

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

DATE: Wednesday, December 12, 2018

MEETING TIME: 1:30 p.m.

Monterey Regional Water Pollution Control Agency Offices
5 Harris Court, Building D (Ryan Ranch)
Monterey, CA 93940

If you wish to participate in the meeting from a remote location, please call in on the Watermaster Conference Line by dialing (515) 739-1015. Use the Meeting ID 355890617. Please note that if no telephone attendees have joined the meeting by 10 minutes after its start, the conference call will be ended.

OFFICERS

Chairperson: Nina Miller, California American Water Company

Vice-Chairperson: Jon Lear, MPWMD

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

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The next regular meeting will be held on Wednesday January 9, 2019 at 1:30 p.m. at the MRWPCA Board Room.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	December 12, 2018
AGENDA ITEM:	2.A
AGENDA TITLE:	Approve Minutes from the November 21, 2018 Meeting
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	<p>Draft Minutes from this meeting was emailed to all TAC members. Any changes requested by TAC members have been included in the attached version.</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
November 21, 2018**

Attendees: TAC Members

City of Seaside – No Representative
California American Water – Nina Miller
City of Monterey – Max Rieser
Laguna Seca Property Owners – No Representative
MPWMD – Jon Lear
MCWRA – Howard Franklin (via telephone)
City of Del Rey Oaks – No Representative
City of Sand City – Leon Gomez (via telephone)
Coastal Subarea Landowners – No Representative

Watermaster

Technical Program Manager - Robert Jaques

Consultants

Montgomery & Associates - Georgina King (via telephone)

Others

None

The meeting was convened at 1:36 p.m. after a quorum had been established.

1. Public Comments

There were no public comments.

2. Administrative Matters:

A. Approve Minutes from the August 15, 2018 Meeting

On a motion by Mr. Lear, seconded by Mr. Rieser, the minutes were unanimously approved as presented.

B. Well Completion Logs for the Pure Water Monterey Groundwater Replenishment Project

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

Mr. Lear commented that the Number Two well is being developed now, and should be completed in the January-February 2019 timeframe.

C. Sustainable Groundwater Management Act (SGMA) Update

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

Mr. Lear reported that the Department of Water Resources is now developing a program with grant funds to help entities achieve sustainability goals. He said the Department of Water Resources suggested that the Watermaster (Mr. Jaques) contact them to seek information about whether such funds would be available for Adjudicated Basins to help them achieve their

objectives. Mr. Jaques said that he would contact the Department of Water Resources to follow up on this.

D. Update on Potential Expansion of the Pure Water Monterey (PWM) Project

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

Ms. Miller commented that California American Water is trying to get a larger water profile to better serve its customers, and noted that the nominal 10,000 acre-foot-per-year level that would be achieved through the Monterey Peninsula Water Supply Project is not up to the amount California American Water would like to achieve. Mr. Lear said he concurred with that.

E. Results from Martin Feeney's September 2018 Induction Logging of the Sentinel Wells

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

F. Update on Geochemical Modeling

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

Mr. Lear reported that fresh soil samples from the Santa Margarita aquifer have now been obtained. These well cuttings are now being tested in the laboratory to obtain needed data. The timing for the start of geochemical modeling will depend on when the lab data is received, and a determination can be made as to whether performing additional lab work will be necessary. He went on to say that if the lab tests do not detect the presence of any heavy metals following the acid digestion analytical process, then no modeling would be necessary. This is because the acid digestion process would be the most severe means of releasing heavy metals that might be bound in the soil matrix. If the acid digestion process does not release any heavy metals, then it would not be possible for combinations of injected nonnative waters to release heavy metals.

G. Change in Monitoring Well

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

Mr. Lear commented that it should be the Producer doing the sampling, not the Monterey Peninsula Water Management District. The Watermaster should therefore ask SNG to start doing the required sampling since it is now operating a production well. He also commented that there was a discrepancy in the production data that had been provided to the Monterey Peninsula Water Management District by SNG for its well compared to the data that had been provided to the Watermaster. He provided Mr. Jaques a copy of the data that had been received by the Monterey Peninsula Water Management District. Mr. Jaques will provide that data to Ms. Dadiw-Paxton for her use.

3. Approve Initial RFSs for MPWMD, Montgomery & Associates, Todd Groundwater, and Martin Feeney for 2019

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

Mr. Gomez commented that he was comfortable approving the contracts.

On a motion by Mr. Gomez, seconded by Mr. Franklin, all seven of the contracts were unanimously approved.

4. Discuss and Provide Input on the Draft 2018 Seawater Intrusion Analysis Report (SIAR)

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

Mr. Franklin reported that Tamara Voss, the usual TAC representative from the Monterey County Water Resources Agency, had provided him with a significant number of suggested edits. He will email these to Mr. Jaques who will in turn send them onto Ms. King so she can address them in a final version of the Report. He said that none of these were substantive comments, they were all editorial in nature.

Ms. King then provided a PowerPoint presentation describing the Report. Copies of the slides she used in her presentation are attached.

Mr. Lear noted that two wells had been converted from production wells to monitoring wells. Ms. King will make that correction in her report.

Mr. Franklin pointed out that a correction needed to be made in the fourth bulleted item from the top on page 2 of the Executive Summary of the Report, inserting the word “not” before the word “indicative” in the final sentence of that bulleted item. This same correction needs to be made in the Conclusions section of the report.

On a motion by Mr. Franklin, seconded by Mr. Lear, the Seawater Intrusion Analysis Report as-presented was unanimously approved, with the qualification that the editorial revisions suggested by Ms. Voss be addressed in a final version of the Report.

5. Discuss and Provide Input on the Preliminary Draft Watermaster 2018 Annual Report

Mr. Jaques summarized the agenda packet materials for this item. Rather than going through each section of the document, Ms. Miller asked if TAC members had any sections that they wished to discuss or have described by Mr. Jaques, and there were none.

Mr. Franklin noted that there appeared to be an incorrect citation at the bottom of page 84 of the agenda packet where the referenced Section number of 8.2.9.2 should apparently be 8.9.2.2.

On a motion by Mr. Lear, seconded by Mr. Gomez, the Preliminary Draft Annual Report was unanimously approved, with a correction if necessary, to be made on page 84 of the agenda packet as pointed out by Mr. Franklin.

6. Draft Agreement with Cal Am and MPWMD for Storage and Recovery of Water from the Pure Water Monterey Project

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

Mr. Lear noted that the list of recovery locations in Section 4 of the proposed Agreement did not include ASR No. 5 or ASR No. 6 wells. He said these are currently out-to-bid for construction, and should become operational in early 2019. He said that including them would provide additional operational flexibility, if some of the other listed wells had to be temporarily taken out of service.

Mr. Franklin asked if these two new wells were both funded and shovel-ready. Mr. Lear responded that they were.

Following some discussion, there was a motion by Mr. Lear, seconded by Mr. Franklin to approve the proposed Agreement either with or without the two additional wells being added, with California American Water to make that decision. The motion passed unanimously. Ms. Miller said she would get back to Mr. Jaques with California American Water’s desires in this regard in the near future.

7. Information from AquaTronic Solutions Regarding Technology for Locating the Seawater Intrusion Interface Offshore in Monterey Bay

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

Mr. Franklin commented that the use of acoustic-seismic technology in the Monterey Bay National Marine Sanctuary would require multiple permits that could be difficult to obtain.

Mr. Lear reported that some work has been done in the Santa Cruz County area using other technology which would be much less expensive.

Following a brief discussion there was consensus to drop this topic from further consideration.

8. Set Next Meeting Date

Mr. Jaques explained that it would be necessary to have a TAC meeting in December to discuss the update to the Basin Management Action Plan. The meeting will be at the usual time of 1:30 PM on Wednesday, December 12.

9. Schedule

Mr. Jaques highlighted some of the information under this agenda item. There was no other discussion.

10. Other Business

Mr. Lear reported that SNG's well has been reactivated for the new Eco-Resort project. The PCA-West well, which in the past has been used to obtain data in this vicinity, would be adversely impacted by SNG's proposed grading plan.

Mr. Gomez reported that he had asked SNG to show existing wells on their development plans, but he did not see this well on those plans. He asked Mr. Lear to send him an email describing his concerns so he could have this addressed in the approval documents for the SNG project. Mr. Lear said he would do so.

The meeting adjourned at 3:10 p.m.


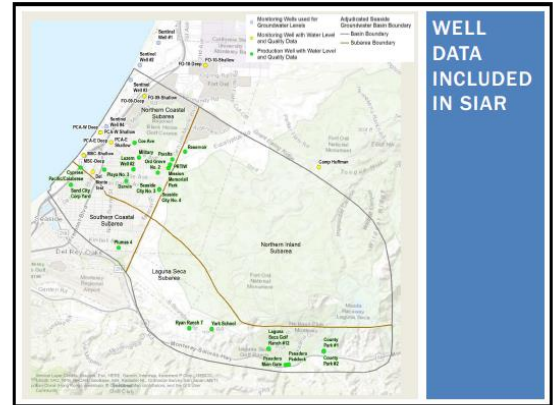
SEASIDE GROUNDWATER BASIN

2018

SEAWATER INTRUSION

ANALYSIS REPORT


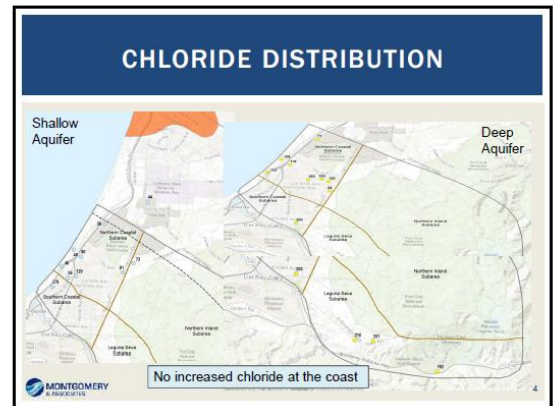
Presented to the
Seaside Basin
Technical
Advisory
Committee
November 21,
2018

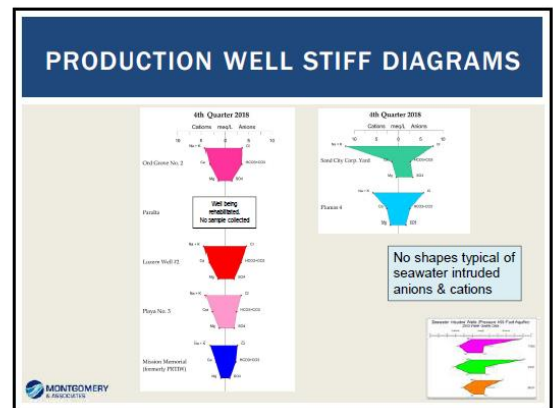
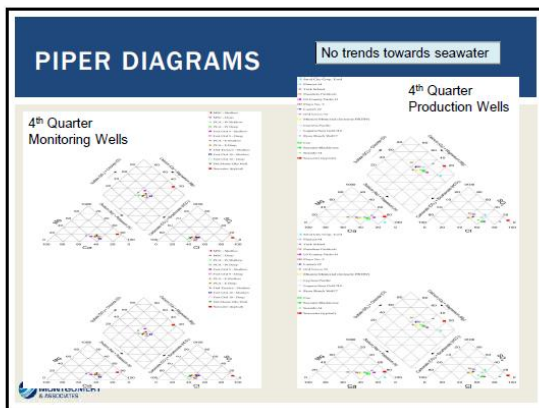
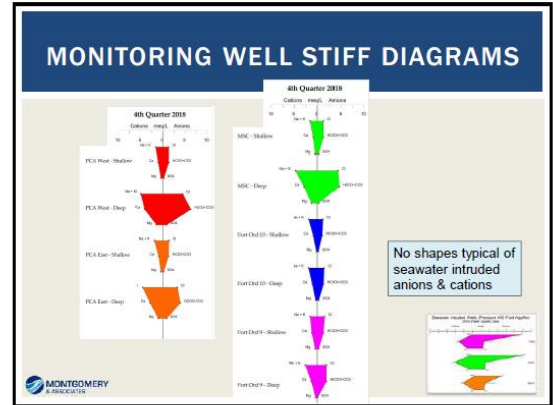
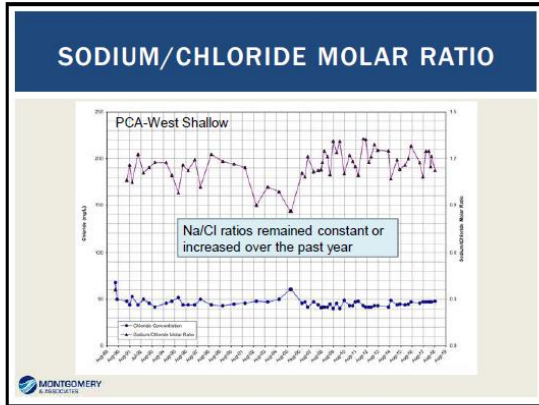



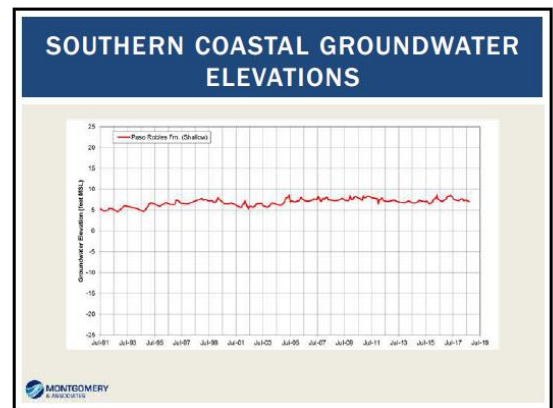
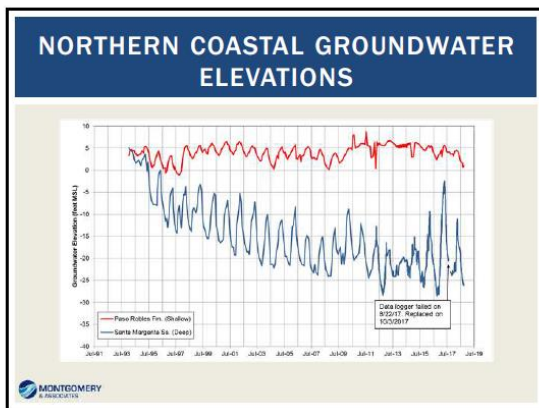
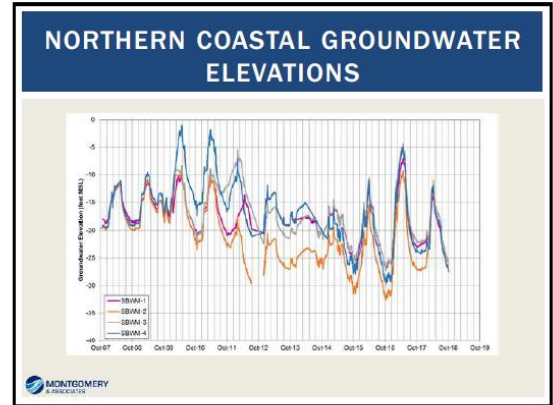
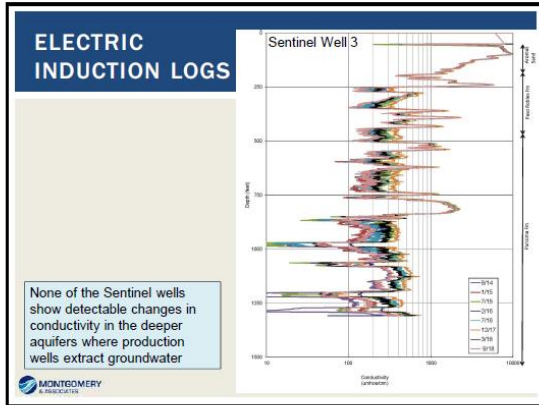
SIAR ANALYSIS

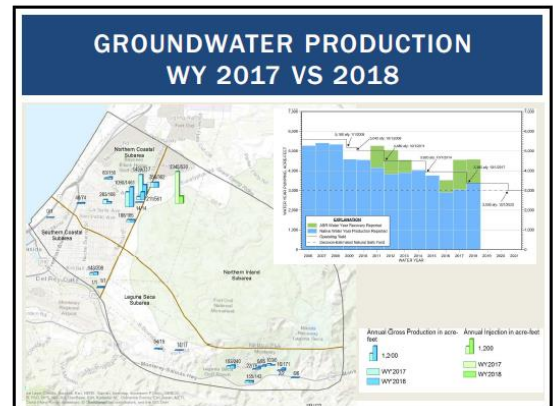
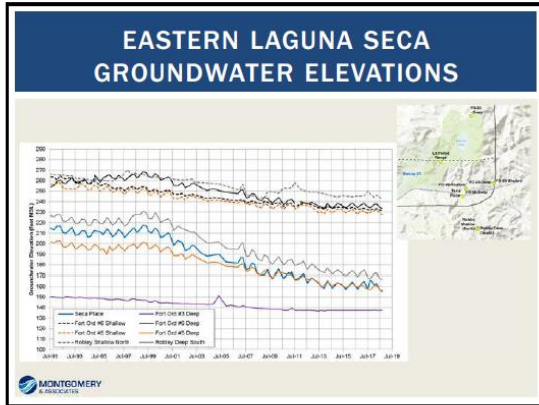
- Chloride Distribution and Na/Cl Molar Ratio
- Cation/Anions - Piper and Stiff Diagrams
- Electric Induction Logs
- Groundwater Elevations
- Protective Groundwater Elevations
- Groundwater Production

2








CONCLUSIONS


Analyses indicating seawater intrusion is NOT occurring:

- No groundwater chemistry changes towards seawater in either shallow or deep groundwater
- Overall, chloride concentration trends were stable for most monitoring wells, with no increases greater than 10 mg/L
- Sodium/chloride molar ratios in the monitoring wells remained constant or increased over the past year
- Induction logging data at the coastal Sentinel Wells do not show large changes over time that are indicative of seawater intrusion



CONCLUSIONS


- After 16 years of ongoing declines in the Laguna Seca Subarea, the rate of decline is now less and appears close to stabilizing
- Native groundwater production in the Seaside Groundwater Basin for Water Year 2018 was 3,363.4 acre-feet:
 - 314 acre-feet more than Water Year 2017
 - 3.4 acre-feet more than the Decision-ordered Operating Yield of 3,360 acre-feet per year that is required between October 1, 2017 and September 30, 2020



CONCLUSIONS


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

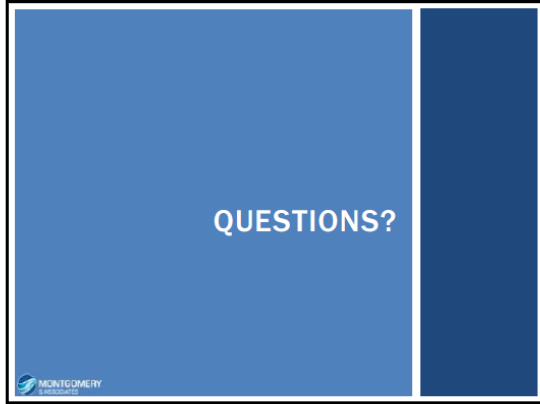
- All deep groundwater in the Northern Coastal subarea is below sea level
 - 2nd quarter (winter/spring) > 12 feet below sea level
 - 4th quarter (summer/fall) > 25 feet below sea level
- Groundwater levels remain below protective elevations in all deep target monitoring wells
- Currently, only one of the three shallow wells' groundwater levels are above protective elevations



RECOMMENDATIONS

1. Continue to Analyze and Report on Water Quality Annually
2. Include Data from New Monitoring Wells Installed as Part of Recharge Projects





**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	December 12, 2018
AGENDA ITEM:	2.B
AGENDA TITLE:	Update on Draft Agreement with Cal Am and MPWMD for Storage and Recovery of Water from the Pure Water Monterey Project
PREPARED BY:	Robert Jaques, Technical Program Manager

At its November 21 meeting the TAC approved a Draft Agreement with Cal Am and MPWMD for Storage and Recovery of Water from the Pure Water Monterey Project. At that meeting Jon Lear had suggested that it would be beneficial to add future ASR Wells No. 5 and 6 to the Agreement so those would be included in Section 4 as potential sites where the injected water could be recovered. Cal Am has reported that it agreeable to having those included in the Agreement.

Subsequent to the November 21 TAC meeting Mr. Lear also suggested that wording be added to the Agreement to clarify that the geochemical modeling that is to be performed as a condition of the Agreement (in Section 6 thereof) would pertain only to mitigating the impacts of injecting the advance treated recycled water from the Pure Water Monterey Project (AWT water), and that mitigation of the impacts of injecting desalinated water would be made a condition of a future Storage and Recovery Agreement with Cal Am for the storage of water from the Monterey Peninsula Water Supply Project.

Cal Am has proposed that the following wording be added to Section 6 of the Agreement to provide this clarification:

The Parties expect that desalinated water will not be present/injected into the Basin prior to the initial injection of AWT Water, therefore, in that case, any mitigation measures to be implemented prior to the initial injection of AWT Water shall not include any measures recommended as a result of the presence/injection of desalinated water. Any mitigation measures to be required as a result of the injection of desalinated water into the Basin will be addressed at the time a Storage and Recovery Agreement for desalinated water is presented to the WATERMASTER for consideration.

I find this additional language to be acceptable to the Watermaster, and MPWMD has stated it, too, finds the addition of this language to be acceptable.

ATTACHMENTS:	None
RECOMMENDED ACTION:	Approve or suggest edits to these language revisions to the Draft Agreement with Cal Am and MPWMD for Storage and Recovery of Water from the Pure Water Monterey Project

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	December 12, 2018
AGENDA ITEM:	3
AGENDA TITLE:	Basin Management Action Plan Update
PREPARED BY:	Robert Jaques, Technical Program Manager
<p>Under RFS No. 2013-03 issued on August 1, 2018 Montgomery & Associates began work to update the Watermaster's Basin Management Action Plan (BMAP). Georgina King, formerly with HydroMetrics and now with Montgomery & Associates, is managing that work.</p> <p>The Watermaster's first BMAP was completed in 2009. The BMAP constitutes the basic plan for managing the Seaside Groundwater Basin. The BMAP identifies both short-term actions and long-term strategies intended to protect the groundwater resource while maximizing the beneficial use of groundwater in the basin. It provides the Watermaster a logical set of actions that can be undertaken to manage the basin to its Safe Yield. Over the nine years since the BMAP was completed, the Watermaster has collected much groundwater level and quality data, and conducted various studies to improve the understanding of the basin. This improved understanding has now been incorporated into an updated BMAP to facilitate ongoing responsible management of the groundwater resource. The Preliminary Draft of the updated BMAP is quite lengthy, so only the Executive Summary from that document is attached. However, a full copy of the document was posted for review on the Watermaster's website at: http://www.seasidebasinwatermaster.org/Other/BMAP%20Updated%20Draft%20with%20Changes%20Accepted%2011-28-18.pdf</p> <p>By an email dated November 29, 2018 TAC members were notified that the full document had been posted to the website in order to provide adequate time from them to review it prior to the December 12 TAC meeting.</p> <p>Ms. King will provide a presentation on this work at today's meeting and will respond to questions from the TAC. Depending on the amount of input received, and what if any revisions need to be made to the Preliminary Draft Updated BMAP, it is hoped that Ms. King will be able to make those revisions in time to provide a Draft version for the Board's consideration at its January 2, 2019 meeting.</p> <p>Due to the significance of certain of the findings and conclusions in the Updated BMAP, I have asked Gus Yates of Todd Groundwater to review the document and to provide his comments on it and any recommendations he may have pertaining to it. He stated he could complete his review and provide to me a short technical memorandum containing his comments and any recommendations before December 25, so that it can be included in the agenda transmittal to the Board on the Updated BMAP.</p>	
ATTACHMENTS:	Introductory Pages and Executive Summary from the Preliminary Draft Updated Basin Management Action Plan
RECOMMENDED ACTION:	Provide input (questions, comments, suggested edits, etc.) to aid Montgomery & Associates in producing a Draft version that can be presented to the Board for their consideration

November 28, 2018

Seaside Groundwater Basin
2018 Basin Management Action Plan

SEASIDE GROUNDWATER BASIN WATERMASTER
MONTEREY COUNTY, CALIFORNIA

DRAFT
UPDATED BMAP

Preliminary Draft

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Preliminary Draft

1 EXECUTIVE SUMMARY

1.1 Introduction

The Seaside Groundwater Basin's (the Basin) court-appointed Watermaster's primary role is to administer and enforce the provisions of the Decision filed February 9, 2007 by the Superior Court in Monterey County under Case No. M66343 - California American Water v. City of Seaside et al. (the Decision). One provision of the Decision is the requirement to develop a Monitoring and Management Plan (M&MP), which the Watermaster developed in May 2006. The M&MP included a recommendation to prepare a Basin Management Plan. The first Basin Management Plan, titled the *Seaside Groundwater Basin Management Action Plan* (BMAP) was completed in February 2009 (HydroMetrics LLC, 2009a). This current report updates the previous BMAP with the benefit of nine additional years' worth of groundwater data and an enhanced understanding of the Basin.

1.2 Description and State of the Seaside Groundwater Basin

The Basin as delineated in Exhibit B of the Decision is bounded by the Pacific Ocean on the west, faults and bedrock on the south, bedrock on the east, and a groundwater flow divide on the northern boundary. The Decision subdivides the subbasins into four subareas: Northern Inland, Northern Coastal, Southern Inland, and Southern Coastal. The northern and southern subbasins are separated by the Laguna Seca Anticline. This feature, including the segment of the Ord Terrace Fault that offsets the anticline, forms a subsurface hydraulic barrier to groundwater flow (**Figure ES-1**). The coastal and inland subareas are not separated by any geologic features, and groundwater flow is continuous between coastal and inland subareas.

The Basin comprises three aquifers: a deep aquifer, a shallow aquifer, and surficial Aromas Sands. The deep aquifer generally consists of the Purisima Formation and Santa Margarita Sandstone. The shallow aquifer refers collectively to numerous discontinuous lenses of sand and gravel in the Paso Robles Formation overlying the Santa Margarita Sandstone and below the surficial Aromas Sand layer.



X:\2018 Projects\BMAP\GIS\BMAP_Fig1_Wells.mxd

EXPLANATION

- Adjudicated Seaside Groundwater Basin Boundary
- Basin Boundary
- Subarea Boundary
- Monitoring Well
- Production Well
- ASR Well
- Laguna Seca Anticline
- Faults

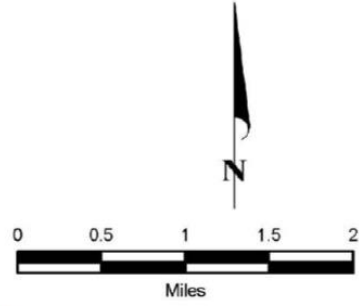


Figure ES-1. Seaside Basin Well Locations

Since the first BMAP, groundwater levels have continued to decline in all parts of the Basin except in the Southern Coastal Subarea and in shallow wells near the coast in the Northern Coastal Subarea. In those locations, groundwater levels remain stable. The continued groundwater level declines have not led to any observed seawater intrusion or other operational problems, other than the need to replace a monitoring well sampling pump so it can operate from a deeper depth. However, the declining groundwater level trend is not sustainable over the long-term.

The Basin's *Usable Stored Groundwater* is the amount of groundwater above protective groundwater elevations. It is estimated that the *Usable Stored Groundwater* is 6,350 acre-feet as of Fall 2017. The unsaturated area above the current groundwater table has approximately 90,600 acre-feet of *Total Usable Storage* space. Of the 90,600 acre-feet of total usable storage space, 62,020 acre-feet are in the Coastal and Northern Inland Subareas and 28,580 acre-feet are in the Laguna Seca Subarea. Using revised protective groundwater elevation surfaces, the sum of the *Usable Stored Groundwater* and the *Total Usable Storage* space is approximately 96,950 acre-feet.

The Basin has lost approximately 1,450 acre-feet per year of groundwater from storage since 1988. This equates to 43,500 acre-feet of groundwater lost from storage over 30 years. These losses are reflected in the lowered groundwater levels observed throughout the Basin.

A review of the Basin's Natural Safe Yield was conducted using the Basin's updated groundwater flow model. Using the same approach but different analysis period to that used in establishing the Natural Safe Yield in the Decision and in the first BMAP in 2009, the Natural Safe Yield was estimated to be 2,310 acre-feet per year over the past 30 years. This is less than the 2,850 acre-feet per year estimated in the 2009 BMAP, which was estimated over a six-year period between Water Years 2002 and 2007; and lower than the Natural Safe Yield of 3,000 acre-feet per year included in the Decision. Because the Natural Safe Yield estimate reflects the theoretical maximum amount of groundwater production that would have resulted in no decreases in groundwater in storage, it does not account for the uneven pumping distribution in the Basin which will cause localized groundwater level declines even at the lower Natural Safe Yield estimate.

Preventing future seawater intrusion requires raising groundwater levels near the coast to protective elevations. These groundwater elevations can be raised only if

replenishment water is recharged into the Basin and not recovered, or pumping is reduced to less than the Natural Safe Yield.

Preliminary Draft

1.3 Supplemental Water Supplies

Long-term supplemental supplies are needed to reduce pumping in the Basin to at or below the Natural Safe Yield; and to provide water which can be used to replenish the Basin. Developing these supplemental supplies is the strategy that will have the greatest impact on the Basin and allows for its long-term management and use in the future. Since the first BMAP, a number of projects have been developed by various project proponents and are in various stages of planning, environmental assessment, or construction. Most of these supplies are part of other larger programs.

The largest agency producers of groundwater in the Basin are California American Water Company (CAWC) and the City of Seaside. Supplemental water supply projects that have progressed the farthest focus on providing supplemental supplies to these two producers in order to meet their water rights as established by the Decision. These projects additionally provide water for CAWC to return to the Basin to restore the water it has over-pumped since the date of the Decision. A summary of supplemental water supply projects that are currently being considered, some of which are in the construction phase, is provided in **Table 1**. **Table 2** provides a summary of supplemental supply projects that have been implemented since the first BMAP was prepared in 2009. **Table 3** summarizes Basin management actions that have been implemented since 2009.

All of the projects and management actions, except one, are physical projects with capital costs associated with them. The exception is water conservation which does not produce additional supply but rather results in a demand reduction. Water conservation is already being given high priority by the Seaside Groundwater Basin Watermaster's (Watermaster) and its member agencies.

Table 1. Summary of Supplemental Water Supply Projects Currently Being Considered

Project	Project Proponent	Project Type and Capacity	Benefit to Seaside Basin	Status
Monterey Peninsula Water Supply Project (MPWSP)	California American Water Company (CAWC)	Desalinate (6.4 mgd plant capacity) saltwater extracted by slant wells; 7,167 AFY desalinated water, plus ASR wells for additional storage of desalinated water	Supplemental supply for CAWC so they can meet their adjudicated right, plus return to the Basin by in-lieu recharge, over a period of 25 years, the volume that they have historically over pumped	Draft EIR approved by California Public Utilities Commission (CPUC) in August 2018 CPUC approved project in September 2018
	Monterey One Water (M1W)	Inject purified wastewater from Pure Water Monterey (PWM) Project into the Seaside Basin; 3,500 AFY	Modeling predicts an increase in Basin groundwater levels	EIR complete and infrastructure currently being constructed
Regional Urban Water Augmentation Project (RUWAP)	Marina Coast Water District (MCWD)	Distribute recycled water from the M1W Reclamation Plant; total of 1,727 AFY of recycled water to identified urban areas	Supplemental supply for two City of Seaside golf courses (Blackhorse and Bayonet, 450 AF) and 250 AF for a proposed golf course in Del Rey Oaks; total of 700 AFY supplemental supply to offset over-pumping of the Basin	Phase 1 under construction in 2018
Monterey Bay Regional Water Project (MBRWP or DeepWater Desal)	Deepwater Desal LLC (DWD)	Desalinate ocean water from a deep open ocean intake within the Monterey Canyon; 25,000 AFY potable water	Supplemental supply to meet water demand and keep pumping below the Safe Yield	Notice of Preparation/ Notice of Intent to prepare a Draft EIR/EIS issued in June 2015
People's Moss Landing Water Desalination Project (People's Project)	Moss Landing Green Commercial Park, LLC	Desalinate ocean water from an open ocean intake; 13,400 AFY potable water	Water to be used to meet needs of Monterey Peninsula area	Notice of Preparation for the People's Project issued in June 2015
Greater Monterey County Storm Water Resource Plan (SWRP)	Multiple entities	Provide more source water for PWM by identifying storm water capture opportunities and/or direct recharge of storm water	Water for use in recharging, or reducing pumping from the Basin	Planning stage

Table 2. Summary of Supplemental Supply Projects Implemented since 2009

Project	Project Proponent	Project Type and Capacity	Benefit to Seaside Basin	Status
Sand City Water Supply Project	Owner: City of Sand City Operator: CAWC	Desalinate brackish source water; up to 300 AFY desalinated water	Supplemental water supply helps reduce pumping from the Basin	Facilities completed and placed into operation in 2010
Carmel River Water Aquifer Storage and Recovery Project (aka Seaside ASR) – Phases 1 & 2	Monterey Peninsula Water Management District (MPWMD)	Divert excess Carmel River winter flows during high flow periods, treat, and inject into four ASR wells for recovery by CAWC during dry periods; Phase 1 (2 wells) = up to 2,400 AFY stored, with an average annual yield of 920 AFY; Phase 2 (2 wells) = up to 2,900 AFY stored, with an average annual yield of 1,050 AFY	Supplemental water supply for the Basin	Phase 1 completed in 2007 and operational in 2008; Phase 2 completed in stages with one ASR well operational in 2012 and the second ASR well operational in 2015
Pacific Grove Wastewater Reuse Project	City of Pacific Grove	Treat and distribute reclaimed waste water for irrigation; 100 – 125 AFY	No benefit to Basin	Facilities completed and placed into operation in 2017

Table 3. Summary of Management Actions Implemented since 2009

Action	Proponent	Project Type and Capacity	Benefit to Seaside Basin	Status
Water Conservation	All municipal suppliers	Public awareness	Reduced water demand	Ongoing.
Irrigate the Bayonet and Blackhorse Golf Courses with Water from the Ord Community Water System	City of Seaside	MCWD temporarily provided 2,160 AF to City of Seaside over a period of six years	Temporary supplemental water supply for the Basin used in-lieu of pumping by the City of Seaside	This source was used from 2010 – 2015

1.4 Groundwater Management Actions

A number of management actions could be implemented by various water agencies to delay the onset of seawater intrusion and maximize the use of existing groundwater. Any action that assists in appropriate management of the Basin should be encouraged and supported by the Watermaster.

Of the near-term management actions reviewed in this BMAP, the following appear to be the most cost-effective, most likely to be implemented, and provide the greatest benefit to the Basin:

- Install Southern Coastal Subarea wells in coordination with the Watermaster to determine optimal pumping locations that do not cause groundwater levels to fall below protective elevations,
- Use recycled water in the Laguna Seca Subarea for golf course irrigation,
- Support water conservation,
- Coordinate with the Salinas Valley Basin Groundwater Sustainability Agency and Marina Coast Water District Groundwater Sustainability Agency to ensure that sustainable management criteria included in the neighboring Groundwater Sustainability Plans (GSPs) do not limit the Watermaster's sustainable management of the Basin, and
- Enhance storm water recharge of the City of Seaside's storm water.

The recommended near-term actions are not intended to provide long-term solutions for restoring groundwater levels in the Basin, although some near-term solutions may have long-term benefits.

1.5 Other Recommendations

This updated BMAP identifies other recommendations that need to be addressed and pursued by the Watermaster.

- Use the groundwater flow model to evaluate the combination of Basin management actions and supplemental water supply projects to determine their ability to raise groundwater levels to protective elevations.
- Re-evaluate the Basin's natural safe yield given the impacts of various projects currently being implemented.

- Continue ongoing groundwater monitoring of groundwater levels, quality and production. These data will allow Basin impacts from management actions and supplemental water supply projects to be evaluated over the long-term.
- Continual annual analyses of groundwater levels and quality.

Preliminary Draft

**SEASIDE GROUNDWATER
BASIN**

2018

**BASIN MANAGEMENT
ACTION PLAN (BMAP)**



**MONTGOMERY
& ASSOCIATES**

**Presented to the
Seaside Basin
Technical
Advisory
Committee
December 12,
2018**

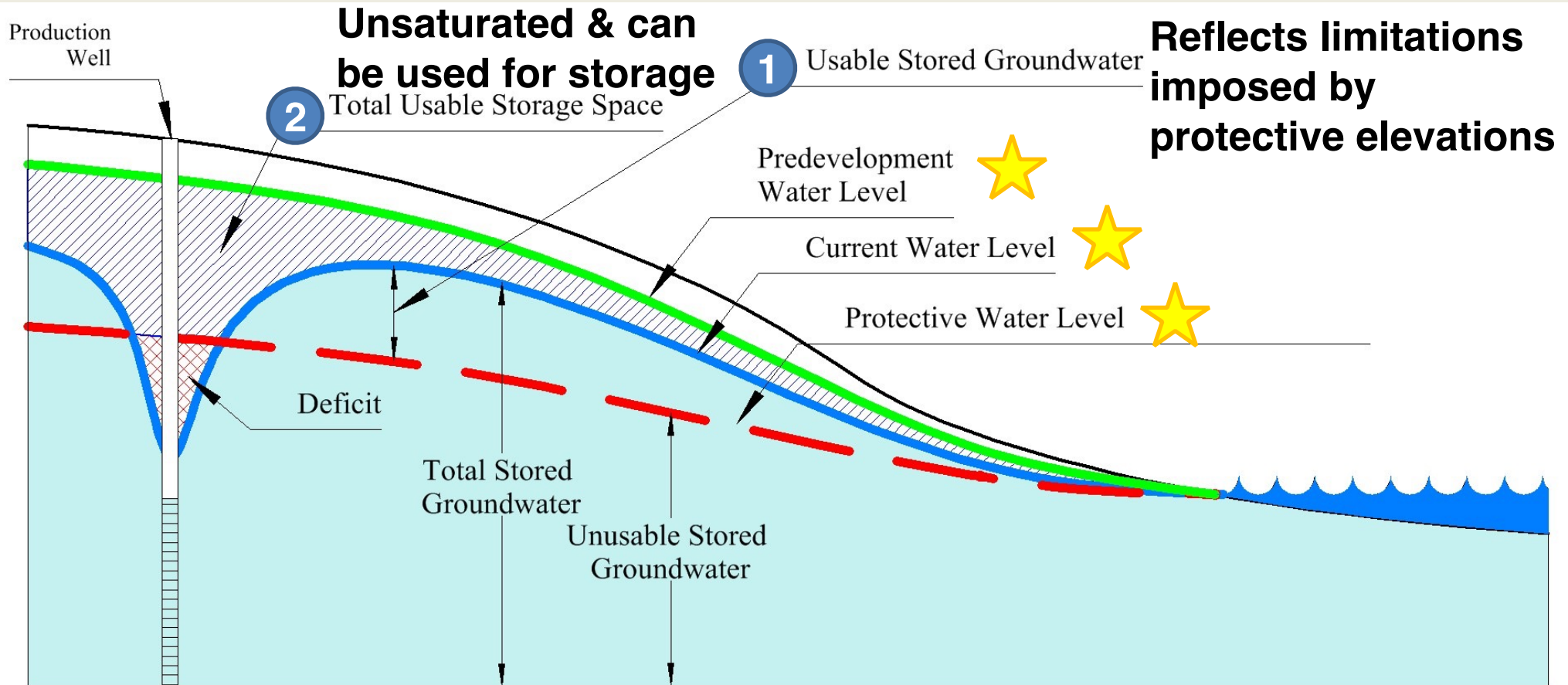
BACKGROUND & SCOPE

- **Update of the 2009 BMAP**
- **Contents include:**
 - **Description of State of the Basin**
 - **Groundwater Storage**
 - **Groundwater Budget**
 - **Review of Natural Safe Yield**
 - **Supplemental Supplies**
 - **Management Actions**
 - **Recommendations**

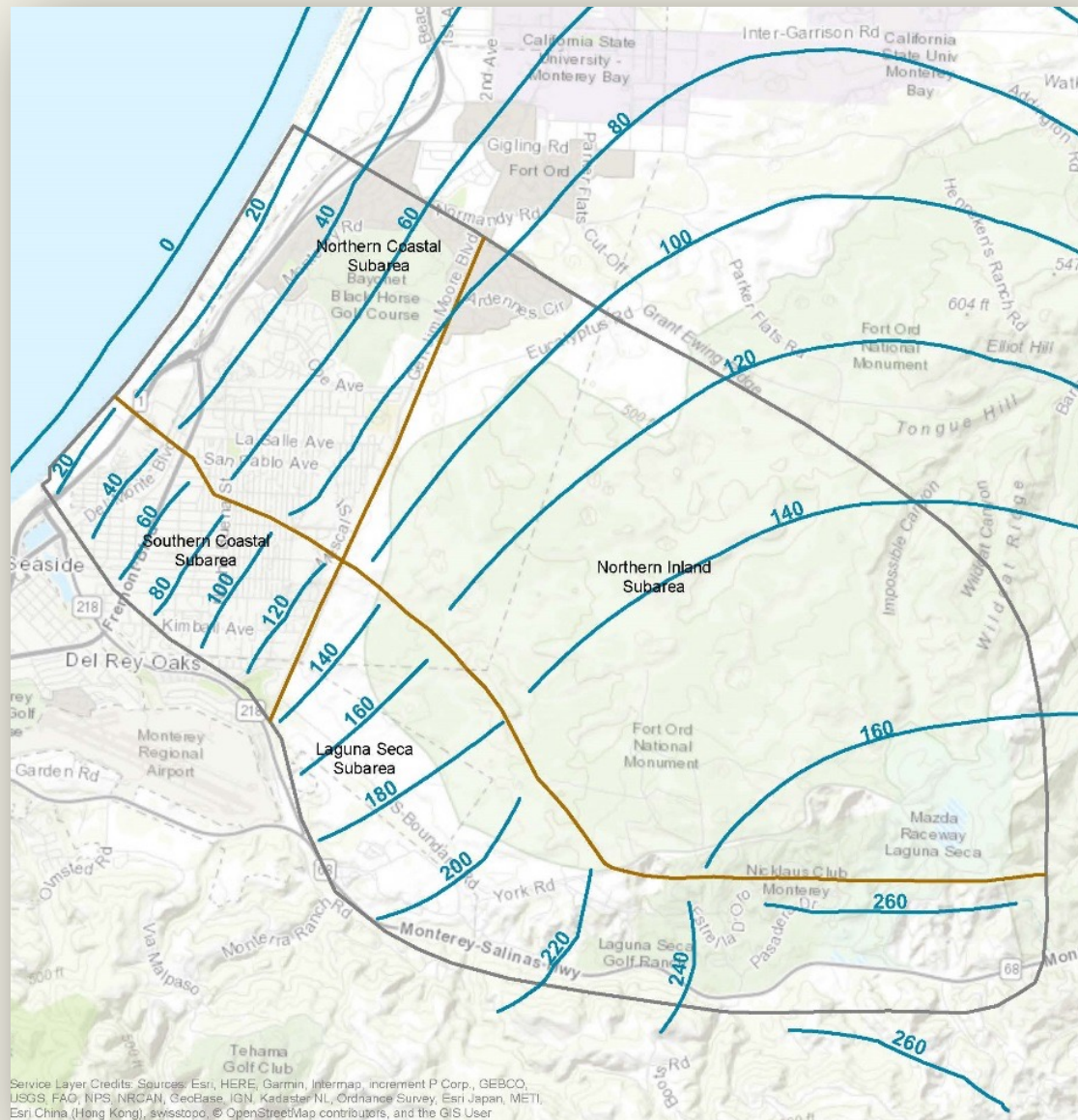
STATE OF THE BASIN

- **Groundwater levels continue to decline, except in Southern Coastal Subarea and in shallow coastal wells**
- **All of the Northern Coastal Subarea levels are below sea level**
- **Protective elevation are not met in any of the 3 monitoring wells with deep aquifer protective elevations**
- **Protective elevation are not met in 2 of the 3 monitoring wells with shallow aquifer protective elevations**

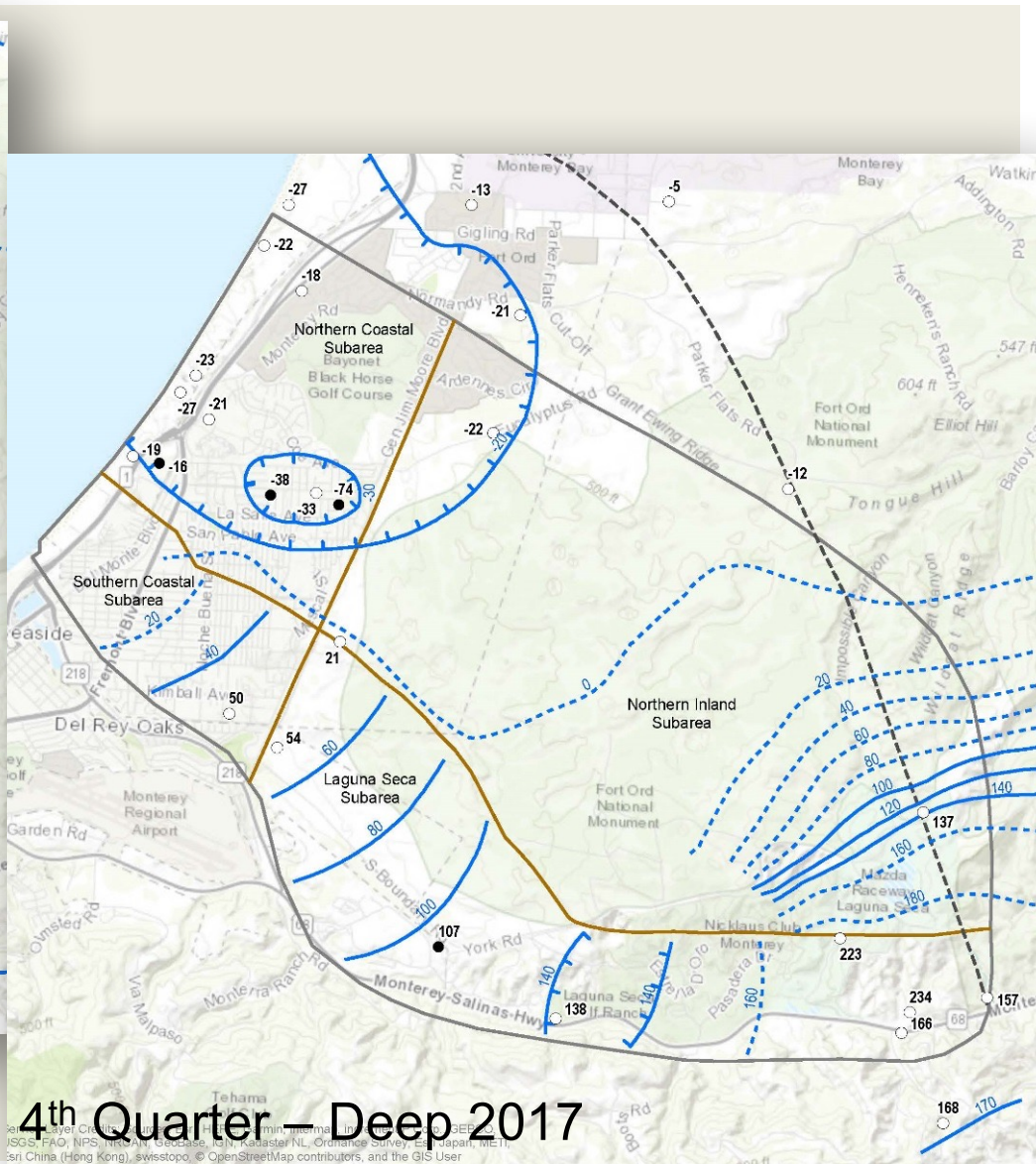
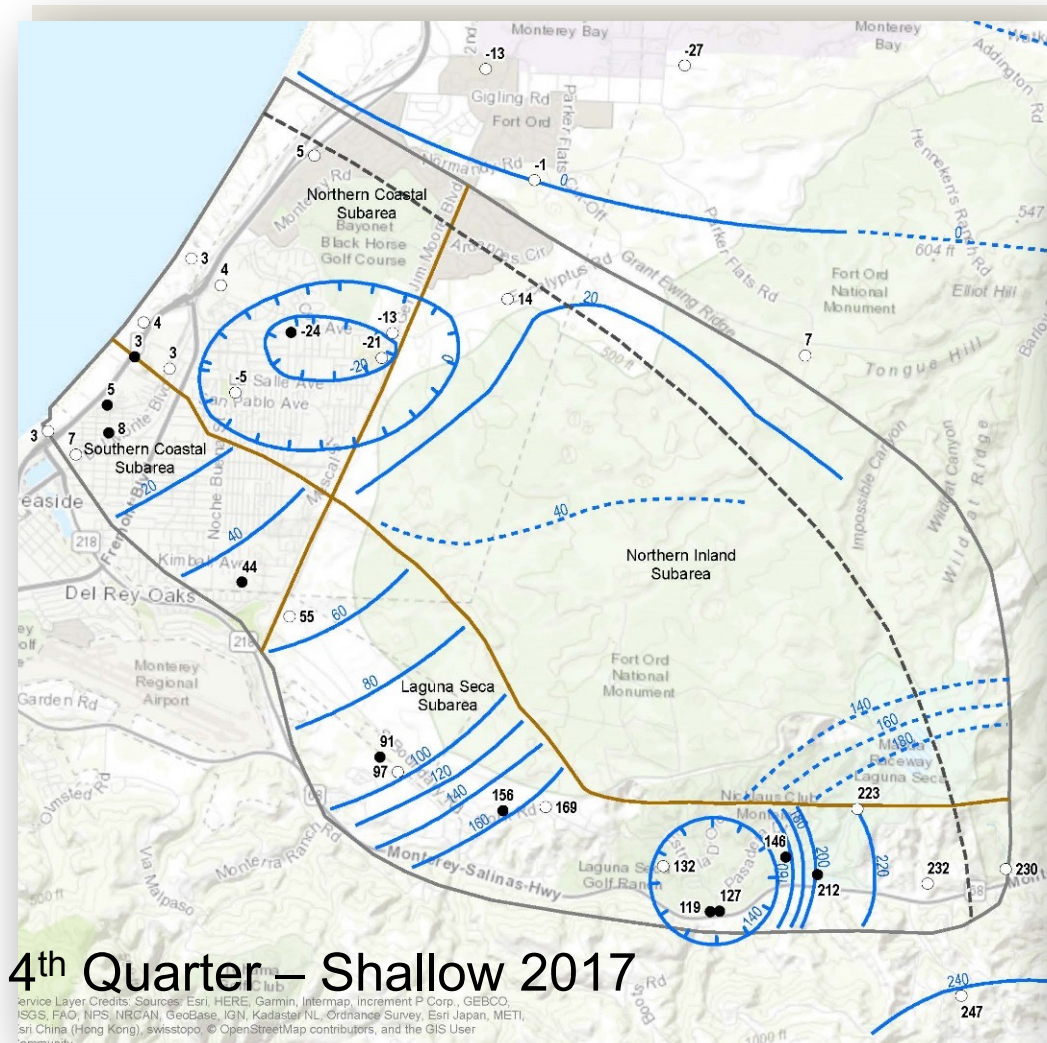
GROUNDWATER STORAGE



PRE-DEVELOPMENT GROUNDWATER ELEVATION

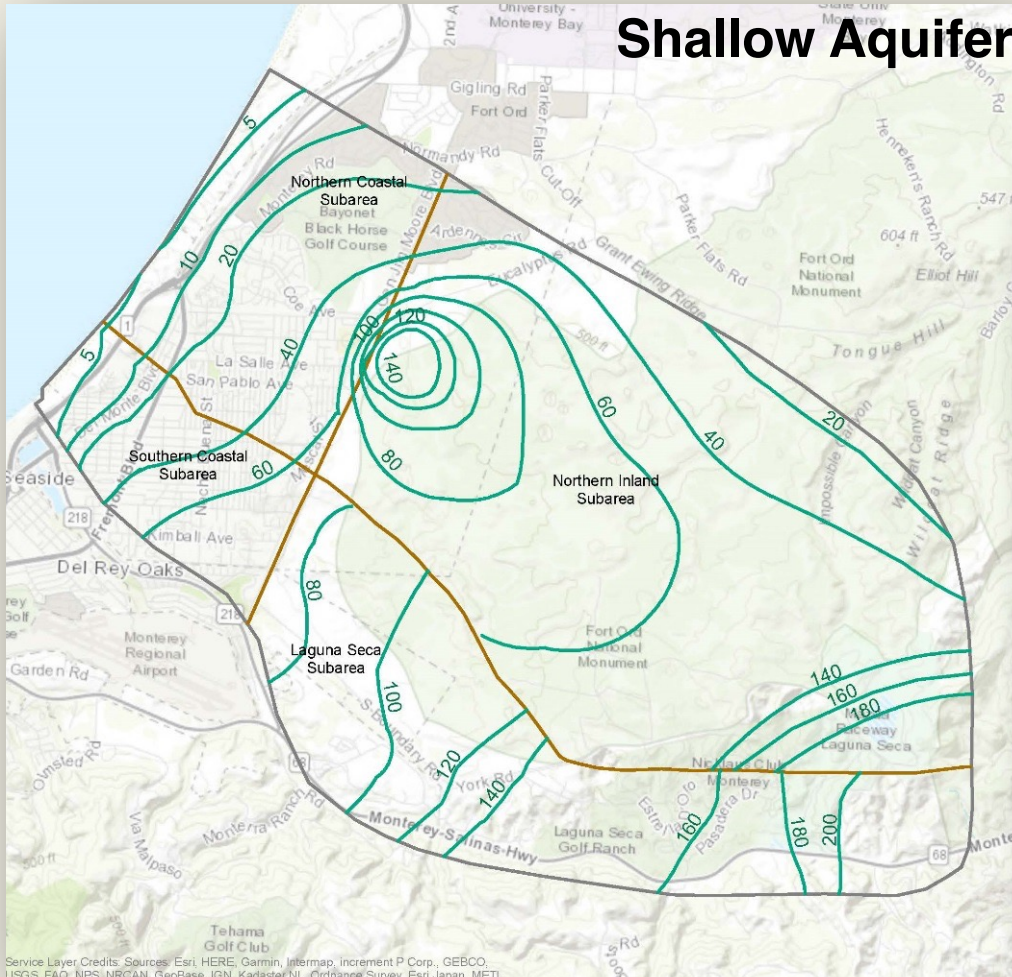


CURRENT GROUNDWATER ELEVATIONS



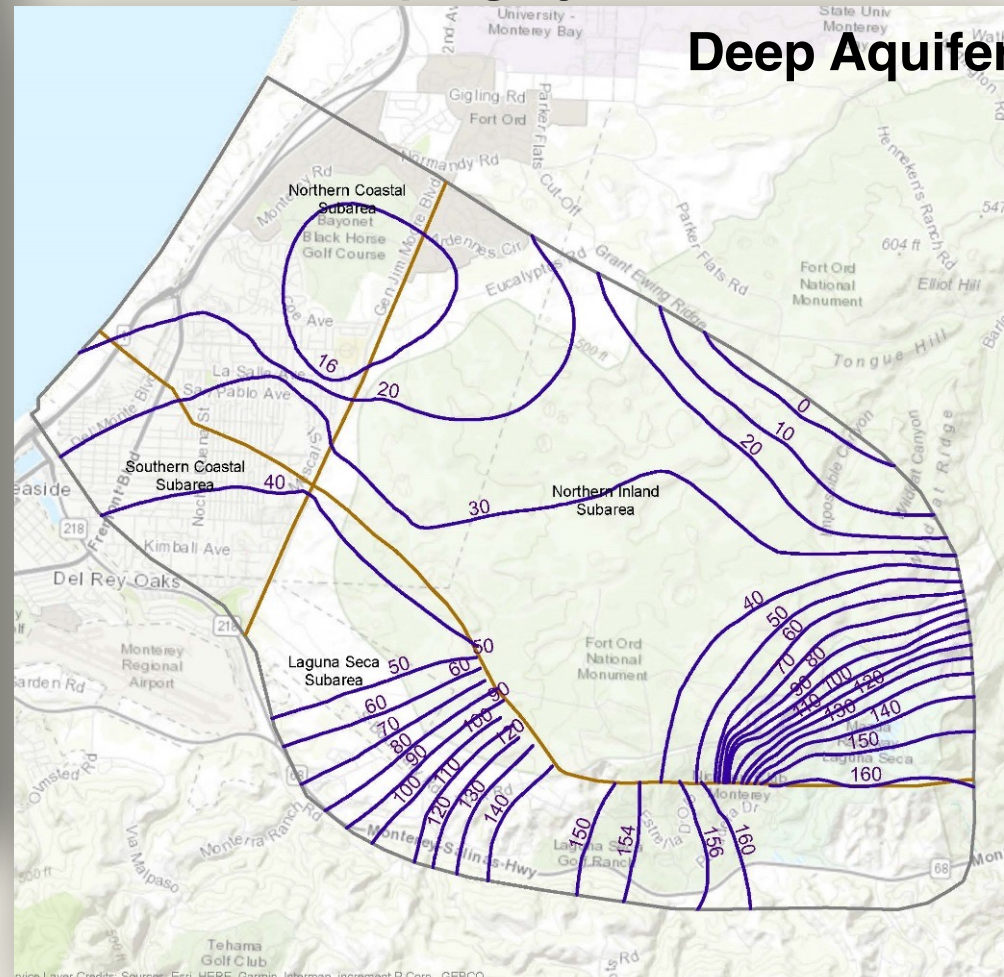
PROTECTIVE GROUNDWATER ELEVATIONS

Shallow Aquifer



Simulated assuming Pure Water Monterey and reducing Northern Coastal pumping by 1,800 AFY

Deep Aquifer



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeBCo, IGN, Kadaster NL, Ordnance Survey, Esri, Japan, METI

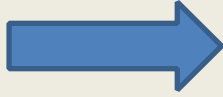
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO

STORAGE EFFICIENCY

- The percentage of usable stored groundwater in the Basin that can be recovered at a later date
- Inefficiency happens when stored groundwater flows out of the Basin to adjacent basins, the ocean, or when groundwater is consumed by vegetation
- Depends on location and method of storage
 - ASR may cause groundwater to mound and flow north out of the Basin
 - Surface percolation may take a many years to reach the water table and may leave the Basin as outflow
- Recommended that the Watermaster evaluate the project specific storage efficiencies and include these in the producer's Storage and Recovery Agreement.

GROUNDWATER (1988 – 2017) BUDGET

Recharge Source	Northern Coastal Subarea	Northern Inland Subarea	Southern Coastal Subarea	Laguna Seca Subarea	Total
	Acre-feet per Year				
<i>Basin Inflows</i>					
<i>Percolation from streams</i>	0	0	0	0	0
<i>Deep Percolation</i>					
<i>Rainfall</i>	510	1,670	130	900	3,210
<i>Irrigation & System Losses</i>	150	20	100	10	280
<i>Injection wells</i>	260	0	0	0	260
<i>Groundwater inflow</i>					
<i>From adjacent subareas</i>	2,900	1,520	520	360	5,300
<i>From adjacent basins</i>	130	400	50	770	1,350
<i>From offshore area</i>	490	0	10	0	500
<i>Total inflows</i>	4,440	3,610	810	2,040	10,900
<i>Basin Outflows</i>					
<i>Wells</i>	3,660	70	170	680	4,580
<i>Groundwater outflow</i>					
<i>To adjacent subareas of the Basin</i>	290	2,710	550	1,750	5,300
<i>To adjacent basins</i>	280	1,310	70	490	2,150
<i>To offshore area</i>	260	0	60	0	320
<i>Total outflows</i>	4,490	4,090	850	2,920	12,350
<i>Storage Change</i>					
<i>Based on Inflows-Outflows</i>	-50	-480	-40	-880	-1,450



SUBSURFACE FLOWS BETWEEN SUBAREAS, OCEAN & OTHER BASINS



CHANGE IN GROUNDWATER IN STORAGE (1988 – 2017)

Basin Inflows
5,600 AFY

-

Basin Outflows
7,050 AFY

= Change in Storage
Loss of 1,450 AFY

43,500 AF loss of
groundwater in storage over
30 years

NATURAL SAFE YIELD

- Decision established initial Natural Safe Yield = 3,000 AFY
- Using 1988 – 2017 model output, Natural Safe Yield estimated as
 - Coastal and Northern Inland Subareas = 2,500 AFY
 - Laguna Seca Subarea = -190 AFY
 - Basin total = 2,310 AFY
- Laguna Seca Subarea Natural Safe Yield has been studied in the past
 - Even if all wells stop pumping in the subarea, groundwater levels the very eastern portion of the subarea do not stabilize
 - Pumping in Corral de Tierra subbasin of the Monterey subbasin of the Salinas Valley Basin having an effect in the Seaside Basin

SUPPLEMENTAL SUPPLIES BEING CONSIDERED

- **Monterey Peninsula Water Supply Project (MPWSP)**
 - 6.4 MGD Desalination Plant
 - Pure Water Monterey Project (3,500 AFY high quality purified water for recharge)

- **Regional Urban Water Augmentation Project (RUWAP) - recycled water distribution from the M1W Advanced Wastewater Purification Facility**

- **DeepWater Desal**

- **Various projects in the planning stage to increase source water to the M1W Advanced Wastewater Purification Facility**

SUPPLEMENTAL SUPPLIES

■ Implemented since 2009 BMAP:

- Sand City Water Supply Project – desalination plant with beach wells
- Pacific Grove Wastewater Reuse Project – recycled water irrigation at golf course and cemetery
- Carmel River Water Aquifer Storage and Recovery Project – Phases 1 and 2

■ Various alternatives no longer being considered

MANAGEMENT ACTIONS

Purpose of management actions

- Raise groundwater levels before supplemental supplies become available
- Optimize existing natural recharge and basin storage capacity
- Manage and reduce the near-term threat of seawater intrusion

1. Increase groundwater recharge

- Enhanced Storm Water Recharge within the City of Seaside
- Modeling shows injection as a recharge mechanism is more effective than in-lieu recharge for raising groundwater levels

MANAGEMENT ACTIONS

2. Decrease groundwater demand

- Water conservation
- Recycled water for Laguna Seca golf courses

3. Operational management

- Redistribute pumping amongst existing wells
- Install new Southern Coastal Subarea production wells to shift pumping from Northern Coastal Subarea – use model to optimize locations
- Install new Northern Inland Subarea production wells to shift pumping from Northern Coastal Subarea – modeled to have limited benefit
- Coordinate with neighboring Sustainability Management Planning agencies

RECOMMENDATIONS

- 1. Encourage implementation of selected management actions**
 - **Install new Southern Coastal Subarea production wells**
 - **Recycled water for Laguna Seca golf courses**
 - **Water conservation**
 - **Coordination with the Salinas Valley Basin Groundwater Sustainability Agency (Laguna Seca Subarea management)**
 - **Enhanced storm water recharge within the City of Seaside**
- 2. Groundwater modeling to determine a combination of management actions and supplemental supply projects that achieve protective groundwater elevations at the coast**

QUESTIONS?

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

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

MEETING DATE:	December 12, 2018
AGENDA ITEM:	4
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