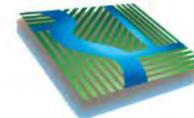




Chowchilla Subbasin GSP
Advisory Committee
GSP Revisions

July 6, 2022



DAVIDS
ENGINEERING, INC



Luhdorff & Scalmanini
Consulting Engineers

Agenda

- Background
- Department of Water Resources (DWR) Consultation Letter: Groundwater Sustainability Plan (GSP) Deficiencies
 - Chronic Groundwater Level (GWL) Decline
 - Subsidence
 - Interconnected Surface Water (ISW)
- GSP Revisions
 - Domestic Well Mitigation Program
 - Revisions to GWL Minimum Thresholds (MTs)
 - Revisions (Western Management Area (WMA)) and Additions (Eastern Management Area (EMA)) to Subsidence MTs
 - Additional MTs for ISW
- Questions

Background

- GSP
 - Submitted in January 2020
 - DWR Review/Consultation Letter- January 2022
 - DWR Meetings – December 2021 to May 2022
 - Ongoing Groundwater Sustainability Agency (GSA) Meetings related to Domestic Well Mitigation Program (discussed in previous Advisory Committee Meeting)



CALIFORNIA DEPARTMENT OF WATER RESOURCES

SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

715 P Street, | Sacramento, CA 95814 | P.O. Box 942836 | Sacramento, CA 94236-0001

January 28, 2022

Doug Welch
Chowchilla Subbasin Plan Manager
327 S. Chowchilla Blvd.
Chowchilla, CA 93610
dwelch@cwdwater.com

RE: Incomplete Determination of the 2020 Chowchilla Subbasin Groundwater Sustainability Plan

Dear Doug Welch,

The Department of Water Resources (Department) has evaluated the groundwater sustainability plan (GSP) submitted for the Chowchilla Subbasin (Subbasin) and has determined that the GSP is incomplete. The Department based its determination on recommendations from the Staff Report, included as an enclosure to the attached Statement of Findings, which describes that the Chowchilla Subbasin GSP does not satisfy the objectives of the Sustainable Groundwater Management Act (SGMA) nor substantially comply with the GSP Regulations. The Staff Report also provides corrective actions which the Department recommends to address the identified deficiencies.

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Department staff will work expeditiously to review the revised components of your GSP resubmittal. If the revisions address the identified deficiencies, the Department will determine that the GSP is approved. In that scenario, Department staff will identify additional recommended corrective actions that the GSAs should address early in implementing their GSP (i.e., no later than the first required periodic evaluation). Among other items, those recommendations will include for the GSAs to provide more detail on

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Background (Cont.....)

- DWR Incomplete Determination
- Three Deficiencies
 - GWL Decline
 - Subsidence
 - ISW



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Key Takeaways from DWR Meetings

- Domestic Well Mitigation Program details of program structure, schedule, and financing are needed
- Better explanation of how GWL MTs relate to Undesirable Results
- Subsidence MTs in WMA – Use of historical GWL lows OK, but cannot use 50% exceedance of MTs to define Undesirable Result (UR) without better justification related to adverse impacts
- Subsidence Sustainable Management Criteria (SMC) in EMA need to be included
- ISW SMC need to be included for at least San Joaquin River (SJR); any percent of time connected = SMC required



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Key Takeaways from DWR Meetings

- MTs can be exceeded during GSP Implementation Period provided Projects and Management Actions (PMAs) are being implemented according to schedule and Interim Milestones (IMs) are being met
- DWR recognizes residual subsidence will occur even if new historical low GWLs do not occur
- While ISW SMC for the San Joaquin River are required, enforcement of this sustainability criteria will not begin prior to 2025
- DWR recognizes the challenges in defining UR and associated MTs, and will allow for future revisions to MTs as more data is collected and implementation proceeds



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Primary Goal of GSP Revisions

- Strike a balance in how sustainability is defined for all Subbasin stakeholders and beneficial users



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DWR Stated Deficiencies – GW Levels A.1.ii

A.1. The GSP lacks justification for, and effects associated with, the sustainable management criteria for groundwater levels, particularly the minimum thresholds and undesirable results, and the effects of those criteria on the interests of beneficial uses and users of groundwater.

DWR Stated Deficiencies – GW Levels A.1.ii

A.1.i. The GSP does not describe when the Potential Domestic Well Mitigation Program will be implemented and financed by the GSAs in the Subbasin, or how rapidly the GSAs will be able to respond to developing domestic well impacts. Absent this information, Department staff cannot evaluate whether the sustainable management criteria for groundwater levels are reasonable and will avoid undesirable results.

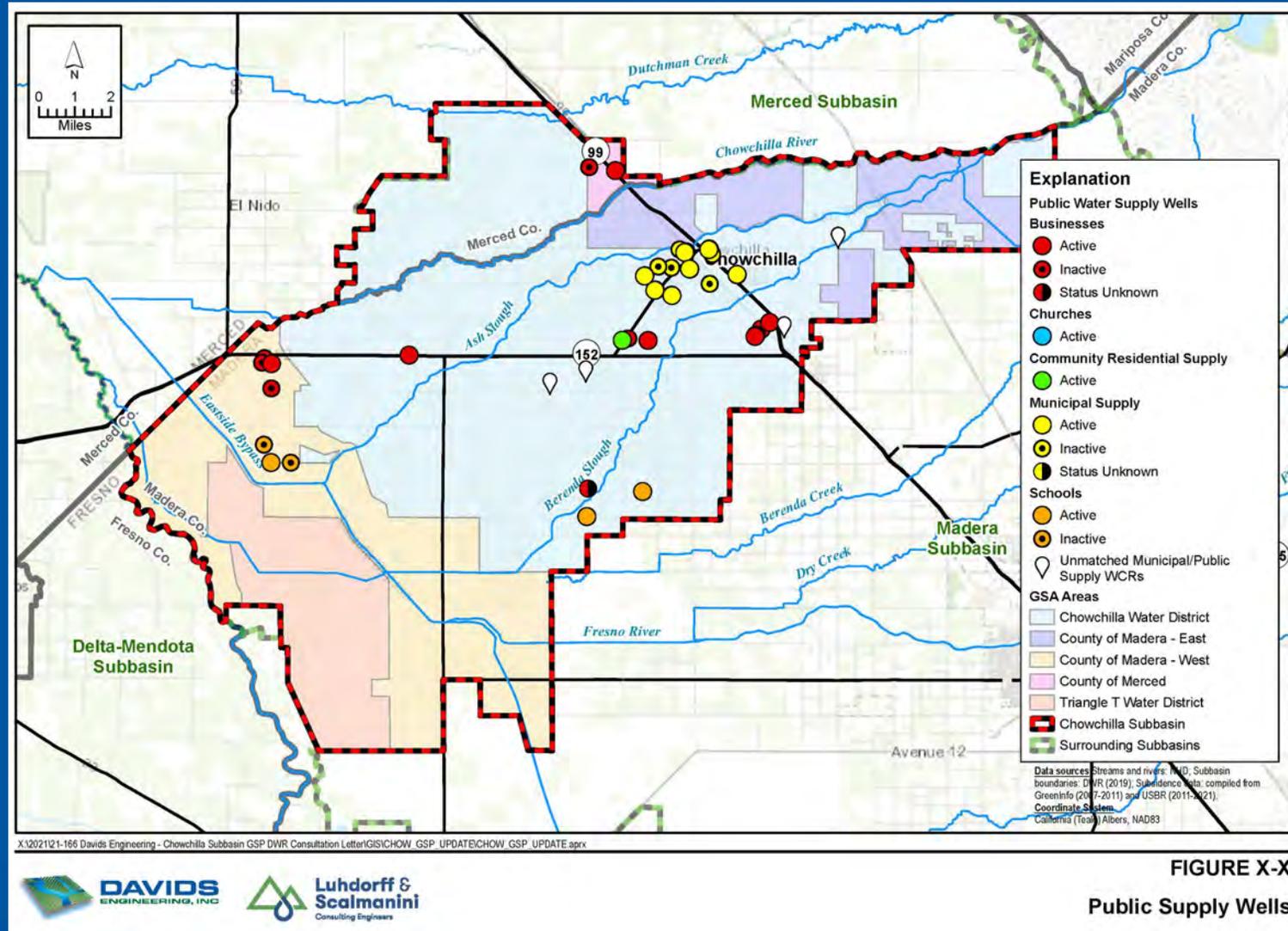
DWR Stated Deficiencies – GW Levels A.1.ii

A.1.ii. The GSP does not provide supporting information for how it determined that the selected minimum thresholds will not interfere with other sustainability indicators. The GSP fails to examine the relationship between allowable groundwater level declines and land subsidence in the Subbasin. Absent that supporting information and specific details regarding how that information was considered by the GSAs,

Additions to HCM/SMC Sections

- Extensive discussion of development, financing, and schedule for implementation of Domestic Well Mitigation Program
- Additional characterization of number, distribution, and activity status of Public Supply Wells
- More detailed evaluation of all well types relative to declines in GWLs
 - Percentage of wells of each well type going dry at different GWLs
- Additional discussion of definition of URs and the process by which MTs were developed (and how MTs avoid UR)
- Commitment to develop and implement a subsidence Workplan

Additions to HCM/SMC Sections



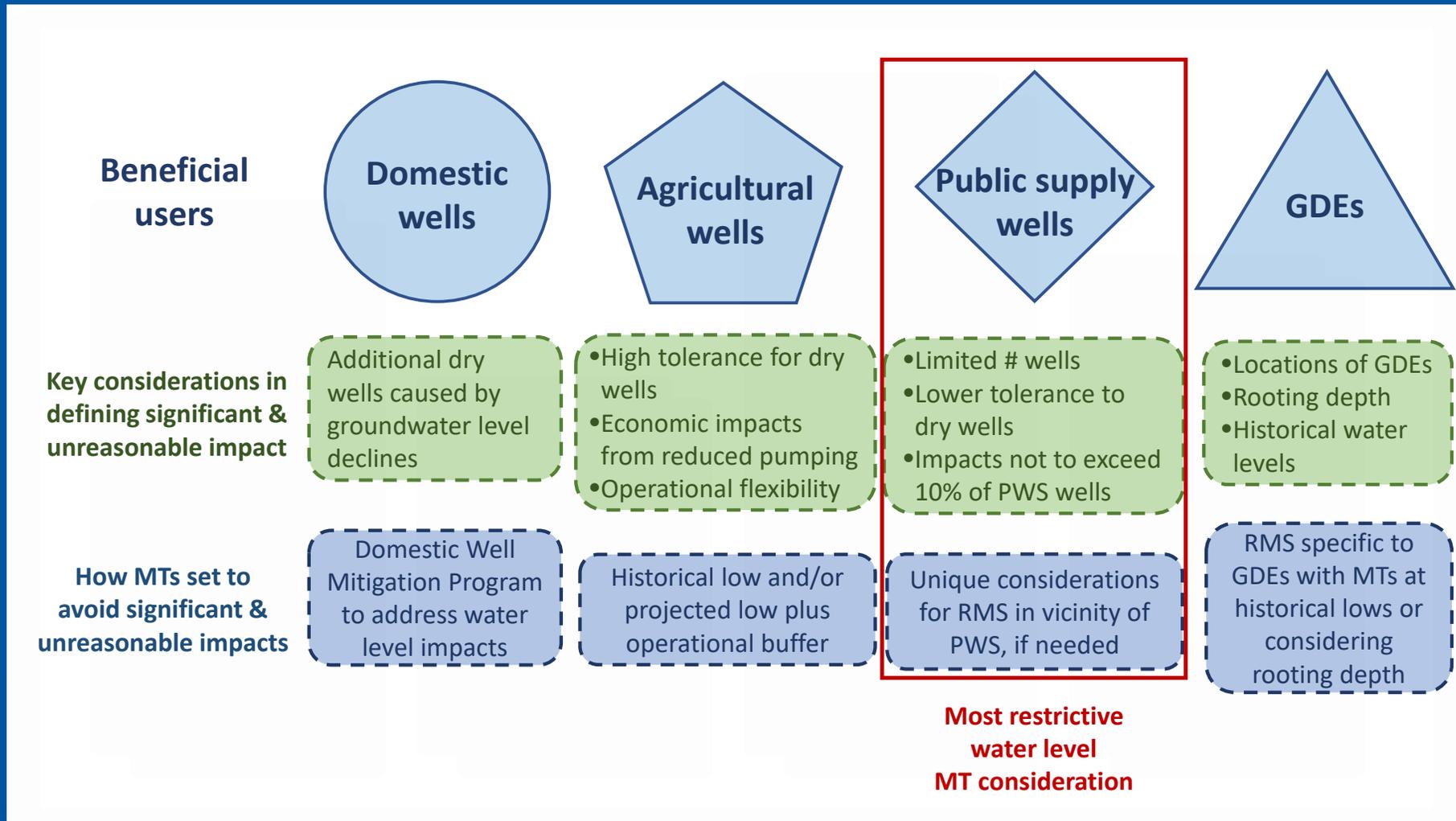
Additions to HCM/SMC Sections

Summary of Community Water Systems in Chowchilla Subbasin								
Community Water Systems (from City of Chowchilla UWMP)								
Well Name	Well ID	City of Chow. Status	GAMA Status	WCR No.	Well Depth (ft)	Top of Screen (ft)	Bottom of Screen (ft)	NOTE
CHOWCHILLA CITY WATER DEPT (Wells: 14; Active: 7)								
WELL 1	2010001-001	ABANDONED	INACTIVE	-	-	556	825	
WELL 1A	2010001-023	ACTIVE	ACTIVE	WCR2018-004564	800	-	800	
WELL 2	2010001-002	UNKNOWN	DESTROYED	WCR2019-006868	754	754	-	Not mentioned in 2020 UWMP
WELL 3	2010001-003	ACTIVE	ACTIVE	WCR0081513	900	506	832	
WELL 4	2010001-004	ABANDONED	ACTIVE	WCR0183879?	610	500	628	Status discrepancy. WCR matched on location.
WELL 5	2010001-005	UNKNOWN	DESTROYED	-	-	-	-	Not mentioned in 2020 UWMP
WELL 5A	2010001-019	ACTIVE	ACTIVE	WCR0120517	795	775	795	
WELL 6	2010001-006	ABANDONED	INACTIVE	-	790	218	548	
WELL 7	2010001-007	ABANDONED	DESTROYED	-	-	506	618	
WELL 8	2010001-008	ACTIVE	INACTIVE	-	396	242	297	Status discrepancy.
WELL 9	2010001-009	ABANDONED	INACTIVE	-	640	-	-	
WELL 10	2010001-010	ACTIVE	ACTIVE	-	470	358	474	
WELL 11	2010001-011	ACTIVE	ACTIVE	-	608.1	310	393	
WELL 13	n/a	UNKNOWN	UNKNOWN	-	-	-	-	Listed in City of Chowchilla Well feature class, but not in any other dataset.
WELL 14	2010001-020	ACTIVE	ACTIVE	-	-	-	-	

Summary of Community Water Systems in Chowchilla Subbasin

	Well ID	Well Name	Status	Well Depth (ft)	Top of Screen (ft)	Bottom of Screen (ft)
CHOWCHILLA CITY WATER DEPT (Wells: 14; Active: 7)						
	2010001-001	WELL 01 - INACTIVE	INACTIVE		556	825
WCR2018-004564	2010001-023	WELL NO. 1A	ACTIVE	800		800
WCR2019-006868	2010001-002	WELL 02 - DESTROYED	INACTIVE	754	754	
WCR0081513	2010001-003	WELL 03 - RAW	ACTIVE	900	506	832
WCR0183879?	2010001-004	WELL 04 - RAW	ACTIVE	610	500	628
	2010001-005	WELL 05 - DESTROYED	INACTIVE			
WCR0120517	2010001-019	WELL 05A - RAW	ACTIVE	795	775	795
	2010001-006	WELL 06 - INACTIVE - RAW	INACTIVE	790	218	548
	2010001-007	WELL 07 - DESTROYED - 2004	INACTIVE		506	618
	2010001-008	WELL 08 - INACTIVE	INACTIVE	396	242	297
	2010001-009	WELL 09 - INACTIVE	INACTIVE	640		
	2010001-010	WELL 10 - RAW	ACTIVE	470	358	474
	2010001-011	WELL 11 - RAW	ACTIVE	608.1	310	393
	2010001-020	WELL 14 - RAW	ACTIVE			
MD 85 VALETA (Wells: 1; Active: 1)						
	2000511-001	SOURCE WELL 1-DEEPEN 2009	ACTIVE		0	

Additions to HCM/SMC Sections



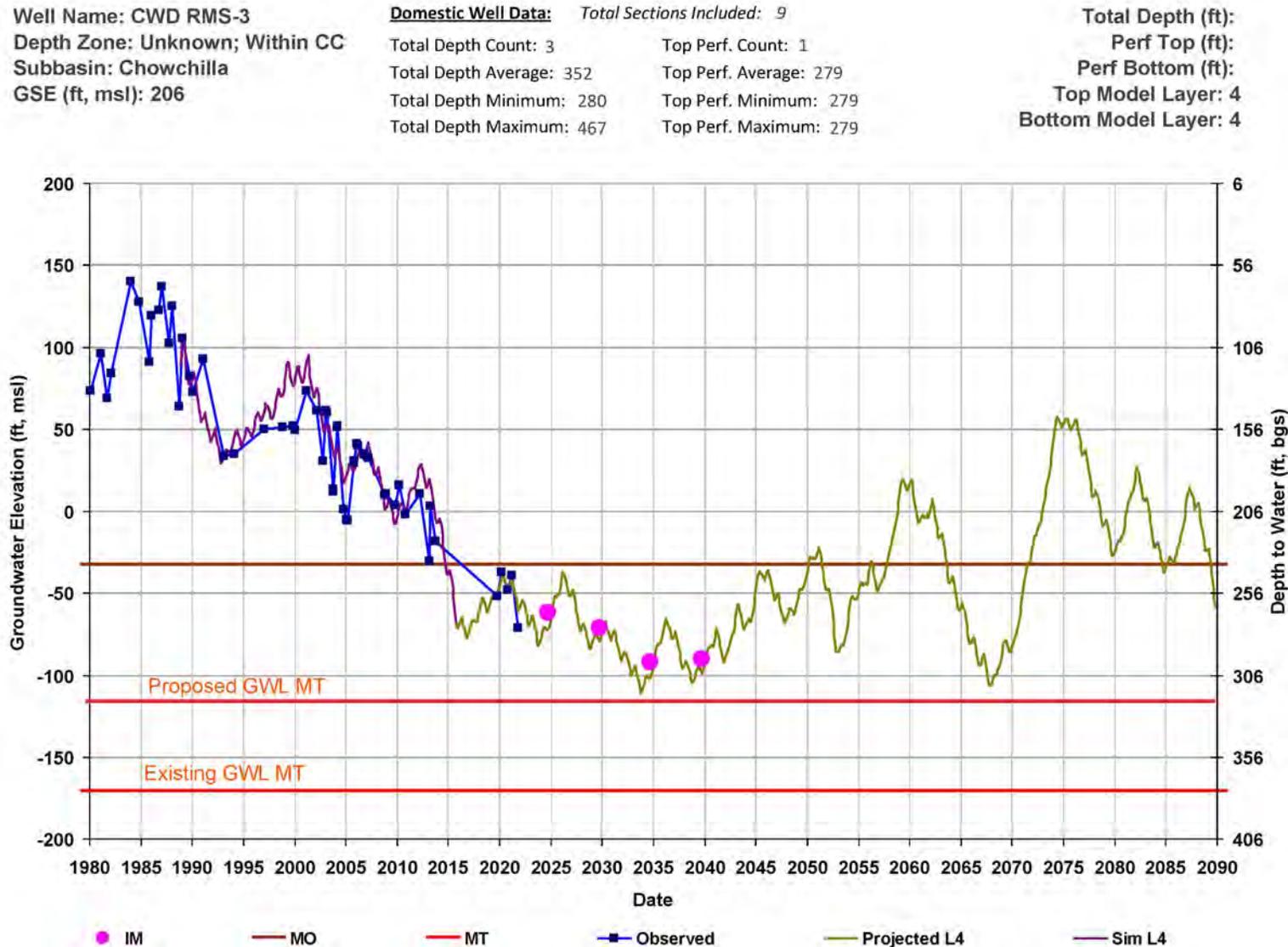
Considerations/Adjustments for Setting GWL MTs

- More closely tied to occurrence of URs
 - Domestic wells addressed by mitigation program
 - Percentage of agricultural and public supply wells going dry
- Based primarily on occurrence of future 6-year drought (equivalent to longest historical drought) with some operational flexibility rather than a future 10-year drought
- Based on understanding from DWR that exceedance of MTs during GSP Implementation Period is allowable provided PMAs on schedule and meeting IMs

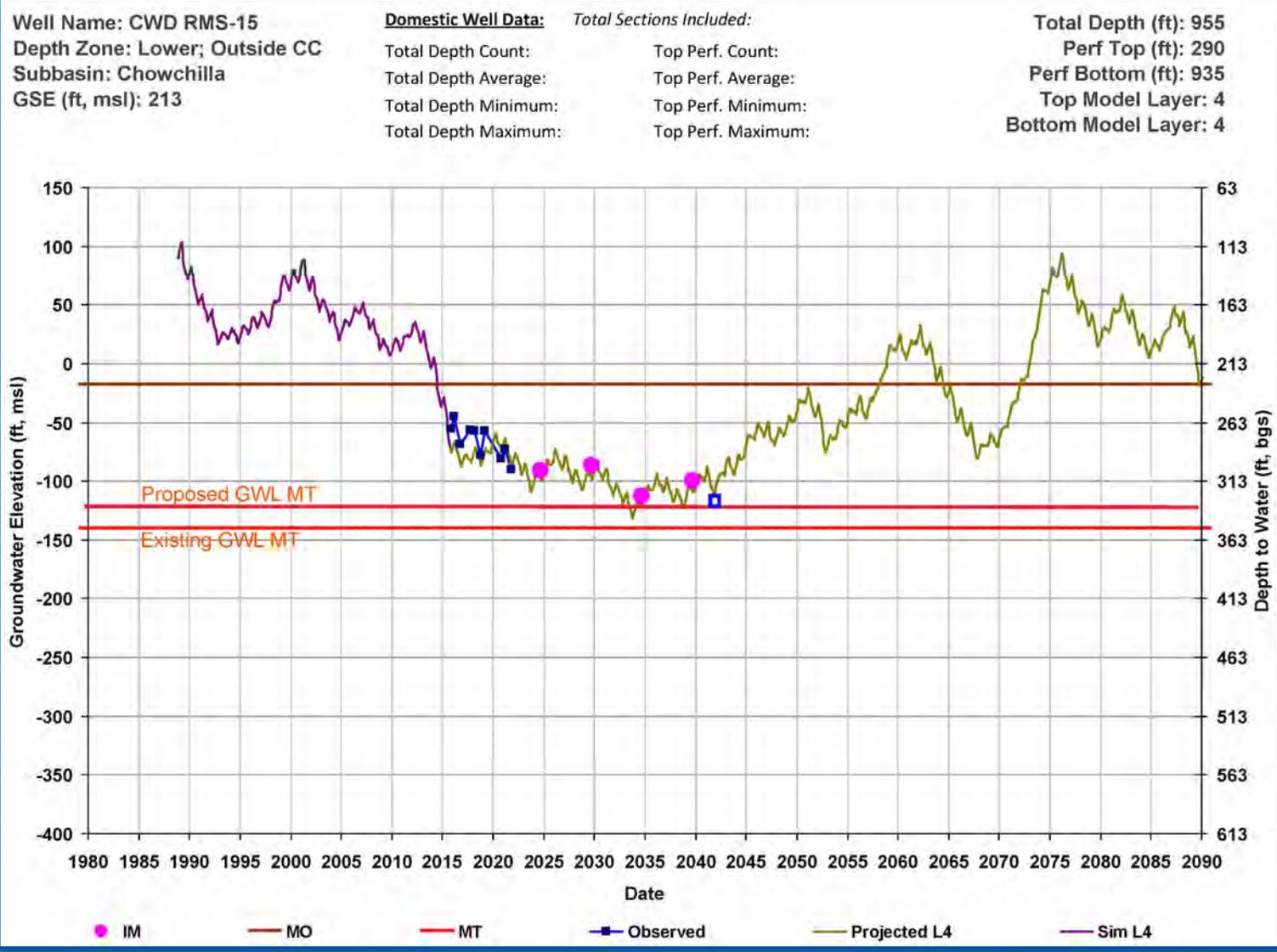
Steps for Setting GWL MTs

- Evaluate anticipated future groundwater elevations after January 1, 2040 when the Subbasin is being operated under sustainable groundwater conditions, and identify the lowest groundwater elevation that would occur
- Subtract a 10-foot operational buffer from the lowest groundwater elevation that occurs after January 1, 2040
- Adjust MT to account for offset between historic observed and modeled data, if necessary
- Conduct evaluation of selected MT values at each Representative Monitoring Site (RMS) well to ensure that undesirable results would not occur the selected MT groundwater elevations

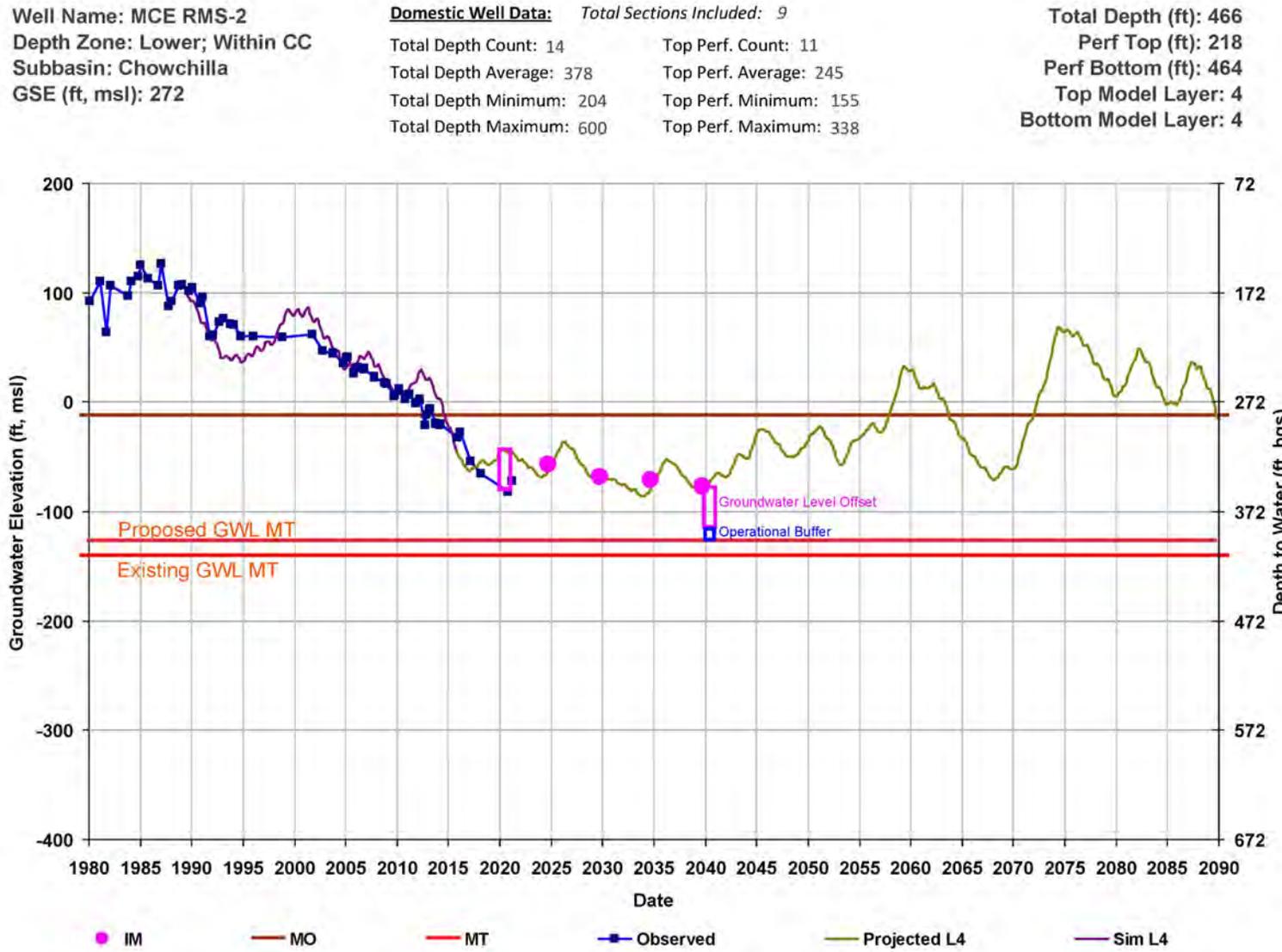
DWR Stated Deficiencies – GW Levels A.1.ii



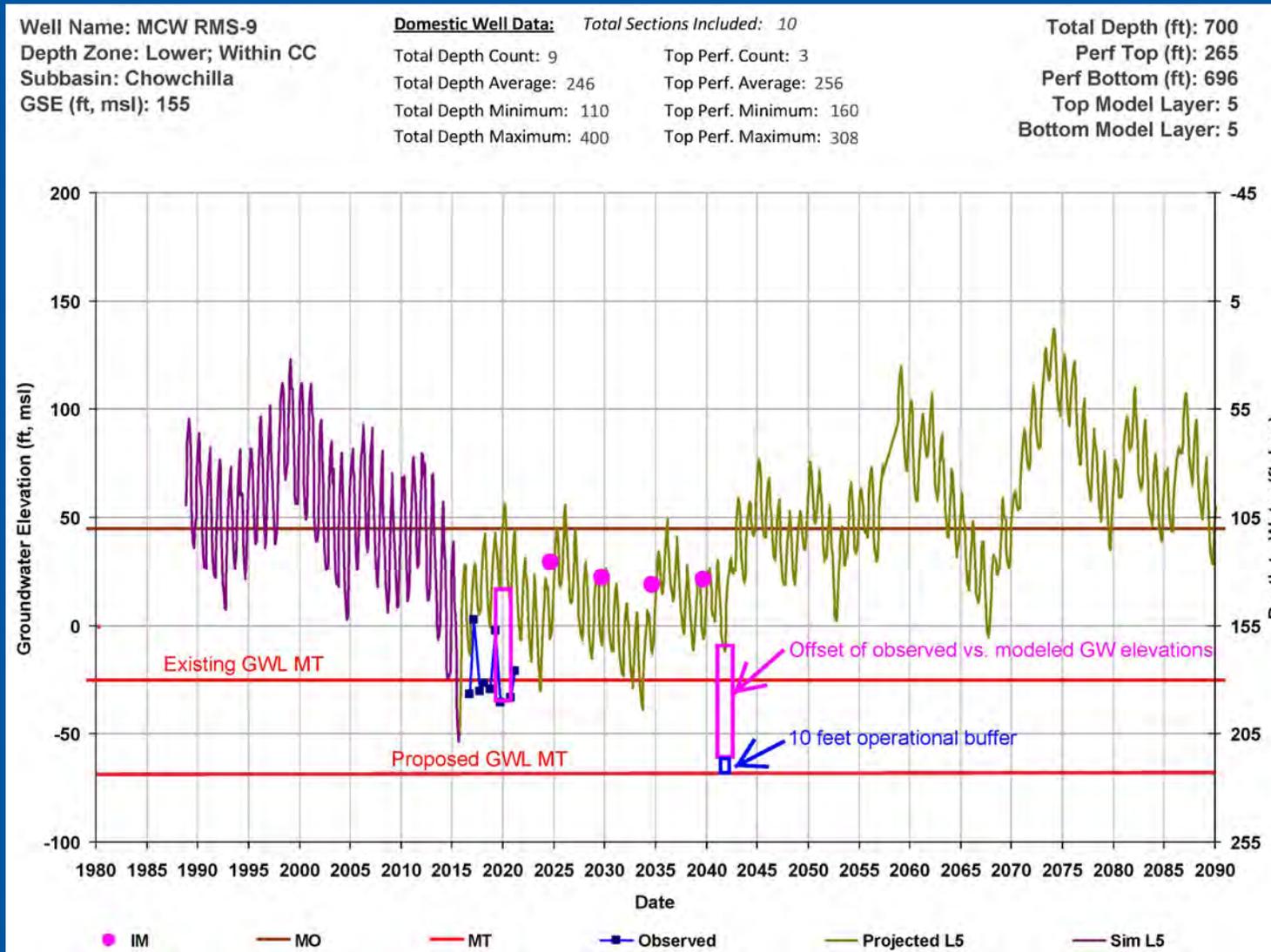
DWR Stated Deficiencies – GW Levels A.1.ii



DWR Stated Deficiencies – GW Levels A.1.ii



DWR Stated Deficiencies – GW Levels A.1.ii



DWR Stated Deficiencies – GW Levels A.1.ii

(Table of percent wells going dry at GWL MTs)

DWR Stated Deficiencies – Subsidence A.2

A.2. The GSP lacks justification for, and effects associated with, the sustainable management criteria for land subsidence, particularly the minimum thresholds and undesirable results and the effects of those criteria on the interests of land surface beneficial uses and users in the Subbasin.

DWR Stated Deficiencies – Subsidence A.2.i

A.2.i. The GSP does not describe in specific terms what land surface beneficial uses and users in the Subbasin (e.g., infrastructure such as canals or levees) may be susceptible to substantial interference as a result of continued subsidence, or what amount of continued subsidence is tolerable for the identified land surface beneficial uses and users.

DWR Stated Deficiencies – Subsidence A.2.ii

A.2.ii. The GSP does not include analysis demonstrating a significant correlation between groundwater levels, which are allowed to decline below the historical low at up to 50 percent of monitoring sites, and land subsidence in the Western Management Area.

DWR Stated Deficiencies – Subsidence A.2.iii

A.2.iii. The GSP allows for continued land subsidence in the Eastern Management Area, which does not reflect the intent of SGMA that subsidence be avoided or minimized once sustainability is achieved. The GSP does not explain how implementation of the projects and management actions is consistent both with achieving the long-term avoidance or minimization of subsidence and with not exceeding the tolerable amount of cumulative subsidence.

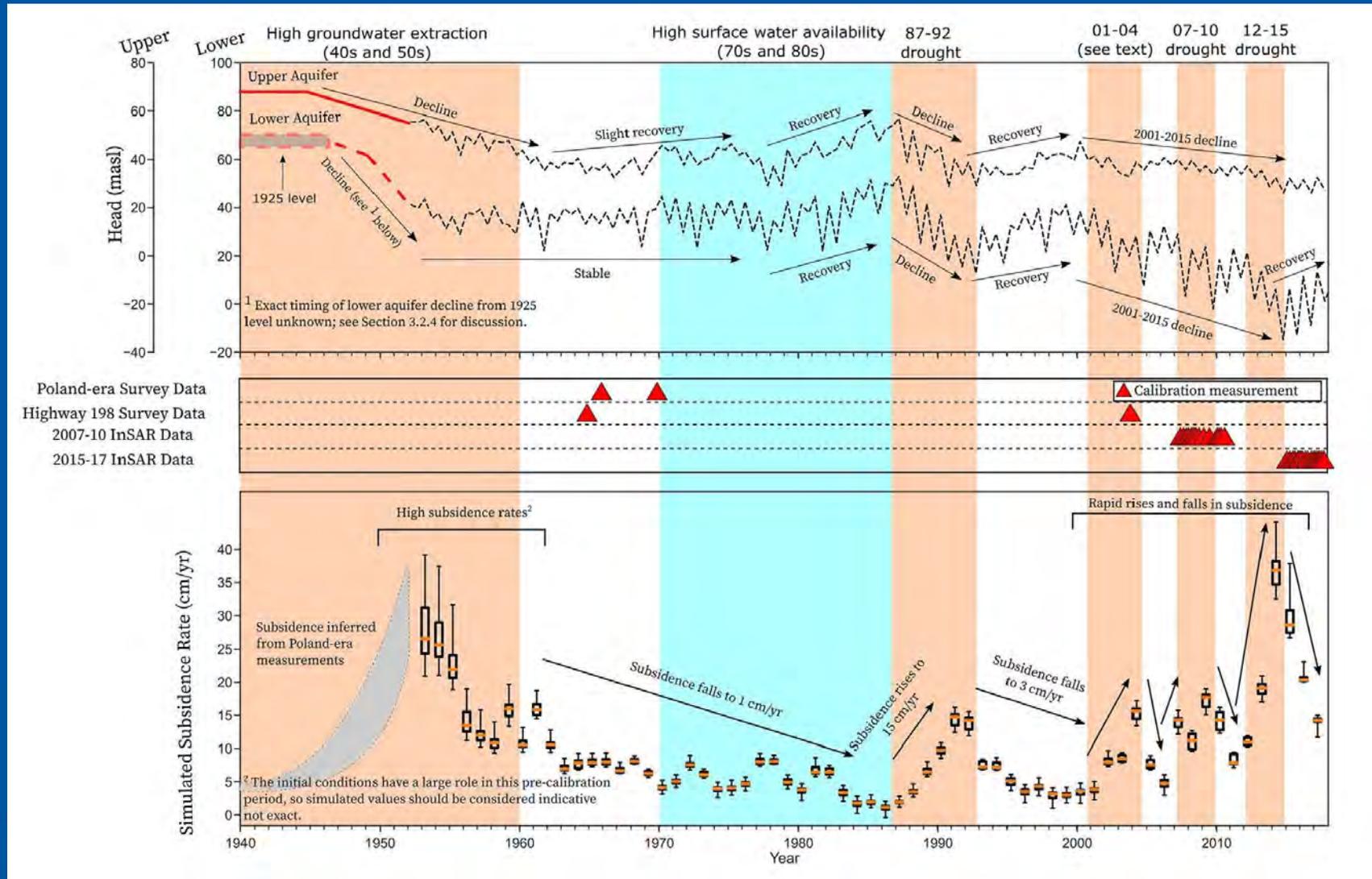
Additions to HCM/SMC Sections

- Comparison of time-series for GWLs and subsidence
 - Relationship varies; subsidence occurs at several locations with decreasing, stable, and increasing groundwater levels
 - Above relationships and lack of consistent trends likely due to occurrence of residual subsidence
- Extensive literature review regarding residual subsidence
 - Residual subsidence is a major factor in ongoing subsidence
 - Likely to be increasing over time with repeated cycles of new GWL lows
 - Likely to continue for many years/decades even with stable/recovering GWLs
- More detailed assessment of infrastructure susceptible to subsidence (identification/characterization of critical infrastructure)

Additions to HCM Section (Graphics related to)

- GWL vs. subsidence
- Map of critical infrastructure?

Residual Subsidence (Figure from WRR Article)



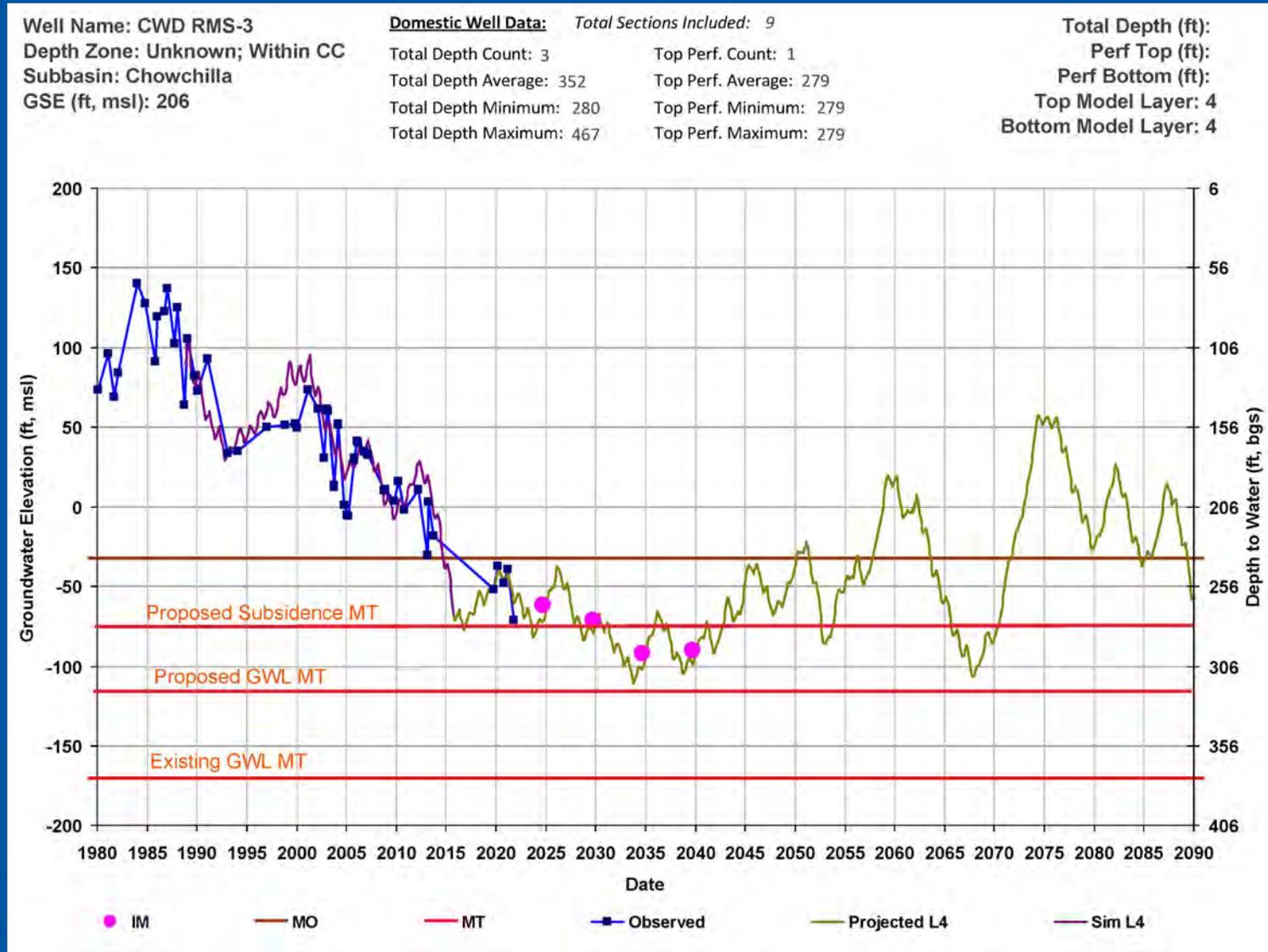
Considerations/Adjustments for Setting Subsidence MTs

- More closely tied to key infrastructure tolerance for more subsidence
 - WMA – Sack Dam and Bypass
 - EMA – Surface water conveyances, with consideration of well casing failures
- WMA definition of UR more stringent near key infrastructure
- EMA now has assigned subsidence SMC
- EMA MT include combination of GWL proxy and cumulative subsidence

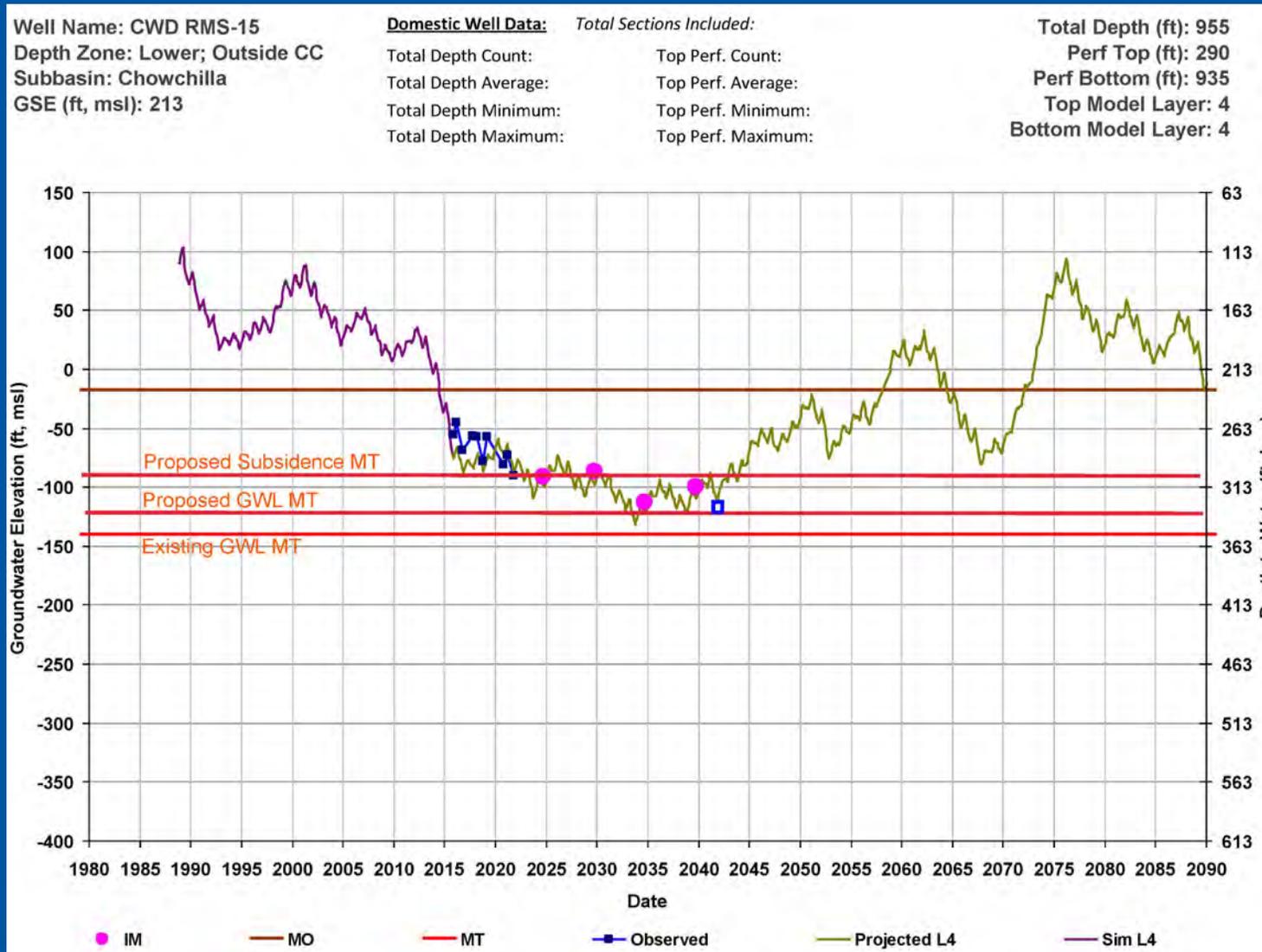
Steps for Setting Subsidence GWL Proxy MTs

- Determine if the RMS represents the Lower Aquifer or Upper Aquifer; the subsidence minimum threshold only applies to the Lower Aquifer
- Review the modeled groundwater level data to determine the historical low groundwater elevation, which typically occurred between 2014 and 2016
- If necessary, adjust the subsidence-based groundwater level minimum threshold to account for observed groundwater levels in the well that are below the modeled low elevation

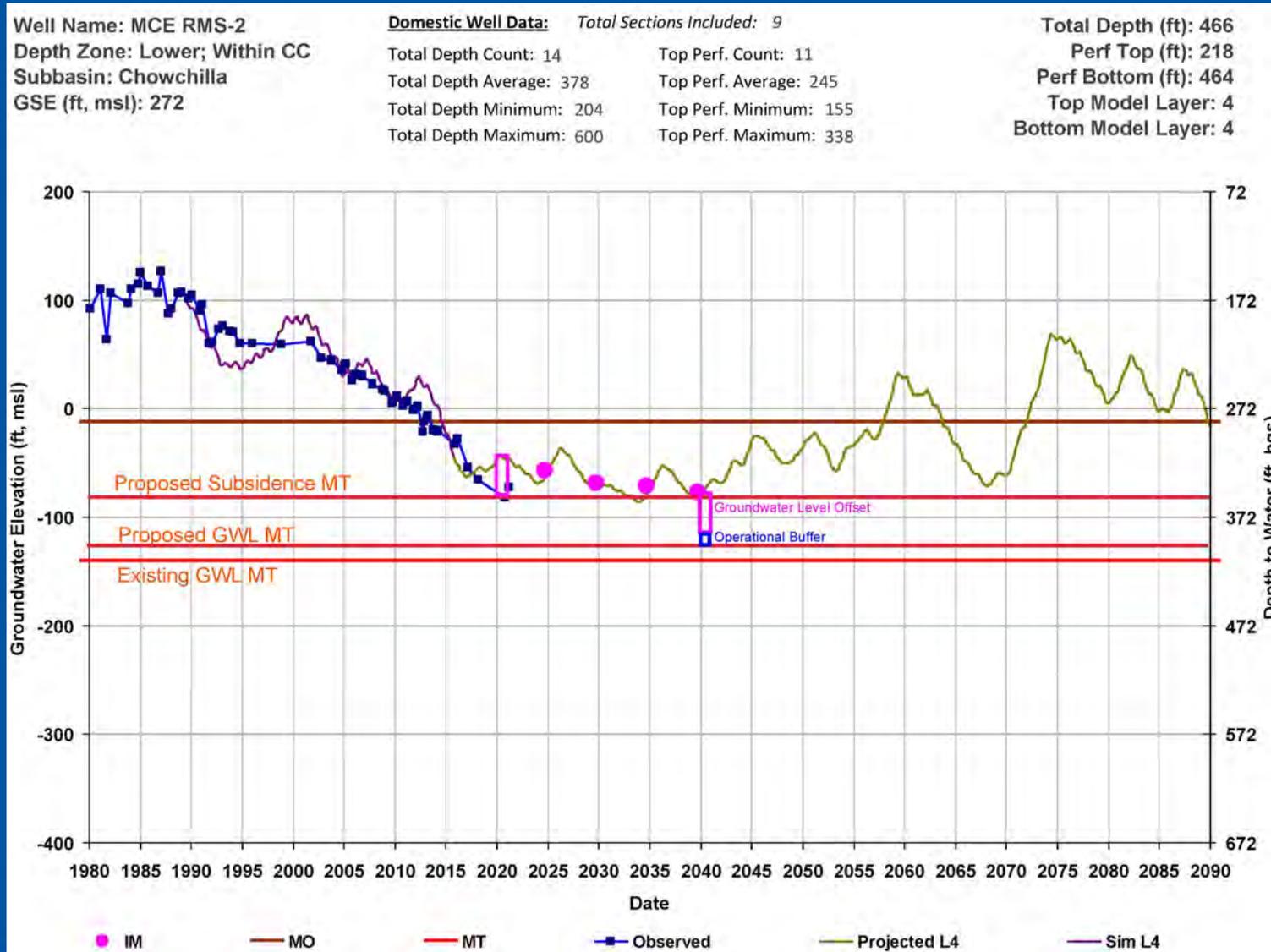
DWR Stated Deficiencies – GW Levels A.1.ii



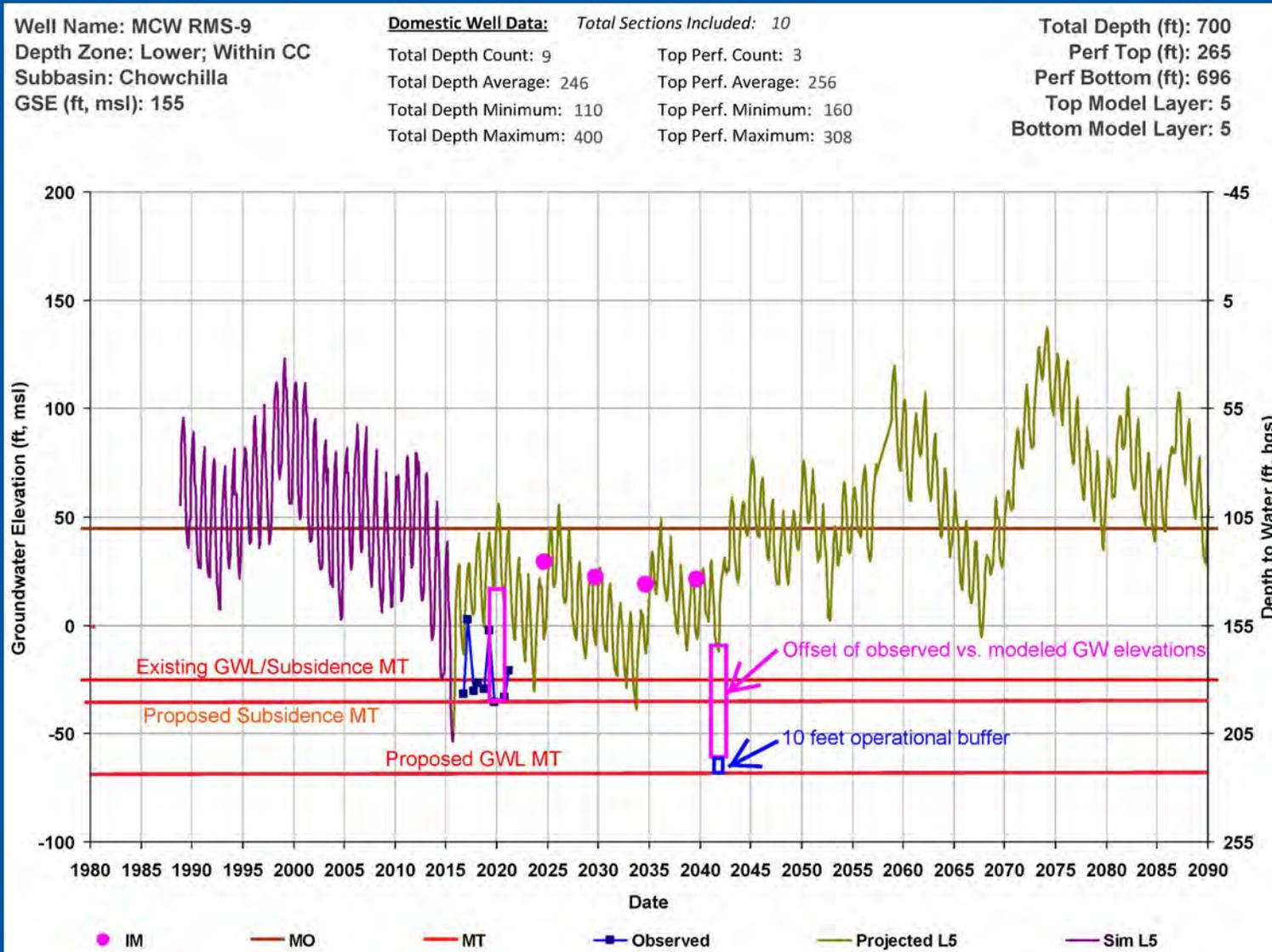
DWR Stated Deficiencies – GW Levels A.1.ii



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DWR Stated Deficiencies – ISW B.1

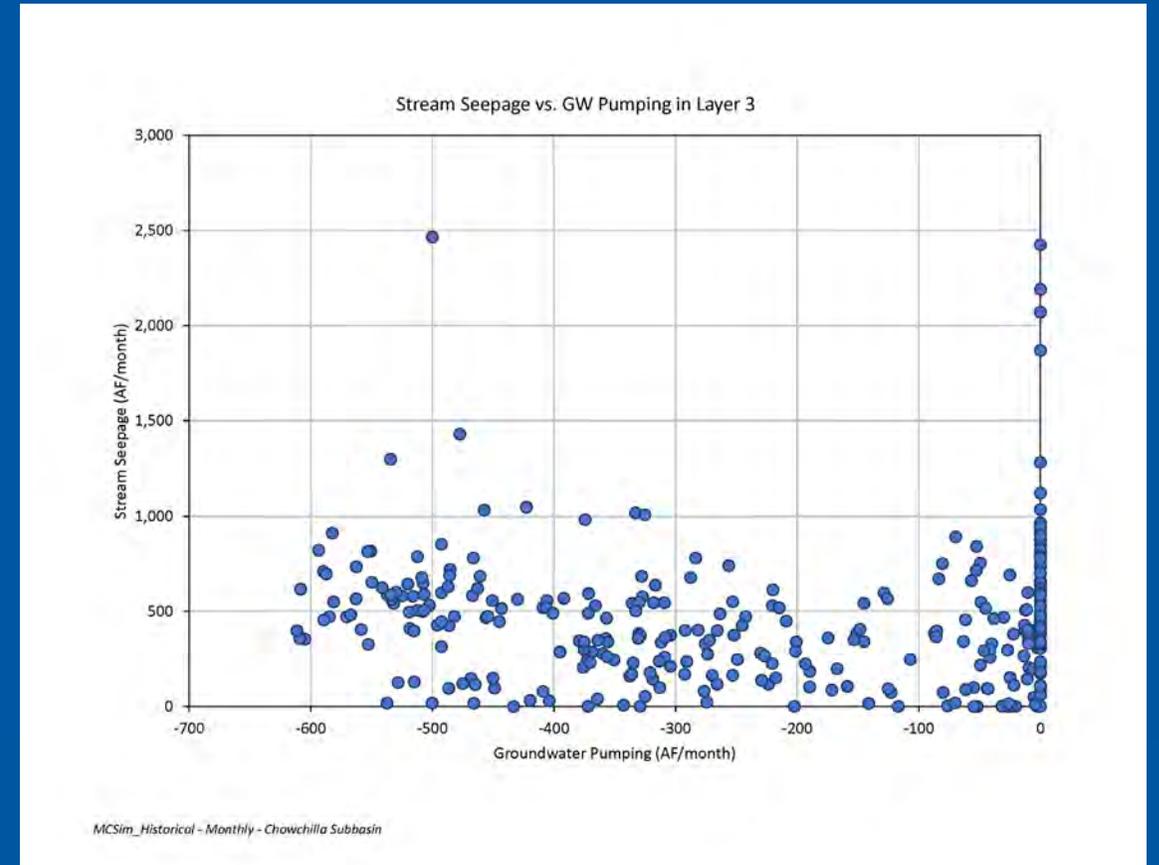
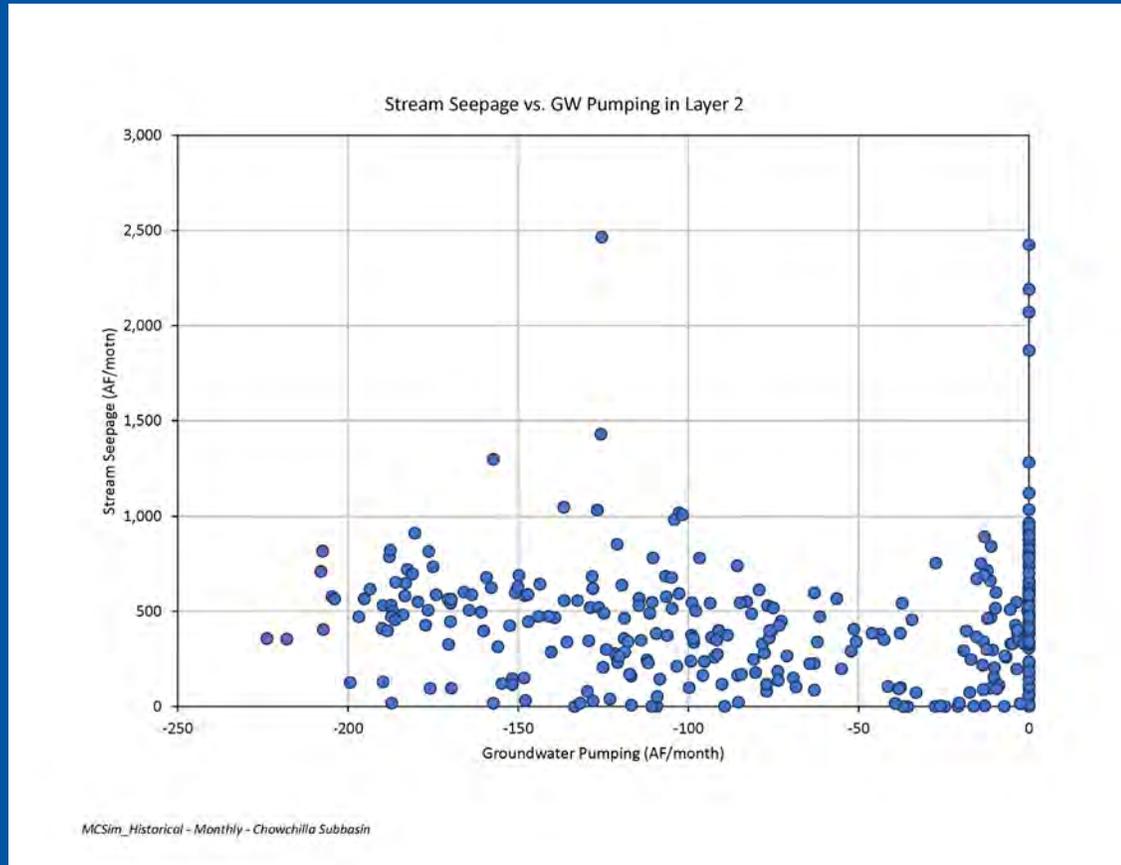
B. The GSAs do not sufficiently demonstrate that interconnected surface water or undesirable results related to depletions of interconnected surface water are not present and are not likely to occur in the Subbasin.

1. The GSP does not provide a clear and comprehensive analysis of the potential for interconnected surface water to be present along the San Joaquin River in the Subbasin.

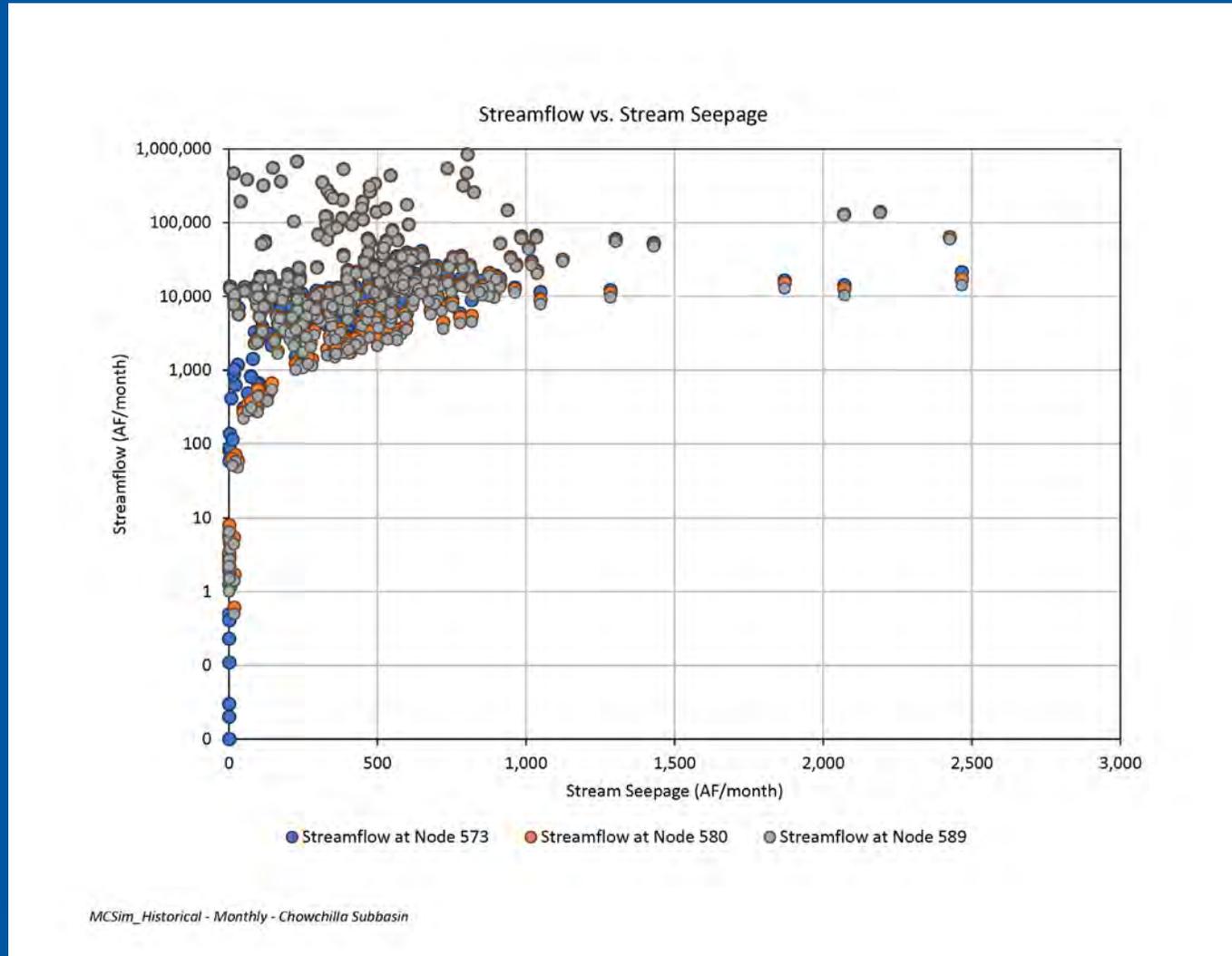
Additions to ISW HCM/SMC Section

- Evaluation of factors affecting shallow groundwater levels (dependence on streamflow, GW pumping)
- Evaluation of historical percent of time SW/GW connected
- Evaluation of relationships between water levels at different depth intervals
- Commitment to develop and implement an ISW Workplan

Additions to ISW HCM/SMC Sections (graphics related to)



Additions to ISW HCM/SMC Sections (graphics related to)



Additions to ISW HCM/SMC Sections

ISW MT Evaluation

	Count of GW Elevation Measurements	Count of GW Elevation Measurements that are greater than Streambed Elevation	Percent of Time that GW Elevation Measurements are greater than Streambed Elevation
<i>MCW RMS-1 (streambed elevation = 100.93 feet; Model Layer 3)</i>			
1989-2015	325	2	1%
2016-2019	48	0	0%
2020-2039	240	0	0%
2040-2090	612	34	6%
<i>MCW RMS-10 (streambed elevation = 106.72 feet; Model Layer 1)</i>			
1989-2015	325	252	78%
2016-2019	48	45	94%
2020-2039	240	183	76%
2040-2090	612	455	74%
<i>MCW RMS-11 (streambed elevation = 115.01 feet; Model Layers 1 & 2)</i>			
1989-2015	650	107	16%
2016-2019	96	19	20%
2020-2039	480	51	11%
2040-2090	1,224	349	29%
<i>MCW RMS-12 (streambed elevation = 116.05 feet; Model Layers 1 & 2)</i>			
1989-2015	650	9	1%
2016-2019	96	0	0%
2020-2039	480	21	4%
2040-2090	1,224	284	23%
<i>MCW RMS-2 (streambed elevation = 103.63 feet; Model Layer 2)</i>			
1989-2015	325	60	18%
2016-2019	48	0	0%
2020-2039	240	11	5%
2040-2090	612	117	19%
<i>MCW RMS-3 (streambed elevation = 109.08 feet; Model Layers 2 & 3)</i>			
1989-2015	650	0	0%
2016-2019	96	0	0%
2020-2039	480	0	0%
2040-2090	1,224	124	10%

Considerations for Setting ISW MTs

- Options for metrics
 - Amount of depletion – increases with increasing streamflow and decreases with decreasing streamflow; not a good option
 - Groundwater level proxy – higher with increasing streamflow and lower with decreasing streamflow; not a good option
 - Percentage of time connected – best available option but requires consideration of a multi-year period of average climatic/hydrologic conditions
- Requirement to set MTs limited to SJR
- Data demonstrate that occurrence of shallow groundwater along SJR closely associated with occurrence/amount of streamflow
- Available data and modeling indicate pumping near SJR may not be primary factor related to stream seepage/depletion; occurrence of streamflow is the primary factor

Steps for Setting ISW MTs

- Evaluate historical/baseline percent of time connected
- Determine time period sufficiently long enough to be basis for rolling average
- Interim MT evaluation to be based on comparing percent of time stream was connected using rolling average over multiple years vs. the baseline, with consideration of representativeness of climatic/hydrologic conditions over rolling average time period

Summary of GSP Revisions

- Chronic GWL Declines (GWL MT) – Refined based on 6-year drought instead of 10-year drought consistent with refined analysis of URs
- Subsidence MTs – Refined in WMA to emphasize key infrastructure; Added in EMA
- Interconnected Surface Water MTs – Added for SJR



Questions?