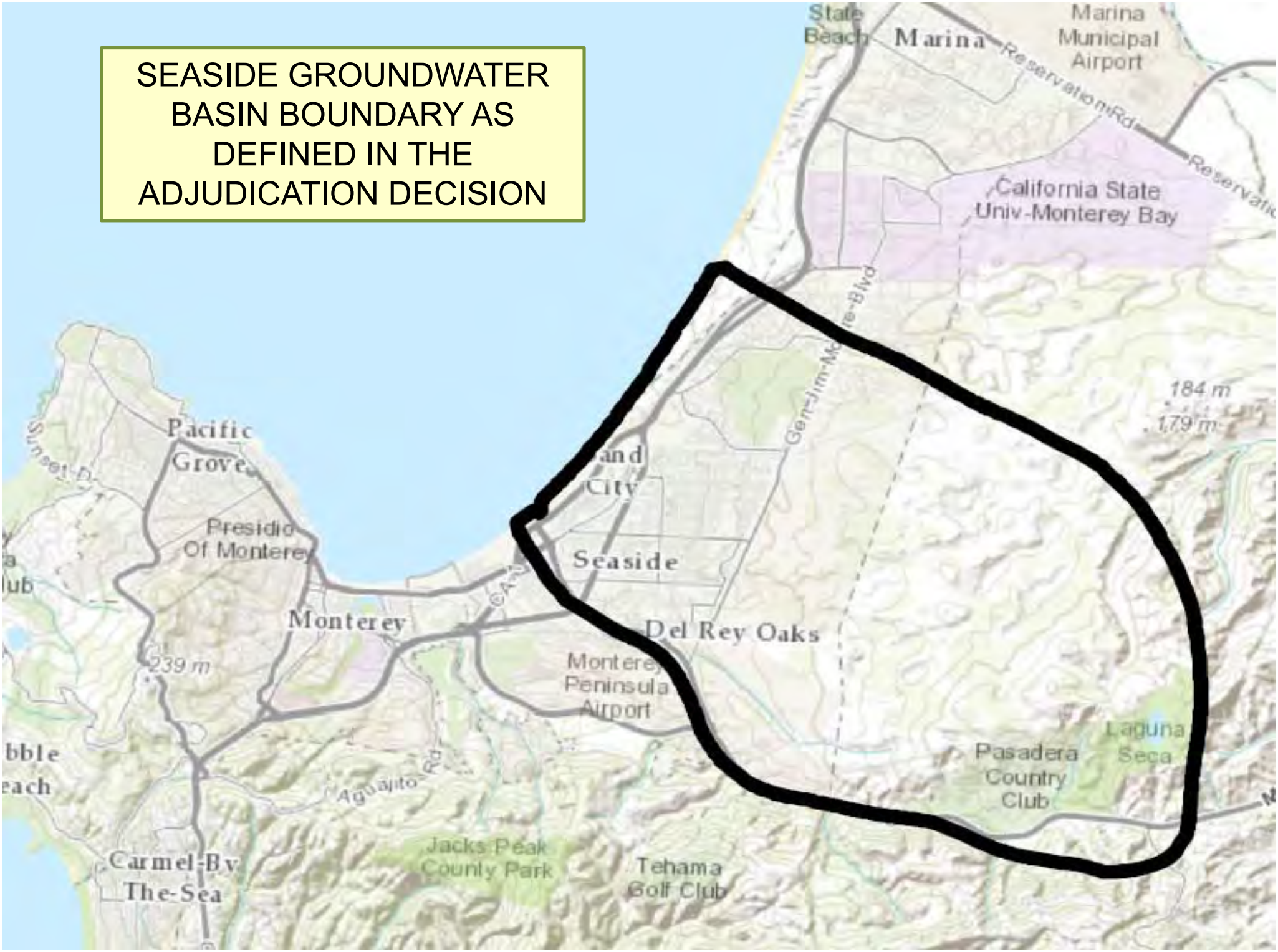
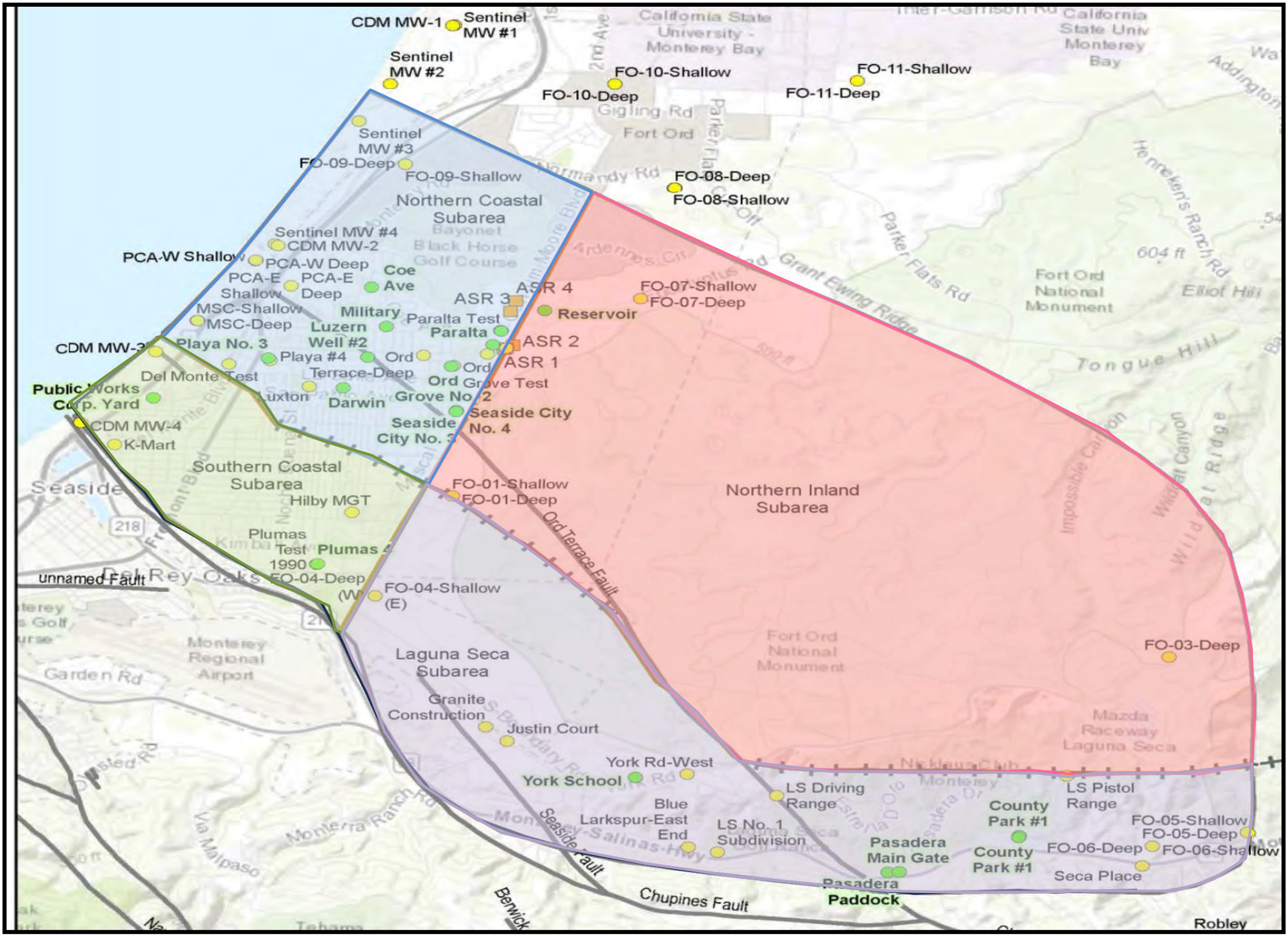
SEASIDE GROUNDWATER BASIN

Informational Presentation to the Watermaster Board

Basin Description

April 2, 2025


SEASIDE GROUNDWATER BASIN BOUNDARY AS DEFINED IN THE ADJUDICATION DECISION
State Beach
Marina
Marina Municipal Airport
California State Univ-Monterey Bay
Pacific Grove
Presidio Of Monterey
Monterey
Seaside
Del Rey Oaks
Monterey Peninsula Airport
239 m
184 m
179 m
Pasadera Country Club
Laguna Seca
Jacks Peak County Park
Tehama Golf Club
Carmel-By-The-Sea


CDM MW-1
Sentinel MW #1
Sentinel MW #2
FO-10-Shallow
FO-10-Deep
FO-11-Shallow
FO-11-Deep
Sentinel MW #3
FO-09-Deep
FO-09-Shallow
FO-08-Deep
FO-08-Shallow
Northern Coastal Subarea
Sentinel MW #4
CDM MW-2
PCA-W Shallow
PCA-W Deep
PCA-E Shallow
PCA-E Deep
Coe Ave
MSC-Shallow
MSC-Deep
Military
Luzern Well #2
Paralta Test
Paralta
ASR 4
ASR 3
ASR 2
ASR 1
Reservoir
FO-07-Shallow
FO-07-Deep
CDM MW-3
Playa No. 3
Playa #4
Ord Terrace-Deep
Ord
Ord Grove Test
Ord Grove No. 2
Seaside City No. 4
Seaside City No. 3
Darwin
Del Monte Test
Public Works Corp. Yard
CDM MW-4
K-Mart
Southern Coastal Subarea
Hilby MGT
Plumas Test 1990
Plumas
FO-04-Deep
FO-04-Shallow (W)
(E)
unnamed Fault
FO-01-Shallow
FO-01-Deep
Ord Terrace Fault
Northern Inland Subarea
Laguna Seca Subarea
Granite Construction
Justin Court
York Rd-West
York School
LS Driving Range
LS Pistol Range
Blue Larkspur-East End
LS No. 1 Subdivision
Pasadera Main Gate
Pasadera Paddock
County Park #1
FO-03-Deep
FO-05-Shallow
FO-05-Deep
FO-06-Deep
FO-06-Shallow
Seca Place
Seaside Fault
Chupines Fault
Seaside
Del Rey Oaks
Monterey Regional Airport
Fort Ord
Fort Ord National Monument
California State University - Monterey Bay
Gigling Rd
Normandy Rd
Parker Flats Rd
Grant Ewing Ridge
Tongue Hill
Elliot Hill
Garden Rd
Monterra Ranch Rd
Via Malpaso
Mazda Raceway Laguna Seca
Robley

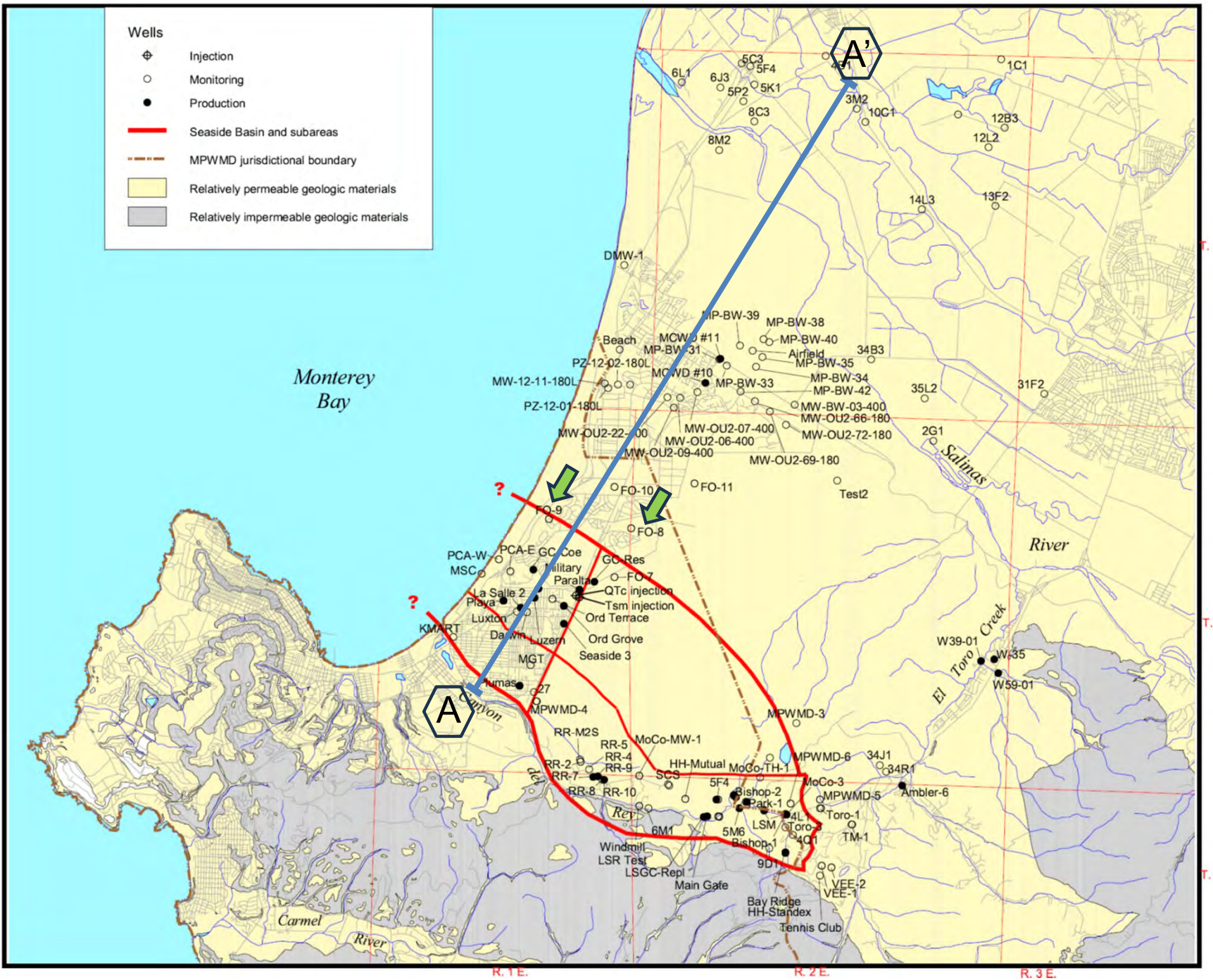
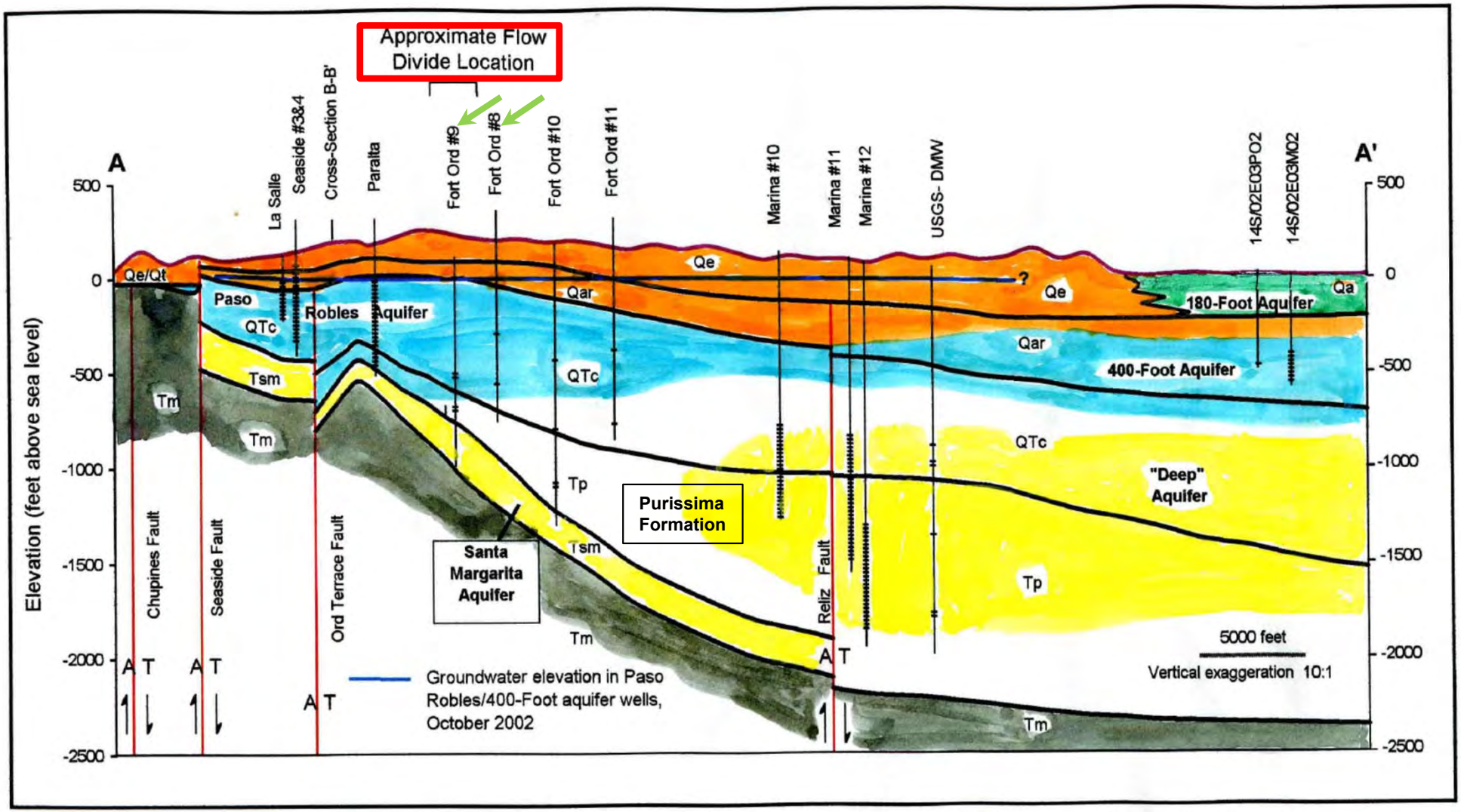


Figure 2. Locations of Production and Monitoring Wells in and near the Seaside Basin

Source:
Seaside Groundwater Basin: Update on Water Resource Conditions
Prepared by Eugene B. (Gus) Yates, Martin B. Feeney, & Lewis I. Rosenberg
April 14, 2005

Note: For clarity, clusters of wells with similar names are shown with a single label

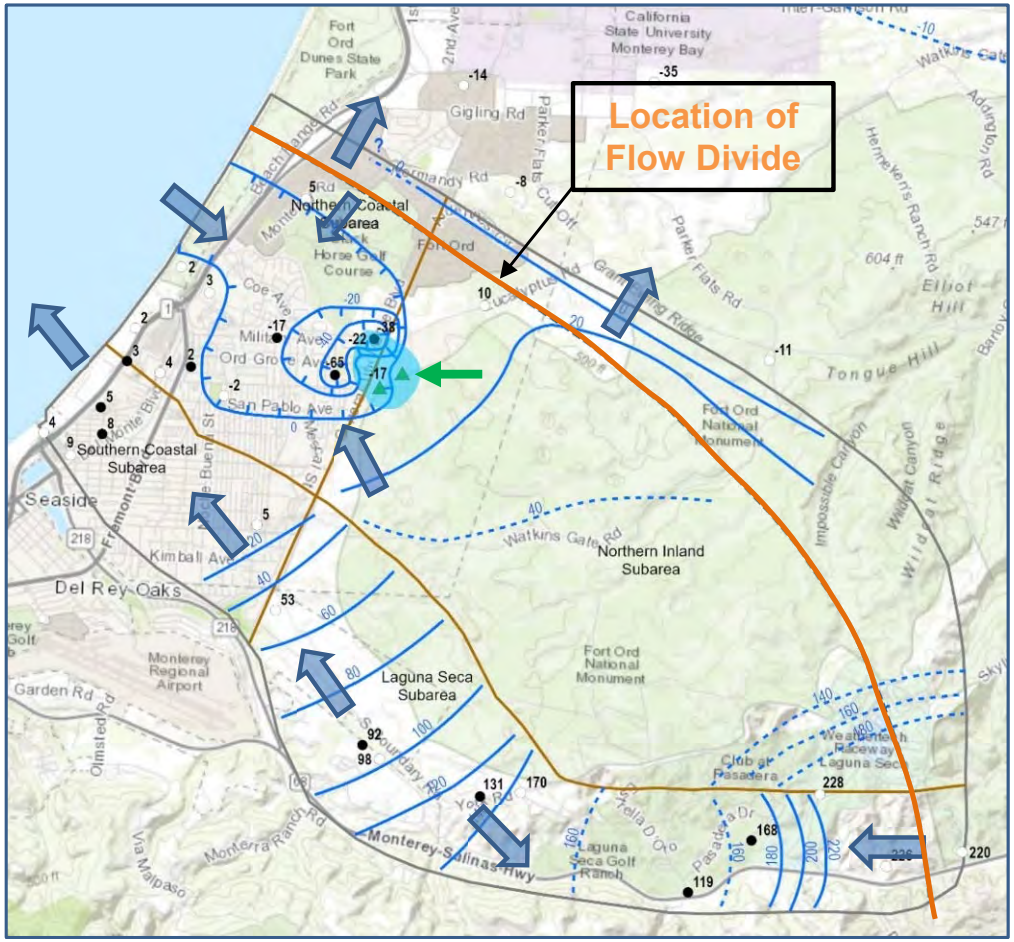


Location of cross-section is shown on Figure 3. Geology from Clark and others, 1997; Fugro West, Inc., 1997b: and WRIME, Inc., 2003. Formations: Tm = Monterey Formation; Tsm = Santa Margarita Sandstone; Tp = Purisima Formation; QTc = continental deposits; Qar = Aromas Sand; Qe = eolian deposits (dunes); Qt = terrace deposits; Qa = undifferentiated alluvial deposits. See text and Figure 3 for descriptions. Fault movement: arrows indicate vertical movement; A = horizontal movement away from the viewer; T = toward viewer.

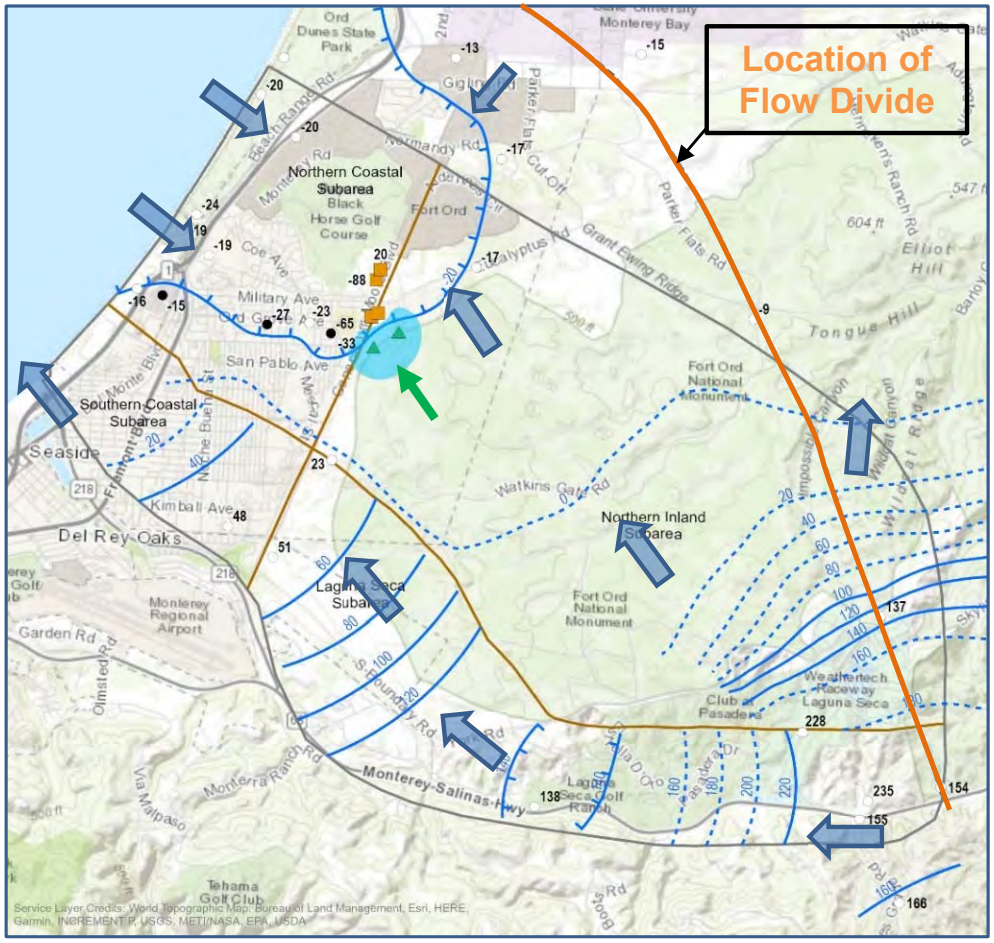
Figure 4. Hydrogeologic Cross-Section A-A'

GROUNDWATER FLOW DIRECTIONS

4TH QUARTER OF 2024



Paso Robles (Shallow) Aquifer



Santa Margarita (Deep) Aquifer

Adapted from 2024 SIAR Presentation

IS THE SEASIDE BASIN LOSING GROUNDWATER TO THE ADJACENT MONTEREY SUBBASIN AND/OR THE OCEAN?

- The Watermaster's 2018 Updated Basin Management Plan Prepared by Montgomery & Associates
- The 2022 Monterey Subbasin Groundwater Sustainability Plan Prepared by the Marina Coast Water District and Salinas Valley Basin Groundwater Sustainability Agencies
- The 2022 Replenishment Water Analysis Prepared for the Watermaster by Mr. Pascual Benito of Montgomery & Associates

Source: 2018 Basin Management Action Plan Table 11 - Modeled Net Flows between Subareas, Adjacent Basins and the Ocean, Average over Water Years 1988 – 2017

Net Flows From	Net Flows To					
	Northern Coastal Subarea	Northern Inland Subarea	Southern Coastal Subarea	Laguna Seca Subarea	Adjacent Basins (Monterey Subbasin)	Ocean
	acre-feet per year					
Northern Coastal Subarea		-2,130	-480	0	150	-230
Northern Inland Subarea	2,130		0	-940	910	0
Southern Coastal Subarea	480	0		-450	20	50
Laguna Seca Subarea	0	940	450		-280	0
Adjacent Basins	-150	-910	-20	280		0
Ocean	230	0	-50	0	0	

- Total Outflow from Seaside Basin to the Marina-Ord Subarea of the Monterey Subbasin was 1,060 AFY.
- Total Inflow from the Corral de Tierra Subarea of the Monterey Subbasin was 280 AFY.
- Net Outflow to the Monterey Subbasin was 780 AFY.

Table 6-4. Comparison of Projected Water Budget Results Under "No Project" Scenarios with Variable Boundary Conditions and 2030 Climate Condition, Monterey Subbasin

Net Annual Groundwater Flows (a) (AFY)	Historical Annual Inflows/Outflows (WY 2004-2018)	Projected Annual Inflows/Outflows 2030 Climate Conditions		
		Minimum Threshold Boundary Conditions	Measurable Objective Boundary Conditions	Seawater Intrusion Protective Boundary Conditions
Recharge				
● Rainfall, leakage, irrigation	**10,055**	**10,928**	**10,928**	**10,928**
Well Pumping				
● Well Pumping	**-5,641**	**-10,955**	**-10,955**	**-10,955**
Net Inter-Basin Flow				
● Seaside Subbasin	918	2,414	1,258	-453
● 180/400-Foot Aquifer Subbasin	-12,265	-5,583	-3,412	-295
● Ocean (Presumed Freshwater)	-524	-725	-752	-794
● Ocean (Presumed Seawater)	2,872	2,939	2,369	1,308
	-8,999	**-955**	**-537**	**-234**
Net Surface Water Exchange				
● Salinas River Exchange	**151**	**261**	**254**	**279**
NET ANNUAL CHANGE IN GROUNDWATER STORAGE	**-4,434**	**-721**	**-310**	**18**

- Historical Total Outflow from the Seaside Basin was 918 AFY.
- Projected 2030 Total Inflow from the Seaside Basin will be between 1,258 and 2,414 AFY if a seawater extraction barrier is installed in the 180/400-Foot Aquifer Subbasin.
- Only if the 180/400-Foot Aquifer Subbasin could somehow find a way to greatly raise its water levels to achieve protective elevations would there be a net outflow to the Seaside Basin. This is very unlikely.

Table 6-5. Comparison of Projected Water Budget Results Under "No Project" Scenarios with Variable Boundary Conditions and 2030 Climate Condition, Marina-Ord Area WBZ

Net Annual Groundwater Flows (a) (AFY)	Historical Annual Inflows/Outflows (WY 2004-2018)	Projected Annual Inflows/Outflows (b) 2030 Climate Conditions		
		Minimum Threshold Boundary Conditions	Measurable Objective Boundary Conditions	Seawater Intrusion Protective Boundary Conditions
Recharge				
● Rainfall, leakage, irrigation	**6,144**	**6,823**	**6,823**	**6,823**
Well Pumping				
● Well Pumping	**-4,346**	**-8,767**	**-8,767**	**-8,767**
Net Inter-Basin Flow				
● Seaside Subbasin	1,310	2,513	1,361	-347
● 180/400-Foot Aquifer Subbasin	-8,633	-3,849	-1,927	1,171
● Ocean (Presumed Freshwater)	-524	-725	-752	-794
● Ocean (Presumed Seawater)	2,872	2,939	2,369	1,308
	-4,975	**878**	**1,051**	**1,338**
Net Intra-basin Flow				
● Corral de Tierra Area (Water Budget Zone)	**1,544**	**923**	**1,026**	**985**
Net Surface Water Exchange				
● Salinas River Exchange	**0**	**0**	**0**	**0**
NET ANNUAL CHANGE IN GROUNDWATER STORAGE	**-1,632**	**-143**	**133**	**379**

- Historical Total Outflow from the Seaside Basin was 1,310 AFY.
- Projected 2030 Total Inflow from the Seaside Basin will be between 1,361 and 2,513 AFY if a seawater extraction barrier is installed in the 180/400-Foot Aquifer Subbasin.
- Only if the 180/400-Foot Aquifer Subbasin could somehow find a way to greatly raise its water levels to achieve protective elevations would there be a net outflow to the Seaside Basin. This is very unlikely.

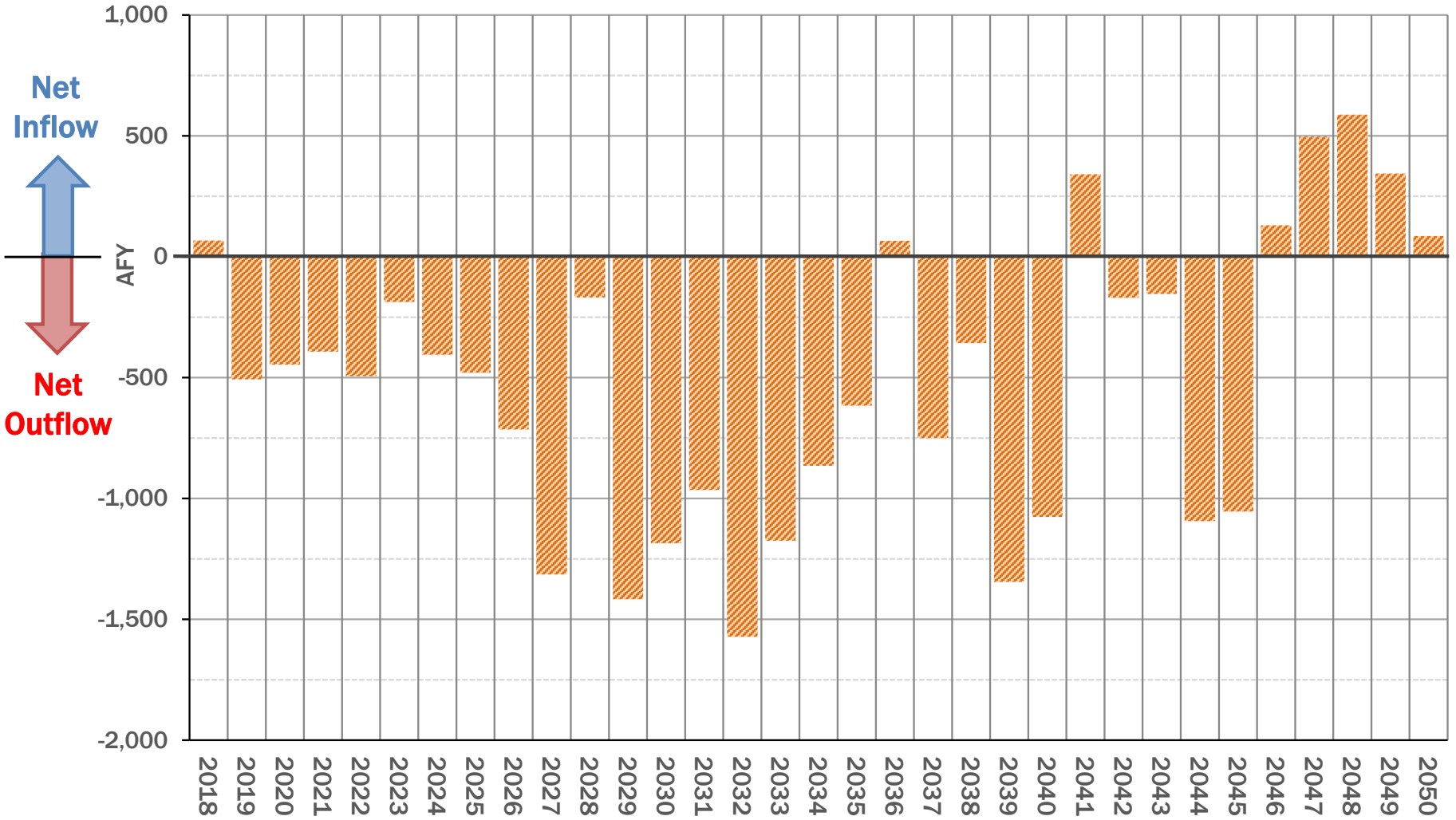
Table 9-4. Projected Water Budget Results Under Marina-Ord Area Water Augmentation "Project" Scenario with Variable Boundary Conditions and 2030 Climate Condition

Net Annual Groundwater Flows (a) (AFY)	Projected Annual Inflows/Outflows (b) 2030 Climate Conditions		
	Minimum Threshold Boundary Conditions	Measurable Objective Boundary Conditions	Seawater Intrusion Protective Boundary Conditions
Recharge			
● Rainfall, leakage, irrigation	**6,823**	**6,823**	**6,823**
Well Pumping			
● Well Pumping (c)	**-4,488**	**-4,488**	**-4,488**
Net Inter-Basin Flow			
● Seaside Subbasin	1,776	612	-1,115
● 180/400-Foot Aquifer Subbasin	-6,833	-4,901	-1,788
● Ocean (Presumed Freshwater)	-738	-764	-806
● Ocean (Presumed Seawater)	2,617	2,047	989
	-3,178	**-3,006**	**-2,721**
Net Intra-basin Flow			
● Corral de Tierra Area (Water Budget Zone)	**898**	**1,001**	**958**
Net Surface Water Exchange			
● Salinas River Exchange	**0**	**0**	**0**
NET ANNUAL CHANGE IN GROUNDWATER STORAGE	**55**	**330**	**572**

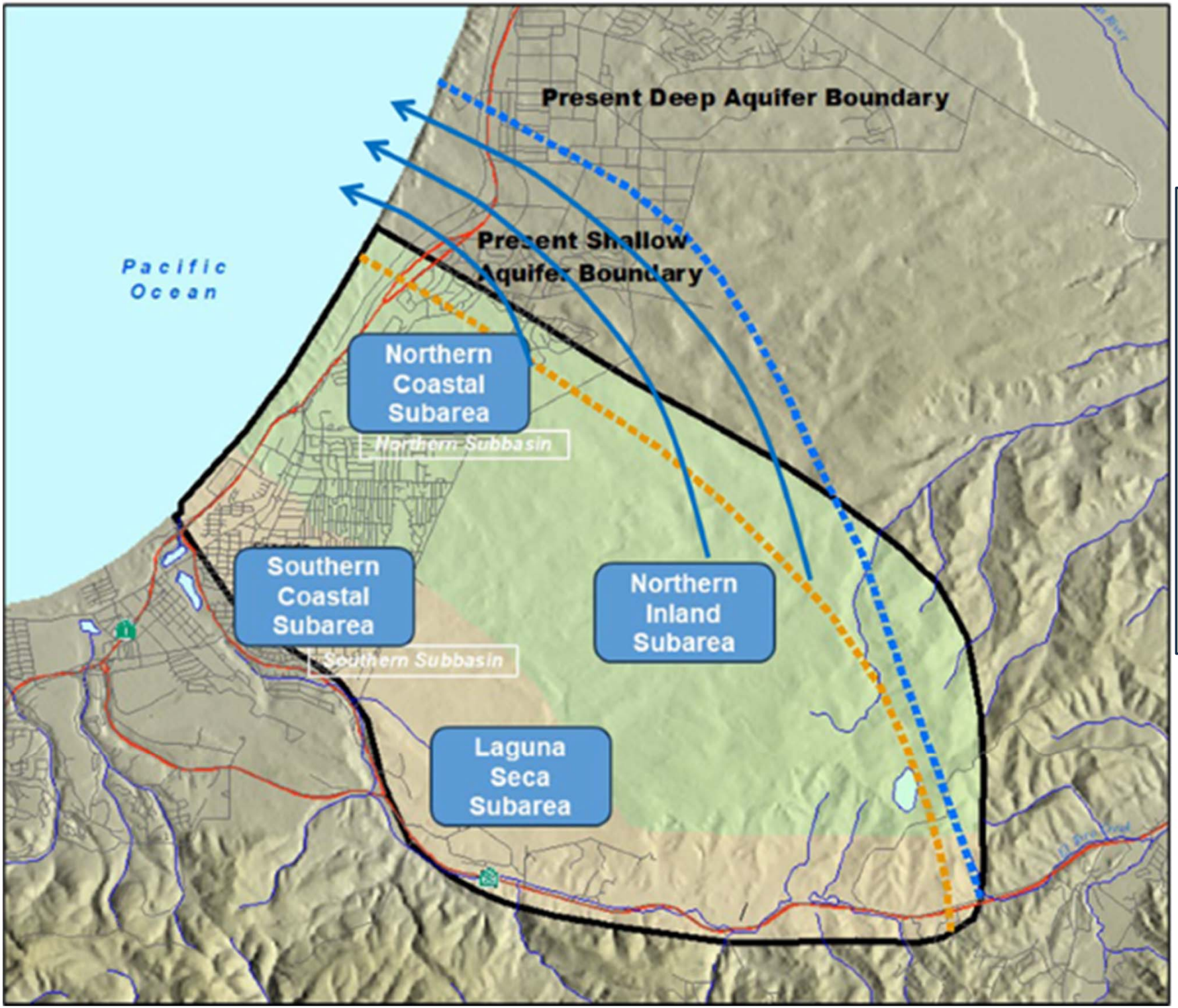
- Projected 2030 Total Outflow from the Seaside Basin would be reduced to between 612 and 1,776 AFY if groundwater levels in the 180/400-Foot Aquifer Subbasin are not raised to protective levels

- Only if the 180/400-Foot Aquifer Subbasin could somehow find a way to greatly raise its water levels to achieve protective elevations would there be a net outflow to the Seaside Basin. This is very unlikely.

Baseline Scenario Net Flows from the Deep Aquifer to the Monterey Subbasin

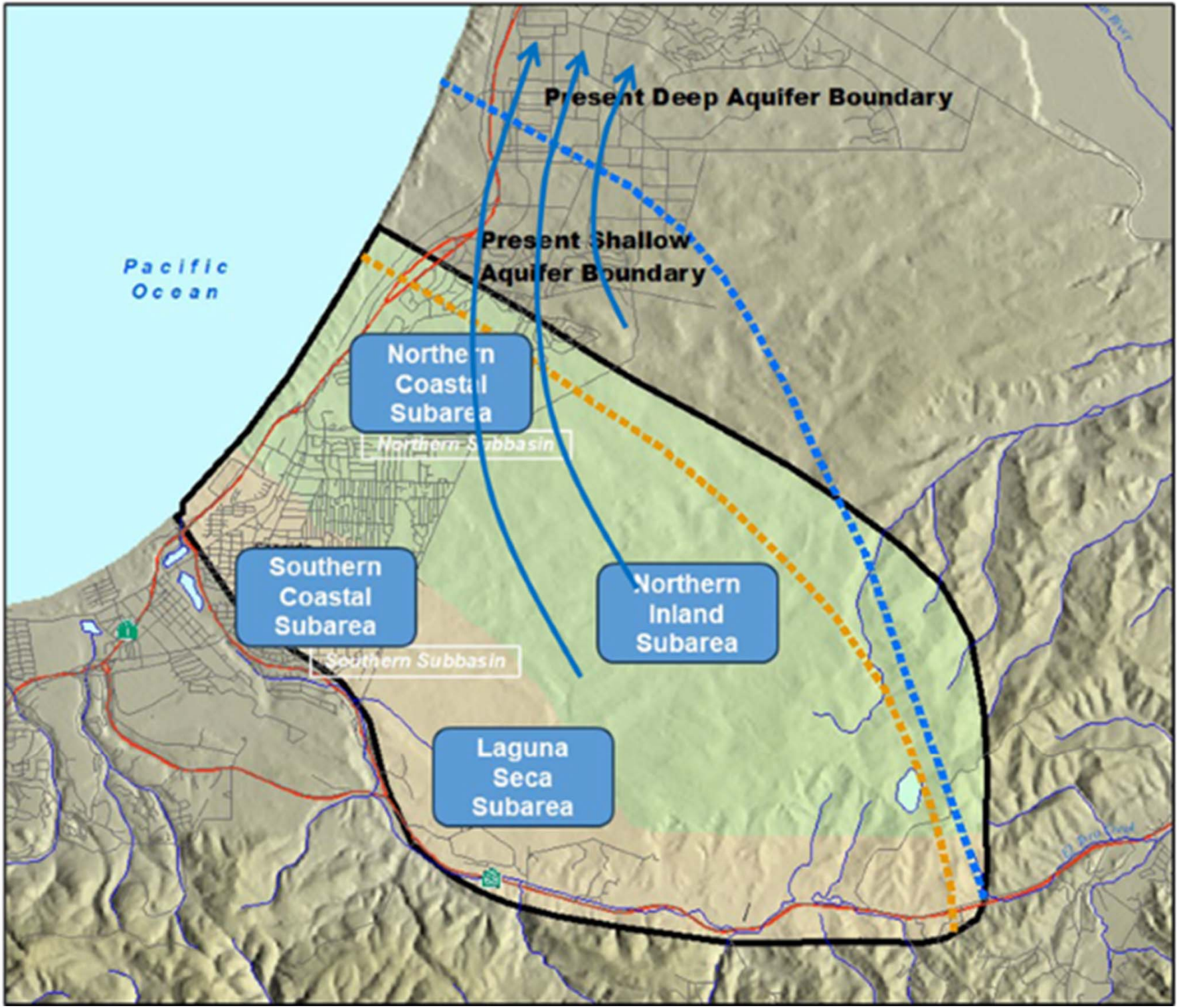


- The Baseline Scenario is based on the future water demands projected by MPWMD
- It includes injection of water from the ASR program and the Expanded Pure Water Monterey Project
- The data shows that in the large majority of years there will be groundwater losses from the Seaside Basin to the Monterey Subbasin



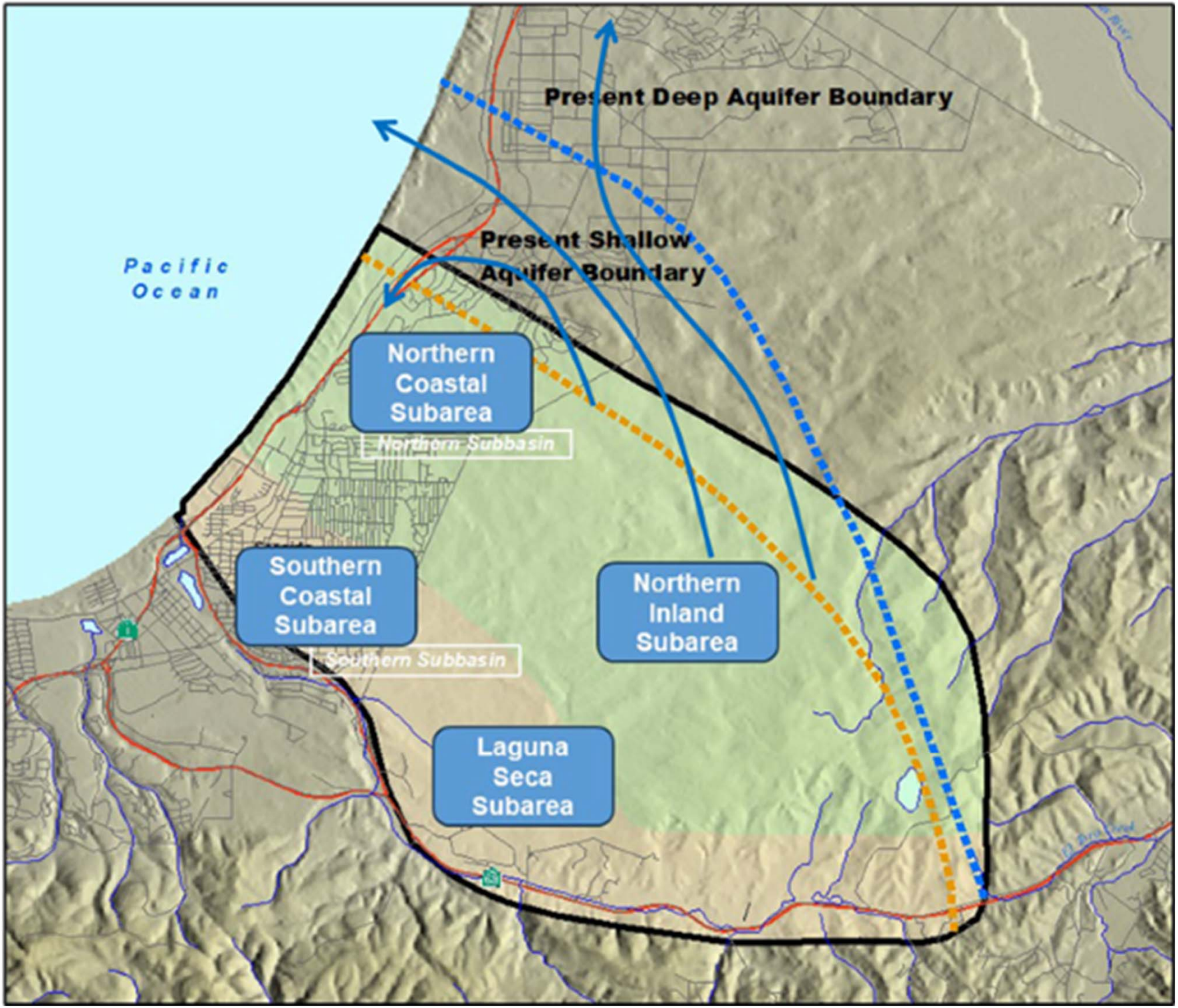
POSSIBILITY NO. 1

ALL FLOWS LEAVING THE NORTHERLY BOUNDARY OF THE SEASIDE BASIN FLOW PARALLEL TO THE FLOW DIVIDE AND INTO THE OCEAN



POSSIBILITY NO. 2

ALL FLOWS LEAVING THE NORTHERLY BOUNDARY OF THE SEASIDE BASIN CONTINUE FLOWING TO THE NORTH AND INTO THE MARINA-ORD AREA OF THE MONTEREY SUBBASIN



POSSIBILITY NO. 3

SOME OF THE FLOWS LEAVING THE NORTHERLY BOUNDARY OF THE SEASIDE BASIN FLOW INTO THE OCEAN, SOME CONTINUE FLOWING TO THE NORTH AND INTO THE MARINA-ORD AREA OF THE MONTEREY SUBBASIN, AND SOME FLOW BACK INTO THE SEASIDE BASIN

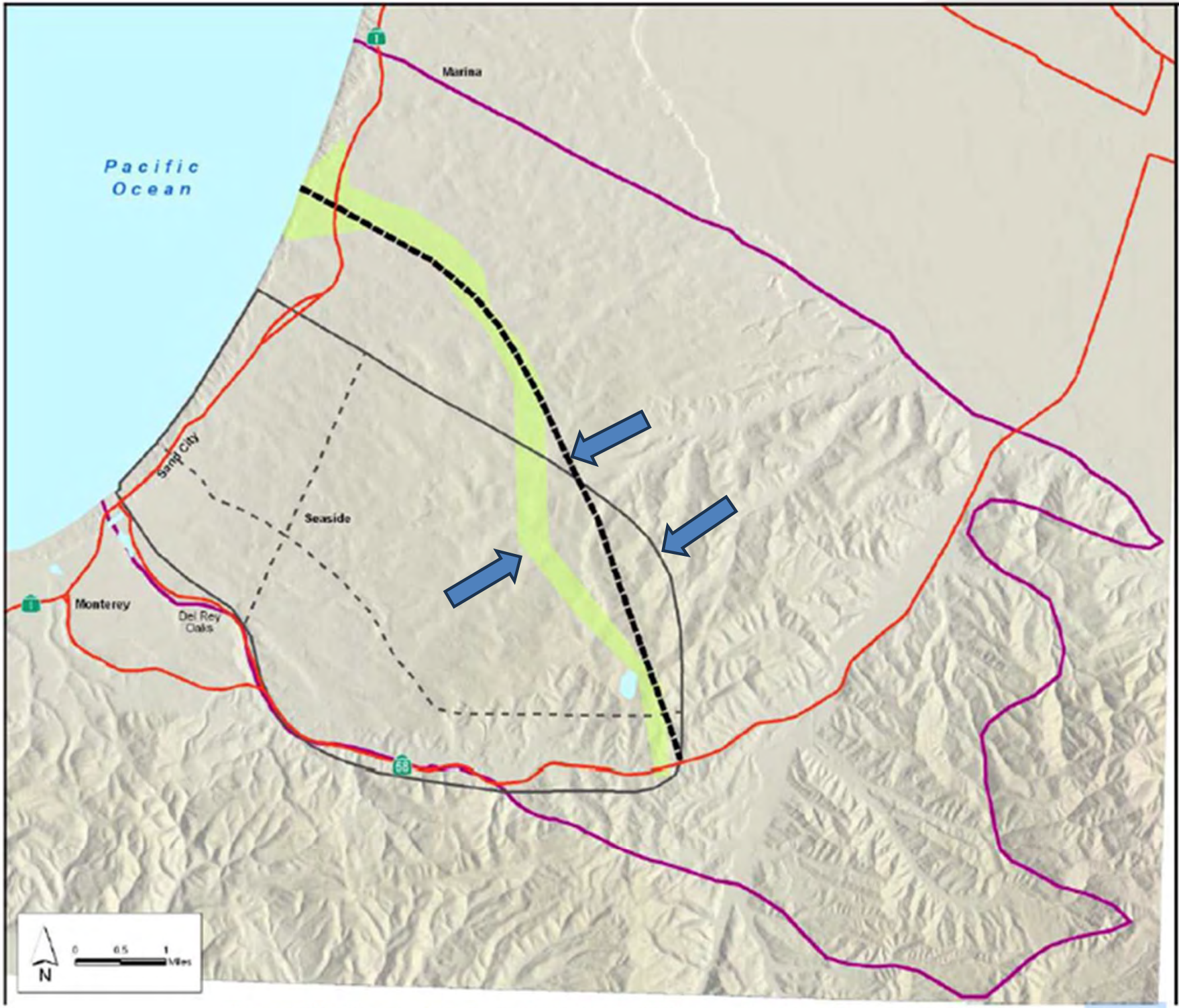


Figure 33: Comparison between Modeled Versus Contour Generated Groundwater Divides

QUESTIONS?

SEASIDE GROUNDWATER BASIN

Informational Presentation to the Watermaster Board:

What is the Problem?

April 2, 2025

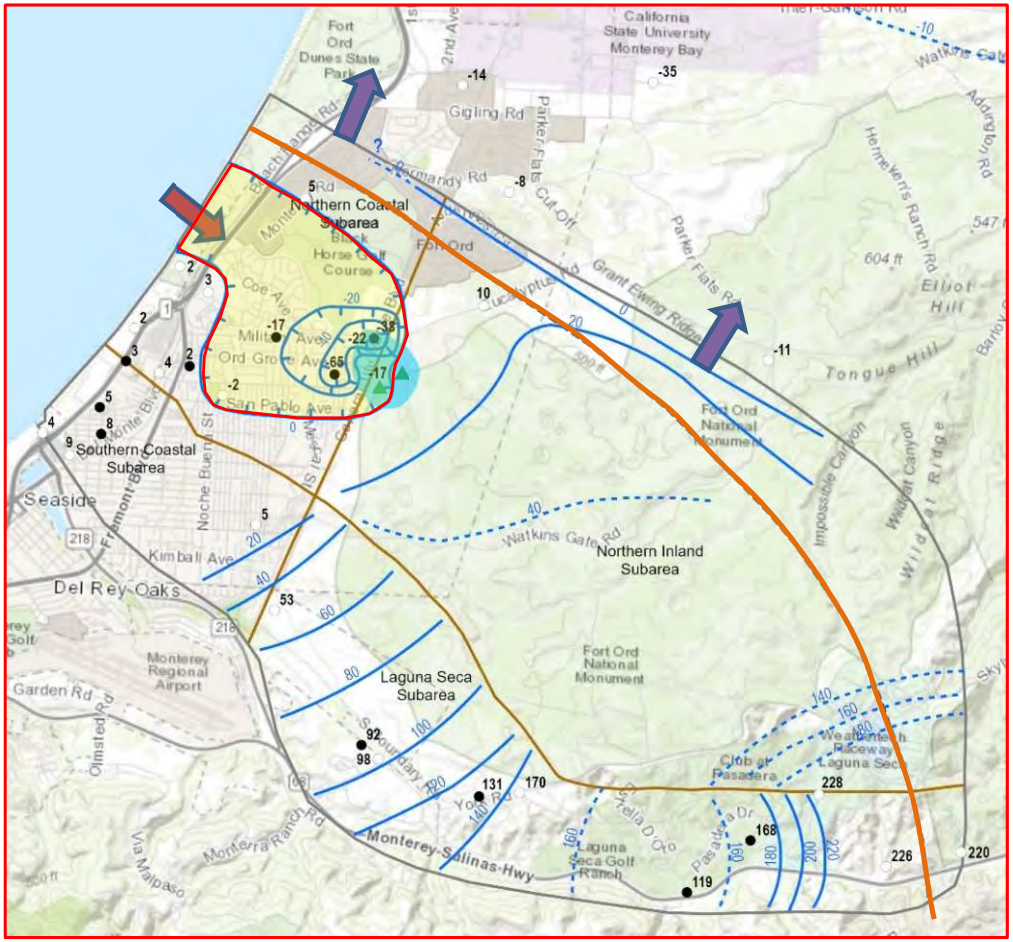
THERE ARE TWO CATEGORIES OF PROBLEMS

- Physical Problems
- Institutional Problems with MPWMD

PHYSICAL PROBLEMS

- Portions of the Basin have groundwater levels below sea level
- Pumping and groundwater losses from the Basin keep groundwater levels from being raised to Protective Elevations without adding replenishment water

RISK OF SEWATER INTRUSION AND LOSS OF GROUNDWATER



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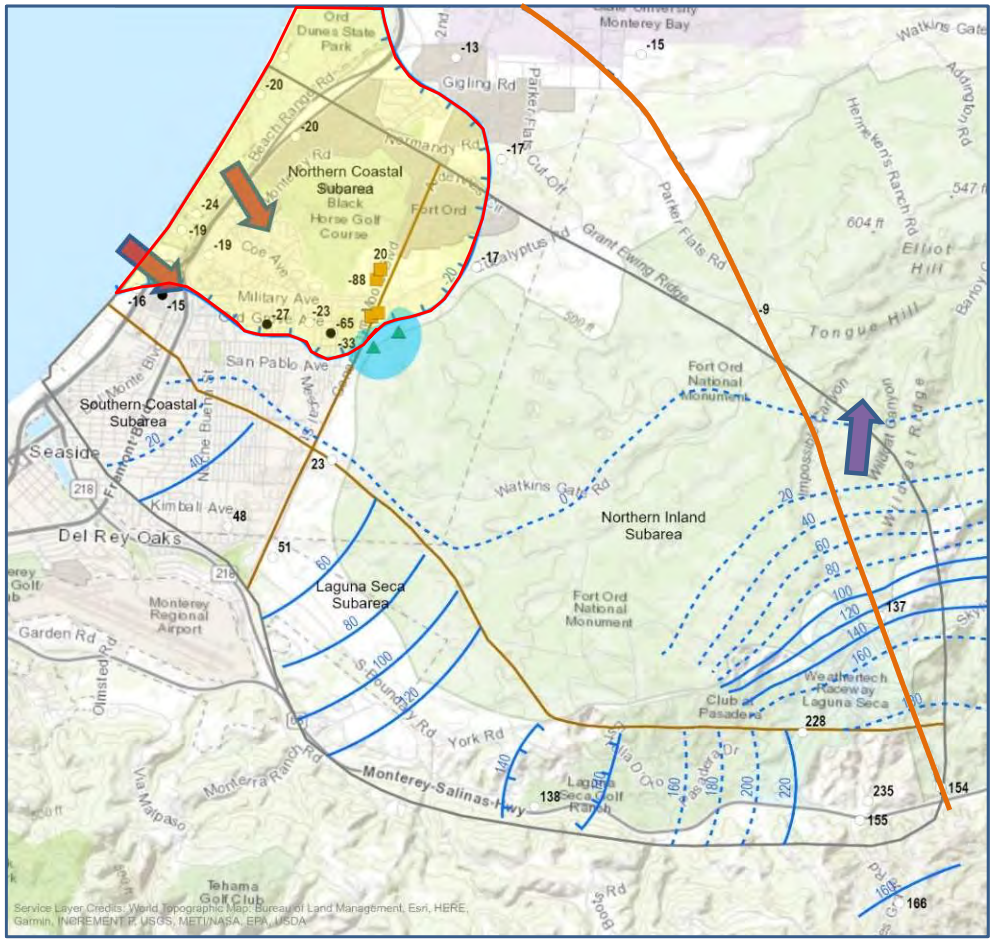
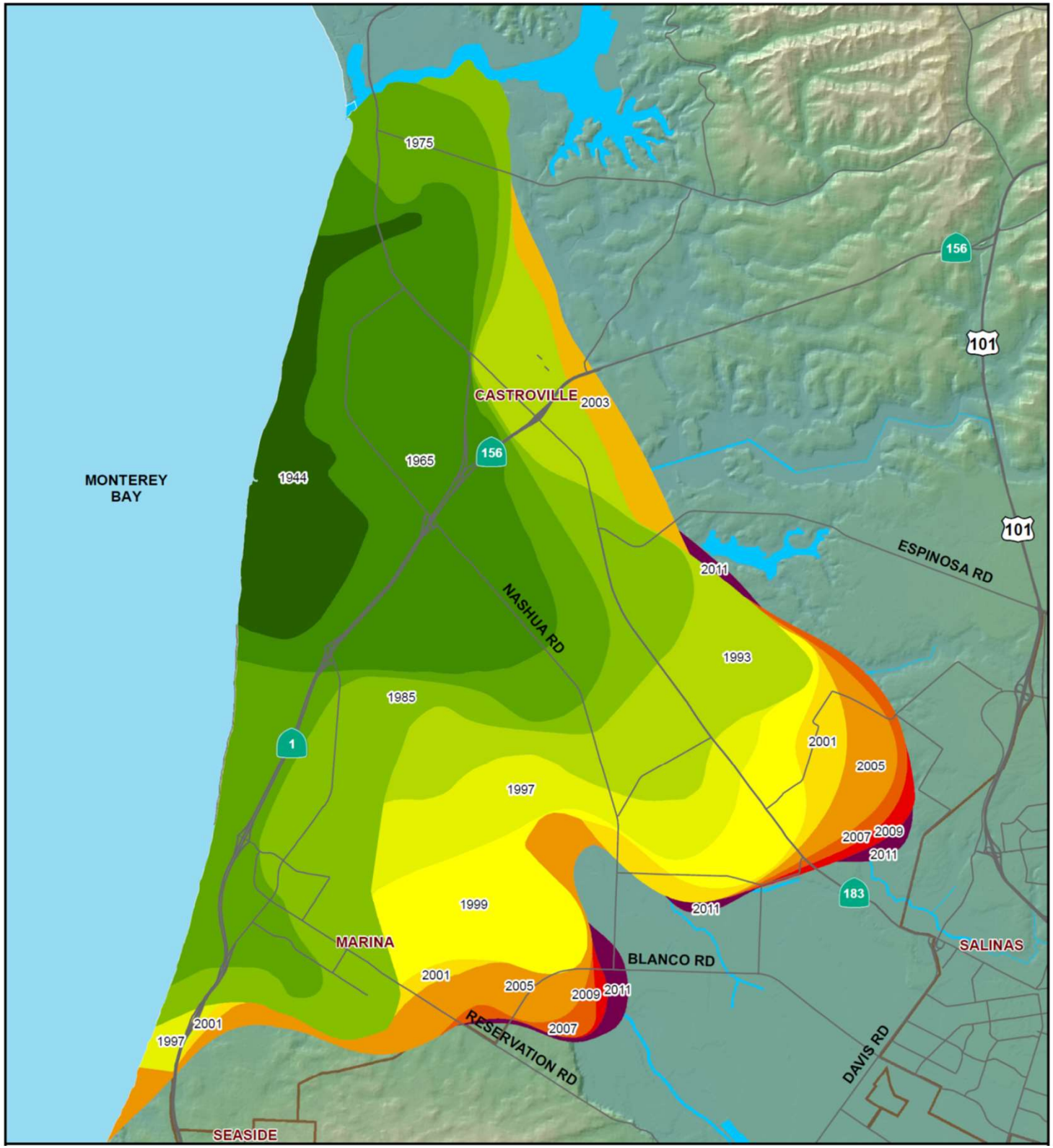


Santa Margarita (Deep) Aquifer

Adapted from 2024 SIAR Presentation



Seawater Intrusion map of the 180- foot aquifer in the Salinas Valley as prepared by MCWRA in 2012

INSTITUTIONAL PROBLEMS WITH MPWMD

- Discounting the risk of seawater intrusion
- Questioning the importance of achieving Protective groundwater elevations
- Questioning the loss of groundwater from the Basin
- Questioning the need for, or the amount of, replenishment water needed to protect the Basin

WHAT IS THE MPWMD STAFF TELLING ITS BOARD ABOUT GROUNDWATER LOSSES, REPLENISHMENT WATER, AND PROTECTIVE ELEVATIONS?

- **These are verbatim excerpts from Mr. Stoldt's statements in his agenda Transmittals:**

- ***This new technical memorandum effectively calls into question the entire concept of "Net Flows from the Deep Aquifer "***

- *Several of the principal conclusions of the Watermaster cannot be substantiated. Specifically, groundwater is not predictably "lost" to the Monterey Subbasin.*

- ***Therefore, the replenishment "target" adopted by the Watermaster is based upon an unproven assumption of leakage or outflow*** *and should be revisited with additional groundwater modeling analyses.*

- **Also, at the March 3 meeting an attorney advising the Committee referred to the Watermaster's Protective Elevations as "alleged."**

WHAT DID THE AUTHOR OF THE MEMORANDUM HAVE TO SAY AFTER LEARNING OF MR. STOLDT'S STATEMENTS?

- **There has not been any new data or modeling results that would revise or change the modeling results in the BMAP update or as presented in the 2022 replenishment modeling**
  - **Those values were calculated based on the simulated net flow across the Adjudication Decision boundary line**
  - **Even the additional particle tracking analysis that MPWMD has asked him to perform to better understand the fate of the water that crosses the Adjudication boundary, and to evaluate the position of the flow divide, would not change those numbers**

- **What could change is our understanding and ability to differentiate where those net outflows across the adjudication boundary end up going. As shown in the earlier slides:**
  - **Does it all actually stay within the previously mapped deep aquifer flow divide boundary and then end up just flowing offshore?**
  - **Or is it really flowing further north into the Monterey Subbasin "proper"?**
  - **Or some combination?**

WHAT IS THE SIGNIFICANCE OF THE SEASIDE BASIN BOUNDARY?

- The boundary of the Basin is set forth in the Adjudication Decision
  - The Watermaster is bound by the Decision to manage groundwater resources within this boundary
  - This is the same boundary shown on the Department of Water Resources Statewide Basin Maps in their Bulletin 118
  - This is the same boundary that the Monterey Subbasin used in its Groundwater Sustainability Plan
- It is the net amount of flow crossing that boundary that is important to the Watermaster in terms of Basin management decision-making.

WHY DOES THE WATERMASTER STAFF CONSIDER THIS TO BE A PROBLEM?

- A source of revenue will be needed in order to obtain replenishment water
- One method of generating this revenue would be to:
  - Request that MPWMD form a "zone" overlying the Basin and
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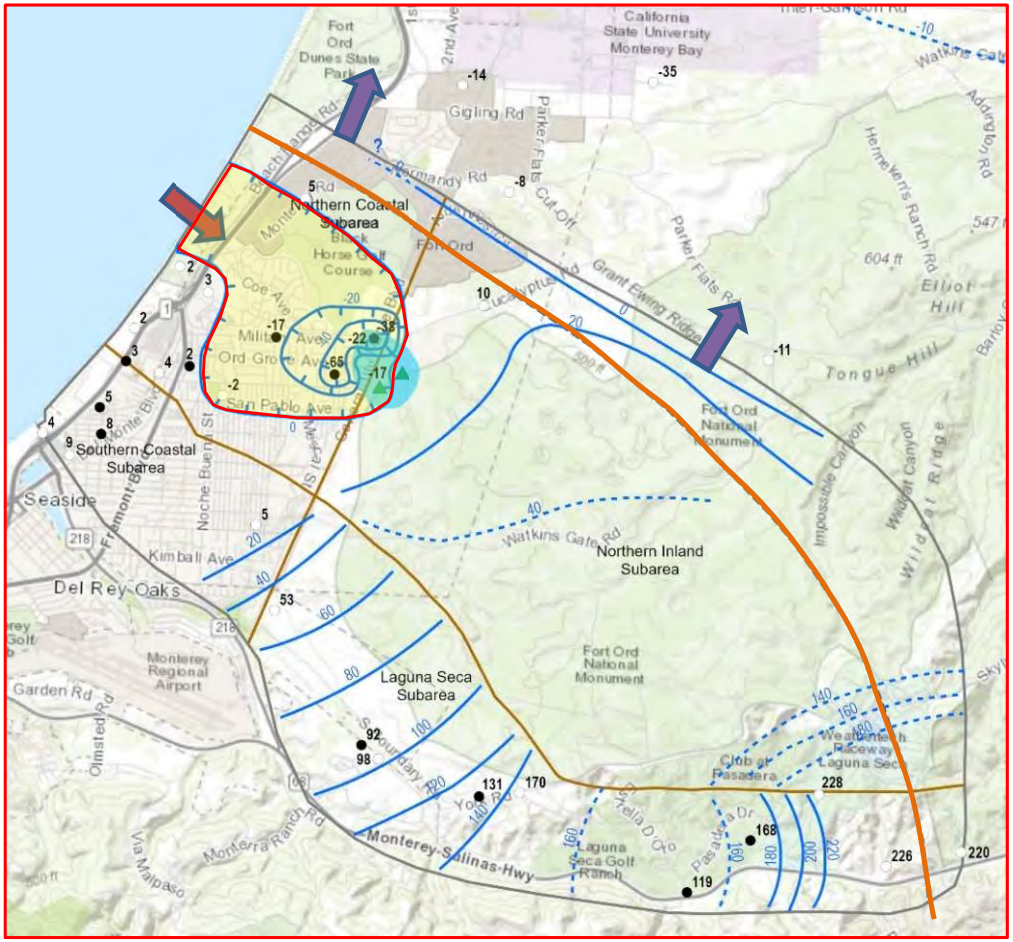

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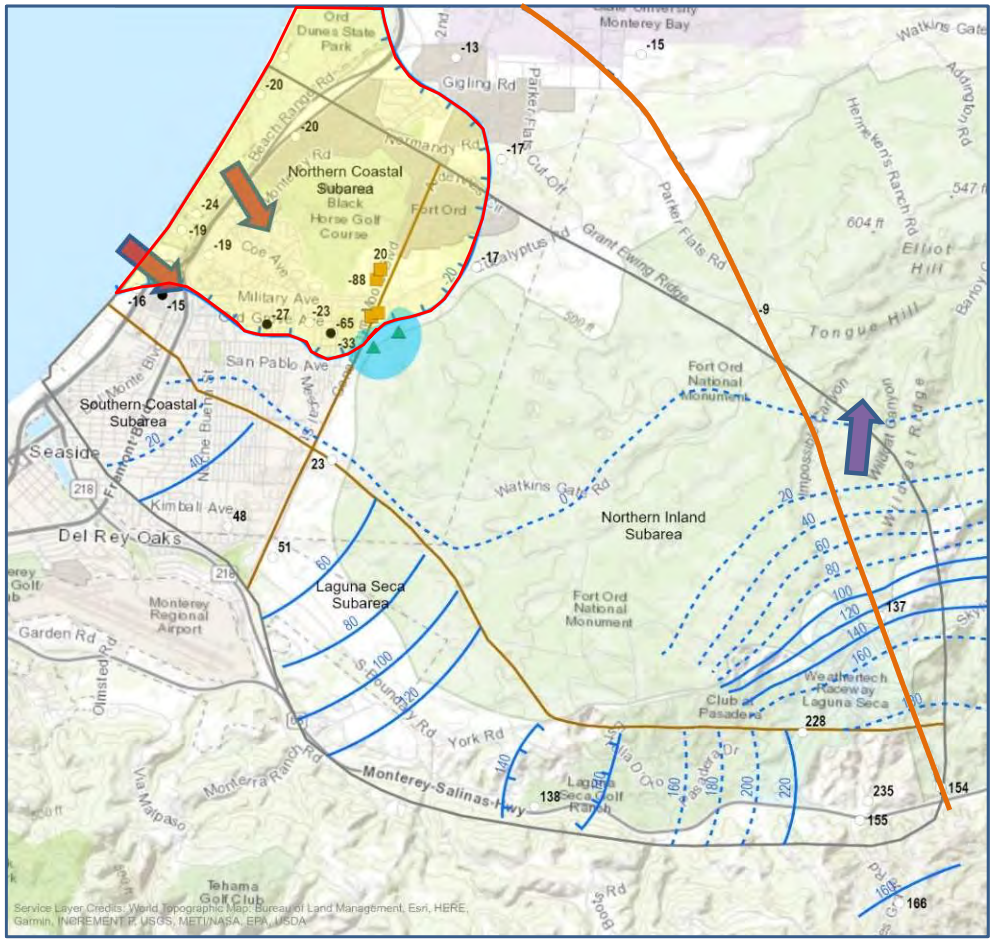

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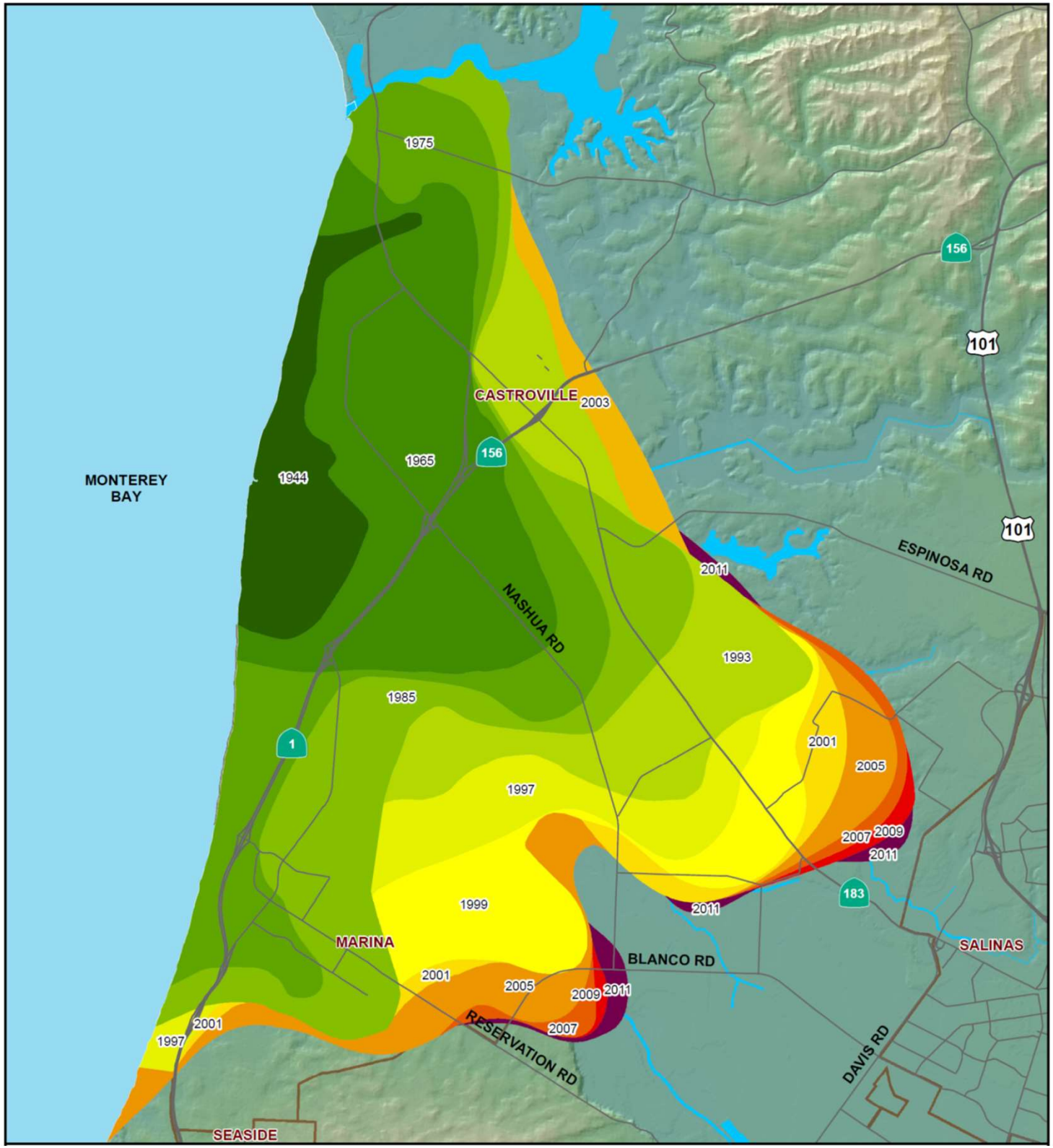

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