MEETING NOTICE AND AGENDA

TECHNICAL ADVISORY COMMITTEE OF THE SEASIDE BASIN WATER MASTER

DATE: Wednesday, April 27, 2022
MEETING TIME: 1:30 p.m.

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

YOU MAY ATTEND AND PARTICIPATE IN THE MEETING AS FOLLOWS:
JOIN FROM A PC, MAC, IPAD, IPHONE OR ANDROID DEVICE (NOTE: ZOOM APP MAY NEED TO BE DOWNLOADED FOR SAFARI OR OTHER BROWSERS PRIOR TO LINKING) BY GOING TO THIS WEB ADDRESS:
https://us02web.zoom.us/j/84650086315?pwd=cHZGYXppSEcra2xuZGtaUXdVVEZqdz09
If joining the meeting by phone, dial this number:
+1 669 900 9128 US (San Jose)

If you encounter problems joining the meeting using the link above, you may join from your Zoom screen using the following information:
Meeting ID: 846 5008 6315
Passcode: 212640

OFFICERS
Chairperson: Jon Lear, MPWMD
Vice-Chairperson: Tamara Voss, MCWRA
MEMBERS

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

The next regular meeting is tentatively planned for Wednesday May 11, 2022 at 1:30 p.m. That meeting will likely also be held via teleconference.

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	April 27, 2022
AGENDA ITEM:	2.A
AGENDA TITLE:	Approve Minutes from the March 9, 2022 Meeting
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

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

ATTACHMENTS:	Minutes from this meeting
RECOMMENDED ACTION:	Approve the minutes

D-R-A-F-T
MINUTES

D-R-A-F-T
MINUTES

Seaside Groundwater Basin Watermaster
Technical Advisory Committee Meeting
March 9, 2022
(Meeting Held Using Zoom Conferencing)

Attendees: TAC Members

City of Seaside – Nisha Patel
California American Water – Tim O'Halloran
City of Monterey – Cody Hennings
Laguna Seca Property Owners – Wes Leith (joined the meeting at 1:59 p.m.)
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 – Pascual Benito

Others
MCWDGSA – Patrick Breen

The meeting was convened at 1:33 p.m.

1.Public Comments
There were no public comments.

2.Administrative Matters:

A. Approve Minutes from the January 12, 2022 Meeting
On a motion by Ms. Voss, seconded by Mr. O'Halloran, the minutes were unanimously approved as presented.

B. Sustainable Groundwater Management Act (SGMA) Update
Mr. Jaques summarized the agenda packet materials for this item and there was no other discussion.

C. Make Findings Required Under AB 361 Regarding Holding Meetings Via Teleconference
Mr. Lear briefly summarized the agenda packet materials for this item. A motion was made by Mr. Gaglioti, seconded by Mr. O'Halloran, to adopt the findings contained in the agenda packet. The motion passed unanimously.

Mr. Jaques reported that he would contact County legal counsel Les Girard to verify that the Governor's proclamation and the other conditions that allow meetings to be held by Zoom were still in effect.

Mr. Gaglioti noted that Monterey Salinas Transit is returning to in-person meetings. He noted that if the Monterey One Water conference room was available for in-person meetings, then it might be possible to resume in-person meetings.

3. Presentation and Discussion of Flow Velocity Modeling

Mr. Jaques introduced this item and Mr. Benito provided a PowerPoint presentation on the modeling work. Copies of his presentation slides are attached.

Mr. Gaglioti asked about what level of confidence there was in the findings of the modeling. Mr. Benito responded that the modeling is based on repeating historical hydrology patterns. Mr. Gaglioti said he felt future years are likely to be drier than the historical patterns.

Mr. Lear commented that in Santa Cruz County the Mid-Coast Basin is modeling more conservative (drier) hydrology projections.

Mr. Benito said other climatic conditions and hydrology projections could be considered. He reported that depressed water levels inland has the greatest impact on the advance of sea water intrusion. He went on to say that the use of recycled water on the Seaside golf courses will have a significant beneficial impact, as will the Cal Am payback program.

Mr. Gaglioti observed that ASR has a strong impact, and if ASR is less than is being projected it would have a harmful impact. Also, he asked if Seaside's use of recycled water at its golf courses to enable it to serve new development projects had been considered. Mr. Benito responded that this has been addressed in the modeling work.

Ms. Voss asked Mr. Benito a question about recharge during wet years. He responded that surface recharge has little impact, mainly in wet years there can be an increase in ASR as a result of increased rainfall in Carmel Valley. This helps raise groundwater levels due to the banking of the ASR-injected water.

Mr. O'Halloran said he views the assumptions used in the modeling work as a best-case scenario, and expressed concern that demand will be higher and Cal Am may not be able to do all of its projected payback, and that the hydrology projections used in the modeling may be overly optimistic.

Mr. Lear commented that looking at other scenarios in the replenishment water modeling work will provide some insight.

Mr. Benito reported that a recent tracer study with the Pure Water Monterey Project found that the initially estimated porosity values needed to be adjusted in order to match the tracer study results. So in the Technical Memorandum includes a range of porosity values (8% to 16%).

He also pointed out that particle tracking is not a substitute for full seawater intrusion modeling. Also, it does not tell us where the seawater-freshwater interface is located now, or where it will be in the future.

The most significant inland flows occur in the lower Paso Robles aquifer.

The hydrologic conditions that are assumed in the modeling have a significant impact on travel times.

There was brief discussion of the potential benefit of evaluating the impacts of adjacent subbasin Groundwater Sustainability Plan projects being implemented.

Mr. Jaques asked Mr. Benito how it might be possible to locate the seawater-freshwater interface in the offshore area. He responded that the Seawater Intrusion Group's seawater intrusion model and airborne electromagnetic work may provide helpful information. Mr. Lear commented that in the Mid-County Basin in Santa Cruz County they did repeatable surveys to detect changes in location.

Mr. Gaglioti asked Mr. Jaques the status of the airborne electromagnetic work. Mr. Jaques said he was not aware of the status of Rosemary Knight's proposed development of further airborne electromagnetic surveys. He noted that DWR is apparently not planning to do airborne electromagnetic surveys in the Seaside basin.

Mr. Gaglioti recommended that in the staff report to the Board on this modeling work that the time-series graphics should be highlighted as being very climate dependent. He felt that people could get a misleading impression by assuming that the climate pattern will repeat itself. He went on to say he would like to see more "dire" (likely) drought conditions evaluated in the flow direction and flow velocity modeling work. He referred to Mr. Benito's slides number four and five which he felt could give the wrong impression that everything will be fine with Pure Water Monterey Expansion and Cal Am payback taking place.

Mr. O'Halloran said that if the TAC recommends running additional replenishment water scenarios (a topic to be discussed under agenda item 4 during today's meeting) it would be beneficial to put discussion of the flow direction and flow velocity Technical Memorandum on hold and then determine if it should include modeling of additional scenarios.

Ms. Voss said it was important to highlight which components affect the results of the flow direction and flow velocity analysis the most, e.g. ASR, Pure Water Monterey Expansion, Cal Am repayment, etc. Mr. Lear suggested identifying what percentage of groundwater level rise is attributed to each of those components. Mr. Benito said he could develop graphics and text to explain this.

Mr. Lear recommended tabling further discussion of the flow direction and flow velocity modeling Technical Memorandum for the time being, and there was consensus to support this recommendation.

4. Discuss Performing Additional Replenishment Water Modeling Using Different Assumptions
Mr. Jaques summarized the agenda packet materials for this item.

Mr. Lear proposed first discussing whether the TAC wants to see additional scenarios run, and then if so, what do we want to learn from those scenarios.

Mr. O'Halloran said he was looking for a more realistic (more conservative) analysis using what he felt were more realistic assumptions. He expressed concern that Cal Am could have to over pump its Seaside basin water rights in order to meet its customers' demands. There was some discussion of ASR injection volumes, timing of ASR injection on a seasonal basis, and climate change impacts on ASR injection.

Mr. Lear asked if the TAC supported having scenarios one and two as described in the agenda packet evaluated.

Mr. Gaglioti said he supported evaluating those scenarios, and that Mr. Jaques should get a cost and scope proposal from Montgomery Associates to do that and bring it back to the TAC for possible refinement of the scope and cost before sending it forward to the Board to authorize this work.

A motion was made by Mr. Gaglioti, seconded by Mr. O'Halloran, to have Montgomery and Associates cost-out scenarios one and two and return to the TAC for further discussion. The motion passed unanimously.

5. Discuss and Provide Direction on Concerns About the Final Draft Groundwater Sustainability Plan for the Monterey Subbasin

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

Mr. Gaglioti felt comments should be submitted.

Mr. O'Halloran, Mr. Lear, Mr. Gaglioti, and Ms. Voss all said they shared the concerns described in the agenda packet. There was some discussion about how long the comment period will be open by DWR as it evaluates the recently submitted Monterey Subbasin Groundwater Sustainability Plan. Ms. Voss reported that that comment period ends April 23.

Mr. Lear said that MPWMD management did not recommend sending a letter opposing approval, rather just submitting the concerns via comments. Mr. Breen said these were valid concerns, and asked that the same types of comments be submitted with regard to the 180/400-foot aquifer Groundwater Sustainability Plan.

Mr. Lear, Ms. Voss, Mr. Leith, and Mr. Gaglioti said they were all okay with the TAC submitting these comments through the comment portal available on the DWR website.

Mr. Gaglioti said he also wanted the Board to have the opportunity to submit a formal letter.

A motion was made by Mr. Gaglioti, seconded by Mr. Lear, to submit the comments contained in the agenda packet and to also forward them to the Board to determine whether the Board wishes to send a formal letter. The motion passed unanimously.

6. Discuss Groundwater Level Protective Elevations

Mr. Jaques summarized the agenda packet materials for this item. He noted that one reason that seawater intrusion may not yet have been detected at the MSC-Shallow well, even though it is not at a protective water level, could be because the seawater intrusion front has not yet advanced that far inland.

Mr. Benito said if the offshore geology were different from what has been used in the modeling, this could change the protective water levels. The current protective water levels are conservative and protective of the basin. He said there could be a three-dimensional component, such that if one well achieved protective water level it might affect the location of the seawater-freshwater interface and might keep it from reaching another well. Also, the seawater intrusion model being developed by the Seawater Intrusion Work Group might provide some insight. It will utilize a three-dimensional density dependent seawater intrusion modeling technique.

Ms. Voss asked what additional data would be needed to refine the protective water levels. Mr. Benito responded that he would need information about the geometry of the aquifers offshore. Mr. Jaques noted that the USGS apparently has some geologic mapping information offshore, and is hoping to get a copy of this which he would share with Mr. Benito.

There was consensus that there is some uncertainty in the accuracy of the protective water levels. Due to a lack of offshore geologic information, it does not appear warranted to do any further analysis of protective water levels.

7. Schedule

Mr. Jaques noted that the only change in the schedule in this update was the timing of the presentations on the flow velocity/flow direction modeling work. There was no other discussion.

8. Other Business

There was no other business.

The meeting adjourned at 4:07 PM.

SEASIDE GROUNDWATER BASIN

2021 SEAWATER INTRUSION TRAVEL-TIME ANALYSIS

MONTGOMERY & ASSOCIATES

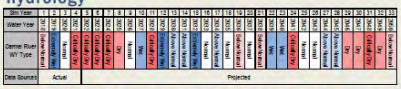
Presented to the Seaside Basin TAC March 9th, 2022

OBJECTIVES

- Estimate range of velocities, time scales, and inland travel distances of potential seawater intrusion along the coastline
- Consider both current conditions and projected potential future conditions as represented in the recently updated predictive baseline model simulation

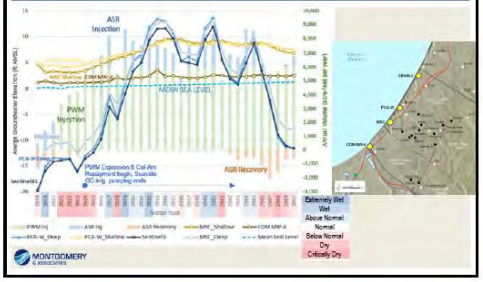
UPDATED BASELINE SIMULATION RECAP

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

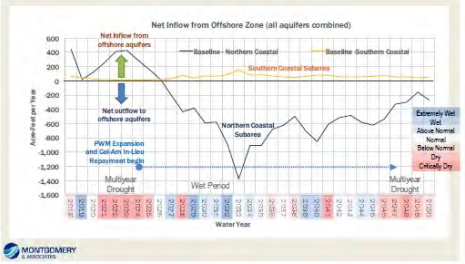


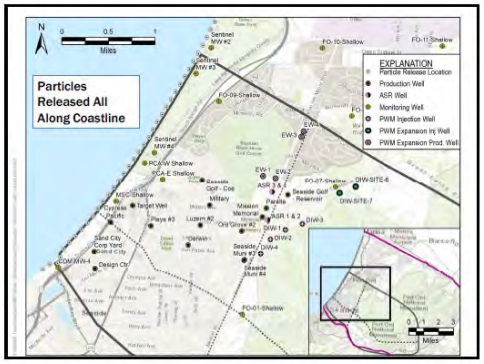
- WY 2022–2050: projected pumping, all planned projects, PWM & ASR injection tied to cycled historical hydrology
- Mean Sea Level rise of 1.3 ft by 2050
- No GSP projects in neighboring subbasins (e.g. no rise in water levels along boundaries)

BASELINE SIMULATION WATER LEVELS



CHANGE IN NET FLOWS TO/FROM OFFSHORE AQUIFERS





PARTICLE PATHS & TRAVEL TIMES

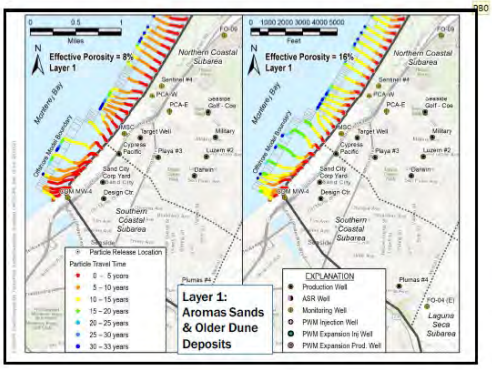
- The travel velocity is inversely dependent on effective porosity of the aquifer material
  - higher porosity → slower velocities, shorter travel distances
  - lower porosity → faster velocities, greater travel distances
- Effective porosity is not a calibrated value in the model, so evaluate range of values
  - Higher Velocity Scenario: 8% effective porosity
  - Lower Velocity scenario: 16% effective porosity

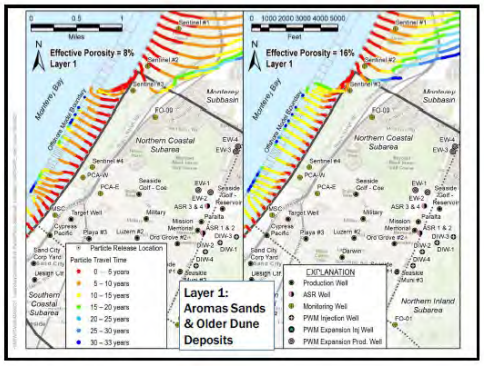
MONTGOMERY & ASSOCIATES

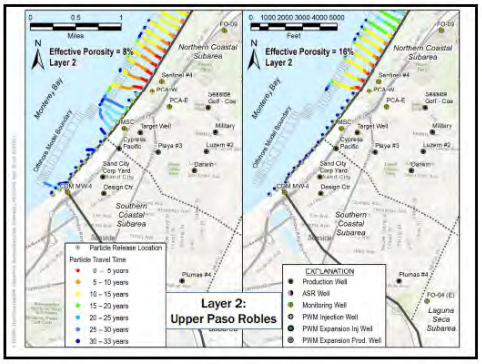
CAVEATS/LIMITATIONS

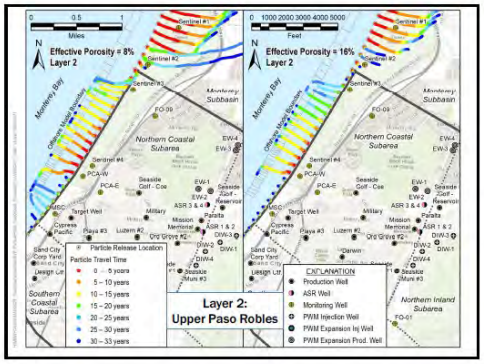
- Particle tracking is not a substitute for full sea water intrusion modeling (e.g. like a SEAWAT density-dependent flow & transport model)
- Represents advective groundwater transport with no density dependence and with no dispersion/spreading
- Seaside Model has been calibrated to water levels, but not to mass transport data, like travel time of solutes
- Does not tell us where the current sea water interface is located offshore or where it will be in the future
- But does give us potential range of groundwater travel rates from the coastline under a range of conditions

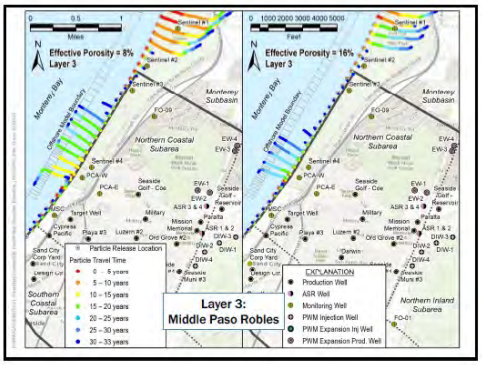
MONTGOMERY & ASSOCIATES

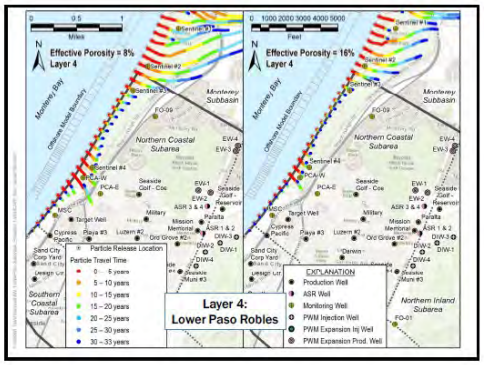


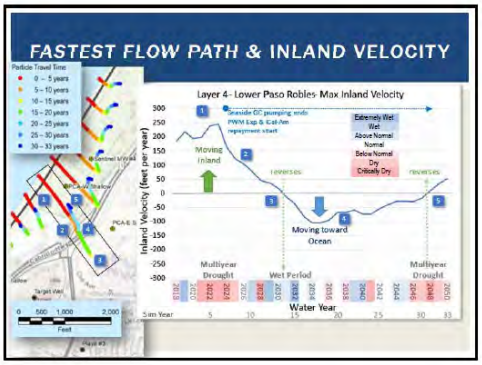


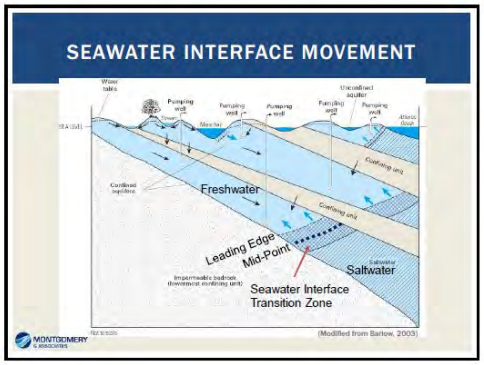


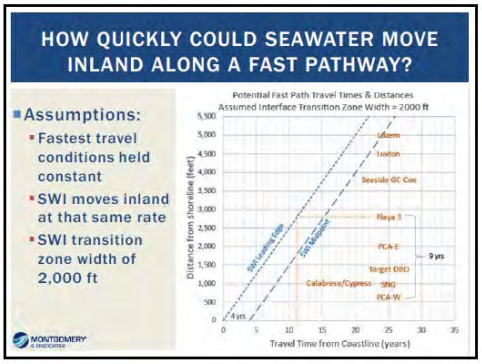


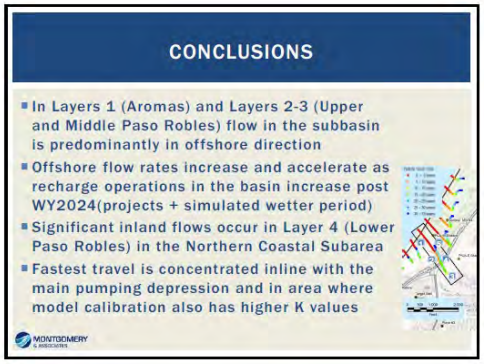

Effective Porosity = 8%
Layer 3
Effective Porosity = 16%
Layer 3
Layer 3:
Middle Paso Robles
EXPLANATION
Production Well
ASR Well
Monitoring Well
PWM Injection Well
PWM Expansion Inj Well
PWM Expansion Prod. Well
Particle Release Location
Particle Travel Time
0 – 5 years
5 – 10 years
10 – 15 years
15 – 20 years
20 – 25 years
25 – 30 years
30 – 33 years


Effective Porosity = 8%
Layer 4
Effective Porosity = 16%
Layer 4
Layer 4:
Lower Paso Robles
EXPLANATION
Production Well
ASR Well
Monitoring Well
PWM Injection Well
PWM Expansion Inj Well
PWM Expansion Prod. Well
Particle Release Location
Particle Travel Time
0 – 5 years
5 – 10 years
10 – 15 years
15 – 20 years
20 – 25 years
25 – 30 years
30 – 33 years


FASTEST FLOW PATH & INLAND VELOCITY
Layer 4- Lower Paso Robles- Max Inland Velocity
Inland Velocity (feet per year)
Moving Inland
Moving toward Ocean
Multiyear Drought
Wet Period
Multiyear Drought
Water Year
Sim Year


SEAWATER INTERFACE MOVEMENT
Freshwater
Leading Edge
Mid-Point
Saltwater
Seawater Interface
Transition Zone
(Modified from Barlow, 2003)


HOW QUICKLY COULD SEAWATER MOVE INLAND ALONG A FAST PATHWAY?
Assumptions:
Fastest travel conditions held constant
SWI moves inland at that same rate
SWI transition zone width of 2,000 ft
Potential Fast Path Travel Times & Distances
Assumed Interface Transition Zone Width = 2000 ft
Distance from shoreline (feet)
Travel Time from Coastline (years)
Lloyd
Luzern
Loxton
Seaside GC Coe
Playa 3
PCA-E
Target DBO
Calabrese/Cypress
SNG
PCA-W
4 yrs
9 yrs


CONCLUSIONS
In Layers 1 (Aromas) and Layers 2-3 (Upper and Middle Paso Robles) flow in the subbasin is predominantly in offshore direction
Offshore flow rates increase and accelerate as recharge operations in the basin increase post WY2024(projects + simulated wetter period)
Significant inland flows occur in Layer 4 (Lower Paso Robles) in the Northern Coastal Subarea
Fastest travel is concentrated inline with the main pumping depression and in area where model calibration also has higher K values

CONCLUSIONS

- Max inland velocities of 250 ft/yr simulated under current & near-term basin conditions
- Inland velocity rates decrease as water levels rise and can reverse direction as gradients change from an inland to offshore direction
- Inland travel rates are sensitive to changes in hydrologic conditions that impact the amount of water available for net-ASR recharge
- Periods of prolonged drought increase potential inland travel rates & seawater intrusion risk

MONTGOMERY & ASSOCIATES

FUTURE CONSIDERATIONS

- Projected hydrologic conditions is one of many possible future hydrology scenarios. Other future climatic conditions could be considered for future modeling
- Cross-boundary flows with the Monterey Subbasin depend on assumed groundwater levels in the Marina/Ord area of model. The assumption that these remain unchanged (i.e. no GSP projects) should be reviewed and the impact evaluated.
- Need improved understanding of where SWI currently located offshore

MONTGOMERY & ASSOCIATES

QUESTIONS & DISCUSSION

MONTGOMERY & ASSOCIATES

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	April 27, 2022
AGENDA ITEM:	2.B
AGENDA TITLE:	Sustainable Groundwater Management Act (SGMA) Update
PREPARED BY:	Robert Jaques, Technical Program Manager

At the State level:
Since my last update, I have not received any new materials from the State that would impact the Watermaster.

At the Monterey County level:
Attached are summaries of meetings held in March 2022.

ATTACHMENTS:	Meeting Summaries
RECOMMENDED ACTION:	None required – information only

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

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

180/400-Foot Aquifer GSP Implementation Committee Meeting March 3, 2022

Topics of interest to the watermaster discussed at this meeting included:

- This subbasin is losing about 13,000 to 14,000 acre-feet per year of usable stored groundwater.
- It is very complicated to develop a sustainable yield for a subbasin. A model is needed and many assumptions must be made. Mr. Williams of Montgomery and Associates reported that there currently is not a model available for the subbasin. Also the listing of projects and management actions to be implemented has not been finalized. So at this point he is only able to make a rough estimate of the same nature as the Natural Safe Yield that is used in the Seaside basin. It is projected that by 2030 the sustainable yield for the 180/400 – foot subbasin will be about 111,200 acre-feet per year, and that by 2070 this will increase to about 116,900 acre-feet per year
- Development of a model for this subbasin is projected to start in the near future.
- The following are projects or management actions being considered in these categories:
- Projects in Lieu of Extraction
    - The largest one is 15,000 acre-feet per year of product desalination water from a 30,000 acre foot per year extraction barrier. This is referred to as the Regional Municipal Supply Project.
    - Other alternate supplies in lieu of extraction include these:
        - irrigation water supply Project
        - CSIP expansion
        - CSIP optimization
        - Modify the M1W recycled water plant
- Groundwater recharge projects from reservoir read operations and ASR
- Seawater intrusion barriers
    - injection barrier
    - extraction barrier (this is considered to be the most appropriate for this subbasin)
    - physical subsurface barrier
- In addition to these projects there are management actions that will be considered.

This group will go over the updated Chapter 9 of the GSP at its April meeting. That chapter describes these projects in detail and may include initial prioritizations of for implementation.

SVBGSA Seawater Intrusion Working Group Meeting March 7, 2022:

- At this meeting there was another, and this time more in-depth, presentation on development of the Seawater Intrusion Model.
- There are differences between this model and the Monterey Subbasin model, but there is fairly good agreement with the Watermaster's Seaside basin model in terms of annual recharge values.
- For the Seaside basin they are using the Watermaster's reported production quantities.
- For the Seaside basin they are using the hydraulic conductivity distributions contained in the Seaside basin's groundwater model.

- They are calibrating the seawater intrusion model to our groundwater level data in the Seaside basin.
- Per Martin Feeney, USGS bathymetry shows the outcroppings of the various strata, including the aquifers, along the coastline of the Seaside basin. Greg Nelson will send us a copy of that document. Per Mr. Feeney the deltaic deposits overlie the outcroppings, so they don't show up in the mapping. Deltaic deposits are considered to have high transmissivity that would allow sea water to flow through it and into these aquifers
- The seawater intrusion model will be used to predict how the seawater intrusion front is affected by various scenarios which would include management actions and projects to mitigate seawater intrusion.
- It might take much longer to push the seawater intrusion front back toward the ocean than it did for the front to advance inland.
- Per Derrik Williams, in the one 180/400-foot Groundwater Sustainability Plan the seawater intrusion Measurable Objective is a "goal" and is not what they realistically expect to achieve by 2040 (20 years after the Groundwater Sustainability Plan started being implemented).

Pure Water Monterey Water Quality and Operations Committee Meeting March 16, 2022:

Information provided at this meeting included:

- The total quantity of water injected since inception of the Pure Water Monterey Project is 6,050 AF and in Water Year 2022 the amount is 1,493 AF. The last injection occurred in December 2021. No more injection can be performed until the Carmel River flow increases to the level that is required.
- There were no water quality exceedances to report.
- The fluorescent dye study has been completed on deep injection wells 1 and 2. It demonstrated that injected water travel times are long enough to obtain an increase in virus removal "credit" to 1:1 (one log of virus removal per month of travel time). Previously with only an intrinsic tracer study the credit was limited to 0.67 log of virus removal per month of travel time.
- Modeling will be performed in the near future in order to seek approval to use Well ASR-1 as a production well.
- The schedule for the Pure Water Monterey Expansion Project calls for the project to go out to bid in May 2022, for construction to begin in September 2022, and for the project to begin full-scale operation in December 2023. Funding through Federal and State grant and loan programs is being pursued.
- Assuming that the data continues to show no operational problems or significant unexpected issues, the meeting frequency for this Committee will be reduced to quarterly with the next meeting to be held in June 2022.

SVBGSA Advisory Committee Meeting March 17, 2022:

Topics of interest to the Watermaster included:

- The SVBGSA Board of Directors ad hoc committee continues evaluating committee functionality and efficiency. The Subbasin GSP Implementation Committees were seated by the Board at its meeting last week. First meetings of those committees will likely be held in May of this year. Note: I submitted an application to be on the Monterey Subbasin Implementation Committee, but one of the criteria the Board established for committee membership is that the member must live or work within the boundaries of the Subbasin. Consequently, I would be ineligible to be a committee member. However I will be on the meeting notice list and plan to participate in those committee meetings as an attendee so I can ask questions and provide input.
- Donna Myers (SVBGSA General Manager) provided a brief report on the regional water issues forum that was held on March 16. She reported that approximately 180 persons participated in

that meeting via Zoom. The next forum will be held June 21. That forum will likely focus on defining critical projects, priorities, financing, and other related matters.

- The Deep Aquifer Study has started. The Department of Water Resources AEM preliminary data has been released and will be helpful in that study. DWR will be conducting informational workshops on that in the near future.
- All six subbasin annual reports will be presented for review and discussion by the Advisory Committee at its next meeting.
- New seawater intrusion maps will be published soon by the Monterey County Water Resources Agency.

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	April 27, 2022
AGENDA ITEM:	2.C
AGENDA TITLE:	Make Findings Required Under AB 361 Regarding Holding Meetings Via Teleconference
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

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

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

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

I recommend that the TAC again adopt these three findings.

ATTACHMENTS:	None
RECOMMENDED ACTION:	Approve Making the Findings Described Above

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	April 27, 2022
AGENDA ITEM:	2.D
AGENDA TITLE:	Discuss Correspondence Received Regarding Replenishment Water and Monterey Subbasin Final GSP
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

Peter Leffler with Luhdorff & Scalmanini, a consultant to Cal Am, provided the attached letter containing their comments on the Watermaster's recent reports and discussions regarding the need for replenishment water for the Seaside Basin. Mr. Leffler also provided a copy of his comments submitted to DWR on the Final GSP for the Monterey Subbasin. An excerpt from that summarizing his comments is also attached.

The TAC is asked to discuss this correspondence and decide whether any follow-up action should be taken in response to it.

ATTACHMENTS:	1. April 8, 2022 letter from Luhdorff & Scalmanini 2. Summary of comments submitted to DWR by Luhdorff & Scalmanini April 20, 2022
RECOMMENDED ACTION:	Discuss this correspondence and provide direction on whether any follow-up actions should be taken by the Watermaster

Luhdorff & Scalmanini
Consulting Engineers

April 8, 2022

Robert Jacques, PE
Technical Program Manager
Seaside Basin Watermaster
Email: Bobj83@comcast.net

SUBJECT: Comments on Options for Replenishment Water Related to Modeling and Subsurface Inflows and Outflows to/from Adjacent and Nearby Subbasins

Dear Mr. Jacques:

This letter is submitted on behalf of California American Water and provides comments on recent Seaside Basin Watermaster meetings and communications related to Seaside Basin water replenishment modeling and estimates/projections of changes in subsurface inflows and outflows to/from the adjacent Monterey Subbasin. The comments below first address the subsurface inflow/outflow issues, and then address other comments related to Seaside Basin replenishment modeling.

SUBSURFACE INFLOW/OUTFLOW COMMENTS

With regard to subsurface inflows and outflows, a Public Awareness Committee Meeting was held on February 8, 2022, which included Item 4.b (Consider Approval of the January 11, 2022 Meeting Minutes) and Item 5a (Impact to Seaside Groundwater Basin by Adjacent Basin Conditions and Sustainability Plans).

The minutes from the January 11, 2022 Public Awareness Committee Meeting included discussion of estimates of subsurface inflows and outflows from the Monterey Subbasin GSP. The discussion noted that while the Seaside Groundwater Basin currently has net subsurface outflows of approximately 1,000 AFY to the adjacent Monterey Subbasin, the reduction in subsurface outflows from Monterey Subbasin to the 180/400-Foot Aquifer Subbasin through various GSP efforts could mitigate the outflows from Seaside to Monterey Subbasin, which in turn, "…would achieve significant and affordable in lieu replenishment for the Seaside Basin." It was requested that more detailed information on this topic be presented at the next meeting.

The agenda package from the February 8, 2022 meeting included further discussion and graphics illustrating various concepts related to subsurface inflows and outflows from adjacent and nearby subbasins and how this may impact Seaside Groundwater Basin in the future. This information was derived from the Monterey Subbasin and 180/400-Foot Aquifer Subbasin GSPs. The text from the agenda package reads in part, "…The MSB GSP Table of Water Budget Results shows that when protective boundary conditions are achieved in the 180/400' ASB, the Seaside Basin not only ceases outflow, it GAINS 453 AF/year inflow from the MSB (Attachment 4). The MSB has a 'no-project' approach to sustainability, counting on the 180/400' ASB achieving boundary conditions to rectify MSB overdraft." The following comments are provided based upon review of the above cited documents.

- **The estimates of subsurface inflow and outflow cited in the discussion are based solely on estimates derived from the Monterey Subbasin GSP Groundwater Flow Model (MBGWFM). There are several issues that likely impact the accuracy of the MBGWFM estimates of subsurface inflow and outflow, including: 1) A flawed hydrogeologic conceptual model in terms of aquifer/aquitard layering used as a basis for model structure; 2) Lack of using all relevant data along the Monterey Subbasin and 180/400-Foot Aquifer Subbasin border (in particular, data/analyses developed for the MPWSP); and 3) Poor model calibration (e.g., model residuals are biased and result in overestimating subsurface outflows from Monterey Subbasin and the 180/400-Foot Aquifer Subbasin). Detailed comments related to these and other aspects of the MBGWFM were submitted on the Public Draft Monterey Subbasin GSP in November 2021, with follow up comments currently being prepared for the Final Monterey Subbasin GSP. A copy of the comments on the Final GSP will be provided to the Seaside Basin Watermaster once they are submitted to DWR.**

- **The MBGWFM incorporates into its future baseline an increase of 10 to 20% in groundwater recharge over historical conditions based on uncertain future projections of climate change. It is quite possible these projected increases in groundwater recharge will not materialize; however, there are no model runs to evaluate the potential scenario where groundwater recharge does not increase 10 to 20%. These assumed future increases in groundwater recharge may impact estimates of future subsurface inflow/outflow.**

- **The Monterey Subbasin GSP assumes that existing and historically higher groundwater pumping volumes, which caused seawater intrusion, can be exceeded without implementing significant projects and management actions in Monterey Subbasin if the GSP-estimated outflows to the 180/400-Foot Aquifer Subbasin are mitigated. Future pumping in Monterey Subbasin is projected to be approximately double the current rates of pumping that are contributing to seawater intrusion. These model assumptions impact estimates of future subsurface inflow/outflow.**

- **The original (January 2020 GSP) and more recent (2022 Draft GSP updates) analyses for the 180/400-Foot Aquifer Subbasin GSP of subsurface inflows and outflows between the 180/400-Foot Aquifer Subbasin and the Monterey Subbasin are quite different than those provided in the Monterey Subbasin GSP based on the MBGWFM. The 180/400-Foot Aquifer Subbasin estimates show significantly less net inflow from Monterey Subbasin to the 180/400-Foot Aquifer Subbasin. It appears some (and perhaps most) of this discrepancy between the two GSPs may be related to poor model calibration for the MBGWFM. These model calibration issues have a dramatic impact on estimates of subsurface inflow/outflow.**

- **In the agenda package for Item 5.a (Impact to Seaside Groundwater Basin by Adjacent Basin Conditions and Sustainability Plans) for the Public Awareness Committee Meeting held on February 8, 2022, three maps were included as Attachments 7 through 9. The maps display groundwater flow direction arrows that were added to the original figures derived from the 180-400-Foot Aquifer Subbasin GSP. These maps show change in groundwater levels between two scenarios (e.g., with and without a certain project); therefore, these are not groundwater elevation contours and cannot be used to determine groundwater flow directions. The groundwater flow direction arrows should be removed from the figures.**

DISCUSSION OF SUBSURFACE INFLOW/OUTFLOW

Review of Seaside Basin Watermaster meeting minutes and agenda packets indicates that consideration is being given to the prospect of Seaside Basin water replenishment needs being met passively by waiting for changes to occur in subsurface inflow/outflow across the Monterey Subbasin/Seaside Basin boundary, which are in turn dependent in part on changes in subsurface inflow/outflow across the 180/400-Foot Aquifer Subbasin/Monterey Subbasin boundary. The option of foregoing development of a source of replenishment water for Seaside Groundwater Basin by waiting for major changes in subsurface inflow/outflow between adjacent subbasins is a very risky strategy. As described above, there is considerable uncertainty in Monterey Subbasin GSP estimates of current subsurface inflow/outflow and GSP projections for future changes in subsurface inflow/outflow.

Furthermore, the Seaside Basin needs a near-term solution to bring in replenishment water to ensure the basin is not compromised by seawater intrusion. Waiting up to 18 years for changes in hydraulic gradients to the extent of significantly mitigating current subsurface outflows to Monterey Subbasin is not a viable solution, particularly since it is quite possible this reversal of subsurface outflows may never materialize. The 180/400-Foot Aquifer Subbasin is currently considering various strategies to mitigate seawater intrusion that do not involve raising groundwater elevations to levels assumed in the Monterey Subbasin GSP and MBGWFM (e.g., regional extraction barrier). In addition, the Monterey Subbasin is considering a no-project future with significantly increased pumping. Depending on the combined projects and management actions (and/or lack thereof) in the two subbasins, it is even possible that subsurface outflows from the Seaside Basin to Monterey Subbasin may increase.

SEASIDE BASIN WATER REPLENISHMENT MODELING COMMENTS

With regard to Seaside Basin water replenishment modeling conducted to date, initial modeling results were documented in a TM by Montgomery Associates dated January 5, 2022. We understand that some additional groundwater modeling work is to be conducted as follow up to the initial water replenishment modeling efforts. The following comments and recommendations are provided based on review of the January 5, 2022 TM.

- **Modeling assumptions assume that Cal Am's repayment of 700 AFY occurs between WY 2024 and WY2048 and ceases thereafter. The model simulation period is through WY2050 and ends with drought years. The impact of ending the Cal Am 700 AFY payback period after WY2048 is obscured by subsequent years coinciding with drought and the model simulation period ending with WY2050. It is not clear from the model results where groundwater levels will stabilize and what fluctuation ranges will be with return to non-drought conditions after the 700 AFY payback period ends. Therefore, the model simulation period should be extended well beyond (at least 10 to 20 years) WY 2050.**

- **Water replenishment model simulation results indicate protective elevations are not consistently met. However, the TM states that the current conditions of having a net inflow from the ocean in the Northern Coastal Subarea of up to 500 AFY are reversed in the future with 1,000 AFY of replenishment water to range between 500 to 1,500 AFY of net outflow to the ocean in the Northern Coastal area. Is the implication of this discussion in the TM that "sustainability" of basin should be**

based more on net inflow/outflow from/to the ocean as opposed to consistently achieving protective elevations? If so, this criterion/threshold warrants more discussion among key parties. Also, there needs to be a more detailed breakdown of model results related to net inflow/outflow in terms of vertical discretization (i.e., by model layers and aquifers). Similar to the issue related to groundwater levels described above, it is not clear from model simulations what will be the range of fluctuation in net inflow/outflow from/to the ocean after the 700 AFY repayment period ends in WY2048 – the model simulation period should extend further out beyond WY 2050 to allow for this evaluation. To the extent that net subsurface inflow/outflow becomes a more important criterion, additional model simulations should be included with greater replenishment amounts than 1,000 AFY to determine how different replenishment amounts affect subsurface inflows/outflow to/from the ocean.

- **The 1/5/22 TM notes that some injected PWM water was lost to Monterey Subbasin, resulting in some changes to injection amounts among various wells to minimize these losses. Reporting of model simulation results in 1/5/22 TM does not specify if injection water losses to Monterey Subbasin were fully mitigated with changes made. If not, a 1:1 injection/extraction ratio would result in net loss from Seaside Basin.**

DISCUSSION OF WATER REPLENISHMENT MODELING

It is highly likely that a source of water will be needed for additional replenishment (beyond the 700 AFY requirement) in Seaside Basin to reduce the risk of seawater intrusion. The modeling currently being conducted needs to simulate a longer future time period so that all parties understand what may be expected to occur after the Cal Am 700 AFY repayment period ends. Furthermore, the criteria (e.g., protective groundwater elevations vs. net surface inflow outflow to/from the ocean) and thresholds (e.g., what percentage of time do protective groundwater elevations need to be met; how much net subsurface outflow is needed from each aquifer) that need to be met must be clearly articulated and agreed upon by all parties.

It is critical that current replenishment modeling is able to quantify the amount of additional replenishment water (beyond the 700 AFY repayment period) that is needed to maintain Seaside Basin in a sustainable condition and avoids seawater intrusion. The most prudent path forward for Seaside Basin is to continue pursuit of a source of sufficient replenishment water to ensure future sustainability of Seaside Basin.

Thank you for the opportunity to provide these comments.

Sincerely,

LUHDORFF AND SCALMANINI CONSULTING ENGINEERS

Peter Leffler

Peter Leffler,
Senior Principal Hydrogeologist

Excerpt from Mr. Leffler's comments submitted to DWR regarding the Monterey Subbasin Final GSP

SUMMARY OF COMMENTS

The Monterey Subbasin GSP emphasizes in several places that subbasin sustainability is entirely dependent on adjacent subbasins reaching sustainability. While there is some interdependence between subbasins that may impact the sustainability of adjacent subbasins, the GSAs in the Monterey Subbasin should focus on their active role in making the subbasin sustainable. For the Marina-Ord MA, sustainability is best achieved by comparing groundwater recharge (the vertical components of inflow from the soil moisture balance, not including subsurface inflows form adjacent subbasins) in the Marina-Ord MA to groundwater pumping in the Marina-Ord MA and implementing the necessary projects and management actions. In addition, the GSAs must take into account there needs to be excess groundwater recharge over and above total pumping for significant outflow to the ocean from each individual aquifer to prevent seawater intrusion (unless a suitable alternative, such as a groundwater extraction barrier, is used).

A summary of several other major GSP comments includes:

- A significant amount of field data was developed for the MPWSP with installation of a full-scale test production well, installation of eight nested monitoring well sites (24 total wells), collection of borehole lithologic/geophysical data, monitoring of groundwater levels and quality since 2015, performance of a nearly three-year pumping test at 2,000 gallons per minute (gpm), and development of a comprehensive HCM and groundwater model. This work was conducted within the model domain of the Monterey Subbasin GSP and is critical to understanding interbasin flows between the Monterey and 180/400-Foot Aquifer Subbasins. These data and analyses are not used or referenced in the Monterey Subbasin GSP.
- The Dune Sand Aquifer does not qualify as a Principal Aquifer, and its designation as such in the Monterey Subbasin GSP is in conflict with it not being designated as a Principal Aquifer in the 180/400-Foot Subbasin GSP.
- The use of the FO CSM north of Reservation Road within Monterey Subbasin and in the 180/400- Foot Subbasin results in a flawed HCM serving as the basis for the MBGWFM that covers a significant portion of the 180/400-Foot Aquifer Subbasin.
- The Monterey Subbasin GSP HCM is based on flawed hydrostratigraphic interpretations from AEM data that are in conflict with field data.
- The Monterey Subbasin GSP is essentially attributing all of its overdraft and seawater intrusion problems to the adjacent 180/400-Foot Aquifer Subbasin. Historical data and reports show this conclusion is inaccurate. The best approach is to start with evaluating just the vertical components of inflow and outflow to the Marina-Ord MA (i.e., take lateral subsurface inflows and outflows out of the equation) while considering that some amount of excess vertical recharge needs to be reserved for ocean outflow within each aquifer to avoid further seawater intrusion. Alternatively, other suitable methods such as an extraction barrier may be considered. The reference data and analyses can be accessed at https://www.watersupplyproject.org.
- The GSP characterization of a unified seawater intrusion wedge in the 180 and 400-Foot Aquifers north of Reservation Road is flawed and proven to be incorrect based on field data, pumping test data, water level fluctuations, and water quality data that demonstrate AEM data hydrostratigraphic interpretations are incorrect.
- The proposed future increases in groundwater pumping and sustainable yield in Monterey Subbasin (Marina-Ord MA in particular) are overestimated based on historical observations and a water balance based on vertical inflows and outflows.

- Estimates of future groundwater pumping and sustainable yield should not be based on assumed future increases in groundwater recharge of 10 to 20% above historical groundwater recharge estimates.
- The MBGWFM boundary conditions related to using a no-flow boundary in the deep aquifer at the ocean shoreline and using the same groundwater elevations in the 180 and 400-Foot Aquifer along the northern model domain boundary are inappropriate.
- The MBGWFM is not well calibrated in the Marina-Ord MA and calibration statistics are obscured by mixing Corral de Tierra MA calibration wells with Marina-Ord wells (particularly for the Dune Sand Aquifer and Deep Aquifer).
- The Marina-Ord MA water balance indicates that increases in groundwater pumping for the future project scenario are not realistic and are not sustainable because they exceed the Marina-Ord MA groundwater recharge and do not provide for outflow to avoid further seawater intrusion.
- Groundwater model results indicate that MTs and MOs will likely not be achieved in the Monterey Subbasin if realistic boundary conditions are applied.
- The projected sustainable yield estimate of 4,400 to 9,900 AFY for the Marina-Ord Area is significantly overestimated and pumping in this range will likely have detrimental impacts on adjacent subbasins (i.e., the Seaside Basin and the 180/400 Foot Aquifer Subbasin).

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	April 27, 2022
AGENDA ITEM:	3
AGENDA TITLE:	Continued Discussion of Additional Replenishment Water Modeling Using Different Assumptions
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

At its January, February, and March, 2022 meetings the TAC discussed a proposed list of revised assumptions that Montgomery & Associates could potentially use to run additional replenishment water modeling scenarios. The proposed revised assumptions were requested by representatives of Cal Am, the City of Seaside, and the MPWMD.

Subsequent to the TAC's March meeting Pascual Benito of Montgomery & Associates and I spoke with Cal Am representatives to seek clarification of certain aspects regarding their proposed revised assumptions. Scenario 1 in the attached "*Revised Assumptions for Additional Replenishment Water Modeling "What If" Scenarios"* reflects the clarifications received from them, as well as earlier input from the City of Seaside. Scenario 2 is unchanged from the previous wording as it had already been discussed by the TAC.

Because the scope of work and costs thus far authorized to Montgomery & Associates to perform the replenishment water modeling work were based on an earlier set of assumptions, asking them to perform additional modeling scenarios to reflect different assumptions would require a contract amendment. Montgomery & Associates has provided the attached Scope and Cost Proposal to run these two scenarios, as well as some other options for the TAC to consider. In addition the Scope and Cost Proposal provides a description of the work and cost associated with performing an analysis of the impact on the availability of ASR water under different climate change forecasts. This topic was raised by the TAC at its last meeting when the Flow Direction/Flow Velocity Technical Memorandum was being discussed.

The contract with Montgomery & Associates to perform the replenishment water modeling analysis completed in January 2022 was for $37,510. As the Cost Proposal shows, there would be considerable additional cost (on the order of $70,000) associated with modeling Scenarios 1 and 2 and comparing the results of that modeling with the baseline scenario in the January 2022 modeling (Tasks 1, 2, 3, and a portion of 6 in the Cost Proposal).

Task 4 in the Scope and Cost Proposal would be a much less costly, and potentially sufficiently informative method, of evaluating the replenishment water needs of Scenario 1. The scope of that Task could be expanded to also evaluate Scenario 2 in a more cost-effective manner.

Mr. Benito has shown (in the far righthand columns of the Cost Proposal spreadsheet) some potential scope reductions to lower costs. He will describe these at today's meeting. The potential savings of implementing all of the scope reductions would be on the order of $40,000, as shown at the bottom of the

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

AGENDA ITEM:	3 (Continued)

spreadsheet. However, the reduced scopes may not be sufficient to adequately provide the desired information.

In the potential scope reductions for Task 3, because of the uncertainty of whether the SVBGSA will implement the seawater intrusion barrier (the Minimum Threshold scenario), or instead try to raise groundwater levels to protect against intrusion (the Seawater Intrusion Protective Conditions scenario) in the 180/400-Foot Aquifer GSP, I believe it would be prudent to evaluate both of those scenarios, and not reduce the scope of that Task.

Mr. Benito will review the Scope and Cost Proposal at today's meeting and will respond to questions about it.

At today's meeting the TAC should discuss these issues and the Scope and Cost Proposal, and provide its recommendation as to what work it feels should be performed. With that direction, I will have the Scope and Cost Proposal revised and brought back to the TAC for its approval at its next meeting.

ATTACHMENTS:	1. List of Revised Assumptions to be Used in Additional Replenishment Water Modeling Scenarios 2. Paper Describing Issues that Complicate Performing this Work 3. Montgomery & Associates Scope and Cost Proposal to Model the Additional Scenarios
RECOMMENDED ACTION:	Provide input to the Technical Program Manager regarding what work the TAC feels should be performed.

ATTACHMENT 1

PROPOSED "WHAT IF" SCENARIO NO. 1 (THIS COULD BE A "MAXIMUM POTENTIAL REPLENISHMENT WATER NEED" SCENARIO):

Regarding the City of Seaside the following revised assumptions will be used:

1. Assume golf course uses 491.4 AFY of recycled water.
2. Assume City pumps an in-lieu amount of 491.4 AFY from the deep aquifer at Latitude = 36.615304, Longitude = 121.826278 (Which is generally in the location of the Lincoln-Cunningham Park in Seaside).
3. Convert 26 AFY of golf course allocation from APA to SPA. New golf course allocation = 540 – 26 = 514.
4. The remaining unused balance of 514-491.4 = 22.6 AFY would be held as a reserve and/or for flushing of greens and tee boxes.

Regarding Cal Am the following revised assumptions will be used:

1. 15 acre-feet per day will be used as the average daily amount of ASR diversion, not the 20 acre-feet per day that was used in the earlier modeling.
2. The Pure Water Monterey Expansion Project will begin operation in 2024.
3. To provide a factor of safety, the amount of water that the Pure Water Monterey Expansion Project will deliver will be reduced from 5,700 acre-feet to the *"Minimum Allotment"* of 4,600 acre-feet per year as set forth in the "*Amended and Restated Water Purchase Agreement"* executed between Cal Am, MPWMD, and M1W in late 2021.
4. Cal Am's desalination plant will begin operation in 2030, and its repayment of 700 AFY will not begin until the desalination plant begins operation, in accordance with Cal Am's *Urban Water Management Plan*.
5. Cal Am's *Urban Water Management Plan* demand figures rather than MPWMD's demand figures will be used for Cal Am's projected water demands.
6. Cal Am will make up any shortfall between supply and demand by overpumping its Seaside Basin allocation of 1,474 AFY.

PROPOSED "WHAT IF" SCENARIO NO. 2 (THIS COULD BE A "MINIMUM POTENTIAL REPLENISHMENT WATER NEED" SCENARIO):

As suggested by Mr. Lear, evaluate the effects on the Seaside Basin if the projects and management actions in the Monterey Subbasin Groundwater Sustainability Plan (GSP) are successfully implemented and result in significant reductions in the amounts of water lost from the Seaside Subbasin to the Monterey Subbasin. In this scenario the inter-basin groundwater levels projected in those GSPs at the end of the 20-year GSP implementation time frame would be used. The model currently assumes that no GSP implementation projects are implemented.

ATTACHMENT 2

During the course of Mr. Benito's development of a Scope and Cost Proposal to perform the additional replenishment water modeling scenarios, he and I communicated a number of times to discuss issues that complicated his doing that. Below are comments and suggestions he provided to me, and which he has used to develop the Proposal he submitted.

Mr. Benito's initial comments:
The more I've been thinking about it the more I am coming to the conclusion that the question of how much replenishment water will be needed doesn't come down to the differences in the Cal-Am versus MPWMD total system demand assumptions, rather it comes down to better understanding the uncertainty in the future availability of Carmel River water for ASR injection. The reason for this is that the native groundwater pumping is not really going to change dramatically if we use the Cal-Am versus the MPWMD demand numbers unless the Watermaster is willing to allow Cal-Am to return to unregulated pumping of native groundwater.

If we go with Cal-Am's higher demand assumptions and lower PWM Expansion deliveries, the higher demand can only be met with the availability of desal water. Despite Cal Am's guidance that we should assume that Cal-Am will over pump their groundwater allocation, the Cal Am's Urban Water Management Plan is very explicit in describing that Cal-Am will introduce demand curtailments if there is a supply shortfall, and even describes that this will be the case in the decade before PWM Expansion & Desal water become available. The UWMP projects having to implement demand reductions of 1,500 AFY before Desal comes online in 2030.

Similarly, if we assume that the Desal plant is built in 2030, then Cal-Am's request that we assume that PWM Expansion will not be able to deliver the full amount would also not result in an increase in native groundwater pumping after 2030 because the supply projections in the UWMP indicates that there will be ample excess Desal water supply that could be used to offset the shortfall of PWM Expansion water, rather than by over pumping native groundwater. It does not seem that it would benefit the Watermaster to run an unrealistic scenario that allows unregulated pumping of the native groundwater, Rather, it seems that it would be more useful to instead focus efforts on getting as much information out of the model runs we have already done.

We now understand that that the rapid initial rise in groundwater levels in the baseline simulation is due primarily to a sequence of above average wet years in the simulated cycled hydrology that allows for significant injection and storage of ASR water. We can conceptualize that if future climate conditions cannot actually provide this amount of ASR injection shown each year in the baseline scenario, then that "missing" amount of ASR water will have to be supplied by an external replenishment source to achieve the same water level increase. From the existing model runs we can quantify this total amount of external water recharge (ASR + additional replenishment) that would be needed to raise water levels:

> *External Basin Recharge = (ASR Injection)*FractionASR + (Additional Replenishment)*FractionReplenishment*

In this equation, the term "FractionASR" refers to the percentage of recharge water coming from ASR, and the term "FractionReplenishment" refers to the percentage of recharge water coming from replenishment from some other source, such as PWM or Desal.

For the assumed Carmel River hydrology in the replenishment water baseline scenario that has already been modeled, FractionASR = 1 and FractionReplenishment = 0.

But for other potential future climate scenarios, both of these fractions will vary between 0 and 1 from year to year depending on future hydrology, as there will be a mix of available ASR water and additional replenishment water needed each year to achieve the same water level increases as shown in the baseline simulation.

So really where I see value to the Watermaster is to focus some effort on determining estimates and statistics on the likely future availability of Carmel River water for ASR injection under climate change projections. This would not even need to involve re-running the groundwater model. Rather, it could be based on getting water budget data from the existing model runs and then looking at data sets and projections that have already been produced by other researchers and agencies on how climate change is expected to alter future stream flows in the Carmel River basin. From this we can determine improved projections of monthly diversion amounts for ASR injection. And from these data we could come up with a conservative assessment of what additional amount of replenishment water will be needed to offset the missing ASR injection each year in the baseline scenario. This would give the Watermaster a better sense of how much additional replenishment water will be needed without having to rerun lots of model scenarios. There are data sets that have been developed by DWR & USGS that apply future climate change projections to California watersheds and which have been used by GSAs in other basins to look at future streamflow reductions and this might be a good way to go. I am proposing that we would add this analysis as an additional item in the proposed scope.

In terms of Cal-Am's repayment period not starting until 2030 (when the Desal plant comes online), we could factor this in simply by adding the additional 700 acre-feet amount into our calculations of how much additional net replenishment water will be needed during each of those years before 2030 to offset the higher native groundwater pumping.

Also I was thinking more about the idea from Cal-Am's consultant (Pete Leffler) to extend the simulations beyond the end of the repayment period. The challenge here is that we don't currently have any information on projected water demand beyond 2050, so we would have to develop assumptions for this in addition to extending all the other future pumping and hydrology assumptions in the model by another 20 or 30 years. I'm not sure we want to get into that right now if the short term importance is just to get ball park estimates of how much replenishment water will be needed each year in the next 10-20 years. I don't think this will be cost-effective or useful to look at this right now, and it would delay all the other analyses. Similarly, the additional minor modifications requested by the City of Seaside with regard to the golf course allocations and the placement of the new Seaside Muni well will likely only have marginal impact on the replenishment volumes and water levels, since the volumes involved are so much smaller than the Cal-Am pumping or the ASR injection amounts.

For the TAC discussion I assume you probably still want the estimate of the effort to run the Cal-Am scenario (with the additional minor changes requested by the City of Seaside). However, it seems like the assumptions and usefulness of the scenario should first be discussed by the TAC as I imagine that most of the TAC members are not familiar with the assumptions that underpin the higher demand values in the UWMP.

<u>Mr. Benito's subsequent comments:</u>
I decided to present a menu of options that can be considered individually or in combinations. Incorporating the new Cal-AM UWMP assumptions in Scenario 1 to create a new baseline scenario, and then having to iteratively re-run the model with different replenishment amounts to evaluate the amounts

necessary to reach the protective elevations is going to be a significant cost comparable with the original modeling we did last year. This would be in addition to the effort for Scenario 2 to develop an alternate baseline with the higher boundary heads that assumes the GSP projects in the neighboring basins are implemented, and then again running the iterative scenarios to see how much replenishment water is needed to reach protective elevations.

I keep coming back to the thought that re-running more scenarios with the Cal-Am UWMP assumptions is not necessarily the most cost-effective way to show the differences between the Cal-Am and MPWMD demand/supply assumptions in terms of the impact on needed replenishment water. As an alternative I've sketched out a hybrid water-budget-based approach that would leverage information we can get from the model scenarios we have already run and combine this information with the alternate Cal-AM UWMP demand and supply assumptions. This approach would be spreadsheet-based and serve as a framework to develop order of magnitude estimates for the range of needed annual replenishment volumes under the different MPMWD and Cal-AM UWMP demand/supply assumptions. This could also be used to include alternate assumptions for reduced ASR water availability due to climate change. This would be done without having to setup and re-run lots of model scenarios.

We have already run the model scenarios that show us how much net-recharge is needed in the vicinity of the PWM and ASR wells to raise the water levels to varying degrees (Net Recharge = ASR Inj + Replenishment - Total Cal-Am Pumping) . The differences between the Cal-AM and MPWMD demand/supply assumptions won't change how much net-recharge is needed to raise the water levels. Rather, it will only change the distribution between the three components of the Net-Recharge. For example, if there is higher assumed demand, there will be more pumping and thus more replenishment water needed to offset this higher amount of pumping. Similarly, assuming a lower demand is like in-lieu recharge and would require less replenishment water. Similarly, reduced ASR water availability will also require more replenishment water to varying degrees depending on the demand assumptions.

So rather than setting up and running lots of different scenarios we would instead focus on developing and presenting easy-to-read tables and graphs of how the three components of Net Recharge look from year-to-year under the different demand/supply assumptions. This will then free up modeling budget to use on setting up and simulating the potential impact of GSP Project implementation in the neighboring basins. The results of these simulations would be worked into the water budget comparison framework by looking at how the net cross-boundary flows between the Seaside and Monterey Subbasin change between scenarios.

Even if TAC decided to go ahead with the Cal-Am UWMP assumption modeling, I think this water budget-based framework would still be a useful way to look at and compare the results of the simulations and will give more insight than just looking at hydrographs.

ATTACHMENT 3

April 18, 2022

Mr. Bob Jaques
Seaside Watermaster Technical Program Manager
83 Via Encanto
Monterey, CA 93940

SUBJECT: SCOPE AND COST FOR ADDITIONAL PREDICTIVE MODELING SCENARIOS OF BASIN REPLENISHMENT OPTIONS TO ACHIEVE PROTECTIVE ELEVATIONS

Dear Mr. Jaques

Per your request, this letter contains a scope of work and estimated cost to evaluate additional assumptions and scenarios to extend the recently updated replenishment water study documented in the Draft Technical Memorandum titled "Updated Modeling of Seaside Basin Replenishment Options" dated January 28, 2022. That study used the basin groundwater model to estimate how much replenishment injection would be needed to achieve protective elevations in Watermaster coastal protective elevation wells. Based on discussion with the TAC members, we have developed a set of tasks to evaluate alternative demand and supply assumptions, the potential impacts of climate change on water availability for ASR injection, and the potential impact of the implementation of projects proposed in the Groundwater Sustainability Plans (GSPs) for the neighboring Monterey and 180-400 Foot Aquifer Subbasins. We also have scoped out some tasks to develop water budget analysis tools and summaries that will give the TAC and the Board a better overview of the relative magnitudes and impacts of different demand and supply assumptions on the estimated amounts of replenishment water needed to achieve protective elevations.

TASK 1. WATER BUDGET ANALYSIS OF ORIGINAL BASELINE SCENARIO AND ONE REPLENISHMENT MODEL SCENARIO

The results of the original (January 2022) baseline simulation (with no replenishment water) and one scenario of 1,000 AFY of replenishment water will be processed and analyzed to produce water budget summaries on an aquifer-by-aquifer basis and by subbasin subareas over time. Having the different components of the future water budgets (e.g., total simulated pumping by aquifer, PWM injection, ASR injection, replenishment volumes etc., boundary inflows/outflows, etc.) will help the TAC and Board better understand the relative importance and impacts of each

component in a way that only seeing hydrographs compared to the protective elevations does not convey. Figure 1 shows an example conceptual model of the types of water budget components that would be included. The analysis will include evaluating the changes in onshore/offshore flows as well as reporting the changes in cross-boundary fluxes to/from the Monterey Subbasin on an aquifer-by-aquifer basis, for this scenario. Summaries will include both tabular and graphical output. Figure 2 and Figure 3 are examples of types of water budget figures that would be produced.

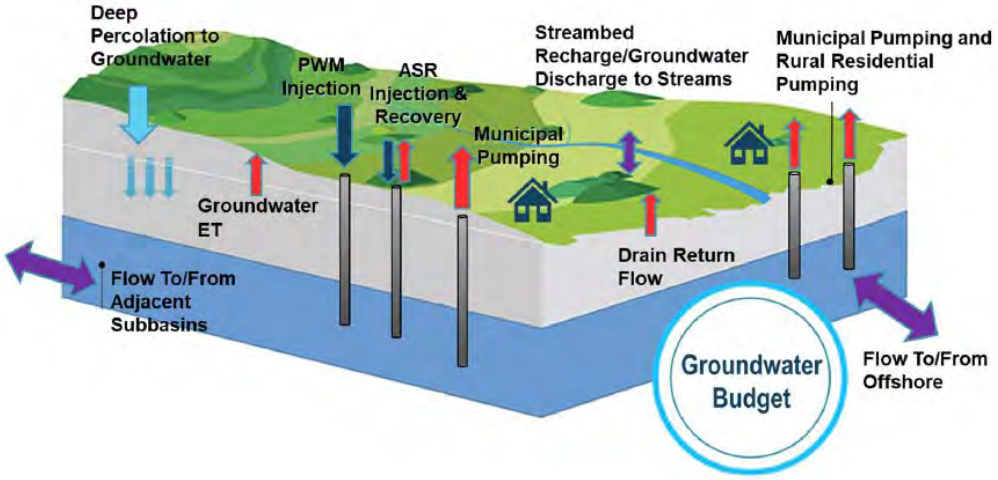
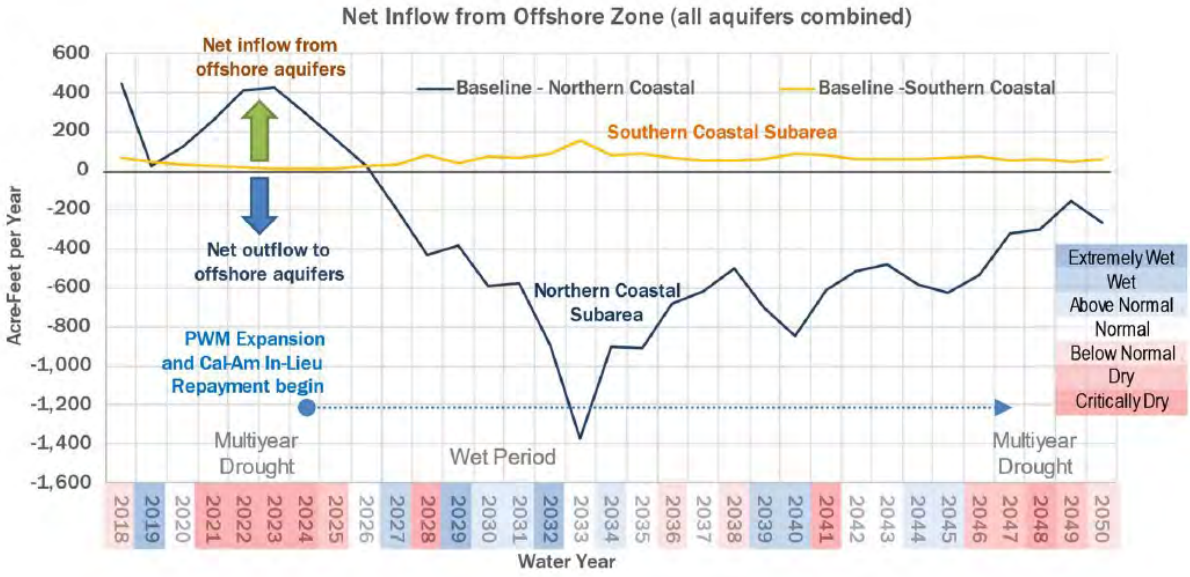


Figure 1. Draft Conceptual Diagram of Water Budget Components for Subbasin



2

Figure 2. Example graph of changes in net offshore flows for the original baseline simulation

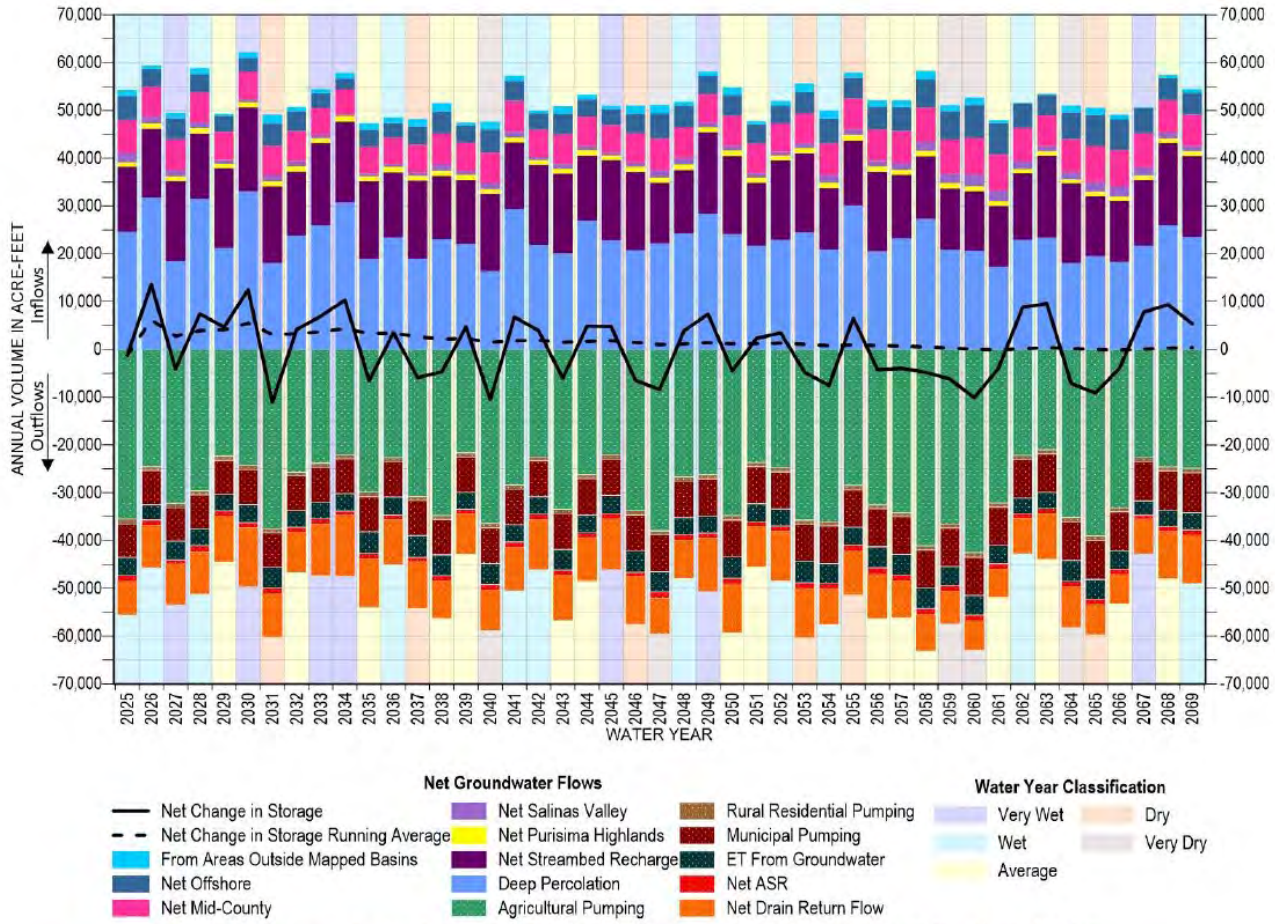


Figure 3. An example graph of a simulated future water budget (from Pajaro Valley Basin Model)

TASK 2. DEVELOP ALTERNATIVE SCENARIO BASED ON CAL-AM URBAN WATER MANAGEMENT PLAN DEMAND ASSUMPTIONS AND UPDATED CITY OF SEASIDE ASSUMPTIONS (NOTE: HEREIN THIS IS REFERRED TO AS ALTERNATIVE SCENARIO 1)

Subtask 2.1. Incorporate Updated Assumptions for City of Seaside Golf Course use of Recycled Water & New Well Location

Mr. Ottmar of the City of Seaside requested that the following revised assumptions be used:

3

1. Assume City of Seaside golf courses use 491.4 AFY of recycled water.
2. Assume City pumps an in-lieu amount of 491.4 AFY from the deep aquifer from a new well located at Latitude = 36.615304, Longitude = 121.826278 (Which is generally in the location of the Lincoln-Cunningham Park in Seaside).
3. Convert 26 AFY of golf course allocation from APA to SPA. New golf course allocation = 540 – 26 = 514.
4. The remaining unused balance of 514-491.4 = 22.6 AFY would be held as a reserve and/or for flushing of greens and tee boxes.

Subtask 2.2. Incorporate Assumptions Requested by Cal-Am

Mr. O'Halloran and Mr. Cook of Cal-Am requested that the following revised assumptions be used:

1. 15 acre-feet per day will be used as the average daily amount of ASR diversion, not the 20 acre-feet per day that was used in the January 2022 modeling. [*In keeping the current cycled Carmel River hydrology record this assumption will result in a 25 percent reduction in the projected annual ASR diversion volumes, from an annual average of 1,214 AFY to 911 AFY, but will not alter the temporal pattern of when ASR injection occurs.*]
2. Cal Am's *Urban Water Management Plan* (UWMP) demand figures rather than MPWMD's demand figures will be used for Cal Am's projected water demands.
3. The MPWSP Desalination Plant will begin operation in 2030 in accordance with the UWMP. *[The UWMP assumes the Desal plant will produce 6,252 AFY for the Monterey Peninsula].*
4. Cal Am's in-lieu repayment of 700 AFY will not begin until its desalination plant begins operation in 2030, in accordance with the UWMP. *[For comparison, the original baseline assumes the repayment period starts in 2024, concurrent with the PWM Expansion project.]*
5. The Pure Water Monterey Expansion Project will begin operation in 2024, as previously simulated in the January 2022 replenishment modeling.
6. To provide a factor of safety, the amount of water that the Pure Water Monterey Expansion Project will deliver will be reduced from 5,700 acre-feet to the *"Minimum Allotment"* of 4,600 acre-feet per year as set forth in the "*Amended and Restated Water Purchase Agreement"* executed between Cal Am, MPWMD, and M1W in late 2021.
7. Cal-Am will make-up any shortfall between supply and demand by over pumping its Seaside Basin allocation of 1,474 AFY. *[If the Desal Plant is built in 2030, even though PWM Expansion is assumed to have reduced deliveries per Cal Am assumption 6 above, there will be no supply shortfall after 2030 because the UWMP indicates that the expected capacity of the Desal plant is sufficient to make up for the reduced PWM Expansion deliveries.]*

These revised assumptions will be incorporated into the monthly supply-demand spreadsheet model that is used to assign and distribute simulated monthly Cal-Am pumping and ASR injection in the groundwater model.

Subtask 2.3. Update Groundwater Model Input Files, Run Alternative Baseline Model & Process Results

All necessary input files will be updated to develop an alternative baseline simulation based on the new assumptions. The model will be run, and results reviewed and processed and simulated heads at the coastal monitoring wells will be compared with the protective elevations.

Subtask 2.4. Iterative Modeling to Determine Amount of Replenishment Water Needed to Achieve Protective Elevations within 20 Years

An iterative model scenario to evaluate additional replenishment required to meet protective elevations based on the Alternative Cal-Am UWMP and City of Seaside Scenario 1, with additional replenishment injection iteratively adjusted until coastal protective groundwater elevations are achieved within 20 years. As per direction from the TAC, injection will be simulated at PWM injection wells regardless of injection capacity. If existing injection capacity is insufficient to replenish the basin, additional infrastructure to increase injection capacity would be needed.

Subtask 2.5. Water Budget Analysis of Alternative Scenario 1 and one Replenishment Model Scenario

The results of the alternative Scenario 1 simulation and one selected replenishment scenario will be processed and analyzed to produce water budget summaries on an aquifer-by-aquifer basis and by subbasin subareas over time. The analysis will include evaluating the changes in onshore/offshore flows as well as reporting the changes in cross-boundary fluxes to/from the Monterey Subbasin on an aquifer-by-aquifer basis, for this scenario. Summaries will include both tabular and graphical output and will be compared to the water budgets from the original January 2022 simulation that was based on the MPWMD demand & supply assumptions.

TASK 3. ALTERNATIVE SCENARIO INCORPORATING WATER LEVEL CHANGES FROM PROPOSED SGMA GSP PROJECTS IN NEIGHBORING SUBBASINS (NOTE: HEREIN THIS IS REFERRED TO AS SCENARIO 2)

As suggested by Mr. Lear, this task will evaluate the effects on the Seaside Basin if the projects and management actions in the Monterey Subbasin Groundwater Sustainability Plan (GSP) are successfully implemented and result in significant reductions in the amounts of water lost from the Seaside Subbasin to the Monterey Subbasin. In this scenario the inter-basin groundwater levels projected in those GSPs at the end of the 20-year GSP implementation time frame would

be used. The January 2022 baseline model assumed that no GSP implementation projects were implemented.

Subtask 3.1. Develop Time-Varying Head Boundary Conditions Representative of GSP Project Implementation in Neighboring Subbasins.

The Monterey Subbasin GSP and related modeling reports will be reviewed to assess the suitability and best approach for incorporating water levels representing achievement of Minimum Threshold and the Seawater Intrusion Protective Conditions scenarios evaluated in the GSP's to represent upper and lower bounds on increased boundary heads. We will coordinate with EKI to receive the model input and output files necessary for extracting the simulated water levels. The extracted heads will be converted into two sets (one for Minimum Threshold [MT] and one for Seawater Intrusion [SWI] Protective Conditions) of time-varying head boundary condition time series for each layer in the Seaside Model.

Subtask 3.2. Update Groundwater Model Input Files, Run Alternative Baseline Model & Process Results

All necessary model input files will be updated to develop an alternative baseline simulation based on the MT and SWI Protective Conditions. The model will be run, and results reviewed and processed and simulated heads at the coastal monitoring wells will be compared with the protective elevations.

Subtask 3.3. Iterative Modeling to Determine Amount of Replenishment Water Needed to Achieve Protective Elevations within 20 Years.

Iterative model runs will be performed to evaluate the amount of additional replenishment water required to meet protective elevations (under both MT and SWI Protective Conditions) with additional replenishment injection iteratively adjusted until coastal protective groundwater elevations are achieved within 20 years. As per direction from the TAC, injection will be simulated at PWM injection wells regardless of injection capacity. If existing injection capacity is insufficient to replenish the basin, additional infrastructure to increase injection capacity would be needed.

Subtask 3.4. Water Budget Analysis of Alternative Scenario 2 and one Replenishment Model Scenario

The results of the alternative Scenario 1 simulation and one selected replenishment scenario will be processed and analyzed to produce water budget summaries on an aquifer-by-aquifer basis and by subbasin subareas over time. The analysis will include evaluating the changes in onshore/offshore flows as well as reporting the changes in cross-boundary fluxes to/from the

Monterey Subbasin on an aquifer-by-aquifer basis, for each scenario. Summaries will include both tabular and graphical output and will be compared to the water budgets from the other baseline alternative simulations.

TASK 4. HYBRID WATER BUDGET ANALYSIS TO SHOW EFFECTS OF DIFFERENT DEMAND/SUPPLY ASSUMPTIONS ON VOLUME OF REPLENISHMENT NEEDED

Running additional alternative baseline simulations with different supply/demand assumption scenarios and then determining what volumes of replenishment are needed to meet protective elevations for each alternative scenario is not the only way to evaluate the impacts of differences between the Cal-Am and MPWMD demand/supply assumptions on the estimate of the volume of replenishment water needed.

An alternative to running multiple additional demand/supply scenarios is to use a hybrid water-budget-based approach that would leverage information we can get from the model scenarios we have already run and combine this information with the Cal-Am UWMP demand and supply assumptions to estimate the replenishment volume needed to achieve protective elevations. This approach would be spreadsheet-based and would serve as a framework to develop order of magnitude estimates for the range of needed annual replenishment volumes under the different MPMWD and Cal-Am UWMP demand & supply assumptions. The same approach could also be used to incorporate the impacts of potential reductions in future ASR water availability due to climate change. This would be done without having to setup, re-run, and analyze multiple additional model scenarios.

The approach takes advantage of the fact that we have already run the model scenarios that show us how much net-recharge is needed in the vicinity of the PWM and ASR well fields to raise the water levels at the coastal monitoring wells to varying degrees. For this purpose, we can define the net recharge as follows:

Net Recharge = ASR Injection + Replenishment - Total Cal-Am Pumping

The differences between the Cal-Am and MPWMD demand/supply assumptions won't change how much net recharge is needed to raise the water levels. Rather, they will only change the distribution between the three components of the Net-Recharge. For example, if there is higher assumed demand, then there will be more pumping, and thus more replenishment water needed to offset that higher pumping while still achieving the same water level rise. Similarly, a lower demand assumption would result in less pumping and would require less replenishment water. So as the demand assumptions are changed, varying amounts of Replenishment water will be needed.

In terms of assuming that Cal-Am's repayment period does not start until 2030 (when the Desal plant comes online per the UWMP), this could be factored in simply by adding the additional 700 acre-feet-per-year amount into the calculations of how much additional net replenishment water will be needed during each of those years before 2030 to offset the higher native groundwater pumping.

Similarly, reduced ASR injection water availability assumptions would also require increased replenishment water volumes to keep the same total net-recharge amount to raise water levels the same amount.

So rather than setting up and running a number of different scenarios, the focus would instead be on developing and presenting easy-to-read tables and graphs of how these three components of Net Recharge vary from year to year under the different demand/supply assumptions.

This non-modeling approach would potentially free up modeling budget to use on setting up and simulating the potential impact of Scenario 2 or the impacts of climate change on the availability of water for ASR. The results of these simulations would be worked into the water budget comparison framework by looking at how the net-boundary flows between the Seaside and Monterey Subbasins change between various scenarios.

TASK 5. CLIMATE CHANGE ANALYSIS OF AVAILABILITY OF CARMEL RIVER WATER FOR ASR INJECTION

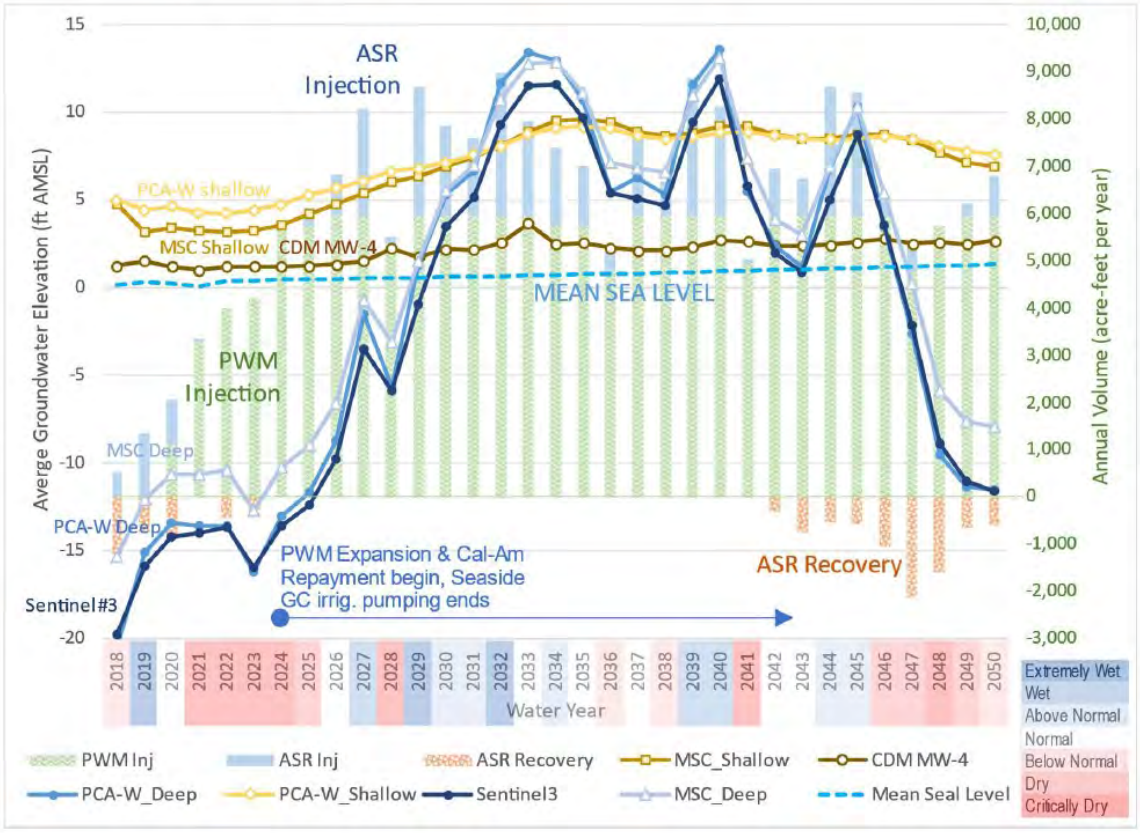


Figure 4. Simulated annually averaged water levels in protective elevation monitoring wells, and ASR and PWM injection and ASR recovery volumes, for the original January 2022 baseline simulation..

Based on the findings from the January 2022 modeling, it is apparent that that the rapid initial rise in simulated groundwater levels in the original baseline simulation (see Figure 4 above, from the January 2022 Technical Memorandum) is due primarily to a sequence of wetter years in the simulated cycled hydrology that allows for a prolonged period of significant injection and storage of ASR water. We can conceptualize that if future climate conditions cannot provide this amount of ASR injection shown each year in the January 2022 modeling, then that "missing" amount of ASR water will have to be supplied by an external replenishment source to achieve the same water level increase that has already been simulated. As described in the description of Task 4, from the previous model runs we can quantify this total amount of external water recharge (ASR Injection + Replenishment) that would be needed to raise water levels by the following equation:

External Recharge = (ASR Injection)*FractionASR + (Replenishment)*FractionReplenishment

9

In this equation, the term "FractionASR" refers to the percentage of recharge water coming from ASR, and the term "FractionReplenishment" refers to the percentage of recharge water coming from replenishment from some other source, such as PWM or Desal.

For the assumed Carmel River hydrology in the replenishment water baseline scenario that has already been modeled, FractionASR = 1 and FractionReplenishment = 0, because the baseline simulation assumed no replenishment.

But for other potential future climate scenarios, both fractions will vary between 0 and 1 from year to year depending on future hydrology, as there will be a combination of available ASR water and additional replenishment water needed each year to achieve the same water level increases as shown in the baseline simulation.

A potentially greater value to the Watermaster would be to focus some effort on determining estimates and statistics on the likely future availability of Carmel River water for ASR injection under different climate change projections, as this will have direct implications for understanding the uncertainty in the amount of replenishment water that will be needed. This would not need to involve re-running the groundwater model. Rather, it could be based on getting water budget data from the previous model runs and then looking at analysis and projections that have already been produced by other researchers and agencies on how climate change is expected to alter future stream flows in the Carmel River Basin. From this we can determine alternate projections of monthly diversion amounts available for ASR injection, and we could develop an informed conservative assessment of what additional amount of replenishment water will likely be needed to offset the missing ASR injection each year in the baseline scenario. This could be done for both the MPWMD demand/supply assumptions and for the Cal-Am UWMP demand/supply assumptions to represent upper and lower bound scenarios.

This would give the Watermaster a better sense of how much additional replenishment water will be needed under several supply/demand assumptions scenarios without having to rerun and analyze a multiple model scenarios. There are existing data sets that have been developed by DWR & USGS that apply future climate change projections to California watersheds, and which have been used by GSAs in other basins to look at future streamflow reductions. These data sets often take the form of seasonally varying stream flow reduction factors that can be applied to historical hydrology data to "re-scale" them to match projected future conditions under different climate change scenarios.

Possible sources of projected streamflow and/or runoff reduction factors that would be reviewed and selected from include:

- Data sets and guidance provide by CA DWR for use by GSP's for incorporating climate change projections into GSP modeling[1];
- Data sets developed as part of the North Monterey County Drought Contingency Plan[2] and the ongoing Salinas and Carmel Rivers Basin Study (SCRBS)[3];
- And Data sets developed by the USGS's California Basin Characterization Model (BCM)[4].

These studies would be reviewed and an approach selected and used to re-scale the current Carmel River streamflow data used in the January 2022 modeling scenario. The re-scaled streamflow data would then be used to estimate the available amounts of monthly diversions available for ASR injection.

These projections on future ASR water availability could also be used in a subsequent scope of work to revisit the sea water intrusion particle path analysis described in the Technical Memorandum titled "Assessment of Potential Seawater Intrusion Travel Rates," dated February 25, 2022, with a revised baseline scenario that has a more conservative estimate of ASR injection than the hydrologic series previously used.

TASK 6. REPORTING

Subtask 6.1. Prepare Technical Memorandum

A technical memorandum summarizing the assumptions made in developing the alternative Baselines and Scenarios, the results of the iterative modeling of replenishment injection needed to achieve protective elevations within 20 years presented on tables and charts, and conclusions of the study will be prepared as a draft. Following review by the Watermaster, a final version incorporating the Watermaster's input will be provided as both a PDF and MS Word document.

---

[1] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Resource-Guide-Climate-Change-Guidance_v8_ay_19.pdf

[2] https://totalwatermanagement.org/drought-contingency-plan/

[3] https://totalwatermanagement.org/rivers-basins-studies/

[4] https://ca.water.usgs.gov/projects/reg_hydro/basin-characterization-model.html

Subtask 6.2. Presentation

A PowerPoint presentation summarizing the findings of the study will be prepared for presentation to the TAC and to the Board. Both presentations are assumed to be made via Zoom.

PROJECT COST ESTIMATE AND SCHEDULE

We anticipate that if all tasks are approved this work can be completed within a three-month period, though the timing may depend on the scheduling of TAC and Board meetings. We can begin work on this immediately following notice to proceed.

The total estimated cost for all the above-described tasks is $99,253. The attached cost estimate provides a breakdown of costs by task and subtask. If the Watermaster opts to only perform some of these tasks, the Scope and Cost can be revised to reflect that.

The hourly rates contained in this proposal are valid through December 31, 2022. If the work will substantially be completed in 2023, the cost estimate will need to be updated with 2023 rates.

Please feel free to contact us with any questions about the proposed scope of work and budget.

Sincerely,

E.L. MONTGOMERY & ASSOCIATES

Pascual Benito, Ph.D., Senior Hydrogeologist

Cost Estimate for Seaside Basin Replenishment Modeling Additional Scenarios & Analysis											Potential a-la-carte Scope Reductions			
		Montgomery & Associates Labor							Other Direct Costs	TOTALS	Minimal Scope Selection	Scope Reduction Options	Reduced Effort Fraction	Estimated Reduced Cost for this Task Resulting from Scope Reduction
		Scientist VIII	Scientist VI	Scientist V	Scientist III	Technical Editor	Labor Total							
		D. Williams	G. King	P. Benito										
Task	Hourly Rates	$275	$228	$205	$160	$80	Hours	(S)	(S)					
1.0	**WATER BUDGET ANALYSIS OF ORIGINAL JANUARY 2022 BASELINE SIMULATION & REPLENISHMENT SCENARIOS**													
	Water budget analysis of Baseline Simulation & 1000 AFY Replenishment Scenario Simulation	0	2	16	24	0	42	$7,576	$0	$7,576	X	Focus only on Monterey Subbasin & Ocean Boundary flows, not full water budget (which would normally include rainfall, change in storage, and other components)	0.75	$5,682
	Task 1 Subtotal	*0*	*2*	*16*	*24*	*0*	*42*	*$7,576*	*$0*	*$7,576*				$0
2.0	**DEVELOP ALTERNATIVE SCENARIO 1**													$0
2.1	Incorporate revised City of Seaside Assumptions & New Well Location	0	0	6	0	0	6	$1,230	$0	$1,230				$0
2.2	Incorporate Cal-AM UWMP Demand Assumptions, MPWSP Desal Project, reduced PWM Expansion delivery and revised ASR Diversion Rate into Monthly Supply-Demand Pumping & Injection Model	2	4	32	16	0	54	$10,582	$0	$10,582	X		1	$10,582
2.3	Prepare MODFLOW input files and run and process Groundwater Model with Alternate Baseline	0	0	12	16	0	28	$5,020	$0	$5,020				$0
2.4	Iterative Modeling to Determine How Much Replenishment Water is Needed to Achieve Protective Elevations within 20 Years	0	1	8	16	0	25	$4,428	$0	$4,428				$0
2.5	Water budget analysis of Scenario 1 & 1 Replenishment Scenario Simulation	0	0	12	24	0	36	$6,300	$0	$6,300		Focus only on Monterey Subbasin & Ocean Boundary flows, not full water budget (which would normally include rainfall, change in storage, and other components)		$0
	Task 2 Subtotal	*2*	*5*	*70*	*72*	*0*	*149*	*$27,560*	*$0*	*$27,560*				$0
3.0	**DEVELOP ALTERNATIVE SCENARIO 2**													$0
3.1	Review Monterey Subbasin GSP to evaluate modeled future project assumptions and approach for incorporating water levels representing project scenarios into Seaside model boundary conditions. Develop Time-Varying Head Boundary Condition Representative of Reaching SMC Goals in Neighboring Subbasins for both MT and SWI Protective Conditions Scenarios	4	4	12	24	0	44	$8,312	$0	$8,312	X	- Reduce this to single run (e.g. either MT or SWI Prot, but not both)	0.85	$7,065
3.2	Update model input files, Run and Process Groundwater Model for both MT and SWI Protective Conditions Scenarios	0	0	12	16	0	28	$5,020	$0	$5,020	X	- Reduce this to single run (e.g. either MT or SWI Prot, but not both)	0.8	$4,016
3.3	Iterative Modeling to Determine How Much Replenishment Water is Needed to Achieve Protective Elevations within 20 Years for both MT and SWI Protective Conditions Scenarios	0	0	8	16	0	24	$4,200	$0	$4,200	X	- Reduce this to single run (e.g. either MT or SWI Prot, but not both) - Focus only on Monterey & Ocean Boundary flows, not full water budget	0.75	$3,150
3.4	Water budget analysis of Scenario 2 for Both MT and SWI Protective Conditions Scenarios & 1 Replenishment Scenario Simulation identified by TAC	0	0	12	24	0	36	$6,300	$0	$6,300	X	- Reduce this to single run (e.g. either MT or SWI Prot, but not both)	0.75	$4,725
	Task 3 Subtotal	*4*	*4*	*44*	*80*	*0*	*132*	*$23,832*	*$0*	*$23,832*				$0

Cost Estimate for Seaside Basin Replenishment Modeling Additional Scenarios & Analysis											Potential a-la-carte Scope Reductions			
		Montgomery & Associates Labor							Other Direct Costs	TOTALS	Minimal Scope Selection	Scope Reduction Options	Reduced Effort Fraction	Estimated Reduced Cost for this Task Resulting from Scope Reduction
		Scientist VIII	Scientist VI	Scientist V	Scientist III	Technical Editor	Labor Total							
		D. Williams	G. King	P. Benito										
Task	Hourly Rates	$275	$228	$205	$160	$80	Hours	($)	($)					
4.0	**HYBRID WATER BUDGET ANALYSIS TO SHOW EFECTS OF DIFFERENT DEMAND/SUPPLY ASSUMPTIONS ON VOLUME OF REPLENISHMENT WATER NEEDED**													$0
	Develop hybrid water budget analysis framework and tables for comparing different fractions of components of net-recharge required to achieve protective elevations under different Demand and Supply assumptions	2	2	32	16	0	52	$10,126	$0	$10,126	X		1	$10,126
	Task 4 Subtotal	*2*	*2*	*32*	*16*	*0*	*52*	*$10,126*	*$0*	*$10,126*				$0
5.0	**ANALYSIS OF AVAILABILITY OF CARMEL RIVER WATER FOR ASR INJECTION UNDER CLIMATE CHANGE**													$0
	Review existing studies and data sets and develop projection of potential Carmel River Water Availability under climate change & Analysis of Fraction of Additional Replenishment Water needed to offset missing ASR recharge	2	2	32	24	0	60	$11,406	$0	$11,406				$0
	Task 5 Subtotal	*2*	*2*	*32*	*24*	*0*	*60*	*$11,406*	*$0*	*$11,406*				$0
6.0	**REPORTING**													$0
6.1	Prepare Technical Memorandum describing Scenarios, Analyses, Findings, and Conclusions	2	12	32	32	8	86	$15,606	$0	$15,606	X	Less hours required if some other tasks reduced or removed	0.9	$14,045
6.2	Prepare Presentation and Present Findings to TAC and Board via Zoom	1	4	8	2	0	15	$3,147	$0	$3,147	X		1	$3,147
	Task 6 Subtotal	*3*	*16*	*40*	*34*	*8*	*101*	*$18,753*	*$0*	*$18,753*				
	Total	**13**	**31**	**234**	**250**	**8**	**536**	**$99,253**	**$0**	**$99,253**				$62,539
		COST SAVINGS FROM IMPLEMENTING ALL OF THE SCOPE REDUCTIONS =							**$36,714**					

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

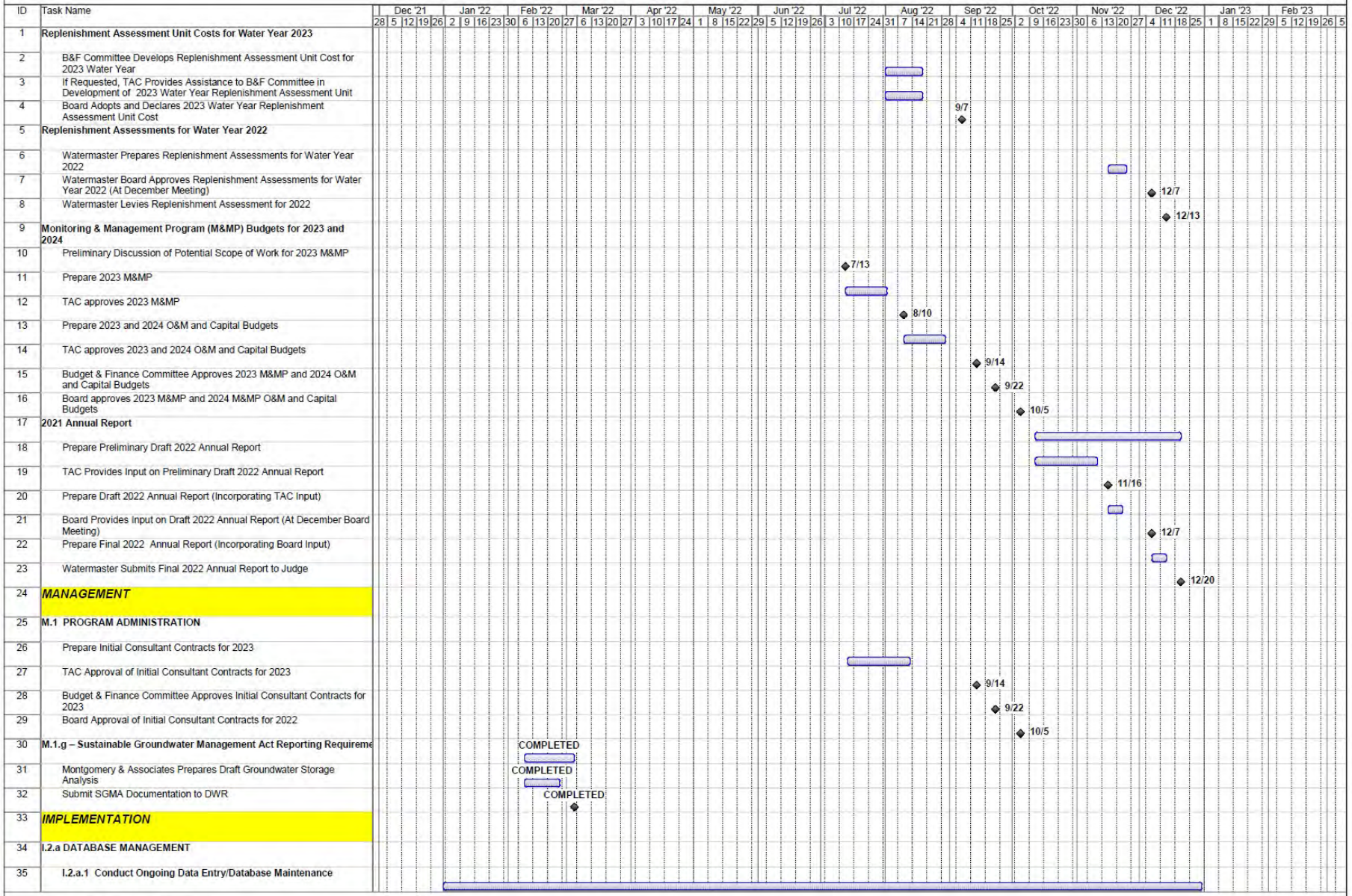
MEETING DATE:	April 27, 2022
AGENDA ITEM:	4
AGENDA TITLE:	Schedule
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:
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.

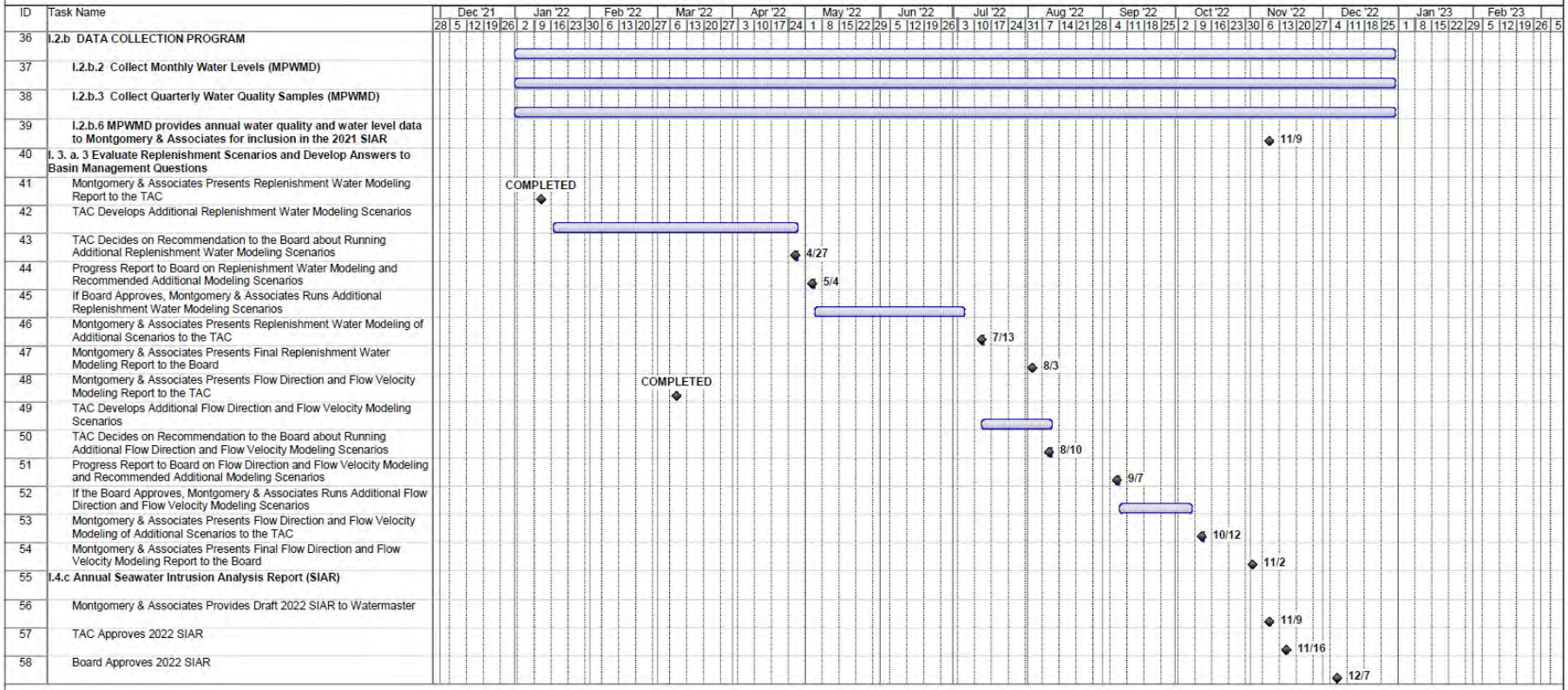
Attached is the updated schedule for 2022 activities.

ATTACHMENTS:	Schedule of Work Activities for FY 2022
RECOMMENDED ACTION:	Provide Input to Technical Program Manager Regarding Any Corrections or Additions to the Schedules

Seaside Basin Watermaster
2022 Monitoring and Management Program
Work Schedule



Seaside Basin Watermaster
2022 Monitoring and Management Program
Work Schedule



SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	April 27, 2022
AGENDA ITEM:	5
AGENDA TITLE:	Other Business
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:
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.

ATTACHMENTS:	None
RECOMMENDED ACTION:	None required – information only