



Recap and Recommended 2021 Ambient Water Quality Pilot Study

September 27, 2022

Agenda

- Recap of Groundwater Monitoring Plan requirements and purpose
- Recap of objectives and approach
- Recap of Recycled Water Policy requirements
- Path to Comply with Recycled Water Policy
- Summary of Stakeholder input on the groundwater monitoring program and 2021 ambient water quality pilot discussions to date
- Recommended Process to be Piloted for Recomputation of AWQ Through 2021
- Vision to the Future – what needs to be accomplished in the coming years?

New Basin Plan Requirement

- Groundwater Monitoring Program

No later than August 1, 2022 ... [the Task Force Members] ... shall submit to the Regional Board for approval, an updated watershed-wide TDS and nitrogen monitoring program that will provide the data necessary to implement the TDS/nitrogen management plan. Data to be collected and analyzed shall address at a minimum

- (1) determination of current ambient quality in groundwater management zones;
- (2) determination of compliance with TDS and nitrate-nitrogen objectives for the management zones;
- (3) evaluation of assimilative capacity findings for groundwater management zones;
- (4) assessment of the effects of recharge of surface water POTW discharges on the quality of affected groundwater management zones; and
- (5) ***any other requirements specified in the State Water Board's Recycled Water Policy*** (Resolution No. 2018-0057)

New Basin Plan Requirement

- Ambient Water Quality

The determination of current ambient quality can be accomplished using the method consistent with that employed by the N/TDS Task Force (20-yr running average) to develop the TDS and nitrogen water quality objectives included in the Basin Plan, **or an alternative method approved by the Executive Officer of the Regional Board**. The determination of current ambient groundwater quality throughout the watershed must be reported by October 1, 2023, and, at a minimum, **every five years thereafter** unless the Regional Board revises this schedule.

Purpose of the Ask

- Monitoring program hasn't been updated since 2005
- Past recommendations to revise ambient water quality methods
- 2019 Recycled Water Policy (Policy) Amendments
 - Requires the Regional Board and Task Force to address more than just the monitoring program and ambient water quality methods
 - Monitoring program and ambient water quality are elements identified as an early target for the RB in complying with the 2019 Policy amendments

Objectives and Approach

- Our approach was to start with the end in mind → compliance with 2019 Recycled Water Policy
- Our objective is to develop monitoring and reporting specifications that:
 - Create compliance with applicable regulations (Basin Plan objectives; Recycled Water Policy)
 - Leverage regulations to reduce frequency and cost of future assessments
 - Leverage technology advancements to create flexibility in assessment methods and reduce costs of future assessments
 - Create clear and actionable schedule to perform compliance actions through next ambient water quality update due by April 2029
- Build consensus through education and collecting stakeholder input

Objectives and Approach

Two key priorities for current scope of work

1. Define groundwater monitoring program
 - a. Define wells to be monitored and responsible parties
 - b. Identify data gaps
 - c. Define actions (and timeline) to improve monitoring networks to fill data gaps
2. Assess current ambient water quality methodology
 - a. What changes can we make, enabled by 2019 Recycled Water Policy?
 - b. What methods can we pilot for the required assessment due October 2023?

Also... provides a framework for work over the next several years

Recap of Recycled Water Policy Requirements and Path to Comply

Recycled Water Policy: Five-Year Assessments

Section 6.2.1.3 of Policy

Salt and nutrient management plans adopted as a Basin Plan amendment or accepted by the regional water board prior to April 8, 2019 shall be evaluated pursuant to 6.2.6 and 6.2.7 by **April 8, 2024**

Section 6.2.6 of Policy

- 1 Observed trends in groundwater salinity with the predicted trends from the SNMP
- 2 The ability of the monitoring network to adequately characterize groundwater quality in each GMZ and
- 3 Potential new data gaps
- 4 The ability of any relied-upon models to adequately simulate groundwater quality
- 5 Available assimilative capacity based on observed trends and the most recent water quality data
- 6 The impact of new projects that are reasonably foreseeable at the time of the assessment

SNMP Monitoring Plan Requirements

Section 6.2.4.1 of Policy

- Monitoring program must be representative – designed to address SNMP
- The monitoring plan must be designed to effectively evaluate water quality in the basin. The monitoring plan must focus on:
 - water supply wells,
 - areas proximate to
 - large water recycling projects, particularly groundwater recharge projects, and
 - other potential sources of salt and nutrients identified in the salt and nutrient management plan.
 - Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.
- Monitoring data must be submitted every year

A Vision to the Future – Path to Comply with Recycled Water Policy

Actions for September 2022 through April 2029

- Complete 2021 Ambient Water Quality Pilot Study (due October 2023)
 - Includes pilot assessment of ambient water quality and assimilative capacity methods
 - Recommends methodology for future assessments
- Document 5-year assessment of Basin Plan SNMP (Regional Board to complete by April 2024)
- Task Force implements process to collect all water quality data annually
- All priority data gaps identified in 2022 have been addressed through step-wise process
- Complete 5-year assessment of monitoring program data and SNMP (due April 2029)
 - Update groundwater monitoring program and identify any new data gaps
 - Assess ambient water quality and assimilative capacity per revised method

A Vision to the Future



Summary of Stakeholder Input

Recommendations for addressing questions for consideration and stakeholder feedback

Questions Posed for Consideration: Monitoring Program and Data Gaps

- Should we reduce the monitoring network from any well with data to a set of key wells that MUST be monitored?
 - → *NO, many GMZs are too complex to do this effectively. Focus on adequate spatial distribution of ongoing monitoring, and periodic check to fill data gaps as wells are lost*

Recommendation:

- Define initial monitoring network as all wells that are currently monitored or planned to be (**Drafted**)
- Identify data gaps (**Drafted**)

Questions Posed for Consideration: Monitoring Program and Data Gaps

- Should we include landfill (or similar) monitoring wells in the monitoring network? If so, which ones?
 - → *Some, only those within saturated aquifer system*
 - → *Exclude those isolated by slurry walls and outside saturated aquifer system*

Recommendation:

- Identify the wells that are in the saturated zone of each GMZ for inclusion in the monitoring program (**DONE, addressed in drafted network**)
- Collect and process the data from only the wells identified in the monitoring plan going forward each year

Questions Posed for Consideration: Monitoring Program and Data Gaps

- Should the high TDS concentrations along the Pacific Coast of Orange County GMZ be included in the ambient concentration – especially in light of regional groundwater management actions to address seawater intrusion?
 - → YES, part of aquifer system

Recommendation:

- Include the high-TDS coastal wells that are in the saturated zone of the Orange County GMZ (**Done , addressed in drafted network**)

Questions Posed for Consideration: Monitoring Program and Data Gaps

- Should filling data gaps mean construction of new wells?
 - → *No, need tiered approach to fill data gaps that allows (1) time to identify additional existing wells that could be monitored but currently are not, (2) well siting feasibility analysis to fill remaining gaps, if any, (3) construct wells, if feasible*

Recommendation:

- Fill spatial data gaps through step-wise process over the next several years (*Process Drafted presented in August 2022*, pending modification based on stakeholder feedback)

Questions Posed for Consideration: Monitoring Program and Data Gaps

- Should we prioritize addressing data gaps? How?
 - → Yes, Prioritize based on assimilative capacity, recycled water discharge/permitting needs, drinking water supply
 - → Need exceptions if recycled water use is very limited (small amounts, spatially concentrated)
 - → Re-assess if new data gaps exist every five years, as required by RW Policy

Recommendation:

- Define criteria for deferring filling data gaps to next data gap analysis (Process Drafted). Proposed criteria...
 - Data gaps do not need to be filled until recycled water discharge/reuse, or imported water recharge, is planned in the GMZ within the next five-year period.
- Reassess data gaps every five years

Questions Posed for Consideration: Monitoring Program and Data Gaps

- Who should be responsible for filling data gaps?
 - → *Agencies with recycled water use or discharge that affects GMZ*
 - → *Water supply agencies with wells in the GMZs should collaborate*

Recommendation:

- Create matrix that identifies responsible parties for each GMZ in the Santa Ana River Watershed (*Drafted, requires feedback on assignment of responsible parties*)

Feedback on Monitoring Program and Data Gap Analysis Thus Far

- Need alternative terminology to “Data Gap”
 - Recommendation: change terminology. *SUGGESTIONS?*
- The step-wise process need not define every detail of what we do – some items may warrant further discussion.
 - Example: don’t need to state the details about recomputing objective if storage model changes
 - What would trigger an update to TDS/N objective? (*TBD*)
 - Recommendation: Reduce specificity of actions in proposed process to create flexibility
- Recycled Water Policy only requires updating data gaps every five years
 - Recommendation: modify process to include update data gaps analysis every five years

Feedback on Monitoring Program and Data Gap Analysis Thus Far

- What is Regional Board authority to require filing of the data gaps?
 - Regional Board not interested in issuing orders, desires collaborative process to address data gaps
 - Data gaps need to be filled, prior efforts through attrition analysis did not result in data gaps being addressed
 - Goal is to have a process to address them over time
- What to do about La Habra and Santiago GMZs?
 - Not in OCWD purview – agencies not involved in task force - How to address this?
- Need longer timeframe to perform the defined steps
- There are existing wells out there that can be sampled, but need some sort of documentation of why it is required to encourage well owners to allow sampling
- Can SBVMWD and WMWD be responsible agencies on behalf of their members?

Questions Posed for Consideration: Ambient Water Quality Methods

Questions Posed for Consideration: Ambient Water Quality Methods

- Should we continue to rely on a 20-year period of record?
 - → *Generally, Yes. Focus on improved monitoring plan will improve data quality for analysis in the long term*
 - → *Suggestion to explore alternative time periods since improved data availability*

Recommendation: Continue to rely on 20-year period of analysis and do not pilot different analysis period

Basis

- At many wells, data is only collected every three years and limiting period to shorter than 20 years could greatly reduce data-set for computing statistics or other trend analyses. A shorter timeframe would necessitate higher sampling frequency and increase costs

Questions for Consideration in Ongoing Methods and Data Collection

- Should we continue to rely on the statistical analysis method developed in 2004?
 - → *Generally, Yes,*
 - *beneficial to pilot other ideas*
 - *Identify ways to streamline analysis*
 - → *Case-specific changes may be warranted in a GMZ, but should be done as part of a GMZ-specific SNMP (e.g. Upper Temescal Valley SNMP)*

Recommendation:

- Continue to rely a statistical analysis method developed in 2004 to prepare point statistics at wells and compute volume-weighted ambient water quality, where warranted per the outcomes of the 2021 AWQ Pilot Study

Questions Posed for Consideration: Ambient Water Quality Methods

- Should we prioritize only those wells with recent data that are still monitored in statistical analysis (e.g. only include these data in the analysis)
 - → *NO, we should continue to use all data and focus on improved monitoring network going forward that deals with data gaps*

Recommendation:

- Use all available data for all wells within the saturated zone of the GMZs, even if the well is no longer monitored
- Fill identified data gaps to ensure sufficient spatial coverage of GMZ in the future when the wells with historical data are no longer in the timeframe of the analysis

Questions for Consideration in Ongoing Methods and Data Collection

- Can we reduce the level of effort to perform ambient water quality analysis by prioritizing our GMZs based on historical results, current water quality, and regulatory compliance factors?
 - → *Yes, this should be piloted, but there needs to be a focus to continue collecting data in all GMZs, and long-term cost of methods should not be equal or greater than if current methods continued*

Recommendation:

- Pilot procedures to make the standard method more efficient
- Pilot alternative approaches based on historical trends and statistics and use this information to determine if a full analysis per standard method is appropriate (e.g. because change in trend)

Questions for Consideration in Ongoing Methods and Data Collection

- Should we consider the extent of the saturated aquifer system in contouring, statistical analysis, and map presentations?
 - → Yes, limit analysis to wells and extent of interpolation to extent of saturated aquifer

Recommendation:

- For Pilot study, develop contours, rasters, and other characterizations that do not extrapolate beyond the boundaries of the saturated system

Questions for Consideration in Ongoing Methods and Data Collection

- Should the aquifer parameters defined in 2004 be updated?
 - → *Yes, but consider:*
 - *Not doing it all at once because it could be more cost effective to do over time and timing may be best to address based on the timing of next update of aquifer parameters for GMZs (e.g. Chino Basin updates the model every five years)*
 - *The impact to Basin Plan Objectives – do they need to be recomputed?*

Recommendation:

- The 2021 AWQ Pilot Study deliverable should:
 - Update aquifer parameters for maximum-benefit GMZs, if timing is appropriate
 - Include a plan and schedule to complete the update of aquifer parameters in remaining GMZs before the next 5-year assessment is due in April 2029

Questions for Consideration in Ongoing Methods and Data Collection

- What other updates should be considered?
 - → *Ideas for improving the efficiency and reducing the cost of the routine analyses*

Recommendation:

- Use the 2021 AWQ Pilot Study as an opportunity to pilot using available water level contours prepared for the GMZs by others to reduce data collection, processing, and analysis costs (e.g. water level contours prepared for SGMA annual reporting)
- Use the 2021 AWQ Pilot Study as an opportunity to develop processes (e.g. coding for automation) to reduce analysis time

Questions for Consideration in Ongoing Methods and Data Collection

- What other updates should be considered?
 - → *Pilot using ISARM to perform ambient water quality*

Recommendation:

- Could be considered, but not enough detail was provided on how to do this to be included in the recommended pilot study

Recommended 2021 Ambient Water Quality Pilot Study

Recommended 2021 Ambient Water Quality Pilot Study

1. Collect all water quality data through December 2021
 - a. Collect data
 - b. Perform QA/QC checks (including time history charts by well)
 - a. Develop code to automate this process and that can be used for future assessments

Recommended 2021 Ambient Water Quality Pilot Study

2. For 2002-2021 20-year analysis period:
 - a. Prepare table of TDS/N summary statistics by GMZ, including AWQ statistic
 - b. Perform Mann-Kendall trend analysis at all wells, document in tables/charts
 - c. Map spatial distribution of TDS/N statistics and trends
 - d. Develop code to automate these processes and that can be used again in future assessments

Recommended 2021 Ambient Water Quality Pilot Study

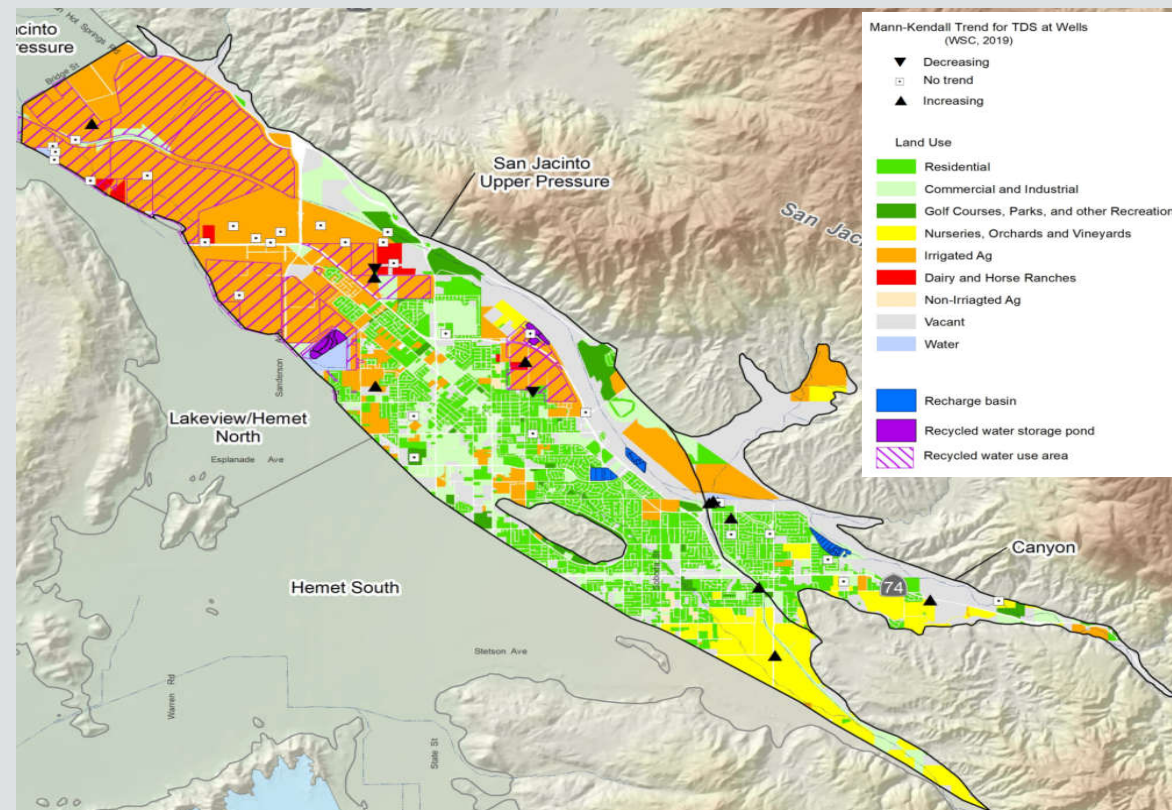
3. Assess ambient water quality and assimilative capacity as follows:
 - a. For GMZs with Maximum Benefit SNMP (required by Basin Plan for Beaumont, San Timoteo, Yucaipa, Elsinore, San Jacinto Upper Pressure, Chino-North, Cucamonga) – plus Orange County GMZ:
 - a. Compute ambient water quality using standard methodology Max Benefit GMZs: Beaumont, San Timoteo, Yucaipa, Elsinore, San Jacinto Upper Pressure, Chino-North, Cucamonga
 - b. Remaining GMZs
 - a. Based on analysis of historical trends, current statistics, and spatial distribution of TDS/N in GMZs, determine if state of assimilative capacity has changed since 2021
 - i. Has there been a change in the trends at wells and across the GMZ?
 - ii. Does the change in the statistic value suggest the ambient concentration might be significantly different?

Recommended 2021 Ambient Water Quality Pilot Study

4. For GMZs where standard ambient water quality method will be performed:
 - a. Update of aquifer parameters (if applicable)
 - b. Pilot use of computer-assisted generation of contours (vs. hand contouring)
 - c. Pilot limiting mapping/interpolation to extent of saturated aquifer
 - d. Pilot using available groundwater-level contours to reduce cost of analysis

Recommended 2021 Ambient Water Quality Pilot Study

5. For GMZs where data and trends used only, pilot
 - a. Mapping of loading factors (e.g. land use, recycled water use areas, septic tanks) to support interpretation of water quality trends (pilot in 2 GMZs only)



Recommended 2021 Ambient Water Quality Pilot Study

6. Based on work performed, develop recommended plan for ongoing ambient water quality and assimilative capacity methods
7. Define schedule for any pre-work to performed before the next assessment due (e.g. update aquifer properties)
 - a. If 5-year frequency allowed, next assessment would be due before April 2029

A Vision to the Future – Path to Comply with Recycled Water Policy

A Vision to the Future – Path to Comply with Recycled Water Policy

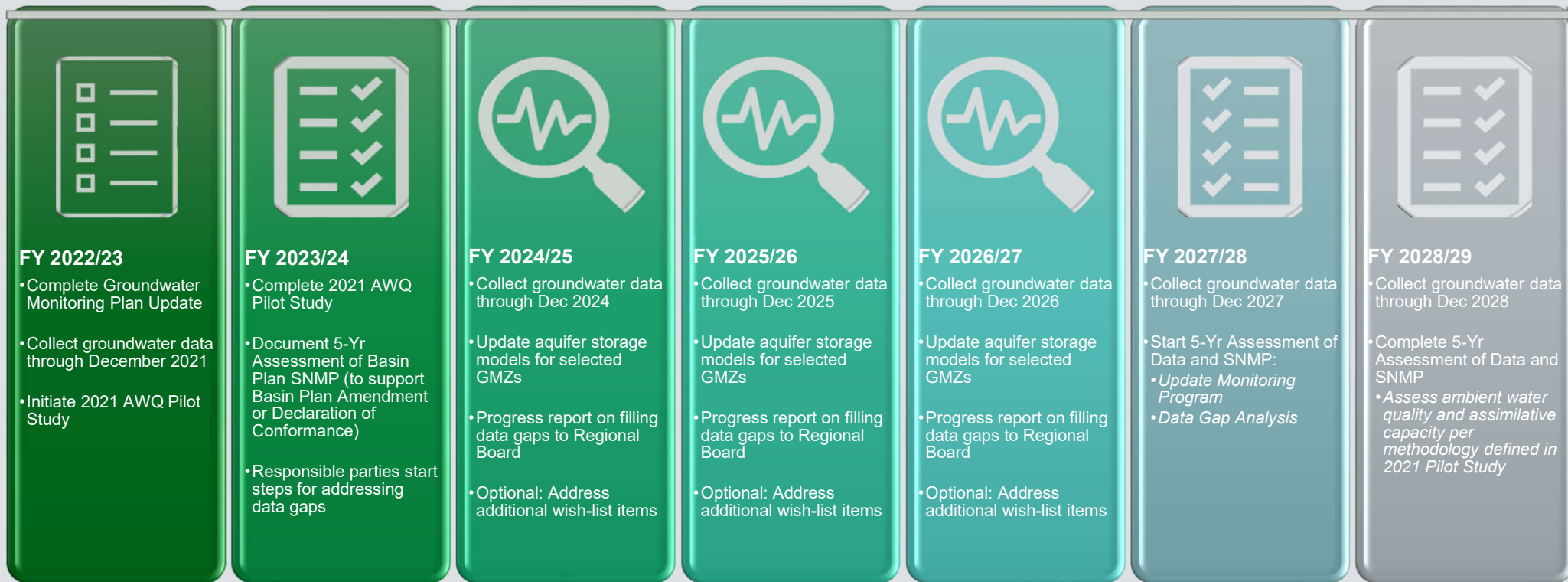
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- Complete 2021 Ambient Water Quality Pilot Study (due October 2023)
 - Includes pilot assessment of ambient water quality and assimilative capacity methods
 - Recommends methodology for future assessments
- Document 5-year assessment of Basin Plan SNMP (Regional Board to complete by April 2024)
- Task Force implements process to collect all water quality data annually
- All GMZ storage models updated to reflect latest hydrogeologic conceptual models
- All priority data gaps identified in 2022 have been addressed through step-wise process
- Complete 5-year assessment of monitoring program data and SNMP (due April 2029)
 - Update groundwater monitoring program and identify any new data gaps
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A Vision to the Future

- Additional Wish List of Items to Support Basin Plan SNMP
 - Create single database of all water quality data collected and used for all past AWQ assessments, including objective setting period
 - Geodatabase of all shapefiles produced and used for AWQ assessments back to objective setting period
 - Detailed GMZ summary information that characterizes features of GMZ relative to SNMP and permitting factors (recycled water uses, amounts, and locations, other key loading features, history of ambient water quality results and assimilative capacity)

A Vision for the Future



A Vision to the Future – Costs

- TBD depending on final scope. Initial estimates for tasks in next 2-3 years
 - Collect and process data for 2021 AWQ Pilot Study: \$85,000 to \$100,000
 - 2021 AWQ Pilot Study: \$225,000 to \$250,000
 - Technical support on 5-year SNMP assessment: \$20,000
 - Ongoing annual data collection and management costs: \$35,000 to \$40,000
 - Annually track progress on data gaps progress: \$15,000
 - Process to update storage model updates: \$10,000 to \$20,000 per year over three years

THANK YOU

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Who are the Responsible Agencies in each GMZ?

Summary of Data Gaps and Responsible Agencies to Address Data Gaps - **DRAFT FOR REVIEW**

Refer to maps for Data Gap Locations

Groundwater Management Zones	GMZ Features				Number of Data Gaps Identified to Fill	Responsible Agencies for Addressing Data Gaps																						
	GMZ receives recharge of recycled water discharged to SAR/tributaries	Existing recycled water direct use or recharge in GMZ	Imported water recharge in GMZ	GMZ used for municipal or domestic supply		Eastern MWD	Beaumont Cherry Valley WD	City of Banning	City of Beaumont	San Gorgonio Pass WA	Yucaipa Valley WD	San Bernardino County Special Districts Department	San Bernardino Valley MWD	City of Redlands	East Valley WD	City of Rialto	City of Colton	City of San Bernardino	City of Riverside	Western Municipal WD	Cucamonga Valley WD	Chino Basin Watermaster	Inland Empire Utilities Agency	Jurupa CSD	Elsinore Valley MWD	Lee Lake Water District	City of Corona	Orange County WD

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San Jacinto Basins																												
Canyon			X	X	1	X																						
San Jacinto Upper Pressure		X	X	X	0	X																						
San Jacinto Lower Pressure		X			1	X																						
Hemet South		X		X	2	X																						
Lakeview/Hemet North		X		X	0	X																						
Perris North		X		X	0	X													X									
Perris South				X	0	X																						
Menifee		X		X	1	X																						

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Beaumont/Yucaipa Plain																												
Beaumont	X	X	X	X	1		X	X	X	X	X																	
San Timoteo	X			X	0				X		X																	
Yucaipa		X	X	X	2						X																	

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San Bernardino Basin																												
Lytle		X		X	1							X	X															
Bunker Hill-A		X	X	X	1							X	X															
Bunker Hill-B	X	X	X	X	1							X	X	X														
Rialto				X	0							?			?													
Colton	X			X	1							?				?		?										

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Riverside and Arlington Basins																												
Riverside-B		X		X	2										X													
Riverside-C					3 - 4																		X					
Riverside-A	X				2										X	X	X											
Riverside-F				X	2													X										
Riverside-E				X	1													X										
Riverside-D					2 - 3													X										
Arlington		X		X	2													X	X									

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Chino and Cucamonga Basins																												
Cucamonga				X	3																X	X	X					
Chino-North		X	X	X	2																	X	X	X				
Chino-East				X	3																	X		X				
Chino-South	X			X	3												X	X	X			X		X				

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Elsinore and Temescal Valleys																												
Elsinore		X		X	2																				X			
Upper Temescal Valley	X	X		X	0	X																			X			
Coldwater				X	0																				X	X	X	
Temescal	X	X		X	2																						X	

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Orange County																											
La Habra					2 - 3																						X
Orange County	X	X	X	X	0																						X
Santiago					2 - 3																						X
Irvine		X		X	0																						X

WE SUPPORT OUR COMMUNITIES

WE ARE WATER FOCUSED

WE TAKE PRIDE IN WHAT WE DO

WE DO WHAT'S RIGHT

WE STRIVE TO BECOME OUR BEST

WE BELIEVE IN QUALITY

WE LISTEN

WE SOLVE HARD PROBLEMS

WE SEE THE BIGGER PICTURE

WE TAKE OWNERSHIP

WE COLLABORATE

WE HAVE FUN

WE ARE WEST YOST

