

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

**DATE: Wednesday, February 10, 2021**

**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/82557525167?pwd=ODBMY1FOOEJ4NWFJOU0yTVloOHIRdz09>**

**If joining the meeting by phone, dial either of these numbers:**

**+1 408 638 0968 US (San Jose)**

**+1 669 900 6833 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: 825 5752 5167**

**Passcode: 813162**

**OFFICERS**

**Chairperson: Jon Lear, MPWMD**

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

**MEMBERS**

**California American Water Company  
Monterey**

**City of Del Rey Oaks**

**City of**

**City of Sand City**

**City of Seaside**

**Coastal Subarea Landowners**

**Laguna Seca Property Owners  
Agency**

**Monterey County Water Resources**

**Monterey Peninsula Water Management District**

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The next regular meeting is tentatively planned for Wednesday March 10, 2021 at 1:30 p.m. That meeting will likely also be held via teleconference.	

***SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE  
\* \* \* AGENDA TRANSMITTAL FORM \* \* \****

<b>MEETING DATE:</b>	February 10, 2021
<b>AGENDA ITEM:</b>	2.A
<b>AGENDA TITLE:</b>	Approve Minutes from the November 18, 2020 Meeting
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager

**SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE  
\* \* \* AGENDA TRANSMITTAL FORM \* \* \***

**SUMMARY:**

Draft Minutes from this meeting was emailed to all TAC members. Any changes requested by TAC members have been included in the attached version.

**ATTACHMENTS:**

Minutes from this meeting

**RECOMMENDED  
ACTION:**

Approve the minutes

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

**Seaside Groundwater Basin Watermaster  
Technical Advisory Committee Meeting  
November 18, 2020  
(Meeting Held Using Zoom Conferencing)**

**Attendees: TAC Members**

City of Seaside – Scott Ottmar  
California American Water – Tim O’Halloran  
City of Monterey – Max Reiser  
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

**Consultants**

Montgomery & Associates – Georgina King

**Others**

None

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The meeting was convened at 1:30 p.m.

**1. Public Comments**

There were no public comments.

**2. Administrative Matters:**

**A.Approve Minutes from the August 12, 2020 Meeting**

On a motion by Ms. Voss, seconded by Mr. O’Halloran, and with Mr. Gaglioti abstaining because he had not attended the meeting, the minutes were unanimously approved as presented.

**B.Results from Martin Feeney’s October 2020 Induction Logging of the Sentinel Wells**

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

Mr. Gaglioti commented that while we are not seeing seawater intrusion indications in the Sentinel Wells, we know it’s a matter of “when”, not “if” seawater intrusion will eventually occur. Further discussion under this topic is covered below under Agenda item 3.

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

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

Mr. Lear added that conditioning of the first deep injection well had been completed and it had been restored to its original injection capacity. Conditioning of deep injection well No. 2 will be performed in the near future. New deep injection wells No. 3 and No. 4 will be constructed and should become operational in 2022. Those wells are covered by the Storage and Recovery Agreement with the Watermaster.

Mr. Gaglioti added that a total of over 300 acre-feet above the Operational Reserve quantity has now been stored in the Basin.

**D. Discuss Monitoring to be Performed at Security National Guarantee (SNG) Well**  
**Mr. Jaques summarized the agenda packet materials for this item.**

Mr. Lear added that on the former sand mining site where this well is located, the landowner is planning to build an ecoresort. The owner has a wheeling agreement with Cal Am for Cal Am to use his allocation and have the water to the resort supplied by Cal Am.

Ms. Voss said she agreed that data from this site would be valuable, and that water quality as well as water level data should be provided for that purpose, as well as to comply with the requirements of the Monitoring and Management Program.

Ms. King said that the SNG well is screened in a different part of the aquifer, and therefore water quality data from this well would provide additional information.

Mr. Gaglioti asked if the land owner was pushing back against having to do water quality sampling. Mr. Jaques responded no; he was just asking to see if he could be relieved of that obligation. Mr. Gaglioti went on to say that he concurred with the need and requirement for the well to be monitored for both water level and water quality.

A motion was made by Mr. Gaglioti, seconded by Ms. Voss, to require the SNG well to provide both water level and water quality data. With Mr. Gomez abstaining because he represents Sand City and was involved in project development approval for this project, the motion passed unanimously.

**3. Discuss and Provide Input on the Draft 2020 Seawater Intrusion Analysis Report (SIAR)**

Mr. Jaques introduced this item and then Ms. King provided a PowerPoint presentation on the SIAR. Copies of the presentation slides are attached.

Comments included in Ms. King's presentation are summarized below:

- She highlighted that two monitoring wells (FO-9 and FO-10 shallow) again showed rising chloride levels, as was also seen last year. The FO-9 shallow chloride level and sodium/chloride ratio plot suggests that the source of the chloride increases may be seawater. The same is true for FO-10 shallow. FO-10 shallow has been resampled and results are expected to be received in December. The field electrical conductivity reading taken during the resampling is similar to what it was when the prior sample was taken, so the chloride result will probably be confirmed as correct. FO-10 shallow Piper diagram shows trending toward seawater, but the Stiff diagram does not show this.

- In recent years there has been some decline in groundwater levels at the PCA-E well in the Paso Robles aquifer, but in the Santa Margarita aquifer at this well no increasing or decreasing trend is apparent.
- The Sentinel wells have groundwater levels that are fairly stable.
- The Southern Coastal Subarea Paso Robles groundwater level is also fairly stable, based on measurements made at the K-Mart well. Mr. Lear recommended putting in a data logger at that well, and this was supported by Ms. King and Ms. Voss. Ms. Voss added that the data logger could be placed in a lockable vault to prevent vandalism at that site. There was TAC consensus to put in a data logger there.

Further on the subject of data loggers, it was suggested that a recommendation from Montgomery and Associates be requested to identify the most beneficial wells where data loggers could be installed. This will be added to the agenda of an upcoming TAC meeting, and cost information from Mr. Lear to purchase and install additional data loggers will also be solicited.

- The Laguna Seca Subarea continues to show declining groundwater levels, as it has for some years.
- The Northern Coastal Subarea groundwater pumping depression is actually slightly smaller this year in both the shallow and deep aquifers than it was in 2019. However, groundwater levels in the Northern Coastal Subarea declined by from 2 feet to 7 feet in the shallow aquifer, and by 1 foot to 7 feet in the deep aquifer.
- In the Laguna Seca Subarea the pumping depression was slightly larger than it was in 2019. That pumping depression is the result of pumping for the golf courses.
- All Northern Coastal Subarea groundwater levels were below Protective Water Levels. Only the Southern Coastal Subarea shallow well had a groundwater level above Protective Water Level.
- The SIAR recommends increasing sampling of the FO-9 and FO-10 shallow wells to a quarterly basis. Mr. Lear reported that he will need to buy another pump for the FO-10 well, but can use the line-item already in the 2020 contract with the Watermaster to cover this cost. Mr. Lear will look into whether additional costs will be incurred to perform the additional sampling and will advise Mr. Jaques if any amendment to the contract will be necessary.

Ms. Voss recommended trying to get data in the area to the north of the Seaside groundwater basin boundary to better understand what is happening there. She noted that little data currently is available for that area. Also, if data from the SNG well raises any questions, sampling of that well could also be increased in frequency.

Mr. Jaques reported that the stakeholder meetings with the Marina Coast Water District GSA for the development of the Groundwater Sustainability Plan for the Monterey Subbasin are now getting into more complex hydrogeologic issues. It appears that the Marina Coast Water District may have less interest in the central and southern portions of their part of the Monterey Subbasin, than they do in the northern part where their production wells are located. Because of the Watermaster's concern about the potential for seawater intrusion to come into the Seaside Basin from the southerly part of the Monterey Subbasin, Mr. Jaques said he would like to have Ms. King become more involved in reviewing

documents and potentially attending some of the stakeholder meetings to ensure that the Watermaster's concerns are being adequately addressed.

Mr. O'Halloran reported that the Laguna Seca Subarea Cal Am pipeline to provide service to that area from its Main System had been constructed, and the Main System will begin serving the Laguna Seca Subarea shortly. Cal Am will retain its existing wells there for the time being, but ultimately will probably abandon and decommission them.

Mr. Gaglioti recommended that the SIAR state in its conclusions that we are beginning to see the start of seawater intrusion in the FO-9 and FO-10 wells. He went on to urge quarterly sampling at the SNG well, and that the additional sampling be done at the Watermaster's expense, rather than expecting the landowner to cover the additional sampling. He also recommended that Ms. Voss see if the Resource Management Agency of the County had data available on wells to the north of the boundary between the Seaside Subbasin and the Monterey Subbasin. He also stated he concurred with Mr. Jaques' proposal to have Ms. King become more involved in matters associated with development of the Monterey Subbasin Groundwater Sustainability Plan by the Marina Coast Water District GSA.

Mr. Lear noted that he also attends the Marina Coast Water District stakeholder meetings and would be able to provide additional input on these matters at those meetings.

Ms. King noted that even though the FO-9 shallow well appears to be showing the start of seawater intrusion, Sentinel Well No. 3 induction logging is not showing this.

Mr. Cook said he concurred with highlighting the seawater intrusion findings of Wells FO-9 and FO-10. He also said that Cal Am has some flexibility in the use of the ASR wells as to when and how much each of them pumps. He asked if some recommendation could be provided as to how pumping from the ASR wells could be managed to best benefit the Basin. Ms. King recommended pumping as much as possible from the wells that are furthest from the coast as being the best way to manage this. Mr. Cook said that Cal Am would try to do this. Mr. Lear added that he concurred with using well ASR No. 1 (the easternmost one) as much as possible.

Mr. Ottmar and Mr. Gomez complimented Ms. King on preparing an excellent report.

A motion was made by Ms. Voss, seconded by Mr. Gaglioti, to approve the SIAR with the revision to the conclusions was that had been recommended by Mr. Gaglioti. The motion passed unanimously.

Note: At this point in the meeting at 3:00 Mr. Gaglioti had to depart.

#### **4. Discuss and Provide Input on the Preliminary Draft Watermaster 2020 Annual Report**

Mr. Jaques summarized the agenda packet materials for this item. There were no questions or comments by TAC members with regard to the Preliminary Draft Annual Report.

On a motion by Mr. O'Halloran, seconded by Mr. Leith, the TAC unanimously approved forwarding the Preliminary Draft Annual Report to the Board of Directors for their consideration of approval.

Note: At this point in the meeting at 3:06 Mr. Lear had to depart.

## **5. Schedule**

Mr. Jaques summarized the agenda packet materials for this item. He reported that there would be no need for a TAC meeting in December, and that if there was no pressing business for the TAC, the January 2021 meeting would be canceled. A meeting notice regarding the January 2021 meeting will be sent out in early January. There was no other discussion.

## **6. Other Business**

There was no other business.


The meeting adjourned at 3:10 PM.



**SEASIDE GROUNDWATER BASIN**

**2020**


**SEAWATER INTRUSION ANALYSIS REPORT**



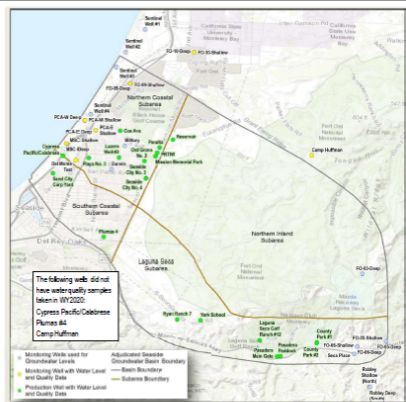
Presented to the  
Seaside Basin  
Technical  
Advisory  
Committee  
November 18,  
2020

## SIAR ANALYSIS

- Chloride Distribution and Na/Cl Molar Ratio
- Cation/Anions – Piper and Stiff Diagrams
- Electric Induction Logs
- Groundwater Elevations
- Protective Groundwater Elevations
- Groundwater Production



2



WELL DATA INCLUDED IN SIAR

## CHLORIDE DISTRIBUTION

**Shallow Aquifer**

FO-9 Shallow

FO-10 Shallow


**Deep Aquifer**

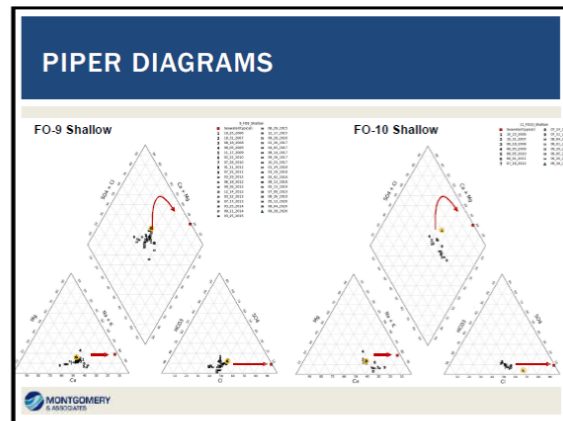
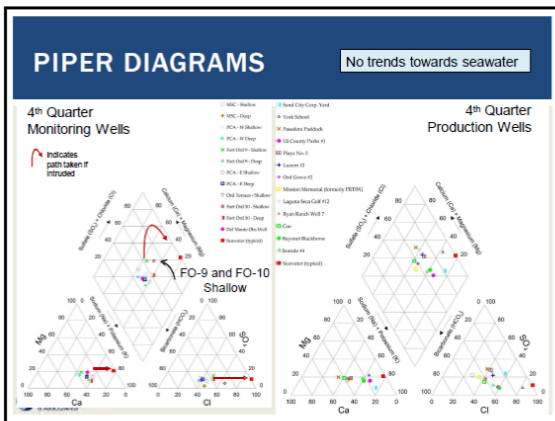
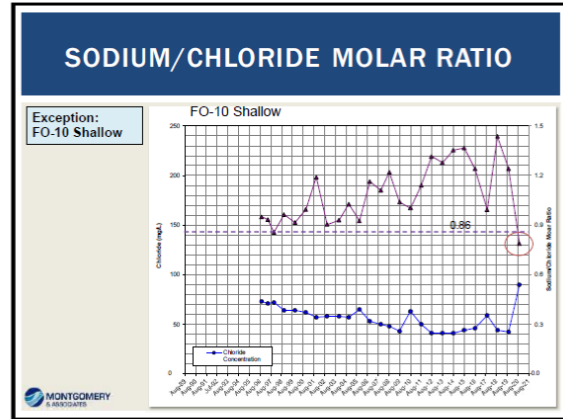
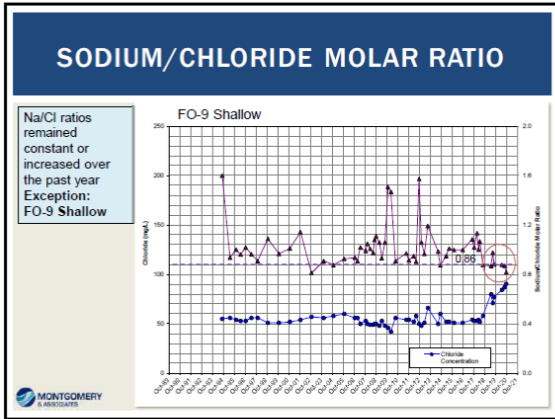
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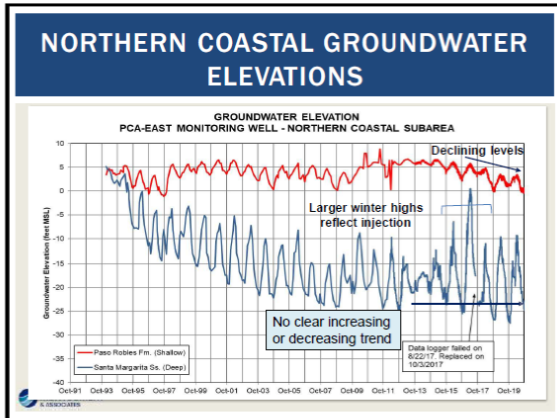
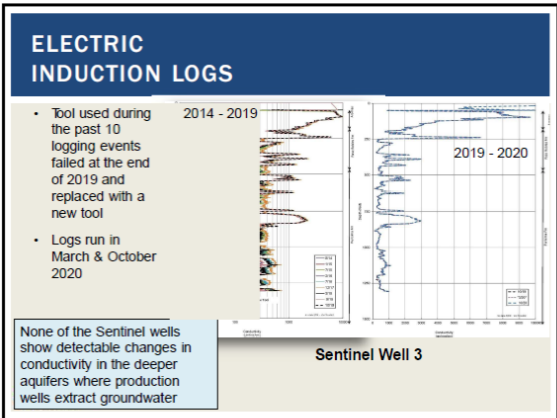
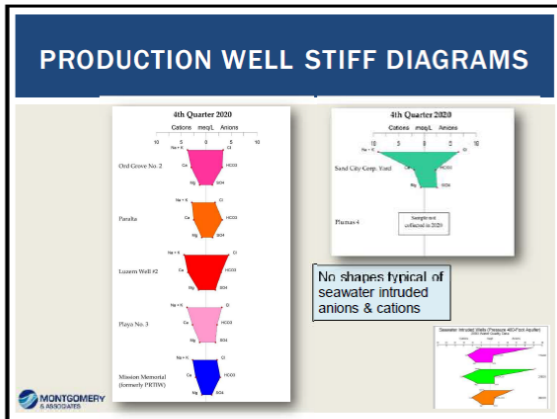
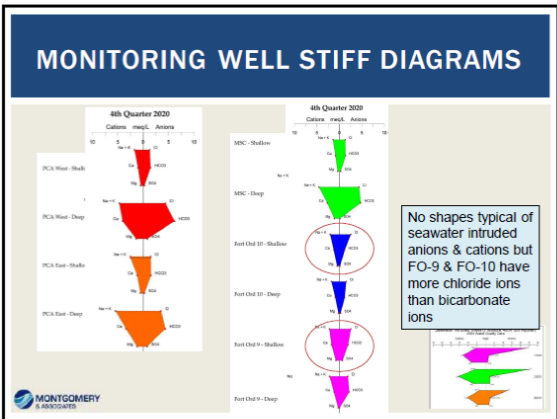
Chloride at the coast remained constant or decreased over the past year

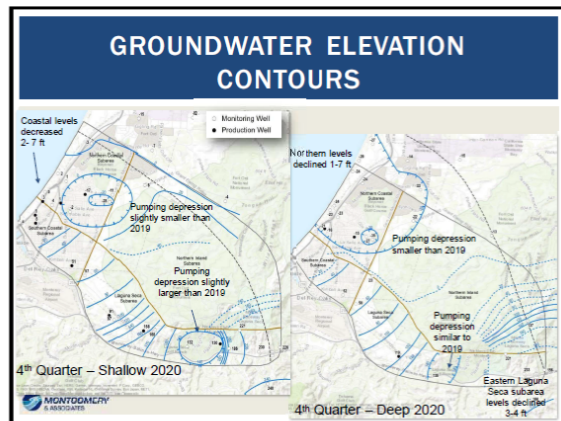
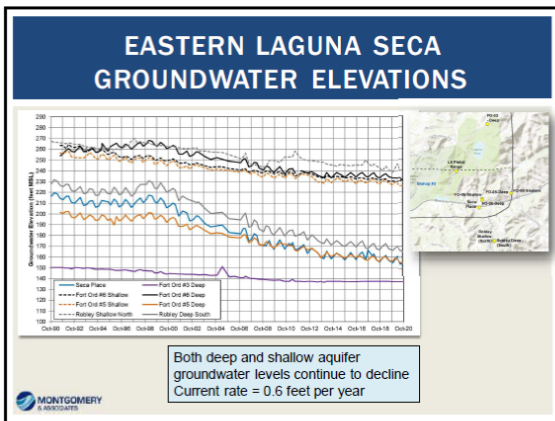
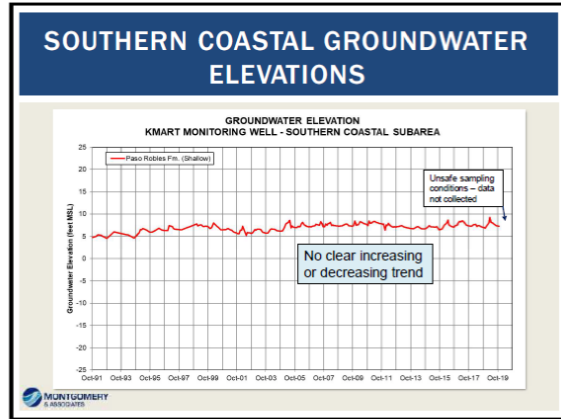
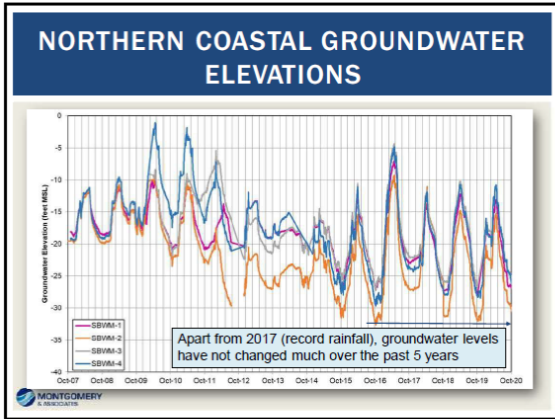
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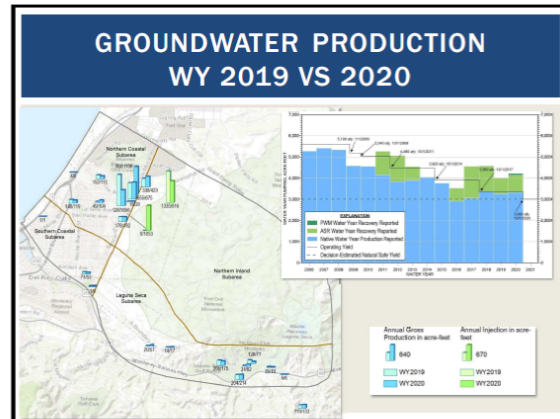
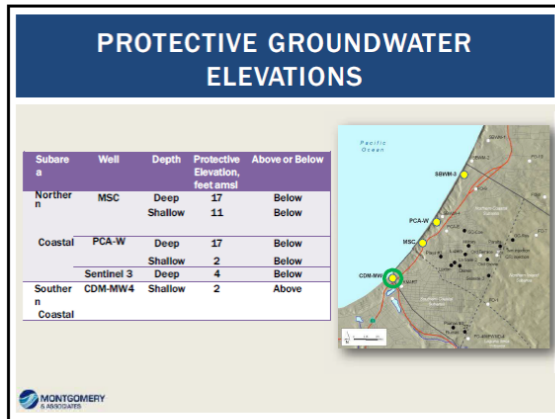
- FO-9 shallow increased 13 mg/L since last water year
- FO-10 shallow increased 48 mg/L since last water year











### CONCLUSIONS

Conditions in the basin that continue to provide a potential for seawater intrusion:

- All deep groundwater in the Northern Coastal subarea is below sea level
  - 2nd quarter (winter/spring) > 20 feet below sea level
  - 4th quarter (summer/fall) > 30 feet below sea level
- Groundwater levels remain below protective elevations in all deep target monitoring wells
- Two of the three shallow wells' groundwater levels are below protective elevations

MONTGOMERY & ASSOCIATES

### CONCLUSIONS


Analyses indicating seawater intrusion is currently NOT occurring:

- No groundwater chemistry changes towards seawater in either shallow or deep groundwater
- Overall, chloride concentration trends were stable for most monitoring wells. Two wells had an increase greater than 10 mg/L
  - FO-9 shallow has a sustained increase leading to a 13 mg/L chloride increase over last years concentrations
  - FO-10 shallow has an increase of 48 mg/L over last years concentrations.
- Sodium/chloride molar ratios at most monitoring wells remained constant or increased over the past year. Two wells had molar ratios below 0.86:
  - FO-9 shallow now has a molar ratio of 0.81
  - FO-10 shallow now has a molar ratio 0.76
- Induction logging data at the coastal Sentinel Wells do not show large changes over time that are indicative of seawater intrusion

MONTGOMERY & ASSOCIATES


### CONCLUSIONS

- There are still ongoing groundwater level declines in the Laguna Seca subarea of around 0.6 feet per year
- Native groundwater production in the Seaside Groundwater Basin for Water Year 2020 was 3,323.1 acre-feet:
  - 53.9 acre-feet more than Water Year 2019
  - 36.9 acre-feet less than the Decision-ordered Operating Yield of 3,360 acre-feet per year that is required between October 1, 2017 and September 30, 2020
  - Operating yield starting this water year will be 3,000 acre-feet per year – this is the last Court-Ordered triennial reduction




### RECOMMENDATIONS

1. Immediately resample FO-10 shallow to confirm 48 mg/L chloride concentration increase. Sample was collected on November 10 and results are expected in three weeks
2. Increase sampling frequency at FO-9 Shallow and FO-10 Shallow to quarterly, and review concentrations after each sampling event
3. Continue to analyze and report on groundwater quality and levels annually
4. For the 2021 SIAR, include groundwater level data from selected monitoring wells installed as part of Pure Water Monterey's monitoring program



## QUESTIONS?



**SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE  
\* \* \* AGENDA TRANSMITTAL FORM \* \* \***

<b>MEETING DATE:</b>	February 10, 2021
<b>AGENDA ITEM:</b>	2.B
<b>AGENDA TITLE:</b>	Sustainable Groundwater Management Act (SGMA) Update
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager
<p><b>At the State level:</b>            Since my last update, I have not received any new materials from the State that would impact the Watermaster.</p> <p><b>At the Monterey County level:</b>            Because so many meetings are being cancelled, the Board asked that I keep them updated on issues related to my participation in meetings held by the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) by sending out meeting summaries on a monthly basis. Attached are summaries of those meetings held in November and December 2020, and in January 2021.</p>	
<b>ATTACHMENTS:</b>	Meeting Summaries
<b>RECOMMENDED ACTION:</b>	None required – information only

**SUMMARY OF**  
**PURE WATER MONTEREY,**  
**SALINAS VALLEY GROUNDWATER SUSTAINABILITY, AND**  
**MARINA COAST WATER DISTRICT GROUNDWATER SUSTAINABILITY**  
**ZOOM MEETINGS**  
**IN NOVEMBER 2020**

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

**SVBGSA Monterey Subbasin Committee meeting, November 6, 2020**

In this meeting there was discussion about how the Salinas Valley Basin GSA is coordinating with the Marina Coast Water District GSA on their respective portions of this subbasin. There had been some apparent difficulties in this regard early on, but they are now meeting on a regular basis to try to make sure that their activities are well coordinated.

There was a review of comments made by the Salinas Valley Basin GSA on the chapters of the GSP that had been prepared in draft form by Marina Coast Water District. I had previously submitted the Watermaster's comments to the Marina Coast Water District GSA on their website.

The Salinas Valley Basin GSA had sent out a survey seeking input from members of the Monterey Subbasin GSP committee on what they consider to be the issues of greatest concern, so that these could be properly addressed as the Sustainable Management Criteria are developed. I provided multiple comments in that survey regarding our concerns about the impacts that pumping in the Corral de Tierra portion of the Monterey Subbasin is having on groundwater levels in the Laguna Seca Subarea.

**MCWD GSA Monterey Subbasin Stakeholders meeting, November 17, 2020**

In this meeting MCWD's consultants covered these topics and provided these responses to my questions:

- Draft GSP chapters will be posted after the meeting at which they are presented by EKI, MCWD's consultants.
- They briefly mentioned comments received on Draft Chapters 1 through 4 of their GSP.
- They briefly described the work that was being undertaken by the SVBGSA GSP Monterey Subbasin Committee.
- They provided an overview presentation on upcoming Draft Chapter 5, which they said would be released in early December for review.
- I asked if they plan to consider installing additional monitoring wells to provide water quality data in the vicinity of the interface between the Monterey subbasin and the Seaside subbasin, where very little water quality data appears to exist. Their response was that they plan to consider additional monitoring wells near the seawater intrusion front along the coast, but at this point were not considering additional monitoring wells in the central or southern portion of their part of the Monterey subbasin.
- I asked if they plan to get water quality data from existing wells in the central and southern portion of their part of the Monterey subbasin, where only groundwater level data appears to currently exist. They said they would look into that.
- Water levels in the deep aquifer (900-foot aquifer) are dropping because growers are having to put their wells into the deeper aquifer in order to get suitable water quality for irrigation. This is along



the northerly boundary of the Monterey subbasin where it abuts the 180/400-foot aquifer subbasin of the Salinas Valley basin.

- MCWD’s consultants are preparing a Monterey subbasin “specific model” which they expect to be more accurate than the SVIHM for that part of the basin. In response to my question, they said they used the Watermaster’s Seaside basin model to “inform” their model at the interface between the basins, so that groundwater levels will match along the boundary between the two subbasins.

**Pure Water Monterey Water (PWM) Quality and Operations Committee Meeting, November 18, 2020**

- A progress report was provided on work being done on the vadose and deep injection wells.
- The tracer study has now detected movement of injected Pure Water Monterey water at monitoring well MWD-2. It will still be many months before the water will reach any production well.
- In a water quality report, it was noted that some initial mineral and other fluctuating constituent exceedances have now been eliminated, and no exceedance problems have been encountered in recent months. Some arsenic was found to have solubilized in one of the deep monitoring wells, but it reattached to the soil matrix as the water moved through the aquifer and met the water quality requirements.
- An update was provided on operation of the ASR system and construction of chemical feed buildings and other facilities that will be needed when injected water starts to be extracted from production wells.
- The next meeting is scheduled for December 16 at 3:00 PM.

**SVBGSA Advisory Committee meeting, November 19, 2020**

In this meeting there were no items of particular interest to the Watermaster.

**SVBGSA Seawater Intrusion Work Group meeting, November 23, 2020**

The SVBGSA is planning to undertake a study of the deep aquifer(s) in the Salinas Valley Groundwater Basin. The term “deep aquifer” refers to any aquifer below the 400-foot aquifer, often at a depth of 900 feet or so. Much of this meeting was spent reviewing the proposed scope of for this study, and I provided input in that discussion.

There were no items of particular interest to the Watermaster in this meeting..

**SUMMARY OF**  
**PURE WATER MONTEREY,**  
**SALINAS VALLEY GROUNDWATER SUSTAINABILITY, AND**  
**MARINA COAST WATER DISTRICT GROUNDWATER SUSTAINABILITY**  
**ZOOM MEETINGS**  
**IN DECEMBER 2020**

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

**Pure Water Monterey Water (PWM) Quality and Operations Committee Meeting, December 16, 2020**

- Work has been completed on the shallow (Vadose zone) injection wells to correct some problems with them that was encountered earlier in the year.
- A contract has been let to install two additional deep injection wells. These are scheduled for completion in mid- to late-2021 with injection from the first of the wells scheduled for November 2021 and injection from the second of the wells scheduled for February 2022.
- In November 2020 223 AF of AWT water was injected. Total AWT water injected for potable reuse as of the end of November was 501 AF. This is the amount injected above the operating reserve amount.
- In a water quality report, it was reported that no exceedance problems have been encountered in recent months.
- An update was provided on operation of the ASR system. It was also reported that construction of the chemical feed buildings and other facilities that will be needed when injected water starts to be extracted from production wells has been completed.
- The next meeting is scheduled for January 20, 2021.

**SUMMARY OF**  
**PURE WATER MONTEREY,**  
**SALINAS VALLEY GROUNDWATER SUSTAINABILITY, AND**  
**MARINA COAST WATER DISTRICT GROUNDWATER SUSTAINABILITY**  
**ZOOM MEETINGS**  
**IN JANUARY 2021**

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

**SVBGSA Monterey Subbasin Committee meeting, January 7, 2021**

In this meeting it was reported that:

- On January 27, 2021 there will be a Zoom Funding Workshop to present information on how funding to carry out Sustainable Management Criteria in GSPs can be obtained.
- The next meeting of the MCWDGSA Stakeholder’s Group will be held in February 2021.
- Weekly coordination meetings are being held between the staff of the MCWDGSA and the SVBGSA and their consultants (EKI for MCWD and Montgomery & Associates for SVGB) on development of the GSP for the Monterey Subbasin. In conjunction with these, there was a joint meeting held with DWR to discuss certain topics. Communication between the two GSAs on development of this GSP is going well.
- Patrick Breen of MCWD announced that Derrik Craig (MCWD’s Operations Supervisor) is currently the acting General Manager of MCWD, following Mr. Van Der Maaten’s departure. A search for a permanent replacement is in progress and it will probably be 2-3 months before the position is filled.

There was a lengthy discussion on methods to use in making pumping allocations in order to reduce pumping in the two subareas (Marina-Ord and Corral de Tierra) of the Monterey Subbasin in order to bring both subareas into sustainable conditions. The intent is to avoid having the subareas adjudicated by the Court due to overpumping and falling groundwater levels. Sustainable Yields will be developed for each of these subareas.

There was a presentation and initial discussion on Chapter 5 of the GSP which covers “Current and Historical Groundwater Conditions” in the Subbasin. I had a number of comments which I submitted using the Comment Portals that both GSAs have established for providing input on the development of the GSP.

The next meeting of the SVBGSA Monterey Subbasin GSP Committee is scheduled for March 5, 2021.

**Pure Water Monterey Water (PWM) Quality and Operations Committee Meeting, January 20, 2021**

- A progress report was provided on work being done on the vadose and deep injection wells.
- In the water quality report, although there were some “outliers” briefly discussed, no issues of concern were reported.
- An update was provided on operation of the ASR system and the newly constructed chemical feed buildings and other facilities that will be needed when injected water starts to be extracted from production wells.

- The next meeting is scheduled for February 17 at 3:00 PM.

### **SVBGSA Advisory Committee meeting, January 21, 2021**

In this meeting there were no items of particular interest to the Watermaster.

### **SVBGSA Seawater Intrusion Work Group meeting, January 25, 2021**

After reviewing the agenda packet for this meeting I did not attend as it did not appear to have any agenda topics that would directly concern the Watermaster. This meeting centered on discussions of two topics:

1. An update on Monterey County's Well Ordinance - changes to the well permitting process for wells in the deep aquifer.
2. The SVBGSA's Proposition 68 SGMA Grant to help implement projects from the Groundwater Sustainability Plan for the 180/400-Foot Aquifer Subbasin. The objective is to decrease groundwater use, reduce overdraft, increase groundwater elevations, slow seawater intrusion and protect drinking water supplies. This would be done by increasing in-lieu groundwater recharge with increased use of surface and recycled water for agricultural irrigation, and by reducing evapotranspiration through removal of *Arundo donax*, an invasive species predominant in the Valley.

This issues should have no direct impact on the Watermaster, but might have some impact on the Monterey Subbasin in the Marina-ORD subarea.

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<b>MEETING DATE:</b>	February 10, 2021
<b>AGENDA ITEM:</b>	2.C
<b>AGENDA TITLE:</b>	PWM Project Tracer Study Conclusions and Next Steps
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager

**SUMMARY:**

In a previous meeting the TAC expressed interest in learning the findings and conclusions of the tracer studies to be performed on the Pure Water Monterey Project, once AWT water had begun being injected into the Seaside Basin.

Attached are excerpts from the three tracer reports that were provided to me by M1W. The full documents are quite lengthy, but I can email them to anyone who wishes to read the full reports.

<b>ATTACHMENTS:</b>	Conclusions and Next Steps excerpts from these tracer study reports
<b>RECOMMENDED ACTION:</b>	None required – information only

# **Intrinsic Tracer Test Status Report No. 1 (through June 2020) Pure Water Monterey, Groundwater Replenishment Project**

## **CONCLUSIONS AND NEXT STEPS**

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### Conclusions

Based on the evaluation of data collected through June 30, 2020 in compliance with the PWM Tracer Work Plan, the following conclusions can be made:

- The breakthrough of purified recycled water in onsite deep monitoring wells MW-1D and MW-2D has been confirmed with continuous transducer-recorded data and discrete water quality samples. Geochemical plotting techniques, including trilinear diagrams, radial plots, and stiff plots, support this conclusion.
- SC data from continuous transducer data and discrete water quality samples do not indicate that purified recycled water has arrived in offsite deep monitoring wells MW1AD and MW-2AD. Geochemical plotting techniques, including trilinear diagrams, radial plots, and stiff plots, support this conclusion.
- Observed declines in SC concentration in MW-2AD starting May 20, 2020 are within the upper range of SC concentrations observed in baseline transducer and discrete water sample SC measurements. Therefore, those declines are not considered to indicate breakthrough of purified recycled water.

### Next Steps

- The sampling frequency of MW-1AD and MW-2AD was increased to once every two weeks starting July 6 to 12, 2020 and may be increased to weekly to ensure adequate tracking of the arrival and breakthrough of purified recycled water in the two offsite deep monitoring wells.
- A replacement transducer will be installed in MW-2D to record water level and temperature.
- The approved tracer sampling program in the Work Plan (Table 2 of this TM) will continue to be implemented accordingly with an increased sampling frequency at MW-1AD and MW-2AD triggered by review of continuous SC data and discrete sample data.
- In satisfaction of the Tracer Work Plan, monitoring data collected through September 30, 2020 will be documented in a 2nd tracer status report to be submitted to DDW in October 2020.

# **Intrinsic Tracer Test Status Report No. 2 (through September 2020) Pure Water Monterey Groundwater Replenishment Project**

## **CONCLUSIONS AND NEXT STEPS**

### Conclusions

Based on the evaluation of data collected through September 30, 2020 in compliance with the PWM Tracer Work Plan, the following conclusions can be made:

- The arrival of purified recycled water in offsite deep monitoring wells MW-2AD has been confirmed with continuous transducer-recorded data and discrete water quality samples. Geochemical plotting techniques, including trilinear diagrams, radial plots, and stiff plots, support this conclusion. The first sample that definitively contained purified recycled water was collected on September 2, 2020, which was 5.7 months after injection commenced. An anion shift toward AWP signature is expected to take place in the trilinear diagram within the next couple of months.
- Low SC detected in offsite well MW-2AD from late May until September 20 was in a range that could have been caused by the arrival of ASR water or purified recycled water. Major-ion ratios also did not definitively pinpoint the source. However, injection volumes and water level data strongly indicate that the low-SC water detected between May and September originated from ASR injection, not PWM injection.
- Breakthrough of purified recycled water at offsite well MW-2AD could have occurred prior to September 2, but the exact date cannot be ascertained on the basis of the measured water quality alone because of the confounding effects of ASR water. The two metrics defining breakthrough of purified recycled water (SC greater than 2% of purified recycled water or greater than 10% of the eventual peak concentration) were passed back in May because of the arrival of ASR water. Recalibrating the groundwater model based on these measured results will allow the separate arrivals of ASR and purified recycled water to be estimated independently.
- SC data from continuous transducer data and discrete water quality samples do not indicate that purified recycled water has arrived in offsite deep monitoring well MW1AD. Geochemical plotting techniques, including trilinear diagrams, radial plots, and stiff plots, support this conclusion.

### Next Steps

- The malfunctioning transducer in MW-2D will be replaced. The transducer producing erratic results in MW-2AD was swapped with another temporary data logger to investigate the cause of the problem. A temporary data logger will remain installed until new ones arrive.
- The sampling frequency of MW-1AD may be increased within the next quarter to weekly to ensure adequate tracking of the arrival and breakthrough of purified recycled water in the offsite deep monitoring wells. To date, there is no indication of first arrival of purified recycled Water at MW-1AD.
- After the observation of peak purified recycled water concentration, the underground retention time from the tracer test will be calculated based on the time from when the purified recycled water was injected to when two percent (2%) of the initial tracer concentration has reached the downgradient monitoring point, or when ten percent (10%) of the peak tracer concentration observed in the downgradient monitoring point reaches the monitoring point. In the event of uncertainty due to concurrent ASR injection, the arrival times will be determined from the groundwater model (recalibrated to match observed injection and water quality).
- The duration of the tracer test as specified in the Tracer Work Plan is open-ended and contingent on the observed arrival of purified recycled water at the various monitoring wells.

Monitoring and reporting will continue through at least December 31, 2020, by which time SC at MW-2AD will probably have stabilized and arrival of purified recycled water at MW-1AD might have commenced. Continuation of monitoring will be evaluated at the end of each quarter based on the adequacy of observed water quality to date for recalibrating the groundwater model. The Tracer Work Plan envisioned a duration of approximately 1 year.



# **Intrinsic Tracer Test Status Report No. 3 (through December 2020) Pure Water Monterey Groundwater Replenishment Project**

## **CONCLUSIONS AND NEXT STEPS**

### Conclusions

Based on the evaluation of data collected through December 31, 2020 in compliance with the PWM Tracer Work Plan, the following conclusions can be made:

- SC data from continuous transducer data and discrete water quality samples indicate the arrival of either Carmel River water or purified recycled water in offsite deep monitoring well MW-1AD. Geochemical plotting techniques, including trilinear diagrams, radial plots, and stiff plots do not definitively indicate which water is causing the decreased SC levels. Given that ASR wells have not been injecting since April (only extraction has occurred from ASR-1 July through end of 2020), and that DIW-1 has resumed injection following rehabilitation, further decreases in SC—if any—will be due to PWM injection.
- SC and major ion data in MW-1D, MW-2D, and MW-2AD were affected by well rehabilitation. Notably, following the extraction season for ASR wells and during the cessation of injection at DIW-2, SC at MW-2AD rebounded during December toward the background range.
- Due to a strong westward water-level gradient toward the Ord Grove #2 well, purified recycled water might not break through at well MW-1AD, which is slightly east of the PWM and ASR wells. Arrival and breakthrough are affected by the timing and rates of injection and extraction, aquifer transmissivity, and the slope of the regional gradient.

### Next Steps

- The sampling frequency of MW-1AD can continue at a biweekly interval. Arrival and breakthrough at that location are not likely to be rapid, given the nine months of elapsed time since the beginning of injection and the lack of definitive arrival to date. After the observation of peak purified recycled water concentration, the underground retention time from the tracer test will be calculated based on the time from when the purified recycled water was injected to when two percent (2%) of the initial tracer concentration has reached the downgradient monitoring point, or when ten percent (10%) of the peak tracer concentration observed in the downgradient monitoring point reaches the monitoring point. Because of uncertainty due to concurrent ASR injection and the change in purified recycled water quality beginning in October, the arrival times will need to be determined from the groundwater model (recalibrated to match observed injection and water quality).
- The duration of the tracer test as specified in the Tracer Work Plan was expected to be one year, or possibly shorter if breakthrough of purified recycled water occurred earlier at both off-site monitoring wells. Given that breakthrough has not yet occurred at MW-1AD, monitoring should continue into the fourth quarter.

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<b>MEETING DATE:</b>	February 10, 2021
<b>AGENDA ITEM:</b>	3
<b>AGENDA TITLE:</b>	Discuss the Need for Dataloggers in Monitoring Wells
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager

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**SUMMARY:**

At the TAC's November 18, 2020 meeting, during discussion of the 2020 Seawater Intrusion Analysis Report, Mr. Lear recommended putting in a data logger into the K-Mart monitoring well, because of its location near a homeless encampment. This was supported by Ms. King and Ms. Voss. Ms. Voss added that the data logger could be placed in a lockable vault to prevent vandalism at that site. There was TAC consensus to put in a datalogger there.

It was also suggested that a recommendation from Montgomery and Associates be requested to identify the most beneficial wells where data loggers could be installed.

Attached is a Technical Memo from Georgina King that describes the Seaside Basin Datalogger Program and contains her recommendations regarding dataloggers.

As Ms. King's Tech Memo states, the TAC needs to determine what the purpose of the Watermaster's datalogger program is. If the purpose is to have the data available to look back on when the need arises, and if for current data needs monthly or quarterly manual measurements suffice, then no change in the way the dataloggers are managed is needed. On the other hand if the purpose of having dataloggers is to use the more detailed data collected between monthly hand measurements for basin management, then changes to the way the dataloggers need to be made. As the Tech Memo states, there would be a one-time cost of approximately \$7,400 (from Montgomery & Associates) to get the backlog of unprocessed datalogger data processed through Water Year 2020. There would be a cost annually of approximately \$2,900 (from Montgomery & Associates) to process datalogger data from the 12 monitoring wells with dataloggers, plus the four Sentinel Wells, when the Seawater Intrusion Analysis Report (SIAR) is prepared.

Jon Lear reported that MPWMD downloads data loggers they own quarterly because the data sets generated by these loggers are required for ASR compliance. This work is not connected to work MPWMD performs for the Watermaster except that some of the wells used for ASR compliance are also in the M&MP. Wells in the M&MP are visited monthly for manual measurements according to MPWMD's contract with the Watermaster. If a well in the M&MP also has a dedicated sampling pump installed, the data logger is interrogated to obtain the monthly M&MP water level so that tangling of equipment in the well is avoided. This is the proposed set up for FO 10(S).

Mr. Lear went on to report that MPWMD has been downloading the Watermaster's data loggers, sending them in for repairs when they fail, archiving the data, and providing the data downloads to the Watermaster's consultants upon request since the first loggers were installed in the Sentinel wells. This began when there were only 4 data loggers in the network and the level of effort to support the logger network was not large. Over the years the network has grown to over 14 loggers and may expand after

**AGENDA ITEM:**

3 (Continued)

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today's TAC discussion. Maintaining the logger network and archiving the data files has grown into a task that takes a non-inconsequential amount of staff time to complete and is not scoped or budgeted in the contract. MPWMD has been completing this task on its own volition so that the loggers did not overwrite the logs they are collecting.

He reported that in past water years, MPWMD had been downloading data loggers owned by the Watermaster annually when MPWMD was completing the 4th quarter downloads of the ASR data loggers. MPWMD has not been compensated for this work. The contract currently only provides 8 hours for the entire year to download the Sentinel Well data loggers. Completing annual downloads of the Watermaster network, verifying the data, and archiving the data now takes MPWMD over 2 days for the single annual download. The annual download of the Watermaster data loggers is not covered in the current contract between the Watermaster and MPWMD. If the Watermaster would like MPWMD to continue to support the data logger network, scope and budget addressing the level of effort of an 8-hour field day to download the loggers and 4 hours to evaluate if the loggers are still functioning properly and archive the downloaded logs will need to be added to the contract. This scope would support annual downloads at the close of the water year, evaluating if the loggers are functioning properly, archiving the data, and responding to data requests for logger data. More frequent downloads protect against larger data gaps in case the loggers fail in the middle of the water year. (MPWMD downloads its data logger network quarterly because the data is a requirement for ASR permits.) If more frequent downloads are desired, that will add 8 field hours and 4 office hours per download event. [Note: The additional scope Mr. Lear describes would apparently be in addition to the Montgomery & Associates costs described above.]

Mr. Lear added that if the Watermaster is not using the data being collected by the loggers, it would be good to have a TAC discussion about the value of collecting this data vs. the cost of paying MPWMD to maintain the datalogger network.

Based on this information, the TAC should decide whether the datalogger program should be continued or modified, if the data are not being processed and evaluated.

It appears that the level of detail that dataloggers provide provides beneficial information about those wells listed in Table 3 of Ms. King's Technical Memo. Some of these are required to have dataloggers in them because it states in the Court-approved Monitoring and Management Program that they will. It would also be beneficial to provide a datalogger in the Kmart monitoring well for safety and security reasons, since this well is monitored for water level monthly and would only have to be measured manually on a less frequent basis for calibration purposes.

A question that I feel still needs to be answered is whether the data from these dataloggers needs to be processed now (with the exception of the Kmart datalogger which would be needed in order to obtain monthly water levels there), or whether the data could instead just be stored, so if at some time in the future it was decided that more detailed water level data is needed, it could then be retro-processed. Except for the Sentinel Wells, the SIARs prepared for the Watermaster since 2007 have apparently all been prepared using manual, rather than datalogger, water level data, and those SIARs have thus far

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**AGENDA ITEM:**

3 (Continued)

**ATTACHMENTS:**

Technical Memo from Georgina King that describes the Seaside Basin Datalogger Program

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**RECOMMENDED  
ACTION:**

Provide Recommendations to the Technical Program Manager  
Regarding Any Changes to the Watermaster's Datalogger Program

## TECHNICAL MEMORANDUM

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**DATE:** January 26, 2021  
**TO:** Bob Jaques, Seaside Basin Watermaster Program Manager  
**FROM:** Georgina King, P.G., C.Hg.  
**SUBJECT:** Seaside Basin Datalogger Program

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### HISTORY OF DATALOGGER DEPLOYMENT IN SEASIDE BASIN

1. The Watermaster Amended Decision recognized that there were data gaps in the Seaside Basin monitoring network and required the development of a Monitoring and Management Plan.
2. In response, the Watermaster developed a “Seaside Basin Monitoring and Management Program (MMP)”. This program was initially reviewed by Judge Randall, who asked for some modifications. Accordingly, the revised MMP was included as Exhibit A of the Court Petition that was filed on December 1, 2006. The MMP has discussion of the need for automatic recording dataloggers for groundwater levels (see bullet below), and there is a preliminary cost estimate for them in Figure 6 of the MMP. Exhibit D of this same Court filing has a proposed MMP budget that included \$44,000 for dataloggers (see Capital Improvement table).
  - All coastal sentinel monitor wells shall be equipped with automatic dataloggers to continuously record groundwater levels in each aquifer measured. The dataloggers will be set to record no less frequently than a daily interval and will be downloaded at least quarterly. The dataloggers will be calibrated/confirmed initially and on at least a quarterly basis with the manual water level measurements. All collected data will be entered into the consolidated groundwater resource database on a quarterly basis.
  - At least two monitor well sites in the Laguna Seca subarea shall be equipped with automatic dataloggers to continuously record groundwater levels in each aquifer measured (This follows from a recommendation to instrument monitor wells to better understand water level variations in the report: Yates and others, 2002, Laguna Seca Subarea, Phase III Hydrogeologic Update, prepared for MPWMD, November 2002. See page 65). The dataloggers will be set to record no less frequently than a daily interval and will be downloaded at least quarterly. The dataloggers will be calibrated/confirmed

initially and on at least a quarterly basis with the manual water level measurements. All collected data will be entered into the consolidated groundwater resource database on a quarterly basis.

3. The MMP also noted that there were deficiencies in the then-current monitoring well network. Accordingly, the Watermaster requested that the potential enhancements be described by the MPWMD to fulfill the MMP's directive. MPWMD staff developed Seaside Basin Watermaster Memorandum 2007-04 entitled Enhancement of Seaside Groundwater Basin Monitor Well Network (October 2007). The memo focused on new monitoring wells to add to the network and not on deployment of dataloggers.
4. The well completion report documenting construction of four deep Watermaster Sentinel Wells stated that to "minimize disruption to Park activities and uses, the Sentinel Wells should be equipped with continuous, water-level data loggers to record water level fluctuations. Continuous water level data collection will allow characterization of both tidal fluctuations and the pumping stresses imposed by regional extractions. These data will assist in understanding: (1) the nature and degree of connectivity to the ocean; (2) the influence of pumping/injection stresses at these locations; (3) the regional gradients and groundwater flow directions; and (4) long-term trends in groundwater levels along this section of the coastline."
5. The 2008 Annual Report prepared by Watermaster Staff reported that the Sentinel Wells had loggers installed. It also contained a recommendation regarding dataloggers:

"The potential utility of using dedicated water quality datalogger probes in selected monitor wells that are currently being sampled for water quality on a quarterly basis should be examined as planned in 2009. If suitable and reliable datalogger installations prove successful, then the water quality sample collection frequency at these sites could be reduced."
6. Currently there are 26 dataloggers installed in Seaside Basin monitoring wells (listed in Table 1). The 11 Watermaster dataloggers in the third column of Table 1 comprise the following:
  - a) Four dataloggers deployed in the Laguna Seca subarea are per the recommendations in the Yates and others report (2002) mentioned above. One additional logger was installed in York Road West (screened in the deep aquifer) in Water Year 2020 since this is an area of declining groundwater levels. There are currently a total of five dataloggers installed in the Laguna Seca subarea as indicated on Table 1.



- b) Several years ago the Technical Advisory Committee (TAC) recommended that PCA West Shallow and Deep, and MSC Deep be equipped with dataloggers because they extended the cross-section of coastal pressure records.
- c) Three monitoring wells are Cal-Am production wells converted to monitoring wells. Cal-Am purchased and installed the dataloggers in the wells, but the Watermaster now owns the loggers.

Table 1. Summary of Dataloggers Deployed in the Seaside Basin

Well	Monitored and Processed as part of ASR Permit Compliance (Dataloggers Owned by MPWMD or Cal-Am)	Data is Not Processed by MPMWD, it is Only Stored on their Server (Dataloggers Owned by Watermaster)	Data is Processed and Stored by MPMWD (Dataloggers Owned by Watermaster)
PCA West Shallow		✓ Datalogger stuck in well and cannot be used. Requires pump contractor to pull out both pump and logger to get access to the datalogger again	
PCA West Deep		✓	
PCA East Shallow	✓		
PCA East Deep	✓		
Military <sup>2</sup>		✓	
Pistol Range <sup>1</sup>		✓	
Hilby <sup>2</sup>		✓	
Fitch Park Test	✓		
FO-5 Shallow <sup>1</sup>		✓	
FO-5 Deep <sup>1</sup>		✓	
FO-7 Shallow	✓		
FO-7 Deep	✓		
FO-8 Deep	✓		
FO-9 Shallow	✓		
FO-9 Deep	✓		
Camp Huffman Shallow			
Camp Huffman Deep			
Luxton <sup>2</sup>		✓	
Ord Terrace Shallow	✓		
Paralta Test	✓		
Ord Grove Test	✓		
MSC Deep		✓	
Pasadera Paddock <sup>1</sup>		✓	
York Road West Deep <sup>1</sup>		✓	
Sentinel Well 1			✓

Well	Monitored and Processed as part of ASR Permit Compliance (Dataloggers Owned by MPWMD or Cal-Am)	Data is Not Processed by MPMWD, it is Only Stored on their Server (Dataloggers Owned by Watermaster)	Data is Processed and Stored by MPMWD (Dataloggers Owned by Watermaster)
Sentinel Well 2			✓
Sentinel Well 3			✓
Sentinel Well 4			✓
<b>Total</b>	<b>11</b>	<b>11</b>	<b>4</b>

<sup>1</sup>Laguna Seca subarea well ; <sup>2</sup> former-Cal-Am production well converted to monitoring well

## SEASIDE BASIN DATALOGGER PROGRAM

In total there are 26 monitoring wells with dataloggers deployed in the Basin. Twelve of those have been recording data that the MPWMD downloads annually and stores on their sever. The data for those wells have never been evaluated or processed to corrected depth to water. The table below summarizes the process typically taken for a datalogger monitoring program to ensure the data collected are continuous, accurate, and safely stored. Datalogger data for the four Sentinel Wells has historically been processed by Martin Feeney/MPWMD in the past and included in the SIAR but there is no line item in either Martin Feeney or MPWMD RFS' to process the data so there is no guarantee that processing will continue.

Table 2. Typical Datalogger Program

Action	Currently Being Performed for Watermaster Dataloggers
Set up and install datalogger	Complete
Download data from logger periodically to ensure logger does not fill up or is faulty. Take hand measurement	Downloaded annually. This is not frequent enough, as if the datalogger stops recording, many months of data will be lost
Take more frequent measurements of groundwater level to correct for drift	X
Compensate data for barometric pressure changes and drift	X
Aggregate data measurement interval if too many measurements per day	X
Plot data on hydrograph and compare to hand measurements of groundwater level	X
Store and backup raw data	MPWMD is doing this
Store and backup processed data	X - no processed data

X = not being performed

Having dataloggers supplement monthly hand measurements of depth to water is the only way to establish a continuous record of groundwater levels to evaluate groundwater level changes that

occur more frequently than monthly. For example, to evaluate long-term and short-term effects of pumping or injection in a particular area and whether it changes groundwater flow directions, evaluate short-term effects from an aquifer test, or to evaluate tidal influences on groundwater levels. Monthly hand measurements are generally sufficient for purposes of preparing the Seawater Intrusion Analysis Report. However, there are some places in the basin where having dataloggers deployed is important for improving our understanding of groundwater level responses in the basin.

There are several areas of the basin where dataloggers can provide a more in-depth understanding: 1) along the coast where seawater intrusion is a continual threat, 2) at the basin boundary with the Corral de Tierra area east of the basin where there have been ongoing declines in groundwater levels caused by pumping outside of the basin, 3) within the Northern Coastal and Laguna Seca subarea pumping depressions, and 4) around aquifer storage and recovery (ASR) locations (included in the first column of Table 1). Dataloggers in monitoring wells are included in ASR permitting requirements as it is important to know what groundwater levels changes are in response to injection and recovery events.

Of the 11 monitoring wells with dataloggers whose data are not being evaluated by the Watermaster, there are many that should be continued, and their data processed and evaluated each year. Table 3 lists the justification for why these dataloggers are recommended. There are also several wells listed at the end of Table 3 that do not need dataloggers because there are other nearby dataloggers or they are in an area that does not need more frequent measurements than monthly.

Table 3. Recommendations on Datalogger Monitoring Wells

Well	Justification	Action
<b>Monitoring Wells to Install Dataloggers in</b>		
MSC Shallow	Coastal well and protective elevation well	Move logger from another well
Kmart	Key monitoring well for shallow aquifer in Southern Coastal subarea	Move logger from another well
CDM WW-4	Coastal well and protective elevation well	Move logger from another well
<b>Monitoring Wells with Dataloggers</b>		
PCA West Deep	Coastal well and protective elevation well	Already has logger
MSC Deep	Coastal well and protective elevation well	Already has logger
Sentinel Well 1	Coastal well	Already has logger
Sentinel Well 2	Coastal well	Already has logger
Sentinel Well 3	Coastal well and protective elevation well	Already has logger
Sentinel Well 4	Coastal well	Already has logger
Military <sup>2</sup>	Within the Northern Coastal subarea pumping depression	Already has logger
Pasadera Paddock <sup>1</sup>	Within the Laguna Seca subarea pumping depression	Already has logger

Well	Justification	Action
FO-5 Shallow <sup>1</sup>	Monitors basin boundary with Coral de Tierra	Already has logger
FO-5 Deep <sup>1</sup>	Monitors basin boundary with Coral de Tierra	Already has logger
<b>Remove Dataloggers from these Wells</b>		
York Road West Deep <sup>1</sup>		
Pistol Range <sup>1</sup>		
Luxton <sup>2</sup>		
Hilby <sup>2</sup>		

<sup>1</sup>Laguna Seca subarea well ; <sup>2</sup> former-Cal-Am production well converted to monitoring well

## RECOMMENDATIONS:

1. The TAC needs to determine what the purpose of the Watermaster's datalogger program is. If the purpose is to have the data available to look back on when the need arises and monthly hand measurements suffice, then no change in the way the dataloggers are managed is needed.
2. If the purpose of having dataloggers is to use the more detailed data collected between monthly hand measurements for basin management or to specifically evaluate effects of pumping and injection on the basin, then it is recommended that:
  - a) The data from the 11 monitoring wells with dataloggers that have not been processed and evaluated since the dataloggers were installed in them be corrected and processed for the multiple years they have been collecting data,
  - b) Plot the groundwater levels from these wells on hydrographs. Estimated budget is \$7,400 to get the backlog of data processed through Water Year 2020.
  - c) Redeploy some of the existing dataloggers to other monitoring wells that would provide more useful information by having continuous groundwater level measurements as indicated in Table 3
3. Data from the recommended nine monitoring wells in Table 3 plus four Sentinel Wells be processed annually when the Seawater Intrusion Analysis Report (SIAR) is prepared. The estimated additional effort this adds to preparation of the SIAR is estimated to be \$2,900 for 13 monitoring wells.
4. A pump contractor be hired to pull the pump and stuck datalogger from monitoring well PCA West Shallow. To prevent the logger becoming stuck again, when the pump and logger are redeployed in the well, the logger should include a dedicated data cable from which to download data from so that the logger does not need to be removed from the well each time data is downloaded.

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<b>MEETING DATE:</b>	February 10, 2021
<b>AGENDA ITEM:</b>	4
<b>AGENDA TITLE:</b>	Update on Concerns about Possible Detection of Seawater Intrusion in Monitoring Wells FO-9 and FO-10 Shallow, and Board Direction to Obtain a Cost Estimate to Install a New Monitoring Well
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager

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**SUMMARY:**

Following up on discussion at the TAC's November 18, 2020 meeting regarding the increasing chloride levels in monitoring wells FO-9 and FO-10 Shallow, Mr. Lear provided the following updates:

- Resampling of FO-10 Shallow was done on November 10, 2020 and the chloride level in that sample was 90.2 mg/L. This confirmed the increase found in the September 2020 sample, in which the chloride level was 89.9 mg/L.
- FO-9 Shallow was resampled on January 5, 2021, and its chloride concentration was 92.2 mg/L, which is up from 90.4 mg/L from the last sample that was collected on September 28, 2020. The January sample data is included in the plot on the attached chart. The last 4 samples have shown increased chloride levels above each of the preceding samples.

Installing a new sampling pump is more expensive than replacing a failed pump, because for a failed pump the tubes and pump setting equipment can be reused. MPWMD requested a quote for the materials needed to install a sampling pump in FO-10S to make sure the money budgeted for pump replacement in MPWMD's contract with the Watermaster was sufficient. Based on the depth the pump will be set and the length of the intake manifold required to outfit FO10S, the replacement pump budget from RFS 2020 is sufficient to outfit FO10S. MPWMD has ordered one pump and asked for a quote on another.

In 2009 the Watermaster adopted a *Seawater Intrusion Response Plan (SIRP)*, dated February 2009. This document is posted on the Watermaster's website at this link: [http://www.seasidebasinwatermaster.org/Other/Seawater%20Intrusion%20Response%20Plan%20Final%20Feb22%2009%2011-27-12%20\(2019\\_03\\_17%20\\_52\\_28%20UTC\).pdf](http://www.seasidebasinwatermaster.org/Other/Seawater%20Intrusion%20Response%20Plan%20Final%20Feb22%2009%2011-27-12%20(2019_03_17%20_52_28%20UTC).pdf)

The SIRP is the Watermaster's contingency plan for responding to seawater intrusion in the Seaside Groundwater Basin, if and when it occurs. The SIRP was developed as part of the Watermaster's implementation of the Seaside Groundwater Basin Monitoring and Management Program in 2006. This document was produced in accordance with requirements contained in the Adjudication Decision under which the Watermaster was created.

The SIRP details the indicators of seawater intrusion, and contains a list of recommended actions to be taken if seawater intrusion is observed. "Trigger" levels were established to determine when response measures should be taken, if seawater intrusion were to be detected in the Basin.

The attached excerpt from the SIRP describes the Contingency Plan Triggers. Also in that attachment is

**AGENDA ITEM:**

4 (Continued)

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an evaluation of those triggers as currently applied to monitoring well FO-9 Shallow.

The SIRP calls for a series of actions to be taken if the Contingency Plan Triggers are met. As discussed in the second attachment, it appears that it is too early to determine if all of the triggers have been met in monitoring well FO-09 Shallow.

At its December 2, 2020 meeting the Board directed staff to obtain a quote for installation of a shallow monitoring well in the area between the groundwater depression that exists to the southwest of the Bayonet/Blackhorse golf courses, and existing monitoring well FO-9, which is located to the north in the Northern Coastal Subarea of the Seaside Basin. The purpose of the new monitoring well would be to be able to obtain water quality data from this part of the Basin where there currently are no monitoring or production wells, and thus no ability to obtain water quality data. The additional data from a new monitoring well in this location might provide useful information about the potential movement of seawater intruded water which may be coming toward the Basin from the north.

I contacted Martin Feeney, the Watermaster's hydrogeologic consultant who has managed the installation of all of the Watermaster's Sentinel Wells, and requested a cost estimate to install a new monitoring well into the shallow (Paso Robles) aquifer. He spoke with colleagues who had recently finished installing a similar monitoring well in Santa Cruz. Based on cost information from that project, he estimates the drilling contractor's cost to install a monitoring well would be approximately \$280/ ft. It is estimated that a well into the shallow (Paso Robles) aquifer would need to be between 650 and 900 feet deep, meaning the drilling contractor's cost would be between \$180,000 and \$250,000. It is estimated that the cost to design, provide geologic support, and manage the well installation work would be about \$35,000. So the estimated total installed cost would likely be in the range of \$200,000 to \$300,000.

As an alternative means of estimating the movement of groundwater coming toward the Basin from the north, I asked Montgomery & Associates (Georgina King) if the Watermaster's groundwater model could be used for that purpose. Her response notes are attached.

Installing a new monitoring well will be quite costly and will only provide data from the location where the well is installed. However, a new well would be useful in seeing how water quality in its location is changing over time. Using the groundwater model, or manually estimating groundwater flow patterns using available groundwater level data, would provide information on how groundwater is moving in a larger area, but would only be as accurate as the Model or the manual plotting can predict. The model is currently not capable of predicting changes in water quality, only the movement of groundwater. A supplemental software would need to be added to the model to predict water quality changes.

A presentation was made to the Board at its February 3, 2021 meeting to update them on this matter. Also, on February 2<sup>nd</sup> a Zoom meeting was held with all of the Watermaster's hydrogeologic consultants, as well as Jon Lear and Tamara Voss, to discuss a number of topics pertaining to this. Attached are detailed notes from that Zoom meeting including the principal findings and conclusions.

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<b>AGENDA ITEM:</b>	4 (Continued)
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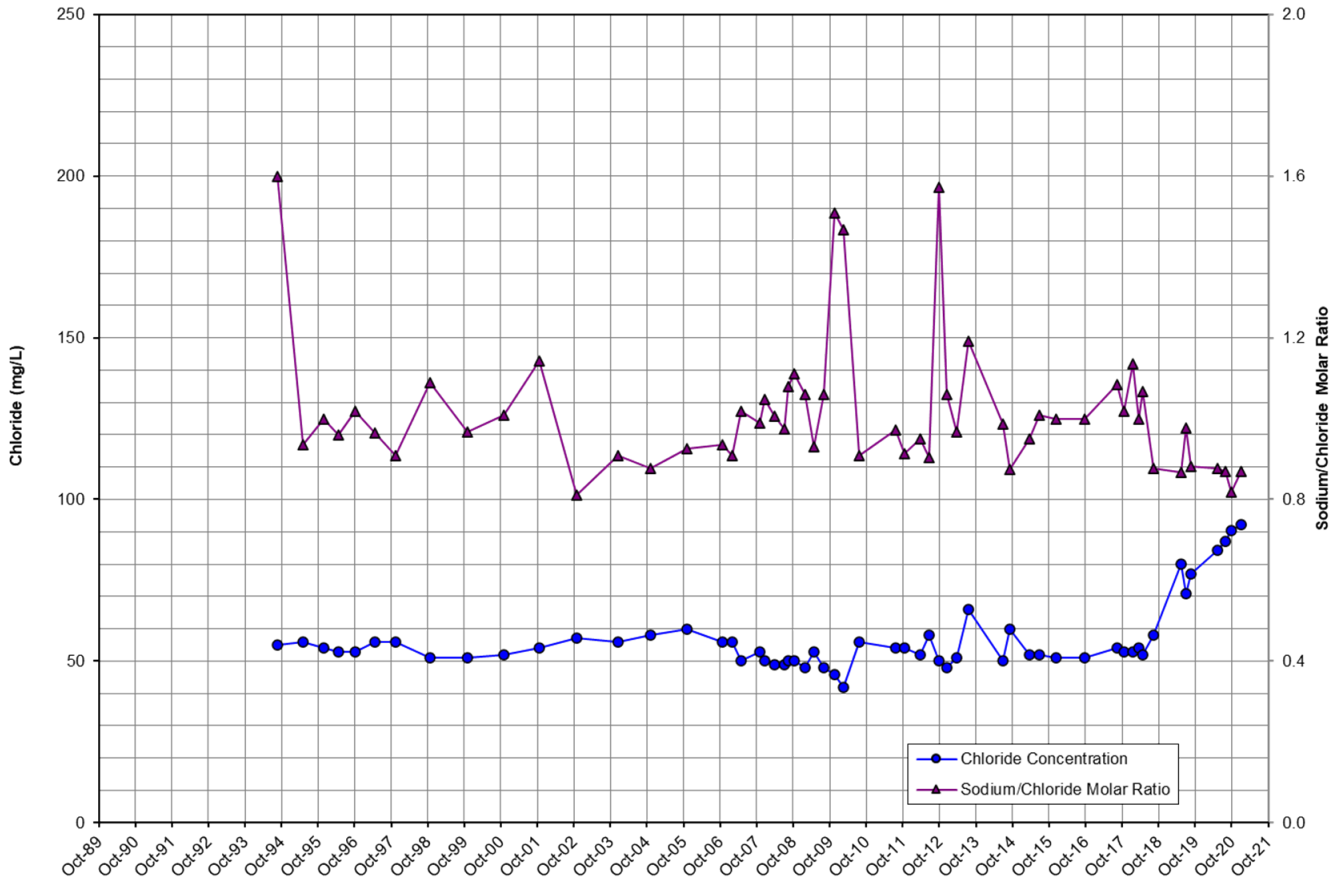


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<b>ATTACHMENTS:</b>	<ol style="list-style-type: none"> <li>1. Plot showing chloride levels in monitoring well FO-9 Shallow</li> <li>2. Contingency Plan Trigger excerpt from the SIRP and evaluation of monitoring well FO-9 Shallow</li> <li>3. Figure C-9 of Appendix C from the 2020 Seawater Intrusion Analysis Report (SIAR)</li> <li>4. Information from Montgomery &amp; Associates about using the Groundwater Model to estimate groundwater movement</li> <li>5. Meeting Notes</li> </ol>
<b>RECOMMENDED ACTION:</b>	None required – information only

1.

### Chloride Levels and Na<sup>+</sup>:Cl<sup>-</sup> Ratios in Monitoring Well FO-9 Shallow



**Contingency Plan Triggers from the SIRP  
and an  
Evaluation of Monitoring Well FO-9 Shallow Against Those Triggers**

The four seawater intrusion indicators listed in the SIRP are combined to form the triggers that prompt the contingency actions described in the SIRP. These four indicators are:

1. Increasing chloride concentrations
2. Decreasing sodium/chloride molar ratios
3. Visual inspection of cation/anion ratios
4. Chloride concentration maps

Because no one indicator definitively identifies seawater intrusion, a combination of indicators is necessary to identify intrusion. In order to clearly define seawater intrusion, the following combination of indicators should be used to trigger the implementation of the contingency response actions described in Section 4 of the SIRP:

1. Chloride concentrations must be higher than the chloride threshold value shown on Table 1 of the SIRP (titled "*Chloride Threshold Values and Trend Analysis*").
2. Sodium/chloride molar ratios must show a rapid drop, and be below the 0.86 molar ratio.
3. At least one of the following four trends or qualitative indicators must be apparent:
  - a. The Mann-Kendall statistical trend for chloride concentrations is increasing.
  - b. Evolution of seawater mixing is observed in Piper diagram(s).
  - c. Change of Stiff diagram(s) shape from baseline conditions featuring prominent high chloride spike.
  - d. Concentration maps indicate increasing chloride concentrations near the coast.

When these triggers are applied to monitoring well FO-9 Shallow, the following conclusions can be drawn:

Regarding the 1<sup>st</sup> Trigger: The Chloride Threshold value in Table 1 for monitoring well FO-9 Shallow is 67 mg/L. Currently, chloride levels in this well have risen to around 90 mg/L. Thus, the first trigger has been met.

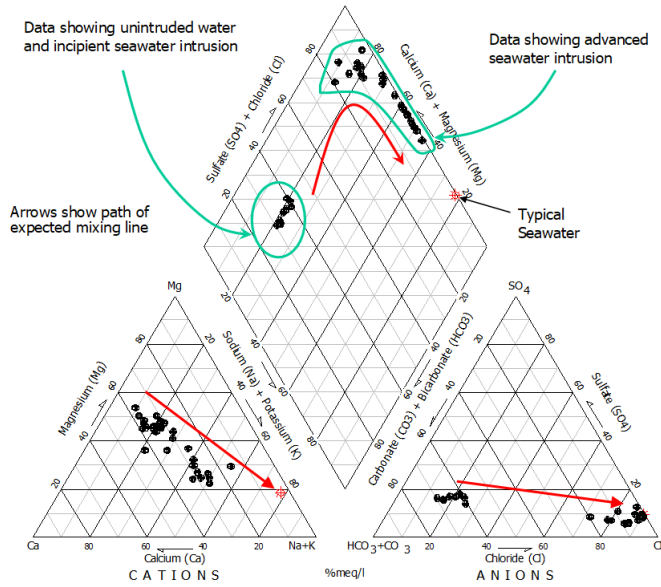
Regarding the 2<sup>nd</sup> Trigger: In Figure C-9 in Appendix C of the 2020 SIAR there does not appear to be an appreciable change in any of the plots in the Piper Diagram for this well, but the most recent data is slightly more toward the Seawater (typical) red box in the middle and right-hand plots in that figure. The left-hand plot does not show this, and the recent data point there falls in the midst of the grouping of prior data points in that plot.

In the figure above titled *Chloride Levels and Na<sup>+</sup>:Cl<sup>-</sup> Ratios in Monitoring Well FO-9 Shallow*, the Na<sup>+</sup>:Cl<sup>-</sup> molar ratio is clearly below 0.86, and there is a decrease in the Na<sup>+</sup>:Cl<sup>-</sup> molar ratio in 2020, along with the increase in Cl<sup>-</sup> concentration. However, the Na<sup>+</sup>:Cl<sup>-</sup> molar ratio was pretty stable through WY 2019 and the first half of WY 2020, even though the Cl<sup>-</sup> concentration was going up during that same time period. The decrease in Na<sup>+</sup>:Cl<sup>-</sup> molar ratio is only about 0.08 from the 2019 data. This is somewhat of a rapid drop compared to its historical fluctuations, but we can't determine for sure whether this is an ongoing trend or just part of a fluctuation, until we get more sampling data from this well. Thus, it is not clear whether this trigger has been met.

Regarding the 3<sup>rd</sup> Trigger:

Condition a: Applying the Mann-Kendall statistical test to the data from this well indicates that the chloride values are definitely increasing. Thus, this trigger has been met.

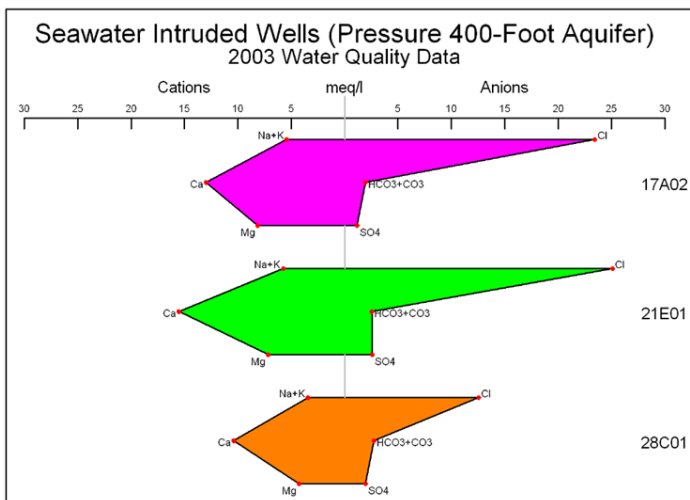
Condition b: Seawater mixing with native water would show a path looking like the one shown in the sample Piper diagram shown below. The Piper diagram for monitoring well FO-9 Shallow has not started to show this type of path. Thus, it does not appear that this trigger has been met.



**Condition c:** Figure 12 in the 2020 SIAR (see below) clearly does not show a Stiff diagram shape change with a high chloride spike, like this example of a seawater intruded well from another groundwater basin. Thus, this trigger has not been met.

### Stiff Diagrams from Salinas Valley Wells with Seawater Intrusion

**Condition d:** The discussion in the 2020 SIAR about mapping of chloride concentrations indicates that there is too much variation in chloride levels in wells that are near to each other to be able to plot chloride concentration contours. We do not have chloride data from coastal wells north of monitoring well PCA-West, because we have been relying on induction logging from the Sentinel Wells as the means of detecting seawater intrusion in that area. The near-coast wells from which there is chloride data do not show increasing levels. Thus, it does not appear that this trigger has been met, but we would not know for sure unless we had a shallow monitoring well at the coast in the vicinity of the Sentinel Wells, from which samples could be collected and analyzed for chloride.



# Figure C-9 of Appendix C from the 2020 Seawater Intrusion Analysis Report

Figure C-9. Piper Diagram of Fort Ord 9 Shallow

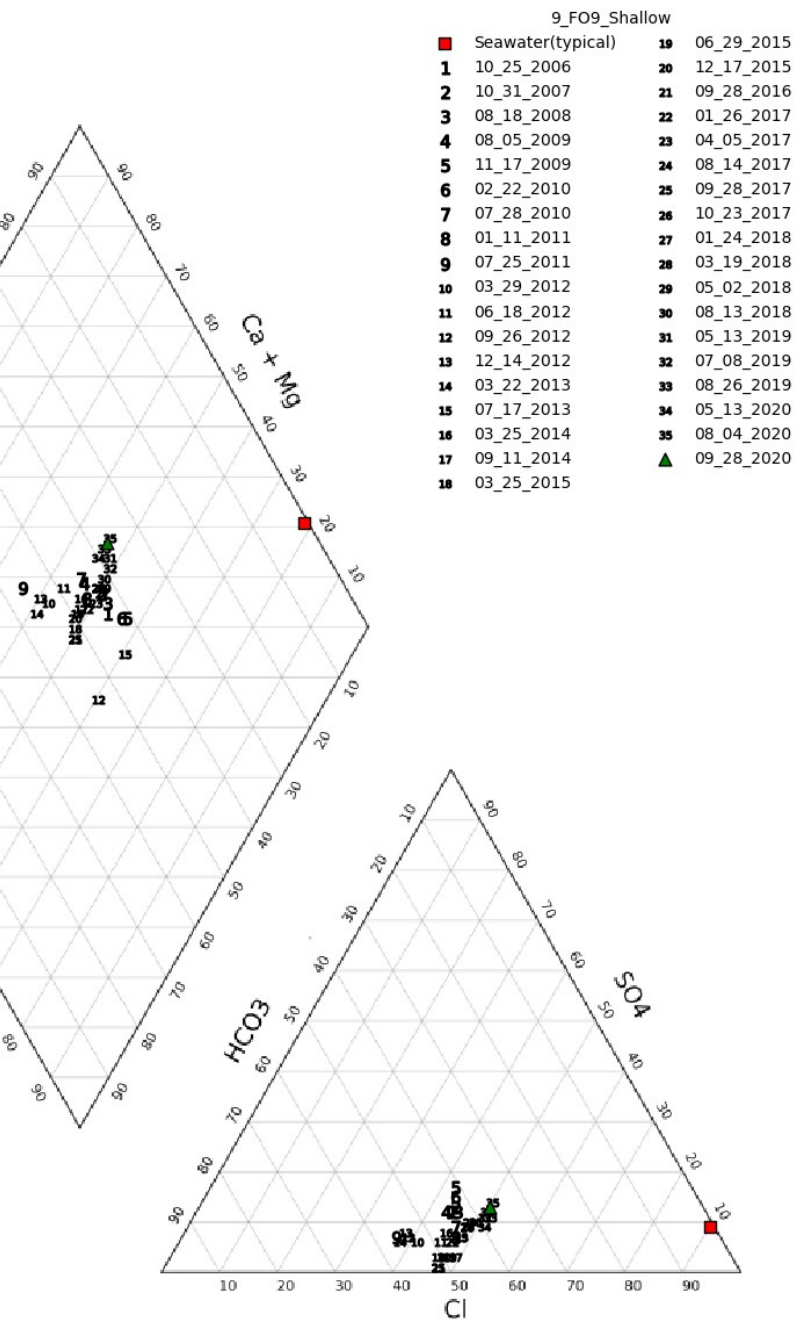
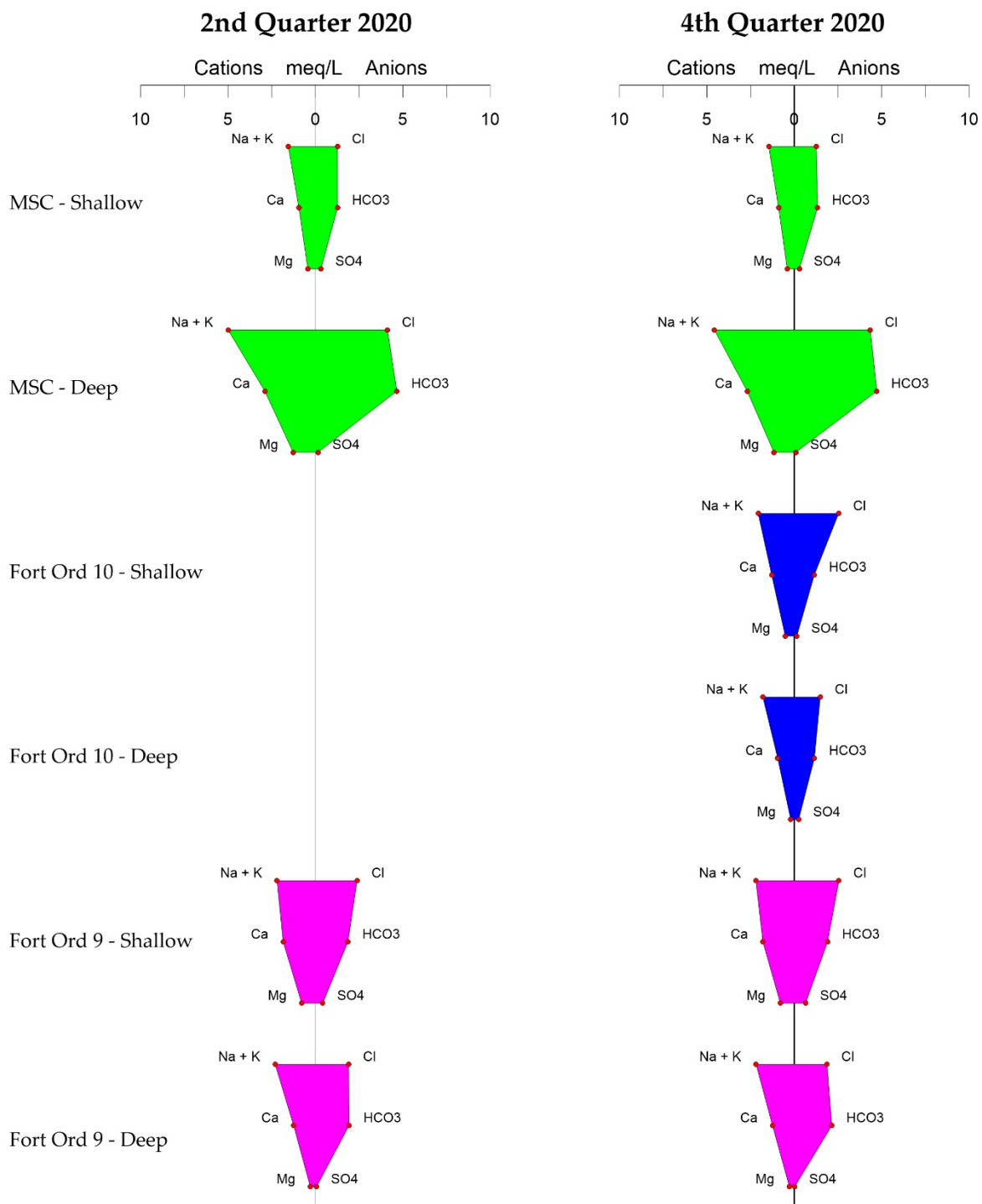


Figure 12 in the 2020 Seawater Intrusion Ana



## **Response from Montgomery & Associates Regarding Use of the Seaside Basin Groundwater Model to Estimate Velocities and Directions of Flow in the Aquifers**

These notes are in response to these two topics:

- 1) Could the Seaside Basin Groundwater Model be used to show velocities and directions of flow in the aquifers? If so, would that be helpful in predicting where the chloride plume that we are seeing in FO-9 and FO-10 is going and how fast it is moving?
- 2) Draft Chapter 5 of the Monterey Subbasin GSP shows a localized groundwater level depression in the 400-Foot Aquifer around monitoring wells FO-10 and FO-11 (outside of the Seaside Basin to the north). What pertinent information does this provide?

### Response:

The model is only as good as its calibration and input of measured stresses such as pumping and rainfall etc. In the next month or so, we will be improving model calibration in the Santa Margarita aquifer based on the travel times of water injected in the Santa Margarita aquifer at the PWM deep injection wells. This is being done [for MIW] because more accurate data from the model is needed to understand potential travel times to meet permit requirements. Unfortunately, as this effort focuses on the Santa Margarita aquifer, there will be no calibration of the Paso Robles model layer in the model where the increase in chloride has been observed within the Seaside basin.

The model could still be used to evaluate the movement of groundwater in the Paso Robles aquifer even at its current calibration, but the stress that is causing the decline in groundwater levels around FO-10 and FO-11 (outside of the basin) is not simulated in the model so we can't simulate flow very well outside of the basin. The Marina Coast Water District is also developing a groundwater model, and since Draft Chapter 5 of the Monterey Subbasin GSP says there is no known pumping in this area, what is causing the declines may not be simulated in their model either. Matters are complicated even more so because of the groundwater flow divide that runs between FO-9 (inside the basin) and FO-10 (outside the basin).

It may be better to manually calculate groundwater flow directions and velocities between wells using measured groundwater levels and a range of effective porosities. It is almost certain, though, that because of the significant pumping depression in the Paso Robles aquifer in the Northern Coastal subarea, groundwater in the vicinity of FO-9 is flowing towards the subarea's lowest groundwater elevations which are being caused by the pumping depression.

Flow from FO-10 outside of the basin is likely towards FO-11 [which is located to the east of FO-10] and not towards the Seaside Basin, since FO-11 is where the lowest measured groundwater elevations are [in that part of the Monterey Subbasin]. Figure 5-3 of the Draft Chapter 5 of the Monterey Subbasin GSP has a contour map of the 400-Foot aquifer which is equivalent to the Paso Robles aquifer that shows the groundwater low around FO-11.

Figure 1 includes hydrographs of wells in the vicinity of FO-9 and FO-10 (see Figure 2 for well location map). The hydrographs show that the greatest decline in groundwater levels in the shallow aquifer (Paso Robles) has occurred around FO-11 Shallow (about 25 feet). As you move away from FO-11 the decline seems to decrease with distance from FO-11. Groundwater level declines observed in FO-10 Shallow and FO-11 Shallow start before the City of Seaside was supplied water by Marina Coast Water District for their golf courses in-lieu of pumping their Reservoir and Coe Ave wells in the Seaside basin. Declines in FO-10 Shallow and FO-11 Shallow continued through the period the City was not pumping indicating some other source outside of the Seaside basin that is causing groundwater declines in FO-10 Shallow and FO-11 Shallow. Camp Huffman Shallow [the Watermaster's Sentinel Well No. 5] located 2 miles southeast of FO-11 also has a declining groundwater level similar to the wells plotted on the hydrograph.

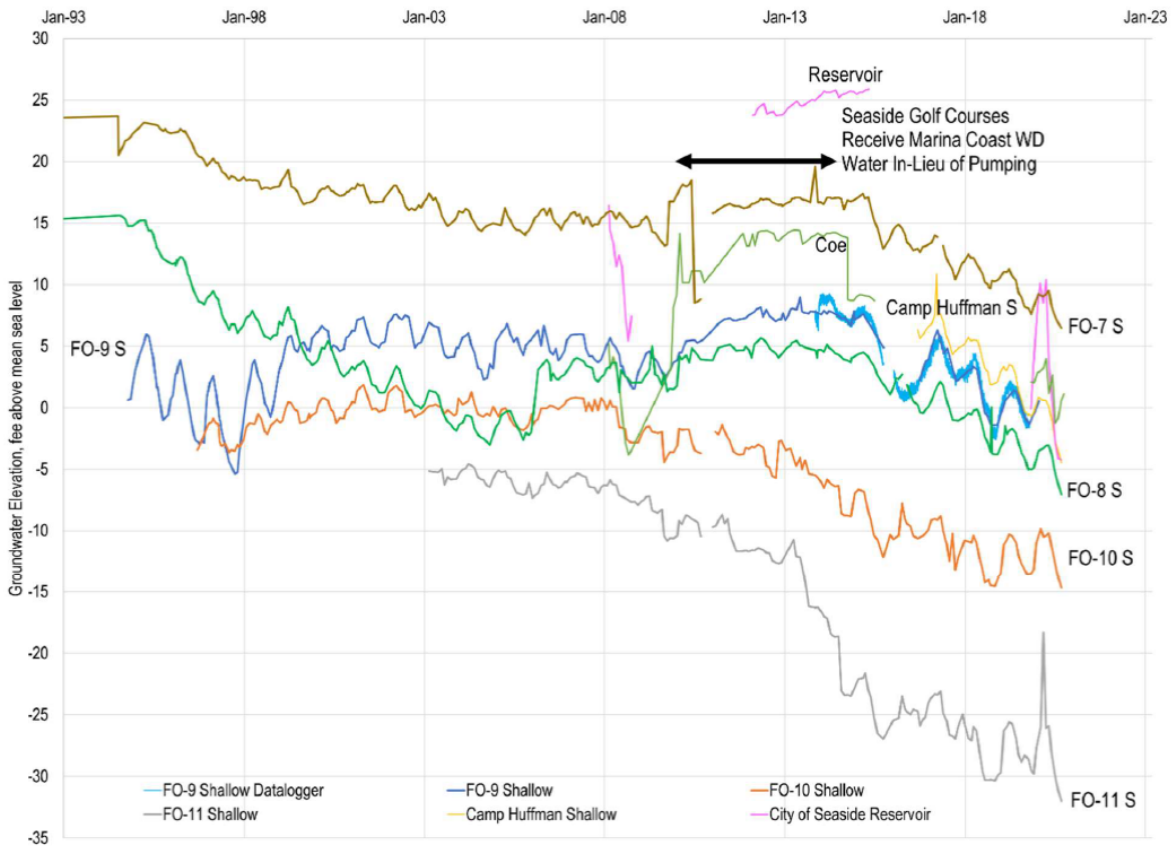


Figure 1. Comparison of Shallow Aquifer Well Groundwater Elevations

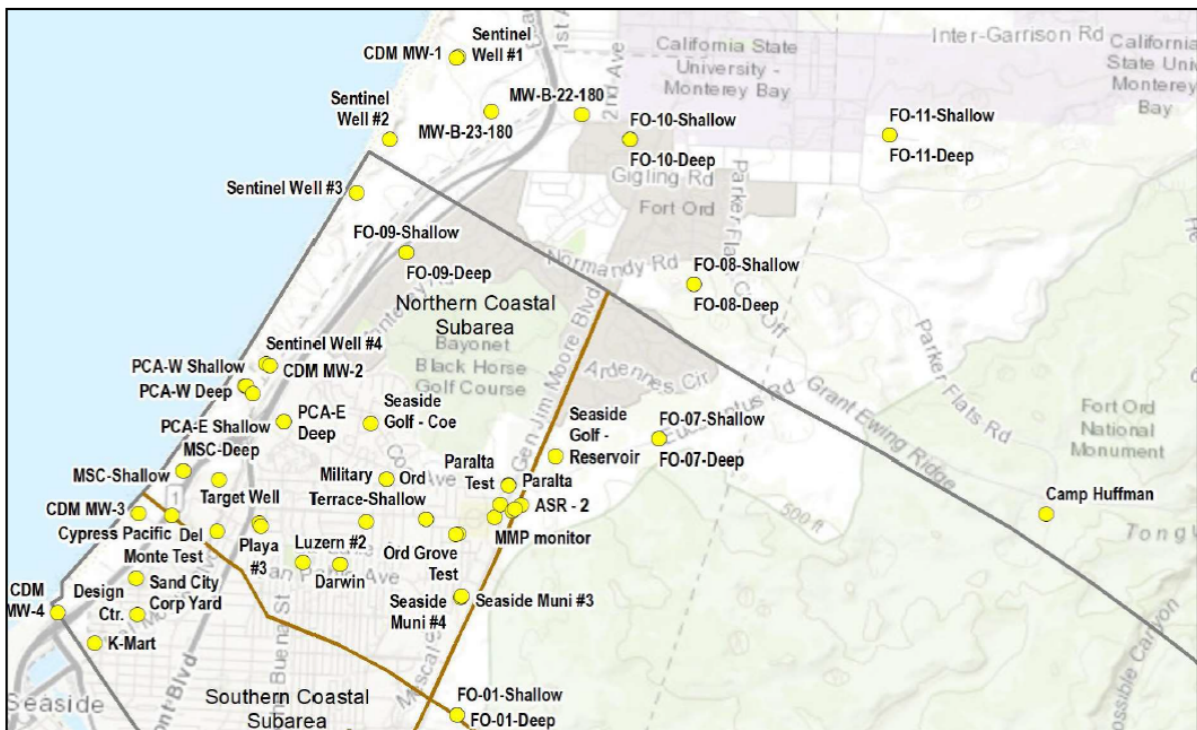


Figure 2. Well Locations



In the SIAR we associate the decline in FO-9 Shallow groundwater levels with the City of Seaside golf course pumping that started back up once their contract with Marina Coast Water District ended. This association is made because FO-9 Shallow recovered when golf course well pumping stopped and declined when pumping started back up (Figure 1). The monitoring wells that show the same groundwater level trends when the City of Seaside golf course pumping stops and starts are: FO-7 Shallow, FO-8 Shallow, and FO-9 Shallow (Figure 1).

FO-10 Shallow and FO-11 Shallow are on the north side of a groundwater divide between the Seaside basin and Monterey Subbasin, and so it makes sense that they do not respond to golf course pumping in the Seaside basin. Their declines are most likely due to pumping in the Monterey Subbasin and not Seaside basin. Based on measured groundwater levels, FO-10 Shallow and Deep appear to be screened in the same aquifer since their groundwater levels are very similar (Figure 3) while FO-11 Shallow and Deep appear to be screened in different aquifers that are connected since their groundwater level trends are similar but not at the same elevation (Figure 4). Figure 5 has FO-9 Shallow and Deep groundwater elevations that are very different to FO-10 and FO-11 that reflects that FO-9 is separated from FO-10 and FO-11 by the groundwater divide.

**Notes from Topics Discussed During Zoom Meeting on February 2, 2021**  
**Regarding Increasing Chloride Levels in Monitoring Well FO-9 Shallow**

Attendees:

Watermaster: **Bob Jaques**, Laura Paxton

MCWRA : **Tamara Voss**, Nicole Koerth

MPWMD : **Jon Lear**

Montgomery & Associates : **Georgina King**, **Derrick Williams**

Martin Feeney: **Martin Feeney**

Todd Groundwater: **Gus Yates**

**Sea Water Intrusion and Water Quality Sampling in the Sentinel Wells.**

A decision was made in late 2017, after concerns arose because of inconsistent water quality sampling results from the Sentinel Wells, to discontinue water quality sampling from these wells and to rely exclusively on induction logging to indicate the onset of seawater intrusion. The decision was made because it was felt that water quality samples from the Sentinel Wells were not representative of water quality in the aquifer surrounding the Sentinel Wells at the depths from which the water quality samples were collected but rather of the water within the well casing.

Questions:

**1. If seawater intrusion is coming into the Seaside Basin from the coast, why are we not seeing it in the Sentinel Wells?**

**GY**- Feels sea water is coming in from the coastline, but it is coming in near the surface and that seawater in the surface sands has been there for a long time. It is now gradually working its way down into the upper part of the Paso Robles aquifer. **MF** concurred with Mr. Yates. He noted that the Paso Robles aquifer is highly stratified so water moves easily horizontally through it.

**GK** - The Santa Margarita water quality near the coastline is fine.

**2.If it is sea water intrusion coming in from the north in the Marina - ORD area of the Monterey sub-basin, then the seawater intrusion front there must be further south than previously believed.**

There was general consensus at this point that the possible seawater intrusion is most likely coming in directly along the coastline of the Seaside Basin rather than from the north. However it may also be coming in along the coastline in the Marina-ORD area of the Monterey Subbasin as well.

**GK**-Monitoring well FO – 10 shallow is also showing high chloride levels similar to those in FO – 9 shallow. The increases in FO – 9 shallow started around October 2018 while the increase in FO-10 shallow started a year later. Currently both wells have chloride levels of approximately 90 mg/L.

**JL** -following the original sample showing high chloride levels in FO – 10 shallow, a confirmation sample was taken and it verified the original reading.

**MF**-He asked at what depth the sample pump in FO-9 was placed and JL responded that it is placed in the middle of the perforation zones.

**GY**-The perforations in well FO – 9 shallow are at these depths below sea level: 400 to 530 feet and 670 to 711 feet. In well FO-10 shallow they are at these depths below sea level: 420 to 444 feet and 1,180 to 1,200 feet.

**GY**-The groundwater depression in the Monterey Subbasin east of monitoring well FO – 11 may be pulling seawater inland.

**GK-EKI** (MCWD’s hydrogeologic consultant) feels pumping north of that depression in the 180/400-foot aquifer is causing this depression. **DW** pointed out that the hydrographs in monitoring well FO-11 shallow suggest that pumping in the deep aquifer cannot be drawing down water from the shallow aquifer, because the water level in the shallow aquifer is already lower than the water level in the deep aquifer.

**DW**-There is limited information on the geologic structure in the Monterey subbasin in the Marina-Ord area and this complicates gaining an understanding of the hydrogeology there. **MF-EKI** may have additional information that would be helpful in this regard.

**DW**-the flow divide between the Seaside Basin and the Monterey Subbasin in this area is very weak near the coast. **GK**- Water levels in FO – 10 shallow and FO – 11 shallow continued to drop even when the Seaside golf courses were getting water from MCWD and were therefore not pumping their own wells. This indicates that these two wells are north of the flow divide.

**3.If it is seawater water coming up from an underlying aquifer, or saline deposits from a lower geological formation, is there any way to determine that?**

**DW**- High chloride levels are not being seen in the deep aquifers. Therefore, it is more likely that seawater is coming in from along the coastline.

**4.Should the late 2017 decision to stop sampling for water quality in the Sentinel Wells be revisited? Could there be value in the results of water quality samples collected from the Sentinel Wells?**

**MF**- The Sentinel wells are only perforated in the Purisima formation and not in the Paso Robles aquifer. Therefore, water quality sampling from the Sentinel Wells would not provide information about the water quality in the Paso Robles aquifer. **GY** concurred, noting that the Sentinel Well perforations are not where we think the salt water may be coming from.

**5.Would expanding the scale on the induction logs to a higher resolution enable us to see smaller changes to detect smaller changes in water quality, e.g. chlorides?**

**MF**-Provided higher resolution copies of the induction logs and they did not indicate any appreciable changes in water quality. He noted that the salinity in the Sentinel Wells gets higher as you go from south to north. This is particularly evident in the shallower formations (Aromas Sands and Paso Robles).

**GY**-Changes in the logging tool seems to account for the more recent years of data showing somewhat higher conductivity. Since the traces from each tool cluster together it appears that there is no change in

conductivity, rather the changes noted in the plots were simply the result of using a different tool which gets slightly different readings.

**MF**-The current induction logging data compares well with the E-log data from when the Sentinel Wells were installed in 2007. He recommended doing induction logging in well FO-9 shallow and comparing this to the original E-log data for that well when it was installed. **JL** recalled that FO-9 shallow was installed around 1986. He said that he has the E- log charts from that work. **MF** will check with the well driller about getting E- log data from that well. **GY** asked whether we should also do induction logging in well FO-10 shallow, and **MF** supported doing that.

**6.Does the down-hole conductivity measuring done by Martin in 2017 show that water samples taken at the depths of each set of perforations are representative of the water quality in the aquifers at those depths?**

This topic was not discussed because there are no perforations in the Paso Robles aquifer in the Sentinel Wells.

**7.Martin Feeney ( in a November 2017 telecon) suggested having a geophysicist help explain the correlation between the induction logging results and the fluid conductivity profiling done in 2017. Is this something we should pursue?**

**MF**- Surface resistivity measurements could be used to perform a geophysical survey along a transect in this area. This was done in an area near the Sentinel Wells in 2015 by Rosemarie Knight (Stanford University) and Adam Pidlisecky (University of Calgary). These types of measurements could show relative changes in subsurface water quality, if they were done sequentially over a period of time. These types of surface geophysical methods always need to be calibrated to well samples or geophysical logs to ensure they are producing data that is consistent with actual physical groundwater measurements taken in the same area. **TV** concurred with the need for ground-truthing. **JL/MF**-They did not see how this remote-sensing method could detect seawater intrusion under the ocean, as it has reportedly been able to do.

**GY**-Performing surface resistivity measurements might be best done in the golf course area where there would be little electrical or other types of emissions that could interfere with that method. One firm that may be able to perform these types of measurements is Ramball, which is believed to have an office in Sacramento.

**8.Should we consider discontinuing induction logging and replace it with the low volume/low flow sample collection method to obtain water quality samples? (Martin mentioned this in one of his earlier reports).**

**GY** - No. The induction logs continue to serve their original purpose, which is to detect changes in groundwater salinity throughout the vertical profile. Water quality samples are difficult to do in these wells because of their small diameter and large depth, and they would only provide quality for deep horizons where salinity is currently still low.

**9. Is it possible to retrofit the Sentinel Wells in some manner so that depth-specific water quality samples can be collected? For example, could only the perforations at the desired depth be retained by sealing off other perforations, so the only water entering the casing would be from the desired depth (and aquifer)?**

**MF**-No it would not be possible to do this. A cement seal fills the annulus all the way down to the perforated interval. It is not possible to punch new perforations at shallower depths through the cement.

**10. Since the well logs indicate that all but one of the Sentinel Wells is perforated in the Purisima formation, and none are perforated in the Paso Robles formation, is there any way the Sentinel Wells, particularly Sentinel Wells No. 1 and No. 2, could be retro-perforated in the Paso Robles aquifer in order to obtain water quality samples from that aquifer?**

**MF**-These wells were designed for induction logging purposes, not for water quality sample collection. Due to the way these wells are constructed, it would not be possible to retrofit them to collect water quality samples from the Paso Robles aquifer. The concrete seal around the outside of the well is too deep to allow perforations to be placed in the Paso Robles aquifer.

**11. Are there any existing wells in the vicinity of the Sentinel Wells which could be used as monitoring wells to provide data from that part of the Basin to compare to the induction logging results from the Sentinel Wells?**

**JL** and **MF**-the CDM wells are very shallow (only about 100 feet deep) and were installed years ago in conjunction with a study about constructing a desalination plant. and would not be helpful in providing information on the Paso Robles aquifer. The Sentinel Well perforations are too deep, so they would not provide useful information either. None of the call participants were aware of existing wells that would be useful for monitoring that are not already monitored.

**12. Would it now be worth undertaking the work described in HydroMetrics' February 2, 2017 Proposed Work Plan to Investigate Sources of Fluctuating Chlorides in the Sentinel Wells?**

**TV**-Any water quality samples taken from the Sentinel Wells would provide inconclusive information. **DW/MF**-It would be better to undertake a geophysical survey rather than taking water quality samples from these wells.

### Additional Monitoring Wells

#### Questions:

**1. Are there existing wells in the Northern Coastal Subarea of the Seaside Basin, or in the southwestern portion of the Marina-Ord subarea of the Monterey Subbasin, which could be used as monitoring wells to provide data from that part of the Basin to compare to the water quality sampling results from monitoring wells FO-9 Shallow and FO-10 Shallow? If so, would they need retrofitting in order to be sampled for water quality?**

**DW**- Asked if there were any wells that were being recommended for destruction in the lower Salinas Valley that could potentially be used to provide monitoring well information in this area. **TV**-There is a list of wells that are recommended for destruction in the CSIP area of the 180/400-foot aquifer and inland

and southerly toward the Davis/Reservation Road area. However, there are no wells on the destruction list in the Monterey subbasin.

**JL**-He is not aware of any other wells in this area that could be used to monitor the Paso Robles aquifer.

**2. If there are no existing wells that could be used for water quality monitoring in that area, would it be worth the cost (estimated at between \$200K and \$300K each) of installing one or more monitoring wells in the Paso Robles aquifer in that part of the Basin in order to get a better understanding of the hydrogeology in, and be able to obtain water quality samples from, the area where we are finding increasing chloride levels? Should such wells go deep enough to also get into the Santa Margarita aquifer?**

**MF**-It is hard to get permission nowadays to put in a monitoring well along the coastline in this area, because it is all managed by California Department of Parks and Recreation.

**DW**-If we feel that a new monitoring well should be put in, we would need to decide where best to locate it.

**GY**-It would be more cost-effective to perform a geophysical survey for a few years to see if there are changes in subsurface water quality over time. This information could also be helpful in finding the best location for a new monitoring well, if it was ultimately decided that it would be beneficial to install a new monitoring well.

There was general consensus that performing a geophysical survey would be a better and more cost-effective means of testing the hypothesis that seawater is coming in via the shallow sand formations near the coastline and gradually working its way downward into the Paso Robles aquifer, than it would be to put in a monitoring well at this time.

### Other Topics

**JL**-When the Fort Ord golf course wells stop pumping and they begin irrigating with recycled water, this will probably have an effect on groundwater levels and groundwater movement.

**DW**-We may want to know more about the water hydraulics in the shallow aquifers such as how fast the water is moving in and what directions.

**MF**-Pure Water Monterey vadose zone wells will inject water just above the Paso Robles aquifer. **JL** reported that those wells are currently injecting about 70 gallons per minute and that it would take over 200 years for the injected water to reach the production well area. **GY** noted that 70 gallons per minute is too small to help raise water levels in the production wells.

**GK**-the sodium:chloride ratios in FO – 9 and FO – 10 shallow are not dropping as fast as expected, so it is not clear whether seawater or something else is the cause of the increasing chloride levels. However, sodium/chloride ratio data from Pajaro Valley showing the onset of seawater intrusion also did not show a drop in the ratio until chloride concentrations were higher than about 200 mg/L.

**TV**-A 90 mg/L chloride level is not a big change over the baseline level which **GK** reported was about 50 mg/L.

**GK**-We could perform the bromide analysis as another possible indicator of whether the cause of the increased chloride levels is seawater. **JL**-the data exist to do that. **BJ** -we are already doing some of the anion:cation analyses in the SIAR.

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<b>MEETING DATE:</b>	February 10, 2021
<b>AGENDA ITEM:</b>	5
<b>AGENDA TITLE:</b>	Schedule
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager
<p><b>SUMMARY:</b> As a regular part of each monthly TAC meeting, I will provide the TAC with an updated Schedule of the activities being performed by the Watermaster, its consultants, and the public entity (MPWMD) which are performing certain portions of the work.</p> <p>Attached is the updated schedule for 2021 activities.</p>	
<b>ATTACHMENTS:</b>	Schedule of Work Activities for FY 2021
<b>RECOMMENDED ACTION:</b>	Provide Input to Technical Program Manager Regarding Any Corrections or Additions to the Schedules



## Seaside Basin Watermaster 2021 Monitoring and Management Program Work Schedule

ID	Task Name	Dec '20	Jan '21	Feb '21	Mar '21	Apr '21	May '21	Jun '21	Jul '21	Aug '21	Sep '21	Oct '21	Nov '21	Dec '21
1	<b>Replenishment Assessment Unit Costs for Water Year 2022</b>													
2	B&F Committee Develops Replenishment Assessment Unit Cost for 2022 Water Year													
3	If Requested, TAC Provides Assistance to B&F Committee in Development of 2022 Water Year Replenishment Assessment Unit Cost													
4	Board Adopts and Declares 2022 Water Year Replenishment Assessment Unit Cost													
5	<b>Replenishment Assessments for Water Year 2021</b>													
6	Watermaster Prepares Replenishment Assessments for Water Year 2021													
7	Watermaster Board Approves Replenishment Assessments for Water Year 2021 (At December Meeting)													
8	Watermaster Levies Replenishment Assessment for 2021													
9	<b>Monitoring &amp; Management Program (M&amp;MP) Budgets for 2022 and 2023</b>													
10	Preliminary Discussion of Potential Scope of Work for 2022 M&MP													
11	Prepare Draft 2022 M&MP													
12	TAC approves Draft 2022 M&MP													
13	Prepare Draft 2022 and 2023 O&M and Capital Budgets													
14	TAC approves Draft 2022 and 2023 O&M and Capital Budgets													
15	Budget & Finance Committee Approves Draft 2022 M&MP and Draft 2022 O&M and Capital Budgets													
16	Board approves 2022 M&MP and 2022 M&MP O&M and Capital Budgets													
17	<b>2021 Annual Report</b>													
18	Prepare Preliminary Draft 2021 Annual Report													
19	TAC Provides Input on Preliminary Draft 2021 Annual Report													
20	Prepare Draft 2021 Annual Report (Incorporating TAC Input)													
21	Board Provides Input on Draft 2021 Annual Report (At December Board Meeting)													
22	Prepare Final 2021 Annual Report (Incorporating Board Input)													
23	Watermaster Submits Final 2021 Annual Report to Judge													
24	<b>MANAGEMENT</b>													

## Seaside Basin Watermaster 2021 Monitoring and Management Program Work Schedule

ID	Task Name	Dec '20	Jan '21	Feb '21	Mar '21	Apr '21	May '21	Jun '21	Jul '21	Aug '21	Sep '21	Oct '21	Nov '21	Dec '21
		29	6	13	20	27	3	10	17	24	31	7	14	21
25	<b>M.1 PROGRAM ADMINISTRATION</b>													
26	Prepare Initial Consultant Contracts for 2022													
27	TAC Approval of Initial Consultant Contracts for 2022													
28	Board Approval of Initial Consultant Contracts for 2022													
29	<b>M.1.g – Sustainable Groundwater Management Act Reporting Requirements</b>													
30	Montgomery & Associates Prepares Draft Groundwater Storage Analysis													
31	Submit SGMA Documentation to DWR													
32	<b>IMPLEMENTATION</b>													
33	<b>I.2.a DATABASE MANAGEMENT</b>													
34	I.2.a.1 Conduct Ongoing Data Entry/Database Maintenance													
35	<b>I.2.b DATA COLLECTION PROGRAM</b>													
36	I.2.b.2 Collect Monthly Water Levels (MPWMD)													
37	I.2.b.3 Collect Quarterly Water Quality Samples (MPWMD)													
38	I.2.b.6 MPWMD provides annual water quality and water level data to Montgomery & Associates for inclusion in the 2021 SIAR													
39	<b>I.4.c Annual Seawater Intrusion Analysis Report (SIAR)</b>													
40	Montgomery & Associates Provides Draft SIAR to Watermaster													
41	TAC Approves Annual Seawater Intrusion Analysis Report (SIAR)													
42	Board Approves Annual Seawater Intrusion Analysis Report (SIAR)													

**SEASIDE BASIN WATER MASTER  
TECHNICAL ADVISORY COMMITTEE  
\* \* \* AGENDA TRANSMITTAL FORM \* \* \***

<b>MEETING DATE:</b>	February 10, 2021
<b>AGENDA ITEM:</b>	6
<b>AGENDA TITLE:</b>	Other Business
<b>PREPARED BY:</b>	Robert Jaques, Technical Program Manager
<b>SUMMARY:</b> The “Other Business” agenda item is intended to provide an opportunity for TAC members or others present at the meeting to discuss items not on the agenda that may be of interest to the TAC.	
<b>ATTACHMENTS:</b>	None
<b>RECOMMENDED ACTION:</b>	None required – information only