

Staff Report

To: CGA-GGA Joint TAC

Agenda Item: 6. Colusa Subbasin Groundwater Sustainability Plan (GSP)

Date: February 9, 2024

On October 26, 2023, the Department of Water Resources (DWR) issued a letter informing the Groundwater Sustainability Agencies (GSAs) of its determination of the Colusa Subbasin GSP to be “incomplete”. The letter outlined specific deficiencies and recommended corrective actions which include:

- a) Re-evaluation of the overdraft conditions in the Subbasin using the most recent data, and include projects and management actions to mitigate overdraft;
- b) Providing a more detailed explanation and justification of the sustainable management criteria for groundwater levels, particularly minimum thresholds and measurable objectives, and quantify the effects of those criteria on beneficial uses; and
- c) Providing a more detailed explanation and justification of sustainable management criteria, monitoring method, and projects and management actions related to land subsidence.

The consultant team (Davids Engineering) has been retained to complete the Colusa Subbasin GSP Revisions to address the identified deficiencies. The CGA/GGA Joint TAC will receive presentations from the consultant team and engage in discussion on the identified deficiencies and provide recommendations to the GSA Boards.

The consultant team will provide information and lead a discussion relating to Projects and Management Actions (PMAs), the Groundwater Level Sustainable Management Criteria (SMC), and the monitoring network and the basis of Land Subsidence SMC.

Recommendation

1. Hear GSP revision schedule overview
2. Discuss and potentially recommend to GSAs updates to PMAs.
3. Discuss and potentially recommend to GSAs updates to Groundwater Level SMC.
4. Discuss and potentially recommend to GSAs a monitoring network and basis of Land Subsidence SMC.

Attachments

- Presentation (draft) (pg. 65)
- Information about Projects and Management Actions:
 - Colusa Subbasin GSP Projects and Management Actions DRAFT Revisions: Tabular summary of PMAs from the initial Colusa GSP (Jan 2022), identifying those where more detail is being added and suggestions for prioritization. (pg. 90)
 - DRAFT Agreement Establishing a Domestic Well Mitigation Program: Select content for technical consideration and discussion. (pg. 92)
 - DRAFT Agreement Establishing a Demand Reduction Program: Select content for technical consideration and discussion. (pg. 95)
- Information Related to SMC Refinements:
 - Conceptual Focus Areas (DRAFT): Conceptual areas for refining SMC to avoid undesirable results, and/or focusing PMAs to address the most significant subsidence, groundwater level impacts, and adverse groundwater conditions. (pg. 98)
 - Comparison of Groundwater Level Sustainable Management Criteria with Approved GSPs: Information about SMC: Tabular summary of SMC for groundwater levels in the initial Colusa GSP (Jan 2022) versus Approved GSPs. (pg. 102)

DRAFT



Colusa Subbasin GSP Revisions

Joint Technical Advisory Committee Meeting

February 9, 2024

Agenda

- 1. Takeaways from DWR Meetings (through 01/22) and Joint GSA Board Direction**
- 2. Proposed Revisions: Projects and Management Actions (PMAs)**
- 3. Proposed Revisions: Groundwater Level SMC**
- 4. Proposed Approach: Subsidence Monitoring and SMC Basis**
- 5. Next Steps and Timeline**

Takeaways from DWR Meetings (through 01/22) and Joint GSA Board Direction

Deficiencies As Outlined in DWR's Review Letter

1. **Overdraft:** “The GSP does not include a reasonable assessment of overdraft conditions and reasonable means to mitigate overdraft.”
2. **Groundwater Levels:** “The GSP does not establish sustainable management criteria (SMC) for chronic lowering of groundwater levels in a manner substantially compliant with the GSP regulations.”
3. **Subsidence:** The GSP does not establish SMC for land subsidence in a manner substantially compliant with the GSP regulations.

Our discussions are focused only on these deficiencies and the efforts needed to resolve these sufficiently.

Takeaways from DWR Meetings (12/19 and 01/22)

- DWR's main concerns, priorities:
 - Existing conditions don't indicate the subbasin is on track to reach sustainability.
 - Undesirable results (URs) to GW users and land users need to be more clearly defined and justified (DWR senses that those conditions are happening now).
- Potential GSP revision approaches raised by the Colusa Team seem conceptually aligned with DWR's expectations, but:
 - PMAs are needed to mitigate overdraft, subsidence and groundwater level decline.
 - Actions are warranted immediately.
- **The revisions should focus on:**
 - **Developing management actions as backstops to address overdraft, GW conditions.**
 - **Revising the SMC for more justifiable URs, minimum thresholds (MTs).**

Recap of DWR Meeting #2 (01/22) and Joint Board Direction (01/26)

- Topics and Approaches Discussed:
 - **Overdraft** (revise estimate based on groundwater levels (Annual Report approach); provide for recurring evaluation of overdraft each year in Annual Report)
 - **PMAs**
 - **Projects** (*lower priority*): Update available details on timeline, benefits
 - **Management Actions** (*higher priority*): “Formal Agreement” approach is conceptually suitable, but need to provide sufficient details
- Direction and Next Steps
 - Move forward with overdraft revisions (providing for recurring evaluation)
 - Prepare draft “Formal Agreement” content to review with GSAs, DWR
 - Prepare SMC revision recommendations (with West Yost)

Key Needs to Address Deficiencies

- PMA: DWR’s main concern and focus, all other deficiencies tie into these.
 - PMAs to mitigate overdraft.
 - PMAs to mitigate domestic well impacts until sustainability is reached.
 - PMAs to address and mitigate subsidence.

Focus Today

- Overdraft: Revise based on more recent empirical data

- GWL:
 - Rephrase/revise URs and MTs to justify why those represent unreasonable conditions for domestic wells, GDEs.
 - Clarify relationship between GWL SMC and subsidence, if revised GWL SMC are lower than pre-SGMA levels.
- Subsidence:
 - Revise basis for monitoring, SMC
 - Use InSAR
 - No long-term subsidence past 2042

Focus in Next Meeting

- Evaluate effects of subsidence on critical infrastructure
- Rephrase/revise URs and MTs to justify why those represent unreasonable conditions for facilities, structures, etc.

Proposed Revisions: Projects and Management Actions (PMAs)

Approach for PMA Revisions

- **Project Updates (Lower Priority)**
 - Add details to clarify **Planned/Ongoing Projects** (coordinating with proponents)
 - Add new project details (from Annual Reports, recent grants/grant applications)

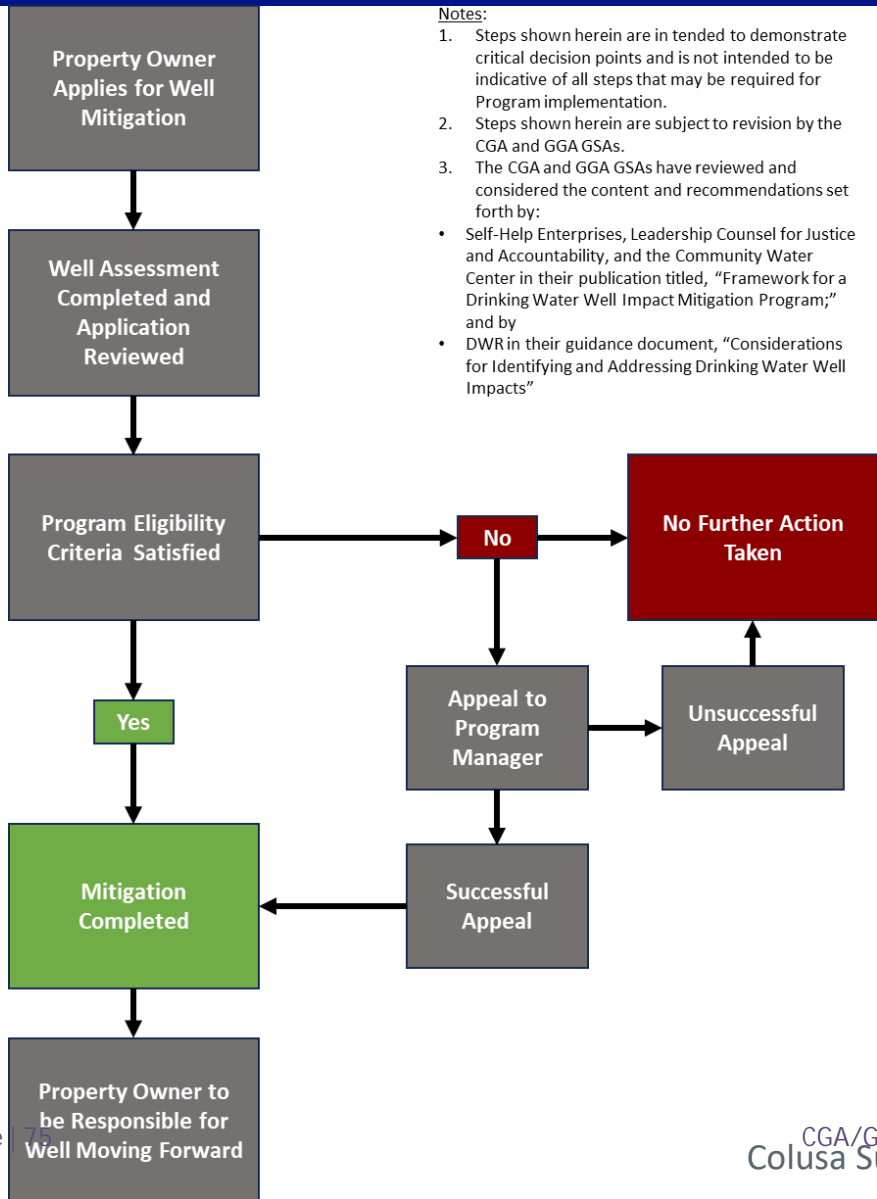
- **Management Action Updates (Higher Priority)**
 - Propose, refine, and sign **“Formal agreements”** to develop and implement programs
 - Domestic well mitigation
 - Demand reduction/management (mitigating overdraft, subsidence)
 - Moving forward with GSA staff/chairs/counsel to draft program details, review with DWR
 - **Discuss certain technical details with Joint TACs**

Domestic Well Mitigation Program

- **Potential Program Measures:**
 - Short-term solutions in emergencies, e.g., delivery of bottled water and/or water tanks
 - Deepening existing wells, or otherwise rehabilitating existing wells.
 - Lowering pumps in existing wells, or replacing pumps in existing wells.
 - Well consolidation (many to one).
 - Connection to or development of public water systems to serve impacted communities.
 - Connection to municipal water systems.

- **Considerations:**
 - Conduct a well evaluation process to determine appropriate mitigation measures (structured form to verify the well impacts/causes, eligibility, preferred solution)
 - Mitigate only once per well (permanent solution under the GSP, e.g., drill deeper than MTs)
 - Coordinate program with well permitting/ordinances to minimize well impacts

Domestic Well Mitigation Program (continued)



Notes:

1. Steps shown herein are intended to demonstrate critical decision points and is not intended to be indicative of all steps that may be required for Program implementation.
2. Steps shown herein are subject to revision by the CGA and GGA GSAs.
3. The CGA and GGA GSAs have reviewed and considered the content and recommendations set forth by:
 - Self-Help Enterprises, Leadership Counsel for Justice and Accountability, and the Community Water Center in their publication titled, "Framework for a Drinking Water Well Impact Mitigation Program;" and by
 - DWR in their guidance document, "Considerations for Identifying and Addressing Drinking Water Well Impacts"

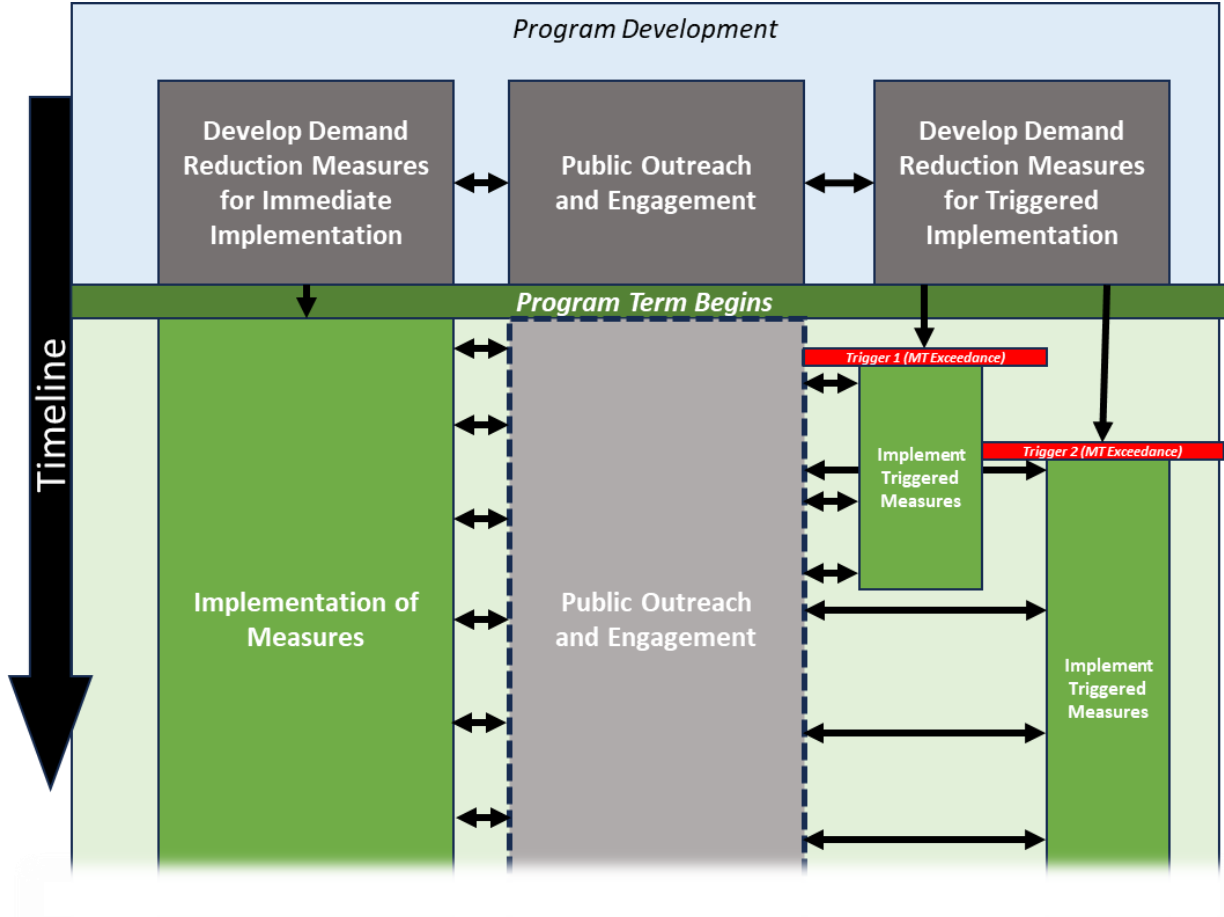
■ **Items to consider in Program development:**

- Program application process (*left*)
- Eligibility criteria (property/property owner)
- Preferred contractors (reputable services)
- Initial well evaluation
- Program form development (participation terms, agreement)
- Priority (first-come-first-served)
- Eligible mitigation (supply focused) vs. non-eligible services (landscaping, ongoing maintenance, etc.)
- Mitigation award (how costs will be reviewed/approved)
- Recordation of mitigation award
- Post-mitigation responsibility (property owner to be responsible for well moving forward)

Demand Reduction / Management Program

- **Potential Program Measures:**
 - **Immediate Implementation** (at Program start date)
 - Voluntary measures for reducing demand
 - Dry farming
 - Fallowing
 - Incentivized land use changes
 - Multi-benefit land repurposing (e.g., recharge basins, renewable energy, habitat, recreation)
 - **Triggered Implementation** (ready to trigger shortly after trigger occurs, commensurate with issues)
 - Allocations
 - Water market/trading and/or fee structures
 - Well/pumping restrictions, in coordination with the Counties
 - Land use restrictions, in coordination with the Counties

Demand Reduction / Management Program (continued)



Notes:

- 1. Steps shown herein are intended to demonstrate critical decision points and is not intended to be indicative of all steps that may be required for Program implementation.
- 2. Steps shown herein are subject to revision by the CGA and GGA GSAs.

- **Items to consider in Program development:**
 - Program implementation process (*left*)
 - Which actions occur when (immediate/triggered)
 - Priority of actions (which actions will be prioritized)
 - Trigger criteria, and process for evaluating groundwater conditions relative to triggers
 - Public noticing of actions (stakeholders/public)
- **Proposed Trigger Criteria, Process**
 - Progressive actions tied to MT exceedances (e.g., first action at 1-2 MT exceedances).
 - Evaluate causes, see if project(s) possible in short order, otherwise implement a Program measure
 - Evaluate conditions annually (Annual Report)

Proposed Revisions: Groundwater Level (GWL) SMC

Groundwater Level (GWL) SMC: Deficiency Recap

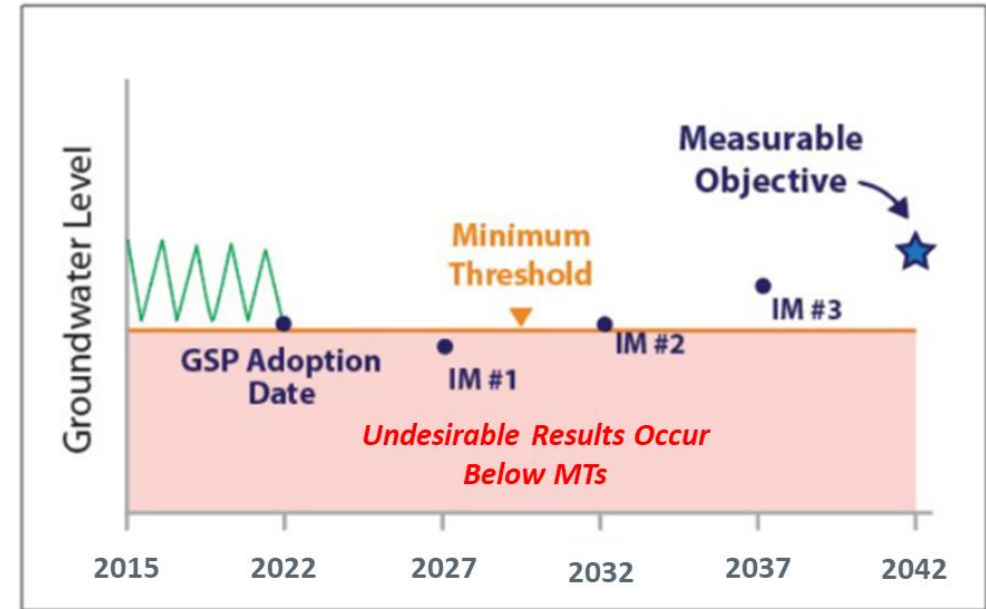
- “The GSP does not establish SMC for chronic lowering of groundwater levels in a manner substantially compliant with the GSP regulations.”
- **Key Needs:**
 - Clearly justify how URs and MTs represent significant and unreasonable conditions, especially for domestic well users and GDEs, and why conditions before then do not. *(Likely requires rephrasing UR definitions and revising MTs.)*
 - Show clear consideration of PMAs that will supply alternate supplies of water and mitigate impacts to domestic wells (e.g., municipal connections, well mitigation).
 - Clarify relationship between GWL SMC and subsidence, if revised GWL SMC are lower than historical (pre-SGMA) levels.

GWL SMC: Undesirable Results (URs)

- Need to update UR definitions:
 - Describe what URs are (what conditions are significant/unreasonable)
 - Justify criteria for identifying (e.g., exceed MTs at XX% wells for XX consecutive months)
 - Explain how beneficial uses and users would be impacted (e.g., domestic wells)
- Current Definition (Jan 2022):
 - “A result that would cause significant and unreasonable reduction in the long-term viability of beneficial uses and users over the planning and implementation horizon of this GSP.”
 - “...Experienced if sustained groundwater levels are too low to reasonably satisfy beneficial uses and users”
 - Conditions that are URs:
 - “Significant/unreasonable” number of dry wells
 - “Significant/unreasonable” reduction in pumping capacity
 - “Significant/unreasonable” need for deeper wells, lower pumps
 - Adverse impacts to environment
- **Need clarity - At what GWL do these conditions occur? (consider conditions in 2020-2022)**

GWL SMC: Proposed Revisions to URs

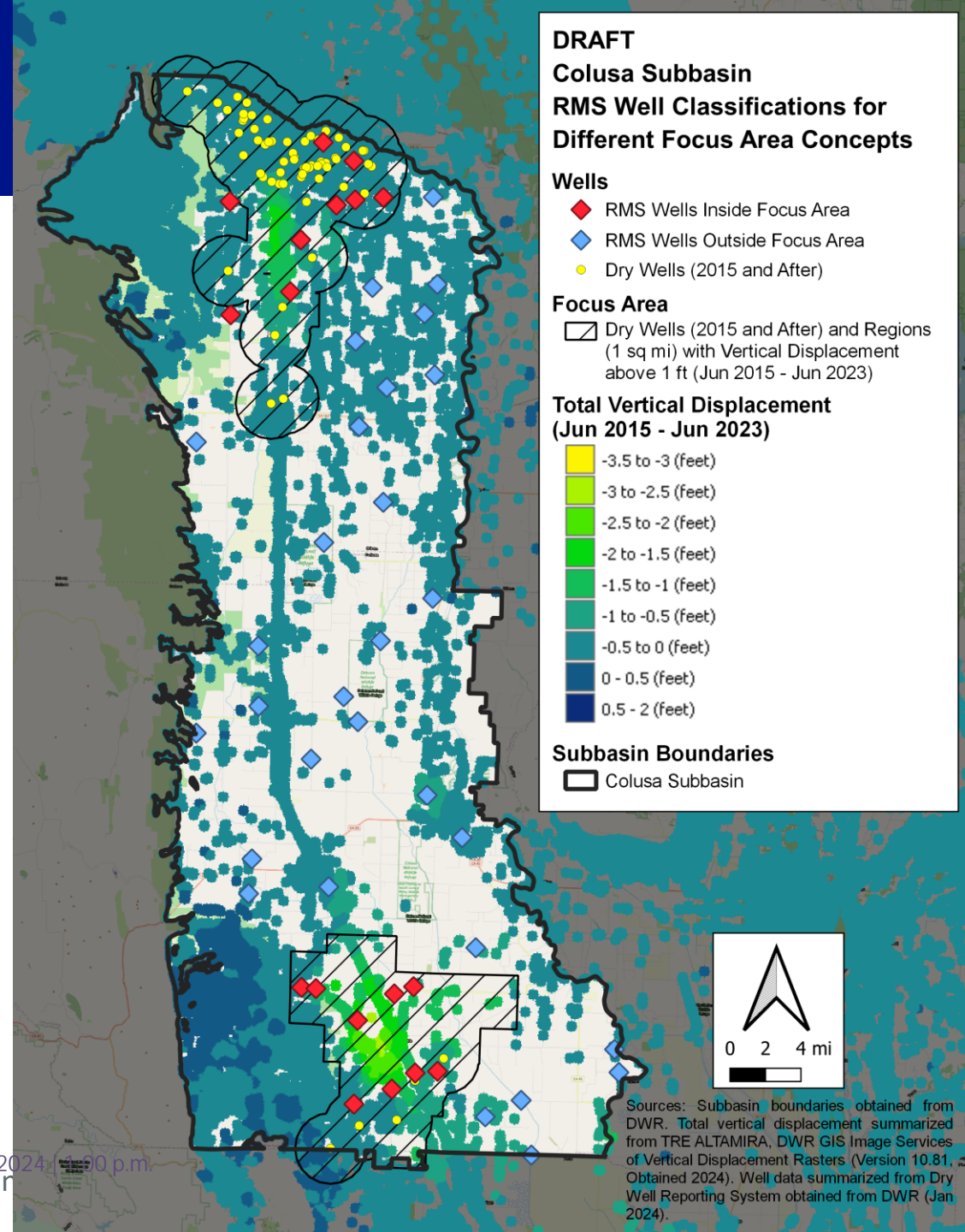
- Revise definition to speak to conditions that occurred in 2020-2022:
 - Dry wells at rates observed in 2020-2022
 - Reduction in pumping capacity as observed in 2020-2022
 - Need to deeper wells, lower pumps as observed in 2020-2022
 - Adverse impacts to the environment
- Provides clearer, justifiable basis for:
 - Explaining impacts to beneficial uses and users (e.g., domestic well impacts that were observed)
 - Connection to subsidence (i.e., subsidence that was observed)
 - Number of RMS wells exceeding MTs that leads to a UR (look at GWL in 2020-2022)



Source: DWR, 2017. Sustainable Management Criteria Best Management Practices.

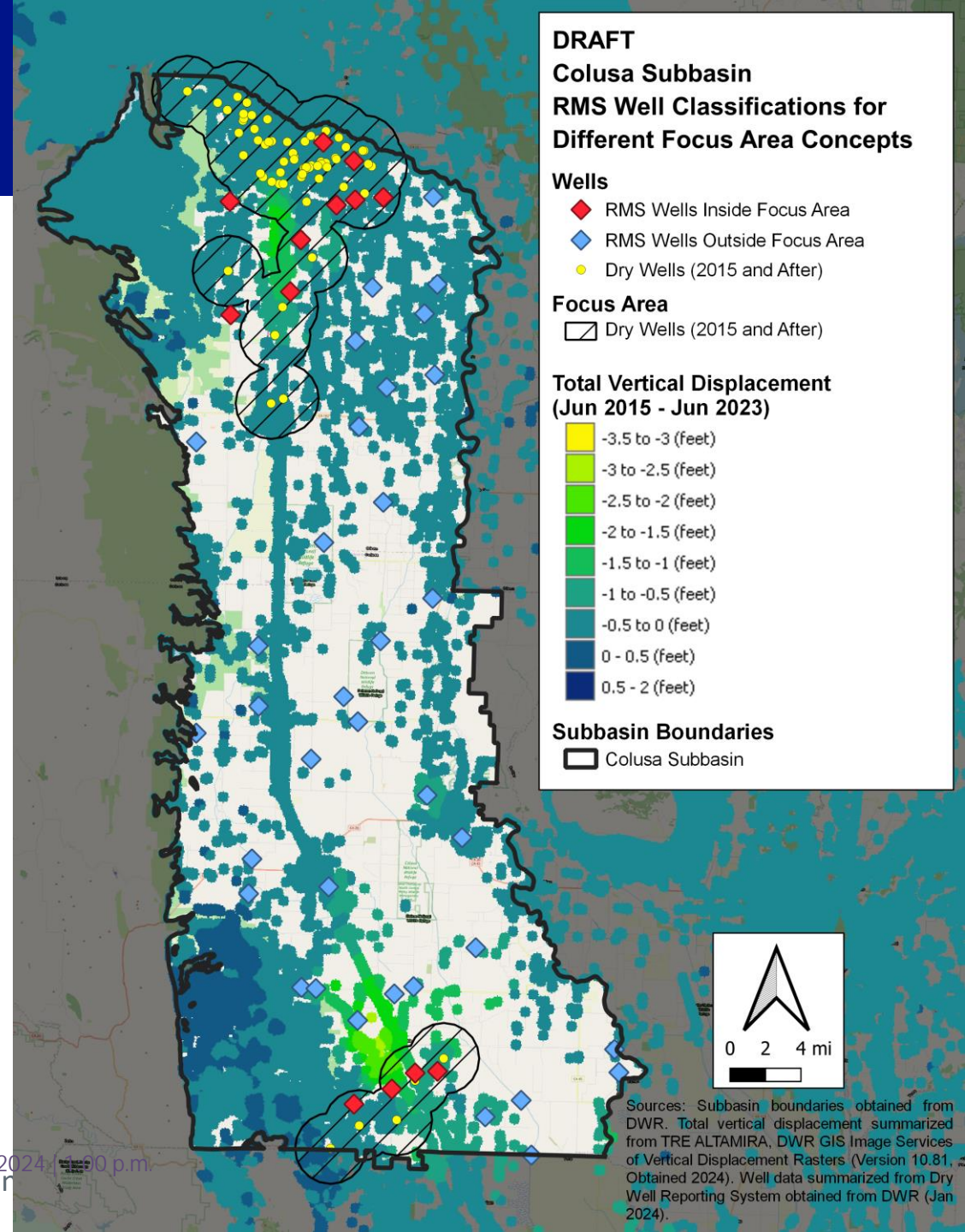
GWL SMC: Proposed Revisions to SMC

- **Minimum Thresholds (MTs):** Based on 2020-2022 GWL data
 - **Areas with dry wells and/or subsidence since 2015** (Within “Focus Areas”): **2020-2022 low**
 - **Areas without dry wells and/or subsidence since 2015** (Outside “Focus Areas”): **2020-2022 low + 10 ft deeper (buffer)**
 - Considerations:
 - Already know the conditions those years (undesirable, challenging period)
 - Some wells do not have 2020-2022 data, use earlier period where needed (e.g., 2015-2022 low)
- **Measurable Objectives (MOs):** Avg. pre-SGMA GWL (2011-2013)
- **Interim Milestones (IMs)** bridging MTs → MOs



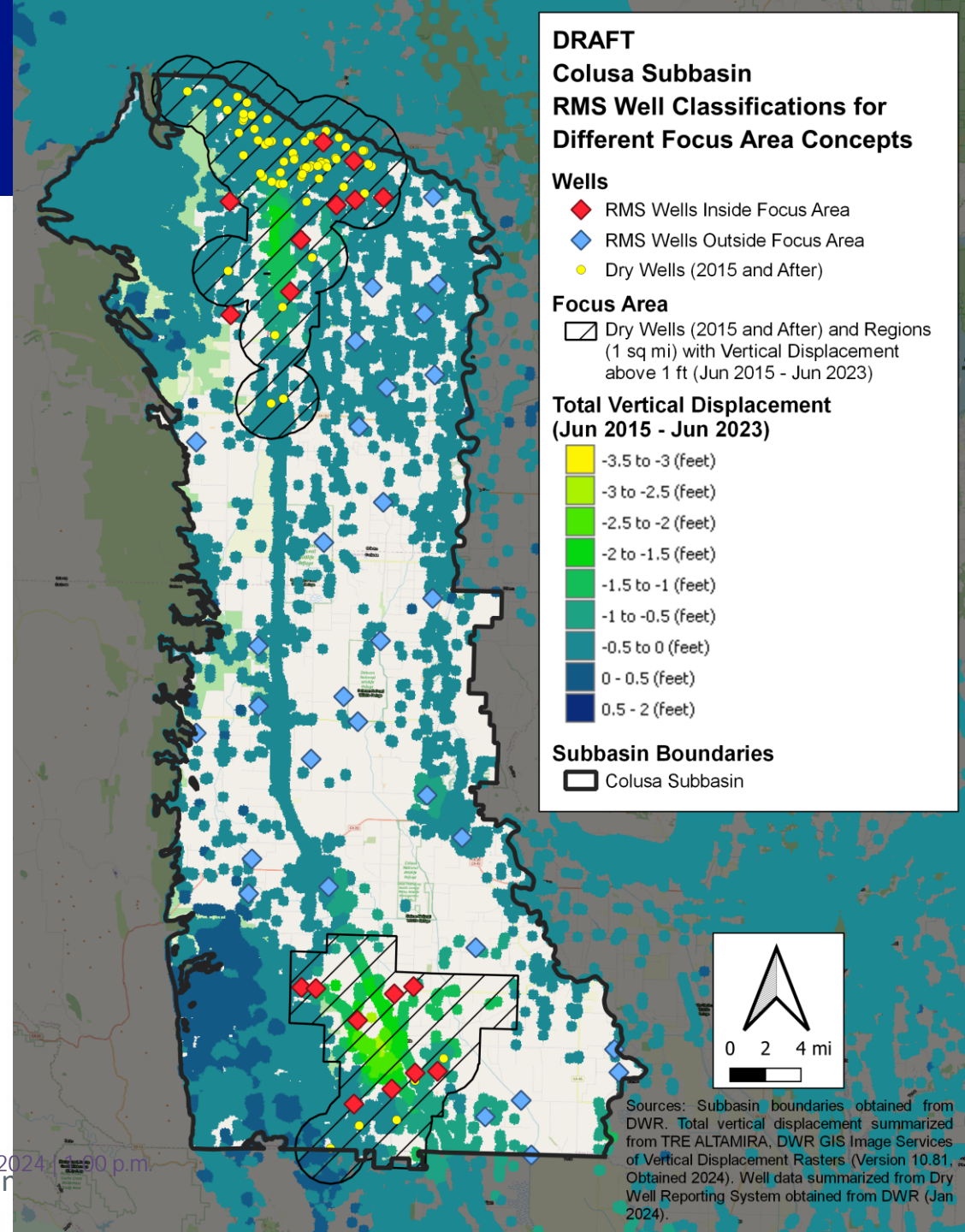
GWL SMC: MT Revisions and Focus Areas

Focus Area Concepts	Inside Focus Area (More Protective)	Outside Focus Area (Margin of Flexibility)
Dry wells within 2 mi	2020-2022 min	2020-2022 min + 10 ft deeper (margin)
Dry wells within 2 mi, Subsidence >1 ft within 1 mi ²	2020-2022 min	2020-2022 min + 10 ft deeper (margin)
Dry wells within 2 mi, Subsidence >1 ft within 36 mi ²	2020-2022 min	2020-2022 min + 10 ft deeper (margin)



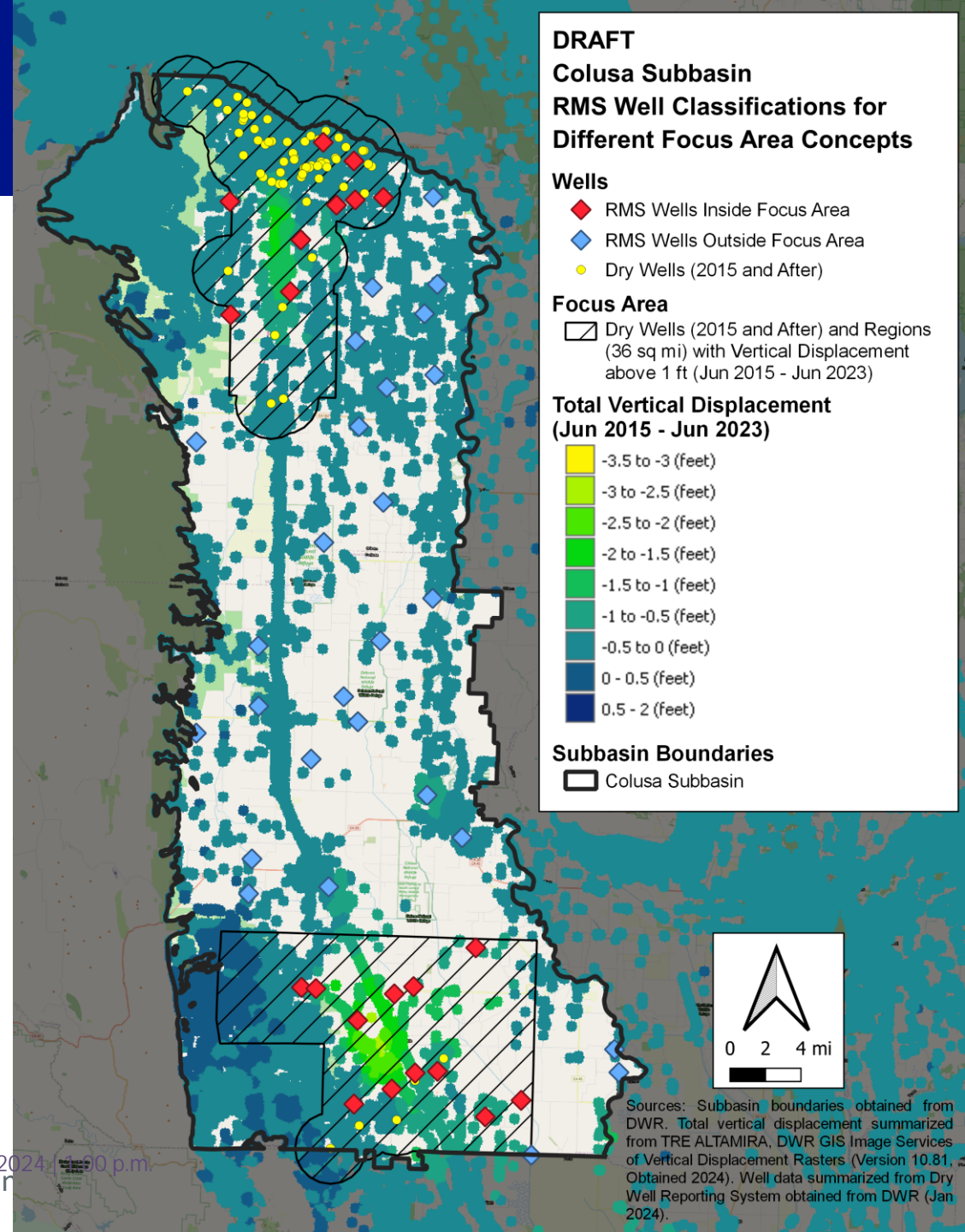
GWL SMC: MT Revisions and Focus Areas

Focus Area Concepts	Inside Focus Area (More Protective)	Outside Focus Area (Margin of Flexibility)
Dry wells within 2 mi	2020-2022 min	2020-2022 min + 10 ft deeper (margin)
Dry wells within 2 mi, Subsidence >1 ft within 1 mi ²	2020-2022 min	2020-2022 min + 10 ft deeper (margin)
Dry wells within 2 mi, Subsidence >1 ft within 36 mi ²	2020-2022 min	2020-2022 min + 10 ft deeper (margin)



GWL SMC: MT Revisions and Focus Areas

Focus Area Concepts	Inside Focus Area (More Protective)	Outside Focus Area (Margin of Flexibility)
Dry wells within 2 mi	2020-2022 min	2020-2022 min + 10 ft deeper (margin)
Dry wells within 2 mi, Subsidence >1 ft within 1 mi ²	2020-2022 min	2020-2022 min + 10 ft deeper (margin)
Dry wells within 2 mi, Subsidence >1 ft within 36 mi ²	2020-2022 min	2020-2022 min + 10 ft deeper (margin)

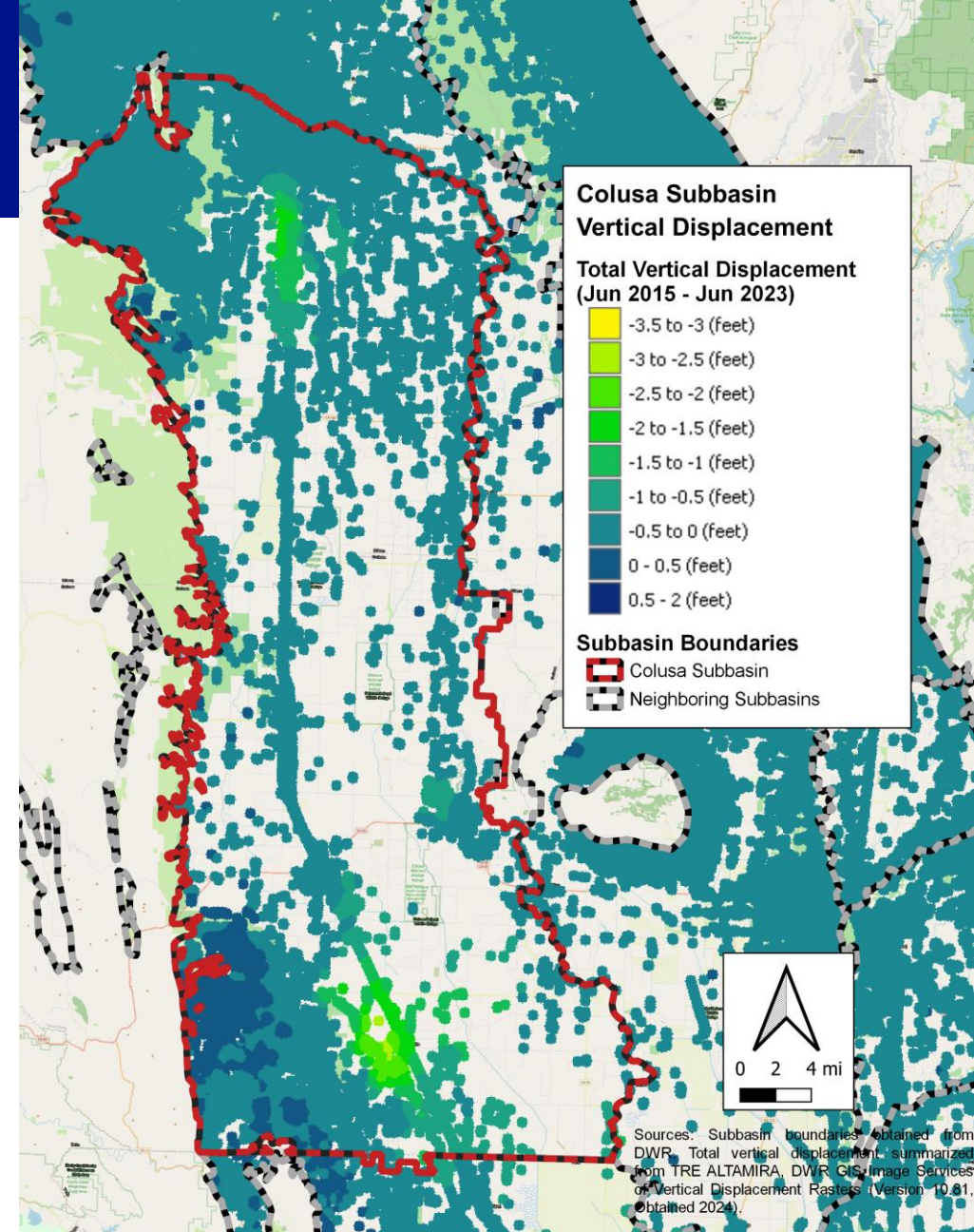


Proposed Approach: Subsidence Monitoring and SMC Basis

Subsidence Monitoring and SMC Basis

- Discussed SMC deficiencies with DWR, some immediate recommended revisions
- **Monitoring and SMC Basis:**
 - Currently based on Sacramento Valley Benchmark Network (last surveyed 2017)
 - **Revise monitoring and SMC based on InSAR***, until such a time as the benchmark network is surveyed
- **SMC Revisions**
 - **Revise SMC to clarify SGMA requirement of no subsidence past 2042** (+/- uncertainty each year, but no long-term subsidence over a multi-year averaging period)

* InSAR = Interferometric Synthetic Aperture Radar



Next Steps and Timeline

Next Steps and Timeline

- DWR Consultation Meeting #3 on 02/16
 - Discuss PMA details, proposed GWL SMC revisions
 - Receive feedback from DWR on acceptability
 - *Schedule final DWR meeting in March*
- CGA/GGA Joint Board Meeting on 02/23
 - Propose PMA details, GWL SMC revisions based on Joint TAC discussions and DWR feedback
 - Receive approval for approach
- Joint TAC Meeting on 03/08
 - Discuss subsidence SMC revisions, other topics as needed



Colusa Subbasin GSP Projects and Management Actions DRAFT Revisions
PMA's from Initial GSP (Jan 2022) With Suggestions for Added Details and Prioritization in GSP Revisions (Apr 2024)

GSP	Project or Management Action	Status	Name	Proponent	Type (If Indicated)	Benefit to Focus Areas*	Suggest Added Details (Timeline, Benefits)	Suggest Prioritization ("Planned" Now or If Trigger)	Note	Average Annual Benefit (AF/year, If Specified)
Colusa	Project	Planned	Colusa County Water District (CCWD) In-Lieu Groundwater Recharge	CCWD	In-lieu Groundwater Recharge	Yes	X		Currently Planned	27,000
Colusa	Project	Planned	Colusa Drain MWC (CDMWC) In-Lieu Groundwater Recharge	CDMWC	In-lieu Groundwater Recharge	Potentially	X		Currently Planned	28,000
Colusa	Project	Planned	Subbasin Multi-Benefit Groundwater Recharge	CGA/GGA/TNC	Direct Groundwater Recharge	Potentially			Currently Planned	5,200
Colusa	Project	Planned	Orland-Artois Water District (OAWD) Land Annexation and Groundwater Recharge	OAWD	Direct and In-lieu Groundwater Recharge	Yes	X		Currently Planned	22,500
Colusa	Project	Planned	Sycamore Slough Groundwater Recharge Pilot Project	Landowner	Direct Groundwater Recharge				Currently Planned	500
Colusa	Project	Ongoing	Reclamation District 108 (RD108) and CCWD Agreement for Five-Year In-Lieu Groundwater Recharge Project	RD108/CCWD	In-lieu Groundwater Recharge	Yes	X		Currently Ongoing	8,000
Colusa	Project	Ongoing	Glenn-Colusa Irrigation District (GCID) Strategic Winter Water Use for Groundwater Recharge and Multiple Benefits	GCID	Direct and In-lieu Groundwater Recharge	Potentially	X		Currently Ongoing	TBD
Colusa	Project	Ongoing	Sycamore Marsh Farm Direct Recharge Project	Landowner	Direct Groundwater Recharge				Currently Ongoing	TBD
Colusa	Project	Ongoing	GCID Expansion of In-Basin Program for In-lieu Groundwater Recharge	GCID	In-lieu Groundwater Recharge	Potentially	X		Currently Ongoing	TBD
Colusa	Project	Ongoing	Orland Unit Water Users Association (OUWUA) Irrigation Modernization for Increased Surface Water Delivery and Reduced Groundwater Pumping	OUWUA	In-lieu Groundwater Recharge	Yes	X		Currently Ongoing	TBD
Colusa	Management Action	Ongoing	Urban Water Conservation in Willows	California Water Service - Willows	Management Action				Currently Ongoing	2
Colusa	Project	Potential	GCID In-lieu Groundwater Recharge	GCID	In-lieu Groundwater Recharge					TBD
Colusa	Project	Potential	Westside Streams Diversion for Direct or In-lieu Groundwater Recharge	CGA/GGA	Direct and In-lieu Groundwater Recharge	Potentially		If Trigger	Potential SB122 connection	TBD
Colusa	Project	Potential	Sites Reservoir	Sites Project Authority	Direct and In-lieu Groundwater Recharge					TBD
Colusa	Project	Potential	Delevan Pipeline Colusa Basin Drainage Canal System (Colusa Drain) Intertie	Landowner	Direct and In-lieu Groundwater Recharge					TBD
Colusa	Project	Potential	Orland Unit Water Users Association (OUWUA) Flood Water Conveyance	OUWUA	Direct Groundwater Recharge	Yes		If Trigger	Potential SB122 connection	TBD
Colusa	Project	Potential	OAWD Direct Groundwater Recharge	OAWD	Direct Groundwater Recharge	Yes		If Trigger		TBD
Colusa	Project	Potential	Sycamore Slough Colusa Drain Multi-Benefit Recharge Project	Landowner	Direct Groundwater Recharge			If Trigger		TBD
Colusa	Project	Potential	Tehama-Colusa Canal Trickle Flow to Ephemeral Streams	RD108	Direct Groundwater Recharge	Potentially	X	"Planned" Now		TBD
Colusa	Project	Potential	Enhanced Infiltration of Precipitation on Agricultural Lands	CGA/GGA	Direct Groundwater Recharge			If Trigger		TBD
Colusa	Project	Potential	Colusa Subbasin Flood-MAR	CGA/GGA	Direct Groundwater Recharge	Potentially		If Trigger	Potential SB122 connection	TBD
Colusa	Project	Potential	Reclamation District 108 "Boards In" Program	RD108	Direct Groundwater Recharge	Potentially		If Trigger		1,800
Colusa	Project	Potential	Colusa County Public Water System Water Treatment Plant	Landowner	In-lieu Groundwater Recharge					TBD
Colusa	Project	Potential	GCID Water Transfers to Tehama-Colusa Canal Authority (TCCA) CVP Contractors	GCID	In-lieu Groundwater Recharge					TBD

Colusa Subbasin GSP Projects and Management Actions DRAFT Revisions
PMA's from Initial GSP (Jan 2022) With Suggestions for Added Details and Prioritization in GSP Revisions (Apr 2024)

GSP	Project or Management Action	Status	Name	Proponent	Type (If Indicated)	Benefit to Focus Areas*	Suggest Added Details (Timeline, Benefits)	Suggest Prioritization ("Planned" Now or If Trigger)	Note	Average Annual Benefit (AF/year, If Specified)
Colusa	Project	Potential	Colusa Subbasin In-lieu Recharge & Banking Program	South Valley Water Resources Authority	In-lieu Groundwater Recharge					TBD
Colusa	Project	Potential	Sycamore Marsh Farm In-lieu Recharge Project	Landowner	In-lieu Groundwater Recharge					TBD
Colusa	Project	Potential	Westside Off-stream Reservoir and In-Lieu Groundwater Recharge	TCCA Contractors	In-lieu Groundwater Recharge					TBD
Colusa	Management Action	Potential	Domestic Well Mitigation Program	CGA/GGA	Management Action	Yes	X	"Planned" Now	Identified by DWR	TBD
Colusa	Management Action	Potential	Drought Contingency Planning for Urban Areas	CGA/GGA/Cities	Management Action					TBD
Colusa	Management Action	Potential	Long-Term Demand Management Action	CGA/GGA	Management Action	Yes	X	"Planned" Now	Identified by DWR (Long/Short-Term not specified)	TBD
Colusa	Management Action	Potential	Strategic Short-Term Demand Management	CGA/GGA	Management Action	Yes	X	"Planned" Now	Identified by DWR (Long/Short-Term not specified)	TBD
Colusa	Management Action	Potential	Well Abandonment Outreach and Funding Program	CGA/GGA	Management Action					TBD
Colusa	Management Action	Potential	Preservation of Lands Favorable for Recharge	CGA/GGA	Management Action					TBD
Colusa	Management Action	Potential	Review of County Well Permitting Ordinances	CGA/GGA	Management Action	Yes				TBD
Colusa	Management Action	Potential	Reduce Non-beneficial Evapotranspiration/Invasive Species Eradication	CGA/GGA	Reduce Demand					TBD
Colusa	Management Action	Potential	Development of a Dedicated Network of Shallow Monitoring Wells for GDE Monitoring	CGA/GGA	Management Action, Closing Data Gaps					TBD

* Management Zones refer to areas of the subbasin where PMA's would be focused to address the most significant subsidence, groundwater level impacts, and adverse groundwater conditions. These would be generally delineated around the Orland-Artois area and Arbuckle-College City area.

DRAFT AGREEMENT
ESTABLISHING A DOMESTIC WELL MITIGATION PROGRAM
FOR THE COLUSA SUBBASIN OF THE SACRAMENTO VALLEY GROUNDWATER BASIN

This document outlines the general content in select sections of the DRAFT agreement between the CGA and GGA GSAs to develop and implement a domestic well mitigation program (Program).

The Program would mitigate impacts to drinking water wells (i.e., domestic wells and shallow wells that supply drinking water users) resulting from declining groundwater levels and subsidence that occur from groundwater management activities during the GSP Implementation Period (through 20242, or until sustainability is achieved).

Items in red are proposed for Technical Advisory Committee consideration.

SELECT AGREEMENT SECTIONS

1. POTENTIAL PROGRAM MITIGATION MEASURES

Potential Program mitigation measures may include, but are not limited to:

- Short-term solutions in emergencies, such as delivery of bottled water and/or water tanks. (Considered only for temporary mitigation while other actions are in progress.)
- Deepening existing wells, or otherwise rehabilitating existing wells.
- Lowering pumps in existing wells, or replacing pumps in existing wells.
- Well consolidation (many to one).
- Connection to or development of public water systems to serve impacted communities.
- Connection to municipal water systems.

A well evaluation process will be used to determine the appropriate Program mitigation measures for each mitigated well. The well evaluation process would follow a structured protocol involving:

- Assessment of impacts to the well and underlying causes.
- Determination that the well impacts are related to groundwater management during the GSP Implementation Period (e.g., not related to normal wear and tear)
- Determination and recommendation of an appropriate mitigation strategy (i.e., one of the potential Program mitigation measures above).

Additional technical details considered in Program mitigation measures:

- Mitigation will occur only once for each well, and will be appropriate to and commensurate with the actual or anticipated well impacts resulting from groundwater management during the GSP Implementation Period (i.e., if a well is dry due to groundwater level decline, and deepening that well is the appropriate Program

mitigation measure, the well will be deepened below the MT to ensure that the same well impacts will not occur again during GSP implementation).

- It is also anticipated that potential Program measures may include, but will not be limited to, well permitting or ordinances to spatially and vertically isolate new wells to minimize impact on wells. The design and implementation of such measures would be coordinated with existing and/or new County well permitting processes and ordinances.

2. PROGRAM DEVELOPMENT

In preparation for Program implementation, the GSAs will clearly define the Program’s purpose, objectives, roles, responsibilities, requirements, and potential outcomes. Items for consideration during Program development include, but are not limited to:

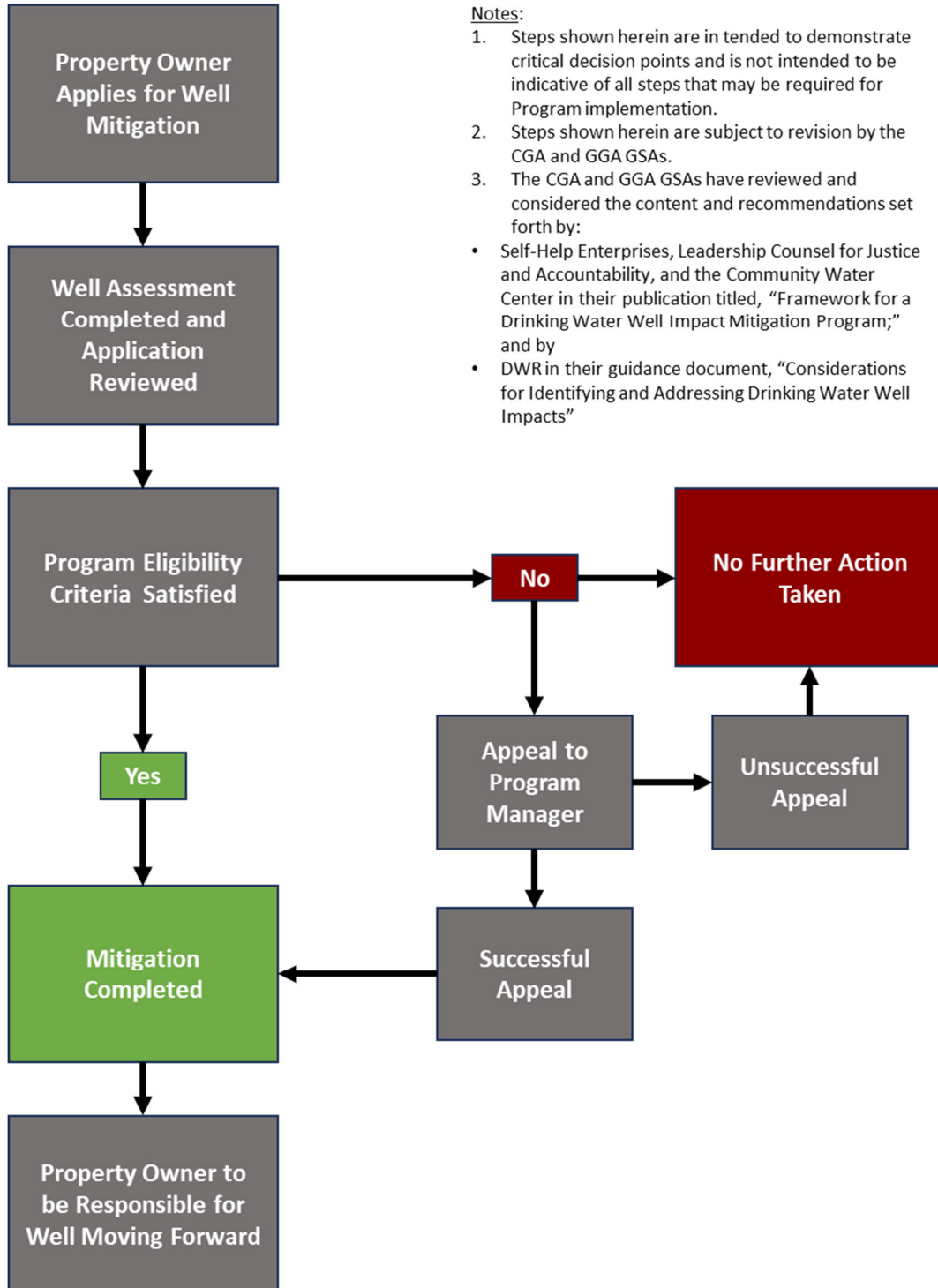
- Definitions
- Program eligibility criteria, potentially including:
 - Property eligibility
 - Property owner eligibility
- Program application process (how will property owners apply to and be approved to participate in the Program)
- Preferred contractors (reputable contractors authorized to provide Program services)
- Preliminary well evaluation (inspecting the well and underlying issues)
- Program form development (formalizing an agreement between the GSAs and the property owner)
- Priority (propose first-come-first-served)
- Eligible mitigation versus non-eligible mitigation (what will and won’t be covered)
- Mitigation award (how will the costs of mitigation be reviewed and approved)
- Recordation of mitigation award
- Post-mitigation responsibility (property owner to be responsible for well moving forward)

These items will be defined in an agreement to be signed by the GSAs, or authorized representative of the GSAs, and the property owner receiving mitigation services through the Program.

3. DRAFT PROGRAM IMPLEMENTATION FLOWCHART

The draft exhibit below outlines a draft process for how the Program would be implemented to mitigate wells.

DRAFT Exhibit.
Colusa Subbasin Domestic Well Mitigation Program
DRAFT Implementation Flowchart.



Notes:

1. Steps shown herein are intended to demonstrate critical decision points and is not intended to be indicative of all steps that may be required for Program implementation.
2. Steps shown herein are subject to revision by the CGA and GGA GSAs.
3. The CGA and GGA GSAs have reviewed and considered the content and recommendations set forth by:
 - Self-Help Enterprises, Leadership Counsel for Justice and Accountability, and the Community Water Center in their publication titled, "Framework for a Drinking Water Well Impact Mitigation Program;" and by
 - DWR in their guidance document, "Considerations for Identifying and Addressing Drinking Water Well Impacts"

DRAFT AGREEMENT
ESTABLISHING A DEMAND REDUCTION PROGRAM
FOR THE COLUSA SUBBASIN OF THE SACRAMENTO VALLEY GROUNDWATER BASIN

This document outlines the general content in select sections of the DRAFT agreement between the CGA and GGA GSAs to develop and implement a demand reduction program (Program).

The Program would review, plan, and implement actions for demand reduction to mitigate overdraft, groundwater level decline, and subsidence resulting from groundwater management activities during the GSP Implementation Period (through 20242, or until sustainability is achieved).

SELECT AGREEMENT SECTIONS

1. POTENTIAL PROGRAM MEASURES

Potential Program measures that will reduce demand may include, but are not limited to:

- Measures to be considered and moved forward for **immediate implementation (at the Program start date)**. Measures may include, but are not limited to:
 - Voluntary measures for reducing demand
 - Dry farming
 - Fallowing
 - Incentivized land use changes
 - Multi-benefit land repurposing (e.g., recharge basins, renewable energy, habitat, recreational spaces)
 - Well permitting/ordinances, in coordination with the Counties
- Measures to be considered and moved forward for **triggered implementation** (i.e., develop the actions further so that they are ready to implement shortly after they are triggered, but only implemented when the trigger occurs). Measures may include, but are not limited to:
 - Land use restrictions, in coordination with the Counties
 - Well/pumping restrictions, in coordination with the Counties
 - Allocations
 - Water market/trading and/or fee structures
- The Parties agree that triggered action(s) are to be commensurate with:
 - The amount of demand reduction required.
 - The particular issues facing the area where the action(s) are to be implemented.

2. PROGRAM DEVELOPMENT

In preparation for Program implementation, the GSAs will clearly define the Program's purpose, objectives, roles, responsibilities, requirements, and potential outcomes. Items for consideration during Program development include, but are not limited to:

- Definitions
- Program actions, including:
 - Immediate actions (measures that will move forward at the Program start date)
 - Triggered actions (measures that will be developed further so that they are ready to implement shortly after they are triggered, but only implemented when the trigger occurs)
- Trigger criteria, including the process for evaluating the groundwater conditions that result in those trigger conditions
- Priority of actions (which actions will be prioritized)
- Noticing and recordation of actions (how will stakeholders and the public be made aware of Program development and actions)

These items will be defined in a Program agreement to be signed by the Parties according to the term indicated below.

3. PROGRAM TRIGGER CRITERIA

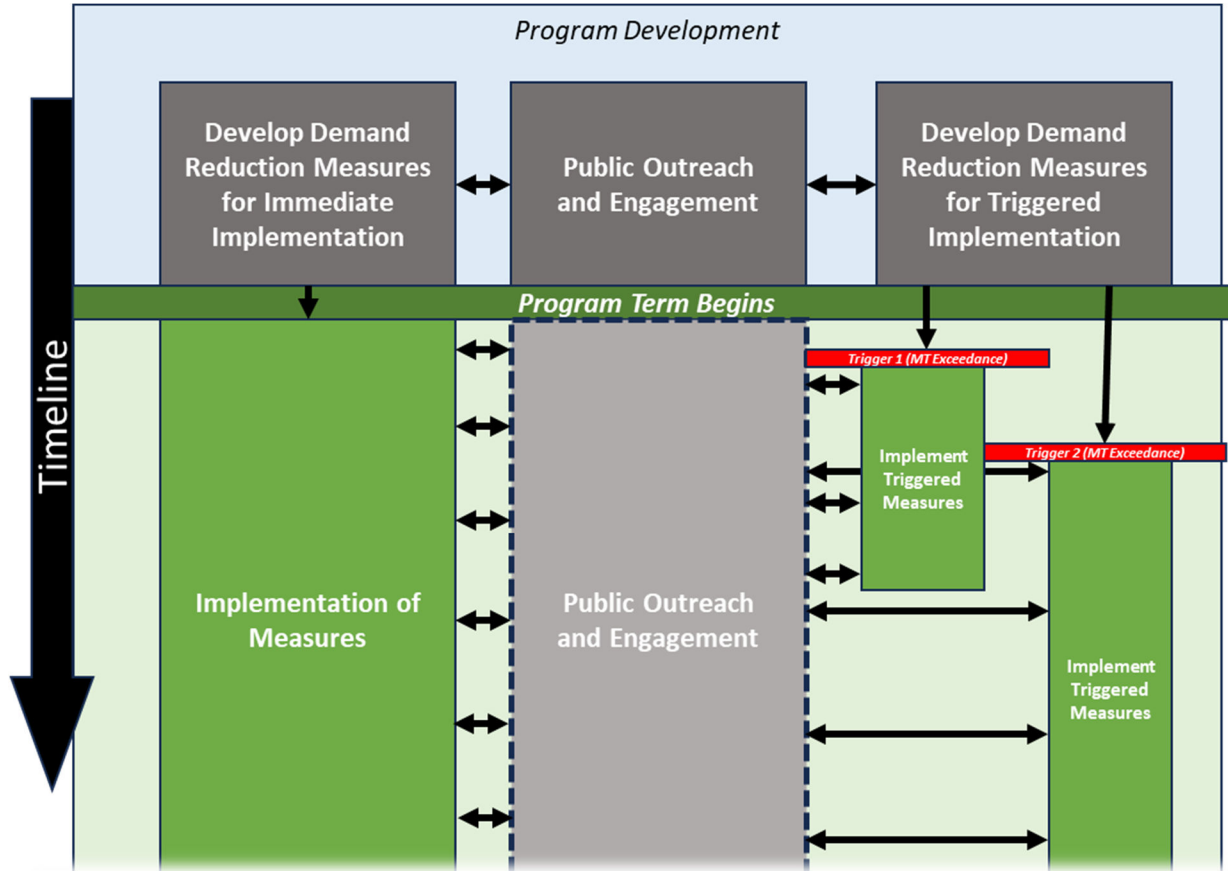
- Immediate actions will move forward immediately according to the term indicated below and are not subject to trigger criteria.
- Triggered actions will move forward according to specific and measurable trigger criteria, which may include progressive actions with progressive MT exceedances (e.g., first action at one MT exceedance, second action at two MT exceedances).
- The general process for triggering actions shall include (sequentially):
 - Determine the underlying cause and local conditions that caused the MT exceedance, as applicable (e.g., are they caused by groundwater level decline)
 - Identify which project(s) or alternative Program measure(s) are suitable for addressing the underlying cause and local conditions.
 1. Projects are those identified in the GSP that provide recharge benefits (whether in-lieu or direct, e.g., Flood-MAR, recharge basins).
 2. Program measure(s) are those actions that will reduce demand, identified above.
 - If project(s) are suitable for addressing the underlying cause and local conditions, AND If implementation of the project(s) are possible within 6 months, then **proceed with implementation of project(s)**.
 - Otherwise, if Program measure(s) are identified as being suitable for addressing the underlying cause and local conditions, OR if implementation of project(s) is not possible within 6 months, **proceed with implementation of Program measure(s)**. The Program measure(s) will be commensurate with the underlying issue and local conditions, and will be implemented until such a time as the action is determined to be no longer required.

- Evaluation of Program benefits will occur in each Annual Report, and implementation of project(s) and Program measure(s) will be adaptively managed according to conditions in the Subbasin.

4. DRAFT PROGRAM IMPLEMENTATION FLOWCHART

The draft exhibit below outlines a **draft process for how the Program would be implemented.**

DRAFT Exhibit. Colusa Subbasin Demand Reduction Program DRAFT Implementation Flowchart.



Notes:

1. Steps shown herein are intended to demonstrate critical decision points and is not intended to be indicative of all steps that may be required for Program implementation.
2. Steps shown herein are subject to revision by the CGA and GGA GSAs.

Conceptual Focus Areas (DRAFT)

“Focus Areas” refer to areas of the Colusa Subbasin where:

- Sustainable Management Criteria (SMC) would be defined more strictly to avoid undesirable results, and/or
- Projects and management actions (PMAs) would be focused to address the most significant subsidence, groundwater level impacts, and adverse groundwater conditions.

It is proposed that these be generally delineated around the Orland-Artois and Arbuckle-College City areas.

Conceptual focus areas for consideration include:

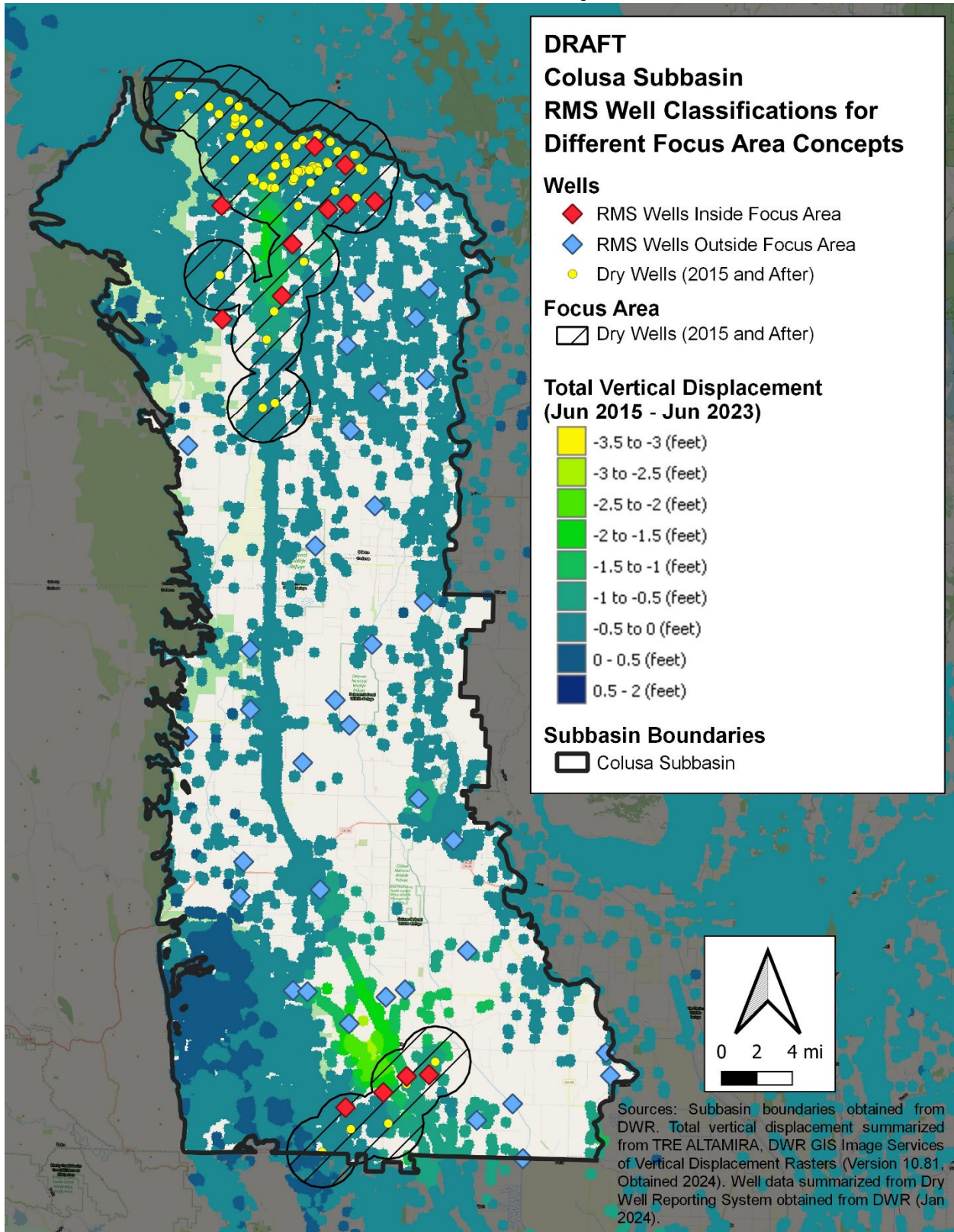
- **Focus Area Concept 1:**
 - **Areas within 2 mi. of reported dry wells** (since 01/01/2015, from DWR’s Dry Well Reporting System)
- **Focus Area Concept 2:**
 - **Areas within 2 mi. of reported dry wells** (since 01/01/2015, from DWR’s Dry Well Reporting System¹), and/or
 - **Sections (1 sq. mi.) with vertical displacement above 1 ft** (Jun 2015 – Jun 2023, from DWR-provided InSAR data²)
- **Focus Area Concept 3:**
 - **Areas within 2 mi. of reported dry wells** (since 01/01/2015, from DWR’s Dry Well Reporting System), and/or
 - **Regions (36 sq. mi.) with vertical displacement above 1 ft** (Jun 2015 – Jun 2023, from DWR-provided InSAR data)

Maps of the Focus Area concepts are shown on the following pages.

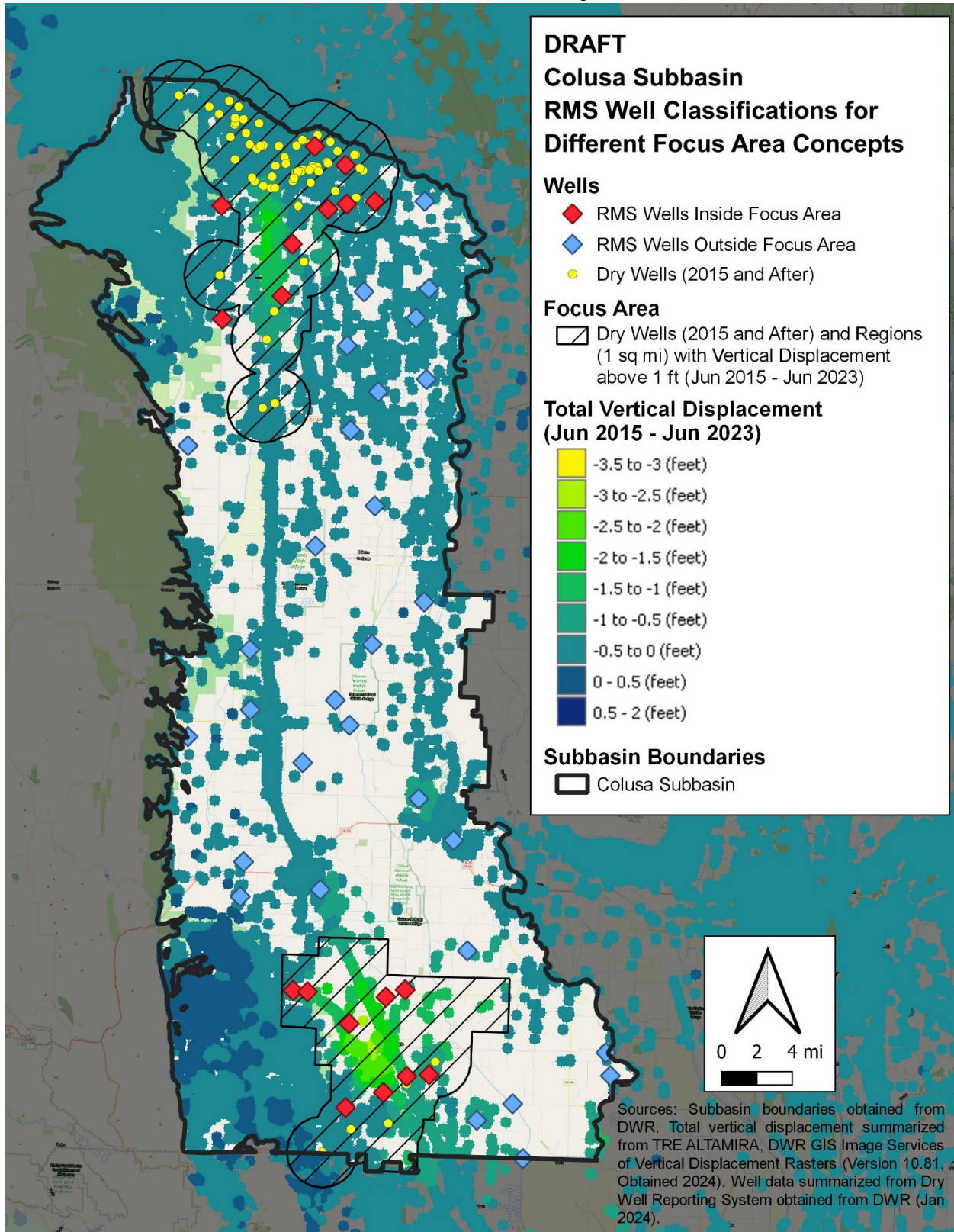
¹ <https://mydrywell.water.ca.gov/report/>

² <https://data.cnra.ca.gov/dataset/tre-altamira-insar-subsidence>

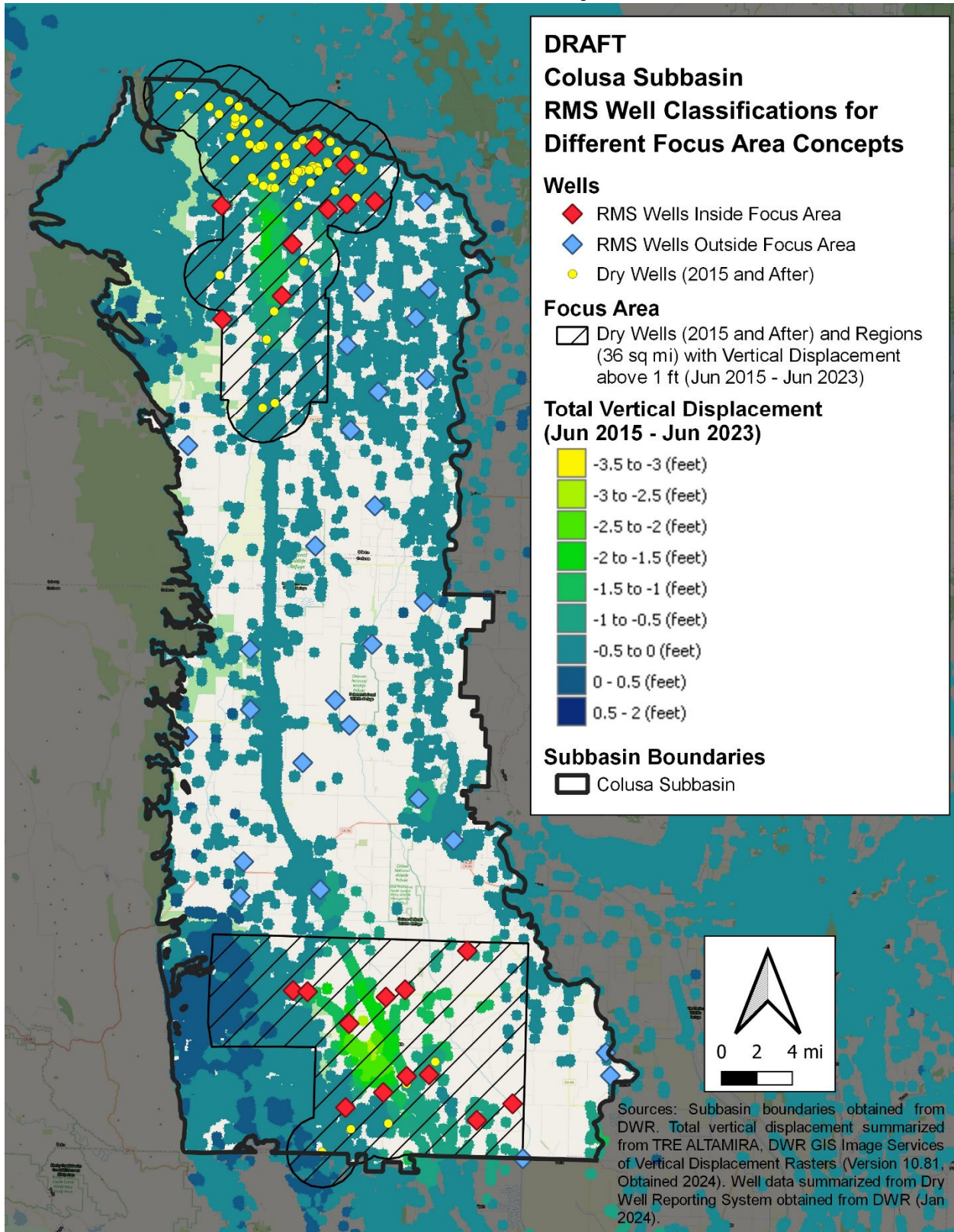
Focus Area Concept 1.



Focus Area Concept 2.



Focus Area Concept 3.



Comparison of Groundwater Level Sustainable Management Criteria with Approved GSPs

Groundwater Level Sustainable Management Criteria

Note there is some paraphrasing and rearranging of text for comparison.

Subbasin	Undesirable Result (UR) Occurs When	Minimum Threshold (MT)	Measurable Objective (MO)
Colusa <i>(Initial GSP, Jan 2022)</i>	25% of RMS continuously below their MT for 24 consecutive months	The lower of: 1. The elevation corresponding to the 20 th percentile of nearby domestic well depths, or 2. 50% of measured historical groundwater elevation range below the historical measured low elevation.	Mean of the most recent 5 years of available groundwater elevation measurements up to 2020 (a fixed value, not a rolling average).
<i>Nearby Subbasins in the Sacramento Valley</i>			
Butte	25% of RMS continuously below their MT for 24 consecutive months	Step 1: The shallowest of the following criteria: 1. The depth associated with the 7 th percentile of nearby domestic wells, to protect domestic wells, or 2. The range of historically measured groundwater levels or 20 feet (whichever is greater) below the observed historic low, to protect conjunctive use by agriculture. Step 2: The deeper of step 1, or the measured low + 10 ft	Mean of the most recent 5 years of available groundwater elevation measurements (generally 2012-2017)
Sutter	25% of RMS drop below the MT concurrently over two consecutive seasonal high measurements.	The deepest of: 1. The historical low at each RMS, or 2. 90% of the average groundwater elevation from the projected water budget (baseline condition over 60-year period) at each RMS with a 50% artificial increase in ET, or 3. The average operating range for the following aquifer zones: - Shallow AZ and AZ-1 = 8.0 feet - AZ-2 and AZ-3 = 16.5 feet	Average of the available historical record at each representative monitoring site.
Vina	Two RMS within a MA exceeding MTs for two consecutive non-dry years (W, AN, BN).	Set through process evaluating depths of “sustainably constructed domestic wells” in the vicinity of the RMS and setting at level that is “protective of the majority of the domestic wells,” (precise metrics not immediately clear from main GSP text)	Set based on groundwater trend line from data since 2000, set at the point the trend line reaches in 2030
Yolo	MT exceedance in 51 percent or more RMS in two (2) MAs.	Different methods in different MAs, e.g. 1) RMS drops below pre-2016 low for two consecutive fall measurements. 2) Criteria 1 plus 20% range below the low. 3) No MTs where no GW used	Average of available fall (Sep.-Dec.) records for 2000-2011 period, evaluated as five-year running average.

Groundwater Level Sustainable Management Criteria, Continued...

Note there is some paraphrasing and rearranging of text for comparison.

Subbasin	Undesirable Result (UR) Occurs When	Minimum Threshold (MT)	Measurable Objective (MO)
Colusa	25% of RMS continuously below their MT for 24 consecutive months	The lower of: 1. The elevation corresponding to the 20 th percentile of nearby domestic well depths, or 2. 50% of measured historical groundwater elevation range below the historical measured low elevation.	Mean of the most recent 5 years of available groundwater elevation measurements up to 2020 (a fixed value, not a rolling average).
<i>Critically Overdrafted Subbasins in the San Joaquin Valley</i>			
Kings (e.g., McMullin Area GSP)	15% of RMS fall below their MT during a single monitoring event	Set at elevation below MO to allow operational flexibility during a 5-year drought (generally the actual decline in 2012-2016 increased by 20%)	Set based on the decline in GWL at each RMS between 1997-2012 (a period with average surface water deliveries), and an incremental mitigation correction planned to reach sustainable levels by 2040 (10-40% correction every 5 years through 2040)
Madera (e.g., Joint GSP)	Same 30% of RMS fall below MT for two consecutive fall measurements	Fall 2015 groundwater elevation (measured if available; otherwise estimated from groundwater model with adjustment for offset from historical data)	Fall 2010 groundwater elevation (measured if available; otherwise estimated from groundwater model with adjustment for offset from historical data)
Merced	Greater than 25% of RMS fall below their MT in 2 consecutive years	Fall 2015 groundwater elevation	November or October 2011 groundwater elevation (measured, or estimation if historical record not available)