

**MEETING NOTICE AND AGENDA**  
**TECHNICAL ADVISORY COMMITTEE**  
**OF THE**  
**SEASIDE BASIN WATER MASTER**

**DATE: Wednesday, November 16, 2022**

**MEETING TIME: 1:30 p.m.**

**IN KEEPING WITH GOVERNOR NEWSOMS EXECUTIVE ORDERS N-29-20 AND N-35-20, THE TECHNICAL ADVISORY COMMITTEE MEETING WILL BE CONDUCTED BY TELECONFERENCE AND WILL NOT BE HELD IN THE MONTEREY ONE WATER OFFICES.**

**YOU MAY ATTEND AND PARTICIPATE IN THE MEETING AS FOLLOWS:  
JOIN FROM A PC, MAC, IPAD, IPHONE OR ANDROID DEVICE (NOTE: ZOOM APP MAY NEED TO BE DOWNLOADED FOR SAFARI OR OTHER BROWSERS PRIOR TO LINKING) BY GOING TO THIS WEB ADDRESS:**

<https://us02web.zoom.us/j/89486942014?pwd=bUFFNURhSFZSVXJRY2RjKzlleVN5QT09>

**If joining the meeting by phone, dial this number:**

**+1 669 900 9128 US (San Jose)**

**If you encounter problems joining the meeting using the link above, you may join from your Zoom screen using the following information:**

**Meeting ID: 894 8694 2014**

**Passcode: 902943**

**OFFICERS**

**Chairperson: Jon Lear, MPWMD**

**Vice-Chairperson: Tamara Voss, MCWRA**

**MEMBERS**

<b>California American Water Company</b>	<b>City of Del Rey Oaks</b>	<b>City of Monterey</b>
<b>City of Sand City</b>	<b>City of Seaside</b>	<b>Coastal Subarea Landowners</b>
<b>Laguna Seca Property Owners</b>	<b>Monterey Peninsula Water Management District</b>	<b>Monterey County Water Resources Agency</b>

<u>Agenda Item</u>	<u>Page No.</u>
<b>1. Public Comments</b>	
<b>2. Administrative Matters:</b>	
<b>A. Make Findings Required Under AB 361 Regarding Holding Meetings Via Teleconference</b>	<b>2</b>
<b>B. Approve Minutes from the August 10, 2022 Meeting</b>	<b>3</b>
<b>C. Results from Martin Feeney’s October 2022 Induction Logging of the Sentinel Wells</b>	<b>14</b>
<b>D. Sustainable Groundwater Management Act (SGMA) Update</b>	<b>21</b>
<b>E. Update on Security National Guarantee (SNG) Well</b>	<b>35</b>
<b>3. Discuss and Provide Input on the 2022 Seawater Intrusion Analysis Report (SIAR)</b>	<b>36</b>
<b>4. Discuss and Provide Input on the Preliminary Draft Watermaster 2022 Annual Report</b>	<b>43</b>
<b>5. Approve Initial RFSs for Montgomery &amp; Associates, MPWMD, Martin Feeney, and Todd Groundwater for 2023</b>	<b>69</b>
<b>6. Schedule</b>	<b>108</b>
<b>7. Other Business</b>	<b>113</b>
<b>The next regular meeting is tentatively planned for Wednesday January 11, 2023 at 1:30 p.m. That meeting will likely also be held via teleconference.</b>	

**SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE**

**\* \* \* AGENDA TRANSMITTAL FORM \* \* \***

<b>MEETING DATE:</b>	November 16, 2022
<b>AGENDA ITEM:</b>	2.A
<b>AGENDA TITLE:</b>	Make Findings Required Under AB 361 Regarding Holding Meetings Via Teleconference
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager

**SUMMARY:**

As discussed at prior TAC meetings, in order to remain in compliance with AB 361 the TAC needs to adopt certain findings every 30 days in order to keep meeting remotely.

One action required at today's meeting is to readopt the same findings the TAC adopted at its November 17 meeting, namely that:

- (1) The Governor's proclaimed state of emergency is still in effect,
- (2) The TAC has reconsidered the circumstances of the state of emergency, and
- (3) The Monterey County Health Officer continues to recommend social distancing measures for meetings of legislative bodies.

I recommend that the TAC again adopt these three findings.

<b>ATTACHMENTS:</b>	None
<b>RECOMMENDED ACTION:</b>	Approve Making the Findings Described Above

**SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE**

**\* \* \* AGENDA TRANSMITTAL FORM \* \* \***

<b>MEETING DATE:</b>	November 16, 2022
<b>AGENDA ITEM:</b>	2.B
<b>AGENDA TITLE:</b>	Approve Minutes from the August 10, 2022 Meeting
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager
<b>SUMMARY:</b>	<p>Draft Minutes from this meeting were emailed to all TAC members. Any changes requested by TAC members have been included in the attached version.</p>
<b>ATTACHMENTS:</b>	Minutes from this meeting
<b>RECOMMENDED ACTION:</b>	Approve the minutes

**D-R-A-F-T**  
**MINUTES**

**Seaside Groundwater Basin Watermaster  
Technical Advisory Committee Meeting  
August 10, 2022  
(Meeting Held Using Zoom Conferencing)**

**Attendees: TAC Members**

City of Seaside – Nisha Patel  
California American Water – Tim O’Halloran  
City of Monterey – Cody Hennings  
Laguna Seca Property Owners – Wes Leith  
MPWMD – Jon Lear  
MCWRA – Tamara Voss  
City of Del Rey Oaks – John Gaglioti  
City of Sand City – Leon Gomez  
Coastal Subarea Landowners – No Representative

**Watermaster**

Technical Program Manager – Robert Jaques  
Administrative Officer Assistant – Michael Paxton

**Consultants**

Montgomery & Associates – Pascual Benito, Bill DeBoer  
Wallace Group – Rick Riedl

**Others**

Cal Am – Josh Stranton  
MPWMD – Maureen Hamilton

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The meeting was convened at 1:34 p.m.

**1. Public Comments and Roll Call**

There were no public comments. Ms. Voss conducted the roll call with the members listed above being in attendance.

**2. Administrative Matters:**

**A. Make Findings Required Under AB 361 Regarding Holding Meetings Via Teleconference**

Mr. Jaques briefly summarized the agenda packet materials for this item. A motion was made by Mr. O’Halloran, seconded by Mr. Gaglioti, to adopt the findings contained in the agenda packet. The motion passed with Mr. Leith voting no.

**B. Approve Minutes from the July13, 2022 Meeting**

On a motion by Mr. O’Halloran, seconded by Mr. Gomez, the minutes were unanimously approved as presented, with Mr. Lear abstaining.

**C. Sustainable Groundwater Management Act (SGMA) Update**

Mr. Jaques summarized the agenda packet materials for this item. There was no other discussion.

#### **D. Update on Issues Concerning Well ASR-1**

Mr. Jaques summarized the agenda packet materials for this item. Mr. Gaglioti thanked Mr. Jaques for providing this information. There was no other discussion.

### **3. Presentation on Additional Replenishment Water Evaluations Using Different Assumptions**

Mr. Jaques introduced this item.

Mr. Gaglioti had joined the meeting by phone and was concerned that he might lose the connection due to the location he was in. He said that if there is a vote on this issue he would vote in favor of sending the material to the Board for their information at the September Board meeting.

Using the attached PowerPoint slides Mr. Benito presented the work done on the additional replenishment water evaluations using different assumptions. He noted that the new work compares the Baseline and 1,000 AFY replenishment water scenarios that were evaluated in the January 2022 work, to the amount of replenishment water needed under the revised assumptions that are described in the August Technical Memorandum.

Mr. Benito reported that water levels rise or fall depending on whether the inflow is greater than or less than the outflow. This work focused on the water budget for the Northern Coastal Subarea, plus the Pure Water Monterey Expansion area to the east. In this subarea, inflows include injected water, and outflows include pumping, both of which are controllable activities. Flows to or from adjacent areas are head - dependent and not directly controllable.

As deep aquifer water levels rise, more water is lost to the Monterey Subbasin and to the offshore area. During prolonged drought periods, larger amounts of net outflow occur because the amounts of water that are injected are reduced and the amount of water pumped generally increases. This lowers groundwater levels, but it also reduces outflows to adjacent areas that are down gradient, and increases inflows from those that are up-gradient.

In this Technical Memorandum the shallow aquifer includes all the unconfined aquifers including the Aromas, Dunes Sands, and Paso Robles.

Some of the principal conclusions from this work include:

- On average about 3,200 acre-feet per year of additional recharge water above the amount in the 1,000 AFY scenario would be needed under the revised assumptions to achieve protective water levels.
- Shallow Aquifer:
  - Factors having significant impact include rainfall and reduction in shallow aquifer pumping.
  - Pure Water Monterey vadose zone wells provide the biggest increase in groundwater levels. Outflows to the Monterey Subbasin and the offshore area increase as groundwater levels rise.
- Deep Aquifer:
  - Outflows to the Monterey Subbasin increase as groundwater levels rise in the deep aquifer.

Mr. O'Halloran and Mr. Gaglioti thanked Mr. Benito for an excellent presentation on a very complex set of conditions. Mr. Gaglioti said he would be submitting some questions of his own in writing to Mr. Benito at a later date.

A motion was made by Mr. Gaglioti, seconded by Mr. O'Halloran to send the information contained in this Technical Memorandum forward to the Board along with the January 2022 work. Mr. Lear reported that MPWMD feels that assumptions 2, 3, and 6 on page 25 of the agenda packet are not accurate.

The motion passed on the following vote:

Yes-Mr. O'Halloran, Ms. Patel, Mr. Hennings, Ms. Voss, Mr. Gaglioti, and Mr. Gomez

No - Mr. Lear, and Mr. Leith

#### **4. Approve the Monitoring and Management Program (M&MP) for FY 2023**

Mr. Jaques summarized the agenda packet materials for this item.

Mr. Lear and Ms. Voss recommended that if other parameters start to indicate possible seawater intrusion, sampling and analysis for barium and iodide be resumed.

A motion was made by Ms. Voss, seconded by Mr. O'Halloran, to approve the Monitoring and Management Program for FY 2023. The motion passed unanimously.

#### **5. Approve the FY 2023 Monitoring and Management Program (M&MP) Operations and Capital Budgets**

A motion was made by Mr. Lear, seconded by Ms. Voss, to approve the Monitoring and Management Program Operations and Capital Budgets for FY 2023. The motion passed unanimously.

#### **6. Update on Monitoring Wells FO-9 and FO-10 and Approval of RFS No. 2022-05 with Montgomery & Associate Regarding Replacement of Well FO-9 Shallow**

Mr. Jaques summarized the agenda packet materials for this item.

Mr. O'Halloran questioned whether or not well FO-9 Shallow was located on Army property. He said he thought the property had been transferred to the City of Seaside. Mr. Lear responded that as far as he knew it was still on Army property. In order to perform the destruction work at well FO-9 Shallow he had to get an easement and permission to access the site from the Army to do the work. Ms. Patel said that she would research the ownership of the property at this location.

With regard to potentially locating the replacement well on the City of Seaside golf course property, Ms. Patel said that she will talk with her upper management next week to see if this will be acceptable to the City. She will also see if the existing well FO-9 Shallow is still on Army property or whether it is now on City of Seaside property.

With regard to the replacement well for well FO-9 Shallow, Ms. Voss said she felt that locating the replacement well on the City of Seaside golf course property would be satisfactory, as it is reasonably close to the location of the former FO-9 Shallow well and this would make it easier to get the necessary permissions to do that work.

Mr. Lear said he was not sure how reliable the FO-9 Shallow well monitoring data has been in recent years, because we do not know how long the casing leakage has been occurring which would compromise the analytical data.

On a motion by Ms. Voss, seconded by Mr. O'Halloran, RFS 2022 – 05 with Montgomery and Associates was unanimously approved, with Tasks 1 and 2 to be authorized at this time. There was brief discussion about determining whether or not the existing well FO-9 Shallow is on Army property. If it is no longer on Army property, and it is now on City of Seaside property, the replacement well could

potentially be located closer to the existing well. If the property is still owned by the Army, the well could more readily be located on the City of Seaside golf course property.

#### **7. Schedule**

Mr. Jaques highlighted his expectation that there would not be a need for TAC meetings in either September or October. Therefore, unless there is a change, the next TAC meeting would be on the 3rd Wednesday of November, i.e. November 16, 2022.


#### **8. Other Business**


There was no other business.

The meeting adjourned at 3:23 PM.

**REPLENISHMENT MODELING**

**WATER BUDGET ANALYSIS & ALTERNATIVE SUPPLY & DEMAND SCENARIO**





Presented to the Seaside Basin TAC August 10th, 2022

Pascual Benito Ph.D.


**OUTLINE**

- Objectives
- Recap of Previous Modeling
- Water Budget Analysis of Baseline Scenario and 1,000-AFY Replenishment Scenario
- Alternative Scenario 1:
  - Alternate Supply & Demand Assumptions
  - Additional Replenishment Needed
- Conclusions
- What is the new Normal Water Year?



**OBJECTIVES**

- Aquifer-by-Aquifer Water Budget Analysis to understand trends and changes in net flows to/from the Basin
  - How much water is flowing to Offshore Region? To Monterey Subbasin?
- Develop alternative Supply & Demand scenario based on Cal-Am UWMP and updated City of Seaside assumptions (referred to as Alternative Scenario 1)
- Use water budget approach to estimate effects of different demand/supply assumptions on volume of replenishment needed


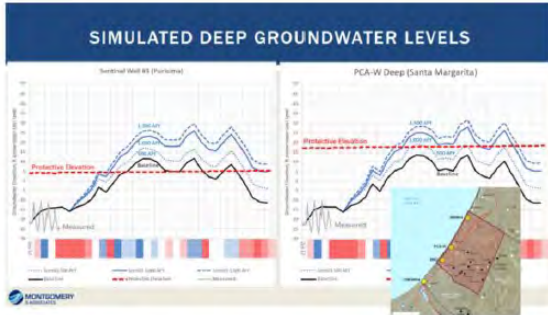
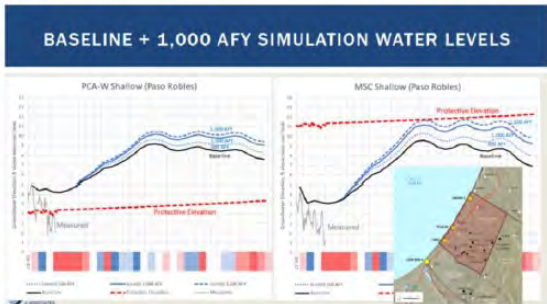


**UPDATED BASELINE SIMULATION RECAP**

- WY 2018–2021: actual pumping, injection & hydrology

Year	Actual	Projected
2018	100	100
2019	100	100
2020	100	100
2021	100	100
2022	100	100
2023	100	100
2024	100	100
2025	100	100
2026	100	100
2027	100	100
2028	100	100
2029	100	100
2030	100	100

- WY 2022–2050: projected pumping, all planned projects, PWM & ASR injection tied to cycled historical hydrology
- Mean Sea Level rise of 1.3 ft by 2050
- No GSP projects in neighboring subbasins (e.g. assume no rise in water levels in Monterey Subbasin)



## YEARS TO REACH PROTECTIVE ELEVATION

Number of Years (from WY2024) for Average Water Level to Reach Protective Elevation

Scenario	Sentinel 3 (Deep)	PCA-W (Deep)	MSC (Deep)	PCA-W (Shallow)	MSC (Shallow)	CDM MW-4 (Shallow)
Baseline	7	not reached	not reached	already reached	not reached	already reached
1) 500 AFY	6	9	9	already reached	not reached	already reached
2) 1,000 AFY	5	7	8	already reached	11*	already reached
3) 1,500 AFY	3	6	6	already reached	10	already reached
4) 1,500 AFY + Q Redist.	3	7	7	already reached	9	already reached

\*within 34 foot



## PERCENT OF TIME PROTECTIVE ELEVATIONS MAINTAINED

Percent of years (WY2024-2048) that average water level achieves protective elevation

Scenario	Sentinel 3 (Deep)	PCA-W (Deep)	MSC (Deep)	PCA-W (Shallow)	MSC (Shallow)	CDM MW-4 (Shallow)
Baseline	52%	not reached	not reached	100%	not reached	100%
1) 500 AFY	72%	12%	8%	100%	not reached	100%
2) 1,000 AFY	89%	56%	52%	100%	4%	100%
3) 1,500 AFY	88%	72%	88%	100%	20%	100%
4) 1,500 AFY + Q Redist.	84%	84%	84%	100%	40%	100%

\*within 34 foot

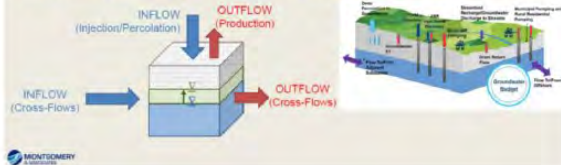


## WATER BUDGET ANALYSIS

INFLWS - OUTFLOWS = CHANGE IN STORAGE

A Change in Storage represent a change in groundwater levels

Net Inflows > Net Outflows for water levels to rise



**WATER BUDGET ZONES**  
Focus on Northern Coastal Subarea extended to include PWH Expansion Project Area

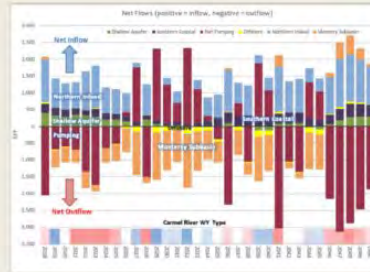
## DEEP AQUIFER FLOW COMPONENTS

NET PUMPING =  $PWM_{in} + ASR_{in} + Replenishment_{in} - Total Production$

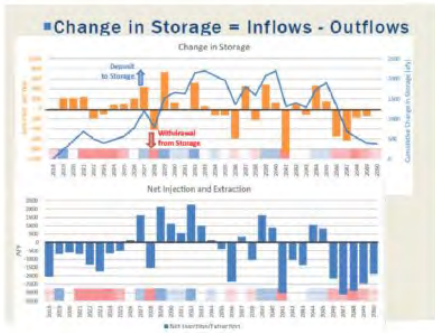
Head Dependent Cross-Flows To/From:

- Monterey Subbasin
- Offshore Region
- Flow to/from Northern Inland Subarea
- Shallow Aquifer
- Southern Coastal Subarea

For each flow component:  
NET INFLOW = TOTAL INFLOW - TOTAL OUTFLOW  
(Positive = a net inflow, Negative = a net outflow)



**DEEP AQUIFER BASELINE NET FLOWS**



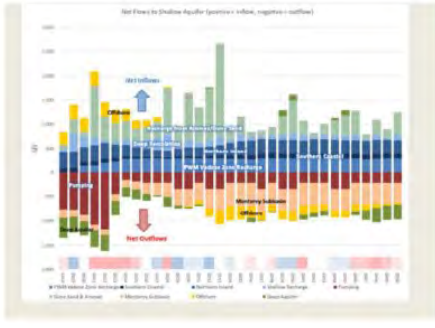
### DEEP AQUIFER BASELINE NET FLOWS

Net Pumping is the driver for changes in water levels in the Deep Aquifer.

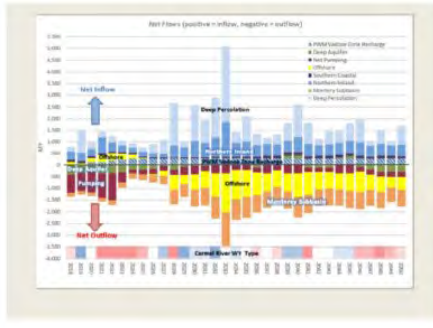
### UNCONFINED AQUIFERS FLOW COMPONENTS

- Deep Percolation
  - Infiltration of rainfall, irrigation return flow & system losses
- PWM Vadose Zone Recharge (VZW Wells + Parc Ponds)
- Pumping from Extraction Wells
- Head Dependent Cross-Flows To/From:
  - Monterey Subbasin
  - Offshore Region
  - Flow to/from Northern Inland Subarea
  - Shallow Aquifer
  - Southern Coastal Subarea

For each flow component  
 $NET\ FLOW = TOTAL\ INFLOW - TOTAL\ OUTFLOW$   
 (Positive = a net inflow, Negative = a net outflow)

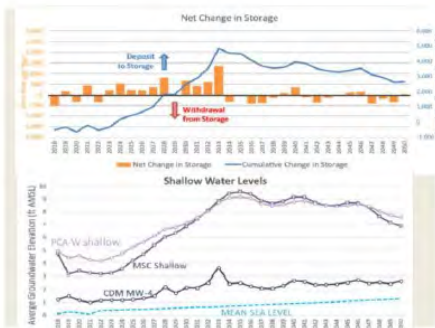


### BASELINE NET FLOWS: SHALLOW AQUIFER (Paso Robles Only)

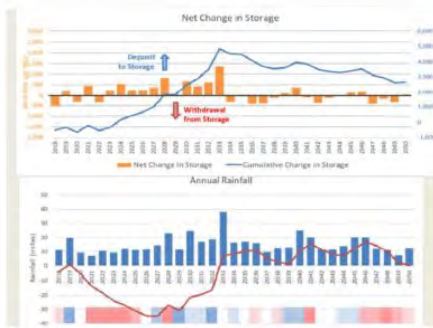


### BASELINE NET FLOWS: UNCONFINED AQUIFERS\*

\*Armas + Dune Sands and Paso Robles Combined



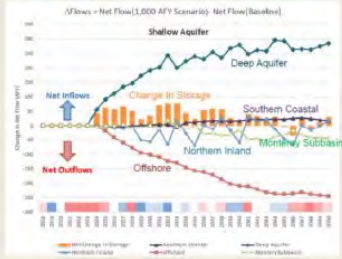
### SHALLOW AQUIFER BASELINE NET FLOWS



### BASELINE SHALLOW AQUIFER CHANGE IN STORAGE

Percolation from Rainfall (direct and via the Armas Sands and Older Dune Deposits) is the primary driver for the increase in shallow water level.

### 1,000-AFY Replenishment Scenario



**CHANGE IN NET FLOW FROM BASELINE SCENARIO**  
 Uncontracted Aquifers Combined (Parks Reservoir, existing Arroyos + Dunn Sands)

### 1,000-AFY Replenishment Scenario



**CHANGE IN NET FLOW FROM BASELINE SCENARIO**  
 Deep Aquifer

### ALTERNATIVE SCENARIO 1: CAL-AM ASSUMPTIONS

- 15 AF per day will be used as the average daily amount of ASR diversion, not the 20 acre-feet per day that was used in the January 2022 modeling (not will have same cycled hydrology)
- 2020 Urban Water Management Plan (UWMP) demand figures rather than MPWMD's demand figures will be used projected water demands
- MPWSP Desalination Plant begins operation in 2030 in accordance with the UWMP. (The UWMP assumes the Desal plant will produce 6,252 AFY for the Monterey Peninsula)
- Cal-Am's in-lieu payment of 700 AFY will begin operation in 2030, in accordance with the UWMP. (For comparison, the original baseline assumes the repayment period starts in 2024, concurrent with the PWM Expansion Project.)
- Pure Water Monterey Expansion Project will begin operation in 2024, the same as previously simulated
- To provide a factor of safety, the amount of water that the PWM Expansion Project will deliver will be reduced from 5,700 acre-feet to the "Minimum Allotment" of 4,600 acre-feet per year as set forth in the "Amended and Related Water Purchase Agreement" executed between Cal-Am, MPWMD, and MLW in late 2021
- Cal-Am will make-up any shortfall between supply and demand by over pumping its Seaside Basin allocation of 1,474 AFY. [If the Desal Plant is built in 2030, even though PWM Expansion is assumed to have reduced deliveries per Cal-Am assumption B above, there will be no supply shortfall after 2030 because the UWMP indicates that the expected capacity of the Desal plant is sufficient to make up for the reduced PWM Expansion deliveries.]



### ALTERNATIVE SCENARIO 1

- City of Seaside
  1. Assume City of Seaside golf courses use 491.4 AFY of recycled water
  2. Assume City pumps an in-lieu amount of 491.4 AFY from the deep aquifer from a new well located generally in the location of the Lincoln-Cunningham Park in Seaside
  3. Convert 26 AFY of golf course allocation from Alternate Producers (APA) to Standard Producers (SPA). New golf course APA allocation = 540 - 26 = 514 AFY
  4. Remaining unused balance of 514 - 491.4 = 22.6 AFY would be held as a reserve and/or for flushing of greens and tee boxes
- Baseline accounts for conversion to recycled water, but only re-allocated 301.1 AFY to supply Campus Town Development via Seaside Muni#4
- So assume full APA allocation is now pumped, this leaves 514 - 301.1 = 212 AFY of additional pumping that needs to be included



### REDUCED ASR AND PWM INJECTION

25% Reduction in ASR Injection Volumes and 20% Reduction in PWM Expansion

Normal Flow Water Year Type	Average Number of Diversion Days per Year	Average ASR Diversion w/20 AFD Capacity (AFY)	Average ASR Diversion w/15 AFD Capacity (AFY)
Extremely Wet	142	2,840	2,130
Wet	125	2,500	1,875
Above Normal	105	2,100	1,575
Normal	64	1,280	960
Below Normal	33	660	495
Dry	19	380	285
Critically Dry	3	60	45

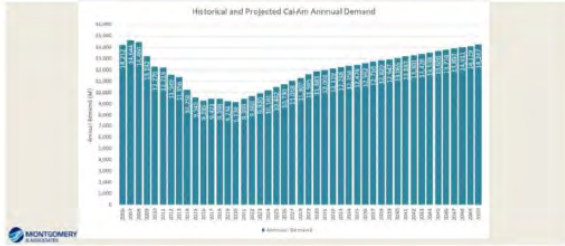


### ASR & PWM INJECTION





## HISTORICAL & PROJECTED SYSTEM DEMAND



## PROJECTED SYSTEM DEMAND AND SUPPLY SOURCE



## SEASIDE PUMPING BY WATER SOURCE



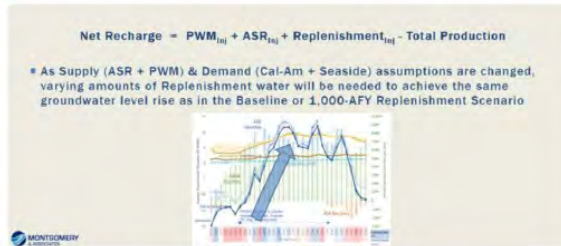
## NET PWM & ASR INJECTION = INJECTION - RECOVERY



## NET PUMPING = $PWM_{INJ} + ASR_{INJ} - TOTAL PUMPING$



## HYBRID WATER BUDGET APPROACH

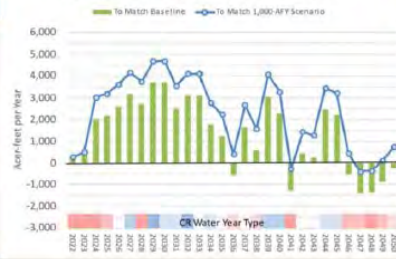


## HYBRID WATER BUDGET APPROACH

$$\text{Additional Replenishment Water Needed} = \text{Net Recharge (Baseline Scenario)} - \text{Net Recharge (Alternative Scenario 1)}$$



Total Replenishment Needed for Alternative Scenario 1



## CONCLUSIONS

### Water Budget Analysis

- **Shallow Aquifer**
  - Biggest Drivers for Increasing Groundwater Levels in the Shallow Aquifer
    - Recharge from percolation of rainfall & irrigation return flows
    - Reduction in Shallow Aquifer pumping
    - PWM vadose zone recharge
    - Net ASR and PWM Deep Injection not significant drivers
- **Unconfined Aquifers and Deep Aquifer**
  - Outflows to Monterey Subbasin will increase as water levels in Seaside Basin rise (assuming levels in Monterey Subbasin do not also rise)
  - Net inflow from the offshore region reverses to a net outflow in all aquifers as water levels increase, with largest net outflows occurring in Aromas Sands and Dune Deposits



## CONCLUSIONS

### Alternative Scenario 1

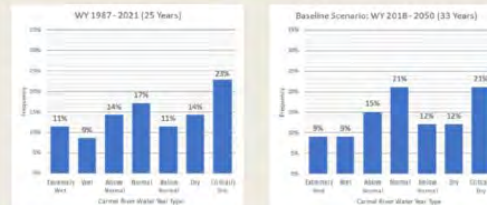
- Without additional replenishment (~2,800 AFY), the water level increases seen in the Baseline Scenario would not occur under Alternative Scenario 1
- An average of approximately 3,800 AFY of additional replenishment needed from 2024-2035 to achieve same level of protective elevations as in the January 2022 1,000-AFY Replenishment Scenario that used Baseline assumptions.
- After 2030, during drought periods the MPWSP Desal supply is offsetting what would have otherwise been pumping of groundwater to recover banked ASR or PWM water in the Baseline Scenario



## WHAT IS THE NEW NORMAL?



## WHAT IS THE NEW NORMAL?



## QUESTIONS & DISCUSSION



**SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE**

**\* \* \* AGENDA TRANSMITTAL FORM \* \* \***

<b>MEETING DATE:</b>	Nonmember 16, 2022
<b>AGENDA ITEM:</b>	2.C
<b>AGENDA TITLE:</b>	Results from Martin Feeney’s October 2022 Induction Logging of the Sentinel Wells
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager

Attached are plots of the induction logging data from the October 2022 Sentinel Well logging event.

Mr. Feeney reports that the October 2022 data shows no detectable change in formation conductivity – a proxy for seawater intrusion. Thus, the induction logging does not show any indication of the start of seawater intrusion in any of the formations within which production wells are located (primarily the Paso Robles and Santa Margarita formations).

When Mr. Feeney accessed Sentinel Well No. 3 to start the logging process, he found that the datalogger cable had detached from the plug to which it is attached at the top of the well, and that the datalogger had fallen down the well. To avoid the possibility of pushing the datalogger down further into the well, or getting the induction logging tool intertwined with the datalogger support cable, he elected not to log this well.

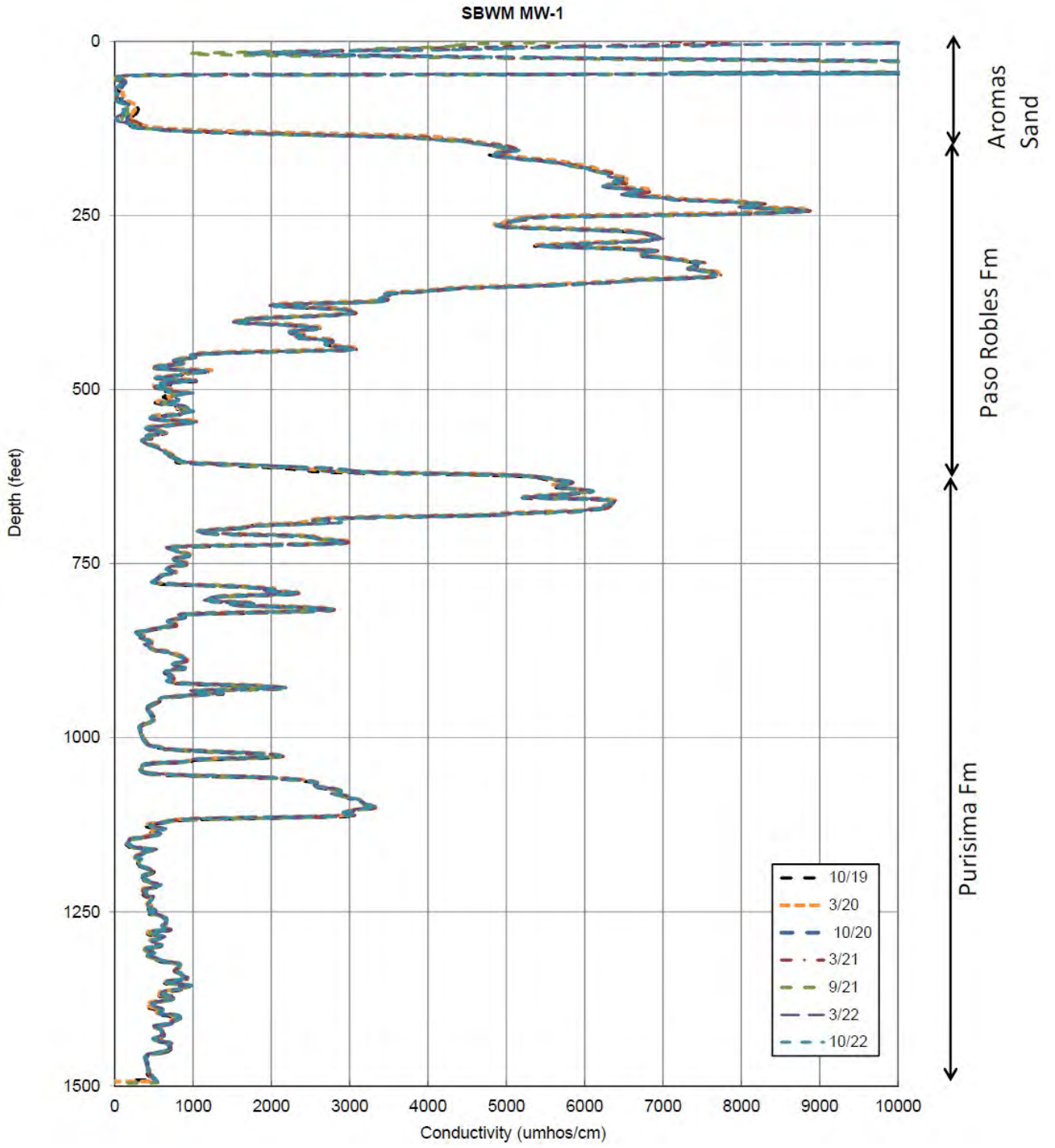
I have asked Mr. Lear to install a new datalogger in this well, using one that is in inventory, so we can continue to get ongoing water level measurements there. He reports that there will be approximately two months of water level data that will be missed by not having the old datalogger.

Mr. Feeney believes the old datalogger will by now have fallen to the bottom of the well, and that he can resume induction logging of this well next October. He also expects that the old datalogger will have been damaged by being submerged at the bottom of the well where the pressure would exceed that which the datalogger is designed to withstand. Thus it would be unlikely that any data could be retrieved from it even if it were recovered.

On a related topic, Mr. Feeney provided copies of induction logs taken from another of his clients who has its own sentinel wells along the coast. These are examples of how induction logging will look if seawater intrusion starts to occur, and demonstrates the value of performing induction logging.

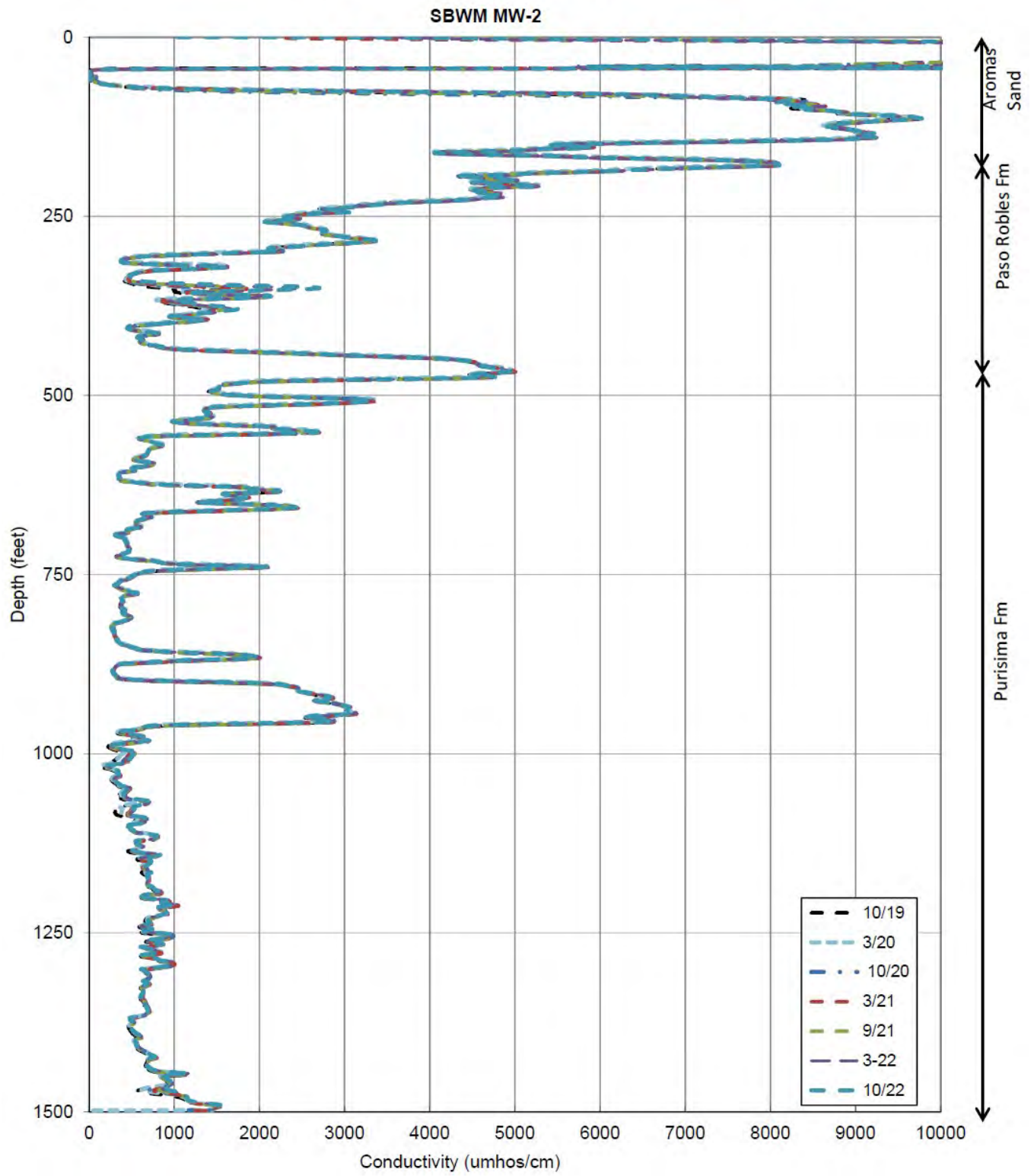
<b>ATTACHMENTS:</b>	1. Induction Logging Results from Watermaster’s Sentinel Wells 2. Induction Logging Results from Another Coastal Monitoring Program
<b>RECOMMENDED ACTION:</b>	None required – information only

# SENTINEL WELLS CONDUCTIVITY





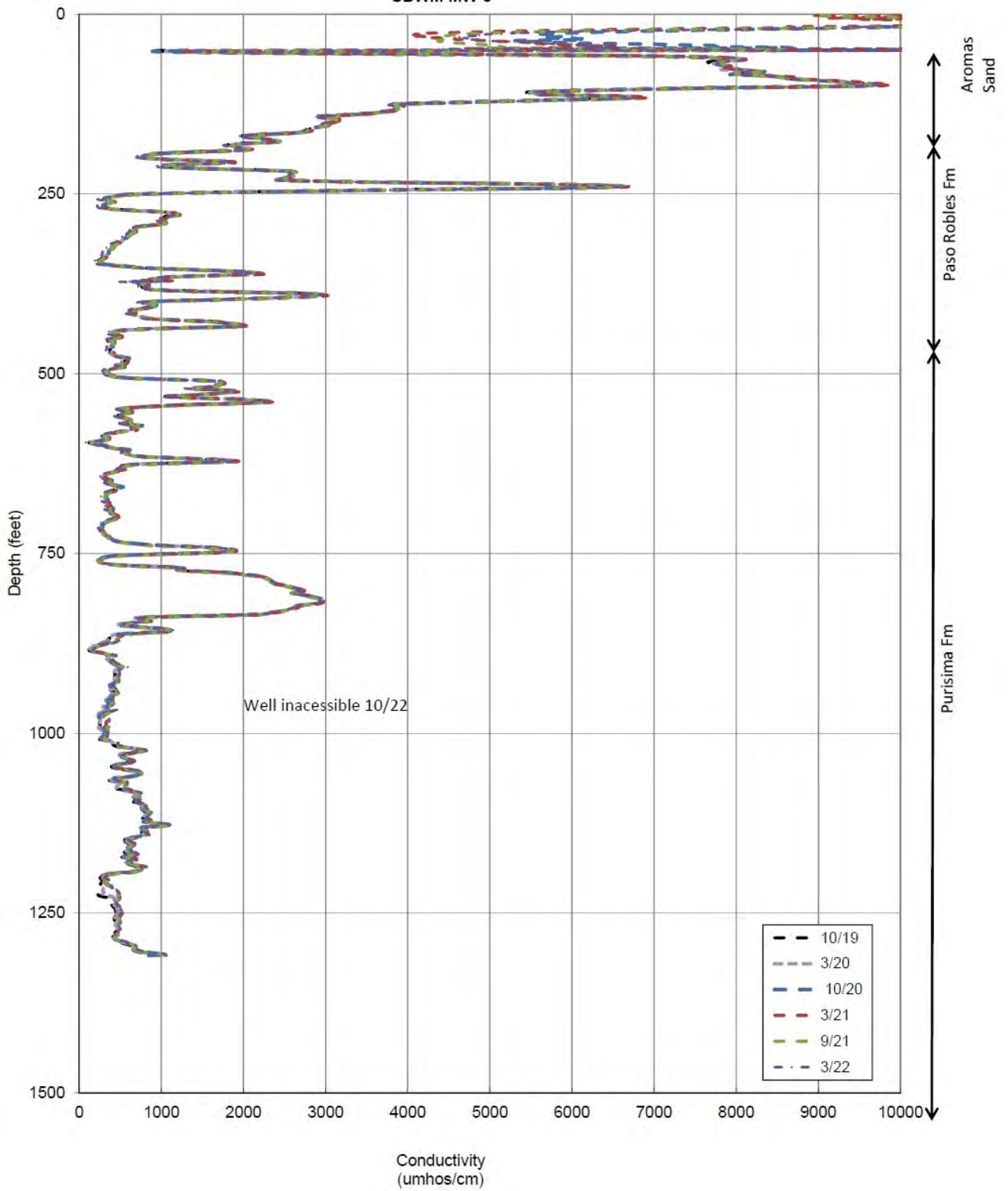
# SENTINEL WELLS CONDUCTIVITY



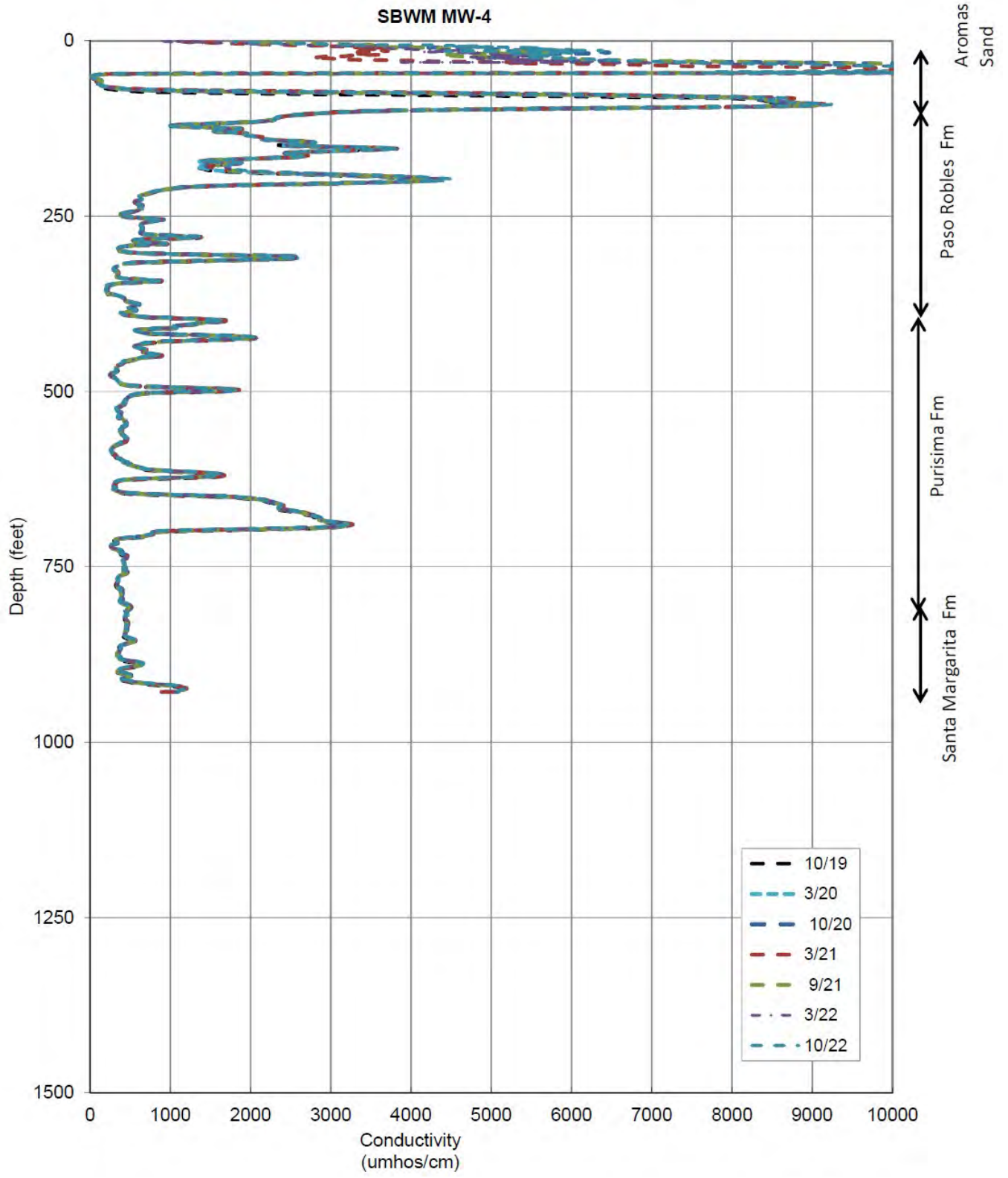


# SENTINEL WELLS CONDUCTIVITY

SBWM MW-3

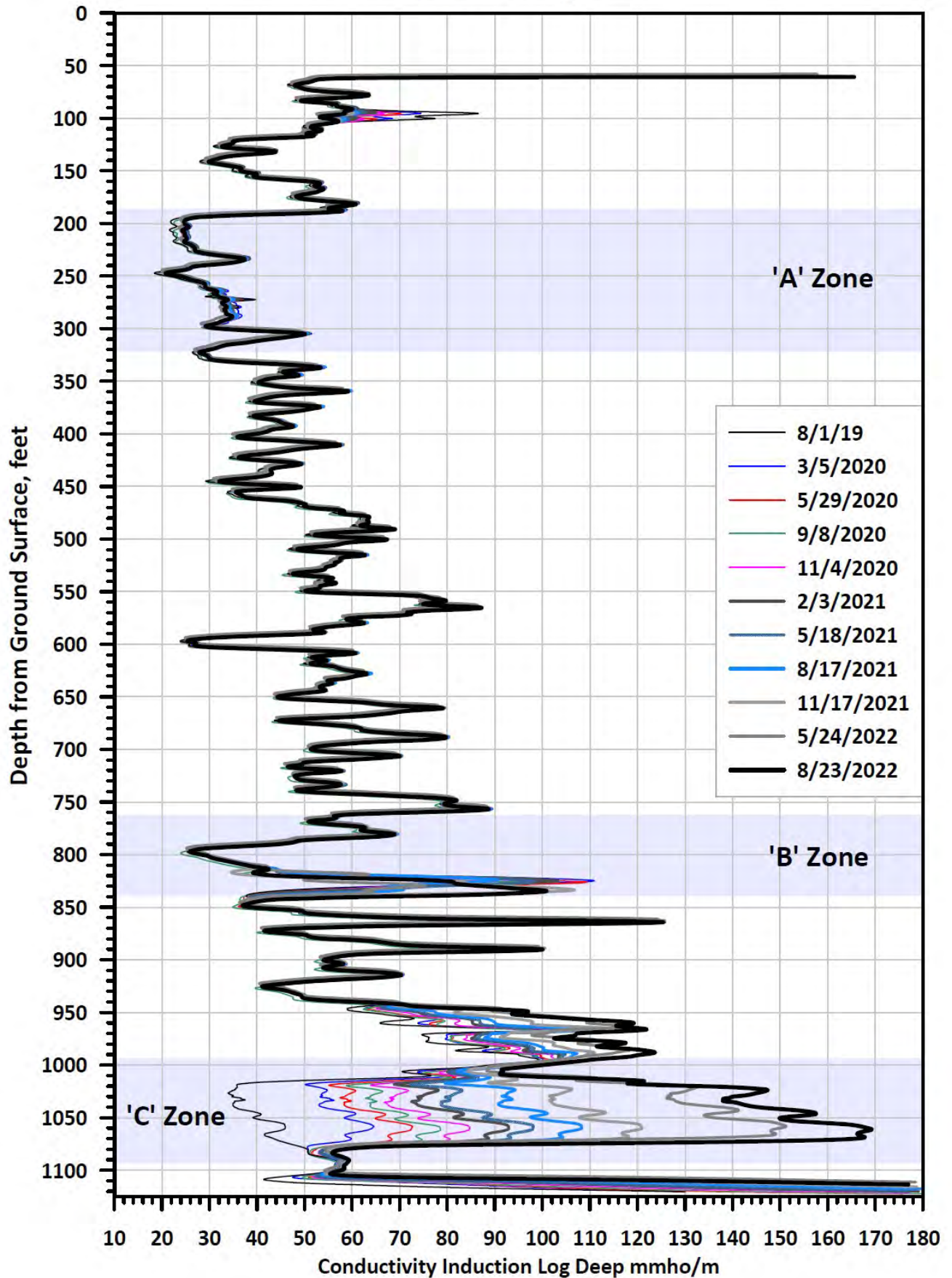


# SENTINEL WELLS CONDUCTIVITY



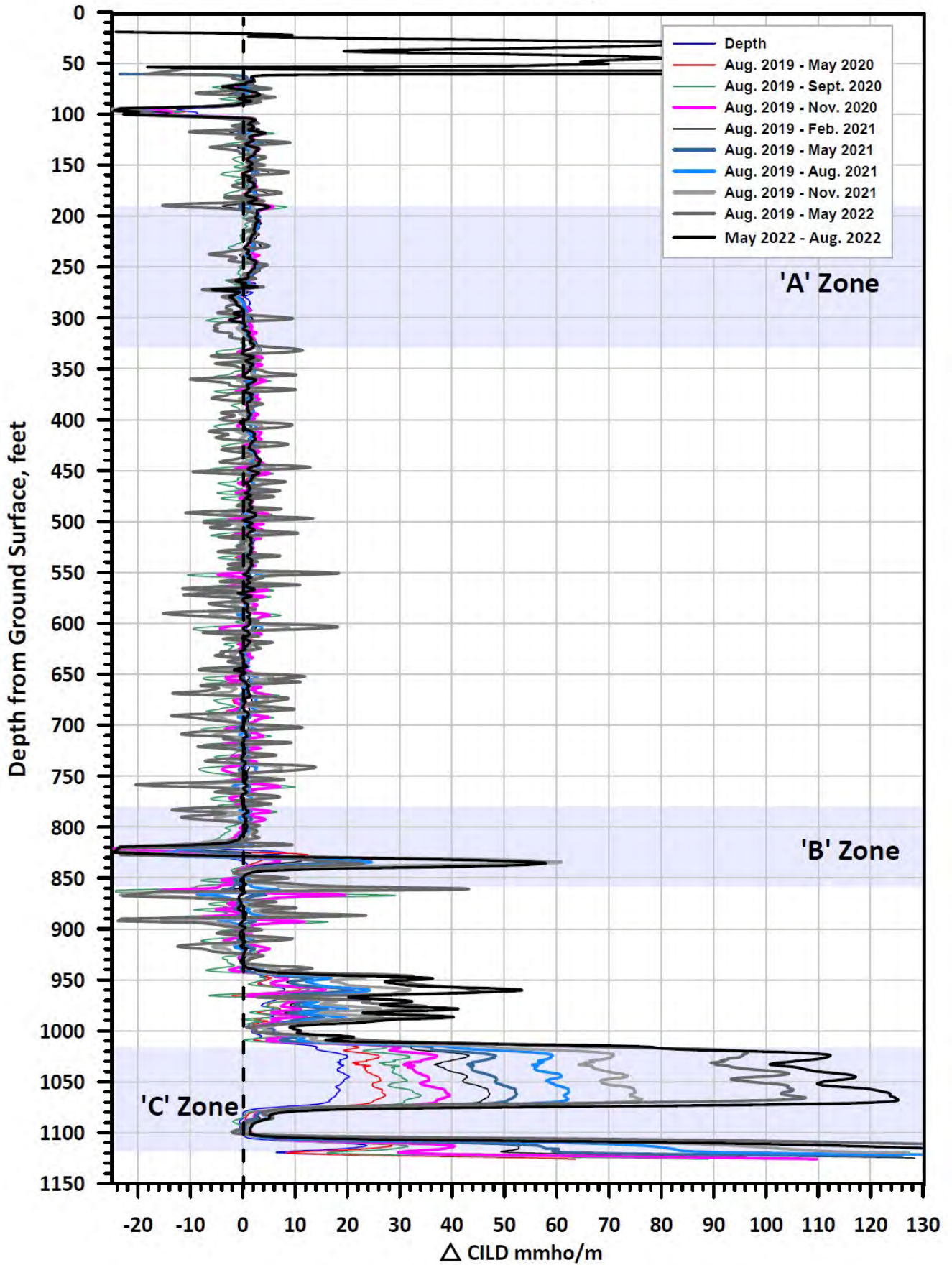
# Examples of Logging from Other Sentinel Wells Along the Coast

## Induction Logs





# Induction Logs



**SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE**

**\* \* \* AGENDA TRANSMITTAL FORM \* \* \***

<b>MEETING DATE:</b>	November 16, 2022
<b>AGENDA ITEM:</b>	2.D
<b>AGENDA TITLE:</b>	Sustainable Groundwater Management Act (SGMA) Update
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager

**At the State level:**

DWR issued updated flight-line mapping showing where the upcoming AEM flights will be. Per our request, they adjusted the flight-lines within the Seaside Basin to provide more useful information for Montgomery & Associates to use in the groundwater model and potentially in other work they do for us. A copy of the revised DWR flight-lines is attached. Also attached is a blow-up of the Seaside Basin area, prepared by Georgina King, showing the revised flight lines compared to the previous version. The yellow lines are the original ones and the blue lines are the revised ones. She notes that they have moved the offshore lines closer to the coastline as we requested, and that there is another line added that goes over Sentinel Well 1 and FO-10. That may have been requested by EKI on behalf of MCWD for the Monterey Subbasin.

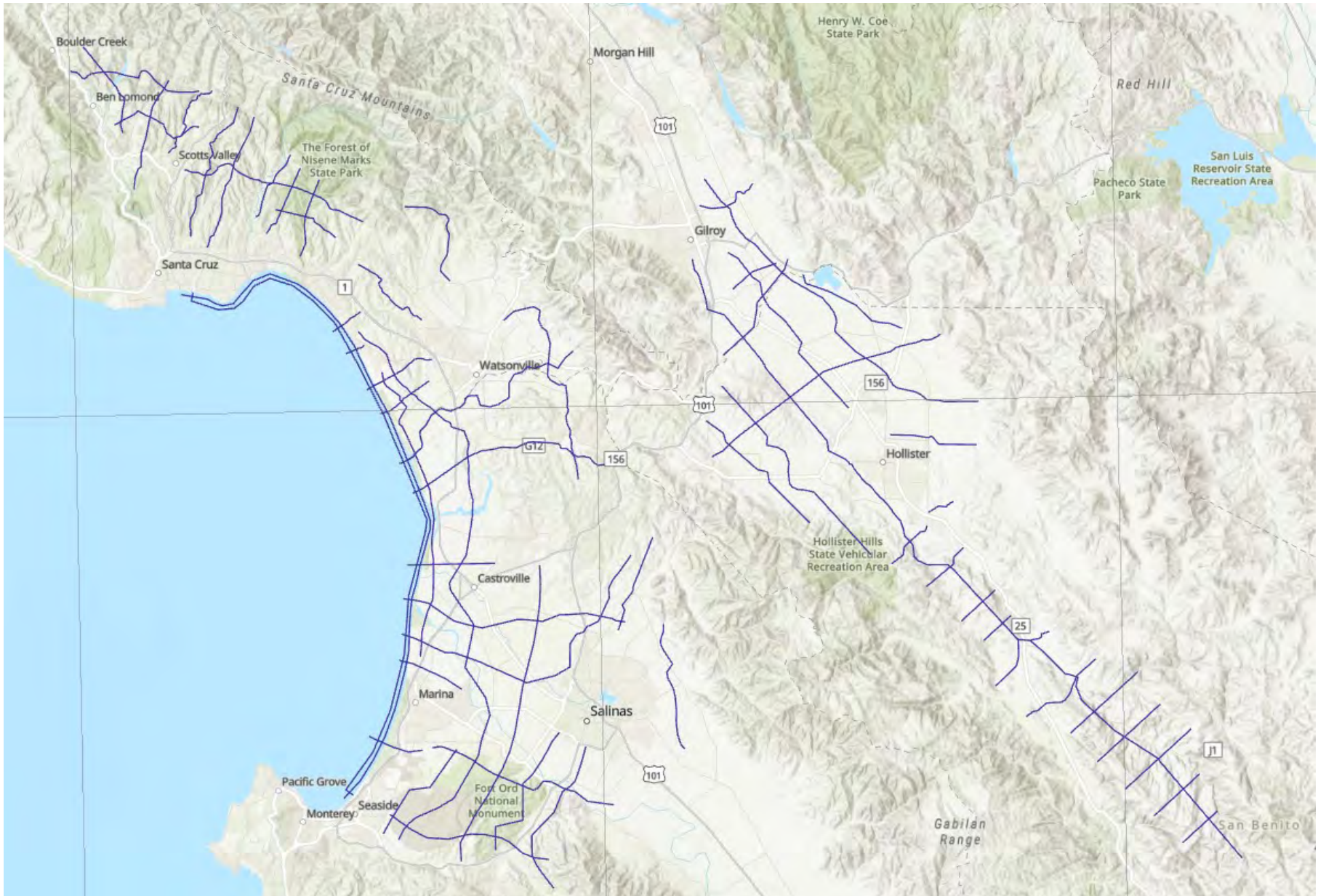
The schedule calls for the AEM flights over the Seaside Basin to occur during the time period November 6th-17th.

**At the Monterey County level:**

Attached are summaries of meetings held in August, September, and October, 2022.

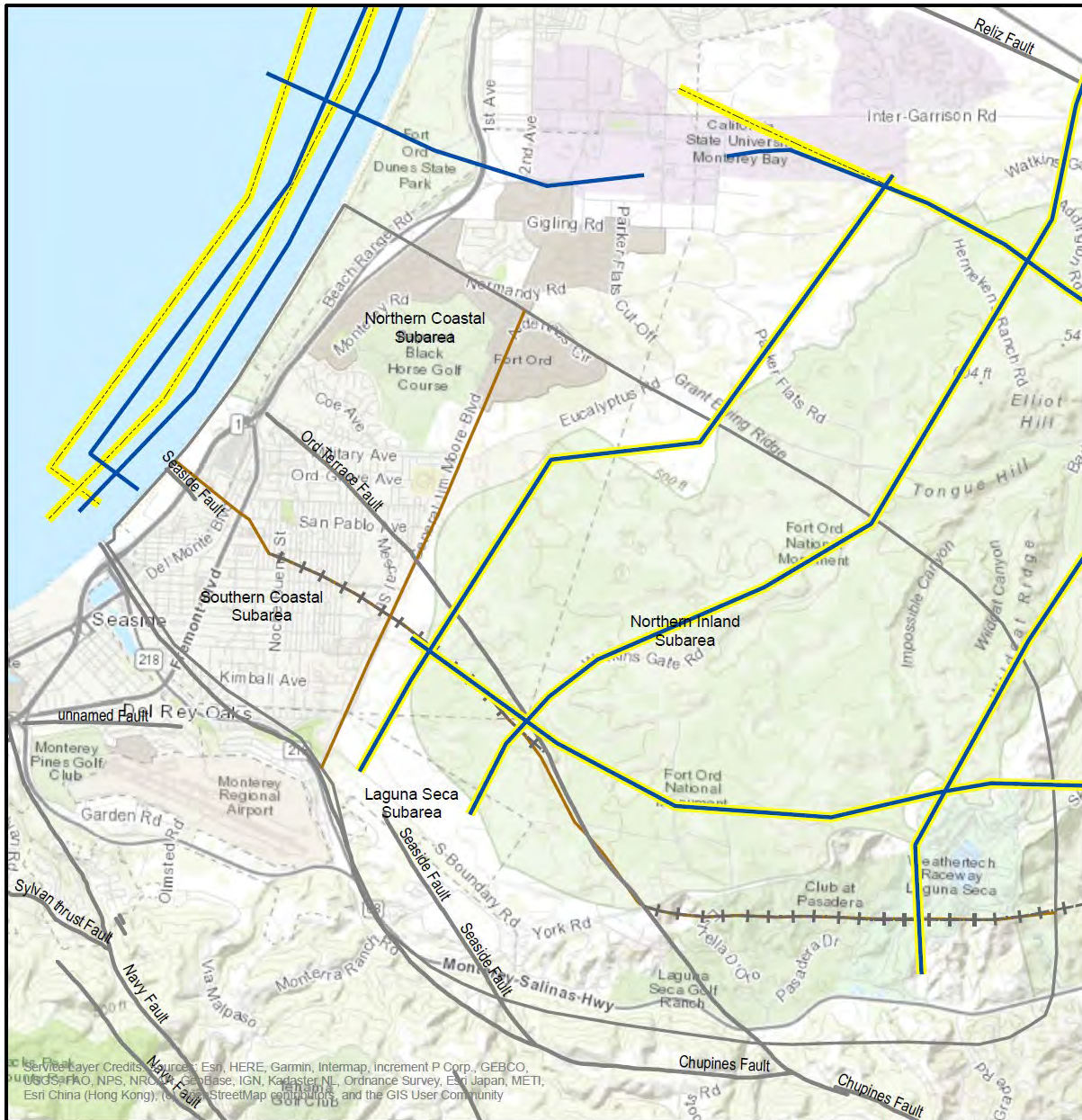
<b>ATTACHMENTS:</b>	Flight-line Maps and Meeting Summaries
<b>RECOMMENDED ACTION:</b>	None required – information only

## Updated DWR Flight-line Map





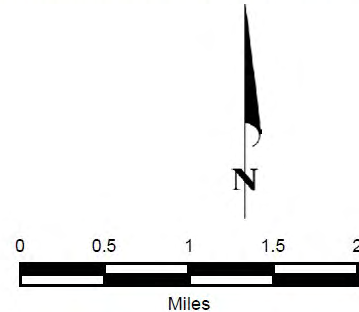
## Blow-up of Seaside Basin Flight-lines



X:\2022 Projects\DWR AEMAEM\_FlightLines\_draft20220928.mxd

### EXPLANATION

- Adjudicated Seaside Groundwater Basin Boundary
- Basin Boundary
- Subarea Boundary
- +—+ Laguna Seca Anticline
- Faults
- Flightlines\_MontereyBay\_DWRdraft20221011
- - - Flightlines\_MontereyBay\_DWRdraft20220928



**SUMMARY OF**  
**PURE WATER MONTEREY, AND**  
**SALINAS VALLEY AND**  
**MARINA COAST WATER DISTRICT GROUNDWATER SUSTAINABILITY**  
**AGENCY ZOOM MEETINGS**  
**IN AUGUST 2022**

Note: This is a synopsis of information from these meetings that may be of interest to the Seaside Basin Watermaster

**SVBGSA Advisory Committee Meeting August 18, 2022:**

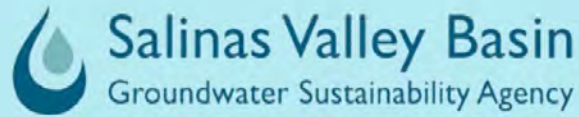
This meeting was largely to acquaint new members of this Committee with the Integrated Implementation Plan that is being developed by the SVBGSA. The integrated plan takes the information from each of the separate subbasin GSPs and consolidates it into a single document so that inter-subbasin issues can be identified and addressed in the individual GSPs. It also enables persons or parties of interest to review the important findings and recommendations of the individual GSPs without having to read each of the voluminous GSPs. The information discussed at this meeting was largely information that had been previously presented in earlier Advisory Committee meetings. Nothing of direct impact on the Seaside Basin was discussed.

Several of the Committee members expressed concerns about certain of the content and understandability of the integrated plan, and were reluctant to “receive” the plan which they felt might indicate that they were “approving” the plan. The consultants preparing the integrated plan were asked to address these concerns as the plan is updated. A motion was made for the Advisory Committee to support the plan, and the motion failed on a split vote. A substitute motion was made and passed on a split vote to report to the Board that the Advisory Committee does not support the plan. Because of the significance of the motion and the lack of direct impact one way or the other on the Watermaster, I abstained on that vote. Donna Meyers, the Executive Officer of the SVBGSA, said she would take the plan to the Board for its information and report the Committee’s lack of support for it.

Attached is a copy of the table of contents of this plan, and a few of the pages from it that are of interest to the Watermaster.



# Salinas Valley Groundwater Integrated Implementation Plan



August 2022



Prepared by:



**MONTGOMERY  
& ASSOCIATES**

Water Resource Consultants

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### **3.5.10 Flow Between the Monterey and Seaside Subbasins**

The inter-subbasin flow estimates for the boundary between the Monterey Subbasin and the Seaside Subbasin is derived from the MBGWFM. Groundwater flows both directions across this boundary. The MBGWFM historical water budget shows an average net groundwater flow of 900 AF/yr. flowing from the Seaside Subbasin into the Monterey Subbasin. Of the 900, AF/yr., 1,300 AF/yr. flows from the Seaside Subbasin into the Marina/Ord Area, and 400 AF/yr. flows from the Corral de Tierra Area into the Seaside Subbasin. These values differ from the estimates produced by the Seaside Watermaster modeling due to differing time periods and modeling assumptions.

The boundary between the Seaside Subbasin and the Monterey Subbasin is jurisdictional, and groundwater flows across this boundary unimpeded. The boundary is based on a assumed groundwater flow divide in the shallower aquifers, and therefore generally represents a divergent flow at the boundary. Since this boundary was drawn, additional data has been collected, pumping patterns have shifted, and models suggest there is flow between subbasins.

### **3.5.11 Inter-Subbasin Flow Summary**

Figure 3-14 shows a map summarizing the historical average annual inter-subbasin flow rates in AF/yr.

### 4.3.7 Summary of SMC and Current Status

SVBGSA is partially or entirely responsible for compliance with SGMA in the 6 subbasins of the Salinas Valley. While SVBGSA and its partner GSAs completed GSPs for each subbasin, it recognizes the interdependence among the subbasins and developed this Salinas Valley IIP to describe the Salinas Valley as a whole, highlight how the GSPs align, and provide a basis for the SVBGSA to implement the subbasin GSPs in coordination with partner GSAs in an integrated manner. SVBGSA is responsible for reaching sustainability in each subbasin independently; however, the Salinas Valley is hydraulically connected, and implementation of management actions and projects must acknowledge and account for that connection.

This IIP shows how the SMC in the Salinas Valley subbasin GSPs align for each sustainability indicator. It compares 2020 groundwater conditions in each subbasin to the subbasin's respective minimum thresholds it seeks to avoid, and the measurable objectives it is aiming for. Table 4-4 summarizes which subbasins would have an undesirable result for each sustainability indicator based on 2020 groundwater conditions.

- Groundwater elevations generally decreased slightly from the prior year, with most wells showing elevations above their minimum thresholds but still below their measurable objectives. The number of wells with groundwater levels below the minimum threshold would constitute an undesirable result in the 180/400-Foot Aquifer, Eastside, Langley, and Monterey Subbasins.
- Groundwater storage is determined directly or indirectly using groundwater levels as a proxy, as well as seawater intrusion if present in the subbasin. Therefore, 2020 conditions would constitute an undesirable result in the 180/400-Foot Aquifer, Eastside, Langley, and Monterey Subbasins.
- In 2020, seawater intrusion continued to advance inland of the minimum threshold the 180/400-Foot Aquifer Subbasin, and therefore it would constitute an undesirable result. There was insufficient data to determine 2020 conditions in the Monterey Subbasin.
- There were some additional wells where groundwater quality that degraded beyond regulatory standards in 2020. All subbasins had groundwater quality minimum threshold exceedances except the Forebay Subbasin; however, none of these were directly caused by GSA management action(s), and therefore no subbasins would have an undesirable result.
- No subsidence was detected, and therefore no subbasins would have an undesirable result.
- No subbasins had an undesirable result for depletion of ISW in 2020; however, there was a lack of data in the Langley Subbasin and Corral de Tierra Area. There are no locations of ISW in the Eastside Subbasin.

Table 4-4. 2020 Groundwater Conditions Compared to Undesirable Results

	Groundwater Levels	Seawater Intrusion	Groundwater Storage	Groundwater Quality	Land Subsidence	Depletion of ISW
<b>180/400</b>	X	X	X	✓	✓	✓
<b>Monterey</b>	X	Lack of data	X	✓	✓	✓ (Lack of data in Corral)
<b>Langley</b>	X	✓	X	✓	✓	Lack of data
<b>Eastside</b>	X	✓	X	✓	✓	No ISW
<b>Forebay</b>	No SWI SMC	No SWI SMC	✓	✓	✓	✓
<b>Upper Valley</b>	No SWI SMC	No SWI SMC	✓	✓	✓	✓



**SUMMARY OF**  
**PURE WATER MONTEREY, AND**  
**SALINAS VALLEY AND**  
**MARINA COAST WATER DISTRICT GROUNDWATER SUSTAINABILITY**  
**AGENCY ZOOM MEETINGS**  
**IN SEPTEMBER 2022**

Note: This is a synopsis of information from these meetings that may be of interest to the Seaside Basin Watermaster

**Pure Water Monterey Water Quality and Operations Committee Meeting September 28, 2022:**

The following topics were presented and discussed at this meeting:

- No water quality exceedances were reported during the most recent reporting period, and all regulatory requirements were met. However, some of the manganese levels have been higher in recent months due to the use of a high flowrate when purging (flushing) some of the monitoring wells. The flushing procedure has been revised to use lower flushing flowrates to avoid this problem in the future.
- During Water Year 2022 as of August 31, 2022 3,318 acre-feet of water has been injected.
- Deep Injection Wells No. 3 and 4 are injecting. One at 1,400 gallons per minute and the other at 400 gallons per minute. Tracer studies are to be conducted on these wells per the request of the Division of Drinking Water. Initially the tracer study will be intrinsic, but this will be followed by an extrinsic tracer study. Results from these studies are expected to be available in the first quarter of 2023.
- A new Monitoring and Reporting Program was received in September from the RWQCB. It relaxes from monthly to quarterly many of the monitoring parameters. Due to this, the Water Quality and Operations Committee will be meeting quarterly from this point on.
- Well ASR-4 has sometimes experienced high mercury levels. In order to get this well permitted for Cal Am to use it, treatment for removal of mercury will be needed. A skid-mounted mercury removal treatment process will be added soon. The Cal Am representative said that approval for the mercury treatment process has not yet been received. It uses a proprietary media for absorbing and removing mercury.
- I asked if there was any update on the ASR-1 well issues. Mr. Lear said that meetings with Cal Am and other parties involved in this have been held to seek a resolution, but he was not aware of their progress or status. The Cal Am representative reiterated that ASR-1 is not currently available for production by Cal Am. They are hoping to get well ASR-4 permitted to use in lieu of ASR-1.

**SUMMARY OF**  
**PURE WATER MONTEREY, AND**  
**SALINAS VALLEY AND**  
**MARINA COAST WATER DISTRICT GROUNDWATER SUSTAINABILITY**  
**AGENCY ZOOM MEETINGS**  
**IN OCTOBER 2022**

Note: This is a synopsis of information from these meetings that may be of interest to the Seaside Basin Watermaster

**Groundwater Workshop: Overview of Demand Management, October 31, 2022:**

Derrick Williams of M&A presented a PowerPoint discussion of the topic of Demand Management, which is one of the Management Actions many of the Groundwater Sustainability Plans (GSPs) include. Much of what he presented covered things that have been discussed over the years by the Watermaster TAC and Board, as well as some things that are not applicable to the Seaside Basin. A few points he made that are of interest to the Watermaster included:

- Demand Management does not necessarily include or imply restricting water pumping by producers. It can include such things as fallowing portions of agricultural land to reduce irrigation amounts, conservation, determining how to share available water resources (groundwater, surface water, imported water, recycled water, etc.), allocating available resources to the pumpers, etc.
- The initial phase of implementing Management Actions is to develop a framework for them including reaching agreement among the involved parties (producers, growers, governmental entities, non-governmental entities, etc.) on such things as definitions of terms, how such actions would be funded, timelines for implementation, agreements on “water allocations” (these are not the same as “water rights”), actions to remedy breaches of agreements, and other general planning-type issues.
- Going through the process described above can be a lengthy process - sometimes many months or even a year or more. He cited some Central Valley GSAs that have already started this process and how long it has been taking them to advance to the actual start of implementation.
- “Water rights” cannot be prescribed in a GSP, they can only be prescribed in an Adjudication, such as is the case in the Seaside Basin. I found this to be surprising and a bit disappointing.
- “Water Allocations” that are agreed to in the implementation of GSPs are just that – agreements by producers to only pump within their allocated amounts. Under the Sustainable Groundwater Management Act (SGMA), if they exceed their allocations there apparently is no legal recourse by the GSA to enforce or penalize them for doing that.

I was left with the impression that it could be a long time before actions that may be taken in the subbasins adjacent to the Seaside Basin will have any potentially beneficial impact on the Seaside Basin.

**SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE**

**\*\*\* AGENDA TRANSMITTAL FORM \*\*\***

<b>MEETING DATE:</b>	November 16, 2022
<b>AGENDA ITEM:</b>	2.E
<b>AGENDA TITLE:</b>	Update on Security National Guarantee (SNG) Well
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager

**SUMMARY:**

Many months ago water quality sampling indicated that chloride levels were rising in the SNG well. The well owner (Mr. Ghandour) was contacted and he was asked to look into whether the well casing was leaking and allowing salty water from a shallow aquifer to flow downward into the Paso Robles aquifer and cause the higher chloride level. He responded that he would look into this, but that the property was in the midst of litigation and he was prevented by the Court from doing any work on the well until the litigation was concluded. In late fall of 2021 he reported that he was awaiting the Court Ruling on the Project, which he expected he would get in late January 2022. He went on to say that the physical trial had ended, but now briefs were being prepared for filing, and that as soon as he gets the Court Order and finalizes the title, he can jump on fixing the well.

On October 7, 2022 I again spoke with Mr. Ghandour and asked for an update. He reported to me that the final Court Decision came out in August 2022 (the one he expected would come out in January of 2022) from the late 2021 trial which was on "Phase 1" issues (I don't know what all the Phase 1 issues were but apparently some of the issues pertained to who has title to the property). He said that SNG found the Decision to be unacceptable and filed an appeal with the State Appellate Court on September 26, 2022. Since an appeal had been filed, the planned trial on "Phase 2" issues (which includes damages and other things) was taken off the calendar by the Court.

Mr. Ghandour said he sent an email to the other parties to the litigation in early October notifying them that in spite of the Court process now being delayed by what will probably be a lengthy time (for the appeal process) the SNG well needs to be repaired. He asked them to agree to having that work done. Thus far he had not received their reply. So in summary the well problem cannot be remedied unless/until the other litigants agree for that to proceed prior to the Court appeal trial occurring, or the completion of the litigation process, whichever comes first.

<b>ATTACHMENTS:</b>	None
<b>RECOMMENDED ACTION:</b>	None required – information only

**SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE**

**\*\*\* AGENDA TRANSMITTAL FORM \*\*\***

<b>MEETING DATE:</b>	November 16, 2022
<b>AGENDA ITEM:</b>	3
<b>AGENDA TITLE:</b>	Discuss and Provide Input on the 2022 Seawater Intrusion Analysis Report (SIAR)
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager
<b>SUMMARY:</b>	
<p>Montgomery &amp; Associates has completed preparing the Seawater Intrusion Analysis Report (SIAR) for Water Year 2021 and the Executive Summary, which contains conclusions and recommendations, is attached. The complete SIAR is lengthy, so rather than including it in this agenda packet it will be posted on the Watermaster’s website so TAC members wishing to review the entire document could do so.</p> <p>The SIAR examines the “health” of the Basin with regard to whether or not there are any indications that seawater intrusion is either occurring or is imminent. Previous SIARs have stated that depressed groundwater levels, continued pumping in excess of recharge and freshwater inflows, and ongoing seawater intrusion in the nearby Salinas Valley all suggest that seawater intrusion could occur in the Seaside Groundwater Basin. In spite of these factors, the previous SIARs stated that neither the Piper nor the Stiff Diagrams nor any of the other parameters indicated the presence of seawater intrusion in the existing monitoring wells. The 2022 SIAR reports that the evaluation of the data from the sampling and monitoring program continues to indicate that seawater intrusion is <u>not</u> occurring.</p> <p>The 2020 SIAR reported on increases in chloride concentrations at monitoring wells FO-9 Shallow and FO-10 Shallow. The cause of the increase in well FO-9 Shallow was determined to be due to a casing leakage allowing water from the overlying Dunes Sands deposit to leak downward to the location where the Paso Robles aquifer (the Shallow) water quality samples were being collected. That well has since been destroyed by MPWMD and is currently not in service. The reason for the increase in well FO-10 Shallow is not known at this time, but will likely be investigated by the MCWDGSA as it implements the GSP for the Marina-Ord subarea of the Monterey Subbasin.</p> <p>A representative from Montgomery &amp; Associates will participate in today’s TAC meeting to provide an oral summary of the report and to respond to questions by TAC members.</p>	
<b>ATTACHMENTS:</b>	Executive Summary from the 2022 SIAR
<b>RECOMMENDED ACTION:</b>	Discuss and either modify or approve the SIAR and forward the document to the Board with the TAC’s recommendation for approval



November 8, 2022

## **Seaside Groundwater Basin 2022 Seawater Intrusion Analysis Report**

*Prepared for:*

Seaside Groundwater Basin Watermaster  
Monterey County, California

*Prepared by:*

Montgomery & Associates  
1970 Broadway, Suite 225  
Oakland, CA 94602

## EXECUTIVE SUMMARY

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This report fulfills part of the annual reporting requirements contained in the Seaside Groundwater Basin Adjudication (California American Water v. City of Seaside, Monterey County Superior Court, Case Number M66343). The annual report addresses the potential for, and extent of, seawater intrusion in the Seaside Groundwater Basin (Basin).

Seawater intrusion may occur under basic hydrogeologic conditions as a wedge beneath fresh groundwater, or in more complex hydrogeology with various intrusion interfaces among the different aquifers. Continued pumping in excess of recharge and freshwater inflows, coastal groundwater levels well below sea level, and ongoing seawater intrusion in the nearby Salinas Valley all suggest that seawater intrusion could occur in the Basin.

Seawater intrusion is typically identified through regular chemical analyses of groundwater which can identify geochemical changes in response to seawater intrusion. No single analysis definitively identifies seawater intrusion, however by examining various analyses it is possible to ascertain when fresh groundwater mixes with seawater. At low chloride concentrations, it is often difficult to identify incipient seawater intrusion. This is due to the natural variation in fresh water chemistry at chloride concentrations below 1,000 milligrams per liter (mg/L). Mixing trends between groundwater and seawater are more easily defined when chloride concentrations exceed 1,000 mg/L. Common geochemical indicators of seawater intrusion are cation and anion ratios, chloride trends, sodium/chloride ratios, and electric induction logging.

As noted in the previous 3 Seawater Intrusion Analysis Reports (SIARs) (M&A, 2019; M&A, 2020; M&A, 2021), monitoring well FO-10 Shallow, located outside and just north of the Basin, has experienced sustained chloride increases and currently has a sodium/chloride molar ratio below 0.86, which may suggest a seawater chloride source. Induction logging of this well took place in March 2021 and confirmed chloride concentrations in groundwater but was inconclusive as to whether this results from seawater intrusion (Feeney, 2021). Following this development, analysis of historical records conducted in February 2022 discovered that a 1,300 foot long 2-inch diameter steel tremie pipe had been stuck in the FO-10 borehole since its construction in 1997 (Feeney, 2022). The presence of this steel pipe, which conducts electricity through the borehole and may be allowing water to travel between upper and lower zones, explains the inconclusive results from the March 2021 induction logging. It is suggested that FO-10 Shallow and FO-10 Deep be destroyed and replaced to maintain robust water quality monitoring in the area. Sentinel Well induction logs, now performed annually, remain stable over the historical record. No data collected in Water Year (WY) 2022 indicate that seawater intrusion is occurring within the Basin.



Based on the findings of this report, ongoing detrimental groundwater conditions that pose a direct threat of seawater intrusion are:

- Both the Paso Robles and Santa Margarita aquifers in the Seaside Groundwater Basin are susceptible to seawater intrusion. The Paso Robles aquifer is in direct hydrogeologic connection with Monterey Bay, and seawater will eventually flow into it if inland groundwater levels continue to be below sea level. The Santa Margarita aquifer may not be in direct connection with Monterey Bay. If that is the case, then seawater intrusion will take longer to appear because the pathway for seawater into that aquifer will be longer as seawater would need to move through the clay rich deposits overlying that aquifer before entering the aquifer itself and thereafter make its way into the Santa Margarita aquifer. It is not if, but when, seawater intrusion into these aquifers will occur if protective water elevations are not achieved.
- Santa Margarita aquifer groundwater levels in the Northern Coastal subarea continue to be below sea level. WY2022 second quarter (winter/spring) coastal groundwater levels in that aquifer are more than 40 feet below sea level, and the fourth quarter (summer/fall) levels are more than 60 feet below sea level. Pumping depressions expanded both vertically and spatially from the previous year in both the Paso Robles and Santa Margarita aquifer systems.
- Groundwater levels remain below protective elevations in all Santa Margarita protective elevation monitoring wells (MSC deep, PCA-W Deep, and sentinel well SBWM-3), and 2 of 3 Paso Robles protective elevation monitoring wells (MSC Shallow and PCA-W Shallow). All 3 Santa Margarita monitoring wells' groundwater elevations are at the lowest in their historical records. Monitoring Elevations at PCA-W shallow were above protective elevations in early WY2020 but have since dropped below. Besides CDM-MW4, all wells for which protective elevations have been established declined in elevation from the previous year.

Data that indicate that seawater intrusion is not occurring are described in the bulleted items below:

- Most groundwater samples for WY2022 from depth-discreet monitoring wells generally plot in a single cluster on Piper diagrams, with no water chemistry changes towards seawater. Increased chloride in recent measurements at FO-10 Shallow, north of the Basin, has shifted how this wells plots on Piper diagrams over the past 3 years. Currently, it appears to be shifting towards a chlorinated water type. As described above, induction logging of this well was inconclusive as to whether seawater intrusion is causing this change in water quality due to the presence of an abandoned steel pipe in the borehole



since the well's construction. This steel pipe may also be serving as a conduit to allow groundwater flow between aquifer zones. Groundwater quality in FO-10 Shallow should continue to be monitored closely to identify if further increases occur, and it is suggested that both FO-10 Shallow and FO-10 Deep be destroyed and replaced to maintain a water quality record in the area.

- In some production wells, groundwater quality plots differently on Piper diagrams compared to monitoring wells. This may be a result of mixed water quality from both the Paso Robles and Santa Margarita aquifers in which these wells are perforated. None of the production wells' groundwater qualities are indicative of seawater intrusion.
- None of the Stiff diagrams for monitoring and production wells show the characteristic chloride spike that typically indicates seawater intrusion in Stiff diagrams. The Stiff diagram for monitoring well FO-10 Shallow shows a slightly different shape than other Paso Robles aquifer wells because of increased chloride.
- Chloride concentration trends are stable for most monitoring wells, except FO-10 Shallow which experienced a 48 mg/L increase in chloride concentrations in WY2020 and has risen by another 8 mg/L since then. However, the sustained elevated concentrations in themselves do not indicate seawater intrusion. As noted above, recent induction logging of the well was unable to provide data with regard to whether seawater intrusion is the source of the elevated chloride level, and the well's integrity for water quality sampling may be compromised by a steel tremie pipe stuck in the borehole since 1997.
- Sodium/chloride molar ratios in most monitoring wells remained constant or increased over the past year. The sodium chloride ratio in 2 of the 3 samples taken at FO-10 Shallow in WY2022 were lower than what has been seen historically at the location. The ratio from 5 of the 7 samples tested since September 2020 are below 0.86. A sodium/chloride ratio less than 0.86 signifies a potential seawater chloride source. It is likely the groundwater quality changes in FO-10 Shallow are permanent and the well should continue to be monitored consistently to track if chloride concentrations increase further. If the well is destroyed and replaced due to the stuck steel pipe mentioned above, water quality from the replacement well should similarly be closely monitored to evaluate changes in chloride over time.
- Maps of chloride concentrations for the Paso Robles aquifer do not show chlorides increasing towards the coast. Santa Margarita aquifer chloride concentration maps show that the highest chloride concentrations are limited to coastal monitoring wells PCA-West Deep and MSC Deep, but these are not indicative of seawater intrusion since their concentrations are less than 155 mg/L and they do not have increasing trends. Two wells, Pasadera Golf- Paddock and Ord Terrace Shallow, sustained a >20 mg/L chloride



increase from WY2021, but as evidenced by their distance from the coast this is not a result of seawater intrusion.

- Induction logging data at the coastal Sentinel Wells do not show historical or recent changes over time that are indicative of seawater intrusion.

Other important findings from the analysis contained in this report are:

- Due to its distance from the coast, seawater intrusion is not an issue of concern in the Laguna Seca subarea. However, groundwater levels in the eastern Laguna Seca subarea have historically declined at rates of 0.6 feet per year in the Paso Robles aquifer, and up to 4 feet per year in the Santa Margarita aquifer. These declines have occurred since 2001, despite triennial reductions in allowable pumping. The cause of the declines is due in part to the Natural Safe Yield of the subarea being too high and in part due to the influence of wells east of the Seaside Basin. In WY2022, groundwater elevations in the area appeared to experience some stabilization and recovery, potentially correlated with a cessation of pumping from CAWC's Laguna Seca Subarea wells. This recovery has continued in WY2022.
- Native groundwater production in the Seaside Groundwater Basin for WY2022 was 2,870 acre-feet, which is 43 acre-feet more than WY2021 but 129 acre-feet less than the Decision-ordered Operating Yield for WY2022 of 3,000 acre-feet. Despite WY2022 being a very dry year, recovery of 3,683 acre-feet of recycled water from PWM helped offset pumping. Native groundwater production was below the Decision-estimated Natural Safe Yield of 3,000 acre-feet for the third year in the historical record, largely due to increased injection of highly treated recycled water.

The following recommendations should be implemented to monitor and track seawater intrusion.

1. Following identification of a compromised well casing, monitoring well FO-9 Shallow was destroyed to prevent leakage of higher chloride water into the underlying aquifer. In accordance with current plans, a similarly constructed monitoring well will replace the destroyed well to ensure continuity of groundwater level measurements from this location. It is anticipated that a new well will be constructed in 2023.
2. The discovery of a 1,300-foot steel tremie pipe in the FO-10 borehole complicates evaluation of water quality at the location and may act as a conduit allowing groundwater to flow between overlying sediments and the underlying aquifers. These wells are outside of the Basin, yet still provide critical information regarding the extent of seawater intrusion north of the Basin in the Monterey Subbasin. Therefore, it is recommended that MPWMD develop plans to destroy both FO-10 Shallow and FO-10 Deep, and that MCWD install similarly constructed monitoring wells to maintain a continuous water quality record at the location. Because seawater intrusion cannot be

excluded as the source of increasing chloride concentrations at FO-10 Shallow over the past several years, groundwater quality sampling at this well should continue at the increased quarterly frequency until the well is destroyed. When the well is replaced, the replacement well should likewise be sampled at a quarterly frequency. As detailed in the Monterey Subbasin GSP (MCWDGSA and SVBGSA, 2022) Section 9.4.7, additional monitoring wells may be installed in both the Lower 180-Foot and 400-Foot Aquifer and the Deep aquifers of the Monterey Subbasin. The proposed location for these wells is in an identified data gap area northeast of FO-10 Shallow (see Monterey Subbasin GSP Figures 7-7 and 7-8). When these wells are installed, they may provide additional insight into potential seawater intrusion in the area.

3. Seawater intrusion is a threat to the Basin, and data must be collected and analyzed regularly to identify incipient intrusion. Maps, graphs, and analyses like those found in this report should continue to be developed every year.
4. It is important to remain vigilant and to closely monitor groundwater quality even though seawater intrusion has not yet been observed in monitoring or production wells in the Basin. As outlined in the most recent Basin Management Action Plan (M&A, 2018a), it is important that the Watermaster continues to promote projects to obtain replenishment water for the Basin that is not extracted out as water supply.
5. Based on the WY2020's SIAR recommendation, groundwater elevation data from the Carmel River water Aquifer Storage and Recovery project (ASR) and PWM monitoring wells are now incorporated into the analysis of groundwater elevations. Although the Watermaster asked for this data to be provided, data from the PWM monitoring wells was not provided for this year's analysis. As these and any future projects are implemented, groundwater levels, groundwater flow directions, and potentially groundwater quality will change. It is important that data from monitoring wells associated with these projects be evaluated in future SIARs.