

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

DATE: Wednesday, May 11, 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/85045558199?pwd=YWs4TG9keHlxKzZnNm1YaTJWYTB6QT09>
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: 850 4555 8199
Passcode: 097290

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 Peninsula Water Management District	Monterey County Water Resources Agency

<u>Agenda Item</u>	<u>Page</u>
1. Public Comments	1
2. Administrative Matters:	:
A. Approve Minutes from the April 27, 2022 Meeting	2
B. Sustainable Groundwater Management Act (SGMA) Update	10
C. Make Findings Required Under AB 361 Regarding Holding Meetings Via Teleconference	14
3. Results from Martin Feeney’s March 2022 Induction Logging of the Sentinel Wells and Recommendation to Reduce Frequency of Induction Logging	15
4. Approve Contract with Montgomery & Associates to Perform Additional Replenishment Water Evaluations Using Different Assumptions (RFS No. 2022-04)	22
5. Resumed Discussion of Pros and Cons of Using the Sustainable Yield (SY) Approach in Place of the Natural Safe Yield (NSY) Approach for Basin Management	34
6. Schedule	54
7. Other Business	57
The next regular meeting is tentatively planned for Wednesday June 8, 2022 at 1:30 p.m. That meeting will likely also be held via teleconference.	57

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	May 11, 2022
AGENDA ITEM:	2.A
AGENDA TITLE:	Approve Minutes from the April 27, 2022 Meeting
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	<p>Draft Minutes from this meeting were emailed to all TAC members. Any changes requested by TAC members have been included in the attached versions.</p>
ATTACHMENTS:	Minutes from this meeting
RECOMMENDED ACTION:	Approve the minutes

D-R-A-F-T
MINUTES

**Seaside Groundwater Basin Watermaster
Technical Advisory Committee Meeting
April 27, 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 part way into the meeting)
MPWMD – Jon Lear
MCWRA – Tamara Voss
City of Del Rey Oaks – No Representative
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
EKI – Vera Nelson, Tina Wang, Aaron Lewis (consultants to MCWD)
MPWMD – Maureen Hamilton, Dave Stoldt
Luhdorff & Scalmanini – Peter Leffler (consultant to Cal Am)

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 Mr. O’Halloran, seconded by Ms. Voss, the minutes were unanimously approved as presented.

B. Sustainable Groundwater Management Act (SGMA) Update

Mr. Jaques presented 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. Jaques briefly summarized the agenda packet materials for this item. A motion was made by Mr. Lear, seconded by Ms. Voss, to adopt the findings contained in the agenda packet. The motion passed unanimously.

3. Discuss Correspondence Received Regarding Replenishment Water and Monterey Subbasin Final GSP

Mr. Jaques introduced this agenda item.

Mr. Lear said he concurred with coordinating between basins for SGMA success.

Mr. Leffler gave an overview of his comments. He recommended pursuing replenishment water for the Seaside groundwater basin. He said there are many uncertainties of what will actually be achieved from implementation of the Groundwater Sustainability Plans (GSPs) in the adjacent basins. Also, climate change uncertainty is another issue because those GSP's do not use a conservative climate change approach.

Mr. Lear and Ms. Voss both supported the need for replenishment water for the Seaside basin.

Mr. Benito said that the replenishment water modeling that was completed in January 2022 did not assume any GSP projects were implemented. It maintained current hydrologic boundary conditions.

Mr. Breen said he disagreed with many of Mr. Leffler's comments.

Ms. Nelson provided a response on behalf of Marina Coast Water District. She said that no model is perfect, and that efforts would continue to make the EKI model more accurate. The Salinas Valley Integrated Hydrologic Model (SVIHM) included only two data points in the Monterey subbasin. So the Monterey Subbasin GSP Groundwater Flow Model (MBGWFM) developed by EKI is the first model for that subbasin has been prepared using extensive data. She reported that calibration of that model exceeds that of the SVIHM, so it was concluded that it was appropriate to use it for the Monterey Subbasin. The EKI model produced similar cross-boundary flow estimates to those produced by the Watermaster's Seaside Basin model. The intent is to address the issues that Mr. Leffler raised and to update the MBGWFM with more data as the GSP is implemented. The MBGWFM incorporates data collected throughout the Monterey Subbasin. The 180/400-Foot Aquifer GSP Implementation Committee is evaluating projects at this time. Ms. Nelson said that she sees great difficulty for the Monterey Subbasin achieving sustainability, if the 180/400-Foot Aquifer Subbasin does not create the Seawater Intrusion Protective Condition. If the 180/400-Foot Aquifer Subbasin goes for an extraction barrier instead, it will be very difficult for the Monterey Subbasin to achieve sustainability. She went on to say that she felt that the MBGWFM has been fully and thoroughly calibrated.

Mr. Lewis described the calibration information for the MBGWFM and for the Watermaster's Seaside Basin groundwater model. He said that the Watermaster's Seaside Basin model has a 2.9% root mean square residual, whereas the MBGWFM has a 1.5% RMS residual. The SVIHM overall had a 6.0% RMS percentage, meaning that there was much more variability and deviation of model data versus measured data. For the Monterey Subbasin portion of the SVIHM the RMS percentage residual was over 7%.

Mr. Leffler responded that his review comments were for the Monterey Subbasin overall, with some emphasis on the Marina-Ord Subarea. He went on to say that with regard to calibration statistics, if one includes the Corral de Tierra Subarea of the Monterey Subbasin, the RMS residual percentage of the MBGWFM would be higher.

4. Continued Discussion of Performing Additional Replenishment Water Modeling Using Different Assumptions

Mr. Jaques introduced this agenda item.

Mr. Benito provided an overview discussion (see attached PowerPoint slides) on the Scope and Cost Proposal that was included in the agenda packet. He said the intent was to hopefully be able to leverage the already-completed replenishment modeling work to minimize costs that would be incurred by having to re-run additional modeling scenarios. He described the components of the Water Budget, and each of the 5 Tasks described in the Scope and Cost Proposal.

Task 4 is a hybrid Water Budget analysis using a spreadsheet approach based on data from the previous modeling. It would reanalyze the previously run simulations using revised demand and supply values.

For Task 5 (climate change) various studies have already been done to forecast stream flows. USGS, USBR, and DWR have done such studies. Using these studies would give an upper and lower range of potential ASR injection quantities.

Scenario 2 would require performing Task 3, because modeling would be needed. The spreadsheet approach of Task 4 would not be usable to cover Scenario 2.

Mr. Lear inquired if the technical portions of the “What if” scenarios had been discussed, vetted, and agreed upon by the TAC Committee. Mr. Jaques explained that the scenarios were discussed at an earlier TAC meeting and he was given direction to refine the scenarios through discussions with the City of Seaside and Cal Am. This was done and the scenarios described in the agenda packet for today’s meeting reflect the results of those discussions. (Note: The minutes from the January 12, 2022 meeting show that TAC consensus had been reached that Mr. Jaques would discuss with Mr. Benito, Mr. O’Halloran, and Mr. Ottmar these various issues and would then come back to the TAC with more refined descriptions of potential additional scenario(s) to be modeled, and what the cost to run the additional scenario(s) would be.)

Mr. Leffler recommended having a longer modeling period to better see what happens after Cal Am water repayment ends.

Mr. Stoldt described a number of what he considered to be faulty assumptions in Cal Am’s Urban Water Management Plan.

Mr. Lear said that the ASR program has used 15 acre-feet per day as an average daily injection amount. He went on to say that MPWMD is currently in discussions with regulatory agencies to see if the streamflow diversion threshold could be reduced, so more diversion days could be authorized through a permit revision.

Mr. O’Halloran explained that Cal Am would like a more realistically conservative analysis to be done. One that does not count on historical hydrology with wet years being repeated. Rather, they would like to have new modeling done as described in Scenario 1 (Task 2).

Mr. Lear said he did not feel Task 3 needs to be done immediately. He felt it would be better to wait until the GSP’s get further along in the implementation process. Mr. Jaques noted that he believed the Watermaster’s Public Awareness Committee may be looking for this information.

Ms. Voss said that from a technical standpoint she did not feel it would be important to run Scenario 2 (Task 3) at this time. However, she noted that the Board and/or the Public Awareness Committee may feel differently.

Mr. Lear and Ms. Voss said if there were fewer wet years, it could take longer and require more water to reach Protective Water Levels. Mr. Lear thought the hydrologic cycle in the modeling was constructed from data, but was not the direct hydrologic data. Mr. Benito responded that it was not constructed, but was based on actual hydrologic data.

There was discussion about how long it should take to achieve Protective Water Levels, e.g. 20 years or longer? Mr. O'Halloran felt that seawater intrusion should be expected "at any time" and that 20 years would be too long to wait. Mr. Lear said that achieving Protective Water Levels will require both technical and financial feasibility.

Mr. Benito said he felt Task 4 would provide a good amount of useful information at a lower cost. It would help give upper and lower replenishment water estimates under different assumptions. He noted that more replenishment water will be needed under the revised Cal Am assumptions.

Mr. Lear felt it would be good to consider doing modeling to look at different time frames to achieve Protective Water Levels.

Mr. Leffler said the higher Seaside Basin groundwater levels that would result from replenishment of the Seaside Basin would cause increased cross-boundary losses to the Monterey Subbasin. Mr. Benito said he concurred with that conclusion, and that the amount of those flows would depend on what is achieved through implementation of the Monterey Subbasin GSP.

There was TAC consensus to:

1. Do a reduced scope version of Task 1 sufficient to be used in conjunction with Task 4,
2. In lieu of doing Task 2, do Task 4 as described in the Scope and Cost Proposal using the Cal Am and City of Seaside assumptions listed in Subtask 2.2, and
3. Do a reduced scope version of Task 6 due to having to prepare a less lengthy Technical Memorandum.
4. Not do Tasks 2, 3 or 5 at this time, but consider doing 3 and/or 5 at some future date.

5. Schedule

Mr. Jaques noted that the only change in the schedule in this update was the timing of some of the tasks. No new tasks were added. There was no other discussion.

6. Other Business

There was no other business.

The meeting adjourned at 3:46 PM.

SEASIDE GROUNDWATER BASIN

ADDITIONAL REPLENISHMENT MODELING



Presented to the Seaside Basin TAC April 27th, 2022

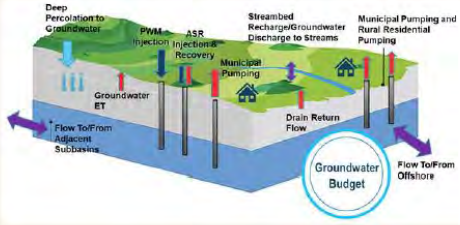


TASKS

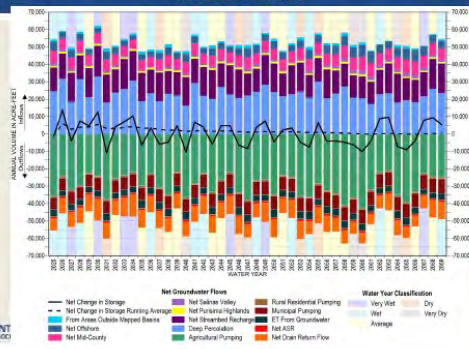
- Task 1. Water budget analysis of original baseline scenario and one replenishment model scenario
- Task 2. Develop alternative scenario based on Cal-Am urban water management plan demand assumptions and updated city of seaside assumptions (note: herein this is referred to as alternative scenario 1)
- 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)
- Task 4. Hybrid water budget analysis to show effects of different demand/supply assumptions on volume of replenishment needed
- Task 5. Climate change analysis of availability of Carmel River water for ASR injection



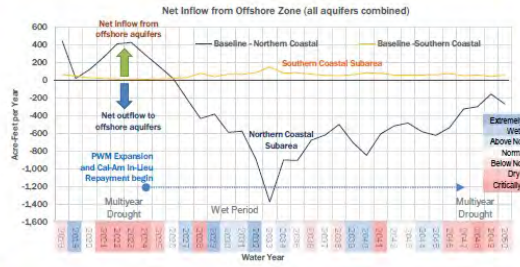
WATER BUDGET COMPONENTS FOR SUBBASIN



WATER BUDGET COMPONENTS FOR SUBBASIN

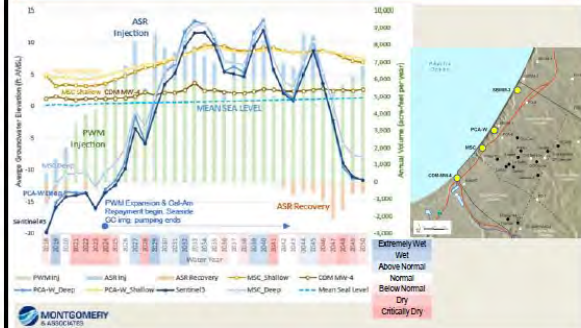


CHANGE IN NET FLOWS TO/FROM OFFSHORE AQUIFERS



MONTGOMERY & ASSOCIATES

BASELINE SIMULATION WATER LEVELS

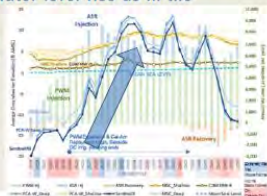


MONTGOMERY & ASSOCIATES

HYBRID WATER BALANCE APPROACH

$$\text{Net Recharge} = \text{ASR}_{inj} + \text{Replenishment} - \text{CalAm Pumping}$$

- As Supply (ASR + PWM) & Demand (CalAm) assumptions are changed, varying amounts of Replenishment water will be needed to achieve the same water level rise as in the baseline.
- We can apply different range of assumptions & summarize the range of replenishment



MONTGOMERY & ASSOCIATES

BASELINE CYCLED HYDROLOGY

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

Sim Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Water Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	
Control Rule & WY Type	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR	ASR
Data Sources	Actual	(1987-2016 Historical Hydrology)																	Projected																					

- WY 2022–2050: projected pumping, all planned projects, PWM & ASR injection tied to cycled historical hydrology

MONTGOMERY & ASSOCIATES

8

QUESTIONS & DISCUSSION

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	May 11, 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 April 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 APRIL 2022

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

SVBGSA Seawater Intrusion Working Group Meeting April 4, 2022:

- At this meeting there was discussion about development of the Seawater Intrusion Model. It will include all of the Seaside Groundwater Basin will go offshore to the extent possible.
- There was discussion of four projected model simulations which are the first ones that will be run using the new seawater intrusion model:
 1. Baseline (current status) including climate change, sea level rise, and some changes in extractions (pumping amounts)
 2. Seasonal release of water to this list River with ASR
 3. Seawater extraction barrier
 4. Pumping reductionsThe purpose of these scenarios will be to see how far toward achieving groundwater stability they get.
- Montgomery & Associates is partnering with Stanford University on calibration of the model using Stanford's AEM data.
- The SVBGSA got a \$7.6 million State grant for GSP implementation. They will be using part of that to perform feasibility studies to use in prioritizing projects for implementation.
- Some people (Peter Leffler, and Bob Abrams) asked if more dire climate change (i.e. drier weather forecasts), could be analyzed, as this would require growers to pump more leading to increased seawater intrusion. The current climate change predictions show more precipitation in the future resulting in more recharge of the aquifers. The current predictions also show higher temperatures which means growers would have to irrigate more. Ms. Ostovar (of Montgomery & Associates) said they may run additional climate change scenarios at some point in the future.
- EKI (Vera Nelson) said Marina Coast Water District would like the extraction barrier to be located as far north as possible to keep from lowering groundwater levels in the Monterey Subbasin.
- There was much discussion about the extraction barrier project and how to dispose of the extracted water. There seemed to be a strong interest toward including with the extraction barrier project a desalination plant so the extracted water could be beneficially reused either for injection into the basin or through direct supply to municipal users.

SVBGSA Advisory Committee Meeting April 21, 2022:

Topics of interest to the Watermaster included:

- Information was presented on the 180/400-Foot Aquifer GSP 2022 Update.
 - These were largely regulatory and administrative in nature.
 - Data was updated from 2017 (in the original GSP) to 2020 data.
 - Some changes were made to the Water Budget. Storage losses was changed to being calculated based on measured groundwater levels, not model projections. This led to a revised annual storage loss averaging 770 AFY.
 - The Project Sustainable Yields were updated as follows:

<u>2030</u>	<u>2070</u>
111,200 AFY	116,900 AFY

- Pumping from this subbasin has historically exceeded the Sustainable Yield.
- The Projects in the GSP have not yet been prioritized, but work to do that has been started.
- An update was provided on the Deep Aquifer Study:
 - Work on this study has commenced.
 - In the summer of 2022 there will be an update on the findings of the preliminary investigations as well as a recommended monitoring program.
 - The Study will include use of AEM data as well as e-logs from existing wells.
 - Work currently in progress is mainly focused on analyzing existing available data.
- There was an overview presentation on the annual reports for all of the SVGWB GSPs. Several of the participants in the meeting felt there were shortcomings in the GSPs that should be addressed.
- The GSP Implementation Committees have now been formed and will begin meeting shortly.

Monterey Subbasin GSP Implementation Committee Meeting April 28, 2022:

- At this meeting it was announced that the implementation committee has now been formed and its members are as follows:

NAME	AFFILIATION
Beverly Bean	Corral de Tierra resident and representative of the League of Women Voters
Patrick Breen (elected as Vice Chair)	MCWD
Doug Ayres	Toro Park resident and works at Corral de Tierra Country Club
Janet Brennan	Carmel Valley resident and representative of the Environmental Caucus
Kent Hibino	Corral de Tierra resident and agricultural grower
Sarah Hardgrave (elected Chair)	Representing Supervisor Mary Adams
Michael Wowzowski	California Water Company Engineer
Margaret Carbenal	Marina Resident
Mark Kennedy	Toro Park Estates resident
Mr. Long	(he was absent from this meeting)
Matt Panziera	Corral de Tierra resident and agricultural grower
Mike Weaver	Corral de Tierra resident and owns/operates several small water systems

- There were general presentations on SGMA, the SVBGSA and the MCWDGSA, GSP's, and annual reports.
- One attendee asked if there was any way the Corral de Tierra subarea could achieve sustainability if the 180/400 foot aquifer subbasin did not achieve sustainability. Ms. Ostovar responded that even with no pumping in the Corral de Tierra subarea it could not achieve sustainability if the 180/400 foot aquifer subbasin did not.
- Cutting back on Corral de Tierra pumping was discussed. Some felt this should be implemented early-on, rather than waiting for a regional water supply project or something else to help achieve sustainability. Ms. Ostovar said it will be a "heavy lift" for the Corral de Tierra subarea to achieve sustainability.
- There was discussion regarding prioritization of projects. A grant application will be submitted to the Department of Water Resources in the Fall of 2022 to do feasibility studies to help with prioritization of projects, similar to what is being done in the 180/400 foot aquifer subbasin.

Some management actions may not take as long to determine feasibility, such as demand management, and therefore could be prioritized to start sooner.

- One person suggested asking the SVBGSA board to allocate money from its operations budget to help get started sooner and not wait for grant funds, which are not a certainty, since grant funds are competitive.
- This Committee will probably meet on a monthly basis.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	May 11, 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
<p>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.</p> <p>One action required at today's meeting is to readopt the same findings the TAC adopted at its November 17 meeting, namely that:</p> <ol style="list-style-type: none"> (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. <p>I recommend that the TAC again adopt these three findings.</p>	
ATTACHMENTS:	None
RECOMMENDED ACTION:	Approve Making the Findings Described Above

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	May 11, 2022
AGENDA ITEM:	3
AGENDA TITLE:	Results from Martin Feeney’s March 2022 Induction Logging of the Sentinel Wells and Recommendation to Reduce Frequency of Induction Logging
PREPARED BY:	Robert Jaques, Technical Program Manager

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

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

Since the results of the logging ever since the start of logging many years ago continue to be the same, and do not show any intrusion occurring, Mr. Feeney also recommends that the frequency of induction logging of these wells be reduced from semi-annually to annually.

Both Mr. Feeney and Mr. Yates (of Todd Groundwater) have opined that (1) The Santa Margarita may not have a direct hydrologic connection to Monterey Bay, and therefore may not be at risk for seawater directly entering this aquifer from the Bay. The most likely route for SWI to occur in the Santa Margarita aquifer would be from SWI occurring in the Paso Robles aquifer and migrating downward into the Santa Margarita aquifer, (2) If SWI were to begin to occur in the Santa Margarita aquifer it would move inland at a very slow rate.

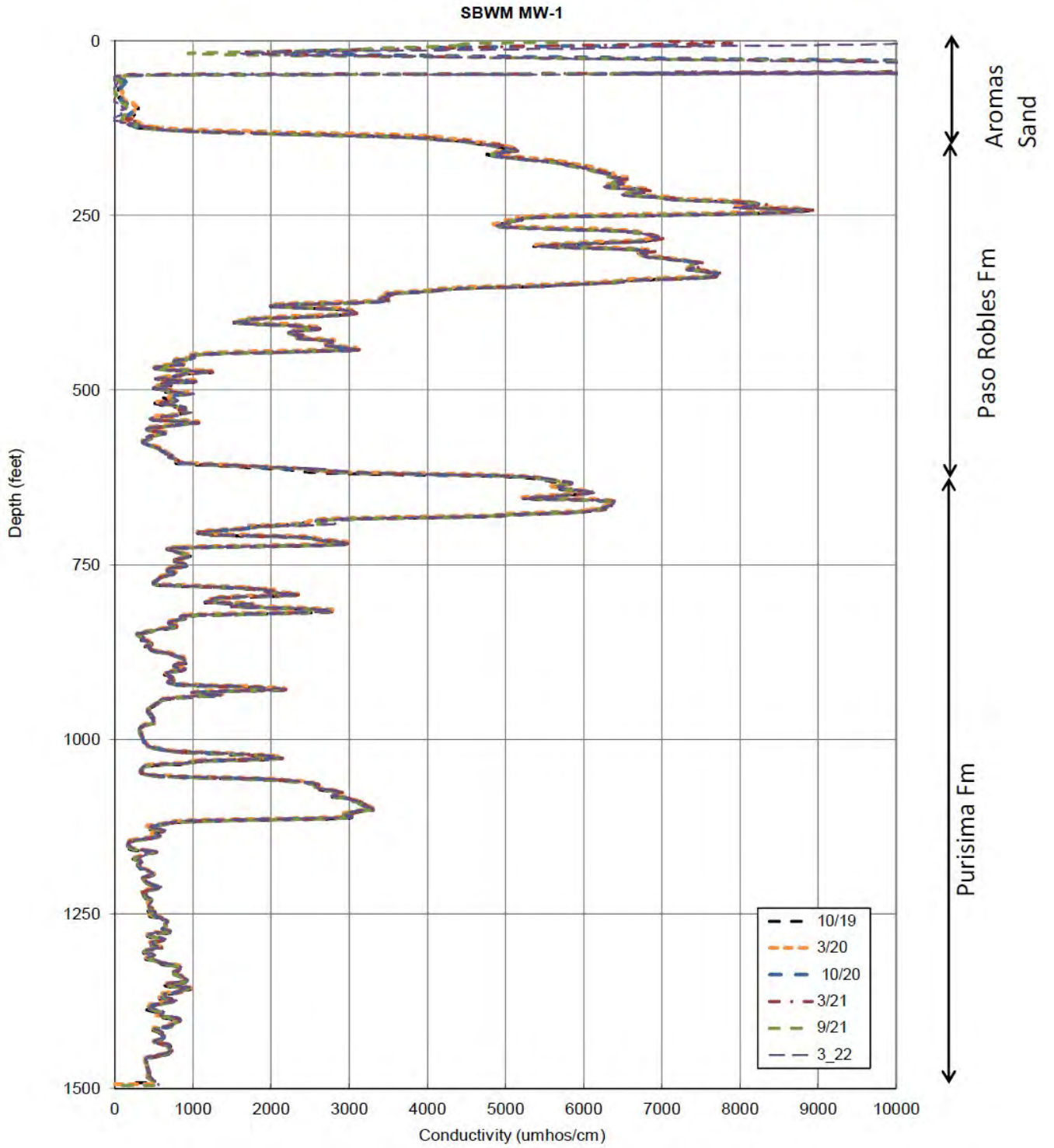
Mr. Feeney has gone on to further opine that if SWI were to begin to occur in the Paso Robles aquifer, it would also move inland at a very slow rate. This is confirmed by the recently completed Flow Direction/Flow Velocity modeling work by Montgomery & Associates which projected that water would move inland in the Lower Paso Robles aquifer slowly and would take years to reach any production wells. See attached Figures 12 and 14 from that modeling Technical Memorandum.

Mr. Feeney reports that water movement through both of these aquifers is very slow, so it would take a long time for SWI in the Paso Robles aquifer to reach the Santa Margarita aquifer.

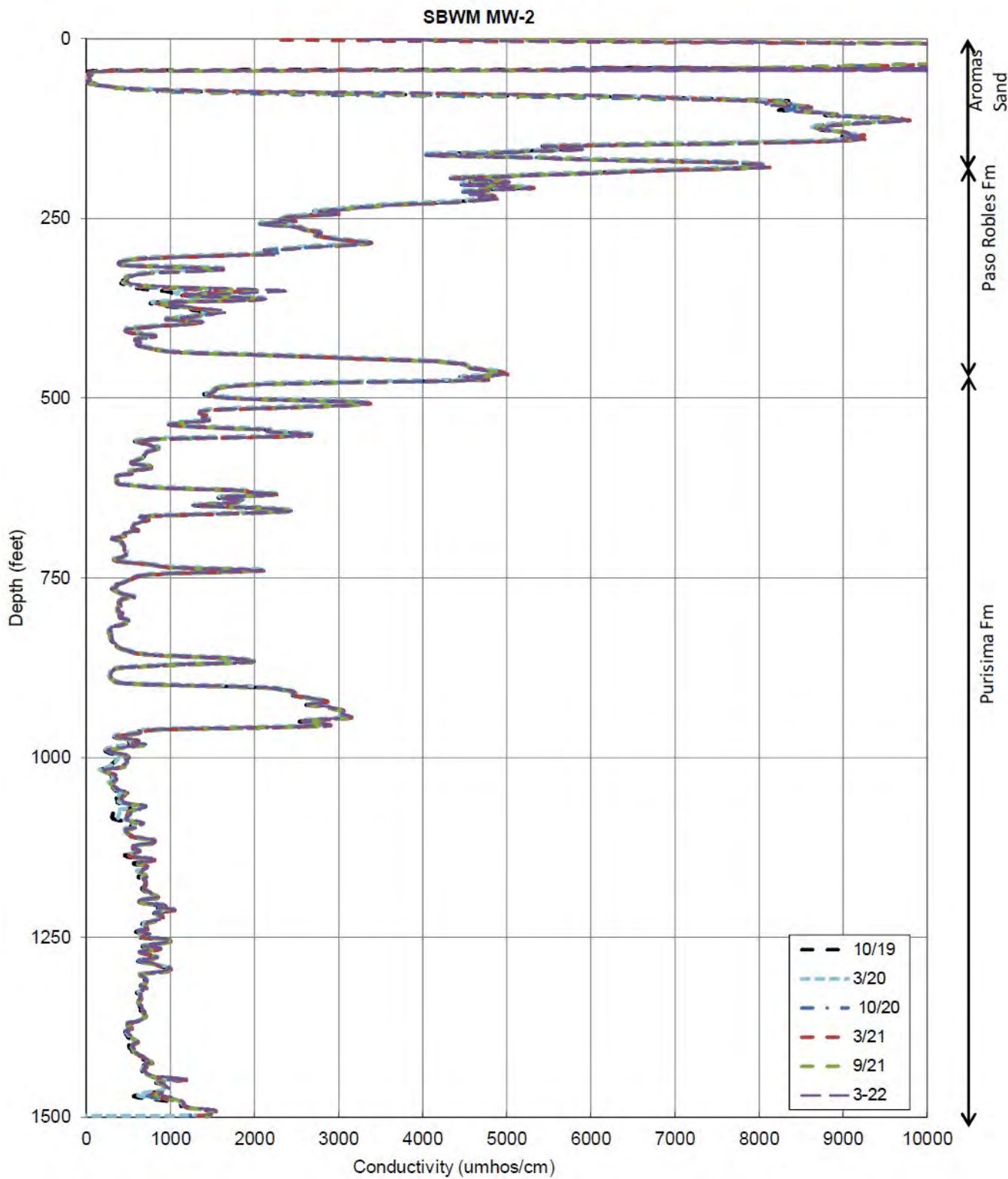
For these reasons I concur with Mr. Feeney’s recommendation and ask that the TAC give its approval so this can be forwarded to the Board for them to also approve. Ms. King and Mr. Williams of Montgomery & Associates also concurred with reducing the induction logging frequency. If approved by the Board, reducing the induction logging frequency would be reported in the 2022 Annual Report that is filed with the Court at the end of each Water Year.

ATTACHMENTS:	Induction Logging Results and Recommendation to Reduce Induction Logging Frequency
RECOMMENDED ACTION:	Approve recommendation to reduce induction logging frequency of the four Sentinel Wells from semi-annually to annually starting in Water Year 2022

SENTINEL WELLS CONDUCTIVITY

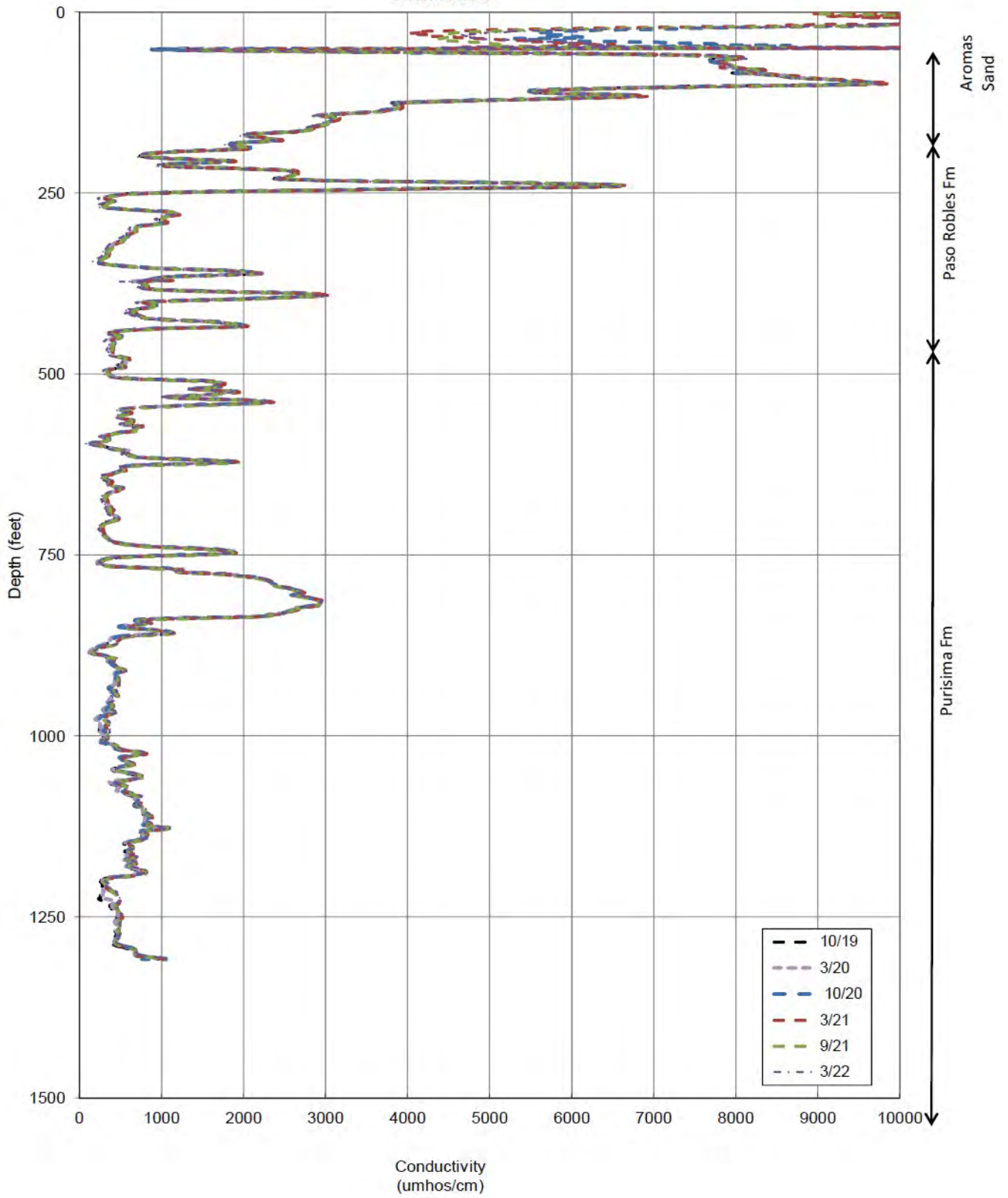


SENTINEL WELLS CONDUCTIVITY

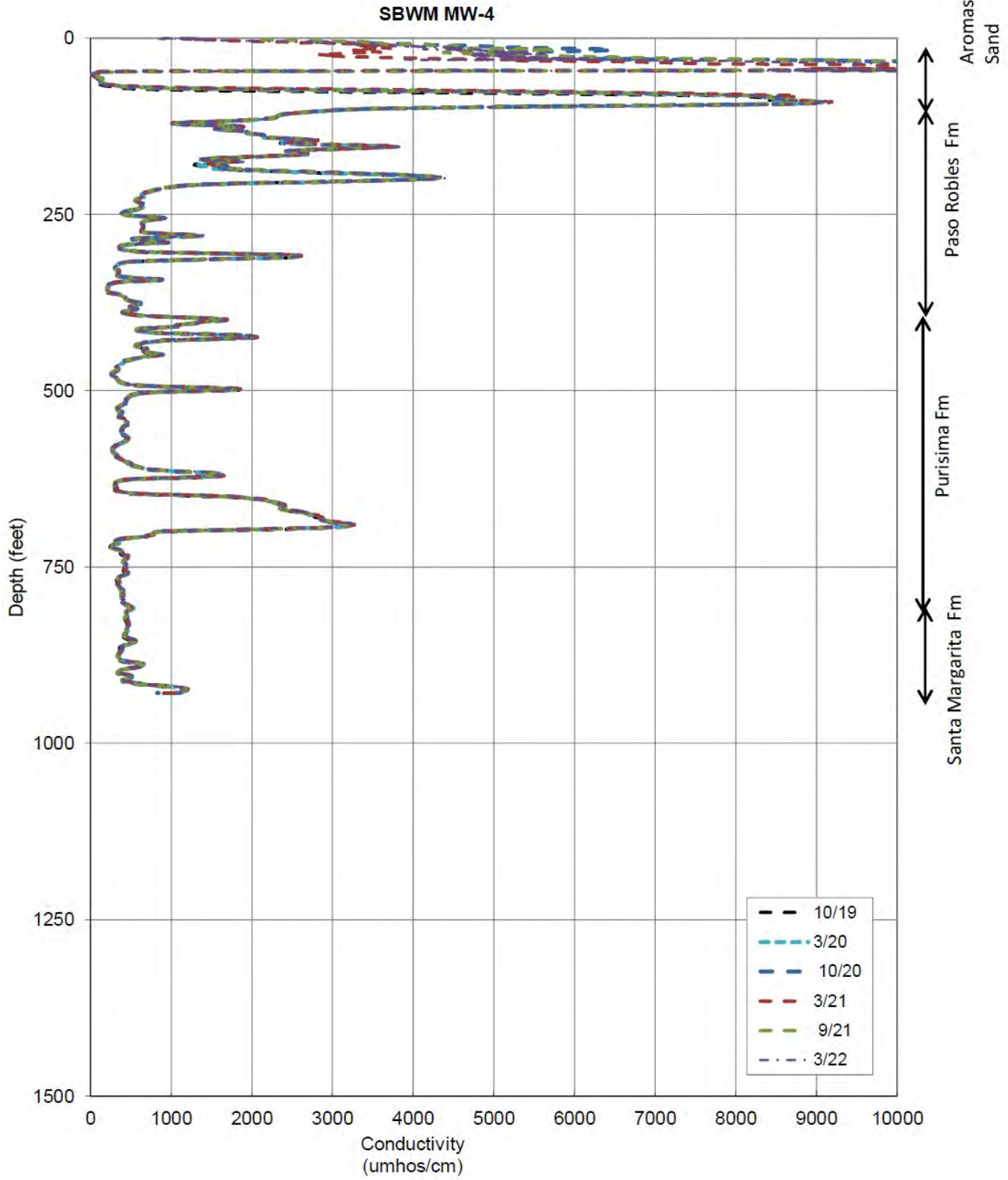


SENTINEL WELLS CONDUCTIVITY

SBWM MW-3



SENTINEL WELLS CONDUCTIVITY



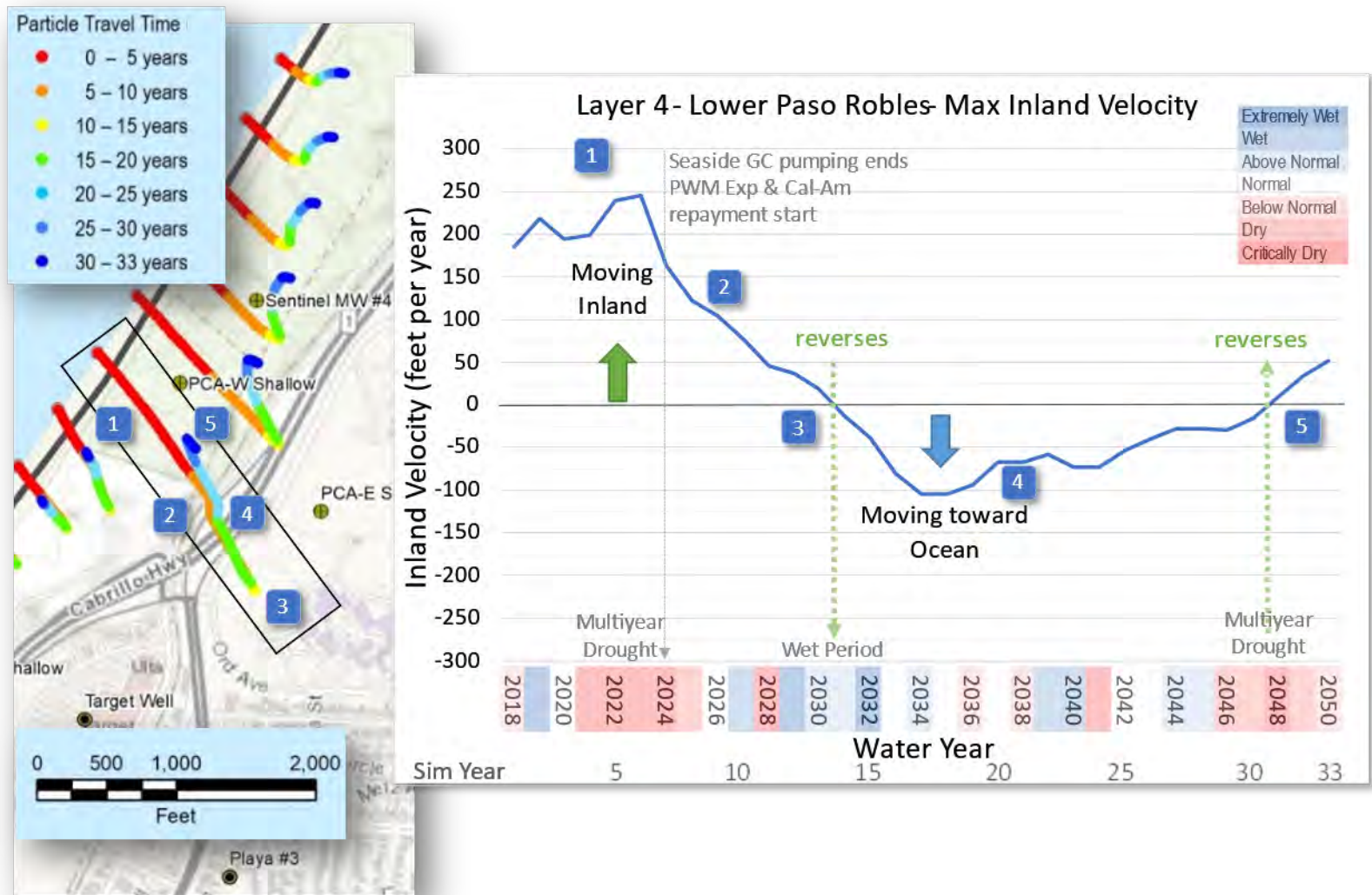


Figure 1. Particle Flow Paths and Inland Velocity Along Fastest Pathway for 8% Effective Porosity Scenario

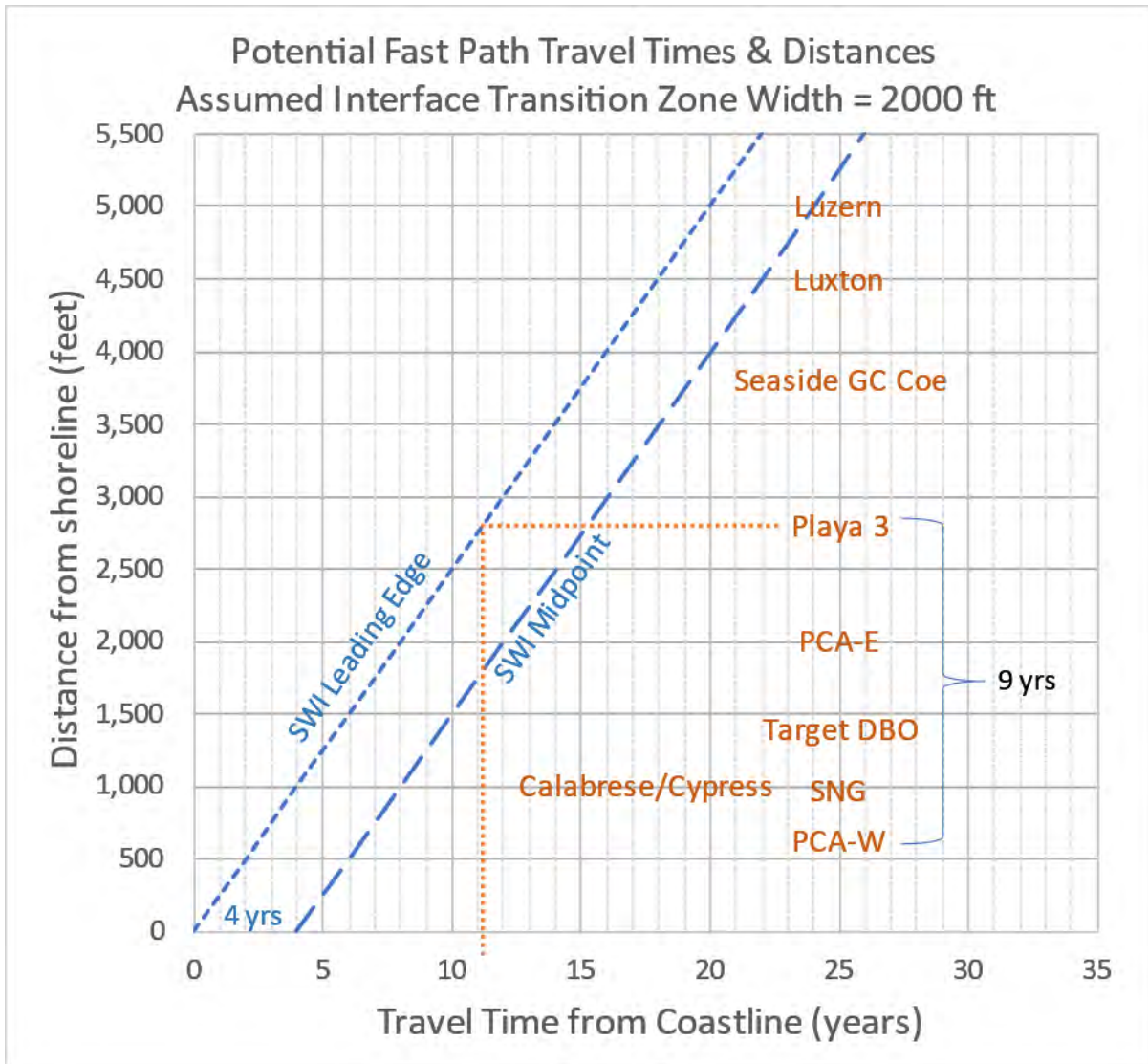


Figure 2. Potential Maximum Inland Travel Times and Distances Along a Preferential Flow Path

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	May 11, 2022
AGENDA ITEM:	4
AGENDA TITLE:	Approve Contract with Montgomery & Associates to Perform Additional Replenishment Water Evaluations Using Different Assumptions (RFS No. 2022-04)
PREPARED BY:	Robert Jaques, Technical Program Manager
<p>SUMMARY: At its April 27th meeting the TAC discussed the Scope and Cost Proposal provided by Montgomery & Associates to perform additional replenishment water modeling work using a revised set of assumptions suggested by Cal Am, the City of Seaside, and MPWMD. That Proposal was dated April 18, 2022 and was included in the agenda packet for the April 27, 2022 TAC meeting.</p> <p>The TAC reached the following consensus (The task numbers below refer to the Tasks listed in the April 18, 2022 Scope and Cost Proposal):</p> <ol style="list-style-type: none"> 1. Do a reduced version of Task 1, as necessary to compare with Task 4. 2. Do Task 4 as presented, using the revised assumptions from Cal Am and Seaside, and 3. Do a reduced version of Task 6 that reflects not having to prepare a TM covering all 5 of the tasks. <p>Mr. Benito of Montgomery & Associates provided me a revised Scope and Cost Proposal to accomplish this reduced scope of work. He and I discussed possible ways of further reducing and scope and cost, but mutually concluded that the revised Scope and Cost Proposal he presented incorporated all of the scope reductions that could be achieved and still provide the Watermaster with the desired information. I used the revised Scope and Cost Proposal to draft the attached Request for Service (RFS) No. 2022-04 that would authorize Montgomery & Associates to perform the work.</p> <p>If the TAC approves this RFS, I will present it to the Board for their approval at its June 1, 2022 meeting.</p>	
ATTACHMENTS:	Montgomery & Associates RFS No. 2022-04
RECOMMENDED ACTION:	Approve RFS No. 2022-04 and forward it to the Board with the TAC's recommendation for approval

SEASIDE BASIN WATERMASTER
REQUEST FOR SERVICE

DATE: June 2, 2022

RFS NO. 2022-04
(To be filled in by WATERMASTER)

TO: Cameron Tana
Montgomery & Associates
PROFESSIONAL

FROM: Robert Jaques
WATERMASTER

Services Needed and Purpose: Perform additional analyses to determine how much replenishment water will be needed to achieve protective groundwater elevations in the Basin. See Scope of Work in Attachment 1.

Completion Date: All work of this RFS shall be completed not later than December 31, 2022, and shall be performed in accordance with the Schedule contained in Attachment 2.

Method of Compensation: Time and Materials (As defined in Section V of Agreement.)

Total Price Authorized by this RFS: \$ 40,735.00 (Cost is authorized only when evidenced by signature below.) (See Attachment 1 for Estimated Costs).

Total Price may not be exceeded without prior written authorization by WATERMASTER in accordance with Section V. COMPENSATION.

Requested by: _____ **Date:** _____
WATERMASTER Technical Program Manager

Agreed to by: _____ **Date:** _____
PROFESSIONAL

ATTACHMENT 1

SCOPE OF WORK

Under RFS No. 2021-01, Amendment No. 2, PROFESSIONAL performed initial groundwater modeling to determine how much replenishment water will be needed to achieve protective groundwater elevations in the Basin. This RFS No. 2022-04 authorizes PROFESSIONAL to perform the additional analyses described in Attachment 2 hereto to determine how much replenishment water will be needed to achieve protective groundwater elevations in the Basin under different assumptions than those used in the initial modeling work.

ATTACHMENT 2



May 4, 2022

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

**SUBJECT: SCOPE AND COST FOR ADDITIONAL HYBRID WATER BUDGET
ANALYSES OF BASIN REPLENISHMENT OPTIONS TO ACHIEVE PROTECTIVE
ELEVATIONS**

Dear Mr. Jaques

Per your request, this letter contains a revised scope of work and estimated cost to use a water budget analysis approach to evaluate the impact of an alternate set of future supply and demand assumptions has on the volume of replenishment water that would be needed to reach protective elevations in the coastal monitoring wells. The alternate demand and supply assumptions will be based primarily on Cal-Am's Urban Water Management Plan (UWMP), and additional assumptions provided by Cal-Am and the City of Seaside. Rather than perform additional modeling scenarios, we will use a water budget analysis approach that will leverage information that can be extracted from the results of the recent replenishment modeling 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. We will develop a water budget analysis framework 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 the same degree of water level increases already simulated.

**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 subareas over the simulation period. 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, offshore flows, etc.) will help the TAC and Board better understand the

1

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. To reduce the scope, the water budget analysis will be focused only on the Northern Coastal Subarea and the region just to the east of it that encompasses the Pure Water Monterey (and Expansion) project area, and will be aggregated on a water year, rather than monthly, basis.

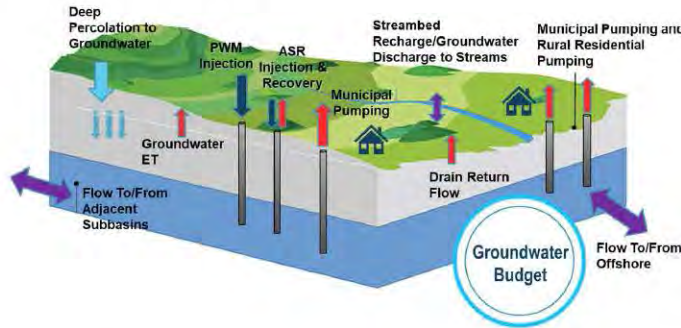


Figure 1. Draft Conceptual Diagram of Water Budget Components for Subbasin

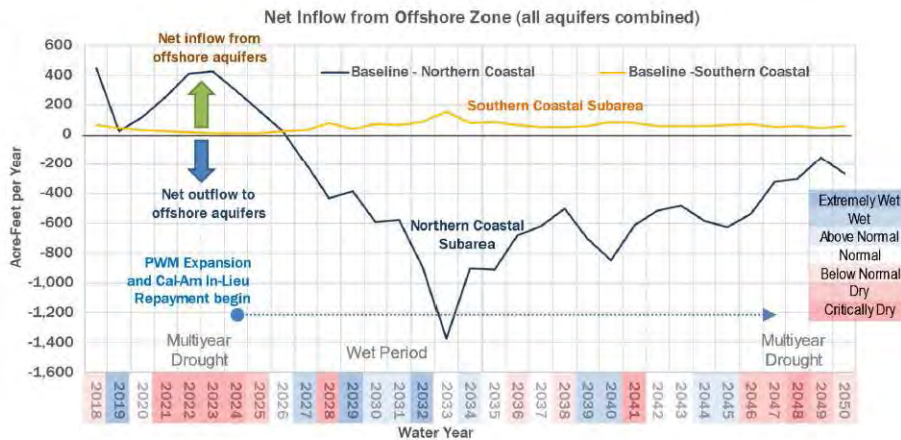


Figure 2. Example graph of changes in net offshore flows for the original baseline simulation

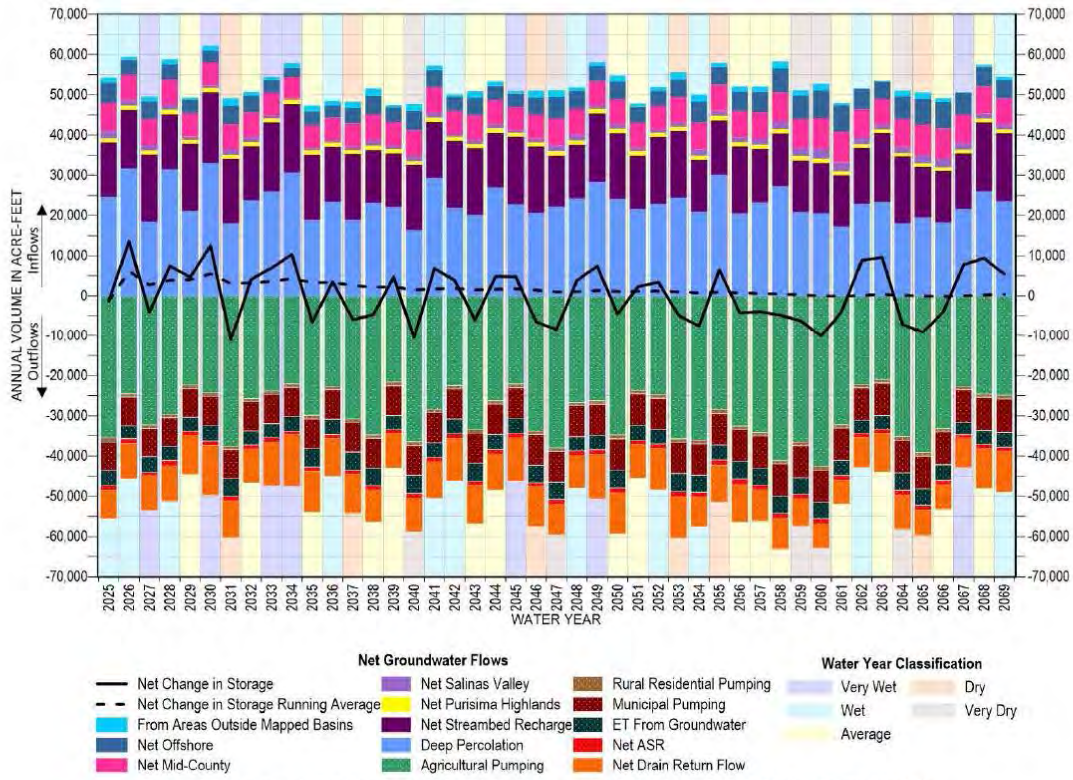


Figure 3. An example graph of a simulated future water budget (from Pajaro Valley Basin Model)

TASK 2. DEVELOP ALTERNATIVE SCENARIO BASED ON CAL-AM URBAN WATER MANAGEMENT PLAN SUPPLY & 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:

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 N., Longitude = 121.826278 W. (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. This model incorporates the cycled Carmel River historical hydrology that is used for the determination of the monthly ASR diversions. The projected ASR injection and Seaside pumping data will then be aggregated on a water year basis for comparison and integration with the water budget analysis from the existing January 2022 replenishment model runs.

TASK 3. HYBRID WATER BUDGET ANALYSIS TO SHOW EFFECTS OF DIFFERENT DEMAND/SUPPLY ASSUMPTIONS ON VOLUME OF REPLENISHMENT NEEDED

Rather than running multiple additional demand/supply scenarios, a hybrid water-budget-based approach will be used leveraging information from the model scenarios that have already been run and combining 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 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 the purposes of analyzing Alternative Scenario 1 in order to compare it to the Baseline and 1,000 AFY replenishment water scenarios in Task 1, the equation below shows the only water balance components that change when calculating the net recharge. For this purpose, we can define the net recharge as follows:

$$\text{Net Recharge} = \text{ASR Injection} + \text{Replenishment} - \text{Total Cal-Am Pumping}$$

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 below 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. 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 replenishment water to achieve the same water level increase that has already been simulated.

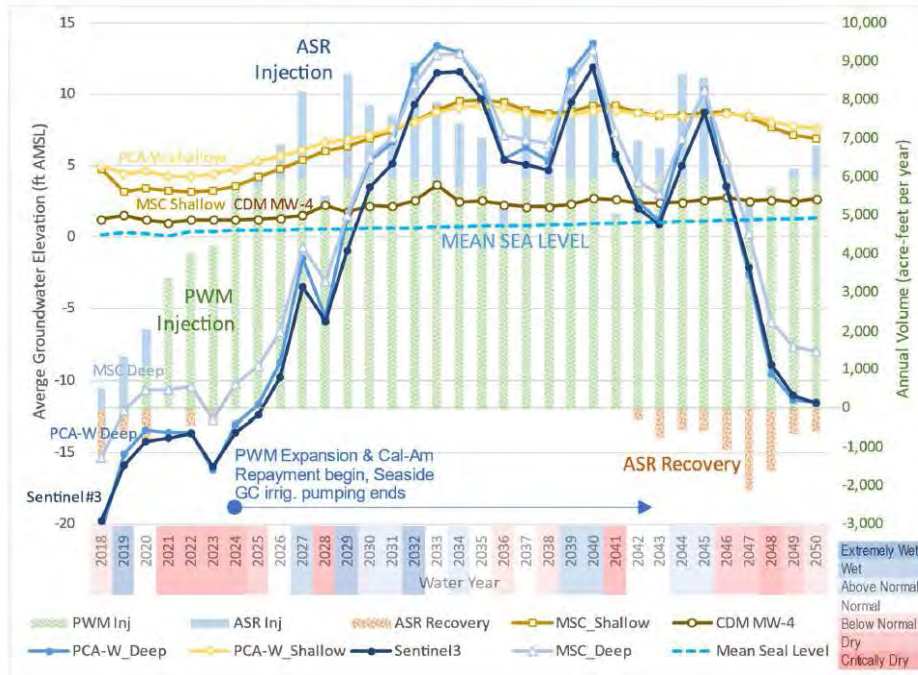


Figure 4. Simulated annually averaged water levels in protective elevation monitoring wells, and ASR and PWM injection and ASR recovery volumes, for the original January 2022 baseline simulation..

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 will be factored in by adding the additional 700 acre-foot-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 will require increased replenishment water volumes to keep the same total net-recharge amount to raise water levels the same amount.

So rather than modeling a number of different scenarios, the focus of the hybrid analysis will 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 framework could later be extended and used to look at the impacts of climate change on the availability of water for ASR, or to look at how changes in cross-boundary flows with the neighboring subbasins due to proposed SGMA GSP projects would impact potential replenishment volumes.

As discussed during the April TAC meeting, this analysis will assume that the protective elevations are met to the same degree and within the same time frame as in the January 2022 replenishment modeling. If the TAC wishes to explore alternative time frames for reaching protective elevations, then additional modeling will be needed.

TASK 4. REPORTING

Subtask 4.1. Prepare Technical Memorandum

A technical memorandum summarizing the water budget analysis results, the Alternate Scenario 1 supply and demand assumptions, and the changes in projected volumes of replenishment injection needed to achieve protective elevations within 20 years will be presented via tables and charts, and conclusions of the study will be prepared as a draft document. Following review by the Watermaster, a final version incorporating the Watermaster's input will be provided as both a PDF and MS Word document.

Subtask 4.2. Presentations

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

PROJECT COST ESTIMATE AND SCHEDULE

We anticipate that the tasks can be completed within a two-month period, though the timing may depend on the scheduling of TAC and Board meetings, and may need to be spread out due to reduced project staff availability the first two weeks of June. We can begin work on this immediately following notice to proceed.

The total estimated cost for all the above-described tasks is \$40,735. The attached cost estimate provides a breakdown of costs by task and subtask.

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											
		Montgomery & Associates Labor						Labor Total		Other Direct Costs	TOTALS
		Scientist VIII	Scientist VI	Scientist V	Scientist III	Technical Editor					
		D. Williams	G. King	P. Benito			Hours	(\$)	(\$)		
Task	Hourly Rates	\$275	\$228	\$205	\$160	\$80					
1.0	WATER BUDGET ANALYSIS OF ORIGINAL JANUARY 2022 BASELINE SIMULATION & REPLENISHMENT SCENARIOS										
	Water budget analysis of Baseline Simulation & 1000 AFY Replenishment Scenario Simulation. Focused on Inflow and Outflows for the Northern Coastal Subarea (extended to include PWM Expansion)	0	1	16	16	0	33	\$6,068	\$0	\$6,068	
	<i>Task 1 Subtotal</i>	0	1	16	16	0	33	\$6,068	\$0	\$6,068	
2.0	DEVELOP ALTERNATIVE SCENARIO 1										
2.1	Incorporate revised City of Seaside Assumptions & New Well Location	0	0	6	0	0	6	\$1,230	\$0	\$1,230	
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	
	<i>Task 2 Subtotal</i>	2	4	38	16	0	60	\$11,812	\$0	\$11,812	
3.0	Hybrid Water Budget Analysis To Show Effects Of Different Demand/Supply Assumptions On Volume Of Replenishment Needed										
	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	
	<i>Task 3 Subtotal</i>	2	2	32	16	0	52	\$10,126	\$0	\$10,126	
4.0	REPORTING										
4.1	Prepare Technical Memorandum describing Scenarios, Analyses, Findings, and Conclusions	2	6	24	16	8	56	\$10,038	\$0	\$10,038	
4.2	Prepare Presentation and Present Findings to TAC and Board via Zoom	1	2	8	2	0	13	\$2,691	\$0	\$2,691	
	<i>Task 4 Subtotal</i>	3	8	32	18	8	69	\$12,729	\$0	\$12,729	
	Total	7	15	118	66	8	214	\$40,735	\$0	\$40,735	

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	May 11 2022
AGENDA ITEM:	5
AGENDA TITLE:	Resumed Discussion of Pros and Cons of Using the Sustainable Yield (SY) Approach in Place of the Natural Safe Yield (NSY) Approach for Basin Management
PREPARED BY:	Robert Jaques, Technical Program Manager

At TAC meetings held in early 2019 there was discussion about the Pros and Cons of Using the Sustainable Yield (SY) Approach in Place of the Natural Safe Yield (NSY) Approach for Basin Management purposes. During those meetings the cost, complexity, and interactions that would be required with the Court to make such a change were discussed.

As a result of those discussions, at the TAC's May 8, 2019 meeting the TAC approved making the following recommendation to the Board:

1. An SY analysis not be performed at this time.
2. That the concept of using the SY approach to replace the NSY approach be revisited after the Groundwater Sustainability Plan for the Monterey Subbasin of the Salinas Valley Groundwater Basin has been completed, and its impacts on the Seaside Groundwater Basin have been determined.
3. However, if something is learned or events occur, that would warrant performing a Sustainable Yield analysis sooner, the Board should revisit the decision at that time.

At its June 5, 2019 meeting the Board approved the TAC's recommendation.

At its September 1, 2021 meeting the Board I again presented this topic to the Board for its direction. Specifically, the Board was asked to determine if developing an SY analysis would be justified without a source for replenishment water first being secured, taking into account the expense and complexity of changing to SY and that with either approach (NSY or SY) the Basin would still be at risk of seawater intrusion. The consensus of the Board was to wait to adopt an SY approach.

Several of the current TAC members were not on the TAC when the 2019 meetings were held, Therefore, the Agenda packet materials from the 2019 TAC meetings are attached as information for the TAC's use in resuming discussion of this topic at today's meeting.

Attachment 1 contains the Proposal received from Montgomery & Associates to perform an SY analysis. (Note that since this Proposal's scope and cost was prepared in 2019, it would need to be updated if this work were to be performed now.)

Attachment 2 contains Background information from Montgomery & Associates and Todd Groundwater on NSY and SY.

Attachment 3 contains a summary of pertinent information gained from previous groundwater modeling work. From this modeling work it seems apparent that the Basin cannot sustain pumping at any level without the injection of a new source of water to raise groundwater levels to protective elevations.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

AGENDA ITEM:

5 (Continued)

Attachment 4 contains a discussion of potential Pros and Cons of developing and using the SY approach.

The GSP for the Monterey Subbasin (and GSPs for all of the other subbasins in the Salinas Valley Groundwater Basin) has now been prepared. In accordance with the TAC's 2019 recommendation, which the Board approved, the concept of using the SY approach to replace the NSY approach should now be revisited.

For the reasons listed below, it is my conclusion that there would be little, if any, benefit to the Watermaster to at this time proceed with performing an SY analysis:

1. Without a source for replenishment water to raise Seaside Basin groundwater levels, revising the Basin's yield based on an SY analysis would still leave the Basin at risk of seawater intrusion and the Basin would therefore not be sustainable.
2. The completed GSPs for the Monterey and 180/400-Foot Aquifer Subbasins do not provide a reliable basis upon which to determine the impacts on the Seaside Basin that will result from the implementation of those GSPs, for a number of reasons including:
 - a. The projects and management actions that will actually be implemented have not yet been determined. At this point in time the 180/400-Foot Aquifer GSP Implementation Committee is just starting to work on prioritizing the projects and management actions in that GSP. That process will likely take many months because feasibility studies of the various projects and management actions will need to be performed in order for the Committee to have sufficient information to prioritize them.
 - b. The feasibility and potential beneficial impacts from the implementation of projects and management actions in the GSPs can at this time only be roughly estimated due to a lack of information and data in those subbasins.
 - c. The Monterey Subbasin GSP Implementation Committee has just been formed and is just starting to conduct meetings.
 - i. For the Marina-Ord Subarea of the Monterey Subbasin:
 1. The GSP is largely relying on the 180/400-Foot Aquifer Subbasin achieving sustainability in order to reduce cross-boundary groundwater losses from the Monterey Subbasin to the 180/400-Foot Aquifer Subbasin.
 - a. If the 180/400-Foot Aquifer Subbasin achieves sustainably (which will be an extremely difficult and costly undertaking) by installing an extraction barrier (a series of wells pumping seawater out along the coast, so it cannot flow inland) to halt seawater intrusion, the newly-created Monterey Subbasin groundwater model indicates that if the Minimum Threshold in the 180/400-Foot Aquifer Subbasin is met, there will be significant (well over 5,000 AFY) of cross-boundary groundwater losses from the Monterey Subbasin to the 180/400-Foot Aquifer Subbasin. Under this scenario, there would also be significant (well over 2,000 AFY) cross-boundary groundwater losses from the Seaside Basin to the Marina-Ord Subarea of the Monterey Subbasin. Those losses would make it

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

AGENDA ITEM:

5 (Continued)

very difficult for the Seaside Basin to raise its groundwater levels, through replenishment, in order to protect the Seaside Basin against seawater intrusion. The Monterey Subbasin GSP states that under this scenario, projects and management actions would need to be taken in order to achieve sustainability in the Monterey Subbasin. However, of the Projects listed in this GSP the Project providing the largest benefit is constructing a regional desalination plant to provide an estimated 15,000 AFY of water as a new municipal supply source. Given the difficulties Cal Am is experiencing in trying to get permits and approvals for its proposed desalination plant, and the large cost of constructing a regional desalination plant, this could prove to be an extremely difficult undertaking.

- b. If the 180/400-Foot Aquifer Subbasin achieves sustainability by raising its groundwater levels to prevent seawater intrusion (something that is very unlikely to be accomplished because of the substantial pumping reductions that would be required) the newly-created Monterey Subbasin groundwater model indicates there could be a modest reversal of cross-boundary flows, with the Monterey Subbasin actually providing some inflow (on the order of 400+ AFY) of groundwater into the Seaside Basin.

- ii. For the Corral de Tierra Subarea of the Monterey Subbasin:

The Monterey Subbasin GSP for that Subarea states that even if all pumping within the subarea were stopped, the subarea could still not achieve sustainability until the 180/400-Foot Aquifer Subbasin achieves sustainability.

- 3. The methodology used to develop the “sustainable yield” values presented in these GSPs is not the same as the methodology that would be used to develop the Seaside Basin’s sustainable yield using the approach described in Attachment 1. Rather, the GSPs use the Water Balance method, which is the same method that was used to develop the NSY in the Adjudication Decision. That method looks at the subbasin as a whole, without regard to the locations within the subbasin where pumping occurs. SGMA’s definition of sustainable yield appears to accept using the Water Balance approach, as it does not go into detail as to how the sustainable yield is to be determined. It may be that the GSAs will eventually try to use the methodology described in Attachment 1, but that would likely take a significant effort and cost, and would require more data than currently exists.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

AGENDA ITEM:	5 (Continued)
	The TAC is asked to resume its discussion of the topic of the NSY and SY approaches, and to provide its recommendation as to whether or not the Watermaster should now undertake performing an SY analysis.
ATTACHMENTS:	<ol style="list-style-type: none">1. Proposal from Montgomery & Associates to Perform an SY Analysis of the Seaside Basin2. Background information on NSY and SY3. Summary of pertinent information from previous groundwater modeling work4. Discussion of potential Pros and Cons of staying with the NSY approach vs. developing and using the SY approach
RECOMMENDED ACTION:	Provide the TAC's recommendation regarding performing an SY analysis.

Attachment 1



www.elmontgomery.com
1814 Franklin Street, Ste. 501
Oakland, CA 94612
510.903.0458

February 1, 2019

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

SUBJECT: COST PROPOSAL FOR SEASIDE BASIN SUSTAINABLE YIELD ANALYSIS

Dear Mr. Jaques:

Montgomery & Associates (M&A) appreciates the opportunity to present this scope of work and cost for estimating the Sustainable Yield of the Seaside Basin (Basin).

As described in the recent BMAP Update, the simplified method used to estimate Natural Safe Yield is now recognized as not being complete enough to take into account the complexities of inflows and outflows that are occurring in the Basin, and which ultimately affect the amount of groundwater that can be sustainably pumped from the Basin without causing negative effects. A more complete approach to managing the Basin is to use the Seaside Basin Watermaster model (model) to optimize the amount of pumping that can be sustained (Natural Sustainable Yield) at existing and/or new wells. This Natural Sustainable Yield acknowledges management targets such as stopping declining groundwater levels or meeting protective groundwater elevations. The model is the appropriate tool for integrating the effects of various pumping rates with operating or planned projects in the Basin. It is important that the Technical Advisory Committee (TAC) provide input for determining all the operational parameters and management targets to include in the analysis of Sustainable Yield.

This scope of work outlines tasks to estimate the Natural Sustainable Yield. Tasks include developing management targets and updating the predictive portion of the model. Additional tasks include simulating and optimizing a combination of management actions and supplemental water supply projects to estimate the Natural Sustainable Yield.

The tasks described below may be more than the TAC would like to include in the modeling for the Natural Sustainable Yield analysis, and therefore some tasks are identified as optional tasks in the task heading.

TASK 1. DEVELOP OPERATIONAL PARAMETERS & MANAGEMENT TARGETS

M&A will support the TAC in developing basin-wide operational parameters and management targets to be used in the Natural Sustainable Yield optimization modeling runs. Examples of potential management targets would include managing the Basin's groundwater levels to meet the protective groundwater elevations at the coast, or setting a groundwater elevation target at Laguna Seca wells to halt declining groundwater levels at a level acceptable to the groundwater users.

We anticipate attending and participating in up to two TAC meetings in person for this task. The costs for TAC meetings are included in Task 7.

TASK 2. EXTEND PREDICTIVE MODEL CLIMATE

The analysis of Natural Sustainable Yield relies entirely on the predictive portion of the model. There are a number of aspects and underlying assumptions of the predictive model that need to be updated for the model to be comparable to groundwater models being used in the larger Salinas Valley. These updates were not part of the recent model update as that effort was purely to update and calibrate the historical Model.

When the model was developed in 2009, the TAC provided substantial input on assumptions related to how long the predictive period was to be, what future climate to use, and what future pumping to include over the predictive period. We acknowledge that some of these are impossible to forecast exactly, but it is important to use assumptions that reflect current science and Basin understanding and therefore some updates are necessary.

TASK 2.1. EXTEND HISTORICAL HYDROLOGY BASELINE SCENARIO

Since 2009, all predictive simulations using the model have been based on repeating the historical hydrology from the 22-year model calibration period of 1987 – 2008. The current predictive simulation runs from 2009 through 2042. While maintaining this approach allows for direct comparison between new simulations and previous simulations, it does not take advantage of the additional nine years of hydrologic and climatic data that have been incorporated into the historical model. The historical model was updated in 2014 and 2018, and now includes a continuous 31 year hydrologic record from 1987 through 2017. Significantly, this 31-year hydrologic record includes the recent 2012-2015 drought. We propose that this full 31-year historical hydrology and climate dataset be used as basis for all predictive modeling, as this incorporates a broader range of potential climate variability.

There are two options for extending the hydrology for the historical predictive baseline:

1. Simply repeat the 31-year hydrology from 1987 – 2017, so that the baseline scenario is extended out 31-years from 2018 to 2048.

2. Extend the predictive model, based on repeating the new extended historical climate record out to 2070, which is more consistent with the long-term planning horizon that will be used in neighboring basins under SGMA compliance.

From the perspective of the Natural Sustainable Yield analysis, there is a strong benefit to having a longer extended predictive simulation period (e.g. out to 2070 instead of 2048). As will be further discussed below in Task 5, the analysis consists of first identifying a shorter-term Basin yield which allows groundwater levels to reach their management targets within a defined time-frame, and then estimating an increased longer-term Natural Sustainable Yield that keeps levels at these targets into the future. Having a longer extended simulation period allows for more flexibility on selecting a reasonable time-frame over which management targets can be met without having to ramp production down too quickly, and it also provides a longer period over which to evaluate the longer-term Natural Sustainable Yield, taking into account historical variability in hydrology and climate.

The updated and extended baseline model will be run and processed to produce a baseline water budget and hydrographs to be used for comparison against subsequent simulations.

TASK 2.2. CONVERT HISTORICAL CLIMATE BASELINE SCENARIO MODEL TO FUTURE CLIMATE CONDITION MODEL (OPTIONAL)

Previous predictive model simulations for the basin have not taken the effects of likely climate change into account: including projected changes in precipitation, temperature, and evapotranspiration. These are projected future conditions that would impact the magnitude and timing of both natural groundwater recharge and surface water deliveries to the Basin. If the TAC feels that management of the Basin should take into account climate change, we propose modifying the baseline predictive simulation model with projected future climate conditions.

For this task we will leverage new California-specific climate change datasets, data preparation tools, and guidance that have been developed by DWR in support of SGMA Groundwater Sustainability Plan development (DWR, 2018). DWR provides basin-specific climate change factors that allow historical hydrology and climatological data to be converted into datasets representative of projected near-future climate conditions in 2030, and late-future climate conditions in 2070.

Depending on the degree of climate change uncertainty to be considered, datasets can be chosen that represent three different climate scenarios including Central Tendency, Drier with Extreme Warming, and Wetter with Moderate Warming. A single climate change scenario will be selected in consultation with the TAC, and the DWR climate change factors will be applied to inputs of the historical climate model to represent future climate conditions and hydrology.



TASK 3. INCORPORATE SEA LEVEL RISE AT OCEAN BOUNDARIES (OPTIONAL)

In this task we will incorporate estimates of projected sea level rise over the next century into the predictive model simulation by adjusting the head boundary conditions specified along the ocean boundary. Generally speaking, sea level rise is expected to increase seawater intrusion and/or the risk of sea water intrusion in coastal aquifers, though the magnitude of the effects due to sea level rise alone are highly dependent on local conditions. The sea level rise estimates will be based on the projected levels for Monterey Bay from the 2018 update of the State of California Sea-Level Rise Guidance document recently released by the California Ocean Protection Council (OPC, 2018). It should be noted that adjustments to the sea level elevations will also entail simple equivalent adjustments to the protective head elevations as they are tied to sea level.

TASK 4. INCORPORATE ALL EXISTING AND APPROVED/PLANNED SUPPLEMENTAL SUPPLY PROJECTS INTO BASELINE MODEL

We will update the predictive model to include various supplemental supply projects likely to be, or are in the process of being, constructed, as described in the 2019 BMAP Update. TAC involvement will be crucial to developing a predictive model that incorporates all of the projects envisioned over the predictive period, such as the Monterey Peninsula Water Supply Project (MPWSP), the Regional Urban Water Augmentation Project (RUWAP), Carmel River water ASR, and potentially other projects such as stormwater recharge projects. M&A will work with the TAC to finalize a list of projects and their planned implementation schedule. For costing purposes we have assumed incorporating up to three new projects not previously modeled and extending previously modeled projects.

The Pure Water Monterey project and existing phases of the Carmel River water ASR have already been modeled through 2041 but operational assumptions will need to be extended through the end of the predictive model period if it is extended, and other operational changes may be incorporated, such as increasing recharge if additional water sources such as RUWAP are included. We assume we will receive technical support from MPWMD who will provide recharge volumes based on climate, similar to what they have provided us before.

TASK 5. OPTIMIZATION SCENARIO SIMULATIONS

TASK 5.1. PREPARE SCENARIO INPUTS AND SETUP SUSTAINABLE OPTIMIZATION MODEL

M&A will work with the TAC to identify production wells that will be used in optimization. This may include only the Standard Producers, or a combination of Standard and Alternate Producers. There are other potential management actions such as installing new wells in either the Southern Coastal Subarea or the Northern Inland Subarea, or shifting a portion of production to these new wells, but this will likely require development of a separate scenario and therefore additional budget. Costs for development of additional scenarios are provided as an optional line item in the budget.



Given the management targets from Task 1 and wells identified for use in optimization, the USGS MODFLOW Groundwater Management Optimization process (GWM) will be configured to optimize average production rates at a predetermined set of wells such that the defined management targets at specific locations (e.g. groundwater levels) are met within a specified time frame and then maintained at those levels in the future. There will be two different Basin yields estimated. The first will be the yield that allows the Basin to achieve its management targets, and the second will be the Natural Sustainable Yield. Reaching management targets will require pumping less than the Natural Sustainable Yield until targets are achieved, thereafter, the Basin yield can be increased to the Natural Safe Yield that keeps groundwater levels at Basin management targets.

For costing purposes, we assume that a single set of management targets to be met within a single defined time frame will be used for the scenario, and that if multiple scenarios are developed, they will be based on the same baseline climate model (e.g. either Historical Climate or Climate Change Baseline).

TASK 5.2. RUN AND PROCESS OPTIMIZATION SCENARIO

In this task we will run the optimization model and process the model results, and document the scenario and the results with hydrographs and maps, along with a brief text summary.

TASK 6. PREPARE TECHNICAL MEMORANDUM

We will prepare a technical memorandum which documents Task 1 through 5, with a synthesis of the model optimization results and water budgets and Natural Sustainable Yield analysis for the Basin based on the identified management targets. For costing purposes we assume preparing one draft, responding to and addressing one round of review comments, and one final version of the report. The report will be provided in MSWord and PDF formats.

TASK 7. ATTEND TAC AND BOARD MEETINGS

In support of Tasks 1 – 5, to get input and direction from the TAC, and to report on progress and findings, we will prepare presentations and attend those monthly TAC meetings at which this work will be discussed. For costing purposes we assume preparing for and attending up to five TAC meetings. One in-person Board meeting is also included to present the findings of the analysis. Should the number of meetings be more than those assumed above, additional budget will be required to prepare for and attend those meetings.

MODELING CONTINGENCY

Modeling the long-term optimization of integrated groundwater management at a basin-wide scale is a complex process with several technical challenges that can arise and can lead to additional effort not originally scoped out. For this reason we have allocated a contingency budget corresponding to 40 additional hours of modeling effort (11% of the lead modeling effort for Tasks 2- 5) to address unexpected model integration or optimization issues that may arise during the modeling components of the project. This contingency task budget will not be used without prior consultation and approval from the client.



PROJECT BUDGET AND SCHEDULE

We anticipate that this work can be completed within an eight 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 estimate costs for these tasks is \$133,035 as detailed in the attached cost table. As mentioned previously, there are a few optional tasks that we have included which may need to be discussed at the Technical Advisory Committee level.

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

Sincerely,

Derrick Williams, Principal Hydrogeologist
E.L. MONTGOMERY & ASSOCIATES

Georgina King, Senior Hydrogeologist
E.L. MONTGOMERY & ASSOCIATES

Cost Estimate for Seaside Basin Watermaster Sustainable Yield Modeling Analysis									
Task	Hourly Rates	Montgomery & Associates Labor				Labor Total		Other Direct Costs	TOTALS
		Scientist VIII	Scientist VI	Scientist V	Scientist III	Hours	(\$)		
		D. Williams	G. King	P. Benito	N. Byler				
1.0	Develop Operational Parameters & Management Targets								
	Support TAC in developing Operational Parameters & Management Targets	8	32	36	0	76	\$14,860	\$0	\$14,860
	<i>Task 1 Subtotal</i>	8	32	36	0	76	\$14,860	\$0	\$14,860
2.0	Extend Predictive Model Climate								
2.1	Option 1: Extend Historical Hydrology Baseline Scenario to 2048	0	2	24	0	26	\$4,840	\$0	\$4,840
	Option 2: Extend Historical Hydrologic Baseline Scenario to 2070	0	2	32	0	34	\$6,320	\$0	\$6,320
	Run and Process Model Results	0	0	12	0	12	\$2,220	\$0	\$2,220
	Document Results and Water Budget	1	1	12	4	18	\$3,225	\$0	\$3,225
2.2	Convert Historical Climate Baseline Model to Future Climate Condition Model (Optional)	2	4	60	0	66	\$12,350	\$0	\$12,350
	Run and Process Model Results	0	0	12	0	12	\$2,220	\$0	\$2,220
	Document Results and Water Budget	1	1	12	4	18	\$3,225	\$0	\$3,225
	<i>Task 2 Subtotal (with Option 2 for Task 2.1)</i>	4	8	140	8	160	\$29,560	\$0	\$29,560
3.0	Incorporate Sea Level Rise at Ocean Boundaries (Optional)								
	Adjust General Head Boundaries to account for predicted sea level rise rate over model period	2	4	16	0	22	\$4,210	\$0	\$4,210
	<i>Optional Task 3 Subtotal</i>	2	4	16	0	22	\$4,210	\$0	\$4,210
4.0	Incorporate All Existing and Approved/Planned Supplemental Supply Projects Into Baseline Predictive Model								
	Set up modified input files including projects	2	4	32	4	42	\$7,750	\$0	\$7,750
	Run and Process Model Results	0	0	12	0	12	\$2,220	\$0	\$2,220
	Document Results and Water Budget	1	1	12	4	18	\$3,225	\$0	\$3,225
	<i>Task 4 Subtotal</i>	3	5	56	8	72	\$13,195	\$0	\$13,195
5.0	Optimization Scenario Simulations								
5.1	Prepare Scenario Inputs and Setup Sustainable Optimization Model	2	8	40	0	50	\$9,450	\$0	\$9,450
5.2	Run and Process Optimization Scenario								
	Run and Process Model Results	0	1	12	0	13	\$2,420	\$0	\$2,420
	Document Results and Water Budget	2	2	12	4	20	\$3,650	\$0	\$3,650
	<i>Task 5 Subtotal</i>	4	11	64	4	83	\$15,520	\$0	\$15,520
6.0	Prepare Technical Memorandum								
	Synthesize Simulation Results and Develop Sustainable Yield	8	30	40	32	110	\$19,840	\$0	\$19,840
	<i>Task 6 Subtotal</i>	8	30	40	32	110	\$19,840	\$0	\$19,840

Task	Hourly Rates	Montgomery & Associates Labor				Labor Total		Other Direct Costs	TOTALS
		Scientist VIII	Scientist VI	Scientist V	Scientist III	Hours	(\$)		
		D. Williams	G. King	P. Benito	N. Byler				
7.0 TAC and Board Meetings									
Prepare for and attend up to five onsite TAC meetings and one Board meeting		16	80	16	0	112	\$22,560	\$1,050	\$23,610
<i>Task 7 Subtotal</i>		16	80	16	0	112	\$22,560	\$1,050	\$23,610
Modeling Contingency (11%)									
Contingency for Modeling Tasks 2-5		0	0	40	0	40	\$7,400	\$0	\$7,400
<i>Task 9 Subtotal</i>		0	0	0	0	40	\$7,400	\$0	\$7,400
Total (with Option 2 for Task 2.1)		45	172	392	52	701	\$131,985	\$1,050	\$133,035
Total without Optional Task 2.2, and 3		40	163	292	48	583	\$109,980	\$1,050	\$111,030
Additional Optimization Scenarios									
Prepare for and Setup Optimization Model		2	8	32	0	42	\$7,970	\$0	\$7,970
Run and Process Optimization Scenario									
Run and Process Model Results		0	1	12	0	13	\$2,420	\$0	\$2,420
Document Results and Water Budget		2	2	12	4	20	\$3,650	\$0	\$3,650
<i>Additional Optimization Scenario Total</i>		4	11	56	4	75	\$14,040	\$0	\$14,040

Attachment 2

Background Information from Montgomery & Associates and Todd Groundwater on Natural Safe Yield and Sustainable Yield

Natural Safe Yield is defined in the Decision as the quantity of groundwater existing in the Seaside Basin that occurs solely as a result of natural replenishment. The only truly natural replenishment is from percolation of rainfall into the aquifers and inflow of groundwater from adjacent basins. Through the use of the groundwater model we have come to understand that although some replenishment occurs from inflow from neighboring basins, more subsurface groundwater leaves the Seaside Basin than enters it, and there is a net subsurface loss from the Basin to neighboring basins. The amount of net outflow from the Basin over the past five years is more than the long-term average (1988-2017). If one assumes that rainfall recharge has remained essentially the same, then the biggest change to natural replenishment is increased outflow to neighboring basins. Increased injection for temporary storage of imported water and decreased native groundwater pumping have changed how groundwater moves within, and in and out of, the Basin. Another way to look at it is that increased Basin outflows are due to groundwater levels in the neighboring basins being lower than those in the Seaside Basin, thereby causing increased flows out of the Seaside Basin.

The method used to estimate Natural Safe Yield is now recognized as not being complete enough to take into account the complexities of inflows and outflows that are occurring and changing operations and conditions. These ultimately affect the amount of groundwater that can sustainably be pumped from the Basin. A more robust method would be to use the groundwater model to optimize the amount of pumping that can be sustained (Sustainable Yield) at existing and/or new wells, using management targets such as meeting protective groundwater elevations and/or stopping declining groundwater levels.

The Draft Updated BMAP includes a recommendation (the first bulleted recommendation in Section 1.5 and Recommendation 2 in Section 6) to use the groundwater model to conduct additional model runs to simulate a combination of basin management actions and supplemental water supply projects that would be able to raise groundwater levels to protective levels. This would be part of the approach to estimate Sustainable Yield for the Basin.

Attachment 3

Summary of Pertinent Information from Previous Groundwater Modeling Work

The information provided below comes from modeling reports prepared for the Watermaster by HydroMetrics.

Report Title: *Seaside Groundwater Basin Modeling and Protective Groundwater Elevations*

Report Date: November 2009

Pertinent Findings/Conclusions:

1. The Decision-required triennial pumping reductions will result in a gradual rise in most groundwater elevations. The pumping reductions will decrease, but not eliminate, inflow into the Basin from the ocean.
2. The “Physical Solution” required in the Decision, consisting of triennial pumping reductions until pumping has been reduced to a Natural Safe Yield of 3,000 AFY, by itself will not achieve protective groundwater level elevations.
3. Significant injection of water that is left in storage and not taken out through pumping will be the most successful means of raising groundwater elevations to protective water level elevations.
4. It will take a long time for the Santa Margarita aquifer to achieve protective water levels without artificial recharge. This is because the Santa Margarita aquifer is highly confined and does not receive significant deep percolation recharge near the coastline.
5. The amount of water in storage is highly dependent on rainfall. Artificial recharge will increase the amount of groundwater in storage.
6. New wells in the Paso Robles aquifer will be required in order to recover much of the stored groundwater.
7. Moving California American Water’s major production wells inland has little benefit and is therefore a not a good option to pursue.
8. The quantity of groundwater flowing into and out of the Seaside Basin, from or to the Salinas Valley Basin, is highly dependent on groundwater elevations in the Salinas Valley Basin.

Report Title: *Groundwater Modeling Results of Temporary Suspension of Triennial Pumping Reductions*

Report Date: September 2012

Pertinent Findings/Conclusions:

1. Skipping one triennial pumping reduction for a three-year period from 2011 to 2014 would have a negligible effect on the rate of advance of seawater intrusion (less than 0.001 feet per day of change).
2. Groundwater levels would reach the same levels by 2031 as they would if the pumping reduction had not been skipped.

Report Title: *Groundwater Modeling Results of Replenishment Repayment in the Seaside Basin*

Report Date: April 2013

Pertinent Findings/Conclusions:

1. The protective water level elevations developed in 2009 remain reasonable targets for groundwater management and should not be lowered.
2. California American Water's 25-year, 700 AFY replenishment payback plan raises shallow aquifer groundwater levels by about 1 to 1.5 feet, and deep aquifer groundwater levels by about 3 feet, but does not achieve protective water level elevations in any of the six protective water level wells, except PCA-West-Shallow, which is already above its protective water level elevation.
3. Stopping all Standard and Alternative Production pumping beginning in 2017 (which would reduce Basinwide pumping by approximately 2,000 AFY) would finally achieve protective water level elevations in all six of the protective water level wells by 2041 (the assumed end of the 25 year payback used for this scenario.)
4. Assuming the 25-year, 700 AFY repayment plan began in 2017, and 1,000 AFY of water was injected at the four ASR wells near General Jim Moore Boulevard and left stored in the Basin and not pumped back out, protective water levels would be achieved in all six of the protective water level wells by 2041.

Report Title: *Groundwater Modeling Results of Coastal Injection in the Seaside Basin*

Report Date: July 2013

Pertinent Findings/Conclusions:

1. All of the findings and conclusions listed below are based on the assumption that California American Water's replenishment repayment program of forgoing 700 AFY of pumping for a period of 25 years is being carried out.
2. Coastal groundwater levels in the Santa Margarita aquifer reach protective groundwater level elevations one to ten years faster, and with less injected water, if injection is performed near the coast rather than inland at the General Jim Moore Boulevard ASR well locations.
3. Coastal groundwater levels in the Paso Robles aquifer reach protective water level elevations at similar times with injection at either the coastal or General Jim Moore Boulevard locations.
4. In order to achieve protective water level elevations in all six of the coastal wells for which protective water levels were developed, over a 25-year injection period only 850 AFY of injection is required using coastal injection wells compared to 1,000 AFY required at the General Jim Moore Boulevard ASR well locations.
5. Injection rates higher than those mentioned in item 4 above would shorten the time needed to achieve protective water level elevations.
6. After coastal protective water level elevations are achieved, injection of 850 AFY would need to be continued indefinitely at coastal injection wells in order to keep groundwater levels above protective water level elevations.

Report Title: *Results of Laguna Seca Safe Yield Analysis (Revised)*

Report Date: July 2014

Pertinent Findings/Conclusions:

1. The Laguna Seca Subarea Natural Safe Yield was estimated to be 240 AFY. The Decision used 608 AFY with no explanation of the basis for that value.
2. Stopping all California American Water Laguna Seca Subarea pumping stabilizes groundwater level elevations in the western portion of the subarea, but they continue to decline in the central and eastern portions of the subarea.
3. Stopping all Laguna Seca Subarea pumping (pumping by California American Water and all Alternative Producers) results in stable or rising groundwater levels in the western and central portions of the subarea, but groundwater levels continue to decline in the eastern portion of the subarea.
4. There is significantly more pumping just east of the Laguna Seca Subarea (within the Monterey Subbasin of the Salinas Valley Basin and outside of the Seaside Basin boundary) than the total pumping that occurs within the Laguna Seca Subarea itself.
5. Groundwater levels in the eastern portion of the Laguna Seca Subarea are heavily influenced by pumping from outside of the Seaside Basin.

Report Title: *Groundwater Flow Divides Within and East of the Laguna Seca Subarea*

Report Date: January 2016

Pertinent Findings/Conclusions:

1. Under anticipated future pumping conditions, groundwater elevations in the Laguna Seca Subarea will continue to decline. The eastern portion of the Laguna Seca Subarea will suffer the greatest and most persistent declines.
2. Pumping by wells located to the east of the Laguna Seca Subarea, outside of the Seaside Basin boundary and in the Monterey Subbasin of the Salinas Valley Basin, affect groundwater levels in the Laguna Seca Subarea by diverting groundwater which would otherwise flow into, and thus recharge, the Laguna Seca Subarea. This diversion results in lowering groundwater levels in the Laguna Seca Subarea.
3. Flow currently goes into the Laguna Seca Subarea from the southeast (from the adjacent portion of the Salinas Valley Basin outside of the Seaside Basin boundary), and flows through the Laguna Seca Subarea to the west into the Southern Coastal Subarea and to the northeast into the Northern Inland Subarea.
4. With reduced pumping in the Laguna Seca Subarea in the future, groundwater levels will rise within this subarea and the flow divide between this subarea and the adjacent Salinas Valley Basin will move west.
5. Because of this flow divide movement, reduced pumping in the Laguna Seca Subarea in the future will result in some flow leaving the Laguna Seca subarea and flowing into the Corral de Tierra region of the Monterey Subbasin of the Salinas Valley Basin.

Attachment 4

Discussion Paper of Potential Pros and Cons of Using the Sustainable Yield Approach in Place of Using Natural Safe Yield for Basin Management

Natural Safe Yield Approach

Discussion. The Adjudication Decision (“Decision”) uses the Natural Safe Yield (NSY) approach to establish the total quantity of water that producers may pump from the Seaside Basin, and to allocate that quantity amongst the various producers. Under the NSY approach used in the Decision, Alternative Producers have first rights to the NSY, and Standard Producers share in the amount of NSY remaining after the Alternative Producer allocations have been made. The Decision established an initial Basin-wide NSY at 3,000 AFY, and allocated 1,387 AFY of this NSY to Alternative Producers. That left $3,000 - 1,387 = 1,613$ AFY to be divided among the Standard Producers. Subsequent to the date of the Decision, one of the Alternative Producers converted part of its allocation to a Standard Producer allocation, which had the effect of increasing the 1,613 AFY figure to 1,621 AFY. If the lower NSY of 2,370 AFY reported in the Updated BMAP were to replace the Decision’s initial NSY of 3,000 AFY, the Standard Producers would need to reduce their collective annual pumping to $2,370 - 1,379 = 991$ AFY. This means the Standard Producers would have to collectively reduce their pumping by an additional 630 AFY.

It would likely be very difficult if not impossible for some of the Standard Producers, particularly Cal Am and the Seaside Municipal system, to accomplish making these additional pumping reductions while still supplying the water demands of their customers.

Pros and Cons of Continuing to Use the NSY Approach for Basin Management.

PROS	CONS
1. This is the approach prescribed by the Decision, so no change from the current approach would be required.	1. There are some oversights in the numbers included in the Decision which slightly complicate the calculation of Producers’ water rights after the pumping ramp-downs are all completed. However, this should be fairly easy to work through.
2. If the 3,000 AFY NSY figure in the Decision continues to be used, no action will be required.	2. The Watermaster’s hydrogeologic consultants report that using the NSY approach in the Decision is no longer appropriate for estimating yield. The NSY figure in the Decision was developed in 2005 based on a simplified water balance equation that accounted for some, but not all, flows in the groundwater system. It has now become apparent that there are significant flows across the Basin’s boundaries that were not accounted for in the 2005 analysis. Unless those flows are also accounted for, the relationship between pumping, intrusion and storage identified in 2005 will be incorrect.

PROS	CONS
<p>3. If the lower NSY figure of 2,370 AFY is used, the recalculation of water rights to each Producer would be relatively straightforward by following the same calculation approach set forth in the Decision. As noted in Con No. 1, however, there are some oversights in the Decision which would need to be resolved.</p>	<p>3. The Watermaster’s hydrogeologic consultants recommend that Basin management use a “sustainable” or “operational” yield approach that takes advantage of the Seaside Basin groundwater model. This would allow the maximum pumping rate to reflect all of the flows across the basin boundaries as well as the locations of wells and the introduction of new sources of recharge (injection, stormwater percolation, etc.). They feel that making this change from using the NSY approach is essential to linking long-term Basin management to reality.</p>
	<p>4. Given the modeling done to date, and evidenced by continuing declining groundwater levels even in years where pumping has been close to 3,000 AFY, Material Damage is more likely to occur if the 3,000 AFY NSY continues to be used rather than using a lower value for NSY.</p>

Sustainable Yield Approach

Discussion. As described in the recent BMAP Update, the simplified method used in the Adjudication Decision to estimate Natural Safe Yield is now recognized as not being complete enough to take into account the complexities of inflows and outflows that are occurring in the Basin. These ultimately affect the amount of groundwater that can be sustainably pumped from the Basin without causing negative effects (Material Injury). A more complete approach to managing the Basin would be to use the Seaside Basin groundwater model to optimize the amount of pumping that can be sustained (the Sustainable Yield) at existing and/or new wells. The Sustainable Yield would take into account management targets such as stopping declining groundwater levels or meeting protective groundwater elevations.

The SY analysis would involve making numerous assumptions and evaluations. These could include such things as alternative pumping scenarios and redistribution of pumping locations and quantities. The SY for the entire Basin would be the sum of the production quantities that each well could produce and still prevent Material Injury from occurring.

Pros and Cons of Changing to Using the Sustainable Yield Approach for Basin Management.

PROS	CONS
<p>1. This approach would more realistically reflect the characteristics of the Basin and more accurately predict how much pumping could be sustainably supported without causing Material Damage in the Basin.</p>	<p>1. Performing an SY analysis would be costly. The cost proposal from Montgomery & Associates to do this work is well over \$100,000. The proposal notes that modeling the long-term optimization of integrated groundwater management at a basin-wide scale is a complex process with several technical challenges that could arise and could lead to additional effort (and cost) not anticipated in the cost proposal.</p>
	<p>2. Changing from the NSY approach to the SY approach would first have to be approved by the Court. Documentation justifying making this change would have to be prepared and submitted to the Court. This would involve considerable staff, consultant, and legal counsel time and effort.</p>
	<p>3. The SY analysis would then need to be prepared and submitted to the Court for its review and approval before it could be used to replace the NSY approach used in the Decision. If the Court approved the SY analysis, then the Decision would need to be amended to reflect this. All of this would involve considerable staff and legal counsel time and effort.</p>
	<p>4. If SY were used instead of NSY, a new method of allocating pumping rights to each producer would have to be developed. This could be a contentious and time-consuming undertaking.</p>
	<p>5. It is very likely that greater pumping reductions will be required of many of the Producers if the Sustainable Yield approach is used in place of the NSY approach. It may be difficult if not impossible for some Producers to make these additional pumping reductions while still supplying the water demands of their customers.</p>

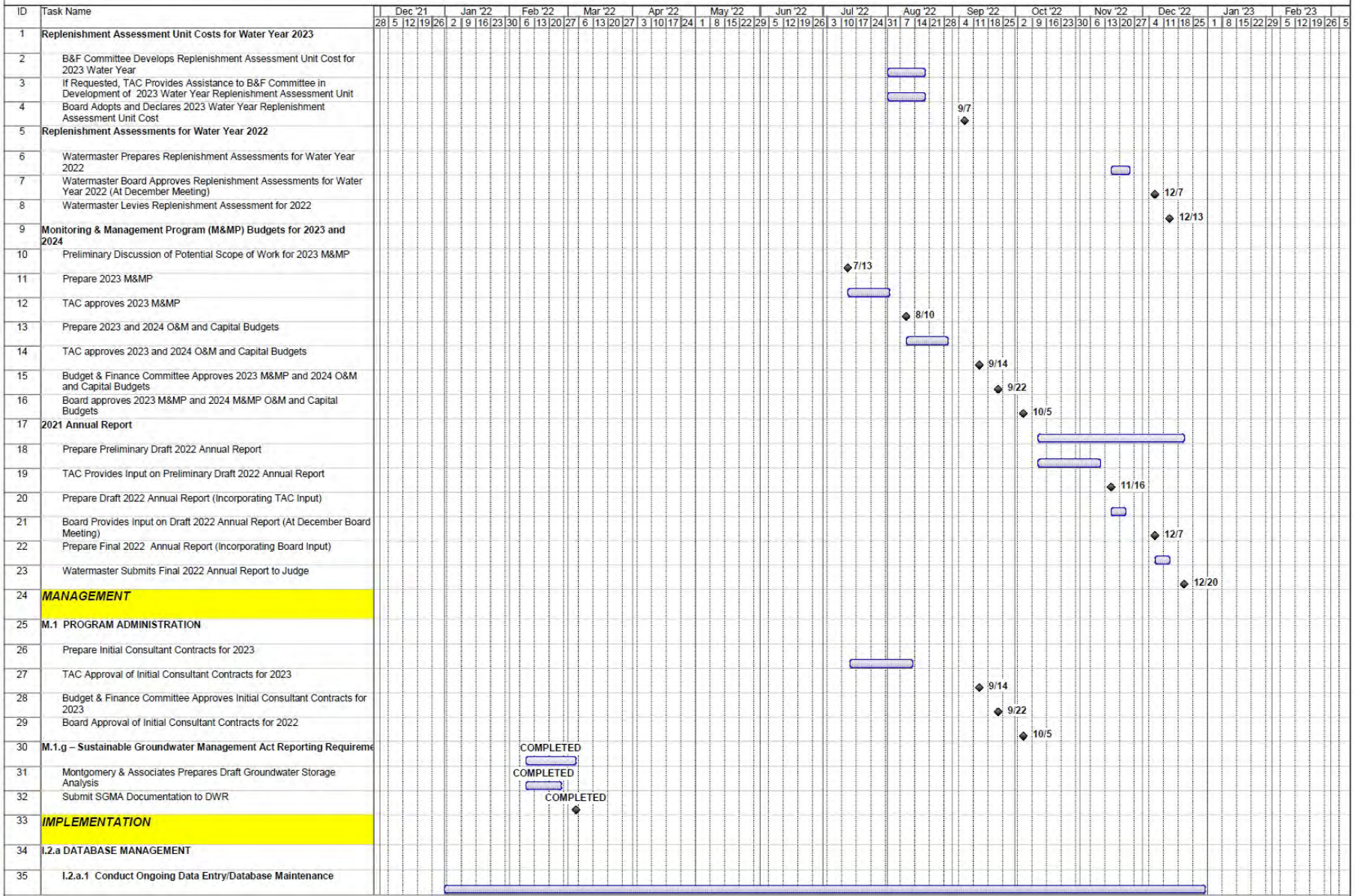
PROS	CONS
	<p>6. Because of the historical overpumping from the Basin, regardless of the approach that is used for Basin management, be it NSY or SY, it is very unlikely that even the reduced NSY pumping levels recommended in the Updated Basin Management Action Plan will achieve protective groundwater levels. The Basin would therefore still be at risk of seawater intrusion at some time in the future. An additional source(s) of water that can be injected into the Basin to raise groundwater levels, and to maintain them at protective water levels, will be necessary regardless of which approach is used for Basin management. Therefore, the expense and complexity of changing to the SY approach may not be justified.</p>

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	May 11, 2022
AGENDA ITEM:	6
AGENDA TITLE:	Schedule
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	<p>As a regular part of each monthly TAC meeting, I will provide the TAC with an updated Schedule of the activities being performed by the Watermaster, its consultants, and the public entity (MPWMD) which are performing certain portions of the work.</p> <p>Attached is the updated schedule for 2022 activities.</p>
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

ID	Task Name	Dec '21	Jan '22	Feb '22	Mar '22	Apr '22	May '22	Jun '22	Jul '22	Aug '22	Sep '22	Oct '22	Nov '22	Dec '22	Jan '23	Feb '23
		28 5 12 19 26	2 9 16 23 30	6 13 20 27	6 13 20 27	3 10 17 24	1 8 15 22 29	5 12 19 26	3 10 17 24	7 14 21 28	4 11 18 25	2 9 16 23 30	6 13 20 27	4 11 18 25	1 8 15 22 29	5 12 19 26
36	I.2.b DATA COLLECTION PROGRAM															
37	I.2.b.2 Collect Monthly Water Levels (MPWMD)															
38	I.2.b.3 Collect Quarterly Water Quality Samples (MPWMD)															
39	I.2.b.6 MPWMD provides annual water quality and water level data to Montgomery & Associates for inclusion in the 2021 SIAR															
40	I.3. a. 3 Evaluate Replenishment Scenarios and Develop Answers to Basin Management Questions															
41	Montgomery & Associates Presents Replenishment Water Modeling Report to the TAC		COMPLETED													
42	TAC Develops Additional Replenishment Water Modeling Scenarios															
43	TAC Decides on Recommendation to the Board about Running Additional Replenishment Water Scenario Analysis															
44	Progress Report to Board on Replenishment Water Modeling and Recommended Additional Scenario Analysis															
45	If Board Approves, Montgomery & Associates Runs Additional Replenishment Water Scenario Analysis															
46	Montgomery & Associates Presents Additional Replenishment Water Scenario Analysis to the TAC															
47	Montgomery & Associates Presents Final Replenishment Water Modeling Report to the Board															
48	Montgomery & Associates Presents Flow Direction and Flow Velocity Modeling Report to the TAC															
49	TAC Discusses and Provides Direction About Developing Additional Flow Direction and Flow Velocity Modeling Scenarios															
50	If TAC Recommends Performing Additional Flow Direction/Flow Velocity Modeling, M&A Prepares Scope and Cost Proposal															
51	TAC Provides Recommendation to the Board about Running Additional Flow Direction and Flow Velocity Modeling Scenarios															
52	Progress Report to Board on Flow Direction and Flow Velocity Modeling and Recommended Additional Modeling Scenarios															
53	If the Board Approves, Montgomery & Associates Runs Additional Flow Direction and Flow Velocity Modeling Scenarios															
54	Montgomery & Associates Presents Flow Direction and Flow Velocity Modeling of Additional Scenarios to the TAC															
55	Montgomery & Associates Presents Final Flow Direction and Flow Velocity Modeling Report to the Board															
56	I.4.c Annual Seawater Intrusion Analysis Report (SIAR)															
57	Montgomery & Associates Provides Draft 2022 SIAR to Watermaster															
58	TAC Approves 2022 SIAR															
59	Board Approves 2022 SIAR															

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	May 11, 2022
AGENDA ITEM:	7
AGENDA TITLE:	Other Business
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	<p>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.</p>
ATTACHMENTS:	None
RECOMMENDED ACTION:	None required – information only