TAC RECOMMENDATION REPORT

DATE: October 29, 2024

TO: Board of Directors
Borrego Springs Watermaster

FROM: Technical Advisory Committee
Borrego Springs Watermaster

SUBJECT: Redetermination of the 2025 Sustainable Yield

BACKGROUND AND OBJECTIVES

The Borrego Valley Hydrologic Model (BVHM) and its supporting tools, the Basin Characterization Model (BCM) and the Farm Process (FMP), were originally developed by the United States Geological Survey (USGS)[1] and were used by the USGS to improve the hydrogeologic understanding of the Borrego Springs Subbasin (Basin) and evaluate future management scenarios that would eliminate conditions of overdraft (*Initial BVHM*).

The *Initial BVHM* was updated and extended by Dudek and used to simulate historical groundwater conditions from October 1929 through September 2016 (*2016 BVHM*).[2] The *2016 BVHM* results were used to characterize the water budget for the Basin and estimate the initial Sustainable Yield for the Basin at 5,700 acre-feet per year (afy).

Sections II.E and III.F of the Judgment requires the Sustainable Yield of the Basin to be redetermined by January 1, 2025 through a process that includes: collecting additional data, refining the BVHM, and using model runs to update the Sustainable Yield (2025 Sustainable Yield). The Watermaster Board approved a scope of work and budget for water years (WYs) 2023 and 2024 to update the BVHM and redetermine the 2025 Sustainable Yield.[3]

Summary of Work Performed, Results, and Conclusions

The scope of work was executed by the Watermaster's Technical Consultant in an iterative process and in collaboration with the Technical Advisory Committee (TAC). The TAC provided feedback on each task. The scope of work involved updating and calibrating the BVHM using historical and newly collected data—most importantly, metered groundwater pumping and measured groundwater elevations at wells. The BVHM was recalibrated over the historical period of 1945-2022 and included a model sensitivity analysis. The final recalibrated model is referred to herein as the *Calibrated BVHM*.

In summary, the *Calibrated BVHM* resulted in a model simulation of the historical hydrology of the Basin (1945-2022), including estimates of historical groundwater pumping, groundwater elevations,

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[1] USGS. 2015. Hydrogeology, Hydrologic Effects of Development, and Simulation of Groundwater Flow in the Borrego Valley, San Diego County, California.

[2] Dudek. 2019. Update to USGS Borrego Valley Hydrologic Model for the Borrego Valley GSA (draft final).

[3] Scope of Work to Redetermine the Sustainable Yield by 2025.

groundwater-flow directions, and the water budget of the Basin. The simulated water budget was used to calculate the Sustainable Yield and recommend the 2025 Sustainable Yield using the following formula:

Natural Inflows – Natural Outflows = Sustainable Yield

The Sustainable Yield is intended to represent the average annual volume of groundwater that can be pumped from the Basin without causing chronic overdraft conditions or other undesirable results. The methods and results of this work are documented in the *2025 Sustainable Yield Technical Report.*[4] The main conclusions of the report are:

- The *Calibrated BVHM* is a good simulator of the hydrology of the Basin and can confidently be used to redetermine the 2025 Sustainable Yield.
- The 2025 Sustainable Yield should be set between 7,600 afy to 8,100 afy based on the 10 best model realizations identified through the uncertainty analysis. The most defensible model realization is the *Calibrated BVHM*, which yielded a Sustainable Yield estimate of 7,952 afy.
- The *Calibrated BVHM* can and should be used to predict future groundwater conditions in the Basin under future groundwater pumping plans and climatic conditions to: (i) assess the sustainability of future groundwater conditions under a Rampdown to the 2025 Sustainable Yield established by the Watermaster; (ii) evaluate Watermaster's current Carryover rules; and (iii) support the Groundwater Management Plan (GMP) Assessment Report.[5]

The TAC has considered the results and conclusions of the effort to redetermine 2025 Sustainable Yield and has prepared this TAC Recommendation Report to the Watermaster Board. The objective of the TAC Recommendation Report is to provide the Watermaster Board with technical opinions and justifications to assist the Board in establishing the 2025 Sustainable Yield. The TAC strives for consensus opinions, but when consensus is not achieved, this report describes the differences in opinions.

Organization of the TAC Recommendation Report

The remainder of this TAC Recommendation Report includes the following sections:

- **TAC Recommendation.** This section describes the TAC recommendations for the redetermination of the 2025 Sustainable Yield (including any differences in TAC opinions).
- **Supplemental Information**. This section describes the purpose of and requirements for supplemental information prepared by TAC members to support the basis of their recommendations. The supplemental information, if any, is included as an attachment.

[4] West Yost. 2024. *Compilation of Technical Work to Redetermine the 2025 Sustainable Yield*. Prepared for the Borrego Springs Watermaster. October 29, 2024. https://borregospringswatermaster.com/wp-content/uploads/2024/10/2025-SYR-Final-Technical-Report.pdf

[5] The GMP Assessment Report is due to the DWR by June 25, 2026.

TAC RECOMMENDATION

This section describes the TAC recommendation(s) on the redetermination of the 2025 Sustainable Yield (including a description of any differences in TAC member opinions). In summary:

- Consensus TAC recommendation: The *Calibrated BVHM* is a good simulator of the hydrology of the Basin and can confidently be used to redetermine the 2025 Sustainable Yield.
- Majority TAC recommendation: The 2025 Sustainable Yield should be set at 7,952 afy. TAC members have differing opinions on the value of the 2025 Sustainable Yield:
    - Three TAC members (representing AAWARE, County of San Diego, and Rams Hill) recommend the 2025 Sustainable Yield be set at 7,952 afy.
    - Two TAC members (representing BWD and the Roadrunner Club) recommend the 2025 Sustainable Yield be set at 7,900 afy.
    - One TAC member (representing the Borrego Springs Community) recommends the 2025 Sustainable Yield be set at 7,800 afy.

Table 1 documents each TAC member recommendation, including any justifications or other considerations, to assist the Board in establishing the 2025 Sustainable Yield.

Table 1. Summary of TAC Recommendations
Redetermination of the 2025 Sustainable Yield

TAC Member Name and Appointing BPA Party	Considerations/Recommendations			
	The *Calibrated* BVHM is a good simulator of the hydrology of the Basin and can confidently be used to redetermine the 2025 Sustainable Yield. (Y/N)	**The 2025 Sustainable Yield should be set at _____ afy.**	**Description of the limitations of the analysis that the Board should consider in setting the 2025 Sustainable Yield (*if any*).**	**Additional Considerations/Recommendations:**
Bob Wagner ***AAWARE***	The Calibrated BVHM is adequate to calculate sustainable yield for 2025.	7,952 AFY	The Board should adopt 7,952 AFY or 8,000 AFY if rounded.	Since we are rounding to the nearest hundredth, sustainable yield should be 8,000 AFY.
Russell Detwiler ***Borrego Springs Community***	Yes, given the currently available data, the Calibrated BVHM is a good simulator of the hydrogeology of the basin.	7,800 afy. The sensitivity analysis that considered the 10 'best' model formulations resulted in estimates of sustainable yield ranging from 7568 afy to 8078 afy. The mean of these 10 estimates (7803 afy) provides a sustainable yield that accounts for the range of model uncertainty.	The Calibrated BVHM model was selected as the single 'best' from thousands of calibration runs. There were a number of models with similar values for various metrics of goodness of fit to the data. The uncertainty reflected by these different models should be considered in current and future decisions about sustainable yield.	
Trey Driscoll ***Borrego Water District***	Yes, The BVHM is currently the best available tool to estimate/redetermine the Sustainable Yield for the Borrego Springs Subbasin.	7,900 acre-feet per year (afy).	The uncertainty analysis of the Sustainable Yield estimate based on the current version of the model is 7,600 to 8,100 acre-feet per year. Future climate may be different than the past climate impacting inflows to the Subbasin that should be tracked with empirical data annually using measured groundwater levels and annual estimates of change in groundwater storage.	Adaptive Management will be implemented to redetermine the Sustainable Yield estimate on least a 5-year basis as per the Judgement and more frequently should monitoring indicate that the Subbasin is not on track to meet sustainability goals defined in the Groundwater Management Plan.
Jim Bennett ***County of San Diego***	Yes	7,952 acre-feet per year, which represents the best fit of the realizations	In a parallel process, the Watermaster is conducting the five-year update of the Groundwater Management Plan (GMP). As part of this update, the groundwater model will simulate future conditions based on various groundwater pumping and climate scenarios. The model's results will be compared to sustainable management criteria for groundwater levels and storage. If the model results indicate the likelihood of undesirable results occurring after 2040, mitigation measures may be implemented, including the development of projects or management actions, or adjustments to the sustainable yield, if deemed necessary.	None
Tom Watson ***T2 Borrego, Rams Hill***	Yes, based on the WM efforts to date.	7,952 AFY	Future refinement of the model will be useful e.g., FMP estimated pumping v. metered pumping.	Continue to refine BVHM based on best available science/data over the next 5 years.
John Peterson ***Roadrunner Club***	I believe that the work that has been completed is a good simulator on the basin.	I believe that we should use the 7,900 ac-ft/yr value.	Time will tell. It is likely that climate trends will affect this value. In the future.	The key factor will be monitoring the basin. This is vitally important.

SUPPLEMENTAL INFORMATION

TAC guidelines[6] allow TAC members to prepare supplemental materials to support the basis of their recommendation, such as memoranda or PowerPoint presentation slides that describe their analyses and recommendations. To be included in the TAC Recommendation Report, all supplemental information must be reviewed and discussed by the TAC.

No supplemental information was provided by the TAC.

[6] Available on the Watermaster's website at: https://borregospringswatermaster.com/wp-content/uploads/2023/03/Resolution-23-01-Guidelines-for-TAC-Process-Executed.pdf