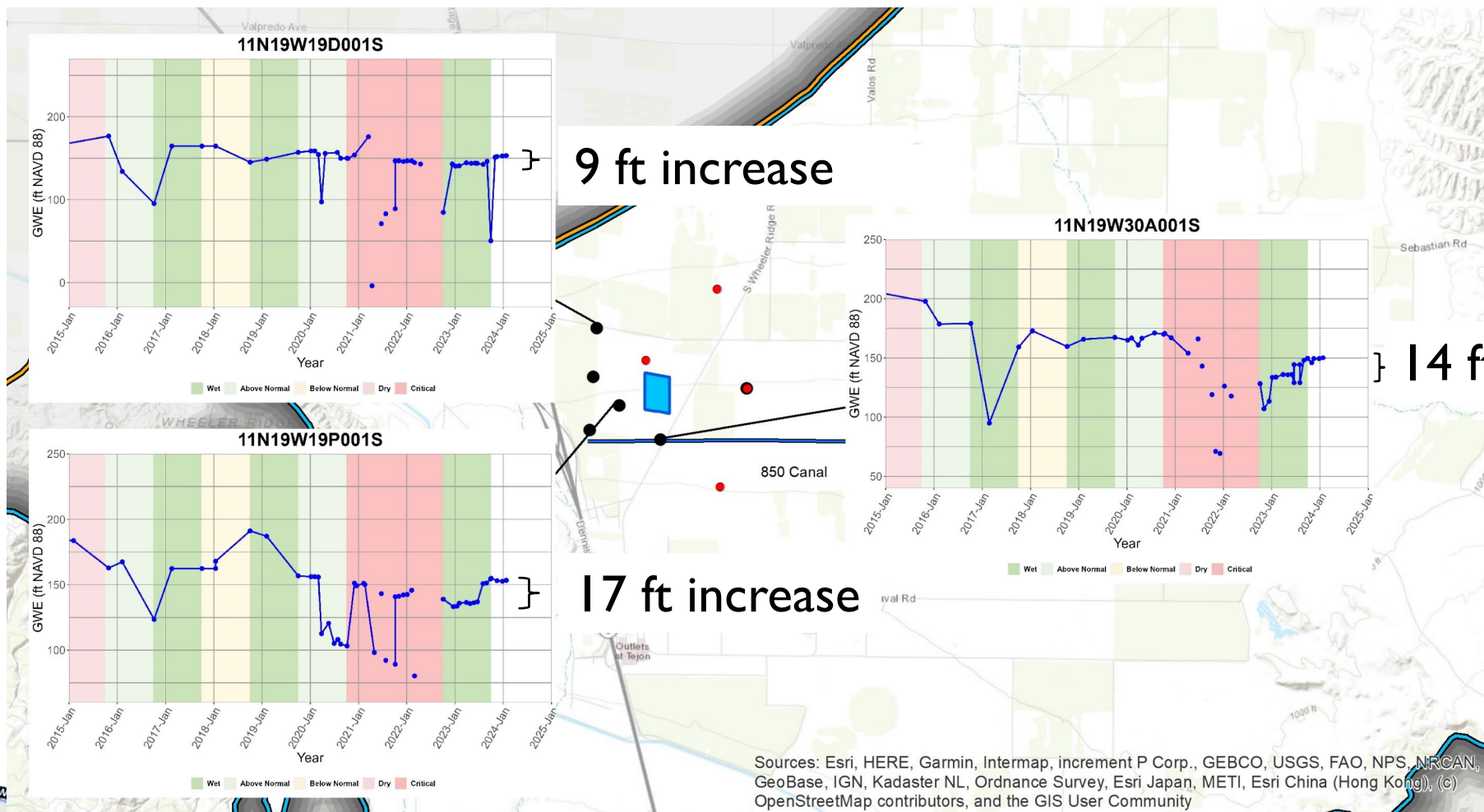


APPROX. 11,900 AF INFILTRATED AT METTLER FACILITY SINCE MARCH 2023

- Average infiltration rate 0.84 ft/day
- Recharge operations ceased on 12/24/2023



RECENT GROUNDWATER LEVEL TRENDS NEAR METTLER RECHARGE FACILITY



■ Increase in nearby water levels since March 2023

} 14 ft increase

} 9 ft increase

} 17 ft increase

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



LEAVE BEHIND CONSIDERATIONS

Analysis: Amount assessed against gross recharge volume to account for **subsurface outflows, non-recoverable supply, and subbasin sustainability.**

White Wolf GSA specifics:

1. Subsurface outflows to neighboring Kern County Subbasin.
2. Non-recoverable supply trapped in unsaturated zone (i.e., recharge water that does not reach groundwater due to subsurface pore space composition and depth to groundwater)
3. Subbasin sustainability protecting groundwater storage and supporting GSA management efforts (i.e., offset long-term storage decreases)



COMPARISONS (LANDOWNER PROGRAMS)

District/GSA	Leave Behind	Basis
Arvin Edison Water Storage District	Not established	
Wheeler Ridge-Maricopa Water Storage District	Not established	
Cawelo Water District	10 to 25%	Source and facility ownership
Madera County GSA (Emergency Recharge Policy)	25%	
Shafter-Wasco Irrigation District	6 to 100%	Water source
Lower Tule River Irrigation District GSA	10 to 25%	Facility ownership
North Fork Kings GSA	10%	
Porterville Irrigation District	10 to 30%	Source and location of recharge facility

Note: considerations typically include local recharge benefits and encouraging new supplies/facilities.

COMPARISONS (BANKING PROGRAMS)

Bank	Status	Leave Behind	SubBasin
Kern Water Bank	Active	10%: 6% unavoidable losses, 4% overdraft correction	Kern County
Mettler	Active	10% after evaporation	White Wolf
AEWSD	Active	10%	Kern County
Semitropic	Active	10%	Kern County
AVEK “High Desert”	Proposed	10%	Antelope Valley
Aquaterra/McMullin	Proposed	10%	Delta Mendota
North Fork Kings GSA	Proposed	10%	Kings
Rainbow IX (Terra Bella)	Proposed	10 to 30%	Tule
Rosedale-Rio Bravo	Active	50%	Kern County
Buena Vista WSD	Proposed	25 to 75%	Kern County

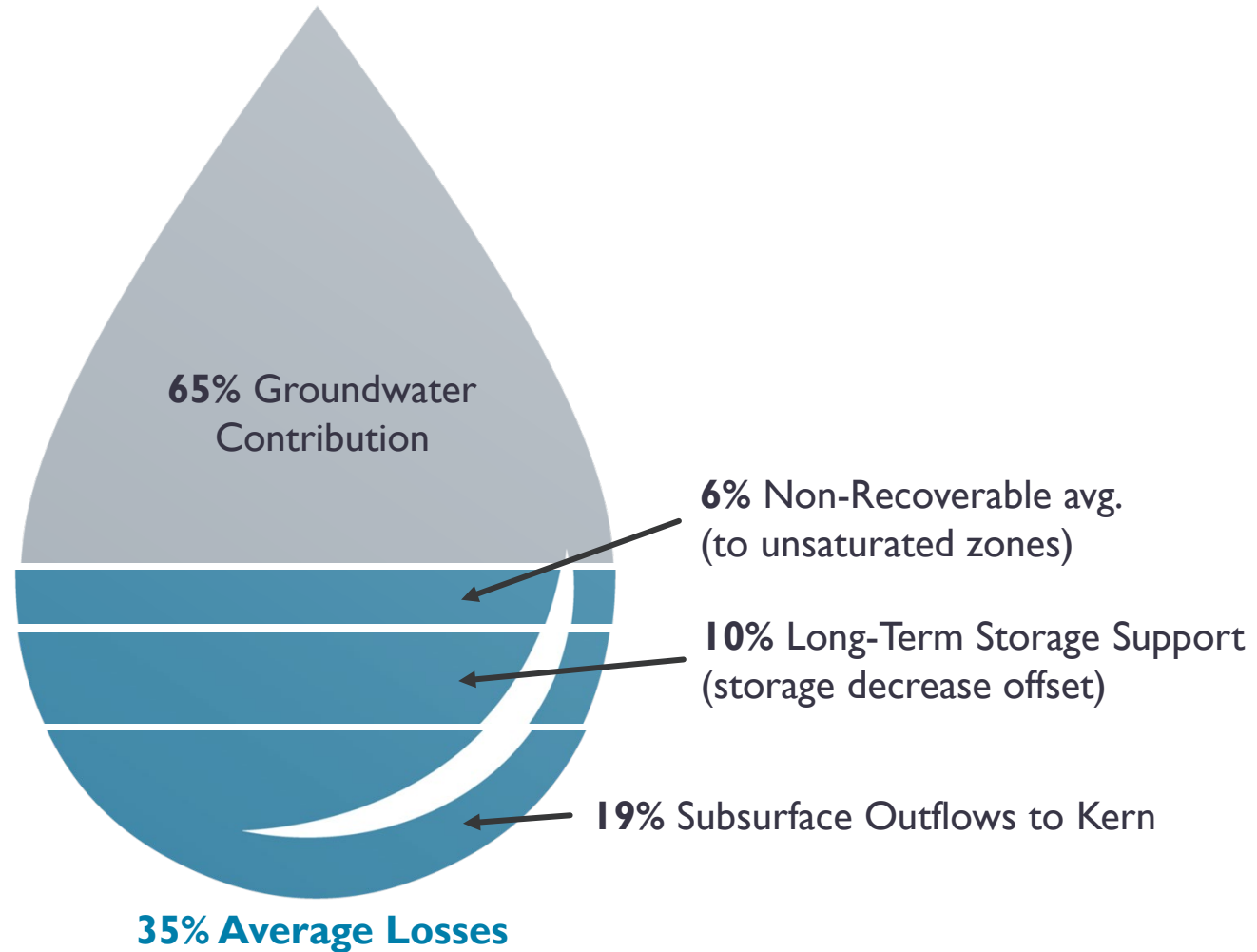
Note: considerations typically include negotiations with potential partners and imported supply availability.

LANDOWNER PROGRAMS IN SUMMARY

- Mostly policy and incentives based: encourage new water sources and facilities.
- Typical 10 to 30% Leave Behind, but neighboring basins are:
 - Typically larger, mitigating sub-surface flow issues (i.e., ability to "hold" recharged water benefit).
 - Contain different hydrogeologic profiles, re: "non-recoverable" zones.
 - Aiming at consistency with other recharge efforts and external party engagement.
- Available info suggests Leave Behind should:
 - Cover potential impacts to undesirable results, neighboring wells, subsurface flow, etc.
 - Encourage and incentivize new recharge approaches (consistent with local practices).
- Can require calculations of inefficiencies based on evaporation, soil percolation data, etc.

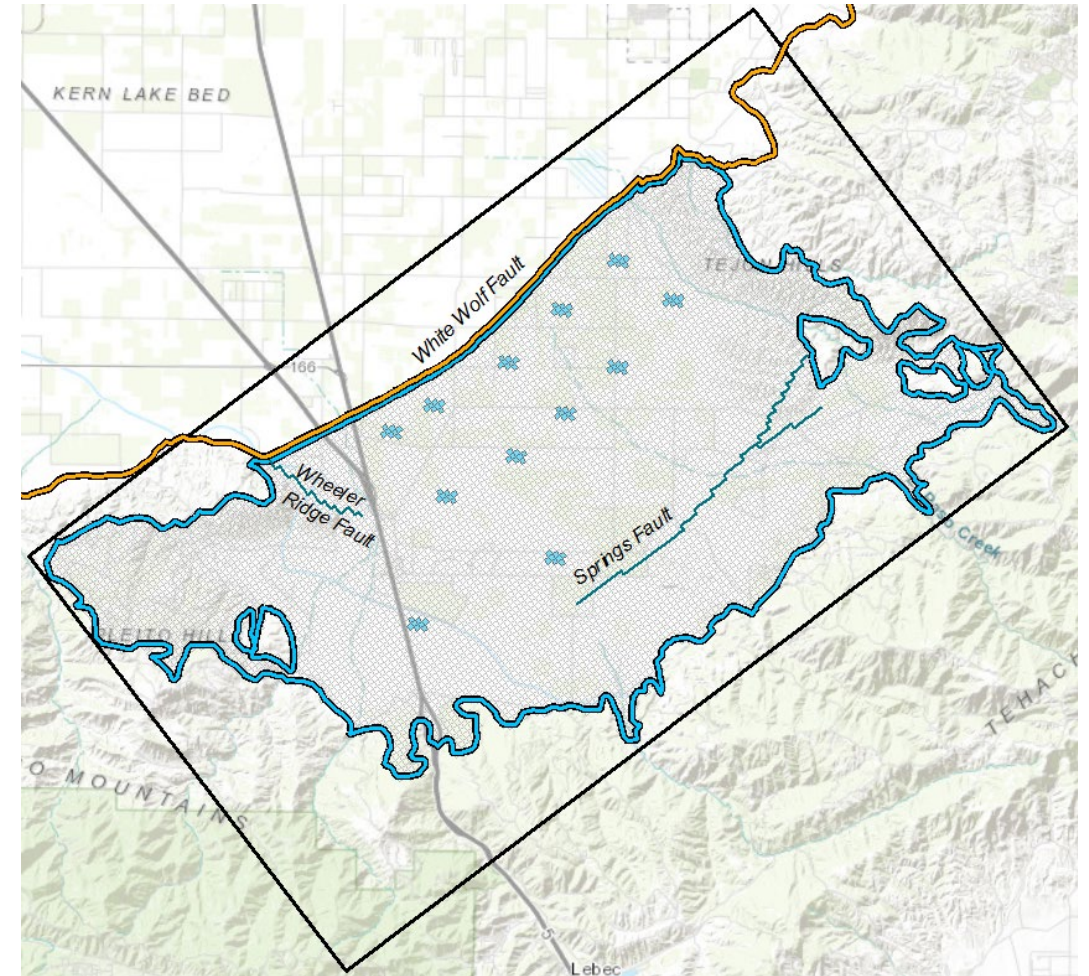
WHITE WOLF LEAVE BEHIND PRELIMINARY ESTIMATE

For groundwater inflows (recharge):



ONGOING REFINEMENTS TO PRELIMINARY LEAVE BEHIND ESTIMATE

- Conduct modeling runs to assess recharge location and associated contributions to outflow across the White Wolf Fault, and quantify average travel times
- Use Mettler as a test case to assess aquifer response to recharge



DEDICATED MONITORING WELL SITING

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- **Issue:** RMWs 005, 007, and 009. Two wells potentially collapsed; replacement wells have inconsistent groundwater level readings.
- Grant Component 2(b) includes siting and design of one to three monitoring wells

Excerpts from draft grant agreement (pending execution):

Category (b): Environmental / Engineering / Design

Conduct planning and design activities associated with the monitoring well installation. Perform a technical assessment of potential monitoring well locations, associated costs, and landowner participation to determine the number and location of one to three wells monitoring wells to be installed, as well as the number of completions to be included in each monitoring well. Acquire any landowner access agreement(s) necessary to install monitoring wells with adequate access for construction and maintenance. Develop and prepare specifications, final design plans, bid communications, contracting, and bid award recommendation. Acquire necessary permits required for the well installation(s). Prepare the required CEQA documentation if applicable. Complete a Site Health and Safety Plan to use during the well installation process.

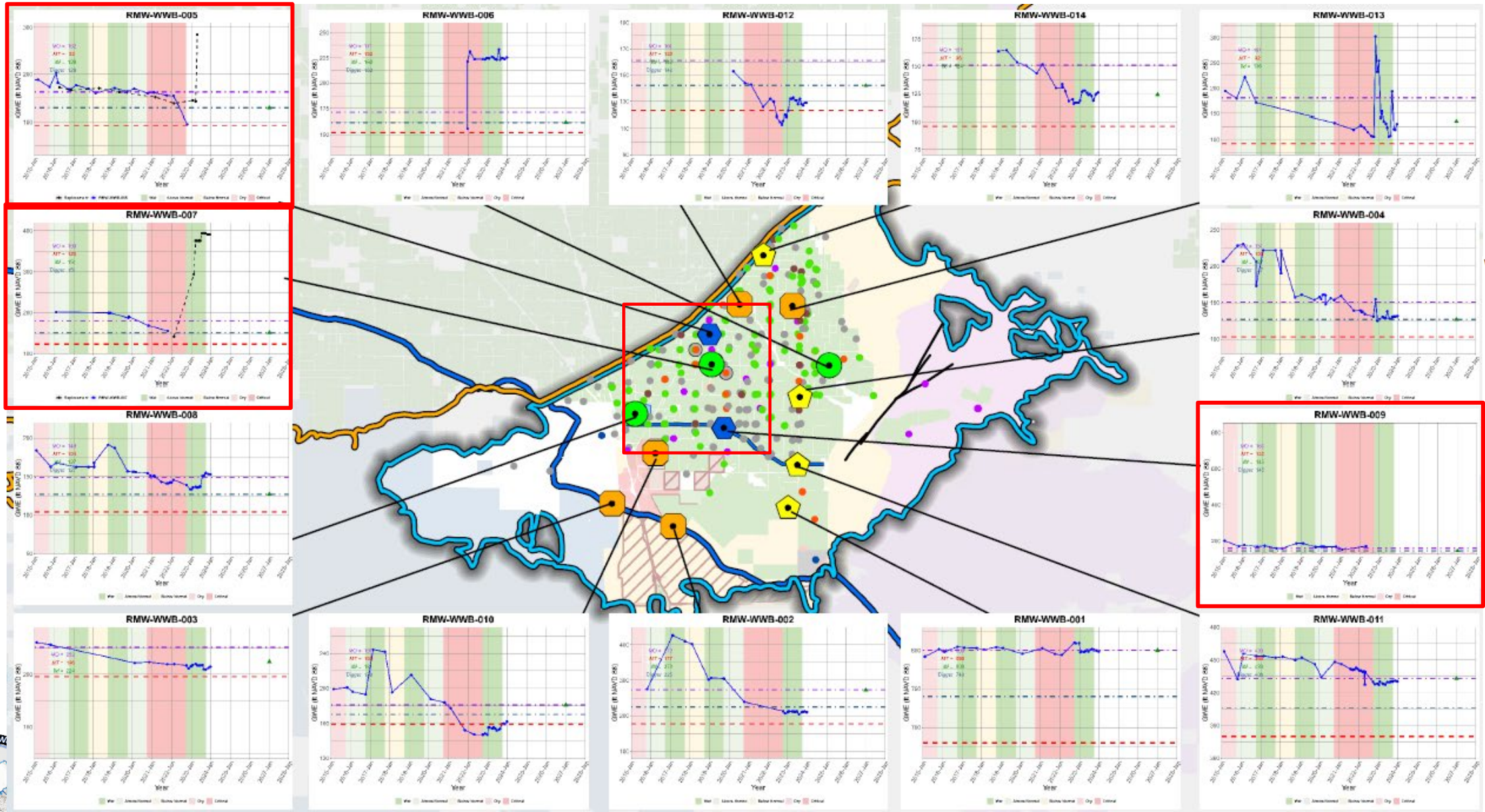
Deliverables:

- Map of approved locations for monitoring wells
- Written access agreement(s), if applicable
- Final design plans
- Bid document(s)
- Awarded contract(s) and Notice to Proceed
- Required permit(s) and environmental documentation, as [applicable](#)
- Site Health and Safety Plan

Component 2: GSP Reporting, Data Gap Filling, Outreach, and SGMA Compliance Activities	10/04/2022	04/30/2026
(a) Component Administration	01/01/2023	04/30/2026
(b) Environmental / Engineering / Design	0510 /01/2023	0510 /01/2024
(c) Implementation / Construction	0402 /01/2024	12/01/2025

Budget Categories	Grant Amount
(a) Component Administration	\$55,000
(b) Environmental / Engineering / Design	\$75,000
(c) Implementation / Construction	\$660,000

DEDICATED MONITORING WELL SITING



DEDICATED MONITORING WELL SITING

- Recommend developing design and bid materials for 2 dedicated monitoring wells:
 - RMW-WWVB-009: Replacement well on same parcel.
 - RMW-WWVB-005/RMW-WWVB-007: Replacement well in vicinity.
- DWR grant manager must:
 - Review design prior to soliciting bids
 - Review CEQA documentation & provide concurrence determination prior to construction

