M E E T I N G N O T I C E AND A G E N D A

TECHNICAL ADVISORY COMMITTEE
OF THE
SEASIDE BASIN WATER MASTER

DATE: Wednesday, August 14, 2013
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 (877)810-9415. Use the Access Code of 4560043. 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: Eric Sabolsice, California American Water Company
Vice-Chairperson: Rob Johnson, MCWRA

MEMBERS

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

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	August 14, 2013
AGENDA ITEM:	2.A
AGENDA TITLE:	Approve Minutes from June 19, 2013
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

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

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

D-R-A-F-T
MINUTES

Seaside Groundwater Basin Watermaster
Technical Advisory Committee Meeting
June 19, 2013

Attendees: TAC Members

City of Seaside – Rick Riedl
California American Water – Eric Sabolsice
City of Monterey – Norm Green
Laguna Seca Property Owners – No Representative
MPWMD – Joe Oliver
MCWRA – No Representative
City of Del Rey Oaks – Leon Gomez
City of Sand City – Leon Gomez
Coastal Subarea Landowners – No Representative

Watermaster
Technical Program Manager - Robert Jaques

Consultants
HydroMetrics – Derrik Williams

Others:
Cal Am – Tim Miller (arrived for Agenda Item No. 3)
MPWMD – Jon Lear
MCWD – Brian True
MRWPCA – Bob Holden and Mike McCullough
DDA – Allison Imamura
University of Calgary – Adam Pidlisecky
ESA – Eric Zigas and Michael Burns
Todd Associates – Phyllis Stanin

The meeting was called to order at 1:37 p.m.

Public Comments
There were no public comments.

1. **Administrative Matters:**
   A. Approve Minutes from May 8, 2012 Meeting
   On a motion by Mr. Oliver, seconded by Mr. Riedl, the Minutes were unanimously approved as presented.

2. **Continued Discussion of Water Supply to the Laguna Seca Subarea**

(Note: This Item was taken up after Item 4 was discussed, so Mr. Miller could be present for this Item)
Mr. Jaques summarized the agenda packet materials for this item.

Mr. Sabolsice reported that Cal Am's plans to serve its Laguna Seca customers once the Laguna Seca subarea has no remaining Natural Safe Yield for Cal Am to pump (since 100 percent of the Natural Safe Yield from the Laguna Seca subarea is assigned to Alternate Producers there). The Monterey Peninsula

Water Supply Project has the Laguna Seca demands included in it, based on this anticipation. About 300 acre feet per year of Cal Am demand currently exists in the Laguna Seca subarea.

Mr. Miller and Mr. Sabolsice explained Cal Am's long-term plans to serve its Laguna Seca customers. The plan is to discontinue pumping from Laguna Seca to serve these customers and to serve them from other parts of Cal Am's system. They will be connected to Cal Am's main system.

Mr. Miller briefly described the history of development of the Adjudication Decision as it pertains to the Laguna Seca subarea, replenishment assessments, and how Natural Safe Yield is allocated among the producers. He described several sections of the Decision (Sections III.m.3.a through c) which pertain to exporting water from subareas of the Basin and anti-portability issues.

Mr. Miller went on to say that Cal and may wish to seek court approval to use its Laguna Seca systems in an emergency to provide backup to the interconnection to its main system, under certain conditions.

Mr. Sabolsice said it would make sense to look at the Laguna Seca subarea with modeling to see if any conditions are now better understood that could result in a change to the Laguna Seca subarea Natural Safe Yield amount. He went on to say that Cal Am would like to see what groundwater impacts there will be if Cal Am discontinues all of its pumping from its Laguna Seca subarea wells. Mr. Williams recommended looking back at prior monitoring work to see what we now know in conjunction with developing a potential scope of work for this. Mr. Riedl also suggested looking at revising the Natural Safe Yield for the Laguna Seca subarea in conjunction with this other modeling work.

Mr. Jaques concurred and will discuss a potential scope of work with HydroMetrics to perform this work. The matter will be brought back to the TAC for further discussion at a future TAC meeting.

3. Potential Sources of Water That Could be Used to Replenish the Seaside Basin and Help to Achieve Protective Water Levels

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

Mr. Riedl asked if the Groundwater Replenishment Project could provide more water in the future. Mr. Jaques and Mr. Holden responded that MRWPCA was seeking additional flows to help expand the potential production quantities from the Groundwater Replenishment Project.

It was noted that the Regional Urban Water Augmentation Project (RUWAP) has a desalination component. Mr. Jaques responded that the desalination component of that project was intended for delivery to potable demands, not non-potable demands.

Mr. Riedl asked for a change in wording on page 19 of the agenda packet as follows: in the third paragraph under section 5, change the first words of the first sentence from "The current market for recycled water..." to "The potential demand for recycled water..."

Mr. True reported that no areas outside of the former Fort Ord are included for service by the RUWAP.

Mr. Sabolsice asked Mr. Riedl where the well in Project No. 4 on page 14 of the agenda is located. Mr. Riedl said that the well is in the vicinity of Laguna Grande but is apparently not connected to the seaside groundwater basin, although it may affect the Sand City desalination plant's water source. Mr. Oliver noted that the well is on the other side of a fault so it is not hydraulically connected to the Seaside Groundwater Basin.

Mr. Sabolsice felt that the Pacific Grove Local Water Project is gaining traction and that it should continue to be monitored.

Mr. Sabolsice requested that with regard to the language under item No. 8 on page 15 of the agenda packet the term "excess capacity" be revised to read "initially unused capacity".

Mr. Sabolsice briefly discussed water conservation, and questioned whether it would provide replenishment water for the Basin. Mr. Jaques responded that reduced demand on the desalination plant should make available capacity in that plant that could potentially be used to produce water for replenishment. There was consensus to indicate that water conservation has a low potential to produce a meaningful quantity of water for replenishment.

There was consensus to provide a report similar to this to the Board, with the revisions as noted above. Mr. Jaques will email a draft version of the Board agenda transmittal to the TAC for pre-review before sending it to Mr. Evans for inclusion in the August Board agenda packet.

4. HydroMetrics Presentation on Modeling of Coastal Injection Sites

Mr. Jaques introduced this item. Mr. Williams then proceeded, with the use of PowerPoint slides (a copy of which is attached), to describe the scope, findings and conclusions of the modeling work.

Mr. Williams stressed that the modeling work was not simulating any specific project; rather it was providing guidance and general direction. Raising groundwater elevations to protective water levels results in some amount of total-Basin freshwater flowing into the ocean, between 400 and 500 acre feet per year.

In response to a question from Mr. Riedl, Mr. Williams explained that the scenarios looked what a 25-year time period ending in 2041, the same as the Cal Am 700 AFY replenishment plan.

All the injection was done with a single injection well; there is no need to have multiple injection wells.

Coastal injection water levels are about four feet higher than inland injection wells, and coastal injection achieves protective water levels about twelve years earlier. However the twelve years is based on a very small difference between the scenarios, and this could be within the accuracy of the modeling.

Seasonal variation is caused by pumping demands (less production pumping in winter than summer). Either coastal or inland injection achieves a large percentage of what is needed to reach protective water levels, about 90 percent. Continued injection will be required for many years beyond 2041 to maintain protective water levels due to outflows to the ocean and the slowness of water level recovery that occurs through natural replenishment, because natural replenishment water takes a long time to percolate into the aquifer and bring Basin water levels to a stable condition.

Mr. Sabolsice noted that coastal injection has minimal benefit compared to inland injection in terms of the actual increase in groundwater levels, only a couple of feet. Mr. Williams confirmed this, but said it more rapidly raises water levels and requires less water for injection.

When Cal Am's 25 year 700 AFY replenishment program ends, additional injection water would be required to replace this 700 acre feet per year to maintain protective water levels. There are cost trade-offs between the scenarios including infrastructure costs to be able to inject water TAC the coast and the cost of purchasing the necessary quantities of water for injection.

Mr. Sabolsice asked Mr. Williams if injection into the Santa Margarita aquifer would result in less outflow to the ocean then injection into the Paso Robles aquifer. Mr. Williams said that these are essentially the same for the Basin as a whole.

Ms. Stannin asked Mr. Williams if there was a potential for creation of artesian conditions as result of the injection that had been modeled. Mr. Williams responded no.

Mr. Williams said that Natural Safe Yield was calculated on the Basin as a whole without consideration of individual aquifers.

Mr. Riedl asked that language be added to Conclusions six and seven in the Tech Memo stating that 700 acre feet per year of Cal Am replenishment water is included as part of these conclusions.

TAC members suggested several other wording revisions in the Technical Memorandum and the PowerPoint slides.

Mr. Sabolsice asked Mr. Williams what the next step would be. Mr. Williams responded that as projects that could provide injection water are developed, the Watermaster should determine the feasibility of acquiring water for injection from those projects.

There was discussion of various issues pertaining to future decisions and possible actions by the Watermaster.

5. Discussion of Geophysical Imaging of Saltwater Intrusion

Mr. Jaques summarized the agenda packet materials for this item, and introduced Mr. Pidlisecky who made the presentation on this item.

Mr. Pidlisecky works for the Stanford Center for Groundwater Evaluation and Management, which focuses on integrating new technology into groundwater management. Their website lists approximately 12 partnerships with which they have been involved. Using a PowerPoint presentation (copy attached) he described the research he is involved with, which uses electrical resistivity tomography (ERT), a technology that was developed in contamination mitigation and the oil and gas industry.

He reported that borehole based monitoring does not provide early warning against seawater intrusion, because once the intrusion is detected it has already arrived at the monitoring well location.

Pore fluid chemistry is used. Metal probes (electrodes) about one foot long are driven into the ground and current is applied and voltage is measured at numerous locations. This process can cover about three kilometers a day in the field. It uses similar algorithms as medical tomography procedures. Work done locally in 2011and 2012, if done by a commercial company, would cost about $60,000. It

Their current work only images down to about 150 meters in depth. A longer than 1 kilometer array would allow a greater imaging depth.

Seawater intrusion can come not just from the ocean, but also from other aquifers that are seawater intruded.

This technology is done on the ground, but electromagnetic imaging from the air is another technology that is being evaluated.

The technology would not be very useful for detecting the location of the seawater-freshwater interface in Monterey Bay, but there are ways of using the land-based sensors to get some of that information.

Seismic surveying is also helpful in order to accurately learn the subsurface structures.

Mr. Sabolsice felt that this technology might be helpful in siting Cal Am's desalination plant intake wells. In response to a question from Mr. Sabolsice, Mr. Pidlisecky reported that there are a few commercial firms that can do this type of work.

6. Schedule

Mr. Jaques reported that there will be no July TAC meeting, and that the next TAC meeting will be in August.

7. Other Business

There was no other business.

8. Set Next Meeting Date

The next TAC meeting will be on August 14, 2013.

The meeting adjourned at 4:34 p.m.

Seaside Groundwater Basin TAC Meeting
June 19, 2013

Results of Coastal Injection Modeling

Project Purposes

A. Compare benefits of injecting water near the coast to injecting water at existing ASR wells

B. Criteria:
   A. Time to reach protective elevations
   B. Injection rates
   C. Total quantity of injected water
   D. Outflow to ocean

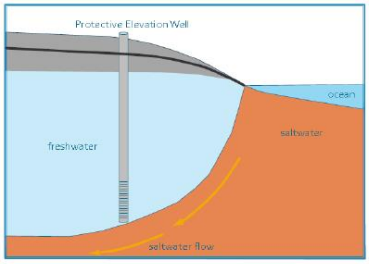
Project Purposes

These results provide only guidance and general direction

Results do not simulate any project

Protective Groundwater Elevations

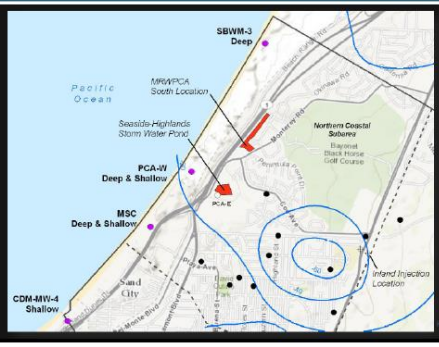
Achieving protective elevations eliminates the threat of seawater intrusion



Previous Modeling

- Inject at existing ASR sites
- Inject approximately 1,000 AFY
- Leave water in the basin
- Protective elevations are achieved by 2041

Inland and Coastal Injection Sites



Assumptions

- Implement Cal-Am's 25-year replenishment repayment schedule
- All other producers subject to triennial pumping reductions
- Repeat historical rainfall

Modeling Scenarios Encompass Reasonable Operations

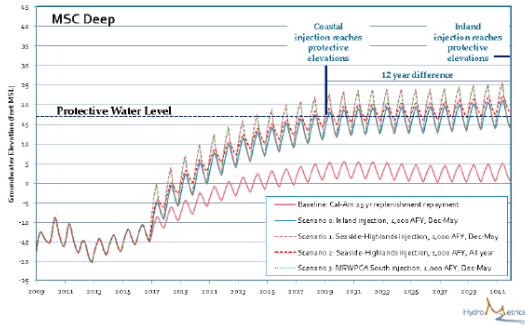
Scenario	Injection Rate	Injection Location	Reduce Injection in Late Time?	Injection Season
0	1,000 AFY	Existing Inland ASR	No	Dec – May
1	1,000 AFY	Seaside - Highlands	No	Dec – May
2	1,000 AFY	Seaside - Highlands	No	All Year
3	1,000 AFY	MRWPCA South	No	Dec – May
4	Reach protective elevations in 2041	Seaside – Highlands	No	Dec – May
5	Reach protective elevations is 5 years	Seaside - Highlands	No	Dec – May
6	1,000 AFY	Seaside - Highlands	Yes	Dec – May
7	Reach protective elevations is 5 years	Seaside - Highlands	Yes	Dec – May

Modeling Results

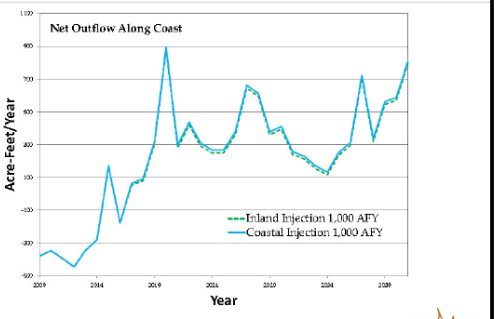
Inland vs. Coastal Injection

Scenario	Injection Rate	Injection Location	Reduce Injection in Late Time?	Injection Season
0	1,000 AFY	Existing Inland ASR	No	Dec – May
1	1,000 AFY	Seaside - Highlands	No	Dec – May
2	1,000 AFY	Seaside - Highlands	No	All Year
3	1,000 AFY	MRWPCA South	No	Dec – May

Inland vs. Coastal Injection

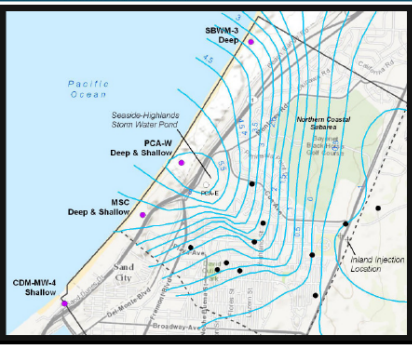


Inland vs. Coastal Injection



Inland vs. Coastal Injection

Groundwater Level Difference in Santa Margarita Aquifer (Coastal Injection WL– Inland Injection WL)

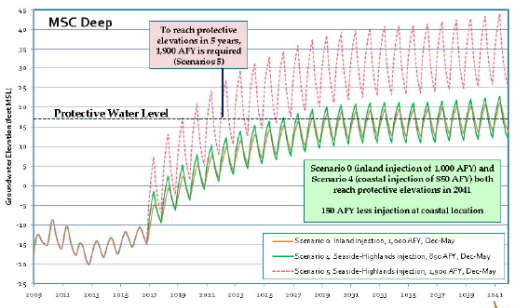


Modeling Results

How much injection in needed to reach protective elevations in 25 years and 5 years?

Scenario	Injection Rate	Injection Location	Reduce Injection in Late Time?	Injection Season
4	Reach protective elevations in 2041	Seaside – Highlands	No	Dec – May
5	Reach protective elevations is 5 years	Seaside - Highlands	No	Dec – May

Protective Elevations in 25 years or 5 years

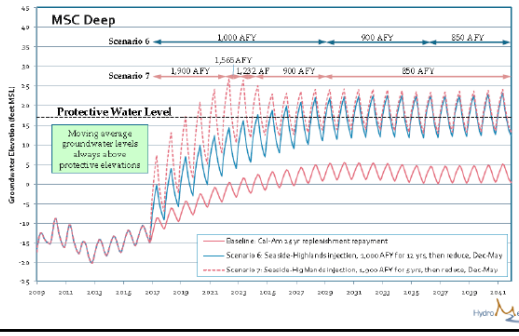


Maintaining Protective Groundwater Elevations

How much to reduce injection once protective elevations have been reached?

Scenario	Injection Rate	Injection Location	Reduce Injection in Late Time?	Injection Season
6	1,000 AFY	Seaside - Highlands	Yes	Dec – May
7	Reach protective elevations is 5 years	Seaside - Highlands	Yes	Dec – May

Maintaining Protective Groundwater Elevations



Scenario Comparison

Scenario	Years to Reach Protective Elevations	Injected Volume through 2041 (acre-feet)	Outflow to Ocean (acre-feet)
0: Inland, 1,000AFY, Dec-May	25	25,000	9,310
1 : S-H, 1,000 AFY, Dec-May	12	25,000	9,720
2: S-H, 1,000 AFY, all year	12	25,000	9,730
3: MRWPCA, 1,000 AFY, Dec-May	12	25,000	9,780
4: S-H, 850 AFY, Dec-May	25	21,250	9,140
5: S-H, 1,900 AFY, Dec-May	5	47,500	13,830
6: S-H, 1,000 to 900 AFY, Dec-May	12	23,600	9,550
7: S-H, 1,900 to 850 AFY, Dec-May	5	28,850	10,990

Conclusions

1. Seaside-Highland or MRWPCA South site equally suitable as coastal injection location.
2. Average groundwater elevations similar if injected seasonally or year round.
3. Coastal injection reaches protective elevations 12 years faster than inland injection at existing ASR wells.
4. Offshore flow ranges from 100 to 900 AFY.

Conclusions continued

5. 150 AFY less water is needed for coastal injection to achieve protective elevations by the end of 2041 compared to injecting in existing ASR wells.
6. Protective elevations can be reached in 5 years if 1,900 AFY are injected at the coast.
7. 850 AFY is required to maintain groundwater levels above protective elevations once they have been reached by:
   - Injecting 1,000 AFY for 12 years, and ramping down
   - Injecting 1,900 AFY for 5 years, and ramping down

Questions?

Looking Beneath a Saltwater Intrusion:
Geophysics for Improved Groundwater Management

Adam Pidlisecky
University of Calgary
Tara Moran
Stanford University
Rosemary Knight
Stanford University

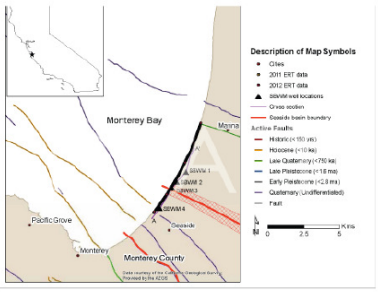
The Center for Groundwater Evaluation and Management
Stanford University

The Center for Groundwater Evaluation and Management
Stanford University

Goal: To foster integration of new and emerging technologies into local, regional and statewide groundwater management practice.

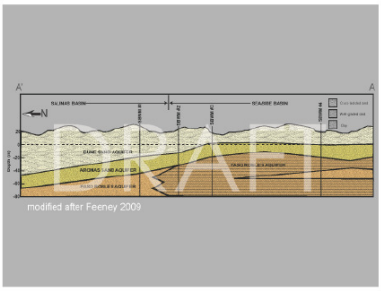
Approach: Partnering with with groundwater management districts throughout the western US to demonstrate the value of these technologies.

gemcenter.stanford.edu



Borehole based monitoring for Saltwater intrusion

- Sentinel Wells 2007
- 4 monitoring wells drilled to facilitate time-lapse logging of the aquifer to identify saltwater intrusion zones
- Wells drilled to ~ 300-400m
- Logged seasonally using resistivity logging –WHY?
- Not really early warning! Once we see it in the well it is there.

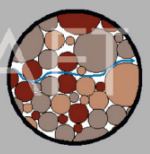


Why resistivity?

- Electrical Resistivity Tomography (ERT)
- Well documented for small-scale water resource applications
- Currently used in petroleum applications – this has lead to advancement in field systems and processing approaches
- Non-invasive, fast deployment, continuous data
- 2D, 3D, and 4D imaging is possible

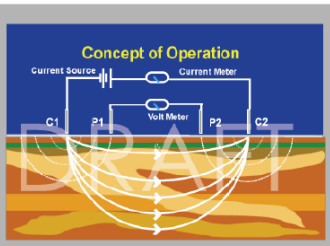
What You're Measuring: Resistivity (Ohm-m)

- Resistivity is a function of the bulk electrical properties and is sensitive to:
  - porosity
  - connectivity of pore fluid
  - pore fluid chemistry
  - lithology

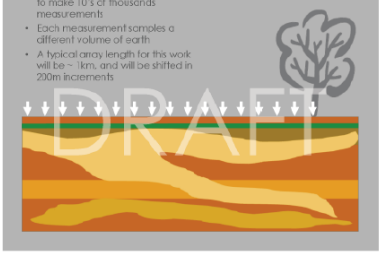


Pore fluid chemistry: Salinity

	Concentration (g/L)	Conductivity (S/m)	Resistivity (Ohm-m)
Freshwater	0.03	0.006	156
	0.1	0.02	48
	0.3	0.06	16
	1	0.2	5
	3	0.6	2
Saltwater	10	1.8	1

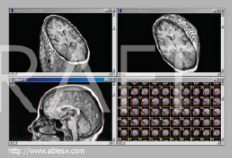


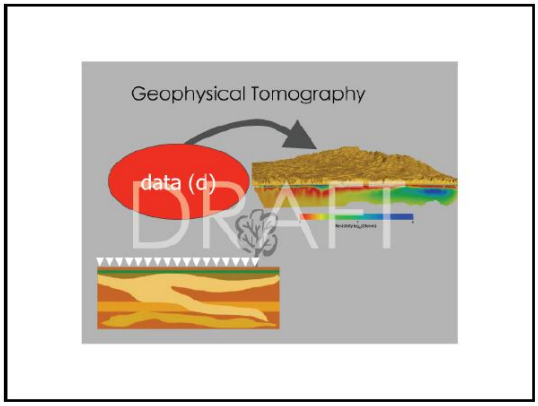
- We use multiple sensors (electrodes) to make 10's of thousands measurements
- Each measurement samples a different volume of earth
- A typical array length for this work will be ~ 1km, and will be shifted in 200m increments

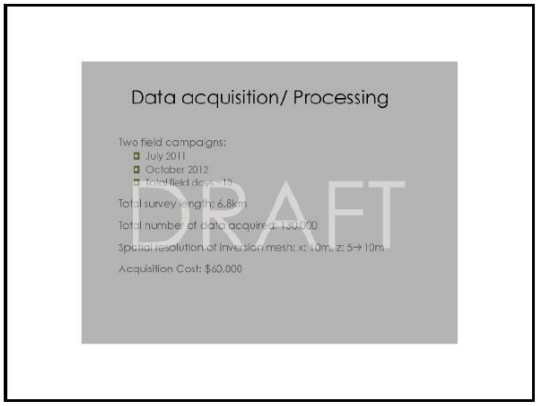


Geophysical Tomography

Like medical tomography, but with much poorer resolution

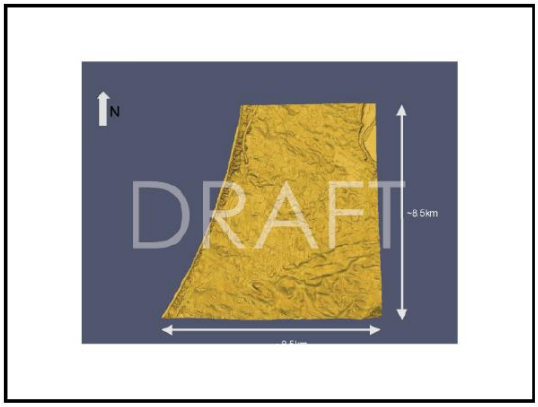



Geophysical Tomography
data (d)
DRAFT


Data acquisition/ Processing
Two field campaigns:
July 2011
October 2012
Total survey length: 6.8km
Total number of data acquired: 1300.00
Spatial resolution of inversion mesh: x: 10m, z: 5→10m
Acquisition Cost: $60,000
DRAFT


DRAFT


DRAFT


N
~8.5km
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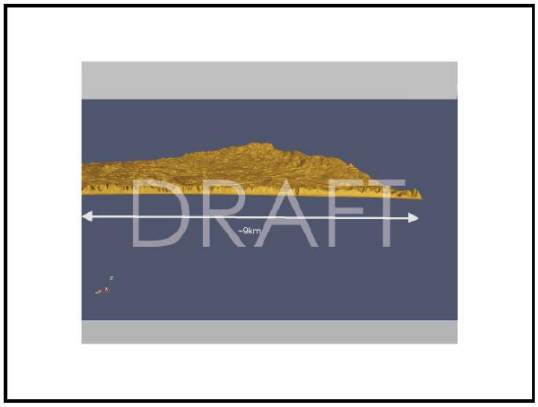
~9km
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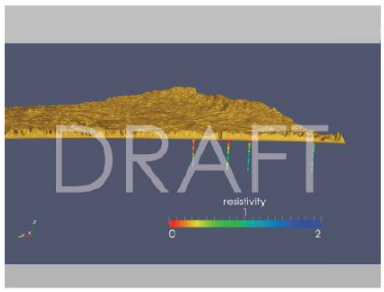


Conclusions

- Effective non-invasive subsurface imaging
- Improved large-scale understanding of aquifers
- Improved operational modeling
- Optimized remediation or interventions
- Lower cost and environmental impact
- Potential for long-term, spatially exhaustive monitoring

Acknowledgments

S. D. BECHTEL, JR. FOUNDATION
STEPHEN BECHTEL FUND

NSERC CRSNG

- Brad Hanson, Curtis Ferguson, Andrew Parsekian, Jan Walbrecker, Nick Oefum, Jackie Randell
- Stephen Bachman at California State Parks- Monterey Division
- Tim Jensen at Monterey Peninsula Regional Parks
- Ben Mirus and Kim Perkins, USGS

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

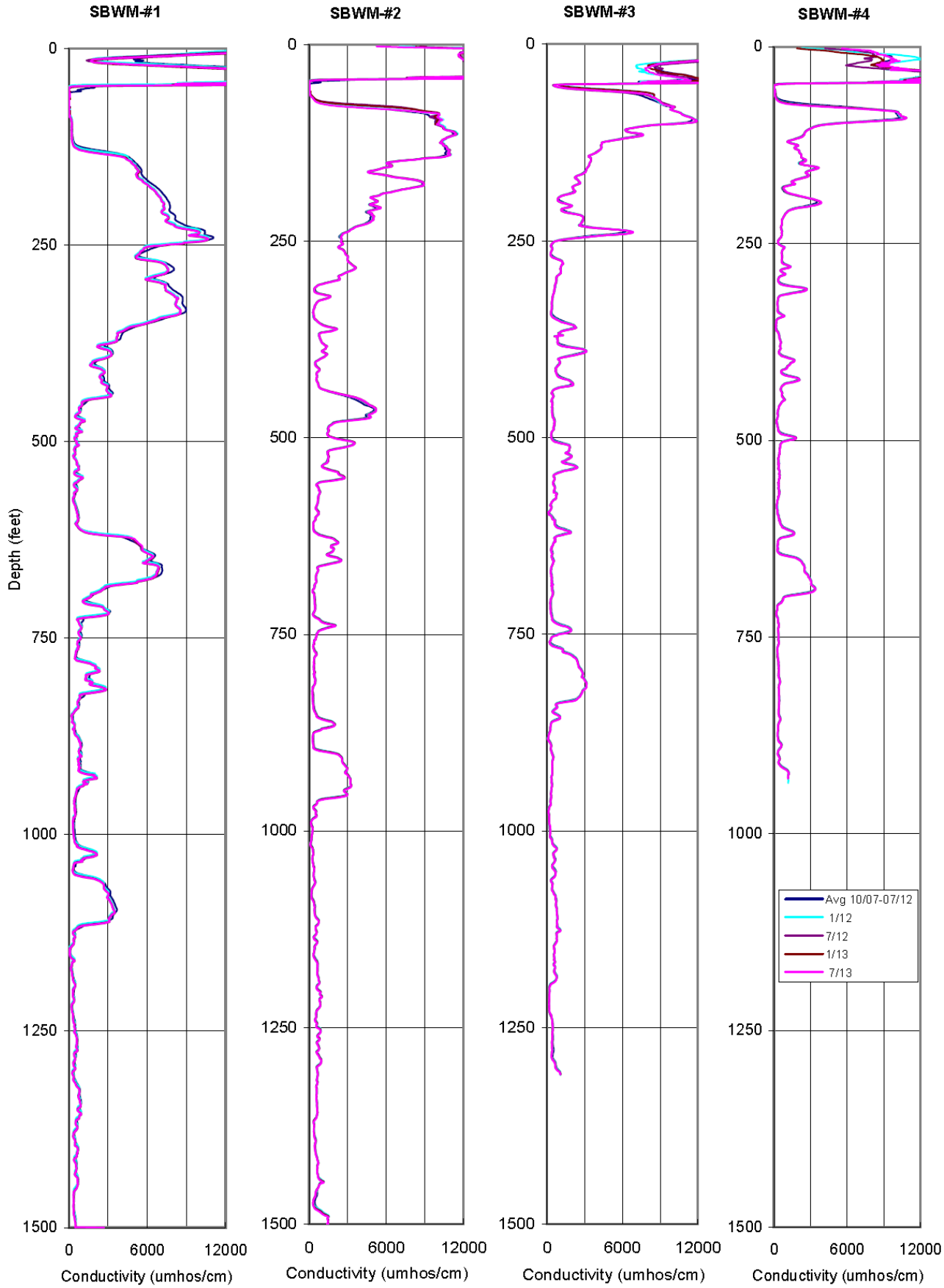
MEETING DATE:	August 14, 2013
AGENDA ITEM:	2.B
AGENDA TITLE:	Sentinel Well Induction Logging Results for July 2013
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY: Martin Feeney has provided the attached Sentinel Well induction log data for the July 2013 logging event, and the data is plotted along with all of the cumulative data from the start of the program.

Mr. Feeney reports that the data does not show anything out of the ordinary or that would be indicative of seawater intrusion.

ATTACHMENTS:	Induction Log Plots from the Sentinel Wells from 2007 through July 2013
RECOMMENDED ACTION:	None required – information only

Seaside Groundwater Basin Watermaster
Sentinel Wells
Induction Logs
2007-2013



SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	August 14, 2013
AGENDA ITEM:	3
AGENDA TITLE:	Proposed Replenishment Assessment Unit Costs for Water Year 2014 (October 1, 2013-September 30, 2014)
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

For the benefit of newer TAC members who may not be familiar with this topic, Attachment 1 contains a background paper describing Replenishment Assessment issues.

This Unit Cost is used to calculate the Replenishment Assessments that are charged to any Standard Producer that exceeds its allocation during the Water Year.

Several years ago in conjunction with developing the Replenishment Assessment Unit Cost at that time, the TAC recommended, and the Board approved, using the following procedures:

1. All potential replenishment water supply projects that could bring water to the Seaside Basin any time within the next 10 years will be included in the calculations, assuming sufficient information on those projects can be obtained.
2. Costs for each project will be inflated to the first year in which it could potentially begin supplying water, to reflect the increase in costs that will be occurring before the projects actually come on-line.
3. Contingency allowances will be included in these costs based on the level of project development for each project. This allowance is intended to provide for unforeseen cost impacts to the projects, particularly for projects that are only at the conceptual level of development. The footnotes in Table 1 describe the contingency allowances.

Each of the projects that the TAC determined at its June 19, 2013 meeting to be potentially able to supply water for replenishment of the Seaside Basin, and which are sufficiently developed to have all of the necessary data to enable them to be evaluated, is discussed in Attachment 2, and is included in Table 1 in Attachment 3..

Attachment 3 (Table 1) is the proposed Unit Cost calculation spreadsheet for the upcoming Water Year October 1, 2013-September 30, 2014. The Unit Cost used for the Water Year that is just ending was $2,780. The proposed new Unit Cost is $3,666. This higher cost results primarily from using the more complete and comprehensive cost estimates now available from the projects that were evaluated.

Once the TAC has discussed these documents and the Proposed Unit Cost for Water Year 2014 Replenishment Assessments has been edited to meet the satisfaction of the TAC, I will present the Proposed Unit Cost information to the Budget and Finance Committee for their use in establishing the WY 2014 Replenishment Assessment Unit Cost.

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

AGENDA ITEM:	3 (Continued)
ATTACHMENTS:	1. Paper discussing the Replenishment Assessment, its purpose and intent under the Court Order 2. Status of and Comments Regarding the Projects Included in the Water Year 2014 Replenishment Assessment Unit Cost Calculations Contained in Table 1 3. Table 1: Proposed Replenishment Assessment Unit Costs for Water Year 2014
RECOMMENDED ACTION:	Approve the Proposed Replenishment Assessment Unit Costs for Water Year 2014 (October 1, 2013-September 30, 2014), either as-presented in Table 1, or with revisions, and recommend that they be considered by the Budget and Finance Committee in establishing the Replenishment Assessment Unit Cost for WY 2014

Attachment 1: Replenishment Assessments

What is the Replenishment Assessment?
The Amended Decision filed with the Court February 9, 2007 contains the following statements and/or requirements pertaining to the Replenishment Assessment on pages 32 and 33:

> *Each Water Year, the Watermaster will determine a Replenishment Assessment for Artificial Replenishment of the Seaside Basin necessary to offset the cumulative Basin Over-Production (as defined in Section III.A. 21), and levy a Replenishment Assessment. Replenishment Assessments based on Over-Production and on Operating Yield Over-Production shall be assessed within 60 days of the end of each Water Year on a per acre-foot basis on each acre-foot, or portion of an acre-foot, of Over-Production, and payment shall be due no later than January 15th of the following year. The per acre-foot amount of the Replenishment Assessments shall be determined and declared by Watermaster in October of each Water Year in order to provide Parties with advance knowledge of the cost of Over-Production in that Water Year.*

Section III.A.21 of the Order defines Over-Production to mean, with regard to all Production from the Seaside Basin, *"…that quantity of Production which exceeds an initially assumed Natural Safe Yield of 3,000 AFY."* With regard to each Producer, Over-Production means *"…that quantity of Water Produced in any Water Year in excess of that Producer's Baser Water Right, as applied to an assumed Natural Safe Yield of 3,000 AFY."*

Replenishment Assessments are collected from Standard Producers (and Alternative Producers but only if they exceed their allocations) in proportion to the amount that they have cumulatively pumped in excess of their allocation of the Basin Natural Safe Yield of 3,000 AFY. If a Standard Producer has not pumped in excess of their allocation, then they are not charged a Replenishment Assessment.

The actual calculation of the Assessments gets complex and will therefore not be discussed or explained in this paper. The purpose of this paper is to describe the Replenishment Assessments and what the monies collected through these Assessments is intended to be used for.

What Are the Monies Collected Through the Replenishment Assessments to be Used for?
On Page 34 of the Order it states that *"…All proceeds of Replenishment Assessments shall be used to procure Non-Native water, including, if appropriate, substitute reclaimed water."*

Although there is some variation in language between several sections of the Order, it is clear that the monies collected through the Replenishment Assessments are intended to be used to obtain water to recharge the Basin to the extent necessary to reduce the net water production taken from the Basin to a level at or below the Natural Safe Yield of 3,000 AFY. The recharge water could be such things as water imported from another water supply outside the Basin, recycled water used to reduce pumping for landscape irrigation, or recycled water used for recharge through direct injection or spreading.

How is the Per Acre-Foot Cost of the Replenishment Assessments to be Determined?
Per page 33 of the Order, *"The per acre-foot amount of the Replenishment Assessments shall be determined and declared by Watermaster in October of each Water Year in order to provide Parties with advance knowledge of the cost of Over-Production in that Water Year."* Thus, the per acre-foot amount declared by the Board in October of each year will be used to calculate Replenishment Assessments for pumping that occurs during the Water Year which begins on October 1 of that year and ends on September 30 of the following year.

On pages 9 and 10 (Section 6.5) of the Watermaster Rules and Regulations, there is a discussion of how the Replenishment Assessment per acre-foot costs are to be calculated. It states that *"The per acre- foot cost of Replenishment Assessments for Production in excess of Natural Safe Yield shall be based on the anticipated cost of Artificial Replenishment, including the cost to construct, operate, and maintain facilities necessary for replenishment of the Basin. Replenishment Assessment may only be used for Artificial Replenishment."* The Order defines Artificial Replenishment to mean the act of engaging in or contracting for Non-Native Water to be added to the Groundwater Basin through spreading or direct injection to offset the cumulative Over-Production from the Basin in any particular Water Year. It can also include programs in which Producers agree to refrain from exercising their rights to pump their full Production Allocations where the intent is to cause the replenishment of the Basin through forbearance in lieu of the injection or spreading of Non-Native Water.

So the per acre-foot cost used to determine the Replenishment Assessments should be the cost that would have to be paid, per acre-foot, to obtain water to recharge the Basin to the extent necessary to offset the cumulative over-production above the Natural Safe Yield, during a given Water Year.

From work done to date in calculating the per acre-foot cost, it is apparent that there are ongoing changes in projected costs of recharge water and in the timing of the projects which will provide that water. Hence, the per acre-foot cost needs to be recalculated each year using updated cost projections and implementation schedules for these recharge projects.

If recharge water is not available to be purchased in a given Water Year to offset the cumulative over-production that occurred in that year, then the monies collected through the Replenishment Assessments in that Water Year may be accumulated for multiple Water Years until they can be used to purchase recharge water.

It is to be expected that the costs of the recharge projects will increase with inflation, among other things. Therefore, the unspent Replenishment Assessment monies should be invested in interest-earning accounts that will offset these inflation increases, until such time as the recharge projects come on-line and the needed water can then be purchased.

As long as the unit costs of water from the various potential recharge projects is forecast by the agencies sponsoring the recharge projects to the dates at which the projects will come on-line, there should be no need to inflate those unit costs when the per acre-foot cost used to determine the Replenishment Assessments is calculated. However, if the costs have not been inflated to the year the project will come on-line, then inflation should be included in the calculations.

Attachment 2:
Status of and Comments Regarding the Projects Considered in the Water Year 2014 Replenishment Assessment Unit Cost Calculations in Table 1

1. Possible Initially Unused Capacity of Cal Am's Regional Desalination Plant in the Monterey Peninsula Water Supply Project (Regional Desalination): This project would involve using initially unused capacity in Cal Am's regional desalination plant as a source of replenishment water for the Seaside Basin.

Cal Am has indicated that it will seek (or may already have done so) approval by the CPUC to increase the size of the Regional desalination plant under the Monterey Peninsula Water Supply Project in order to: (1) provide replenishment water to the Seaside Basin, (2) provide service for the build-out of the Pebble Beach Company's projects, (3) provide water to support the anticipated "bounce back" in local tourism that will result from the improving economy, and (4) to serve legal lots of record that are not currently being served. The anticipated requested increase in desalination plant size is summarized in the table below:

Demand	AFY
Seaside Basin Replenishment	700
PBC Projects Build-out	325
Tourism "bounce back"	500
Lots of Record	1,180
Total	**2,705**

The report to MPWMD's Board for its February 12, 2013 meeting commented that MPWMD staff felt some of the demands listed in the table above were overly conservative, at least in the early years, as follows:

1. In the sizing of the desalination plant Cal Am had used a 5-year average to establish its current demand. The 5-year average Cal Am used was 13,291 AFY. MPWMD pointed out that Cal Am's current actual demand is only approximately 12,500 AFY.
2. As MPWMD understands it, the water demand cited in the EIR for build-out of PBC's Projects is only 135 AFY, rather than the 325 AFY used by Cal Am.
3. MPWMD's analysis of commercial water demands in the early-to-mid 2000s, compared to current commercial water demands (during the current economic downturn period) indicates current demand is only about 200 to 400 AFY below pre-economic downturn demand, rather than the 500 AFY used by Cal Am in its plant-sizing analysis.
4. The lots of record demand of 1,180 AFY was reportedly taken from a 2001 MPWMD analysis, but MPWMD does not recommend continued use of this value. MPWMD indicated it planned to examine more recent reports to try to provide an updated figure.

For the reasons stated above, there may be initially unused capacity available in the Regional desalination plant in its early years of operation. If so, that excess capacity could provide a potential additional source of replenishment water for injection.

2. Seaside Basin ASR Expansion: This project would be an expansion of the existing Seaside Basin ASR project. ASR entails diverting excess winter flows from the Carmel River Basin during high flow periods using existing Cal Am wells in the lower stretches of the river. Diverted water is treated to

potable drinking water standards and pumped through the Cal Am distribution system to the Seaside Basin, where the water is injected for later recovery during dry periods. MPWMD has operated a full-scale ASR test well (Santa Margarita Test Injection Well No. 1) since 2002, and a second injection/extraction well was completed in 2008. Maximum extraction capacity of the current ASR facilities is approximately 1,500 AFY.

Expansion of the ASR project would provide for a greater diversion of water from the Carmel River during high flows for transport and injection into the Seaside Basin, and could increase the maximum extraction to approximately 2,400 AFY. The facilities to accomplish this are included in the scope of Cal Am's Monterey Peninsula Water Supply Project, and include:

- Increased capacity in Cal Am's Carmel River Basin well capacity in order to deliver water for injection in the Seaside Basin
- Increasing the capacity of Cal Am's conveyance pipeline from the Carmel River Basin in order to be able to deliver the peak instantaneous flow of injection water to the Seaside Basin
- Making some other improvements in Cal Am's distribution system in order to remedy limitations in getting water to the ASR sites while simultaneously meeting Cal Am's system demands

This project is being pursued jointly by MPWMD and Cal Am. Up until the time that Cal Am reduces its Carmel River diversions in accordance with the SWRCB's Cease and Desist Order No. 95-10, all of the water production of this project has to be used by Cal Am to reduce the amount of water it takes from the Carmel River Basin. Therefore, up until that point in time, which will correspond to the time that Cal Am's Monterey Peninsula Water Supply Project becomes fully operational, this project will not be able to serve as a potential source of supplemental replenishment water for the Seaside Basin. However, once the Cease and Desist Order has been satisfied, in the wet years in which ASR injection water quantities greater than 1,300 AFY are available, it may be permissible to inject and leave in the Seaside Basin at least some portion of any amount over 1,300 AFY, without having to pump it out to reduce Cal Am's Carmel River Basin diversions. This project would be a potential additional source of replenishment water for injection.

3. Regional Urban Water Augmentation Project: This project consists of construction by MCWD of a recycled water distribution system to provide up to 1,727 acre-feet per year (AFY) of recycled water from MRWPCA's existing Salinas Valley Reclamation Plant (SVRP) to urban users within the Ord Community (former Fort Ord) and the Monterey Peninsula. Approximately 300 AFY would be made available to the Monterey Peninsula with the remainder being supplied for redevelopment of Fort Ord. Additional facilities to store recycled water during winter would be needed to meet instantaneous summer-time demands and to increase the project yield to an envisioned 3,000 AFY. The MCWD recycled water system would service existing and new water users within the Fort Ord community and the City of Marina. Existing users' irrigation systems would be disconnected from the potable water system and would tie directly into the new recycled water system.

With the exception of a winter storage reservoir, the project design is essentially complete, and much of the right-of-way for the pipelines has been acquired. Some sections of pipeline have already been installed as components of roadway projects constructed under the Fort Ord Reuse Plan.

The current market for recycled water from this project is approximately 550-700 AFY within the City of Seaside, CSUMB, and the City of Marina. The bulk of this (450 to 500 AFY) is the irrigation demand of the two City of Seaside golf courses.

Development fees from Fort Ord redevelopment projects are needed to help fund the project's capital costs. The project is on hold at this time due to slow progress on redevelopment of the former Fort Ord.

In the meantime MCWD and MRWPCA are seeking additional participants to increase the demand for recycled water to make the project economically feasible. It appears that the project is at least 3 to 5 years away from implementation.

The only direct benefit to the Seaside Basin from this project would be the reduction of pumping by the Seaside Golf Courses' two wells that draw from the Seaside Basin. All of the other markets for the recycled water are currently served by water from the Salinas River Basin. Thus, if this project were to be implemented, it would have the potential of providing in-lieu replenishment of the Seaside Basin only by reducing pumping for the Seaside Golf Courses. It would not be a potential additional source of replenishment water for injection.

4. MRWPCA/MCWD Groundwater Replenishment Project (GWRP): This project would produce highly treated recycled water for use in replenishing the Seaside Basin. If it is deemed feasible, and can be completed on a schedule that is acceptable, Cal Am will include it as a part of the Monterey Peninsula Water Supply Project and thereby reduce the size of its desalination plant. Cal Am's Monterey Peninsula Water Supply Project contains two plant size alternatives, one which has a 9,000 AFY seawater desalination plant, and a second one which has a 5,500 AFY desalination plant and a Groundwater Replenishment Project (GWRP) delivering 3,500 AFY of water for replenishment of the Seaside Basin.

With regard to the GWRP component of the second alternative, although there is not yet a formal water purchase agreement in place, institutional agreements are being pursued between MRWPCA, MPWMD, and Cal Am such that:

- MPWMD would enter into a Storage and Recovery Agreement with the Watermaster.
- MPWMD would buy recycled water from MRWPCA when that water is injected into the Seaside Basin. The purchase price for the recycled water would cover O&M, Capital Recovery, and Administrative expenses of MRWPCA and MPWMD.
- 6 months after injection occurs (in order to comply with State Department of Public Health requirements pertaining to groundwater replenishment) Cal-Am would purchase potable water from MPWMD and either withdraw it from the ground or leave it for withdrawal later.

This approach is very similar to the manner in which MPWMD financed the reclamation project at Carmel Area Wastewater District.

Providing additional water beyond the 3,500 AFY is not being considered in the EIR that MRWPCA is currently preparing for the GWRP. However, at the TAC's May 2013 meeting MRWPCA reported that the GWRP might be capable of also providing an additional amount of water (perhaps on the order of 1,000 AFY) for replenishment of the Seaside Basin. In conjunction with this, MRWPCA reportedly is looking for sources of water to augment its decreasing influent flows of wastewater. Potential augmentation flows it is examining include stormwater flows from its member entities and the City of Salinas' industrial wastewater flows currently being treated at that city's industrial wastewater treatment plant.

If this additional water became available, it would be a potential additional source of replenishment water for injection.

Attachment 3: Table 1. Proposed Replenishment Assessment Unit Costs for Water Year 2014 (October 1, 2013-September 30, 2014)

WATER YEAR 2014 (October 1, 2013-September 30, 2014)

ANTICIPATED UNIT COSTS OF REPLENISHMENT WATER FOR THE SEASIDE BASIN

POTENTIAL SOURCE OF REPLENISHMENT WATER	POTENTIAL DATE REPLENISH-MENT WATER COULD BECOME AVAILABLE	POTENTIAL VOLUME OF WATER THAT COULD BE SUPPLIED BY THE PROJECT (AFY) [1]	LEVEL OF PROJECT DEVELOP-MENT	CONTINGENCY INCLUDED IN BASE UNIT COST [2] (%)	BASE UNIT COST ($/AF)	BASE UNIT COST YEAR	ADDITIONAL CONTINGENCY ADDED TO REFLECT LEVEL OF PROJECT DEVELOPMENT [3] (%)	UNIT COST INCLUDING ADDITIONAL CONTINGENCY ($/AF)	UNIT COST INFLATED @ 3% FROM COST BASIS YEAR TO YEAR REPLENISH-MENT WATER COULD BECOME AVAILABLE ($/AF)	VOLUME-WEIGHTED AVG %	REPLENISH-MENT UNIT COST SHARE ($/AF)
Monterey Peninsula Water Supply Project (Regional Desalination) [4]	2018	9,752	Project Report	30%	$3,507	2012	0%	$3,507	$4,188	56.53%	$2,367
Seaside Basin ASR Expansion [5]	2015	1,000	Conceptual	11%	$1,800	2012	39%	$2,502	$2,734	5.80%	$158
Regional Urban Water Augmentation Project [6]	2017	3,000	Design	5%	$2,000	2013	10%	$2,200	$2,476	17.39%	$431
Groundwater Replenishment Project (GWRP) [7]	2017	3,500	Conceptual	50%	$3,500	2017	0%	$3,500	$3,500	20.29%	$710

Total Quantity of Replenishment Water (AFY) the Listed Projects Could Cumulatively Potentially be Able to Produce Within the Next 10 Years [8] = 17,252

Volume-Weighted Replenishment Water Cost Per Acre-Foot = $3,666

FOOTNOTES:

(1) For the Monterey Peninsula Water Supply Project this is the total amount of water from this source which could potentially come to the CAW distribution system. Only a portion of this amount might be available as initially unused capacity that could be used to help replenish the Seaside Basin. For the RUWAP this is the total amount of water from this source. Only a portion of this amount might be used for in-lieu replenishment of the Seaside Basin. For the ASR Expansion Project this is the additional amount of water that could potentially be provided by this project (see footnote 5). For the RUWAP this is the total amount of water that this project is expected to produce. Only a portion of this amount might be used as in-lieu replenishment of the Seaside Basin. For the GWRP this is the quantity of water that is being considered at this time by CAW for inclusion in its Monterey Peninsula Water Supply Project.

(2)(3) The following Contingency percentages were considered reasonable for the indicated levels of project development: Conceptual Level - 50%, Project Report Level - 30%, and Design Level - 15%. The sum of the values in the columns titled "Contingency Included in Base Unit Cost" and "Additional Contingency Added to Reflect Level of Project Development" equals the Contingency appropriate for the project's level of development.

(4) Project data based on documents provided by Cal Am and MPWMD.

(5) Project data provided by MPWMD. The 1,000 AFY of potential water that this project could supply would be in addition to the 1,300 AFY included as part of the Monterey Peninsula Water Supply Project, and would be an annual average taking into account river flow and hydrologic conditions that change from year to year.

(6) Project data provided by MCWD.

(7) Project data provided by MRWPCA. MRWPCA reported that the GWRP quantity being used in the current CEQA documentation is 3,500 AFY, but that the project could potentially supply 6,500 AFY or more. The unit cost would be lower if a quantity larger than 3,500 AFY were produced.

(8) This value is the cumulative production capacity of all of the Potential Sources of Replenishment Water that listed in this table, and is used only to determine the "Valued-Weighted Average." It is not the amount of water that is expected to be available to the Seaside Basin.

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

MEETING DATE:	August 14, 2013
AGENDA ITEM:	4
AGENDA TITLE:	HydroMetrics Scope and Cost Proposal to Perform Modeling of the Laguna Seca Subarea and MPWMD Cost Proposal to Provide Assistance
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

At its June 19, 2013 meeting the TAC discussed the potential benefits of performing modeling of the Laguna Seca subarea to gain a better understanding of certain issues. These were:

1. What groundwater impacts there will be if Cal Am discontinues all of its pumping from its Laguna Seca subarea wells.
2. Potentially revising the Natural Safe Yield for the Laguna Seca subarea.

I requested that HydroMetrics prepare a scope of work and cost proposal to perform this work. Their proposal is attached. HydroMetrics proposed cost to perform this work is $25,060.

It should be noted, as explained in their proposal, that they have not included costs to collect pumping drawdown, screen and pump data on each production well in this subarea. They recommended that the Watermaster ask MPWMD if they could collect and compile the screen depth, pump depth, and pumping drawdown together with the pump rate at the time drawdown is measured for each well in the subarea. HydroMetrics notes that because the model only works with static groundwater levels, the pumping drawdown will be added to the model predicted groundwater level depths to get the "predicted" pumping groundwater depth. The pumping groundwater depth will then be used to determine if the pumping groundwater level is reaching the top of the well screen or the pump intake.

MPWMD's response is also attached. MPWMD's proposed cost to perform this work is $2,209.

If approved by the TAC, these two scope and cost proposals would be used to prepare RFSs to HydroMetrics and MPWMD to perform this work, and those would be presented to the Budget and Finance Committee for its approval and for its recommendation on how to provide funds for this work. This work was unanticipated, and therefore not included, when the FY 2013 Watermaster M&MP Operations Budget was prepared. However, funds remaining in the Contingency line item in the M&MP Budget, together with projected savings in other line items in the M&MP Budget, may be sufficient to fund this work.

ATTACHMENTS:	1. HydroMetrics Scope and Cost Proposal to Perform Modeling of the Laguna Seca Subarea 2. MPWMD Scope and Cost Proposal to Obtain Well Data for Use by HydroMetrics in Performing this Modeling
RECOMMENDED ACTION:	Approve or modify these scopes of work and/or costs, or determine not to recommend proceeding with this work

HydroMetrics WRI

519 17th Street, Suite 500
Oakland, CA 94612

Mr. Robert S. Jaques, Technical Program Manager
Seaside Basin Watermaster
83 Via Encanto
Monterey, CA 93940

July 18, 2013

Subject: Scope and Cost Estimate to Model Laguna Seca Operational Changes and Determination of Natural and Operational Safe Yield

Dear Mr. Jaques:

HydroMetrics Water Resources Inc. is pleased to submit this scope and cost estimate for using the Seaside groundwater model to determine impacts to the Laguna Seca subarea from pumping changes, and to estimate the Natural Safe Yield and Operational Safe Yield of the subarea. The sections below outline the approach to be taken in this work for the Seaside Watermaster Technical Advisory Committee (TAC).

Task 1. Groundwater Modeling

SUBTASK 1.1 CAL-AM DISCONTINUES LAGUNA SECA PUMPING

The first modeling task will be to model the influence of discontinuing pumping from California American Water (Cal-Am) wells in the Laguna Seca subarea. The impacts of this operational change will be evaluated by plotting hydrographs of several key wells in the subarea to determine whether the current groundwater elevation declines stop or are altered in any way.

SUBTASK 1.2 ESTIMATE LAGUNA SECA NATURAL SAFE YIELD

The second modeling task will be to determine the Natural Safe Yield of the Laguna Seca subarea. The Natural Safe Yield is the amount of groundwater that

can theoretically be extracted from a basin without causing adverse environmental effects. We will meet with the TAC to define adverse impacts. These impacts may include reduced subsurface outflows from the Laguna Seca subarea or reduced streamflows. The Natural Safe Yield will be determined as:

Natural Safe Yield = Aerial Recharge + Subsurface Inflow
– Required Subsurface Outflow – Required Streamflow

Unless otherwise directed by the TAC, the latest baseline used for the recent coastal injection modeling will be used as the model run from which to estimate aerial recharge and subsurface inflow.

SUBTASK 1.3 ESTIMATE LAGUNA SECA OPERATIONAL SAFE YIELD

The Operational Safe Yield is a preferable estimate of safe yield over Natural Safe Yield because it acknowledges that not all groundwater left in the basin after recharges and discharges are taken into account can be physically and realistically extracted by production wells. The amount of groundwater that can be extracted safely is a function of the wells' physical locations, and well screen and pump depths. Groundwater levels dropping below a well's screen or pump intake could cause damage to the well and/or pump.

The third modeling task estimates the Operational Safe Yield of the Laguna Seca subarea. This will be achieved by starting with the Natural Safe Yield model run obtained in the previous subtask. Using this model run as a basis, the amount of pumping in existing wells will be reduced iteratively until:

1) Groundwater levels stop declining,
2) Pumping groundwater levels remain above the well pump intake and top of screen for each well,
3) Subsurface outflows set in Task 1.2 are achieved, and
4) Streamflows set in Task 1.2 are achieved.

Our cost estimate only includes time for modeling and does not include collecting pumping drawdown, screen and pump data on each production well. We recommend that Monterey Peninsula Water Management District collect and compile the screen depth, pump depth, and pumping drawdown together with the pump rate at the time drawdown is measured for each well in the subarea. Because the model only works with static groundwater levels, the pumping drawdown will be added to the model predicted groundwater level depths to get

the "predicted" pumping groundwater depth. The pumping groundwater depth will be used to determine if the pumping groundwater level is reaching the top of the well screen or the pump intake.

Task 2. Meetings

We will prepare for and attend three meetings: the first will be by telephone to finalize the modeling assumptions; the second meeting will be to present the results to the Technical Advisory Committee in person, and the third meeting will be to present results to the Watermaster Board in person.

Task 3. Reporting

A summary technical memorandum will be prepared to document the assumptions and results of the modeling effort.

The estimated cost for the work discussed is $25,060, as shown on the attached table.

Sincerely,

Derrik Williams

Derrik Williams, President
HydroMetrics Water Resources Inc.

Georgina King, Project Manager
HydroMetrics Water Resources Inc.

Cost Estimate for Seaside Groundwater Basin Watermaster
Laguna Seca Modeling

Tasks	HydroMetrics WRI Labor					Other Direct Costs	TOTALS
	Derrik Williams	Georgina King	Stephen Hundt	Labor Total			
	President	Senior Hydrogeologist	Staff Hydrogeologist				
Rates	$190	$160	$115	Hours	($)	($)	($)
Task 1. Groundwater Modeling							
1.1 Cal-Am discontinues Laguna Seca pumping	2	1	8	11	$ 1,460	$ -	$ 1,460
1.2 Estimate Laguna Seca Natural Safe Yield	4	8	16	28	$ 3,880	$ -	$ 3,880
1.3 Estimate Laguna Seca Operational Safe Yield	4	16	32	52	$ 7,000	$ -	$ 7,000
Subtotal Task 1				*91*	*$ 12,340*	*$ -*	*$ 12,340*
Task 2. Meetings							
Assume Three Meetings - First meeting to finalize model assumptions (telephone), Second to Present Results to TAC (Seaside) and, Last to Present Results to Board (Seaside)	20	8	0	28	$ 5,080	$ 280	$ 5,360
Subtotal Task 2				*28*	*$ 5,080*	*$ 280*	*$ 5,360*
Task 3. Reporting							
Prepare Technical Memorandum describing Assumptions and Results (Provide as MS Word and PDF)	4	24	24	52	$ 7,360	$ -	$ 7,360
Subtotal Task 3				*52*	*$ 7,360*	*$ -*	*$ 7,360*
TOTAL				*171*	*$ 24,780*	*$ 280*	*$ 25,060*

Notes

Other Direct Costs includes mileage, postage, office supplies

Estimate for MPWMD to collect and compile the screen depth, pump depth, and current pumping and static groundwater level data for each well in the Laguna Seca subarea ***to be provided***

Attachment 2

The estimate for MPWMD staff to collect and provide the well and WL data that HydroMetrics has requested to support their planned Laguna Seca Subarea modeling effort is $2,209. During preparation of this estimate, we conferred about the possible pitfalls and/or limitations that could be encountered in our attempt to acquire these data in the field. These can best be summarized as described below:

PRECAUTIONS AND LIMITATIONS REGARDING FIELD WELL DATA COLLECTION EFFORTS:

1. Data collection will not be possible unless Producers allow access to their wells under static and pumping conditions.

2. Data collection will be subject to an assessment by MPWMD staff as to the risk involved in lowering WL monitoring equipment into the wells to collect SWL and PWL data. If this risk is determined to be unacceptable, then it will not be possible to collect the needed data from those wells as MPWMD cannot accept any risk associated with loss of WL monitoring equipment and/or damage to wells as a result of this work.

We believe it is important that all involved in the analysis should be aware that due to either well owners declining to grant access for this data collection effort, or due to lack of adequate surface access or obstructions that could impede WL data collection (particularly while the well is in operation), it may not be possible to acquire these data for all of the WM Producer wells in the LSS. We won't know for sure which wells will be successful until we conduct the field visits to the wells.

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	August 14, 2013
AGENDA ITEM:	5
AGENDA TITLE:	Initial Discussion Regarding Scope of Work for Monitoring and Management Plan (M&MP) for FY 2014
PREPARED BY:	Robert Jaques

The Schedule calls for the TAC to approve an FY 2014 Work Plan and Budget for the 2014 Management and Monitoring Program (M&MP) at its September 2013 meeting. This will then go on to the Board for approval at its October 2013 meeting.

In order to obtain TAC input and direction regarding these items, I have reviewed the FY 2013 M&MP and have edited it to reflect those work items that I anticipate being performed in FY 2014. A copy of this Proposed Work Plan is attached.

Items highlighted in yellow are those that I will evaluate and update as necessary, based on the TAC's input at today's meeting and discussions with our consultants.

Items highlighted in red are questions for the TAC to consider in determining whether, and to what extent, certain tasks from prior years need to be continued.

At the Board's August 7 meeting a couple of comments or requests were made by Board members that I recommend we include in the 2014 M&MP. These are:

1. Once per year perform a comparison of measured monitoring well water levels with Model-predicted water levels for these same wells. From this comparison determine if the Model needs any recalibration in order to accurately predict water levels. I propose that this be added to the scope of work for the annual Seawater Intrusion Analysis Report under Task I.4.c.
2. Include the effects of predicted sea level rise in future modeling work and future reports. I propose that this be incorporated into future contract work with HydroMetrics, as appropriate.

ATTACHMENTS:	Proposed Seaside Groundwater Basin Management and Monitoring Program - FY 2014 Work Plan
RECOMMENDED ACTION:	Approve Proposed Work Plan or Recommend Edits to It

Seaside Groundwater Basin Management and Monitoring Program
FY 2014 Work Plan

The tasks outlined below are those that are anticipated to be performed during 2014. Some Tasks listed below are specific to 2014, while others Tasks recur throughout the program, such as data collection and database entry, and Program Administration Tasks.
Within the context of this document the term "Consultant" refers either to a firm providing professional engineering or other types of technical services, or to the Monterey Peninsula Water Management District (MPWMD). The term "Contractor" refers to a firm providing construction or field services such as well drilling, induction logging, or meter calibration.

M.1 Program Administration

M. 1. a Project Budget and Controls ($0)	Consultants will provide monthly or bimonthly invoices to the Watermaster for work performed under their contracts with the Watermaster. Consultants will perform maintenance of their internal budgets and schedules, and management of their subconsultants. The Watermaster will perform management of its Consultants.
M. 1. b Assist with Board and TAC Agendas ($0)	Watermaster staff will prepare Board and TAC meeting agenda materials. No assistance from Consultants is expected to be necessary to accomplish this Task.
M. 1. c. & M. 1. d Preparation for and Attendance at Meetings ($5,500)	The Consultants' work will require internal meetings and possibly meetings with outside governmental agencies and the public. For meetings with outside agencies, other Consultants, or any other parties which are necessary for the conduct of the work of their contracts, the Consultants will set up the meetings and prepare agendas and meeting minutes to facilitate the meetings. These may include planning and review meetings with Watermaster staff. The costs for these meetings will be included in their contracts, under the specific Tasks and/or subtasks to which the meetings relate. The only meeting costs that will be incurred under Tasks M.1.c and M.1.d will be: • Those associated with attendance at TAC meetings (either in person or by teleconference connection), including providing written monthly progress reports to the Watermaster for inclusion in the agenda packets for the TAC meetings, when requested by the Watermaster to do so. These progress reports will typically include project progress that has been made, problem identification and resolution, and planned upcoming work. and • From time-to-time when Watermaster staff asks Consultants to make special presentations to the Watermaster Board and/or the TAC, and which are not included in the Consultant's contracts for other tasks. Appropriate Consultant representatives will attend TAC meetings when requested to do so by Watermaster Staff (either in person or by teleconference connection), but will not be asked to prepare agendas or meeting minutes. As necessary, Consultants may provide oral updates to their progress reports (prepared under Task M.1.d) at the TAC meetings.
M. 1. e Peer Review of Documents and Reports ($3,100)	When requested by the Watermaster staff, Consultants may be asked to assist the TAC and the Watermaster staff with peer reviews of documents and reports prepared by various other Watermaster Consultants and/or entities.
M. 1. f QA/QC ($0)	A Consultant (MPWMD) will provide general QA/QC support over the Seaside Basin Monitoring and Management Program. [CONFIRM THIS WORK IS COVERED UNDER MPWMD'S RFSs FOR WORK IN 2014]

I. 2 Comprehensive Basin Production, Water Level and Water Quality Monitoring Program

I. 2. a. Database Management

I. 2. a. 1 Conduct Ongoing Data Entry and Database Maintenance/ Enhancement ($11,724)	The database will be maintained by a Consultant (MPWMD) performing this work for the Watermaster. MPWMD will enter new data into the consolidated database, including water production volumes, water quality and water level data, and such other data as may be appropriate. Another Consultant will periodically post database information to the Watermaster's website, so it will be accessible to the public and other interested parties. No enhancements to the database are anticipated during 2014. [CONFIRM NO DATABASE ENHANCEMENTS NEEDED]
I. 2. a. 2 Verify Accuracy of Production Well Meters ($0)	To ensure that water production data is accurate, the well meters of the major producers were verified for accuracy during 2009. No additional work of this type is anticipated during 2014. [IS THIS SOMETHING WE SHOULD DO AGAIN ANYTIME SOON?]
I. 2. b. Data Collection Program	
I. 2. b. 1 Site Representation and Selection. ($0)	The monitoring well network review that was started in 2008 has been completed, and sites have been identified where future monitoring well(s) could be installed, if it is deemed necessary to do so in order to fill in data gaps. No further work of this type is anticipated in 2014. [CONFIRM NO NEW WELLS NEEDED]
I. 2. b. 2 Collect Monthly Manual Water Levels. ($7,076)	Each of the monitoring wells will be visited on a monthly basis. Water levels will be determined by either taking manual water levels using an electric sounder, or by dataloggers. Pursuant to the Management and Monitoring Program approved by the Court in 2006, in 2013 wells at 2 additional sites in the Laguna Seca Subarea were equipped with dataloggers taking measurements in two aquifers at each site. The cost included in this Task for equipping these additional wells is $2,400. Also included in the cost for this Task is the purchase of one replacement datalogger @ $500. [CONFIRM THE DATALOGGERS IN LAGUNA SECA WERE INSTALLED IN 2013 AND THAT NO ADDITIONAL DATALOGGERS NEED TO BE PURCHASED OR INSTALLED IN 2014]
I. 2. b. 3 Collect Quarterly Water Quality Samples. ($48,738)	Water quality data will be collected quarterly from certain of the monitoring wells. In 2012 water quality analyses were expanded to include barium and iodide ions, to determine the potential benefit of performing these additional analyses. These two parameters have been useful in analyzing seawater intrusion potential in other vulnerable coastal groundwater basins, and are briefly mentioned in the Watermaster's annual Seawater Intrusion Analysis Reports. These parameters were added to the annual water quality sampling list for the four Watermaster Sentinel wells (SBWM-1, SBWM-2, SBWM-3, and SBWM-4), and also for the 3 most coastal MPWMD monitoring wells (MSC, PCA, and FO-09). Barium and iodide analyses will continue being performed in 2014. [CONFIRM WE WANT TO CONTINUE DOING THESE ANALYSES IN 2014] Water quality data may come from water quality samples that are taken from these wells and submitted to a State Certified analytic laboratory for general mineral and physical suite of analyses, or the data may come from induction logging of these wells and/or other data gathering techniques. The Consultant selected to perform this work will make this judgment based on consideration of costs and other factors. Under this Task in 2013 retrofitting was completed on the wells that are sampled on an annual basis to use the new low-flow purge approach for getting water quality samples. The wells that are sampled quarterly were previously retrofitted, and all except two of the wells that are sampled annually have been retrofitted. These two wells are FO-9 (Shallow) and FO-9 (Deep). The cost included in this Task to retrofit these two wells in 2013 is $1,500. [CONFIRM THESE 2 WELLS WERE RETROFITTED IN 2013 AND THAT NO FURTHER RETROFITTING IS NEEDED IN 2014] This sampling equipment sits in the water column and may periodically need to be replaced or repaired. $500 is included in the cost of this Task for performing ongoing maintenance and/or replacement of the sample collection equipment. [CONFIRM THAT $500 SHOULD BE INCLUDED IN 2014 FOR THIS PURPOSE]

I. 2. b. 4 Update Program Schedule and Standard Operating Procedures. ($0)	All recommendations from prior reviews of the data collection program have been implemented. No additional work of this type is anticipated in 2014.
I. 2. b. 5. Monitor Well Construction ($0)	An additional monitoring well was installed in 2009. No further work of this type is anticipated in 2014. [CONFIRM NO ADDITIONAL MONITORING WELLS ARE NEEDED]
I. 2. b.6 Reports ($5,448)	The groundwater level and quality monitoring will be conducted on a monthly, quarterly, and annual basis, as described in the Consultant's Scope of Work. Reports summarizing data collected and analyzed will be submitted to the Watermaster on a schedule to be established during the year, and will consist of: • One combined report summarizing the water production data and summarizing and analyzing the water quality and water level data from the 1st & 2nd Quarters of the Water Year. • One annual report summarizing the water production data and summarizing and analyzing the water quality and water level data from the 3rd & 4th Quarters of the Water Year, and containing tables consolidating the data from the quarterly reports and a narrative summarization of the findings, conclusions, and recommendations from the quarterly reports. This annual report may include, as attachments, each of the quarterly reports.
	I. 3 Basin Management
I. 3. a. Enhanced Seaside Basin Groundwater Model (Costs listed in subtasks below)	The Watermaster and its consultants use a Groundwater Model for basin management purposes.
I.3.a.1 Update the Existing Model ($0)	The existing Model, described in the report titled "Groundwater Flow and Transport Model" dated October 1, 2007, was updated in 2009 in order to develop protective water levels, and to evaluate replenishment scenarios and develop answers to Basin management questions (Tasks I.3.a.2 and I.3.a.3). No further work of this type is anticipated in 2014.
I. 3. a. 2 Develop Protective Water Levels ($25,000)	A series of cross-sectional models was created in 2009 in order to develop protective water levels for selected production wells, as well as for the Basin as a whole. This work is discussed in Hydrometrics' "Seaside Groundwater Basin Protective Water Elevations Technical Memorandum." In subsequent years further work was scheduled and budgeted to be done to refine these protective water levels to find the most cost-effective approach to provide the desired degree of protection. However, not all of the information needed to perform the refinements was available in those years, so this Task was performed in 2013. No further work of this type is anticipated in 2014. [CONFIRM NO FURTHER WORK NEEDED ON PROTECTIVE ELEVATIONS]
I. 3. a. 3 Evaluate Replenishment Scenarios and Develop Answers to Basin Management Questions ($25,000)	In 2009 the updated Model was used to evaluate different scenarios to determine such things as the most effective methods of using supplemental water sources to replenish the Basin and/or to assess the impacts of pumping redistribution. This work is described in HydroMetrics' "Seaside Groundwater Basin Groundwater Model Report." In 2010, and again in 2013, HydroMetrics used the updated Model to develop answers to some questions associated with Basin management. If requested by the Watermaster additional work may be performed in 2014 to answer additional questions. [SHOULD WE INCLUDE FUNDS IN 2014 IN CASE MORE MODELING OR OTHER WORK IS DESIRED?]

I. 3. b. **Complete Preparation of Basin Management Action Plan ($0)**	The Watermaster's Consultant completed preparation of the Basin Management Action Plan (BMAP) in February 2009. The BMAP serves as the Watermaster's long-term seawater intrusion prevention plan. The Sections that are included in the BMAP are: Executive Summary Section 1 – Background and Purpose Section 2 – State of the Seaside Groundwater Basin Section 3 – Supplemental Water Supplies Section 4 –Groundwater Management Actions Section 5 – Recommended Management Strategies Section 6 – References The only work which is anticipated to be performed on the BMAP in 2013 is discussed under Task I. 3. c.
I. 3. c. **Refine and/or Update the Basin Management Action Plan ($25,000)**	During 2014 it may be beneficial to update the BMAP based on new data, and/or knowledge that is gained from the work described under Tasks I. 3. a. 2 and/or I. 3. a. 3. Such work might involve issues pertaining to Basin storage capacity, water storage rights, or pumping redistribution strategies. This work has been scheduled and budgeted in several of the preceding years, but not all of the information needed to update the BMAP was available at those times. Therefore, the updating has been rescheduled to occur in 2014. This task is included primarily for budgeting purposes in the event such work is deemed necessary. [CONFIRM WE WANT TO CONTINUE INCLUDING FUNDS FOR THIS WORK IN CASE THE BOARD WISHES TO PERFORM IT IN 2014]
I. 3. d. **Evaluate Coastal Wells for Cross-Aquifer Contamination Potential ($4,700)**	If seawater intrusion were to reach any of the coastal wells in any aquifer, and if a well was constructed without proper seals to prevent cross-aquifer communication, or if deterioration of the well had compromised these seals, it would be possible for the intrusion to flow from one aquifer to another. An evaluation of this was completed in 2012 and is described in MPWMD's Memorandum titled "Summary of Seaside Groundwater Basin Cross-Aquifer Contamination Wells Investigation Process and Conclusions" dated August 8, 2012. This Memorandum did not recommend performing any further work on this matter at this time, other than to incorporate into the Watermaster's Database data from wells that were newly identified by the work performed in 2012. That data has now been incorporated into the Database, and no further work of this type is anticipated in 2014. [CONFIRM NO FURTHER WORK NEEDED]

I. 4 Seawater Intrusion Response Plan (formerly referred to as the Seawater Intrusion Contingency Plan)

I. 4. a. **Oversight of Seawater Intrusion Detection and Tracking ($4,664)**	Consultants will provide general oversight over the Seawater Intrusion detection program.
I. 4. b. **Focused Hydrogeologic Evaluation ($7,520)**	A Consultant will compile historical and current water quality data in the coastal area to provide more in-depth evaluation of conditions in the shallow Dune Sand/Aromas Sand aquifer in the vicinity of the Sand City Public Works well, where unique water quality conditions and variability have recently been observed as discussed at TAC meetings. It was found that no historical water quality data from Cal Am's now-abandoned wells existed, and consequently it was not possible to answer the question of why water quality in the Sand City Public Works well differs from water quality in other wells in the Basin. The Sand City desalination plant could be affecting water quality in this area, but without the prior water quality data from now-abandoned wells, this could not be determined. The results of this work were summarized in a brief Technical Memorandum with conclusions and recommendations. [CONFIRM THIS WORK WAS COMPLETED IN 2013 AS MUCH AS POSSIBLE, SINCE IT WAS FOUND THAT NO HISTORICAL WATER QUALITY DATA COULD BE FOUND]

I. 4. c. **Annual Report- Seawater Intrusion Analysis ($25,750)**	At the end of each water year, a Consultant will reanalyze all water quality data. Semi-annual chloride concentration maps will be produced for each aquifer in the basin. Time series graphs, trilinear graphs, and stiff diagram comparisons will be updated with new data. The annual EM logs will be analyzed to identify changes in seawater wedge locations. All analyses will be incorporated into an annual report that follows the format of the initial, historical data report. Potential seawater intrusion will be highlighted in the report, and if necessary, recommendations will be included. The annual report will be submitted for review by the TAC and the Board. Modifications to the report will be incorporated based on input from these bodies, as well as Watermaster staff. Include in the SIAR a comparison of measured monitoring well water levels with Model-predicted water levels for these same wells. From this comparison determine if the Model developed under Task I.3.a.1 needs any recalibration in order to accurately predict water levels.
I. 4. d **Complete Preparation of Seawater Intrusion Response Plan ($0)**	The Watermaster's Consultant (HydroMetrics) completed preparation of the long-tem Seawater Intrusion Response Plans (SIRP) in February 2009. The Sections that are included in the SIRP are: Section 1 – Background and Purpose Section 2 – Consistency with Other Documents Section 3 – Seawater Intrusion Indicators and Triggers Section 4 –Seawater Intrusion Contingency Actions Section 5 - References No further work on the SIRP is anticipated in 2014.
I. 4. e. **Refine and/or Update the Seawater Intrusion Response Plan ($0)**	At the beginning of 2009 it was thought that it might be beneficial or necessary to perform work to refine the SIRP and/or to update it based on new data or knowledge that was gained subsequent to the preparation of the SIRP. However, this did not prove to be necessary, and no further work of this type is anticipated in 2014.
I. 4. f. **If Seawater Intrusion is Determined to be Occurring, Implement Contingency Response Plan ($0)**	The SIRP will be implemented if seawater intrusion, as defined in the Plan, is determined by the Watermaster to be occurring.

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	August 14, 2013
AGENDA ITEM:	6
AGENDA TITLE:	Schedule
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

As a regular part of each monthly TAC meeting, I will provide the TAC with an updated Schedule of the activities being performed by the Watermaster, its consultants, and the public entity, MPWMD, which is performing certain portions of the work.

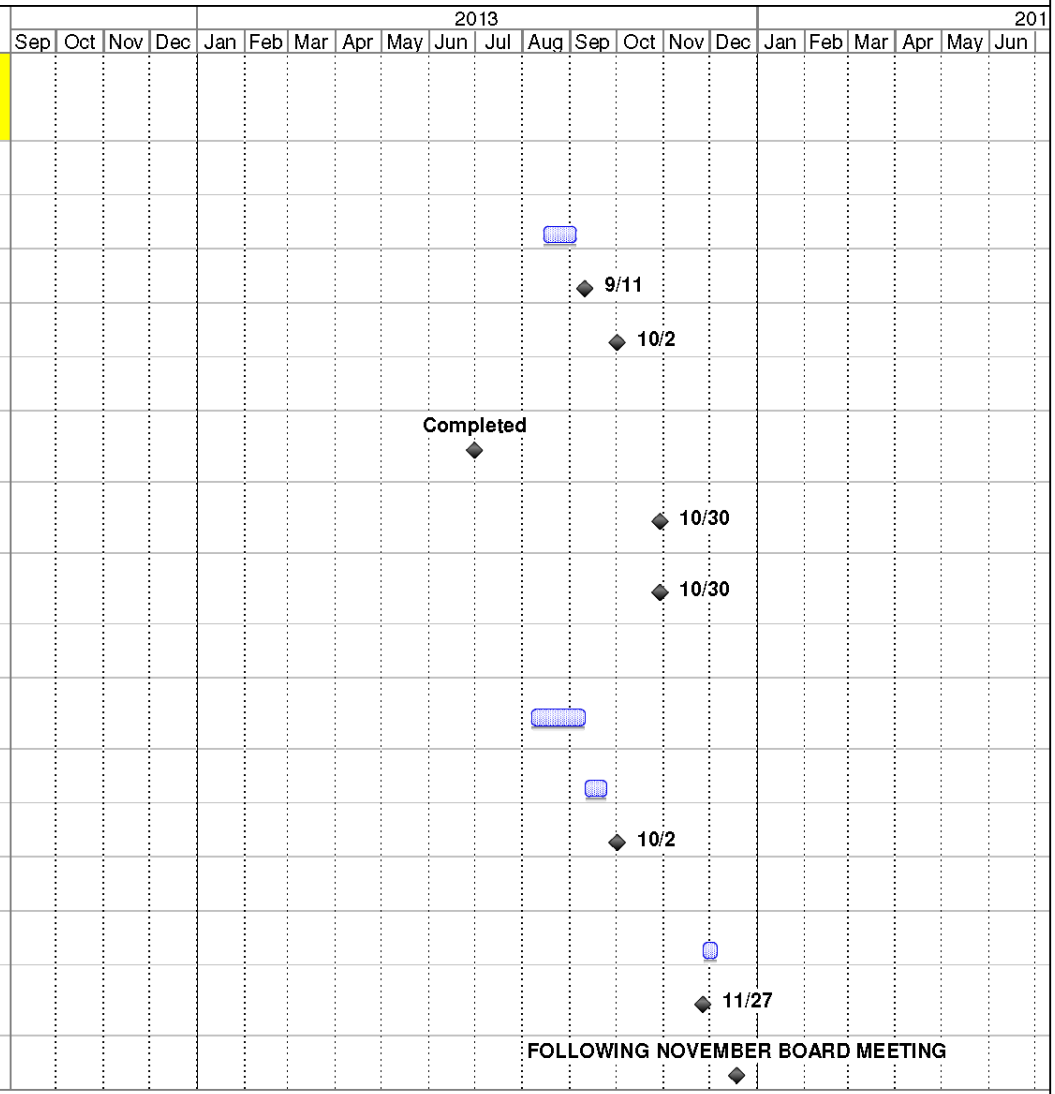
Attached is the most recent update of the Work Schedule for FY 2013.

I do not envision having a TAC meeting in the month of October. All TAC work that can be performed prior to October will be completed by the September TAC meeting. October will be needed for our consultants (HydroMetrics and MPWMD) to work on the Seawater Intrusion Analysis Report (SIAR) and the year-end Water Quality and Water Level reports, respectively, and for staff to work on the Annual Report and consultant contracts for 2014. All of these documents will be presented to the TAC at its November 13, 2013 meeting.

ATTACHMENTS:	Schedule of Work Activities for FY 2013
RECOMMENDED ACTION:	Provide Input to Technical Program Manager Regarding Any Corrections or Additions to the Schedule

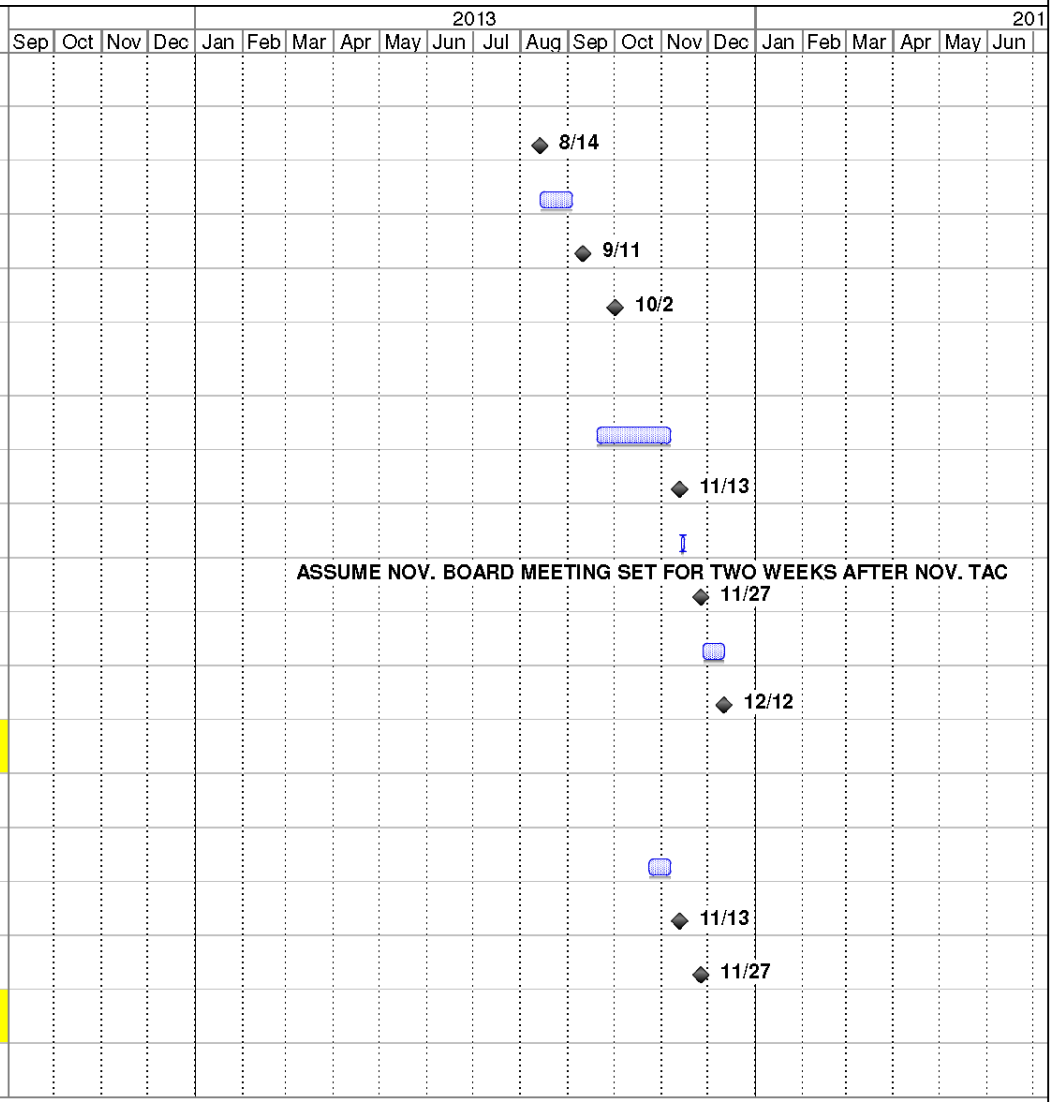
Seaside Basin Watermaster
Monitoring and Management Program
2013 Work Schedule

ID	Task Name
1	***CRITICAL PROJECT MILESTONES ASSOCIATED WITH TAC, BOARD, AND/OR CONSULTANT WORK***
2	**2014 Administration, Operations and Replenishment Budgets**
3	Prepare M&MP Draft Budgets (Same as Task 19)
4	TAC Approves M&MP Budgets (Same as Task 20)
5	Board Approves M&MP Budgets (Same as Task 21)
6	**Watermaster Prepares Quarterly Water Production, Water Level, and Water Quality Reports**
7	Watermaster Prepares Combined Quarterly Water Production, Water Level, and Water Quality Reports for 1st & 2nd Quarters (Same as Task 41)
8	Watermaster Prepares Quarterly Water Production, Water Level, and Water Quality Reports for 3rd and 4th Quarters (Same as Task 42)
9	Watermaster Prepares Annual Water Production, Water Level, and Water Quality Report for 2013 (Same as Task 43)
10	**Replenishment Assessment Unit Costs for Water Year 2014**
11	TAC Provides Assistance to B&F Committee in Development of 2014 Water Year Replenishment Assessment Unit Cost
12	B&F Committee Develops Replenishment Assessment Unit Cost for 2014 Water Year
13	Board Adopts and Declares 2014 Water Year Replenishment Assessment Unit Cost
14	**Replenishment Assessments for Water Year 2013**
15	Watermaster Prepares Replenishment Assessments for Water Year 2013
16	Watermaster Board Approves Replenishment Assessments for Water Year 2013 (At November Meeting)
17	Watermaster Levies Replenishment Assessment for 2013

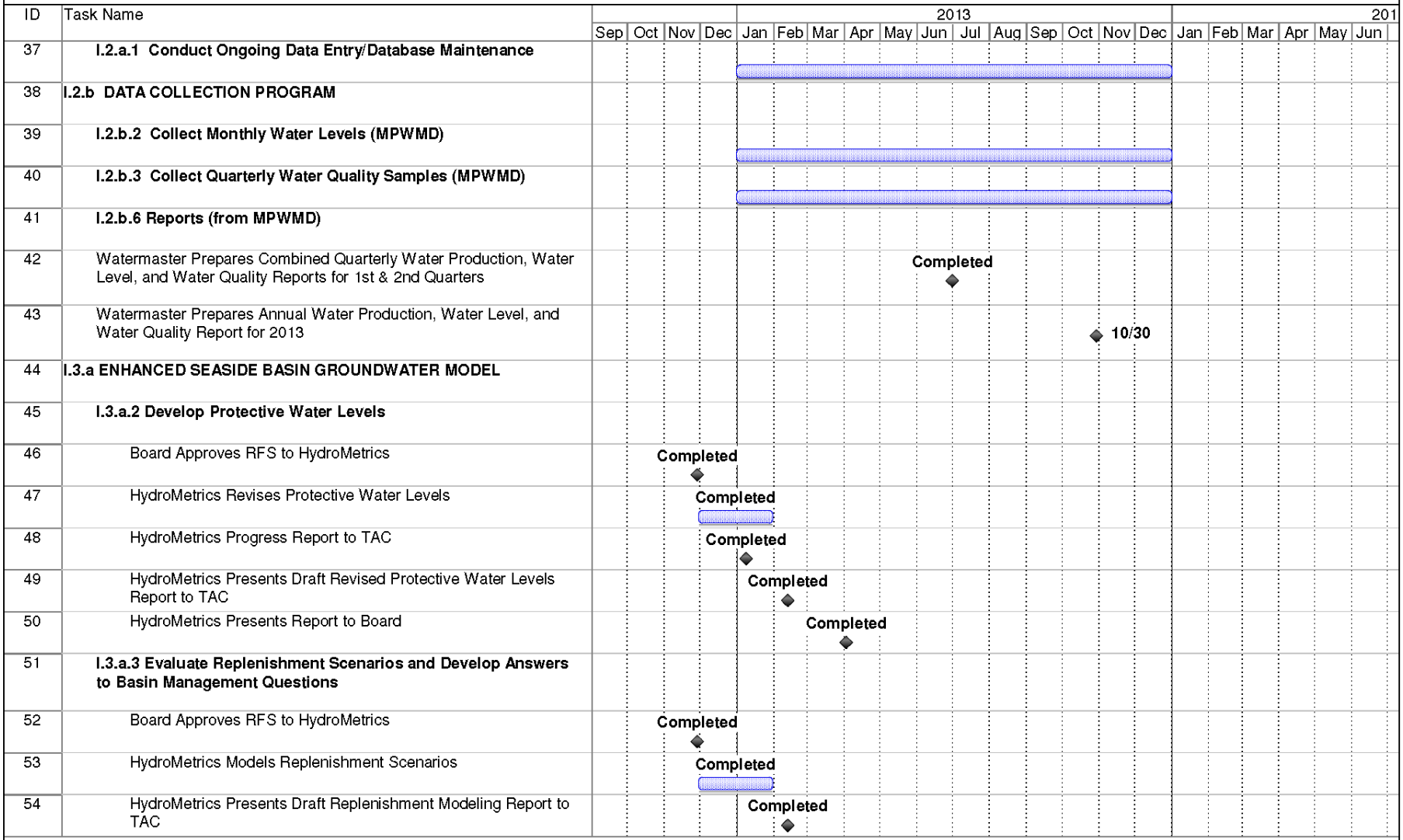


Seaside Basin Watermaster
Monitoring and Management Program
2013 Work Schedule

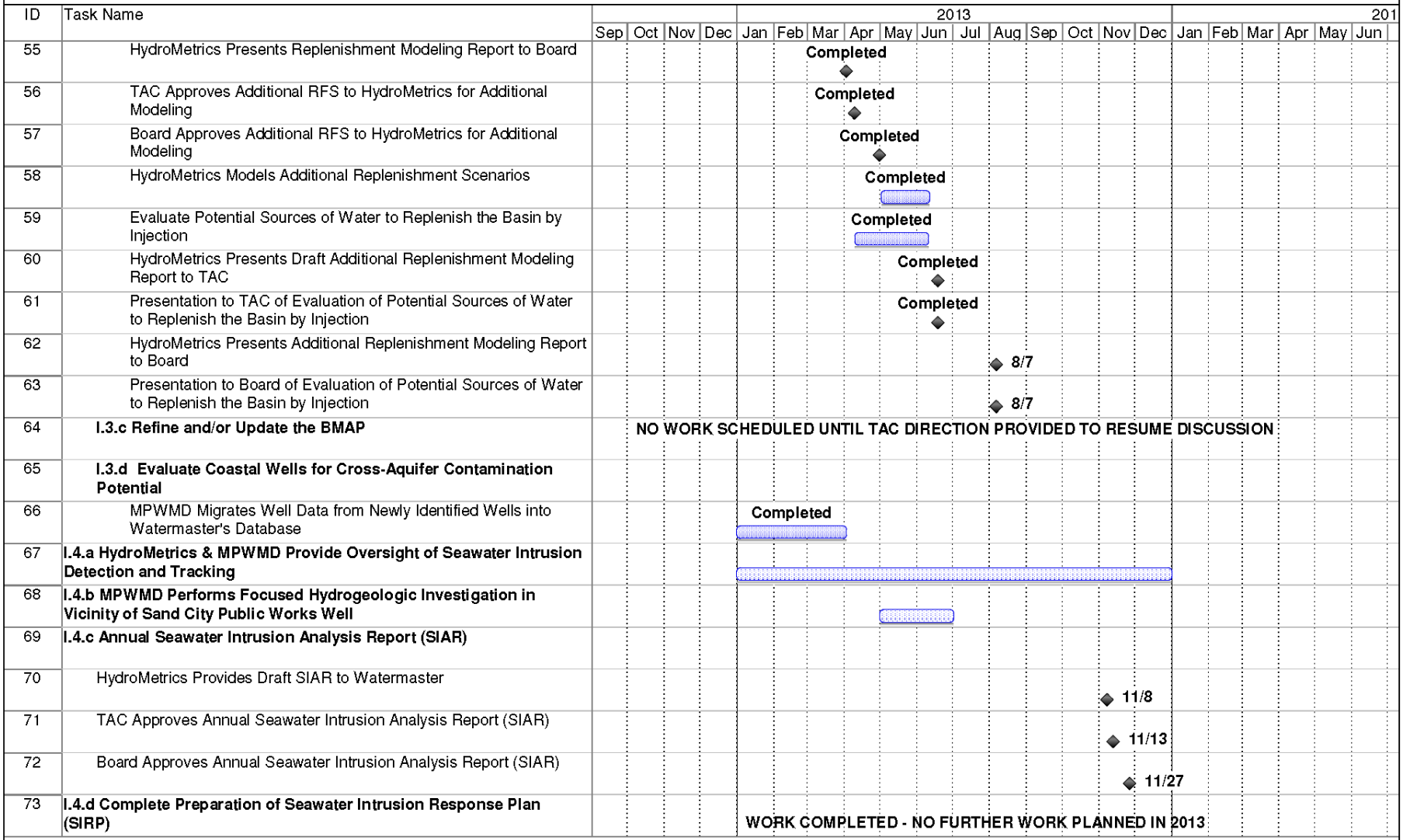
ID	Task Name
18	**Monitoring & Management Program (M&MP) Budgets for 2012 and 2013**
19	Preliminary Discussion of Potential Scope of Work for 2014 M&MP
20	Prepare Draft 2014 and 2015 M&MP O&M and Capital Budgets
21	TAC approves Draft 2014 and 2015 M&MP O&M and Capital Budgets
22	Board approves 2014 and 2015 M&MP O&M and Capital Budgets
23	**2013 Annual Report (Note: Schedule Reflects Court Approval of Later Submittal Date for Annual Report)**
24	Prepare Preliminary Draft 2013 Annual Report
25	TAC Provides Input on Draft 2013 Annual Report
26	Prepare Revised Draft 2013 Annual Report (Incorporating TAC Input)
27	Board Provides Input on Revised Draft 2013 Annual Report (At November Board Meeting)
28	Prepare Final 2013 Annual Report (Incorporating Board Input)
29	Watermaster Submits Final 2013 Annual Report to Judge
30	***MANAGEMENT***
31	**M.1 PROGRAM ADMINISTRATION (All Work Performed by Watermaster Staff)**
32	Prepare Initial Consultant Contracts for 2014
33	TAC Approval of Initial Consultant Contracts for 2014
34	Board Approval of Initial Consultant Contracts for 2014 (At November Board Meeting)
35	***IMPLEMENTATION***
36	**I.2.a DATABASE MANAGEMENT**



Seaside Basin Watermaster
Monitoring and Management Program
2013 Work Schedule



Seaside Basin Watermaster
Monitoring and Management Program
2013 Work Schedule



Seaside Basin Watermaster
Monitoring and Management Program
2013 Work Schedule

ID	Task Name	2013																201					
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
74	**I.4.e Refine and/or Update the SIRP**						**NOT NECESSARY**																

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	August 14, 2013
AGENDA ITEM:	7
AGENDA TITLE:	Other Business
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:
The "Other Business" agenda item is intended to provide an opportunity for TAC members or others present at the meeting to discuss items not on the agenda that may be of interest to the TAC.

ATTACHMENTS:	None
RECOMMENDED ACTION:	None required – information only