Agenda

Santa Cruz Mid-County Groundwater Sustainability Plan

Advisory Committee Meeting #20

Wednesday, June 19, 2019, 5:00 – 8:30 p.m.
Simpkins Family Swim Center
Room A&B - 979 17th Avenue Santa Cruz CA 95062

Meeting Objectives

- Discuss and refine final Groundwater Sustainability Plan (GSP) Advisory Committee recommendations for the Sustainability Goal and Sustainable Management Criteria
- Identify level of support for Advisory Committee recommendations to the Mid-County Groundwater Agency (MGA) Board
- Convey thanks and appreciation to Advisory Committee members.

Agenda

Item No.	Time[1]	Topic	Presenter & Materials
	4:30 p.m.	*Arrivals/Committee members collect food for dinner*	
1.	5:00 p.m.	Welcome, Introductions, Meeting Objectives, and Agenda Review • Review updated project timeline and anticipated GSP roll-out, review, and approval process	• Ralph Bracamonte, Central Water District • Eric Poncelet, Facilitator • Sierra Ryan, Santa Cruz County *Materials:* *1.1 Agenda* *1.2 Santa Cruz Mid-County Basin Groundwater Sustainability Plan Process Overview Timeline* *1.3 Groundwater Sustainability Plan Release, Review, and Approval Process Timeline* *Refer to PowerPoint Presentation*
2.	5:15 p.m.	Oral Communications • *Members of the public to comment on non-agenda items*	• Public
3.	5:25 p.m.	Review and discuss proposed revisions to Advisory Committee recommendations; develop final text • Sustainability Goal • Sustainable Management Criteria	• Darcy Pruitt, RWMF • Georgina King, Montgomery & Associates • Advisory Committee *Materials:* *3.1 Groundwater Sustainability Plan - Recommended Sustainability Goal with Proposed Revisions*

[1] The times allotted on this agenda are approximate and are subject to change.

Item No.	Time[1]	Topic	Presenter & Materials
			3.2 Santa Cruz Mid-County Basin Summary of Sustainable Management Criteria *Refer to PowerPoint Presentation*
4.	6:25 p.m.	Public Comment	• Public
5.	*6:35 p.m.*	*Break*	
6.	6:50 p.m.	Identify level of support for Advisory Committee recommendations to the MGA Board • Voting and individual comments • Review and confirm draft Conveyance Memo	• Eric Poncelet, Facilitator • Advisory Committee *Materials:* *6.1 Groundwater Sustainability Plan Advisory Committee Voting Process* *6.2 Draft Outline and Text for Conveyance Memo to Accompany Advisory Committee's Recommendations to MGA Board* *Refer to PowerPoint Presentation*
7.	7:45 p.m.	Public Comment	• Public
8.	7:55 p.m.	Confirm: • Draft April 24, 2019 GSP Advisory Committee Meeting Summary • Draft May 16, 2019 Joint MGA Board/Advisory Committee Meeting Summary	• Advisory Committee • Eric Poncelet, Facilitator *Materials:* *8.1 Draft Meeting Summary – Groundwater Sustainability Plan Advisory Committee Meeting #18, April 24, 2019* *8.2 Draft Meeting Summary – Joint MGA Board/Advisory Committee Meeting #19, May 16, 2019*
9.	8:00 p.m.	Recap, Next Steps, Commemoration and Gratitude	• Eric Poncelet, Facilitator • Executive Team members • Advisory Committee
	8:30 p.m.	*Adjourn*	

Written Communications and Correspondence (included in the packet materials):

1. Letter from B. Steinbruner, June 10, 2019.

Santa Cruz Mid-County Basin Groundwater Sustainability Plan (GSP)
Process Overview Timeline March – November 2019

2019

3/19 4/19 5/19 6/19 7/19 8/19 9/19 10/19 11/19 12/19

Santa Cruz Mid-County GSP Advisory Committee Objectives for March – November 2019

Mar 27, 2019

- Discuss modeling results for Reconfigured Aquifer Storage and Recovery and combined projects
- Discuss Sustainable Management Criteria for Groundwater Storage and Seawater Intrusion
- Receive primer and share initial reflections on "who pays for what?" related to projects and rationale behind funding/payment
- Review and confirm representative monitoring wells for each sustainability indicator

***Enrichment Session: Forecasting Water Use from Land Use and Population (April 18)**

- Discuss relationship between population, land use, conservation and forecasting water supply
- Relate these factors to GSP

Apr 24, 2019

- Introduce Mid-County sustainability goal
- Discuss next round of modeling results for Surface Water Interaction
- Receive and discuss overview of initial draft GSP recommendations (Section 3 of GSP), including refined sustainability indicator management criteria for all sustainability indicators

May 16, 2019 (Joint MGA/Advisory Committee):

- Discuss Mid-County sustainability goal
- Discuss implementation plan, funding tools and milestones (Section 5 of GSP)
- Discuss draft compilation of recommendations and modeling results for Sustainable Management Criteria (Section 3 of GSP)

June 19, 2019

- Refine recommendations for Sustainable Management Criteria
- Discuss level of support for Advisory Committee recommendations to the MGA Board
- End of Advisory Committee process

Committee work is anticipated to conclude

July 2019

- Deliver draft GSP and set of recommendations on Sustainable Management Criteria to MGA Board
- Public/Open House Meeting

Sep 2019

- MGA Board Report Back on final deliberations related to GSP
- MGA Board final action on GSP

Nov 2019

- MGA Board Follow-up on final GSP actions as needed

1/19 2/19 3/19 4/19 5/19 6/19 7/19 8/19 9/19 10/19 11/19 12/19

Revised 06/04/2019

June 19, 2019

MEMO TO THE GSP ADVISORY COMMITTEE

Subject: Agenda Item 1.3

Title: Santa Cruz Mid-County Groundwater Agency (MGA) Groundwater Sustainability Plan (GSP) Release, Review, and Approval Process Timeline

Attachments:
1. GSP Review and Approval Process Timeline

Background

California's Sustainable Groundwater Management Act (SGMA) requires Groundwater Sustainability Agencies (GSA) of all critically overdrafted basins to approve and submit a GSP to the California Department of Water Resources (DWR) by January 31, 2020. This requirement applies to the MGA because the Santa Cruz Mid-County Groundwater Basin (Basin) is a state-designated high priority groundwater basin in critical overdraft.

GSP Advisory Committee Role and Recommendations

The GSP Advisory Committee will make specific recommendations to the MGA Board on the Basin sustainability goal. The committee will also recommend sustainable management criteria for each the six state identified sustainability indicators, including: Seawater Intrusion, Depletion of Interconnected Surface Water, Land Subsidence, Chronic Lowering of Groundwater Levels, Reduction of Groundwater in Storage, and Degraded Water Quality.

Within the GSP each of the following sustainable management criteria will be described for the sustainability indicators that apply to the MGA Basin:

1) Undesirable Results (qualitative definition of unsustainable conditions),
2) Minimum Thresholds (quantifiable measure of unsustainable conditions), and
3) Measureable Objective (quantifiable measure of sustainability goals)

At their June 19, 2019 meeting, GSP Advisory Committee members will vote to approve their final recommendations to the MGA Board on the sustainability goal and sustainable management criteria. MGA staff and consultants will then summarize the final recommendations, including any comments that provide insight and context regarding the recommendations made to MGA Board.

GSP Release, Review, and Approval Process

The MGA will release a draft GSP in the MGA Board packet on July 12, 2019. The GSP comment period will run from July 19, 2019 to September 19, 2019 and will include two public meetings in July. The first public meeting will be held on Saturday, July 20, 2019 from 10:00-noon at the Community Foundation Santa Cruz County. A second public meeting will be held on Monday, July 22, 2019 from 7:00-9:00 pm at Simpkins Family Swim Center. A question and answer (Q&A) session with MGA member agency staff on draft GSP will be held Wednesday, August 28, 2019 from 7:00-9:00 pm at Simpkins Family Swim Center. The MGA will accept comments and finalize the GSP for submission to DWR prior to the January 31, 2020 deadline. The first GSP Annual Report is due to DWR prior to April 1, 2020.

Local Agencies and Interested Parties

Under SGMA, the MGA is required to notify any city and county within the groundwater basin to allow an opportunity to comment on the plan at least 90 days prior to the date the MGA approves the GSP.[1] The MGA is required to consult with any city or county that requests a GSP consultation within 30 days of receipt of the MGA notice. The notice will be distributed to the cities of Santa Cruz and Capitola, the County of Santa Cruz, and interested parties[2] using the MGA email list no later than July 12, 2019.

MGA Board

At its July 18, 2019 board meeting, the MGA Board will receive the GSP Advisory Committee's sustainability recommendations and the draft GSP based on those recommendations as prepared by staff and technical consultants. MGA Board members will discuss the recommendations and open the public comment period. The MGA Board may also provide initial direction to MGA staff on the recommendations received from the GSP Advisory Committee and the public at its July 18th meeting.

At its September 19, 2019 board meeting, the MGA Board will provide additional direction to staff to finalize the GSP based on all comments received. MGA staff and technical consultants will prepare a final GSP based on direction received from the MGA Board. The final GSP will be published in the MGA Board packet for

[1] California Water Code § 10728.4 states, "A groundwater sustainability agency may adopt or amend a groundwater sustainability plan after a public hearing, held at least 90 days after providing notice to a city or county within the area of the proposed plan or amendment. The groundwater sustainability agency shall review and consider comments from any city or county that receives notice pursuant to this section and shall consult with a city or county that requests consultation within 30 days of receipt of the notice…"

[2] Interested parties refers to persons and entities interested in receiving notices regarding plan preparation, meetings and other relevant information. By written request, persons and entities are placed on the list of interested persons established by the Agency pursuant to Water Code Section 10723.4.

consideration at the Board's November 21, 2019 meeting. The MGA Board will approve or amend the final GSP for submission to DWR prior to the state mandated deadline on January 31, 2020.

Department of Water Resources (DWR)
DWR will receive all GSP submissions posted by GSAs online at DWR's SGMA Portal website. Once plans are posted online, the DWR 60-day comment period begins. DWR will receive comments from resource agencies, the public, and other interested parties during the comment period. Comments received by DWR will be posted to the SGMA Portal. DWR is not required to respond to comments received during this 60-day comment period but will review GSPs in light of comments received.

Schedule
A proposed GSP review and approval process timeline is provided as attachment 1 to this memo.

Item 1.3 – Attachment 1
MGA GSP Release, Review, and Approval Process Timeline

Date	Activity	Purpose/comments
May 16, 2019	Joint Meeting of MGA Board and GSP Advisory Committee	Provide status update and set GSP review expectations.
May 2019	MGA Website Updates	Create locations for: draft GSP and GSP outreach and meeting timelines (easy to find). Update all other content to focus on GSP rollout.
June 1, 2019	Survey of MGA Basin residents	Get a better sense of where we stand with MGA outreach. Survey as an outreach mechanism.
June 15, 2019	MGA Basin Postcard Mailer	Inform all MGA Basin residents and property owners about the GSA, the GSP rollout, and direct them to MGA website and survey.
June 19, 2019	GSP Advisory Committee Final Meeting	GSP Advisory Committee makes final refinements to Sustainable Management Criteria for each Sustainability Indicator and MGA Sustainability Goal and votes on its recommendations (showing levels of support and providing comments as needed).
July 12, 2019	Draft GSP in MGA Board meeting packet	GSP release date under Brown Act
July 12, 2019	GSP Notification to Interested Parties, including Cities and County	SGMA Requirement. Can be noticed electronically.
July 18, 2019	MGA Board Meeting	Draft GSP comment period begins. Staff will do media outreach in anticipation of this MGA Board meeting.
July 20th (morning) and 22nd (evening), 2019	Draft GSP Open House Meetings	Introduce major GSP elements to the public and take written comments. Introductory presentation, tables representing major GSP components for people to visit, learn, and ask questions.

August 28, 2019	Draft GSP Question & Answer Session	MGA staff will host a question and answer session on the draft Groundwater Sustainability Plan.
July 18 - September 19	GSP review and written comment period.	MGA Board members to review GSP. MGA staff will accept, review, and consider all written GSP comments received from board members, agencies, the public, and interested parties.
Ongoing	MGA staff reviews comments	MGA staff to review comments for major items to go before MGA Board during September meeting.
September 19, 2019	MGA Board Meeting and Public Hearing	Receive and discuss MGA Board comments and those provided by agencies, public, and interested parties as needed. Opportunity to present oral comments on the GSP.
Sep-Nov	Comment incorporation	MGA staff and technical team to revise Draft GSP based on comments received at direction from MGA Board. All comments will be compiled. All comments need not be directly addressed as in a CEQA document.
November 21, 2019	MGA Board Meeting	Adopt Final GSP.
Late November	Submit Final GSP to DWR	Final GSP uploaded and available at DWR SGMA Portal.
Within 20 days of submittal	DWR comment period	60 days to make comments to DWR regarding MGA's GSP submission.
January 31, 2020	GSP submission cutoff	Last day to submit GSP to DWR under SGMA legislation.
April 1, 2020	First Annual Report due	Report to include: general information about MGA basin, description of basin conditions (groundwater elevations, groundwater extractions, surface water supply for groundwater replenishment, total water use, change in groundwater storage) description of GPS implementation progress (including achieving interim milestones and implementation of projects and/or management actions.)

June 19, 2019

MEMO TO THE GSP ADVISORY COMMITTEE

Subject: Agenda Item 3.1

Title: Groundwater Sustainability Plan (GSP) – Recommended Sustainability Goal with Proposed Revisions

Agenda item 3.1 presents the recommended revisions to the draft GSP sustainability goal developed for the Santa Cruz Mid-County Groundwater Basin's (Basin) Groundwater Sustainability Plan (GSP) Section 1.2. The revised sustainability goal is based on the Sustainable Groundwater Management Act (SGMA) requirements to achieve local and regional sustainability, the GSP Advisory Committee's vision for sustainability in the Basin, public comments received during GSP Advisory Committee meetings, and comments received from the Santa Cruz Mid-County Groundwater Agency (MGA) Board and the public during the May 16, 2019 MGA joint meeting.

Background

During the MGA Board and GSP Advisory Committee joint meeting on May 16, 2019, board and committee members considered the administrative draft GSP sustainability goal and basin sustainability criteria. During this meeting, MGA Board members asked questions of GSP Advisory Committee members regarding their preliminary recommendations. MGA Board members suggested several revisions for the committee's consideration prior to the committee making final recommendation to the MGA Board.

In relationship to the Basin sustainability goal, Board members specifically asked the committee to consider stating that the Basin's sustainability goal explicitly responds to climate change and sea level rise.

Revisions to the draft GSP sustainability goal are shown in ~~strikethrough~~ text. Recommendations in the revised GSP sustainability goal are shown ***bold green italic*** text.

Draft GSP Sustainability Goal – Presented at Joint Meeting

The MGA Basin's sustainability goal is:

> *~~To m~~anage the groundwater ~~b~~asin to ensure beneficial uses and users have access to a safe and reliable groundwater supply to meet current and future expected regional demand without causing undesirable ~~impacts.~~*
>
> *~~To achieve this goal requires groundwater management~~ that:*
>
> - *Ensures groundwater is available for beneficial uses and a diverse population of beneficial users,*
> - *Protects groundwater supply against seawater intrusion,*

- *Maintains or enhances groundwater levels where groundwater dependent ecosystems exist,*
- *Maintains or enhances groundwater contributions to streamflow,*
- ~~*Resolves problems of groundwater overdraft within the MGA Basin,*~~ [moved up and rewritten to reduce ambiguity.]
- *Supports reliable groundwater supply and quality to promote public health and welfare,*
- *Ensures operational flexibility within the ~~MGA~~ Basin by maintaining a drought reserve, ~~and~~*
- *Does no harm to neighboring groundwater basins in regional efforts to achieve groundwater sustainability.*

Revised GSP Sustainability Goal – For GSP Advisory Committee Consideration

The MGA Basin's sustainability goal is:

> ***M****anage the groundwater Basin to ensure beneficial uses and users have access to a safe and reliable groundwater supply that meets current and future* ***Basin*** *demand without causing undesirable* ***results*** *that:*
>
> - *Ensures groundwater is available for beneficial uses and a diverse population of beneficial users,*
> - *Protects groundwater supply against seawater intrusion,*
> - ***Prevents groundwater overdraft within the Basin and resolves problems resulting from prior overdraft, [moved up and rewritten to reduce ambiguity]***
> - *Maintains or enhances groundwater levels where groundwater dependent ecosystems exist,*
> - *Maintains or enhances groundwater contributions to streamflow,*
> - *Supports reliable groundwater supply and quality to promote public health and welfare,*
> - *Ensures operational flexibility within the Basin by maintaining a drought reserve,*
> - ***Accounts for changing groundwater conditions related to projected climate change and sea level rise in Basin planning and management, and***
> - *Does no harm to neighboring groundwater basins in regional efforts to achieve groundwater sustainability.*

Santa Cruz Mid-County Basin
Summary of Sustainable Management Criteria

Text in red has been changed or added since the May 16, 2019 joint Mid-County Groundwater Agency (MGA) Board and Groundwater Sustainability Plan (GSP) Advisory Committee meeting.

Sustainability Indicator #1
Chronic Lowering of Groundwater Levels

The chronic lowering of groundwater level sustainability indicator is a separate sustainability indicator to other sustainability indicators that use groundwater elevations as proxy measures of sustainability, i.e., seawater intrusion and depletion of interconnected surface water. For example, the seawater intrusion sustainability indicator focuses on groundwater elevations near the coast, while the chronic lowering of groundwater level sustainability indicator applies to groundwater elevations inland of the area of municipal groundwater pumping and are not set based on protective groundwater elevations.

SIGNIFICANT AND UNREASONABLE CHRONIC LOWERING OF GROUNDWATER LEVELS

A significant number of private, agricultural, industrial, and municipal production wells can no longer provide enough groundwater to supply beneficial uses would be a significant and unreasonable lowering of groundwater levels.

In the late 1980's, groundwater levels in parts of the Basin were between 35 and 140 feet lower than they are currently. Even at these lower levels production wells were still able to extract groundwater to supply beneficial uses. Based on the above statement of significant and unreasonable, significant and unreasonable chronic lowering of groundwater levels has not historically occurred in the Basin and is not currently occurring.

UNDESIRABLE RESULTS - CHRONIC LOWERING OF GROUNDWATER LEVEL

The average monthly representative monitoring well groundwater elevation falls below the <Minimum Threshold>.

MINIMUM THRESHOLDS - CHRONIC LOWERING OF GROUNDWATER LEVEL

Each representative monitoring well gets its own minimum threshold based on the groundwater elevation required to meet the typical overlying water demand in the shallowest well in the vicinity of the representative monitoring well. The minimum threshold is not allowed to be more than 30 feet below the historic low groundwater elevation. All representative monitoring wells must be equipped with data loggers.

Selection of Limiting Minimum Threshold to no Greater than 30 feet below Historic Low Groundwater Level

There are six representative monitoring wells that have minimum saturated thicknesses more than 30 feet below historic low groundwater levels (Figure 1). For these wells, the minimum threshold elevation was increased to 30 feet below historic low groundwater levels, which is where the majority of the representative monitoring wells' minimum thresholds are below their respective historic lows. This upward adjustment took place because, although the wells could meet their demand with a much lower groundwater level (Figure 2), having groundwater levels drop to these depths may negatively impact achieving sustainability in other sustainability indicators. There are also three representative monitoring wells, with minimum saturated thicknesses less than 30 feet below their historic lows, where the minimum threshold elevation was raised to sea level as these are close to protective elevation coastal monitoring wells and allowing groundwater levels to fall below sea level will make it difficult to achieve protective elevations at the coastal monitoring wells.

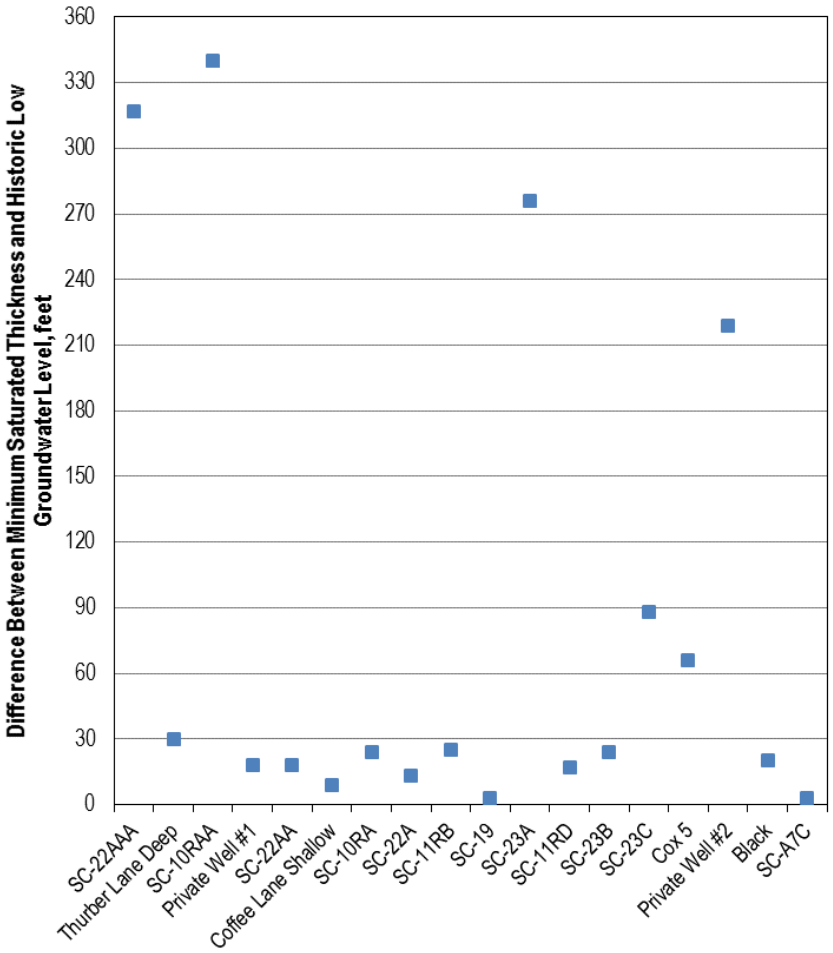

Figure 1. Difference between Minimum Saturated Thickness and Historic Low Groundwater Levels for Representative Monitoring Wells

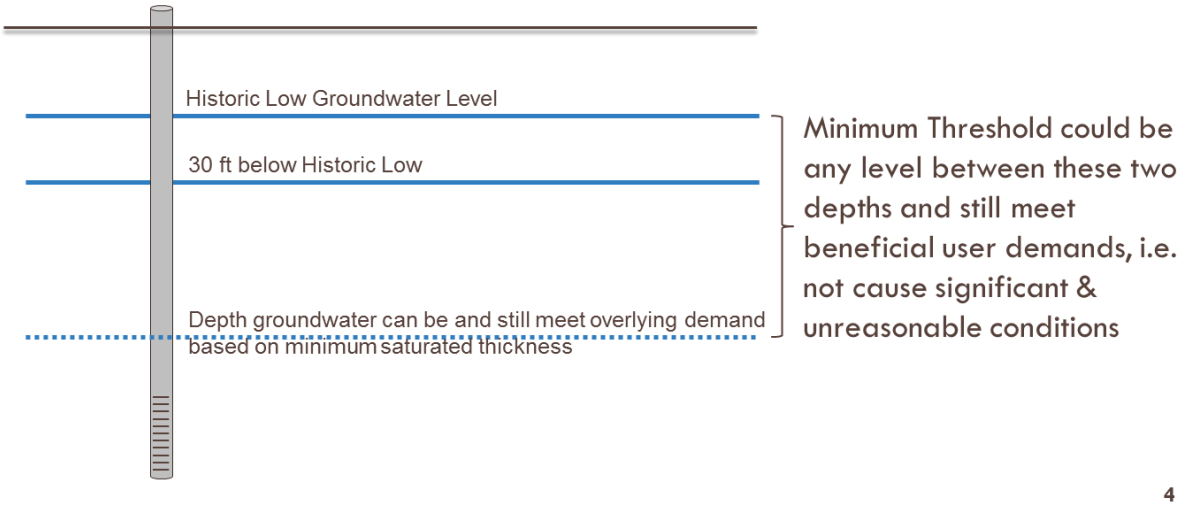

Figure 2. Minimum Saturated Thickness in Relation to Historic Low Groundwater Level

MEASURABLE OBJECTIVES - CHRONIC LOWERING OF GROUNDWATER LEVEL

Measurable objectives at each representative monitoring well are the 75 ~~90~~th percentile of historical groundwater elevations for the period of record. This meets the GSP Advisory Committee's desire for high groundwater elevations whilst acknowledging that setting measurable objectives at the near maximum elevation is unrealistic as those elevations are generally associated with very wet years and would not be achievable most of the time.

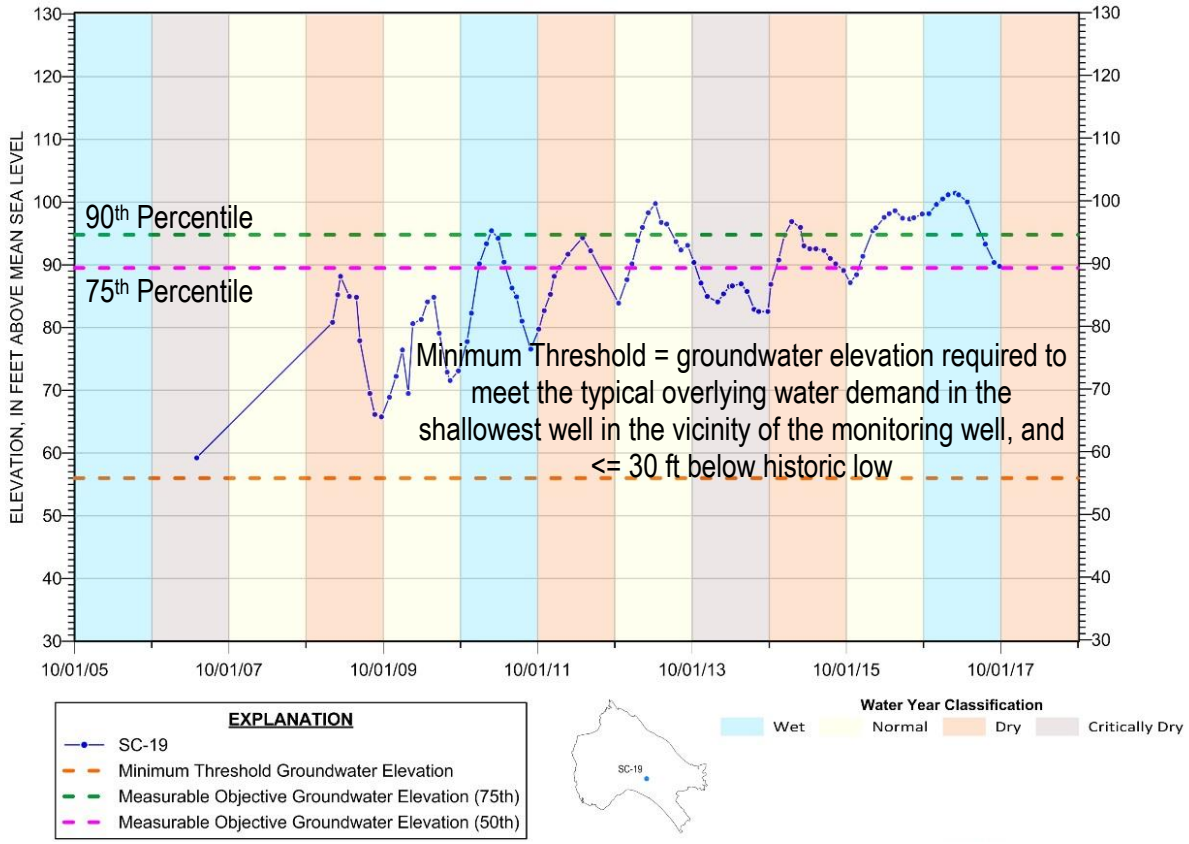

Figure 3. Example of Minimum Threshold and Measurable Objective in a Representative Monitoring Well SC-19

Sustainability Indicator #2
Reduction in Groundwater Storage

The reduction in storage sustainability indicator is not measured by change of groundwater in storage. Rather, the reduction in groundwater in storage sustainability indicator requires a metric that is "a ***total volume of groundwater that can be withdrawn from the basin*** without causing conditions that may lead to undesirable results."

SIGNIFICANT AND UNREASONABLE REDUCTION IN GROUNDWATER STORAGE

A significant and unreasonable reduction of groundwater in storage would be a net volume of groundwater extracted that will likely cause other sustainability indicators to have undesirable results.

UNDESIRABLE RESULTS - REDUCTION IN GROUNDWATER STORAGE

Five-year average net extraction exceeding the Sustainable Yield (minimum threshold) for the Aromas aquifer and Purisima F unit, five-year average net extraction exceeding the Sustainable Yield (minimum threshold) for the Purisima DEF, BC, A, and AA aquifers, or five-year average net extraction exceeding the Sustainable Yield (minimum threshold) for the Tu aquifer.

BASIS OF GROUPING AQUIFER UNITS FOR REDUCTION OF GROUNDWATER IN STORAGE SUSTAINABLE MANAGEMENT CRITERIA

The reduction of groundwater in storage sustainable management criteria are metrics that represent "a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results." Although only a total volume for the whole basin is required for the GSP, the technical team recommends separate criteria for three groups of aquifer units in the Basin: (1) Purisma F and Aromas Red Sands, (2) Purisima DEF, BC, A, and AA aquifers, and (3) the Tu aquifer. The metrics used for sustainable management criteria will be sustainable yields for the three groups estimated from groundwater modeling of the projects and management actions in the plan that are projected to prevent undesirable results.

Developing sustainable management criteria for separate aquifer units reflects the stacked aquifer units of the Basin where groundwater supply in different areas of the Basin are provided by different aquifer units. The groupings are based on how municipal wells are screened. Most municipal wells screened in the Aromas Red Sands are also screened in the deeper Purisima F unit. There are municipal wells screened across the DEF and BC units, the BC and A units, and the A and AA units. Although the municipal wells screened in the Tu unit are also screened in the AA unit, a high percentage of the flow in these wells has been observed to come from the Tu unit. Additionally, the vertical separation of flow between the AA and Tu units is observed to be greater than the vertical separation between the A and AA units.

Even though there are identified aquitard units between the DEF and BC aquifer units and between the BC and A aquifer units, technical consultant does not recommend developing reduction of groundwater in storage sustainable management criteria for each of these Purisima aquifer units. The purpose of this sustainability indicator is to prevent undesirable results for other sustainability indicators such as seawater intrusion, chronic lowering of groundwater levels, and depletion of interconnected surface water. Each of these sustainability indicators will be monitored for by any potentially affected aquifer unit. If undesirable results are observed in any aquifer unit or related to pumping from a specific aquifer unit, the most likely management action to eliminate the undesirable result is to change net pumping from the aquifer unit. The change in net pumping will be determined by what is necessary to eliminate the undesirable result, not based on the reduction of groundwater in storage criteria. Recognizing this, it is technical consultant's opinion that using the groundwater model to develop reduction on storage criteria for each aquifer unit is not necessary for planning groundwater management and it may restrict operational flexibility.

MINIMUM THRESHOLDS - REDUCTION IN GROUNDWATER STORAGE

Sustainable Yield (still to be estimated) representing the net annual volume of groundwater extracted (pumping minus annual volume of managed aquifer recharge) for any one of the groups of aquifers:

- Aromas aquifer and Purisima F aquifer
- Purisima DEF, BC, A, and AA aquifer
- Tu aquifer

MEASURABLE OBJECTIVES - REDUCTION IN GROUNDWATER STORAGE

The maximum net annual groundwater to be extracted that ensures if there were four subsequent years of maximum projected net groundwater extraction, net annual groundwater extractions greater than the minimum threshold will not occur for any one of the following groups of aquifers:

- Aromas and Purisima F aquifers
- Purisima DEF, BC, A, and AA aquifers
- Tu aquifer

Annual net extractions for the different aquifer groups will be used to compare against measurable objectives, and not the five-year average of net extractions. This is because the measurable objective is the maximum that can be pumped if the next four years all had maximum projected pumping, and undesirable results are to be avoided.

A hypothetical scenario is provided on Figure 4 to show how the measurable objective is estimated, and how a five-year average would compare to the minimum threshold. There are some years (e.g., 2030) where the annual net pumping exceeds the minimum threshold. Because we are proposing a five-year average to compare against the minimum threshold, this would still be considered sustainable if the previous four years' net pumping were low enough that the five-year average is below the minimum threshold. There are also many years when pumping exceeds the measurable objective. Exceeding the measurable objective would indicate that pumping over the next four years needs to be lower than the total of four years of the maximum annual pumping.

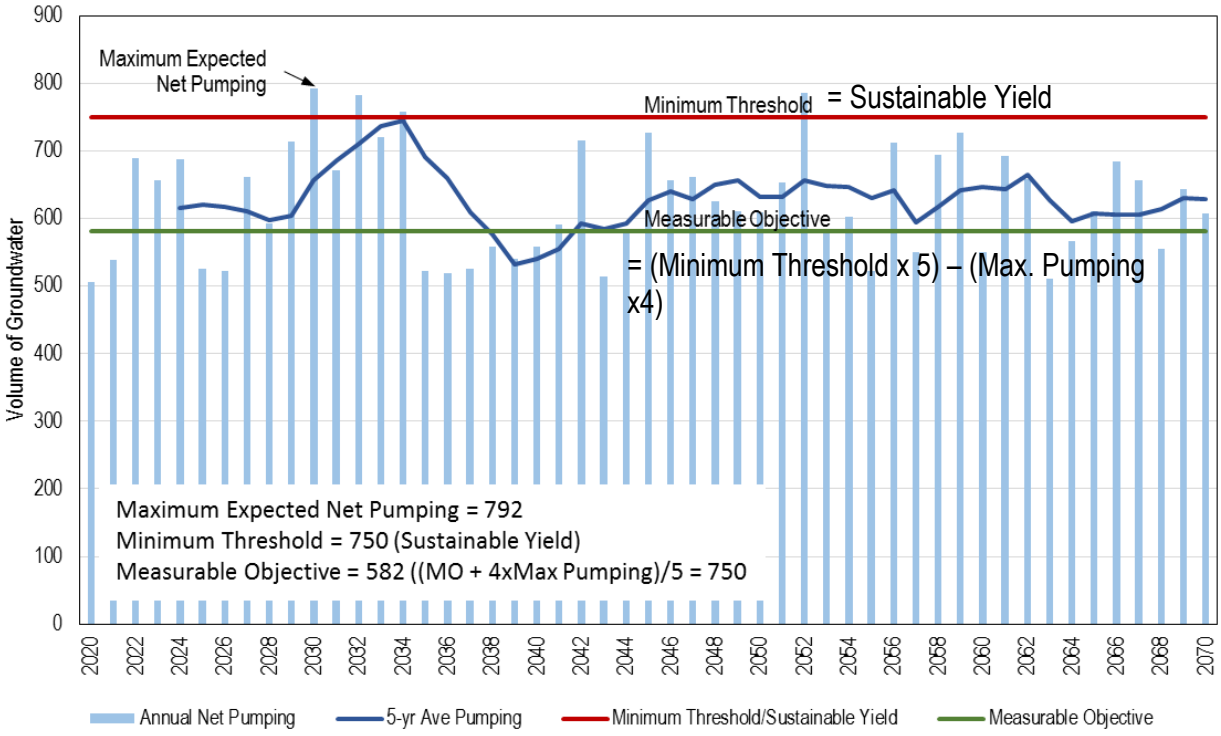

Figure 4. Hypothetical Estimation of Measurable Objective for a Fictitious Aquifer

Sustainability Indicator #3
Seawater Intrusion

SIGNIFICANT AND UNREASONABLE SEAWATER INTRUSION CONDITIONS

Seawater moving farther inland than has been observed from 2013 through 2017.

UNDESIRABLE RESULTS - SEAWATER INTRUSION

The undesirable results for seawater intrusion described are related to the inland movement of chloride related to seawater intrusion which would be considered significant and unreasonable. To be able to monitor the location of the isocontour, chloride concentrations are tracked in representative monitoring wells on either side of the chloride isocontours, and are used in the definition of undesirable results. Additionally, undesirable results are related to protective groundwater elevations used as a proxy for seawater intrusion. Any of the following undesirable results would be considered significant and unreasonable conditions for seawater intrusion.

1. **Undesirable Results for Intruded Coastal Monitoring Wells**
   Any coastal monitoring well with current seawater intrusion has a chloride concentration above their 2013-2017 maximum chloride concentration. This concentration must be exceeded in 2 or more of the last 4 consecutive quarterly samples.

2. **Undesirable Results for Unintruded Coastal Monitoring Wells, and Inland Monitoring and Production Wells closest to the Coast**
   A. Any unintruded coastal monitoring well has a chloride concentration above 250 mg/L. This concentration must be exceeded in 2 or more of the last 4 consecutive quarterly samples.

   B. Any unintruded inland monitoring well (which includes municipal production wells closest to the coast and other non-coastal monitoring wells) has a chloride concentration above 150 mg/L. This concentration must be exceeded in 2 or more of the last 4 consecutive quarterly samples.

3. **Undesirable Results for Protective Groundwater Elevations**
   Five -year average groundwater elevations below protective groundwater elevations for any coastal monitoring well.

BASIS OF FIVE-YEAR AVERAGE FOR GROUNDWATER LEVEL PROXIES

The cross-sectional models that estimate most of the protective elevations are quasi-steady state models. Therefore, the protective elevations estimated by the models represent long-term averages that need to be achieved to maintain the freshwater-seawater interface at the desired location. The Basin is currently considered in critical overdraft because groundwater levels are below protective elevations in a number of coastal monitoring wells. Therefore, the technical consultant has recommended establishing seawater intrusion groundwater level proxies for minimum thresholds that define sustainability based on a multi-year average to ensure that critical overdraft is considered eliminated only when groundwater levels achieve the long-term average estimated to maintain the freshwater-seawater interface at the desired location. Achieving protective elevations in a single year should not represent elimination of the Basin's critical overdraft condition.

However, the multi-year averaging period cannot be too long because once protective elevations are achieved with a multi-year average, an overly long averaging period would allow for long periods of groundwater levels being below protective elevations and seawater to advance inland during those periods. This was the reason the GSP advisory committee revised the recommendation for averaging from ten years to five years. A five-year period also corresponds with SGMA requirements for a five-year update of the GSP.

CONCERNS ON USING FIVE-YEAR AVERAGE FOR GROUNDWATER LEVEL PROXIES

The five-year averaging period for groundwater elevations was questioned at the April GSP Advisory Committee's meeting as still too long, allowing seawater to advance inland during times when groundwater elevations fall below protective elevations, even as the five-year average is still above protective elevations. Defining undesirable results for protective elevations (as a groundwater level proxy) using a five-year average does potentially allow the saltwater interface to advance inland during periods with lower groundwater levels. To meet the five-year average for the groundwater level proxy, these periods with lower groundwater levels would need to be balanced by periods with higher groundwater levels, which could push the saltwater interface back towards Monterey Bay.

GSP Advisory Committee members raised the concern that this potential back and forth movement of the interface could result in dispersion and increases in salt concentrations that may be difficult to reduce even as the average interface is moved out with higher

groundwater levels. There are a number of examples where seawater intrusion can be reduced with sufficiently high groundwater levels, including at the City of Santa Cruz's Moran Lake well in the Basin's Purisima A unit (see attachment for additional examples). However, the concern raised does represent some risk in that specific geologic conditions could cause salt to remain even as the average interface is pushed out. It is technical consultant's opinion that this risk is limited if using a five-year averaging period because within short time periods of less than five years, the back and forth movement would be limited and therefore risk of high concentrations from dispersion is low.

USE OF CHLORIDE CONCENTRATION MINIMUM THRESHOLDS DESIGNED TO PREVENT SIGNIFICANT AND UNREASONABLE CONDITIONS FROM SEAWATER INTRUSION

Although it is technical consultant's opinion that using a five-year averaging period for groundwater level proxies is appropriate, the proposed sustainable management criteria for seawater intrusion do not rely on this opinion to prevent significant and unreasonable conditions in the Basin. The proposed significant and unreasonable conditions are defined as seawater moving farther inland than observed from 2013 through 2017. The GSP regulations require use of a chloride isocontour to define undesirable results for seawater intrusion and for practical reasons, the technical team has proposed using chloride concentrations as minimum thresholds at monitoring wells, including those with groundwater level proxies. Even if groundwater level proxies are being met, exceedances of chloride concentrations at these monitoring wells will represent significant and unreasonable conditions that will require action to meet sustainability requirements under SGMA.

ACTIONS WHEN MEASURABLE OBJECTIVES FOR CHLORIDE CONCENTRATIONS ARE EXCEEDED, INCLUDING POSSIBLE REVISION OF GROUNDWATER LEVEL PROXIES

Although not required by GSP regulations, the technical team recommends using exceedances of measurable objectives for chloride concentrations as a trigger for actions to prevent significant and unreasonable conditions from occurring. Technical team makes this recommendation only for this specific sustainability indicator because this is the indicator for which the basin is in critical overdraft. If chloride concentrations exceed measurable objectives for chloride concentrations, this indicates that concentrations are trending toward minimum thresholds that define undesirable results. Such a trend that seawater intrusion is becoming (or is forecasted to become) significant and unreasonable should be addressed immediately.

For unintruded monitoring wells where chloride concentrations are below 250 mg/L, the measurable objective for chloride concentration is 100 mg/L. It is technical consultant's opinion that variation of chloride concentrations below 100 mg/L is not necessarily indicative of seawater intrusion. Chloride concentrations above 100 mg/L in two of four quarterly samples are more likely indicative of seawater intrusion and warrant management action.

For intruded monitoring wells where chloride concentrations are currently above 250 mg/L, the measurable objective for chloride concentrations is the average concentration from 2013-2017. As this average concentration includes seasonal and measurement variation, an annual average of four quarterly samples above the measurable objective is indicative of seawater intrusion moving inland and warrants management action. The minimum threshold for chloride concentration is the maximum concentration from 2013-2017. Exceedances of this minimum threshold in two of four quarterly samples in a monitoring well is considered an undesired result, which also warrants management action.

The recommended management action for exceedances of chloride measurable objectives is for pumping to be reduced at the municipal well nearest to the monitoring well with the exceedance. The objective of this action is to raise groundwater levels in the monitoring well and prevent further increases of chloride concentrations that could result in significant and unreasonable conditions.

If the groundwater level proxy minimum threshold is being met but chloride measurable objective is exceeded at any monitoring well, this indicates that the groundwater level proxy is not protective for preventing further seawater intrusion than observed over 2013-2017. In this case, the groundwater level proxy should be revised. The groundwater level proxy may not be sufficient because the level is too low or because the multi-year averaging period is too long. Based on an evaluation of groundwater levels and chloride concentrations for what appears insufficient, the level should be raised and/or the averaging period should be shortened.

BENEFIT OF USING FIVE-YEAR AVERAGE FOR GROUNDWATER LEVEL PROXIES

One benefit of using a five-year average for groundwater level proxies is that it can be achieved by a wider range of projects than using a shorter averaging period such as one year. Some projects such as those relying on surface water supplies may not have consistent supplemental supply from year to year. Using a five-year average along with

concentration thresholds allows for projects that cannot achieve a consistent groundwater level every year while protecting the basin over the long-term. Unnecessarily requiring groundwater level proxies to be achieved every single year may limit options for achieving groundwater sustainability and meeting drought demand, or increase requirements on projects.

MINIMUM THRESHOLDS - SEAWATER INTRUSION

Chloride Isocontours Minimum Threshold (Aromas and Purisima aquifers)

Separate 250 mg/L chloride isocontours for Aromas and Purisima aquifers (Figure 5) based on current chloride concentrations in coastal monitoring wells.

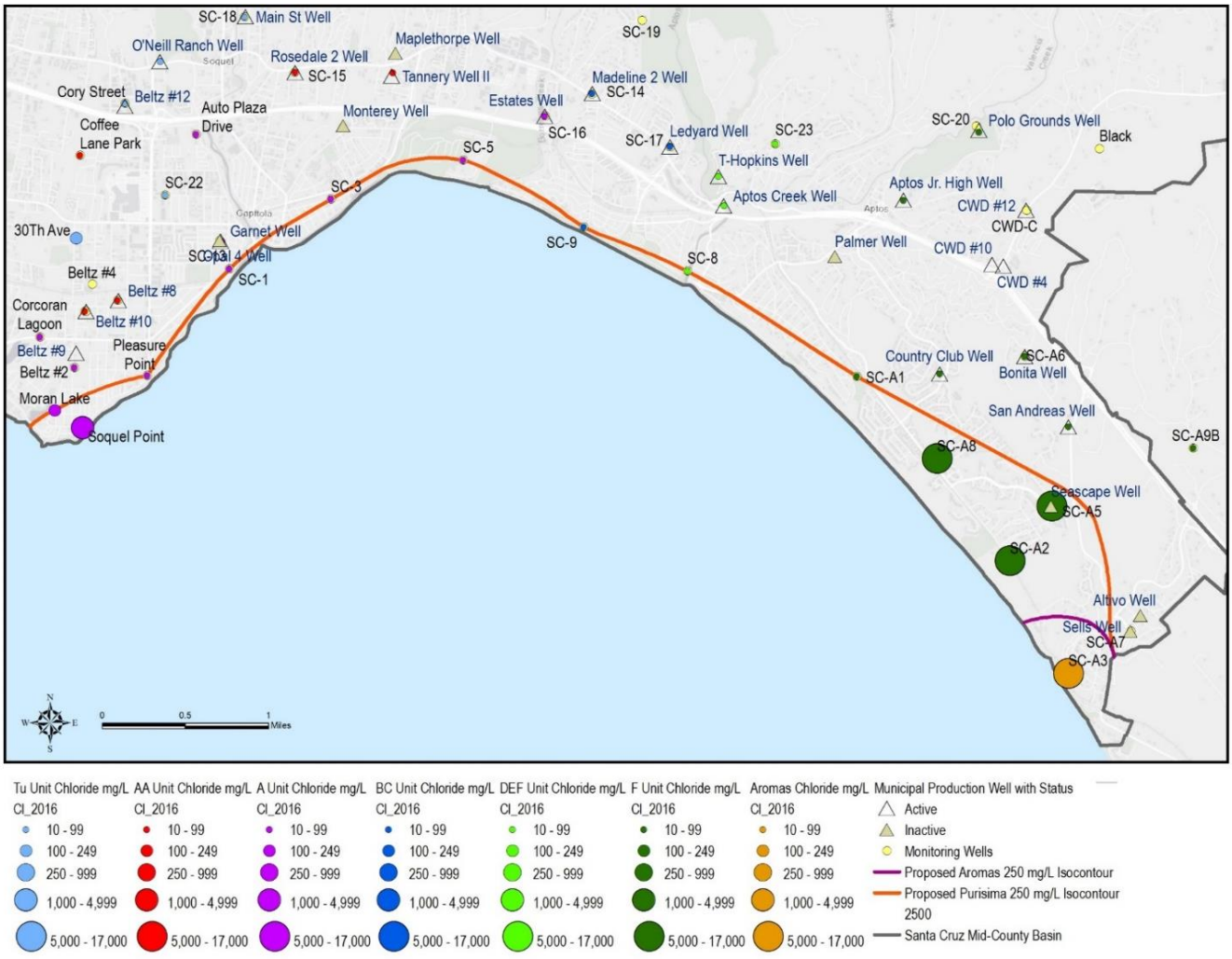

Figure 5. 250 mg/L Chloride Isocontours for the Aromas and Purisima Aquifers

Groundwater Elevations as a Proxy Minimum Thresholds

Groundwater elevations are used as a proxy for seawater intrusion because it is more responsive to the threat of seawater intrusion to manage groundwater elevations and hydraulic gradients than the location of the chloride isocontour and chloride concentrations in representative monitoring wells that are not optimally located for purposes of tracking concentrations around an isocontour. Since 2009, seawater intrusion in the Basin has been managed using protective elevations established to prevent seawater intrusion at the coastline without significant and unreasonable conditions occurring ~~with great success~~. Protective elevations are established at specific elevations above sea level to keep the equilibrium position of the freshwater / seawater interface from impacting underlying aquifers from which production wells pump.

MEASURABLE OBJECTIVES - SEAWATER INTRUSION

Isocontour Measurable Objective

Same locations as the minimum threshold isocontour shown on Figure 5 but the concentration is reduced from 250 mg/L (minimum threshold) to 100 mg/L (Measurable Objective).

Groundwater Elevations as a Proxy Measurable Objectives

Groundwater elevations as a proxy Measurable Objectives are determined based on whether the cross-sectional groundwater model is available for the area or not.

1. Cross-sectional model available: measurable objectives are groundwater elevations that represents >99% of cross-sectional model simulations being protective against seawater intrusion for each monitoring well with a protective elevation. For wells where seawater intrusion has not been observed, cross-sectional models estimate protective elevations to protect the entire depth of the aquifer unit of the monitoring wells' lowest screen. For wells where seawater intrusion has been observed, the cross-sectional models estimate protective elevations to prevent seawater intrusion from advancing.
2. Cross-sectional model not available: measurable objectives are the groundwater elevations that represent protective groundwater elevation estimated by using the Ghyben-Herzberg method to protect the entire depth of the aquifer unit the monitoring wells are screened in.

Sustainability Indicator #4
Degraded Groundwater Quality

Proposals for degraded groundwater quality SMC were discussed at the following GSP Advisory Committee meetings: June 2018, September 2018 and October 2018.

SIGNIFICANT AND UNREASONABLE DEGRADED GROUNDWATER QUALITY

Significant and unreasonable degradation of groundwater would occur when groundwater quality, attributable to groundwater pumping or managed aquifer recharge, fails to meet state drinking water standards.

UNDESIRABLE RESULTS - DEGRADED GROUNDWATER QUALITY

Groundwater quality undesirable results in the basin occur when as a result of groundwater pumping or managed aquifer recharge, any representative monitoring well exceeds any <minimum threshold>.

MINIMUM THRESHOLDS - DEGRADED GROUNDWATER QUALITY

Minimum thresholds are state drinking water standards for each constituent of concern that are monitored in selected monitoring and private wells, and all municipal production wells for degraded groundwater quality.

Table 1. General Basin Constituents of Concern

Constituent of Concern	Reason for Concern	Minimum Threshold/ Drinking Water Standard
Total dissolved solids	general health of basin & seawater intrusion	1,000 mg/L
Chloride	general health of basin & seawater intrusion	250 mg/L
Iron	naturally elevated	300 µg/L
Manganese	naturally elevated	50 µg/L
Arsenic	naturally elevated	10 µg/L
Chromium (Total)	naturally elevated	50 µg/L
Chromium VI	naturally elevated	none set yet
Nitrate as Nitrogen	septic systems & agriculture	10 mg/L
Perchlorate	agriculture related	6 µg/L
Organic compounds	human introduced	various

Each project implemented as part of the GSP will have its own unique constituents of concern that will apply to monitoring and production wells included in their use permits granted by the State Water Board Division of Drinking Water (DDW). Monitoring wells to be used for monitoring as part of permit conditions will be included as representative monitoring wells in the GSP and the constituents monitored will become constituents of concern at those particular representative monitoring wells.

MEASURABLE OBJECTIVES - DEGRADED GROUNDWATER QUALITY

Measurable objectives for each representative monitoring well are equal to the 2013 – 2017 average concentrations for each constituent of concern. If a representative monitoring well does not have groundwater quality data during this period, the most recent concentrations will be used for averaging.

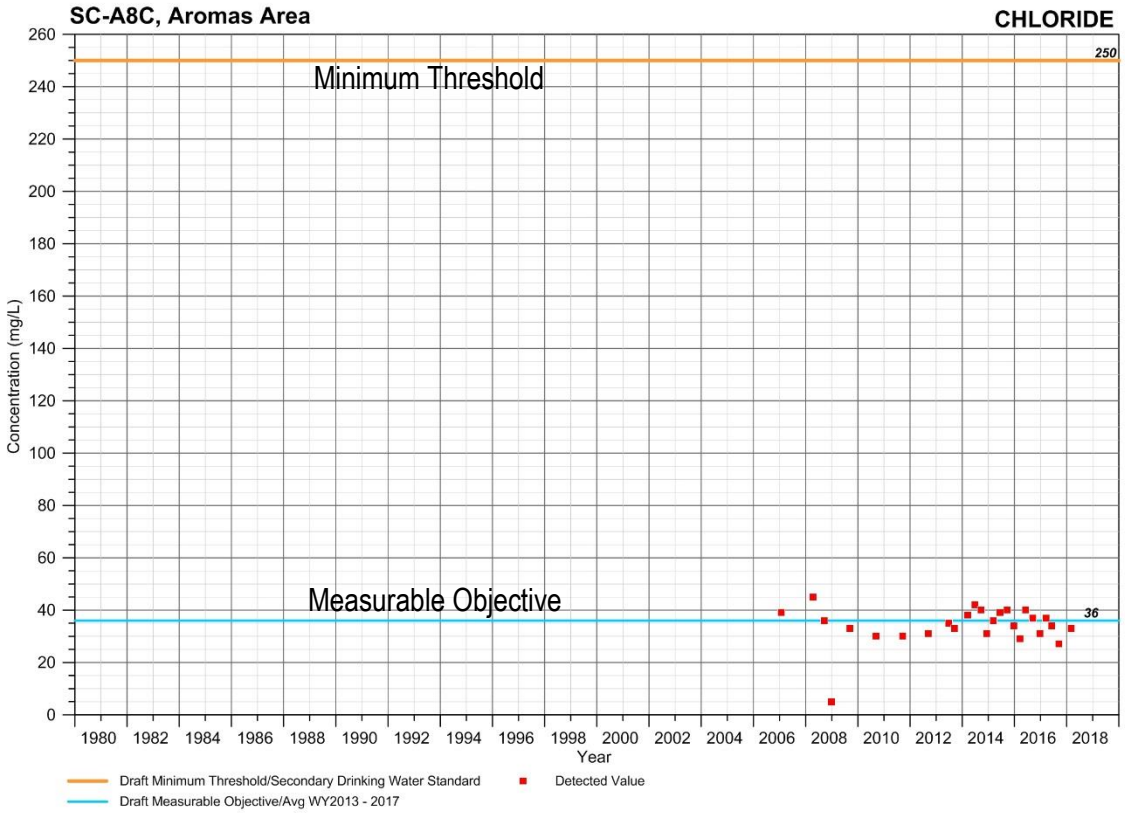

Figure 6. Example of Minimum Threshold and Measurable Objective for Chloride in Monitoring Well SC-A8C

Sustainability Indicator #5
Subsidence

Proposals for subsidence SMC were discussed at the following GSP Advisory Committee meetings: April 2018 and May 2018.

The sustainability indicator was found to not be applicable in the Santa Cruz Mid-County Basin as an indicator of groundwater sustainability and therefore no SMC are set. Even though the indicator is not applicable, a statement of significant and unreasonable subsidence caused by lowering of groundwater levels was discussed and is included below:

> Any land subsidence caused by lowering of groundwater levels occurring in the basin would be considered significant and unreasonable.

Sustainability Indicator #6
Depletion of Interconnected Surface Water

Proposals for depletion of interconnected surface water SMC were discussed at the following GSP Advisory Committee meetings: June 2018, February 2019 and April 2019. There have also been four Working Group meetings.

SIGNIFICANT AND UNREASONABLE DEPLETION OF INTERCONNECTED SURFACE WATER

Surface water depletion, due to groundwater extraction, in interconnected streams supporting priority species, greater than that experienced over the period from the start of shallow groundwater level monitoring through 2015, would be a significant and unreasonable depletion of surface water.

UNDESIRABLE RESULTS - DEPLETION OF INTERCONNECTED SURFACE WATER

Any shallow representative monitoring well's groundwater elevation falling below its minimum threshold would be an undesirable result.

MINIMUM THRESHOLDS - DEPLETION OF INTERCONNECTED SURFACE WATER

The approach for developing minimum thresholds for the depletion of interconnected surface water sustainability indicator is to select groundwater elevations in shallow representative monitoring wells below which significant and unreasonable depletions of surface water due to groundwater extractions would occur.

Since significant and unreasonable conditions have not occurred since at least 2001 when shallow groundwater level monitoring began, minimum thresholds for shallow groundwater elevations in the vicinity of interconnected streams are based on the highest seasonal-low elevation during below-average rainfall years, over the period from the start of monitoring through 2015. The years after 2015 are not included because 2016 was an average rainfall year and 2017 was extremely wet, which increased overall Basin shallow groundwater elevations above all previous levels.

MEASURABLE OBJECTIVES - DEPLETION OF INTERCONNECTED SURFACE WATER

Where groundwater and surface water are interconnected, measurable objectives at monitoring points are groundwater elevations that are greater than the minimum

thresholds by the range in seasonal-low shallow elevations over the period of record through 2015. In all cases this results in groundwater elevations that are higher than the creek bed elevation at each monitoring point. The increased hydraulic gradient increases groundwater contributions to streamflow.

The range in seasonal-low elevations represents known change in seasonal-low elevations that can occur and includes the years when groundwater elevations in the Basin as a whole have been increasing. The range effectively provides the operational flexibility that measureable objectives are intended to provide.

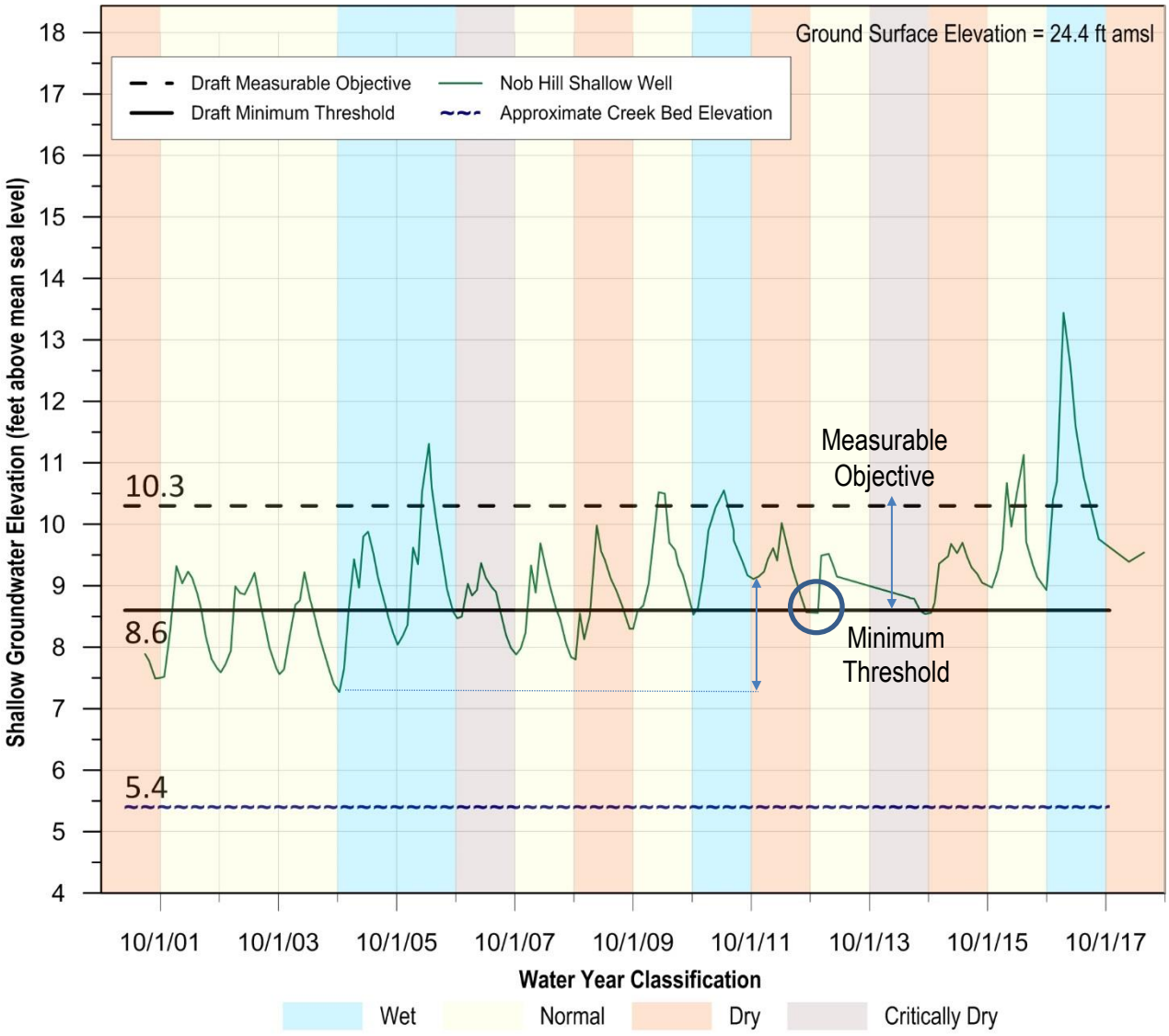

Figure 7. Example of Minimum Threshold and Measurable Objective for Shallow Monitoring Well at Nob Hill

Attachment to Item 3.2

Introduction

A few GSP Advisory Committee members have expressed concern with using the five-year average to calculate groundwater level proxies to protect against seawater intrusion. Using a five-year average does potentially allow the saltwater interface to advance inland during periods with lower groundwater levels. To meet the five-year average for the groundwater level proxy, these periods with lower groundwater levels would need to be balanced by periods with higher groundwater levels, which would push the saltwater interface back towards the ocean. Advisory Committee members are concerned that higher groundwater levels might not push out seawater intrusion and reduce high salt concentrations resulting from periods of low groundwater levels, and they have asked whether a more constant hydraulic barrier would be more appropriate and whether the averaging period should be a shorter duration.

This attachment provides examples from several basins in California that address the question about whether seawater intrusion can be pushed out with higher groundwater levels. It should be noted that the sustainable management criteria for seawater intrusion do not rely on this conclusion to prevent significant and unreasonable conditions for seawater intrusion. The main document for Agenda Item 3.2 describes how the risk that the averaging duration for the groundwater level proxy is too long to be protective is lowered by using criteria for chloride concentration to prevent significant and unreasonable conditions.

Overall Conclusion

Upon review of a few documented cases of seawater intrusion (SWI) presented below, the information suggests that reversing SWI is possible and appears to have been accomplished in some cases. However, there are hydrogeologic conditions where higher groundwater levels may not reverse seawater intrusion. Data also show that chloride concentrations can increase during periods of low groundwater levels, emphasizing the importance of using chloride concentrations as sustainable management criteria to quickly respond to any increases.

Example 1: City of Santa Cruz Moran Lake Monitoring Well

When the Moran Lake monitoring well was installed in 2005, the Medium well depth completion in the Purisima A unit of the Santa Cruz Mid-County Basin had chloride concentrations at levels indicating seawater intrusion. Chloride concentrations were greater than 700 mg/L, which is above the proposed minimum threshold of 250 mg/L. Since 2005, average groundwater levels in the well have been at or above the protective elevation calculated for the well, and chloride concentrations have consistently dropped to concentrations below the proposed measurable objective of 100 mg/L for unintruded wells (Figure 1). This indicates that groundwater levels meeting protective elevations can reverse seawater intrusion. However, groundwater levels were already above protective elevations at the time of the well's installation. Although there are no groundwater level data from the Moran Lake well to show how seawater intrusion advanced inland, the nearby but farther inland Beltz #2 well that was pumped prior to 2000 shows how low groundwater levels corresponding with a period of high City of Santa Cruz pumping resulted in an increase of chloride concentrations over a five year period. As groundwater levels rose with a reduction of City pumping by more than 50%, chloride concentrations at Beltz #2 declined after 1994 showing the beginning of seawater intrusion reversal that continues to be observed at the Moran Lake well (inset and overlay on Figure 1).

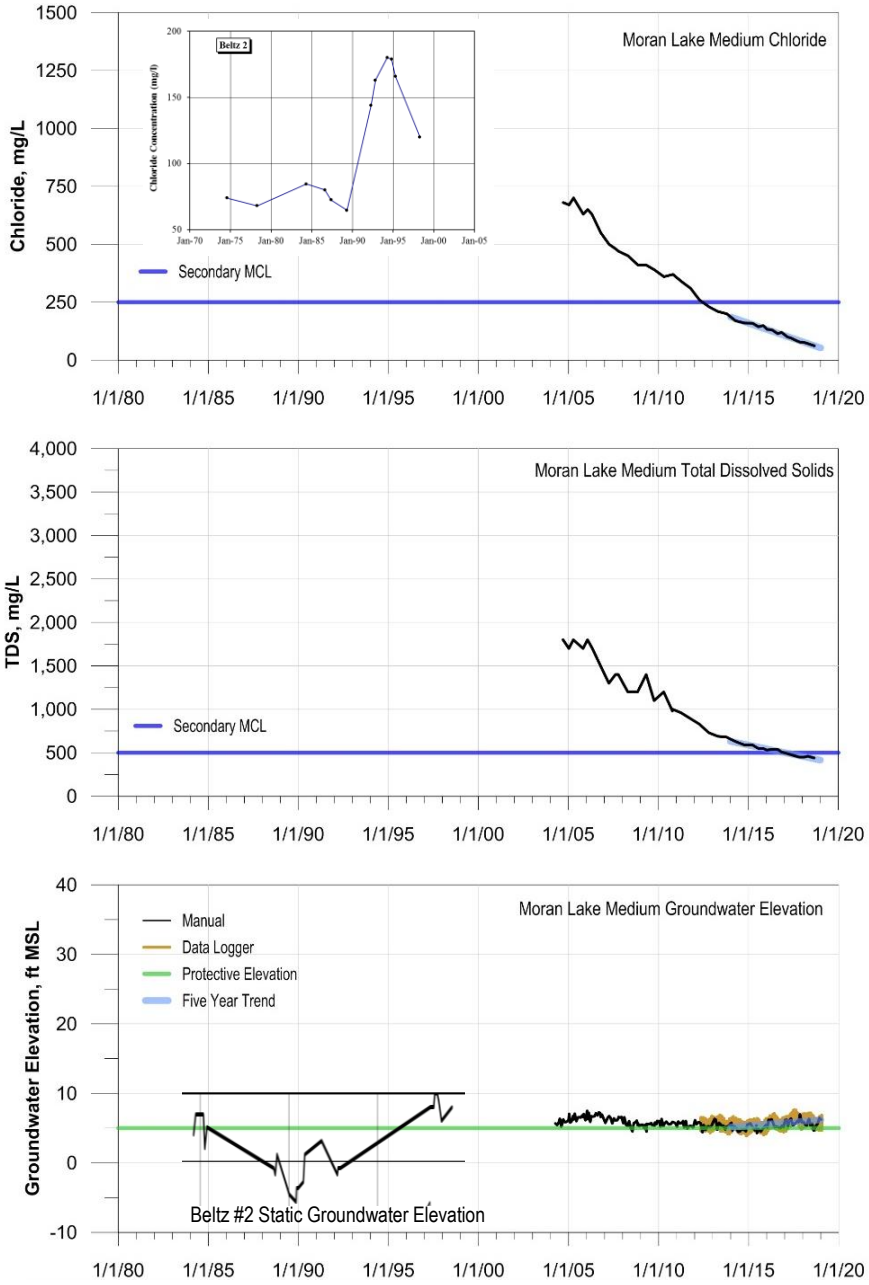

Figure 1. Hydrograph and Chemograph of Moran Lake Medium Well (Montgomery & Associates, 2019) Overlain by Hydrograph and Inset Chemograph of Beltz #2 Well (Johnson et al., 2004)

Moran Lake Monitoring Well Conclusions and implications for Santa Cruz Mid-County Basin

This example shows that seawater intrusion has been reversed with groundwater levels at protective elevations at a single location in one of the main groundwater supply aquifers of the Basin.

References

Johnson, N.M., D. Williams, E.B Yates, and G. Thrupp, 2004, Groundwater Assessment of Alternative Conjunctive Use Scenarios Technical Memorandum 2: Hydrogeologic Conceptual Model, prepared for Soquel Creek Water District, September.

Montgomery & Associates, 2019, Santa Cruz Mid-County Basin Groundwater Monitoring: Update through Water Year 2018, technical memorandum to Santa Cruz Mid-County Groundwater Agency, May 9.

Example 2: Orange County Talbert Seawater Barrier/Groundwater Replenishment System

Orange County Water District's (OCWD) Talbert Seawater Barrier began operation in 1976, pumping recycled and treated water into the multiple aquifers below Orange County. Local geology consists of older folded aquifers overlain by and hydrologically connected to the younger Talbert aquifer (Figure 2). Substantial groundwater pumping inland caused intrusion into these aquifers. However, the lowermost main aquifer system did not experience intrusion as it is hydrogeologically disconnected from the ocean due to faulting.

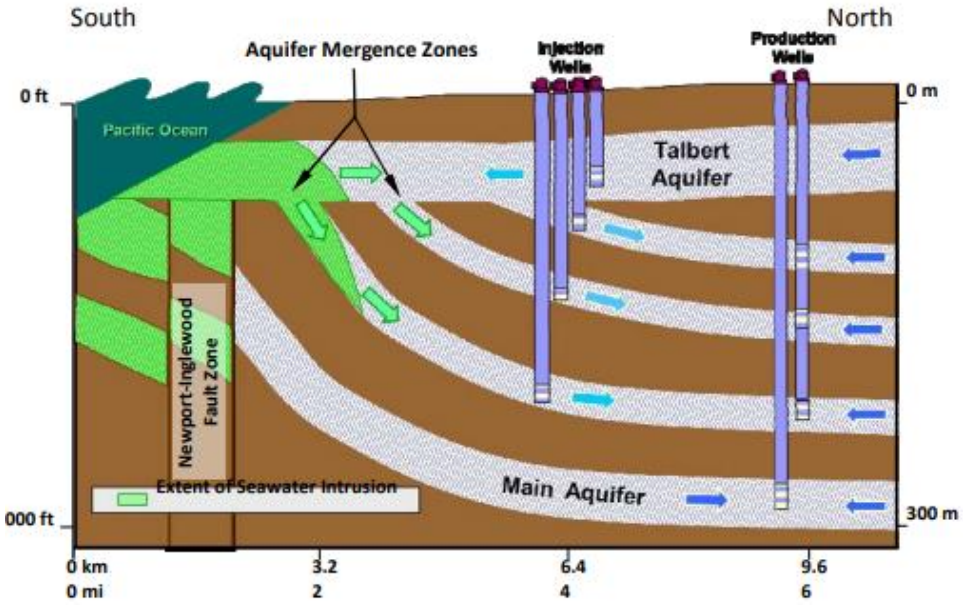

Figure 2. Conceptual Model of OCWD SWI, Injection Wells, and Production Wells (Herndon and Markus,

Around the 1990s, increases in pumping exacerbated seawater intrusion, which began flanking the Talbert barrier as evidenced by the 1998 and 2004 chloride isocontours shown in Figure 3. Due to increases in managed aquifer recharge (MAR) activity in the early 2000s, the rate of intrusion slowed and began reversing in most areas by 2014. Chloride and groundwater levels from specific wells within this area are further illustrated and discussed below.

To improve management of the SWI, OCWD constructed a number of new injection wells after 2000, from which they have reported some success not only stopping intrusion, but reversing it, as evidenced by chloride concentrations.

Within the OCWD annual reports (OCWD, 2015), graphs are shown displaying injection volume, groundwater water levels, and chloride concentrations at monitoring wells near injection sites. Two representative graphs are included as Figure 4 and Figure 5, along with some explanatory text from the report. Essentially, when injection occurred, chloride concentrations lowered in nearby monitoring wells. This is also evidenced on a larger scale by the retreating chloride isocontours in Figure 3. While some areas still show advancing SWI, most areas near the Barrier show stable or retreating chloride concentrations.

"When groundwater elevations rise and are sustained above mean sea level, chloride concentrations decrease and intrusion is pushed back seaward. This is especially evident in HBM-2MP1 [Figure 4] which shows how chloride concentrations were significantly reduced when new injection wells were turned on to raise groundwater levels." (OCWD, 2016)

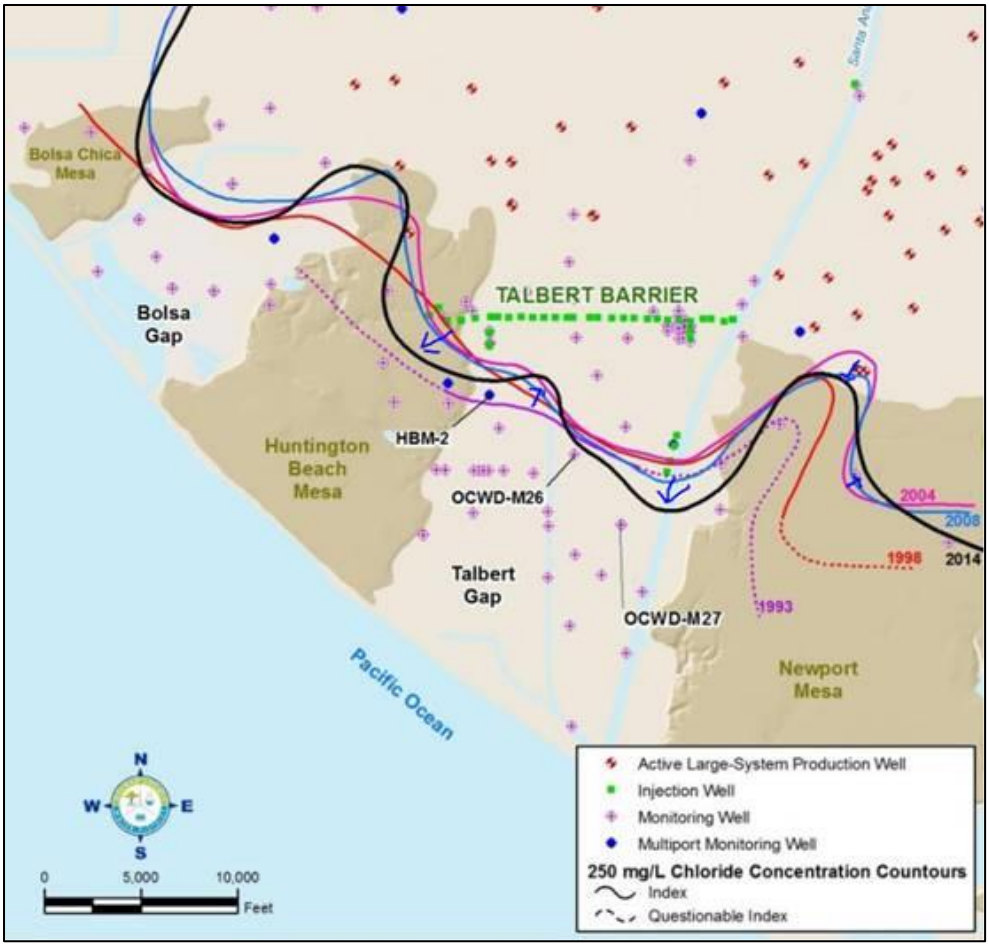

Figure 3. Extent of SWI in the Talbert Gap Area as of 2014 (OCWD, 2016)

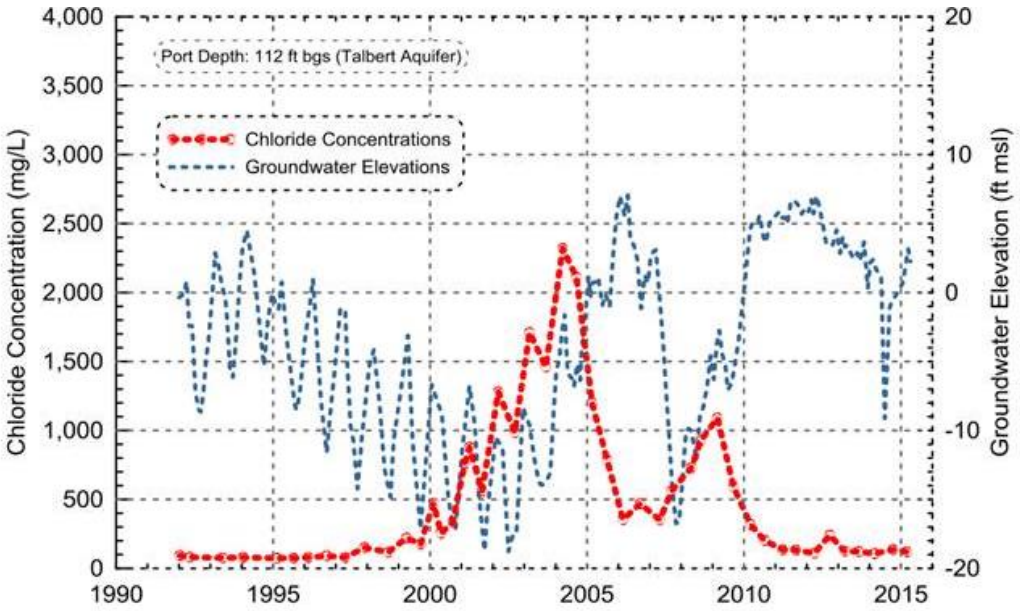

Figure 4. Chloride concentrations and Groundwater Elevation at Monitoring Well HBM-2/MP1 (OCWD, 2015)

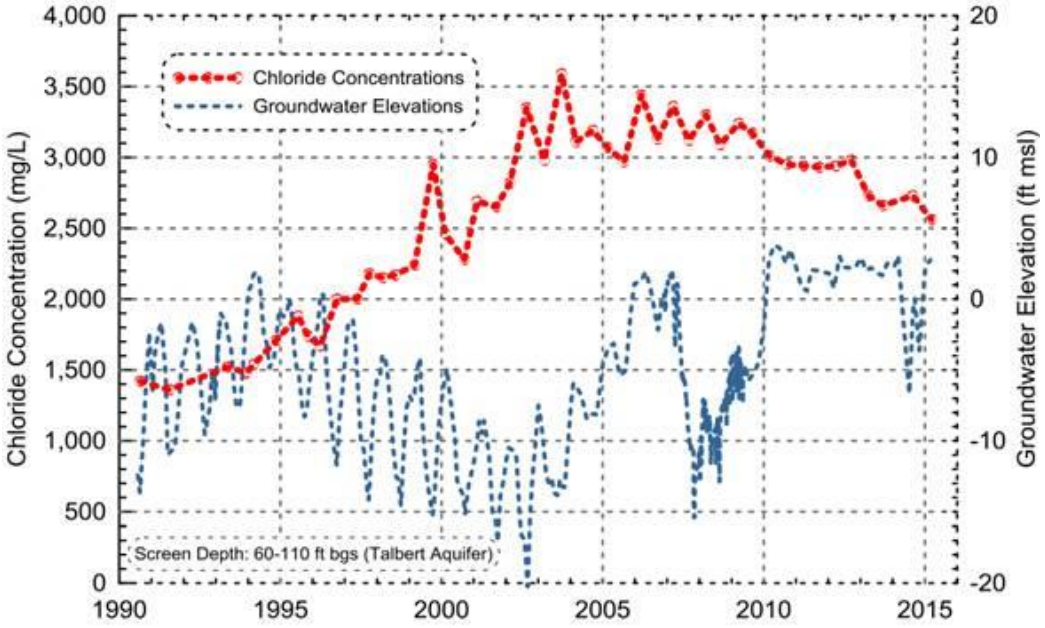

Figure 5. Chloride Concentrations and Groundwater Elevation at Monitoring Well OCWD-M27 (OCWD, 2015)

As pointed out in the report excerpt above, HBM-2/MP1 shows clear declines in chloride concentration correlated with increased groundwater elevation (Figure 4). In particular, the periods from 2005-2007 and 2009-2015 exhibit high groundwater elevations and dramatic decreases in chloride. Conversely, periods with low groundwater levels lead to a rise in chloride concentrations. Figure 4 demonstrates that when groundwater levels fall below sea level for even a short period at this well, such as the few years between 2007 and 2010, the chloride concentration increases in response. However, prior to 2010, a five-year average of groundwater levels above sea level is not achieved. This demonstrates the importance of raising groundwater levels and maintaining them such that a multi-year average at the protective elevations is achieved. The average groundwater levels for 2010-2015 were above sea level and concentrations remained low even during the short period when groundwater levels dropped below sea level. Seasonal fluctuations in groundwater level also appear to drive similar oscillations in chloride concentrations. This is particularly evident in the period of leading up to maximum intrusion from 2000-2005.

Figure 5 plots chloride concentrations and groundwater level from another monitoring well (OCWD-M27), seaward of the Talbert Barrier. Chloride concentrations and groundwater levels are not as strongly correlated in this example, but there are still some periods of interest. The period from 1995-2004 has very low groundwater levels, during which there is a steady increase in chloride concentration. From 2005 onward, groundwater levels increase and are mostly above sea level after 2000, and SWI appears to level out and begin a slow reversal.

Talbert Gap Barrier Conclusions and Implications for Santa Cruz Mid-County Basin

This project showcases an example of high chloride concentrations in groundwater (SWI), which were reversed by groundwater injection. It also demonstrates that even during short periods (1-3 years) of lower groundwater levels chlorides levels can increase significantly and the importance of achieving higher groundwater levels averaged over multiple years. Additionally, it serves as an example of how ineffectively placed and/or preforming injection wells can be circumvented or overpowered by SWI.

References

Herndon, R. and M. Markus, 2014, Large-Scale Aquifer Replenishment and Seawater Intrusion Control Using Recycled Water in Southern California. https://www.ocwd.com/media/1857/large-scale-aquifer-replenishment-and-seawater-intrusion-control-using-recycled-water-in-southern-california.pdf

Orange County Water District (OCWD), 2015 Groundwater Management Plan, 2015 Update, Final Draft, June 15, https://www.waterboards.ca.gov/santaana/water_issues/programs/Wastewater/Poseidon/2016_05-02_OCWD_Groundwater_Management_Plan_2015_Update.pdf

Example 3: Santa Clara Valley

Santa Clara Valley has been subject to historic SWI since at least 1945; during periods of high pumping, salt water infiltrated through saltwater creeks and percolated down into the underlying aquifer. From 1945-1980, this pattern is clear; higher levels of pumping led to the 100 mg/l chloride isocontour encroaching up to 5 miles inland over this period. From 1980-2012, activities such as managed aquifer recharge (MAR), treated water deliveries, and decreased pumping pushed the 100mg/l isocontour back close to its position in 1945 (Figure 6). From 2012-2015, SWI occurs again, perhaps a ramification of the recent drought when supplemental supplies to support MAR and treated water deliveries were reduced.

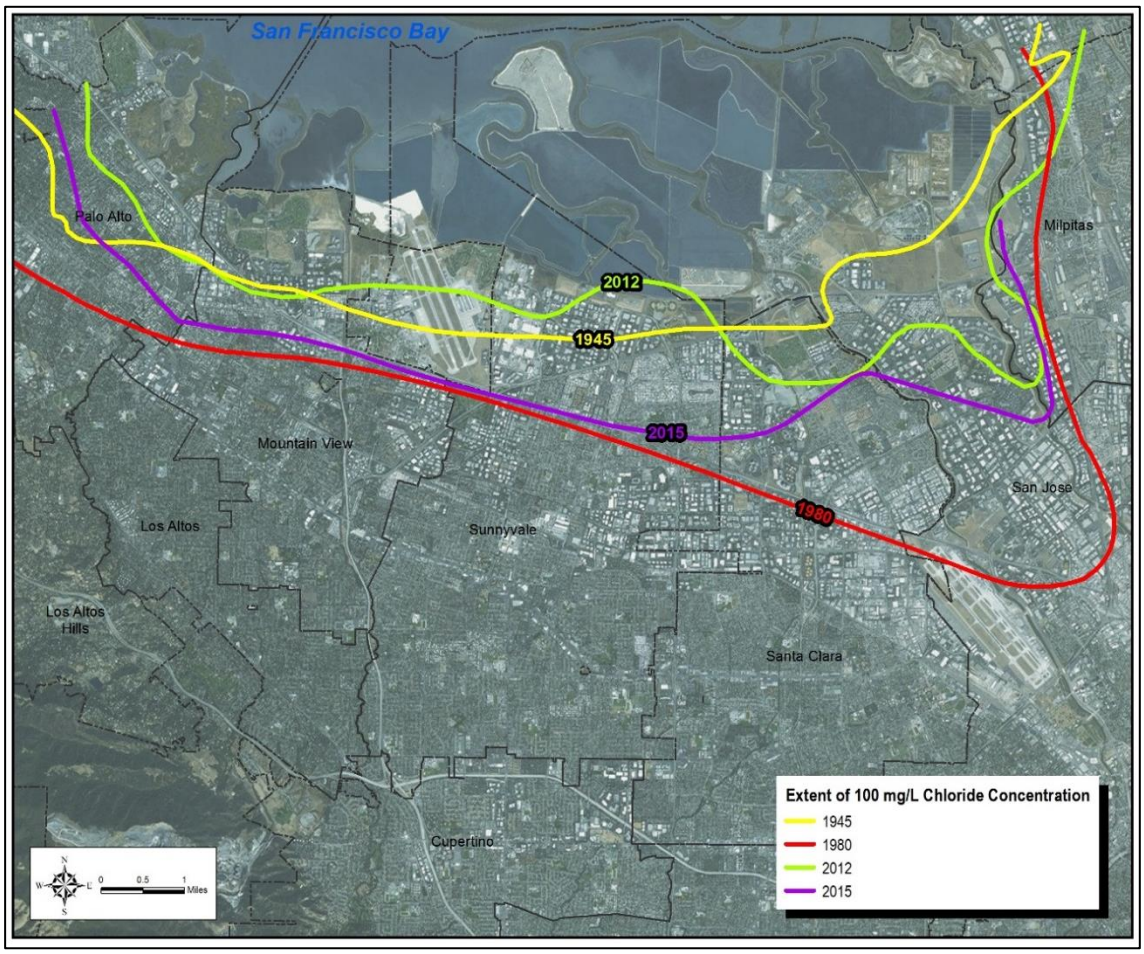

Figure 6. Seawater Intrusion in Santa Clara County (HydroMetrics WRI, 2017)

Conclusions and Implications for Santa Cruz Mid-County Basin

The movement of the chloride extent in the Santa Clara Valley example illustrates the responsiveness of SWI to changes in freshwater groundwater elevation. Seawater intrusion appears to be pushed back by groundwater management activities undertaken in the basin to raise groundwater levels. When supplies for groundwater management activities were reduced, saltwater intrusion advanced. This shows groundwater levels can move the saltwater interface and the importance of managing to changes in chloride concentrations as well as groundwater level proxies.

Reference

HydroMetrics WRI, 2017, Preliminary Groundwater Zones of Benefit Study, Santa Clara County, California, prepared for Santa Clara Valley Water District, October, https://www.valleywater.org/sites/default/files/Draft_Preliminary_Zone_of_Benefit_Study_Report-op.pdf

Example 4: Dominguez Gap Barrier Project

The Dominguez Gap Barrier Project consists of three sets of injection wells constructed in coastal Los Angeles to combat SWI (Figure 7). Current injection wells have slowed seawater intrusion but have not stopped or reversed it, as evidenced by groundwater level and chloride measurements in nearby monitoring wells (Figure 8). Explanatory text from the full USGS Report (Land et al., 2004) is edited for brevity and presented below the figure. Overall, while most wells exhibit increased groundwater levels that slow or stop SWI, some display increases in chloride, such as 331-A and 351-G (Figure 8**).** The USGS reports that "For most wells, water levels along the coast have been rising since the early 1970s in response to injection of freshwater at the barrier projects and reduced pumping. However, not all wells with increased water levels show a corresponding decrease in dissolved chloride….Several time-series plots showing chloride concentration and water level at a few selected wells are presented in [Figure 8]. These plots were constructed from historical water-level and depth-dependent chloride-concentration data…." (Land, et al., 2004).

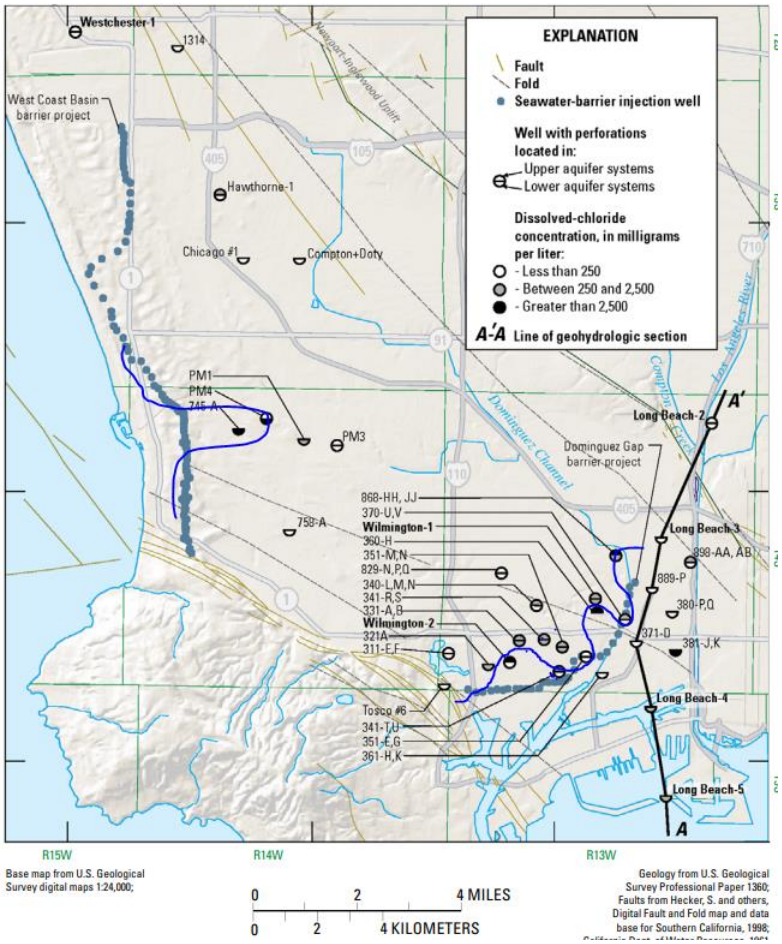

Figure 7. Chloride Measurements near the Dominguez Gap Barrier Project (Land et al. 2004)

It should also be noted that most groundwater levels measured over the study period were still below sea level, and therefore would not be expected to reverse SWI. Groundwater modeling predicts that increased injection could effectively reverse the current SWI by raising groundwater levels above sea level.

The USGS team used a SUTRA model[1] to test the response of SWI to three scenarios: (1) no change, (2) slurry wall, and (3) raising of inland groundwater levels. Scenario 3 was considered very effective at controlling SWI in modeled simulations and actually reversed chloride concentrations (Land et al. 2004).

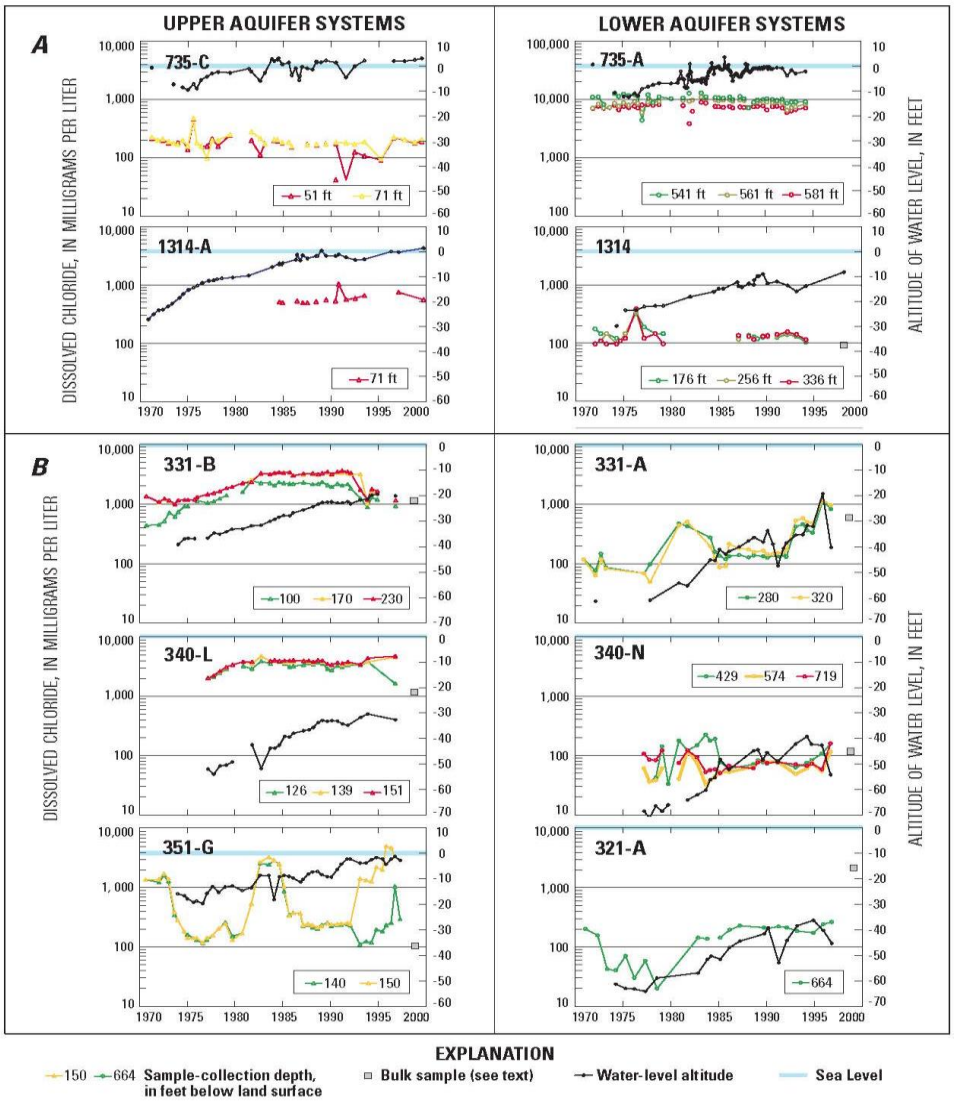

Figure 8.Chloride and GWL Measurements in Monitoring Wells (Land et al. 2004)

Reference

Land, M., Reichard, E.G., Crawford, S.M., Everett, R.R., Newhouse, M.W., and Williams, C.F., 2004, Ground-Water Quality of Coastal Aquifer Systems in the West Coast Basin, Los Angeles County, California, 1999–2002: U.S. Geological Survey Scientific Investigations Report 2004–5067, 80 p

Conclusions and Implications for Santa Cruz Mid-County Basin

The Dominguez Gap Barrier Project illustrates both the consequences of insufficient injection volumes and the modeled possibilities for SWI reversal given proper injection volumes to raise groundwater levels above sea level. Rising groundwater levels are not sufficient to stop and reverse seawater intrusion if groundwater levels remain below protective elevations.

[1] SUTRA is a model for saturated-unsaturated, variable-density ground-water flow with solute or energy transport.

June 12, 2019

MEMO TO GSP ADVISORY COMMITTEE

Subject: Agenda Item 6.1

Title: Groundwater Sustainability Plan (GSP) Advisory Committee Voting Process

At your June 19, 2019 meeting, the GSP Advisory Committee members will be asked to vote and express individual levels of support for the package of recommendations that will be forwarded to the Mid-County Groundwater Agency (MGA) Board following the meeting for its consideration.

Background

Over the past several Advisory Committee meetings, staff has been working with Committee members to develop a package of recommendations to forward to the MGA Board. There are two main elements of Advisory Committee's recommendations:

- Proposed Sustainability Goal (meeting material 3.1)
- Proposed Sustainable Management Criteria for all Sustainability Indicators (meeting material 3.2)

Section E of the Advisory Committee's adopted Charter provides guidance on how Committee members will make decisions, including how they will show level of support for Committee recommendations. The Committee's Charter may be found on the MGA's website at: http://bit.ly/GSP-AC-Charter. The Charter affirms that the Advisory "will strive to achieve a high level of agreement in developing advice for the MGA Board."

Voting Process

As detailed in the Charter, "[f]ormal proposed recommendations to the MGA Board will be presented verbally and/or in writing for consideration by the full Advisory Committee. Members will be allowed sufficient time to consider them before voting. Advisory Committee members will be invited to indicate whether they support, or not, an item under discussion."

Also per the Charter, a "'**recommendation**' from the GSP Advisory Committee will be achieved if a majority of Committee members present expresses support for a particular decision item." Furthermore, the Charter specifies that "every recommendation that is brought to the MGA Board will contain context in terms of which Advisory Committee members voted for or against a particular item."

At the Advisory Committee's June 19, 2019 meeting, staff will invite individual Committee members to vote on the recommendation package. In particular, Committee members will be invited to:

1. Share their level of support for the entire package. Optional levels of support described in the Charter include:

    - General support ("I like it")
    - Qualified support ("I have some issues with it, but I can live with it")
    - Fundamental disagreement ("I don't like it and cannot live with it")

    Note: "Support" for the package of recommendations is captured by the first two bullets above.

2. Share their rationale behind their level of support.

The specific steps by which the voting process will take place at the June 19 meeting include the following:

- Step 1: The Committee will discuss recent refinements to the package stemming from the May 16th joint MGA Board and Advisory Committee meeting, make any final refinements as needed, and confirm the complete package of recommendations for voting.

- Step 2: The committee will vote on the complete package. In particular:
    - Each Committee member will share his or her level of support and provide a rationale (reasons for agreement or disagreement).
    - Staff will document this information.
    - If fundamental disagreements exist regarding the package of recommendations (i.e., it does not achieve the threshold for "support"), Committee members will discuss and seek resolution.
    - Staff will capture any remaining disagreements to share with MGA Board.

If a Committee member believes that he or she is not able to express a level of support for the package of recommendations, he or she may abstain.

Following the June 19th meeting, staff will transmit the final recommendations to the MGA Board via a memo. The recommendations will contain context in terms of which Advisory Committee members voted for or against a particular item, along with a description of the reasons why and any other rationale provided.

The recommendations will be accompanied by a “conveyance memo” that will provide an overview of the voting process and any additional explanatory details. A draft conveyance memo may be found in the meeting packet entitled Item 6.2.

June 12, 2019

MEMO TO THE GSP ADVISORY COMMITTEE

Subject: Agenda Item 6.2

Title: Draft Outline and Text for Conveyance Memo to Accompany Advisory Committee's Recommendations to MGA Board

Below is a draft outline and proposed text for the conveyance memo that will accompany the Groundwater Sustainability Plan (GSP) Advisory Committee's recommendations to the Santa Cruz Mid-County Groundwater Agency (MGA) Board.

Attached to this conveyance memo are the Groundwater Sustainability Plan (GSP) Advisory Committee's GSP-related recommendations to the Santa Cruz Mid-County Groundwater Agency (MGA) Board.

The attached document includes the following information:

- Recommended text for inclusion in the Santa Cruz Mid-County GSP on the following two topics: 1) proposed Sustainability Goal, and 2) proposed Sustainable Management Criteria for the six Sustainability Indicators specified in the Sustainable Groundwater Management Act (SGMA).
- A listing of the "level of support" for the above package of recommendations provided by each of the 13 Advisory Committee members.
- Additional detail and rationale provided by individual Advisory Committee members explaining their level of support for the recommendations.

The Advisory Committee is submitting these recommendations to the MGA Board for consideration and potential inclusion in the draft Santa Cruz Mid-County Groundwater Basin GSP.

Background – Advisory Committee Charge and MGA Board Guidance

The Advisory Committee initially convened in October 2017 to begin fulfilling its charge to the Board. Since then the Committee has participated in 20 formal meetings, along with additional orientation sessions, enrichment sessions, and technical work groups.

The Committee's charge, as detailed in the Advisory Committee Charter, includes the following:

The Groundwater Sustainability Plan Advisory Committee will provide guidance to staff and the Santa Cruz MGA Board for the creation of the Groundwater Sustainability Plan. The Committee will analyze and provide recommendations to the MGA Board on key policy issues that will form the Plan. The Committee's final presentation to the MGA Board will take place no later than the MGA's July 2019 Board Meeting.

Committee members will represent diverse interest groups within the Basin. They will deliberate based on scientific data to understand current and projected basin conditions. The Committee will work collaboratively in an open and public process to ensure community concerns are addressed within the Plan.

The Committee will recommend strategies to the MGA Board to achieve a sustainable groundwater basin by 2040. Responsibilities include:

- *Evaluate scientific information and recommendations from staff on the impacts to the Basin, and assess various management approaches to reach sustainability,*
- *Consider the effect of changing climate and sea level on groundwater conditions,*
- *Establish objectives and thresholds for State mandated sustainability indicators,*
- *Analyze options and recommend supplemental water supply alternatives to meet projected demand,*
- *Promote public education about Plan decisions and the Basin's sustainability, and*
- *Recommend approaches to funding projects and allocation of project costs.*

The Advisory Committee will be tasked to work with staff and consultants to support development of the Plan. They will provide the MGA Board with recommendations on how to address key policy issues required by the State's legal mandate. The Committee will make periodic reports to the MGA Board for input and feedback. They will report on key milestones in the development of the Plan, including: groundwater pumping impacts, key alternatives to reach groundwater sustainability, thresholds and measurable objectives for each sustainability indicator, possible program funding strategies, and recommendations for Plan implementation.

The MGA Board provided additional guidance relevant to the Advisory Committee.

- At its March 16, 2017 meeting, the Board approved staff recommendation to focus GSP committee input on policy issues, rather than technical issues.
    - Staff reviewed and identified sections of the Department of Water Resources' GSP Annotated Outline for likely GSP committee review and input:

        a. Current and Historical Groundwater Conditions [GSP section 2.2.2]
        b. Water Budget [GSP section 2.2.3]
        c. Sustainability Goals [GSP section 3.1]
        d. Undesirable Results [GSP section 3.4]
    - Staff also outlined the materials that the GSP Committee would likely be expected to produce:
        a. Mission Statement [sustainability goal GSP section 1.2]
        b. Principles [sustainability goal GSP section 1.2]
        c. Basin Management Goals [minimum thresholds GSP section 3.3]
        d. Basin Management Objectives [measurable objectives GSP section 3.2]
- At its November 15, 2018 meeting, the Board:
    - Clarified that the MGA's role with respect to funding projects and/or management actions related to the GSP would be limited.
    - Clarified that Section 4.0 [Projects and Management Actions to Achieve Sustainability Goal] of the GSP will be inclusive and include a broader rather than limited set of projects and management actions being considered in the basin so as not to limit potential future options.
    - Directed the Advisory Committee consider Section 5.0 [Plan Implementation] of the GSP and to include "those member agency programs and projects that are currently being implemented or are in development including, but not limited to, river water transfers, in lieu recharge, Pure Water Soquel, aquifer storage and recovery, and managed aquifer recharge."[1]

Development of Advisory Committee Recommendations

The attached recommendations are the product of many months of learning about and evaluating basin conditions and impacts on each of the six sustainability indicators; iterative development of undesirable results, minimum thresholds and measurable objectives; and deliberation and analysis of groundwater modeling that simulates future baseline conditions and compares that to future potential management actions and supplemental water supply projects that need to be implemented to achieve sustainability as defined by undesirable results. Management actions that were modeled include: pumping curtailment and pumping redistribution made possible by operation of Pure Water Soquel. The pumping curtailment simulations provide a preliminary evaluation of in-lieu recharge

[1] Section 5.0 includes an estimate of the GSP Implementation costs. At the May 16, 2019 joint meeting of the Advisory Committee and MGA Board, staff presented items relevant to Section 5.0 including ongoing funding approaches for the MGA and presented an *Evaluation of Private Pumper Funding Mechanisms and Fee Criteria (Raftelis, May 2019).*

projects such as water transfers and desalination. Projects that were modeled include: Pure Water Soquel and Santa Cruz Aquifer Storage and Recovery.

Consistent with guidance from the MGA Board, the Advisory Committee did not otherwise evaluate the above projects with regard to potential negative impacts or the cost-effectiveness of the projects' contributions to groundwater sustainability in the basin.

Summary of Level of Support for the Recommendations *[To be completed after the June 19th Advisory Committee meeting]*

The attached package of recommendations was supported by ***XX*** of the 13 Advisory Committee members.

Key areas of concern that Advisory Committee members request be further discussed and addressed by the MGA Board include:

- ***[To be completed after the June 19th Advisory Committee meeting]***

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Draft Meeting Summary

Santa Cruz Mid-County Groundwater Sustainability Plan
Advisory Committee Meeting #18
April 24, 2019, 5:00 – 8:30 p.m.

This meeting was the eighteenth convening of the Santa Cruz Mid-County Groundwater Sustainability Plan (GSP) Advisory Committee. It took place on April 24, 2019 from 5:00 - 8:30 p.m. at the Simpkins Family Swim Center in Santa Cruz. This document summarizes key outcomes from Advisory Committee and staff discussions on the following topics: project updates; Interconnected Surface Water Sustainability Indicator, the Mid-County Sustainability Goal, the initial draft of GSP recommendations for Sustainable Management Criteria (Chapter 3 of the GSP), and a preview of Advisory Committee deliberations and voting process on the recommendations. This document also provides an overview of public comment received. It is not intended to serve as a detailed transcript of the meeting.

Meeting Objectives

The primary objectives for the meeting were to:

- Receive and discuss the next round of modeling results and Sustainable Management Criteria for the Interconnected Surface Water Sustainability Indicator.
- Introduce the Mid-County sustainability goal.
- Receive and discuss an overview of initial draft GSP recommendations (Section 3 of the GSP), including refined Sustainable Management Criteria for all Sustainability Indicators.
- Discuss how the Advisory Committee will be making its recommendations, including sharing levels of support.

Action Items

Key action items from the meeting include the following:

- Staff to update the draft Sustainability Goal and draft Sustainable Management Criteria based on input provided by the Advisory Committee at the April 24th meeting. Staff to share this with the Committee before the May 16 joint Mid-County Groundwater Agency (MGA) Board/Advisory Committee meeting.
- Advisory Committee to provide staff with any additional input on the draft Sustainability Goal before the May 16 meeting.

Meeting attendance

Committee members in attendance included:

1. Kate Anderton, Environmental Representative
2. John Bargetto, Agricultural Representative
3. David Baskin, City of Santa Cruz
4. Rich Casale, Small Water System Management
5. Keith Gudger, At-Large Representative
6. Bruce Jaffe, Soquel Creek Water District
7. Dana Katofsky McCarthy, Water Utility Rate Payer
8. Jon Kennedy, Private Well Representative
9. Jonathan Lear, At-Large Representative
10. Marco Romanini, Central Water District
11. Charlie Rous, At-Large Representative
12. Allyson Violante, County of Santa Cruz
13. Thomas Wyner for Cabrillo College, Institutional Representative

No Committee members were absent.

Meeting Key Outcomes (linked to agenda items)

1. Introduction and Discussion of GSP Process Timeline and Project Updates

John Ricker, County of Santa Cruz, opened the meeting and welcomed participants. Mr. Ricker asked the GSP Advisory Committee members, MGA Executive Team, and the consultant support team to introduce themselves. He also addressed members of the public in attendance and asked them for self-introductions. Trent Sherman introduced himself as the new Department of Water Resources (DWR) point-of-contact for the Santa Cruz Mid-County Groundwater Basin.

Eric Poncelet, facilitator, reviewed the agenda and meeting objectives, and provided key updates to the project process for the remaining two months of the GSP Advisory Committee process as reflected on the updated timeline.

MGA GSP Rollout Process

Sierra Ryan, County of Santa Cruz, discussed the MGA GSP rollout process. She described key event for the May through late November time frame, which will include a survey and two public open houses in the July. She confirmed with DWR that the 60-day public comment period for the GSP will start as soon as it is submitted and posted to the DWR website.

Ms. Ryan confirmed that staff will be sending out post cards regarding the public open houses to all residents of Mid-County Basin. Additionally, she clarified that the draft GSP will be discussed at the open houses, and changes to the GSP resulting from public comment will be incorporated into a revised version of the Plan that will be discussed at the September MGA Board meeting.

2. Oral Communications (for items *not* on the agenda)

Mr. Poncelet, facilitator, invited members of the public to make comments on any GSP-related issues not on the agenda.

One participant expressed concern that the GSP roll out process seems to include the public toward the end and suggested that a separate (ad hoc) meeting among private well owners and small water users be convened prior to the summer open houses to solicit input on the Plan. The participant also requested an update on direct contact information for Committee members and separately, that staff consider further research on the impacts of Seawater Intrusion once it occurs.

Tim Carson, Regional Water Management Foundation (RWMF), responded that the MGA Board has approved email accounts for both Board and Committee members not affiliated with agencies. Those affiliated with member agencies gnerally already have accounts. He added that invitations to non-affiliated Committee members were sent out and that staff is awaiting responses.

Another participant commented that the climate change model being used to inform the GSP can predict climate change impacts better if it focuses on using actual local conditions in past years, selecting a catalog of the hotter years.

3. Project Updates

Mr. Poncelet invited the following project updates:

- **April 18 2019 Enrichment Session: Forecasting Water Use from Land Use and Population**
  Ms. Ryan provided an update on the April 18 enrichment session on Forecasting Water Use from Land use and Population, indicating that a recording of the session is posted on the MGA website.

  Committee members who attended reported that the session was informative and helpful.

4. Interconnected **Surface Water Sustainability Indicator**

John Ricker, County of Santa Cruz, reviewed the outcomes of the April 8 Surface Water Interaction working group meeting. He confirmed that the group accomplished a great deal, including addressing Sustainable Management Criteria and reviewing the most current modeling results.

The Committee members discussed the following key items following Mr. Ricker's overview:

- With respect to the relationship between rainfall and groundwater pumping, groundwater storage and streamflow in the upper watershed is primarily influenced by rainfall amounts in the current and prior years. Groundwater levels in the lowers and streamflow interactions in the lower watershed are also significantly influenced by pumping
- Watershed evapotranspiration is captured in the groundwater model (e.g., PRMS model), , but it does not account for riparian evapotranspiration influence on streamflow, which is substantial. not on the riparian side.
- Historical data shows pumping reduction and redistributions, that has resulted in some groundwater level recovery in both shallow and deeper zones.

Georgina King, Montgomery & Associates, covered the updated proposed Sustainable Management Criteria for the Depletion of Interconnected Surface Water Sustainability Indicator. Staff and Committee members discussed key points for each criterion as follows:

- For **Significant and Unreasonable Depletion of Interconnected Surface Water**, Ms. King asked the Committee to comment on the following statement: *Surface water depletion due to groundwater extraction in interconnected streams supporting priority species, greater than that experienced over the period from the start of monitoring through 2015, would be a significant and unreasonable depletion of surface water.* Key discussion points included the following:
    - The term "priority species" is used to infer that if such species' needs are met, other species' needs would also be met (e.g., riparian habitat, salmonid). This term is will be specifically defined in the GSP
    - The working group considered all creeks that support "priority species.
    - Staff used metrics on how the "priority species" standard is set, even though it is not required by the GSP.

- For **Minimum Threshold for Groundwater Elevations as a Proxy for Streamflow Depletion**, Ms. King indicated that the working group used the Environmental Defense Fund's (EDF) proposed approach, which is based on a relationship between groundwater levels and stream depletion. Ms. King also reported the working group has proposed a *Minimum*

Threshold that is the highest observed seasonal low Groundwater level in a below-average rainfall year, over the period from the start of monitoring through 2015.

The Committee discussed the possibility of using a lower Minimum Threshold to cover the years when Groundwater Levels went below the Minimum Threshold. The Committee concluded that this is ultimately not necessary since recent data show that groundwater levels are increasing. Staff also indicated that the National Oceanic and Atmospheric Administration (NOAA) and the California Department of Fish and Wildlife (CDFW) are both looking closely at this Sustainability Indicator to improve conditions for fish habitat (Steelhead and Coho).

- For **Measurable Objectives**, Ms. King proposed the objectives, that groundwater levels be: 1) higher than creek bed elevations to ensure groundwater contribution to streamflow; and 2) higher than the minimum threshold - in seasonal-low elevations over the period of record to provide operational flexibility. Ms. King also discussed how to link streamflow depletion with groundwater level Measurable Objectives using the groundwater model.

  The Committee discussed the following key points regarding Measurable Objectives related to streamflow depletion:
  - It is more challenging to accomplish Measurable Objectives and stay above the Minimum Threshold without new projects.
  - Adjustments to Measurable Objectives can be made over the next 20 years during GSP implementation as more information on surface water/groundwater interactions is generated from monitoring.

5. Mid-County Sustainability Goal

Darcy Pruitt, RWMF presented an introduction to the Mid-County Sustainability Goal and proposed the following draft goal statement for the GSP: *To provide a safe, reliable, and affordable water supply to meet current and expected regional demand without causing undesirable impacts.*

The Committee discussed the following key points regarding the proposed Sustainability Goal:

- There were concerns expressed about the term "affordability" because the MGA has said that its role does not include governing affordability. Committee members agreed that some element of affordability or economics, and diversity should be included in the Sustainability Goal.
- There was agreement on using the term "beneficial users" as a way of incorporating diverse socioeconomic populations in the Sustainability Goal.

Staff indicated that it will rework the draft Sustainability Goal statement, considering the Committee's comments and suggestions, and will present an updated draft before the May 16 joint MGA Board/Advisory Committee meeting.

6. Public Comment

Mr. Poncelet, facilitator, invited members of the public to comment on the proposed Depletion of Interconnected Surface Water Sustainable Management Criteria and the Sustainability Goal, the Advisory Committee's reflections on the presentation, and any other Advisory Committee work.

One participant commented that various groundwater models do cover evapotranspiration and that most streamflow comes up from the upper basin. Therefore, it is difficult to see how there are more controls in the lower basin. Further, the participant indicated that as it is not easy to manage groundwater levels as they link to streamflow.

Another participant requested that staff consider fog within the climate model, as it could affect the evapotranspiration rates in the riparian areas. Further, the participant commented on groundwater recharge from outside and inside the basin and when to start monitoring for significant and unreasonable conditions for depletion of surface water interaction.

7. Overview of initial draft GSP recommendations (Section 3 of GSP), including refined Sustainable Management Criteria for all Sustainability Indicators

Ms. King reviewed the initial *draft* GSP recommendations of Sustainable Management Criteria, focusing her discussion on the four relevant Sustainability Indicators (i.e., Groundwater Levels, Groundwater Storage, Seawater Intrusion and Groundwater Quality) in the basin, excluding the Depletion of Interconnected Surface Water, which was already covered earlier in the meeting, and Subsidence, which is not applicable to the basin. Ms. King emphasized that the group has discussed all of these Sustainability Indicators in previous meetings and this discussion is a review.

- With respect to **Groundwater Levels**, the Committee discussed the following additional key points:
  - A Committee member commented that the Significant and Unreasonable Conditions statement seems vague and open to interpretation. Staff responded that it is supposed to be a qualitative statement, and it is not required to be included in the GSP. [Note: it was pointed out by DWR after the meeting that staff's response that statements of Significant and Unreasonable Conditions are not required to be in the GSP is not correct. Consideration of Significant and Unreasonable Conditions is made when determining Undesirable Results, which occur when significant and unreasonable effects for any of

the sustainability indicators are caused by groundwater conditions occurring throughout the basin
  - The 90th percentile is only applicable to representative monitoring wells.
  - There is further need to justify staff's decision to use the Minimum Threshold of 30 feet below historic levels to assure that a GSP reader would understand that this threshold would result in a sustainable basin.

- For **Groundwater Storage**, the Committee requested more clarity on Sustainable Yield. Staff indicated that it will provide this information by the June meeting.

- For **Seawater Intrusion,** the Committee discussed the following key points for this Indicator:
  - There is a concern about the five-year average for evaluating groundwater protective elevations to determine whether there is seawater intrusion at coastal monitoring wells.
  - A Committee member requested that staff include the time span (e.g., 2013 – 2017) for observed Significant and Unreasonable Conditions for Seawater Intrusion in the GSP as it is important to clearly define the five-year *timeframe*.

- For **Degraded Groundwater Quality**, the Committee addressed the following key discussion points for this indicator :
  - A period of background monitoring on Groundwater Quality needs to be conducted before and after projects are implemented.
  - Staff included a statement in the GSP requiring background monitoring for Groundwater Quality before project starts and after project is mobilized in order to determine the change in/impact to the Groundwater Quality. This is particularly important for constituents like Arsenic, which is naturally occurring.
  - State regulations are constantly evolving with respect to the list of constituents of concern which need to be monitored to set drinking water standards and could include more information on *emerging* constituents of concern in the future.
  - A Committee member requested staff confirm whether Significant and Unreasonable Conditions for Groundwater Quality is caused by or linked to Seawater Intrusion.

At the end of her presentation on the draft Sustainable Management Criteria, Ms. King requested input from the Committee on how to present the same information to the MGA Board, considering that the Board does not have the same background discussing these items. Committee members offered the following suggestions:

- Provide an example graph showing changes in Groundwater Levels at particular wells. This is helpful to illustrate overall concepts.

- Include visuals and provide a good overview of this content in a clear, succinct staff memo.

8. Preview of Advisory Committee deliberations and voting on recommendations to MGA Board

Eric Poncelet, facilitator, provided a preview of method by which the Committee would deliberate, vote, and indicate levels of support on its recommendation to the MGA. This method was pulled from the Advisory Committee's Charter. Mr. Poncelet indicated that the Committee would be asked to vote on a single package that would contain the Sustainability Goal and Sustainable Management Criteria for all of the Sustainability Indicators. He noted that each Committee member in turn would be provided the opportunity to express their level of support for the package and to provide additional details and rationale behind their stated level of support. The three levels of support identified in the charter include: general support ("I like it"), qualified support ("I have some issues with it but can live with it"), and fundamental disagreement ("I don't like it and cannot live with it"). Any disagreements will be shared with the MGA Board. Mr. Poncelet reminded the Committee that while it is an agreement-seeking body, unanimity is not required to make a recommendation to the Board.

The Committee asked clarifying questions about the approach. Their discussion included the following observations:

- The MGA Board will want to know whether the Committee's consent is unanimous on any Sustainability Indicator. This will be expressed in the conveyance letter.
- Committee members confirmed that they understand the intended approach.

9. Public Comment

During this final public comment session, Mr. Poncelet invited members of the public to provide comments on draft GSP recommendations for Sustainability Indicators, the process for Committee deliberations and recommendations to the MGA Board, and any other aspect of Advisory Committee work.

A participant asked for clarification on who will be drafting the GSP and requested a discussion on the Sustainable Yield earlier than June. The participant reiterated the request for staff to convene a community meeting before the June 19 Advisory Committee meeting to get a sense of community input on the GSP.

10. Confirm the February 27, 2019 and March 27, 2019 Advisory Committee Meetings Summaries

The Committee confirmed the February and March meeting summaries for forwarding to the MGA Board.

11. Next Steps

In closing, Mr. Poncelet provided a recap of the GSP process timeline for May through July 2019, focusing on objectives for the May and June meetings and emphasizing that June is the last Advisory Committee meeting.

Executive Team members closed the meeting by thanking the attendees for their participation.

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Draft Meeting Summary

Joint Meeting of the Santa Cruz Mid-County Groundwater Agency (MGA) Board and Groundwater Sustainability Planning (GSP) Advisory Committee
GSP Advisory Committee Meeting #19
May 16, 2019, 6:30 – 9:00 pm

This meeting was a joint convening of the Santa Cruz Mid-County Groundwater Agency (MGA) Board and the Groundwater Sustainability Planning (GSP) Advisory Committee. It took place on May 16, 2019 from 6:30 – 9:00 p.m. at the Simpkins Family Swim Center in Santa Cruz. This document summarizes Agenda Items 8-14 of the joint meeting. The following key discussions topics were covered at the joint meeting:

- Overview of the Advisory Committee charge, process progress, and desired outcomes of this joint meeting.
- Review the GSP Sustainability Goal.
- Review and discuss the sustainable management criteria (SMC), indicators, and modeling.
- Review and discuss the GSP review and approval process.

This summary is not intended to serve as a detailed transcript of the meeting or Agenda Items 8-14.

Meeting attendance

Advisory Committee members in attendance included:

1. Kate Anderton, Environmental Representative
2. John Bargetto, Agricultural Representative
3. Rich Casale, Small Water System Management
4. Keith Gudger, At-Large Representative
5. Bruce Jaffe, Soquel Creek Water District
6. Dana Katofsky McCarthy, Water Utility Rate Payer
7. Jon Kennedy, Private Well Representative
8. Jonathan Lear, At-Large Representative
9. Charlie Rous, At-Large Representative
10. Allyson Violante, County of Santa Cruz
11. Thomas Wyner for Cabrillo College, Institutional Representative

Committee members who were absent included:

1. Marco Romanini, Central Water District
2. David Baskin, City of Santa Cruz

Agenda Item 8: Oral Communications

Participating members of the public were invited to address matters not on the agenda but within the purview of the MGA. The following comments were recorded during these oral communications. (*Questions are represented as (Q), comments as (C) and responses as (R) below*.)

(C) A member of the public commented that he believed that Soquel Creek Water District should not be allowed to contaminate the aquifer by pumping water from Pure Water Soquel into it. He said that ratepayers don't own the aquifer and are not the only ones who depend on it. He disagrees with current water use law and believes that 50%+1 of ratepayers writing approval for projects like Pure Water Soquel should be necessary for such projects, rather than 50%+1 having to write a reply objecting to the project.

(C) A member of the public commented that there is pushback against the Pure Water Soquel project from the public within and outside of the Soquel Creek Water District because the aquifer is not exclusively used by the District's customers. She said that rate payers don't always know what goes on and that there was a perception that decisions were kept secret until late in the process. She is pursuing a California Environmental Quality Act (CEQA) writ of mandate against Pure Water Soquel for environmental and process violations. There is a preliminary injunctive hearing scheduled for June 20, 2019 in Santa Cruz.

Agenda Item 9: Overview of the GSP Advisory Committee's Charge, Process, Progress, and Desired Outcomes of this Joint Meeting.

Rosemary Menard, City of Santa Cruz, gave an overview of the process that the Advisory Committee went through to reach their recommendations, including learning the science behind each Sustainability Indicator and examining modelling results. Ms. Menard added that the goal of the Joint Meeting was to hear any comments from the Board that the Committee should consider before finalizing their recommendations.

Agenda Item 10: Review and Discuss the GSP Sustainability Goal

Jon Kennedy, Private Well Representative on the Advisory Committee, presented the Committee's proposed GSP Sustainability Goal, including language changes the Advisory Committee agreed on at the April 24th meeting. The following comment and responses were recorded following this presentation.

(C) Bruce Daniels, MGA Board member representing Soquel Creek Water District, suggested adding language to the Sustainability Goal explicitly incorporating climate change (e.g., "manage groundwater

considering climate change," or "taking climate change into account"). He suggested being careful to include language that addresses everything that the Sustainable Groundwater Management Act (SGMA) requires.

- (R) Allyson Violante, County of Santa Cruz, responded that the Advisory Committee had discussed climate change and decided that since managing climate change is beyond the capabilities and scope of what the MGA can manage, it was not included in the Sustainability Goal language. She added that the Committee did consider climate change extensively for each bullet in the Sustainability Goal. She agrees the MGA should, and in fact did, take climate change in consideration in developing the MGA's groundwater management indicators in response to climate change. She suggested the Committee discuss inclusion of climate change language at their next meeting.
- (R) Bruce Jaffe, Soquel Creek Water District, commented that he had no problem including language explicitly mentioning climate change and agreed that this could be discussed at the next Advisory Committee meeting.

Agenda Item 11: Public Comment

Participating members of the pubic were given an opportunity to make public comment at this juncture. The following question and responses were recorded during this period.

(Q) A member of the public commented that in previous discussions it had been stated that the boundaries for the GSP purview could be extended north to show better benefit in the basin. She asked if there had been discussions of boundary changes with the Pajaro Valley to this effect.

- (R) Mr. Daniels responded that there had been no boundary changes.
- (R) John Ricker, County of Santa Cruz, responded that staff have worked closely with the Pajaro Valley Water Management Agency, since they influence each other's basins, but there had been no discussion of boundary modifications.

Agenda Item 12: Review and Discuss the Sustainable Management Criteria

Georgina King, Montgomery and Associates, presented an overview of the Sustainable Management Criteria (SMCs) that make up the core of the GSP. Ms. King reviewed the proposed significant and unreasonable conditions, undesirable results, minimum thresholds, and measurable objectives for each Sustainability Indicator. The discussion of each of these Indicators is summarized below:

Groundwater Levels (proposal): Significant and unreasonable conditions for groundwater levels occur if a significant number of wells can no longer supply groundwater to supply beneficial uses. The minimum threshold for groundwater level is based on an elevation that meets the demand for overlying users and

cannot be more than 30 feet below historic low groundwater elevations. The measurable objective is the 90th percentile of historic groundwater levels over the period of record.

Mr. Kennedy discussed the chronic lowering of groundwater and the choice of the 90th percentile for the measurable objective. The following questions, comments, and responses were recorded following this presentation.

(C) Mr. Daniels commented that the choice to only use areas inland of municipal pumping makes it seem as though it is not a concern if municipal pumps go dry. He added that the GSP would have to defend why it only focused inland of these wells.

- (R) Ms. King responded that there are several potential monitoring wells located near to the municipal pumping wells, but that we did not want to select monitoring wells that might be influenced by that associated cones of depression.

(Q) Mr. Daniels asked how many representative monitoring wells are used and how it was decided which wells to consider.

- (R) Ms. King responded that the choice of which wells to use for monitoring depended on available data, whether the associated aquifer was known, and if there were other wells nearby.

(Q) Mr. Jaffe asked how the choice of 30ft below historic low groundwater levels for the minimum threshold was defended, and whether there were significant effects associated with that level.

- (R) Ms. King responded that the minimum threshold choice was made by considering wells with a large range in water levels and looking at that range over the period of record.
- (C) Mr. Daniels commented that the minimum threshold choice should be defended in the plan.

Reduction in Storage (proposal): Significant and unreasonable reduction in groundwater storage is a net volume of groundwater extracted that will likely cause other Sustainability Indicators to have undesirable results. Undesirable results are a five-year average net extraction exceeding the minimum threshold for any one of a selected group of aquifers. The minimum threshold is the sustainable yield representing the net annual volume of groundwater extracted for the same group of aquifers. The measurable objective is set as the volume of groundwater that can be extracted that would not exceed the five-year minimum threshold if four of those years were at maximum projected groundwater extraction.

Jonathan Lear, At-Large Representative, discussed the Advisory Committee's decision to consider reduction in storage for multiple aquifers rather than a single volume for the entire basin. The following questions, comments, and responses were recorded following this presentation.

(C) Mr. Daniels suggested removing the term "management," because "managed aquifer recharge" is the term that the city of Santa Cruz uses for its program.

- (R) Ms. King responded that this was a general term.

(Q) Mr. Daniels asked why certain aquifers were grouped together for determining total storage.

- (R) Cameron Tana, Montgomery and Associates, responded that aquifers were grouped as a way to simplify this Indicator.

Seawater Intrusion (proposal): The significant and unreasonable condition for seawater intrusion is seawater moving farther inland than has been observed from 2013-2017. Undesirable results are established both for chloride isocontours and protective groundwater elevations. Undesirable conditions occur if either of these show an undesirable result. The minimum threshold for the chloride isocontour is set at 250 mg/L chloride concentration for Aromas and Purisma aquifers, with the measurable objective set at 100 mg/L in the same locations. For protective elevations, the minimum threshold is the groundwater level that prevents the equilibrium freshwater/seawater interface from impacting aquifers from which production wells pump. The measurable objectives are higher groundwater elevations that are protective of the full depth of the aquifer.

Ms. Violante discussed the process that the Advisory Committee used to decide on significant and unreasonable conditions for this Indicator, and the decision to use both isocontours and protective elevations. The following questions, comments, and responses ensued.

(Q) Mr. Daniels asked for clarification on the isocontour measurable objectives.

- (R) Ms. King responded that the goal was for the chloride concentration to decrease along the isocontour from 250 to 100 mg/L.

(Q) Mr. Daniels asked whether concentrations along the isocontour would be interpolated.

- (R) Ms. King and Mr. Tana responded that there is a lack of data and concentrations would be evaluated at wells along the isocontour.

(Q) Thomas Wyner, Institutional Representative, asked whether the draft GSP specifically endorses the Pure Water Soquel and Aquifer Storage and Recovery (ASR) projects. In his view, the Advisory Committee had not considered the potential negative consequences of either project enough to officially recommend them. He added that he was not objecting to either project, but he anticipated hearing objections if the Advisory Committee did not consider project consequences in greater depth.

- (R) Ms. Menard responded that the MGA Board had directed the Advisory Committee to include the ASR and Pure Water Soquel projects in the implementation section of the GSP.
- (C) Mr. Daniels commented that it was important to reference specific projects for the GSP to seem feasible.
- (C) Ms. Violante commented that the Advisory Committee had been directed to include these projects in the GSP and that they had agreed to that when they joined the Advisory Committee.

- (C) Mr. Kennedy commented that the Advisory Committee had considered the groundwater modeling enough to understand that ASR and water transfer measures on their own would not be sufficient to meet basin needs with regard to sustainability. He agreed with Mr. Wyner that it was worth looking further into the negative effects of the ASR and Pure Water Soquel projects.

(C) Mr. Jaffe commented that, in his view, the five-year average used to determine undesirable results for protective elevation was not restrictive enough. One year of low groundwater levels would allow seawater intrusion that would not simply be pushed out by higher levels on a five-year average.

- (R) Mr. Tana responded that the five-year average is used because protective elevations are long-term elevations used to prevent intrusion. He added that the plan does not rely solely on protective groundwater elevations but also chloride concentrations. The combination of these Indicators makes the five-year average a reasonable way of evaluating undesirable results.
- (Q) Mr. Daniels asked what alternatives were considered besides the five-year average for groundwater levels.
- (R) Ms. King and Mr. Tana responded that there were other alternatives considered, including quarterly and annual values.

(C) Ron Duncan, Soquel Creek Water District, suggested adding language about considering trends and not just minimum thresholds, saying that if there was a trend towards an undesirable result, management actions would be taken before the minimum threshold was reached.

- (R) Mr. Daniels responded that explicitly stating this was not necessary in the GSP, but that management actions could be taken to achieve higher standards than what is included in the GSP.

(Q) Kate Anderton, Environmental Representative, asked whether SGMA included an approach to meeting the isocontour requirement. She added that she struggles with the notion of a jagged line isocontour that would be variable and not smooth.

- (R) Mr. Tana responded that monitoring for the chloride isocontour would be done using the concentrations measured from representative monitoring wells on either side of the isocontour. He added that as the concentrations measured at monitoring wells change, it is not necessary to redraw the isocontour line.

(C) Mr. Daniels commented that the SC-A8A well fails to meet thresholds on the hydrograph, and the reason for this should be mentioned.

- (R) Ms. King responded that there are certain effects out of their control, and their plan is to show that the GSP won't affect neighboring basins.

(C) Mr. Daniels suggested continuing this discussion at the next GSP Advisory Committee meeting.

(C) Ralph Bracamonte, Central Water District, commented that this will be a living document that can be adjusted as necessary.

Degraded Groundwater Quality (proposal): Significant and unreasonable groundwater quality degradation occurs when groundwater quality, attributable to groundwater pumping or managed recharge, fails to meet state drinking water standards, which are used as minimum thresholds. Undesirable results occur if any representative monitoring well exceeds any minimum threshold as a result of groundwater pumping or managed aquifer recharge. The measurable objective equals the 2013-17 average concentrations for each constituent of concern at each representative monitoring well.

Keith Gudger, At-Large Representative, discussed the Advisory Committee's process for selecting undesirable results for groundwater quality. The Committee wanted to take a conservative approach and decided that this criterion would apply to any representative monitoring. The following question and responses ensued.

(Q) Mr. Daniels asked how it was determined what groundwater quality changes were attributable to groundwater pumping or managed recharge.

- (R) Ms. King responded that this Indicator is meant as a do no harm provision. Other regulatory agencies are already managing water quality. Projects are not allowed to degrade groundwater quality per those regulations.
- (R) Ms. Violante added that the GSP was not responsible for natural changes to water quality, hence the use of the term "attributable."

Subsidence (proposal): This Sustainability Indicator is not applicable to this basin, but significant and unreasonable conditions were defined as any land subsidence caused by lowering groundwater levels occurring in the basin.

There was no discussion on the topic of subsidence.

Depletion of Interconnected Surface Water (proposal): The significant and unreasonable condition is surface water depletion, due to groundwater extraction, in interconnected streams supporting priority species greater than that over the period of record through 2015. Undesirable results occur when any representative monitoring well's groundwater elevation falls below its minimum threshold. Minimum thresholds are set as the highest seasonal-low groundwater elevation in representative monitoring wells during below-average rainfall years of the period of record through 2015.

Ms. Anderton discussed the Advisory Committee's process for deciding to use priority species in defining significant and unreasonable conditions, and for using groundwater levels as a proxy for this Indicator. The following comment was recorded following this presentation.

(C) Mr. Daniels commented that in addition to isotopes, temperature is another way to track source water.

<u>Agenda Item 13:</u> Review and Discuss the GSP Review and Approval Process and Timeline, and Ongoing Funding Approach

Darcy Pruitt, Regional Water Management Foundation (RWMF), discussed the GSP review and approval process. The Advisory Committee will provide recommendations to the MGA Board on the GSP Sustainability Goal and Sustainability Indicator Sustainable Management Criteria. The MGA Board will make a decision based on what they receive from the Advisory Committee, and on information from staff received between June and July. The draft GSP will be available on July 12th, to be discussed at the July 18th MGA Board meeting which will open the public comment period for through September 19th. At the September Board meeting, there will be a public hearing. The required notice will be sent to cities and counties on July 12th.

Sierra Ryan, County of Santa Cruz, discussed the GSP implementation and ongoing funding approach. The Board decided that it is not their role to implement projects in the GSP, rather that responsibility falls to individual member agencies. The role for the MGA going forward will be funding for ongoing administrative work, annual reviews, reports to the Department of Water Resources (DWR), additional monitoring, data management, and ongoing modelling and outreach. Near-term funding will be sourced from the MGA member agencies, both cash and in-kind.

<u>Agenda Item 14: Public Comment</u>

Participating members of the public were invited to make public comment at this juncture. The following comment was recorded during this period.

- A member of the public commented that it would be helpful if the seawater intrusion presentation noted the location of SC 11, because that is a shallow well in the vicinity of multiple private pumpers and knowing the location would be helpful. She commented that Montgomery and Associates has stated that if ASR and Pure Water Soquel occurred at the same time it would bring groundwater levels to the ground surface and would create competition for storage capacity if both were done. She thanked Mr. Wyner for his comments about the projects and agreed that there has been little discussion of the negative effects of Pure Water Soquel. She would like a definition of inland and coastal wells. She sees the GSP as biased for not including the north coast streams and other alternatives.

For Darcy Pruitt

June 10, 2019

Public Outreach Committee
Soquel Creek Water District
5180 Soquel Drive,
Soquel, CA 95073

Dear Public Outreach Committee,

I am unable to attend your meeting on June 11, 10:30am - 11:30am, as I must instead attend a County Board of Supervisor pre-Budget meeting at the same hour.

Therefore, I feel it important to communicate to you that while the two District Pure Water Soquel Project outreach events last month at the Live Oak Grange were important, that will NOT cure and correct the District's deficient California Environmental Quality Act (CEQA) process that excluded the Live Oak community when the Scope of the Project changed to focus on the Chanticleer Avenue facility for water treatment. Live Oak is not within the District's Service area, so

those residents and business owners had no idea the Project would affect their neighborhoods.

You need to know that this is just one of the eight causes of action stated against the District for environmental violations regarding the Pure Water Soquel Project. (Case 19CV00181 in Santa Cruz County Superior Court).

Sincerely,
Becky Steinbruner
3441 Redwood Dr.
Aptos, CA 95003

C: Soquel Creek Water District Board of Directors
Mid County Groundwater Agency Board
Mid County Groundwater Agency GSP Advisory Committee