
MARINA COAST WATER DISTRICT STAKEHOLDER COMMITTEE MEETING #3 MONTEREY SUBBASIN

11 MARCH 2021

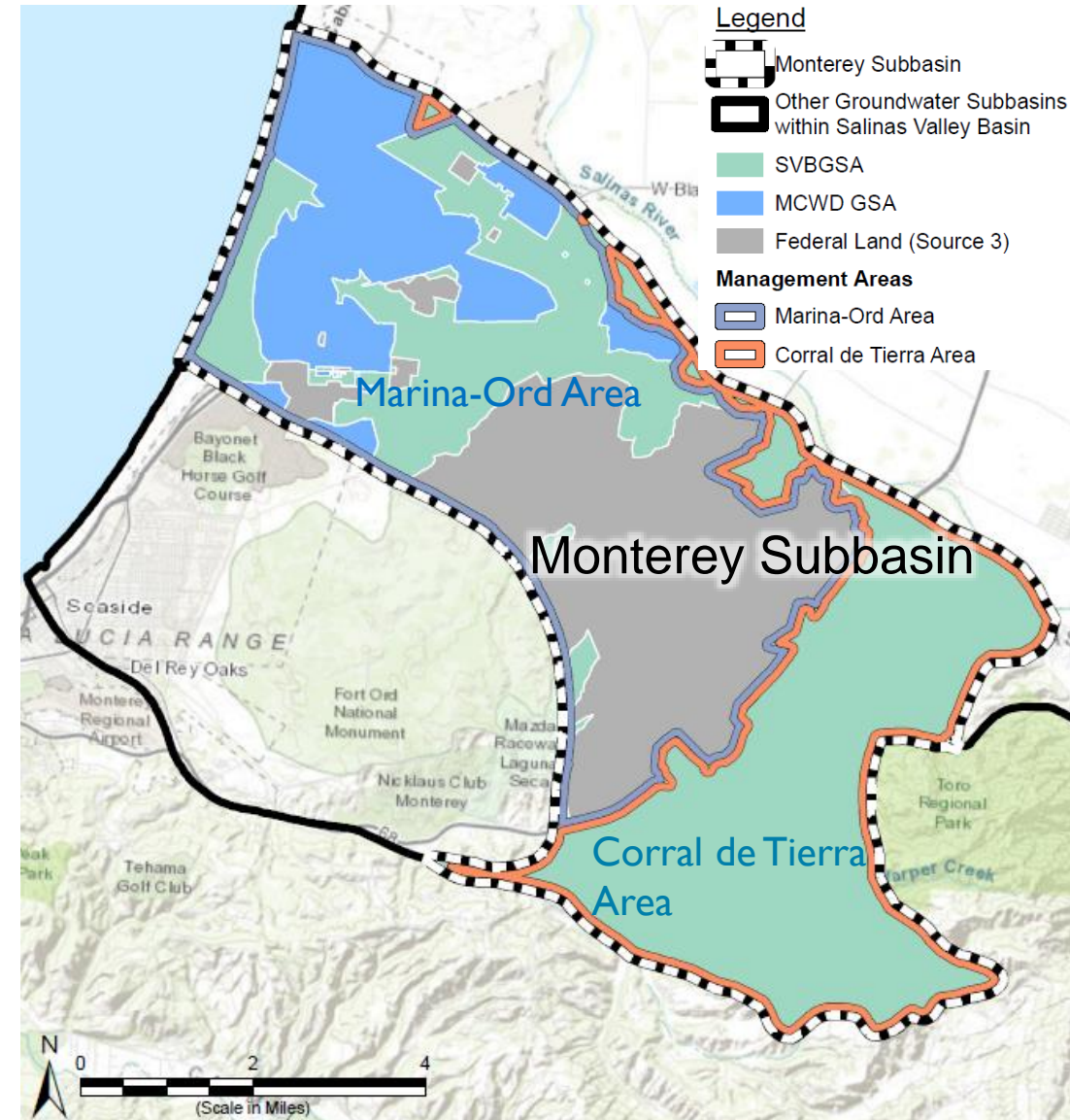
PRESENTATION OUTLINE

- Monterey Subbasin Groundwater Sustainability Plan (GSP) and Stakeholder Engagement Overview
- Comments and Questions for GSP Chapters 4 and 5
- Preview of GSP Chapters 7 and 8
- Next Steps
 - Overview of Proposed Projects and Management Actions (GSP Chapter 9)

GSP AND STAKEHOLDER ENGAGEMENT OVERVIEW

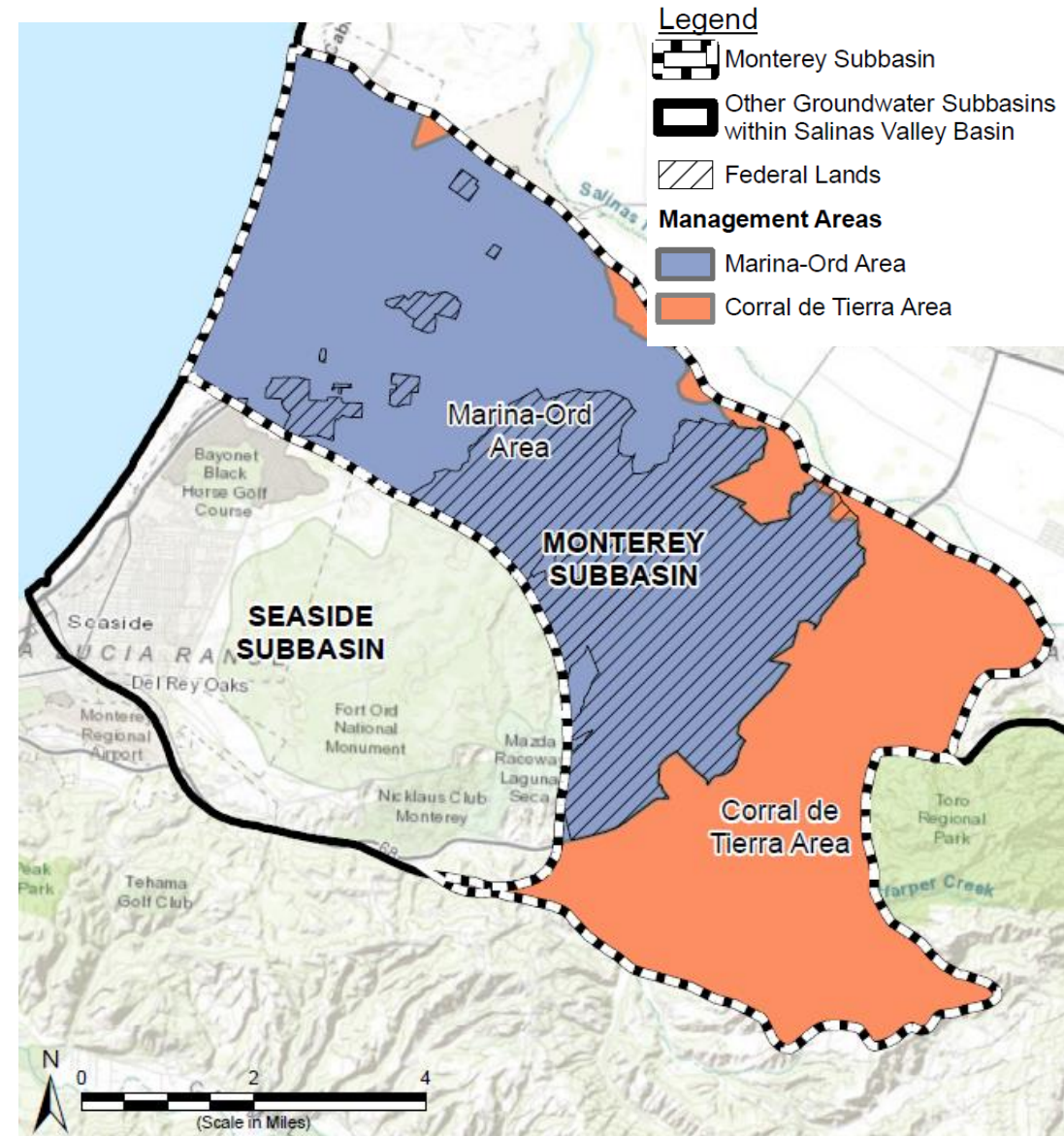
MONTEREY SUBBASIN GSP BEING DEVELOPED BY MCWD GSA AND SVBGSA

- One GSP covering the entire basin to be adopted by two GSAs
- GSP developed pursuant to Framework agreement between MCWD and SVBGSA
- GSP implementation to be defined by an Implementation Agreement to be developed in the near term
- GSP development subdivided by Management Area:
 - MCWD: Marina-Ord Area
 - SVBGSA: Corral de Tierra Area




MANAGEMENT AREAS

- Based on jurisdictional and hydrogeological differences
- Boundaries pending finalization
- Marina-Ord Area includes:
 - MCWD's service area, Sphere of Influence, and Future Planning areas (currently no water use, but will be served by MCWD upon development)
 - Includes Federal lands (not subject to SGMA)
- Corral de Tierra includes:
 - Remainder of the Subbasin
 - Primarily communities along and southeast of Hwy 68

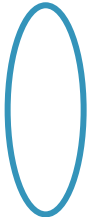


GSP CHAPTER OUTLINE

1. Introduction and Agency Information
2. Plan Area
3. Stakeholder Engagement and Communication
4. Hydrogeological Conceptual Model (HCM)
5. Groundwater Conditions Assessment
6. Water Budget
7. Monitoring Network
8. Sustainable Management Criteria (SMCs)
9. Projects & Management Actions (P&MAs)
10. GSP Implementation



Draft Chapters 1 through 5
Released for Stakeholder Review



Stakeholder
Questions/Comments
today



Overview
Presented
today

GSP DEVELOPMENT SCHEDULE

TASK	2020								2021								
	JAN-MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL		
Chapters 1-4	[Grey bar with yellow triangle at end of Aug]																
Chapter 5 - Groundwater Conditions			[Grey bar with yellow triangle at end of Dec]														
Chapter 6 - Water Budget					[Grey bar with yellow triangle at end of May]												
Chapter 7 - Monitoring Network							[Grey bar with yellow triangle at end of Mar]										
Chapter 8 - Sustainable Management Criteria						[Grey bar with yellow triangle at end of Mar]											
Chapter 9 - Projects and Management Actions									[Grey bar with yellow triangle at end of Apr]								
Chapter 10 - GSP Implementation									[Grey bar with yellow triangle at end of Jun]								
Public / Management Meetings																	
MCWD Stakeholder Meetings				■				■			■			■			
				Chp. 1-4				Chp. 5, 8			Chp. 7-8			Chp. 6, 9-10			
SVBGSA Stakeholder Meetings					■					■			■			■	
Steering Committee Meetings **							■	□	□	□	□	□	□	□	□		
MCWD Board Meetings											■						■
											Chp. 1-5						Chp. 6-10



- Adoption by SVBGSA & MCWDGSA December 2021 or January 2022
- Submittal of Adopted GSP to DWR by 31 January 2022

** Steering Committee meetings are scheduled regularly. However, the committee meets only when needed to manage issues raised by the Technical Committee.



MCWD GSP DEVELOPMENT SCHEDULE

Stakeholder Meeting Dates	Draft Chapters Presentation and Release Schedule
Aug 2020	Chapter 1: Introduction Chapter 2: Plan Area Chapter 3: Stakeholder Engagement Chapter 4: Hydrogeologic Conceptual Model
Nov 2020	Chapter 5: Groundwater Conditions Chapter 8: Sustainable Management Criteria
Mar 2021	Chapter 7: Monitoring Network Chapter 8: Sustainable Management Criteria
May/June 2021	Chapter 6: Water Budget Chapter 9: Projects and Management Actions Chapter 10: Implementation

OPPORTUNITIES FOR STAKEHOLDER ENGAGEMENT DURING GSP DEVELOPMENT

- Stakeholder Committee Meetings
 - Quarterly meetings; open to public
 - Presentation of draft contents and discussion of planning topics
 - Draft chapters will be made available following the meeting
- MCWD GSA Board Meeting Updates
 - First interim GSP update to MCWD Board presented on 16 February 2021
 - Second GSP update to MCWD Board scheduled in July 2021
- MCWD GSA website
 - Posting of draft chapters
 - Submit comments, opinions, and recommendations, comment letters online (select GSA Feedback Form under GSA dropdown at www.mcwd.org or visit <https://form.jotform.com/202364609327051>)

QUESTIONS AND COMMENTS FOR GSP CHAPTERS 4-5

COMMENTS RECEIVED ON CHAPTERS 4 AND 5

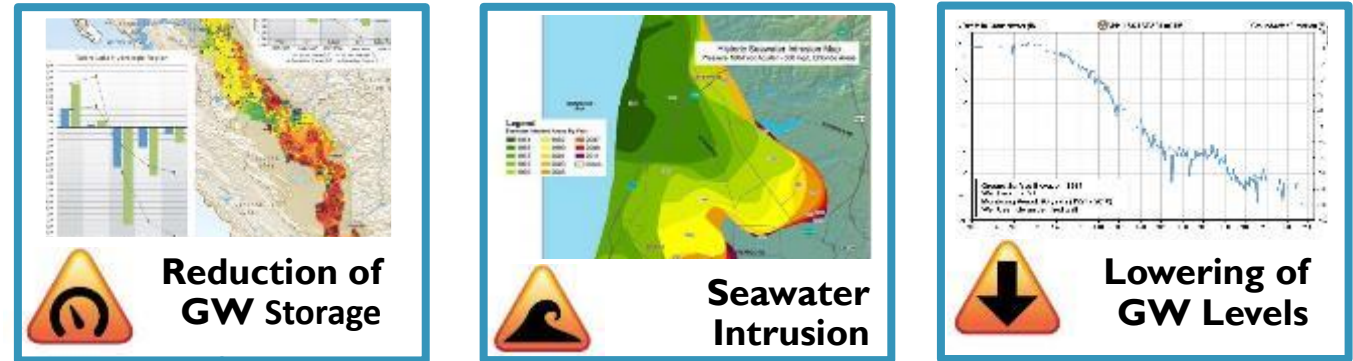
- Draft chapter 5 and revised chapters 1-4 posted on MCWD website in January 2021 (documents dated December 2020)
- Received stakeholder comments across multiple platforms
 - Both GSA's stakeholder meetings and website comment forms
- MCWD and SVBGSA is coordinating response
 - Met individually with Seaside Watermaster and MCWRA

QUESTIONS AND COMMENTS?

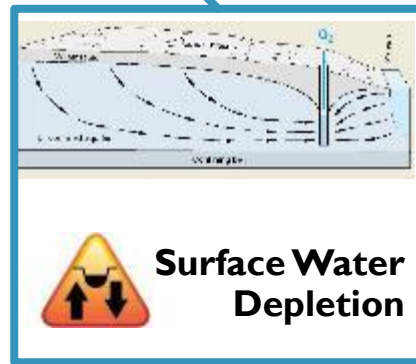
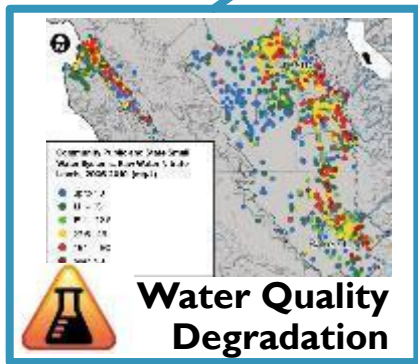
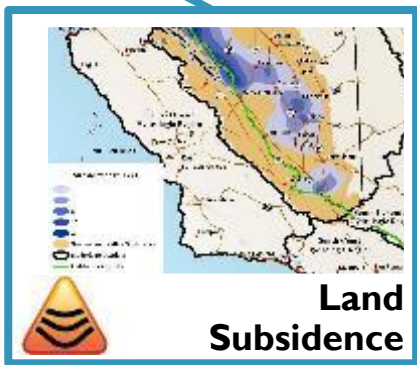


PREVIEW OF GSP CHAPTERS 7 AND 8

CHAPTERS 7 & 8 – MONITORING NETWORK & SUSTAINABLE MANAGEMENT CRITERIA

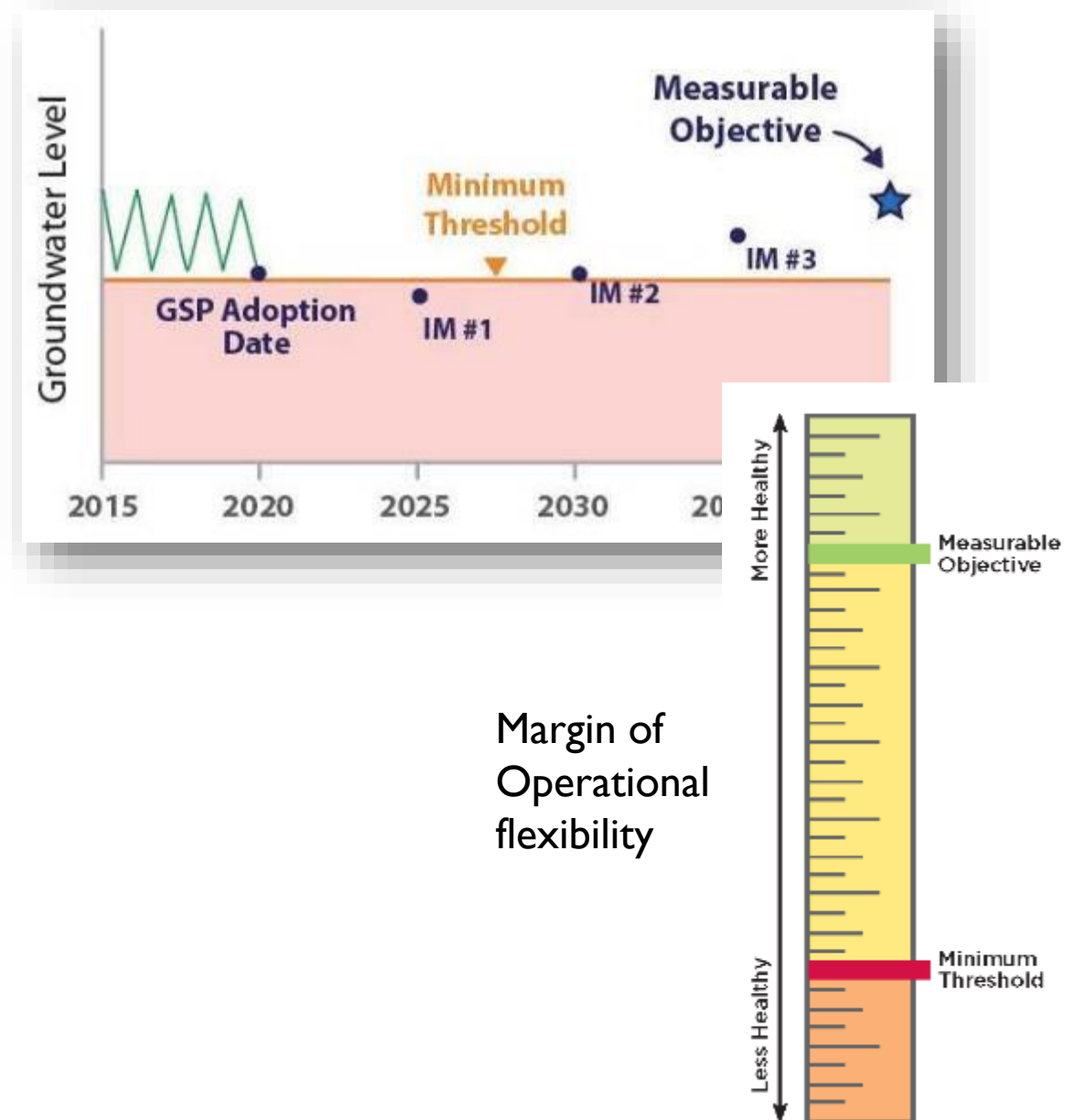


Primary Issues in Monterey Subbasin



SUSTAINABILITY CRITERIA⁽¹⁾

- **Sustainability indicators** (SIs) are the six effects that, when **significant and unreasonable**, become undesirable results
- **Minimum thresholds** (MTs) are the quantitative values representing groundwater conditions at a representative monitoring site that, when exceeded, may cause an undesirable result(s)
- **Measurable Objectives** (MOs) are quantitative goals that reflect the basin's desired groundwater conditions and allow the GSA to achieve the sustainability goal within 20 years



SMCS DEVELOPMENT PROCESS

- Establishing a procedure to SMCs development in the Technical Committee;
- Gathering input and develop preferences for establishing SMCs for each GSA's respective management area, including consultation with stakeholders and discussions within GSA staff;
- Reconciling management area-level input in the Technical Committee;
 - Two sets of SMCs are be developed for some indicators
- Reconciling subbasin SMC in the Integrated Sustainability Committee when subbasin SMC did not align;
- **Presenting proposed SMC to GSA governing bodies and stakeholder groups;**
- Modifying SMCs based on input from the public, GSA staff, and Board Members.

CRITICAL DRIVERS TO AVOID UNDESIRABLE RESULTS

(BASIS FOR DEVELOPMENT OF MINIMUM THRESHOLDS)

Marina-Ord Area

- Limit further advancement of Seawater Intrusion
- Stabilize Groundwater Levels in the 400 Foot and Deep Aquifers (*at 2015 levels*)
- Make sure that Projects do not:
 - Cause shallow Groundwater Levels to decline in vicinity of groundwater dependent ecosystems
 - Cause legacy Fort Ord Contamination to migrate further

Corral de Tierra Area

- Stabilize Groundwater Levels to
 - Protect domestic and small water system supply wells
 - Maintain current (reasonable) levels of Surface water depletion
- Pump within the sustainable yield

PRINCIPAL AQUIFERS AND AQUITARDS

Principal Aquifers and Aquitards	
Marina-Ord Area	Corral de Tierra Area
Dune Sand Aquifer	--
Salinas Valley Aquitard	
180-Foot Aquifer	
Middle Aquitard	
400-Foot Aquifer	El Toro Primary Aquifer
Deep Aquitard	
Deep Aquifers	

CHRONIC LOWERING OF GROUNDWATER LEVELS

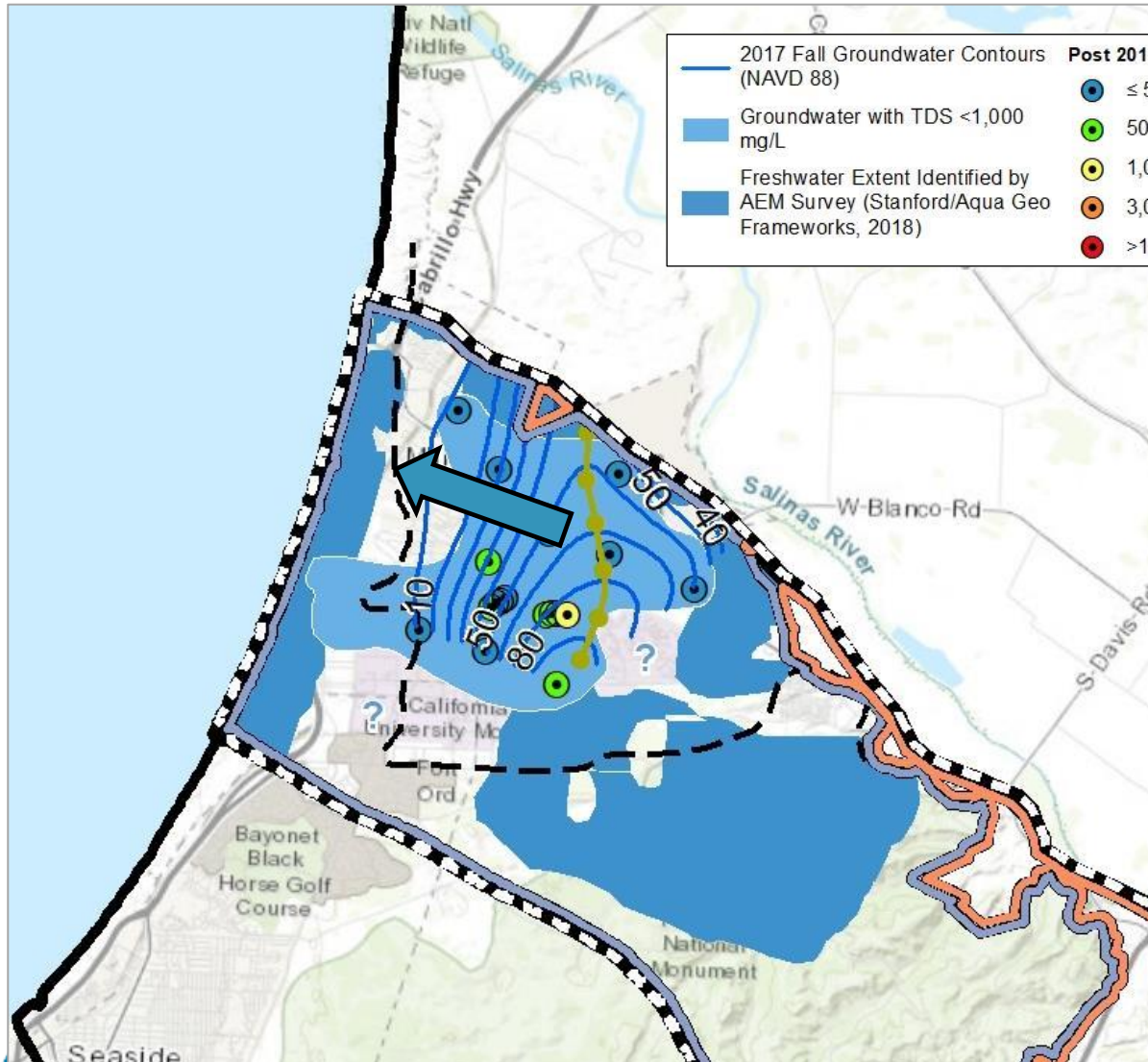
Significant and unreasonable groundwater elevations in the Marina-Ord Area include:

Groundwater elevations below those historically observed between 1995 and 2015:

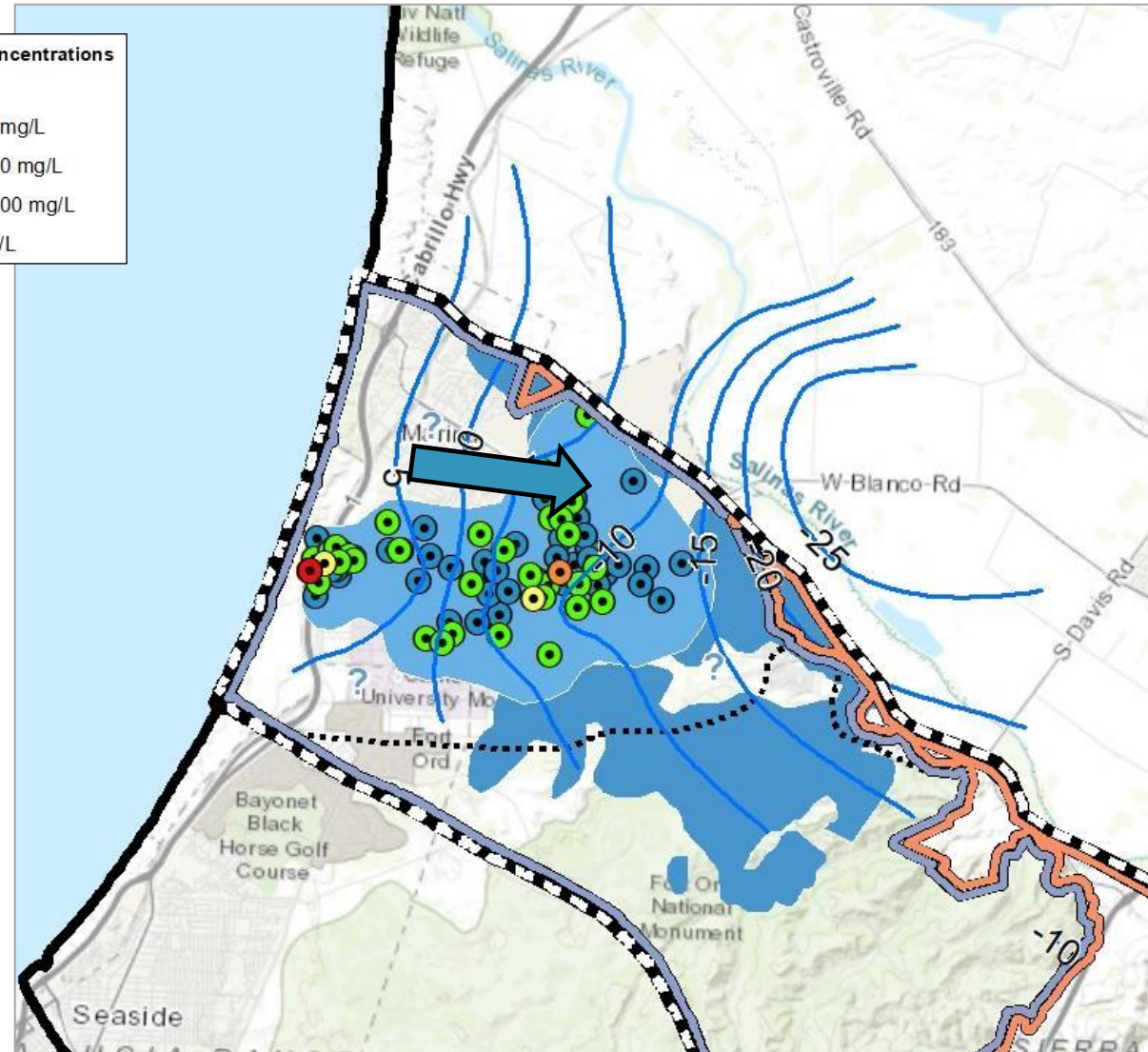
- *Near the coast in the Dune Sand, 180-Foot, and 400-Foot Aquifers (where not seawater intruded),*
- *Near the seawater intrusion front in the lower 180-Foot and 400-Foot Aquifers, and*
- *throughout the Deep Aquifers.*

because, such groundwater elevations could cause lateral or vertical expansion of the existing seawater intrusion extent and/or eventual migration of saline water into Deep Aquifer wells.

GROUNDWATER ELEVATIONS/SEAWATER INTRUSION (MARINA-ORD AREA)

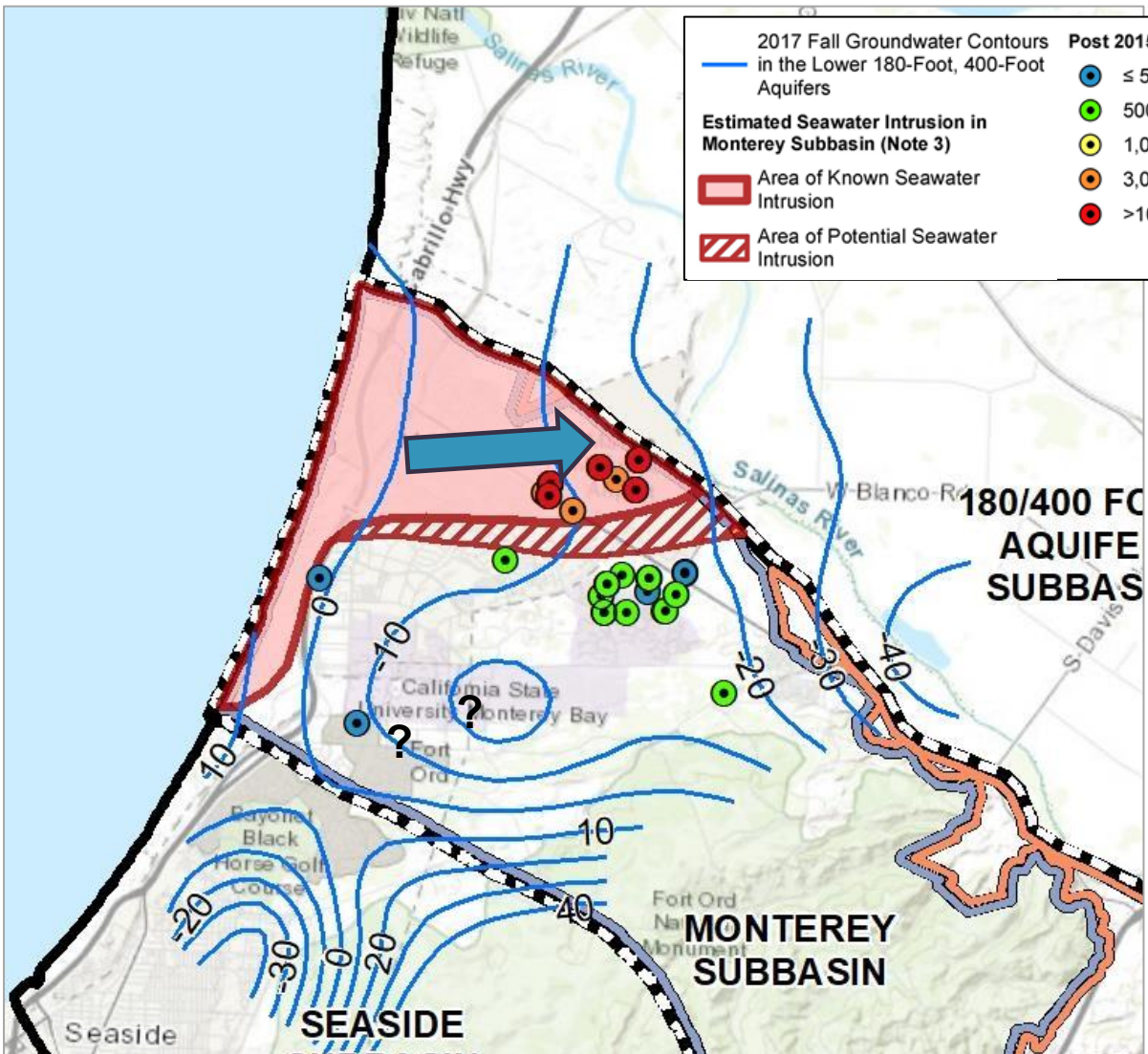


Dune Sand Aquifer

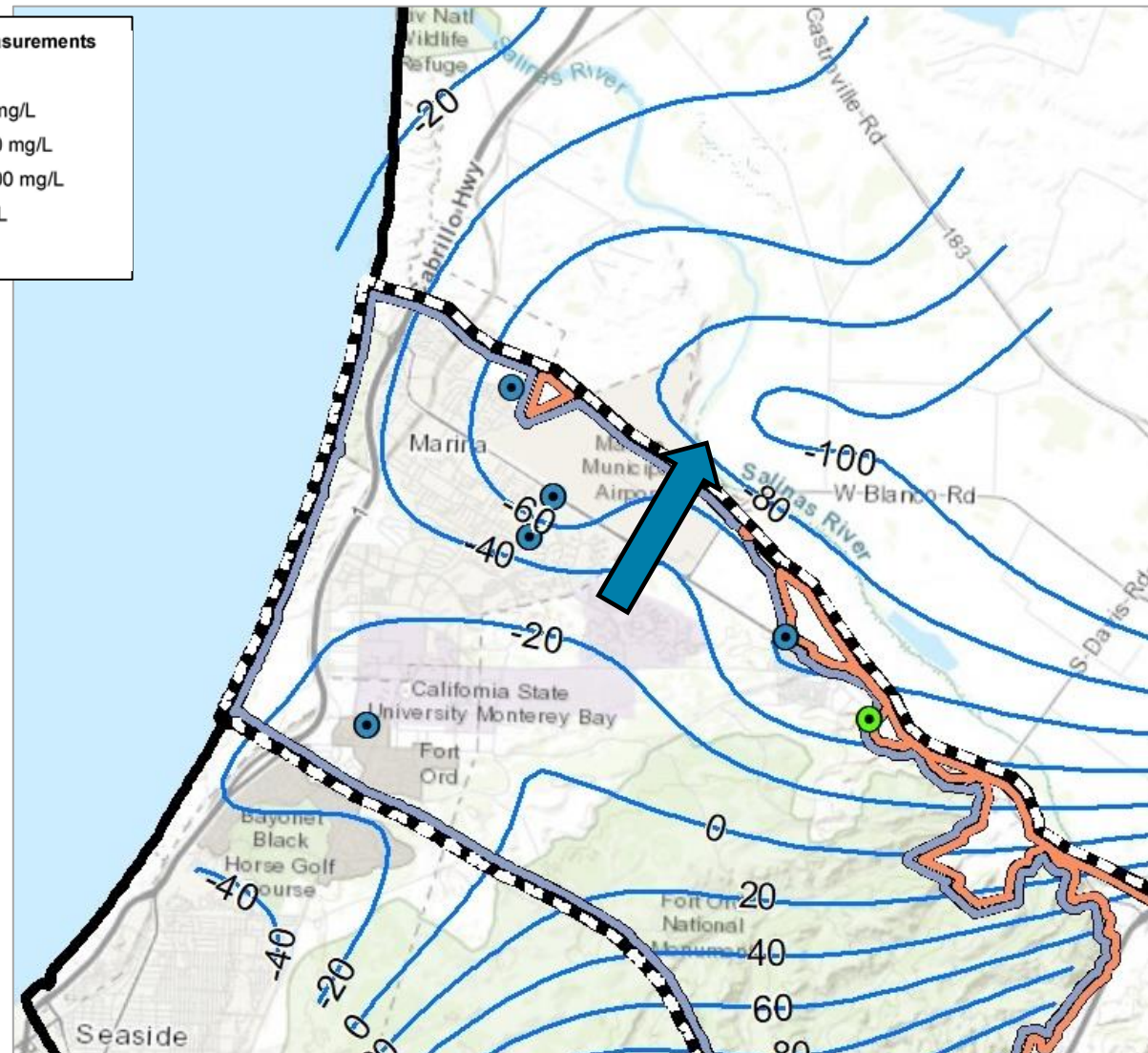


Upper 180-Foot Aquifer

GROUNDWATER ELEVATIONS/SEAWATER INTRUSION (MARINA ORD AREA)



400-Foot Aquifer

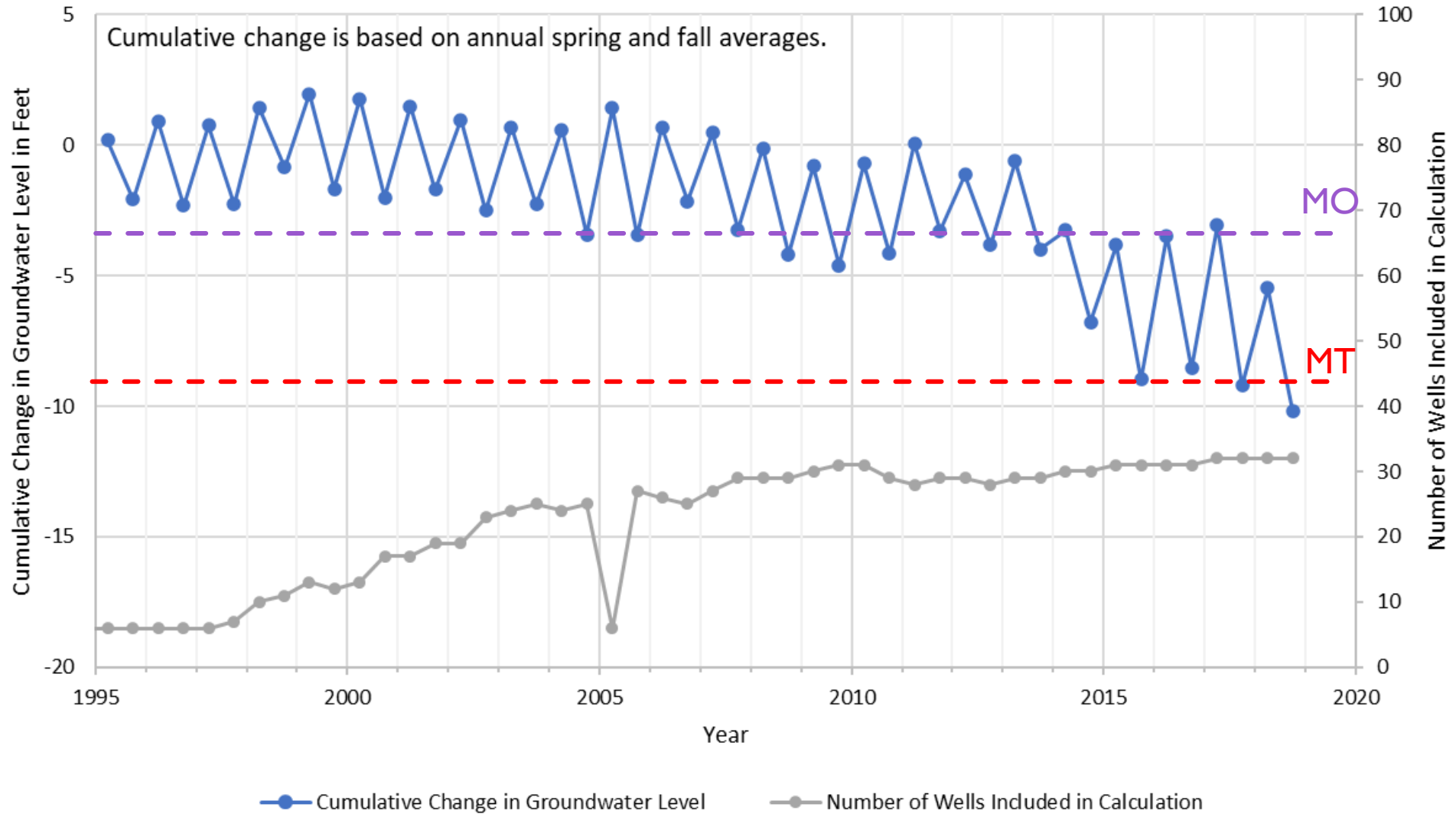


Deep Aquifer

CHRONIC LOWERING OF GROUNDWATER LEVELS

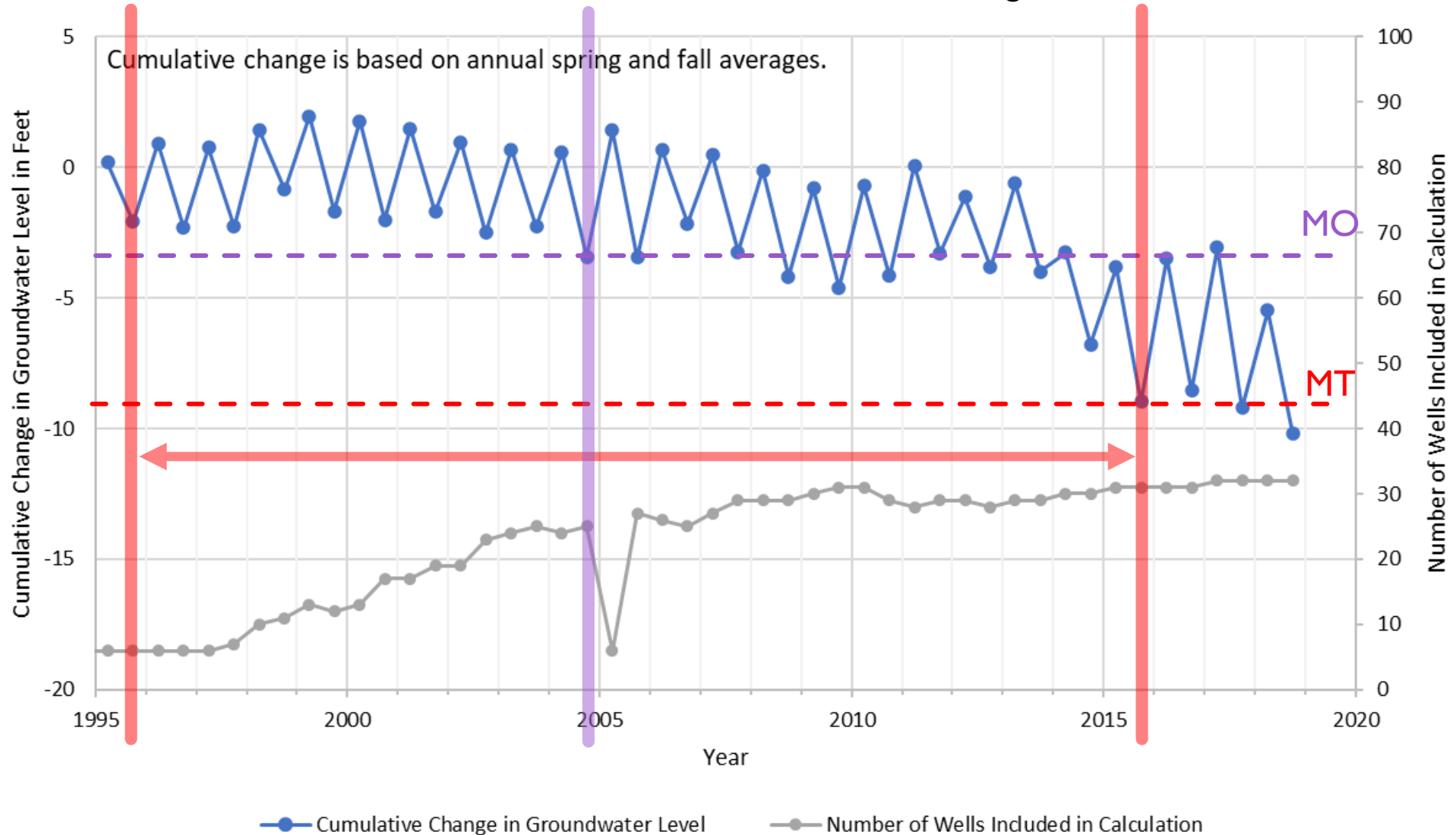
Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
<p>Marina-Ord Area: In the Dune Sand, 180-Foot, 400-Foot, and Deep Aquifers, set to the minimum groundwater elevations historically observed between 1995 and 2015.</p> <hr/> <p>Corral de Tierra Area: Set to 2015 groundwater elevations for the El Toro Primary Aquifer System.</p>	<p>Measured through the groundwater elevation representative monitoring well network within each management area</p>	<p>Marina-Ord Area: In the Dune Sand, 180-Foot, 400-Foot, and Deep Aquifers, set to the groundwater elevations historically observed in 2004.</p> <hr/> <p>Corral de Tierra Area: Set to [YEAR TBD] groundwater elevations for the El Toro Primary Aquifer System.</p>	<p>(1) Within the Marina-Ord Area, over the course of any one year, more than 20% of groundwater elevation minimum thresholds are exceeded in either</p> <ul style="list-style-type: none"> a) the Dune Sand and upper 180-Foot Aquifers, or b) the lower 180-Foot and 400-Foot Aquifers, or c) the Deep Aquifers; <p>OR</p> <p>(2) Within the Corral de Tierra Area, more than 15% of groundwater elevation minimum thresholds are exceeded over the course of any one year.</p>

CUMULATIVE GROUNDWATER CHANGE IN THE MARINA-ORD AREA



CUMULATIVE GROUNDWATER CHANGE IN THE MARINA-ORD AREA

Definition and measurement of SMCs will be based on November / December groundwater elevations

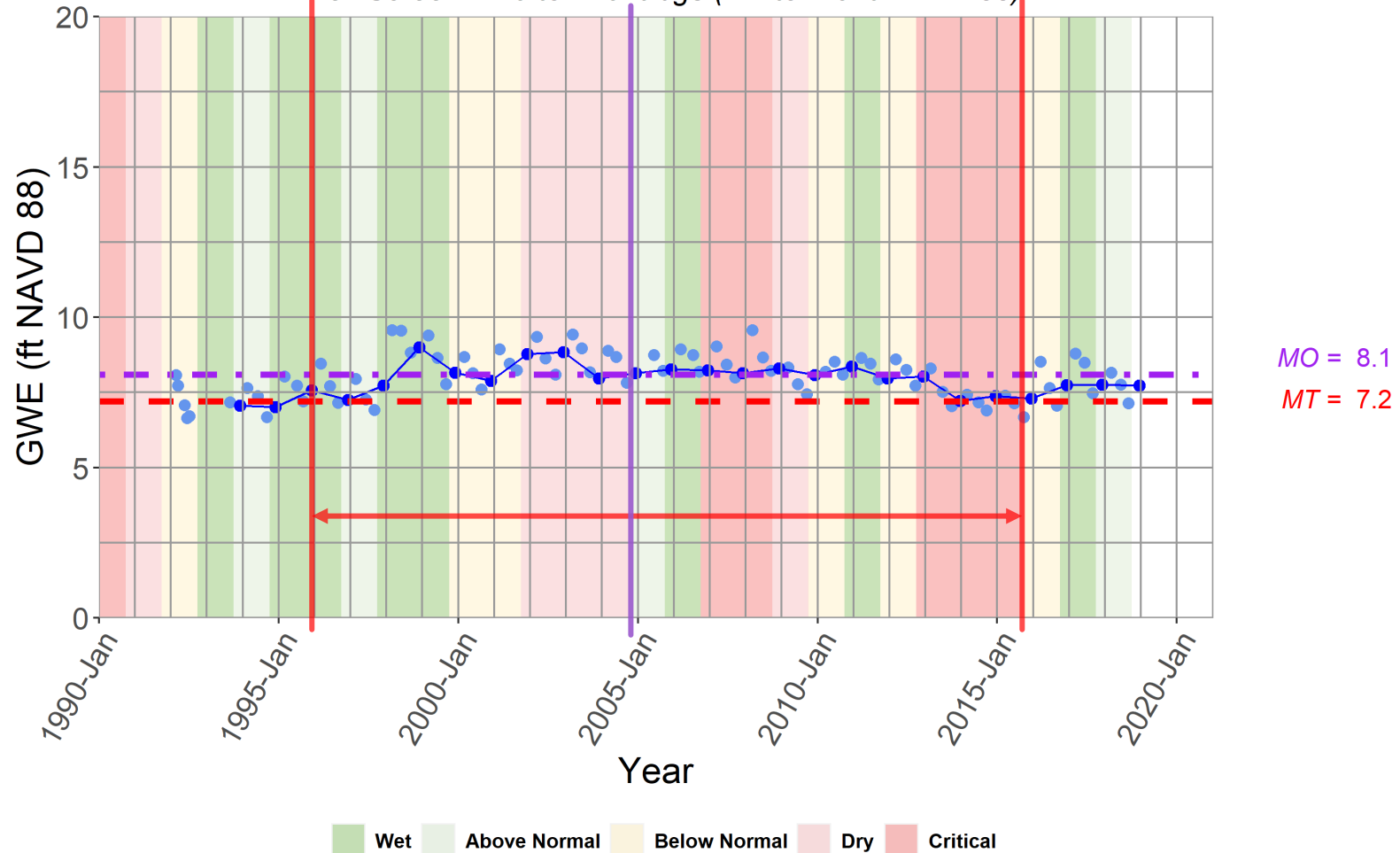


EXAMPLE HYDROGRAPH WITH MT AND MO

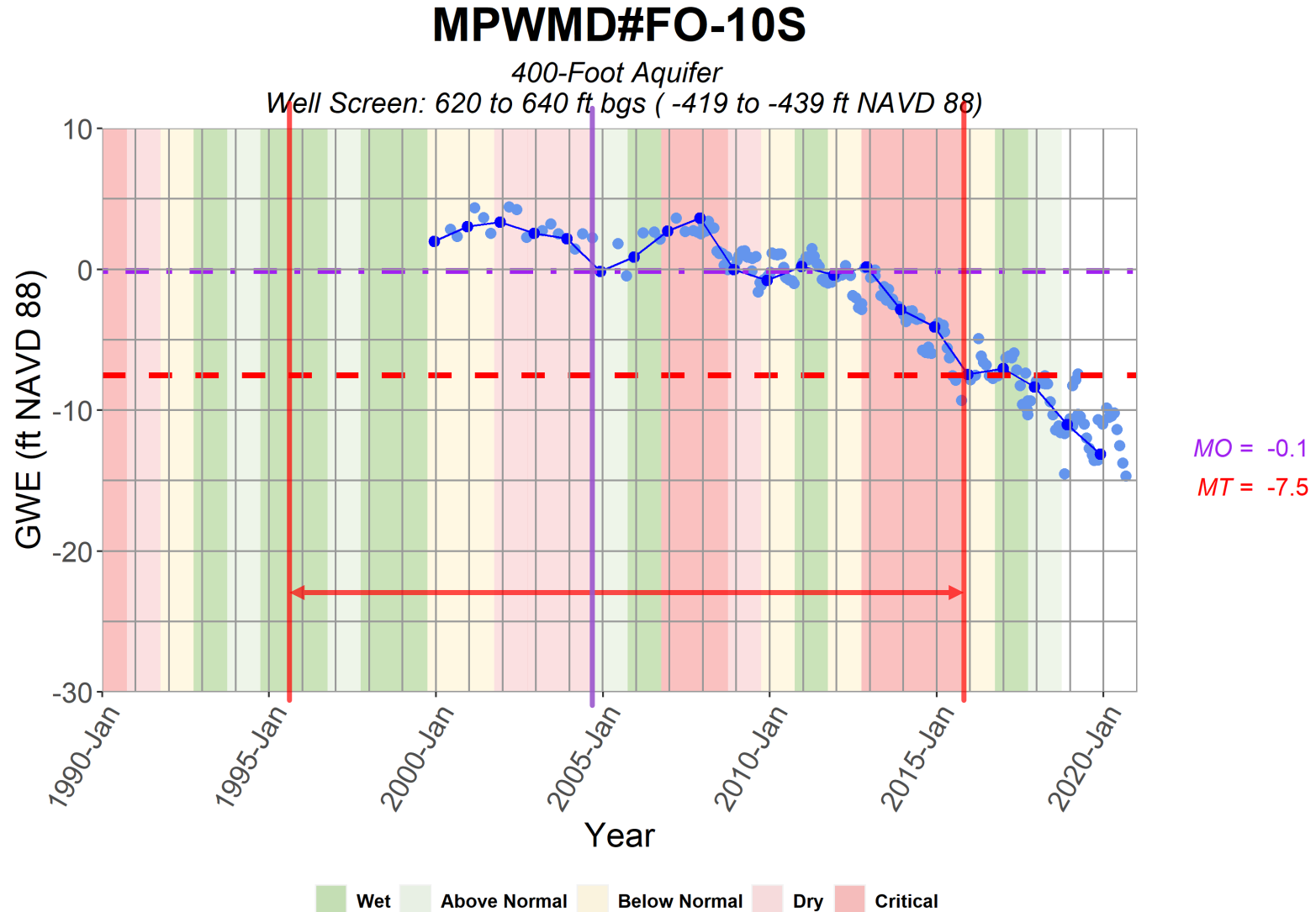
MW-OU2-32-A

Dune Sand Aquifer

Well Screen: 110 to 140 ft bgs (11 to -19 ft NAVD 88)



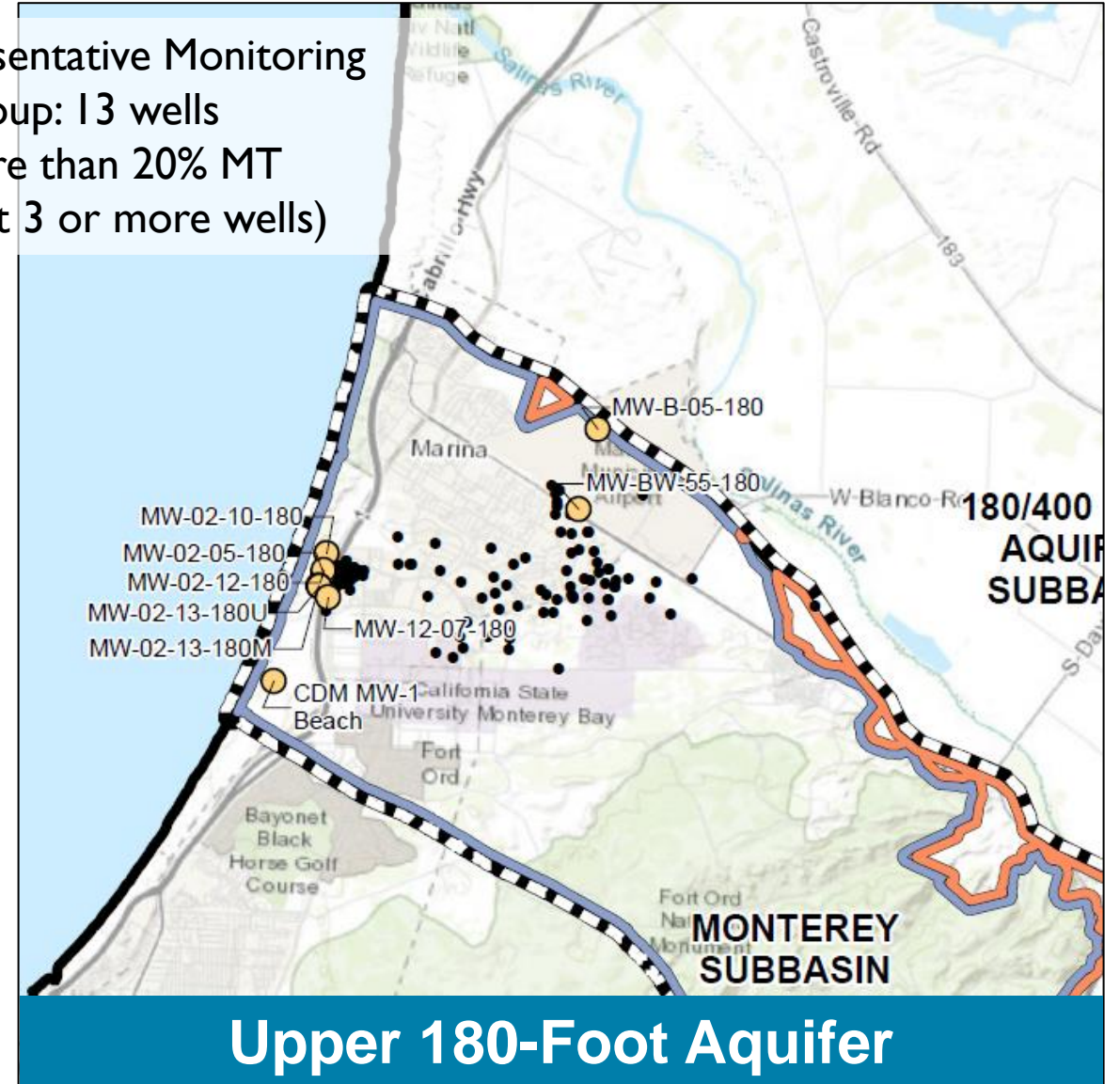
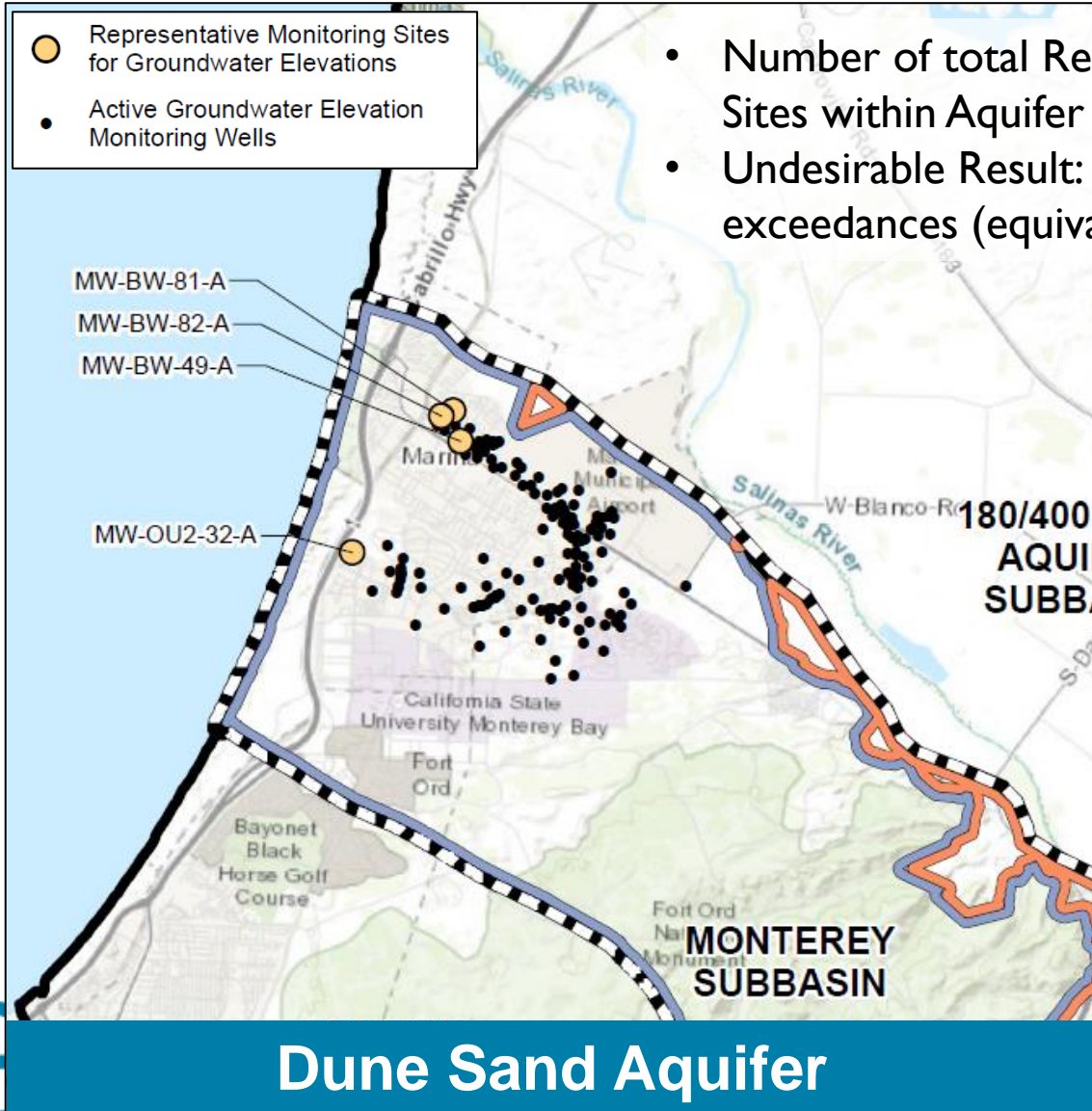
EXAMPLE HYDROGRAPH WITH MT AND MO



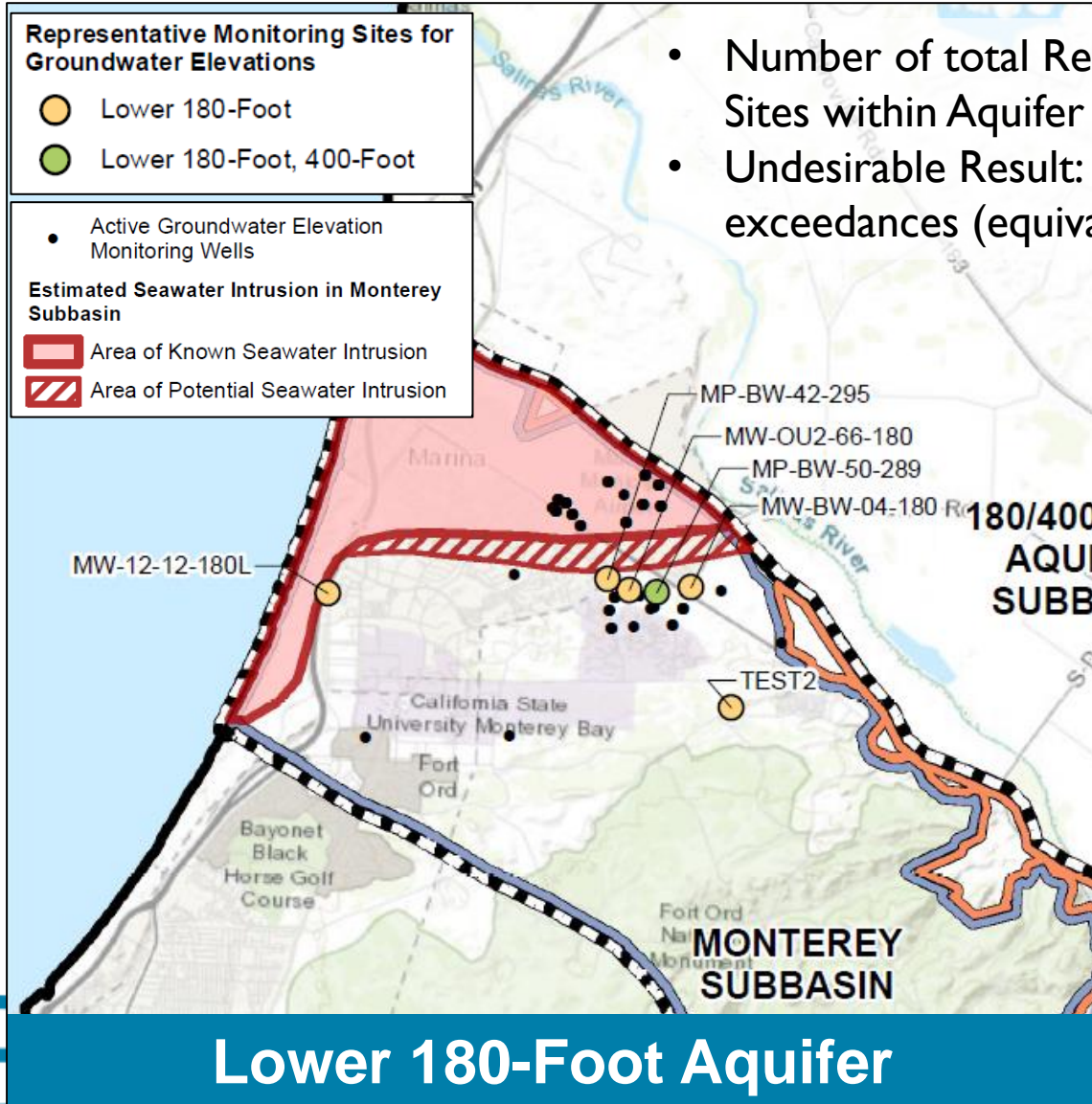
UNDESIRABLE RESULTS

- Within the Marina-Ord Area, over the course of any one year, more than 20% of groundwater elevation minimum thresholds are exceeded in either
 - the Dune Sand and upper 180-Foot Aquifers, or
 - the lower 180-Foot and 400-Foot Aquifers, or
 - the Deep Aquifers;

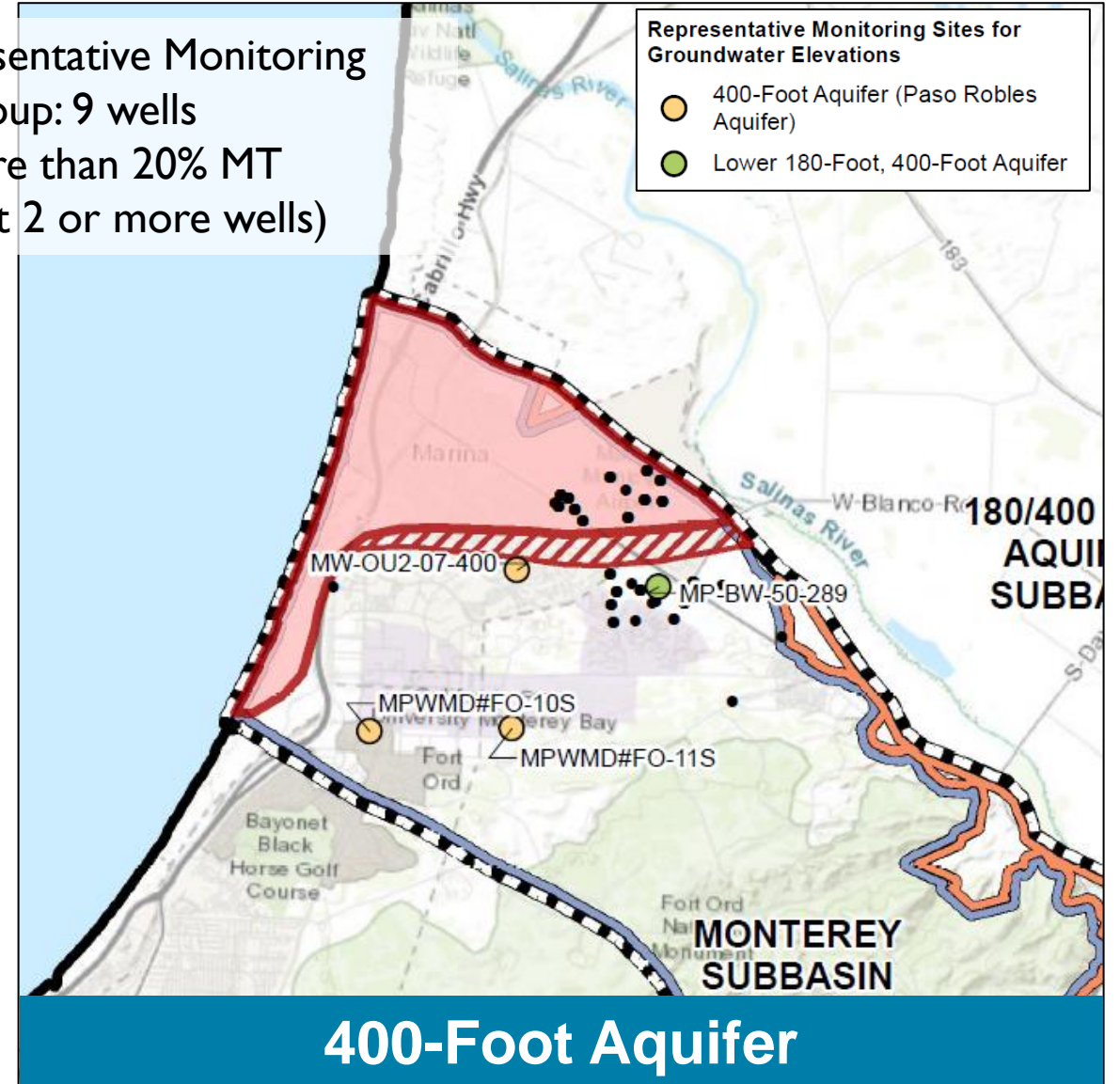
DUNE SAND AND UPPER 180-FOOT AQUIFERS



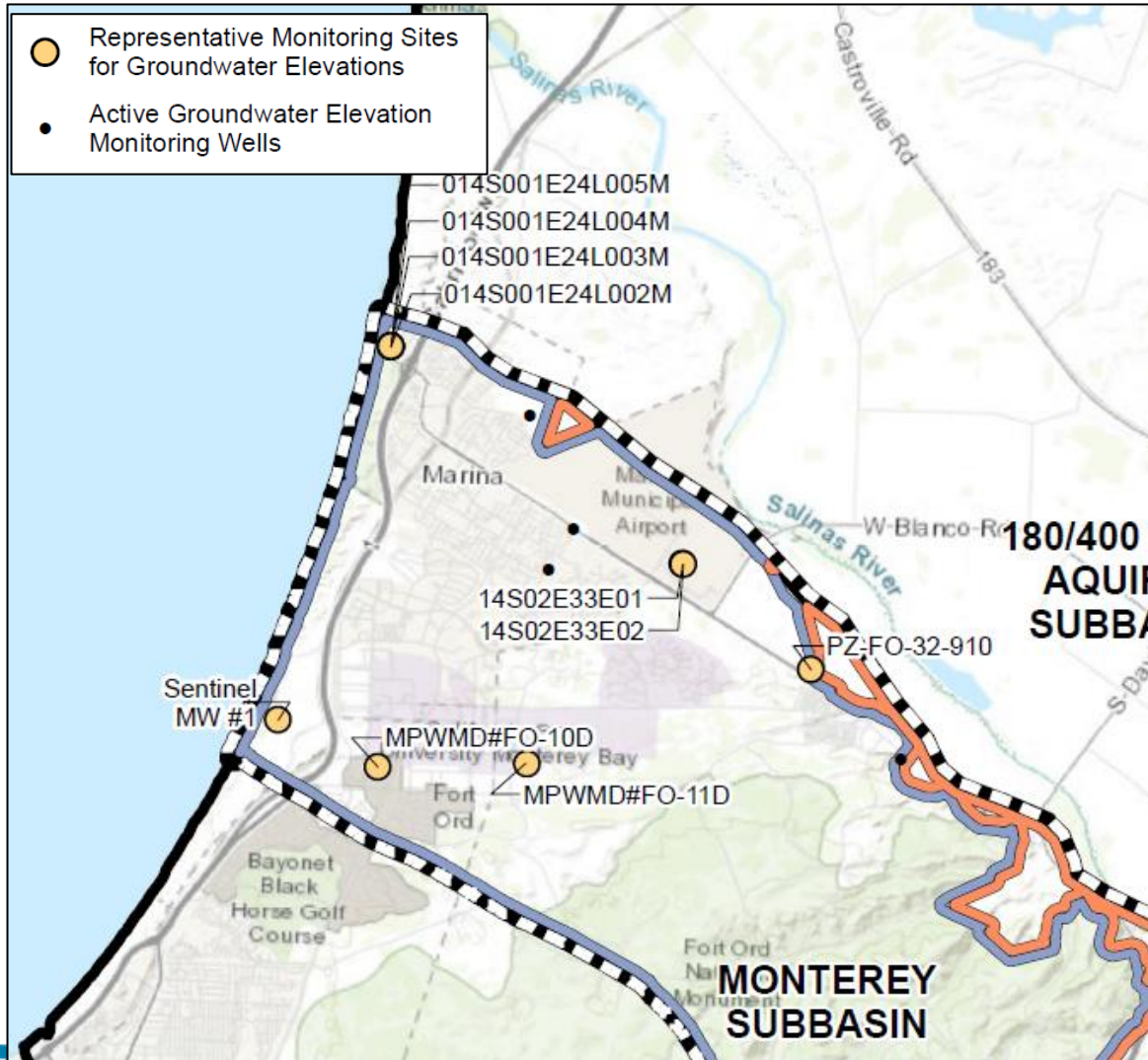
LOWER 180-FOOT AND 400-FOOT AQUIFERS



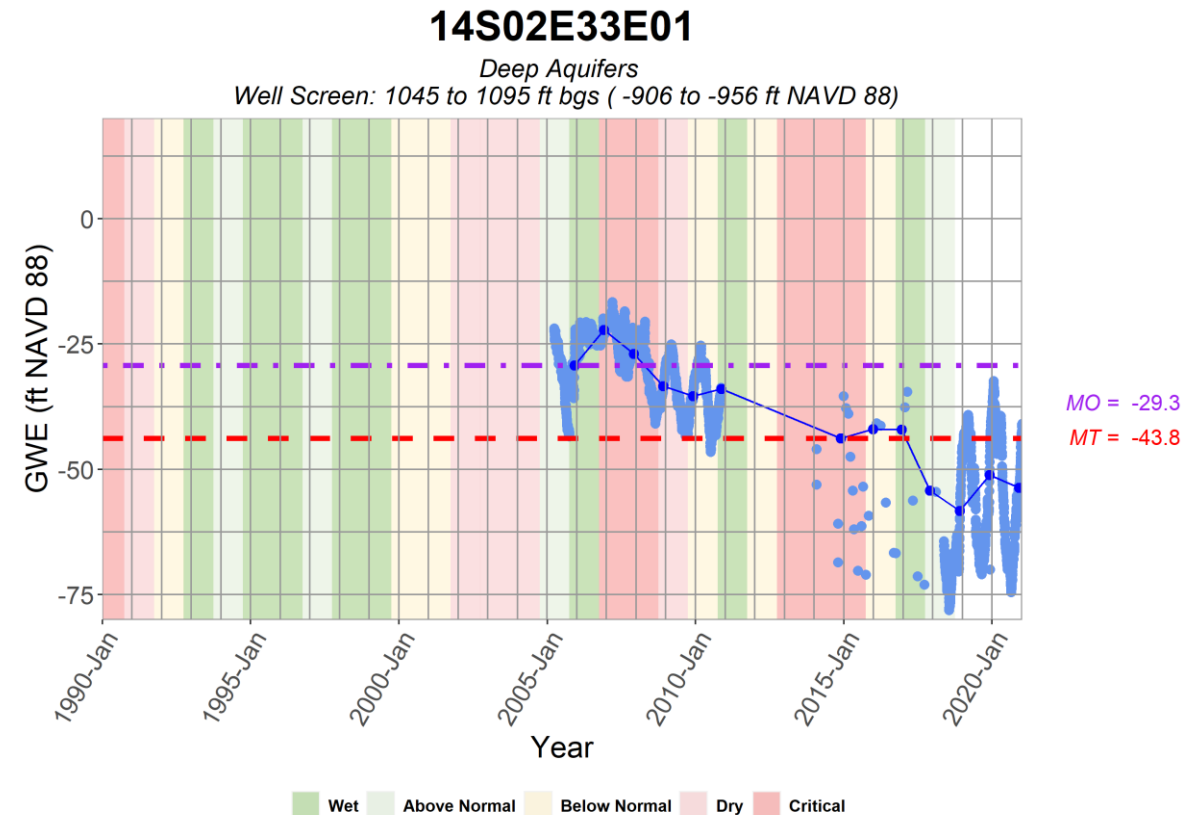
- Number of total Representative Monitoring Sites within Aquifer Group: 9 wells
- Undesirable Result: more than 20% MT exceedances (equivalent 2 or more wells)



DEEP AQUIFERS



- Number of total Representative Monitoring Sites within Aquifer Group: 10 wells
- Undesirable Result: more than 20% MT exceedances (equivalent 2 or more wells)

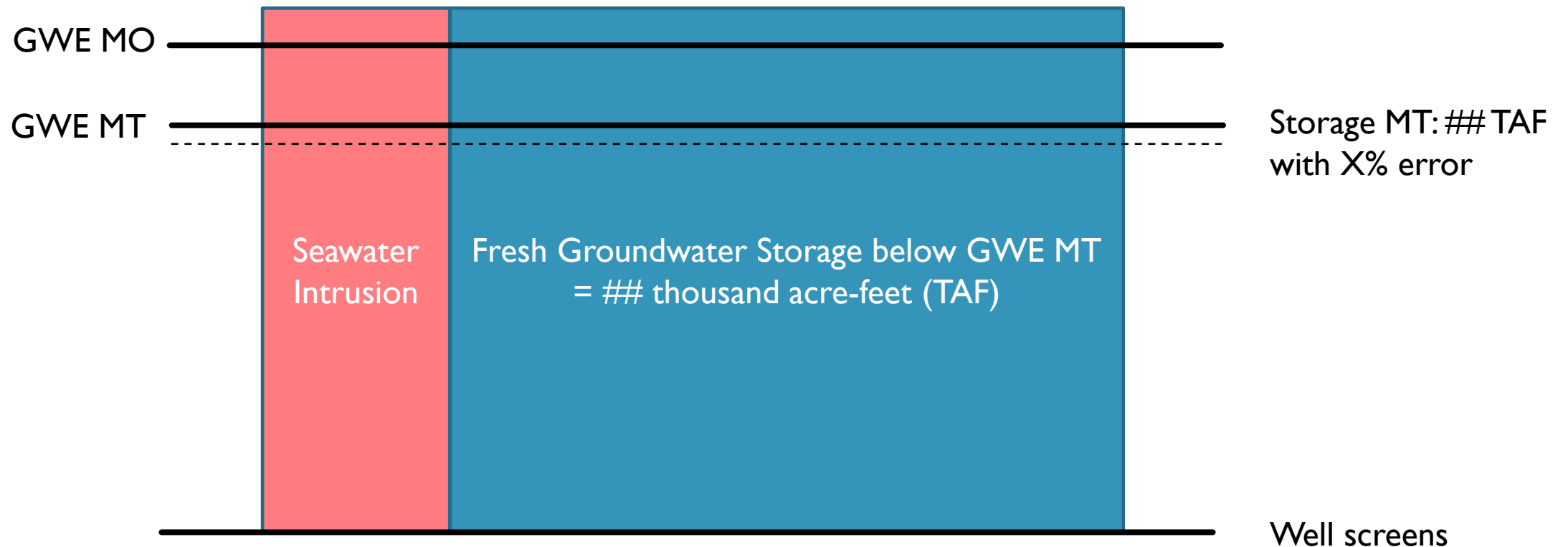


Deep Aquifers

REDUCTION OF GROUNDWATER STORAGE

- MCWD GSA and SVBGSA working on groundwater storage criteria that are tied to groundwater elevation MTs and MOs and current seawater intrusion extent

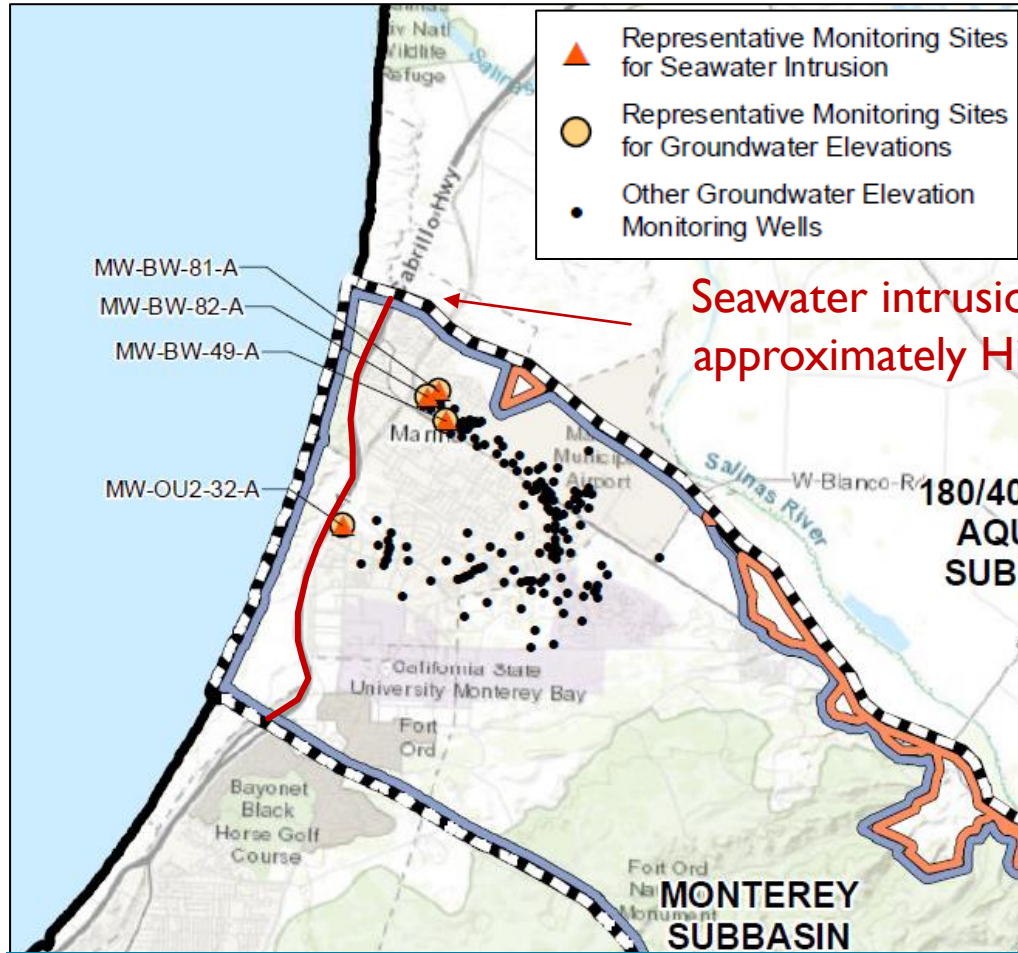
Example storage illustration within the 400-Foot Aquifer



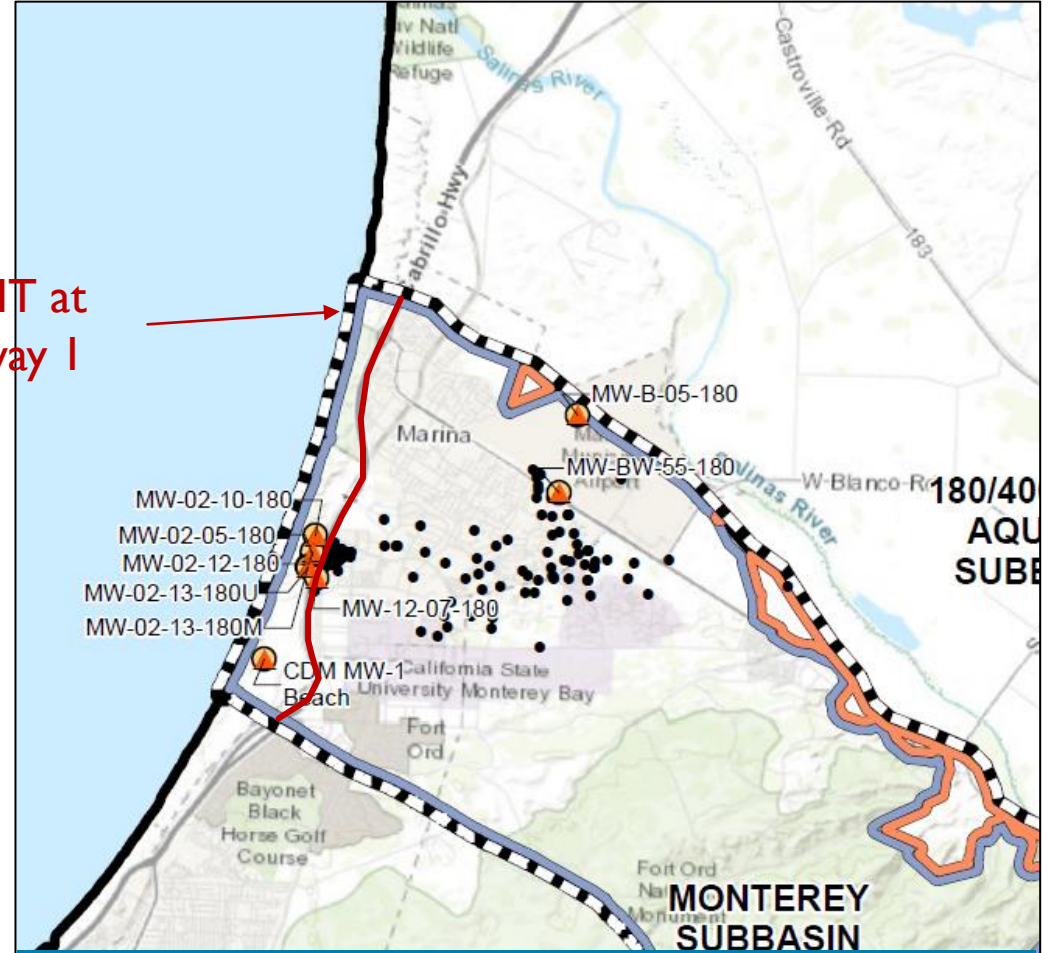
SEAWATER INTRUSION

Minimum threshold	Measurement	Measurable objective	Undesirable Result
<p>Marina-Ord Area: Seawater intrusion extent (500 mg/L chloride isoconcentration line) set at 2015 location in the lower 180-Foot and 400-Foot Aquifers; Seawater intrusion extent set at approximately Highway 1 in the Dune Sand, upper 180-Foot, and Deep Aquifers.</p> <hr/> <p>Corral de Tierra Area: Not applicable; Seawater intrusion is not occurring and not likely to occur in the Corral de Tierra Area</p>	<p>Measured through seawater intrusion representative monitoring well network.</p>	<p>Marina-Ord Area: Measurable objective is identical to the minimum threshold.</p> <hr/> <p>Corral de Tierra Area: Not applicable; Seawater intrusion is not occurring and not likely to occur in the Corral de Tierra Area</p>	<p>Any exceedances of the minimum threshold on average in any one year, i.e. any well inland of the identified extents above 500 mg/L chloride.</p>

DUNE SAND AND UPPER 180-FOOT AQUIFERS

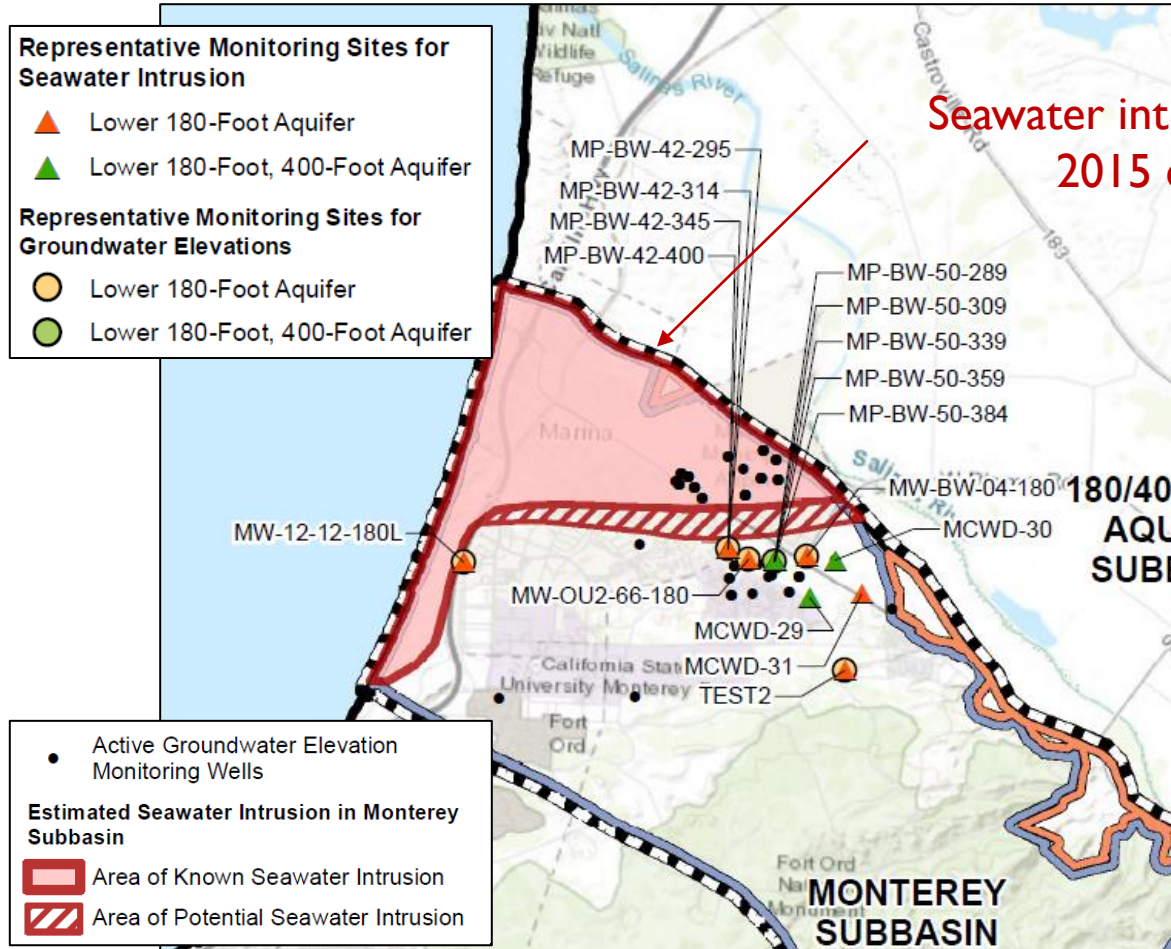


Dune Sand Aquifer

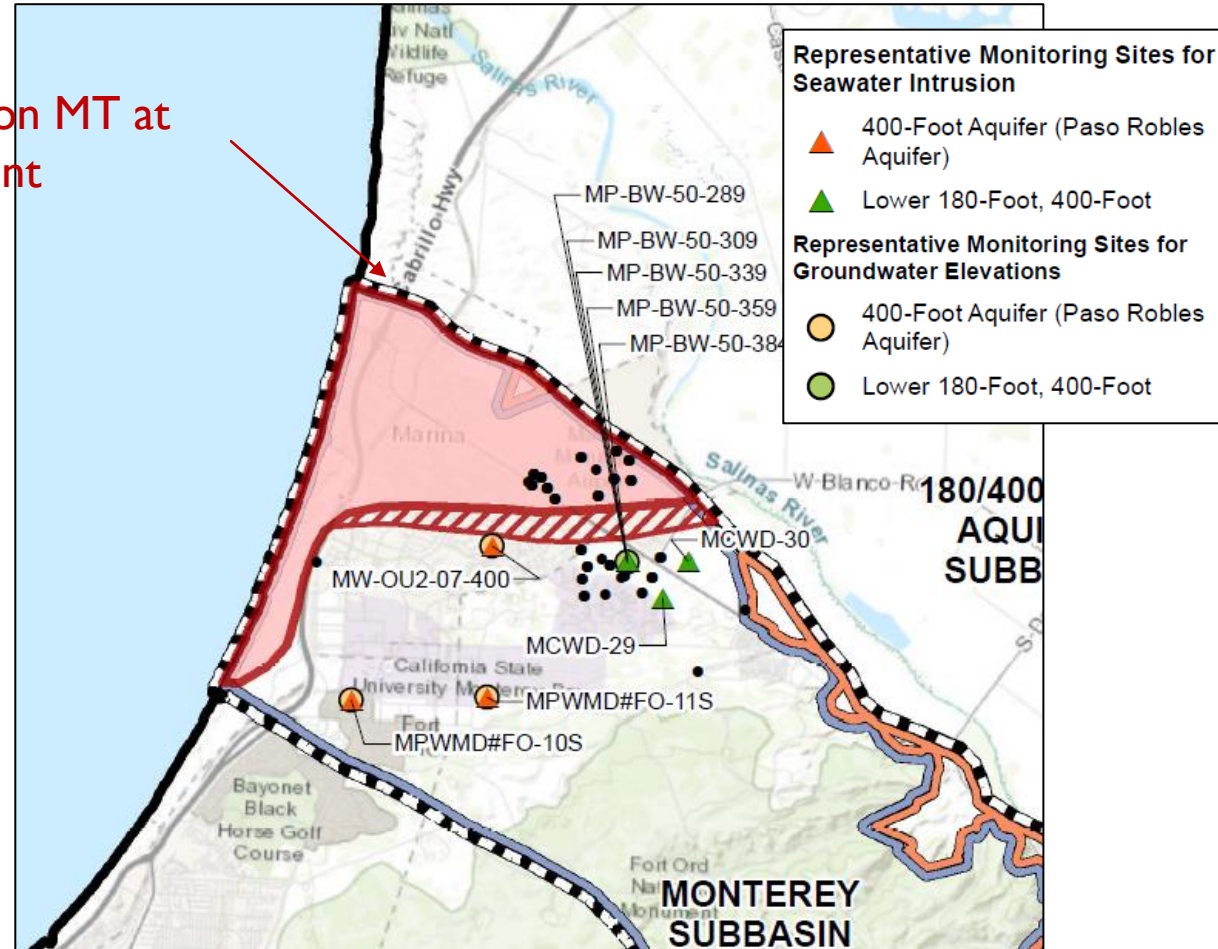


Upper 180-Foot Aquifer

LOWER 180-FOOT AND 400-FOOT AQUIFERS

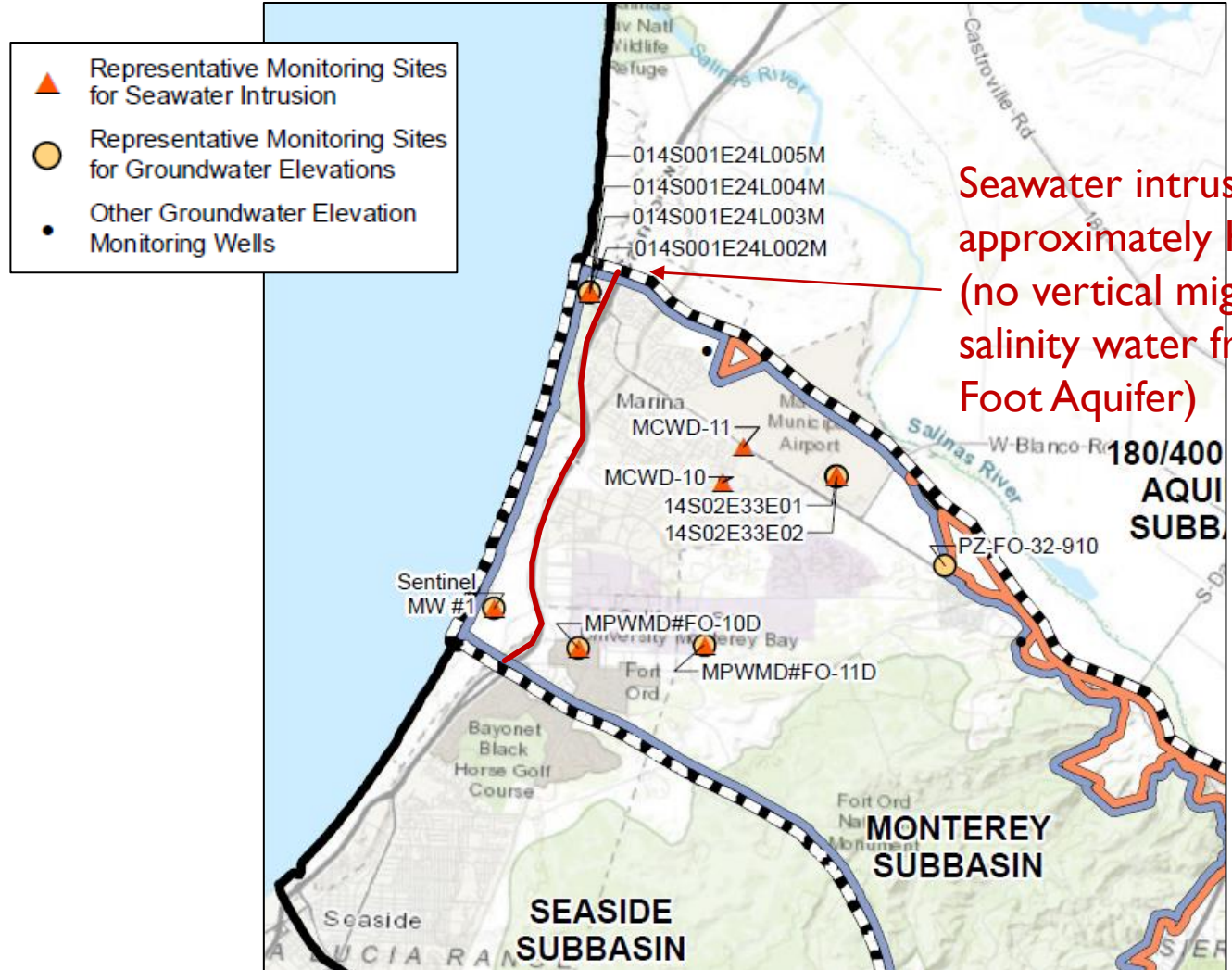


Lower 180-Footer Aquifer



400-Footer Aquifer

DEEP AQUIFERS



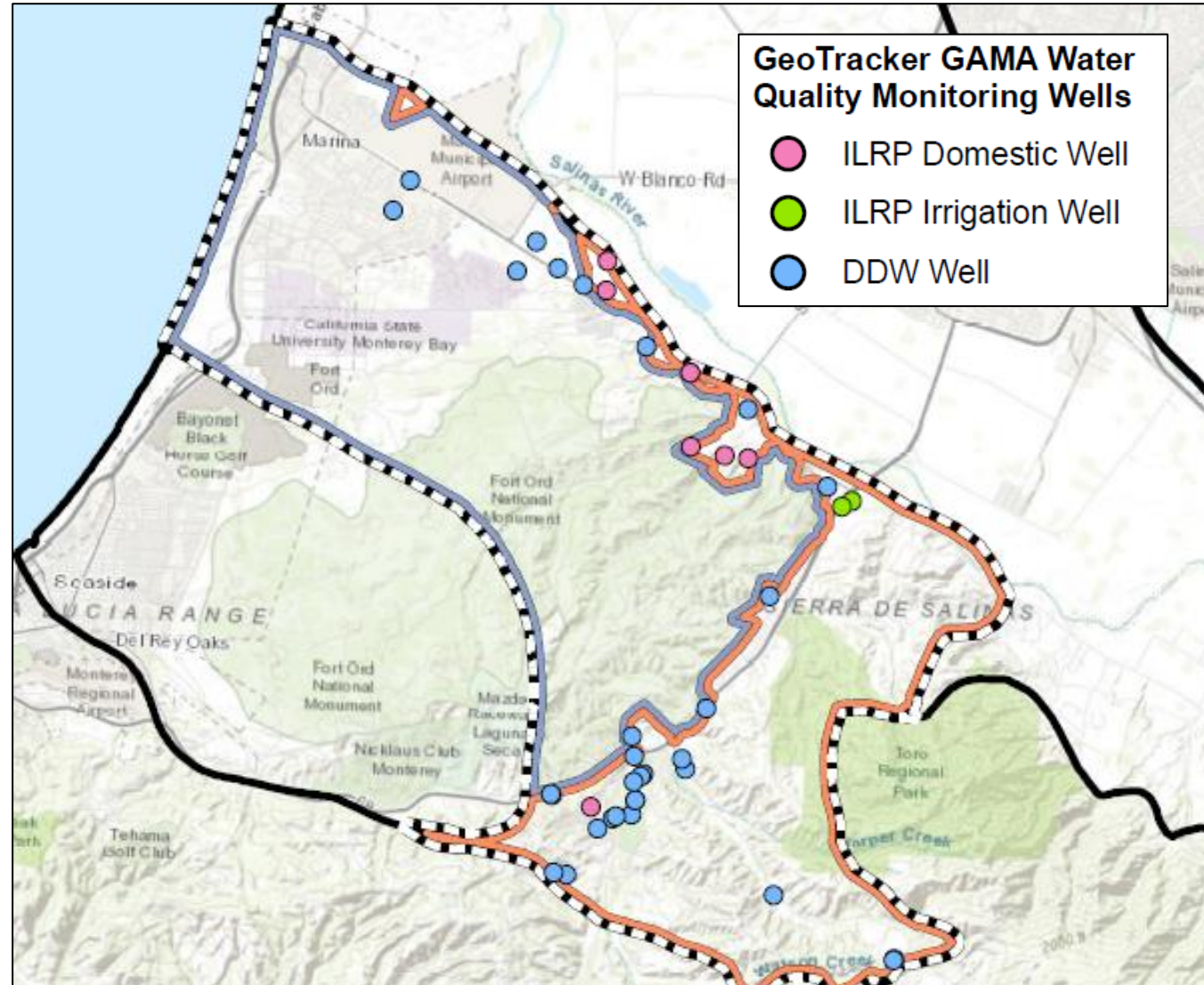
WATER QUALITY DEGRADATION

Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
<p>Whole Subbasin:</p> <p>Minimum threshold is zero additional exceedances of either the regulatory drinking water standards (potable supply wells) or the basin objectives (agricultural supply wells) for groundwater quality constituents of concern known to exist in the Subbasin, as a direct result of projects or management actions taken as part of GSP implementation. Exceedances are only measured in public water system supply wells and domestic and agricultural (ILRP) wells. See Table 8-7 for the list of constituents.</p>	<p>Groundwater quality data downloaded annually from state sources.</p>	<p>Whole Subbasin:</p> <p>Measurable objective is identical to the minimum threshold. Zero additional exceedances of groundwater quality constituents of concern known to exist in the Subbasin above either drinking water standards (potable supply wells), or basin plan objectives (agricultural supply wells).</p>	<p>During any one year, any exceedance of minimum threshold as a direct result of projects or management actions taken as part of GSP implementation.</p>

WATER QUALITY DEGRADATION

ILRP: Irrigated Lands
Regulatory Program
(agricultural and
domestic wells)

DDW: Department of
Drinking Water
(municipal and small
water system wells)

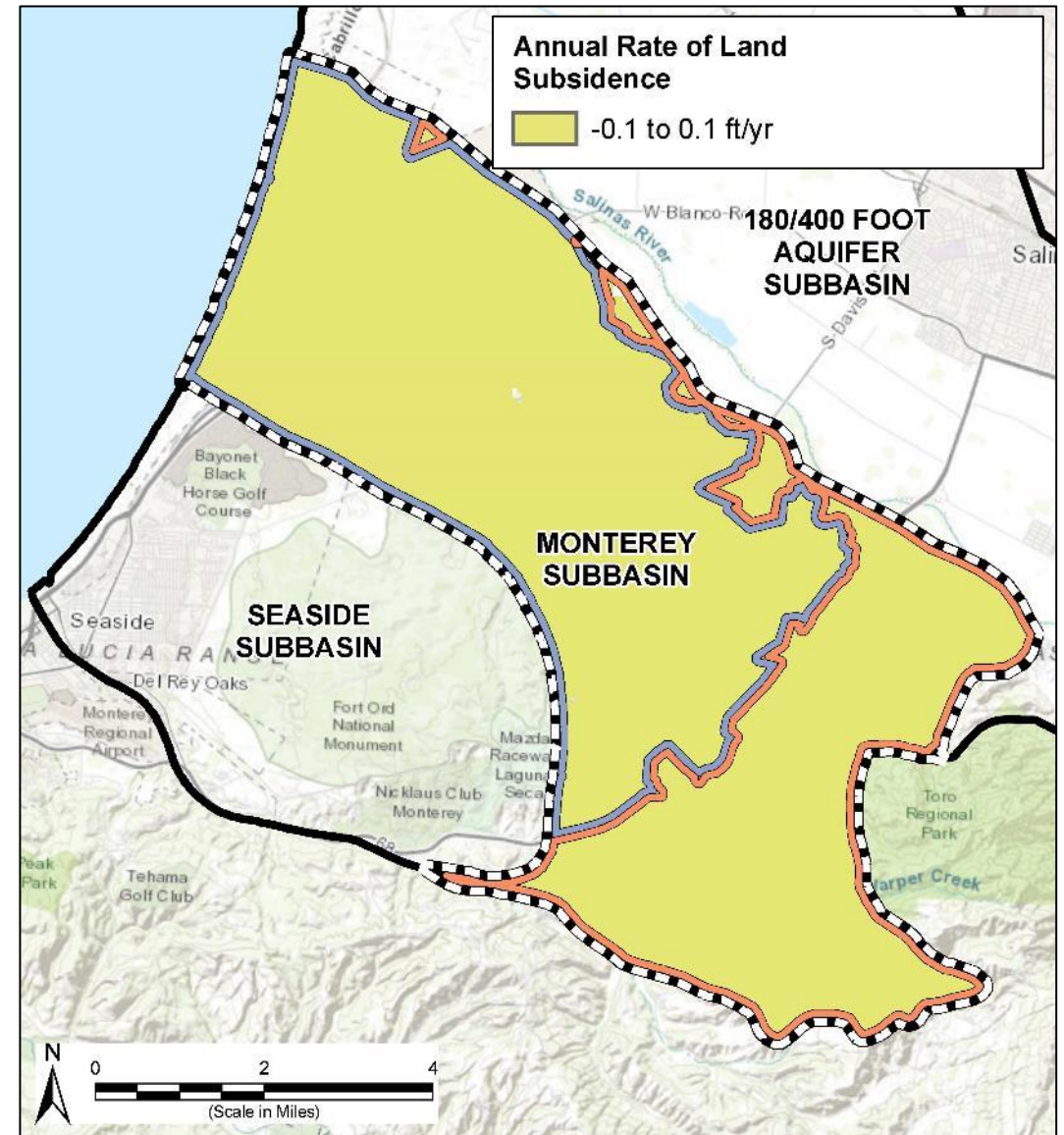


SUBSIDENCE

Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
Whole Subbasin: Minimum threshold is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors.	Measured using DWR provided InSAR data.	Whole Subbasin: Measurable objective is identical to the minimum threshold, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors, resulting in zero net long-term subsidence.	In any one year, any exceedance of the minimum thresholds for subsidence, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors.

LAND SUBSIDENCE

- Not subsidence observed in basin

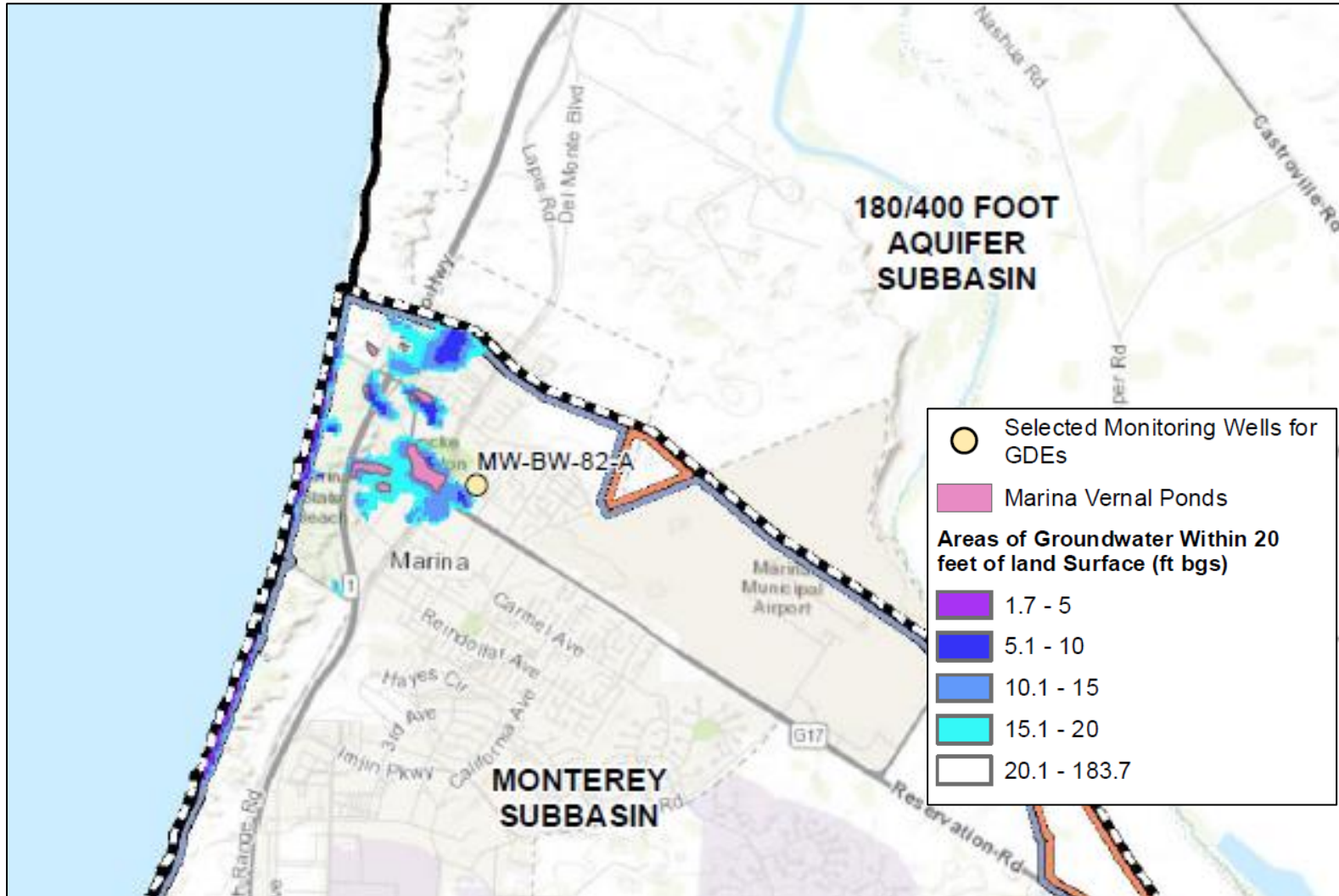


INTERCONNECTED SURFACE WATER

Minimum Threshold	Measurement	Measurable Objective	Undesirable Result
<p>Marina-Ord Area: Set to the minimum shallow groundwater elevations historically observed between 1995 and 2015 near locations of ISW.</p> <hr/> <p>Corral de Tierra Area: Set to the shallow groundwater elevations in 2015 or near locations of ISW.</p>	<p>Measured through shallow groundwater elevations as a proxy near locations of ISW in the ISW representative monitoring well network</p>	<p>Marina-Ord Area: Measurable objective is identical to the minimum threshold shallow groundwater elevations.</p> <hr/> <p>Corral de Tierra Area: Measurable objective is identical to the minimum threshold shallow groundwater elevations</p>	<p>During average hydrogeologic conditions, more than 40% of minimum thresholds are exceeded near any location of ISW for more than two consecutive years.</p>

INTERCONNECTED SURFACE WATER

Existing Representative Monitoring Site for Interconnected Surface Water



NEXT STEPS

NEXT STEPS

- Release draft Chapters 7 & 8 end of March 2021
- Stakeholder Meeting #4 (May/June - possibly 2 meetings)
 - Chapter 6 – Water Budget
 - Chapter 9: Projects and Management Actions
 - Chapter 10: Implementation

OVERVIEW: POTENTIAL PROJECTS AND MANAGEMENT ACTIONS

POTENTIAL PROJECTS AND MANAGEMENT ACTIONS IN THE MARINA-ORD AREA

- Indirect Potable Reuse in the 180/400-Foot and/or Deep Aquifers
- Continued Water Conservation Projects
- Participation in Regional Projects (Specific Projects To Be Determined)
- Coordination of Sustainable Management Criteria with adjacent Subbasins

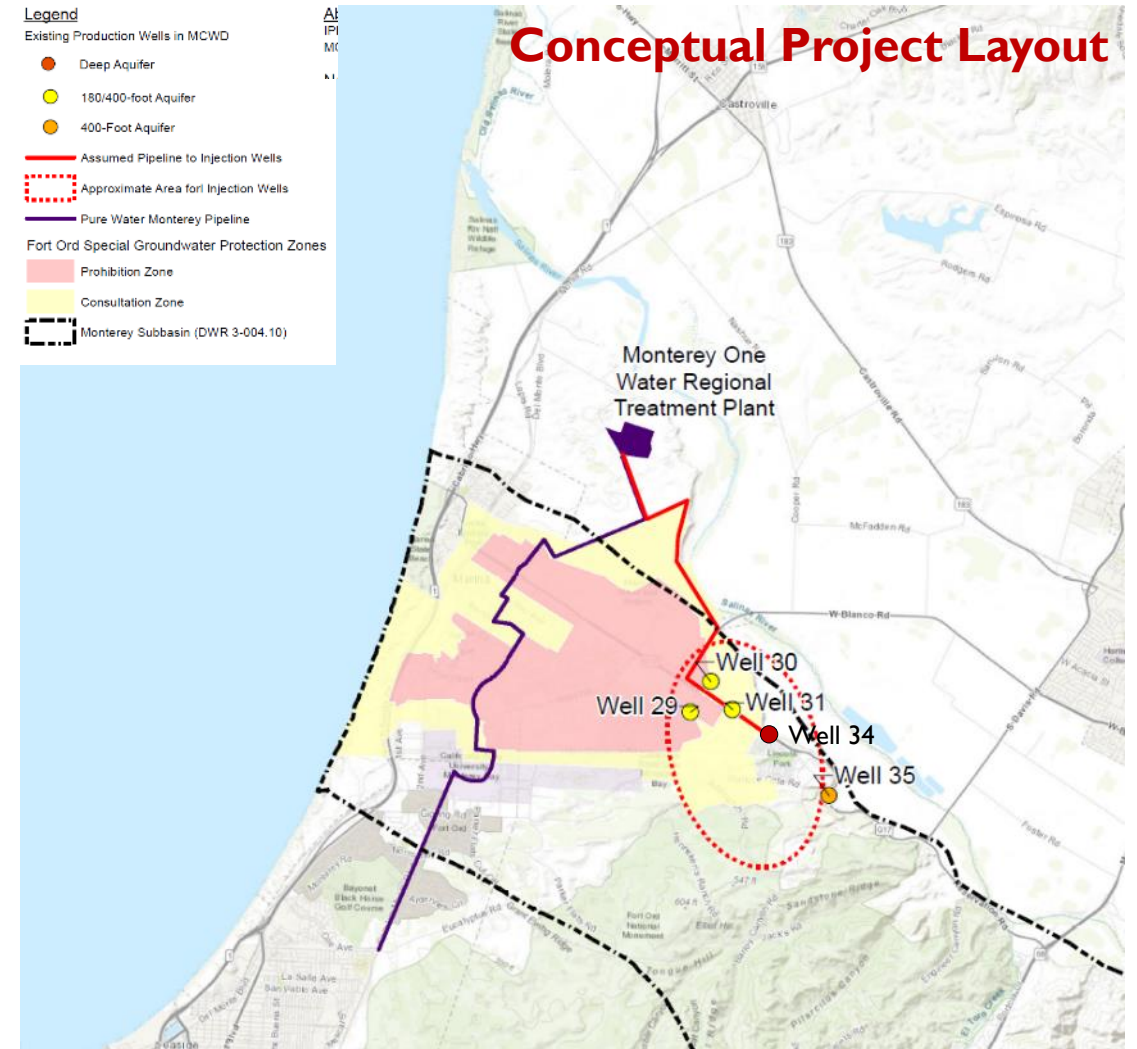
INDIRECT POTABLE REUSE IN 180/400 FOOT AND/OR DEEP AQUIFER ZONES

Description: Project will inject purified recycled water into 180/400 Foot and/or Deep Aquifer Zones. Primarily between October and March. Groundwater will be extracted with existing and/or new MCWD production wells.

Project Benefit: Project yield estimated at: 1000 AFY to 2500 AFY. Will aid in protecting MCWD Production wells from Seawater Intrusion

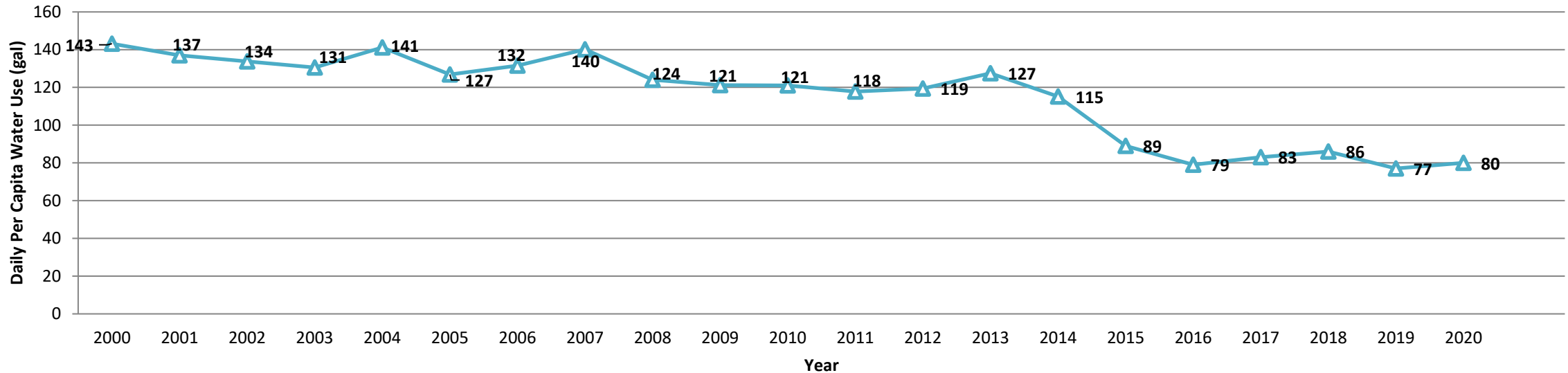
Conceptual Cost Estimate:
\$2,300 \$/AFY to \$3,300 \$/AF

based on 30-year average (3% interest)
lower costs per AF with increased total yield



CONTINUED WATER CONSERVATION

MCWD Daily Per Capita Water Use
2000-2020



Description: Project will include existing and potentially new conservation programs to decrease MCWD Per Capita Water Use

Project Benefit/Conceptual Cost Estimate: Under Development

