

# CHOWCHILLA SUBBASIN

Sustainable Groundwater  
Management Act (SGMA)

## *Groundwater Sustainability Plan*

### APPENDIX 3. SUSTAINABLE MANAGEMENT CRITERIA

Technical Appendices 3.A. through 3.J.

**January 2020**

**Revision 1 July 2022**

**Revision 2 May 2023**



*Prepared by*

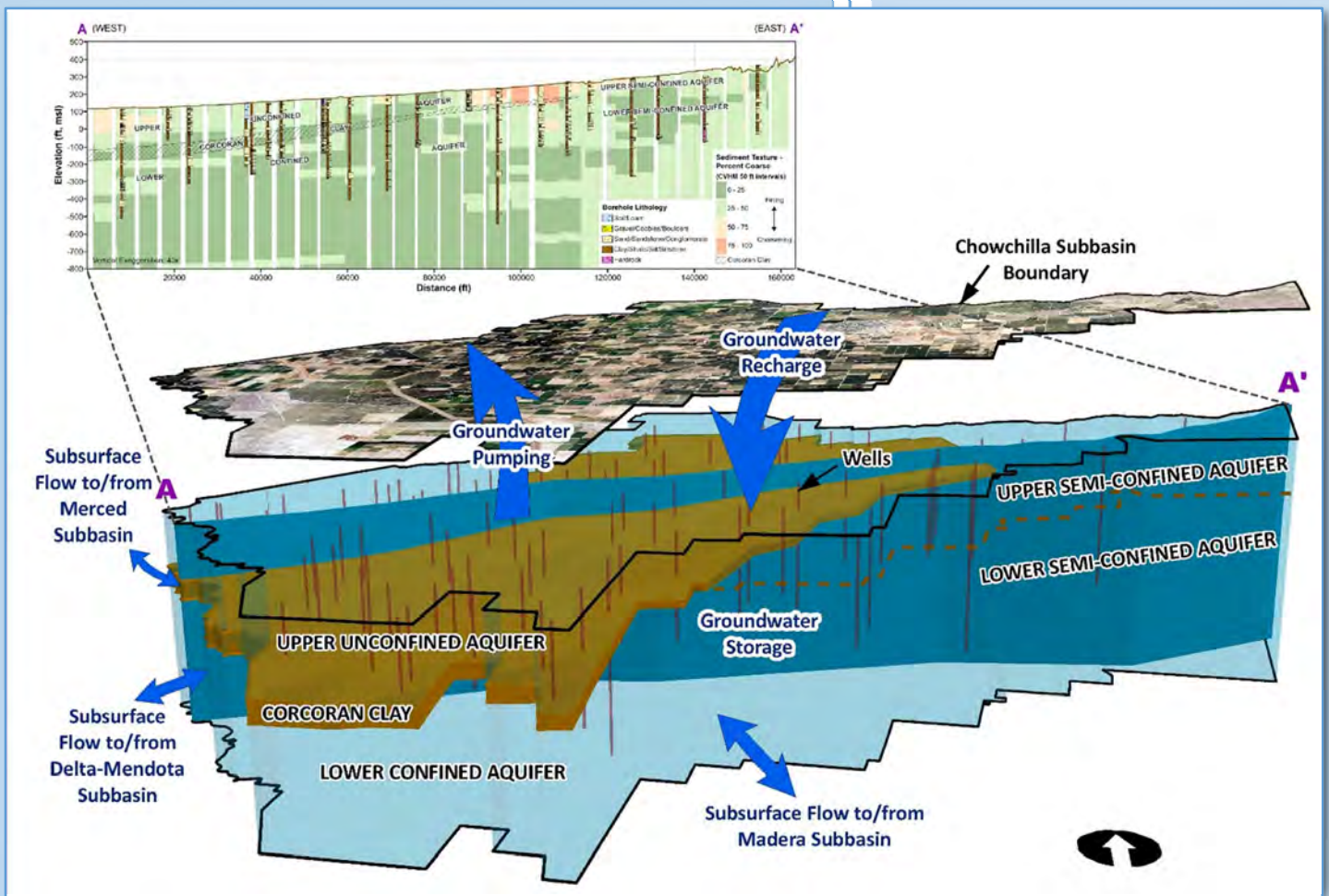
*Dauids Engineering, Inc (Revised GSP Team)*

*Luhdorff & Scalmanini (Revised GSP Team)*

*ERA Economics*

*Stillwater Sciences and*

*California State University, Sacramento*



*Chowchilla Subbasin*

Sustainable Groundwater  
Management Act

**Groundwater Sustainability Plan**

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**January 2020**  
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**Prepared For**  
Chowchilla Subbasin GSP Advisory Committee

**Prepared By**  
Davids Engineering, Inc (Revised GSP Team)  
Luhdorff & Scalmanini (Revised GSP Team)  
ERA Economics  
Stillwater Sciences and  
California State University, Sacramento

## **APPENDIX 3. SUSTAINABLE MANAGEMENT CRITERIA**

- 3.A. Measurable Objectives and Minimum Thresholds for Groundwater Levels
- 3.B. Measurable Objectives and Minimum Thresholds for Groundwater Quality
- 3.C. Economic Analysis and Framework for Potential Domestic Well Mitigation Program
- 3.D. Chowchilla Subbasin Domestic Well Mitigation Program
- 3.E. Chowchilla Subbasin Infrastructure Sensitivity Assessment
- 3.F. Subsidence Control Measures Agreement
- 3.G. Monitoring Network
- 3.H. Subsidence Data Gaps Workplan
- 3.I. Interconnected Surface Water Data Gaps Workplan
- 3.J. Detailed Process for Setting Groundwater Level Interim Milestones

## **APPENDIX 3.A. MEASURABLE OBJECTIVES AND MINIMUM THRESHOLDS FOR GROUNDWATER LEVELS**

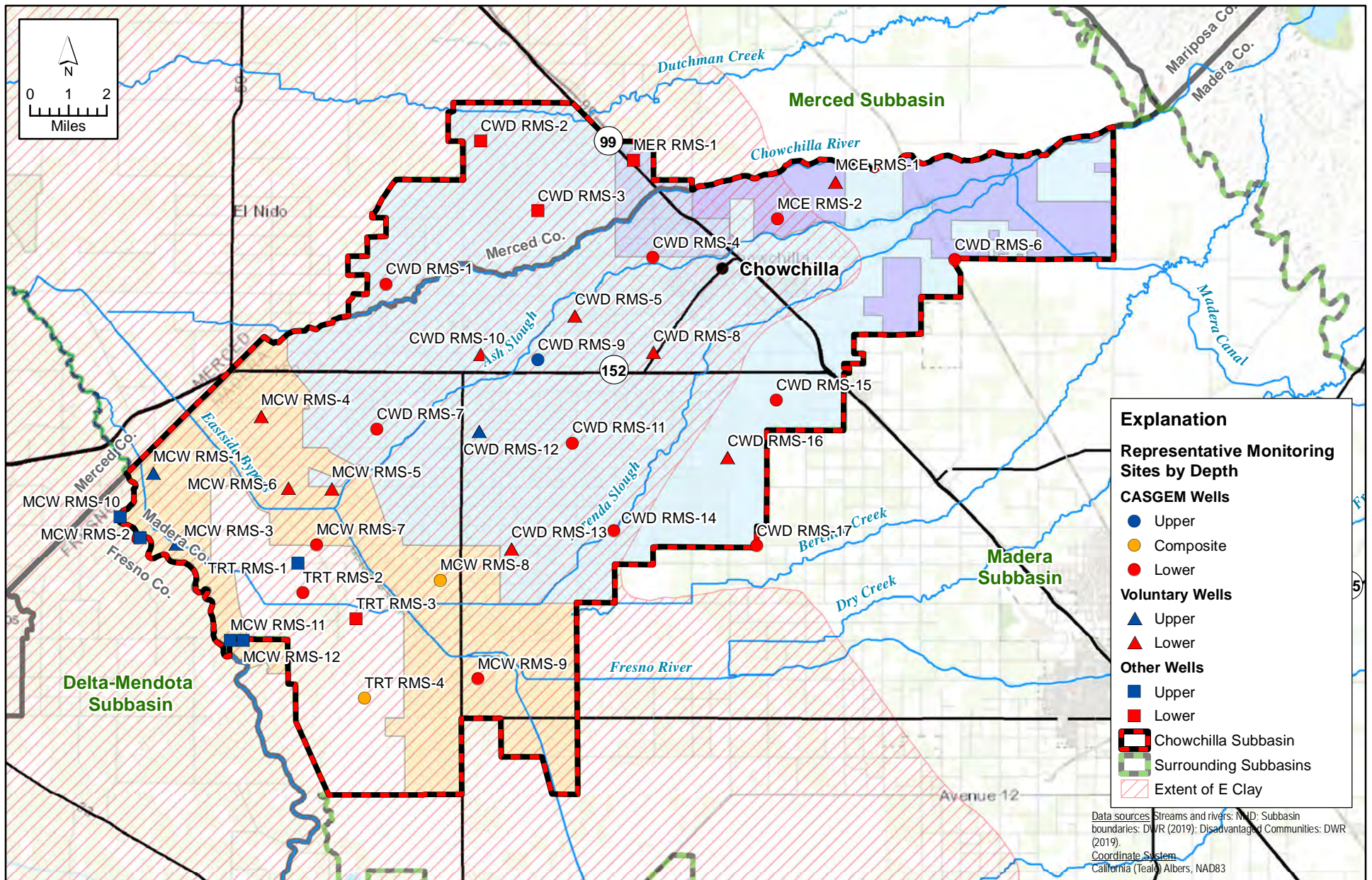
Prepared as part of the  
**Groundwater Sustainability Plan**  
**Chowchilla Subbasin**

January 2020  
Revision 1 July 2022  
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### **GSP Team:**

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Stillwater Sciences and  
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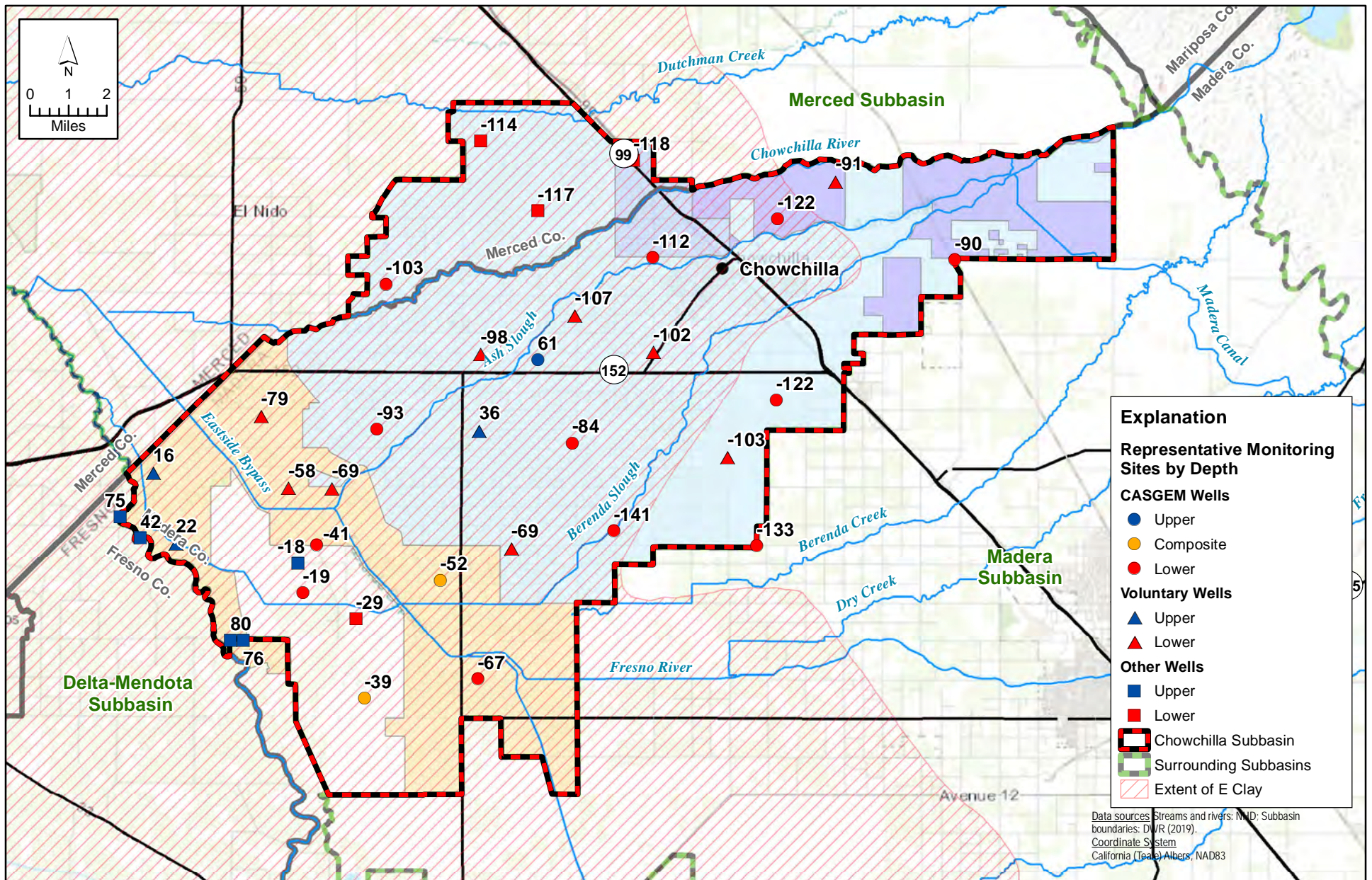
\\SERVER-01\Clerical\2018\18-017 Chowchilla GSP Development\GIS\Map files\Report Figures\Figure 3.A-1 Chowchilla Subbasin Proposed Sustainability Indicator Wells.mxd



**FIGURE 3.A-1**  
**Proposed Groundwater Level Sustainability Indicator**  
**Representative Monitoring Sites**

*Chowchilla Subbasin*  
*Groundwater Sustainability Plan*





\\SERVER-01\Clerical\2018\18-017 Chowchilla GSP Development\GIS\Map files\Report Figures\Figure 3.A-2 Chowchilla Subbasin Elevation of Minimum Thresholds.mxd

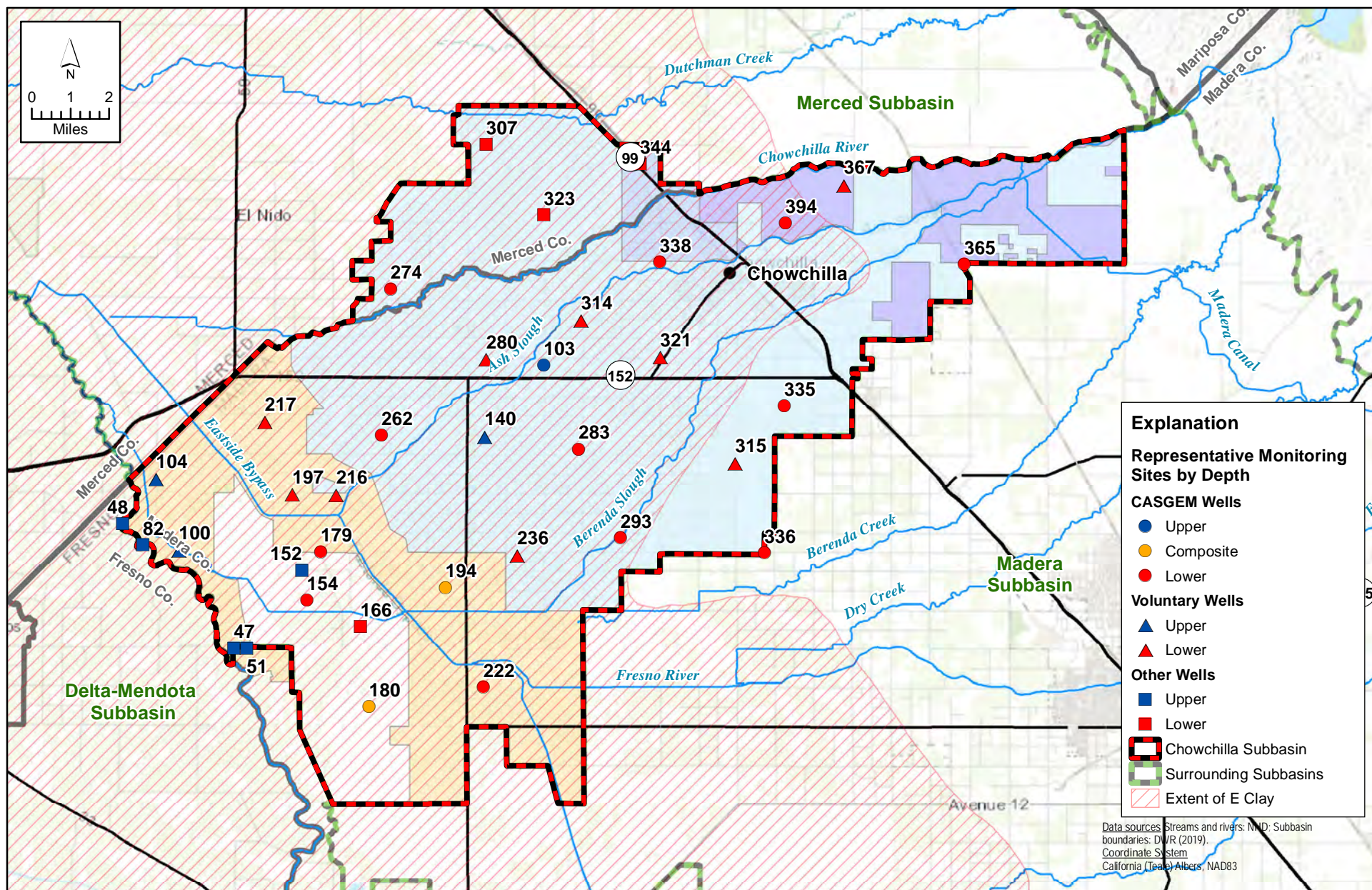
**FIGURE 3.A-2**



## Elevation of Groundwater Level Minimum Thresholds

*Chowchilla Subbasin  
Groundwater Sustainability Plan*





\\SERVER-01\Clerical\2018\18-017 Chowchilla GSP Development\GIS\Map files\Report Figures\Figure 3.A-3 Chowchilla Subbasin Depth to Minimum Thresholds.mxd

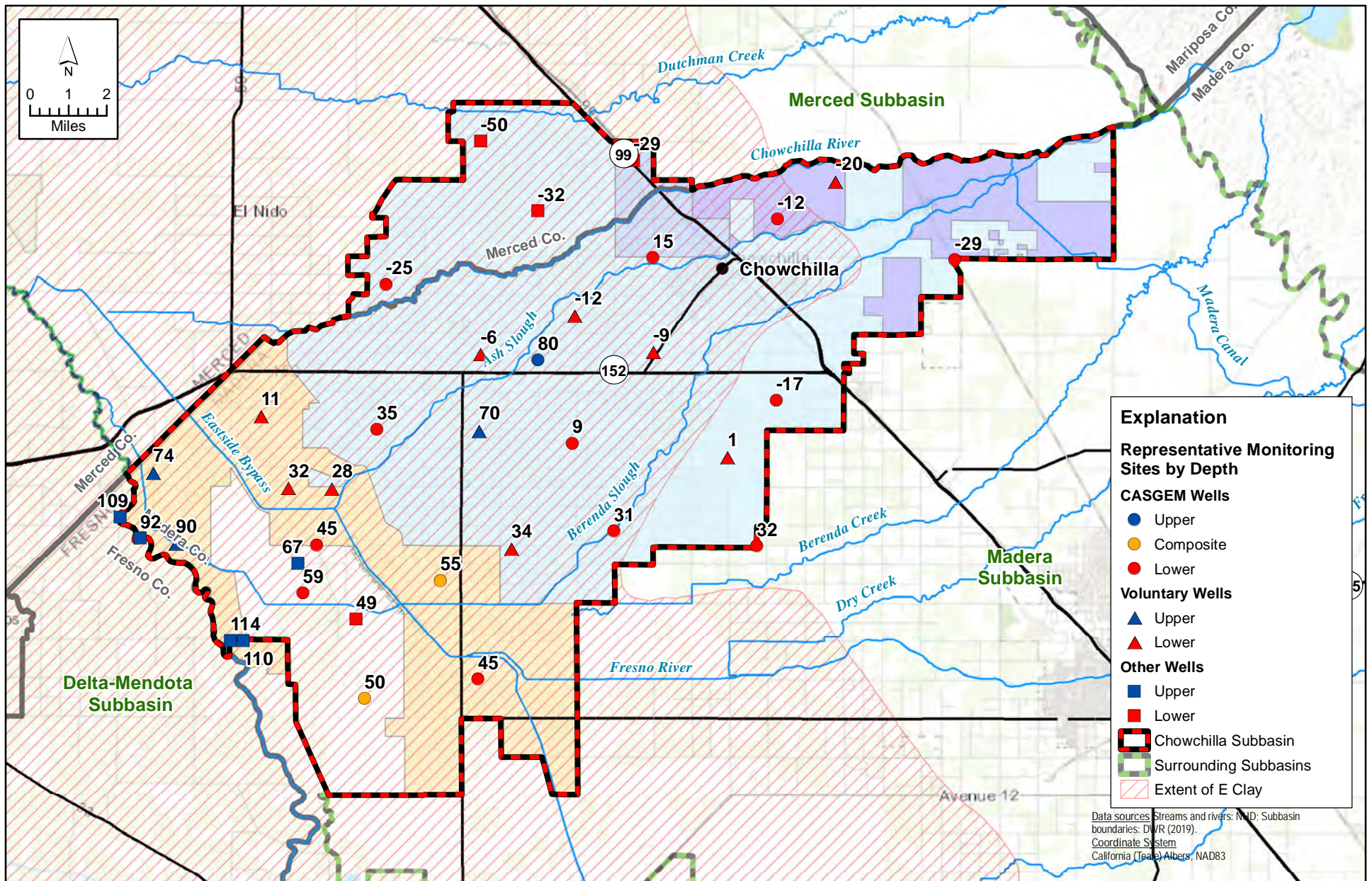
**FIGURE 3.A-3**



## Depth to Groundwater Level Minimum Thresholds

*Chowchilla Subbasin  
Groundwater Sustainability Plan*





\\SERVER-01\Clerical\2018\18-017 Chowchilla GSP Development\GIS\Map files\Report Figures\Figure 3.A-4 Chowchilla Subbasin Elevation of Measurable Objectives.mxd

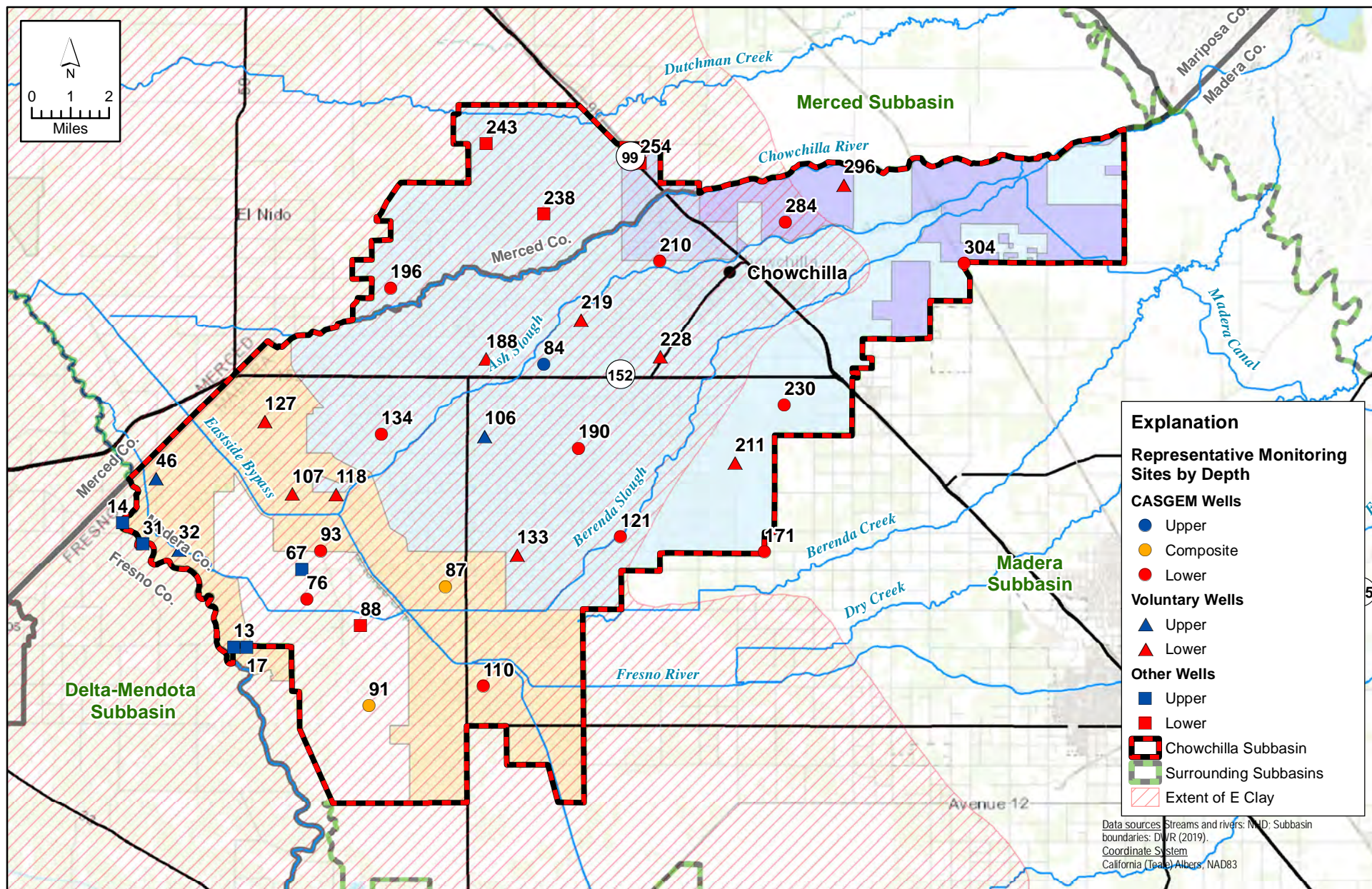
**FIGURE 3.A-4**



## Elevation of Groundwater Level Measurable Objectives

*Chowchilla Subbasin  
Groundwater Sustainability Plan*





\\SERVER-01\Clerical\2018\18-017 Chowchilla GSP Development\GIS\Map files\Report Figures\Figure 3.A-5 Chowchilla Subbasin Depth to Measurable Objectives.mxd

**FIGURE 3.A-5**



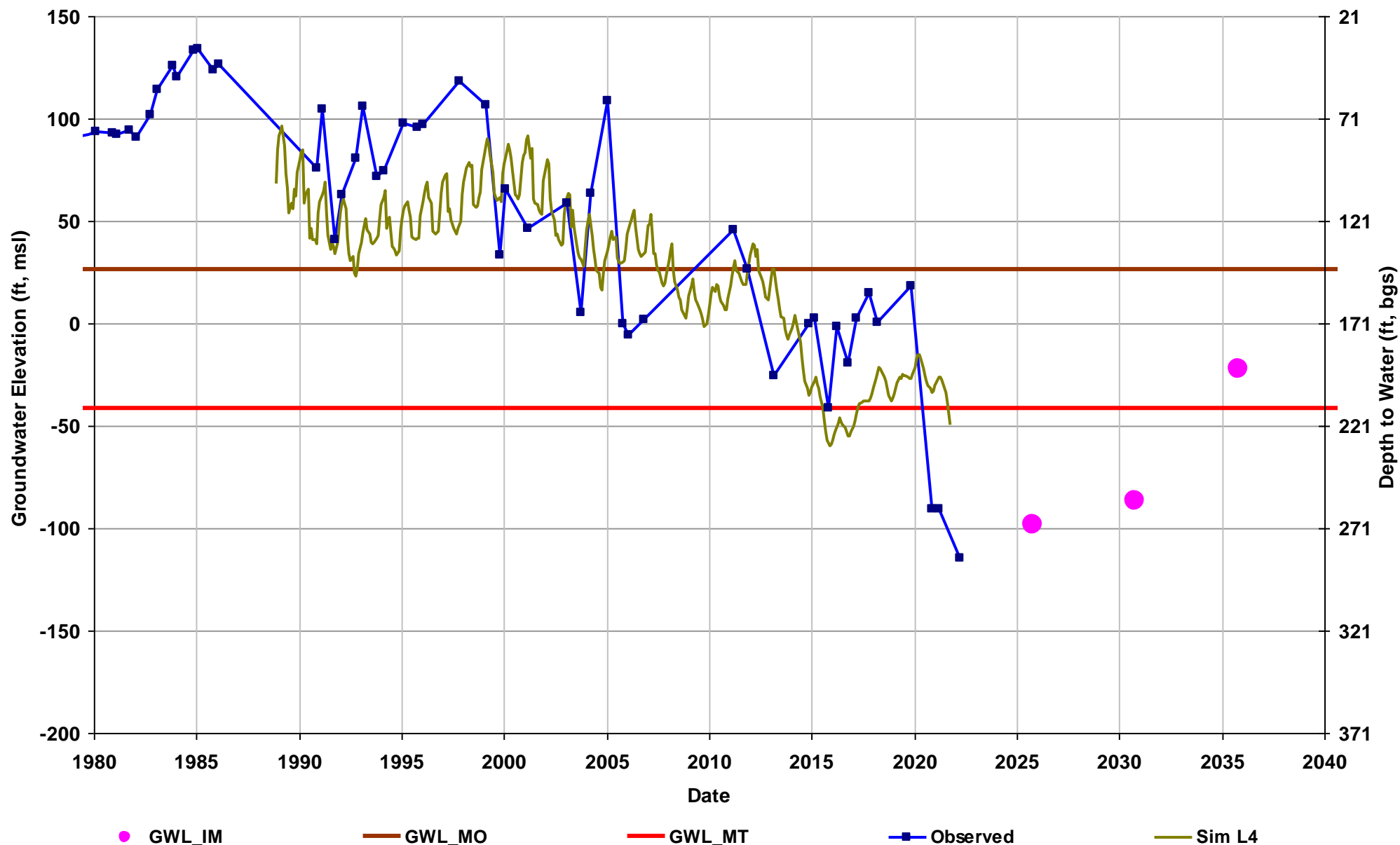
## Depth to Groundwater Level Measurable Objectives

*Chowchilla Subbasin  
Groundwater Sustainability Plan*

**Well Name: CWD RMS-1**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 171**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 7                      Top Perf. Count: 5  
Total Depth Average: 415                  Top Perf. Average: 340  
Total Depth Minimum: 118                Top Perf. Minimum: 98  
Total Depth Maximum: 960                Top Perf. Maximum: 604

**Total Depth (ft bgs): 275**  
**Perf. Top (ft bgs): 160**  
**Perf. Bottom (ft bgs): 275**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**

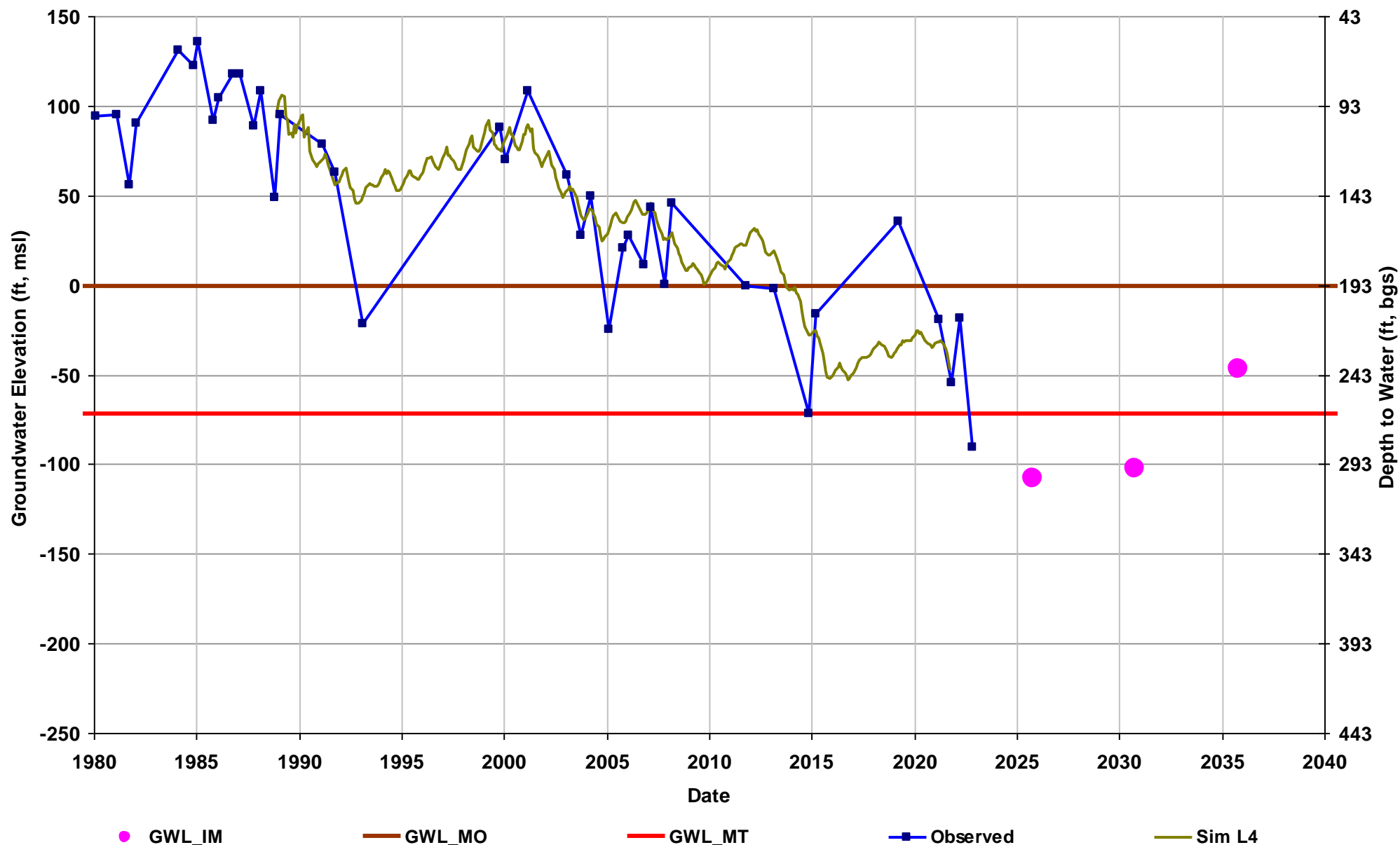




**Well Name: CWD RMS-2**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 193**

**Domestic Well Data:**    *Total Sections Included: 8*  
Total Depth Count: 4                      Top Perf. Count: 2  
Total Depth Average: 640                  Top Perf. Average: 360  
Total Depth Minimum: 208                Top Perf. Minimum: 320  
Total Depth Maximum: 800                Top Perf. Maximum: 400

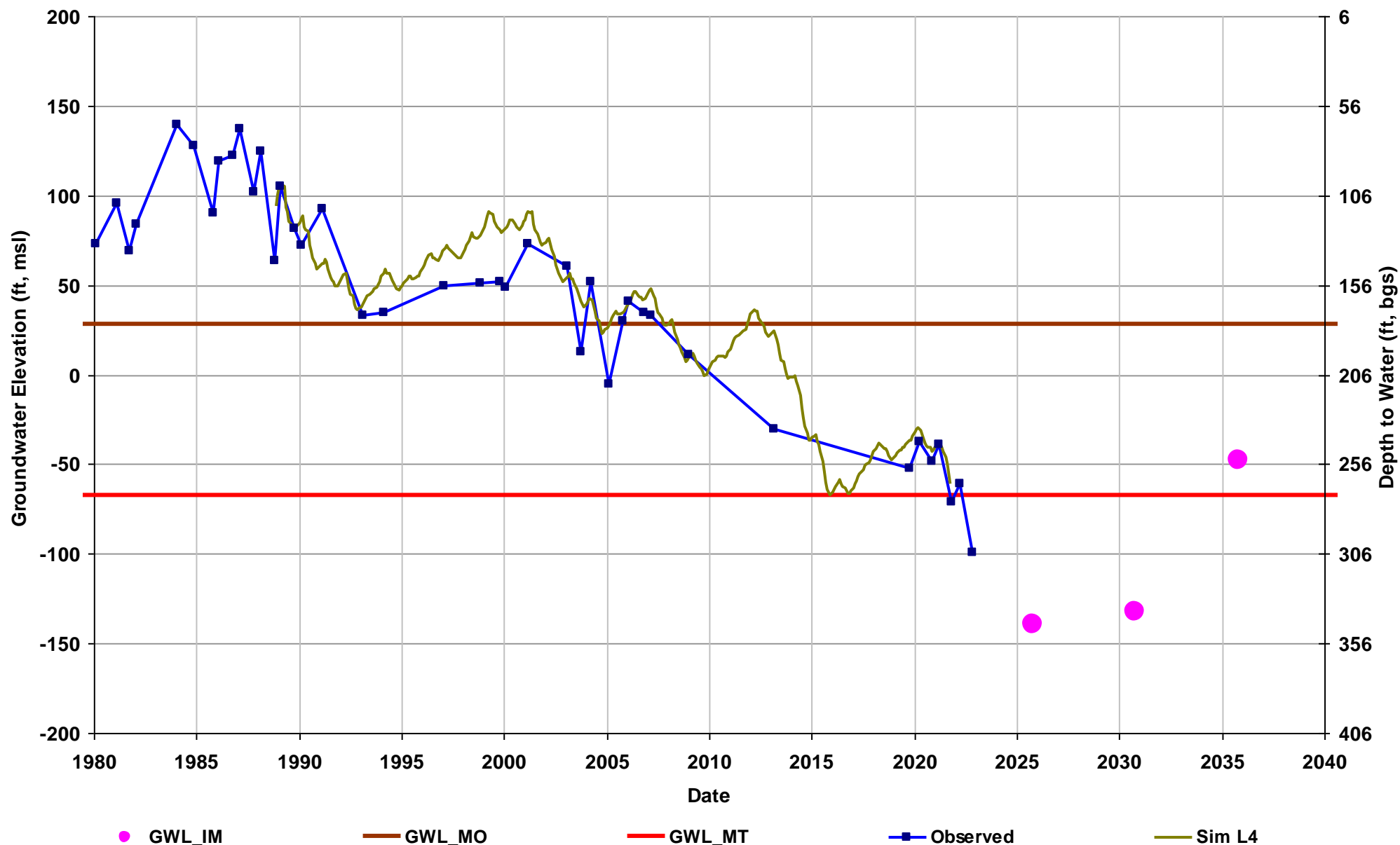
**Total Depth (ft bgs): 780**  
**Perf. Top (ft bgs): 230**  
**Perf. Bottom (ft bgs): 775**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**



**Well Name: CWD RMS-3**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 206**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 3                      Top Perf. Count: 1  
Total Depth Average: 352                  Top Perf. Average: 279  
Total Depth Minimum: 280                Top Perf. Minimum: 279  
Total Depth Maximum: 467                Top Perf. Maximum: 279

**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**

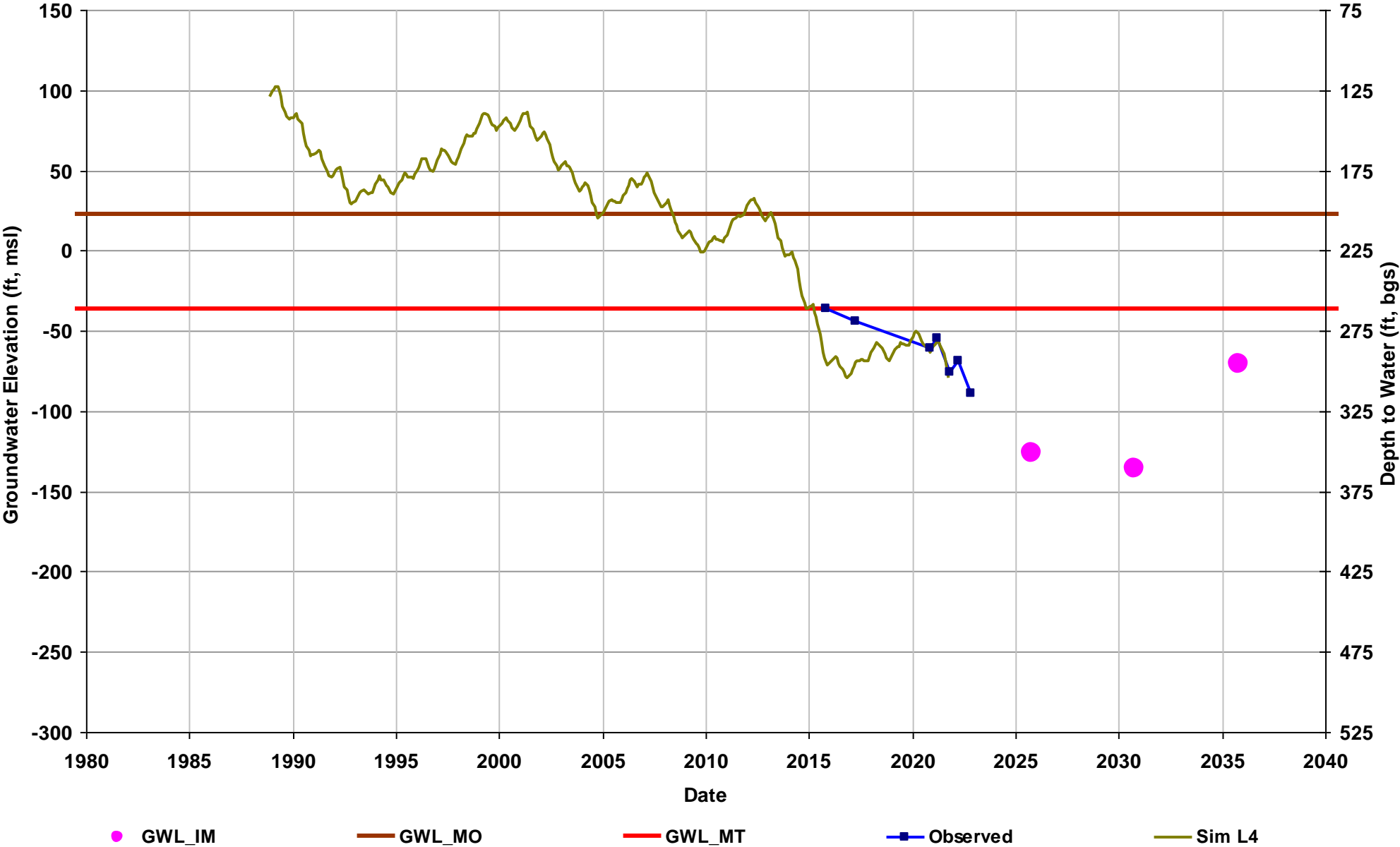




Well Name: CWD RMS-4  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 225

Domestic Well Data:    Total Sections Included: 9  
Total Depth Count: 41      Top Perf. Count: 24  
Total Depth Average: 369    Top Perf. Average: 244  
Total Depth Minimum: 144    Top Perf. Minimum: 145  
Total Depth Maximum: 600    Top Perf. Maximum: 420

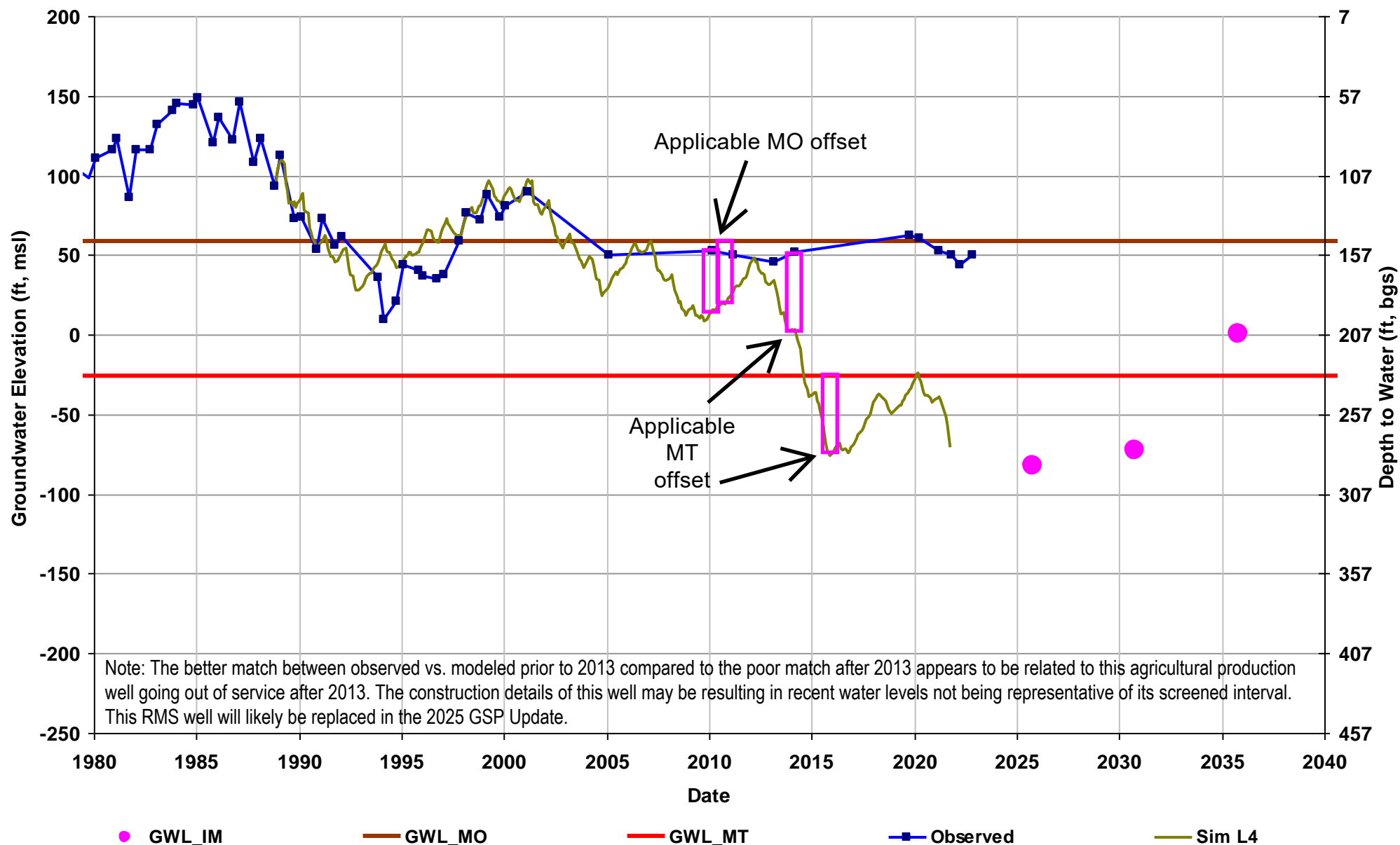
Total Depth (ft bgs): 800  
Perf. Top (ft bgs): 320  
Perf. Bottom (ft bgs): 800  
Top Model Layer: 4  
Bottom Model Layer: 4



**Well Name: CWD RMS-5**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 207**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 20                      Top Perf. Count: 13  
Total Depth Average: 310                      Top Perf. Average: 225  
Total Depth Minimum: 103                      Top Perf. Minimum: 145  
Total Depth Maximum: 600                      Top Perf. Maximum: 308

**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**

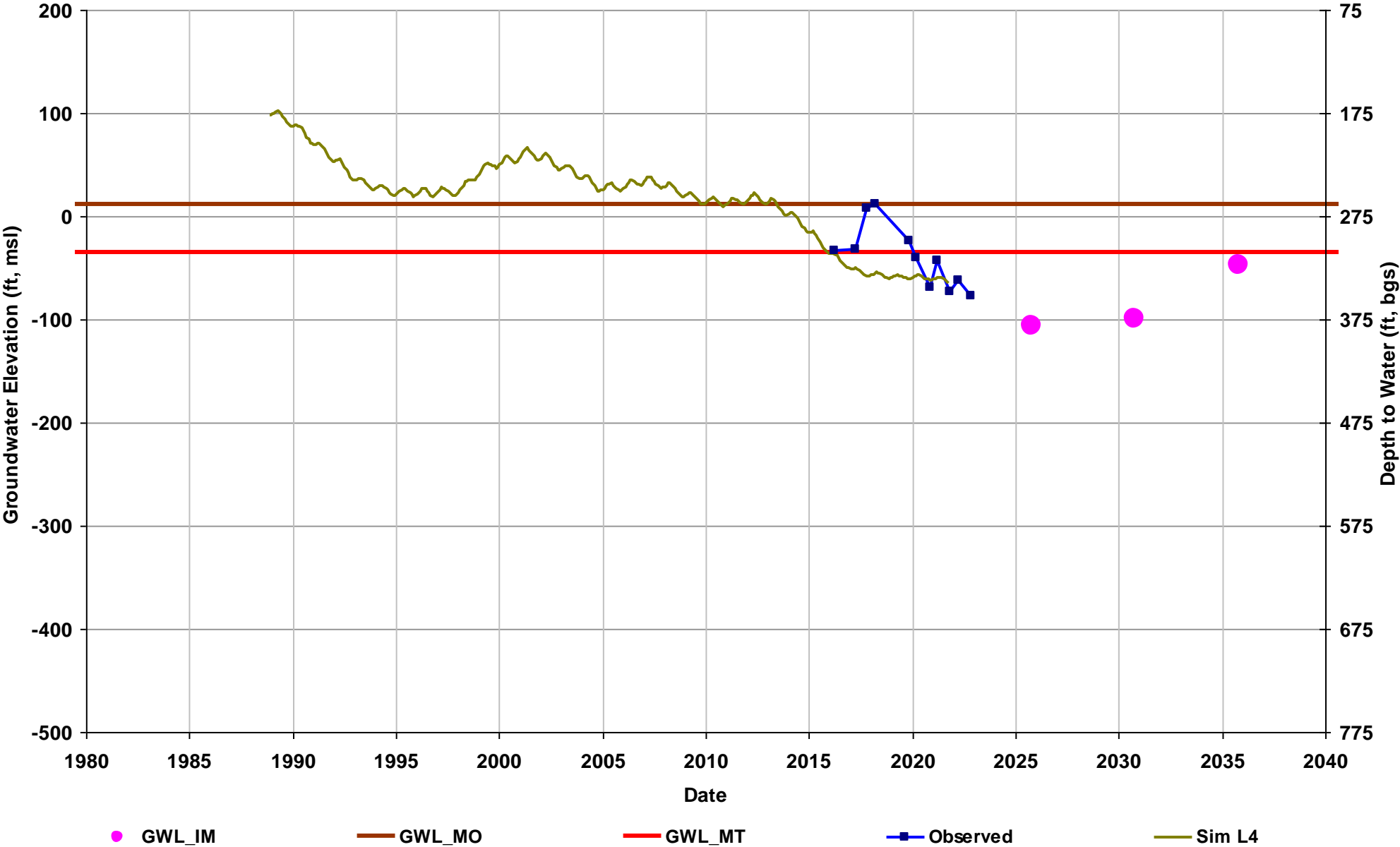




Well Name: CWD RMS-6  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 275

**Domestic Well Data:**    *Total Sections Included:*  
Total Depth Count:            Top Perf. Count:  
Total Depth Average:        Top Perf. Average:  
Total Depth Minimum:       Top Perf. Minimum:  
Total Depth Maximum:       Top Perf. Maximum:

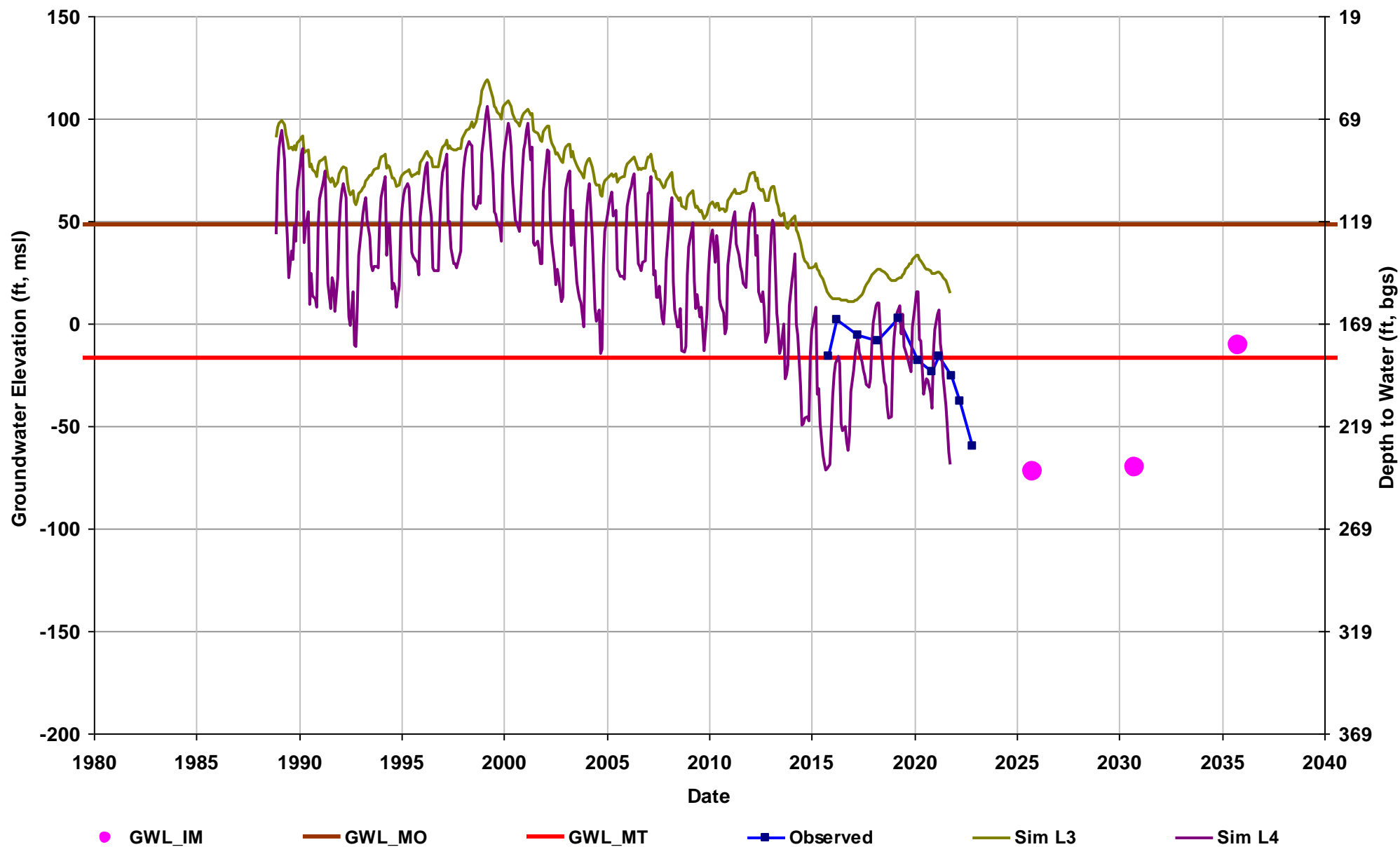
Total Depth (ft bgs): 820  
Perf. Top (ft bgs): 257  
Perf. Bottom (ft bgs): 726  
Top Model Layer: 4  
Bottom Model Layer: 4



**Well Name: CWD RMS-7**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 169**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 14            Top Perf. Count: 5  
Total Depth Average: 381        Top Perf. Average: 262  
Total Depth Minimum: 146       Top Perf. Minimum: 220  
Total Depth Maximum: 600       Top Perf. Maximum: 360

**Total Depth (ft bgs): 330**  
**Perf. Top (ft bgs): 135**  
**Perf. Bottom (ft bgs): 288**  
**Top Model Layer: 3**  
**Bottom Model Layer: 4**



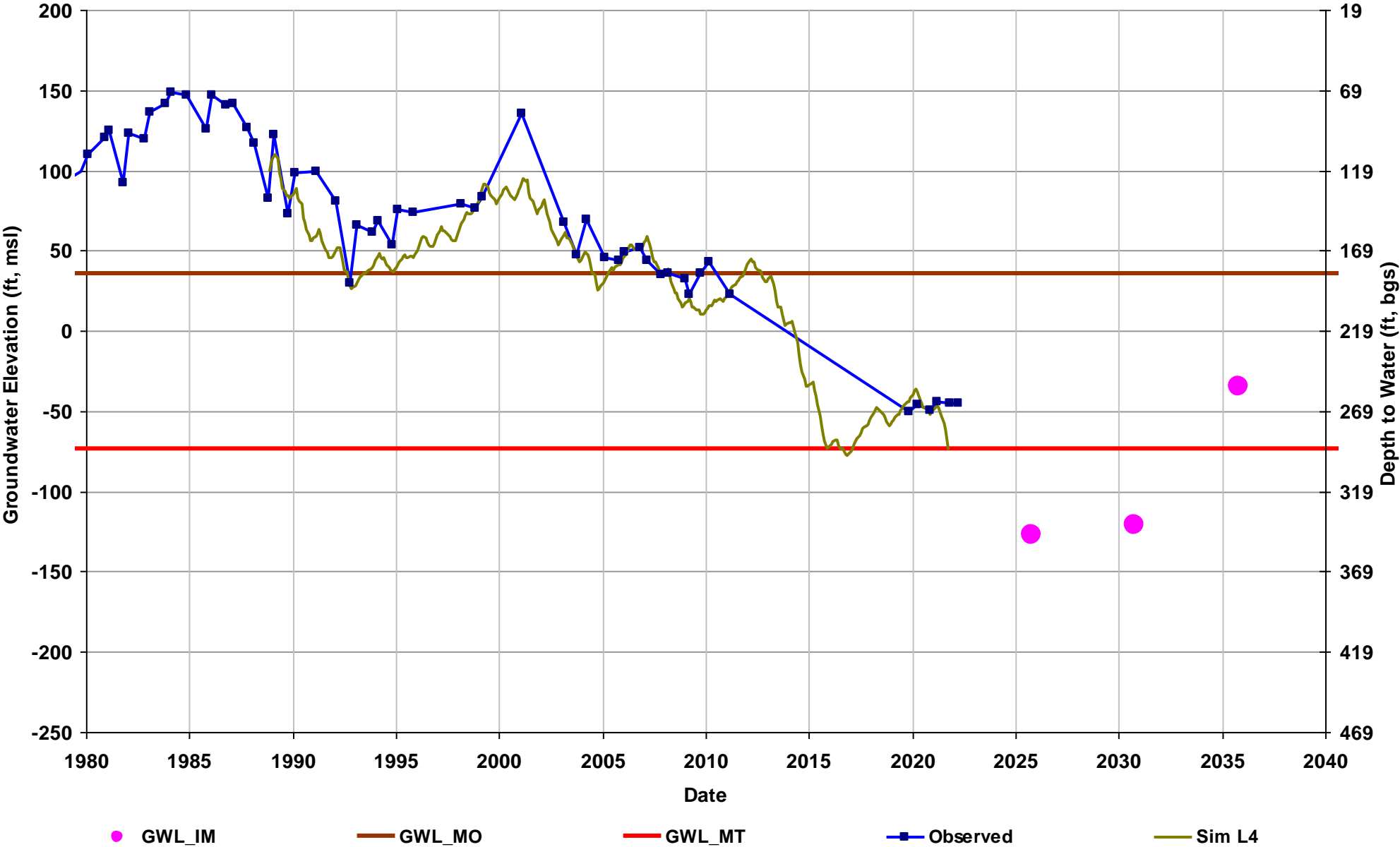


Well Name: CWD RMS-8  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 219

Domestic Well Data:    Total Sections Included: 9

Total Depth Count: 110	Top Perf. Count: 77
Total Depth Average: 373	Top Perf. Average: 241
Total Depth Minimum: 130	Top Perf. Minimum: 112
Total Depth Maximum: 700	Top Perf. Maximum: 365

Total Depth (ft bgs):  
Perf. Top (ft bgs):  
Perf. Bottom (ft bgs):  
Top Model Layer: 4  
Bottom Model Layer: 4



**Well Name: CWD RMS-9**  
**Depth Zone: Upper**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 164**

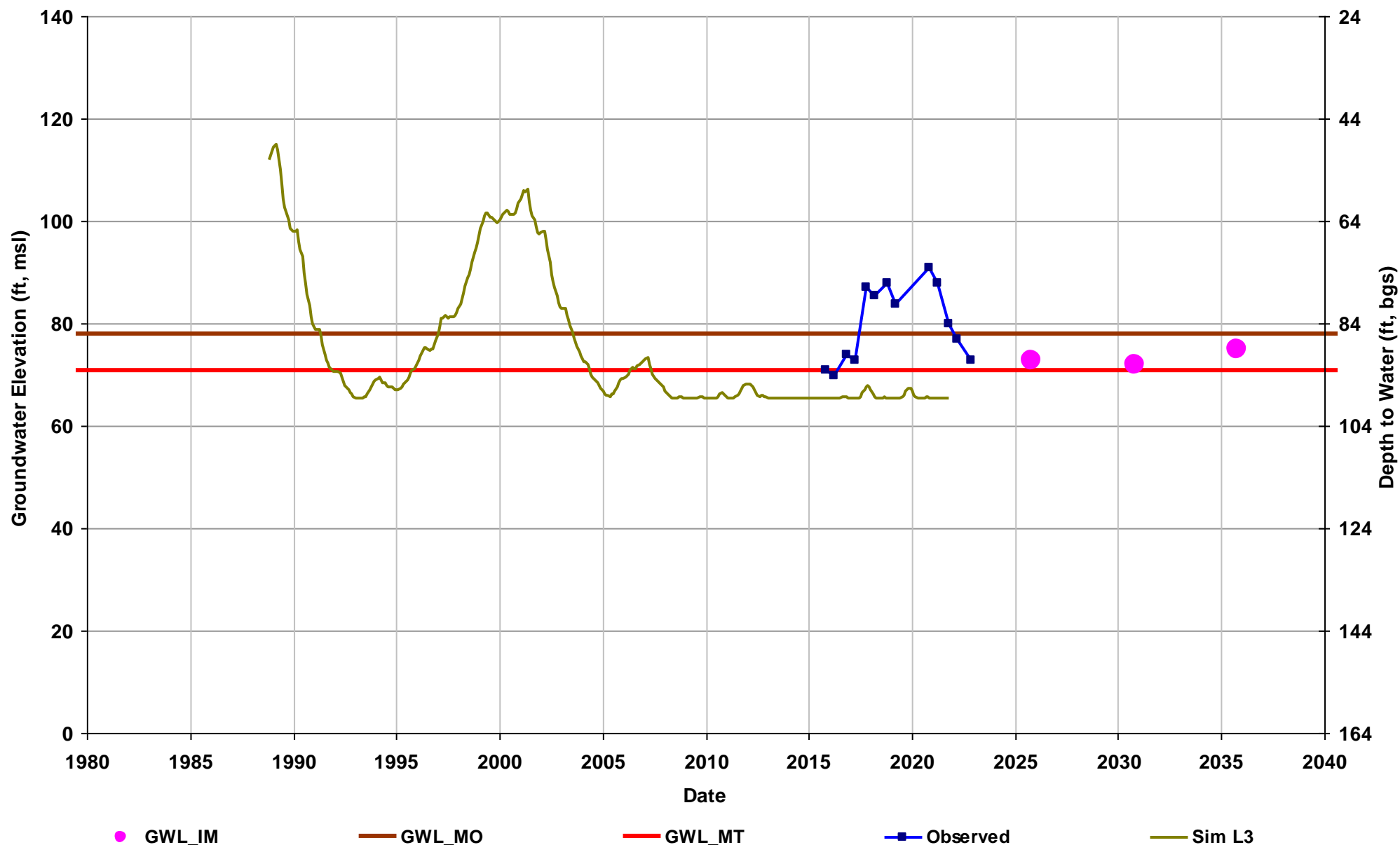
**Domestic Well Data:**

Total Depth Count:  
Total Depth Average:  
Total Depth Minimum:  
Total Depth Maximum:

**Total Sections Included:**

Top Perf. Count:  
Top Perf. Average:  
Top Perf. Minimum:  
Top Perf. Maximum:

**Total Depth (ft bgs): 97**  
**Perf. Top (ft bgs): 82**  
**Perf. Bottom (ft bgs): 97**  
**Top Model Layer: 3**  
**Bottom Model Layer: 3**



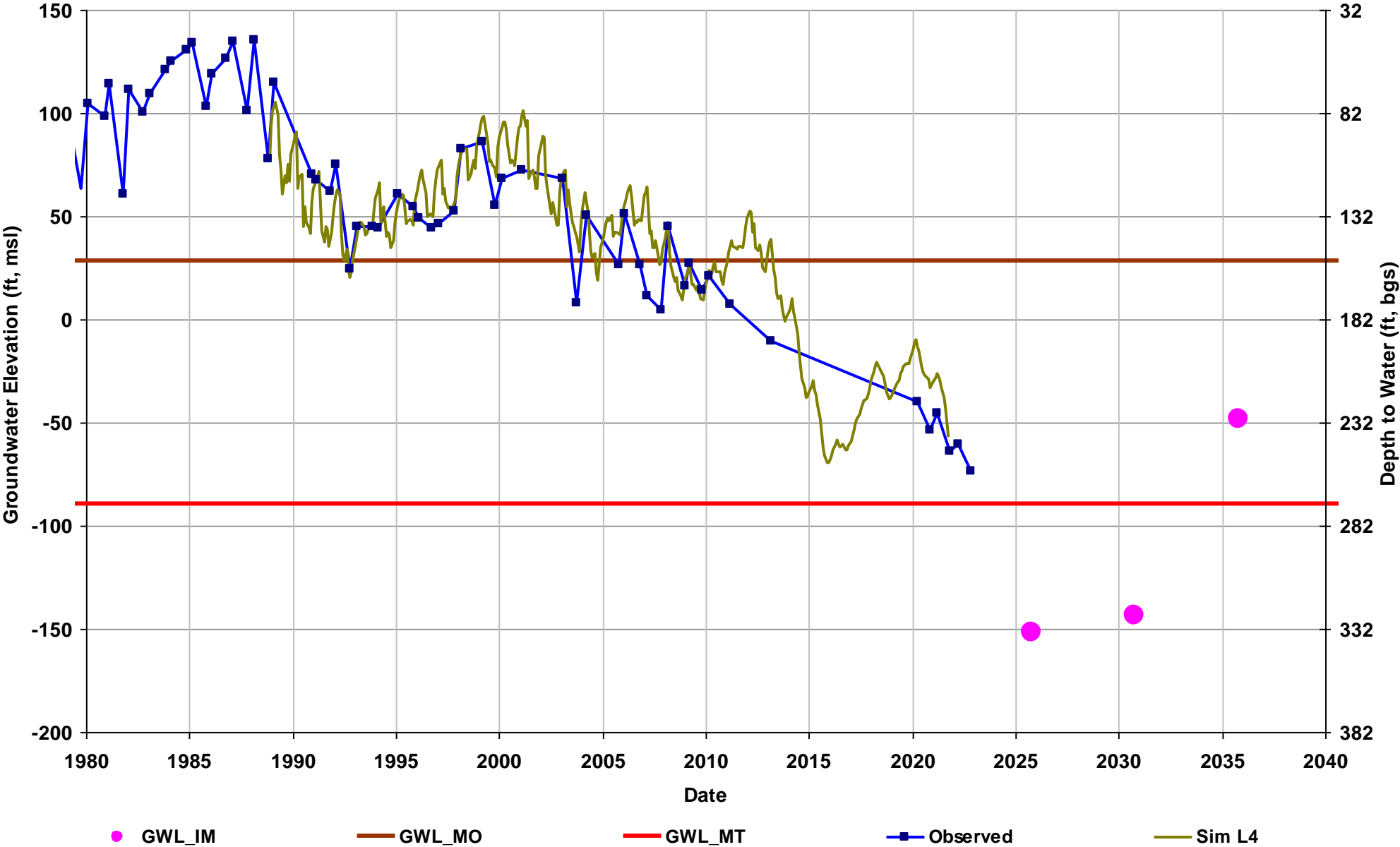


Well Name: CWD RMS-10  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 182

Domestic Well Data:    Total Sections Included: 9

Total Depth Count: 13	Top Perf. Count: 7
Total Depth Average: 335	Top Perf. Average: 226
Total Depth Minimum: 103	Top Perf. Minimum: 145
Total Depth Maximum: 800	Top Perf. Maximum: 320

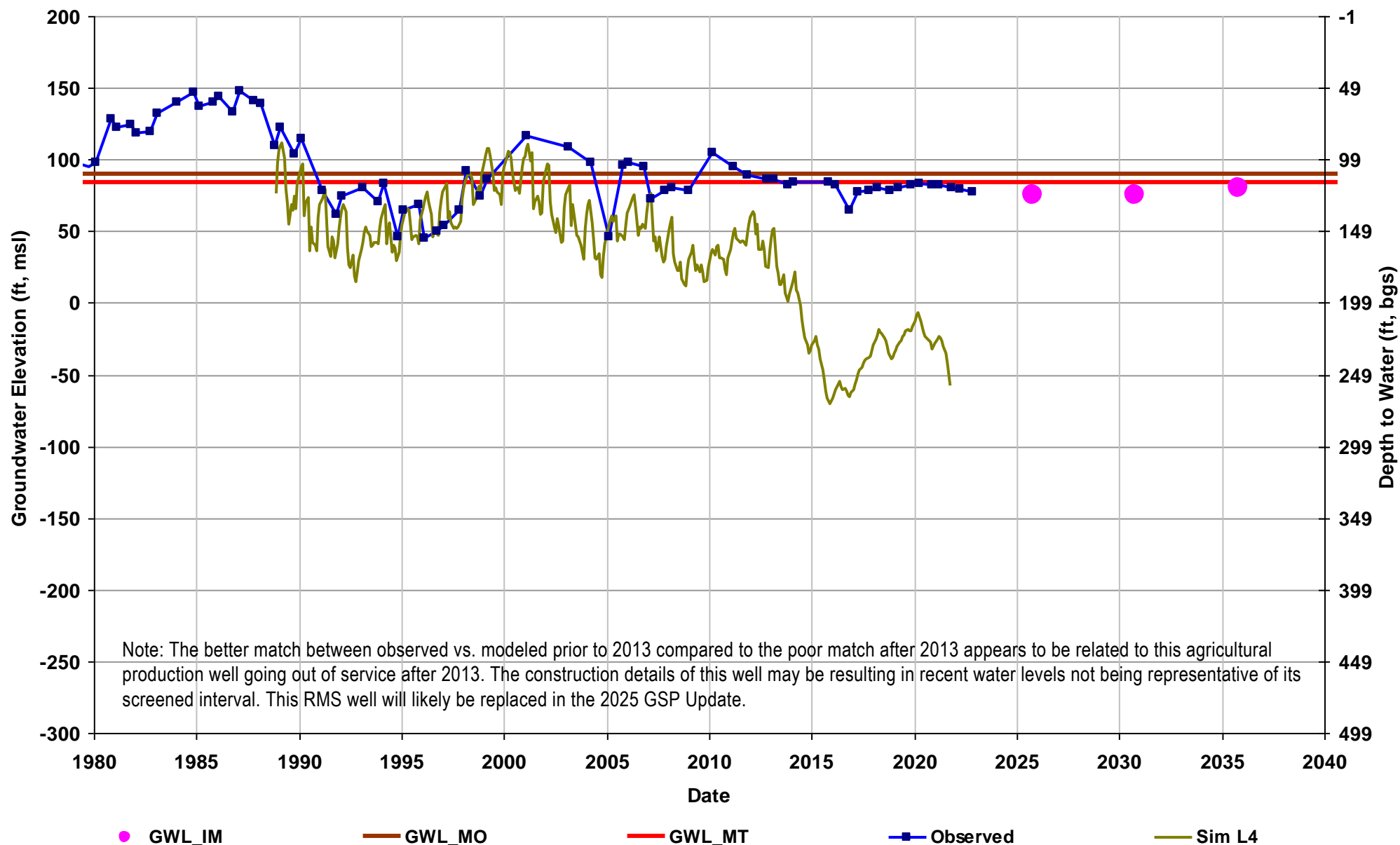
Total Depth (ft bgs):  
Perf. Top (ft bgs):  
Perf. Bottom (ft bgs):  
Top Model Layer: 4  
Bottom Model Layer: 4



**Well Name: CWD RMS-11**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 199**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 27                      Top Perf. Count: 14  
Total Depth Average: 351                    Top Perf. Average: 246  
Total Depth Minimum: 112                   Top Perf. Minimum: 72  
Total Depth Maximum: 660                   Top Perf. Maximum: 337

**Total Depth (ft bgs): 529**  
**Perf. Top (ft bgs): 187**  
**Perf. Bottom (ft bgs): 529**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**

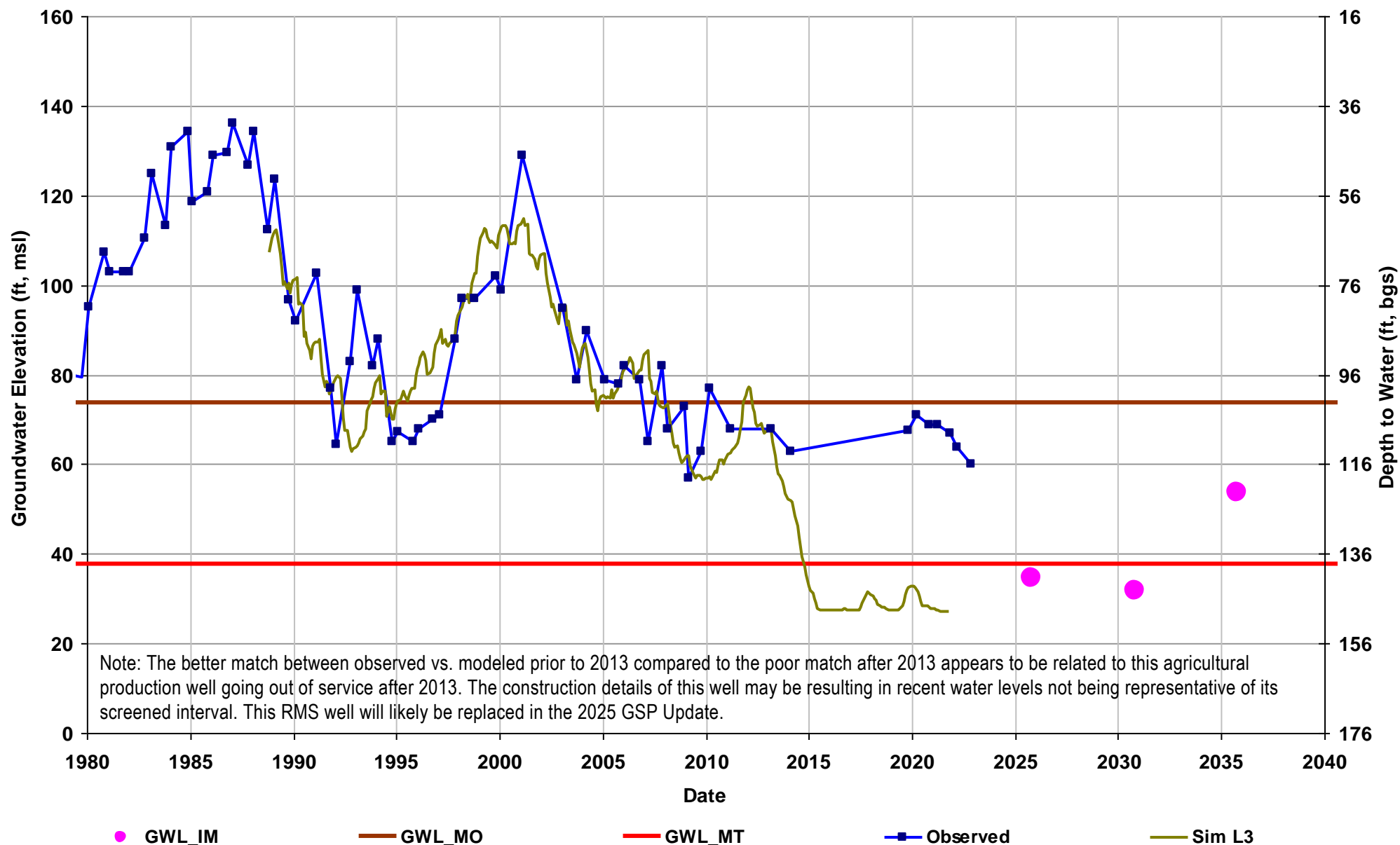




**Well Name: CWD RMS-12**  
**Depth Zone: Upper**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 176**

**Domestic Well Data:** *Total Sections Included: 9*  
Total Depth Count: 12  
Total Depth Average: 364  
Total Depth Minimum: 150  
Total Depth Maximum: 660  
Top Perf. Count: 8  
Top Perf. Average: 246  
Top Perf. Minimum: 201  
Top Perf. Maximum: 336

**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 3**  
**Bottom Model Layer: 3**

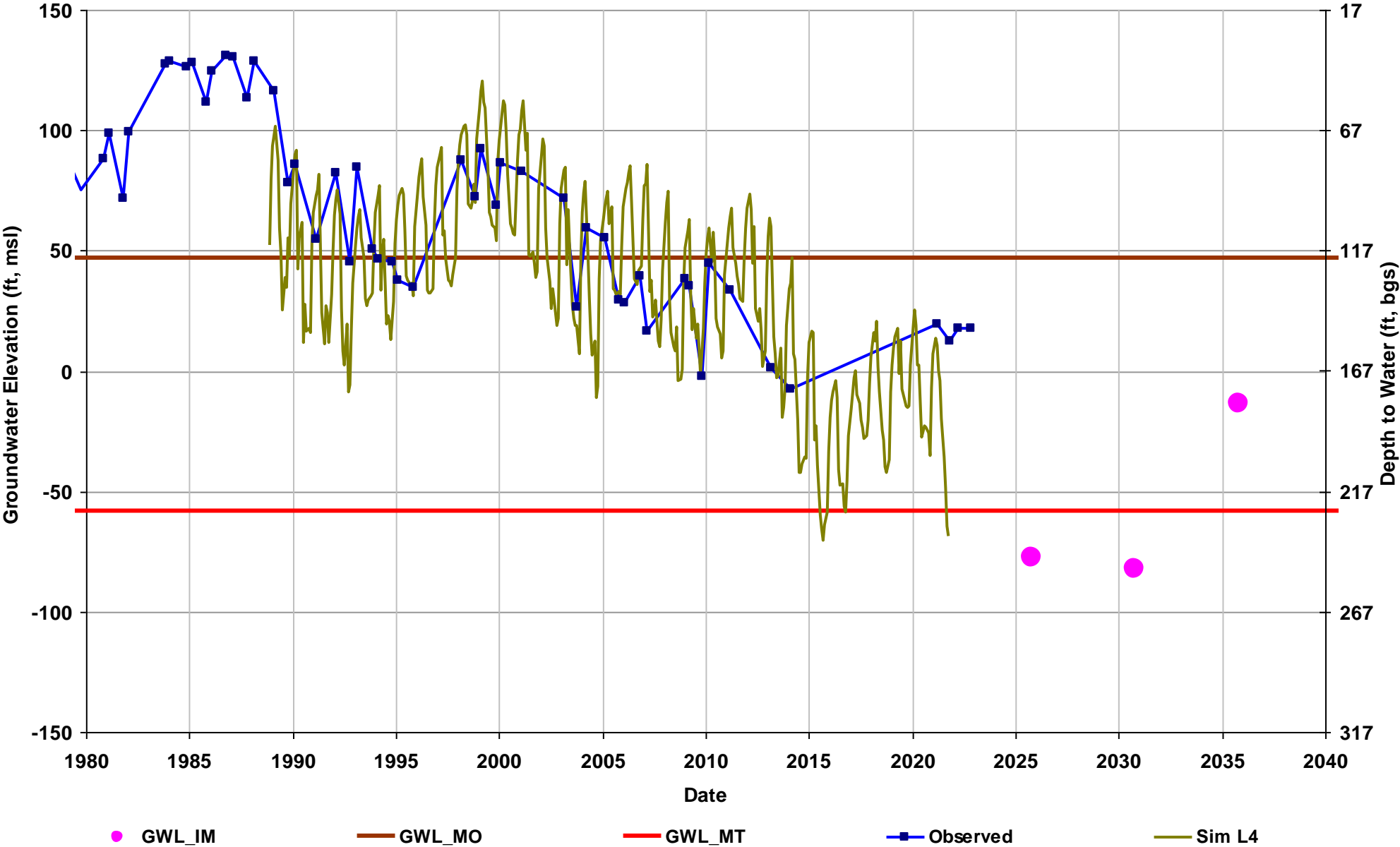


Well Name: CWD RMS-13  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 167

Domestic Well Data:    Total Sections Included: 9

Total Depth Count: 24	Top Perf. Count: 15
Total Depth Average: 313	Top Perf. Average: 224
Total Depth Minimum: 126	Top Perf. Minimum: 145
Total Depth Maximum: 600	Top Perf. Maximum: 389

Total Depth (ft bgs):  
Perf. Top (ft bgs):  
Perf. Bottom (ft bgs):  
Top Model Layer: 4  
Bottom Model Layer: 4

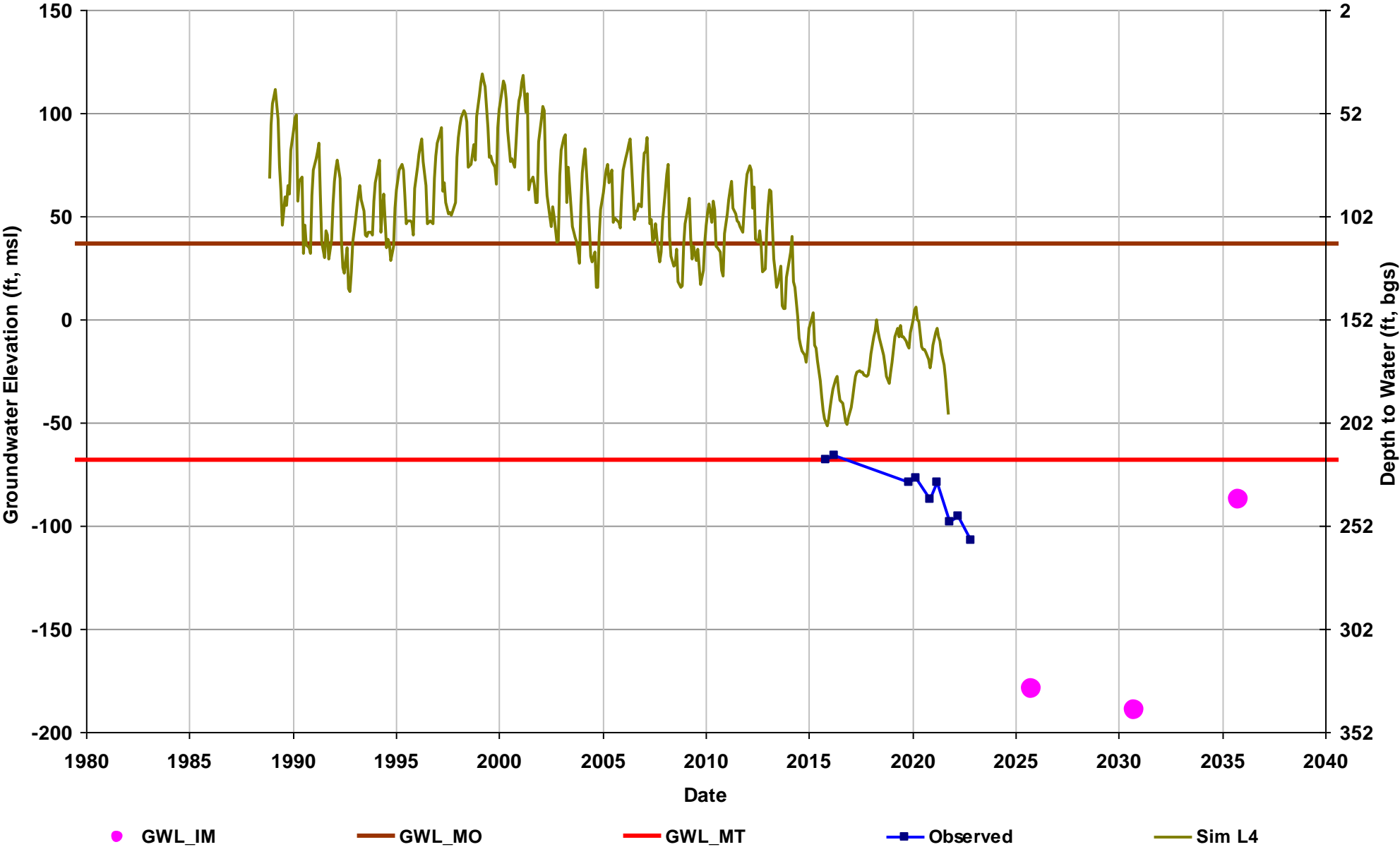




Well Name: CWD RMS-14  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 152

Domestic Well Data:    *Total Sections Included:*  
Total Depth Count:                      Top Perf. Count:  
Total Depth Average:                    Top Perf. Average:  
Total Depth Minimum:                   Top Perf. Minimum:  
Total Depth Maximum:                   Top Perf. Maximum:

Total Depth (ft bgs): 455  
Perf. Top (ft bgs): 185  
Perf. Bottom (ft bgs): 365  
Top Model Layer: 4  
Bottom Model Layer: 4



**Well Name: CWD RMS-15**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 213**

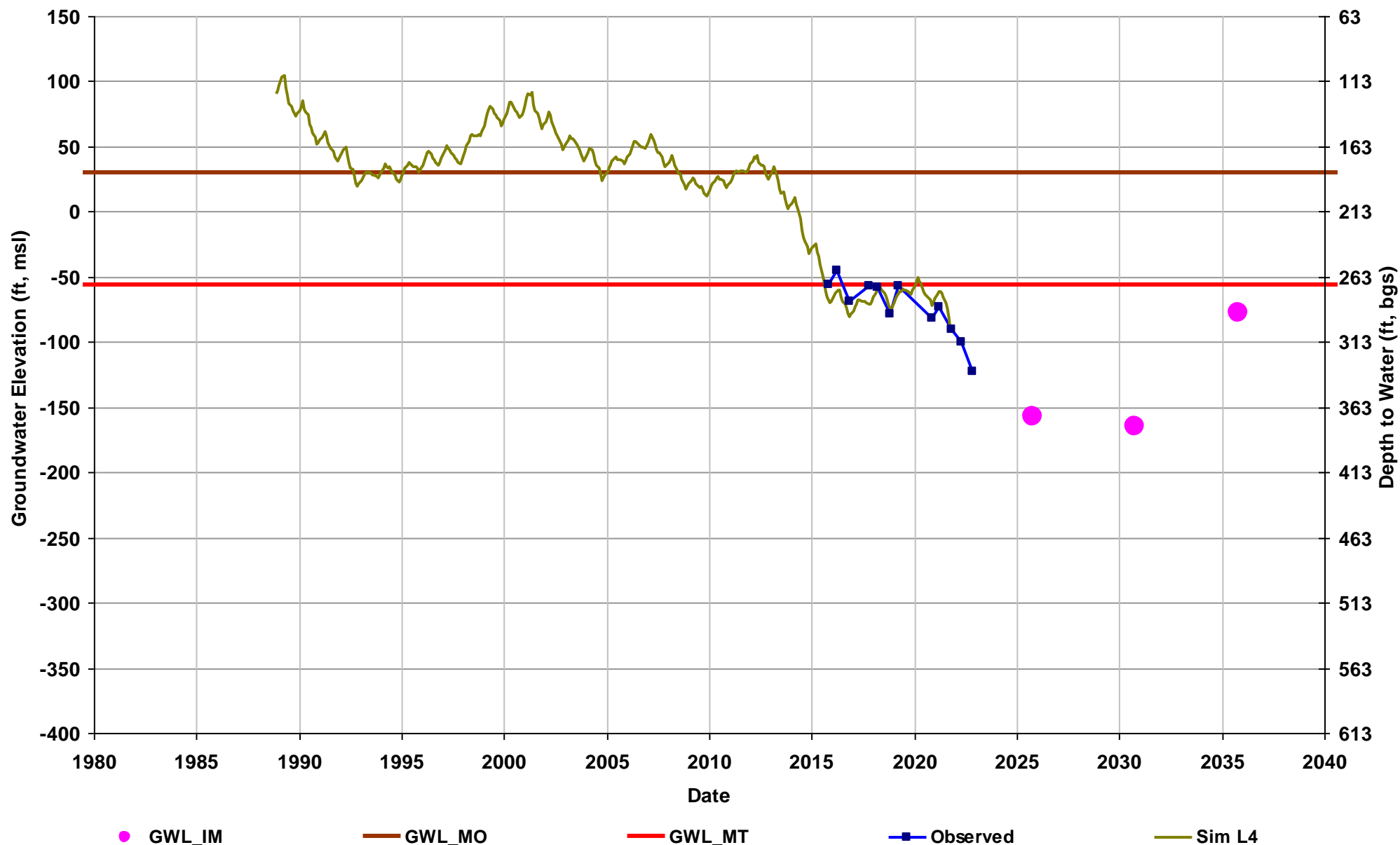
**Domestic Well Data:**

Total Depth Count:  
Total Depth Average:  
Total Depth Minimum:  
Total Depth Maximum:

**Total Sections Included:**

Top Perf. Count:  
Top Perf. Average:  
Top Perf. Minimum:  
Top Perf. Maximum:

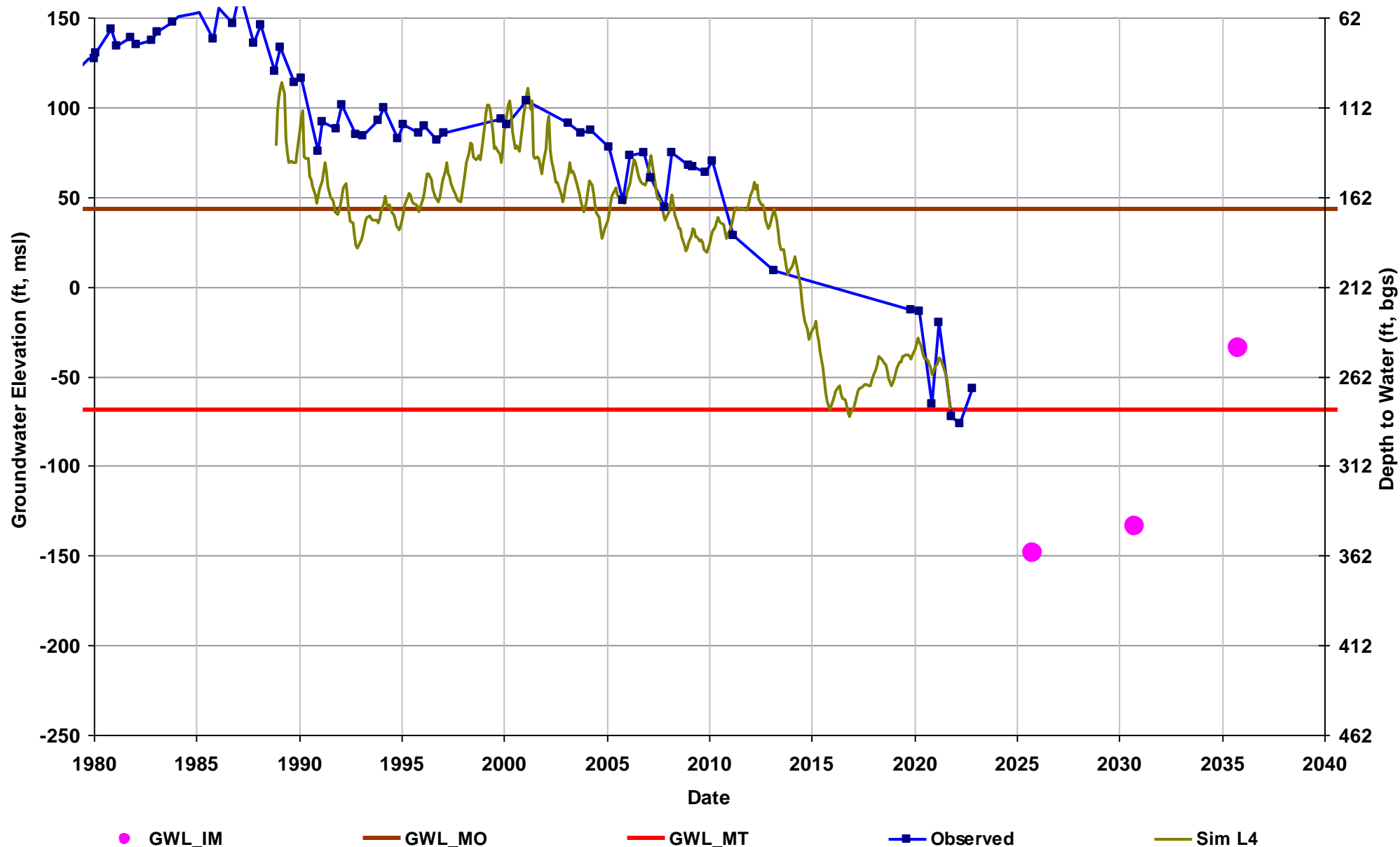
**Total Depth (ft bgs): 955**  
**Perf. Top (ft bgs): 290**  
**Perf. Bottom (ft bgs): 935**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**



**Well Name: CWD RMS-16**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 212**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 22            Top Perf. Count: 13  
Total Depth Average: 339        Top Perf. Average: 222  
Total Depth Minimum: 168       Top Perf. Minimum: 160  
Total Depth Maximum: 600      Top Perf. Maximum: 340

**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**

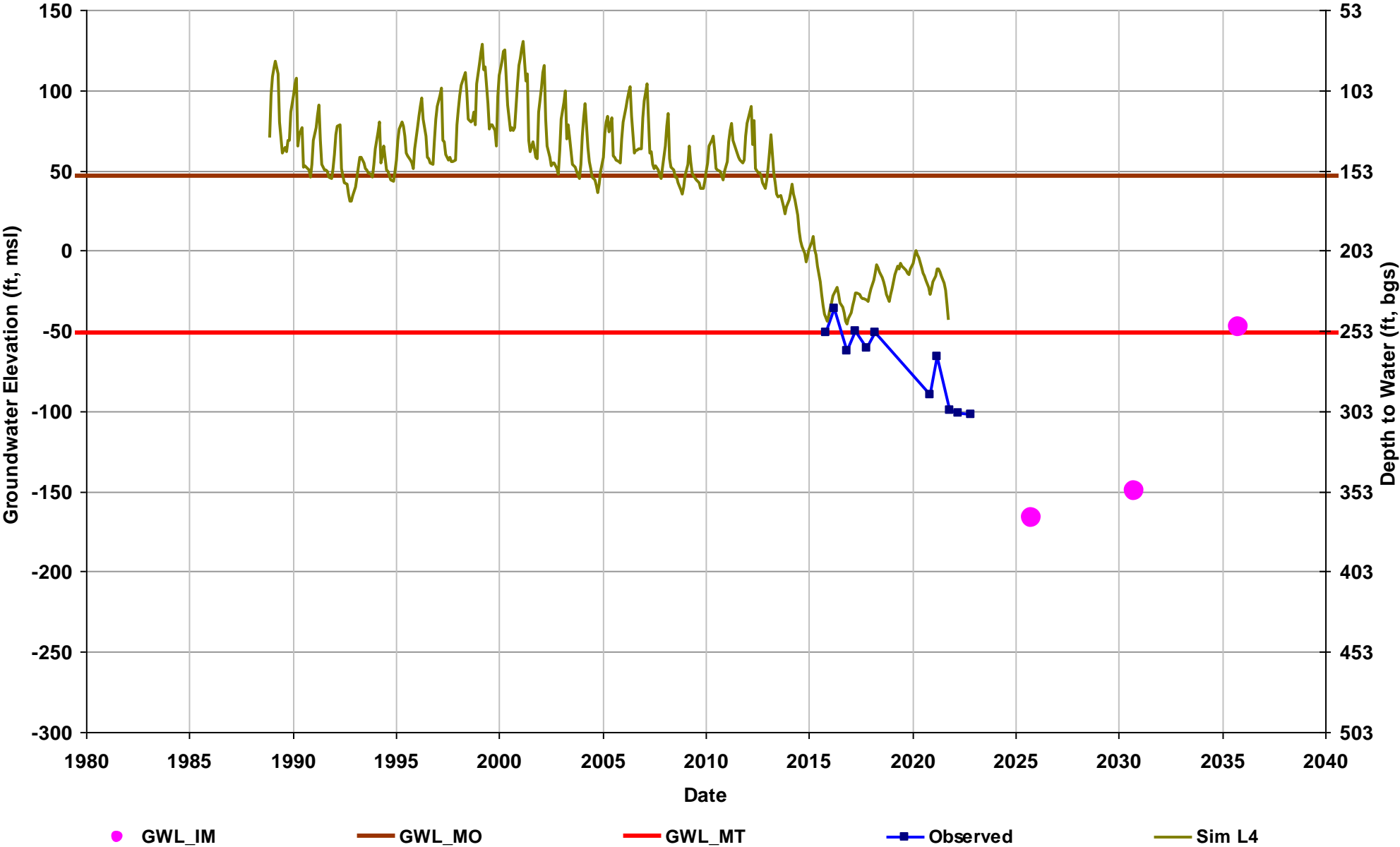




Well Name: CWD RMS-17  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 203

Domestic Well Data:    *Total Sections Included:*  
Total Depth Count:            Top Perf. Count:  
Total Depth Average:        Top Perf. Average:  
Total Depth Minimum:      Top Perf. Minimum:  
Total Depth Maximum:      Top Perf. Maximum:

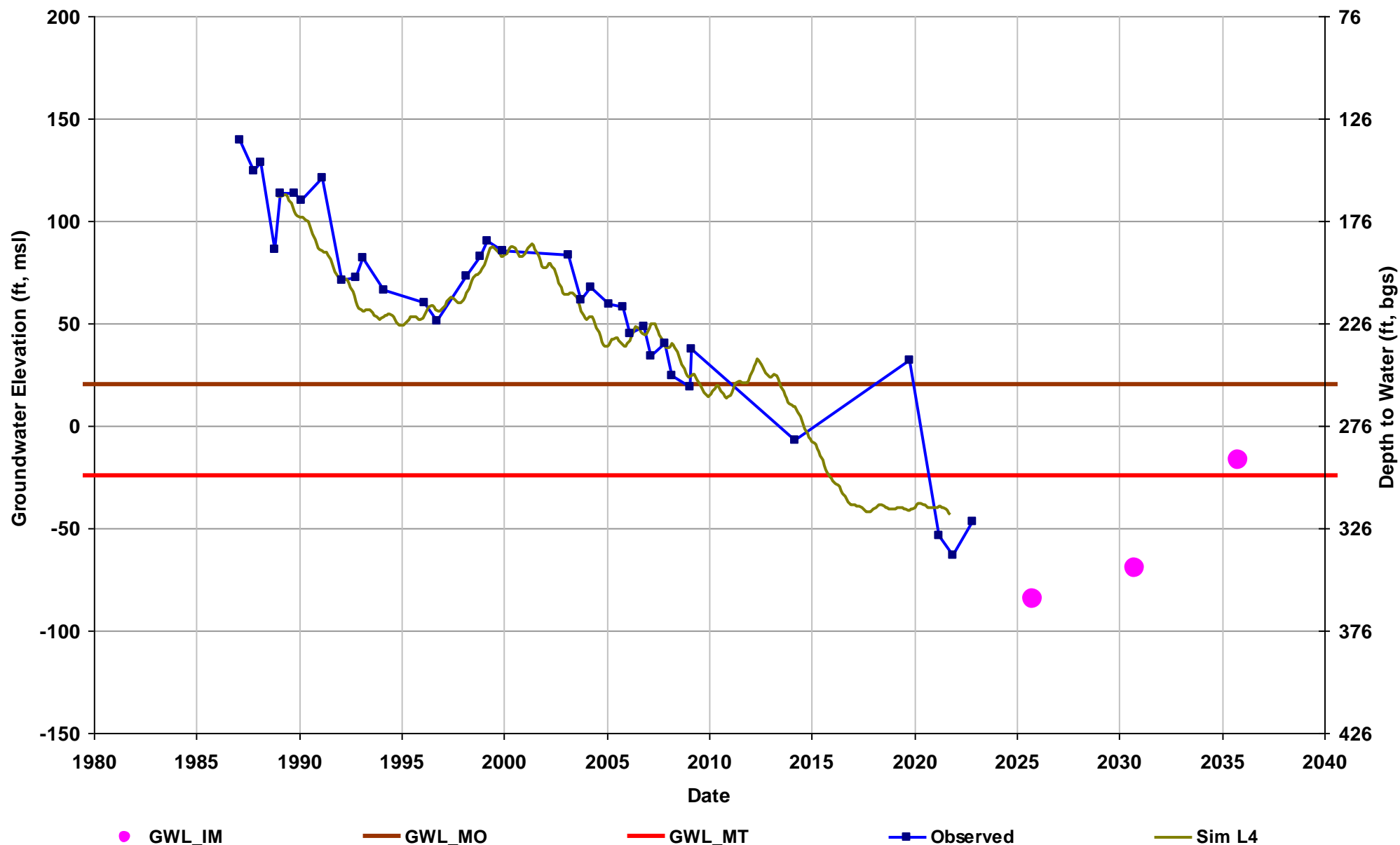
Total Depth (ft bgs): 624  
Perf. Top (ft bgs): 278  
Perf. Bottom (ft bgs): 588  
Top Model Layer: 4  
Bottom Model Layer: 4



**Well Name: MCE RMS-1**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 276**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 7                      Top Perf. Count: 5  
Total Depth Average: 336                  Top Perf. Average: 229  
Total Depth Minimum: 205                Top Perf. Minimum: 164  
Total Depth Maximum: 440                Top Perf. Maximum: 300

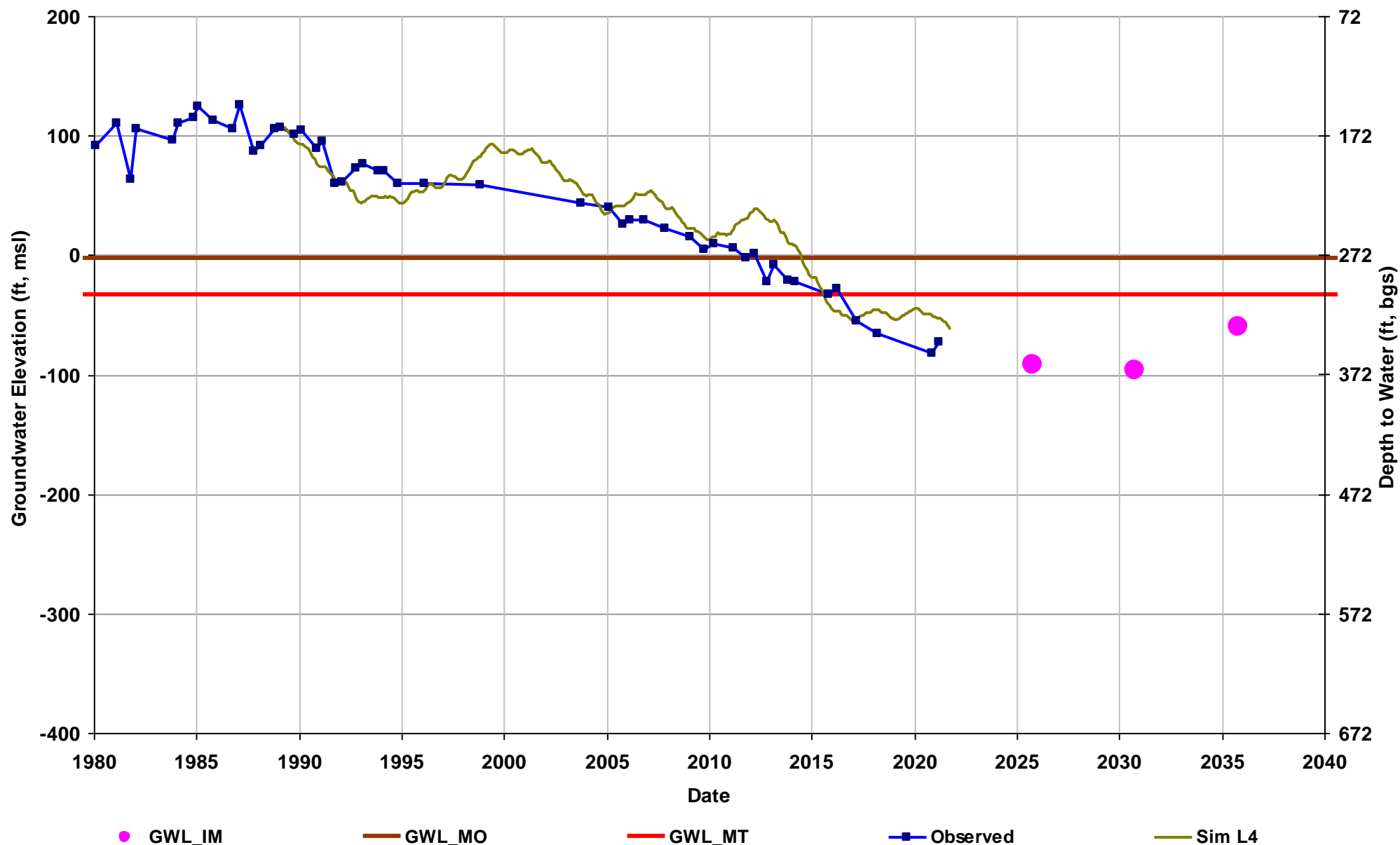
**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**



**Well Name: MCE RMS-2**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 272**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 14            Top Perf. Count: 11  
Total Depth Average: 378        Top Perf. Average: 245  
Total Depth Minimum: 204       Top Perf. Minimum: 155  
Total Depth Maximum: 600      Top Perf. Maximum: 338

**Total Depth (ft bgs): 466**  
**Perf. Top (ft bgs): 218**  
**Perf. Bottom (ft bgs): 464**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**

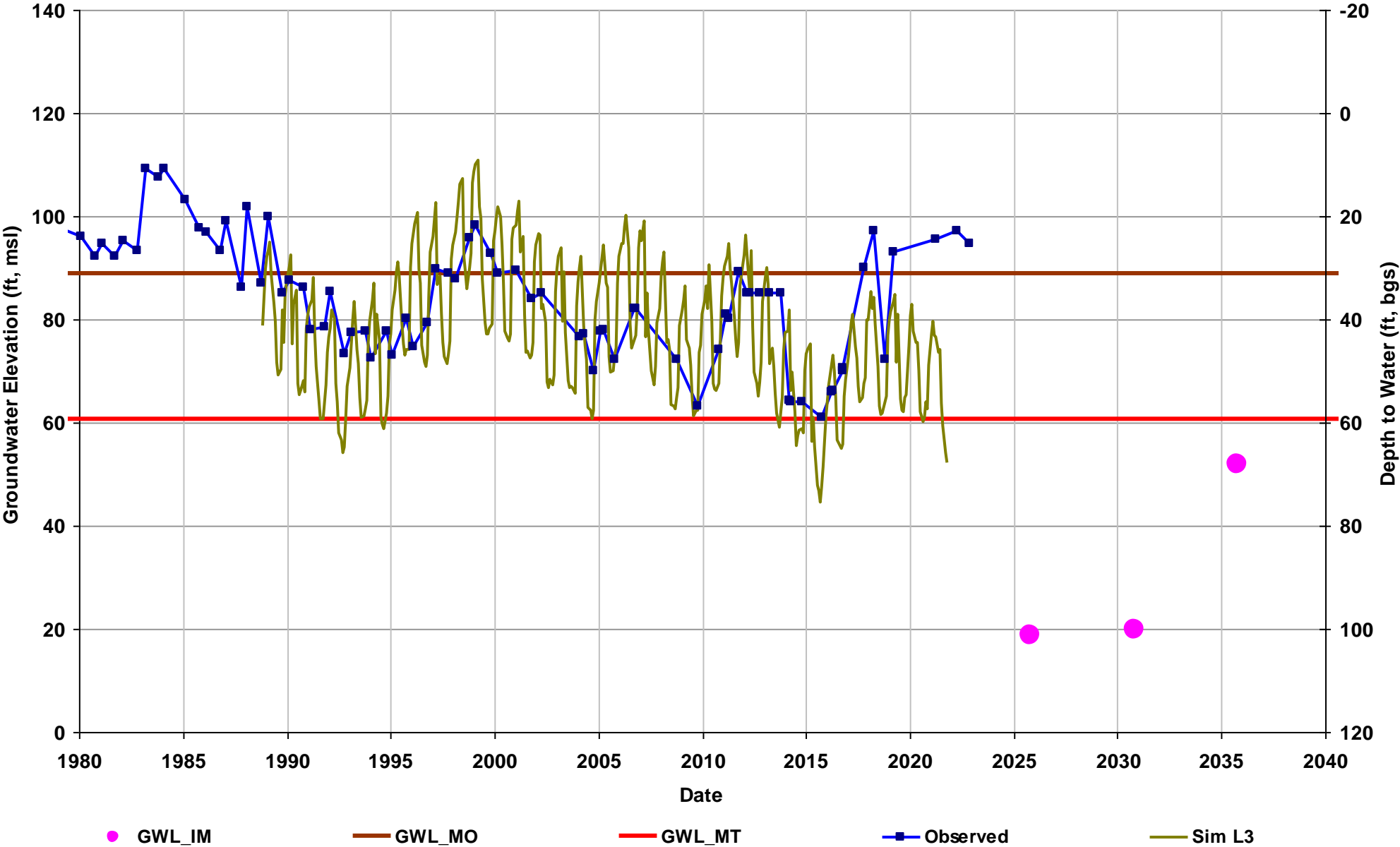




Well Name: MCW RMS-1  
Depth Zone: Upper  
Subbasin: Chowchilla  
GSE (ft, msl): 120

Domestic Well Data:    Total Sections Included: 9  
Total Depth Count: 9            Top Perf. Count: 6  
Total Depth Average: 344        Top Perf. Average: 208  
Total Depth Minimum: 152        Top Perf. Minimum: 130  
Total Depth Maximum: 650        Top Perf. Maximum: 340

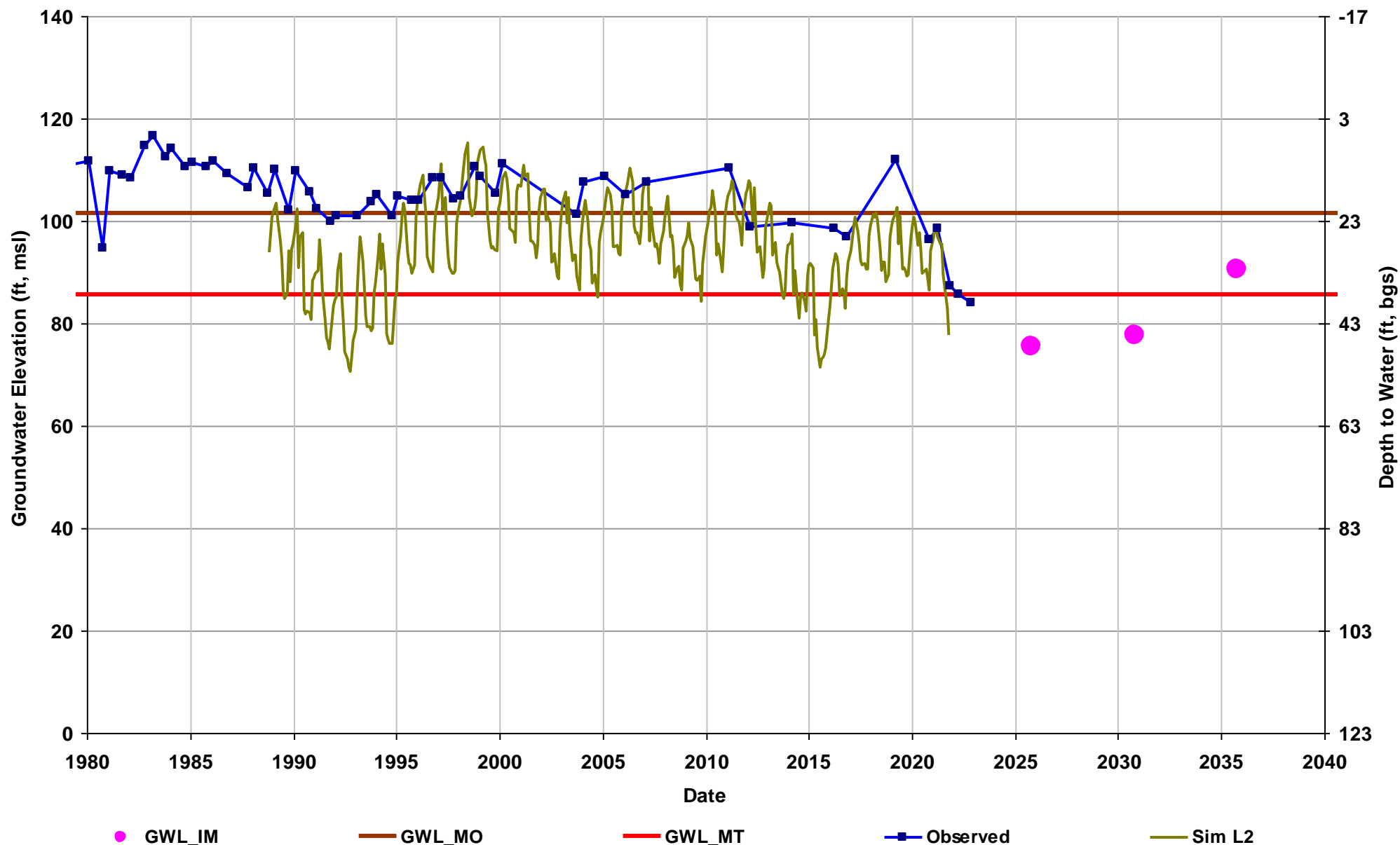
Total Depth (ft bgs): 186  
Perf. Top (ft bgs):  
Perf. Bottom (ft bgs):  
Top Model Layer: 3  
Bottom Model Layer: 3



**Well Name: MCW RMS-2**  
**Depth Zone: Upper**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 123**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 6                      Top Perf. Count: 6  
Total Depth Average: 183                  Top Perf. Average: 159  
Total Depth Minimum: 152                Top Perf. Minimum: 130  
Total Depth Maximum: 220                Top Perf. Maximum: 210

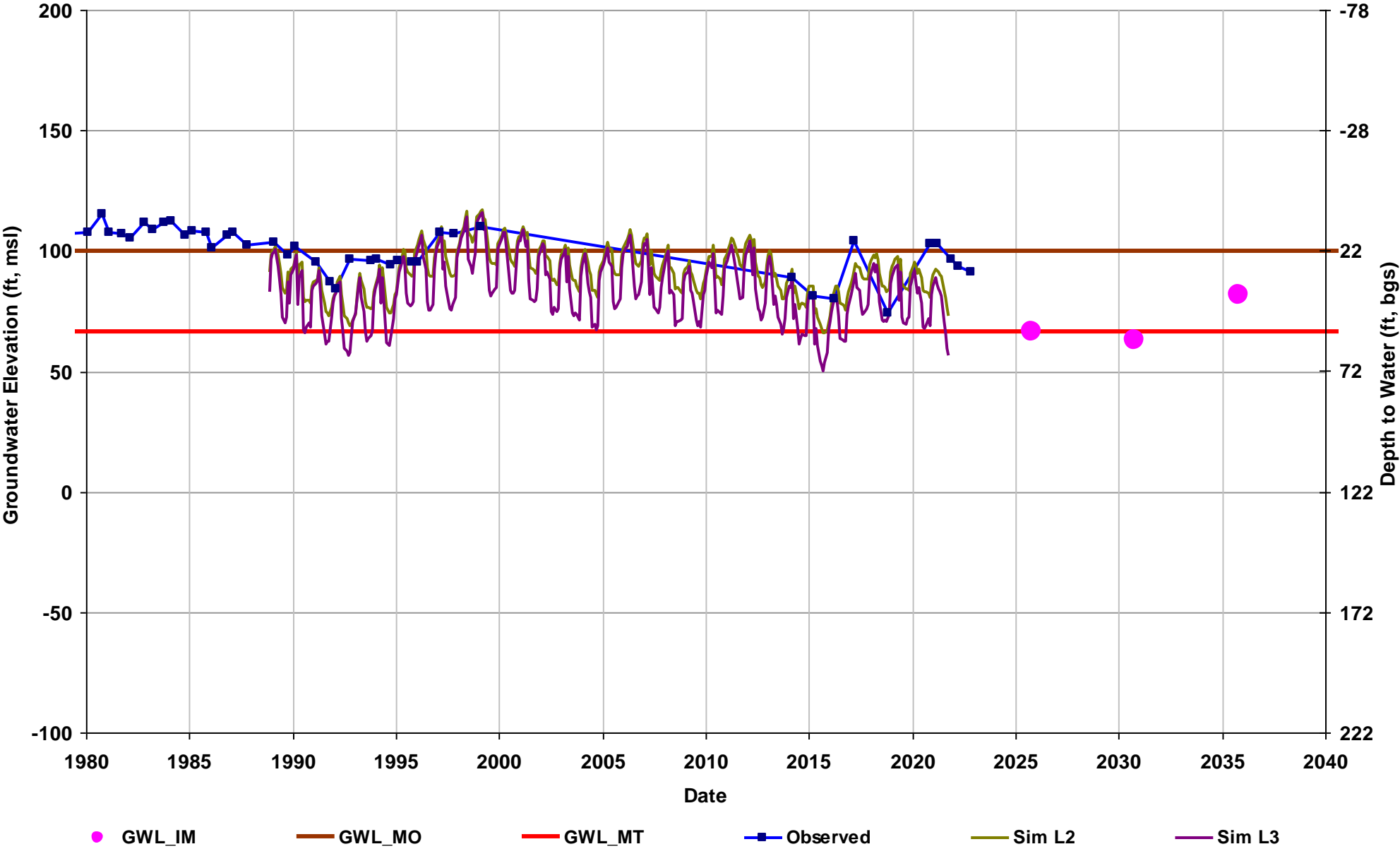
**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 2**  
**Bottom Model Layer: 2**



Well Name: MCW RMS-3  
Depth Zone: Upper  
Subbasin: Chowchilla  
GSE (ft, msl): 122

**Domestic Well Data:**    *Total Sections Included: 8*  
Total Depth Count: 2                      Top Perf. Count: 2  
Total Depth Average: 195                  Top Perf. Average: 165  
Total Depth Minimum: 170                  Top Perf. Minimum: 130  
Total Depth Maximum: 220                  Top Perf. Maximum: 200

**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 2**  
**Bottom Model Layer: 3**

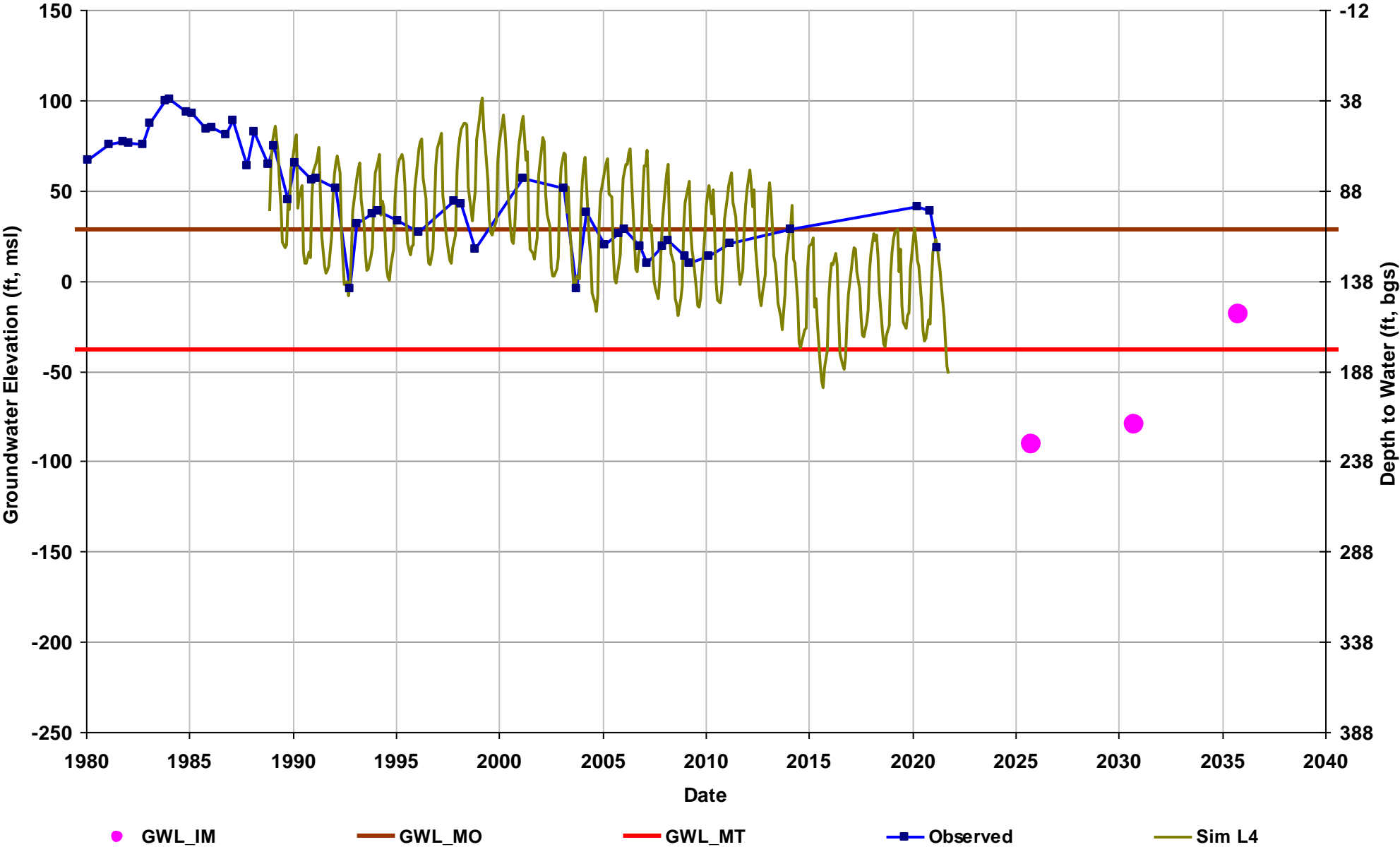




Well Name: MCW RMS-4  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 138

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 9                      Top Perf. Count: 6  
Total Depth Average: 283                  Top Perf. Average: 231  
Total Depth Minimum: 160                Top Perf. Minimum: 154  
Total Depth Maximum: 450                Top Perf. Maximum: 400

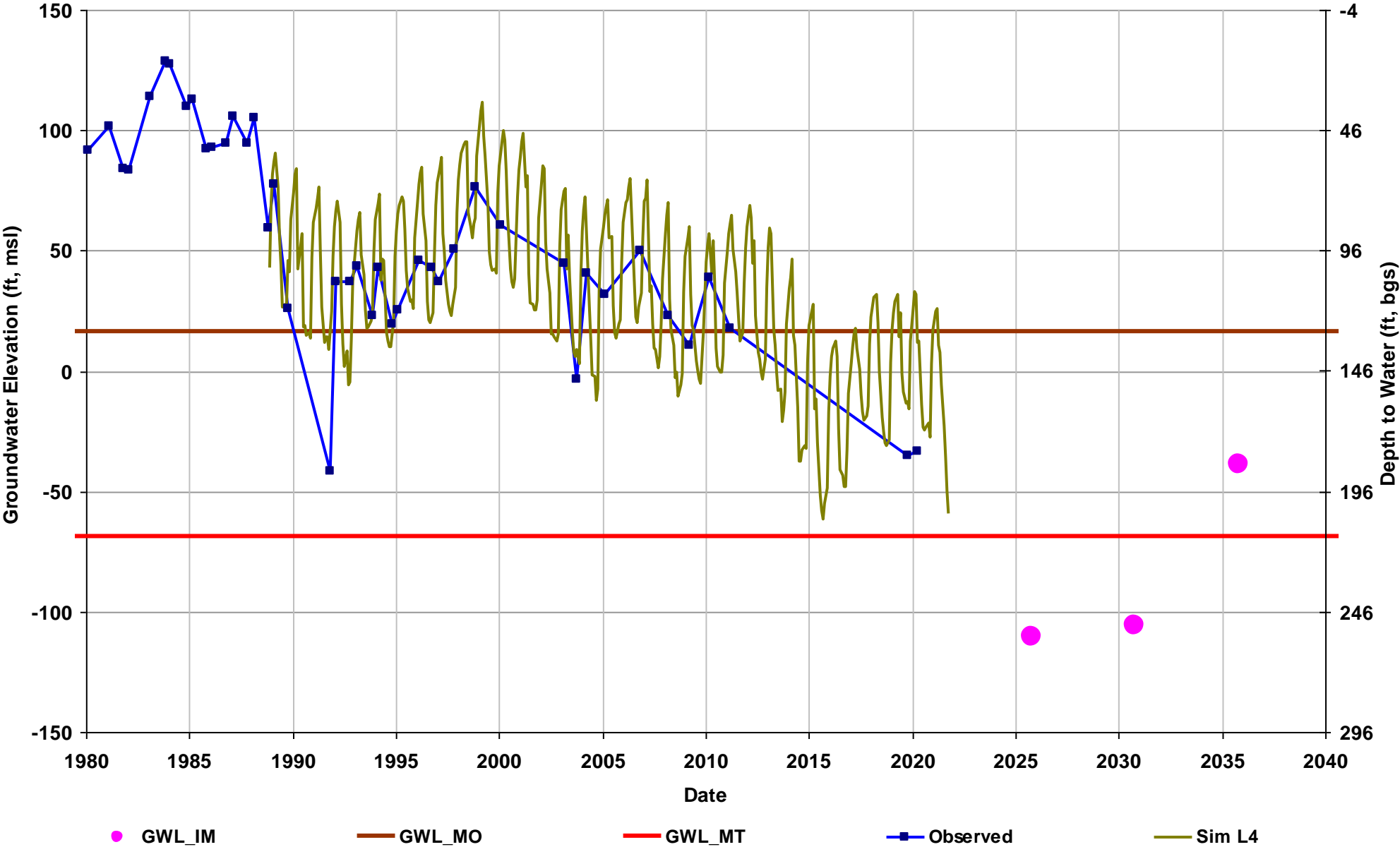
**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**



Well Name: MCW RMS-5  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 146

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 6                      Top Perf. Count: 4  
Total Depth Average: 268                  Top Perf. Average: 207  
Total Depth Minimum: 165                Top Perf. Minimum: 100  
Total Depth Maximum: 400                Top Perf. Maximum: 300

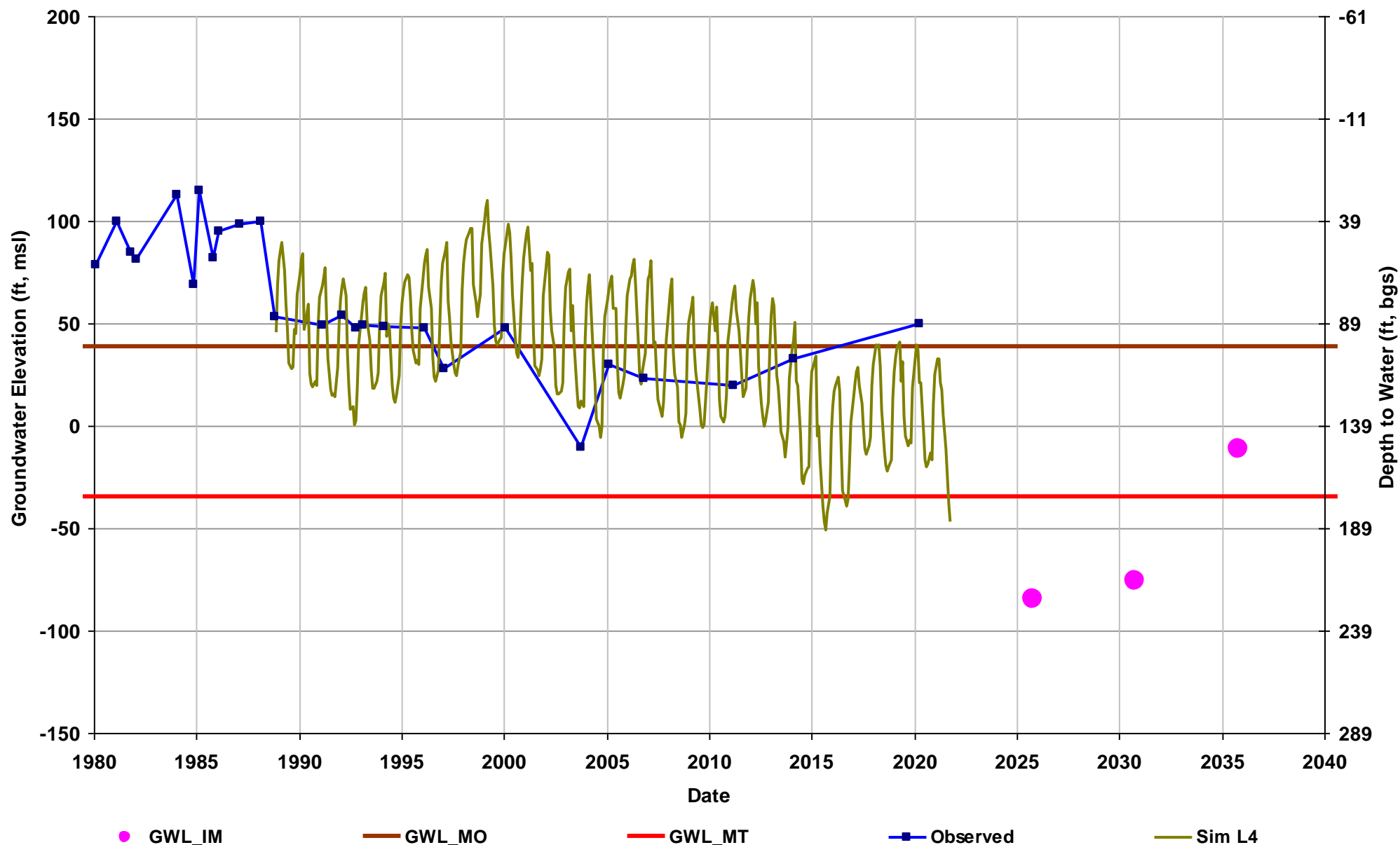
**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**



**Well Name: MCW RMS-6**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 139**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 6                      Top Perf. Count: 5  
Total Depth Average: 292                  Top Perf. Average: 218  
Total Depth Minimum: 165                Top Perf. Minimum: 100  
Total Depth Maximum: 400                Top Perf. Maximum: 310

**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**

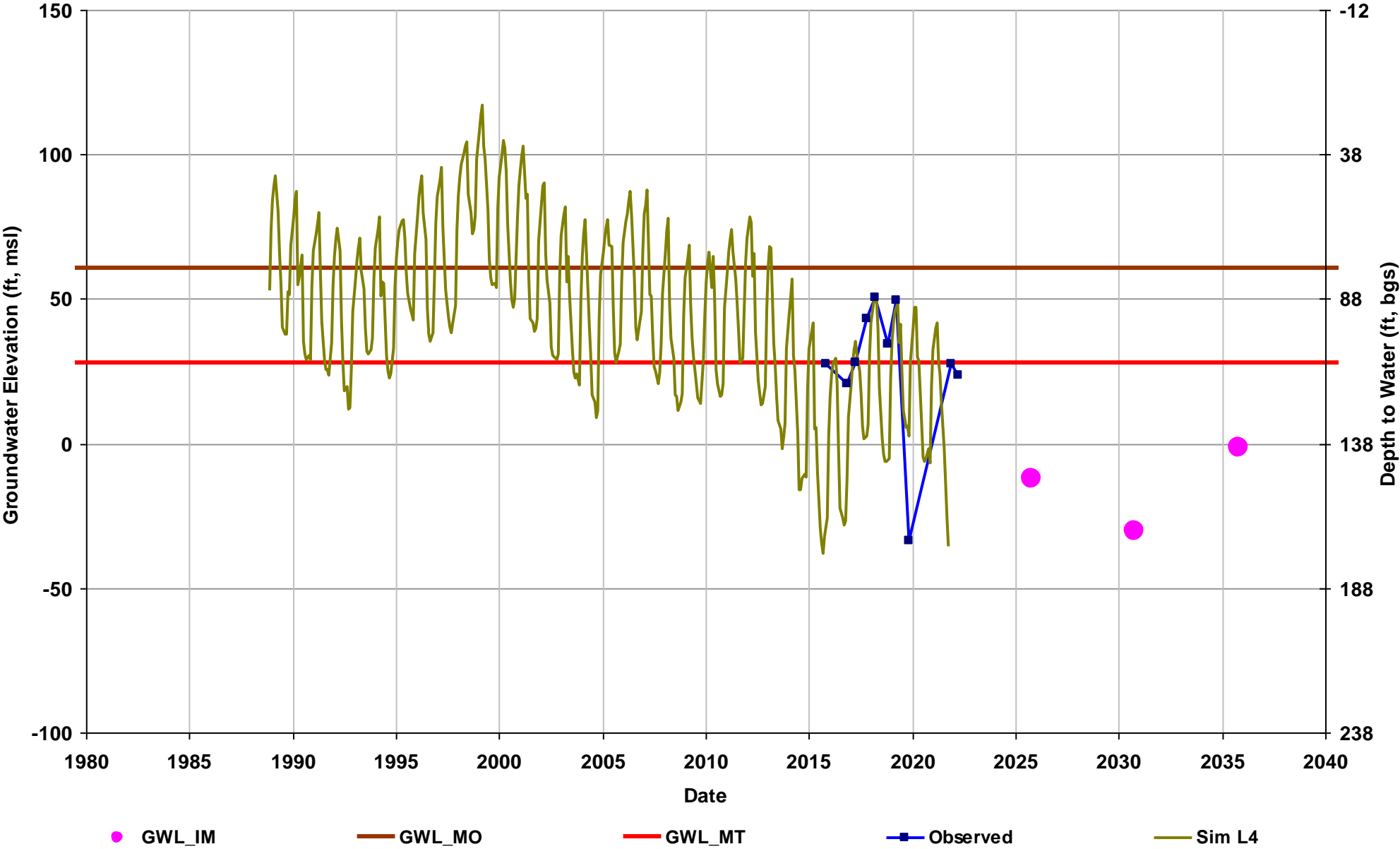




Well Name: MCW RMS-7  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 138

Domestic Well Data:    Total Sections Included: 9  
Total Depth Count: 4            Top Perf. Count: 3  
Total Depth Average: 248        Top Perf. Average: 203  
Total Depth Minimum: 165        Top Perf. Minimum: 100  
Total Depth Maximum: 400        Top Perf. Maximum: 300

Total Depth (ft bgs): 800  
Perf. Top (ft bgs): 290  
Perf. Bottom (ft bgs): 400  
Top Model Layer: 4  
Bottom Model Layer: 4

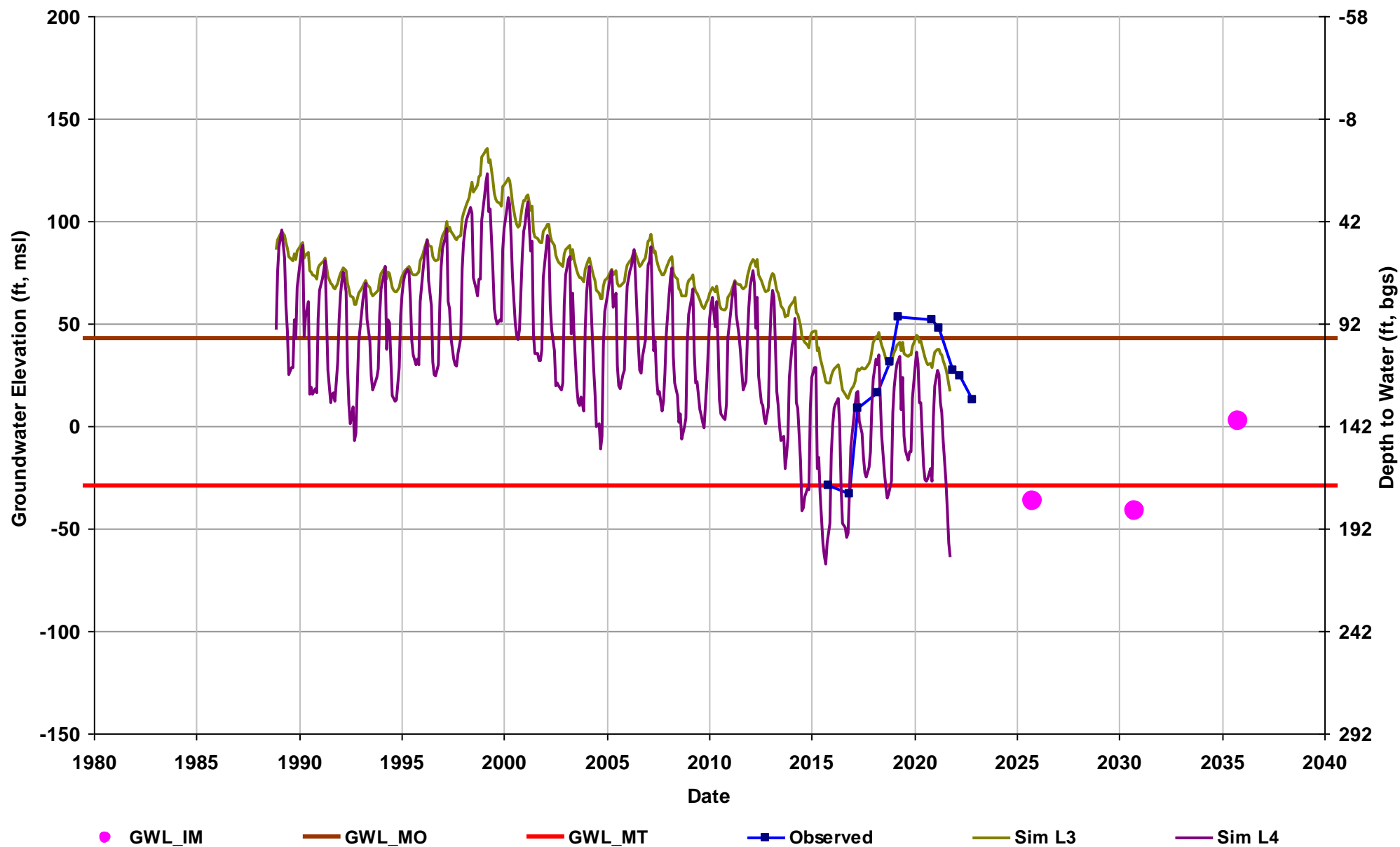


**Well Name: MCW RMS-8**  
**Depth Zone: Composite**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 142**

**Domestic Well Data:** *Total Sections Included:*

Total Depth Count:	Top Perf. Count:
Total Depth Average:	Top Perf. Average:
Total Depth Minimum:	Top Perf. Minimum:
Total Depth Maximum:	Top Perf. Maximum:

**Total Depth (ft bgs): 480**  
**Perf. Top (ft bgs): 160**  
**Perf. Bottom (ft bgs): 475**  
**Top Model Layer: 3**  
**Bottom Model Layer: 4**



Well Name: MCW RMS-9

Depth Zone: Lower

Subbasin: Chowchilla

GSE (ft, msl): 155

Domestic Well Data:

Total Depth Count: 9

Total Depth Average: 246

Total Depth Minimum: 110

Total Depth Maximum: 400

Total Sections Included: 10

Top Perf. Count: 3

Top Perf. Average: 256

Top Perf. Minimum: 160

Top Perf. Maximum: 308

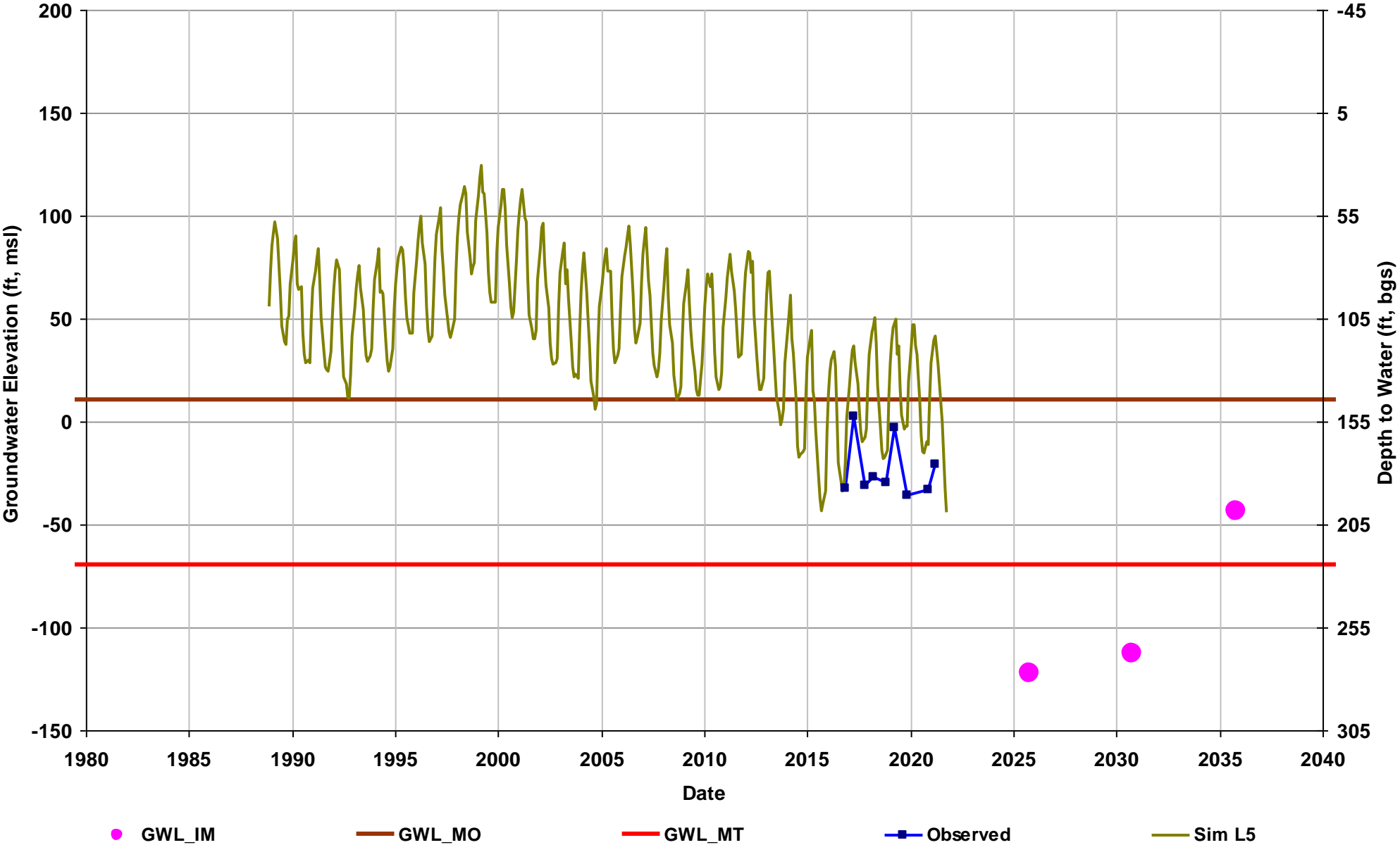
Total Depth (ft bgs): 700

Perf. Top (ft bgs): 265

Perf. Bottom (ft bgs): 696

Top Model Layer: 5

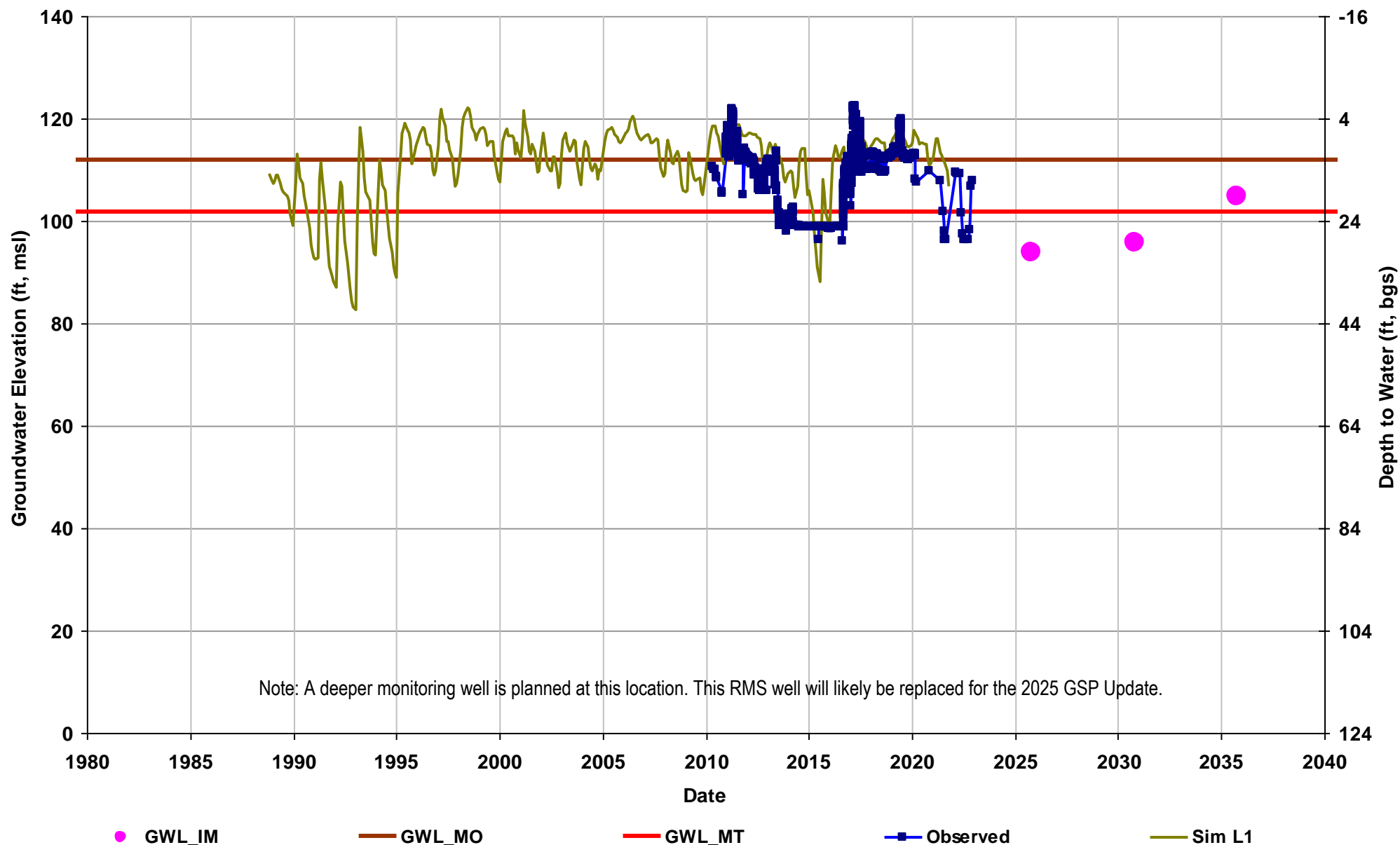
Bottom Model Layer: 5



**Well Name: MCW RMS-10**  
**Depth Zone: Upper**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 123**

**Domestic Well Data:**    *Total Sections Included: 8*  
Total Depth Count: 9                      Top Perf. Count: 7  
Total Depth Average: 245                  Top Perf. Average: 158  
Total Depth Minimum: 152                  Top Perf. Minimum: 130  
Total Depth Maximum: 500                  Top Perf. Maximum: 210

**Total Depth (ft bgs): 26**  
**Perf. Top (ft bgs): 10**  
**Perf. Bottom (ft bgs): 25**  
**Top Model Layer: 1**  
**Bottom Model Layer: 1**

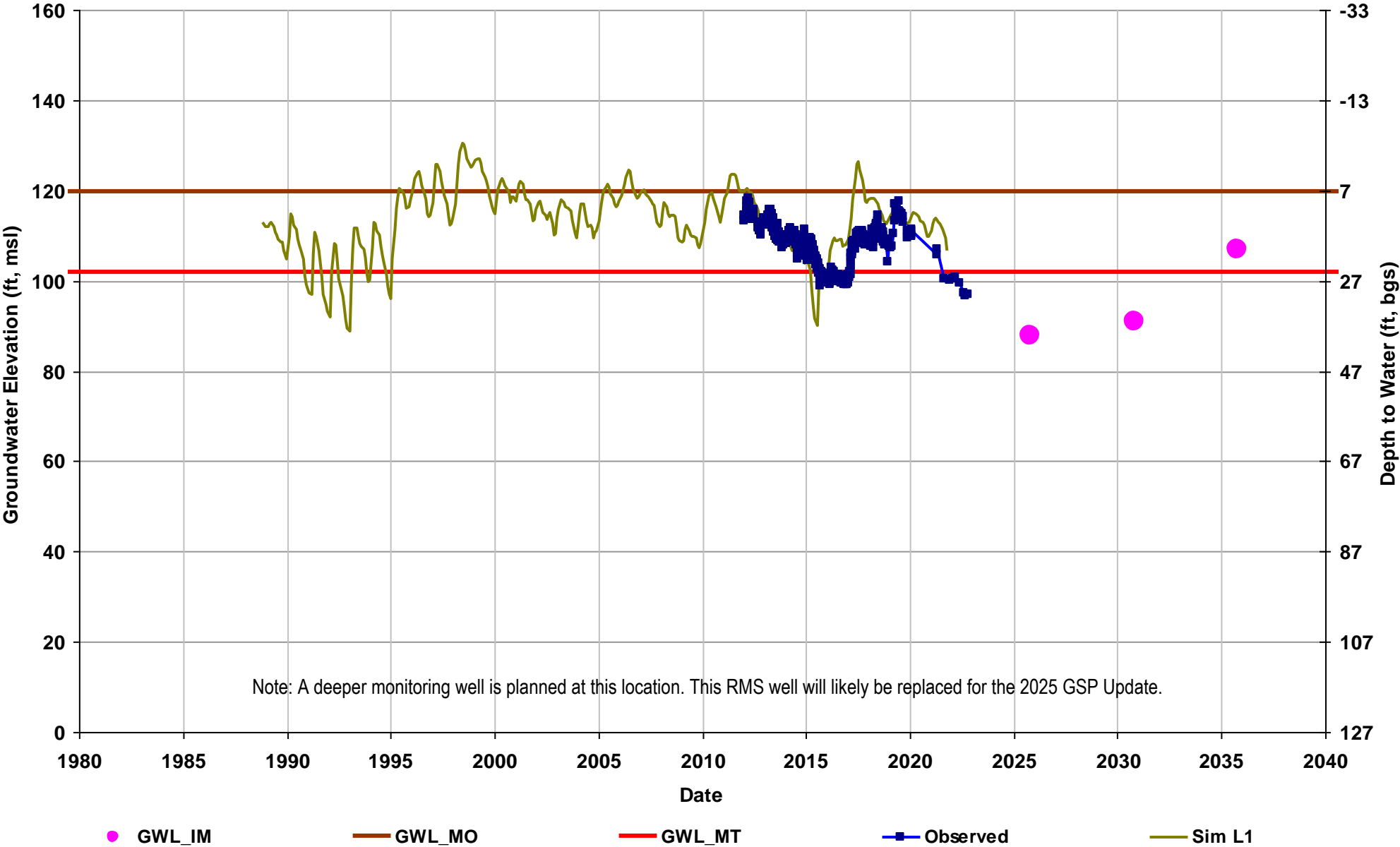




Well Name: MCW RMS-11  
Depth Zone: Upper  
Subbasin: Chowchilla  
GSE (ft, msl): 127

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 9                      Top Perf. Count: 8  
Total Depth Average: 216                  Top Perf. Average: 154  
Total Depth Minimum: 110                Top Perf. Minimum: 90  
Total Depth Maximum: 470                Top Perf. Maximum: 400

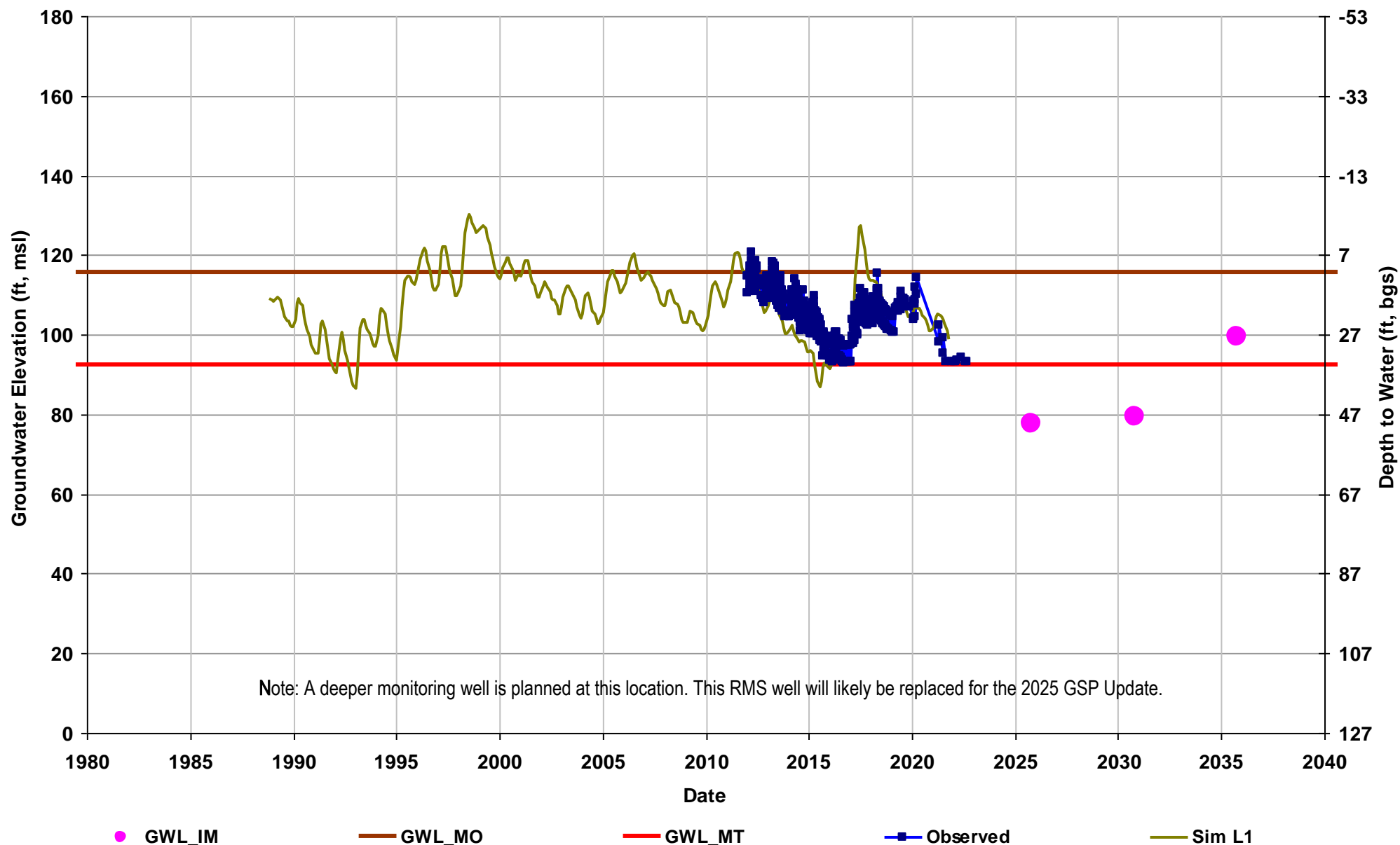
**Total Depth (ft bgs): 30**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 1**  
**Bottom Model Layer: 1**



**Well Name: MCW RMS-12**  
**Depth Zone: Upper**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 127**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 4                      Top Perf. Count: 3  
Total Depth Average: 309                  Top Perf. Average: 227  
Total Depth Minimum: 140                Top Perf. Minimum: 120  
Total Depth Maximum: 470                Top Perf. Maximum: 400

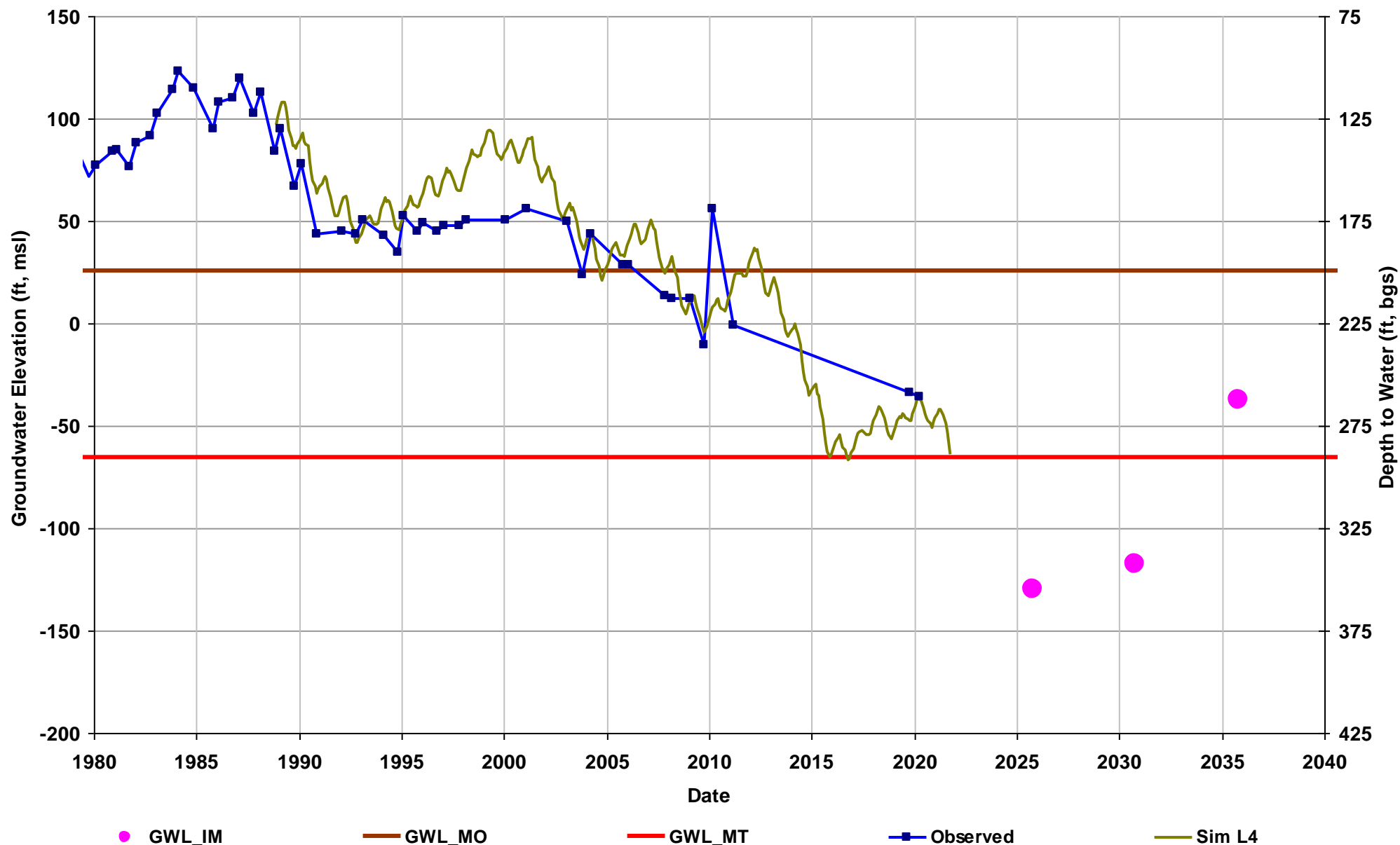
**Total Depth (ft bgs): 29**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 1**  
**Bottom Model Layer: 1**



**Well Name: MER RMS-1**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 225**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 13            Top Perf. Count: 9  
Total Depth Average: 403        Top Perf. Average: 338  
Total Depth Minimum: 215       Top Perf. Minimum: 160  
Total Depth Maximum: 810       Top Perf. Maximum: 545

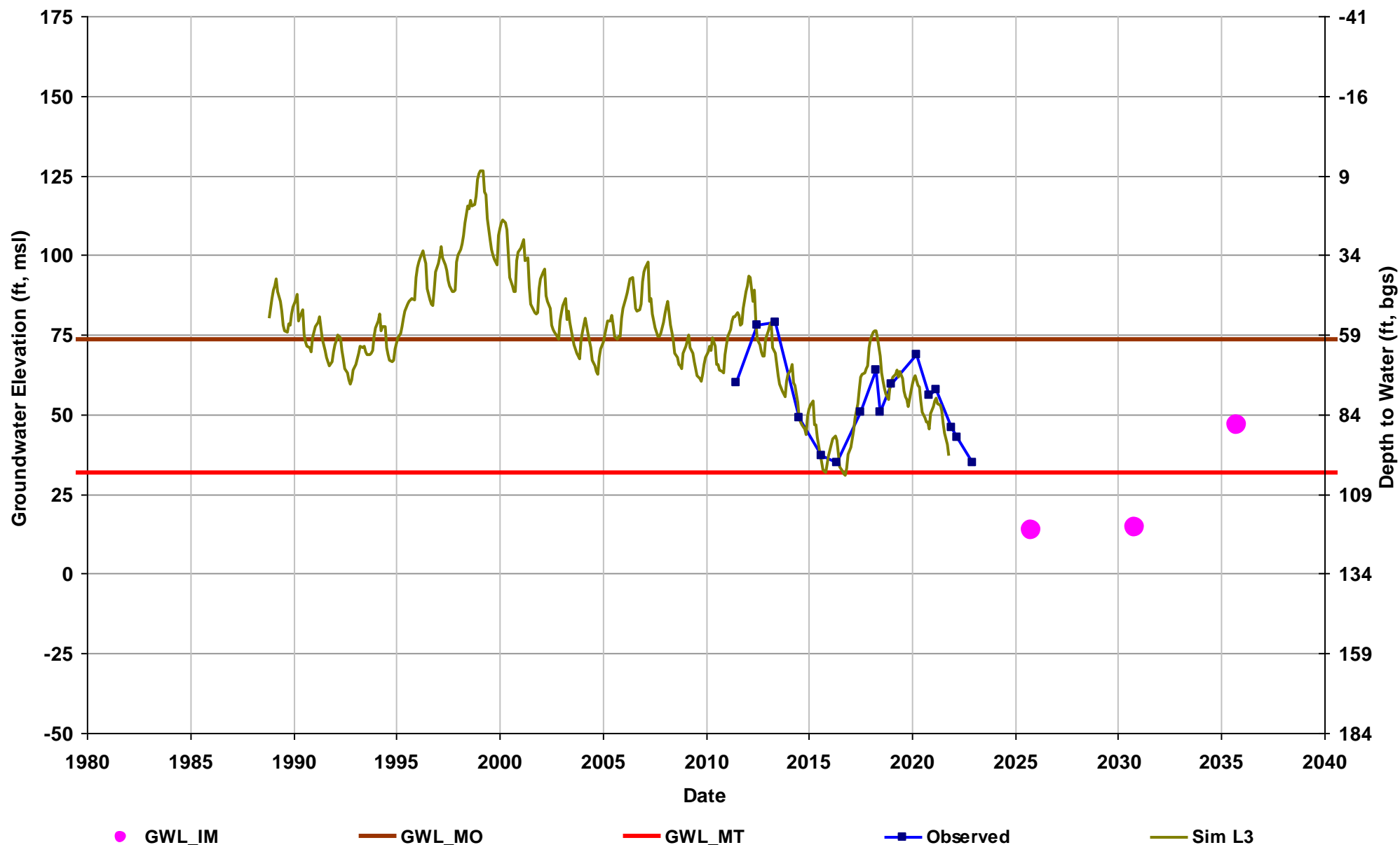
**Total Depth (ft bgs):**  
**Perf. Top (ft bgs):**  
**Perf. Bottom (ft bgs):**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**



**Well Name: TRT RMS-1**  
**Depth Zone: Upper**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 134**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 3                      Top Perf. Count: 2  
Total Depth Average: 257                  Top Perf. Average: 200  
Total Depth Minimum: 165                Top Perf. Minimum: 100  
Total Depth Maximum: 400                Top Perf. Maximum: 300

**Total Depth (ft bgs): 196**  
**Perf. Top (ft bgs): 158**  
**Perf. Bottom (ft bgs): 192**  
**Top Model Layer: 3**  
**Bottom Model Layer: 3**

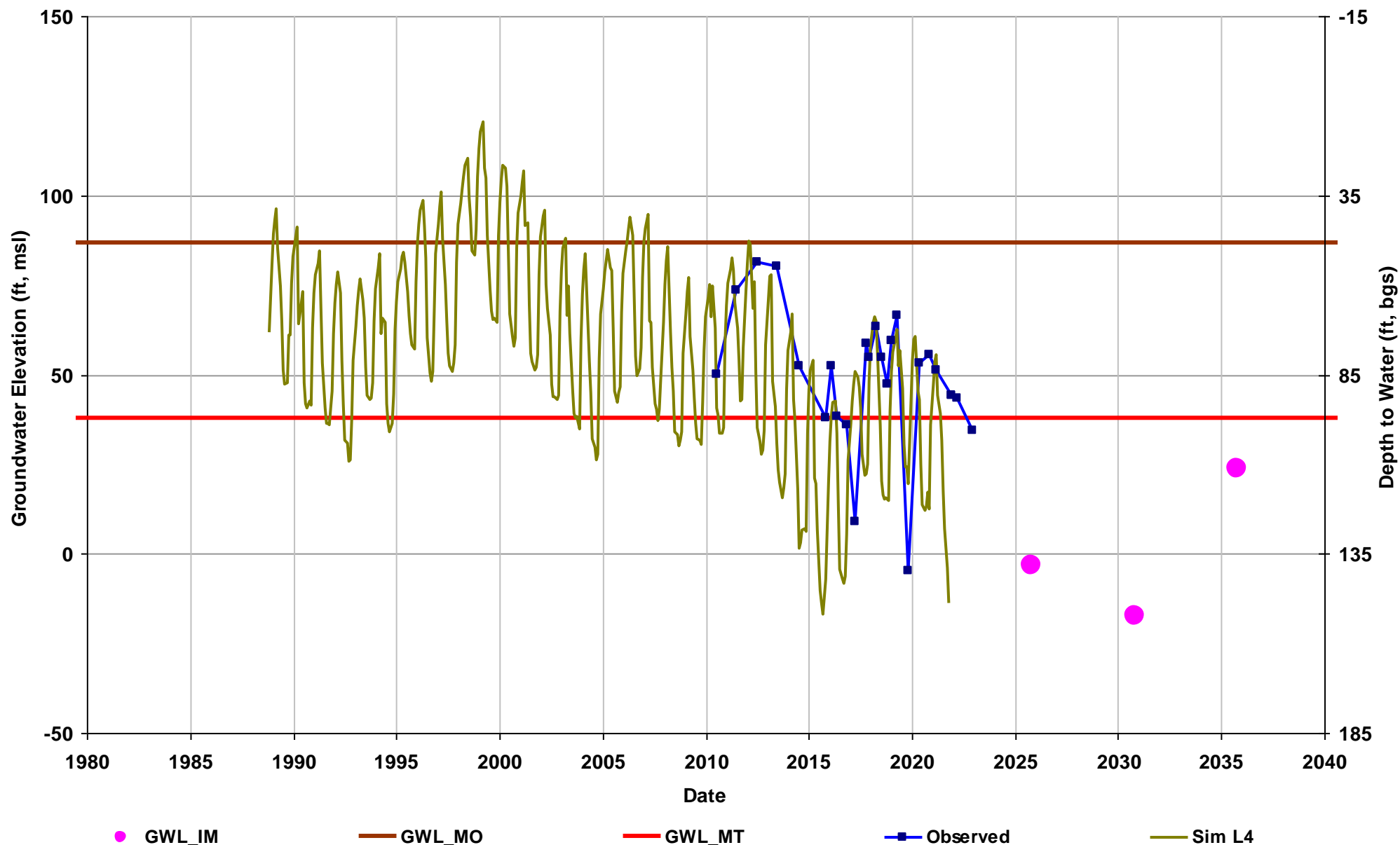




**Well Name: TRT RMS-2**  
**Depth Zone: Lower**  
**Subbasin: Chowchilla**  
**GSE (ft, msl): 135**

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 7                      Top Perf. Count: 4  
Total Depth Average: 314                  Top Perf. Average: 202  
Total Depth Minimum: 150                Top Perf. Minimum: 100  
Total Depth Maximum: 500                Top Perf. Maximum: 300

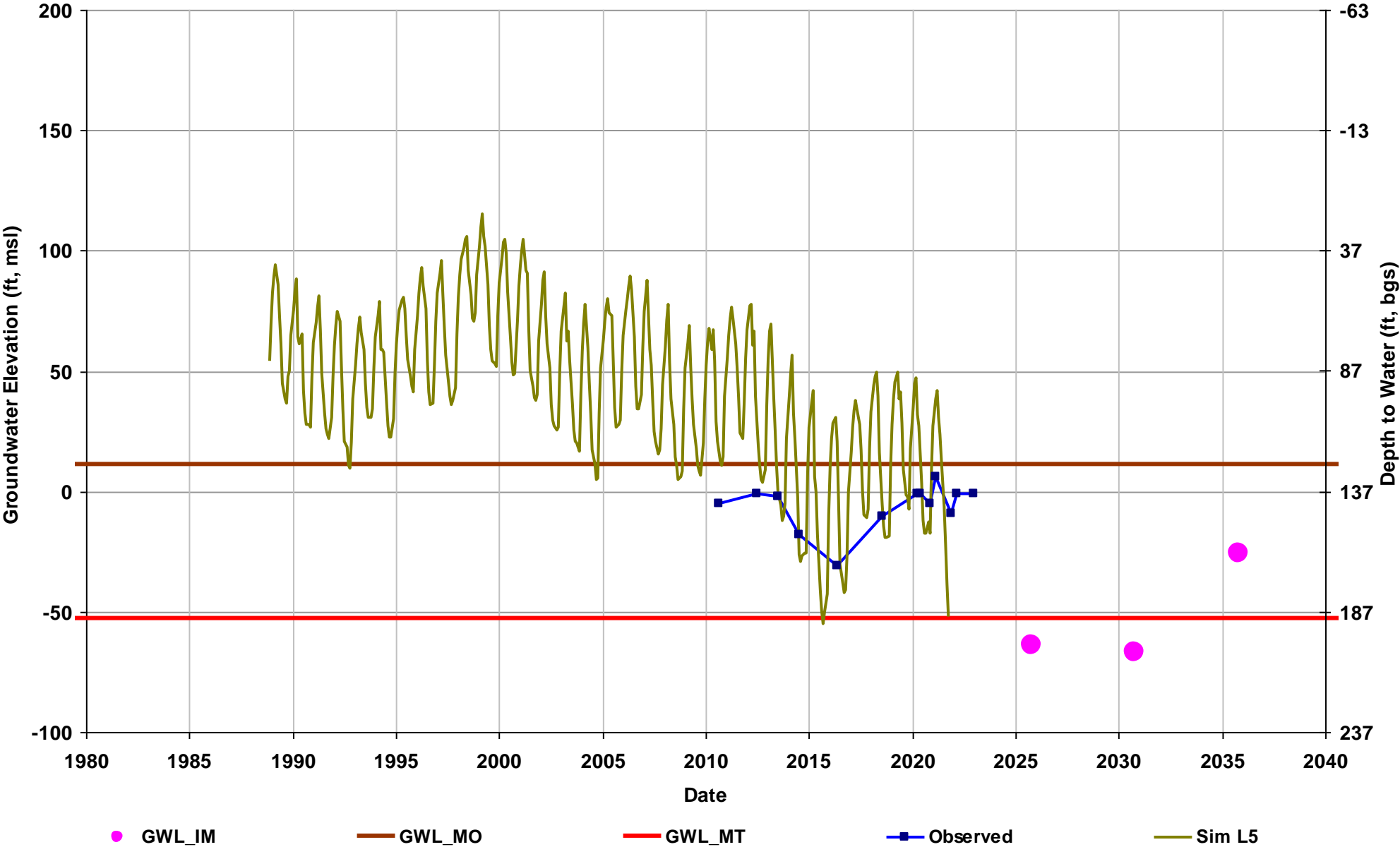
**Total Depth (ft bgs): 500**  
**Perf. Top (ft bgs): 300**  
**Perf. Bottom (ft bgs): 500**  
**Top Model Layer: 4**  
**Bottom Model Layer: 4**



Well Name: TRT RMS-3  
Depth Zone: Lower  
Subbasin: Chowchilla  
GSE (ft, msl): 137

**Domestic Well Data:**    *Total Sections Included: 9*  
Total Depth Count: 6                      Top Perf. Count: 3  
Total Depth Average: 303                  Top Perf. Average: 196  
Total Depth Minimum: 150                Top Perf. Minimum: 130  
Total Depth Maximum: 500                Top Perf. Maximum: 277

Total Depth (ft bgs): 799  
Perf. Top (ft bgs): 168  
Perf. Bottom (ft bgs): 790  
Top Model Layer: 5  
Bottom Model Layer: 5

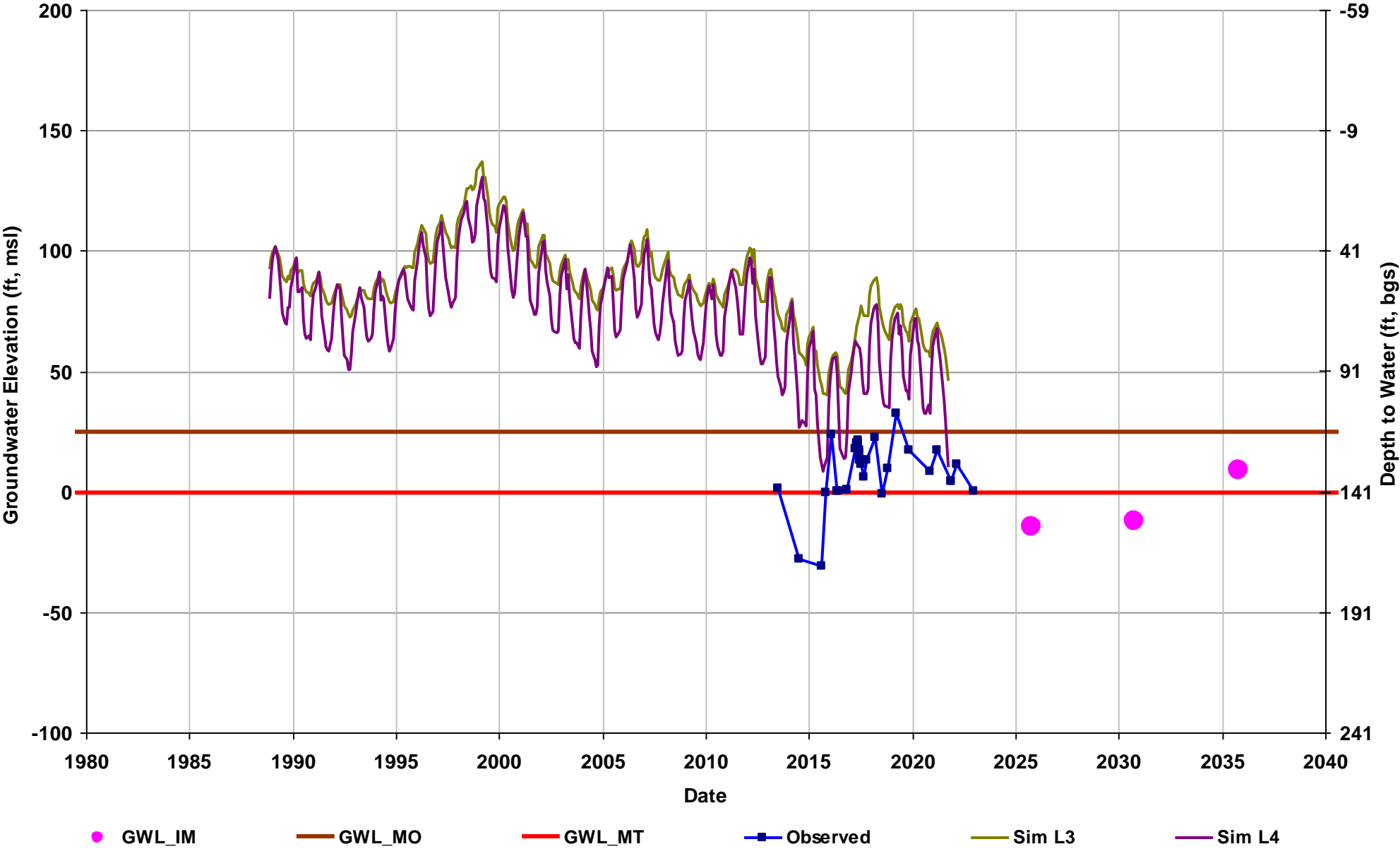


Well Name: TRT RMS-4  
Depth Zone: Composite  
Subbasin: Chowchilla  
GSE (ft, msl): 141

Domestic Well Data:    Total Sections Included: 9

Total Depth Count: 3	Top Perf. Count: 1
Total Depth Average: 275	Top Perf. Average: 180
Total Depth Minimum: 150	Top Perf. Minimum: 180
Total Depth Maximum: 444	Top Perf. Maximum: 180

Total Depth (ft bgs): 840  
Perf. Top (ft bgs): 190  
Perf. Bottom (ft bgs): 260  
Top Model Layer: 3  
Bottom Model Layer: 4



## **APPENDIX 3.B. MEASURABLE OBJECTIVES AND MINIMUM THRESHOLDS FOR GROUNDWATER QUALITY**

Prepared as part of the  
**Groundwater Sustainability Plan**  
**Chowchilla Subbasin**

January 2020

**GSP Team:**

Davids Engineering, Inc  
Luhdorff & Scalmanini  
ERA Economics  
Stillwater Sciences and  
California State University, Sacramento



## Summary of Recent (Since January 2015) Results for Key Water Quality Constituents in Groundwater Quality Indicator Wells

Well ID	Arsenic Concentrations (µg/L)						Nitrate Concentrations (mg/L as nitrogen)						Specific Conductance (µS/cm)						TDS Concentrations (mg/L)					
	Minimum Result	Maximum Result	Average Result	Num. of Observations	Date First Observation	Date Last Observation	Minimum Result	Maximum Result	Average Result	Num. of Observations	Date First Observation	Date Last Observation	Minimum Result	Maximum Result	Average Result	Num. of Observations	Date First Observation	Date Last Observation	Minimum Result	Maximum Result	Average Result	Num. of Observations	Date First Observation	Date Last Observation
2000511-001*	1.4	1.4	1.4	1	1/9/2018	1/9/2018	4.8	5.4	5.1	4	1/7/2015	1/9/2018	490	560	525	2	1/7/2015	1/9/2018	330	330	330	1	1/9/2018	1/9/2018
2000597-001	0.0	0.0	0.0	1	12/17/2015	12/17/2015	2.9	7.0	4.4	9	3/12/2015	3/7/2019	910	910	910	1	12/21/2017	12/21/2017						
2000681-002	0.0	0.0	0.0	1	12/13/2017	12/13/2017	1.5	2.2	1.9	2	12/13/2017	12/20/2018	250	250	250	1	12/13/2017	12/13/2017						
2010001-010							4.8	5.9	5.3	6	3/9/2015	3/18/2019	660	680	670	2	8/3/2015	8/18/2015	440	440	440	1	8/4/2016	8/4/2016
2010001-011	0.0	0.0	0.0	1	3/28/2017	3/28/2017	0.6	0.6	0.6	1	8/18/2015	8/18/2015	210	210	210	1	7/27/2016	7/27/2016						
2400216-001	4.4	4.4	4.4	1	10/24/2016	10/24/2016	1.6	1.8	1.7	4	5/4/2015	8/20/2018												
ES111							7.1	7.1	7.1	1	10/30/2018	10/30/2018	740	740	740	1	10/30/2018	10/30/2018	520	520	520	1	10/30/2018	10/30/2018

\* Well was deepened in 2009. Nitrate concentrations prior to 2009 were near or above the MCL of 10 mg/L as nitrogen. After the well deepening in 2009, concentrations dropped initially to just below 3 mg/L and have been increasing since with recent concentrations around 5 mg/L.

## Summary of All Historical Results for Key Water Quality Constituents in Groundwater Quality Indicator Wells

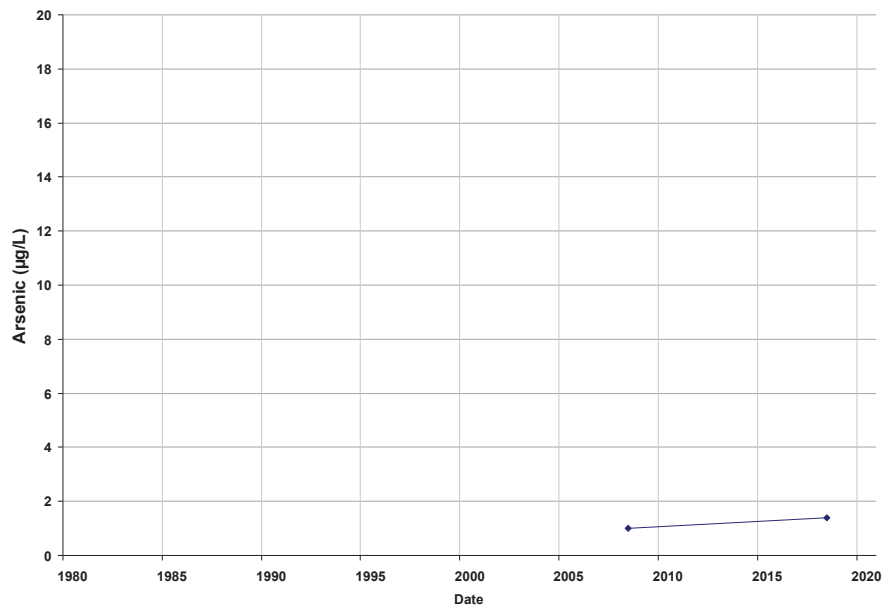
Well ID	Arsenic Concentrations (µg/L)						Nitrate Concentrations (mg/L as nitrogen)						Specific Conductance (µS/cm)						TDS Concentrations (mg/L)					
	Minimum Result	Maximum Result	Average Result	Number of Observations	Date First Observation	Date Last Observation	Minimum Result	Maximum Result	Average Result	Number of Observations	Date First Observation	Date Last Observation	Minimum Result	Maximum Result	Average Result	Number of Observations	Date First Observation	Date Last Observation	Minimum Result	Maximum Result	Average Result	Number of Observations	Date First Observation	Date Last Observation
2000511-001*	1.0	1.4	1.2	2	5/27/2008	1/9/2018	2.6	13.1	6.6	38	2/22/2006	1/9/2018	490	970	745	4	3/4/2008	1/9/2018	300	330	315	2	8/9/2012	1/9/2018
2000597-001	0.0	1.0	0.7	3	6/5/2006	12/17/2015	1.3	7.0	3.7	16	2/14/2006	3/7/2019	280	910	595	2	12/17/2009	12/21/2017	154	190	172	2	2/18/2003	12/17/2009
2000681-002	0.0	0.0	0.0	3	1/23/2012	12/13/2017	1.5	2.2	1.8	3	3/3/2009	12/20/2018	250	260	255	2	5/7/2013	12/13/2017						
2010001-008	0.0	2.2	1.5	5	12/13/2000	7/29/2015	0.8	2.3	1.3	16	10/10/1991	10/23/2017	120	230	198	9	10/10/1991	8/18/2015	108	190	168	7	10/10/1991	8/25/2010
2010001-010	0.0	3.0	1.2	6	12/1/1994	7/12/2012	3.4	6.7	5.3	24	12/12/2000	3/18/2019	180	700	550	8	12/15/1999	8/18/2015	160	440	343	8	12/15/1999	8/4/2016
2010001-011	0.0	3.0	1.7	4	12/12/2000	3/28/2017	0.6	1.7	0.9	10	12/15/1999	8/18/2015	170	230	205	11	8/19/1996	7/27/2016	120	190	173	8	8/19/1996	7/31/2013
2400216-001	4.3	5.3	4.7	3	8/10/2010	10/24/2016	1.0	1.8	1.5	14	3/20/2003	8/20/2018	160	166	162	3	8/10/2010	10/10/2013	160	180	170	2	8/10/2010	8/22/2013
ESJ11							7.1	7.1	7.1	1	10/30/2018	10/30/2018	740	740	740	1	10/30/2018	10/30/2018	520	520	520	1	10/30/2018	10/30/2018

\* Well was deepened in 2009. Nitrate concentrations prior to 2009 were near or above the MCL of 10 mg/L as nitrogen. After the well deepening in 2009, concentrations dropped initially to just below 3 mg/L and have been increasing since with recent concentrations around 5 mg/L.

Well ID: 2000511-001  
GSA Location: CWD  
Depth Zone: Unknown

Well Depth: Unknown  
Screen: Unknown

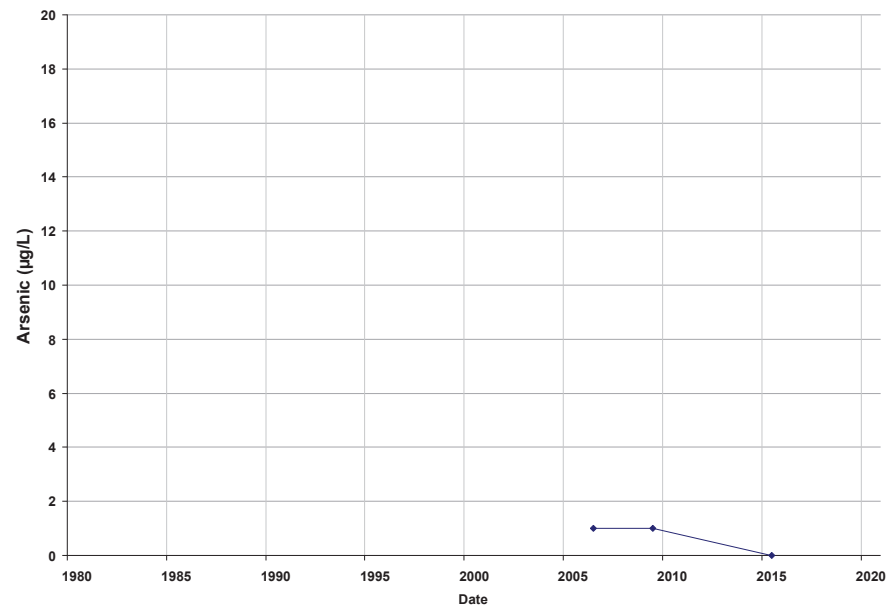
### Arsenic



Well ID: 2000597-001  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 300-?

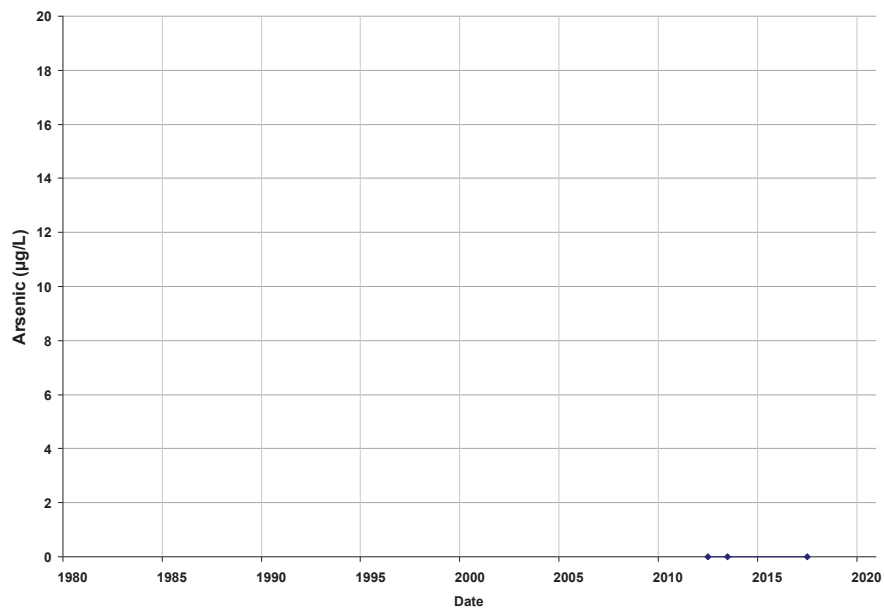
### Arsenic



Well ID: 2000681-002  
GSA Location: CWD  
Depth Zone: Unknown

Well Depth: Unknown  
Screen: Unknown

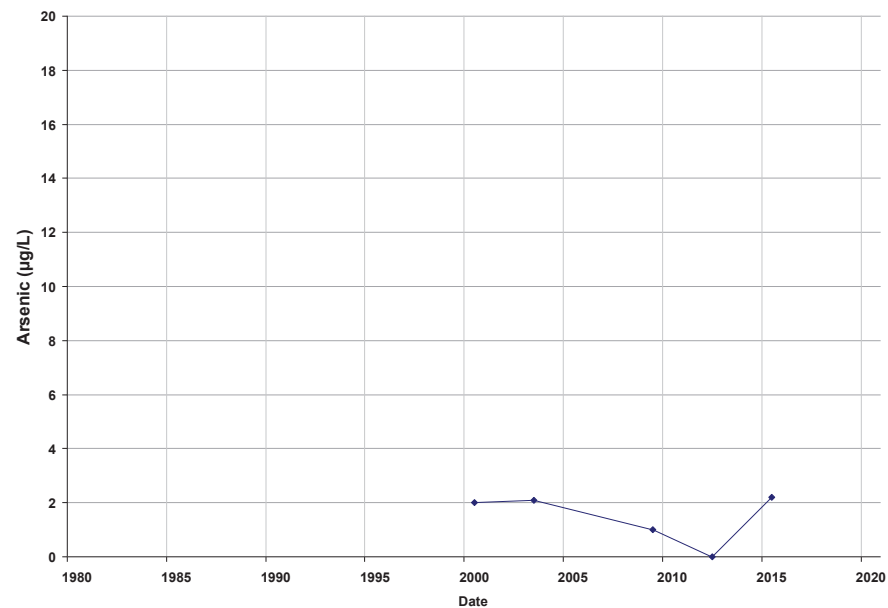
### Arsenic



Well ID: 2010001-008  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 242-297

### Arsenic

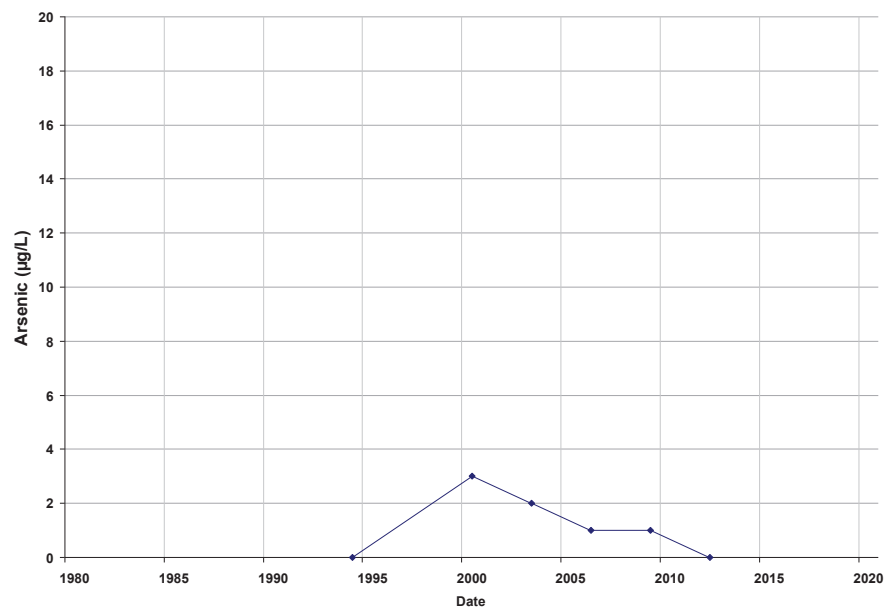


A3.B-3

Well ID: 2010001-010  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 358-474

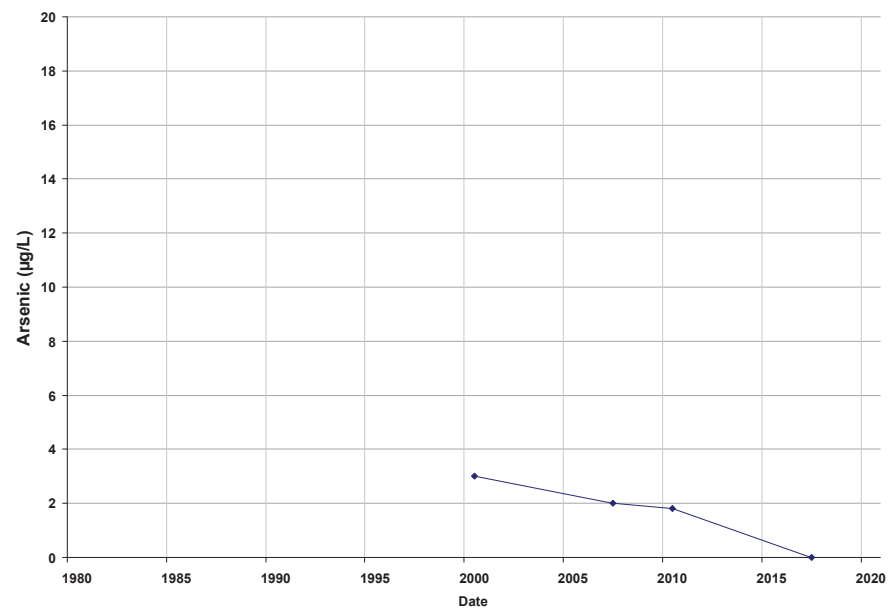
### Arsenic



Well ID: 2010001-011  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 310-393

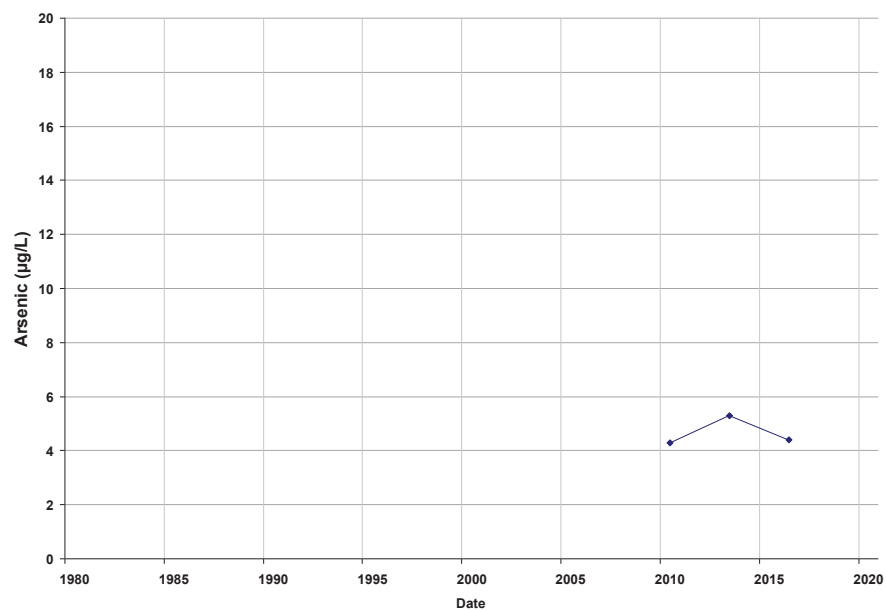
### Arsenic



Well ID: 2400216-001  
GSA Location: Madera County East  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 400-460

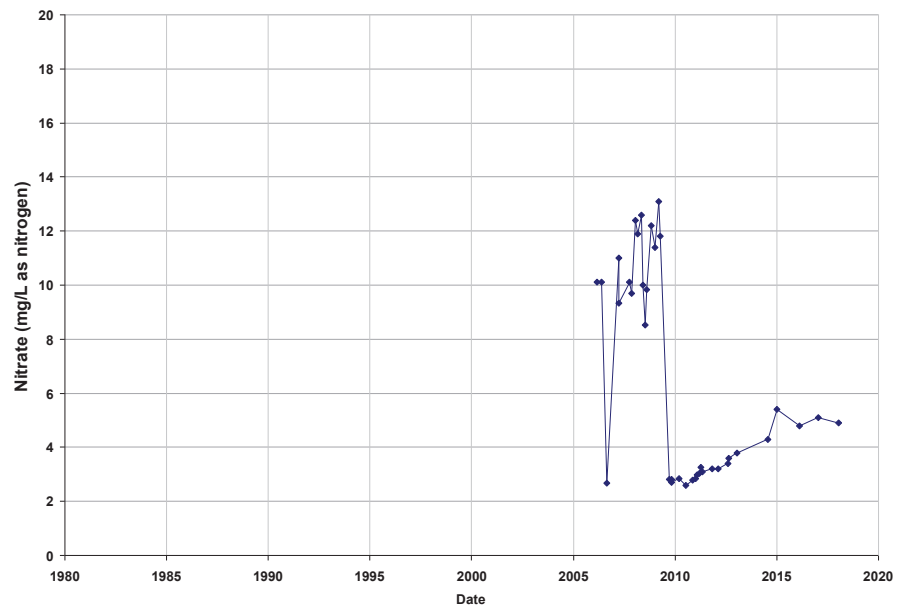
### Arsenic



Well ID: 2000511-001  
GSA Location: CWD  
Depth Zone: Unknown

Well Depth: Unknown  
Screen: Unknown

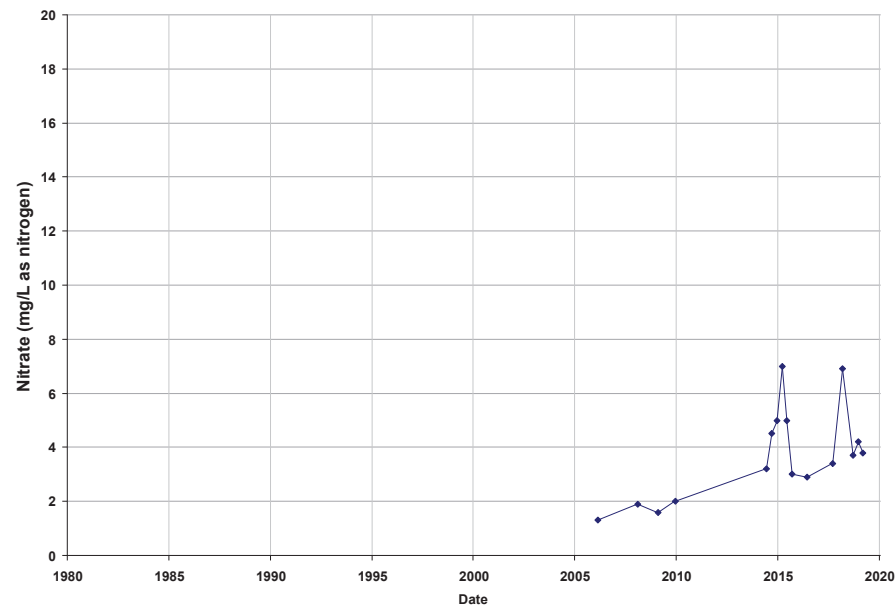
### Nitrate as N



Well ID: 2000597-001  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 300-?

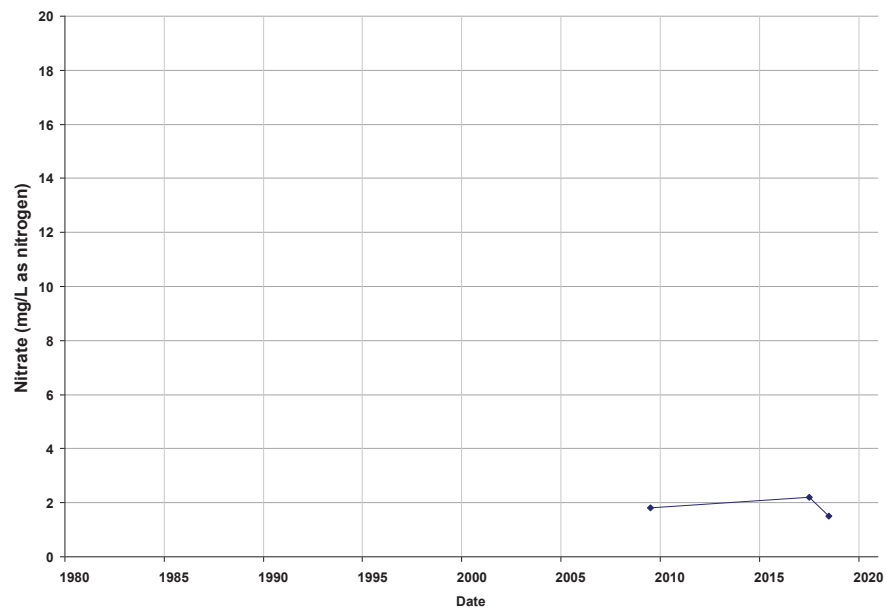
### Nitrate as N



Well ID: 2000681-002  
GSA Location: CWD  
Depth Zone: Unknown

Well Depth: Unknown  
Screen: Unknown

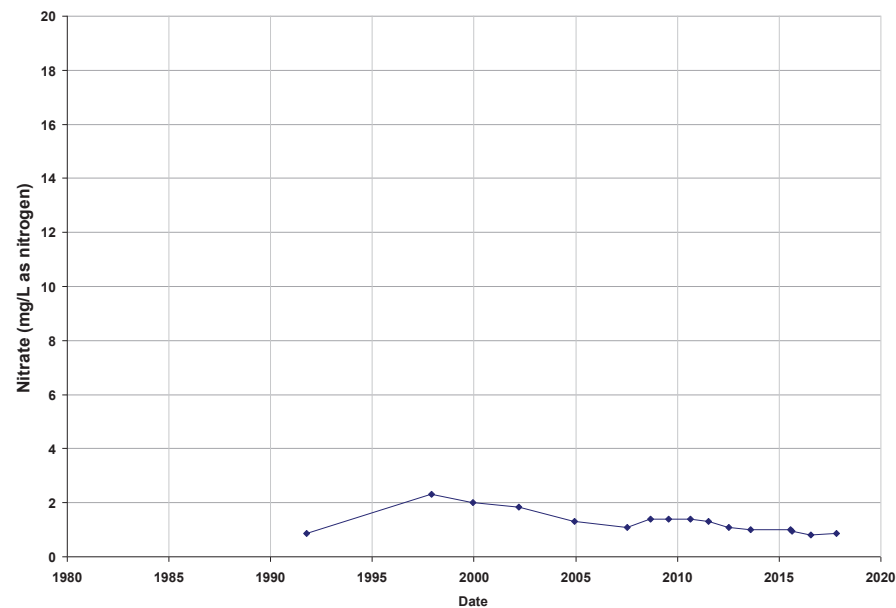
### Nitrate as N



Well ID: 2010001-008  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 242-297

### Nitrate as N

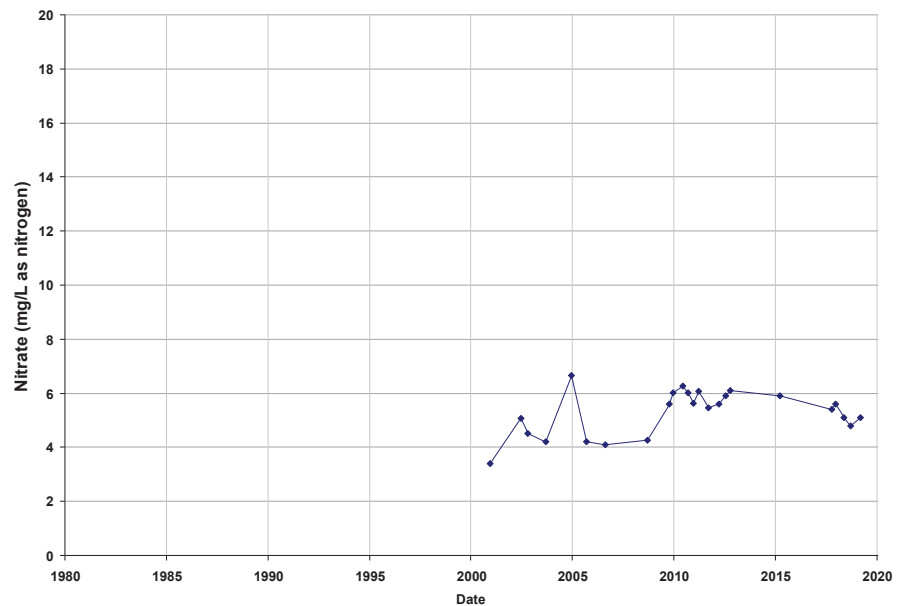




Well ID: 2010001-010  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 358-474

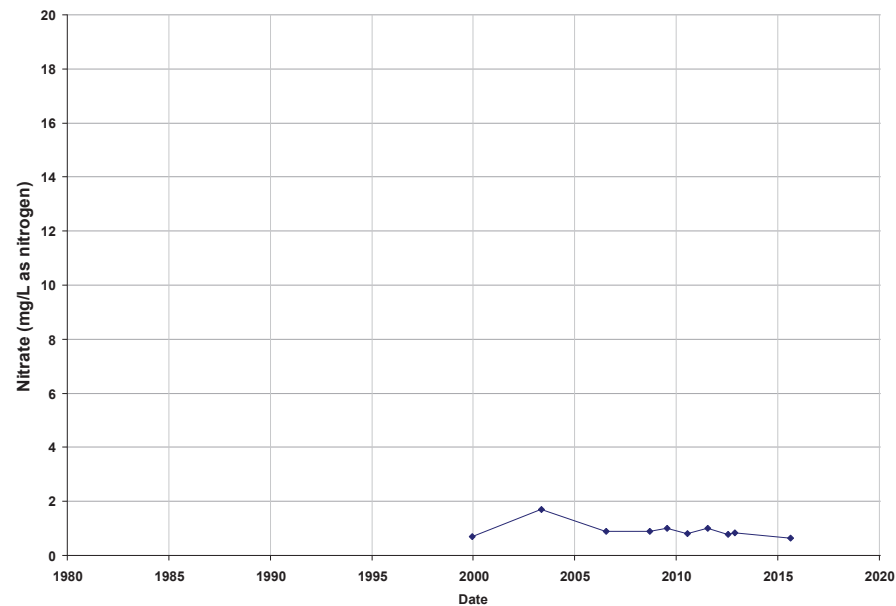
### Nitrate as N



Well ID: 2010001-011  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 310-393

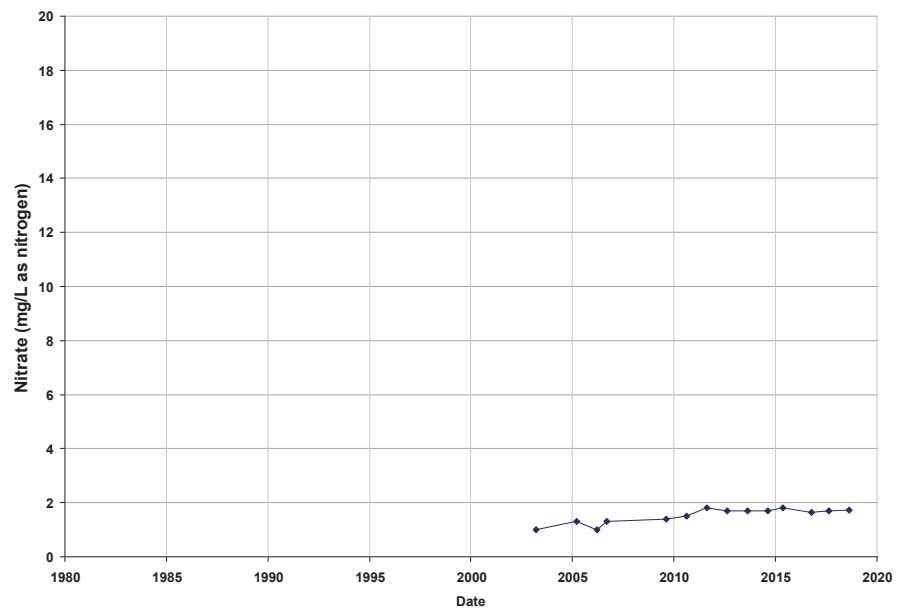
### Nitrate as N



Well ID: 2400216-001  
GSA Location: Madera County East  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 400-460

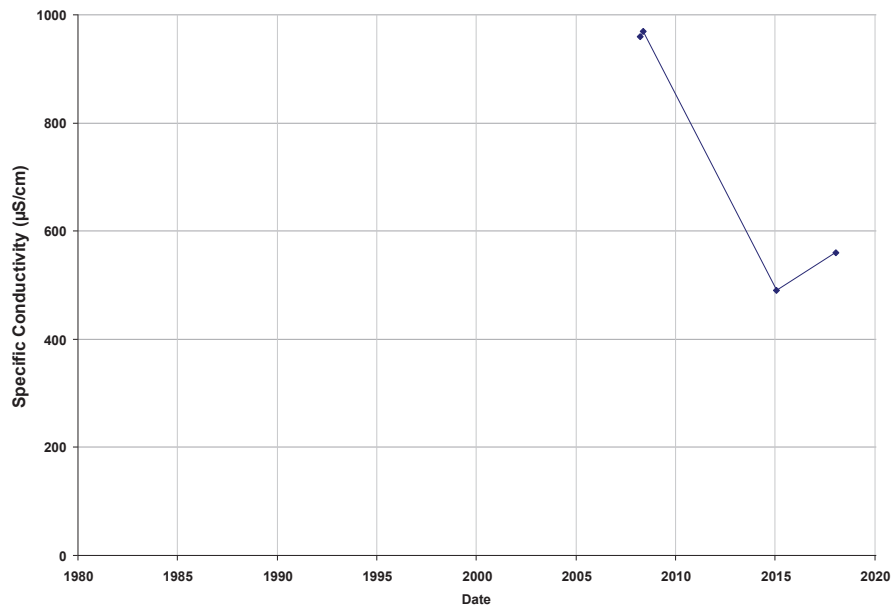
### Nitrate as N



Well ID: 2000511-001  
GSA Location: CWD  
Depth Zone: Unknown

Well Depth: Unknown  
Screen: Unknown

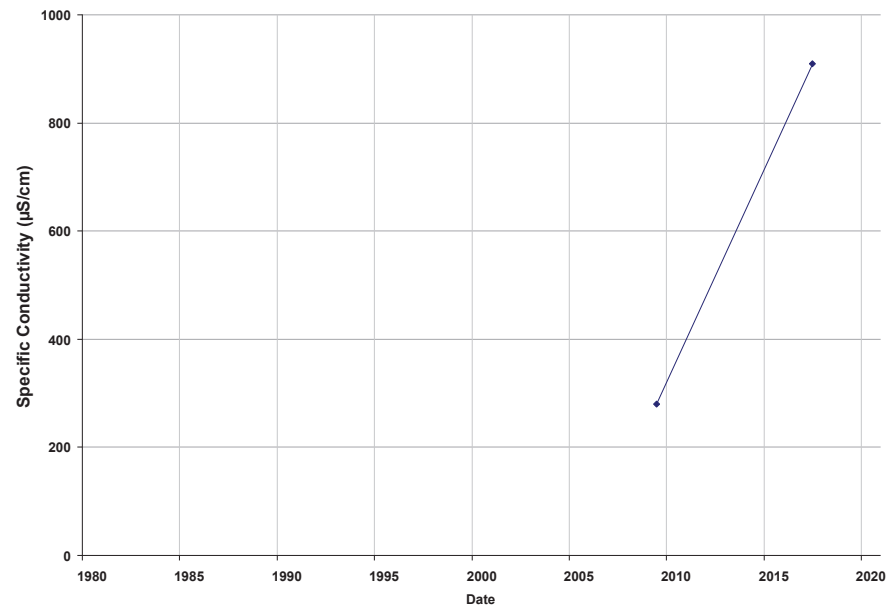
### Specific Conductivity



Well ID: 2000597-001  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 300-?

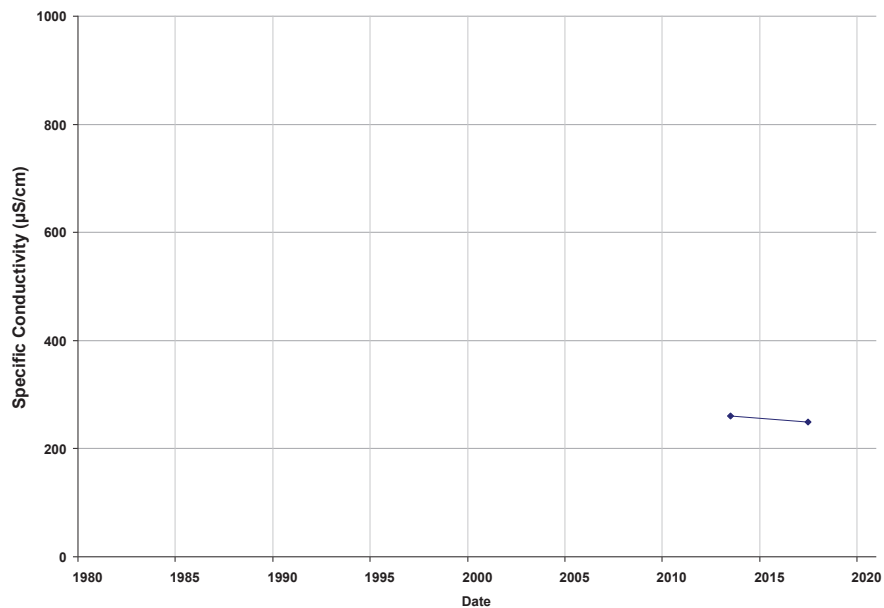
### Specific Conductivity



Well ID: 2000681-002  
GSA Location: CWD  
Depth Zone: Unknown

Well Depth: Unknown  
Screen: Unknown

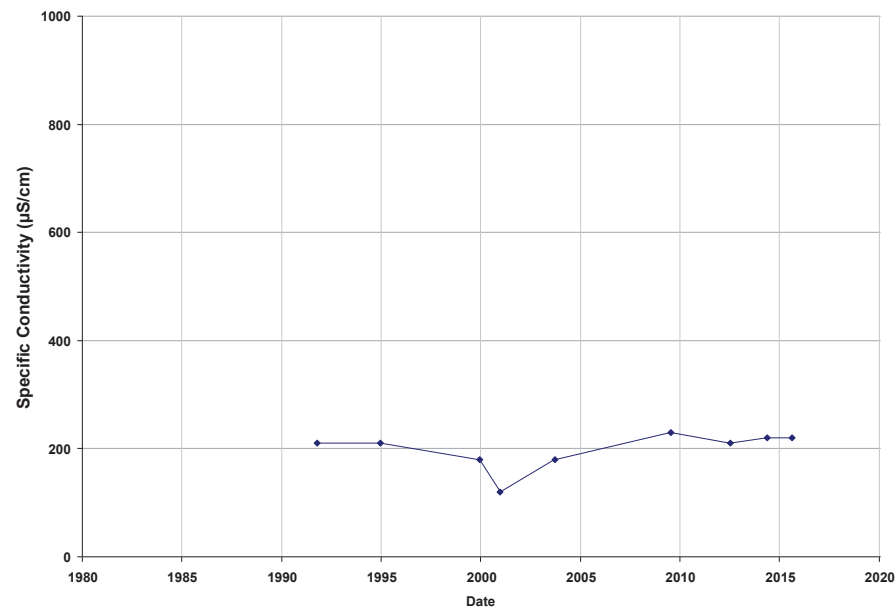
### Specific Conductivity



Well ID: 2010001-008  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 242-297

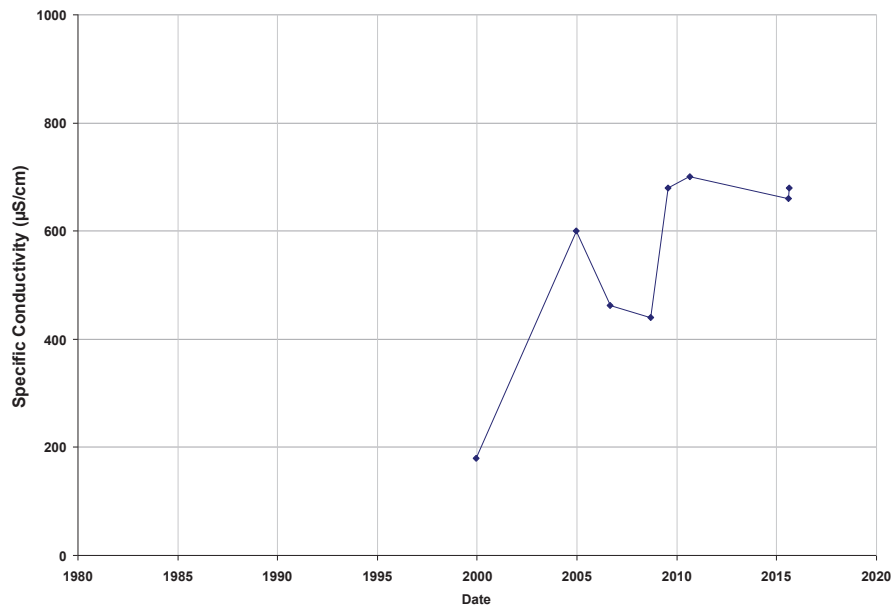
### Specific Conductivity



Well ID: 2010001-010  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 358-474

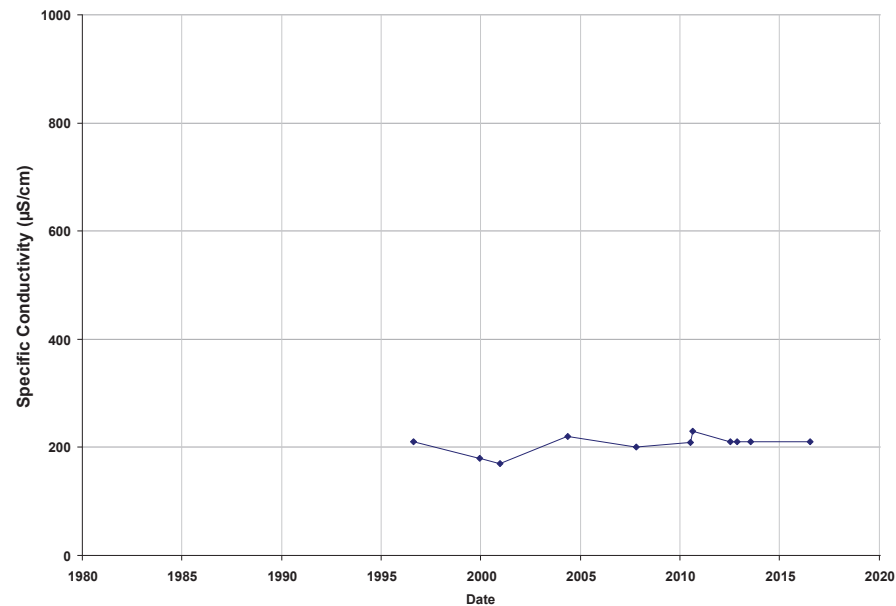
### Specific Conductivity



Well ID: 2010001-011  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 310-393

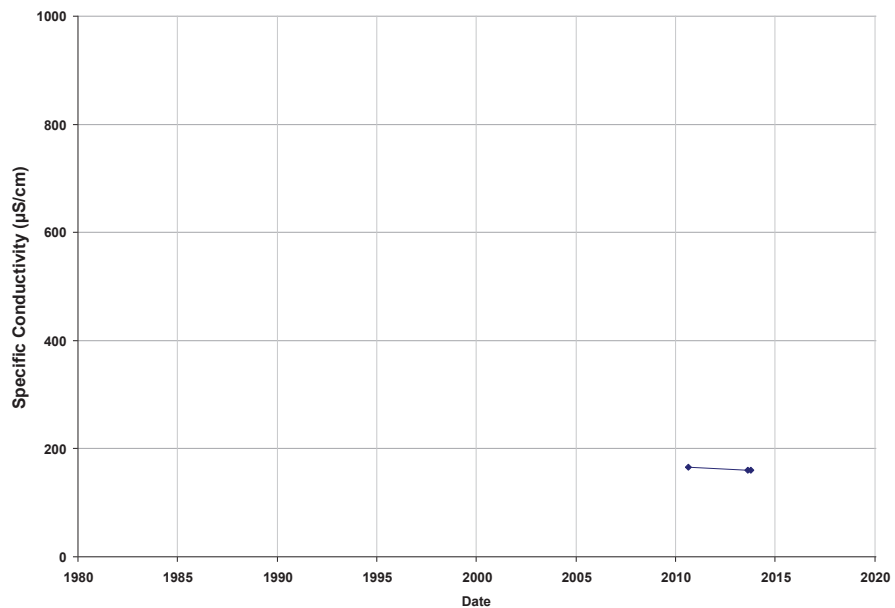
### Specific Conductivity



Well ID: 2400216-001  
GSA Location: Madera County East  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 400-460

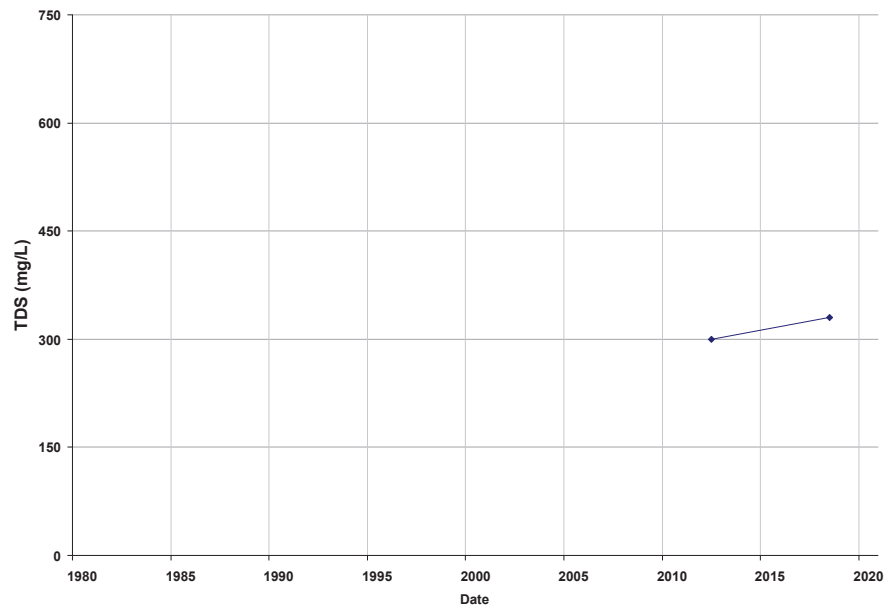
### Specific Conductivity



Well ID: 2000511-001  
GSA Location: CWD  
Depth Zone: Unknown

Well Depth: Unknown  
Screen: Unknown

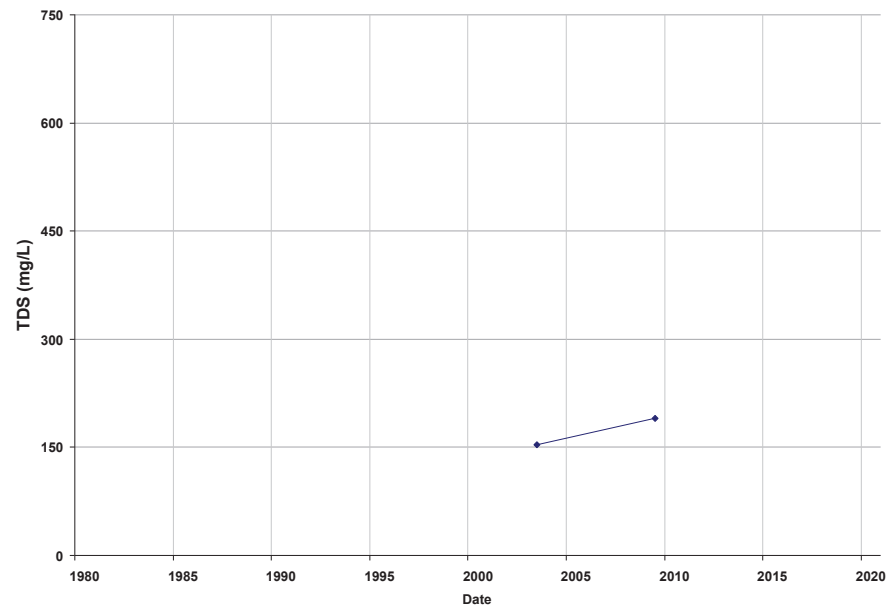
### Total Dissolved Solids



Well ID: 2000597-001  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 300-?

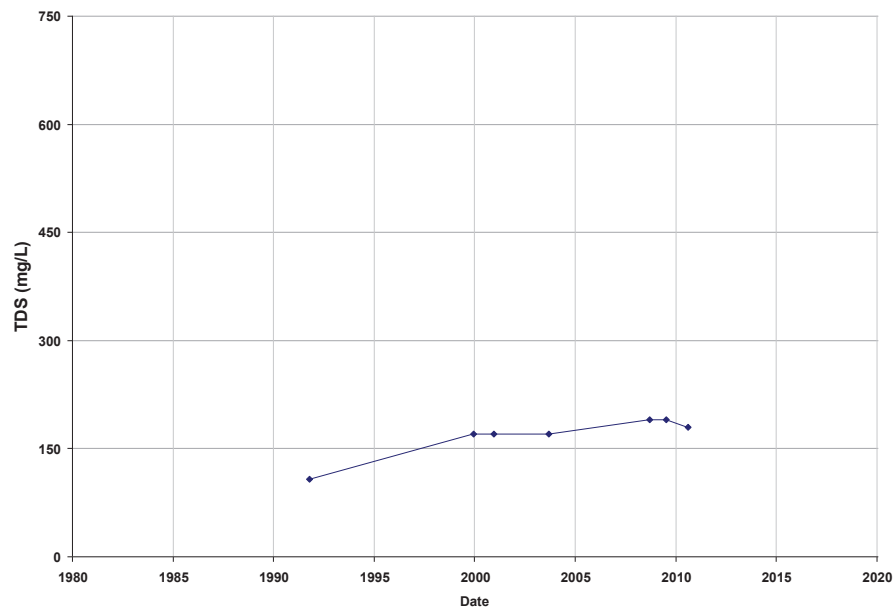
### Total Dissolved Solids



Well ID: 2010001-008  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 242-297

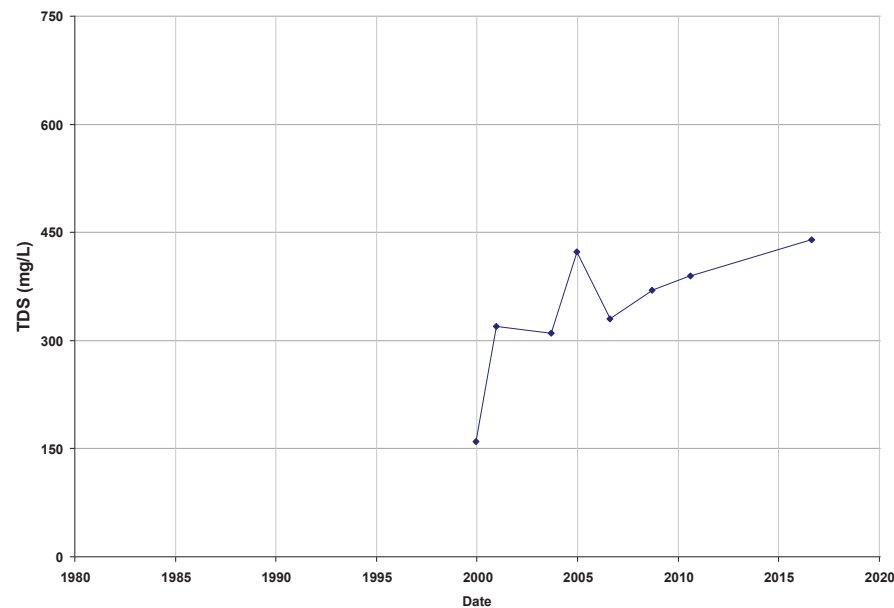
### Total Dissolved Solids



Well ID: 2010001-010  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 358-474

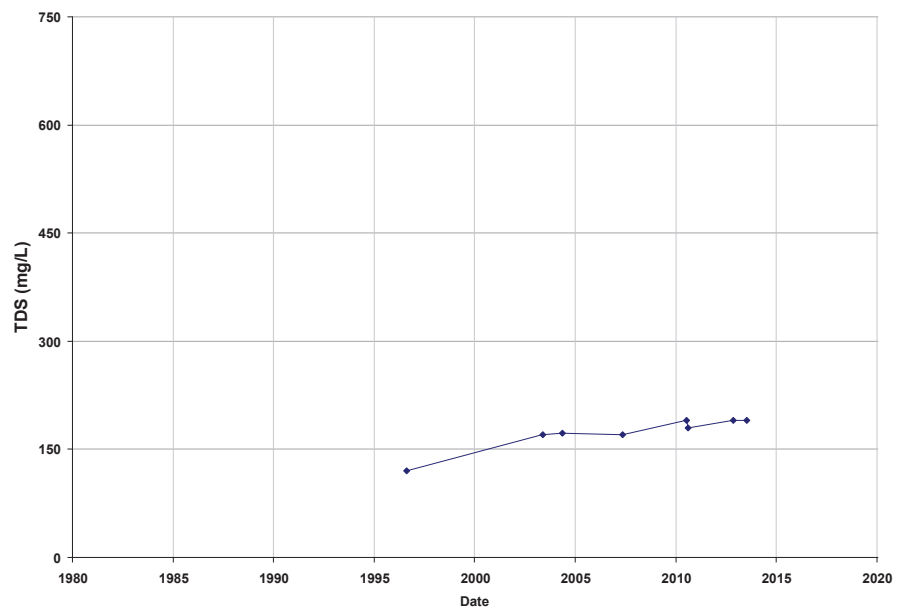
### Total Dissolved Solids



Well ID: 2010001-011  
GSA Location: CWD  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 310-393

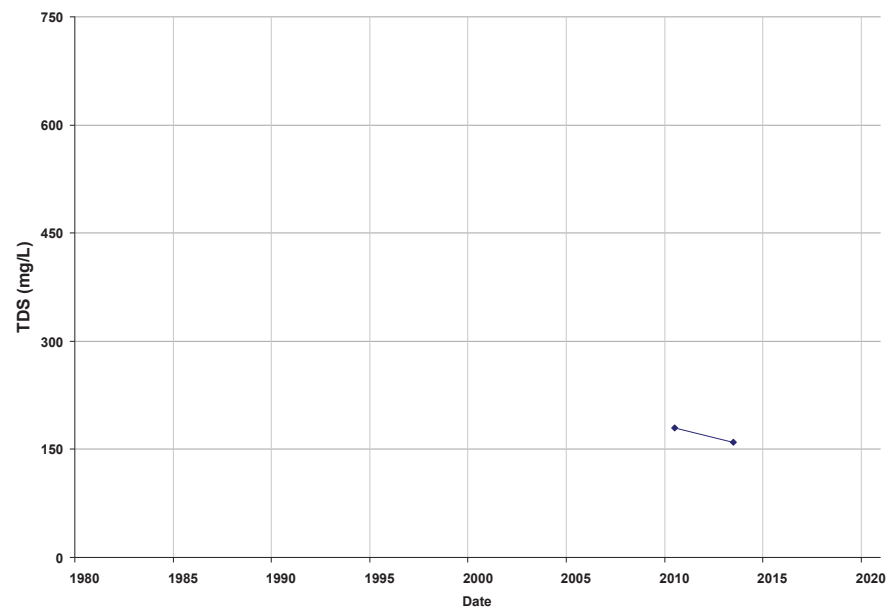
### Total Dissolved Solids



Well ID: 2400216-001  
GSA Location: Madera County East  
Depth Zone: Lower

Well Depth: Unknown  
Screen: 400-460

### Total Dissolved Solids





## **APPENDIX 3.C. ECONOMIC ANALYSIS AND FRAMEWORK FOR POTENTIAL DOMESTIC WELL MITIGATION PROGRAM**

Prepared as part of the  
**Groundwater Sustainability Plan**  
**Chowchilla Subbasin**

January 2020  
Revised July 2022

### **GSP Team:**

Davids Engineering, Inc  
Luhdorff & Scalmanini  
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Table A3.C-1. Demand Management vs. Domestic Well Replacement - Summary Results for Chowchilla Subbasin, Present Value (PV) \$ in Millions

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## 1 OVERVIEW

This appendix serves two purposes. The initial section, titled Benefits and Costs of Faster Implementation of Demand Management, assesses whether a faster trajectory toward sustainability during the implementation period would be economically justified. It compares the cost of implementing demand management more quickly against the benefits (avoided costs) of avoided well replacement and reduced pumping costs. The second section, titled Domestic Well Replacement Mitigation Program, estimates the total cost of replacing domestic wells potentially impacted by declining groundwater levels under the baseline conditions without SGMA and under the draft proposed SGMA implementation plan (with-SGMA). The second section can support discussions and consideration of potential mitigations for the cost of well replacement.

## 2 BENEFITS AND COSTS OF FASTER IMPLEMENTATION OF DEMAND MANAGEMENT

This section describes an initial analysis of how many domestic wells in the Chowchilla Subbasin might be impacted by the continued overdraft of groundwater during the transition from 2020 until full implementation of projects and management actions specified in the (draft) GSP and thereafter through 50 years of sustainable management<sup>1</sup>. The purpose of this reconnaissance-level analysis is to assess the costs to different stakeholder groups (agricultural pumpers and domestic well users) and to consider if a faster trajectory to sustainable management at higher groundwater levels would be cost-effective in the aggregate. If the initial analysis indicates that avoiding well replacement costs might be warranted, a more detailed analysis could be conducted.

In order to provide an initial answer, this analysis uses data inputs for and results from the Chowchilla Subbasin groundwater model. The units of analysis are domestic wells in each section (one square mile or 640 acres). Other key assumptions and simplifications for this initial analysis include:

- Projected depth to water simulated by the groundwater model for the 2020 – 2040 implementation period and subsequent 50-year sustainability period uses a single scenario of hydrology developed based on historical hydrology.
- The cost analysis only considers the cost of replacing domestic wells. It does not consider replacement of agricultural wells or the cost of declining well yields before a well is replaced.
- Well Completion Report (WCR) data from DWR are the basis for the quantity and characteristics of domestic wells in the Madera Subbasin used in the assessment. Wells not in DWR's WCR database are not included in the analysis. A sensitivity analysis is presented that evaluates how wells not in the WCR database may affect results of the analysis.
- As a simplification, for all Public Land Survey System (PLSS) sections in the Subbasin, the analysis compares the minimum depth to the top of the perforated interval for domestic wells with the average simulated September depth to water (DTW) in the Lower Aquifer.
- The timing, quantity, and location of projects is the same as the with-GSP scenario and no other alternatives are considered.

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<sup>1</sup> For purposes of this memorandum, sustainable management means the state in which the long-term trend of declining groundwater levels has stabilized.

The analysis compares costs associated with groundwater pumping, well replacement, and management actions needed to reach sustainable management for two scenarios: 1) baseline conditions (without-SGMA) and 2) baseline conditions with the draft proposed GSP implementation plan (with-SGMA). Assuming that the GSP already includes implementation of water supply and recharge projects as soon as practical, the analysis focuses on demand management implementation as a possible means to speed the trajectory toward groundwater sustainability.

The following costs related to groundwater levels and management over time are considered:

- Costs to replace dewatered domestic wells.
- Changes in variable costs to pump groundwater, for both domestic and agricultural users.
- Costs to growers in foregone net return for demand management needed (if any) to achieve sustainable management after implementing supply and recharge projects.

## 2.1 Assumptions and Results

Assumptions and results below are summarized for each of the cost categories considered.

### 2.1.1 Costs to replace dewatered domestic wells.

For purposes of this analysis, a replacement cost of \$25,000<sup>2</sup> per well is used. This cost is triggered when the groundwater level in the section the well is located in falls below the minimum depth to top perforation of the domestic wells in that cell. Once the wells in a section are replaced, that section is no longer tested against further changes in DTW. The simulated September depth to water value is used for each year's comparison, which typically reflects the lowest groundwater levels in a season. The process for each 2015-2090 scenario (without-SGMA and with-SGMA) is summarized as:

- For each section and year, compare the average DTW in the Lower Aquifer to the minimum depth to top of perforations of the domestic wells in that section.
- If DTW equals or exceeds the top perforation depth, all domestic wells in the section must be replaced.
- After a section's domestic wells are replaced, they are assumed to be drilled and screened deep enough to withstand any further increase in DTW.

In the Chowchilla subbasin, 127 domestic wells are impacted in the without-SGMA case, but 87 of those appear to be impacted prior to the 2020 implementation start (DTW is greater than minimum depth to top perforation). Therefore, 40 (127 minus 87) domestic wells are potentially affected in the comparison of scenarios. Thirty out of the 40 wells are impacted between 2021 and 2033, with the remaining 10 impacted by 2066. The present value (at 2020) of replacement costs for these 40 impacted domestic wells is \$0.69 million. All but seven domestic well replacements are avoided in the with-SGMA scenario. The present value of replacement cost for these impacted domestic wells is \$0.13 million. *The net domestic well replacement cost avoided by the draft proposed GSP implementation plan is \$0.56 million in present value.*

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<sup>2</sup> The cost of well replacement used in the analysis is based on feedback from well drillers that work in the area: (i) drilling a domestic well costs \$35/foot, (ii) a sanitary seal for a domestic well is \$2,000, and (iii) a pump for a domestic well is \$4,500. This does not include permit costs. Assuming a well depth of approximately 500 feet results in an estimated cost of about \$25,000 per well.

## 2.1.2 Changes in variable costs to pump groundwater, for both domestic and agricultural users.

This analysis applies an aggregate calculation of change in water depth and pumping cost, using an average depth over all sections (weighted by well count in each section). As DTW decreases in the with-SGMA scenario relative to without-SGMA, the benefit (reduced pumping lift and cost) grows year to year. Both domestic wells and agricultural users benefit from this, though the agricultural cost saving is many times greater simply due to volume pumped. A more precise estimate can be created using an estimate of agricultural and domestic pumping in each section. For the Chowchilla Subbasin, benefits after 10 years are about \$105,000 per year in total for all domestic well pumping and \$3.29 million per year for agricultural pumping. The present value of savings over the analysis period is about \$5.94 million for domestic pumping and \$169.84 million for agricultural pumping. *These savings are small relative to the loss of net return from demand management (see Table A3.C-1), so the benefit of achieving them sooner does not appear to be justified by implementing demand management sooner.*

## 2.1.3 Costs to growers in foregone net return for demand management needed (if any) to achieve sustainable management after implementing supply and recharge projects.

This analysis uses the estimated demand reduction in acre-feet needed to achieve sustainable management after accounting for the yield of supply and recharge projects. The cost of that reduction is based on a separate economic analysis of net return lost from crop production developed for the GSP. This loss increases with the level of demand management, and ranges from about \$300 per AF to over \$1,000 per AF. In this example analysis, a constant cost of \$500 per AF of demand management is used, which represents the approximate cost of demand management in the Chowchilla Subbasin. The current water balance shows pumping to be approximately 309,000 AF/year on average. After implementation of projects specified in the GSP, pumping to maintain sustainable management is estimated to be about 246,000 AF/year. This analysis assumes that the difference – 63,000 AF per year – would be spread equally from 2021 to 2040 as a reduction of about 3,150 AF per year (note this is a simplifying assumption – actual demand reduction occurs unevenly in the GSP implementation plan). At \$500 per AF, this adds a demand management cost of about \$1.58 million per year, which accumulates, so that by 2040 the annual demand management cost is about \$31.5 million per year. These values are discounted back to the start of implementation, resulting in a present value in 2020 of about \$581 million (Table A3.C-1).

**Table A3.C-1. Demand Management vs. Domestic Well Replacement - Summary Results for Chowchilla Subbasin, Present Value (PV) \$ in Millions**

	Without SGMA	With-SGMA	Difference
Domestic Well Repl. Cost			
Number of Domestic Wells Replaced	40	7	-33
PV of Cost	\$0.69	\$0.13	-\$0.56
Pumping Cost (Savings), PV			
Domestic	NA	-\$5.94	-\$5.94
Agricultural	NA	-\$169.84	-\$169.84
Demand Mgmt. Cost, PV	NA	\$580.96	\$580.96



## 2.2 Discussion

Results indicate that the cost of implementing demand management on a faster trajectory (sooner in the implementation period) would not be cost effective from a subbasin-wide perspective. The avoided costs (fewer domestic wells requiring replacement) would be small, \$0.13 million, relative to the lost agricultural net return, \$581 (0.02 percent) million. The general conclusions are robust to the assumptions used – that is, results are not sensitive to reasonable ranges in key assumptions, including the loss in net return per AF of demand management, the total level of demand management, when demand management begins to scale in, or the cost of replacing a domestic well.

The analysis also considered different measures for comparing depth to water to well characteristics and different hydrologic sequences (one beginning with a wet period and one with a dry period), and the conclusions hold. Even doubling the number of affected wells (based on the possibility that some domestic wells in use are not logged in the WCR database) does not change the conclusion. The conclusions are strong enough that no further groundwater analysis is recommended for the sole purpose of evaluating whether more rapid demand management is justified by the aggregate avoided domestic well replacement.

Although the conclusion is that more rapid demand management is not cost-effective from a basin-wide or County-wide perspective, the distribution of the costs imposed on domestic well users should be acknowledged. Continued drawdown of groundwater levels during the GSP implementation period would be caused primarily by pumping for irrigation (because domestic wells are a smaller share of subbasin pumping), whereas the cost of domestic well replacement would be borne by domestic well users.

The above results use demand management as the policy variable to assess the tradeoff of its costs with the costs of domestic well replacement. Rather than use demand management for the cost comparison, another analysis could compare avoided well replacement and pumping costs with the cost of implementing supply or recharge projects sooner during the implementation period. However, that comparison is not possible with current information and the GSP implementation schedule already reflects an aggressive timeline for project implementation. The additional cost of accelerating a recharge project by, say 5 years, would be the increased present value of the capital and O&M cost stream. The benefit would be the change in expected present value of avoided well replacement and pumping costs. This benefit would need to be calculated based on a groundwater model analysis of the resulting expected DTW over time under the accelerated project implementation.

## 3 DOMESTIC WELL MITIGATION PROGRAM

Some GSAs in the Chowchilla Subbasin have discussed a program to replace domestic wells that are impacted by falling groundwater levels over the GSP implementation timeline. The May 29, 2019 GSP summary presentation outlined the general parameters of a domestic well mitigation program. The program is expected to be further developed during the first year of GSP implementation. Well owners would be required to sign up for the program and mitigation actions may include replacing or lowering existing wells, and in cases where it is feasible, connecting groups of wells to a community water system. The program would be funded by fees and external support including grants and low interest loan.

### 3.1 Chowchilla Subbasin Domestic Well Mitigation Program Costs

An analysis was developed to approximate the cost of a domestic well mitigation program in the Chowchilla Subbasin. The example program/analysis assumes:

- All pumpers pay into the program to fund full replacement of impacted domestic wells (\$25,000/well).
- The number of affected wells is the total number affected under the with-SGMA scenario, including those potentially already impacted. Ninety-three wells are impacted in Chowchilla Subbasin based on the analysis described earlier in this memorandum (namely, uses the WCR data). The number of impacted domestic wells is doubled to account for potential under-reporting in the WCR data.
- The program cost (\$/af) is based on the sustainable level of pumping. Pumping fees cover admin, replacement, and contingency program costs and are charged to every acre foot of groundwater pumped. The fee is calculated as an annual amount that will raise the required total expected mitigation program cost (in present value terms). A cash flow analysis has not been prepared at this time. All costs are expressed in real dollars.
- An annual program administration cost is assumed to cover staff time to run the program, manage the fund, and conduct technical review of any applications. For this estimate, the cost for Chowchilla Subbasin is estimated to be \$100,000 per year plus \$5,000 per replaced well.
- An additional program cost contingency of 30% is added to the average annual well replacement cost to account for higher than expected costs per well and unexpected impacts (e.g. longer drought cycles).
- A sensitivity analysis of well replacement cost, admin cost, and contingency cost is used to develop a program fee range (\$/af). The actual program cost depends on the timing of well impacts, which depends on unknown future hydrologic sequences.

Summary results are as follows:

- **# impacted domestic wells:** 93 (doubled to 186 for cost estimation purposes)
- **Average annual program cost:** \$198,000
- **Domestic well mitigation program fee per acre-foot** of sustainable yield: \$1.44/AF (sensitivity range ~\$1.05 - \$3 per AF)

### 3.2 Draft Outline for Chowchilla Subbasin Domestic Well Mitigation Program

This section provides a general outline of a domestic well mitigation program for the Chowchilla Subbasin.

#### 3.2.1 Domestic well mitigation program policy/purpose statement

Define the mission of the program. For example, the purpose of the Chowchilla Subbasin Domestic Well Mitigation program is to mitigate undesirable results on domestic wells due to GSP implementations.

#### 3.2.2 Definition of undesirable results

Program should clearly define the types of impacts to domestic wells that will, and will not, be mitigated.

#### 3.2.3 Inventory domestic wells

Develop a database and registration system and allow domestic well owners to sign up (if not already permitted/in the system). Initial information should include pumping level.

### 3.2.4 Mitigation measures

Define mitigation measures. Other well mitigation programs suggest the following potential mitigation measures:

- Deepen or replace well for domestic wells where municipal water service is not expected to exist in the near future
- Correct to municipal service for domestic wells near existing municipal water service
- Develop municipal system to serve the impacted community high density of domestic wells impacted within a small geographic area

The mitigation measures should consider and coordinate with any mitigation actions being undertaken by other programs such as the Nitrate Control Program and Salt Control Program being implemented by the State Water Resources Control Board and Regional Water Quality Control Board as part of the Central Valley's Water Quality Control Plans (i.e., Basin Plans). In areas of the Central Valley where drinking water supplies have been impacted by water quality, the Basin Plan includes new regulatory actions focused on managing nitrates locally while providing interim and long-term solutions for providing safe drinking water supplies.

### 3.2.5 Define mitigation costs

Define how the mitigation fund will pay for each type of impacted domestic well. Other well programs suggest the following examples:

- Establish payment of e.g. \$/AF) to deepen wells. If well cannot be deepened, establish standard cost to replace well (e.g. \$/well
- Decide how to compensate well owners that can connect to municipal system
- Establish "rapid response" approach for situations when wells go dry

### 3.2.6 Establish review process

Develop a board to review and approve domestic well mitigation claims consistent. Establish process for expedient review.

### 3.2.7 Financing

Financing program through groundwater extraction fees (see above for estimated costs).

## 3.3 Domestic Well Mitigation Programs Reviewed

A review of existing domestic well mitigation programs identified two examples that could be used as a policy template:

### 3.3.1 Truckee Meadows Water Authority

#### 3.3.1.1 Motivation

Nevada Legislature identified a need to avoid, or mitigate, impacts to domestic wells and granted authority to the State Engineer to limit pumping in areas to avoid impacts. Impacts to domestic wells from

several sources (too many wells in the same area, new deep wells, etc.) in Washoe County. Truckee Meadows Water Authority (TMWA) eventually developed and approved the Mt. Rose/Galena Fan Domestic Well Mitigation Program.

### 3.3.1.2 Program overview

The program compensates domestic well owners who can demonstrate impacts to their well operation. It is the responsibility of the well owner to report impacts and request compensation from TMWA (<https://tmwa.com/doing-business-with-us/wellmitigation/>). A Board is established to review claims and approve/deny each application. If the application is approved, the home owner is compensated out of an existing fund to deepen their well.

### 3.3.1.3 Program financing and implementation

Compensation is specified by the program – wells can be deepened by 150 ft. Compensation (as of FY 2013) was \$66/ft – meaning ~\$10,000 for each well. Property owners are responsible for covering the cost of any other appurtenances (estimated around \$4,500/well). If a well cannot be deepened, then the program pays for a new well and covers the cost of all appurtenances.

### 3.3.1.4 Applicability to Chowchilla GSP

Very applicable to the Chowchilla GSP. The program is a result of similar issues identified in the GSP – continued pumping for the benefit of the entire region is causing impacts to some shallower domestic wells. A fund is established to pay for those impacts so that pumping can continue in other parts of the basin. All users fund the program and it is the responsibility of individual well owners to submit impact claims. An independent board reviews the claims and approves/denies payment. <https://www.leg.state.nv.us/Interim/76th2011/Exhibits/OverseeWRWC/E062812B.pdf>

## 3.3.2 Yuba County Water Agency

### 3.3.2.1 Motivation

Potential groundwater substitution water transfers under the Yuba River Accord, or other transfers out of the Yuba County Water Agency (YCWA) area, could cause third-party impacts to other water users, including impacts to domestic wells.

### 3.3.2.2 Program overview

The program goal is to compensate domestic well owners that are demonstrably impacted by groundwater substitution water transfers. It was specified as Mitigation Measure 6-2 in the Lower Yuba River Accord EIR/S. In general, well owners are required to report impacts and a process is established for validating each claim. Monitoring wells (specified in Mitigation Measure 6-1) measure groundwater elevations throughout the season which are used to assess whether water transfers resulted in third-party domestic well impacts. The program description includes provisions to compensate or fully replace affected wells.<sup>3</sup>

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<sup>3</sup><http://www.hdrprojects.com/engineering/ProposedLowerYubaRiverAccord/Chapter%206%20-%20MMRP-ECP.pdf>

### 3.3.2.3 Program financing and implementation

No information on program financing was identified. No information on number of affected wells or if the program was ever fully implemented beyond being specified as a Mitigation Measure.

### 3.3.2.4 Applicability to Chowchilla GSP

Limited applicability to the Chowchilla Subbasin GSP. The YCWA program deals with short-term water transfer impacts, whereas the GSPs are concerned with long-term planned overdraft and cumulative impacts to domestic wells. The general program guidelines are applicable (compensate well owners that are impacted). However, the financing strategy is different. Compensation for third-party impacts can be included in the cost of a groundwater substitution transfer (the source of the impact), whereas the planned overdraft in the GSP is a benefit to all groundwater users in the subbasin.

**Domestic Well Replacement Economic Analysis  
for the Chowchilla Subbasin**

**Updated January 2022**

**As Part of the  
Domestic Well Inventory for the  
Chowchilla Subbasin**

***(See Appendix 2.G for the Complete  
Domestic Well Inventory for the  
Chowchilla Subbasin)***



## Technical Memorandum

**Subject:** Domestic Well Replacement Economic Analysis – Chowchilla Update  
**By:** ERA Economics  
**To:** LSCE and the Madera County GSA  
**Date:** January 10, 2022

## Purpose and Background

In June 2019 ERA provided a technical memorandum (TM) estimating the cost and benefit of more rapid implementation of demand management under the Chowchilla Subbasin GSP. The economic analysis was included as Appendix 3C to the Chowchilla Subbasin GSP. The analysis was prepared with the best available data and information at that time. After finalizing the GSP, the LSCE and DE consultant teams have continued to assist the Chowchilla Subbasin GSAs with GSP implementation and annual GSP reporting. LSCE was engaged by the Madera County GSA to prepare an updated domestic well inventory for the subbasin.

The economic analysis included as Appendix 3C to the Chowchilla Subbasin GSP estimated the total cost of replacing domestic wells potentially impacted by declining groundwater levels under baseline conditions without SGMA and under the draft proposed GSP implementation plan (so-called “with-SGMA” scenario).

This technical memorandum (TM) serves as an update to those estimates by: (i) updating the project and demand management schedule to reflect the adopted allocation in the Chowchilla Subbasin, (ii) incorporating updated data and analysis on potentially impacted wells from the domestic well inventory, (iii) updating all costs and benefits to current dollars (e.g., well replacement costs), and (iv) refining the economic analysis to compare the cost and benefit of accelerating demand management specified in the GSP. That is, the 2019 analysis compared the draft GSP implementation to baseline conditions without SGMA, whereas this analysis compares the proposed plan with phased implementation of projects and management actions (PMAs) to an accelerated, immediate implementation of PMAs, notably with immediate full demand management to avoid further domestic well impacts.<sup>1</sup>

These updates to the data affect the resulting economic analysis and results. The 2019 estimate of domestic wells needing to be replaced without increased demand management was 40 wells, which at that time was doubled to account for potential under-reporting. In addition, a sensitivity calculation as

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<sup>1</sup> Whereas the cost of immediate demand management implementation has been included, the effect on cost of accelerating recharge and supply projects has not yet been estimated. A full cost estimate of projects for all GSAs in the subbasin is still under development. If this additional cost were included, it would strengthen the conclusion of this analysis.

part of the earlier analysis verified that the conclusions would have held even if the number of affected wells were substantially larger. The updated domestic well inventory puts the number of domestic wells potentially needing replacement at 176 over the 20-year GSP implementation period. This TM briefly summarizes the updated analysis, results, and summary conclusions.

## Summary Conclusions

Results of this updated analysis comparing the cost of accelerated PMA implementation to the benefit of avoided domestic well replacement costs support the general conclusion of the 2019 analysis. The loss in agricultural value from more rapid demand management still greatly exceeds domestic well replacement costs even though the estimated number of potentially dewatered domestic wells has increased and the cost of replacement for each domestic well has increased by 20 percent. That is, the results of the economic analysis show that the additional cost of more rapid demand management is substantially greater than the cost of replacing potentially dewatered domestic wells and paying higher pumping costs due to lower water levels. This supports the phased implementation schedule and domestic well mitigation program defined in the GSP.

## Updated Assumptions

Assumptions and results below are summarized for each of the cost categories considered. All costs (or savings) are expressed as constant 2021 dollars converted to present value using a 3.5 percent real (inflation-free) discount rate<sup>2</sup>. The two implementation scenarios compared are referred to as *GSP implementation* (the phased implementation as described in the GSP) scenario and the *immediate demand reduction* (full demand reduction to eliminate overdraft from 2021 onward) scenario.

1. **Number of dewatered wells needing replacement.** Revised estimates of dewatered wells are calculated and described in the Technical Memorandum prepared by LSCE for the Chowchilla Subbasin Domestic Well Inventory. For this analysis, a total of 176 wells were estimated to be dewatered, spread across four 5-year periods. The cost analysis further assumed that well impacts would be evenly divided by year within each 5-year period<sup>3</sup>. For the comparison scenario with immediate demand reduction, it was assumed that none of those wells would need replacement.
2. **Costs to replace dewatered domestic wells.** The 2019 estimate of an average \$25,000 per replaced domestic well is updated to \$30,000 per domestic well.
3. **Groundwater pumping depth to water (DTW).** The average DTW for the GSP implementation scenario was provided from groundwater model projections described in the Chowchilla Subbasin GSP. The immediate demand reduction scenario is intended to represent immediate elimination of average annual overdraft. A time series was created that followed the

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<sup>2</sup> The current federal discount rate for water projects is 2.25%, but a real rate of 3.5% better reflects borrowing conditions in Madera County. A 1.5% increase or decrease in the real discount rate does not affect the conclusions of the analysis.

<sup>3</sup> The timing of the well replacement within each 5-year period does not affect the conclusions of this analysis.

general hydrologic variation estimated for the GSP implementation scenario but held the DTW the same on average during the 2021-2040 implementation period. The ending (2040) difference in DTW between the two scenarios was then carried forward beyond 2040. These pumping depth differences are the basis for the estimated annual pumping cost savings.

4. **Changes in variable costs to pump groundwater, for both domestic and agricultural users.** Energy prices, estimated using a mix of PG&E's latest electricity rates for agricultural pumping, have increased substantially. The analysis now uses an average of PG&E's 2021 AG-B and AG-C peak and off-peak summer rates, resulting in an estimate of \$0.40 per acre-foot per foot of lift for the variable cost to pump groundwater. As a result, more rapid demand management provides greater savings (avoided pumping lift) for domestic and agricultural pumping. All agricultural and domestic groundwater pumping in the basin would receive this avoided lift benefit from faster demand reduction.
5. **Costs of demand management under GSP implementation.** Costs of demand reduction have been revised based on the latest estimates of the net return to agricultural water use developed for planning the SALC program. In addition, pumping volumes have been updated to reflect current conditions and the planned ramp-down adopted in the Madera County GSA groundwater allocation ordinance (applicable to the GSP implementation scenario only). These values do not represent average returns to all lands and crops in the subbasin but rather the lands and crops more likely to participate in a demand reduction program. For purposes of this analysis, the lost net return from demand reduction is valued at \$200 per acre-foot<sup>4</sup>.

## Results

The following discussion compares costs between the GSP implementation scenario and the (alternative) immediate demand management scenario. General observations are:

- Demand management costs are greater in the immediate implementation scenario because demand management would be implemented sooner (immediately) and for more years during the GSP implementation period. Recharge and supply projects' costs have not been included in this analysis, but their present value costs would also increase because they would be implemented sooner.
- Pumping costs are lower in the immediate demand reduction scenario because, by definition, the average annual overdraft is eliminated immediately. The effect (smaller DTW and lower pumping cost) is carried throughout the remaining years of GSP implementation and in perpetuity.

---

<sup>4</sup> The value of water depends on future crop market conditions. Note that a higher value (greater than \$200 per acre-foot applied in this TM) would further increase the cost of accelerated demand management relative to avoided well replacement and additional pumping costs.

- Well replacement costs occur in the GSP implementation scenario but are not required in the immediate demand reduction scenario.
- The net effect of these differences in costs results in the GSP implementation scenario having a substantial cost advantage (by about \$36 million in present value, or 16 percent) over the immediate demand reduction scenario. In other words, the Chowchilla Subbasin is better off (i.e., realizes benefits that exceed costs) implementing its phased GSP implementation plan and developing/funding the domestic well mitigation program to replace impacted wells than it is if it were to implement immediate demand reduction to avoid dewatering any domestic wells.

Table 1 summarizes the results of the economic analysis. All values are expressed in present value terms. The first two rows show the number of and cost to replace wells estimated to go dry in each scenario. The next rows present the pumping cost savings of the immediate demand reduction scenario relative to the GSP implementation scenario, broken down by domestic pumping and agricultural pumping. The next row shows the demand management costs. For the GSP implementation scenario, demand management is phased in at two percent per year initially, increasing to 6 percent per year until full demand management is reached by 2040. In contrast, the immediate demand reduction scenario implements the full demand management required in 2020, resulting in substantially higher demand management costs.

**Table 1. Costs of GSP Implementation Scenario Compared to Costs of Immediate Demand Reduction Scenario - Summary Results for Chowchilla Subbasin, Present Value (\$ in Millions)**

	<b>GSP Implementation with Well Replacement</b>	<b>Immediate Demand Reduction</b>	<b>Difference</b>
Domestic Well Replacement Number	176	0	176
Cost, PV	\$4.60	\$0.0	\$4.60
Pumping Cost (Savings), PV			
Domestic	NA	-\$2.87	\$2.87
Agricultural	NA	-\$79.58	\$79.58
Demand Mgmt. Cost, PV	\$219.43	\$342.37	-\$122.94
Total Cost, PV*	\$224.03	\$259.91	-\$35.88

\* Totals may not add exactly due to rounding.

## Discussion

Results indicate that the cost of implementing demand management on a faster trajectory (in this case, in year one of the implementation period) would not be cost effective from a subbasin-wide perspective. The avoided costs (fewer domestic wells requiring replacement) would be small (\$4.6 million) relative

to the additional lost agricultural net return<sup>5</sup> from immediate implementation (\$122.9 million) for the Chowchilla Subbasin, even after accounting for pumping cost savings (\$82.5 million). The general conclusions are robust to the assumptions used. That is, results are not sensitive to reasonable ranges in key assumptions, including the loss in net return per acre-foot of demand management, the total level of demand management, when demand management begins to scale in, or the cost of replacing a domestic well.

This analysis only compares the cost of well replacement to net costs of immediate demand management implementation; it has not considered the timing of other projects such as new surface water supplies or groundwater recharge. That comparison is not possible with current information, and the GSP implementation schedule already reflects an aggressive timeline for project implementation. The cost (in present value) of accelerating implementation of projects has also not been included here. The additional cost of accelerating a recharge project by, say five years, would be the increased present value of the project's capital and O&M cost stream. Costs of new supply and recharge projects have not been accelerated, so the present value of costs for immediate implementation is underestimated. Simply stated, including these additional costs would further support the conclusions of the analysis.

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<sup>5</sup> Note that demand management would result in additional economic impacts to other county businesses and industries. These additional indirect impacts are not considered in this updated analysis but would only further support its conclusions.

## **APPENDIX 3.D. CHOWCHILLA SUBBASIN DOMESTIC WELL MITIGATION PROGRAM**

Prepared as part of the  
**Groundwater Sustainability Plan  
Chowchilla Subbasin**

January 2020  
Revised May 2023

### **GSP Team:**

Davids Engineering, Inc  
Luhdorff & Scalmanini  
ERA Economics  
Stillwater Sciences and  
California State University, Sacramento

**MEMORANDUM OF UNDERSTANDING ESTABLISHING A DOMESTIC WELL MITIGATION  
PROGRAM FOR THE CHOWCHILLA SUBBASIN OF THE SAN JOAQUIN VALLEY GROUNDWATER  
BASIN**

This Memorandum of Understanding (“MOU”) is entered into this \_\_\_ day of \_\_\_\_\_ 2022 (the “Effective Date”), by and between the Chowchilla Water District GSA (Chowchilla WD), Madera County GSA – Chowchilla (Madera County), Merced County GSA – Chowchilla (Merced County), and Triangle T Water District GSA (Triangle T WD), collectively hereinafter referred to as the “Parties,” or individually as the “Party.”

**RECITALS**

- A. **WHEREAS**, groundwater and surface water resources within the Chowchilla Subbasin of the San Joaquin Valley Groundwater Basin (DWR Bulletin 118 No. 5-022.05) (Subbasin) are vitally important resources, in that they provide the foundation to maintain and fulfill current and future environmental, agricultural, domestic, municipal, and industrial needs, and to maintain the economic viability, prosperity, and sustainable management of the Subbasin; and
- B. **WHEREAS**, agriculture has been prominent in making Madera County and Merced County one of the world’s foremost agricultural areas and plays a major role in the economy of both Madera County and Merced County; and
- C. **WHEREAS**, in 2014 the California Legislature passed a statewide framework for sustainable groundwater management, known as the Sustainable Groundwater Management Act, California Water Code § 10720-10737.8 (SGMA), pursuant to Senate Bill 1168, Senate Bill 1319, and Assembly Bill 1739, which was approved by the Governor on September 16, 2014. and went into effect on January 1, 2015; and
- D. **WHEREAS**, the Subbasin has been designated by the California Department of Water Resources (DWR) as a high-priority subbasin in a condition of critical groundwater overdraft and is subject to the requirements of SGMA; and
- E. **WHEREAS**, SGMA requires that all medium and high priority groundwater basins in California be managed by a Groundwater Sustainability Agency (GSA), or multiple GSAs, and that such management be implemented pursuant to an approved Groundwater Sustainability Plan (GSP), or multiple GSPs; and
- F. **WHEREAS**, in accordance with Resolution No. 2016-17, Chowchilla Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- G. **WHEREAS**, in accordance with Resolution No. 2017-014, the County of Madera elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and

- H. **WHEREAS**, in accordance with Resolution No. 2017-15, County of Merced elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- I. **WHEREAS**, in accordance with Resolution No. 17-7, Triangle T Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- J. **WHEREAS**, on January 29, 2020, the Parties submitted a GSP to DWR; and
- K. **WHEREAS**, the Parties agree, and as SGMA allows, a transition to sustainability over the 20-year GSP Implementation Period is in the best overall interest of the Subbasin, although this approach is expected to result in some continued groundwater level declines during the GSP Implementation Period; and
- L. **WHEREAS**, the Parties agree that for the purposes of this MOU, "Domestic Wells" shall be limited to individual private domestic wells.
- M. **WHEREAS**, the Parties agree that as a result of the continued decline in groundwater levels anticipated to occur over the GSP Implementation Period, there may be adverse impacts to some domestic wells in the Subbasin.
- N. **WHEREAS**, the Parties 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."
- O. **NOW, THEREFORE**, in consideration of the mutual promises, covenants and conditions contained herein and these Recitals, which are hereby incorporated herein by this reference, the Parties agree to mitigate for domestic well impacts resulting from declining groundwater levels that occur from groundwater management activities outlined in the GSP through creation and implementation of a Domestic Well Mitigation Program (Program) as follows:

### **AGREEMENT**

1. **PROPORTIONATE SHARE.** The Parties agree to fund the Program on a proportional basis consistent with that set-forth in Exhibit B. Each Party shall be responsible for its proportionate share of the funding requirements.
2. **FUNDING.** The Parties agree to fund the Program on an annual basis consistent with Section 9 set-forth herein. Estimated expenses through 2032 are set-forth in Exhibit C. Expenses for 2033 through 2040, or as may required until groundwater sustainability is achieved, shall be recommended by the GSP Advisory Committee and approved by the Parties no later than December 31, 2030.



3. **ACCOUNTING.** Annual funding shall be placed in an interest-bearing account managed by one of Parties.
4. **PROGRAM DEVELOPMENT COMMITTEE.** The Parties shall establish a Program Development Committee (Committee) that will oversee Program development consistent with Section 11. The Committee shall include at least one technical staff representative from each of the Parties. Decisions of the Committee shall be made through simple majority of the Committee. The Committee shall cease to exist upon the start date of the Program as set-forth in Section 10.
5. **PROGRAM ORGANIZATIONAL STRUCTURE.** Unless otherwise amended and approved by the Parties, the Program organizational structure shall be as shown in Exhibit D.
6. **BUDGET CYCLE.** The budget cycle of the Program shall be on a calendar year basis.
7. **BUDGET REVIEW.** Not less than once per year, the Parties shall convene a meeting of the GSP Advisory Committee to review Program implementation progress in that year and plan for Program implementation in the subsequent year.
8. **IN-KIND SERVICES.** Each Party is likely to provide in-kind services and subsequently incur in-kind costs as part of continued program development and management. Said costs shall be the responsibility of each Party unless otherwise agreed to by the Parties.
9. **FAILURE TO PAY.** The Parties recognize that any Party's failure to pay its respective share of any Annual Budget or budget increase when due, whether or not that Party's Governing Body approved the Annual Budget or the budget increase, places the Subbasin in jeopardy of being subject to intervention by the State Water Resources Control Board (SWRCB), including being designated on probationary status, and being subject to an interim plan promulgated by the SWRCB. Recognizing the importance of this Program, the parties agree to the following potential actions should any Party fail to pay consistent with this Section 9:
  - a. The Party that fails to pay shall be ineligible to vote on any subject or issue unless such failure is excused by the Committee through formal action and majority approval of the Committee. During any period of time during which a Party is ineligible to vote on a matter by reason of the application of this Section 9, such Party shall not be counted as a Party in determining a quorum, or in determining a "majority" with regard to the approval of any action. In order to restore its eligibility to vote, a Party must be current on all amounts due, including any expenditures approved by the Committee while such Party was ineligible to vote.

- b. Failure to pay shall be explicitly noted in the Annual Report for the Subbasin.
  - c. Within 10 days after such failure to pay, the Parties shall attempt in good faith to resolve the dispute through informal means for a period of 30 days. If the Parties, through informal means, cannot agree upon a resolution of the failure to pay within 30 days, the Parties shall submit the dispute to mediation prior to commencement of legal action. The cost of mediation shall be split equally between the Parties. Upon completion of mediation and if the dispute has not been resolved, any Party may exercise any and all rights to bring a legal action relating to the dispute.
10. **TERM.** The Program shall begin no later than January 1, 2023, shall cover eligible mitigation as of January 31, 2020, and shall continue for the duration of the GSP Implementation Period or until groundwater sustainability is achieved.
11. **PROGRAM ELIGIBILITY AND TERMS AND CONDITIONS.** The Parties agree to develop Program eligibility and terms and conditions for Program implementation as generally defined in Exhibit E. Said eligibility and terms and conditions shall include, but shall not be limited to:
- a. Definitions
  - b. Property eligibility
  - c. Property owner eligibility
  - d. Program application process
  - e. Preferred contractors
  - f. Preliminary inspection process
  - g. Program form development
  - h. Priority
  - i. Eligible mitigation
  - j. Non-eligible mitigation
  - k. Maximum mitigation award
  - l. Recordation of mitigation award
12. **PROGRAM MANAGEMENT.** Program management shall be facilitated by one of the Parties. If one of the Parties doesn't elect to program management duties and through recommendation of the GSP Advisory Committee and approval of the Parties, Program management shall be facilitated through a third party.
13. **ENVIRONMENTAL REVIEW.** The Parties agree to cooperatively complete any environmental review as may be determined necessary for Program implementation. Any costs associated with environmental review shall be per the proportionate share as set-forth in this MOU.

14. **OTHER COSTS.** Any and all other costs not specifically included in this MOU shall be attributed to the Parties per the proportionate share as set-forth in this MOU.
15. **NOTICES.** All notices required or permitted by the MOU shall be made in writing, and may be delivered in person (by hand or by courier) or may be sent regular, certified, or registered mail or U.S. Postal Service Express Mail, with postage prepaid, or by facsimile transmission, or by electronic transmission (email) and shall be deemed sufficiently given if served in a manner specified in this Section 16. The addresses and addressees noted below are the Party's designated address and addressee for deliver or mailing notices.

To Madera County:

County of Madera  
Stephanie Anagnoson  
200 W 4<sup>th</sup> Street, 4<sup>th</sup> Floor  
Madera, CA 93637

To Chowchilla WD:

Chowchilla Water District  
Brandon Tomlinson  
327 South Chowchilla Blvd.  
Chowchilla, CA 93610

To Merced County:

County of Merced  
Lacey McBride  
2222 M Street  
Merced, CA 95340

To Triangle T WD:

Triangle T Water District  
Brad Samuelson  
P.O. Box 2657  
Los Banos, CA 93635

Any Party may, by written notice to each of the other Parties, specify a different address for notice. Any notice sent by registered or certified mail, return receipt requested, shall be deemed given on the date of delivery shown on the receipt card, or if no delivery date is shown, three days after the postmark date. If sent by regular mail, the notice shall be deemed given 48 hours after it is addressed as required in this section and mailed with postage prepaid. Notices delivered by United States Express Mail or overnight courier that guarantee next day delivery shall be deemed given 24 hours after delivery to the Postal Service or overnight courier. Notices transmitted by facsimile transmission or similar means (including email) shall be deemed delivered upon telephone or similar confirmation of delivery (conformation report from fax machine is sufficient), provided a copy is also delivered via personal delivery or mail. If notice is received after 4:00 p.m. or on a Saturday, Sunday or legal holiday, it shall be deemed received on the next business day.

**IN WITNESS WHEREOF**, the Parties have caused this MOU to be executed, each signatory hereto represents that he/she has been appropriately authorized to enter into this MOU on behalf of the Party whom he/she signs.

**County of Madera**

\_\_\_\_\_  
[Signature]

\_\_\_\_\_  
Date

**Chowchilla Water District**

\_\_\_\_\_  
Brandon Tomlinson

\_\_\_\_\_  
Date

**County of Merced**

\_\_\_\_\_

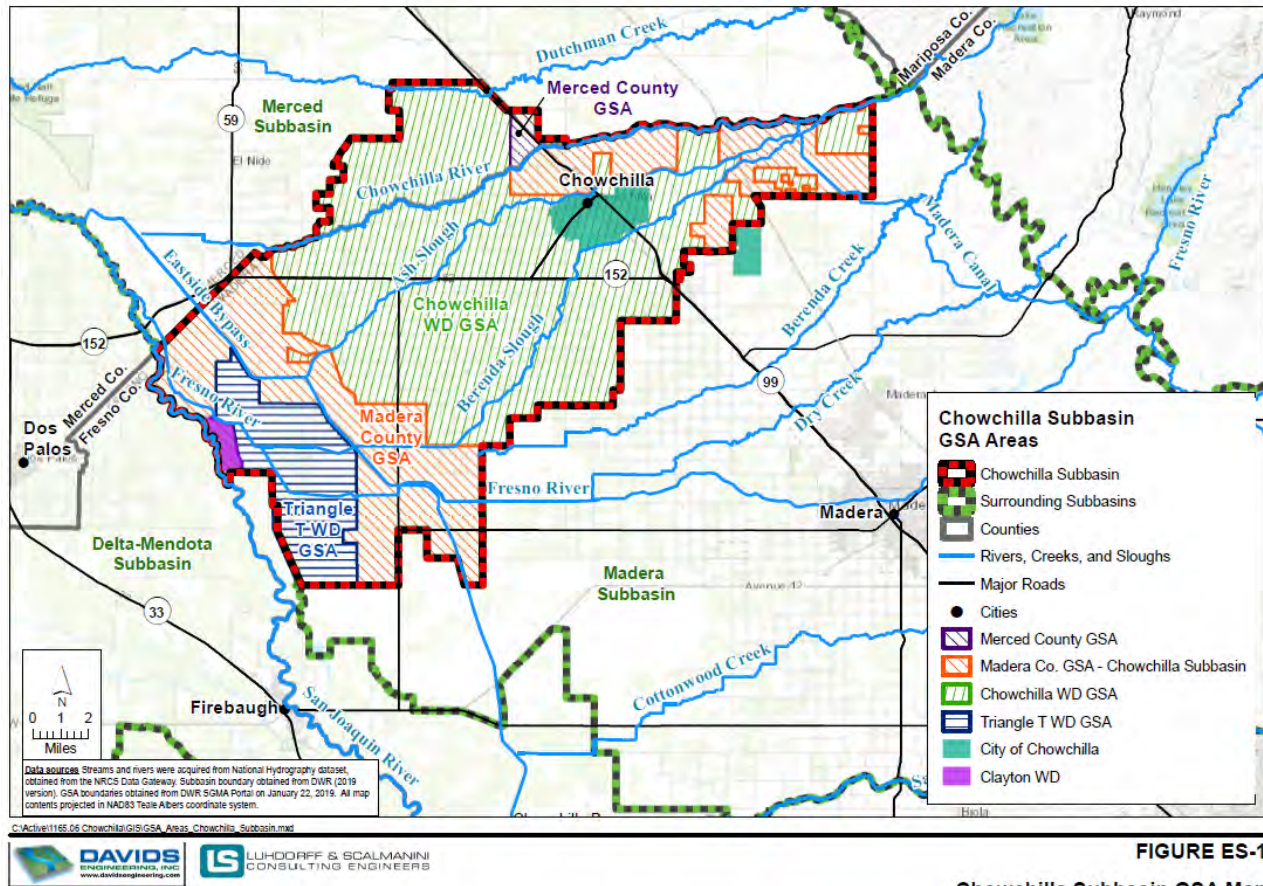
\_\_\_\_\_  
Date

**Triangle T Water District**

\_\_\_\_\_

\_\_\_\_\_  
Date

## EXHIBIT A



## EXHIBIT B

GSA	Average Shortage (AF) <sup>1</sup>	Net Recharge (AF) <sup>2</sup>	Proportionate Share (%)
Chowchilla WD	22800	-22800	30%
Madera County <sup>3</sup>	39700	-39700	53%
Madera County - Sierra Vista MWC <sup>4</sup>	1800	-1800	2%
Merced County - Sierra Vista MWC <sup>4</sup>	900	-900	1%
Triangle T WD	10200	-10200	14%
Subbasin Totals =	75400	-75400	100%

**Notes:**

<sup>1</sup> Average Shortage is defined as groundwater extraction minus total recharge from the SWS (deep percolation and seepage), thus a positive value indicates more water is taken from a subbasin than is recharging from the surface. This is equivalent to the inverse of Net Recharge from SWS as defined in some presentations and documents.

<sup>2</sup> Net Recharge is defined as total recharge minus groundwater extraction, thus a positive value indicates that more water is recharged from the surface than is taken from the surface.

<sup>3</sup> Net Recharge summarized from the Madera County - East and Madera County West subregion water budgets developed for the Chowchilla Subbasin GSP.

<sup>4</sup> Sierra Vista MWC spans the Merced County GSA - Chowchilla area (1,300 ac) and part of the Madera County GSA - Chowchilla area (2,600 ac). Total Sierra Vista MWC average shortage is 2,700 AF. Using the acreage distribution previously noted, one-third of the average shortage has been assigned to Merced County and two-thirds has been assigned to Madera County. Merced County will bill Sierra Vista MWC for their proportionate share (1%) for lands within Merced County.

## EXHIBIT C

GSA <sup>2,3</sup>	Description	Proportionate Share <sup>1</sup>	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028	FYE 2029	FYE 2030	FYE 2031	FYE 2032
Madera County	Capital Costs	55%	\$ 552,602	\$ 570,285	\$ 588,533	\$ 260,299	\$ 268,629	\$ 277,226	\$ 286,097	\$ 295,252	\$ 4,353	\$ 4,492
	Admin/Operating Costs		\$ 53,251	\$ 54,955	\$ 56,713	\$ 25,083	\$ 25,886	\$ 26,714	\$ 27,569	\$ 28,452	\$ 419	\$ 433
	Total Costs		\$ 605,853	\$ 625,240	\$ 645,246	\$ 285,382	\$ 294,515	\$ 303,940	\$ 313,666	\$ 323,704	\$ 4,772	\$ 4,925
Merced County	Capital Costs	1%	\$ 10,047	\$ 10,369	\$ 10,701	\$ 4,733	\$ 4,884	\$ 5,040	\$ 5,202	\$ 5,368	\$ 79	\$ 82
	Admin/Operating Costs		\$ 1,005	\$ 1,037	\$ 1,070	\$ 473	\$ 488	\$ 504	\$ 520	\$ 537	\$ 8	\$ 8
	Total Costs		\$ 11,052	\$ 11,406	\$ 11,771	\$ 5,206	\$ 5,373	\$ 5,545	\$ 5,722	\$ 5,905	\$ 87	\$ 90
Triangle T WD	Capital Costs	14%	\$ 140,662	\$ 145,163	\$ 149,808	\$ 66,258	\$ 68,378	\$ 70,567	\$ 72,825	\$ 75,155	\$ 1,108	\$ 1,144
	Admin/Operating Costs		\$ 14,066	\$ 14,516	\$ 14,981	\$ 6,626	\$ 6,838	\$ 7,057	\$ 7,282	\$ 7,516	\$ 111	\$ 114
	Total Costs		\$ 154,728	\$ 159,680	\$ 164,789	\$ 72,884	\$ 75,216	\$ 77,623	\$ 80,107	\$ 82,671	\$ 1,219	\$ 1,258
Chowchilla WD	Capital Costs	30%	\$ 301,419	\$ 311,064	\$ 321,018	\$ 141,982	\$ 146,525	\$ 151,214	\$ 156,053	\$ 161,047	\$ 2,375	\$ 2,450
	Admin/Operating Costs		\$ 30,142	\$ 31,106	\$ 32,102	\$ 14,198	\$ 14,653	\$ 15,121	\$ 15,605	\$ 16,105	\$ 237	\$ 245
	Total Costs		\$ 331,561	\$ 342,171	\$ 353,120	\$ 156,180	\$ 161,178	\$ 166,336	\$ 171,658	\$ 177,151	\$ 2,612	\$ 2,695
	% Responsibility	100%										
	Total Capital Costs		\$ 1,004,730	\$ 1,036,881	\$ 1,070,060	\$ 473,272	\$ 488,417	\$ 504,047	\$ 520,175	\$ 536,823	\$ 7,915	\$ 8,168
	Total Admin/Operating Costs		\$ 98,464	\$ 101,615	\$ 104,866	\$ 46,380	\$ 47,865	\$ 49,396	\$ 50,977	\$ 52,609	\$ 775	\$ 801
	Total Costs		\$ 1,103,194	\$ 1,138,496	\$ 1,174,926	\$ 519,652	\$ 536,282	\$ 553,443	\$ 571,152	\$ 589,432	\$ 8,690	\$ 8,968

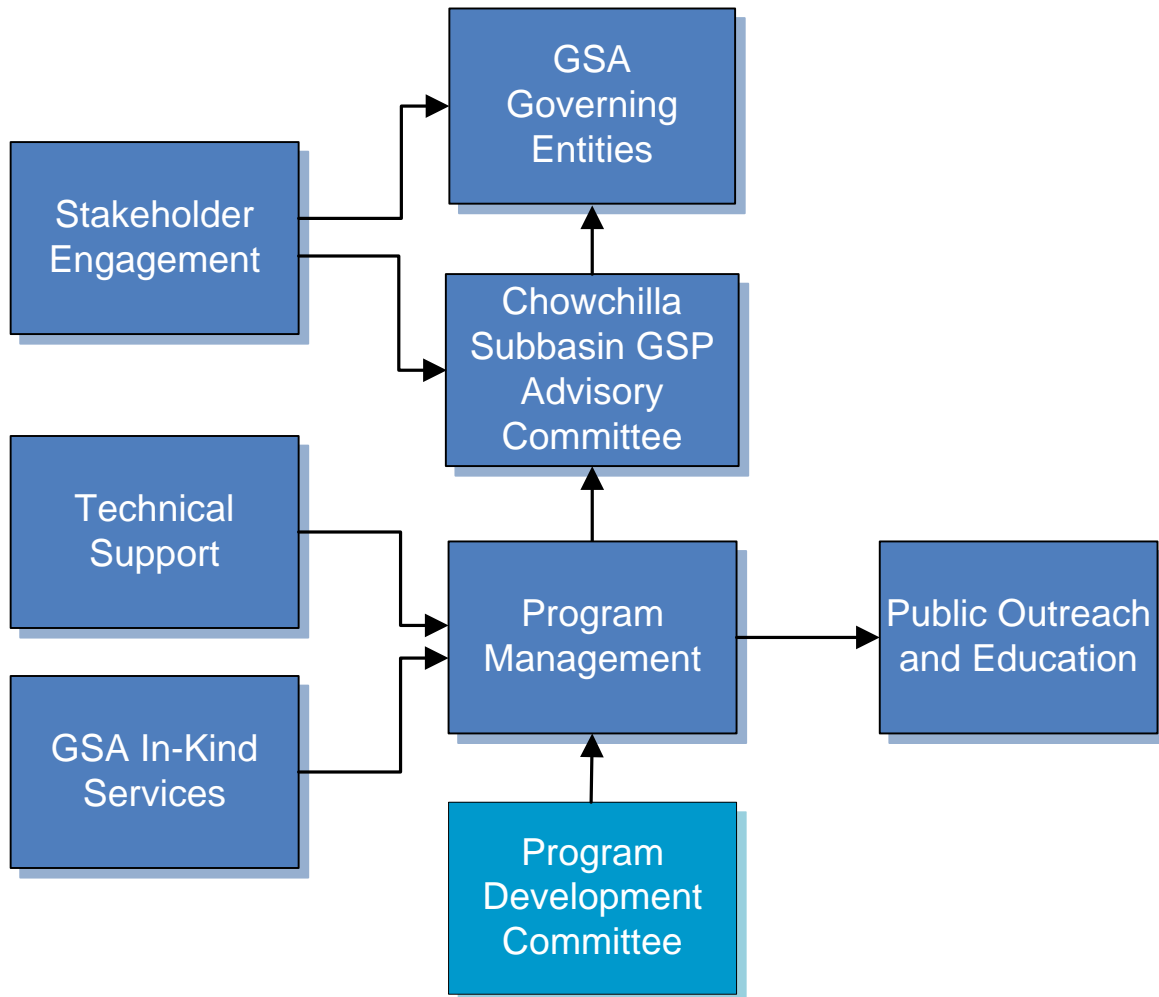
**Notes:**

<sup>1</sup> Proportionate share is as determined in a spreadsheet prepared by Davids Engineering titled Chowchilla\_Historical\_Projected\_Water\_Budget\_Shortage dated May 21, 2021.

<sup>2</sup> Merced County, Triangle T WD, and Chowchilla WD GSA costs have been scaled from the Madera County GSA costs.

<sup>3</sup> Sierra Vista MWC spans the Merced County GSA - Chowchilla area (1,300 ac) and part of the Madera County GSA - Chowchilla area (2,600 ac). Total Sierra Vista MWC average shortage is 2,700 AF. Using the acreage distribution previously noted, one-third of the average shortage has been assigned to Merced County and two-thirds has been assigned to Madera County. Merced County will bill Sierra Vista MWC for their proportionate share (1%) for lands within Merced County.

**Exhibit D**  
**Chowchilla Subbasin – Domestic Well Mitigation Program**  
**Organizational Structure**  
June 6, 2022



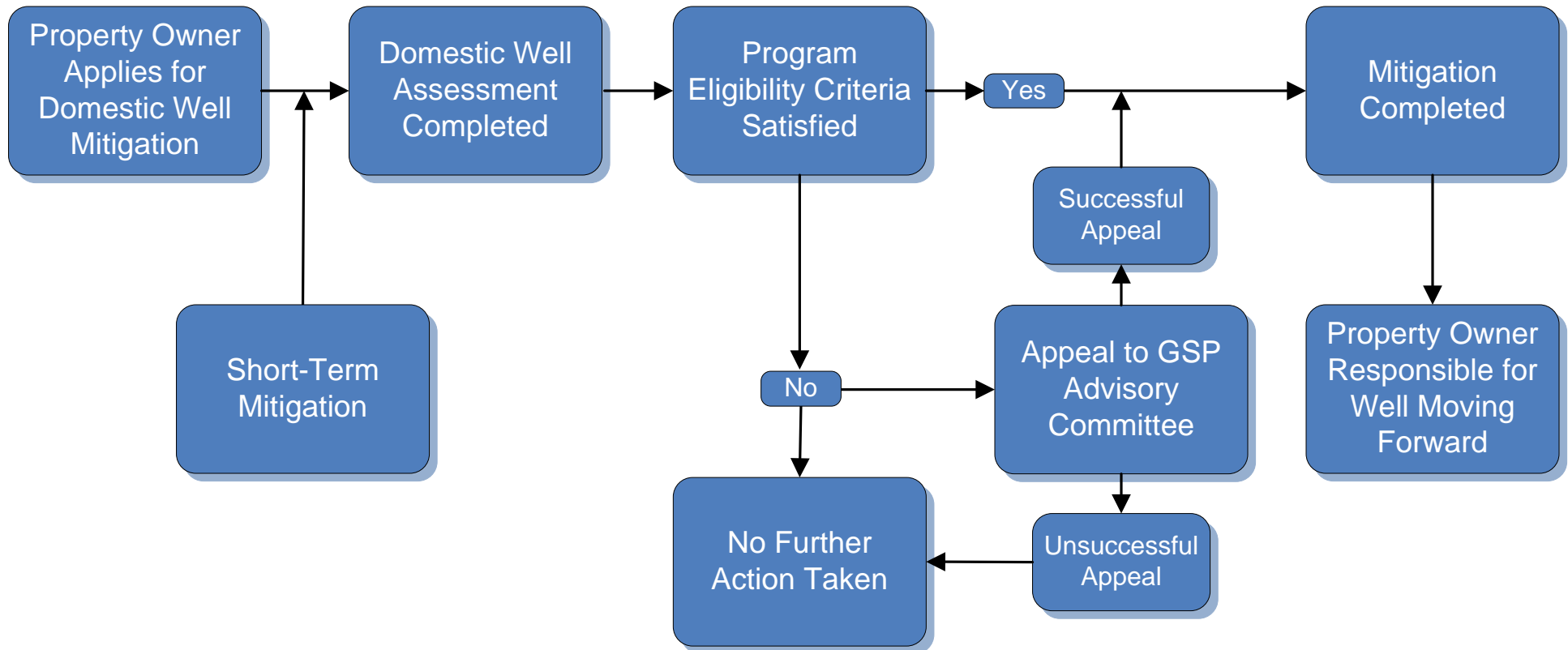
**Notes:**

1. That shown herein is subject to revision by the Parties.
2. Public Outreach and Engagement is a necessary component as outlined 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."
3. The Chowchilla Subbasin GSP Advisory Committee is as defined and established under Section 3 of the Memorandum of Understanding with Respect to the Coordination, Cooperation and Cost Sharing in the Implementation of Chowchilla Subbasin Groundwater Sustainability Plan entered into by the Parties on December 17, 2019.



**Exhibit E**  
**Chowchilla Subbasin – Domestic Well Mitigation Program**  
**Implementation Flowchart**

June 6, 2022



**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.
2. That shown herein is subject to revision by the Parties.
3. The GSAs have reviewed and considered the content and recommendation set-for 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."

Chowchilla Subbasin Domestic Well Mitigation Program  
Memorandum of Understanding

SIGNED

## Chowchilla Water District GSA

**MEMORANDUM OF UNDERSTANDING ESTABLISHING A DOMESTIC WELL MITIGATION  
PROGRAM FOR THE CHOWCHILLA SUBBASIN OF THE SAN JOAQUIN VALLEY GROUNDWATER  
BASIN**

This Memorandum of Understanding ("MOU") is entered into this 13<sup>th</sup> day of July 2022 (the "Effective Date"), by and between the Chowchilla Water District GSA (Chowchilla WD), Madera County GSA – Chowchilla (Madera County), Merced County GSA – Chowchilla (Merced County), and Triangle T Water District GSA (Triangle T WD), collectively hereinafter referred to as the "Parties," or individually as the "Party."

**RECITALS**

- A. **WHEREAS**, groundwater and surface water resources within the Chowchilla Subbasin of the San Joaquin Valley Groundwater Basin (DWR Bulletin 118 No. 5-022.05) (Subbasin) are vitally important resources, in that they provide the foundation to maintain and fulfill current and future environmental, agricultural, domestic, municipal, and industrial needs, and to maintain the economic viability, prosperity, and sustainable management of the Subbasin; and
- B. **WHEREAS**, agriculture has been prominent in making Madera County and Merced County one of the world's foremost agricultural areas and plays a major role in the economy of both Madera County and Merced County; and
- C. **WHEREAS**, in 2014 the California Legislature passed a statewide framework for sustainable groundwater management, known as the Sustainable Groundwater Management Act, California Water Code § 10720-10737.8 (SGMA), pursuant to Senate Bill 1168, Senate Bill 1319, and Assembly Bill 1739, which was approved by the Governor on September 16, 2014. and went into effect on January 1, 2015; and
- D. **WHEREAS**, the Subbasin has been designated by the California Department of Water Resources (DWR) as a high-priority subbasin in a condition of critical groundwater overdraft and is subject to the requirements of SGMA; and
- E. **WHEREAS**, SGMA requires that all medium and high priority groundwater basins in California be managed by a Groundwater Sustainability Agency (GSA), or multiple GSAs, and that such management be implemented pursuant to an approved Groundwater Sustainability Plan (GSP), or multiple GSPs; and
- F. **WHEREAS**, in accordance with Resolution No. 2016-17, Chowchilla Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
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- I. **WHEREAS**, in accordance with Resolution No. 17-7, Triangle T Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- J. **WHEREAS**, on January 29, 2020, the Parties submitted a GSP to DWR; and
- K. **WHEREAS**, the Parties agree, and as SGMA allows, a transition to sustainability over the 20-year GSP Implementation Period is in the best overall interest of the Subbasin, although this approach is expected to result in some continued groundwater level declines during the GSP Implementation Period; and
- L. **WHEREAS**, the Parties agree that for the purposes of this MOU, "Domestic Wells" shall be limited to individual private domestic wells.
- M. **WHEREAS**, the Parties agree that as a result of the continued decline in groundwater levels anticipated to occur over the GSP Implementation Period, there may be adverse impacts to some domestic wells in the Subbasin.
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3. **ACCOUNTING.** Annual funding shall be placed in an interest-bearing account managed by one of Parties.
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- b. Failure to pay shall be explicitly noted in the Annual Report for the Subbasin.
- c. Within 10 days after such failure to pay, the Parties shall attempt in good faith to resolve the dispute through informal means for a period of 30 days. If the Parties, through informal means, cannot agree upon a resolution of the failure to pay within 30 days, the Parties shall submit the dispute to mediation prior to commencement of legal action. The cost of mediation shall be split equally between the Parties. Upon completion of mediation and if the dispute has not been resolved, any Party may exercise any and all rights to bring a legal action relating to the dispute.

10. **TERM.** The Program shall begin no later than January 1, 2023, shall cover eligible mitigation as of January 31, 2020, and shall continue for the duration of the GSP Implementation Period or until groundwater sustainability is achieved.

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- h. Priority
- i. Eligible mitigation
- j. Non-eligible mitigation
- k. Maximum mitigation award
- l. Recordation of mitigation award

12. **PROGRAM MANAGEMENT.** Program management shall be facilitated by one of the Parties. If one of the Parties doesn't elect to program management duties and through recommendation of the GSP Advisory Committee and approval of the Parties, Program management shall be facilitated through a third party.

13. **ENVIRONMENTAL REVIEW.** The Parties agree to cooperatively complete any environmental review as may be determined necessary for Program implementation. Any costs associated with environmental review shall be per the proportionate share as set-forth in this MOU.

14. **OTHER COSTS.** Any and all other costs not specifically included in this MOU shall be attributed to the Parties per the proportionate share as set-forth in this MOU.
15. **NOTICES.** All notices required or permitted by the MOU shall be made in writing, and may be delivered in person (by hand or by courier) or may be sent regular, certified, or registered mail or U.S. Postal Service Express Mail, with postage prepaid, or by facsimile transmission, or by electronic transmission (email) and shall be deemed sufficiently given if served in a manner specified in this Section 16. The addresses and addressees noted below are the Party's designated address and addressee for deliver or mailing notices.

To Madera County:	County of Madera Stephanie Anagnoson 200 W 4 <sup>th</sup> Street, 4 <sup>th</sup> Floor Madera, CA 93637
-------------------	--

To Chowchilla WD:	Chowchilla Water District Brandon Tomlinson 327 South Chowchilla Blvd. Chowchilla, CA 93610
-------------------	--

To Merced County:	County of Merced Lacey McBride 2222 M Street Merced, CA 95340
-------------------	--

To Triangle T WD:	Triangle T Water District Brad Samuelson P.O. Box 2657 Los Banos, CA 93635
-------------------	---

Any Party may, by written notice to each of the other Parties, specify a different address for notice. Any notice sent by registered or certified mail, return receipt requested, shall be deemed given on the date of delivery shown on the receipt card, or if no delivery date is shown, three days after the postmark date. If sent by regular mail, the notice shall be deemed given 48 hours after it is addressed as required in this section and mailed with postage prepaid. Notices delivered by United States Express Mail or overnight courier that guarantee next day delivery shall be deemed given 24 hours after delivery to the Postal Service or overnight courier. Notices transmitted by facsimile transmission or similar means (including email) shall be deemed delivered upon telephone or similar confirmation of delivery (conformation report from fax machine is sufficient), provided a copy is also delivered via personal delivery or mail. If notice is received after 4:00 p.m. or on a Saturday, Sunday or legal holiday, it shall be deemed received on the next business day.



**IN WITNESS WHEREOF**, the Parties have caused this MOU to be executed, each signatory hereto represents that he/she has been appropriately authorized to enter into this MOU on behalf of the Party whom he/she signs.

**County of Madera**

\_\_\_\_\_

\_\_\_\_\_  
Date

**Chowchilla Water District**

  
Brandon Tomlinson

*7/13/22*  
\_\_\_\_\_  
Date

**County of Merced**

\_\_\_\_\_

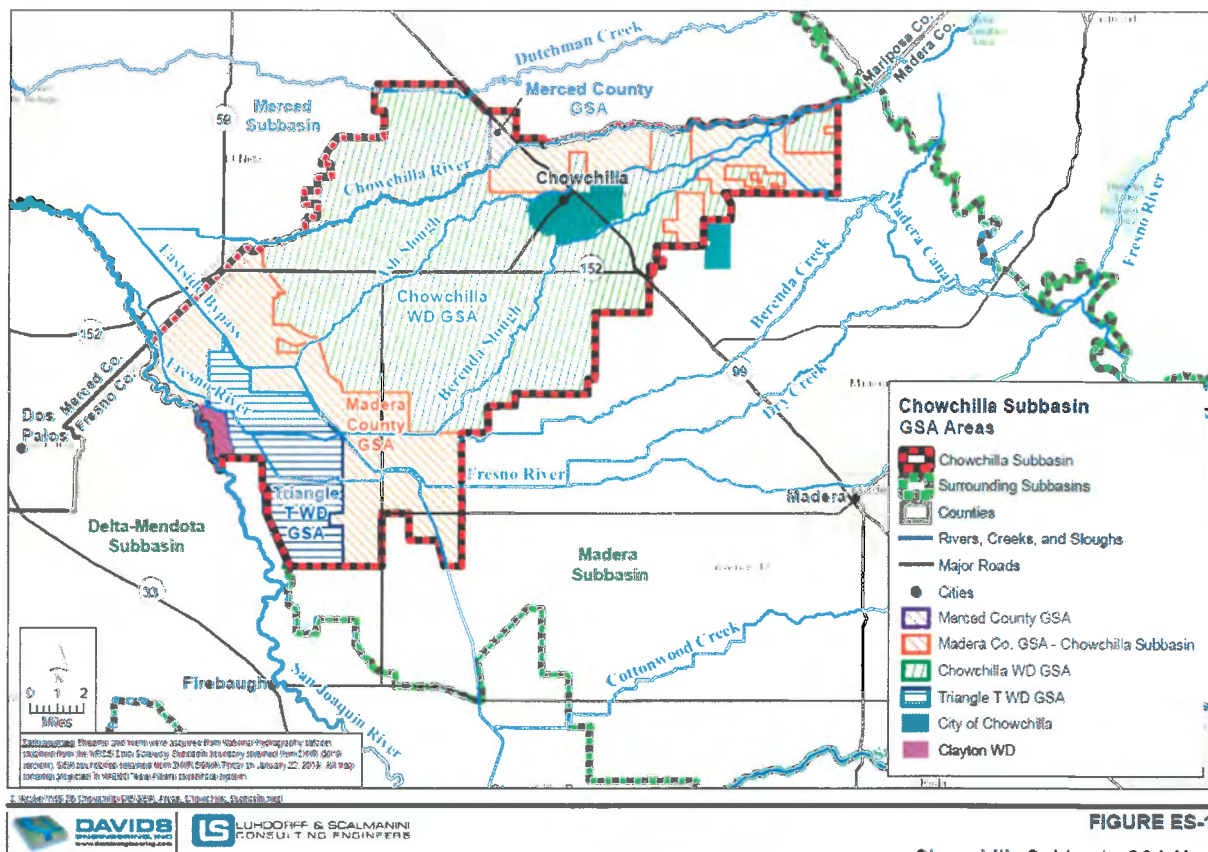
\_\_\_\_\_  
Date

**Triangle T Water District**

\_\_\_\_\_

\_\_\_\_\_  
Date

## EXHIBIT A



**FIGURE ES-1**

### Chowchilla Subbasin GSA Map

Madera County - Chowchilla Subbasin  
SGMA Data Collection and Analysis

## EXHIBIT B

GSA	Average Shortage (AF) <sup>1</sup>	Net Recharge (AF) <sup>2</sup>	Proportionate Share (%)
Chowchilla WD	22800	-22800	30%
Madera County <sup>3</sup>	39700	-39700	53%
Madera County - Sierra Vista MWC <sup>4</sup>	1800	-1800	2%
Merced County - Sierra Vista MWC <sup>4</sup>	900	-900	1%
Triangle T WD	10200	-10200	14%
Subbasin Totals =	75400	-75400	100%

Notes:

<sup>1</sup> Average Shortage is defined as groundwater extraction minus total recharge from the SWS (deep percolation and seepage), thus a positive value indicates more water is taken from a subbasin than is recharging from the surface. This is equivalent to the inverse of Net Recharge from SWS as defined in some presentations and documents.

<sup>2</sup> Net Recharge is defined as total recharge minus groundwater extraction, thus a positive value indicates that more water is recharged from the surface than is taken from the surface.

<sup>3</sup> Net Recharge summarized from the Madera County - East and Madera County West subregion water budgets developed for the Chowchilla Subbasin GSP.

<sup>4</sup> Sierra Vista MWC spans the Merced County GSA - Chowchilla area (1,300 ac) and part of the Madera County GSA - Chowchilla area (2,600 ac). Total Sierra Vista MWC average shortage is 2,700 AF. Using the acreage distribution previously noted, one-third of the average shortage has been assigned to Merced County and two-thirds has been assigned to Madera County. Merced County will bill Sierra Vista MWC for their proportionate share (1%) for lands within Merced County.

## EXHIBIT C

GSA <sup>1,2</sup>	Description	Proportionate Share <sup>1</sup>	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028	FYE 2029	FYE 2030	FYE 2031	FYE 2032
Madera County	Capital Costs	55%	\$ 552,602	\$ 570,285	\$ 588,533	\$ 260,299	\$ 268,629	\$ 277,226	\$ 286,097	\$ 295,252	\$ 4,353	\$ 4,492
	Admin/Operating Costs		\$ 53,251	\$ 54,955	\$ 56,713	\$ 25,083	\$ 25,886	\$ 26,714	\$ 27,569	\$ 28,452	\$ 419	\$ 433
	Total Costs		\$ 605,853	\$ 625,240	\$ 645,246	\$ 285,382	\$ 294,515	\$ 303,940	\$ 313,666	\$ 323,704	\$ 4,772	\$ 4,925
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**Notes:**

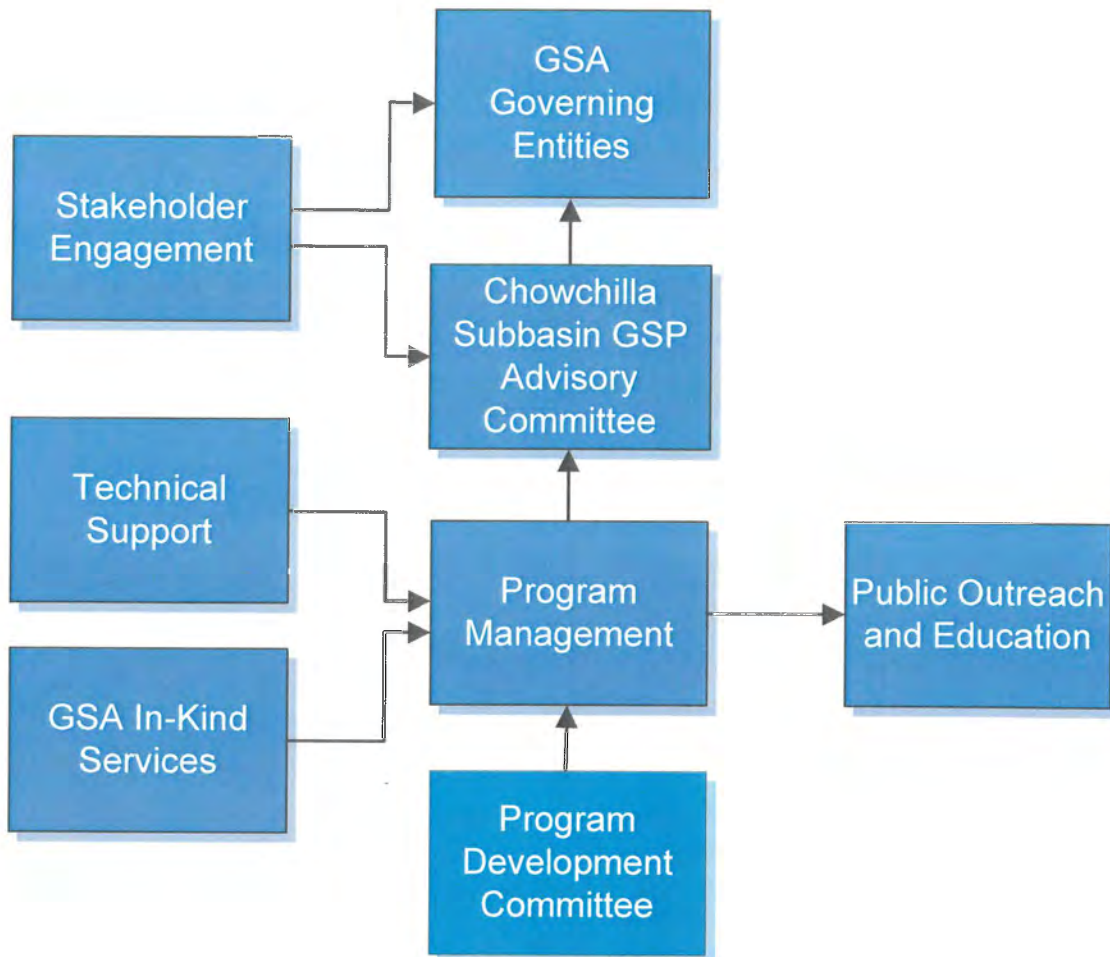
<sup>1</sup> Proportionate share is as determined in a spreadsheet prepared by Davids Engineering titled Chowchilla\_Historical\_Projected\_Water\_Budget\_Shortage dated May 21, 2021.

<sup>2</sup> Merced County, Triangle T WD, and Chowchilla WD GSA costs have been scaled from the Madera County GSA costs.

<sup>3</sup> Sierra Vista MWC spans the Merced County GSA - Chowchilla area (1,300 ac) and part of the Madera County GSA - Chowchilla area (2,600 ac). Total Sierra Vista MWC average shortage is 2,700 AF. Using the acreage distribution previously noted, one-third of the average shortage has been assigned to Merced County and two-thirds has been assigned to Madera County. Merced County will bill Sierra Vista MWC for their proportionate share (1%) for lands within Merced County.

Exhibit D  
Chowchilla Subbasin – Domestic Well Mitigation Program  
Organizational Structure

June 6, 2022

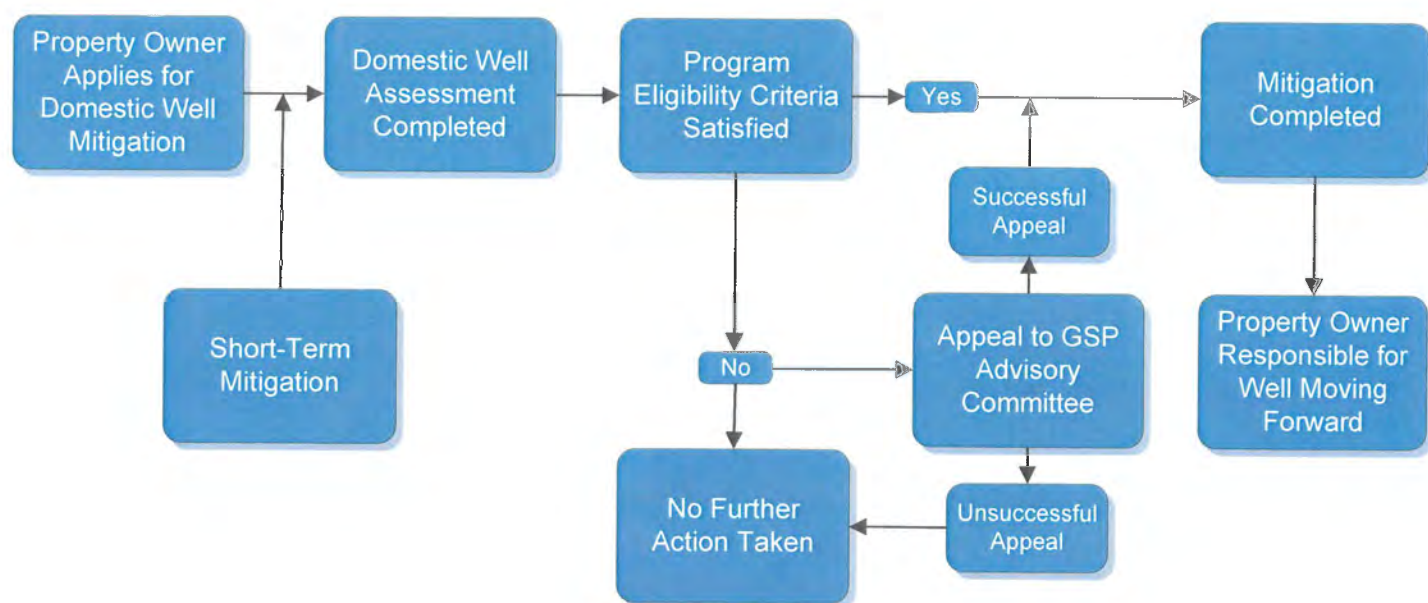


Notes:

1. That shown herein is subject to revision by the Parties.
2. Public Outreach and Engagement is a necessary component as outlined 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."
3. The Chowchilla Subbasin GSP Advisory Committee is as defined and established under Section 3 of the Memorandum of Understanding with Respect to the Coordination, Cooperation and Cost Sharing in the Implementation of Chowchilla Subbasin Groundwater Sustainability Plan entered into by the Parties on December 17, 2019.

Exhibit E  
Chowchilla Subbasin – Domestic Well Mitigation Program  
Implementation Flowchart

June 6, 2022



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.
2. That shown herein is subject to revision by the Parties.
3. The GSAs have reviewed and considered the content and recommendation set-for 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."

County of Merced GSA - Chowchilla



**MEMORANDUM OF UNDERSTANDING ESTABLISHING A DOMESTIC WELL MITIGATION  
PROGRAM FOR THE CHOWCHILLA SUBBASIN OF THE SAN JOAQUIN VALLEY GROUNDWATER  
BASIN**

This Memorandum of Understanding ("MOU") is entered into this 19<sup>th</sup> day of July, 2022 (the "Effective Date"), by and between the Chowchilla Water District GSA (Chowchilla WD), Madera County GSA – Chowchilla (Madera County), Merced County GSA – Chowchilla (Merced County), and Triangle T Water District GSA (Triangle T WD), collectively hereinafter referred to as the "Parties," or individually as the "Party."

**RECITALS**

- A. **WHEREAS**, groundwater and surface water resources within the Chowchilla Subbasin of the San Joaquin Valley Groundwater Basin (DWR Bulletin 118 No. 5-022.05) (Subbasin) are vitally important resources, in that they provide the foundation to maintain and fulfill current and future environmental, agricultural, domestic, municipal, and industrial needs, and to maintain the economic viability, prosperity, and sustainable management of the Subbasin; and
- B. **WHEREAS**, agriculture has been prominent in making Madera County and Merced County one of the world's foremost agricultural areas and plays a major role in the economy of both Madera County and Merced County; and
- C. **WHEREAS**, in 2014 the California Legislature passed a statewide framework for sustainable groundwater management, known as the Sustainable Groundwater Management Act, California Water Code § 10720-10737.8 (SGMA), pursuant to Senate Bill 1168, Senate Bill 1319, and Assembly Bill 1739, which was approved by the Governor on September 16, 2014, and went into effect on January 1, 2015; and
- D. **WHEREAS**, the Subbasin has been designated by the California Department of Water Resources (DWR) as a high-priority subbasin in a condition of critical groundwater overdraft and is subject to the requirements of SGMA; and
- E. **WHEREAS**, SGMA requires that all medium and high priority groundwater basins in California be managed by a Groundwater Sustainability Agency (GSA), or multiple GSAs, and that such management be implemented pursuant to an approved Groundwater Sustainability Plan (GSP), or multiple GSPs; and
- F. **WHEREAS**, in accordance with Resolution No. 2016-17, Chowchilla Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- G. **WHEREAS**, in accordance with Resolution No. 2017-014, the County of Madera elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and



- H. **WHEREAS**, in accordance with Resolution No. 2017-15, County of Merced elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- I. **WHEREAS**, in accordance with Resolution No. 17-7, Triangle T Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- J. **WHEREAS**, on January 29, 2020, the Parties submitted a GSP to DWR; and
- K. **WHEREAS**, the Parties agree, and as SGMA allows, a transition to sustainability over the 20-year GSP Implementation Period is in the best overall interest of the Subbasin, although this approach is expected to result in some continued groundwater level declines during the GSP Implementation Period; and
- L. **WHEREAS**, the Parties agree that for the purposes of this MOU, "Domestic Wells" shall be limited to individual private domestic wells.
- M. **WHEREAS**, the Parties agree that as a result of the continued decline in groundwater levels anticipated to occur over the GSP Implementation Period, there may be adverse impacts to some domestic wells in the Subbasin.
- N. **WHEREAS**, the Parties 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."
- O. **NOW, THEREFORE**, in consideration of the mutual promises, covenants and conditions contained herein and these Recitals, which are hereby incorporated herein by this reference, the Parties agree to mitigate for domestic well impacts resulting from declining groundwater levels that occur from groundwater management activities outlined in the GSP through creation and implementation of a Domestic Well Mitigation Program (Program) as follows:

#### **AGREEMENT**

1. **PROPORTIONATE SHARE.** The Parties agree to fund the Program on a proportional basis consistent with that set-forth in Exhibit B. Each Party shall be responsible for its proportionate share of the funding requirements.
2. **FUNDING.** The Parties agree to fund the Program on an annual basis consistent with Section 9 set-forth herein. Estimated expenses through 2032 are set-forth in Exhibit C. Expenses for 2033 through 2040, or as may required until groundwater sustainability is achieved, shall be recommended by the GSP Advisory Committee and approved by the Parties no later than December 31, 2030.



3. **ACCOUNTING.** Annual funding shall be placed in an interest-bearing account managed by one of Parties.
4. **PROGRAM DEVELOPMENT COMMITTEE.** The Parties shall establish a Program Development Committee (Committee) that will oversee Program development consistent with Section 11. The Committee shall include at least one technical staff representative from each of the Parties. Decisions of the Committee shall be made through simple majority of the Committee. The Committee shall cease to exist upon the start date of the Program as set-forth in Section 10.
5. **PROGRAM ORGANIZATIONAL STRUCTURE.** Unless otherwise amended and approved by the Parties, the Program organizational structure shall be as shown in Exhibit D.
6. **BUDGET CYCLE.** The budget cycle of the Program shall be on a calendar year basis.
7. **BUDGET REVIEW.** Not less than once per year, the Parties shall convene a meeting of the GSP Advisory Committee to review Program implementation progress in that year and plan for Program implementation in the subsequent year.
8. **IN-KIND SERVICES.** Each Party is likely to provide in-kind services and subsequently incur in-kind costs as part of continued program development and management. Said costs shall be the responsibility of each Party unless otherwise agreed to by the Parties.
9. **FAILURE TO PAY.** The Parties recognize that any Party's failure to pay its respective share of any Annual Budget or budget increase when due, whether or not that Party's Governing Body approved the Annual Budget or the budget increase, places the Subbasin in jeopardy of being subject to intervention by the State Water Resources Control Board (SWRCB), including being designated on probationary status, and being subject to an interim plan promulgated by the SWRCB. Recognizing the importance of this Program, the parties agree to the following potential actions should any Party fail to pay consistent with this Section 9:
  - a. The Party that fails to pay shall be ineligible to vote on any subject or issue unless such failure is excused by the Committee through formal action and majority approval of the Committee. During any period of time during which a Party is ineligible to vote on a matter by reason of the application of this Section 9, such Party shall not be counted as a Party in determining a quorum, or in determining a "majority" with regard to the approval of any action. In order to restore its eligibility to vote, a Party must be current on all amounts due, including any expenditures approved by the Committee while such Party was ineligible to vote.



- b. Failure to pay shall be explicitly noted in the Annual Report for the Subbasin.
  - c. Within 10 days after such failure to pay, the Parties shall attempt in good faith to resolve the dispute through informal means for a period of 30 days. If the Parties, through informal means, cannot agree upon a resolution of the failure to pay within 30 days, the Parties shall submit the dispute to mediation prior to commencement of legal action. The cost of mediation shall be split equally between the Parties. Upon completion of mediation and if the dispute has not been resolved, any Party may exercise any and all rights to bring a legal action relating to the dispute.
10. **TERM.** The Program shall begin no later than January 1, 2023, shall cover eligible mitigation as of January 31, 2020, and shall continue for the duration of the GSP Implementation Period or until groundwater sustainability is achieved.
11. **PROGRAM ELIGIBILITY AND TERMS AND CONDITIONS.** The Parties agree to develop Program eligibility and terms and conditions for Program implementation as generally defined in Exhibit E. Said eligibility and terms and conditions shall include, but shall not be limited to:
- a. Definitions
  - b. Property eligibility
  - c. Property owner eligibility
  - d. Program application process
  - e. Preferred contractors
  - f. Preliminary inspection process
  - g. Program form development
  - h. Priority
  - i. Eligible mitigation
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200 W 4<sup>th</sup> Street, 4<sup>th</sup> Floor  
Madera, CA 93637

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327 South Chowchilla Blvd.  
Chowchilla, CA 93610

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County of Madera

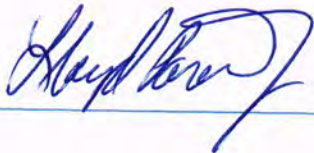
Chowchilla Water District

Date

Brandon Tomlinson

Date

County of Merced



JUL 19 2022

Date


Triangle T Water District

Date

APPROVED AS TO LEGAL FORM:

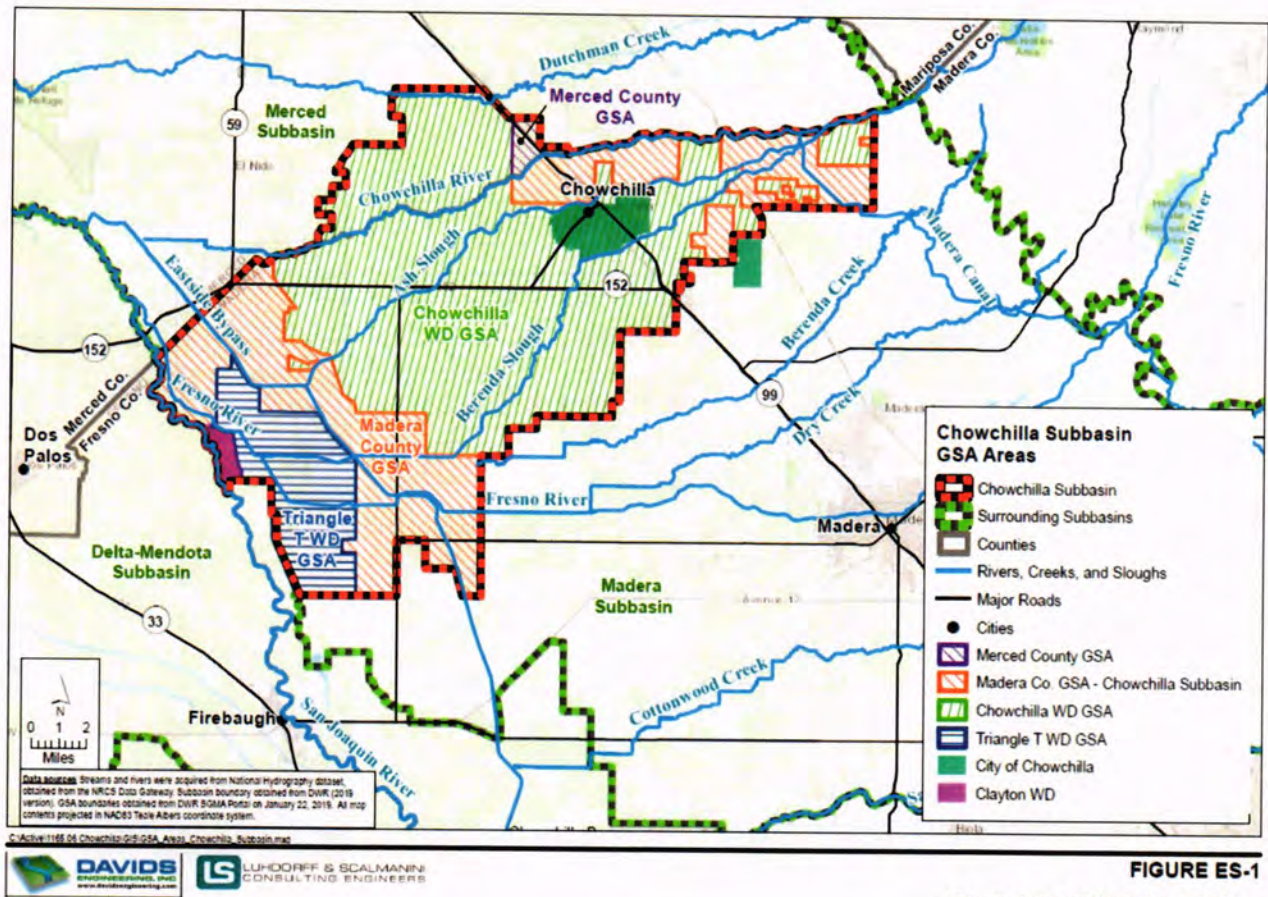
FORREST W. HANSEN  
MERCED COUNTY COUNSEL

BY:

  
Jeffrey B. Grant



## EXHIBIT A



## EXHIBIT B

GSA	Average Shortage (AF) <sup>1</sup>	Net Recharge (AF) <sup>2</sup>	Proportionate Share (%)
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**Notes:**

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## EXHIBIT C

GSA <sup>2,3</sup>	Description	Proportionate Share <sup>1</sup>	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028	FYE 2029	FYE 2030	FYE 2031	FYE 2032
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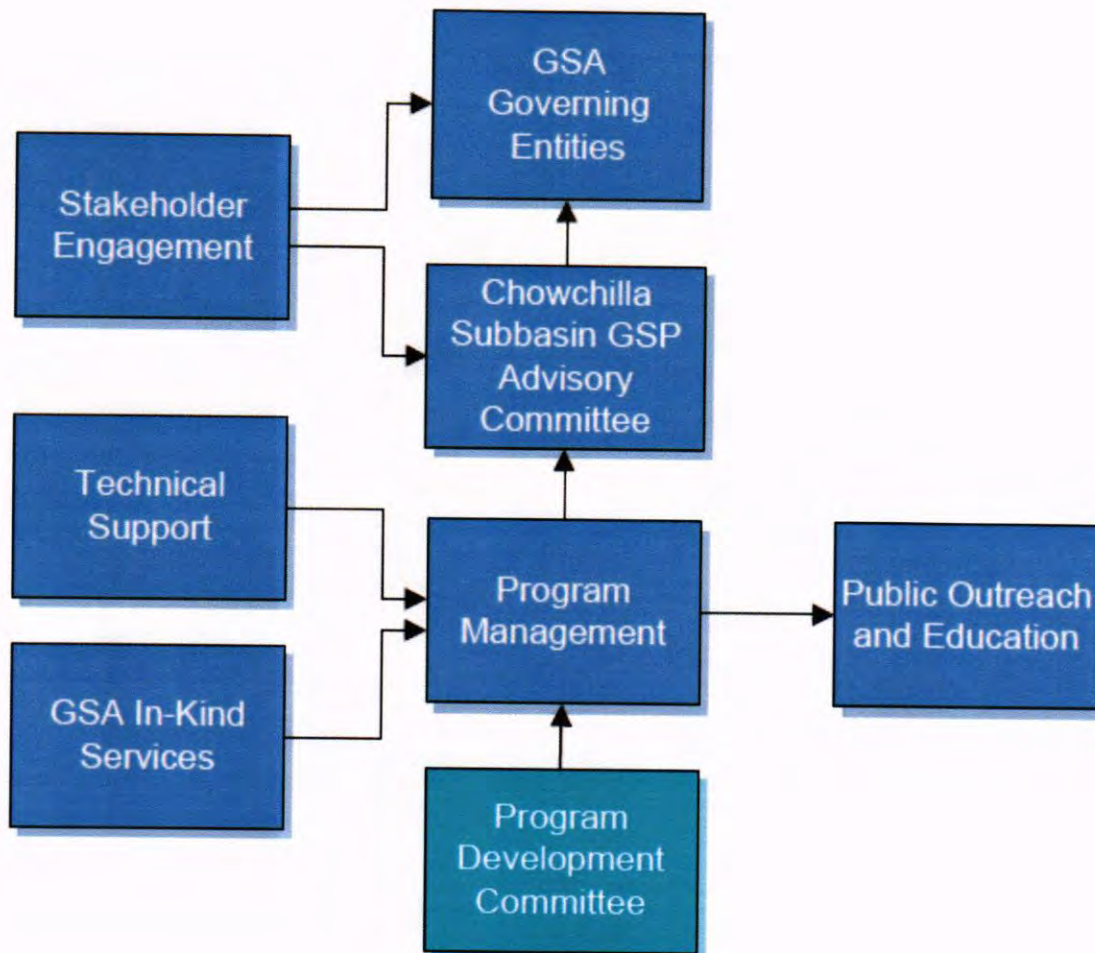
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## Exhibit D

### Chowchilla Subbasin – Domestic Well Mitigation Program Organizational Structure

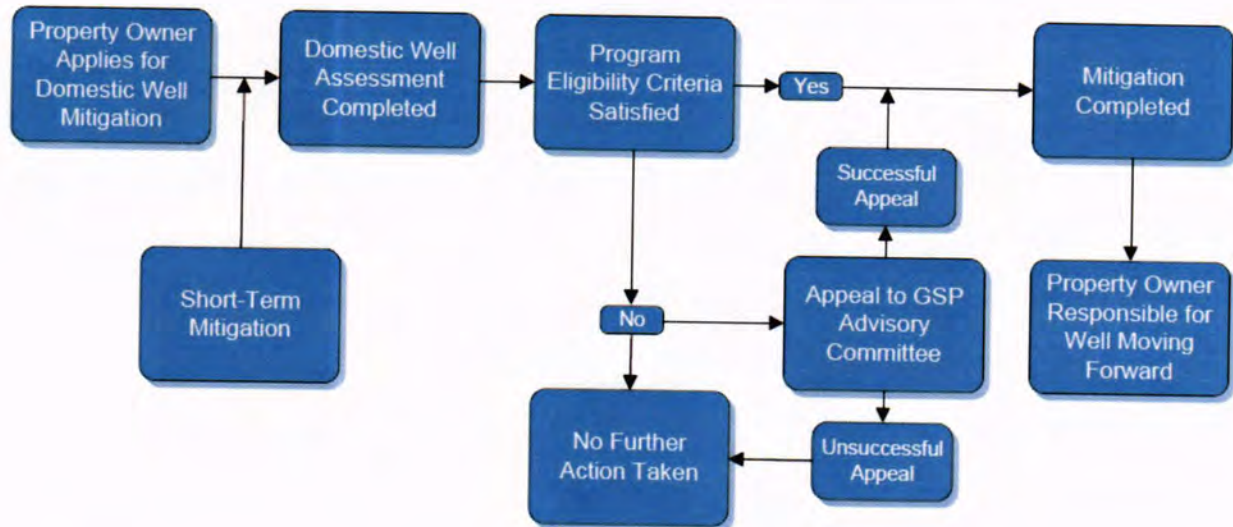
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3. The Chowchilla Subbasin GSP Advisory Committee is as defined and established under Section 3 of the Memorandum of Understanding with Respect to the Coordination, Cooperation and Cost Sharing in the Implementation of Chowchilla Subbasin Groundwater Sustainability Plan entered into by the Parties on December 17, 2019.

**Exhibit E**  
**Chowchilla Subbasin – Domestic Well Mitigation Program**  
**Implementation Flowchart**  
June 6, 2022



**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.
2. That shown herein is subject to revision by the Parties.
3. The GSAs have reviewed and considered the content and recommendation set-for 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."

Triangle T Water District GSA

**MEMORANDUM OF UNDERSTANDING ESTABLISHING A DOMESTIC WELL MITIGATION  
PROGRAM FOR THE CHOWCHILLA SUBBASIN OF THE SAN JOAQUIN VALLEY GROUNDWATER  
BASIN**

This Memorandum of Understanding (“MOU”) is entered into this \_\_\_ day of \_\_\_\_\_ 2022 (the “Effective Date”), by and between the Chowchilla Water District GSA (Chowchilla WD), Madera County GSA – Chowchilla (Madera County), Merced County GSA – Chowchilla (Merced County), and Triangle T Water District GSA (Triangle T WD), collectively hereinafter referred to as the “Parties,” or individually as the “Party.”

**RECITALS**

- A. **WHEREAS**, groundwater and surface water resources within the Chowchilla Subbasin of the San Joaquin Valley Groundwater Basin (DWR Bulletin 118 No. 5-022.05) (Subbasin) are vitally important resources, in that they provide the foundation to maintain and fulfill current and future environmental, agricultural, domestic, municipal, and industrial needs, and to maintain the economic viability, prosperity, and sustainable management of the Subbasin; and
- B. **WHEREAS**, agriculture has been prominent in making Madera County and Merced County one of the world’s foremost agricultural areas and plays a major role in the economy of both Madera County and Merced County; and
- C. **WHEREAS**, in 2014 the California Legislature passed a statewide framework for sustainable groundwater management, known as the Sustainable Groundwater Management Act, California Water Code § 10720-10737.8 (SGMA), pursuant to Senate Bill 1168, Senate Bill 1319, and Assembly Bill 1739, which was approved by the Governor on September 16, 2014. and went into effect on January 1, 2015; and
- D. **WHEREAS**, the Subbasin has been designated by the California Department of Water Resources (DWR) as a high-priority subbasin in a condition of critical groundwater overdraft and is subject to the requirements of SGMA; and
- E. **WHEREAS**, SGMA requires that all medium and high priority groundwater basins in California be managed by a Groundwater Sustainability Agency (GSA), or multiple GSAs, and that such management be implemented pursuant to an approved Groundwater Sustainability Plan (GSP), or multiple GSPs; and
- F. **WHEREAS**, in accordance with Resolution No. 2016-17, Chowchilla Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- G. **WHEREAS**, in accordance with Resolution No. 2017-014, the County of Madera elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and

- H. **WHEREAS**, in accordance with Resolution No. 2017-15, County of Merced elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- I. **WHEREAS**, in accordance with Resolution No. 17-7, Triangle T Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit A; and
- J. **WHEREAS**, on January 29, 2020, the Parties submitted a GSP to DWR; and
- K. **WHEREAS**, the Parties agree, and as SGMA allows, a transition to sustainability over the 20-year GSP Implementation Period is in the best overall interest of the Subbasin, although this approach is expected to result in some continued groundwater level declines during the GSP Implementation Period; and
- L. **WHEREAS**, the Parties agree that for the purposes of this MOU, "Domestic Wells" shall be limited to individual private domestic wells.
- M. **WHEREAS**, the Parties agree that as a result of the continued decline in groundwater levels anticipated to occur over the GSP Implementation Period, there may be adverse impacts to some domestic wells in the Subbasin.
- N. **WHEREAS**, the Parties 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."
- O. **NOW, THEREFORE**, in consideration of the mutual promises, covenants and conditions contained herein and these Recitals, which are hereby incorporated herein by this reference, the Parties agree to mitigate for domestic well impacts resulting from declining groundwater levels that occur from groundwater management activities outlined in the GSP through creation and implementation of a Domestic Well Mitigation Program (Program) as follows:

### **AGREEMENT**

1. **PROPORTIONATE SHARE.** The Parties agree to fund the Program on a proportional basis consistent with that set-forth in Exhibit B. Each Party shall be responsible for its proportionate share of the funding requirements.
2. **FUNDING.** The Parties agree to fund the Program on an annual basis consistent with Section 9 set-forth herein. Estimated expenses through 2032 are set-forth in Exhibit C. Expenses for 2033 through 2040, or as may required until groundwater sustainability is achieved, shall be recommended by the GSP Advisory Committee and approved by the Parties no later than December 31, 2030.

3. **ACCOUNTING.** Annual funding shall be placed in an interest-bearing account managed by one of Parties.
4. **PROGRAM DEVELOPMENT COMMITTEE.** The Parties shall establish a Program Development Committee (Committee) that will oversee Program development consistent with Section 11. The Committee shall include at least one technical staff representative from each of the Parties. Decisions of the Committee shall be made through simple majority of the Committee. The Committee shall cease to exist upon the start date of the Program as set-forth in Section 10.
5. **PROGRAM ORGANIZATIONAL STRUCTURE.** Unless otherwise amended and approved by the Parties, the Program organizational structure shall be as shown in Exhibit D.
6. **BUDGET CYCLE.** The budget cycle of the Program shall be on a calendar year basis.
7. **BUDGET REVIEW.** Not less than once per year, the Parties shall convene a meeting of the GSP Advisory Committee to review Program implementation progress in that year and plan for Program implementation in the subsequent year.
8. **IN-KIND SERVICES.** Each Party is likely to provide in-kind services and subsequently incur in-kind costs as part of continued program development and management. Said costs shall be the responsibility of each Party unless otherwise agreed to by the Parties.
9. **FAILURE TO PAY.** The Parties recognize that any Party's failure to pay its respective share of any Annual Budget or budget increase when due, whether or not that Party's Governing Body approved the Annual Budget or the budget increase, places the Subbasin in jeopardy of being subject to intervention by the State Water Resources Control Board (SWRCB), including being designated on probationary status, and being subject to an interim plan promulgated by the SWRCB. Recognizing the importance of this Program, the parties agree to the following potential actions should any Party fail to pay consistent with this Section 9:
  - a. The Party that fails to pay shall be ineligible to vote on any subject or issue unless such failure is excused by the Committee through formal action and majority approval of the Committee. During any period of time during which a Party is ineligible to vote on a matter by reason of the application of this Section 9, such Party shall not be counted as a Party in determining a quorum, or in determining a "majority" with regard to the approval of any action. In order to restore its eligibility to vote, a Party must be current on all amounts due, including any expenditures approved by the Committee while such Party was ineligible to vote.

- b. Failure to pay shall be explicitly noted in the Annual Report for the Subbasin.
  - c. Within 10 days after such failure to pay, the Parties shall attempt in good faith to resolve the dispute through informal means for a period of 30 days. If the Parties, through informal means, cannot agree upon a resolution of the failure to pay within 30 days, the Parties shall submit the dispute to mediation prior to commencement of legal action. The cost of mediation shall be split equally between the Parties. Upon completion of mediation and if the dispute has not been resolved, any Party may exercise any and all rights to bring a legal action relating to the dispute.
10. **TERM.** The Program shall begin no later than January 1, 2023, shall cover eligible mitigation as of January 31, 2020, and shall continue for the duration of the GSP Implementation Period or until groundwater sustainability is achieved.
11. **PROGRAM ELIGIBILITY AND TERMS AND CONDITIONS.** The Parties agree to develop Program eligibility and terms and conditions for Program implementation as generally defined in Exhibit E. Said eligibility and terms and conditions shall include, but shall not be limited to:
- a. Definitions
  - b. Property eligibility
  - c. Property owner eligibility
  - d. Program application process
  - e. Preferred contractors
  - f. Preliminary inspection process
  - g. Program form development
  - h. Priority
  - i. Eligible mitigation
  - j. Non-eligible mitigation
  - k. Maximum mitigation award
  - l. Recordation of mitigation award
12. **PROGRAM MANAGEMENT.** Program management shall be facilitated by one of the Parties. If one of the Parties doesn't elect to program management duties and through recommendation of the GSP Advisory Committee and approval of the Parties, Program management shall be facilitated through a third party.
13. **ENVIRONMENTAL REVIEW.** The Parties agree to cooperatively complete any environmental review as may be determined necessary for Program implementation. Any costs associated with environmental review shall be per the proportionate share as set-forth in this MOU.



14. **OTHER COSTS.** Any and all other costs not specifically included in this MOU shall be attributed to the Parties per the proportionate share as set-forth in this MOU.
15. **NOTICES.** All notices required or permitted by the MOU shall be made in writing, and may be delivered in person (by hand or by courier) or may be sent regular, certified, or registered mail or U.S. Postal Service Express Mail, with postage prepaid, or by facsimile transmission, or by electronic transmission (email) and shall be deemed sufficiently given if served in a manner specified in this Section 16. The addresses and addressees noted below are the Party's designated address and addressee for deliver or mailing notices.

To Madera County:

County of Madera  
Stephanie Anagnoson  
200 W 4<sup>th</sup> Street, 4<sup>th</sup> Floor  
Madera, CA 93637

To Chowchilla WD:

Chowchilla Water District  
Brandon Tomlinson  
327 South Chowchilla Blvd.  
Chowchilla, CA 93610

To Merced County:

County of Merced  
Lacey McBride  
2222 M Street  
Merced, CA 95340

To Triangle T WD:

Triangle T Water District  
Brad Samuelson  
P.O. Box 2657  
Los Banos, CA 93635

Any Party may, by written notice to each of the other Parties, specify a different address for notice. Any notice sent by registered or certified mail, return receipt requested, shall be deemed given on the date of delivery shown on the receipt card, or if no delivery date is shown, three days after the postmark date. If sent by regular mail, the notice shall be deemed given 48 hours after it is addressed as required in this section and mailed with postage prepaid. Notices delivered by United States Express Mail or overnight courier that guarantee next day delivery shall be deemed given 24 hours after delivery to the Postal Service or overnight courier. Notices transmitted by facsimile transmission or similar means (including email) shall be deemed delivered upon telephone or similar confirmation of delivery (conformation report from fax machine is sufficient), provided a copy is also delivered via personal delivery or mail. If notice is received after 4:00 p.m. or on a Saturday, Sunday or legal holiday, it shall be deemed received on the next business day.

**IN WITNESS WHEREOF**, the Parties have caused this MOU to be executed, each signatory hereto represents that he/she has been appropriately authorized to enter into this MOU on behalf of the Party whom he/she signs.

**County of Madera**

\_\_\_\_\_

\_\_\_\_\_  
Date

**Chowchilla Water District**

\_\_\_\_\_  
Brandon Tomlinson

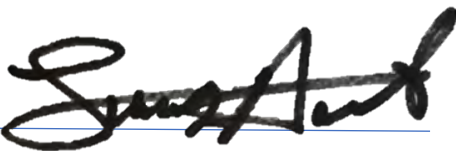
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Date

**County of Merced**

\_\_\_\_\_

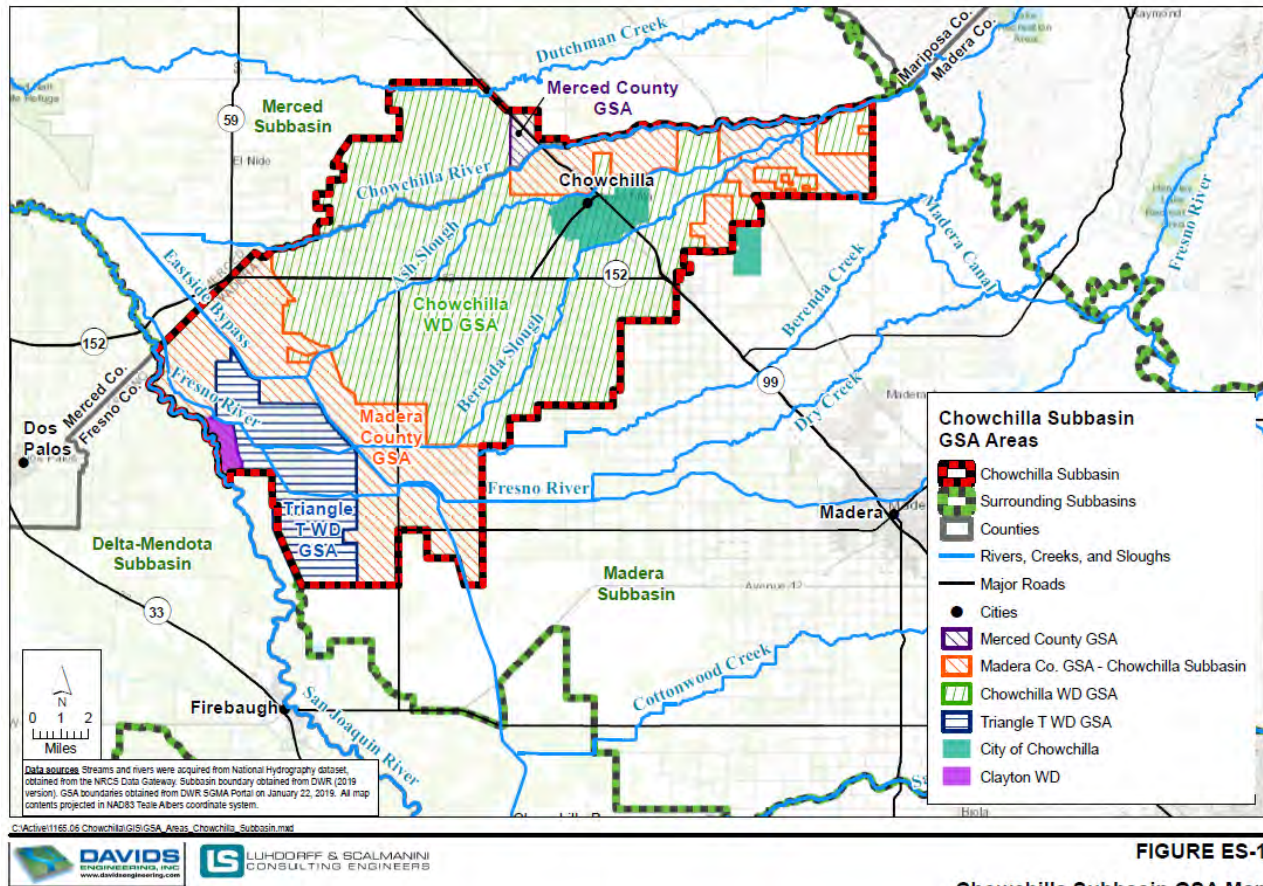
\_\_\_\_\_  
Date

**Triangle T Water District**

\_\_\_\_\_  


\_\_\_\_\_  
Date

## EXHIBIT A



## EXHIBIT B

GSA	Average Shortage (AF) <sup>1</sup>	Net Recharge (AF) <sup>2</sup>	Proportionate Share (%)
Chowchilla WD	22800	-22800	30%
Madera County <sup>3</sup>	39700	-39700	53%
Madera County - Sierra Vista MWC <sup>4</sup>	1800	-1800	2%
Merced County - Sierra Vista MWC <sup>4</sup>	900	-900	1%
Triangle T WD	10200	-10200	14%
Subbasin Totals =	75400	-75400	100%

Notes:

<sup>1</sup> Average Shortage is defined as groundwater extraction minus total recharge from the SWS (deep percolation and seepage), thus a positive value indicates more water is taken from a subbasin than is recharging from the surface. This is equivalent to the inverse of Net Recharge from SWS as defined in some presentations and documents.

<sup>2</sup> Net Recharge is defined as total recharge minus groundwater extraction, thus a positive value indicates that more water is recharged from the surface than is taken from the surface.

<sup>3</sup> Net Recharge summarized from the Madera County - East and Madera County West subregion water budgets developed for the Chowchilla Subbasin GSP.

<sup>4</sup> Sierra Vista MWC spans the Merced County GSA - Chowchilla area (1,300 ac) and part of the Madera County GSA - Chowchilla area (2,600 ac). Total Sierra Vista MWC average shortage is 2,700 AF. Using the acreage distribution previously noted, one-third of the average shortage has been assigned to Merced County and two-thirds has been assigned to Madera County. Merced County will bill Sierra Vista MWC for their proportionate share (1%) for lands within Merced County.

## EXHIBIT C

GSA <sup>2,3</sup>	Description	Proportionate Share <sup>1</sup>	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028	FYE 2029	FYE 2030	FYE 2031	FYE 2032
Madera County	Capital Costs	55%	\$ 552,602	\$ 570,285	\$ 588,533	\$ 260,299	\$ 268,629	\$ 277,226	\$ 286,097	\$ 295,252	\$ 4,353	\$ 4,492
	Admin/Operating Costs		\$ 53,251	\$ 54,955	\$ 56,713	\$ 25,083	\$ 25,886	\$ 26,714	\$ 27,569	\$ 28,452	\$ 419	\$ 433
	Total Costs		\$ 605,853	\$ 625,240	\$ 645,246	\$ 285,382	\$ 294,515	\$ 303,940	\$ 313,666	\$ 323,704	\$ 4,772	\$ 4,925
Merced County	Capital Costs	1%	\$ 10,047	\$ 10,369	\$ 10,701	\$ 4,733	\$ 4,884	\$ 5,040	\$ 5,202	\$ 5,368	\$ 79	\$ 82
	Admin/Operating Costs		\$ 1,005	\$ 1,037	\$ 1,070	\$ 473	\$ 488	\$ 504	\$ 520	\$ 537	\$ 8	\$ 8
	Total Costs		\$ 11,052	\$ 11,406	\$ 11,771	\$ 5,206	\$ 5,373	\$ 5,545	\$ 5,722	\$ 5,905	\$ 87	\$ 90
Triangle T WD	Capital Costs	14%	\$ 140,662	\$ 145,163	\$ 149,808	\$ 66,258	\$ 68,378	\$ 70,567	\$ 72,825	\$ 75,155	\$ 1,108	\$ 1,144
	Admin/Operating Costs		\$ 14,066	\$ 14,516	\$ 14,981	\$ 6,626	\$ 6,838	\$ 7,057	\$ 7,282	\$ 7,516	\$ 111	\$ 114
	Total Costs		\$ 154,728	\$ 159,680	\$ 164,789	\$ 72,884	\$ 75,216	\$ 77,623	\$ 80,107	\$ 82,671	\$ 1,219	\$ 1,258
Chowchilla WD	Capital Costs	30%	\$ 301,419	\$ 311,064	\$ 321,018	\$ 141,982	\$ 146,525	\$ 151,214	\$ 156,053	\$ 161,047	\$ 2,375	\$ 2,450
	Admin/Operating Costs		\$ 30,142	\$ 31,106	\$ 32,102	\$ 14,198	\$ 14,653	\$ 15,121	\$ 15,605	\$ 16,105	\$ 237	\$ 245
	Total Costs		\$ 331,561	\$ 342,171	\$ 353,120	\$ 156,180	\$ 161,178	\$ 166,336	\$ 171,658	\$ 177,151	\$ 2,612	\$ 2,695
	% Responsibility	100%										
	Total Capital Costs		\$ 1,004,730	\$ 1,036,881	\$ 1,070,060	\$ 473,272	\$ 488,417	\$ 504,047	\$ 520,175	\$ 536,823	\$ 7,915	\$ 8,168
	Total Admin/Operating Costs		\$ 98,464	\$ 101,615	\$ 104,866	\$ 46,380	\$ 47,865	\$ 49,396	\$ 50,977	\$ 52,609	\$ 775	\$ 801
	Total Costs		\$ 1,103,194	\$ 1,138,496	\$ 1,174,926	\$ 519,652	\$ 536,282	\$ 553,443	\$ 571,152	\$ 589,432	\$ 8,690	\$ 8,968

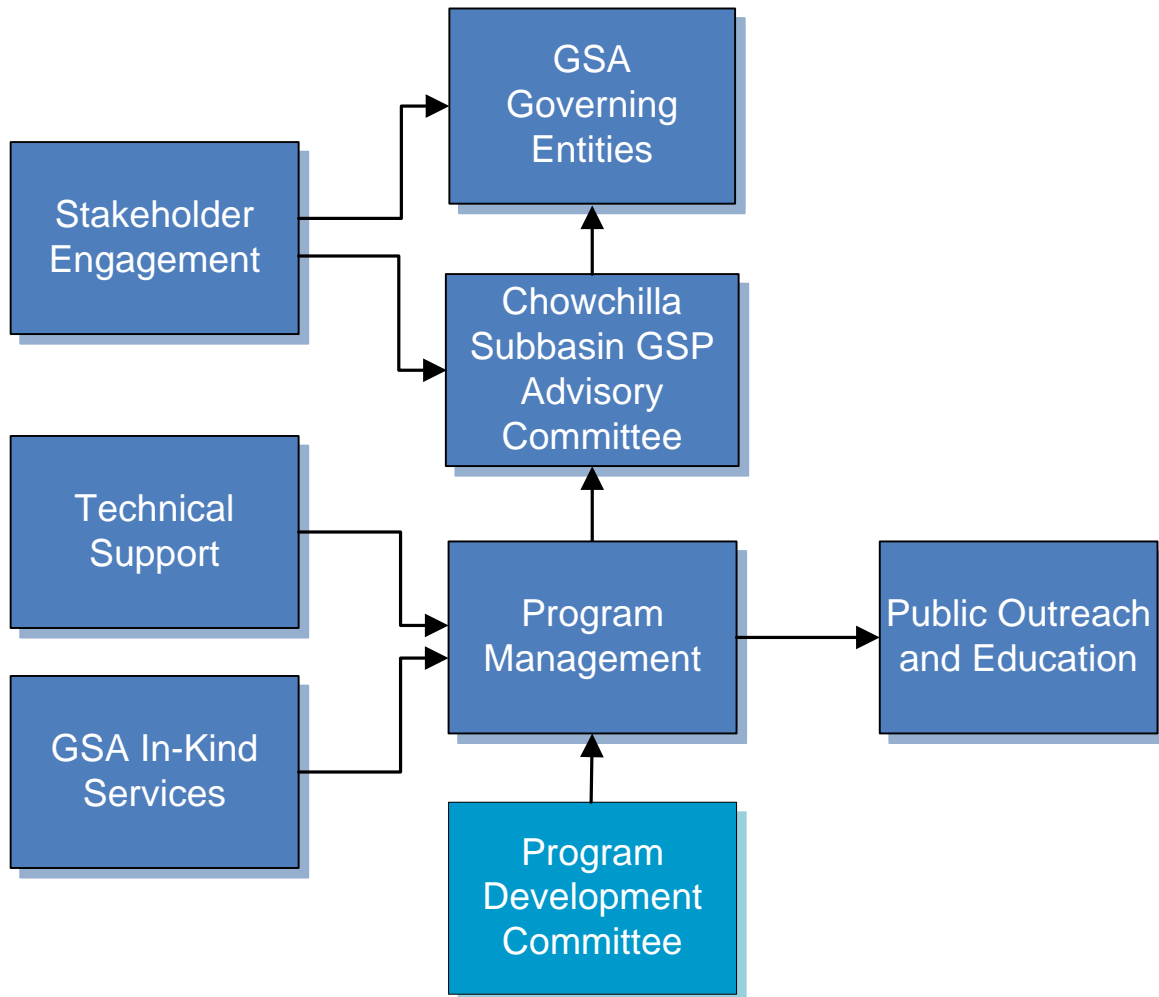
**Notes:**

<sup>1</sup> Proportionate share is as determined in a spreadsheet prepared by Davids Engineering titled Chowchilla\_Historical\_Projected\_Water\_Budget\_Shortage dated May 21, 2021.

<sup>2</sup> Merced County, Triangle T WD, and Chowchilla WD GSA costs have been scaled from the Madera County GSA costs.

<sup>3</sup> Sierra Vista MWC spans the Merced County GSA - Chowchilla area (1,300 ac) and part of the Madera County GSA - Chowchilla area (2,600 ac). Total Sierra Vista MWC average shortage is 2,700 AF. Using the acreage distribution previously noted, one-third of the average shortage has been assigned to Merced County and two-thirds has been assigned to Madera County. Merced County will bill Sierra Vista MWC for their proportionate share (1%) for lands within Merced County.

**Exhibit D**  
**Chowchilla Subbasin – Domestic Well Mitigation Program**  
**Organizational Structure**  
June 6, 2022

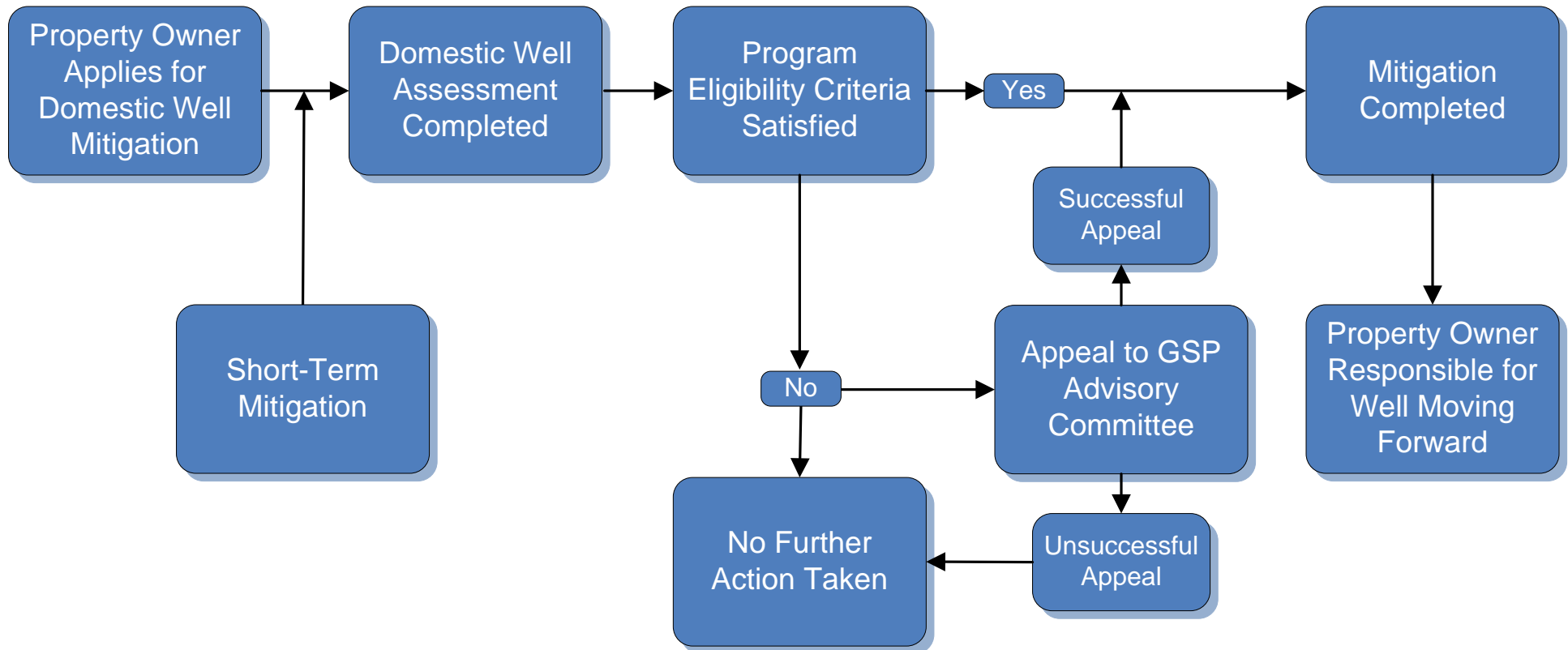


**Notes:**

1. That shown herein is subject to revision by the Parties.
2. Public Outreach and Engagement is a necessary component as outlined 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."
3. The Chowchilla Subbasin GSP Advisory Committee is as defined and established under Section 3 of the Memorandum of Understanding with Respect to the Coordination, Cooperation and Cost Sharing in the Implementation of Chowchilla Subbasin Groundwater Sustainability Plan entered into by the Parties on December 17, 2019.

**Exhibit E**  
**Chowchilla Subbasin – Domestic Well Mitigation Program**  
**Implementation Flowchart**

June 6, 2022



**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.
2. That shown herein is subject to revision by the Parties.
3. The GSAs have reviewed and considered the content and recommendation set-for 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."



## County of Madera GSA - Chowchilla



























**FIRST AMENDMENT TO THE  
MEMORANDUM OF UNDERSTANDING ESTABLISHING A DOMESTIC WELL MITIGATION PROGRAM FOR  
THE CHOWCHILLA SUBBASIN OF THE SAN JOAQUIN VALLEY GROUNDWATER BASIN**

This FIRST AMENDMENT (AMENDMENT) to the MEMORANDUM OF UNDERSTANDING (“MOU”) is entered into this \_\_\_\_ day of \_\_\_\_\_ 2023 (the “Effective Date”), by and between the Chowchilla Water District GSA (Chowchilla WD), Madera County GSA – Chowchilla (Madera County), Merced County GSA – Chowchilla (Merced County), and Triangle T Water District GSA (Triangle T WD), collectively hereinafter referred to as the “Parties,” or individually as the “Party.”

**RECITALS**

- A. **WHEREAS**, the Parties entered into the MOU as fully executed on July 26, 2022; and
- B. **WHEREAS**, the Parties desire to amend the MOU on the terms and conditions set forth in this AMENDMENT; and
- C. **WHEREAS**, this AMENDMENT is the first amendment to the MOU; and
- D. **WHEREAS**, references in this AMENDMENT to the MOU are to the MOU as executed on July 26, 2022.
- E. **WHEREAS**, except as otherwise expressly provided in this AMENDMENT, all of the terms and conditions of the MOU remain unchanged and in full force and effect.
- F. **NOW, THEREFORE**, in consideration of the mutual promises, covenants, and conditions contained herein and these Recitals, which are hereby incorporated herein by this reference, the Parties agree to amend the MOU as follows:

**AMENDMENTS**

- 1. **WELLS ELIGIBLE FOR MITIGATION.** The Parties agree that for the purposes of the MOU, “Domestic Wells” shall include private domestic wells and shallow wells that supply drinking water users (e.g., public water systems and state small water systems) whose primary purpose is serving drinking water needs.



**IN WITNESS WHEREOF**, the Parties have caused this AMENDMENT to be executed, each signatory hereto represents that he/she has been appropriately authorized to enter into this AMENDMENT on behalf of the Party whom he/she signs.

**County of Madera**

\_\_\_\_\_

\_\_\_\_\_  
Date

**Chowchilla Water District**

\_\_\_\_\_  
Brandon Tomlinson

\_\_\_\_\_  
Date

**County of Merced**

\_\_\_\_\_

\_\_\_\_\_  
Date

**Triangle T Water District**

\_\_\_\_\_

\_\_\_\_\_  
Date

## **Chowchilla Subbasin**

### **Domestic Well Mitigation Program**

#### *Program Application*

*Revised May 3, 2023*

**Background:** The Domestic Well Mitigation Program (Program) is a cooperative effort funded and implemented by the Groundwater Sustainability Agencies (GSAs) in the Chowchilla Subbasin (Subbasin) through a Memorandum of Understanding (MOU). The GSAs in the Subbasin include Chowchilla Water District, Madera County, Triangle T Water District, and Merced County. Collectively, and consistent with the Sustainable Groundwater Management Act (SGMA), the GSAs agree to mitigate for current or anticipated impacts to domestic wells and shallow wells that supply drinking water users (e.g., public water systems and state small water systems) resulting from declining groundwater levels that occur from groundwater management activities outlined in the Subbasin Groundwater Sustainability Plan (GSP). Through creation and implementation of this Program, the GSAs will facilitate mitigation efforts for domestic wells and shallow wells that supply drinking water users.

**Instructions:** Sections 1 and 2 of this Program Application shall be completed by the property owner of record (Applicant). Completion of this Program Application by the Applicant is not a guarantee of Program eligibility and does not bind the GSAs in the Subbasin to provide mitigation as may be afforded under this Program. This Program Application is intended to initiate the review process. Should the Applicant qualify for mitigation under the Program, additional consultation, analysis, and documentation will be required.

**Initial well assessment:** Prior to submission of this Program Application, the Applicant shall complete an initial well assessment using one of the Preferred Contractors. A list of Preferred Contractors may be obtained by contacting the Program Manager as shown below. The initial well assessment must clearly identify and document the current or anticipated operational issue(s) associated with the well for which mitigation is being sought.

**One-time Fee:** Costs associated with determining Program eligibility shall be covered by the Applicant through a one-time fee of \$100. Review of this Program Application will not be initiated until receipt of the one-time fee is received by the Program Manager. If the Applicant is awarded mitigation under the Program, the one-time fee will be reimbursed. Payments shall be delivered to and made payable to:

Chowchilla Water District  
Attn: Chowchilla Subbasin Domestic Well Mitigation Program Manager  
327 South Chowchilla Boulevard  
Chowchilla, CA 93610

1. Applicant Information					
Last Name: Last Name		First Name: First Name		Middle: Middle Name	
Mailing Address: Mailing Address			City: City	State: CA	ZIP: ZIP
Property Address: Property Address			City: City	State: CA	ZIP: ZIP
Phone: Phone Number	Secondary Phone: Phone Number		County: County		
E-mail Address: E-mail Address				Date: Date	

2. Property Information					
Parcel Number: Parcel Number			Do you live on Property? <input type="checkbox"/> Yes <input type="checkbox"/> No		Number of Occupants at Dwelling: # of Occupants
Well Primary Purpose is to Meet Domestic Needs? <input type="checkbox"/> Yes <input type="checkbox"/> No	Well completion report and any other well construction information attached? <input type="checkbox"/> Yes <input type="checkbox"/> No	Have you participated in the program previously for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No		Initial Well Assessment Completed and Summary Documentation Attached? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Is Temporary Mitigation Necessary? <input type="checkbox"/> Yes <input type="checkbox"/> No	Status of Well? <input type="checkbox"/> Producing <input type="checkbox"/> Not Producing	Depth of Well: Well Depth	Depth to Water: Depth to Water	Age of Well: Age of Well	Pump Capacity in GPM: GPM
Reasons for Current or Anticipated Dry Well: Please describe reason(s) for current or anticipated dry well					

3. To be Completed by Program Manager
---------------------------------------

Program Application Received by:		Date of Receipt:	Program Application Complete: <input type="checkbox"/> Yes <input type="checkbox"/> No
Initial Well Assessment Included? <input type="checkbox"/> Yes <input type="checkbox"/> No	Review Applicability and Nexus to other Regional Programs		
Program Application Referred to:		One-time fee received? <input type="checkbox"/> No <input type="checkbox"/> Yes: Check Number: _____	

**AGREEMENT FOR ONE-TIME DOMESTIC WELL MITIGATION UNDER THE CHOWCHILLA SUBBASIN  
DOMESTIC WELL MITIGATION PROGRAM**

This Agreement for One-Time Domestic Well Mitigation under the Chowchilla Subbasin Domestic Well Mitigation Program (Program) is entered into this \_\_\_\_ day of \_\_\_\_\_ 20\_\_ (the “Effective Date”), by and between \_\_\_\_\_ (hereinafter referred to as “Landowner”) and the Chowchilla Water District GSA (Chowchilla WD), Madera County GSA – Chowchilla (Madera County), Merced County GSA – Chowchilla (Merced County), and Triangle T Water District GSA (Triangle T WD) (collectively hereinafter referred to as the “Parties”).

**RECITALS**

- A. **WHEREAS**, groundwater and surface water resources within the Chowchilla Subbasin of the San Joaquin Valley Groundwater Basin (DWR Bulletin 118 No. 5-022.05) (Subbasin) are vitally important resources, in that they provide the foundation to maintain and fulfill current and future environmental, agricultural, domestic, municipal, and industrial needs, and to maintain the economic viability, prosperity, and sustainable management of the Subbasin; and
- B. **WHEREAS**, agriculture has been prominent in making Madera County and Merced County one of the world’s foremost agricultural areas and plays a major role in the economy of both Madera County and Merced County; and
- C. **WHEREAS**, in 2014 the California Legislature passed a statewide framework for sustainable groundwater management, known as the Sustainable Groundwater Management Act, California Water Code § 10720-10737.8 (SGMA), pursuant to Senate Bill 1168, Senate Bill 1319, and Assembly Bill 1739, which was approved by the Governor on September 16, 2014, and went into effect on January 1, 2015; and
- D. **WHEREAS**, the Subbasin has been designated by the California Department of Water Resources (DWR) as a high-priority subbasin in a condition of critical groundwater overdraft and is subject to the requirements of SGMA; and
- E. **WHEREAS**, SGMA requires that all medium and high priority groundwater basins in California be managed by a Groundwater Sustainability Agency (GSA), or multiple GSAs, and that such management be implemented pursuant to an approved Groundwater Sustainability Plan (GSP), or multiple GSPs; and
- F. **WHEREAS**, in accordance with Resolution No. 2016-17, Chowchilla Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit C; and
- G. **WHEREAS**, in accordance with Resolution No. 2017-014, the County of Madera elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit C; and
- H. **WHEREAS**, in accordance with Resolution No. 2017-15, County of Merced elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit C; and

- I. **WHEREAS**, in accordance with Resolution No. 17-7, Triangle T Water District elected to become the exclusive GSA for those portions of the Subbasin as shown in Exhibit C; and
- J. **WHEREAS**, on January 29, 2020, the Parties submitted a GSP to DWR; and
- K. **WHEREAS**, on July 27, 2022, the Parties submitted a Revised GSP to DWR; and
- L. **WHEREAS**, the Parties agree, and as SGMA allows, a transition to sustainability over the 20-year GSP Implementation Period is in the best overall interest of the Subbasin, although this approach is expected to result in some continued groundwater level declines during the GSP Implementation Period prior to achieving sustainable groundwater conditions in the Subbasin in 2040 as described in the Revised GSP; and
- M. **WHEREAS**, the Parties agree that as a result of the continued decline in groundwater levels anticipated to occur over the GSP Implementation Period, there may be adverse impacts to some domestic wells and shallow wells that supply drinking water users (e.g., public water systems and state small water systems) in the Subbasin; and
- N. **WHEREAS**, the Parties 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
- O. **WHEREAS**, the Parties have agreed to mitigate for impacts to domestic wells and shallow wells that supply drinking water users (e.g., public water systems and state small water systems) resulting from declining groundwater levels that occur from groundwater management activities, as outlined in the amended Program Memorandum of Understanding (MOU) signed by all Parties; and
- P. **WHEREAS**, the Parties agree that for the purposes of this Agreement, a domestic well is a groundwater well with a de minimis level of extraction, two acre-feet or less (of groundwater) per year, whose primary purpose is serving domestic needs.
- Q. **WHEREAS**, the Parties agree that for the purposes of this Agreement, a shallow well that supplies drinking water users is a groundwater well drilled and screened at a shallow depth in the Upper Aquifer whose primary purpose is serving drinking water needs, such as shallow wells supplying public water systems and state small water systems.
- R. **WHEREAS**, the Landowner owns certain real property within the Subbasin as set-forth in Exhibit A; and
- S. **WHEREAS**, the Landowner has submitted a complete Program Application, inclusive of an initial assessment of the well completed by one of the Preferred Contractors set-forth in Exhibit D, that clearly identifies and documents the current or anticipated operational issue(s); and
- T. **WHEREAS**, the Landowner has paid the one-time fee; and

- U. **WHEREAS**, as set-forth in Exhibit B, the Parties have determined through detailed technical analysis that the Landowner is eligible for mitigation under the Program; and
- V. **WHEREAS**, the Landowner agrees that said mitigation will only be provided one time for any given domestic well or shallow well that supplies drinking water users; and
- W. **WHEREAS**, the Landowner consents to recordation of this Agreement on the real property set-forth in Exhibit A.
- X. **NOW, THEREFORE**, in consideration of the mutual promises, covenants and conditions contained herein and these Recitals, which are hereby incorporated herein by this reference, the Parties and the Landowner agree to Mitigation under the Program for current or anticipated impacts to domestic wells and shallow wells that supply drinking water users resulting from declining groundwater levels that occur from groundwater management activities outlined in the GSP as follows:

#### **AGREEMENT**

1. **PROGRAM ELIGIBILITY.** Landowner must have submitted a complete Program Application inclusive of the initial assessment, paid the one-time fee, be the owner of record for the real property set-forth in Exhibit A, successfully qualified for mitigation under the Program as set-forth in Exhibit B, and said real property must fall within the boundaries of the Subbasin as set-forth in Exhibit C.
2. **INCOME ELIGIBILITY.** Participation in the Program shall not be limited or otherwise dictated by the Landowner's income.
3. **IMPLEMENTATION REVIEW COMMITTEE.** As necessary and as directed by the Parties, an Implementation Review Committee may be established to review the Program, inclusive of Program eligibility. The composition of such Implementation Review Committee shall be established by the Parties.
4. **CONTINUING EDUCATION.** Through execution of this Agreement, Landowner acknowledges and confirms having successfully completed "The Private Well Class" evidence of which is set-forth in Exhibit F. The Private Well Class is a collaboration between the Rural Community Assistance Partnership and the University of Illinois, through the Illinois State Water Survey and the Illinois Water Resource Center, and funded by the U.S. Environmental Protection Agency (<https://privatewellclass.org/enroll>).
5. **ACCESS.** Landowner agrees to access by the Parties, Preferred Contractors, and/or other parties as deemed appropriate at the sole discretion of the Parties. In all cases, the Parties agree to provide at least 24-hour's notice of intent to access the real property set-forth in Exhibit A.

6. **PREFERRED CONTRACTORS.** The Parties wish to ensure that any and all analysis, inspection, and eligible mitigation be completed by competent and qualified contractors. The Preferred Contractors set-forth in Exhibit D have been thoroughly vetted by the Parties and have sufficiently demonstrated said competency and qualifications.
7. **PRELIMINARY INSPECTION PROCESS.** The preliminary inspection process shall include, but is not limited to:
  - a. Review of initial assessment provided by the Landowner
  - b. Review water level data
  - c. Depth of new well
  - d. Applicability and nexus to other regional programs

Findings of the preliminary inspection process and the final eligibility determination are as set-forth in Exhibit B.

8. **PRIORITY.** The Program will be operated on a first-come, first-serve basis as of the date a completed and submitted Program Application is received by the Program Manager. No priority other than first-come, first-serve will be allowed.
9. **ELIGIBLE MITIGATION.** Eligible mitigation shall be limited to the mobilization, drilling, well construction, development, and de-mobilization necessary to facilitate the drilling of one new domestic well or shallow well that supplies drinking water users or consolidation with an existing domestic water system as defined herein with the sole intent of mitigating for declining groundwater levels beginning no earlier than January 31, 2020.
10. **NON-ELIGIBLE MITIGATION.** The Parties shall only be responsible for providing mitigation in accordance with this Agreement. Landowners shall be solely responsible for all other costs arising from construction of a new well or consolidation with an existing domestic water system, including without limitation, landscaping, hardscaping, trenching and installation of private water service facilities, increased electrical costs, modifying residential plumbing, removing and disposing of any pressure tanks or other facilities related to the domestic well or shallow well that supplies drinking water users, abandoning the domestic well or shallow well that supplies drinking water users, obtaining any required permits or inspections, appurtenant facilities such as pumps, motors, wire, pipe adapters, valves, clamps, couplings, spacers, gauges, wrap, pressure tanks, switches, and adapters, and any other related fees or expenses. Landowners connecting to an existing domestic water system shall be required to satisfy all requirements and/or rules of service as may be required by the owner of the existing domestic water system.
11. **MAXIMUM MITIGATION AWARD.** To the extent sufficient funding exists, the maximum mitigation award provided under the Program shall be \$30,000. In no case, is the maximum mitigation award guaranteed and the Parties retain exclusive control over the determination of the maximum mitigation award for the real property set-forth in Exhibit A. The Parties shall be responsible for the maximum mitigation award or the actual cost of the mitigation, whichever is less. Nothing in this Agreement prevents the Landowner from seeking additional and/or alternate funding mechanisms beyond the mitigation provided by the Program.



12. **MONITORING.** The Landowner agrees to allow the Parties the right to monitor groundwater levels in the new well as part of participation in the Program. Landowner agrees to the public use of any and all groundwater level data that may be collected for the purposes of complying with SGMA or as deemed appropriate by the Parties. The Parties' right to monitor groundwater levels in the new well does not alter or otherwise modify the terms and conditions of this Agreement nor does it obligate the Parties to any additional responsibility beyond that set-forth herein.
13. **RECORDATION OF MITIGATION AWARD.** Eligible mitigation provided under the Program shall only occur once per domestic well or shallow well that supplies drinking water users and shall run with the real property set-forth in Exhibit A. This Agreement shall be recorded with the County of Madera or the County of Merced and shall bind the Landowner and/or their heirs and assigns. This Agreement shall be fully executed, but recordation will not occur until mitigation is complete. Applicable well drillers log and site map shall be included as Exhibit E to this Agreement.
14. **WARRANTY.** The Parties shall make all reasonable attempts to ensure that the mitigation provided under this Program meets the intent of the GSP and is based on the best available information. Landowner agrees that the mitigation provided under this Program is a one-time mitigation to address a decline in groundwater levels and shall hold the Parties or their successor(s) harmless from any and all future claims arising from participation in the Program.

**IN WITNESS WHEREOF,** the Landowner and the Parties have caused this Agreement to be executed, each signatory hereto represents that he/she has been appropriately authorized to enter into this Agreement on behalf of the Party whom he/she signs.

**Landowner**

\_\_\_\_\_

\_\_\_\_\_  
Date

**Authorized Representative of the Parties**

\_\_\_\_\_

\_\_\_\_\_  
Date

**EXHIBIT A**

**INSERT COPY OF DEED HERE**

**EXHIBIT B**

**ELIGIBILITY DETERMINATION**

# EXHIBIT C

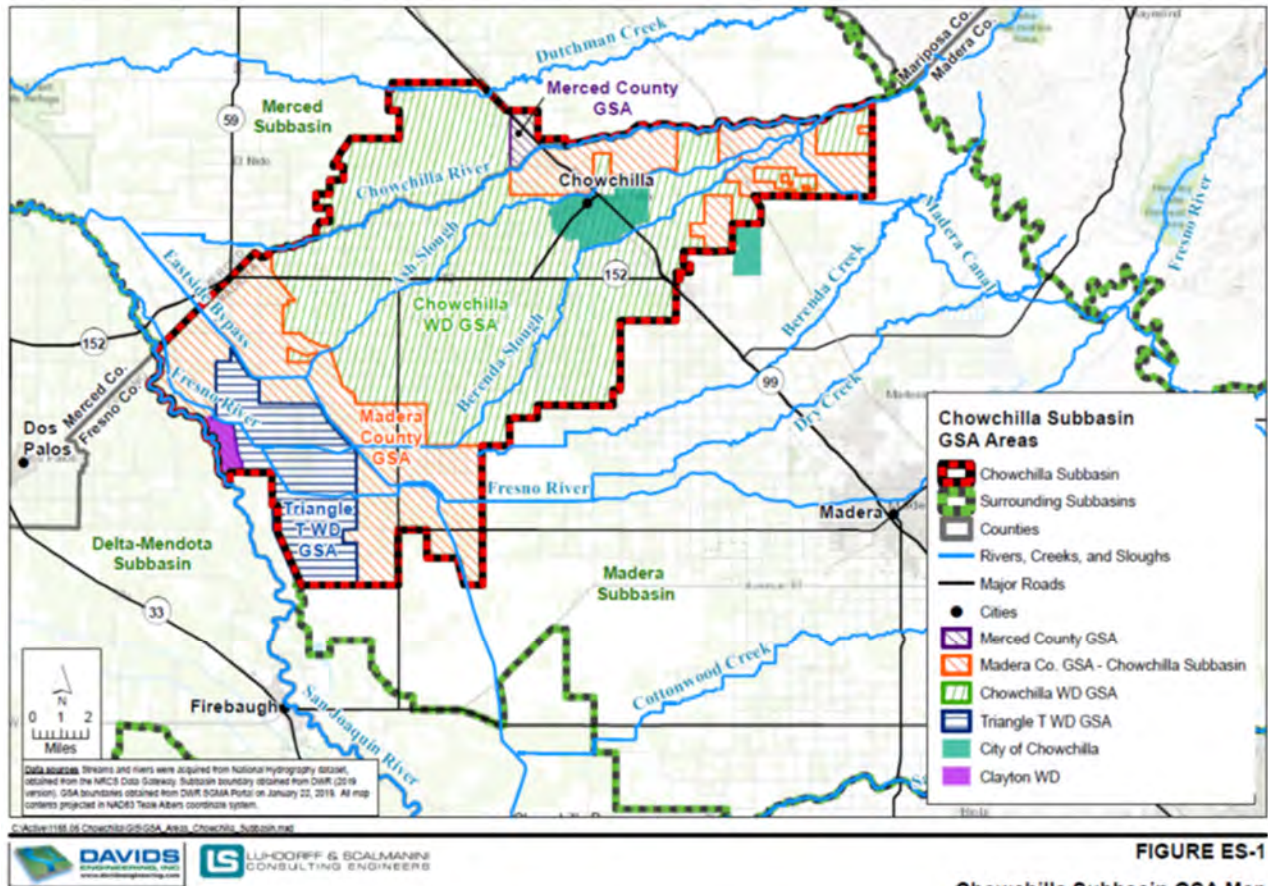


FIGURE ES-1

## Chowchilla Subbasin GSA Map

Madera County - Chowchilla Subbasin  
SGMA Data Collection and Analysis

## EXHIBIT D

**INSERT PREFERRED CONTRACTORS HERE – TWO LISTS: (A) PUMP COMPANIES (INITIAL ASSESSMENT)  
AND (B) WELL (DRILLING OF NEW WELL), CAN ONLY BE ON ONE LIST**

**EXHIBIT E**

**INSERT WELL DRILLERS LOG AND SITE MAP HERE**

**EXHIBIT F**

**INSERT PROOF OF CONTINUING EDUCATION HERE**