

**Borrego Springs Watermaster  
Technical Advisory Committee Meeting  
May 25, 2021  
AGENDA ITEM III**

**To:** Technical Advisory Committee (TAC)

**From:** Andy Malone, PG (West Yost Associates), Lead Technical Consultant

**Date:** May 20, 2021

**Subject:** Recommended Technical Scope-of-Work and Budget for WY 2022 and 2023

**Background and Previous Actions of the TAC**

Pursuant to Section III.F. of the Judgment, the TAC is to recommend to the Board a technical scope-of-work and budget for water years 2022 and 2023 by June 1, 2021. A primary focus of this scope-of-work will be the technical work necessary to redetermine the Sustainable Yield of the Borrego Springs Subbasin by January 1, 2025 to support the implementation of the Rampdown through 2040.

Section III.F. further states:

- The redetermination of the Sustainable Yield will include collecting additional data, refining the Borrego Valley Hydrologic Model (BVHM), and using model runs to update the Sustainable Yield.
- The choice to perform specific technical tasks will be informed by considering the value and importance of the work to attain a better understanding of the Basin and the goal of advancing Sustainable Groundwater Management in comparison to the cost of the work.

The BVHM and its supporting tools, the Basin Characterization Model (BCM) and the Farm Process (FMP), were originally developed by the USGS<sup>1</sup> and used to estimate of the Sustainable Yield and evaluate future scenarios of “Rampdown” in groundwater pumping that would eliminate conditions of overdraft. The BVHM was updated by Dudek<sup>2</sup> to characterize the water budget and determine the Sustainable Yield of 5,700 acre-feet per year (afy) which was incorporated into the Judgment. The USGS and Dudek believe that the main areas of model uncertainty include private pumping, aquifer properties, and streambed recharge. Recommendations in the model reports included collecting new data and information that can be used to reduce model uncertainty and improve model accuracy.

The TAC met on April 25, 2021 to review the past modeling efforts and discuss potential future technical efforts that are necessary to redetermine the Sustainable Yield by January 1, 2025. The following summarizes the discussion and opinions of one or more TAC members:

- **Groundwater Pumping.** Efforts should be made to improve estimates of historical and future pumping. Pumping should be metered at as many wells as possible. At least two years of

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<sup>1</sup> USGS. 2015. [Hydrogeology, Hydrologic Effects of Development, and Simulation of Groundwater Flow in the Borrego Valley, San Diego County, California.](#)

<sup>2</sup> Dudek. 2019. [Update to USGS Borrego Valley Hydrologic Model for the Borrego Valley GSA \(draft final\).](#)

metered data would be needed to evaluate and potentially revise the assumptions and tools used to estimate unmetered pumping.

- **Farm Process (FMP).** The FMP is used in the BVHM to estimate agricultural/recreational pumping and the return flows associated with irrigation. It may make sense to perform a comparative analysis at specific farms of metered pumping vs. FMP estimates of pumping. To perform this analysis, the model will need to be extended through the years with new metered pumping data. Some TAC members felt there is a need to review the appropriateness of the Crop Coefficients used in the FMP.
- **Refinement of Model Grid Cell Size.** The model grid cell size is 2,000 ft x 2,000 ft, or approximately 92 acres. This relatively large cell size may cause erroneous estimates of agricultural/recreational pumping and return flows by the FMP. The need for refining the model grid, and the associated level of effort and cost to do so, should be evaluated.
- **Hydrogeology and Aquifer Properties:** The model results indicated that there are areas of the basin, such as the Southern Management Area, where improved understanding of the hydrogeology and/or aquifer properties is needed. Aquifer-system testing could improve understanding in these areas. Dudek informed the TAC that Borrego Water District (BWD) has performed aquifer-system testing at its wells and can share those results with the Watermaster if requested.
- **Groundwater-Level Data.** Efforts should be made to obtain the groundwater-level data that has been collected by the DWR over the last decade at private wells. These data could support model re-calibration to improve the estimates of aquifer properties and model accuracy.
- **Recharge Estimates**
  - **Mountain Block Recharge.** Subsurface recharge from the surrounding mountain fronts was estimated by the BCM, was used as input for the BVHM, and was assumed to be constant for the duration of the model calibration period and planning horizon. The TAC needs to better understand how the USGS scaled the BCM output to estimate this recharge term.

This source of recharge is impossible to measure and difficult to estimate. Tom Watson noted that remote-sensing studies of vertical ground motion (InSAR) has been used in the Central Valley to identify areas of recharge, and the subsequent flow of the recharge water in the subsurface, and suggested that InSAR could be applied here.
  - **Stream Flow and Streambed Recharge.** Stream discharge from the surrounding mountain fronts into the model domain was estimated by the BCM and was used as input for the BVHM. Streambed recharge is an important component of the Sustainable Yield but is highly variable with precipitation. The TAC needs to better understand the uncertainty in the BCM-generated estimates of stream discharge.

Measurements of stream discharge can be useful in verifying or scaling the model-generated estimates of stream discharge. However, measurements of stream discharge are difficult to obtain in desert environments because discharge typically occurs as flood flows in natural, braided streambeds. While not impossible,

measurement of stream discharge is challenging, requires continual maintenance, and is therefore expensive. Trey Driscoll indicated that the DWR and USGS have recently declined to conduct new stream discharge monitoring in the valley because of these challenges and maintenance requirements. The TAC should investigate alternative methods for measuring stream discharge, particularly during flood stage events.

- **Water Losses from the Distribution Systems.** Perhaps the potential losses from water conveyance pipes are another source of recharge that should be characterized and included in future model simulations.
- **Modeling Methods and Tools.** Dudek indicated that there are technical challenges with using the current modeling tools (BVHM, BCM and FMP), including model versioning and the timeliness of updates, and lack of documentation and support. It is uncertain if the BCM will be updated by the USGS, which could impact the level of effort to redetermine the Sustainable Yield. Alternative tools and methods to redetermine the Sustainable Yield should be considered by the TAC.

Besides the redetermination of the Sustainable Yield, there are other potential technical tasks for WY 2022 and 2023 that are under TAC preview, including:

- Preparing a Water-Quality Monitoring Plan by April 2023 pursuant to Section VI.B of the Judgment.
- Reviewing and potentially revising the methods to estimate annual change in basin storage to support SGMA annual reporting to the DWR.
- Reviewing and potentially updating the well production meter-reading program.
- Recommending an annual scope/budget for the TAC.
- Fulfilling other ad-hoc requests from the Board.

## **Objectives**

Watermaster staff has considered the TAC input described above and has developed a proposed technical scope of work, budget, and schedule for WY 2022 and 2023 described below. The objective of this memorandum is to facilitate discussion and suggested edits at the TAC meeting on May 25, 2021. The objective of the TAC is to achieve final consensus on a recommended technical scope-of-work and budget for WY 2022 and 2023 for the Watermaster Board by June 1, 2021.

## **Process for Developing TAC Consensus**

During the May 25, 2021 TAC meeting, we will review the objective, scope, cost, and schedule for each task in the proposed scope of work that is described below. The TAC will consider the following questions:

- Is the task necessary?
- Is the scope of work appropriate?
- Is the budget sufficient to execute the task?

- Should the task be performed WY 2022 or 2023?

The cost estimates for the tasks are shown in Table 1. The proposed TAC schedule for WY 2022 and WY 2023 is shown on Figure 1.

### **Recommended Technical Scope-of-Work**

**Task 1 – Redetermine the Sustainable Yield (WY 2022).** This task is the work recommended for Year 1 to redetermine the Sustainable Yield, which generally includes: collecting readily available data, identifying data gaps, preparing monitoring/testing workplans to fill data gaps, and planning for the update and use of the BHVM (or an alternative). These tasks are summarized below:

- *Task 1a – Collect Data and Information.* The objective of this task is to collect and compile readily available data that can be used to update the BHVM. These data include:
  - Groundwater-level data that has been collected over the past 10 years by the DWR.
  - Results from well efficiency tests and/or other aquifer-system stress tests.

These data will be reviewed, compiled, checked and uploaded to HydroDaVE if appropriate.

- *Task 1b – Prepare Workplan for Model Update and Redetermination of Sustainable Yield.* The objective of this task is to describe: (i) the recommended steps and costs to update the BHVM and supporting modeling tools and (ii) the methods to use the models to redetermine the Sustainable Yield. The recommended steps and costs will be described as a workplan. The workplan will be implemented in WY 2023 and WY 2024 to redetermine the Sustainable Yield.

The subtasks to develop the workplan include:

- Assess current modeling tools, model results, and methods that were used to determine Sustainable Yield. This subtask includes a comparison of FMP pumping estimates versus actual pumping.
- Assess potential alternative modeling tools and methods to determine Sustainable Yield.
- Prepare draft Workplan for Model Update and Redetermination of Sustainable Yield, including cost estimates to implement workplan in WY 2023 and 2024.
- Prepare for and conduct a TAC meeting to review draft workplan.
- Prepare final workplan based on TAC input.
- Prepare TAC report to the Board.
- *Task 1c – Prepare Workplan for Monitoring/Testing.* The objectives of this task are to: (i) identify the major data gaps in the Borrego Springs Subbasin that should be filled to support the current and future redeterminations of Sustainable Yield and (ii) describe recommended steps and costs to fill the data gaps. The data gaps will be identified through the assessment of the readily available data (Task 1a) and the assessment of the current modeling tools and model results (Task 1b). The recommended steps to fill data gaps may include increased monitoring, aquifer-system stress testing, construction of new monitoring facilities

(monitoring wells, stream gages, etc.), or other strategies. The recommended steps and costs will be described as a workplan. The workplan will be implemented in WY 2023 and beyond.

The data gaps that are anticipated to be addressed in the workplan include, but are not limited to:

- Groundwater levels
  - Stream discharge
  - Streambed recharge
  - Hydrogeology and aquifer properties
- *Task 1d – Prepare Monitoring Well Siting Study.* The objective of this task is to identify available and appropriate sites for a new monitoring well, if a new monitoring well(s) is recommended in Task 1c. In this task, a GIS analysis is performed to identify and rank available and appropriate sites. The well-siting study will include draft technical specifications for the monitoring well and cost estimates for borehole drilling, well construction, well development, wellhead completion, installation of monitoring equipping, and reporting.

**Task 2 – Redetermine the Sustainable Yield (WY 2023).** This task is the work recommended for Year 2 to redetermine the Sustainable Yield, which generally includes: implementing the Workplan for Monitoring/Testing, constructing the monitoring well(s) if recommended in Task 1c, and implementing the first year of the Workplan for Model Update and Redetermination of Sustainable Yield.<sup>3</sup> These tasks are summarized below:

- *Task 2a – Collect Data and Information.* The objectives of this task are to: (i) fill the data gaps identified in Task 1c and (ii) collect any additional data identified in Task 1b to support the modeling. In this task, Year 1 of the Workplan for Monitoring/Testing is implemented. This work may include increased monitoring, aquifer-system stress testing, construction of new monitoring facilities (stream gages, etc.), or other planned activities.
- *Task 2b – Construct Monitoring Well(s).* In this task, the process to construct the new monitoring well(s) is implemented, if a new monitoring well(s) is recommended in Task 1c. This process may span more than one year depending on the speed of well site acquisition, selection of the contractor, permitting, other necessary approvals, and the schedule of the selected contractor.
- *Task 2c – Implement Workplan for Model Update and Redetermination of Sustainable Yield.* In this task, Year 1 of the Workplan for Model Update and Redetermination of Sustainable Yield is implemented. This work likely includes update of the BVHM and its supporting modeling tools or construction of alternative model tools. WY 2024 will likely include tasks to recalibrate the model and use the model to redetermine the Sustainable Yield.<sup>4</sup>

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<sup>3</sup> The specific tasks and costs described in Task 2 are speculative at this time because they will be based on the workplans developed in Task 1.

<sup>4</sup> The steps to recalibrate and use the model to redetermine the Sustainable Yield will be described in the workplan of Task 1b but are not detailed herein since they are planned to occur after WY 2022 and 2023.

Additional tasks for planned for WY 2022 and 2023 will address other potential tasks under TAC purview, such as:

**Task 3 – Prepare Water-Quality Monitoring Plan.** Section VI.B of the Judgment calls for Watermaster to develop a Water-Quality Monitoring Plan with TAC input within 24 months of entry of Judgment (by April 2023). The purpose of the plan is to avoid Undesirable Results and achieve Sustainable Groundwater Management. The plan is to describe the network of monitoring wells, the frequency of monitoring, and the constituents to be monitored. Currently, Watermaster is conducting an interim groundwater-quality monitoring program at selected wells until the Water-Quality Monitoring Plan is completed.

The objective of Task 3 is to develop a Water-Quality Monitoring Plan that satisfies the requirements and objectives of the Judgment. The steps to develop the monitoring plan include: (i) define the questions that the monitoring plan should answer to comply with the Judgment; (ii) identify the gaps in the interim groundwater-quality monitoring program that should be filled to comply with the Judgment; and (iii) describe recommended steps and costs to fill the data gaps. The data gaps will be identified by defining the questions that the monitoring plan should answer, an assessment of the readily available data, and an assessment of the interim groundwater-quality monitoring program. The recommended steps to fill data gaps may include increased or modified monitoring, construction of new monitoring facilities, or other strategies. The workplan will be completed and approved by the Watermaster Board by April 2023. Implementation of the Water-Quality Monitoring Plan will begin in the fall of WY 2024.

- *Task 3a – Perform Monitoring Gap Analysis.* The objective of this task is to develop the criteria that will be used to prepare the Water-Quality Monitoring Plan. Specific questions that need to be answered by the plan will be defined. The readily available groundwater-quality data that has been derived from the interim monitoring program will be assessed and evaluated with respect to the questions that need to be answered to identify the gaps in the interim monitoring program. A technical memorandum will be prepared to document the Monitoring Gap Analysis.
- *Task 3b – Prepare Water-Quality Monitoring Plan.* The Data Gap Analysis memorandum will provide the basis for preparing the Water-Quality Monitoring Plan. The plan will include: the network of monitoring wells; the frequency of monitoring; the constituents to be monitored; recommendations for reporting; a process for adaptation of the plan; and cost estimates to implement the plan. The plan will be approved by the Watermaster Board by April 2023.

**Task 4 – Support DWR Annual Reporting.** The Watermaster Board has shown considerable interest and concern with the change in groundwater storage estimates that were prepared for the 2020 SGMA annual report to the DWR. Topics of concern included the data and methods used to estimate storage change, the storage-change results, and the messaging that the storage-change results send to the BPA Parties and the public. The objective of this task is to establish standard procedures for estimating storage change that ensures technically defensible and timely estimation of annual storage change for SGMA annual reporting, which is due to the DWR by April 1 of each year.

- *Task 4a – Define Methods to Estimate Annual Changes in Basin Storage.* The objective of this task is to develop and document a standard procedure and schedule for estimating annual

storage changes in the Borrego Springs Subbasin. With input from the TAC, the Technical Consultant will consider various procedures to estimate storage changes, and will prepare a draft memorandum that recommends a standard procedure for review by the TAC. A final memorandum that describes the standard procedure will be prepared based on TAC feedback.

- *Task 4b – Perform Technical Review of Change-in-Storage Calculation for WY 2021.* The Technical Consultant will prepare an estimate of storage change during WY 2021 using the standard procedure by January 15, 2022. The TAC will review and comment on the storage change estimate and provide feedback. The Technical Consultant will prepare a final estimate of storage change for WY 2021 by March 1, 2022 for inclusion in the SGMA annual report to the DWR.
- *Task 4c – Perform Technical Review of Change-in-Storage Calculation for WY 2022.* The Technical Consultant will prepare an estimate of storage change during WY 2021 using the standard procedure by January 15, 2023. The TAC will review and comment on the storage change estimate and provide feedback. The Technical Consultant will prepare a final estimate of storage change for WY 2021 by March 1, 2023 for inclusion in the SGMA annual report to the DWR.

#### **Task 5 – Other TAC Duties**

- *Tasks 5a and 5b – Annual Review of Well Production Meter-Reading Program.* The objective of this task is to ensure the measurement of groundwater pumping is being conducted pursuant to the Judgment and the Groundwater Management Plan. At the beginning of each WY, the Technical Consultant will prepare a memorandum that describes the recent data collected and provides recommendations for revisions to the meter-reading program, if any. The TAC will review the memorandum and provide comments and suggested revisions to the recommendations.
- *Task 5c – Ad Hoc Requests from the Board.* From time to time, the Board may request activities or special studies for the TAC to complete. These ad hoc activities are undefined, and the budget assigned to this task is a placeholder.

**Task 6 – Annual Recommendation of TAC Scope and Budget.** The TAC recommends an annual (WY) scope and budget to the Board to inform the Watermaster’s annual budgeting process. The objective of this task is to prepare an annual TAC recommendation for its scope/budget that dovetails with the Watermaster’s schedule to prepare its annual budget.

- *Task 6a – Recommend Scope/Budget for WY 2023.* The Technical Consultant will prepare a recommended TAC scope/budget for WY 2023 by June 1, 2022. The TAC will review and comment on the recommended TAC scope/budget and provide feedback and suggested revisions. The Technical Consultant will prepare a final recommended TAC scope/budget for WY 2023 by August 1, 2022 for inclusion in the Watermaster’s WY 2023 budget.
- *Task 6b – Recommend Scope/Budget for WY 2024.* The Technical Consultant will prepare a recommended TAC scope/budget for WY 2024 by June 1, 2023. The TAC will review and comment on the recommended TAC scope/budget and provide feedback and suggested

revisions. The Technical Consultant will prepare a final recommended TAC scope/budget for WY 2024 by August 1, 2023 for inclusion in the Watermaster's WY 2024 budget for.

**TAC Meetings.** Figure 1 shows a schedule of proposed TAC meetings that will be necessary to execute the scope of work during WY 2022 and 2023. Each TAC meeting will include discussions and TAC decisions for one or more tasks. Each TAC meeting is listed below with the task(s) and topics that will be the subject of each meeting.

- **October 2021**
  - Task 4a: Discuss potential methods to estimate storage change for SGMA annual reporting.
  - Task 5a: Review of the well production meter-reading program and discuss recommendations for improvements.
- **January 2022**
  - Task 1b: Review draft *Workplan for Model Update and Redetermination of Sustainable Yield*.
  - Task 4b: Technical review of change-in-storage calculation for SGMA annual report (WY 2021).
- **May 2022**
  - Task 1c: Review draft *Workplan for Monitoring/Testing*.
  - Task 3a: Review draft *Monitoring Gap Analysis* memorandum for the Water-Quality Monitoring Plan.
- **June 2022**
  - Task 6a: Review draft recommendation for the TAC scope/budget for WY 2023.
- **October 2022**
  - Task 2: Kickoff meeting for efforts to Redetermine the Sustainable Yield in WY 2023. These efforts could include: implementing the *Workplan for Monitoring/Testing*; monitoring well(s) construction; and implementing the *Workplan for Model Update and Redetermination of Sustainable Yield*.
  - Task 3b: Review draft *Water-Quality Monitoring Plan*.
  - Task 5b: Review of the well production meter-reading program and discuss recommendations for improvements.
- **January 2023**
  - Task 4c: Technical review of change-in-storage calculation for SGMA annual report (WY 2022).
- **April 2023**



- Task 2: Check-in on efforts to Redetermine the Sustainable Yield in WY 2023. These efforts could include: implementing the *Workplan for Monitoring/Testing*; monitoring well(s) construction; and implementing the *Workplan for Model Update and Redetermination of Sustainable Yield*.
- **June 2023**
  - Task 6a: Review draft recommendation for the TAC scope/budget for WY 2024.

### **Cost Estimates**

The cost estimates for the TAC budget for WY 2022 and WY 2023 are shown in Table 1 and summarized below. The cost estimates for WY 2023 are based on professional judgment and are highly uncertain because the scope of work for WY 2023 will be dependent on the workplans for monitoring, testing, and modeling that are prepared in WY 2022.

TAC Budget for WY 2022 =	\$262,000
TAC Budget for WY 2023 =	\$220,000 (without monitoring well)
<i>Subtotal</i> =	<u>\$482,000</u>
Monitoring well budget =	\$339,000
<b>Total =</b>	<b><u>\$821,000</u></b>

**Table 1. Cost Estimate for TAC Budget for WY 2022 and WY 2023**

Task and Subtask	Person Hours	Labor Cost		Travel	Sub	Reproduction	Other Direct Costs		Totals	
		Sub-Task	Task				Sub-Task	Task	Sub-Task	Task and Project
<b>Task 1 – Redetermine the Sustainable Yield (WY 2022)</b>										
<b>Task 1a – Collect Data and Information</b>			<b>\$13,225</b>					<b>\$0</b>		<b>\$13,225</b>
Groundwater levels (DWR data)	17	\$2,939					\$0		\$2,939	
Aquifer properties (well efficiency tests; aquifer stress tests)	18	\$3,206					\$0		\$3,206	
Review, compile, and upload to HydroDaVE, if appropriate	40	\$7,080					\$0		\$7,080	
<b>Task 1b – Prepare Workplan for Model Update and Redetermination of Sustainable Yield</b>			<b>\$83,208</b>					<b>\$0</b>		<b>\$83,208</b>
Assess current modeling tools, model results, and methods to determine Sustainable Yield	96	\$21,072					\$0		\$21,072	
Assess potential alternative modeling tools and methods	96	\$21,072					\$0		\$21,072	
Prepare draft Workplan for Model Update and Redetermination of Sustainable Yield	128	\$29,616					\$0		\$29,616	
Prepare for and conduct TAC meeting to review draft workplan	18	\$4,350					\$0		\$4,350	
Prepare final workplan based on TAC input	26	\$6,030					\$0		\$6,030	
Prepare TAC report to the Board	4	\$1,068					\$0		\$1,068	
<b>Task 1c – Prepare Workplan for Monitoring/Testing</b>			<b>\$59,728</b>					<b>\$0</b>		<b>\$59,728</b>
Identify data gaps	54	\$11,730					\$0		\$11,730	
Prepare draft Monitoring/Testing Workplan with cost estimates	154	\$35,682					\$0		\$35,682	
Prepare for and conduct TAC meeting to review draft workplan	18	\$4,350					\$0		\$4,350	
Prepare final workplan based on TAC input	30	\$6,898					\$0		\$6,898	
Prepare TAC report to the Board	4	\$1,068					\$0		\$1,068	
<b>Task 1d – Prepare Monitoring Well Siting Study (if recommended)</b>			<b>\$26,062</b>					<b>\$0</b>		<b>\$26,062</b>
Prepare draft well-siting study	80	\$15,992					\$0		\$15,992	
Prepare final well-siting study	50	\$10,070					\$0		\$10,070	
<b>Task 1 Subtotals</b>	<b>833</b>		<b>\$182,223</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>				<b>\$182,223</b>
<b>Task 2 – Redetermine the Sustainable Yield (WY 2023)</b>										
<b>Task 2a – Collect Data and Information</b>			<b>\$75,640</b>					<b>\$0</b>		<b>\$75,640</b>
Implement Workplan for Monitoring/Testing	240	\$52,160					\$0		\$52,160	
Collect other data to support model update (through WY 2022)	120	\$23,480					\$0		\$23,480	
<b>Task 2b – Construct Monitoring Well (if recommended in Task 1c)</b>			<b>\$102,456</b>					<b>\$236,500</b>		<b>\$338,956</b>
Acquire well sites and/or execute lease agreements	16	\$3,376					\$0		\$3,376	
Conducting a bid process to select a well drilling/construction subcontractor	32	\$6,752					\$0		\$6,752	
Obtain permits and CEQA clearance	16	\$3,376			\$5,500		\$5,500		\$8,876	
Drill, construct, develop and complete new monitoring well	320	\$63,080		\$5,000	\$225,000		\$230,000		\$293,080	
Prepare well completion report	136	\$25,872				\$1,000	\$1,000		\$26,872	
<b>Task 2c – Implement Workplan for Model Update (Year 1)</b>			<b>\$100,020</b>					<b>\$0</b>		<b>\$100,020</b>
Collect and analyze BCM data/information to prepare model input files	230	\$50,010					\$0		\$50,010	
Update BVHM and FMP to prepare for recalibration	230	\$50,010					\$0		\$50,010	
<b>Task 2 Subtotals</b>	<b>1,340</b>		<b>\$278,116</b>	<b>\$5,000</b>	<b>\$230,500</b>	<b>\$1,000</b>		<b>\$236,500</b>		<b>\$514,616</b>

**Table 1. Cost Estimate for TAC Budget for WY 2022 and WY 2023**

Task and Subtask	Person Hours	Labor Cost		Travel	Sub	Reproduction	Other Direct Costs		Totals	
		Sub-Task	Task				Sub-Task	Task	Sub-Task	Task and Project
<b>Task 3 – Prepare Water-Quality Monitoring Plan</b>										
<b>Task 3a – Perform Monitoring Gap Analysis</b>			\$20,258					\$0		\$20,258
Define questions that need to be answered by monitoring program	12	\$2,804						\$0		\$2,804
Assess current data and current monitoring program	14	\$2,890						\$0		\$2,890
Describe gaps in current monitoring program	12	\$2,556						\$0		\$2,556
Prepare draft Monitoring Gap Analysis memorandum	26	\$5,246						\$0		\$5,246
Prepare for and conduct TAC meeting to review draft Monitoring Gap Analysis memorandum	12	\$2,804						\$0		\$2,804
Prepare final Monitoring Gap Analysis memorandum	14	\$2,890						\$0		\$2,890
Prepare TAC report to the Board	4	\$1,068						\$0		\$1,068
<b>Task 3b – Prepare Water-Quality Monitoring Plan</b>			\$13,162					\$0		\$13,162
Prepare draft Water-Quality Monitoring Plan	32	\$6,400						\$0		\$6,400
Prepare for and conduct TAC meeting to review draft workplan	12	\$2,804						\$0		\$2,804
Prepare final Water-Quality Monitoring Plan	14	\$2,890						\$0		\$2,890
Prepare TAC report to the Board	4	\$1,068						\$0		\$1,068
<b>Task 3 Subtotals</b>	<b>156</b>		<b>\$33,420</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>				<b>\$33,420</b>
<b>Task 4 – Support DWR Annual Reporting</b>										
<b>Task 4a – Define Methods to Estimate Annual Changes in Basin Storage</b>			\$15,884					\$0		\$15,884
Prepare for and conduct TAC meeting to discuss potential methods to estimate storage change	12	\$2,804						\$0		\$2,804
Prepare draft memorandum to describe a standard procedure to estimate storage change	40	\$9,432						\$0		\$9,432
Prepare final memorandum to describe a standard procedure to estimate storage change	12	\$2,580						\$0		\$2,580
Prepare TAC report to the Board	4	\$1,068						\$0		\$1,068
<b>Task 4b – Perform Technical Review of Change-in-Storage Calculation for WY 2021</b>			\$10,796					\$0		\$10,796
Prepare draft estimate of storage change during WY 2021 using the standard procedure	26	\$5,150						\$0		\$5,150
Prepare for and conduct TAC meeting to review draft estimate of storage change	12	\$2,804						\$0		\$2,804
Prepare final estimate of storage change during WY 2021	14	\$2,842						\$0		\$2,842
<b>Task 4c – Perform Technical Review of Change-in-Storage Calculation for WY 2022</b>			\$10,796					\$0		\$10,796
Prepare draft estimate of storage change during WY 2021 using the standard procedure	26	\$5,150						\$0		\$5,150
Prepare for and conduct TAC meeting to review draft estimate of storage change	12	\$2,804						\$0		\$2,804
Prepare final estimate of storage change during WY 2021	14	\$2,842						\$0		\$2,842
<b>Task 4 Subtotals</b>	<b>160</b>		<b>\$37,476</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$37,476</b>

**Table 1. Cost Estimate for TAC Budget for WY 2022 and WY 2023**

Task and Subtask	Person Hours	Labor Cost		Travel	Sub	Repro-duction	Other Direct Costs		Totals	
		Sub-Task	Task				Sub-Task	Task	Sub-Task	Task and Project
<b>Task 5 – Other TAC Duties</b>										
<b>Task 5a – Annual Review of Well Production Meter-Reading Program (WY 2021)</b>			<b>\$7,544</b>					<b>\$0</b>		<b>\$7,544</b>
Prepare memorandum on review of meter-reading program	12	\$2,804					\$0		\$2,804	
Prepare for and conduct TAC meeting to receive feedback and recommendations	12	\$2,804					\$0		\$2,804	
Update meter-reading program	4	\$868					\$0		\$868	
Prepare TAC report to the Board	4	\$1,068					\$0		\$1,068	
<b>Task 5b – Annual Review of Well Production Meter-Reading Program (WY 2022)</b>			<b>\$7,544</b>					<b>\$0</b>		<b>\$7,544</b>
Prepare memorandum on review of meter-reading program	12	\$2,804					\$0		\$2,804	
Prepare for and conduct TAC meeting to receive feedback and recommendations	12	\$2,804					\$0		\$2,804	
Update meter-reading program	4	\$868					\$0		\$868	
Prepare TAC report to the Board	4	\$1,068					\$0		\$1,068	
<b>Task 5c – Ad Hoc Requests from the Board</b>			<b>\$17,744</b>					<b>\$0</b>		<b>\$17,744</b>
Fulfill ad hoc requests from the Board	80	\$17,744					\$0		\$17,744	
<b>Task 5 Subtotals</b>	<b>144</b>		<b>\$32,832</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$32,832</b>
<b>Task 6 – Annual Recommendation of TAC Scope and Budget</b>										
<b>Task 6a – Recommend Scope/Budget for WY 2023</b>			<b>\$10,014</b>					<b>\$0</b>		<b>\$10,014</b>
Prepare draft TAC budget recommendation	20	\$4,540					\$0		\$4,540	
Prepare for and conduct TAC meeting to receive feedback and suggested revisions	12	\$2,804					\$0		\$2,804	
Prepare final TAC budget recommendation	6	\$1,602					\$0		\$1,602	
Prepare TAC report to the Board	4	\$1,068					\$0		\$1,068	
<b>Task 6b – Recommend Scope/Budget for WY 2024</b>			<b>\$10,014</b>					<b>\$0</b>		<b>\$10,014</b>
Prepare draft TAC budget recommendation	20	\$4,540					\$0		\$4,540	
Prepare for and conduct TAC meeting to receive feedback and suggested revisions	12	\$2,804					\$0		\$2,804	
Prepare final TAC budget recommendation	6	\$1,602					\$0		\$1,602	
Prepare TAC report to the Board	4	\$1,068					\$0		\$1,068	
<b>Task 6 Subtotals</b>	<b>84</b>		<b>\$20,028</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$20,028</b>
<b>Totals for WY 2022</b>			<b>\$261,991</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$261,991</b>
<b>Totals for WY 2023</b>			<b>\$322,104</b>	<b>\$5,000</b>	<b>\$230,500</b>	<b>\$1,000</b>		<b>\$236,500</b>		<b>\$558,604</b>
<b>Totals for WY 2022 and WY 2023</b>			<b>\$584,095</b>	<b>\$5,000</b>	<b>\$230,500</b>	<b>\$1,000</b>		<b>\$236,500</b>		<b>\$820,595</b>

Figure 1. TAC Schedule for WY 2022 and WY 2023

