Corning Subbasin

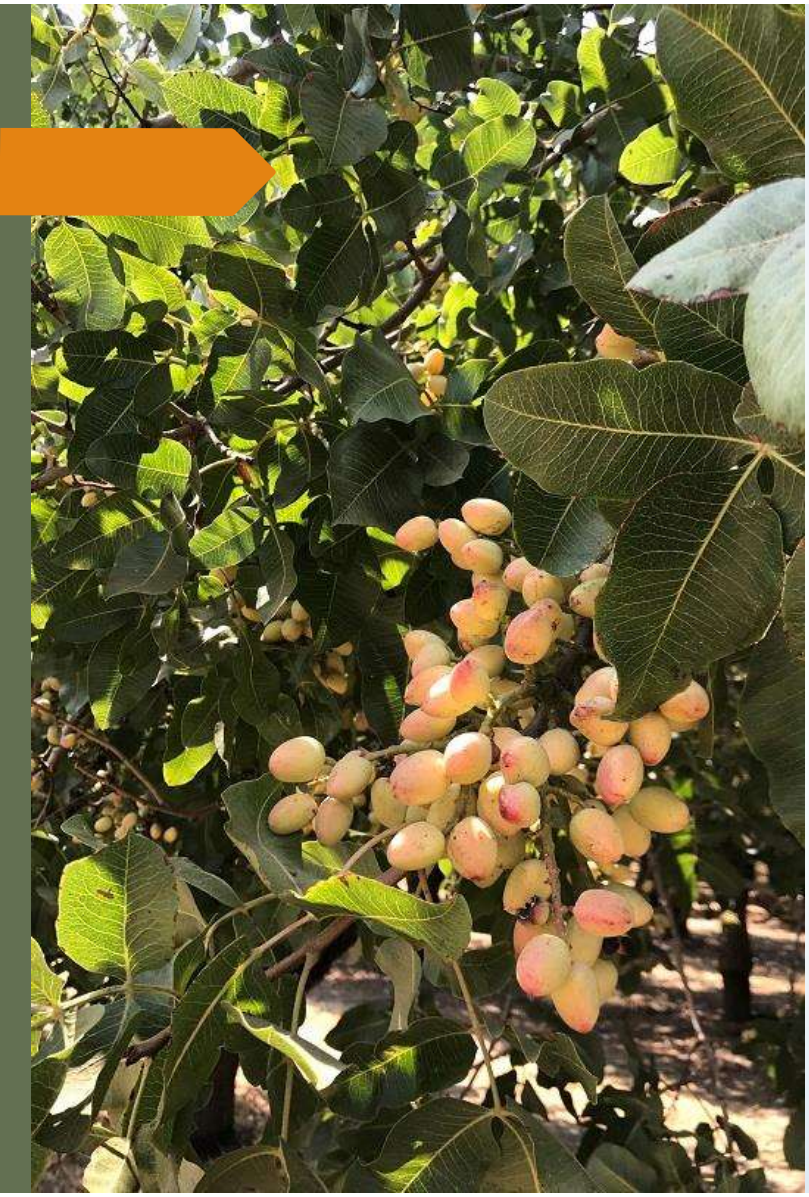
Groundwater Sustainability Plan

Technical Presentation

Presented to Corning Subbasin Advisory Board
08/05/2020 | Teleconference

Prepared by

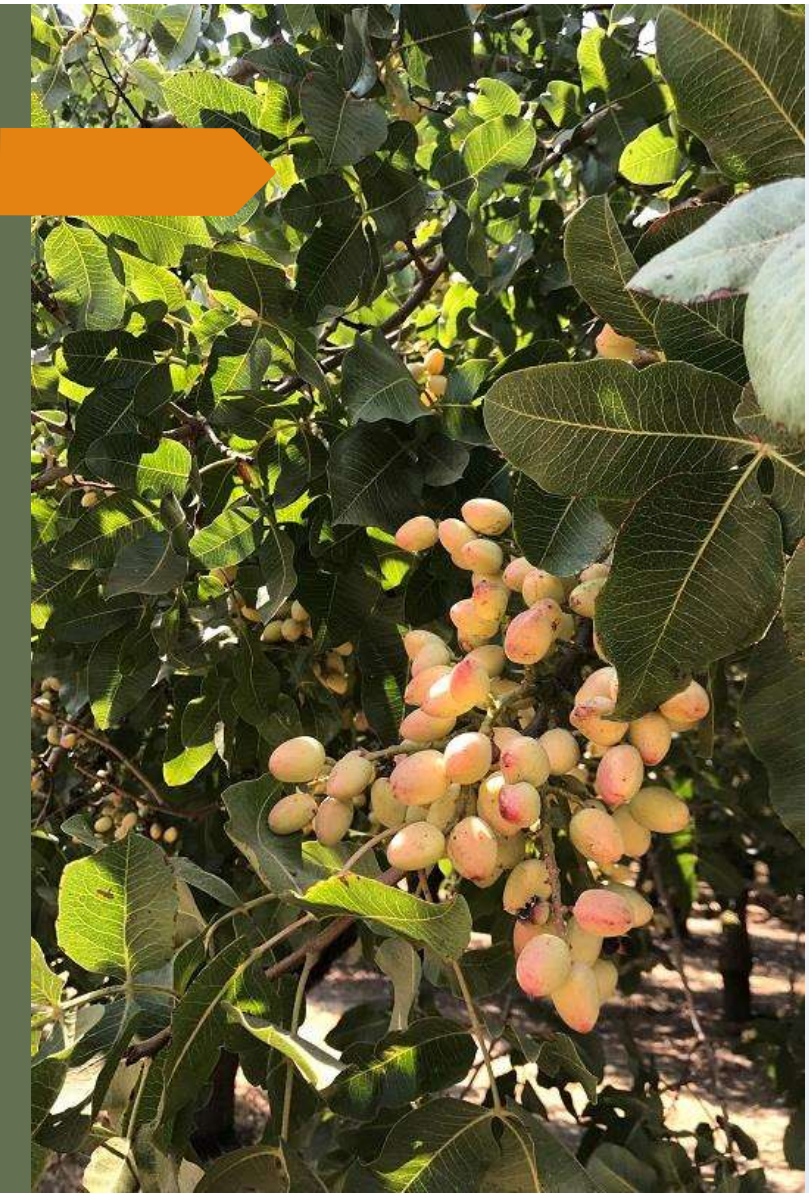
MONTGOMERY & ASSOCIATES



Presentation Overview

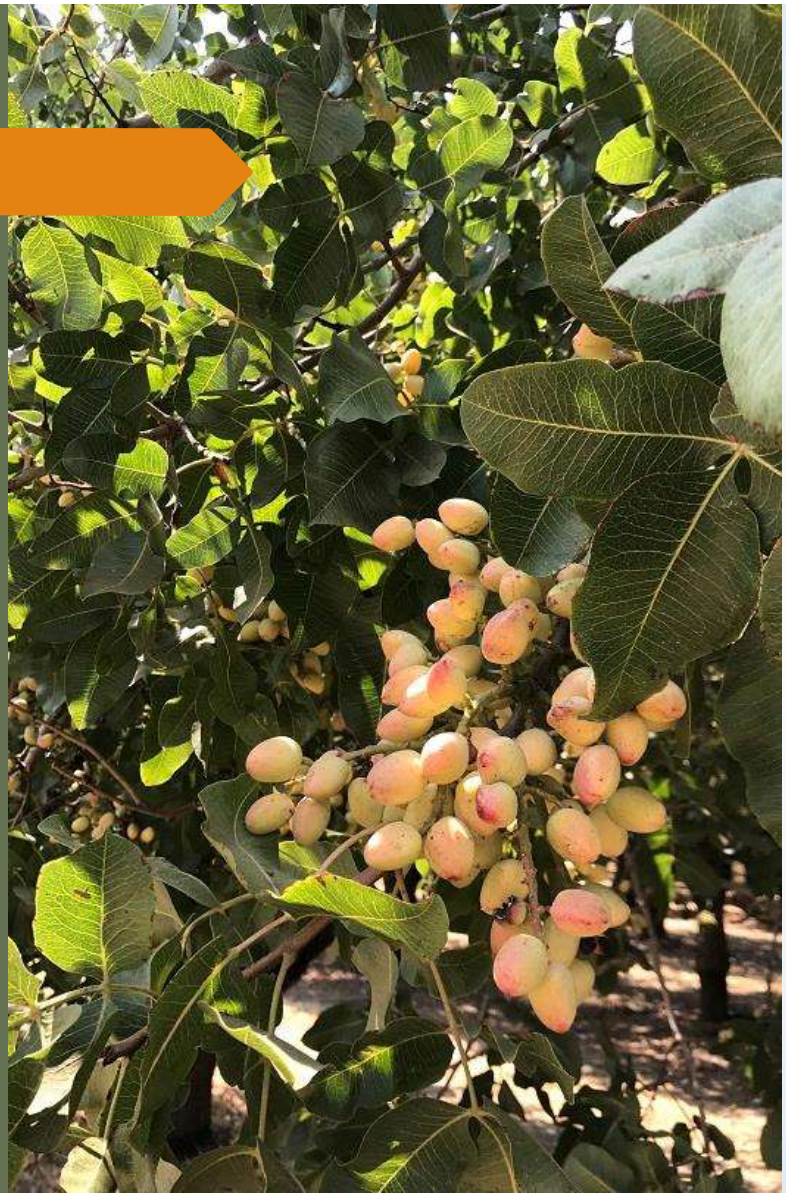
- Follow up on Action Items from Meeting #3 (July 1)
- SMCs 101 – Overview of Sustainable Management Criteria
- Preliminary Monitoring Network Overview

- **Discussion throughout – ask questions!**



Action Items from Meeting #3

- Review Stony Creek Fan unique hydrogeology and recharge challenges while continuing to gather data and work on model.
- Investigate Thomes Creek Irrigation District diversion and revise the Water District Map boundaries.
- Investigate if management areas can be added and the frequency with which they can be changed under SGMA. Specifically, look into whether a new management area or revision to existing management area can be established in the 5-yr GSP Update.



GSP Outline

- **Section 1**: Introduction (Administrative Information)
- **Section 2**: Plan Area and Basin Setting (HCM and GW conditions)
- **Section 3**: Water Budgets (with description of modeling tools)
- **Section 4**: Monitoring Networks
- **Section 5**: Sustainable Management Criteria
- **Section 6**: Projects and Management Actions
- **Section 7**: Plan Implementation

Sustainable Management Criteria

How do we define sustainability? – Review GSP Requirements and Key Concepts

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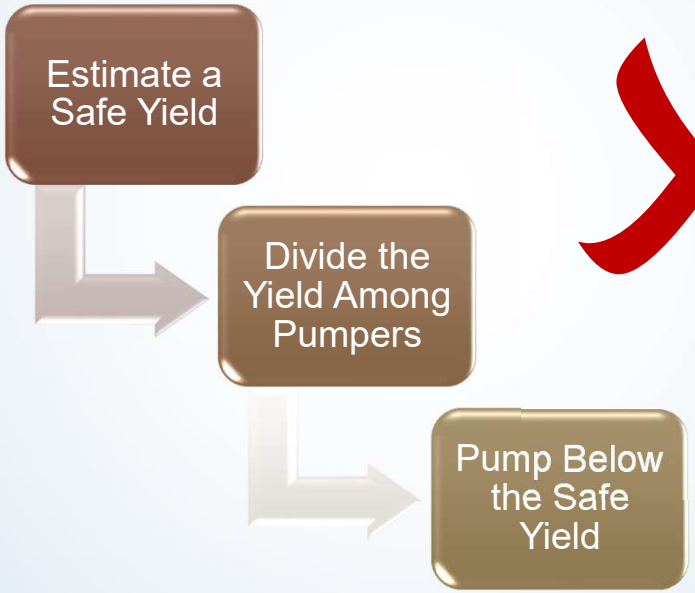
Defining Sustainability

Misconception: “It’s all about the Safe Yield!”



SGMA does NOT define sustainability by pumping within Safe Yield

Defining Sustainability Under SGMA

* Sustainability is based on aquifer condition
* Controlling pumping is one of many tools to achieve sustainability

SGMA defines sustainability differently from adjudications

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Sustainability is Outcome Based

- Sustainability is defined for each of applicable sustainability indicators (SI)

Each of the Sustainability Indicators have Three Sustainability Management Criteria Terms

- Minimum Thresholds
- Measurable Objectives
- Undesirable Results

Defined as quantitative metrics

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Summary of Metrics - From DWR Draft SMC BMP

Sustainability Indicators	Lowering GW Levels	Reduction of Storage	Seawater Intrusion	Degraded Quality	Land Subsidence	Surface Water Depletion
Metric(s) Defined in GSP Regulations	• Groundwater Elevation	• Total Volume	• Chloride concentration isocontour	• Migration of Plumes • Number of supply wells • Volume • Location of isocontour	• Rate and Extent of Land Subsidence	• Volume or rate of surface water depletion

Figure 2. Minimum Threshold Metrics

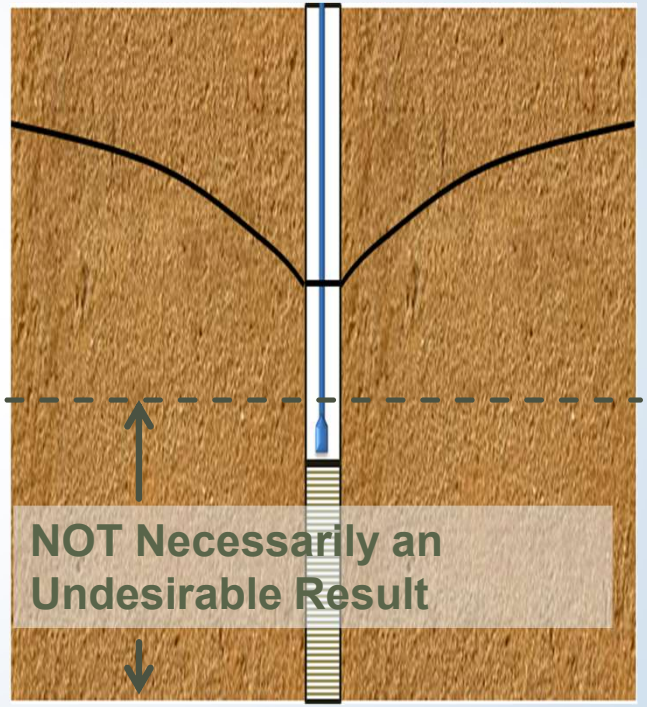
Significant and Unreasonable Statement

- **Locally Defined Significant and Unreasonable Conditions for each Sustainability Indicator (SI)**
- Determined based on discussions with GSA staff, CSAB deliberations and public input - GSAs approve or make the determination accordingly
- A narrative statement that describes what the GSAs don't want to see happen in the Subbasin
- Sets the stage for developing quantitative SMC metrics
- For example, for lowering groundwater levels SI, significant and unreasonable conditions may be defined as:
  - Causing domestic water supply wells to go dry
  - Causing significant financial burden to local agricultural interests due to increased pumping costs

TERMINOLOGY: Minimum Threshold

The value you do not want to cross

- Quantitative value that is used to define an undesirable result
- Set at each representative monitoring point (e.g., well)
- Set for each of the sustainability indicators

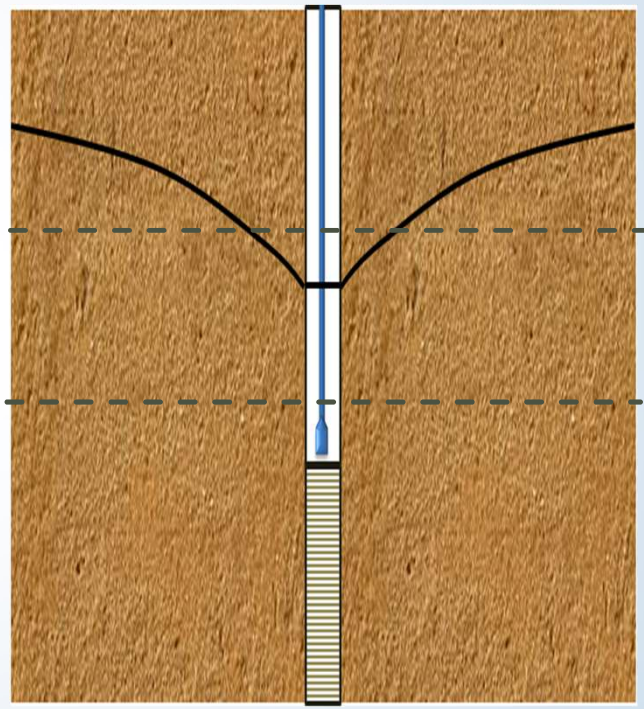


Minimum Thresholds based on what is *Significant and Unreasonable*

TERMINOLOGY: Measurable Objective

Think of Measurable Objectives as safety factors

- Quantitative target or goal that allows operational flexibility above the Minimum Threshold
- Set at each Representative Monitoring Point (well)
- Set for each sustainability indicator
- Must be set in the plan, but are NOT enforceable during implementation



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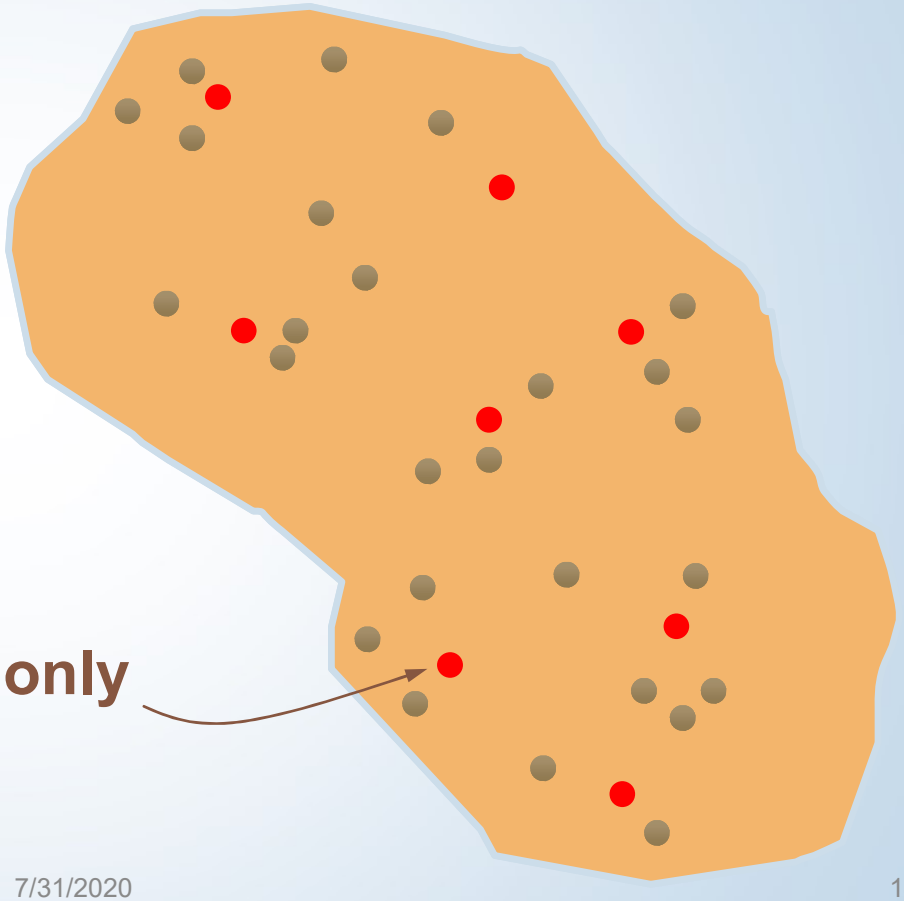
TERMINOLOGY: Representative Monitoring Points

- Representative Monitoring Point (RMP)
- Other Monitoring Point (MP)



Minimum Thresholds and Measurable Objectives are only defined at RMPs

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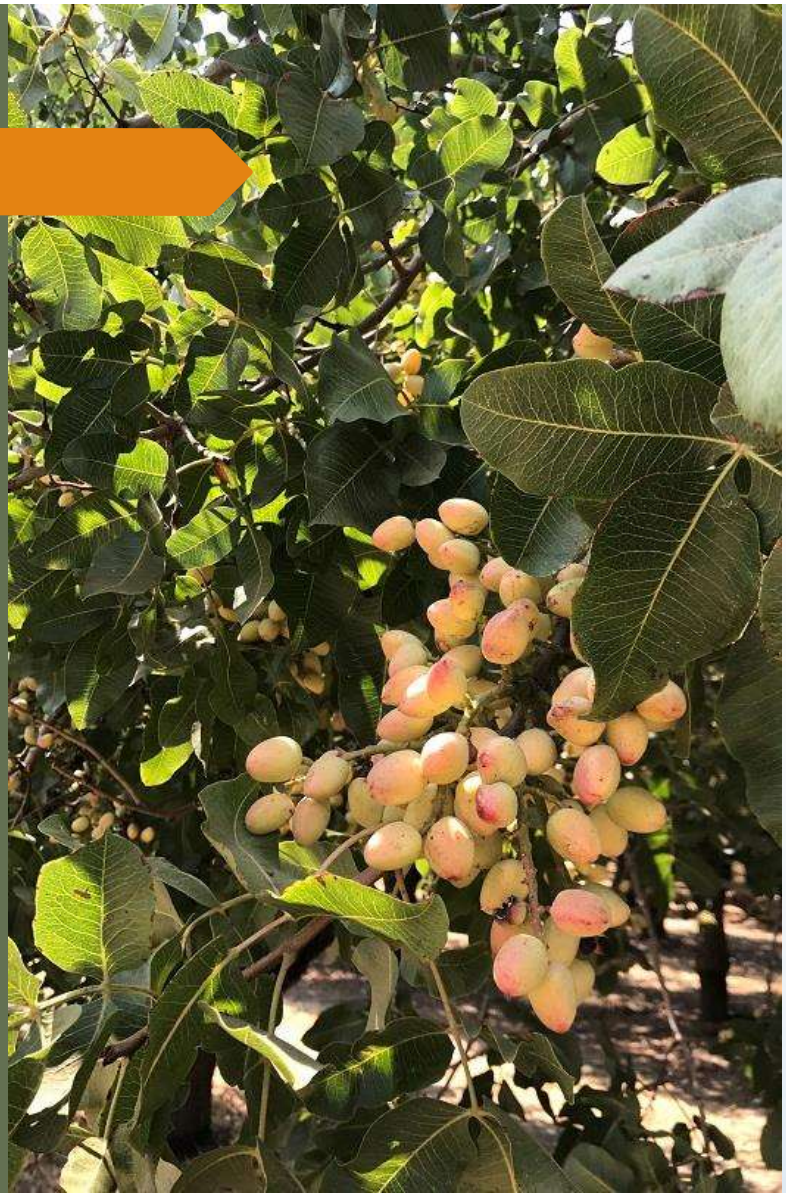
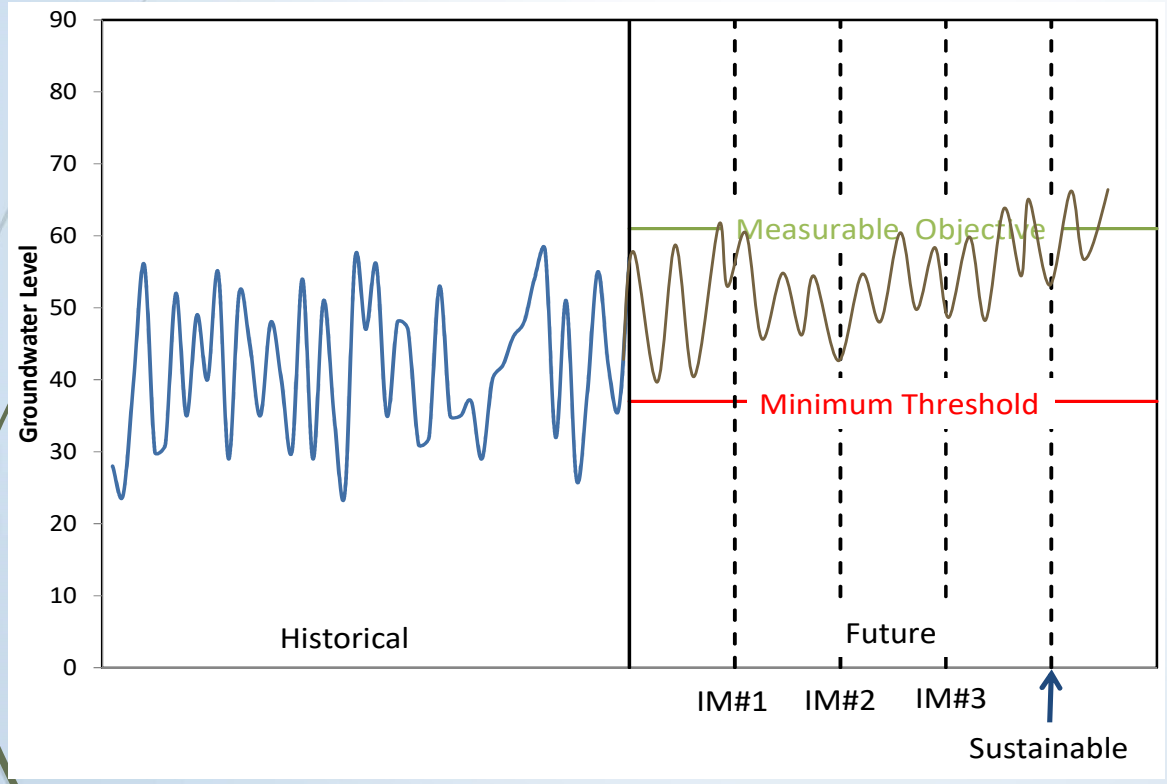


Thresholds and Interim Milestones

- Minimum Thresholds set at every RMP
- Measurable Objectives are set with safety factor on Minimum Thresholds
- Interim milestones are (loose) targets, set at five-year intervals, that show how you plan to be headed towards your Measurable Objectives
  - Interim milestones likely set from modeling results of how projects change future groundwater conditions
- Thresholds can be modified during 5-yr updates based on new data
- **Adaptive management over 20 years until sustainability is reached at 2040**
- Then maintain sustainability over 30 years at set thresholds

Combining Minimum Thresholds, Interim Milestones, and Measurable Objectives at a Single Well



Maintain Sustainability for next 30 years

TERMINOLOGY: Undesirable Results

> *"The description of undesirable results … shall be based on a quantitative description of the **combination of minimum threshold exceedances** that cause significant and unreasonable effects in the basin."*

Reminder: Avoiding Undesirable Results is how you prove sustainability

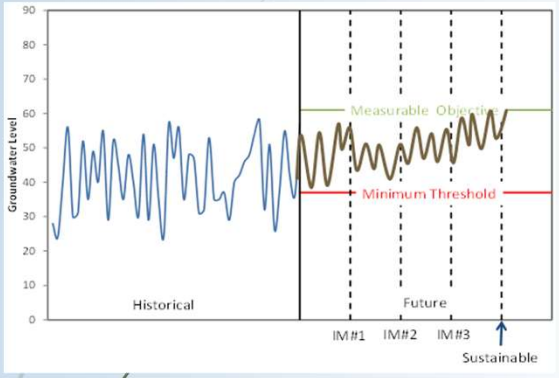
Undesirable Results are a Combination of Minimum Thresholds

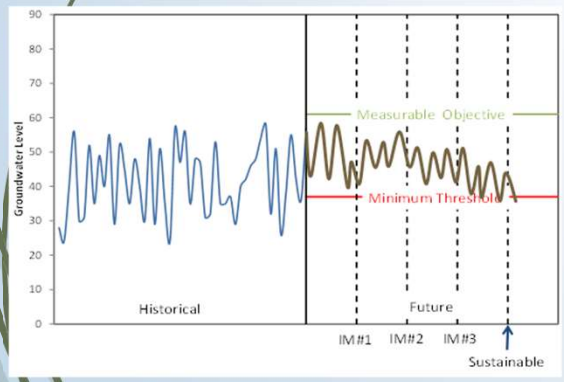
Example: An undesirable result occurs when 10% of your groundwater elevations, measured at Representative Monitoring Points, drop below the associated Minimum Thresholds

This might be an example definition of Undesirable Results for groundwater levels

How you define Undesirable Results is how you can accommodate flexibility

Example


Groundwater Level
Measurable Objective
Minimum Threshold
Historical
Future
IM#1
IM#2
IM#3
Sustainable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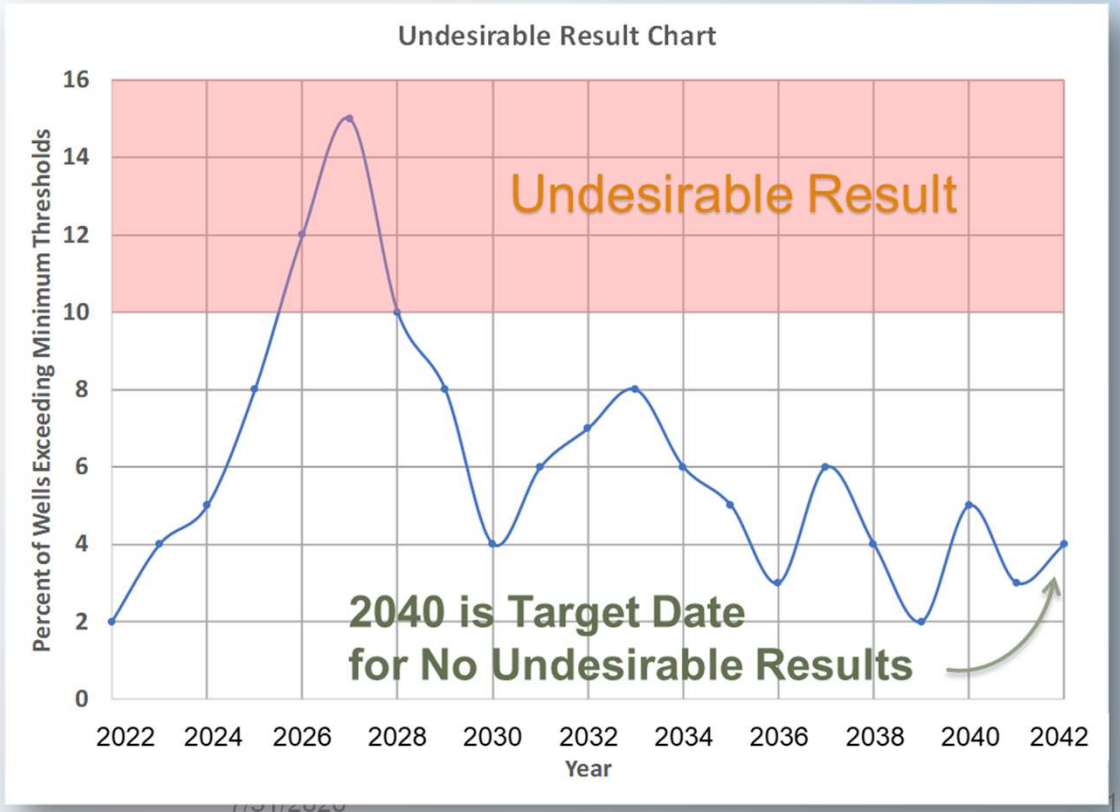
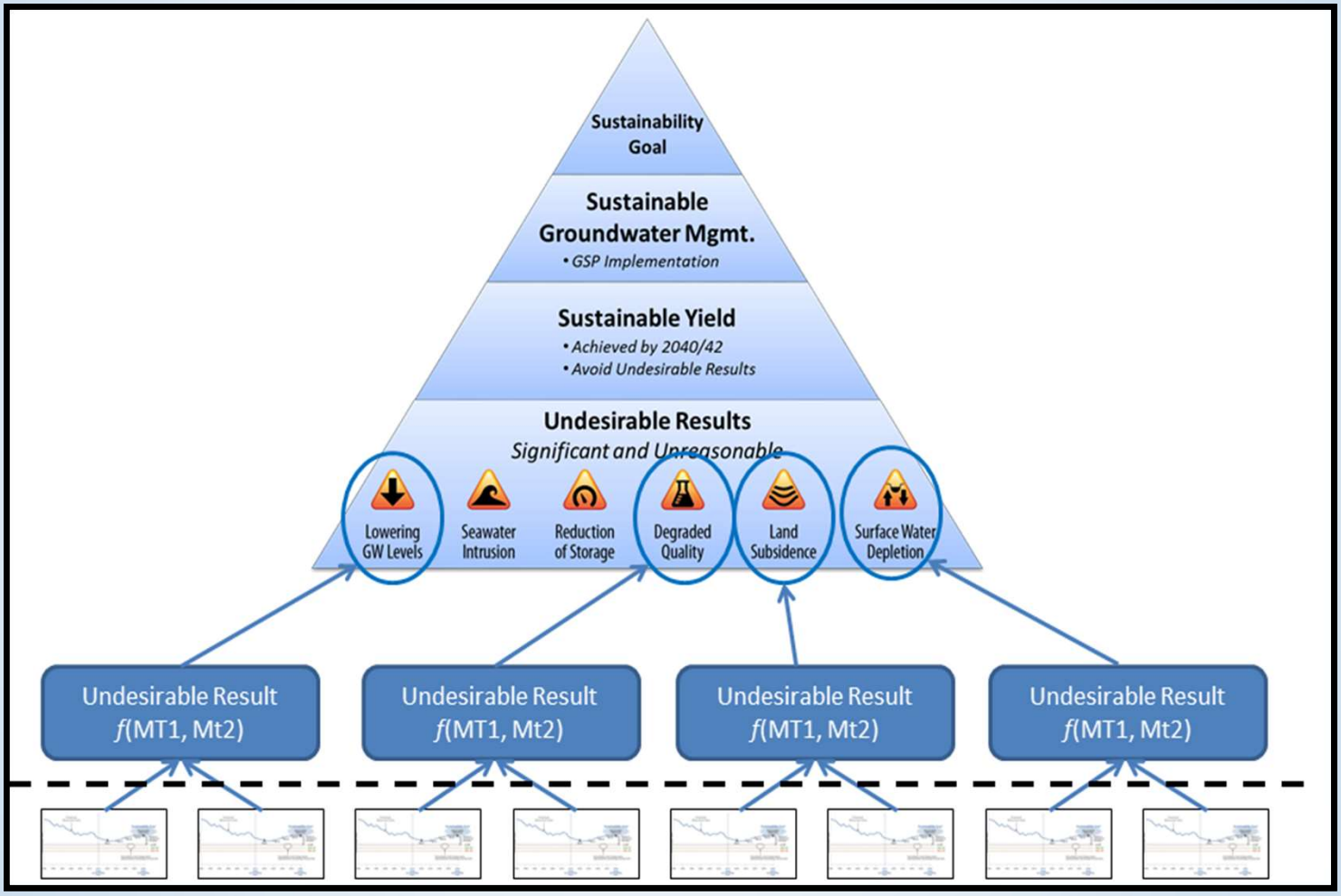

Undesirable Result Chart
Percent of Wells Exceeding Minimum Thresholds
Undesirable Result
2040 is Target Date
for No Undesirable Results
Year

Demonstrating Sustainability: Bringing it All Together



Sustainability Recap

- The fundamental principle is that groundwater sustainability is achieved by avoiding undesirable results for all applicable indicators.
- Sustainability is proven with future measurements of groundwater conditions, not model results.
- Notice that you do not have to necessarily meet your measurable objectives to be managing sustainably.
  - Undesirable Results are the sustainability metric
  - Undesirable Results are a quantitative collection of Minimum Thresholds
  - Your GSP does have to demonstrate that you plan to meet Measurable Objectives

Policy Decisions Based on Understanding of Current Basin Conditions, Public Outreach and Technical Analyses

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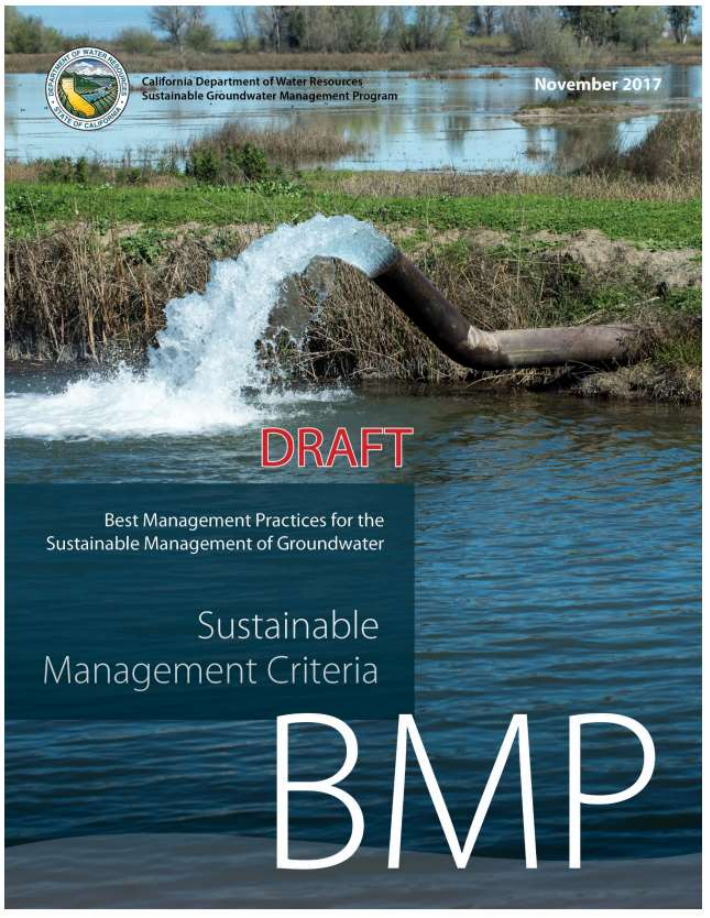
Where to get more information

- https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-6-Sustainable-Management-Criteria-DRAFT_ay_19.pdf



Toward Sustainability in the GSP

Putting it all together – there is no one way to do this!

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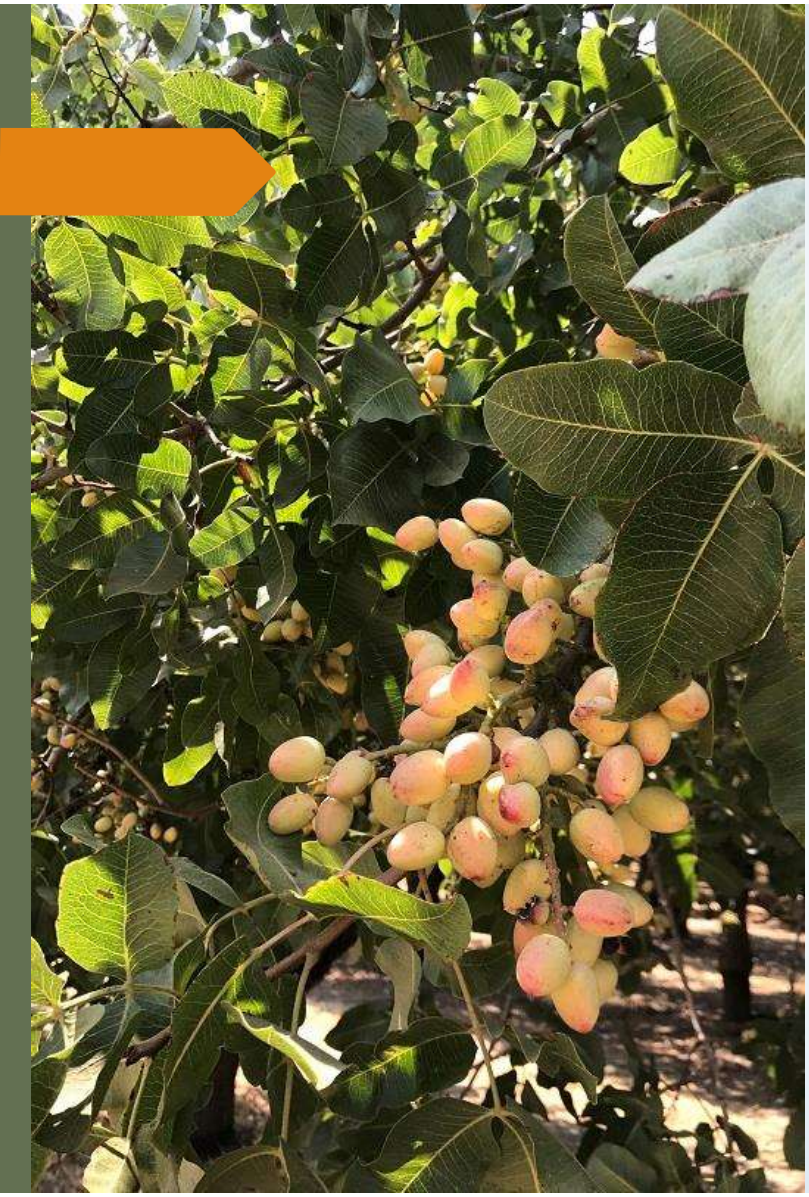


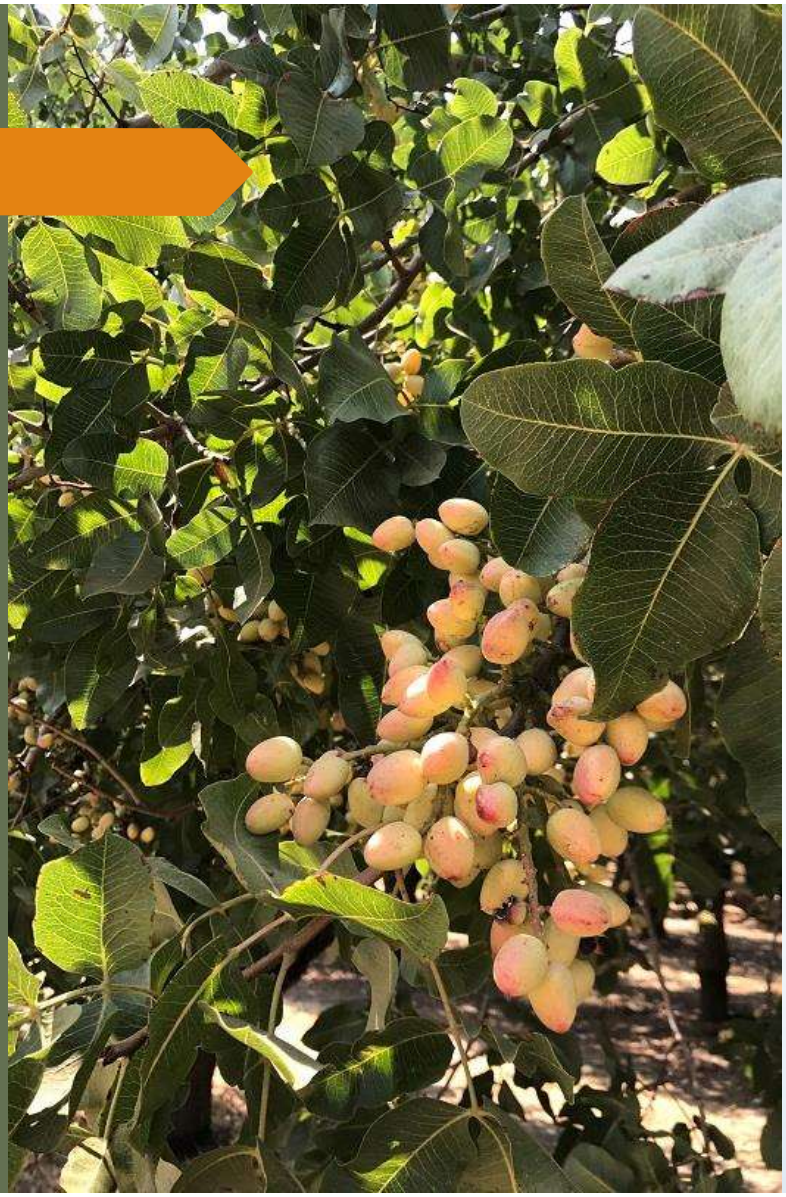
How Is This Implemented?

1. Identify the Subbasin's Sustainability Goal
2. Assess which of the six sustainability indicators are applicable
3. Develop draft descriptions of what is significant and unreasonable (narrative description)
4. Set minimum thresholds at each representative monitoring point to reflect what locally is significant and unreasonable

Identify the Subbasin's Sustainability Goal

Sustainability Goal

- Per Section §354.24 of the SGMA regulations, the sustainability goal for the Subbasin has three parts:
  - A description of the sustainability goal;
  - A discussion of the measures that will be implemented to ensure the Subbasin will be operated within sustainable yield, and;
  - An explanation of how the sustainability goal is likely to be achieved.



Initial Draft Sustainability Goal Description - Discuss and Propose a Recommendation

Examples for consideration:

- The goal of this GSP is to manage the groundwater resources of the Subbasin for long-term **community, financial, and environmental benefits** to the Subbasin's residents and businesses.
- This GSP will ensure **long-term viability of water supplies** while maintaining the unique **cultural, community, and business aspects** of the Subbasin.
- Glenn County WAC Statement: *It is the desire of the people of Glenn County that* ***sufficient and affordable water of good quality be available on a sustainable basis to meet the needs of agricultural, industrial, recreational, environmental, residential, and municipal users within the county, both now and in the future.***

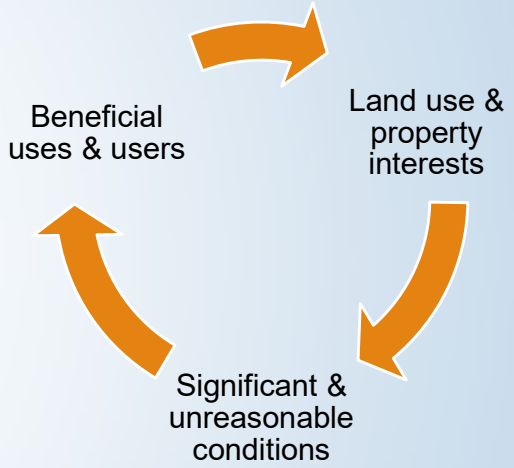
Potential Additional Topics or Changes to Preliminary Sustainability Goal

- Consider:
  - What do you want to protect?
  - Operational flexibility of water resources

- **<u>Possible CSAB Action Item</u>: Make recommendation to GSAs on Preliminary Corning Subbasin Sustainability Goal Description**

How Is This Implemented?

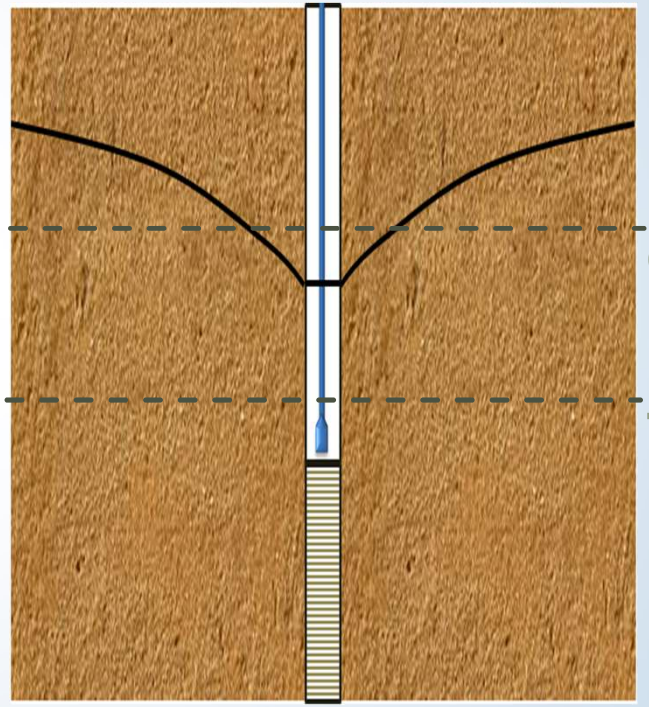
- Decide how to combine Minimum Thresholds into Undesirable Results
- Likely an iterative process:
  - How does this undesirable result affect beneficial uses and users of groundwater?
  - How does this undesirable result affect land uses and property interests?
  - Does the undesirable result adequately characterize conditions that are significant and unreasonable?



Importance of outreach to Basin water managers and groundwater pumpers

How Is This Implemented?

- Set Measurable Objectives, based on the agreed-to Minimum Thresholds
  - Quantify a margin of operational flexibility to each Representative Monitoring Point
  - Goal is to ensure that meeting the Measurable Objective safely avoids Minimum Thresholds



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How Is This Implemented?

- Identify projects and management actions to avoid Undesirable Results
  - Water Supply
  - Extraction Management
  - Land Use Management

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Iterate to get to the appropriate SMC

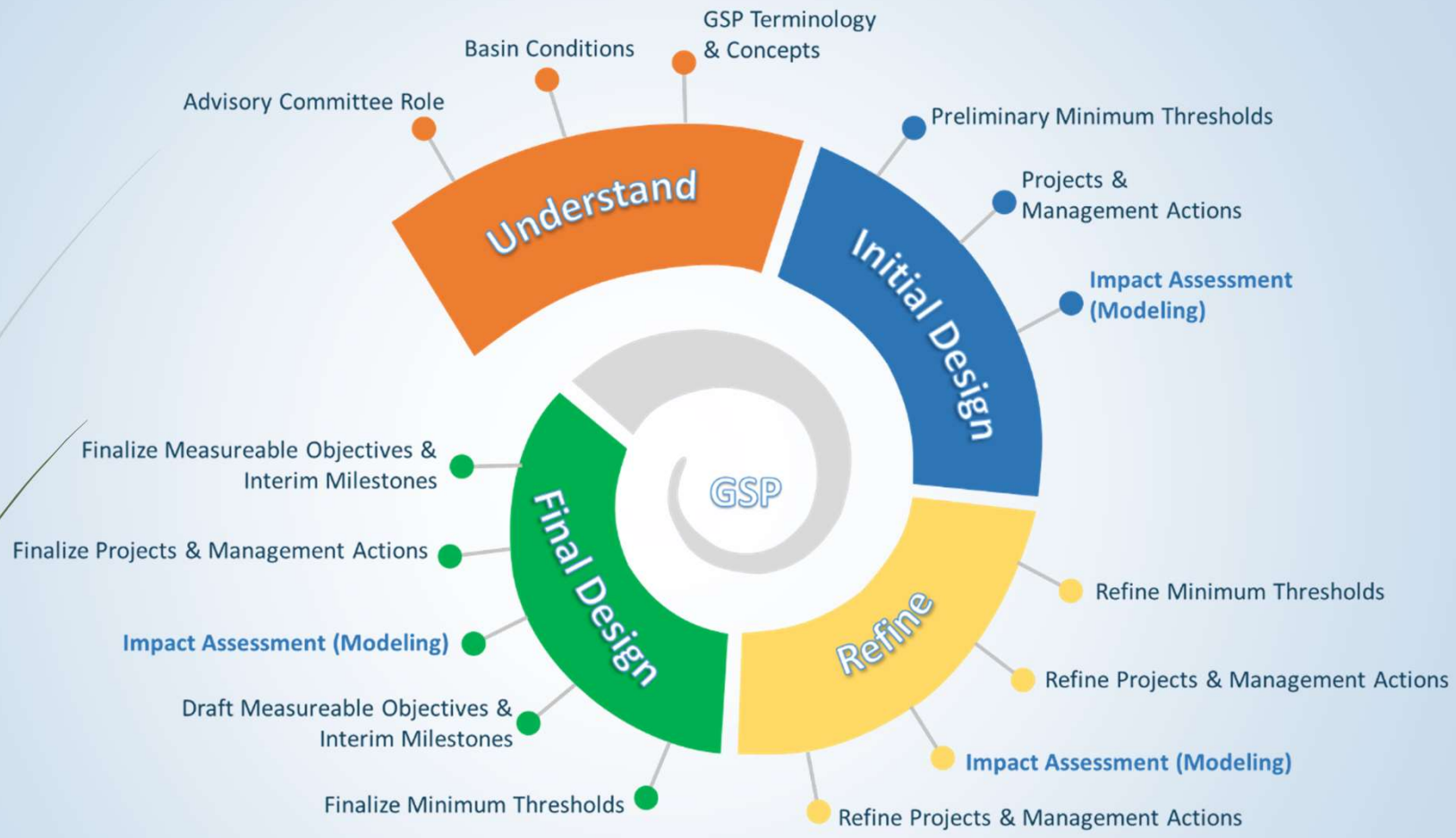
- What combination of projects and management actions avoid all undesirable results simultaneously? *[modeling approaches]*
  - Keep flexibility in projects/actions to address adaptive management
- Can some undesirable results not be avoided?
  - Add/adjust project or management actions
  - Set new minimum thresholds
  - Redefine the formula used to define undesirable results
    - Make sure undesirable results still represent what is significant and unreasonable

Keep in mind that SMC discussions lead to policy decisions

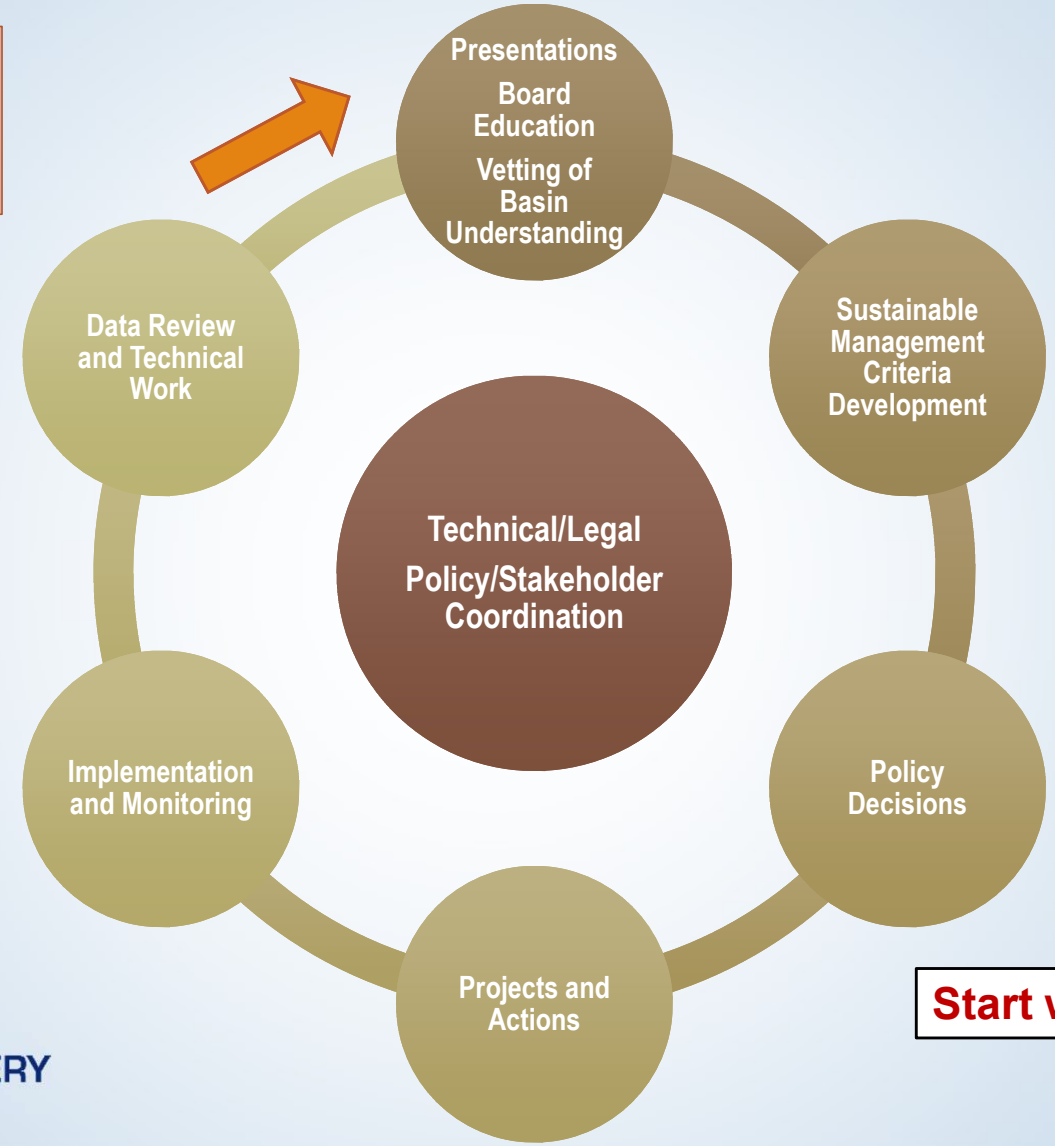
- Plan on iterative discussions on:
  - What constitutes significant and unreasonable
  - Whether the minimum thresholds are adequate, or too restrictive
  - Whether measurable objectives are reasonable
  - How to combine minimum thresholds into undesirable results
  - What projects are necessary (and who pays)

Next Steps

- Make sure everybody understands existing basin conditions
- Receive ideas on what is significant and unreasonable for each of the sustainability indicators, as applicable
  - Significant and unreasonable concepts need not be perfect!
  - We DO need guidance from GSA, CSAB and members of the public
  - We will review each Sustainability Indicator and SMCs at upcoming CSAB meetings


GSP Terminology & Concepts
Basin Conditions
Advisory Committee Role
Understand
Preliminary Minimum Thresholds
Projects & Management Actions
Impact Assessment (Modeling)
Initial Design
GSP
Refine
Refine Minimum Thresholds
Refine Projects & Management Actions
Impact Assessment (Modeling)
Refine Projects & Management Actions
Final Design
Finalize Measureable Objectives & Interim Milestones
Finalize Projects & Management Actions
Impact Assessment (Modeling)
Draft Measureable Objectives & Interim Milestones
Finalize Minimum Thresholds

Example GSP Development Process and GSP Life Cycle



Start with the End in Mind!

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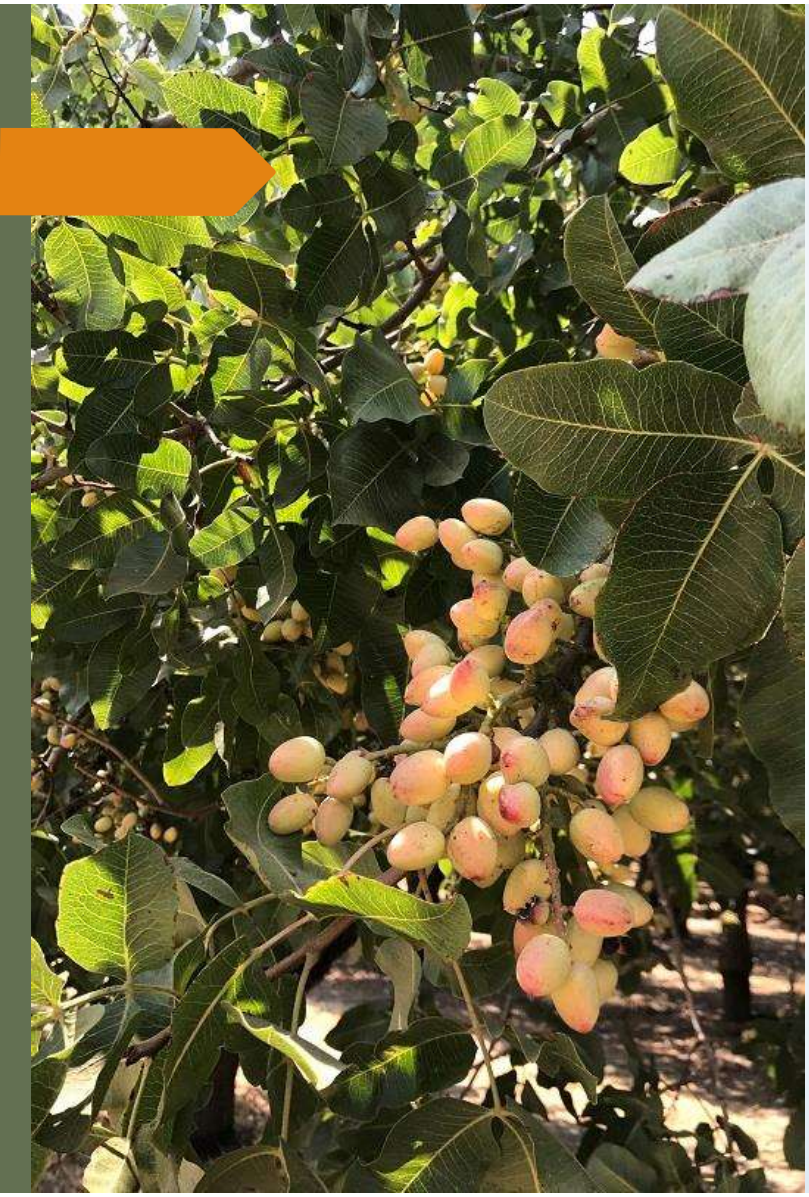

Sustainable Management Criteria – Questions and Comments?

- CSAB comments
- Public comments

Monitoring Networks Overview

Considerations for Development

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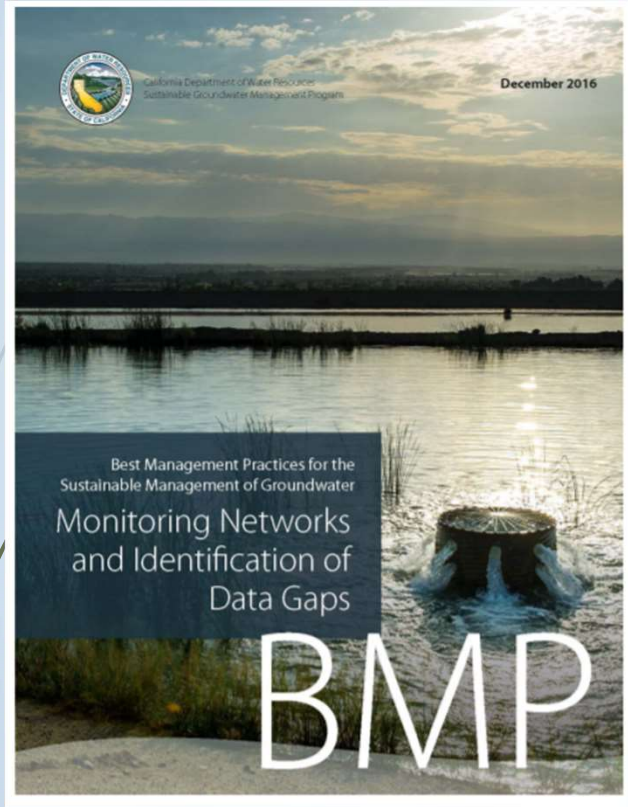
SGMA Monitoring Network



- CA CCR § 354.34 & Best Management Practices document
- SGMA monitoring network purpose:
  - Monitor groundwater conditions to measure progress towards meeting sustainability goals and management criteria
  - Assess impacts to the beneficial use/users of groundwater
  - Quantify annual water budget

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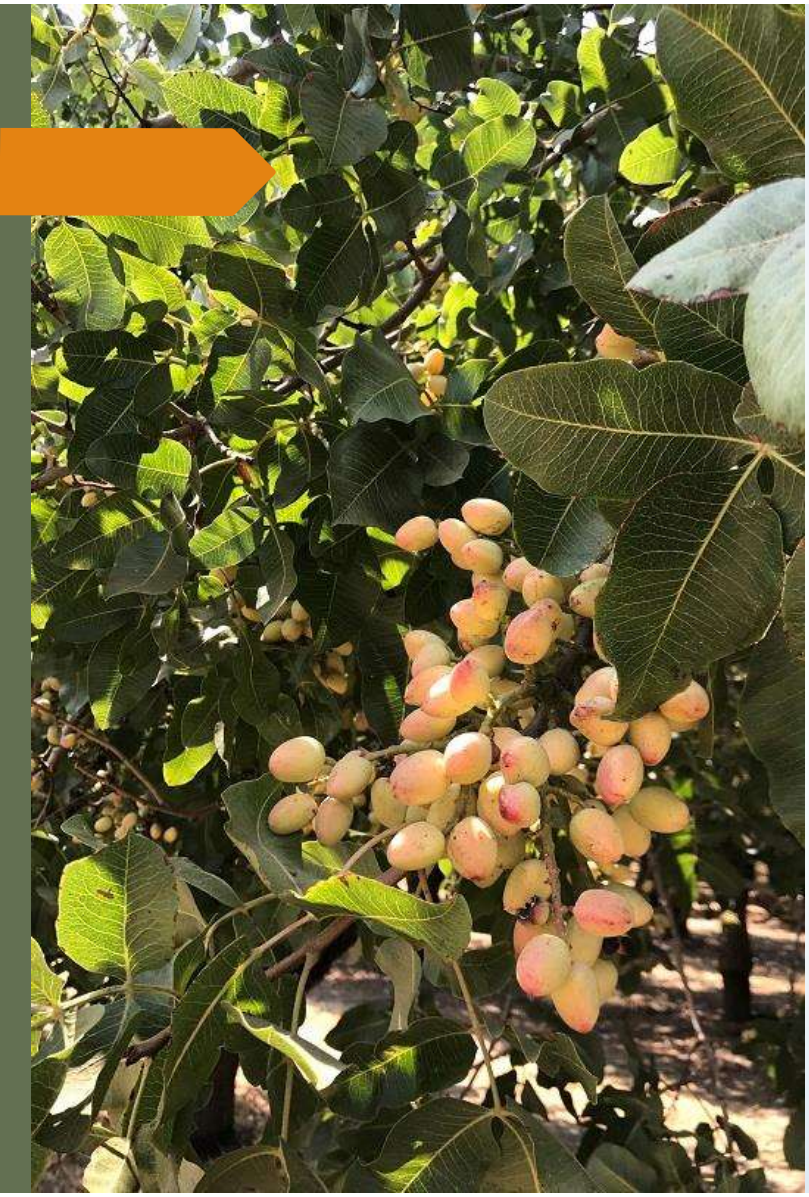
Potential Monitoring Networks

- **Groundwater wells**
  - Groundwater level declines
  - Groundwater quality degradation
  - Groundwater storage reduction
  - Interconnected surface water depletion
- **Subsidence Monuments**
  - Land subsidence
- **Stream Gages**
  - Interconnected surface water depletion



Sustainability Indicators

- Chronic lowering of groundwater levels
- Changes in groundwater storage
- Seawater intrusion
- Land Subsidence
- Groundwater quality
- Depletion of interconnected surface waters

Seawater Intrusion

- SGMA Definition:
  - "Seawater intrusion" refers to the advancement of seawater into a groundwater supply that results in degradation of water quality in the basin and includes seawater from any source.

- SMC BMP:
- The default position for GSAs should be that all six sustainability indicators apply to their basin. If a GSA believes a sustainability indicator is not applicable for their basin, they must provide evidence that the indicator does not exist and could not occur.
- For example, **GSAs in basins not adjacent to the Pacific Ocean, bays, deltas, or inlets may determine that seawater intrusion is not an applicable sustainability indicator, because seawater intrusion does not exist and could not occur**.

Applicability of Seawater Intrusion Sustainability Indicator

- Example statement to be added to GSP:
  - Seawater intrusion is not an applicable sustainability indicator for the Corning Subbasin GSP, due to its distance from the Pacific Ocean, bays, deltas or inlets. Therefore, seawater intrusion is not likely to occur in the Corning Subbasin.
- **<u>Possible CSAB Action Item</u>: make recommendation to GSAs to remove seawater intrusion from the list of applicable sustainability indicators in the Corning Subbasin GSP.**

Chronic Lowering of Groundwater Levels

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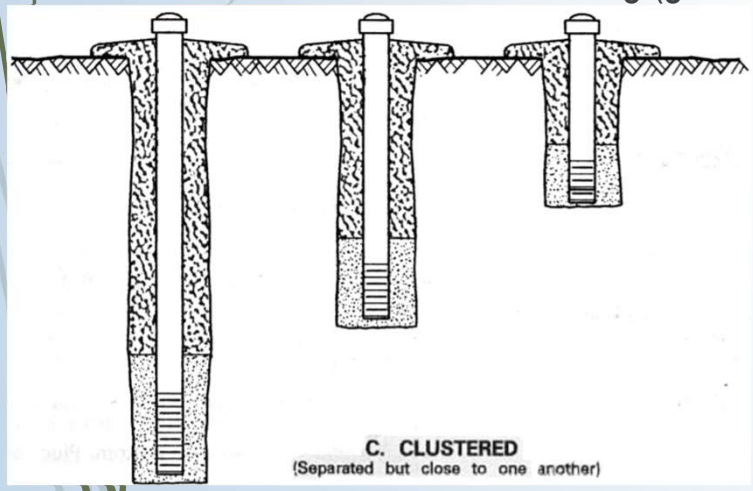
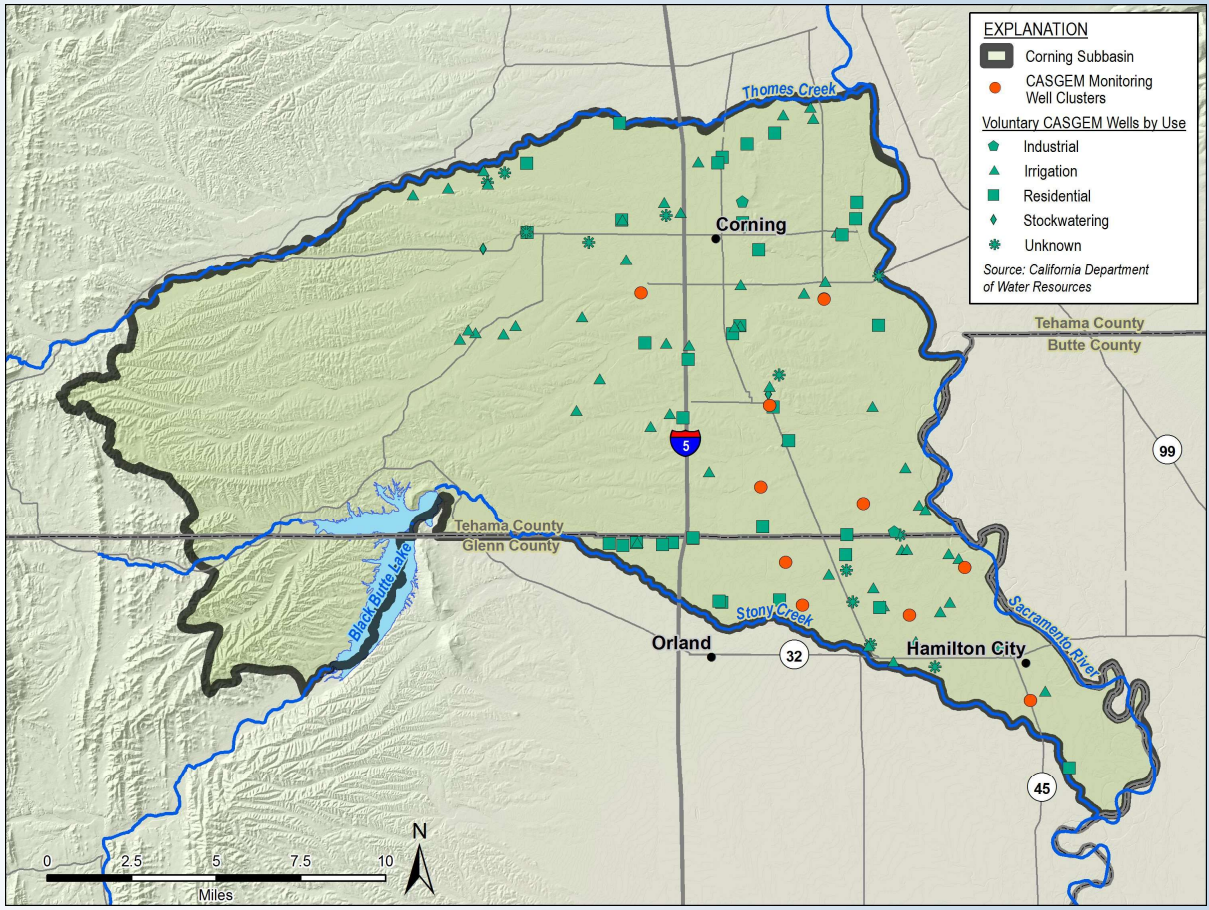
CASGEM Water Level Monitoring Network

- Clustered observation wells (orange)
- Production wells volunteered by owner for monitoring (green)



California Well Standards Bulletin 74-90



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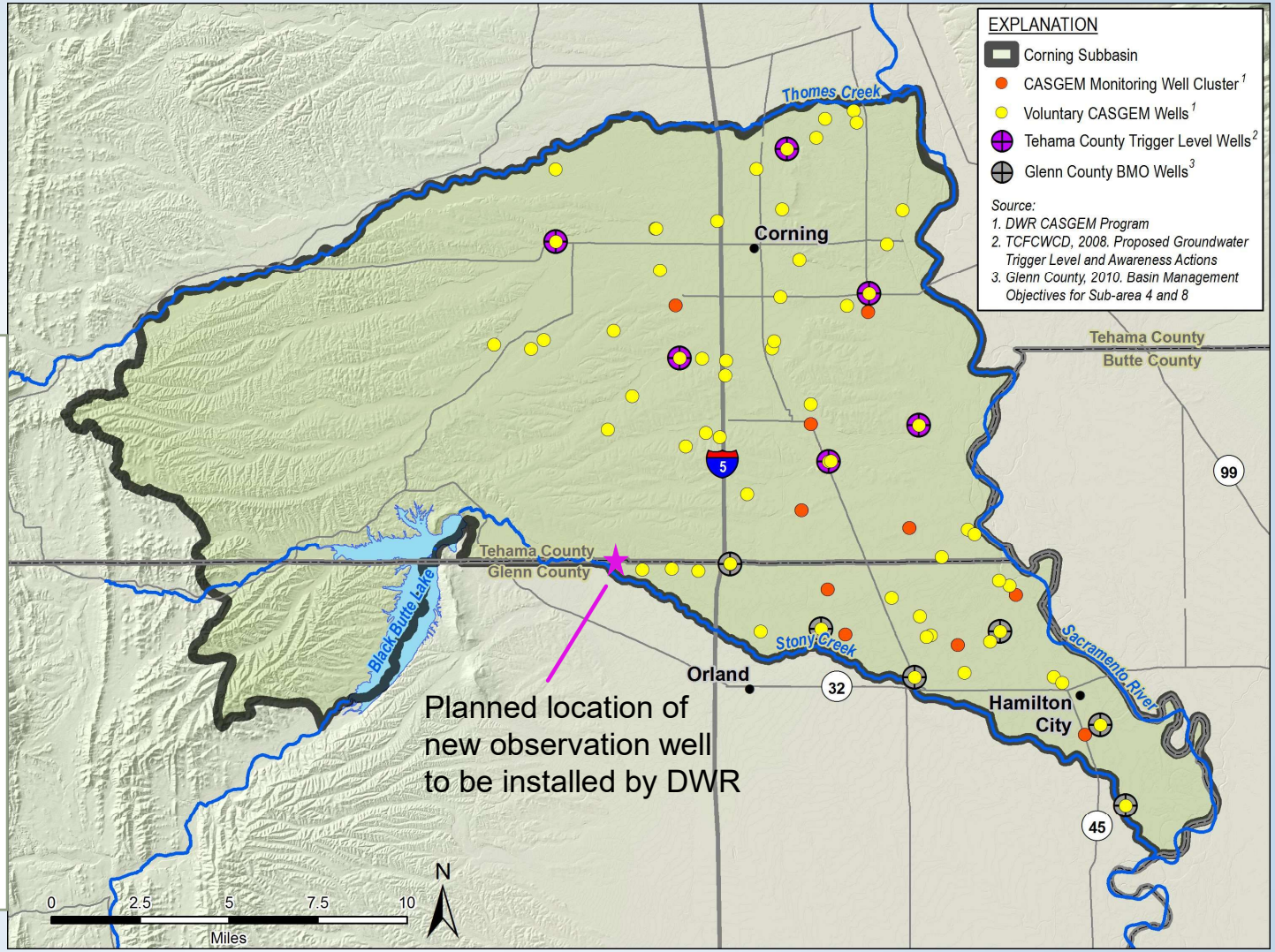
Potential Water Level Monitoring Network

- One principal aquifer monitored
- 99 total wells in CASGEM network
  - 37 CASGEM observation wells in 10 clusters
  - 62 Voluntary CASGEM wells
- Locations of Glenn and Tehama Co compliance wells shown for reference



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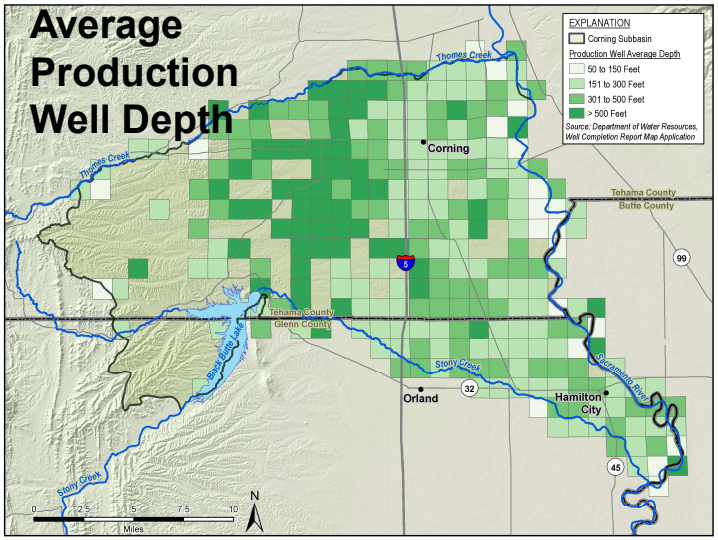
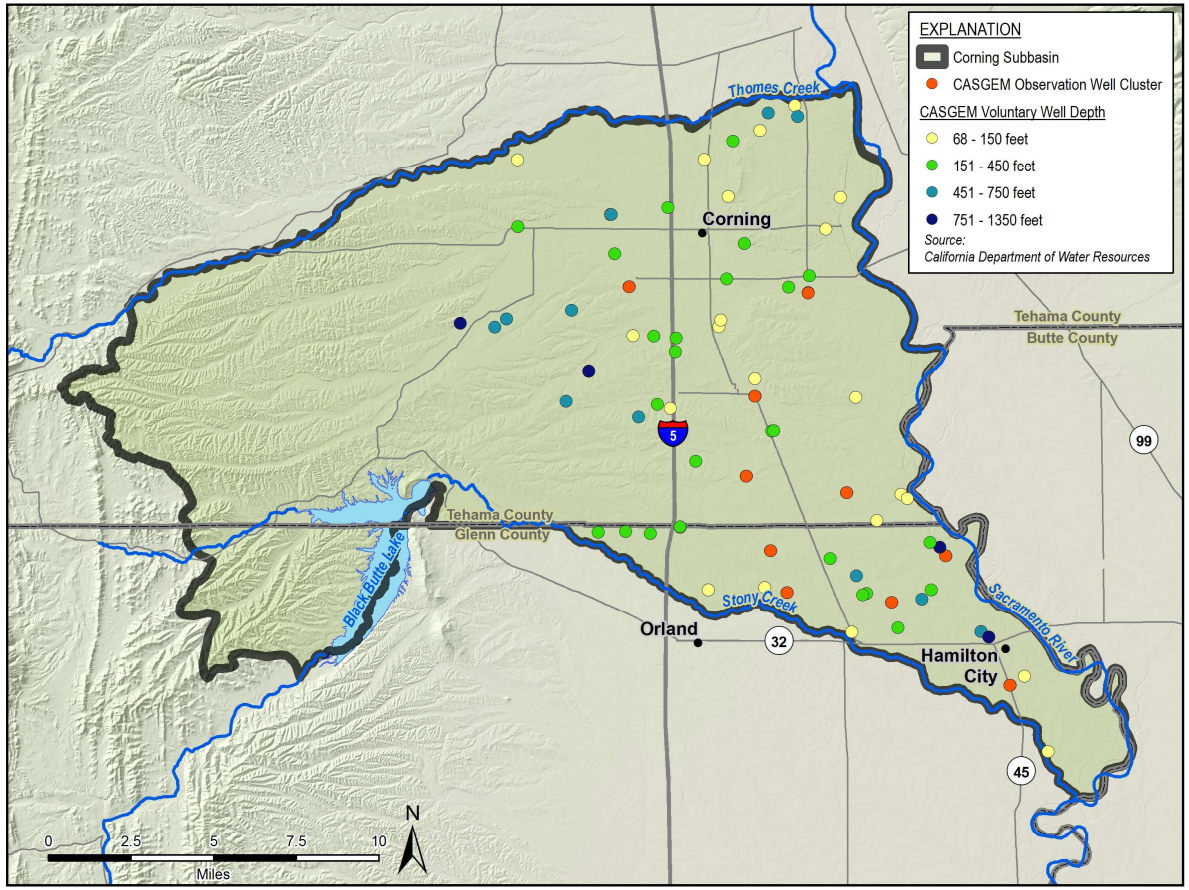
Well Depth

- 10 observation clusters include 3 to 5 wells in shallow and deep portions of aquifer (max depth of clusters ranges from 500 to 1,200 ft)
- Wells in network are generally less than 450 ft deep (66% of wells)
- Wells are mainly deeper in western Subbasin and five locations northwest of Hamilton City





50 – 100 ft

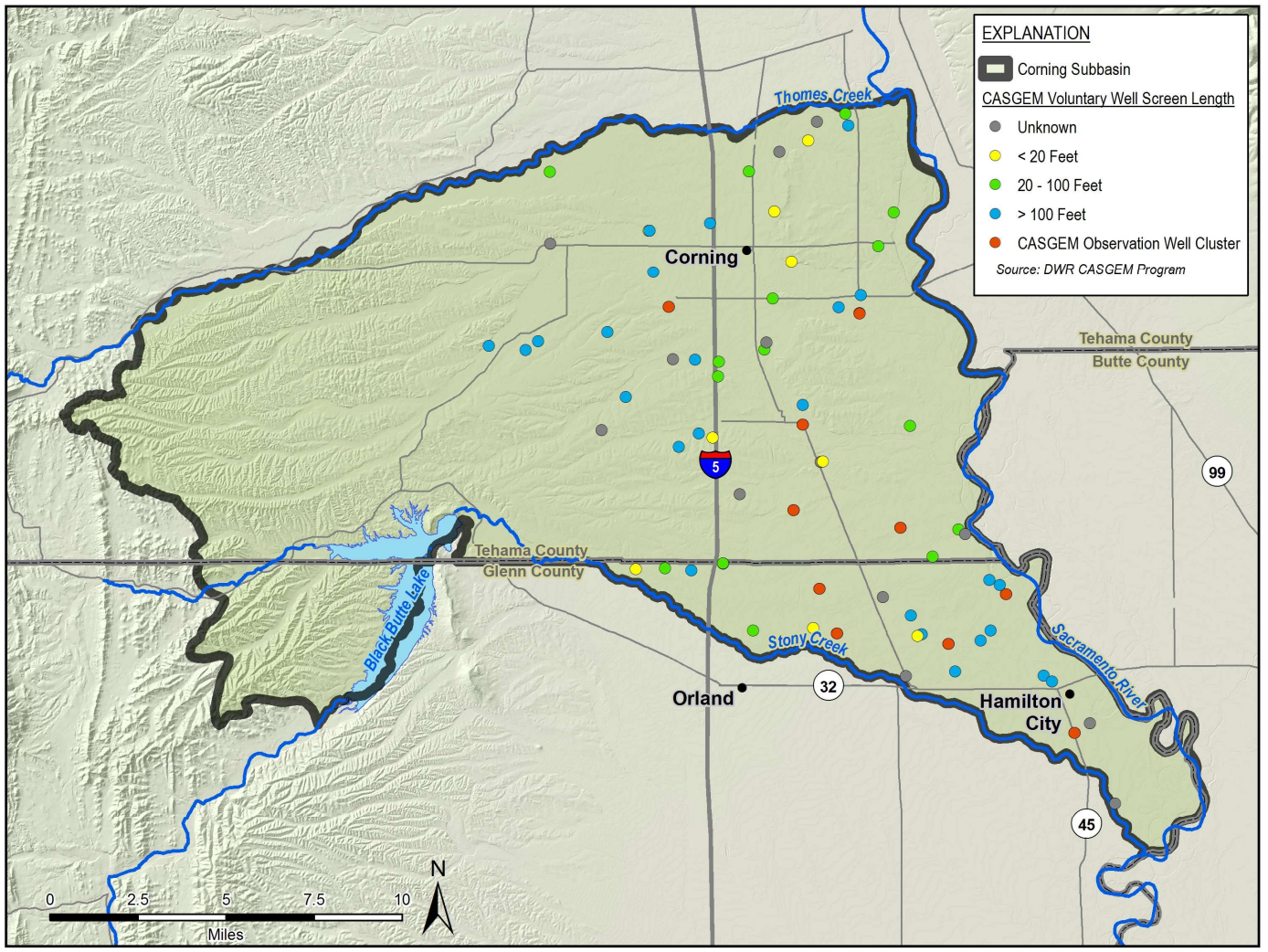
151 – 300 ft

301 – 500 ft

>500 ft

Well Screen Interval

- 50% of observation cluster wells have discrete screen lengths of 20 ft or less
- Deeper wells typically have longer screens
- Screen length typically longer and variable in voluntary wells as these were built for pumping



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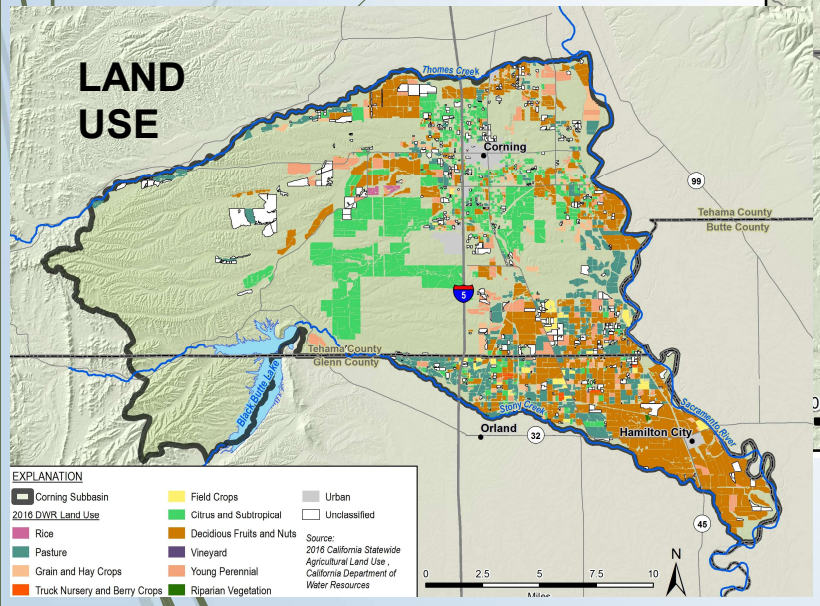
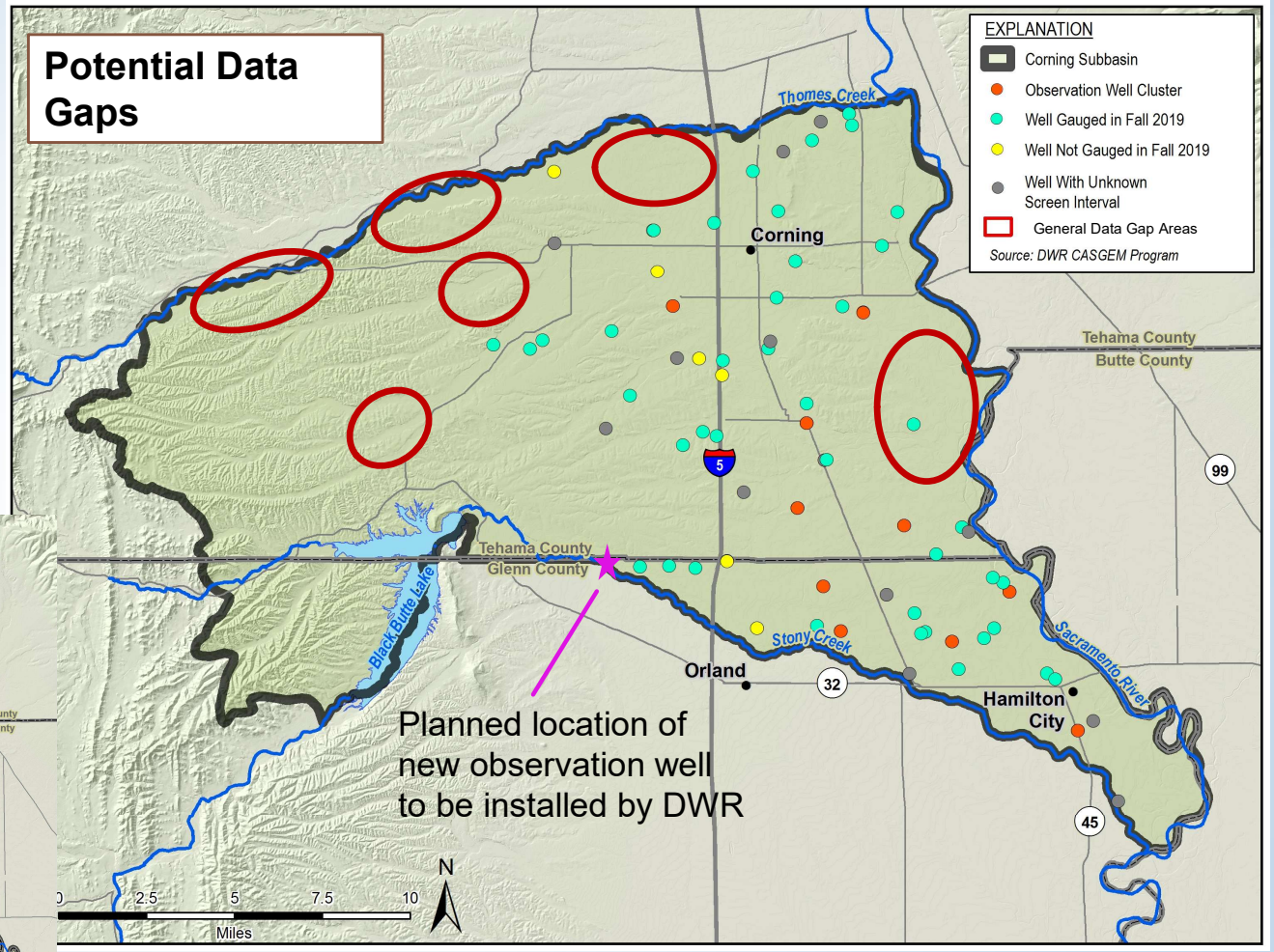
Potential Water Level Data Gaps

- Potential spatial data gaps:
  - Southeast of Corning / Sac. River
  - Northwest of Corning / Thomes Creek
  - West Subbasin





Land Subsidence

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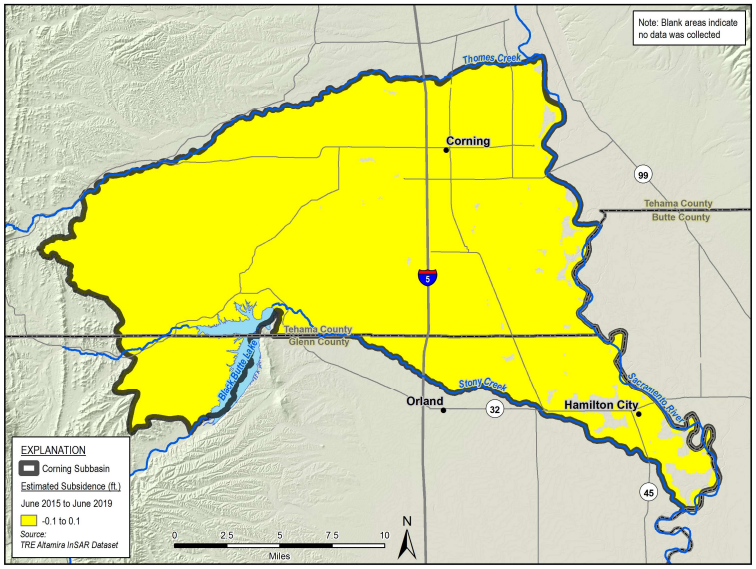
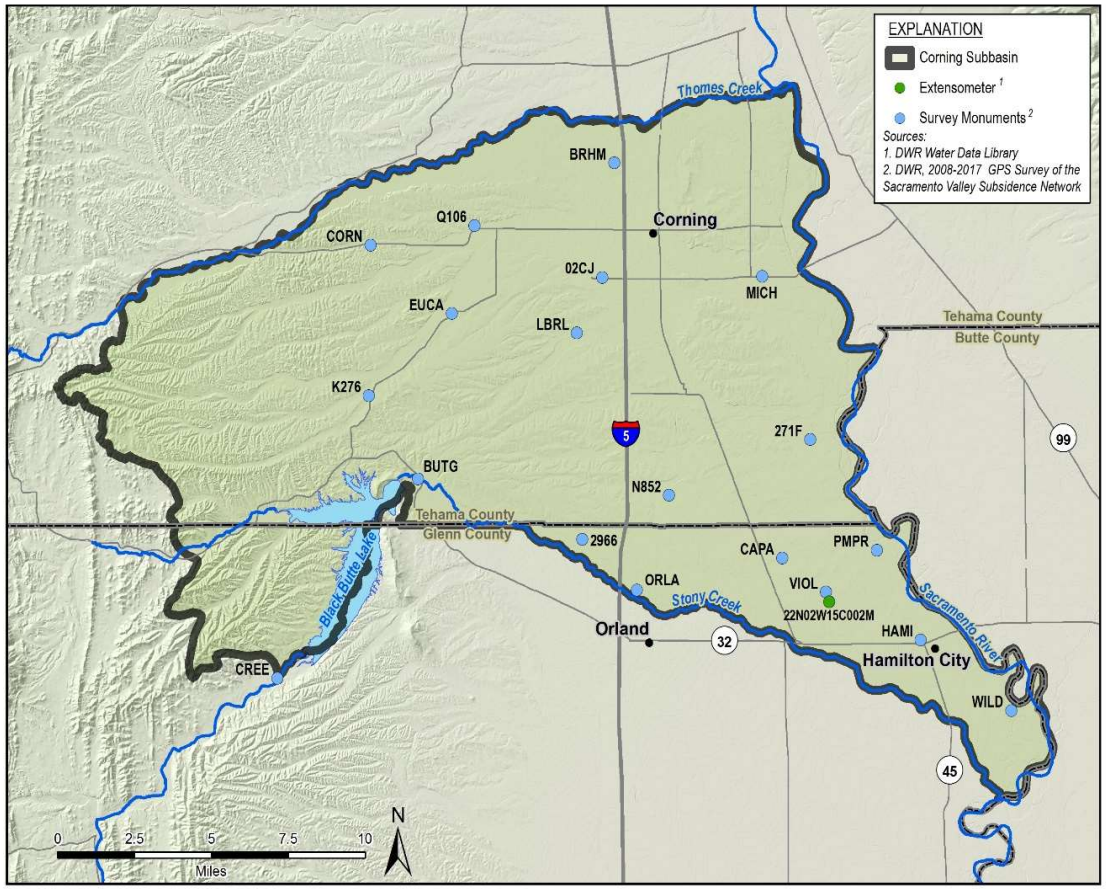
DWR Subsidence Monitoring Network

- Survey monuments
- Extensometer
- In-SAR satellite data





Water Quality

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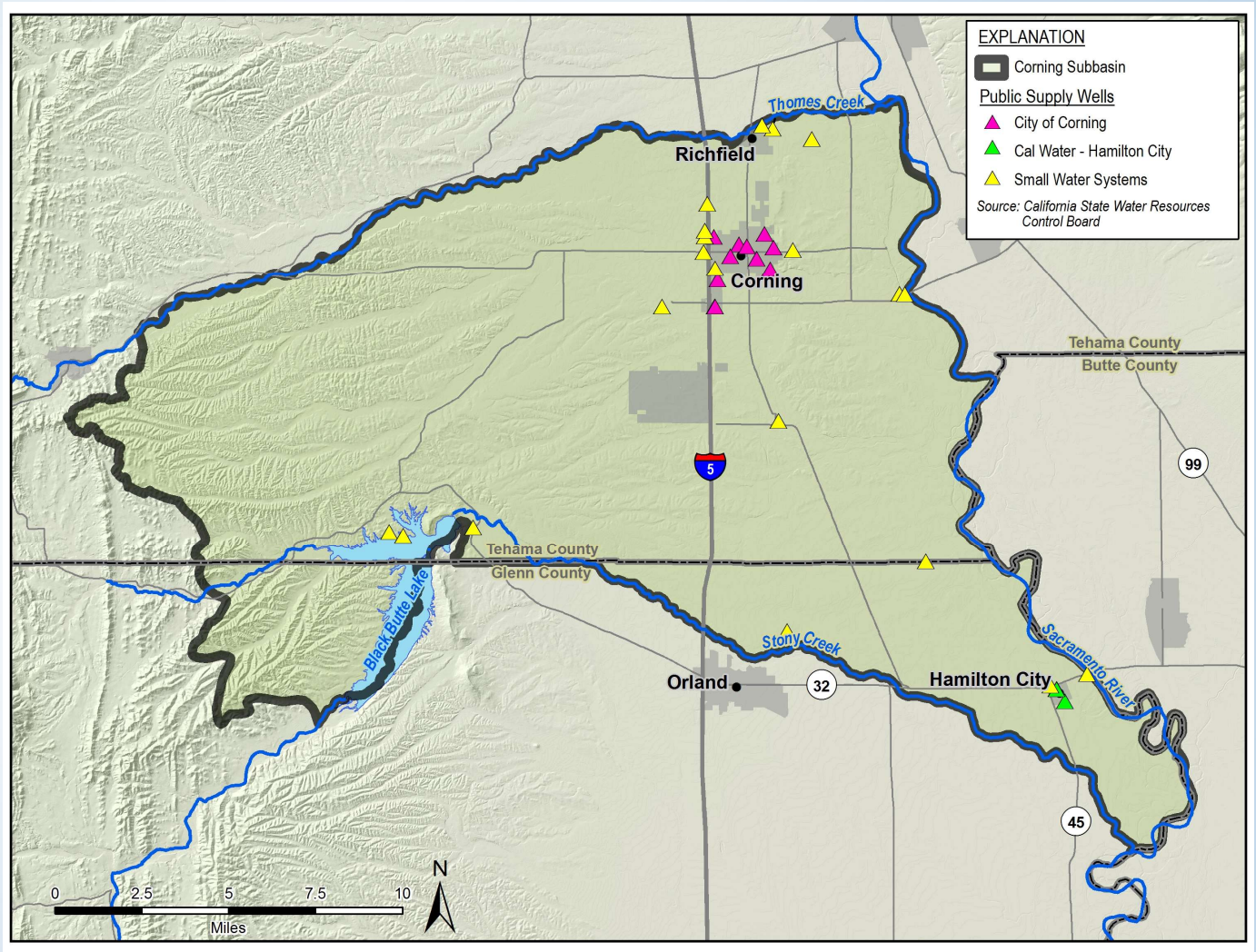
Water Quality Monitoring Network – Public Water Supply Wells

- Public Supply Wells
  - 29 wells in Subbasin
  - Sampled for Title 22
  - Reported to Division of Drinking Water



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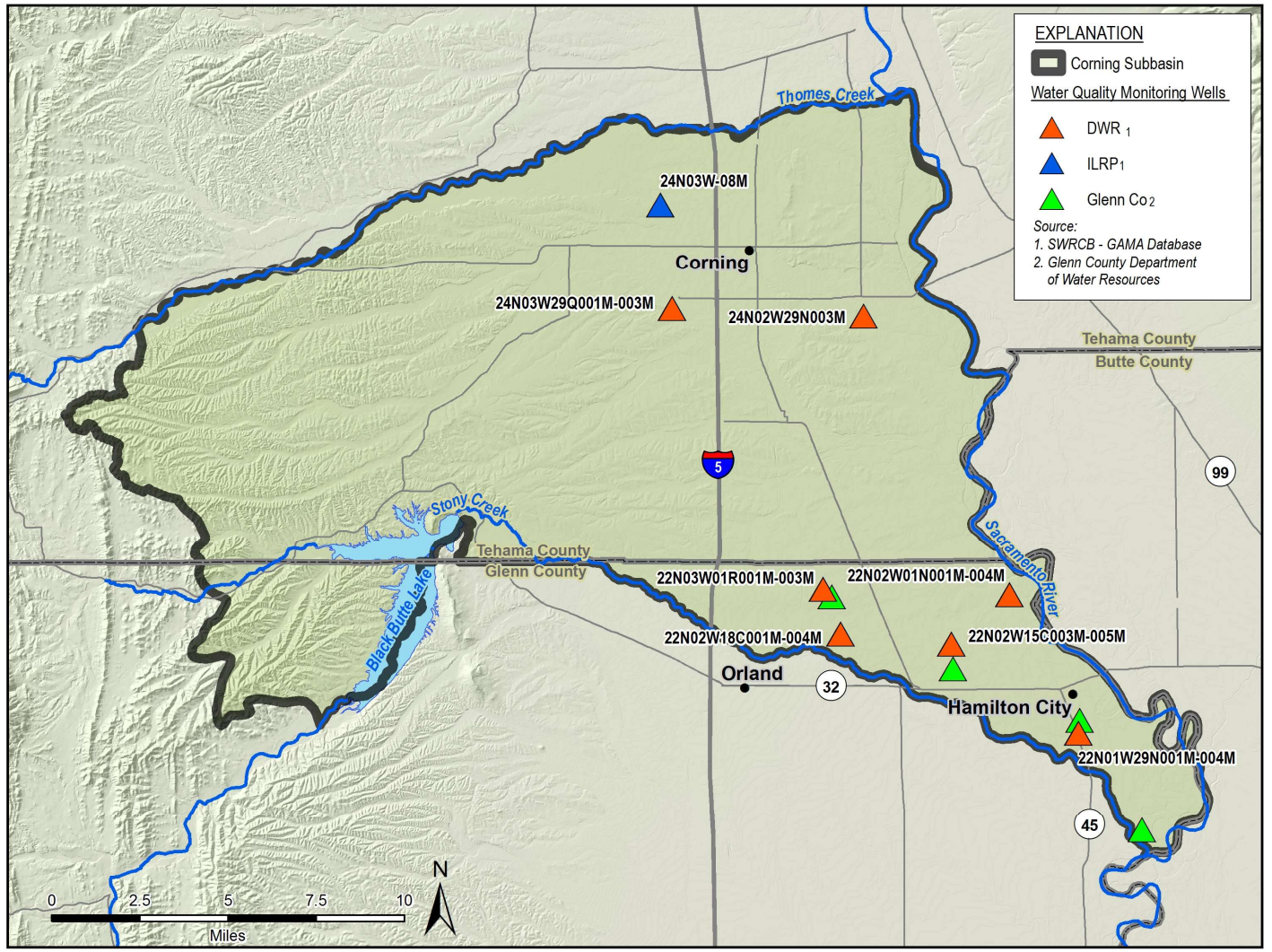
Water Quality Monitoring Network – Observation Wells

- Monitoring wells that have been sampled recently in the Subbasin
  - DWR observations clusters
  - ILRP well northeast of Corning (domestic)
  - Glenn Co monitoring program (EC, Temp., pH)



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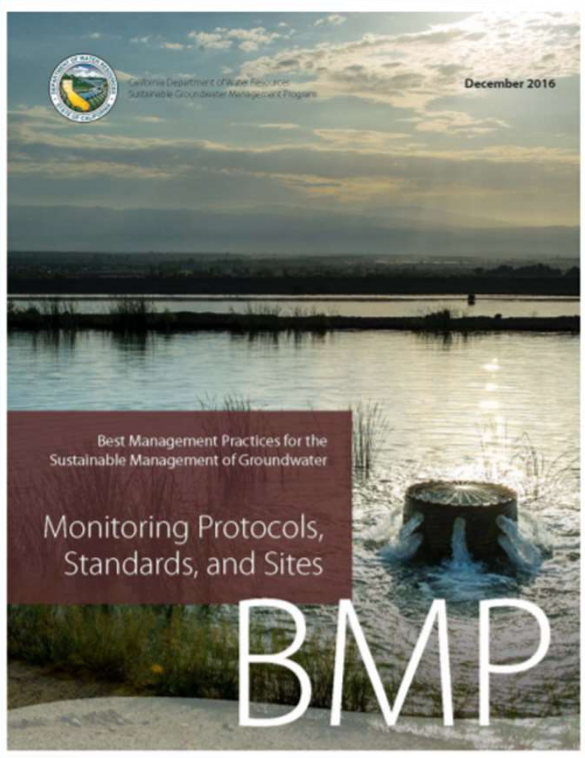
SGMA Monitoring Protocols



- CA CCR § 354.34 & Best Management Practices document
- Used for water level and water quality data collection
- Rely on existing management programs, if possible, for water quality, subsidence, and stream monitoring

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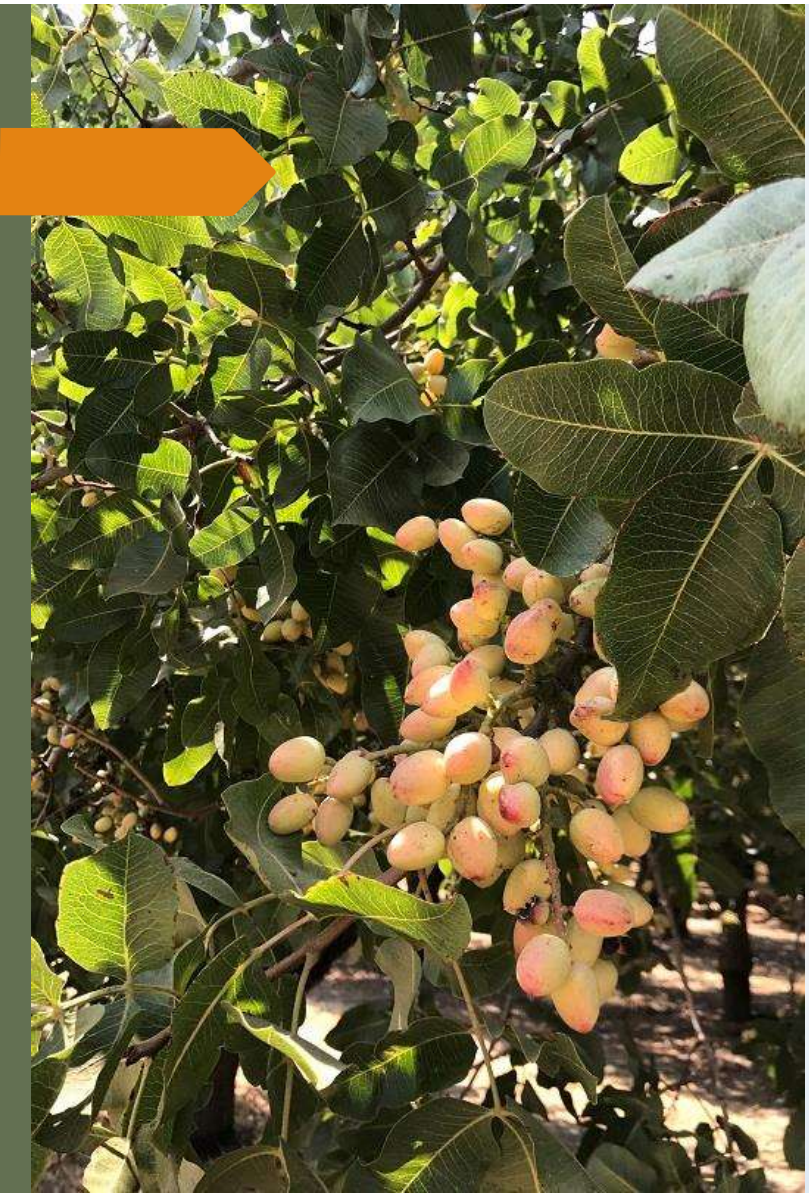
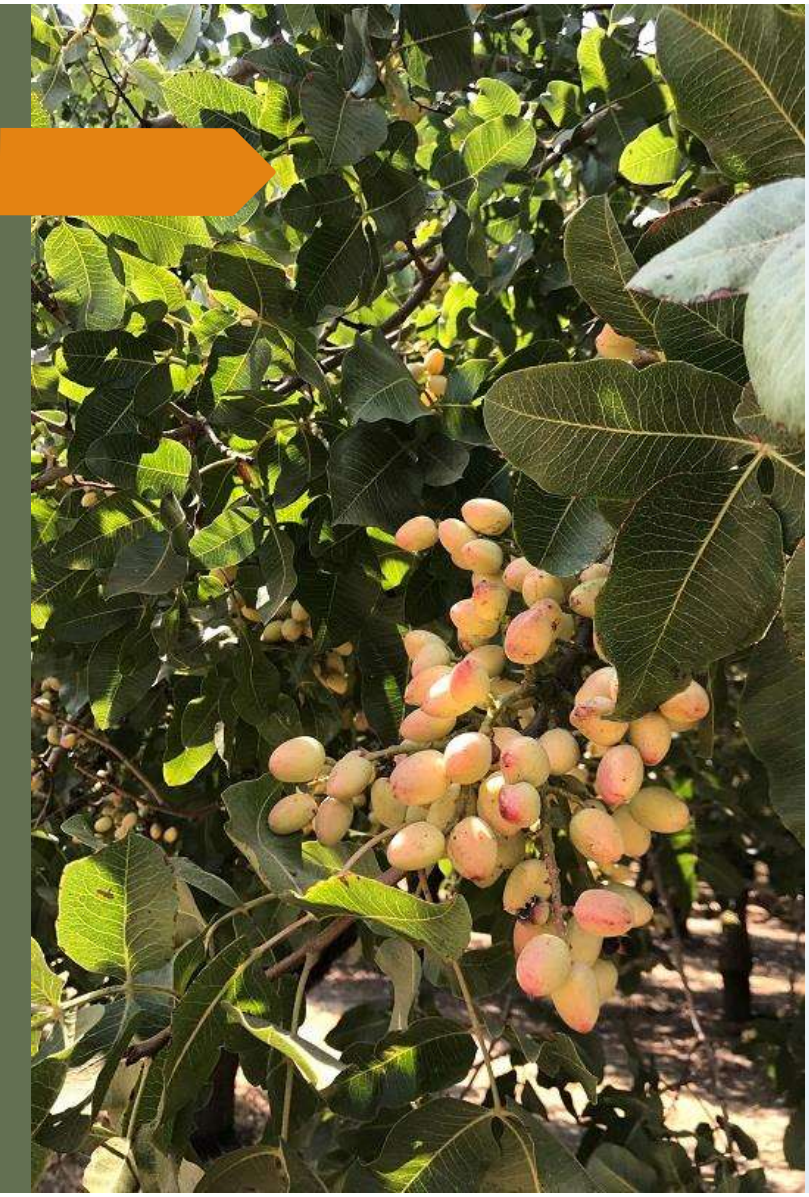


Monitoring Networks– Questions and Comments?

- Other networks available for use?



Meeting Wrap-Up

- Final throughs and comments?
- Action items and next steps
- Preview for next month:
  - Groundwater Level SMC discussion #1
  - Background on Groundwater Levels SMC
  - Discuss “significant and unreasonable"
  - Proposed approaches for MT and MO