



COLUSA SUBBASIN

Colusa Subbasin GSP Revisions

Joint GSA Board Meeting

March 22, 2024

Agenda

- 1. Timeline**
- 2. Overview of GSP Revisions**
- 3. Proposed Revisions:**
 - 1. Demand Management Program**
 - 2. Domestic Well Mitigation Program**
 - 3. Groundwater Level SMC**
 - 4. Subsidence Monitoring and SMC**
- 4. Next Steps**

Timeline

Feb 2024	02/09 – Joint TAC Meeting 02/16 – DWR Meeting #3 02/23 – Joint Board Meeting
Mar 2024	03/08 – Joint TAC Meeting 03/14 – DWR Meeting #4 03/22 – Joint Board Meeting 03/25 – DWR Meeting #5
Apr 2024	04/01 – Draft Revised GSP for Review 04/09 – Comments on Draft Revised GSP 04/12 – Joint GSA Board Meeting (Review Draft Revised GSP and Comments) 04/16 – Final Revised GSP Released 04/19 – Joint GSA Board Meeting (Adopt Revised GSP) 04/22 – Submit Revised GSP

Overview of GSP Revisions

Takeaways from DWR Consultation Meetings (Through 03/14)

- DWR's main concerns, priorities:
 - Existing conditions don't indicate the subbasin is on track to reach sustainability.
 - Undesirable results (URs) must be justified (DWR senses that URs have happened).
- The revisions should focus on:
 - Developing management actions as means to address overdraft, groundwater (GW) conditions.
 - Revising the SMC for more justifiable URs, minimum thresholds (MTs).
- **Many proposed revisions discussed thus far are in line with DWR's expectations** (domestic well mitigation, overdraft, groundwater level MTs/MOs, subsidence monitoring)
- **DWR is concerned about the potential for ongoing subsidence, is looking for:**
 - **Very stringent SMC and requirements around subsidence, AND/OR**
 - **Commitment to moving forward with enforceable demand management (GW allocations)**

Revised GSP Cover Letter and Implementation Timeline

- Preparing a cover letter for the Revised GSP outlining:
 - GSP development and revisions processes
 - Summary of key GSP revisions, including (but not limited to):
 - Commitment to demand management
 - Commitment to domestic well mitigation
 - SMC revisions to address DWR's identified deficiencies (GWL, subsidence)
 - 5-year workplan for GSP Implementation through Q1 2029, including:
 - Ongoing GSA coordination efforts (including GSA organizational structure)
 - Funding/financing discussions
 - Project implementation (recharge projects, etc.)
 - Management action tasks and timelines (domestic well mitigation and demand management)
 - SGMA reporting and compliance activities (Annual Reports, 2027 GSP evaluation, etc.)
 - Public outreach and engagement

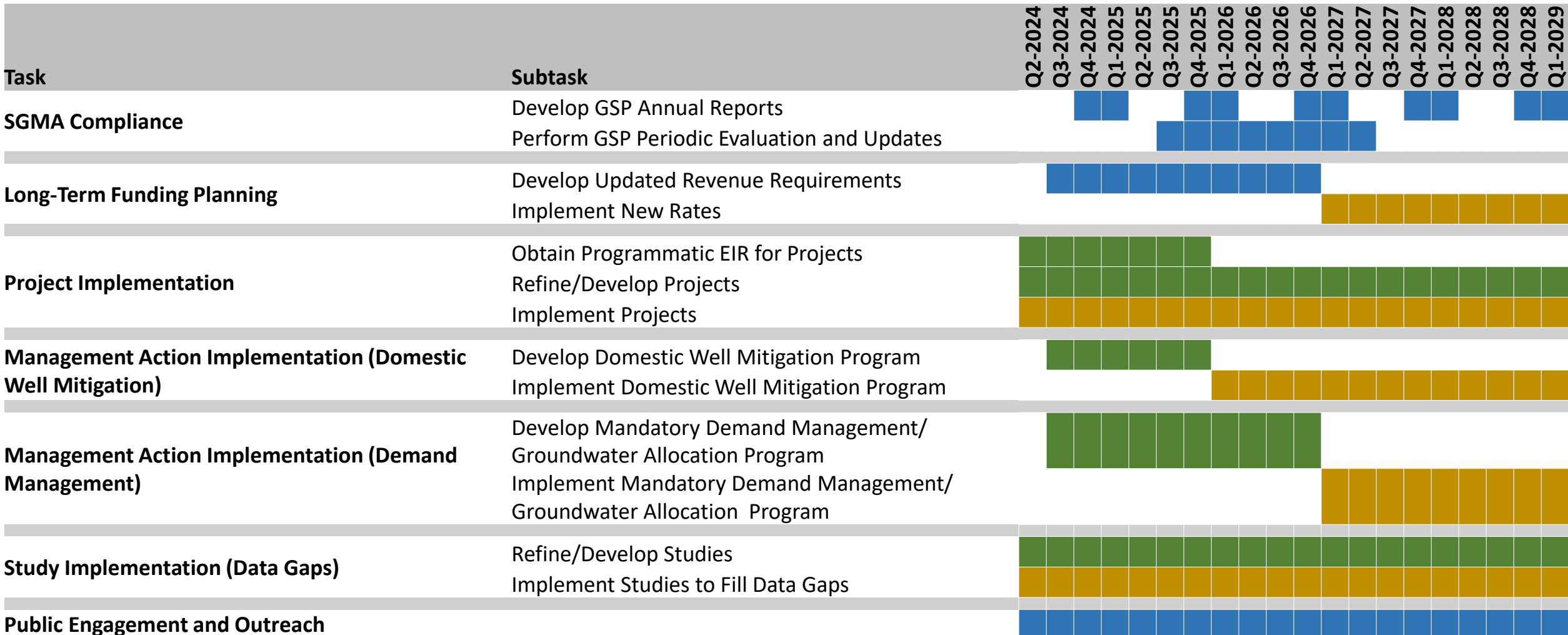
Summary of Recommendations

- Workplan: Proceed with inclusion of workplan in the cover letter, with the understanding that it will be further refined during implementation.
- Demand Management: Proceed with finalizing formal agreement for Demand Management with refinements to phrasing around commitment to enforceable demand management (GW allocations).
- Domestic Well Mitigation: Proceed with finalizing formal agreement for Domestic Well Mitigation.
- Groundwater levels: Proceed with finalizing proposed Groundwater Level Sustainable Management Criteria (SMCs).
- Subsidence: Proceed with finalizing proposed Subsidence Monitoring and SMCs, incorporating feedback from DWR (meeting #5 scheduled 03/25/2024).

5-Year Workplan (Overview)

Legend:

- Recurring/Ongoing Activity
- Planning/Development/Permitting/Construction
- Implementation



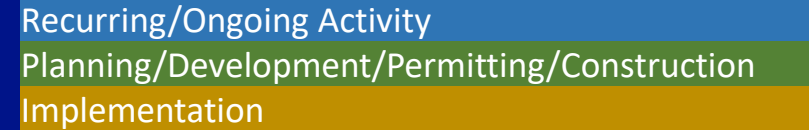
Management Action DRAFT Agreements Demand Management Program

DWR's Concerns About Demand Management Commitment

- DWR is concerned about the potential for ongoing subsidence, is looking for:
 - Very stringent SMC and requirements around subsidence, AND/OR
 - Commitment to moving forward with enforceable demand management (GW allocations)
- Language around Program measures leaves flexibility, but uncertainty in DWR's view
 - Need stronger, overt commitment to enforceable demand management ("will" implement)
 - Current phrasing: “Measures to be considered and moved forward for phased adaptive implementation (commensurate with issues) ...may include...allocations”
 - Proposed phrasing:
 - The GSAs commit to develop and prepare to implement enforceable demand management (GW allocations) according to the Program term.
 - If URs are still occurring (e.g., subsidence still exceeds the MTs), the GSAs are committed to begin implementing enforceable demand management (GW allocations) beginning in 2027.
 - Recognizing there will need to be a transition period (existing → sustainable conditions).

5-Year Workplan (Demand Mgmt)

Legend:



Task	Subtask	Q2-2024	Q3-2024	Q4-2024	Q1-2025	Q2-2025	Q3-2025	Q4-2025	Q1-2026	Q2-2026	Q3-2026	Q4-2026	Q1-2027	Q2-2027	Q3-2027	Q4-2027	Q1-2028	Q2-2028	Q3-2028	Q4-2028	Q1-2029	
Management Action	Develop Mandatory Demand Management/Groundwater Allocation Program																					
	Facilitate Board workshops on allocations in other subbasins (knowledge sharing/learning)																					
	Review and refine of water budgets and basin characteristics																					
	Develop framework for groundwater allocation approach																					
	Refine anticipated program costs																					
	Develop sustainable groundwater yield(s) under climate and water supply scenarios																					
	Identify appropriate transition period(s) from current to sustainable conditions																					
	Develop monitoring and enforcement processes																					
	Determine program proportionate responsibility and funding/financing plan																					
	Pilot initial demand management program formulation(s)																					
	Prepare outreach and program launch strategy																					
	Implement Demand Management Program																					

Demand Management: Discussion and Recommendation

- Proposed Revisions for Discussion
 - MOU reviewed by staff and counsel
 - Program developed by January 1, 2027 (implement with transition period)
 - Draft estimated annual cost of between \$0.5M to \$2.0M dollars (likely decreasing over time)
- Recommendation
 - Proceed with finalizing formal agreement for Demand Management with proposed refinements to phrasing around commitment to enforceable demand management (GW allocations)

Management Action DRAFT Agreements Domestic Well Mitigation Program

Domestic Well Mitigation: Discussion and Recommendation

- Proposed MOU for Discussion
 - MOU reviewed by staff and counsel
 - Program developed by January 1, 2026
 - Draft estimated cost of between \$2M to \$7M dollars total (99 to 166 domestic wells, depending on GW Level SMCs and required mitigation measures)
- Recommendation
 - Proceed with finalizing formal agreement for Domestic Well Mitigation

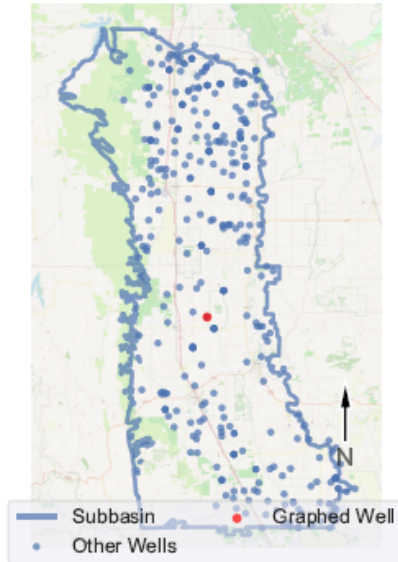
Proposed Revisions: Groundwater Level (GWL) SMC

Groundwater Level (GWL) SMC: Discussion and Recommendation

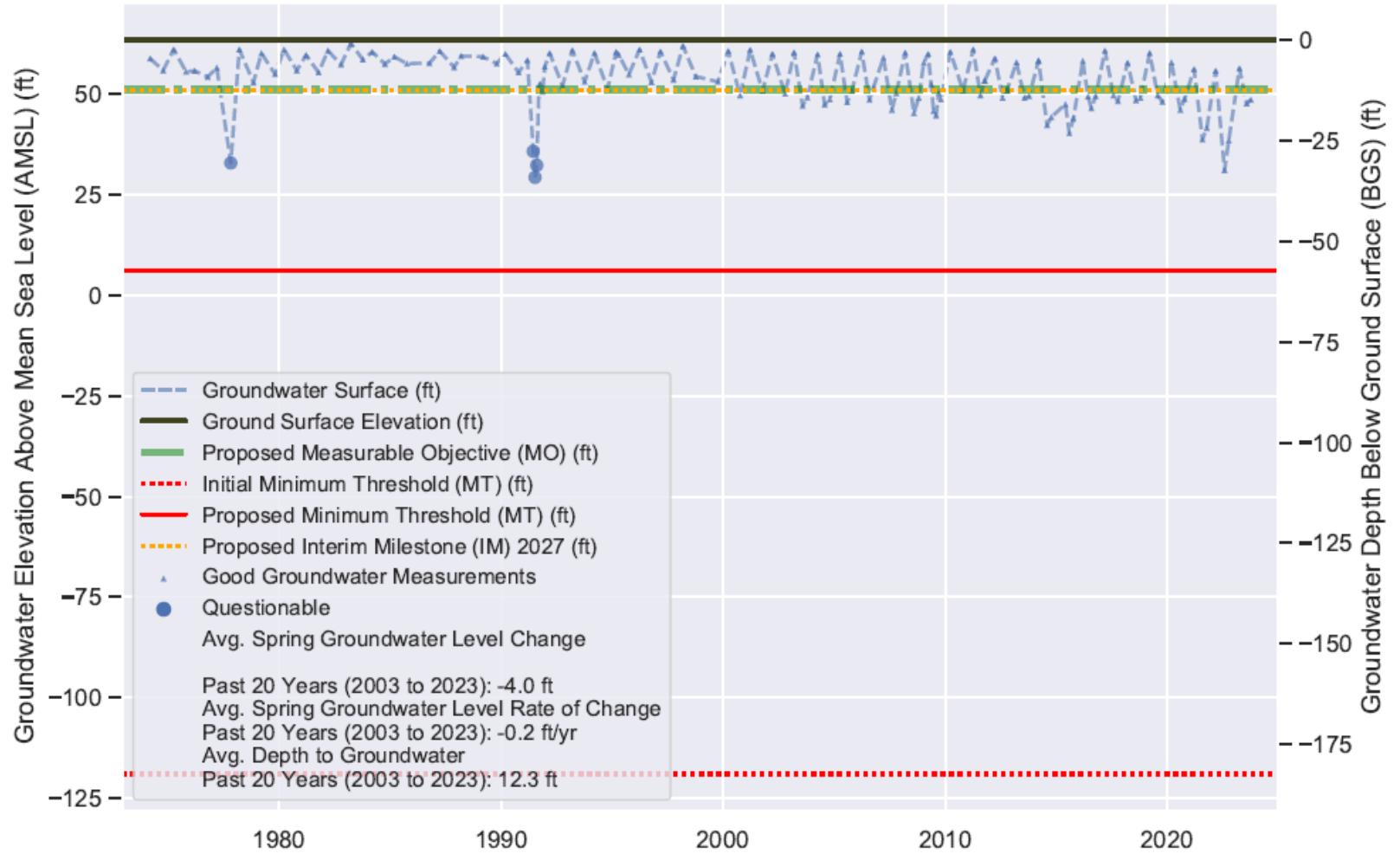
- Proposed Revisions for Discussion
 - MT: 2020-2022 Lows (Focus RMS) or 2020-2022 Lows minus Margin (10-25 FT) (Non-Focus RMS)
 - Estimated total of 99 impacted domestic wells in non-focus areas (~\$2M to \$4M)
 - MO: 2011-2015 Average
 - 2027 IM: MT minus 5 YR * Avg Annual GWL Decline (Focus RMS) or MO (Non-Focus RMS)
 - Estimated total of 67 impacted domestic wells in focus areas (~\$1.4M to \$2.7M)
 - Undesirable Results (URs) definition and identification:
 - URs experienced if GWL declines lead to: (1) unmitigated domestic water well impacts, (2) subsidence impacts, (3) environmental impacts, and (4) agricultural economy impacts
 - Spatial extent: 6 RMS wells (12.5%)
 - Temporal persistence: Two consecutive fall measurements exceeding MT
- Recommendation
 - Proceed with finalizing proposed Groundwater Level SMCs

COLUSA Subbasin - State Well Number (SWN): 17N02W30J002M (Non-Focus RMS Well)

Well Location Map



Perforation 1: 157.0 - 159.0 ft BGS

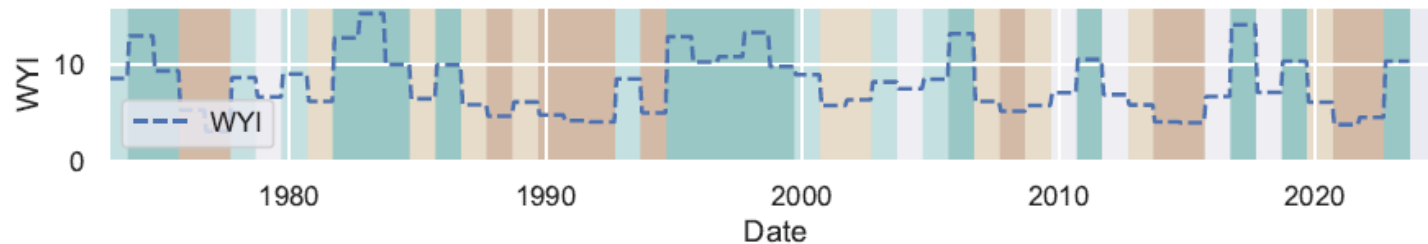


Sustainable Management Criteria:

Proposed IM (2027) = 51.1 ft AMSL
 Proposed MO = 51.1 ft AMSL
 Proposed MT = 6.1 ft AMSL

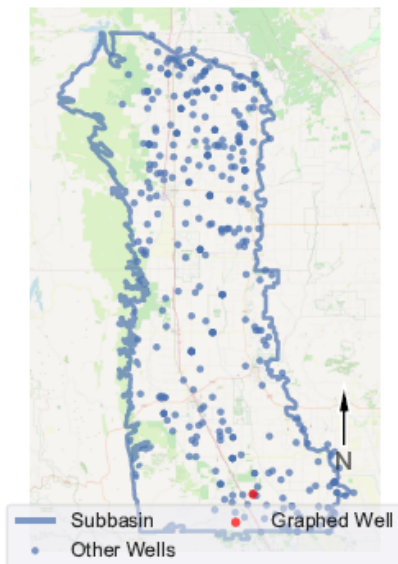
Minimum Threshold is the 2020-2022 low minus a margin (25.0 FT).

Sacramento Valley Water Year Index (WYI) shown on lower right. Meaning of colors defined below.

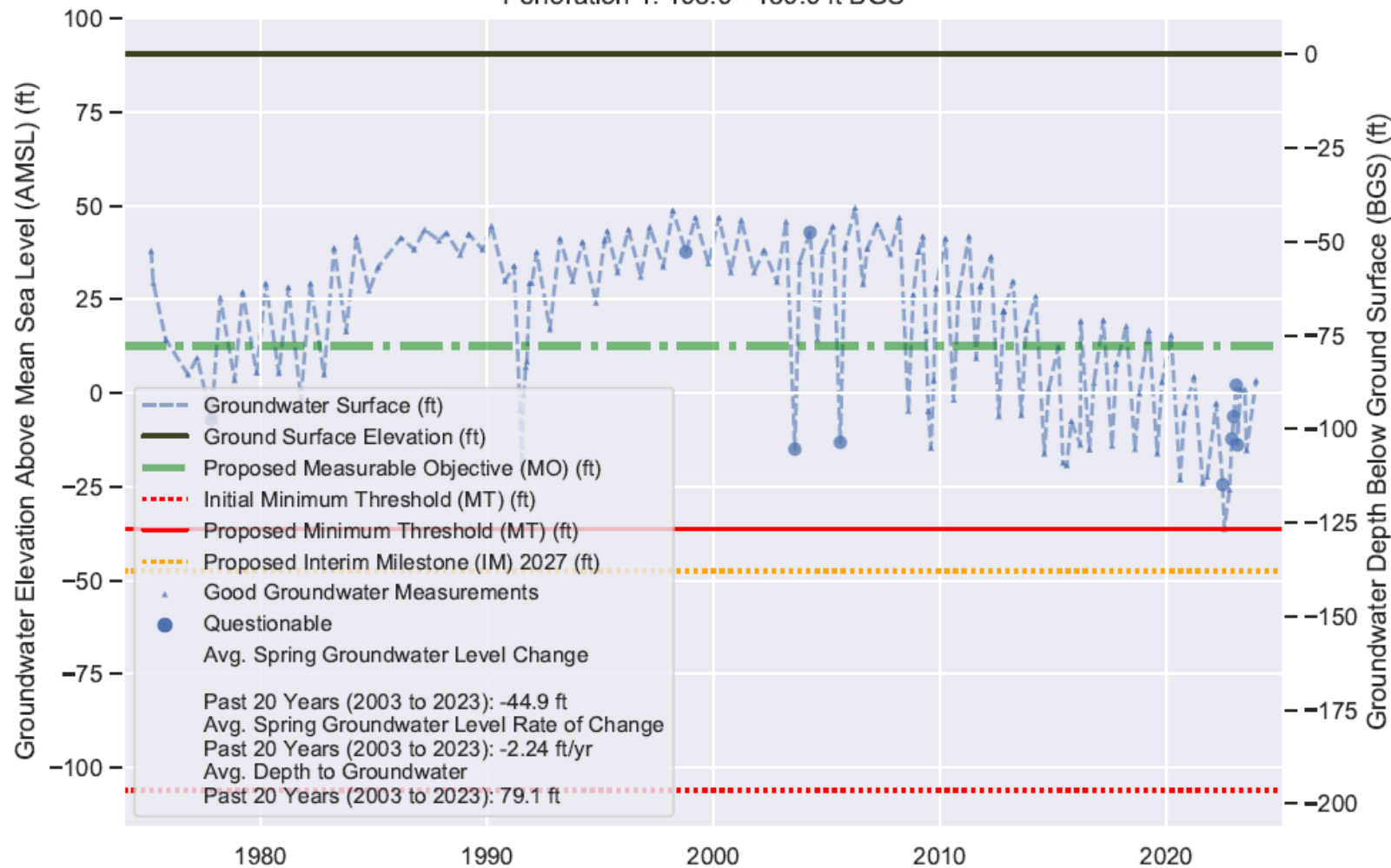


COLUSA Subbasin - State Well Number (SWN): 13N01W07G001M (Focus RMS Well)

Well Location Map



Perforation 1: 108.0 - 180.0 ft BGS

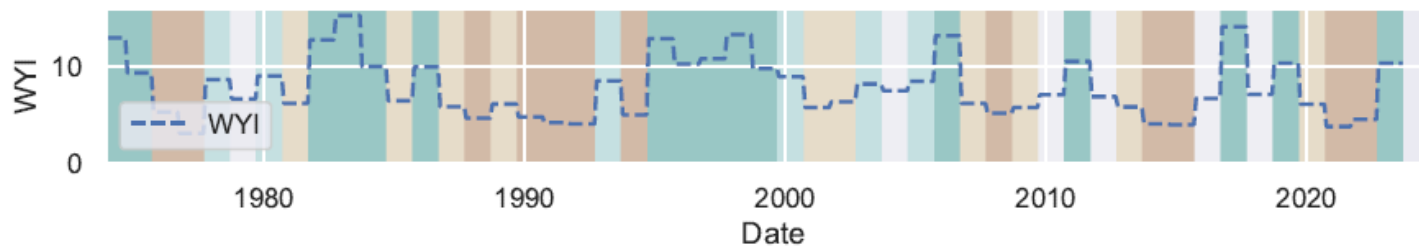
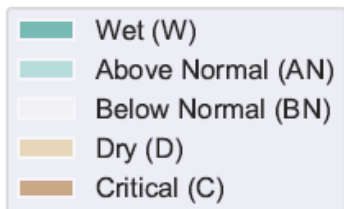


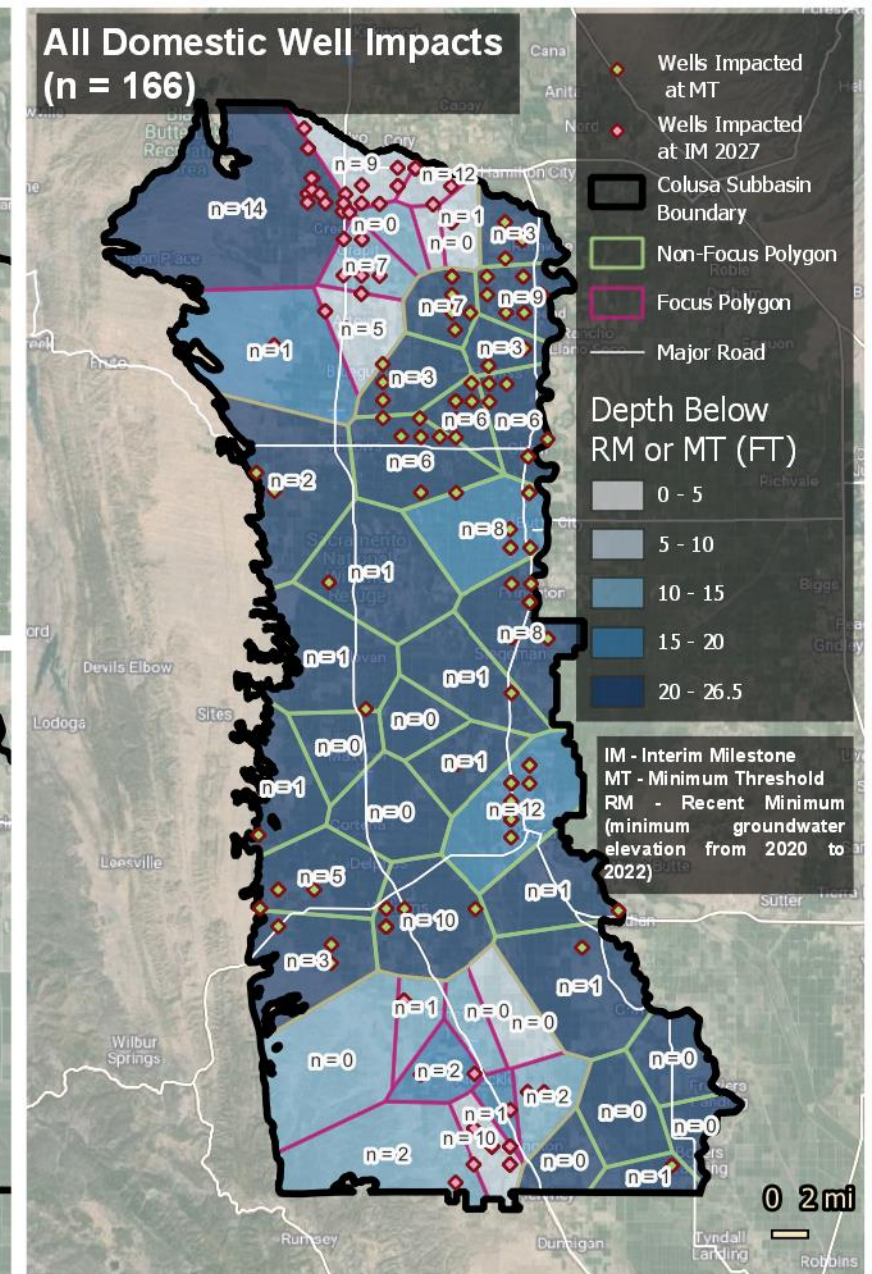
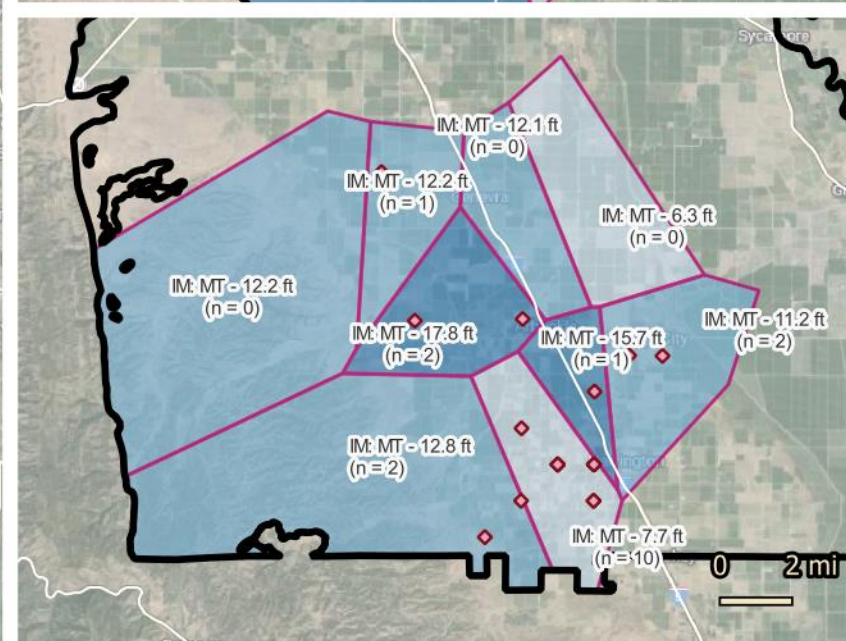
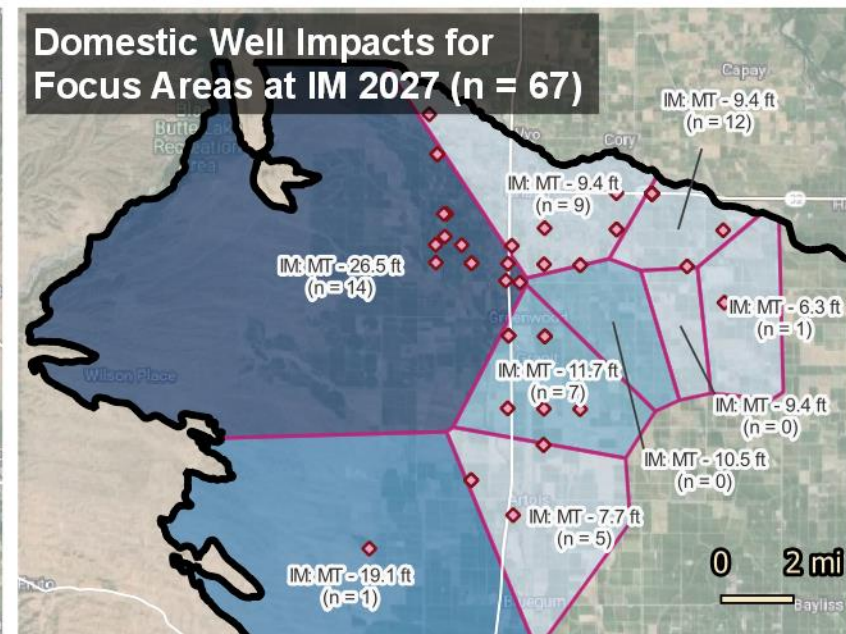
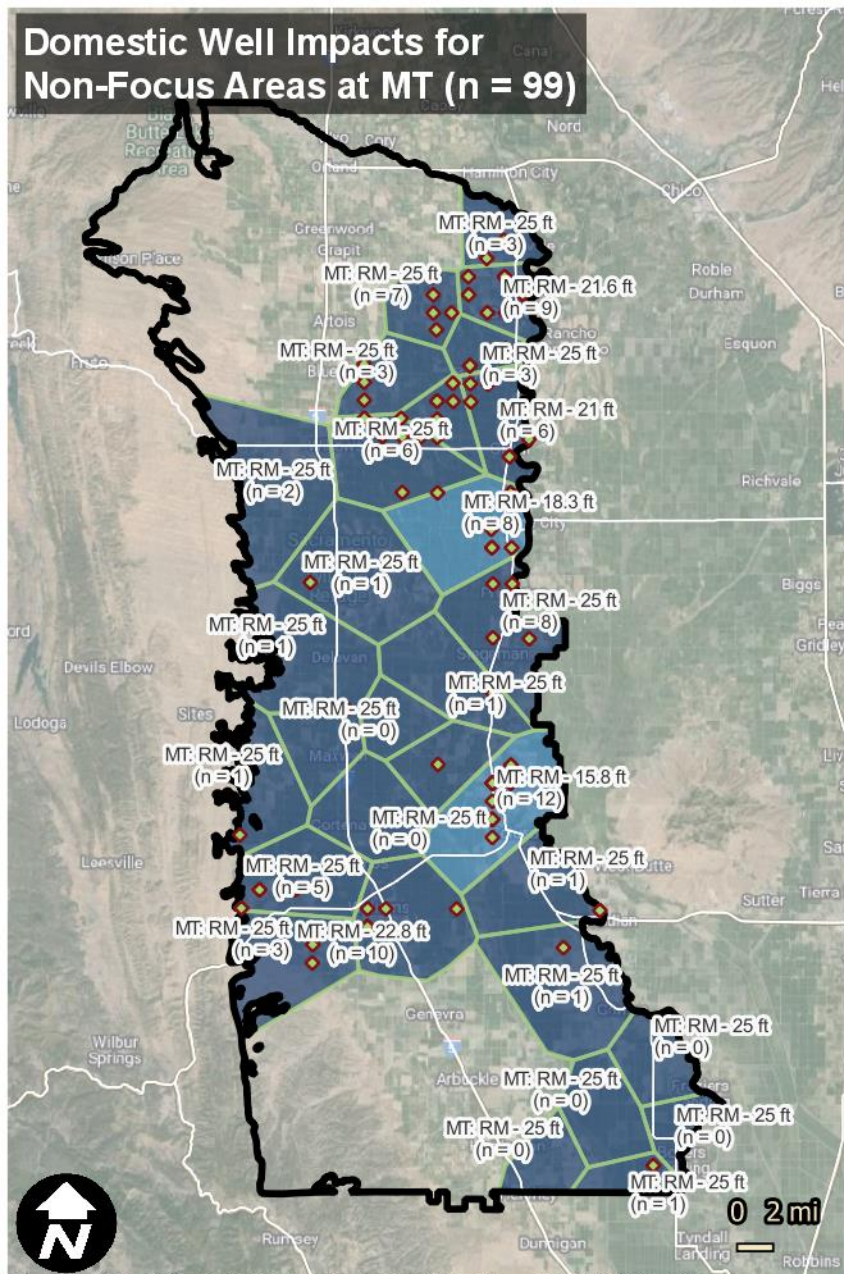
Sustainable Management Criteria:

Proposed IM (2027) = -47.4 ft AMSL
 Proposed MO = 12.7 ft AMSL
 Proposed MT = -36.2 ft AMSL

Minimum Threshold is the 2020-2022 low.

Sacramento Valley Water Year Index (WYI) shown on lower right. Meaning of colors defined below.





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Proposed Revisions: Subsidence Monitoring and SMC

Subsidence Monitoring and SMC: Discussion and Recommendation

- Proposed Revisions for Discussion
 - MT: 0.1 FT/YR
 - MO: 0.0 FT/YR
 - IMs (2027, 2032, 2037): 2027: 0.3 FT/YR; 2032: 0.1 FT/YR; 2037: 0.08 FT/YR
 - Spatial extent for UR: 10 contiguous sections (*i.e.*, 10 square miles or 6400 AC) exceeding MT (pending DWR feedback during meeting #5)
 - Temporal persistence for UR: two consecutive water years exceeding MT
 - Ongoing coordination with land & infrastructure managers to evaluate critical infrastructure including water supply, transportation, energy, and flood control (implemented as part of the Sacramento Valley Subsidence Interbasin Working Group GSP Study)
- Recommendation
 - Proceed with finalizing proposed Subsidence Monitoring and SMCs, incorporating feedback from DWR (meeting #5 scheduled 03/25/2024)

Land Subsidence: Deficiencies Identified by DWR

- **DWR's Position:**

- “The GSP does not establish SMC for land subsidence in a manner substantially compliant with the GSP regulations.”

- **DWR Requirements:**

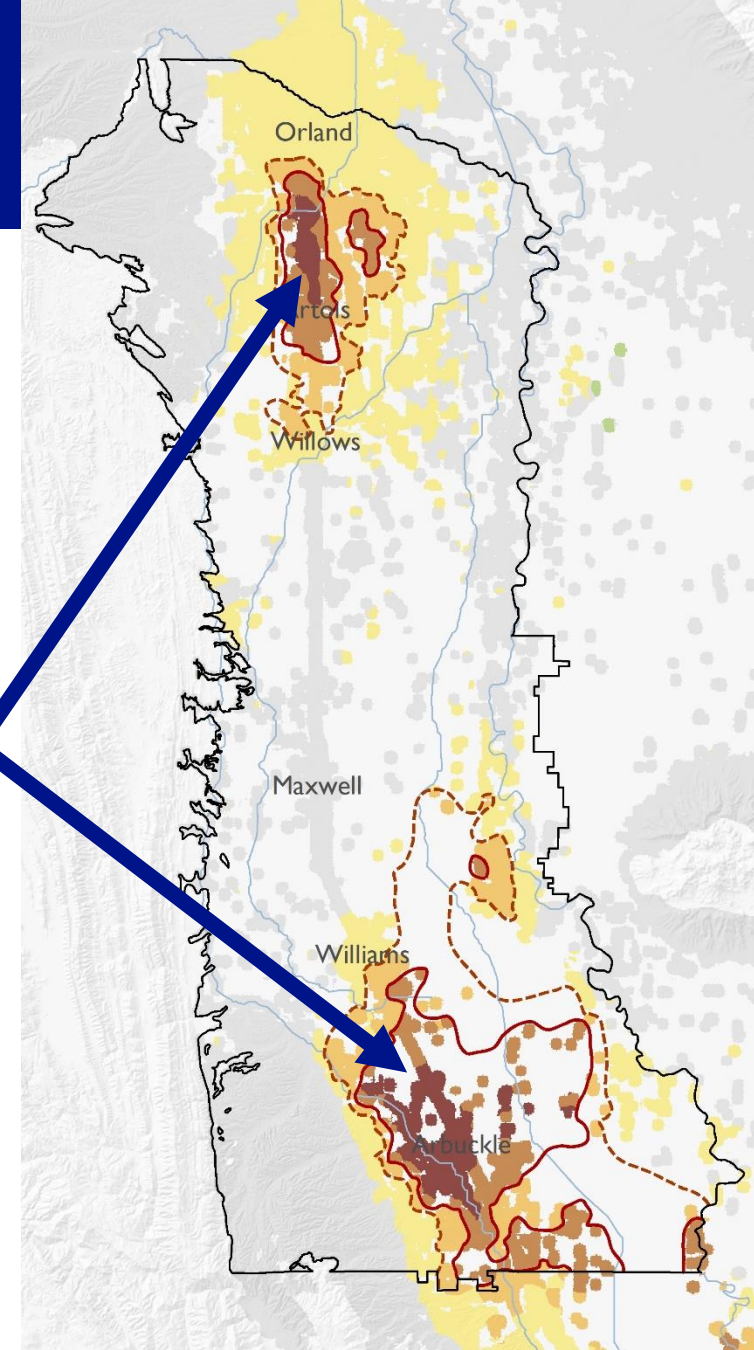
- Revise subsidence monitoring program (benchmark survey v. InSAR).
- Quantify subsidence that would negatively impact functionality of identified critical infrastructure and land uses.
- Clearly describe how significant and unreasonable conditions lead to URs for critical infrastructure and land uses.
- Clearly justify how MTs relate to URs.
- Identify PMAs that would minimize or eliminate subsidence.

Revised Subsidence Monitoring

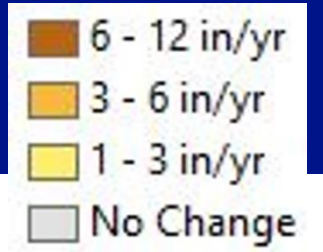
- **Current Monitoring:**
 - Sacramento Valley Benchmark Network
- **Proposed Monitoring:**
 - InSAR* provided by DWR

* InSAR = Interferometric Synthetic Aperture Radar

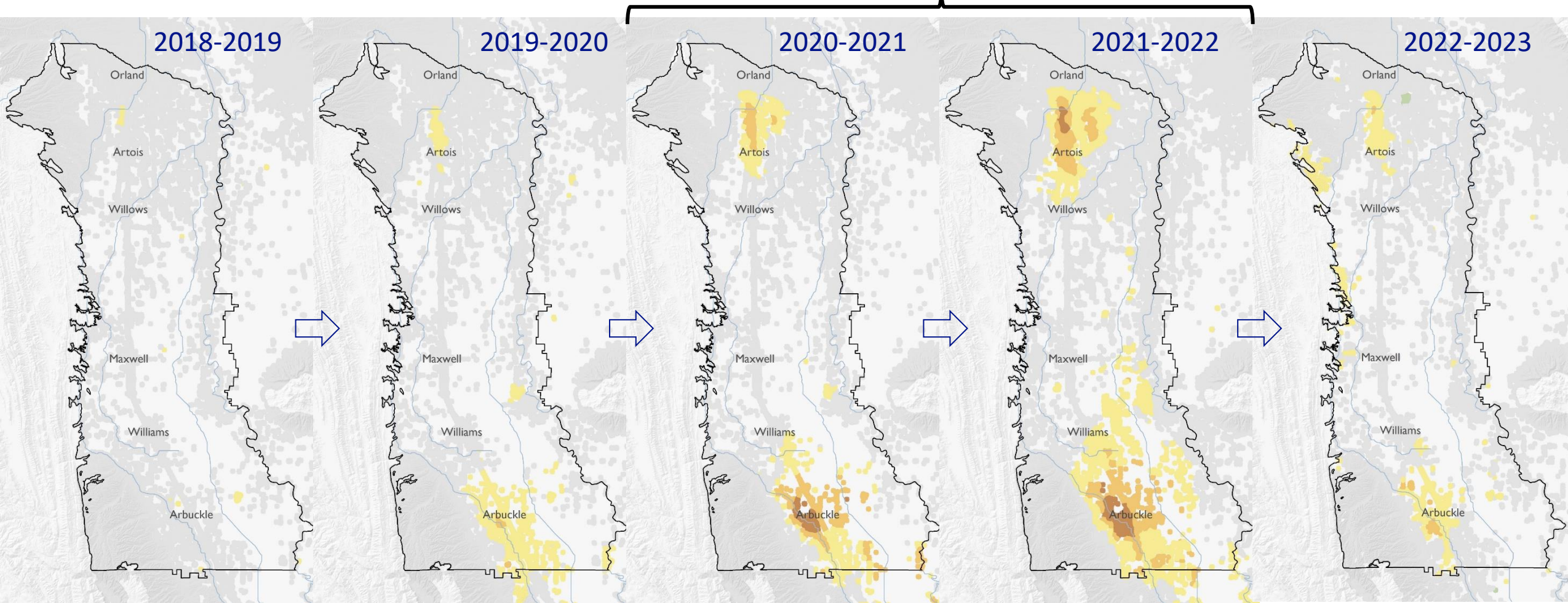
Exceeds
MT



Annual Subsidence: October 2018 – October 2023



Rates peaked in 2020-2022



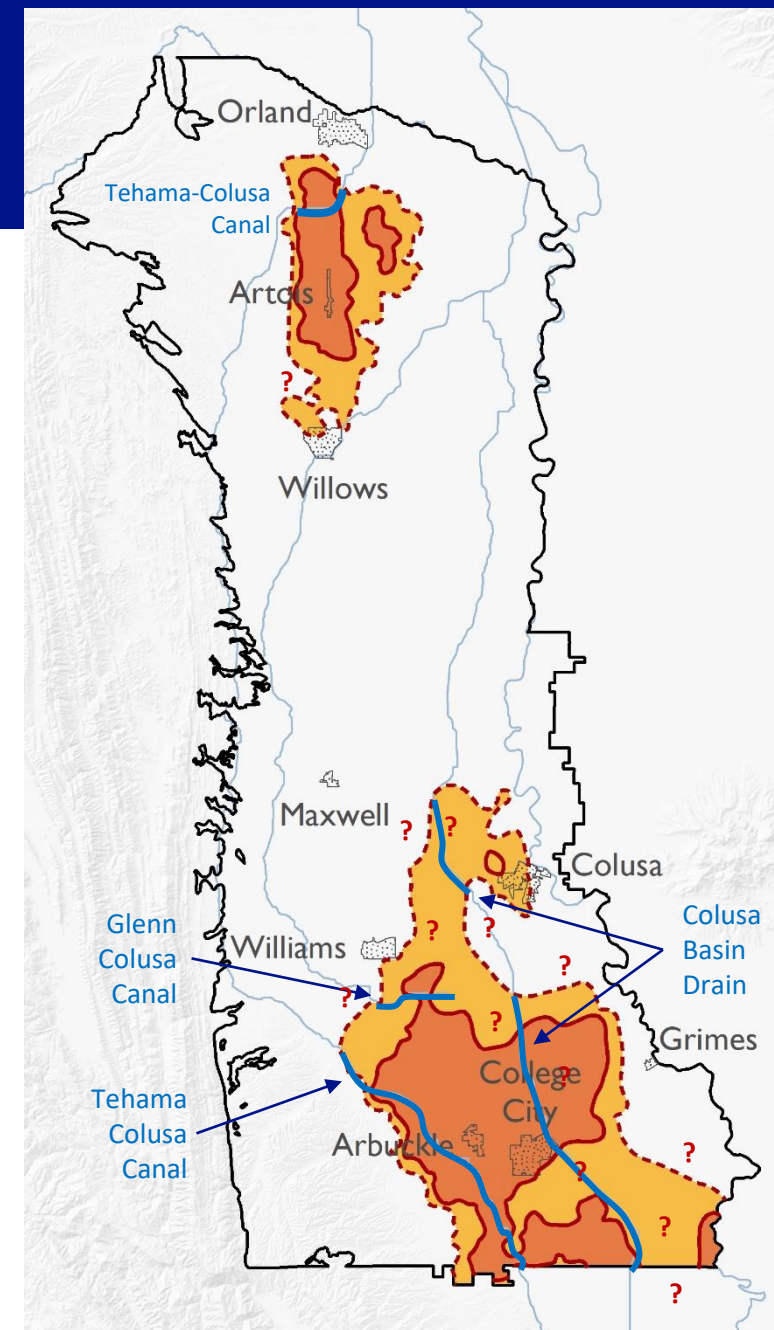
Subsidence SMC: Undesirable Results (URs)

- **Current UR Definition (Jan 2022):**
 - “...A result that would cause significant and unreasonable impacts to critical infrastructure over the planning and implementation horizon of this GSP.”
 - “...Experienced if groundwater withdrawal causes inelastic land subsidence that substantially interferes with the condition or functionality of critical infrastructure within the Subbasin...”
- **Proposed UR Revisions:**
 - Describe URs and impacts to beneficial users:
 - Identify critical infrastructure and land uses.
 - Describe significant/unreasonable conditions.
 - Quantify subsidence that would negatively impact functionality of critical infrastructure and land uses.
 - Justify criteria for identifying (e.g., MT values and exceedance)

Subsidence SMC: Undesirable Results (URs)

Critical Infrastructure and Land Uses:

- Major Water Supply Conveyance (e.g., Tehama-Colusa Canal)
- Agricultural Wells
- Drinking Water Supply Wells
- Oil & Gas Infrastructure
- Transportation
- Flood Control



Subsidence SMC: Undesirable Results (URs)

Significant/Unreasonable Conditions:

- Damage or loss of freeboard within water conveyance infrastructure
- Collapsed wells
- Impacts to health and safety (e.g., drinking water)
- Impacts to agricultural economy
- Damage to major roads and pipelines

Minimal impacts to canals reported to date.

Verbal reports of irrigation well collapse during 2014-2015 but not 2020-2022.

Discussion and coordination is currently underway.*

* Ongoing coordination with land & infrastructure managers will be implemented as part of the Sacramento Valley Subsidence Interbasin Working Group GSP Study.

Subsidence SMC: Proposed Revisions

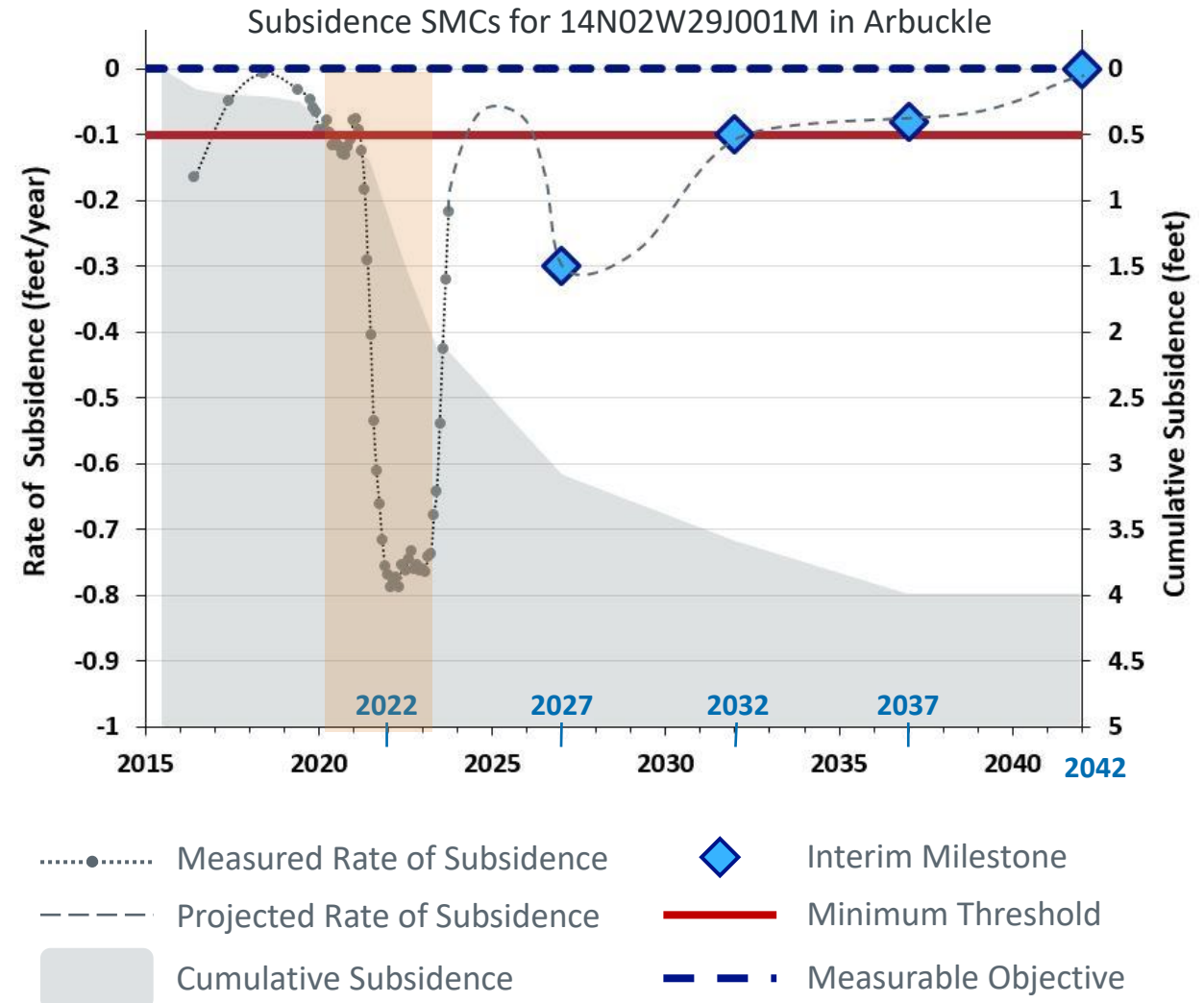
Land Subsidence SMC	Subsidence Monitoring	Unreasonable Result	Minimum Threshold	Interim Milestones	Measurable Objective
Current Definition (Jan 2022)	Benchmarks	20% Benchmarks exceed MT	0.5 ft/5yr	0.25 ft/5yr for each IM	0.25 ft/5yr
Proposed Revision	InSAR Data	Average rate of subsidence exceeds MT in 10 or more contiguous PLS Sections (any configuration) 2 years in a row*	0.1 ft/yr	2027: 0.3 ft/yr 2032: 0.1 ft/yr 2037: 0.08 ft/yr 2042: 0 ft/yr	0 ft/yr

* An average rate of subsidence above the MT in 10 or more contiguous PLS Sections (in any configuration) that occurs the water year preceding the Annual Report will trigger a watch notice. An undesirable result will occur if the MT is exceeded for a second year in 10 or more contiguous PLS Sections (in any configuration, and not necessarily the configuration of the preceding year[s]).

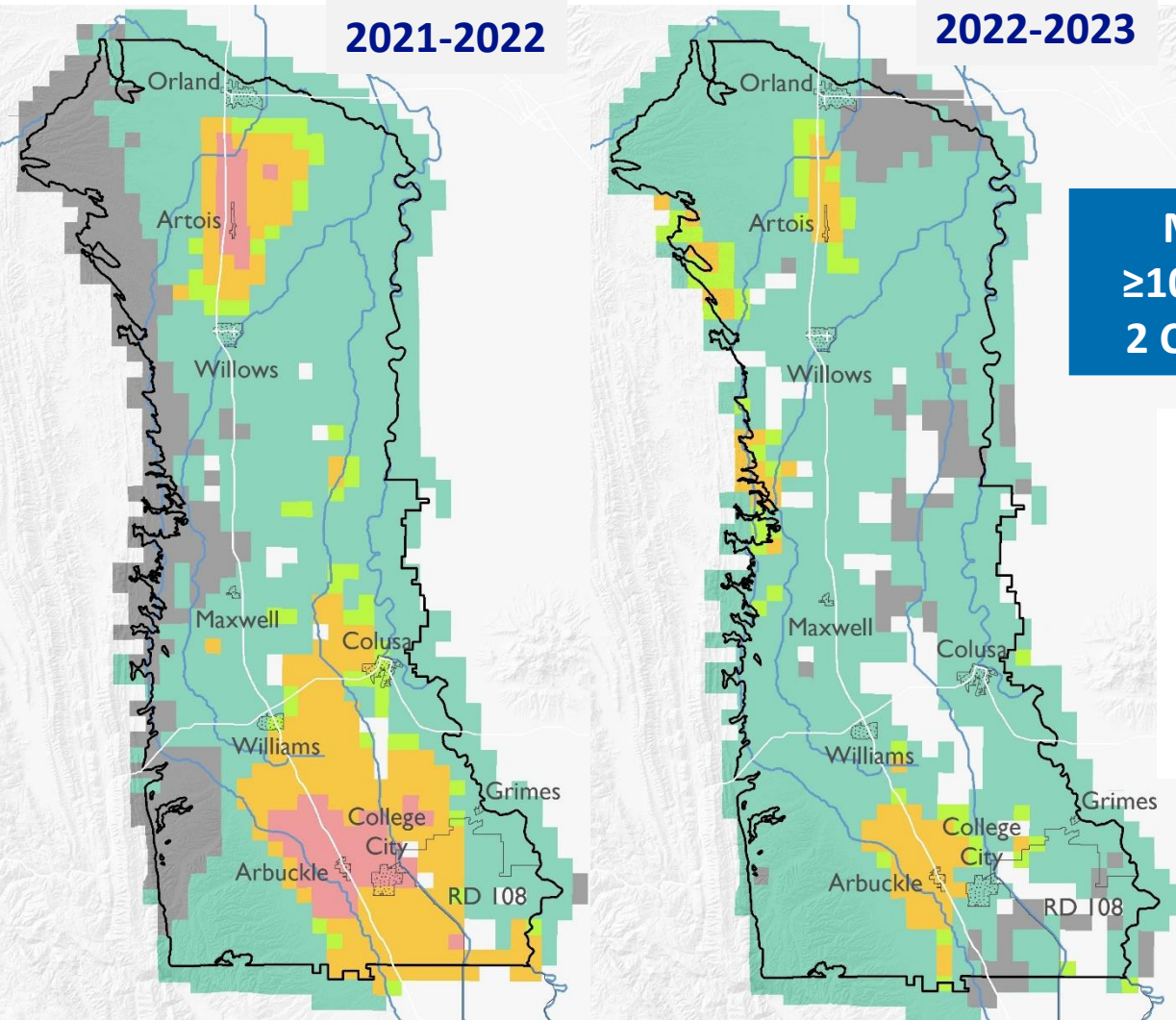
Subsidence SMC: Measurable Objective (MO) & Minimum Thresholds (MT)

■ Proposed Revisions:

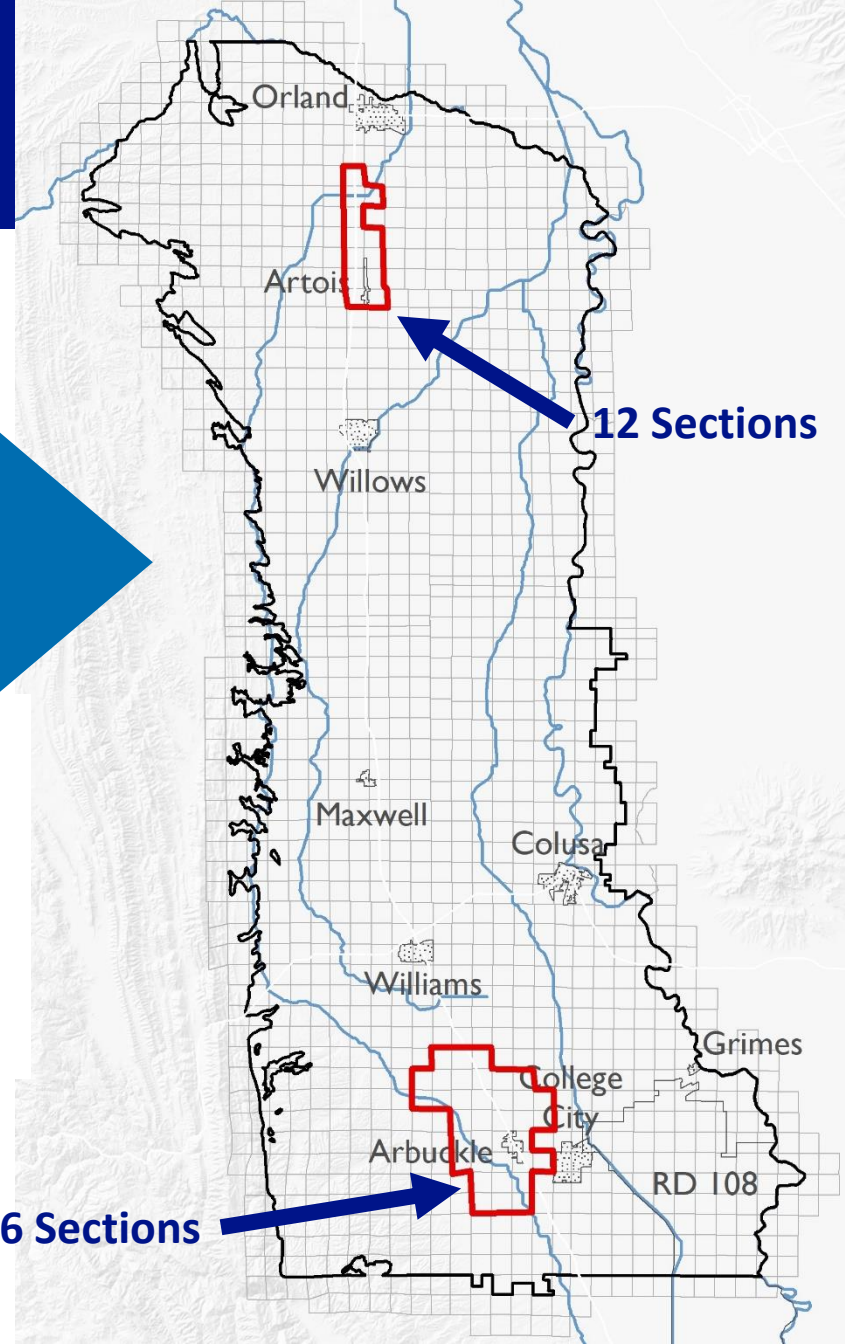
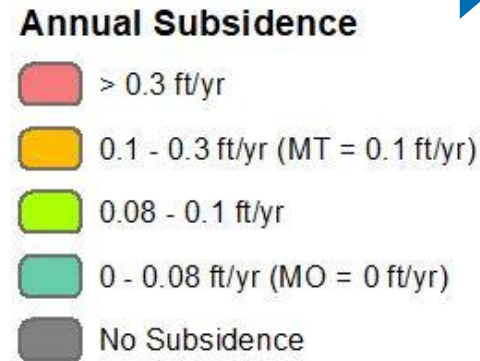
- Measurable Objective:
 - 0 ft/yr
- Minimum Threshold:
 - 0.1 ft/yr
- Interim Milestones:
 - 2027: 0.3 ft/yr
 - 2032: 0.1 ft/yr
 - 2037: 0.08 ft/yr
 - 2042: 0 ft/yr
- SMCs Evaluated Over:
 - 2 consecutive years
 - 10 or more contiguous PLS Sections



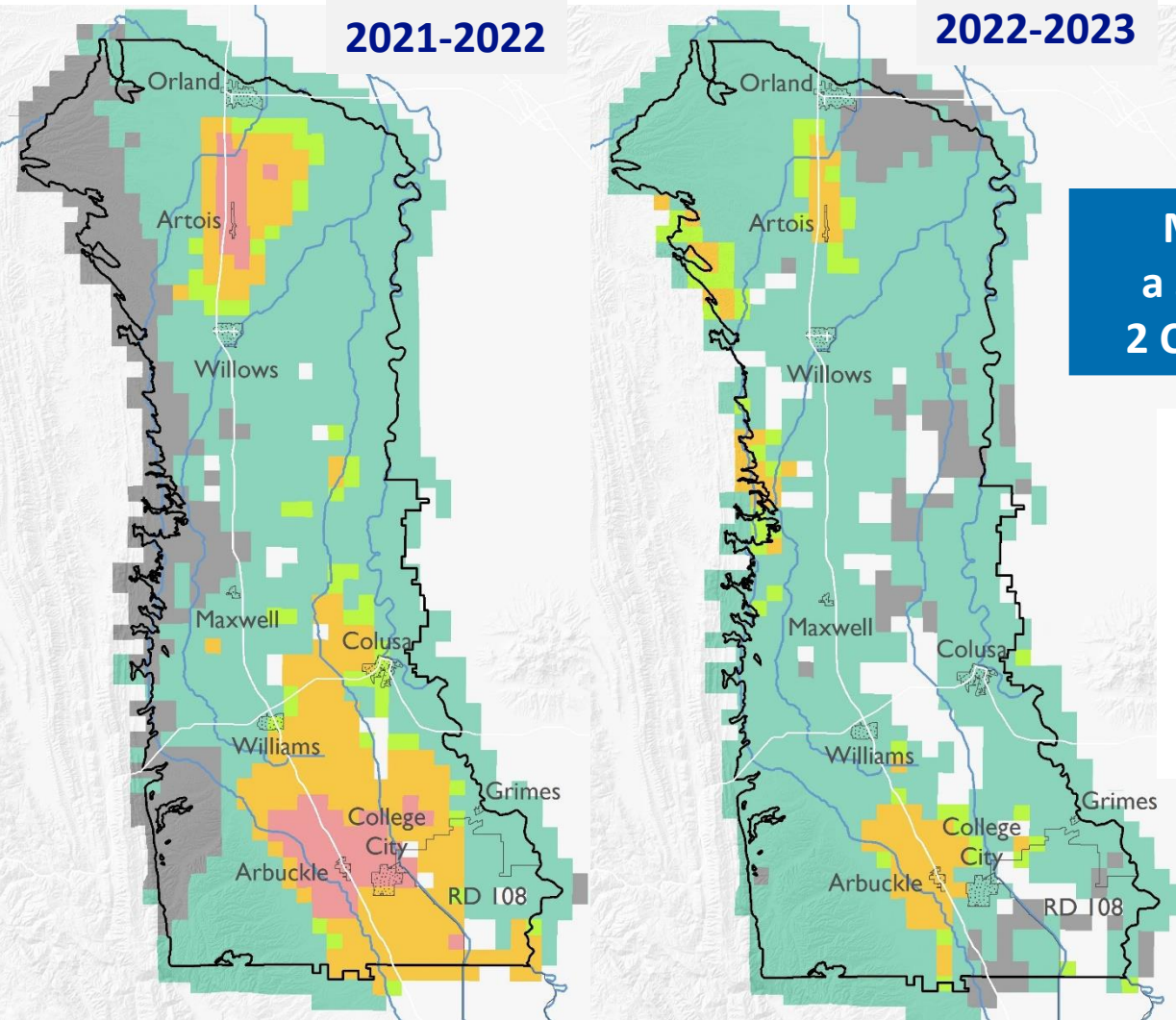
Subsidence SMC: Impacts of Proposed SMC



**MT Exceedance within
≥10 Contiguous Sections in
2 Consecutive Water Years**



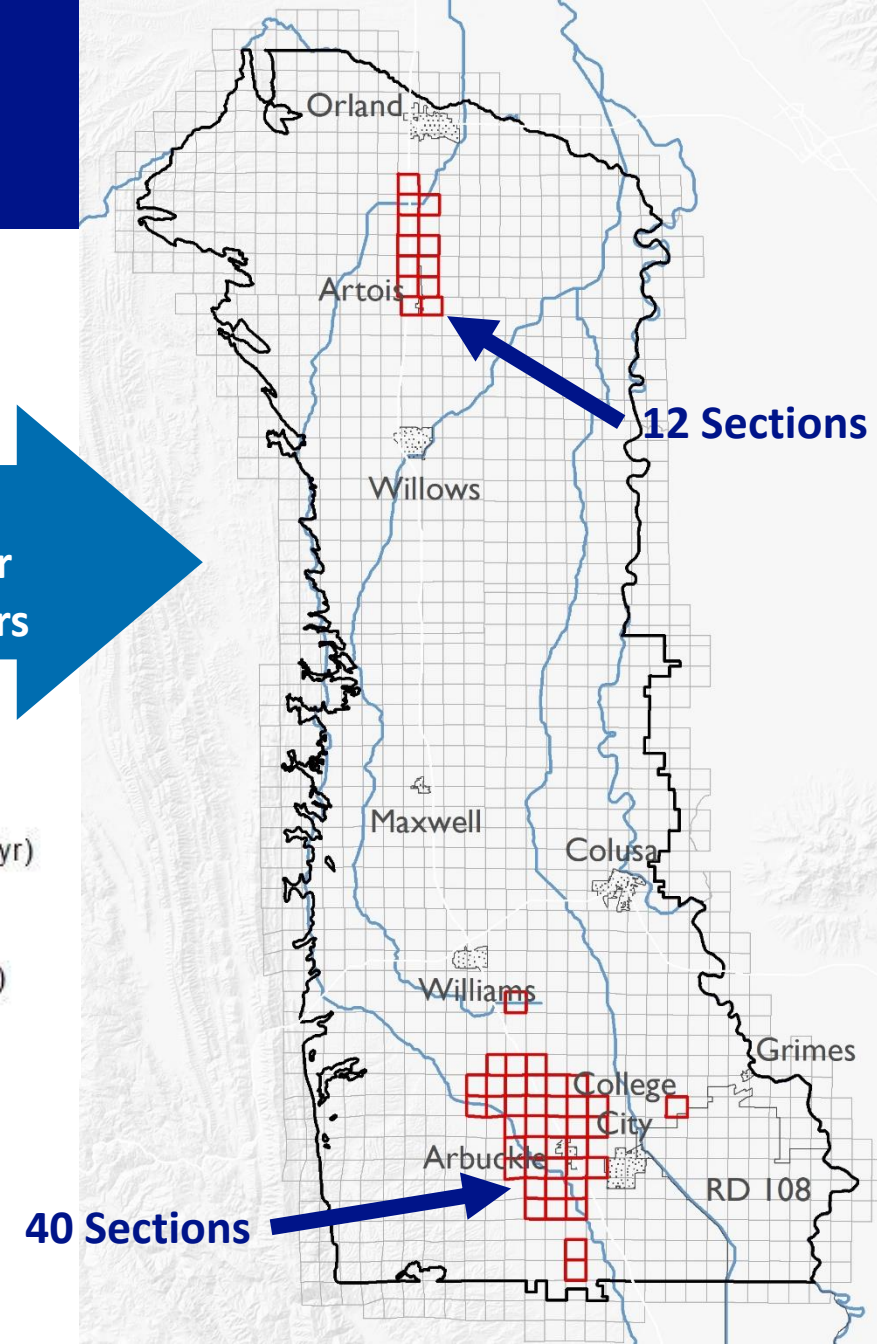
Subsidence SMC: Impacts of Proposed SMC



**MT Exceedance within
a Single PLS Section over
2 Consecutive Water Years**

Annual Subsidence

- > 0.3 ft/yr
- 0.1 - 0.3 ft/yr (MT = 0.1 ft/yr)
- 0.08 - 0.1 ft/yr
- 0 - 0.08 ft/yr (MO = 0 ft/yr)
- No Subsidence



Summary of Recommendations

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- Workplan: Proceed with inclusion of workplan in the cover letter, with the understanding that it will be further refined during implementation.
- Demand Management: Proceed with finalizing formal agreement for Demand Management with refinements to phrasing around commitment to enforceable demand management (GW allocations).
- Domestic Well Mitigation: Proceed with finalizing formal agreement for Domestic Well Mitigation.
- Groundwater levels: Proceed with finalizing proposed Groundwater Level SMCs.
- Subsidence: Proceed with finalizing proposed Subsidence Monitoring and SMCs, incorporating feedback from DWR (meeting #5 scheduled 03/25/2024).

Next Steps

Next Steps and Timeline

- DWR Consultation Meeting #5 on 03/25
 - Discuss subsidence revisions, SMC further with DWR
 - Ask remaining questions (demand management, domestic well mitigation, GWL SMCs, subsidence SMCs)
- Draft Revised GSP to be released for review on April 1
- Meeting with Joint GSA Boards to review Draft Revised GSP on April 12
- Anticipating Revised GSP approval at a public hearing(s) in April, followed by submittal to DWR (before **April 23, 2024**)

