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SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF ORANGE, CIVIL COMPLEX CENTER

MOJAVE PISTACHIOS, LLC; et al.,

Plaintiffs,

v.

INDIAN WELLS VALLEY WATER DISTRICT; et al.,

Defendants.

INDIAN WELLS VALLEY WATER DISTRICT,

Cross-Complainant,

v.

Case No. 30-2021-01187275-CU-OR-CJC
[*Indian Wells Valley Groundwater Adjudication*]

Assigned For All Purposes To:
The Honorable William Claster, Dept. CX101

TECHNICAL WORKING GROUP PHASE 2 JOINT CLOSING BRIEF

RELATED TO ROA 1959
Date: June 8, 2026
Time: 9:00 a.m.
Dept.: CX101

Complaint Filed: November 19, 2019
Phase 1 Trial Date: April 28, 2025
Phase 2 Trial Date: June 8, 2026

ALL PERSONS WHO CLAIM A RIGHT TO EXTRACT GROUNDWATER IN THE INDIAN WELLS VALLEY GROUNDWATER BASIN NO. 6-54 WHETHER BASED ON APPROPRIATION, OVERLYING RIGHT, OR OTHER BASIS OF RIGHT, AND/OR WHO CLAIM A RIGHT TO USE OF STORAGE SPACE IN THE BASIN; et al., Cross-Defendants.
SEARLES VALLEY MINERALS INC., Cross-Complainant, v. ALL PERSONS WHO CLAIM A RIGHT TO EXTRACT GROUNDWATER IN THE INDIAN WELLS VALLEY GROUNDWATER BASIN NO. 6-54 WHETHER BASED ON APPROPRIATION, OVERLYING RIGHT, OR OTHER BASIS OF RIGHT, AND/OR WHO CLAIM A RIGHT TO USE OF STORAGE SPACE IN THE BASIN; et al., Cross-Defendants.

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I. INTRODUCTION

This trial was never a contest between precision and uncertainty. Every hydrogeologist acknowledged that safe yield must be estimated from imperfect information. The question is which evidence gives the Court the most reliable answer for the Indian Wells Valley Groundwater Basin ("Basin") today and for the long-term planning period. The answer is multiple lines of evidence for a representative modern period that include the Basin's actual response, such as measured groundwater levels; recorded pumping; mapped aquifer area; lithology-based storage properties; and independently led land-surface model calculations of the Basin's main source of recharge, mountain-front recharge. Those data, through multiple independent analyses, repeatedly converge on a safe yield of approximately 15,400 acre-feet per year ("AFY") and, at a minimum, no less than 14,300 AFY. (Ex. 3 at pp. 25–30; Ex. 85 at pp. 22–23, 50–55; 3 RT 542:3–554:21; 7 RT 1425:23–1443:26.)[1]

The 7,650 AFY number cannot bear the weight the Indian Wells Valley Groundwater Authority ("IWVGA") and United States place upon it. Early in trial, the Court identified the proper starting point: because the Technical Working Group ("TWG") parties challenged 7,650 AFY as an unevaluated figure carried forward from earlier work, the Court needed to understand how the IWVGA arrived at that number. (2 RT 254:7–255:1.) The evidence provided the answer. Jean Moran acknowledged that the IWVGA's Groundwater Sustainability Plan ("GSP") used 7,650 AFY, that 7,650 AFY was an input in the 2020 model supporting the GSP, that essentially the same recharge figure appeared in the 2016 work of the Desert Research Institute ("DRI"), and that the "updated" 2025 model again used 7,650 AFY. (2 RT 358:6–359:4.) When the Court required a direct answer, Ms. Moran confirmed that the same aggregate 7,650 AFY first determined through the earlier, 2016 DRI work was ultimately input into the 2025 model. (2 RT 360:21–361:2.)

That repetition is not validation. Lauren Wicks explained that the 2016 DRI two-dimensional ("2-D") model was a simplified calibration tool. It assumed uniform aquifer

[1] This brief uses the trial record supplied in the ten official transcript volumes. Transcript citations are to the volume of the reporter's transcript ("RT") page:line.

thickness, used parameters derived from a 1973 study, and adjusted recharge until the simulated water levels matched the sparse 1920–1921 predevelopment observations. The recharge value producing the preferred fit was 7,650 AFY. (3 RT 699:20–700:14; *see* Ex. 7 at pp. 6–8.) DRI then transferred that recharge value into a materially different three-dimensional ("3-D") model, held recharge constant, and calibrated other aquifer parameters around it. Throughout discovery and at trial, the underlying 2-D model was unavailable, preventing the parties and the Court from testing whether its assumptions, calibration, sensitivity, and transfer remained valid. (3 RT 700:15–701:6; *see* Ex. 7 at p. 8.) Dr. Matthew Tonkin independently traced the same repetition lineage: 7,650 AFY first appeared in McGraw et al. (2016)'s analysis, was derived through a 2-D model calibrated to a dry 1920–1926 interval and then was applied in later models even though the original model could not be inspected. (4 RT 909:23–910:22; Ex. 125 at pp. 12–13; Ex. 426A; Dem. Ex. 248.)

The IWVGA's later DRI models did not independently rediscover or validate 7,650 AFY. They were instructed to use it. (2 RT 358:6–359:4, 360:21–361:2.) That distinction is dispositive. A model can be calibrated by changing hydraulic conductivity, specific yield, specific storage, boundary conditions, or recharge distribution while holding total recharge fixed. Successful calibration under that constraint may show that some combination of adjustable parameters can reproduce selected observations. It does not prove, however, that the fixed recharge constraint is physically correct. It proves only that the later DRI models were adjusted to achieve a 7,650 AFY number.

The DRI modeling history illustrates the circularity of 7,650 AFY. The 2020 model assigned specific yield values exceeding 20 percent across most of the Basin—values inconsistent with the lithology-based datasets evaluated by the TWG. By 2025, DRI materially reduced those values, bringing them much closer to the Brown & Caldwell (2009), Kunkel & Chase (1969), and Ramboll (2025) ranges. Dr. Sean McKenna acknowledged that the 2025 distribution was "quite a bit different" and that specific yield values had "come down quite a bit on average." (10 RT 2147:18–2150:8; *see* Ex. 24 at p. 76; Ex. 990 at p. 37.) Yet aggregate

recharge remained 7,650 AFY. A conclusion that survives because the model's other parameters change around it is a retained assumption, not an independent measurement.

The affirmative TWG evidence proceeded in the opposite direction. Rather than reconstructing uncertain predevelopment evapotranspiration or forcing a single historical estimate to drive the analysis, the TWG asked what the Basin actually had done under recent, representative conditions. Eddy Teasdale testified that safe yield changes over time because usage, climate, recharge, return flows, and management conditions change. As a result, an accurate reconstruction of the Basin more than a century ago would not necessarily answer what the safe yield is today. (6 RT 1361:8–21.) His analysis therefore used a current hydrogeologic period with current water usage, climate data, recorded pumping, measured groundwater-level responses, and lithologic information related to specific yield. (6 RT 1361:22–1363:7.)

The resulting TWG evidence is not dependent upon any single expert, dataset, set of assumptions or postulates, method of analysis, or calculation. The TWG Safe Yield Paper produced four results—15,800, 16,200, 14,300, and 17,000 AFY—and the TWG selected 14,300 AFY. (Ex. 3 at pp. 25–30, §§ 4.1–4.3; *see* 3 RT 542:3–546:22, 547:17–549:25, 550:15–554:21.) Mr. Teasdale's refined analyses produced four estimates—14,900, 15,700, 14,200, and 15,100 AFY—and he selected 15,400 AFY as the average of the two analyses using Ramboll's finalized 2025 specific yield values. (7 RT 1425:23–1426:3, 1439:7–1443:26; Ex. 85 at pp. 22–23, 50–55; Dem. Ex. 607 at pp. 60–61.) Ms. Wicks independently testified that 15,400 AFY is a reasonable estimate. (3 RT 701:10–702:11.) The IWVGA's own change in storage framework reflected in its annual reports produced approximately 10,500 AFY, and when the anomalous 2020 DRI specific yield values were changed to Ramboll's 2025 specific yield values, that framework produced approximately 14,800 AFY. (6 RT 1383:15–1385:12, 1388:7–1389:4; 7 RT 1406:19–1409:17.) Dr. Tonkin's independent water budget analysis concluded that the safe yield is approximately 14,375 AFY. (4 RT 916:21–918:12; Ex. 123 at pp. 37–39.) The 2025 Ramboll model provides a further, separately implemented cross-check on these numbers.

The opposition's expert testimony did not close the gap between the TWG safe yield numbers and the 7,650 AFY number. Dr. Todd Kincaid performed no independent basin-scale

safe yield calculation. His assignment contemplated only a "cursory," "preliminary" model review; he admitted that his review remained incomplete and that portions of his opinions were "still evolving." (8 RT 1782:7–1787:6; Ex. 80 at p. 3.) He assembled a low range by selecting and modifying historical estimates, excluded studies because their values were higher or older, omitted anthropogenic recharge, counted the inherited 7,650 AFY figure multiple times, and then reduced his result by 15 percent for ET—a number he admitted came from "thin air." (8 RT 1793:2–1798:10; 9 RT 1859:19–1860:7.)

Dr. McKenna likewise did not perform a new basin-scale safe yield determination that independently yielded 7,650 AFY. His attempted corroboration relied on McGraw's misapplication of regional empirical methods—Anderson et al. (1992) and Epstein et al. (2010)/bootstrap brute-force recharge model ("BBRM")—and a flawed Owens Valley comparison. Dr. McKenna corrected some of the errors in McGraw. (*See* Ex. 60 at pp. 23–24; 4 RT 916:21–917:18, 922:13–18; 9 RT 1906:20–1907:1, 1965:26–1966:1; 10 RT 2111:8–10, 2114:26–2118:2.) Dr. Tonkin corrected an additional error in Dr. McKenna's analysis. And when Epstein's method is applied without improperly assigning zero recharge to the Basin's large low-precipitation area, the resulting best estimate is approximately 15,266 AFY—remarkably consistent with the TWG values, not the lower figure carried into the DRI work. (4 RT 843:26–850:17, 852:22–859:13, 860:18–876:6; 9 RT 1907:3–1910:1; 10 RT 2119:4–2122:1; Ex. 21 at p. 25; Ex. 65 at p. 19, table 4; Exs. 426A, 431A, 432A, 434A, 436A, 438A, 439A, 440A; Dem. Exs. 435, 437.)

Dr. McKenna's Owens Valley comparison fared no better. He used only a truncated portion of the Owens Valley inflow budget while omitting major tributary stream recharge, bedrock runoff, and return flow components. Ms. Wicks corrected the comparison using the omitted terms. The corrected Indian Wells Valley inflow range was approximately 12,800 to 27,600 AFY, with an average of approximately 21,400 AFY—comfortably encompassing both 14,300 and 15,400 AFY. (3 RT 692:1–698:21; 10 RT 2101:9–2103:4, 2134:26–2136:23; Ex. 635/1211 at p. 77, table 10; Exs. 634, 637, 646, 647; Dem. Exs. 663 at pp. 18–20.)

The GSP does not rescue 7,650 AFY. This Court has already ruled that it is not bound by the IWVGA's sustainable yield determination and importantly observed that both the IWVGA and DWR acknowledged material data gaps in the GSP. (Minute Order, Aug. 5, 2024 [ROA 1465, 1469], p. 11.) Trial only strengthened the Court's prior conclusion. The GSP was prepared before Basin-wide metering was fully implemented, through a process in which Stetson Engineers (the IWVGA Water Resources Manager) did not possess the DRI model and did not determine 7,650 AFY, and where the principal modeling assumption was retained by the IWVGA under deadline pressure so work could proceed. DWR later found that the IWVGA had improperly inverted the regulatory process for establishing sustainability criteria by defining projects and management actions first and then defining sustainability by reference to the conditions those measures were expected to produce. (Ex. 359 at pp. 33–34, § 4.3.3.)

Nor does the 2026 Technical Report transform the inherited 7,650 AFY assumption into a physical fact. Code of Civil Procedure section 845, subdivision (d) authorizes IWVGA to submit a report and gives rebuttable prima facie effect to "physical facts" found in it. The statute does not assign presumptive correctness to a mixed scientific and legal opinion about safe yield, and it expressly requires the Court to hear rebuttal evidence.[2] Here, the Court heard ten days of trial testimony, reviewed the competing expert analyses, and received the underlying exhibits. The complete evidentiary record supplies the rebuttal.

The Court should decide safe yield from the best evidence of current Basin capacity and response. The historical literature, change in storage calculations, the IWVGA annual report cross-check, the corrected McGraw application of Anderson and Epstein, Dr. Tonkin's independent water budget analysis using the physically based Basin Characterization Model ("BCM"), and the Ramboll model all point in the same direction. The Court should find that current safe yield is approximately 15,400 AFY and no less than 14,300 AFY.

[2] Subdivision (4) is clear: "A report provided by a groundwater sustainability agency pursuant to paragraph (1) shall be prima facie evidence of the physical facts found in the report, but the court shall hear evidence that may be offered by any party to rebut the report or the prima facie evidence."

II. REQUESTED FINDINGS

The Indian Wells Valley Water District, the Meadowbrook Dairy entities,[3] and Searles Valley Minerals Inc.[4] (collectively, the "TWG Parties") respectfully request that the Court make the following findings after the Phase 2 safe yield trial:

- The current safe yield of the Basin is approximately 15,400 AFY and, in all events, no less than 14,300 AFY.
- The Court should reject the IWVGA and United States' proposed 7,650 AFY figure. The evidence established that 7,650 AFY is not a current, independently measured safe yield determination. It is a recharge input developed through an unavailable 2-D DRI/McGraw calibration exercise and carried forward into later 3-D models, the 2020 DRI model and GSP, the 2025 DRI model, and the 2026 Technical Report.
- The 2014–2023 period is a reasonable and representative base period for determining current safe yield. It includes wet and dry years, closely approximates long-term average precipitation, reflects current cultural and hydrologic conditions, and contains the Basin's most complete and reliable pumping and groundwater-level data.
- The TWG's analyses represent the most persuasive evidence of current safe yield because the TWG offers multiple lines of evidence that reliably converge on similar results.
- The change in storage method applies conservation of mass to the Basin's measured response. It uses recorded pumping, measured groundwater-level changes, polygon area, and

[3] Defendants and Cross-Defendants Meadowbrook Dairy Real Estate, LLC; Big Horn Fields, LLC; Brown Road Fields LLC; Highway 395 Fields, LLC; and The Meadowbrook Mutual Water Company.

[4] On October 21, 2026, Searles moved this Court to substitute 5E SVM Operations Company, LLC ("5E") for Searles for all purposes in this action and related cases. On October 1, 2026, Searles and 5E entered into a Water Assets Assignment Agreement whereby Searles assigned and transferred all its water rights, including those water rights in the Indian Wells Valley Groundwater Basin, to 5E. The United States Bankruptcy Court for the District of Delaware approved the sale by order entered September 21, 2026, in Case No. 26-10966-BLS. Searles' undersigned legal counsel will continue to represent 5E in this action. A hearing is set on Searles' motion for substitution on November 20, 2026. Until that motion is resolved, Searles remains the named party in all filings in this action.

lithology-based specific yield values, thereby accounting for the combined effect of all inflows and outflows without separately estimating each uncertain water budget component.

- Mr. Teasdale's specific yield values and his resulting 15,400 AFY opinion are reasonable and supported by multiple independent sources, including Brown & Caldwell (2009), Kunkel & Chase (1969), Ramboll's 2024 and 2025 work, DRI's revised 2025 values, Basin lithology, and site-specific North Brown Road/Meadowbrook testing. Mr. Teasdale's 15,400 AFY opinion was also independently corroborated by Ms. Wicks.

- The principal criticisms of the change in storage analysis—interpolation, polygon configuration, the 2019 earthquakes, faults, evapotranspiration, and specific yield uncertainty—were either expressly tested, quantified, or addressed through conservative assumptions. None supplies a reasoned path away from the change in storage estimates.

- Dr. Tonkin conducted an independent water balance analysis to conclude a safe yield of 14,375 AFY (rounded at trial to 14,400 AFY). He relied on the physically based BCM, developed independently by experts at the U.S. Geological Survey ("USGS"), to calculate mountain-front recharge—the key source of recharge to the Basin. He reproduced and evaluated the BCM, comparing the results with observed data to validate the model's output.

- The Court is not bound by the IWVGA's sustainable yield determination, DWR's administrative review of the GSP, or the 2026 Technical Report. At most, Code of Civil Procedure section 845, subdivision (d)(4) gives rebuttable prima facie effect to "physical facts" found in a qualifying groundwater sustainability agency ("GSA") report; it does not convert a contested expert opinion about safe yield into a binding physical fact. In any event, rebuttal to such prima facie evidence shall be heard by the court—and was, at trial—and the complete trial record rebuts 7,650 AFY.

- The numerical groundwater modeling evidence also rejects 7,650 AFY.

III. GOVERNING LEGAL STANDARD

A. Safe Yield Is the Maximum Annual Withdrawal Under the Conditions that Exist Without Eventually Depleting the Basin.

California courts define safe yield as "the maximum amount of water that could be extracted annually, year after year, without eventually depleting the underground basin. . . . Safe yield is generally calculated as the net of inflows less subsurface and surface outflows." (*City of Santa Maria v. Adam* (2012) 211 Cal.App.4th 266, 279 [citing and quoting *City of Los Angeles v. City of San Fernando* (1975) 14 Cal.3d 199, 278].) Two aspects of the definition matter here.

First, safe yield must reflect a maximum annual withdrawal, not an artificially low figure selected to eliminate every uncertainty. That principle is consistent with Article X, section 2 of the California Constitution, which directs that the State's water resources be put to beneficial use "to the fullest extent of which they are capable." (Cal. Const., art. X, § 2.) The Court must protect the Basin against eventual depletion, but it need not lock up water by treating as controlling a single historical estimate that is materially below every modern, data-based estimate in the record.

Second, safe yield is determined "under a given set of conditions." (*San Fernando*, *supra*, 14 Cal.3d at p. 278; *see Santa Maria*, *supra*, 211 Cal.App.4th at p. 279 [net of inflows less outflows].) The relevant conditions include the Basin's actual hydrology, current and established uses, return flows, imported water contributions, pumping patterns, and observed storage response. (*E.g.*, *City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224, 1241–1242, 1245–1248 [emphasizing established uses and return flow conditions]; *San Fernando*, *supra*, 14 Cal.3d at pp. 260–261, 279–281 [considering return flows from imported water and actual basin behavior]; *see, e.g.*, *Allen v. Cal. Wat. & Tel. Co.* (1946) 29 Cal.2d 466, 473–475 [describing trial court record supporting safe yield finding based on actual hydrogeologic conditions, not an abstract formula].) Those authorities do not direct the Court to freeze the Basin in a hypothetical pre-pumping landscape of more than 100 years ago.

B. Safe Yield Is Condition-Dependent and May Be Revisited When Conditions and Information Change.

Safe yield is not permanent and immutable. On remand in *San Fernando*, for example, the California Supreme Court instructed that the trial court could determine present safe yield under the conditions previously found or, on a proper showing, determine safe yield under the conditions of a more recent year. (*San Fernando*, *supra*, 14 Cal.3d at p. 288, fn. 96.) *Wright v. Goleta Water District* (1985) 174 Cal.App.3d 74 similarly recognized that a trial court may receive additional evidence concerning changed hydrologic conditions resulting from the passage of time. (*Id.* at pp. 89–90, 93 [court's role is to weigh competing, imperfect expert calculations and arrive at a reasonable, operational figure; an opponent cannot disqualify or defeat an expert's safe yield calculation simply because another expert's model yields a different number].) Code of Civil Procedure section 852 preserves continuing jurisdiction in an adjudication to respond to new information, changed circumstances, the interests of justice, and the statutory criteria governing a judgment.

Stated simply, the IWVGA's and United States' misplaced reliance on sparsely supported presumed conditions from more than a century ago cannot be the basis for the Court's determination of the Basin's current safe yield. The trial record established material changes since the 1920s and even since 2010. (3 RT 665:18–24, 688:1–25; 7 RT 1462:19–26; 8 RT 1788:22–1789:2.) Pumping patterns, irrigated agriculture, municipal use, wastewater disposal, septic return flows, aqueduct operations, monitoring density, metering, and climate variability have all changed. The use of a modern representative period by Mr. Teasdale (2014–2023), Ms. Wicks (2014–2023), and Dr. Tonkin (1980–2023) fits the legal standard. (*See* 6 RT 1361:8–1363:7; 7 RT 1426:20–1427:25, 1461:17–1463:25.) A reconstruction of more than a century ago does not.

C. The Court Should Use the Most Complete, Accurate, and Current Evidence Available.

The Court has already stated that any physical solution should be "based on the most complete, accurate, and up to date information," and that a safe yield analysis is the necessary

"starting point." (Minute Order, Aug. 5, 2024 [ROA 1465, 1469], p. 11.) The 2014–2023 and 1980–2023 base periods fulfill that requirement. They incorporate modern metering and reporting, verified initial disclosures, an expanded groundwater-level network, pressure transducer data, and updated lithologic and specific yield information. Earlier periods do not provide comparable data quality. (*See* 6 RT 1361:8–1363:7; 7 RT 1426:20–1427:25, 1461:17–1463:25; 9 RT 1891:3–6; Ex. 3 at pp. 17–23.)

The law does not require certainty; it requires a reasoned finding supported by substantial evidence. (*See Wright*, *supra*, 174 Cal.App.3d at pp. 89–90, 93 [recognizing that experts may produce different calculations from imperfect hydrologic evidence; the trial court must weigh those competing opinions and reach a reasonable determination supported by substantial evidence].) Expert opinion must rest on matters of a type reasonably relied upon for such an opinion and on a reasoned explanation connecting the data to the conclusion. (Evid. Code, §§ 801, 802; *Sargon Enterprises, Inc. v. Univ. of So. Cal.* (2012) 55 Cal.4th 747, 769–772.) A court may give little weight to an opinion that assumes the disputed conclusion, relies on an unavailable analytical step, or uses a circular calibration process. (*See, e.g.*, *Jennings v. Palomar Pomerado Health Systems, Inc.* (2003) 114 Cal.App.4th 1108, 1117–1118; *Pac. Gas & Elec. Co. v. Zuckerman* (1987) 189 Cal.App.3d 1113, 1135.)

D. <u>As Found in this Court's Earlier Ruling, SGMA and the GSP Do Not Determine Common Law Safe Yield or Bind this Court</u>.

SGMA cannot alter substantive groundwater rights and leaves their determination to adjudication. Water Code section 10720.5 provides that SGMA does not modify rights or priorities to use or store groundwater and that neither SGMA nor a GSP determines or alters groundwater rights under common law. (Wat. Code, § 10720.5, subds. (a)–(c).) Code of Civil Procedure section 834 likewise confirms that a GSA does not determine water rights through a GSP, or otherwise.

SGMA's "sustainable yield" definition may provide some context, but it does not make an agency's number conclusive—especially as to safe yield. "Sustainable yield" refers to the maximum quantity calculated over a representative long-term base period, including temporary

surplus, that may be withdrawn without an undesirable result. (Wat. Code, § 10721, subd. (w).) That definition confirms the importance of a representative base period and the maximum sustainable quantity. But it is not the same as safe yield. In addition, DWR's approval of a GSP is an administrative compliance determination, not an agreement with the precise sustainable yield number, and certainly not an adjudication of safe yield or groundwater rights. (*See* Wat. Code, § 10738; 3 RT 503:3–15, 504:2–9, 505:10–18, 507:7–26, 508:8–26; Ex. 359.) This Court must make its own finding from the trial record.

E. No Party Bears the Burden of Proof on Safe Yield.

No California statute allocates the burden of proof on the hydrologic determination of safe yield. (*See* Evid. Code, § 500; 2 RT 254:7–255:1.) Rather, each party advocating a safe yield determination must present evidence supporting its position. The trial court has broad discretion to weigh competing expert analyses and to select the safe yield figure that is supported by substantial evidence. (*E.g.*, *Wright*, *supra*, 174 Cal.App.3d at pp. 81–82, 89–90, 93.)

The IWVGA's 2026 "technical report" does not impose a burden of proof on the TWG Parties. Whatever evidentiary effect may attach to certain alleged physical facts discussed in that report under Code of Civil Procedure section 845, subdivision (d)(4), the statute does not shift the burden of proof to any party or require the Court to accept the report's safe yield conclusion. It remains with the Court to consider the entire trial record and make its own determination. Substantial evidence supports 15,400 AFY or, at a minimum, 14,300 AFY. (*See*, *infra*, § V.G.)

IV. THE AFFIRMATIVE EVIDENCE ESTABLISHES A CURRENT SAFE YIELD OF APPROXIMATELY 15,400 AFY AND NO LESS THAN 14,300 AFY.

A. Independent Analyses Using Different Methods Converge in the Same Range.

The strength of the TWG case is the convergence of multiple independent analyses and methodologies. The Court is not being asked to accept a single model output or a single expert's preferred assumption. The TWG's evidence includes multiple change in storage analyses using different polygon configurations and specific yield datasets; an independent water budget analysis using a physically based land-surface model to calculate recharge, which was developed independently by third-party experts at the USGS; corrected application of Anderson and Epstein

empirical analyses; the IWVGA's own annual report methodology; and a separate numerical groundwater model. Those lines of evidence differ in implementation, datasets, assumptions, and uncertainty, yet they cluster around the same result.

Table 1. Independent Safe Yield Analyses Converge Above 7,650 AFY

Analysis	Method / Principal Inputs	Safe Yield Result	Record
TWG Safe Yield Paper — Approach 1	Extended 85-polygon change in storage method; Ramboll 2024 / Brown & Caldwell specific yield	15,800 / 16,200 AFY	Ex. 3 at pp. 25–27, § 4.1; 7 RT 1441:7–1442:7
TWG Safe Yield Paper — Approach 2	Redesigned 81-polygon change in storage method; Ramboll 2024 / Brown & Caldwell specific yield	14,300 / 17,000 AFY	Ex. 3 at pp. 27–29, § 4.2; Exs. 373, 374A; 3 RT 542:3–546:22, 547:17–549:25, 550:15–554:21
TWG Safe Yield Paper Conclusion	Conservative synthesis of the TWG calculations	14,300 AFY	Ex. 3 at pp. 29–30, § 4.3; 3 RT 698:15–16
Teasdale — Approach 1	Refined 85-polygon change in storage method; expanded well network; Brown & Caldwell / Ramboll 2025 specific yield	14,900 / 15,700 AFY	Ex. 85 at pp. 22, 25, 28, 33–40, 50–52, 55; 6 RT 1365:20–1366:16; 7 RT 1439:7–1440:25; Exs. 511, 529; Dem. Ex. 607 at p. 60
Teasdale — Approach 2	Redesigned 81-polygon change in storage method; representative wells; Brown & Caldwell / Ramboll 2025 specific yield	14,200 / 15,100 AFY	Ex. 85 at pp. 22–23, 26, 28, 33–40, 52–55; 6 RT 1366:24–1369:15; 7 RT 1442:9–15; Exs. 519, 531; Dem. Ex. 607 at p. 61
Teasdale Opinion	Average of the two calculations using Ramboll 2025 specific yield	15,400 AFY	Ex. 85 at pp. 13, 54–55; 7 RT 1425:23–1426:3
IWVGA annual report framework	IWVGA polygons and data; change in storage method; DRI 2020 specific yield	10,500 AFY	6 RT 1383:15–1385:12; 7 RT 1406:19–1408:5, 1408:25–1409:4; Dem. Ex. 607 at p. 11
IWVGA annual report framework with revised specific yield	Same IWVGA polygons and data; change in storage method; the only change is to use Ramboll 2025 specific yield	14,800 AFY	6 RT 1388:7–1389:4; 7 RT 1409:7–17; Dem. Ex. 607 at p. 12
Tonkin independent water budget	BCM mountain-front recharge plus quantified Rose Valley and incidental inflows	14,375 AFY	Ex. 123 at pp. 37–39; 4 RT 916:21–919:1; Dem. Ex. 451

This independent convergence matters because the primary uncertainties do not all operate in the same way. A different polygon configuration changes the spatial treatment of measured water levels. A different specific yield dataset changes the conversion from water-level change to storage volume change. Dr. Tonkin's analysis estimates inflows rather than solving

safe yield from observed storage response. The Ramboll model incorporates time-varying inputs and 3-D aquifer properties. When methods with different structures and error sources reach comparable results, the common result is less likely to be an artifact of any one assumption and more likely to reflect actual conditions. (*See* 1 RT 47:17–48:5, 56:23–57:7; 3 RT 484:8–485:12, 534:3–6; 4 RT 785:5–18; 5 RT 1102:2–3; 7 RT 1468:13–1469:13; *see also* 1 RT 45:17–46:3; 3 RT 597:11–15; 7 RT 1443:19–26.)

By contrast, the apparent "agreement" among the DRI/GSP sources is not independent convergence. The same 7,650 AFY aggregate recharge assumption was carried from the unavailable 2016 work into the 2020 and 2025 DRI models and the derivative GSP and technical reports. Those documents are not separate corroboration; they just use the same assumption repeatedly. (2 RT 358:6–361:2, 376:22–24, 377:5–378:3 [Moran conceded 7,650 AFY was an input to the 2020 DRI Model, not a result independently generated by the model]; 3 RT 699:20–701:6; 4 RT 797:7–798:15, 909:23–910:22; 6 RT 1260:8–14; 9 RT 1914:5–23, 1915:7–12; 10 RT 2103:22–24, 2105:3–10, 2106:13–24, 2110:6–16, 2127:21–2128:16, 2147:18–2150:8; Ex. 24 at pp. 65–66; Ex. 955 at pp. 20–21, 31, 43, 49–50; *see also* 2 RT 398:17–24; 4 RT 787:20–788:3; 10 RT 2156:16–20.) Moreover, their attempt at a multi-method analysis using Anderson and Epstein demonstrates agreement with the TWG's values, not the 7,650 AFY figure.

B. <u>TWG Change in Storage Analyses Produce a Range of 14,300 to 17,000 AFY</u>.

1. *The change in storage method is the most reliable empirical method because it measures the Basin's actual response.*

The change in storage method follows the law of conservation of mass—mass cannot be created or destroyed. Ms. Wicks explained that groundwater inflows equal groundwater outflows, plus or minus the change in groundwater storage. Rearranging that water budget equation produces two mathematically equivalent approaches. Under a recharge approach, safe yield is calculated from estimated inflows and outflows other than pumping. (3 RT 651:13–652:12; Dem. Ex. 663 at p. 6.) Under a change in storage approach, safe yield is calculated from pumping adjusted by the observed change in storage. (1 RT 22:15–23:5; 3 RT 642:11–643:9;

Dem. Ex. 663 at p. 6.) The second method does not ignore the water budget; it solves the water budget through the Basin's actual, measured response.

The governing equations are straightforward:

Safe Yield = Pumping ± Change in Groundwater Storage

where

Change in Groundwater Storage = Basin Area (polygon area) × Specific Yield × Change in Water Level

(3 RT 640:7–641:22, 642:11–643:9; 7 RT 1423:21–1426:3; Dem. Ex. 607 at pp. 6–8, 27–35, 37.) The Basin is divided into polygons associated with representative wells. (3 RT 640:20–641:8; *see also* 3 RT 542:3–543:9, 551:6–552:13; Ex. 374A.) Annual groundwater-level change is calculated for each polygon, multiplied by the polygon area and a supported specific yield value, and summed across the Basin. (3 RT 543:25–544:17, 551:6–553:18, 554:25–555:15, 653:25–654:26, 656:1–657:10; 6 RT 1371:10–1372:8; 7 RT 1423:15–1426:3; Dem. Ex. 607 at pp. 27–35, 37.) Recorded pumping is then combined with storage change to estimate the annual quantity that could be pumped without long-term storage decline.

The method is particularly well suited to the Basin because the alternative requires separate estimates of components that cannot be directly measured. (9 RT 1884:26–1885:3 ["No sources of recharge can be directly measured"]; *see* 2 RT 368:8–369:4.) The historical studies reported materially different mountain-front recharge, Rose Valley underflow, playa discharge, and incidental recharge estimates, often over different base periods and for different purposes. Ms. Wicks testified that those wide-ranging opinions made direct comparisons difficult and demonstrated substantial uncertainty, especially for mountain-front recharge and Rose Valley underflow. (3 RT 635:22–638:7; *see* Ex. 546; *see also* 2 RT 368:8–369:4; 4 RT 793:12–801:14; Dem. Ex. 410.) The TWG therefore selected "the change in storage method because it implicitly incorporates" the combined effect of the inflow and outflow terms. (3 RT 638:8–16; *see also* 3 RT 554:7–21, 701:15–17.)

Mr. Teasdale explained the practical advantage in the same terms. A recharge analysis asks the Court to determine how much water enters from each mountain block, when it arrives, how much crosses from Rose Valley, how much percolates from aqueduct releases and leakage, how much returns from irrigation and wastewater, and how much leaves through ET or other pathways. Each estimate carries uncertainty, and the uncertainties compound. A storage response analysis eliminates the need to resolve each disputed, uncertain component separately because inflows and outflows that affected the aquifer during the base period are automatically reflected in measured groundwater-level change. (7 RT 1426:20–1429:1, 1461:17–1467:6; Dem. Ex. 607 at pp. 9, 79–83; *see also* 1 RT 98:4–15, 131:11–25; 6 RT 1371:10–1372:8, 1374:8–21, 1380:13–1381:10; 10 RT 2151:25–2152:14, 2154:10–2155:2; Ex. 605.)

The method is neither novel nor litigation-created. Mr. Teasdale testified that more than half of the GSAs submitting water year 2024 annual reports to DWR used a change in storage approach. (6 RT 1334:3–25; 7 RT 1422:9–1423:14; *see also* 9 RT 1890:17–1891:1.) The IWVGA itself uses a Thiessen polygon change in storage method in its annual reports. (6 RT 1383:15–1385:12; 7 RT 1405:17–1408:5; *see, e.g.*, Ex. 944 at pp. 14–16; Ex. 945 at pp. 23–26; Ex. 950 at pp. 36–38.) The opposition cannot plausibly characterize the method as inherently unreliable while its own agency uses it to report annual Basin storage change to DWR.

The fact that modeling efforts independently corroborated the change in storage outcomes further supports the reliability of those outcomes.

2. *The 2014–2023 base period is representative and rests on the best available data.*

A safe yield calculation must distinguish long-term Basin behavior from a single wet or dry year. Ms. Wicks identified the relevant criteria: a base period should include wet and dry years, approximate long-term average hydrology, use reliable pumping and groundwater-level data, extend for at least ten years, and reflect current cultural conditions. (3 RT 658:8–659:3; *see also* 3 RT 606:14–26.) The TWG selected January 2014 through December 2023 because that period satisfies all those criteria extremely well. (3 RT 521:17–20, 586:15–19, 659:13–18, 701:10–14.)

Importantly, this period closely approximates long-term precipitation and includes both wet and dry years. Ms. Wicks compared precipitation at the China Lake station during 2014–2023 with the longer historical record (1945–2023). Average precipitation during the selected period was approximately 3.23 inches—close to (and slightly less than) the long-term average of approximately 3.42 inches. (3 RT 660:4–662:14; Ex. 3 at p. 16; Ex. 4 at p. 8; Ex. 535; *see also* 3 RT 663:5–19, 664:2–665:7; Ex. 576 at pp. 77–78 [IWVGA has used the same precipitation gaging station to measure precipitation].) The period includes very dry, dry, average, wet, and very wet years. (3 RT 665:10–24; 7 RT 1428:9–10; *see* Ex. 3 at p. 16, fig. 4.) That variability is an important feature: a representative period must capture both storage losses in dry years and recharge responses in wet years.

The IWVGA and United States criticized the presence of very wet events, including 2023. But very wet years are actual features of the Basin. Excluding such years would inaccurately bias the result in the opposite direction. Current conditions include episodic runoff, aqueduct releases, and other wet-year inflows. Mr. Teasdale's change in storage method records their net effect only to the extent that the water actually affected groundwater levels during the period. It does not assume that every release became recharge.

The opposition's reliance on Dr. Tonkin to characterize the 2014–2023 period as "fairly wet" fails to accurately capture his analysis. His report compared the TWG base period to the longer record "simulated using the BCMv8 and the Ramboll Model," and at trial he clarified that the period was only about eight or nine percent wetter than his longer-term average based on the BCM. (4 RT 937:9–24; Ex. 123 at pp. 38–39.) That characterization therefore depends on accepting the ability of the BCM to distinguish relatively high and low recharge years. Dr. Tonkin independently evaluated that very capability: he reproduced the BCM outputs, compared modeled runoff against observed Sierra Nevada streamflow, and concluded that the BCM simulated hydrologic response to precipitation "fairly well." (4 RT 834:3–25, 835:11–836:12; Ex. 421A.)

The opposition cannot selectively accept the BCM when its output is useful to criticize the TWG base period, while rejecting the same BCM when its output demonstrates substantially greater recharge than 7,650 AFY. Dr. Tonkin used the BCM to estimate approximately 9,200 AFY

of mountain-front recharge, combined that value with Rose Valley underflow and incidental recharge, and reached a total recharge—and maximum safe yield—estimate of approximately 14,400 AFY. (4 RT 916:21–918:18; Dem. Ex. 451.) His report makes the relationship still clearer: using the same modeling framework over the longer 1980–2023 period, he calculated safe yield at 14,375 AFY without an ET deduction, while his calculation for the purportedly wetter 2014–2023 period was 16,556 AFY. (Ex. 123 at pp. 37–39, 67.) Thus, even accepting the opposition's premise that the TWG period was somewhat wetter than average does not support a safe yield anywhere near 7,650 AFY. The same evidence on which that criticism rests instead corroborates a long-term safe yield exceeding 14,300 AFY.

The IWVGA and United States also suggest the TWG base period is too short, a criticism that rings hollow given that their 7,650 AFY value is derived from discharge estimates from a single year. It is difficult to fault ten years of observed modern Basin response as insufficiently representative while asking the Court to anchor safe yield to a reconstructed snapshot of conditions in a single year over 100 years ago. (8 RT 1651:15–1652:14, 1657:2–8; 9 RT 1864:5–1865:12.)

3. *Modern pumping data are materially more complete and reliable.*

The 2014–2023 period further benefits from SGMA-era metering, IWVGA reporting requirements, annual report data, expanded monitoring networks, improved measurement technology, and verified initial disclosures served under penalty of perjury in this adjudication. The TWG assembled data from those sources and from its domestic well analysis. The resulting datasets capture the overwhelming majority of Basin production and provide a substantially stronger basis than the pre-SGMA estimates used in the GSP's historical compilation. Quite simply, it is the best data available. (3 RT 561:10–563:12, 661:1–677:17, 680:2–681:21; 7 RT 1427:4–19; *see* 1 RT 178:7–12, 194:12–195:8; 9 RT 1891:3–6; Ex. 85 at p. 27; Ex. 549; *see, e.g.*, Exs. 8, 112–114; Ex. 575 at p. 36; Ex. 576 at p. 42 [IWVGA asserts that its annual reports contain "[t]he best engineering estimate" of pumping for the recent water years reported]; Meadowbrook RJN Ex. E; Dem. Ex. 607 at p. 45.)

The Quist Farms example demonstrated why the distinction matters. The older cooperative group dataset reported exactly 750 AFY for Quist Farms in every year from 2002 through 2016—an improbable uniformity. Ms. Wicks regarded that pattern as evidence of simplifying assumptions. The verified disclosures for overlapping years reported lower and varying amounts and identified methods of measurement. The Court immediately recognized the problem, observing that it was "almost impossible" for pumping to be exactly the same for 15 consecutive years. (3 RT 667:16–672:19; *see* Ex. 111 at p. 3; Ex. 642 at p. 4.) The TWG therefore used the more reliable data when available rather than mechanically retaining the older estimates.

In addition, the TWG evaluated groundwater-level information from more than 150 wells, including DWR's Water Data Library, the GSP and annual reports, monitoring well records, and high-frequency pressure transducer data. Mr. Teasdale used as many reliable observations as possible and excluded outliers after review. In areas containing multiple wells, he used the additional observations to refine the groundwater surface and reduce interpolation uncertainty. (Ex. 3 at pp. 19–20, § 3.2.2; Ex. 85 at pp. 13–19; 3 RT 640:20–641:8, 682:17–25, 684:19–687:15; 6 RT 1364:16–1365:6; 7 RT 1439:7–1440:25; Dem. Ex. 663 at p. 13.) Earlier periods had far fewer measurements and no comparable transducer network.

Finally, the selected period spans ten years, satisfying DWR's recommended minimum duration for evaluating representative storage change. (3 RT 687:18–23.) More importantly, it combines that duration with modern data quality. A longer period based on substantially less reliable pumping and groundwater-level information would not necessarily produce a more reliable result.

4. *The TWG's initial calculations produce 14,300 AFY.*

The TWG used two independent polygon approaches with the change in storage method as cross-checks. Approach 1 used an extended 85-polygon method based largely on the IWVGA's 77-polygon configuration, adding 8 polygons to improve Basin coverage. Approach 2 included 81 polygons, reflecting a complete redesign of the polygons based upon the TWG's evaluation of

available water-level data and identification of key wells. (Ex. 3 at pp. 12–15, 19–20, §§ 3.1.1, 3.2.2.) The two TWG approaches produced similar average safe yield results:

- Approach 1, Brown & Caldwell specific yield: 16,200 AFY.
- Approach 1, Ramboll 2024 specific yield: 15,800 AFY.
- Approach 2, Brown & Caldwell specific yield: 17,000 AFY.
- Approach 2, Ramboll 2024 specific yield: 14,300 AFY.

(Ex. 3 at pp. 25–29, §§ 4.1, 4.2; 3 RT 542:3–546:22, 547:17–549:25, 550:15–554:21, 698:15–16; 7 RT 1441:7–1442:7; Exs. 373, 374A.) The TWG selected 14,300 AFY as its initial assessment. (Ex. 3 at pp. 29–30, §§ 4.3, 5.0.)

5. *Mr. Teasdale's transparent calculations produce 15,400 AFY.*

Mr. Teasdale's analysis can be followed step-by-step. He calculated spring-to-spring groundwater-level change for each year within the base period. (7 RT 1423:17–1424:3; Dem. Ex. 607 at p. 28.) He multiplied the groundwater-level change by specific yield for each polygon and then by polygon area to calculate annual storage change. (7 RT 1424:4–1425:5; Dem. Ex. 607 at pp. 29–33.) He combined that result with the 2014–2023 pumping data described by Ms. Wicks. (7 RT 1425:6–13; Dem. Ex. 607 at p. 34.) He also included groundwater uptake/ET as a removal from the system. (7 RT 1425:14–22; Ex. 85 at pp. 20–21, 44–49; Dem. Ex. 607 at p. 35.) The resulting range was 15,100 to 15,700 AFY for his preferred Ramboll 2025 specific yield analyses, with a mean of 15,400 AFY. (7 RT 1425:23–1426:3; Ex. 85 at p. 54; Dem. Ex. 607 at p. 37.)

Mr. Teasdale did not merely repeat the earlier TWG Safe Yield Paper. His expert analysis incorporated four important improvements: finalized Ramboll 2025 specific yield values; a substantially expanded network of approximately 150 wells; site-specific North Brown Road testing; and pressure transducer data from Meadowbrook wells beginning around 2018. (6 RT 1364:3–1365:6, 1368:13–1369:6; 7 RT 1415:10–1419:13, 1432:8–1433:8; Ex. 591; *see also* 3 RT 701:24–702:11.) Those additions directly addressed uncertainty identified in the earlier TWG work.

He also used two different polygon approaches as independent cross-checks. Approach 1 refined the extended 85-polygon configuration, itself based on the IWVGA's configuration but expanded for better Basin coverage. It used the expanded well network and spatial interpolation to construct annual groundwater surfaces. Approach 2 used a separately designed 81-polygon configuration and one representative well per polygon, more closely resembling the approach used in the TWG paper. (6 RT 1365:20–1370:25; 7 RT 1419:14–22, 1439:7–1443:26, 1534:5–1535:1; Ex. 85 at pp. 22–23, 25–26, 28, 50–55; Exs. 511, 519; Dem. Ex. 607 at pp. 6, 14, 27–35, 37.)

The results were internally consistent:

- Approach 1, Brown & Caldwell specific yield: 14,900 AFY.
- Approach 1, Ramboll 2025 specific yield: 15,700 AFY.
- Approach 2, Brown & Caldwell specific yield: 14,200 AFY.
- Approach 2, Ramboll 2025 specific yield: 15,100 AFY.

(7 RT 1439:7–1443:26; Ex. 85 at pp. 50–55; Exs. 529, 531; Dem. Ex. 607 at pp. 60–61.) Mr. Teasdale selected 15,400 AFY—the average of the two Ramboll 2025 results—as his opinion. (Ex. 85 at pp. 54–55; 7 RT 1425:23–1426:3; Dem. Ex. 607 at pp. 60–61.) The two polygon configurations, different water-level treatments, and two independent specific yield datasets all remained within a relatively narrow range. The stability of that range is evidence of robustness.

6. *The specific yield evidence supports the TWG and exposes the 2020 DRI values as outliers.*

Specific yield converts a measured decline or rise in groundwater level into a volume of water released from or added to storage. Ms. Wicks illustrated the calculation: a five-foot change across one acre represents five acre-feet ("AF") of aquifer volume, but only the fraction represented by specific yield is drainable groundwater. At a specific yield of 0.10, the storage change is 0.5 AF. (3 RT 656:1–657:10; *see also* 1 RT 25:19–26:13, 100:1–12.) Because Basin groundwater levels generally declined during the base period, using an unreasonably high specific yield exaggerates storage loss and produces an artificially low safe yield; using an

unreasonably low specific yield would have the opposite effect. (1 RT 26:14–27:7, 100:13–101:5; 3 RT 558:22–26; 7 RT 1417:25–1419:13.)

Specific yield values vary throughout the Basin depending on the types of materials. (*See* 1 RT 92:21–93:8; 3 RT 530:14–531:16; 6 RT 1225:22–1226:15.) The TWG did not select a single convenient value. It tested multiple datasets derived from Basin lithology, field investigations, geologic logs, and model interpretation. (*See* 1 RT 93:9–94:14; 3 RT 542:3–544:4, 546:2–22, 589:9–590:2; 4 RT 744:21–26; 7 RT 1414:2–1419:13, 1429:3–1430:1, 1467:8–1468:11; Dem. Ex. 607 at p. 51.)

Table 2. Specific Yield Evidence Used to Test the Change in Storage Results

Source	Range	Scientific Basis / Significance	Record
Kunkel & Chase (1969)	0.09–0.13	Values assigned to geologic material groups based on intensive California field investigations. Dr. Kincaid acknowledged that foundation.	9 RT 1900:20–1901:6; Ex. 611/1002/1232 at pp. 84–85; *see also* Ex. 4 at p. 31; Dem. Ex. 607 at p. 54
Brown & Caldwell (2009)	0.06–0.17	Derived spatially variable specific yield values from Basin geologic logs, prior studies, Kunkel & Chase (1969) data, depositional environment, local groundwater flow conditions, calibration, and literature ranges corresponding to identified materials. Mr. Teasdale testified that the values fit the Basin's average lithologies. Dr. Kincaid agreed it is an accepted source.	7 RT 1410:2–1413:4, 1431:22–1432:12, 1433:9–23; 9 RT 1882:14–17; Ex. 67 at p. 29; Exs. 520, 521; Dem. Ex. 607 at pp. 52–55
Ramboll (2024)	0.05–0.20	Updated the Brown & Caldwell (2009) framework using AEM (aerial electromagnetic) survey and other modern hydrogeologic data to refine spatial lithology.	7 RT 1414:2–1415:9; Ex. 3 at pp. 20–24; Exs. 520, 521; Dem. Ex. 607 at pp. 54–55
Ramboll (2025)	0.08–0.11	Calibrated values centered within the "plausible range" of 0.05 to 0.15 for the Basin's mixed sediments. Dr. Bedekar testified those values and the specific storage values were physically reasonable.	6 RT 1194:15–1196:2; 7 RT 1415:10–19, 1431:22–1432:12, 1433:9–23; Ex. 97 at pp. 63–65
Teasdale's North Brown Road / Meadowbrook field analysis	0.15–0.20	Paired well and high-frequency water-level evidence in productive sand and gravel materials.	7 RT 1416:3–1419:13, 1432:13–1433:8; Ex. 85 at pp. 40–44
DRI (2020)	Mostly ≈0.21	Outlier values corresponding to an implausibly sand-dominated Basin; materially reduced in DRI's 2025 model.	7 RT 1434:20–1435:6, 1435:19–1436:24, 1437:11–1438:11; 10 RT 2147:18–2150:8; Ex. 3 at pp. 22–23; Ex. 4 at pp. 29–31; Ex. 990 at p. 37; Ex. 538; Dem. Ex. 607 at pp. 54–55

Source	Range	Scientific Basis / Significance	Record
DRI (2025)	Materially reduced	The revised distribution moved substantially toward the lithology-based datasets used by the TWG while aggregate recharge remained fixed at 7,650 AFY.	10 RT 2147:18–2150:8; Ex. 24 at p. 76

Mr. Teasdale performed site-specific work in the North Brown Road/Meadowbrook area. The highly productive wells and observed sand and gravel materials supported higher local specific yield. His paired-well analysis indicated a specific yield of approximately 0.15 to 0.20. (7 RT 1416:3–1419:13, 1432:13–1433:8; Ex. 85 at pp. 40–44.) Dr. McKenna confirmed that Mr. Teasdale's measured 0.20 was within the accepted range for sands and gravels and was "on the low side a little bit" for those materials. (9 RT 2041:4–15.) He further acknowledged that the field value exceeded the lower Ramboll model value at that location. (9 RT 2041:16–2042:1.)

The opposition's criticism that no TWG expert measured specific yield in every polygon proves nothing. Ms. Wicks conceded, as any candid expert would, that she did not personally measure specific yield, run aquifer tests, or conduct multi-well pumping tests in every polygon and that no one has a complete understanding of specific yield everywhere in the Basin. (4 RT 745:1–746:3.) But she also explained why that is not disqualifying: specific yield is based on lithologic interpretation, literature values, and model-derived values; reasonable ranges are typically found in academic literature, and different values within a range can be defensible depending on the material interpretation. (4 RT 746:17–747:18.) Even direct field measurements have assumptions because point measurements may not represent lithology ten feet away. (4 RT 747:20–26.) The law and science do not require a field-measured specific yield at every point in the Basin; they require a reasonable, supported estimate. The TWG provided that estimate.

In the 2020 DRI Model, the bulk of the Basin was assigned a specific yield of approximately 0.225, effectively depicting a Basin dominated by highly drainable sand and gravel, with values grading downward only in a more limited area. Those values are inconsistent with actual Basin lithology. (Ex. 3 at pp. 22–23; Ex. 538; Ex. 990 at p. 37, fig. 22; 7 RT 1434:20–1435:6, 1435:19–1436:24, 1437:11–1438:11; 10 RT 2147:18–2150:8; Dem. Ex. 607 at pp. 54–55.) These unreasonably high specific yield values were forced into the 2020 DRI Model

to calibrate to the erroneously low, pre-determined 7,650 AFY recharge value. (1 RT 132:14–133:17, 134:2–5; Ex. 3 at p. 23, fig. 6; Ex. 4 at pp. 29–31.) The figure below illustrates the extreme divergence presented by "calibration byproduct" specific yield values.

Figure 1. Specific Yield by Thiessen Polygon — Extended 85-Polygon Approach

Source: Ex. 3 at p. 23, fig. 6; Ex. 538; Dem. Ex. 607 at p. 54

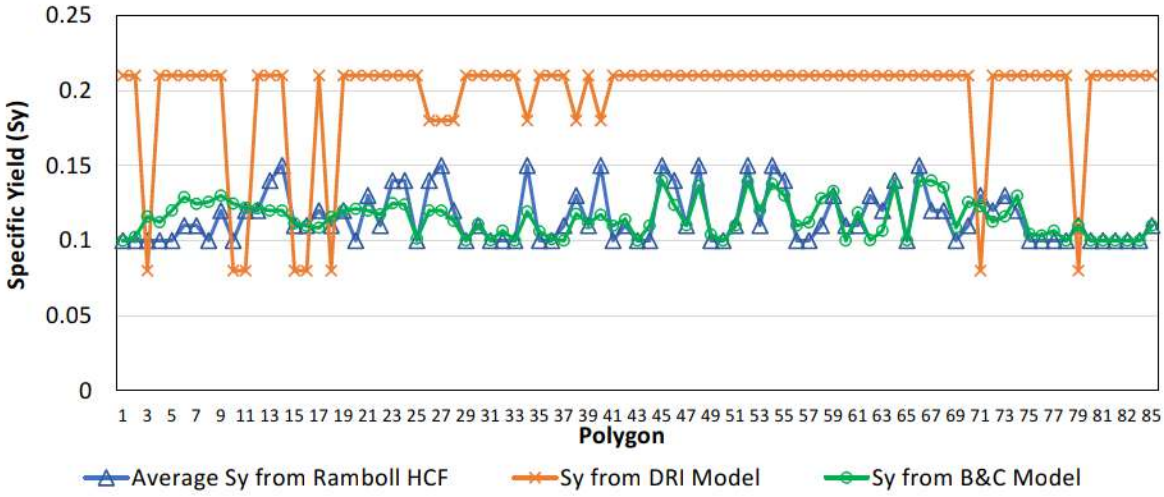


Figure 6. Specific Yield (Sy) by Thiessen Polygon (Extended 85 Polygons)

The DRI 2025 Model tacitly concedes the erroneous DRI 2020 specific yield values, as the DRI 2025 Model significantly revised those values, reducing them to a range much closer to the various datasets used by the TWG. Dr. McKenna agreed that the 2025 distribution was "quite a bit different," that the values had "come down quite a bit on average," and that more than half of Layer 1 is now represented with specific yield values below 0.15. (10 RT 2147:18–2150:8; Ex. 24 at p. 76, fig. 5-9.) The DRI 2025 revised specific yield values are far closer to the specific yield ranges employed by the TWG than to the earlier DRI 2020 values. Mr. Teasdale testified that Brown & Caldwell, Kunkel & Chase, Ramboll 2024, Ramboll 2025, and even DRI's revised 2025 values generally aligned in a range materially different from DRI 2020. (7 RT 1467:8–23.)

The cross-dataset agreement is important. Mr. Teasdale compared the average Brown & Caldwell and Ramboll 2025 values polygon-by-polygon and found similar patterns and magnitudes, as shown in the two figures below. That agreement gave him confidence that both datasets were in the proper hydrogeologic range. (7 RT 1433:12–23.)

Figure 2. Specific Yield by Thiessen Polygon — Teasdale Refined 85-Polygon Approach

Source: Ex. 85 at p. 39, fig. 2-11; Ex. 520; Dem. Ex. 607 at p. 52

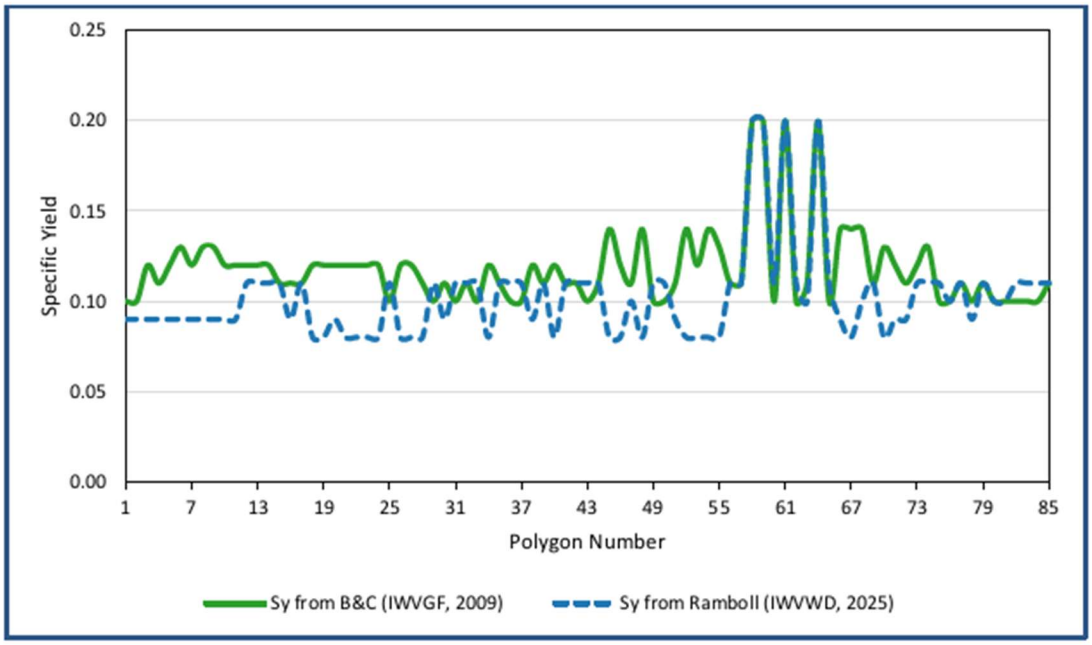


Figure 2-11. Specific Yield by Thiessen Polygon (Approach #1: Extended 85 Polygons)

Figure 3. Specific Yield by Thiessen Polygon — Teasdale Redesigned 81-Polygon Approach

Source: Ex. 85 at p. 40, fig. 2-12; Ex. 521; Dem. Ex. 607 at p. 53

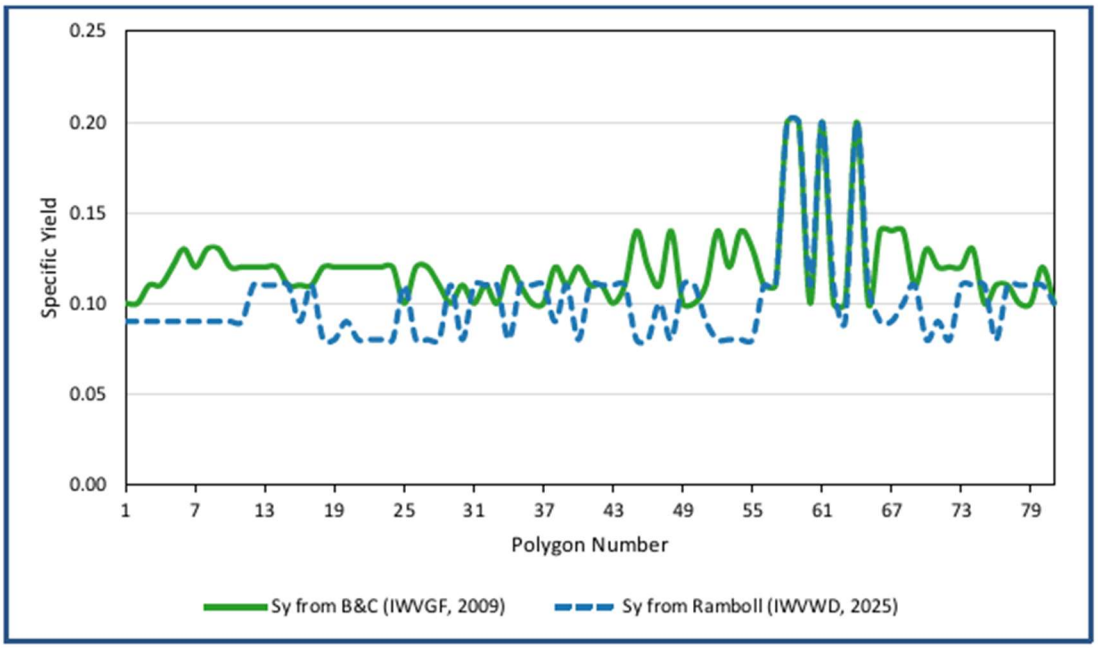


Figure 2-12. Specific Yield by Thiessen Polygon (Approach #2: Redesigned 81 Polygons)

The TWG tested the specific yield datasets it used to estimate safe yield and converged on a range.

Table 3. TWG Safe Yield Comparisons with Specific Yield Datasets

Source	Polygon Configuration	Base Period	Specific Yield Dataset	Safe Yield (AFY)
TWG Approach #1 (Ex. 3 at pp. 25–27)	85 Polygons	2014–2023	Brown & Caldwell (2009)	16,200
TWG Approach #1 (Ex. 3 at pp. 25–27)	85 Polygons	2014–2023	Ramboll (2024)	15,800
TWG Approach #2 (Ex. 3 at pp. 27–29)	81 Polygons	2014–2023	Brown & Caldwell (2009)	17,000
TWG Approach #2 (Ex. 3 at pp. 27–29)	81 Polygons	2014–2023	Ramboll (2024)	14,300
TWG Kunkel & Chase (Ex. 4 at p. 31)			Kunkel & Chase (1969)	15,304–18,527
Teasdale Approach #1 (Ex. 85 at pp. 50–52)	85 Polygons (refined ET)	2014–2023	Brown & Caldwell (2009) MBD-Specific Analysis	14,900
Teasdale Approach #1 (Ex. 85 at pp. 50–52)	85 Polygons (refined ET)	2014–2023	Ramboll (2025) MBD-Specific Analysis	15,700
Teasdale Approach #2 (Ex. 85 at pp. 52–54)	Redesigned 81 Polygons (refined ET)	2014–2023	Brown & Caldwell (2009) MBD-Specific Analysis	14,200
Teasdale Approach #2 (Ex. 85 at pp. 52–54)	Redesigned 81 Polygons (refined ET)	2014–2023	Ramboll (2025) MBD-Specific Analysis	15,100
IWVGA 2024 Annual Report (6 RT 1383:15–1385:12, 1388:7–1389:4; 7 RT 1405:17–1409:17; Ex. 949 at pp. 35–37; Dem. Ex. 607 at p. 11)	41 Polygons 77 Polygons	2015–2023	DRI (2020)	10,500
IWVGA Annual Report with Revised Specific Yield (6 RT 1383:15–1385:12, 1388:7–1389:4; 7 RT 1405:17–1409:17; Dem. Ex. 607 at p. 12)	41 Polygons 77 Polygons	2015–2023	Ramboll (2025)	14,800

The IWVGA annual report cross-check isolates the specific yield variable. Mr. Teasdale retained the IWVGA's polygon method and underlying data and changed only the specific yield values—from the 2020 DRI values used in the reports to Ramboll 2025 values. The result increased safe yield from approximately 10,500 to approximately 14,800 AFY, corroborating the TWG's range. (6 RT 1383:15–1385:12, 1388:7–1389:4; 7 RT 1405:17–1409:17.) That is not a wholesale substitution of the TWG method for the IWVGA's method. It is a controlled test demonstrating that the anomalous 2020 DRI storage values materially depressed the IWVGA's calculation.

Timothy Parker conducted a similar cross-check. He retained TWG approach 2, with 81 polygons and underlying data, and changed only the specific yield values. He applied the average specific yield value from Brown & Caldwell (2009), DRI's 2016 model, the 2020 DRI Model, the 2025 Ramboll Model, and the 2025 DRI Model, among others. The results show that a higher specific yield value results in a lower safe yield, with the safe yield values ranging from 13,000 to 18,000 AFY. (3 RT 557:24–559:17, 560:19–561:7; *see* Dem. Ex. 375.)

C. Dr. Tonkin's Independent Water Budget Analysis Produces Approximately 14,375 AFY.

Dr. Tonkin[5] did not accept any predetermined safe yield number and then calibrate toward it. He reviewed the historical literature, reproduced and evaluated the statewide BCM, independently quantified major inflow components, and compared the results with observed data. (4 RT 791:8–10, 819:13–820:4, 833:13–836:12, 837:17–838:15; Exs. 421A, 422A; Dem. Ex. 410.)

1. *The BCM is the most reliable modeling method because it reflects actual Basin response.*

For mountain-front recharge, Dr. Tonkin used the statewide BCM, a physically based land-surface model developed by specialists at the USGS for California and recommended by DWR. (2 RT 463:5–11, 464:25–465:3; 4 RT 819:24–820:4, 826:3–18, 914:20–915:9; Ex. 123 at

[5] Dr. Tonkin works regularly with DWR. (4 RT 765:11–15, 766:19–767:6, 768:16–23; Ex. 401 at p. 3.)

p. 31; *see* Ex. 242 at pp. 1, 3, 15.) The BCM estimates recharge, runoff, and ET using topography data, watershed characteristics, and climate inputs, including precipitation and air temperature, with its main input being PRISM data. (2 RT 463:5–22, 466:21–467:4; 4 RT 773:17–26, 817:16–818:2, 824:20–825:5, 826:23–828:14, 829:9–13, 831:6–12; 5 RT 1128:1–1129:18; Ex. 123 at p. 31; *see* Ex. 242 at pp. 15, 19, 25.)

The BCM provides a transparent, testable framework for estimating recharge that can be evaluated against observed basin responses. Indeed, Dr. Tonkin re-ran the model from 1896 forward, reproduced its recharge calculations to confirm the accuracy of its outputs, confirmed the outputs used by Ramboll, and compared BCM runoff predictions with three Sierra Nevada stream gauges to ensure BCM outputs reflected observed Basin behavior. (4 RT 773:5–7, 777:10–778:14, 833:13–836:12, 837:17–838:15, 839:5–21, 915:4–9, 931:5–7; Exs. 421A, 422A.) The BCM produced approximately 9,200 AFY of mountain-front recharge for Indian Wells Valley. (4 RT 804:10–13, 874:3–9, 930:11–931:4.)

Dr. Tonkin's corrected Anderson and Epstein calculations further validate the scale of the BCM result. Corrected Anderson yielded approximately 7,500 AFY and corrected Epstein yielded approximately 15,300 AFY for mountain-front recharge, bracketing the BCM's approximately 9,200 AFY. (4 RT 872:14–874:24, 917:12–18; *see* Exs. 438A, 439A; *see*, *infra*, § VI.B.2.) Dr. Tonkin's recalculations of Anderson and Epstein do not make those methods independent evidence of Basin recharge; as described below, those methods are not applicable to the Indian Wells Valley. Their significance is narrower: when the methodologies invoked to support McGraw's recharge estimate are applied consistently and corrected for acknowledged errors, they do not support the low recharge values carried forward from McGraw. (4 RT 845:18–846:24, 870:21–871:8, 873:19–874:9, 875:3–18.)

2. *Dr. Tonkin included Rose Valley underflow and anthropogenic recharge.*

Dr. Tonkin then included Rose Valley underflow, as did the IWVGA/United States, and also included incidental recharge sources that were omitted from the IWVGA/United States total. His resulting total inflow was approximately 14,375 AFY, which he rounded in testimony to 14,400 AFY. (4 RT 788:4–16, 792:1–801:14, 805:4–18, 831:13–833:1, 840:22–842:17, 908:13–

909:12, 916:21–919:1; Ex. 123 at pp. 37–39; Dem. Exs. 410, 423, 451.) Deducting for ET produced approximately 12,300 AFY. (4 RT 918:13–919:1; Ex. 123 at pp. 37–39.) Both figures materially exceed 7,650 AFY.

3. *The 1980–2023 base period is representative.*

Using a different base period than the TWG, Dr. Tonkin reached a result within the range of the other TWG work, including Mr. Teasdale's analyses. Dr. Tonkin used a forty-plus-year base period of 1980–2023. (4 RT 930:11–19, 936:20–937:4; Ex. 123 at pp. 37–38.) The convergence of Dr. Tonkin's safe yield estimate with the TWG's multiple safe yield estimates shows that, when a base period reflects a balance of wet and dry conditions, similar results are obtained.

D. Multiple Independent Methods—Historical Literature, Annual Reports, Change in Storage Analyses, Dr. Tonkin's Analysis Using the Physically Based BCM, Corrected Anderson and Epstein Analyses, and the Ramboll Groundwater Flow Model—Separately Corroborate the TWG Range.

The TWG began by reviewing more than two dozen historical investigations. Those studies reported total recharge estimates ranging roughly from 6,600 to 22,000 AFY. (1 RT 51:23–53:10, 54:6–18; 3 RT 534:7–14, 635:22–637:3; Ex. 4 at pp. 10–17; Exs. 208, 546.) Many studies included sources beyond the Basin's main source of recharge (*i.e.*, mountain-front recharge)—Rose Valley underflow, Los Angeles Aqueduct leakage, distribution system leakage, irrigation return flows, and wastewater-related recharge. (Ex. 4 at pp. 8–9, 10–17; Exs. 208, 546; 1 RT 53:13–55:18; 3 RT 636:23–638:16; 4 RT 791:8–801:14, 908:13–909:2; Dem. Ex. 410.) The variability in the literature supports the decision to measure Basin response rather than elevating a single historical estimate without independent validation.

The IWVGA's own annual reports supply another independent check, as shown in Table 3 above. Using the TWG change in storage method, combined with the IWVGA's polygon configuration and 2020 DRI specific yield, the average result was approximately 10,500 AFY—already materially above 7,650. (6 RT 1383:15–1385:12; 7 RT 1406:19–1408:5, 1408:25–

1409:4; Dem. Ex. 607 at p. 11.) Correcting only for specific yield—with Ramboll 2025 values—produced 14,800 AFY. (6 RT 1388:7–1389:4; 7 RT 1409:7–17; Dem. Ex. 607 at p. 12.)

The TWG's change in storage analyses were independently conducted by three different experts using different polygon configurations, different groundwater-level datasets and well networks, different spatial interpolation approaches, and multiple independent specific yield datasets. The results consistently converged within a relatively narrow range of approximately 14,200 to 17,000 AFY. (*See* 3 RT 542:3–546:22, 547:17–549:25, 550:15–554:21, 698:15–19, 701:10–702:11; 6 RT 1365:20–1369:15; 7 RT 1425:23–1426:3, 1439:7–1440:25, 1441:7–1443:26; Ex. 3 at pp. 25–30, §§ 4.1–4.3, 5.0; Ex. 85 at pp. 13, 22–23, 25–26, 28, 33–40, 52–55; Exs. 373, 374A, 511, 519, 529, 531; Dem. Ex. 607 at pp. 60–61; *see also* 6 RT 1383:15–1385:12, 1388:7–1389:4; 7 RT 1406:19–1408:5, 1408:25–1409:17; Dem. Ex. 607 at pp. 11–12.)

Dr. Tonkin approached the question through an independent water budget. He reproduced and evaluated the statewide BCM, quantified mountain-front recharge at approximately 9,200 AFY, and added Rose Valley underflow and incidental recharge to reach approximately 14,375 AFY. (4 RT 777:10–778:14, 788:4–16, 792:1–801:14, 805:4–18, 819:13–820:4, 831:13–833:1, 833:13–836:12, 837:17–838:15, 839:5–21, 840:22–842:17, 874:3–9, 908:13–909:12, 915:4–9, 916:21–919:1, 930:11–931:7; Ex. 123 at pp. 31, 37–39; Exs. 421A, 422A; Dem. Exs. 410, 423, 451.) His work did not depend on the TWG's polygon configurations or specific yield calculations, was conducted entirely independent of the TWG analyses, and used different methods, yet Dr. Tonkin reached essentially the same result.

The 2025 Ramboll model supplies a final corroborating line of evidence. It uses time-varying, physically based inflows, modern Basin geometry, and physically reasonable storage properties. It does not establish the TWG number by itself, but its ability to reproduce observed conditions using independently quantified inflows supports the conclusion that current recharge and safe yield are materially higher than 7,650 AFY. Modeling evidence is addressed further below. (*See*, *infra*, § VIII.)

E. Safe Yield Should Be Determined Based on Total Recharge, Without a Premature Deduction for Evapotranspiration.

The Court should assess safe yield based on total recharge, without assigning a quantity to discharge to ET at this time. Assigning a quantity to ET discharge is akin to allocating a portion of the safe yield to a water-right claimant. That would be premature. This phase of the case defines the size of the pie; allocations will be determined later.

In that regard, whether some portion of natural discharge ultimately should be preserved is a distinct management question that depends on whether maintaining that discharge serves an identified basin benefit and, if so, the amount of discharge that must actually be maintained.

Dr. Tonkin's testimony illustrates the sequencing. His opinion is that maximum safe yield corresponds to "total inflows, or . . . recharge," and he therefore identified 14,400 AFY as the Basin's maximum safe yield. (4 RT 918:8–26.) Although he also calculated a lower 12,300 AFY alternative after deducting ET, he explained that the deduction would become appropriate only "down the road if it became important that ET processes be maintained because that provides a benefit to the basin." (4 RT 810:3–8.)

Dr. Kincaid's testimony confirms the distinction between the Basin's hydrologic yield and subsequent management of that yield. He agreed that, if a basin receives 10,000 AFY of recharge and no independent need exists to preserve discharge to ET, a pumping program capable of capturing that recharge would make the 10,000 AFY the basin's safe yield. (8 RT 1800:7–1801:1.) And when discussing Kunkel & Chase, Dr. Kincaid expressly characterized the ability to capture natural discharge through the configuration of wells as a "technological" and "planning" issue, agreeing that wells could be relocated to capture more water otherwise lost to ET. (9 RT 1875:9–22.) He further agreed that designing pumping regimes to intercept ET is a common groundwater management practice, that groundwater models are particularly well suited to that task, and that he had no reason to believe a pumping network could not be designed in Indian Wells Valley to intercept a very large portion of existing ET. (9 RT 1878:2–1879:5.)

Dr. Tonkin identified an additional and more fundamental uncertainty: existing information does not establish whether observed ET is supplied by the regional aquifer—as opposed to local recharge, runoff, or other shallow sources—and thus does not establish whether observed ET represents an equivalent loss from the regional aquifer at all. (4 RT 807:8–24, 811:20–25.) As he put it, he did not believe "anyone fully understands" whether the observed ET comes from the regional aquifer or from locally sourced water. (4 RT 920:7–921:4.)

Mr. Teasdale's testimony reinforces that uncertainty. He explained that, based on the Basin's lithology, he could not understand how groundwater from the deeper system could migrate upward through playa clays that in places are 500 to 600 feet thick to satisfy ET demand. He therefore concluded that, apart from precipitation and runoff, ET demand would have to be supplied from the shallow groundwater system. Nevertheless, his safe yield analysis conservatively assumed a hydraulic connection between that shallow system and the deeper regional aquifer. (7 RT 1420:5–1422:8; Dem. Ex. 607 at p. 15.)

That testimony is also consistent with the historical hydrogeologic record. Dr. Kincaid recounted that Kunkel & Chase (1969) reported that upward movement from the main water body to the shallow water body is "very slow" because the two are separated by several tens of feet of poorly permeable clay and silt. (9 RT 1879:7–16.) He further confirmed that Kunkel & Chase described the shallow water body as "semi-perched and partially separated from the main water body." (9 RT 1880:19–1881:11.) Although he himself preferred the term "semiconfined" and did not endorse the historical "semi-perched" terminology, the evidence confirms substantial hydraulic resistance between the deeper and shallow systems. (9 RT 1880:10–18.)

For all these reasons, the approach should follow the sequencing envisioned by the phased adjudication approach. The Court should first determine the Basin's safe yield from the evidence of total recharge. If future basin management requires preservation of some quantity of natural discharge—for water quality protection, ecological purposes, or another demonstrated basin need—the appropriate quantity can then be identified and incorporated into the pumping

regime.[6] Reducing safe yield now by an assumed ET amount would instead convert an unresolved future management question into an unsupported reduction of the Basin's hydrogeologic yield.

V. THE 7,650 AFY PROPOSAL FAILS BECAUSE IT IS A CARRIED-FORWARD CONSTRAINT, NOT AN INDEPENDENT SAFE YIELD DETERMINATION.

A. The Record Establishes an Unbroken Lineage from the Unavailable 2016 2-D Model Calibration to Every Later 7,650 AFY Source, Regardless of Changes to the Models or the Climate.

The most important evidence concerning 7,650 AFY is its provenance. The number did not emerge independently from the 2020 GSP model, the 2025 DRI model, the annual reports, the United States' expert work, or the 2026 Technical Report. It was inherited from 2016.

Table 4. The Record Shows Repetition of 7,650 AFY, Not Independent Validation

Stage	Treatment of 7,650 AFY	Why It Is Not Independent Confirmation	Record
2016 DRI / McGraw 2-D work	Recharge adjusted to 7,650 AFY until a simplified model best matched sparse 1920–1921 water levels.	The model is unavailable; assumptions, parameters, sensitivity, and transferability cannot be tested.	2 RT 413:13–414:3; 3 RT 699:20–701:6; 4 RT 778:15–779:14, 786:17–787:2, 787:20–788:3, 797:7–798:3, 821:21–26, 847:13–26, 849:19–850:17, 852:22–853:7, 875:21–876:6, 884:7–14, 909:23–910:22; 8 RT 1706:23–26; 9 RT 1910:17–1912:16; 10 RT 2103:9–17, 2103:25–2104:5, 2138:10–14, 2142:9–2144:5, 2156:22–2157:8; Ex. 426A
Later DRI 3-D work between 2016 and 2020	The aggregate recharge value of 7,650 AFY was transferred into a materially different model and held fixed while other parameters were calibrated.	Calibration around a fixed target cannot prove the target itself.	3 RT 699:20–701:6; 9 RT 1914:10–23
2020 DRI model for the GSP	7,650 AFY was supplied as an input, not generated as a model output.	The model began with the disputed value.	2 RT 358:17–23; 9 RT 1914:5–23, 1915:7–9; 10 RT 2103:22–24, 2104:6–16; Ex. 24 at pp. 65–66; Ex. 955 at pp. 31, 43, 49–50

[6] Consistent with this approach, the parties stipulated that issues concerning whether particular groundwater dependent ecosystems or public trust resources should receive localized protection is reserved for later phases. (Third Amended Case Management Order re Phase 2 Trial [ROA 1967], May 20, 2026, pp. 7–8; 9 RT 1876:16–1878:17.)

Stage	Treatment of 7,650 AFY	Why It Is Not Independent Confirmation	Record
IWVGA annual reports	The reports tracked progress and storage change but did not reassess 7,650 AFY.	Continued reporting adds no new derivation.	2 RT 390:12–391:7
2025 DRI model	The modeling group retained 7,650 AFY and adjusted the spatial distribution.	The aggregate constraint is maintained despite major changes to model geometry and storage properties.	2 RT 359:2–4, 379:3–22, 398:17–24; 9 RT 1914:5–23, 1915:10–12; 10 RT 2103:22–24, 2104:6–16; Ex. 24 at pp. 65–66
2026 Technical Report	The report repeated the GSP / DRI foundation and 7,650 AFY input.	Repackaging the same assumption does not supply a new analytical foundation.	Ex. 955 at pp. 20–21, 31, 43, 49–50

Ms. Moran's testimony established the chain. She agreed that the GSP used 7,650 AFY, that the value was an input to the 2020 DRI model, that essentially the same aggregate recharge value appeared in the 2016 DRI model, and that the 2025 DRI model again used 7,650 AFY—all despite significant changes to the models. (2 RT 358:6–361:2, 376:22–24, 377:5–378:3; *see* 4 RT 800:4–17, 803:6–24, 909:22–910:14, 911:9–912:26; 10 RT 2103:22–24, 2105:3–10, 2106:13–24, 2110:6–16, 2127:21–2128:16, 2147:18–2150:8, 2156:16–20; Dem. Ex. 248.) She acknowledged that the same 7,650 AFY value first determined in the earlier DRI work was ultimately used as an input to the 2025 model. (2 RT 360:3–361:2, 379:6–22.) Tellingly, according to Ms. Moran, the total recharge of 7,650 AFY will never change, because, in her view, the average over a balanced hydrologic period will always be 7,650 AFY. (2 RT 391:8–392:13.)

The 2025 DRI report says the same thing. It states that the total steady-state recharge rate "was maintained at 7,650 AFY" as previously developed in the earlier DRI work; that the "2020 GSP Model used a constant 7,650 AFY recharge from 1920 to 2016"; and that observed average precipitation was fit to a recharge distribution such that the long-term average would equal 7,650 AFY. (Ex. 24 at pp. 65–66.) The report therefore describes a retained target. It does not describe an independent estimation process that happened to reproduce the same answer.

Ms. Moran confirmed that the 2025 model update did not use the local BCM recharge estimates. The modelers instead "decided to continue with the 7,650 and adjust the distribution of the recharge." (2 RT 398:17–399:6.) Changing the spatial or temporal distribution while requiring the average to remain 7,650 AFY cannot validate that average. It assumes it.

The annual reports likewise do not reassess the number. Ms. Moran explained that annual reports are progress reports and "would not address the 7,650 [AFY]." When asked whether they changed the figure, she answered that doing so was not the purpose of an annual report. (2 RT 390:12–391:7.) Repetition in annual reporting therefore adds no independent foundation.

The 7,650 AFY recharge value has remained constant for the IWVGA and United States since 2016, regardless of changing weather conditions, including the trend in the last 20–30 years of flashier weather patterns common to mountain-front basins. They are defined by periods of drought punctuated by extremely wet years. Because 7,650 AFY was carried forward artificially, it provides no scientific basis for the Basin's safe yield or future planning.

B. The Unavailable Two-Dimensional Model Prevents Reproduction and Testing of the Decisive Analytical Step to 7,650 AFY.

Ms. Wicks explained how the 7,650 AFY number originated. DRI first applied regional empirical recharge methods—McGraw's application of Anderson and Epstein—and then used a simplified 2-D model to adjust recharge until simulated groundwater levels matched sparse observations from 1920 and 1921. The model assumed uniform thickness and aquifer parameters drawn from Dutcher and Moyle's 1973 work. The value producing the preferred fit was 7,650 AFY. (3 RT 699:20–700:14.)

That 2-D model is not the later 3-D GSP model. DRI transferred the recharge value from one model structure (the 2016 2-D model) into another model structure (the 2016 3-D model) with different geometry, layering, parameters, and calibration choices. In the 3-D model, DRI held aggregate recharge constant and adjusted aquifer properties instead. (3 RT 700:15–701:6.) The original 2-D model files were neither produced in discovery nor available at trial to the TWG experts. Its equations, parameterization, objective function, residuals, sensitivity, and non-uniqueness cannot be independently evaluated.

Dr. McKenna confirmed that the 2016 2-D model developed 7,650 AFY, that DRI no longer possessed the model files, and that he did not use or run the model. He nevertheless acknowledged that 7,650 AFY was used as recharge in both the 2020 and 2025 DRI models. (10 RT 2103:9–2104:16, 2138:10–14, 2139:12–16, 2142:9–2144:5; *see also* 4 RT 909:22–910:22.) The later modelers thus accepted the output of an unavailable analytical step and treated it as a fixed input.

Stephen Johnson's testimony underscores the problem. Mr. Johnson is Stetson's chief executive and was the IWVGA Water Resources Manager responsible for the GSP, but he did not determine or develop 7,650 AFY. (2 RT 401:6–8, 401:16–402:6, 402:15–403:2, 408:17–409:20.) He did not independently verify the methodology underlying the earlier 2-D model; when asked whether he had reviewed that model, he clarified that he reviewed the GSP, not the model itself. He also did not recall personally requesting the 2-D model. (2 RT 413:13–414:3.) Stetson also did not possess the 2020 DRI model it relied upon and, therefore, never provided it to DWR. (2 RT 430:2–25.)

Ms. Moran's role was similarly limited. The Court expressly understood that she was presenting background concerning the process by which the IWVGA reached its conclusion, not independent testimony establishing what safe yield should be. (2 RT 259:11–260:5.) Ms. Moran had DRI documentation and output files, but she did not possess the code used to build and run the 2020 DRI model. (2 RT 266:10–267:4, 357:24–358:5, 403:20–24.) Her testimony established the process and lineage of the assumption, not its physical correctness.

Under Evidence Code sections 801 and 802, an expert must identify a reliable analytical bridge from source material to opinion. *Sargon* requires the Court to exclude or discount reasoning that is speculative or not grounded in the matter relied upon. (*Sargon*, *supra*, 55 Cal.4th at pp. 769–772.) Here, the decisive bridge—the 2-D calibration in 2016 that reduced the empirical estimates to 7,650 AFY—is missing. Later repetition cannot replace it.

C. Calibration Around a Fixed Recharge Target is Circular and Non-Unique.

Groundwater model calibration is inherently non-unique: different combinations of recharge, hydraulic conductivity, storage properties, boundary conditions, and other parameters may reproduce selected observations. (Ex. 48 at p. 19; Ex. 80 at p. 15; 4 RT 926:7–18; 9 RT 1897:25–1900:19; 10 RT 2163:22–2164:1; *see also* 9 RT 1896:19–1897:24.) The trial record showed that DRI treated total recharge as fixed while changing other sensitive parameters. That process can produce an acceptable fit even if the fixed recharge is wrong.

Specific yield supplies the clearest example. The DRI 2020 model assigned specific yield values around 0.21 over much of the Basin, materially above most lithology-based sources. (Ex. 990 at p. 37.) The DRI 2025 model substantially lowered the distribution. (Ex. 24 at p. 76.) Dr. McKenna admitted the values changed "quite a bit" and came down materially on average. (10 RT 2147:18–2150:8.) Yet aggregate recharge remained exactly 7,650 AFY. If both sets of materially different storage parameters can be calibrated while recharge remains fixed, the calibration does not independently establish the correctness of that recharge value.

Dr. Bedekar identified the same issue in the 2025 DRI model's physical behavior. He testified that the model's specific storage values were too high and not physically reasonable, which is consistent with a model compensating for underestimated inflows by releasing too much water from storage. (6 RT 1196:4–12.) He further testified that the 2025 DRI model did not reproduce intermittent wet-year groundwater-level increases, that wet-year inflows are missing, and that the model should be recalibrated before scenario use. (6 RT 1215:23–1216:10.) A model that suppresses wet-year variability and relies on inflated storage parameters is not independent proof of its fixed inflow target.

The Court should therefore reject the syllogism embedded in the IWVGA/United States' position: 7,650 AFY was inserted into a model; the model calibrated after other parameters were adjusted; therefore 7,650 AFY is correct. The conclusion appears in the premise.

D. The 1920s-Era Calibration Period was Neither Reliably Predevelopment Nor Representative of Current Conditions.

Cross-examination established the historical assumptions embedded in the analysis underlying 7,650 AFY. Ms. Moran confirmed that McGraw's analysis assumed modeled "predevelopment" conditions. She also confirmed that the "pumping wells" line item in the McGraw steady-state water budget was zero. (2 RT 389:20–390:8.) In other words, the recharge analysis underlying 7,650 AFY was developed under assumed historical predevelopment conditions, not under the present pumping and cultural conditions required for a safe yield determination.

The opposition characterized the early calibration period as "predevelopment," but the evidence showed material pumping before and during the 1920s. Drs. Kincaid and McKenna acknowledged reports of approximately 1,000 to 2,000 AFY being pumped before 1920, and Dr. Kincaid conceded that pumping at that level could be "significant" for purposes of assuming steady state. (8 RT 1807:2–15; 9 RT 1912:10–20; 10 RT 2096:1–2098:10.) Kunkel & Chase discussed possible pumping during the same period in the range of 2,000 to 4,000 AFY. (Ex. 611/1002/1232 at p. 76.) And Brown & Caldwell questioned whether the 1920s period could validly be treated as steady-state predevelopment because the number and geographic distribution of wells suggested broader groundwater use at that time. (Ex. 67 at pp. 12, 73; 9 RT 1854:12–1858:21.)

This matters because the predevelopment recharge method assumes no material pumping, no change in storage, and equality between natural recharge and natural discharge. Once significant pumping has occurred, the equality no longer follows and the integrity of the method is compromised. Dr. Kincaid admitted that if the pre-pumping water budget cannot reasonably be estimated, the change in storage method may be the only available option. (8 RT 1807:2–1808:26; Ex. 80 at p. 17.)

The 1920–1926 interval was also relatively dry, as reflected in precipitation records later incorporated into basin-scale modeling analyses. Dr. McKenna's own analysis of the historical precipitation and recharge shows that the alleged "predevelopment" period was relatively dry.

(*See* Ex. 74.) Dr. Tonkin agreed and demonstrated that calibrating a recharge estimate to that interval tends to embed drought-biased conditions. (4 RT 884:17–885:10, 886:9–887:15, 895:17–896:19, 900:4–15, 903:3–908:7; Exs. 74, 443A, 444A; Dem. Exs. 452–456.)

The relevant inquiry in calculating safe yield is the assessment of current conditions, including current climate, pumping, and cultural conditions. Even a perfect estimate of average natural recharge during that historical interval would not establish current safe yield under a modern representative period that includes today's climate, pumping, return flows, wastewater, septic systems, aqueduct operations, and land use. Dr. McKenna's own analysis shows that conditions more than 100 years ago are not comparable to conditions today. (*See* 5 RT 1074:21–1075:6; 7 RT 1461:17–1462:6, 1462:13–26; 8 RT 1787:13–20, 1788:22–1789:5, 1809:1–26; Ex. 74; Ex. 80 at p. 17.)

Dr. Kincaid agrees that safe yield can change over time, *e.g.*, if natural recharge increases or decreases due to climate change. (8 RT 1787:13–20, 1788:22–1789:6.) Nevertheless, rather than evaluate safe yield under current cultural and climatic conditions, McGraw—on which Drs. Kincaid and McKenna rely—assumed modeled "predevelopment" conditions. For example, Dr. Kincaid's safe yield opinions are driven principally by estimations of discharge (and, by inference, recharge) more than 100 years ago, in 1920. (2 RT 389:20–390:8; 4 RT 788:17–789:3; *see*, *infra*, § VI.A.6 [dubious to assume that recharge in 1920 was the same as discharge, or that vegetation mapping decades later reliably quantified all discharge in 1920].)

Current cultural conditions include both dry periods and more extreme wet years. The Basin's climate is becoming progressively flashier and wetter, which strongly indicates safe yield is higher today than in the past. (3 RT 665:18–24; 4 RT 785:22–786:9, 913:4–25; 5 RT 1129:23–1130:13; *see* 7 RT 1462:19–26; *see, e.g.*, Ex. 605.) Indeed, in its GSP, the IWVGA acknowledged uncertainty about whether precipitation is increasing or decreasing because of climate change. (Ex. 108 at p. 182.) What is certain is that those changes, whatever they are, are not accounted for in Dr. Kincaid's predevelopment discharge-to-ET assessment.

E. The TAC Process Produced a Working Modeling Assumption under Deadline Pressure, Not a Binding Technical Consensus.

The IWVGA emphasized that its Technical Advisory Committee ("TAC") discussed 7,650 AFY before using it in the GSP. But the evidence does not show that the TWG experts accepted 7,650 AFY as a definitive safe yield determination while on the TAC.

Ms. Moran acknowledged that during GSP development, multiple recharge values and uncertainty ranges were considered, that different TAC members held different views, and that a working consensus was needed to allow the modeling process to proceed. (2 RT 362:12–364:12, 386:12–388:6; *see also* 2 RT 383:18–23; Ex. 36 at p. 1, Item 4a.) She described "a sense of urgency" associated with the January 2020 GSP deadline and the need to complete one element so the team could move to the next. (2 RT 387:7–388:6.) The Basin was also Stetson's first GSP. (2 RT 388:12–14.) A number adopted to keep a time-constrained planning process moving is neither a judicial finding of safe yield nor a technical consensus.

Tim Parker testified that the District "went along with" the figure for purposes of completing the GSP, but only with the understanding that recharge would be revisited during the five-year update. He had urged use of a range because the exact value was uncertain; however, Mr. Parker was told there was not enough "time or money" to perform the necessary work before the deadline. When the IWVGA characterized Mr. Parker as having been in "full agreement" with 7,650 AFY, he responded, "That's hogwash." (3 RT 516:24–517:26; *see also* 1 RT 39:24–41:21; 3 RT 483:16–486:1, 486:22–487:1, 487:6–13, 488:13–490:10, 490:24–492:15, 498:4–499:2, 511:5–14, 514:8–25, 515:10–15; Exs. 356, 361; Dem. Exs. 357, 362.)

Mr. Teasdale's contemporaneous record is equally clear. During his TAC and model ad hoc participation, he requested access to the 2020 DRI model, objected that it was not transparent or vetted, questioned the use of a constant 7,650 AFY recharge, explained that varying recharge annually would "take advantage of additional wet years," expressed "several times . . . the lack of transparency that has occurred is very disappointing," recommended using a change in storage analysis, and stated that water-level evidence suggested sustainable yield was materially higher than 7,650 AFY, as water-level data suggested to him that more than twice that

volume could be sustainably pumped from two areas in the Basin. Those concerns were not resolved to his satisfaction, and he ultimately withdrew from the TAC process. (6 RT 1338:7–1341:23, 1342:23–1356:26; Ex. 119 at pp. 1, 27, 34, 36, 71; Ex. 921.)

Anthony Brown of Aquilogic, a well-respected hydrologist involved in both the TAC and the TWG, testified that he was "very disappointed" by his experience with the TAC, while with the TWG, "there was clear intent to collaborate and be very thorough and develop robust solutions to various issues that were being addressed." (1 RT 44:13–46:3.)

Procedural participation is not substantive assent. The Court should evaluate the trial evidence, not convert a planning compromise into an evidentiary presumption.

F. The GSP and DWR's Review Do Not Independently Establish 7,650 AFY.

This Court has already held that it is not bound by the IWVGA's sustainable yield determination and specifically noted the acknowledged data gaps in the GSP. (Minute Order, Aug. 5, 2024 [ROA 1465, 1469], pp. 2, 11; *see also* Ex. 359 at pp. 5, 49–51.) The trial record confirmed why.

The GSP was adopted before a Basin-wide metering program was fully in place. (2 RT 427:1–5.) It relied on older cooperative group pumping estimates that sometimes repeated identical annual quantities for many consecutive years. (*See, e.g.*, 3 RT 667:16–672:19; *see* Ex. 111 at p. 3; Ex. 642 at p. 4.) The Water Resources Manager did not determine 7,650 AFY, did not possess the underlying DRI modeling, and did not independently verify the key 2-D calibration from 2016. (2 RT 401:6–8, 401:16–402:6, 402:15–403:2, 408:17–409:20, 413:13–414:3, 430:2–25.) Because the IWVGA carried the 7,650 AFY figure from DRI's 2016 modeling work into the 2020 DRI Model, the IWVGA did not consider or select a base period until after it confirmed its aggregate recharge value. (2 RT 282:11–21; Ex. 359 at pp. 33–34.)

DWR's administrative review does not cure those defects. DWR evaluates GSPs for substantial compliance with SGMA and the GSP regulations; it does not adjudicate groundwater rights, re-run every model, verify that assumptions represent the most accurate characterization

of Basin conditions, or independently establish sustainable yield. (*See* Wat. Code, § 10738;[7] 3 RT 503:3–15, 504:2–9, 505:10–15, 507:7–20, 508:8–26; Ex. 359 at pp. 5, 49–51.) Water Code section 10720.5 expressly preserves common law groundwater rights and assigns their determination to adjudication. DWR itself found that the IWVGA's approach to sustainability criteria "was not consistent with GSP Regulations" because the IWVGA first defined projects and management actions it was willing to undertake and then defined sustainability by reference to the conditions those projects and actions were expected to produce. (Ex. 359 at pp. 31, 33–34 [IWVGA "inverted the process required by the GSP Regulations"]; 2 RT 415:6–22, 416:20–417:8, 418:25–419:13; *see also* Ex. 4 at pp. 29–43.) That finding seriously undercuts any claim that the GSP's 7,650 AFY figure deserves deference.

The IWVGA may invoke a recent opinion—*AquAlliance v. Vina Groundwater Sustainability Agency* (2026) 122 Cal.App.5th 118—to renew its insistence that this Court should defer to the IWVGA's sustainable yield determination. *AquAlliance* does not support deference.

Citing the primary jurisdiction doctrine, the *AquAlliance* appellate court affirmed granting a GSA's motion to dismiss a reverse validation action challenging a GSP. The primary jurisdiction doctrine applies when an action requires resolution of an issue, which, under a regulatory scheme, has been placed within the special competence of an administrative body. Plaintiffs' validation action required resolution of an issue—whether the GSP fails to achieve sustainable groundwater management—which, under SGMA, has been placed within DWR's special competence. And, while the action was pending, DWR had acted on that issue in "approving" the GSP and finding as part of its approval that the GSP is likely to achieve the sustainability goal. (*Id.* at pp. 130, 138–142, 144–147.)

[7] Section 10738 was enacted in response to concerns over the GSP in this Basin, to clarify that DWR's approval of the GSP should not be "interpreted by the courts to be an endorsement of the allocation of pumping rights as embodied in the GSP." (Sen. Rules Com., Off. of Sen. Floor Analyses, 2d reading analysis of Sen. Bill No. 1372 (2021–2022 Reg. Sess.) as amended Mar. 16, 2022, p. 2.)

AquAlliance is inapplicable here to the Phase 2 Trial. First, this Court has already determined that it is not bound by the IWVGA's sustainable yield determination, regardless of DWR approval of the GSP. (*See* Minute Order, Aug. 5, 2024 [ROA 1465, 1469], pp. 2, 11.) Second, neither SGMA nor any other California law has placed a safe yield determination within the special competence of DWR. On the contrary, DWR's "approval" of the 2020 GSP is not approval of the IWVGA's sustainable yield determination; it is, at most, an acknowledgment that the 2020 GSP conforms to Water Code sections 10727.2 and 10727.4 in that the GSP includes the minimally required content and DWR considers it likely to achieve the Basin's sustainability goal assuming the sustainable yield selected by the IWVGA. (*See* Wat. Code, § 10733, subd. (a); *AquAlliance*, *supra*, 122 Cal.App.5th at pp. 149–150; Ex. 359; *see also* Wat. Code, §§ 10720.5, 10738; Code Civ. Proc., § 830, subd. (b)(7); *Envt'l Law Found. v. State Wat. Res. Control Bd.* (2018) 26 Cal.App.5th 844, 863 ["As a general rule, statutes do not supplant the common law."]; Assem. Off. of Research, Conc. in Sen. Amm. of Assem. Bill No. 1390 (2015–2016 Reg. Sess.) as amended Sept. 4, 2015, pp. 1–4.)

The Phase 2 Trial will determine the safe yield of the Basin, which is foundational in determining water rights and establishing a physical solution in this comprehensive groundwater basin adjudication. (*See* Code Civ. Proc., § 849.) The California Legislature has expressly declared—specifically in reaction to the IWVGA's concerning actions in this Basin—that "approval of a [GSP] by [DWR] shall not be construed to be a determination by or otherwise an opinion of [DWR] that the allocation of groundwater pumping rights in the [GSP] are consistent with groundwater rights law." (Wat. Code, § 10738.)

G. The 2026 Technical Report Adds No New Foundation and Cannot Make a Contested Safe Yield Opinion Presumptively Correct.

Code of Civil Procedure section 845, subdivision (d)(1) requires the Court to request a GSA technical report in specified adjudications. It directs that the report, at a minimum, quantify and describe groundwater use by parties that have not appeared. Subdivision (d)(4) provides that such a report is prima facie evidence of "physical facts" found in it, but it expressly requires the Court to hear rebuttal evidence offered by any party.

First, the 2026 Technical Report fails to address the minimum subject that section 845 expressly requires: it does not identify any alleged "non-appearing" parties and does not quantify or describe their groundwater use. (*See generally* Ex. 955.) To the extent non-appearing parties can be understood to include domestic and rural pumpers, the 2026 Technical Report confirms that such pumping "remains highly uncertain" because of "limited tracking and reporting of groundwater use from private wells," "not all wells within the Basin have registered," and the IWVGA does not require de minimis water users using less than 2 AFY to report pumping. (Ex. 955 at pp. 36–37; *see also* TWG's Objection to 2026 Technical Report [ROA 1993].) By contrast, the TWG performed an independent analysis of domestic well owners' pumping rates and provided an estimate of domestic groundwater demand in areas lacking direct pumping data. (3 RT 561:10–563:12; Ex. 8 at pp. 2, 4–6.)

Second, the statute does not state that a GSA's expert opinion concerning total recharge, sustainable yield, or common law safe yield is a physical fact. Safe yield is the Court's ultimate mixed scientific and legal determination under California law. It depends on selecting a governing legal standard, evaluating a representative period, weighing competing methods, resolving expert assumptions, and deciding what annual withdrawal will avoid eventual depletion under the applicable conditions. Those judgments are not comparable to "physical facts," such as a measured well location, reported pumping quantity, or observed groundwater elevation. (*See* TWG's Objection to 2026 Technical Report [ROA 1993].)

The Court need not define the outer boundary of "physical facts" under section 845 to resolve this case. Even if some underlying measurements in the 2026 Technical Report receive prima facie effect, the report's 7,650 AFY conclusion does not. The 2026 Technical Report did not produce or reconstruct the missing 2-D model from 2016 on which it is based; it did not independently validate the inherited aggregate recharge figure from 2016, 2020, and 2025; and it did not erase the changes in DRI storage parameters or the model's inability to reproduce wet-year behavior. Its repetition of 7,650 AFY adds no independent analytical line.

Moreover, subdivision (d)(4) makes any prima facie showing rebuttable. The TWG presented direct rebuttal through Ms. Wicks, Mr. Teasdale, Mr. Parker, Dr. Tonkin, Dr. Bedekar, Mr. Brown, the trial exhibits, the IWVGA's own annual reports, and the admissions of Ms. Moran, Mr. Johnson, Dr. Kincaid, and Dr. McKenna. The Court should determine the weight to be given to the 2026 Technical Report based on that complete record.

VI. THE OPPOSING EXPERTS DID NOT PROVIDE AN INDEPENDENT RELIABLE PATH TO 7,650 AFY.

A. Dr. Kincaid's Range is the Product of an Incomplete Review, Selective Inputs, and an Arbitrary Deduction—Not a Basin-Scale Safe Yield Calculation.

1. *His assignment and review were expressly preliminary.*

The IWVGA retained Dr. Kincaid to opine on groundwater inflow based on existing studies, to conduct a "cursory review" of the competing 2025 models, and to provide a "preliminary opinion" concerning their differences. (Ex. 80 at p. 3.) At trial he admitted that his understanding was "still evolving," that his opinions concerning the models remained "preliminary," and that he had not completed his review of transient heads, simulated groundwater surfaces, water budgets at different time steps, or the BCM documentation (which he has never used and was "quite involved"). (8 RT 1782:12–1787:10.) He testified that he would have preferred more time to perform substantive review, particularly review of the competing models. (*Ibid.*)

This is especially important because Dr. Kincaid criticized the TWG's data-intensive change in storage work without performing a comparable Basin-wide analysis of his own. An incomplete review may identify questions for further study; it cannot supply substantial evidence for a precise safe yield finding. (*See Sargon*, *supra*, 55 Cal.4th at pp. 769–772 [opinion founded on speculation, conjecture, or inadequate analytical basis lacks evidentiary value]; *Jennings*, *supra*, 114 Cal.App.4th at pp. 1117–1118; *Zuckerman*, *supra*, 189 Cal.App.3d at p. 1135.)

2. *He did not independently calculate current Basin safe yield.*

Dr. Kincaid's original range of approximately 6,100 to 8,400 AFY was assembled from selected historical recharge estimates. (Ex. 80 at pp. 3, 7, 22–23, 52; *see also* 8 RT 1811:8–1814:1.) He averaged the selected values, bounded the average statistically, and then reduced the result by 15 percent to account for ET. (8 RT 1793:9–1798:10.) That procedure does not model the Basin, measure current storage response, reconstruct all recharge and discharge components, or test current conditions. It is arithmetic applied to a curated literature set.

And the literature itself was not homogeneous. The studies used different areas, periods, definitions, recharge components, and methods. Some reported mountain-front recharge only; others reported total inflow; some included Rose Valley or incidental recharge with mountain-front recharge; others did not. (*See* Ex. 4 at pp. 8–9, 10–17; Exs. 208, 546; 1 RT 53:13–55:18; 3 RT 636:23–638:16; 4 RT 791:8–801:14, 908:13–909:2; *see also* Dem. Ex. 410.) Averaging non-comparable values does not eliminate those differences or produce a valid estimate.

3. *His rules of selection systematically favored lower values and were internally inconsistent.*

Dr. Kincaid excluded all estimates calculated using a change in storage method or that he characterized as "exceptionally high." He also categorically excluded studies conducted before 1989. Yet he acknowledged that later estimates tended to be lower and that excluding earlier work reduced the average "by more than 500 [AFY]." (8 RT 1793:2–1796:2, 1814:2–1815:6; Ex. 80 at pp. 22–23; *see* Ex. 80 at p. 52.) Selecting a cutoff because it lowers the average is not an independent scientific validation of the remaining studies.

The cutoff also contradicted his own reliability assessment. He identified Kunkel & Chase (1969) as one of "[t]he most reliable estimate[s] of total recharge" because it was prepared closer in time to the alleged predevelopment condition that he sought to use. He acknowledged that reconstructing conditions many decades later adds uncertainty. (9 RT 1863:9–1865:17, 1866:17–1868:23; Ex. 84 at p. 1.) Yet his categorical post-1989 rule excluded Kunkel & Chase from the numerical average. A study he regarded as particularly "reliable" reported natural

recharge of approximately 11,000 to 15,000 AFY before any anthropogenic sources—well above his selected range. (9 RT 1868:25–1873:16; Ex. 611/1002/1232 at pp. 78–79.)

4. *He modified reported values without consistently presenting the studies' total recharge conclusions.*

Cross-examination showed that Dr. Kincaid often used a reduced recharge figure rather than the total recharge figure reported by the study's author(s). This practice materially lowered his average. Worse, he failed to note in his report that he had made any reductions. (*See* Ex. 80 at p. 52; Dem. Ex. 1000a at p. 40.) Selected examples are explained in Table 5 below.

Table 5. Selected Examples of Dr. Kincaid's Treatment of Prior Recharge Studies

Study	Study's Reported Information	Dr. Kincaid's Treatment	Record
Bean (1989)	Best estimate of total recharge: approximately 15,100 AFY.	Used approximately 10,100 AFY without clearly presenting the full total recharge estimate.	8 RT 1815:7–1821:4; Ex. 1025 at p. 37
Berenbrock & Martin (1991)	Model calibration used total recharge near 11,000 AFY and addressed additional inflows.	Used 9,852 AFY.	8 RT 1824:5–1826:5; Ex. 1026 at pp. 7–8, 32, 40–41, 45
Bureau of Reclamation / Watt (1993)	The work expressed "serious doubt" about recharge quantity and "abandoned" further model development as a result.	Used rounded recharge assumptions as firm inputs.	8 RT 1829:1–1834:4; Ex. 1027 at pp. 5, 17, 87, 126, 137–140 [*assumes* 9,850]
Gillespie & Thyne (1996)	Reported total recharge exceeding 30,000 AFY.	Used 7,761 AFY.	8 RT 1837:24–1842:11; Ex. 1028 at pp. 4–6, 11
Epstein (2010) / McGraw application (2016)	Epstein was a Nevada regression study, not an Indian Wells Valley estimate; the full method includes low precipitation zones.	Used a McGraw-derived 9,300 AFY figure after excluding low precipitation zone recharge.	9 RT 1904:5–1910:1; Ex. 21 at p. 25, table 3; Ex. 65 at p. 19, table 4
Todd Engineers (2014)	Reported a range of approximately 7,700–11,000 AFY.	Used approximately 6,040–8,840 AFY and a total of 7,440 AFY.	9 RT 1860:12–1861:17; Ex. 614 at p. 78
Kunkel & Chase (1969)	Estimated natural recharge of approximately 11,000–15,000 AFY and was called authoritative.	Excluded from the post-1989 average despite relying on it elsewhere as one of the "most reliable" studies.	9 RT 1864:8–1873:16; Ex. 84 at p. 1; Ex. 611/1002/1232 at pp. 78–79

The Court need not decide that every higher historical value is correct. The point is methodological: Dr. Kincaid's range is not an objective summary of the published total recharge estimates. It is the product of choices that consistently reduce those published estimates.

5. *His updated presentation counted the inherited 7,650 AFY value multiple times.*

At trial, Dr. Kincaid presented a revised safe yield range that included multiple entries derived from the same underlying 7,650 AFY assumption. (9 RT 1859:19–1860:7; Dem. Ex. 1000a at p. 40.) Treating derivative publications as independent observations artificially concentrates the average around his client's existing number.

6. *His predevelopment method rests on assumptions he could not reliably establish.*

To estimate recharge, Dr. Kincaid preferred estimating 1920 discharge to ET and assuming it equaled recharge.[8] That approach requires the Basin to have been in steady state, with no material pumping and no change in storage. The evidence showed, and Dr. Kincaid acknowledged, significant uncertainty about pumping before 1920 and credible estimates of pumping of 1,000 to 4,000 AFY. (8 RT 1806:10–17, 1807:12–1808:11; 9 RT 1854:12–1858:21, 1912:10–20; Ex. 67 at pp. 12, 34, table 5-1, 73, fig. 15 [questioning whether 1920 reflected predevelopment]; Ex. 611/1002/1232 at p. 76 [pre-1919 pumping could have been 2,000–4,000 AFY]; *see also* 4 RT 884:15–885:5, 895:17–19; 10 RT 2096:1–2098:10; Ex. 443A; Ex. 487 at pp. 170, fig. 4, 187–188.) He could not identify a principled threshold at which pumping became "significant." (8 RT 1807:1–11.)

Estimating historical ET also requires reconstructing vegetation extent and type, soil conditions, groundwater depth, and ET rates from information more than a century old. Dr. Kincaid admitted that none of the recharge components can be directly measured and that estimating multiple water budget terms creates "compounding" and "significant uncertainty." (9 RT 1866:17–1868:23, 1882:18–1890:15; *see also* 10 RT 2150:23–2151:9 [McKenna agrees there is uncertainty in recharge estimates because they cannot be directly measured].) Dr.

[8] Despite preferring the recharge method that uses discharge to ET, Dr. Kincaid excluded from the historical recharge estimates he used to develop his safe yield range both foundational studies evaluating discharge to ET—Kunkel & Chase (1969) and Lee (1913). (*See* 8 RT 1806:10–17; 9 RT 1868:25–1871:1; Ex. 80 at p. 19, § 4.4.1.1; Ex. 611/1002/1232 at pp. 7, 78–79; Ex. 1275 at pp. 24, 41.)

Kincaid's own report acknowledged that the change in storage method "may be the only option" when the pre-pumping water budget cannot be reasonably estimated or when present hydrologic conditions differ materially from the past. (Ex. 80 at p. 17; 8 RT 1807:2–1809:26.) Those conditions exist here.

7. *He excluded anthropogenic recharge even though his legal definition includes natural and artificial recharge.*

Dr. Kincaid selected a safe yield definition encompassing natural and artificial recharge, yet his safe yield range categorically excluded current anthropogenic sources. (8 RT 1789:3–1791:16, 1823:24–1824:4; *see* Ex. 80 at p. 7 [citing Wat. Code, § 37900].) Moreover, historical studies he relied on included anthropogenic sources as recharge, including aqueduct leakage, irrigation return flows, wastewater, septic percolation, and distribution system leakage, but he removed those components before averaging. (4 RT 788:4–16, 792:19–793:8, 908:13–909:12; 8 RT 1821:21–1824:4; *see* Ex. 4 at pp. 10–13, 15 [citing Bloyd & Robson (1971), Bean (1989), Berenbrock & Martin (1991), Todd (2014), and McGraw (2016) for recognizing and including anthropogenic recharge]; Dem. Ex. 423; Dem. Ex. 1000a at p. 3; *see, e.g.*, Ex. 21 at pp. 27–28; Ex. 67 at p. 17 ["The only significant types of recharge occurring in the IWV Basin are mountain-front recharge and anthropogenic recharge . . . ."]; Ex. 614 at pp. 78, 81–82; Ex. 1011 at pp. 38, 43–44; Ex. 1025 at pp. 27, 31–33, 36–37; Ex. 1026 at pp. 7, 23–24, 41; *see also* DWR Water Budget Best Management Practices,[9] PDF p. 5; 4 RT 805:4–18, 840:22–842:17; Ex. 1211 at p. 77, table 10; Dem. Ex. 410.)

His justification—that anthropogenic sources are difficult to quantify—supports the TWG method rather than his own. Mountain-front recharge and Rose Valley underflow are also estimated, not directly measured. (*See* 9 RT 1882:18–1896:7.) Dr. Kincaid conceded that in a basin where anthropogenic recharge is material, a predevelopment method would not be "optimal." (9 RT 1894:14–1896:7.) The change in storage method avoids this selective omission

[9] Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget_ay_19.pdf?utm_source=chatgpt.com (last visited Nov. 9, 2026.)

because sources contribute to measured aquifer response if and when they actually reach the groundwater system as reflected in measured groundwater levels.

8. *His 15 percent ET reduction was admittedly arbitrary.*

After constructing his recharge range, Dr. Kincaid reduced it by 15 percent for ET. When asked for the technical basis for that number, he admitted he "picked a number out of thin air." (8 RT 1796:5–1798:10; Ex. 80 at p. 7.) That admission alone prevents the reduced range from constituting reliable proof of safe yield. The deduction is both outcome-determinative and unsupported.

9. *His quantitative attack on TWG water levels was due to rounding.*

Dr. Kincaid claimed a 65.4-foot discrepancy between TWG and GSP groundwater-level changes. Cross-examination established that the 65.4 feet was actually the sum of all differences across all 77 polygons across all ten years—not a Basin-wide water-level error. In reality, it was only approximately 0.084 feet per polygon per year, which Dr. Kincaid acknowledged was "small." (8 RT 1768:17–1773:26 [65.4 feet ÷ 10 years = 6.54 feet per year ÷ 77 polygons = 0.084 feet per year per polygon]; *see* Ex. 84 at p. 3, § 1c.) The difference arose because he used values rounded to the nearest tenth of a foot from published tables. (4 RT 726:8–728:9; 8 RT 1771:6–1776:15.) He also acknowledged that the comparison did not apply to Mr. Teasdale's refined analyses. (8 RT 1767:7–1768:14.)

10. *His specific yield testimony ultimately supports the TWG.*

Dr. Kincaid agreed that Brown & Caldwell is an accepted source on specific yield and that Kunkel & Chase assigned specific yield values to material groups based on intensive field investigations. (9 RT 1882:14–17, 1900:20–1901:6.) Dr. Kincaid also opined that specific yield values tend to be overestimated, because field tests are typically performed on production wells that are intentionally located in the more productive parts of an aquifer. At trial, he corrected a statement in his report that had the direction of bias backwards: in a declining basin, overestimating specific yield causes safe yield to be underestimated, not overestimated. (8 RT 1802:11–1806:6; Ex. 80 at p. 15.) That correction confirms that the high 2020 DRI values would

bias the annual report result downward and that Mr. Teasdale's lithology-based values are conservative rather than inflated.

Taken together, Dr. Kincaid's incomplete review, selective treatment of the literature, repeated downward adjustments to published estimates, multiple uses of the inherited 7,650 AFY figure, and arbitrary ET deduction substantially diminish the weight that should be afforded his ultimate opinion. These were not isolated errors; they were a series of choices that consistently biased the result downward and toward his client's 7,650 AFY safe yield figure.

B. Dr. McKenna's Analyses Similarly Fail to Independently Support 7,650 AFY.

Dr. McKenna testified that he had never estimated safe yield before this case and the Basin is the only groundwater basin in California where he has worked on either safe yield or sustainable yield. (10 RT 2095:20–26, 2155:11–13.) His inexperience shows.

1. He adopted the inherited 7,650 AFY figure rather than deriving current Basin safe yield from a new calculation.

Dr. McKenna opined that 7,650 AFY represented the Basin's safe yield because he equated safe yield with long-term average natural recharge under assumed predevelopment conditions. But his own analysis of the historical precipitation and recharge shows that the "predevelopment" period was relatively dry, and that conditions more than 100 years ago are not comparable to conditions since the early 1980s. (*See* 3 RT 665:18–24; 4 RT 785:22–786:9, 884:17–885:10, 886:9–887:15, 895:17–896:19, 900:4–15, 903:3–908:7, 913:4–25; 5 RT 1129:23–1130:13; 8 RT 1807:2–15; 9 RT 1854:12–1858:21, 1912:10–20; 10 RT 2096:1–2098:10; Ex. 67 at pp. 12, 73, fig. 15; Ex. 74; Ex. 108 at p. 182; Ex. 611/1002/1232 at p. 76; Exs. 443A, 444A; Dem. Exs. 452–456; *see, e.g.*, Ex. 605.)

Moreover, the 7,650 AFY value he defended came from the unavailable 2016 2-D model and was used as a fixed recharge input in later models. He confirmed that he did not use the 2016 2-D model, that DRI no longer had it, and that its 7,650 AFY value was nevertheless used in the 2020 and 2025 DRI models. (10 RT 2103:9–2106:24, 2138:10–14, 2139:12–16, 2142:9–23, 2143:2–2144:5, 2156:16–2157:8.)

Dr. McKenna claims to have used multiple lines of evidence in support of a 7,650 AFY safe yield. But his later calculations were framed as corroboration of that inherited value, not as an independent current safe yield analysis using the Basin's full modern water budget or observed storage response. That framing matters because a corroboration exercise can unconsciously preserve the target it is designed to check.

2. *McGraw misapplied the Anderson and Epstein empirical methods.*

The empirical Anderson et al. (1992) and Epstein et al. (2010) methods were regional screening tools developed from other arid basins. They may provide order-of-magnitude context, but they are not Basin-specific measurements. To develop their regressions, Anderson and Epstein purposefully excluded other empirical results from their analyses—relying instead on water balance and modeling studies—so that their empirical results are best considered to be "meta-studies" of previous work by others for other basins. Thus, Anderson and Epstein are helpful for preliminary or reconnaissance-level studies, but do not provide reliable estimates for specific basins. (4 RT 816:4–817:15, 845:14–849:16, 853:14–857:18, 862:20–863:17, 869:3–14; 9 RT 1904:5–15, 1905:26–1906:6, 1913:7–14; 10 RT 2111:19–2113:21, 2118:3–2119:3, 2121:8–14; *see* Exs. 426A, 430A.) Also, Anderson and Epstein have never been used before in California and are not appropriate for use here. (Ex. 67 at p. 19; 9 RT 1861:21–1862:14; 10 RT 2111:23–26, 2118:15–17.)

Errors in McGraw's application of the Anderson and Epstein methods only compounded the uncertainty inherent when using those methods.

Dr. McKenna identified an error in McGraw's Anderson calculation that increased the result from approximately 4,100 to approximately 7,500 AFY. (Ex. 60 at p. 23; 4 RT 844:12–845:17, 846:2–7, 858:5–859:13, 860:18–862:3, 916:21–917:18; 10 RT 2111:8–10, 2114:26–2118:2; *see* Exs. 426A, 430A, 431A, 432A.) He also corrected one aspect of McGraw's Epstein calculation, changing approximately 9,300 to approximately 8,800 AFY. (Ex. 60 at p. 24; 4 RT 849:19–25, 872:14–875:18, 922:13–18; 9 RT 1906:20–1907:1, 1965:26–1966:1.) Those corrections show that the empirical calculations underlying the original 7,650 AFY target were not stable.

Dr. Tonkin identified a further, more fundamental error in McGraw's application of Epstein. The BBRM regression derives interdependent coefficients across the full precipitation distribution. McGraw removed the lowest precipitation category and assigned no recharge to a large portion of the Basin, even though Epstein's method included non-zero coefficients for the full range. Because low precipitation areas occupy a large portion of the Basin, the exclusion materially suppressed recharge. Applying the method consistently—*i.e.*, not excluding precipitation of less than 8 inches—produces a "best estimate" of approximately 15,266 AFY. (4 RT 844:1–850:17, 852:22–859:13, 860:18–862:3, 862:20–876:6; 9 RT 1907:3–1910:5; 10 RT 2119:4–2122:1; Ex. 21 at p. 25; Ex. 65 at p. 19, table 4; Exs. 434A, 436A, 438A, 439A; Dem. Exs. 435, 437.)

3. *His selected precipitation period was designed to compare with McGraw, not to determine current conditions.*

Dr. McKenna used a 1981–2010 base period for his Anderson and Epstein calculations because that is what McGraw used. He acknowledged that PRISM data continued to the present and that using another period would change the results. When asked whether a wetter post-2010 period would produce higher recharge, he agreed it likely would, although he had not performed the analysis. (10 RT 2122:5–2124:6.)

His admission illustrates the difference between checking an old calculation and determining current safe yield. A period selected merely to match McGraw cannot rebut the TWG's reasoned selection of a 2014–2023 or 1980–2023 base period based on representativeness, modern data, and current conditions.

4. *His Owens Valley comparison omitted the very inflows that made it meaningful, and proper application supports the TWG.*

Dr. McKenna attempted to transfer a recharge-to-precipitation ratio from Owens Valley to this Basin. He relied on Danskin's 1998 Owens Valley water budget but selectively used only "mountain-front recharge between tributary streams." He omitted recharge from tributary streams (the largest component), runoff from bedrock outcrops, and other inflows. He also confined precipitation to a boundary that excluded higher elevation areas producing runoff and

recharge. (3 RT 691:22–696:26; 10 RT 2101:9–20, 2134:26–2136:23; Ex. 635/1211 at p. 77, table 10; Exs. 634, 637; Dem. Ex. 663 at pp. 18–20.)

Ms. Wicks, using the components in Danskin, corrected the numerator and denominator for Dr. McKenna's ratio. Her corrected Owens Valley ratio increased from Dr. McKenna's roughly one percent to roughly seven percent. Applying that ratio to Dr. McKenna's precipitation value for the Indian Wells Valley produced approximately 12,800 to 27,600 AFY, averaging approximately 21,400 AFY. (3 RT 697:1–698:21; Exs. 646, 647.) Both 14,300 and 15,400 AFY fall comfortably within the corrected range.

Cross-examination also established that Danskin included irrigation return flows in his Owens Valley calculation, while Dr. McKenna omitted return flows and other incidental recharge from his Indian Wells Valley calculation. (10 RT 2101:9–2103:4; Ex. 635/1211 at p. 77, table 10.) A ratio constructed from selected inflows in one basin cannot reliably validate a total inflow conclusion in another.

5. *His "lag time" rationale selectively excludes anthropogenic recharge.*

Dr. McKenna argued that anthropogenic recharge should be excluded because water may take time to reach the water table. (10 RT 2152:15–19.) The Court identified the inconsistency: mountain-front recharge also does not reach the water table instantaneously. Dr. McKenna agreed. (9 RT 1958:1–23; *see also* 4 RT 908:13–909:12; 9 RT 1893:10–20; 10 RT 2154:10–20; DWR BMP, *supra*, PDF p. 5.) Dr. Tonkin identified other flaws with Dr. McKenna's lag time rationale: at some locations where incidental recharge occurs, the depth to water is not as deep as Dr. McKenna assumes; and Dr. McKenna's lag time calculation uses a natural recharge rate, rather than a recharge rate appropriate for an area of focused recharge. (5 RT 1021:17–1022:5, 1024:7–1025:1, 1027:13–1028:2.) Even assuming Dr. McKenna's conclusion of a lag time of 122 years or 0.6 feet per year, anthropogenic recharge from irrigation return flows in the 1910s and 1920s will have reached the aquifer by now or will be reaching the aquifer in the next 15 years—within the long-term planning period. (10 RT 2098:5–2099:17.)

Travel time is relevant to whether a particular source affected groundwater levels during a particular period; it is not a principled basis to set all anthropogenic recharge to zero while

retaining uncertain natural recharge. The change in storage method resolves the issue empirically. A source is reflected only to the extent it affected measured groundwater levels during the base period. (*See* 9 RT 1892:3–1896:7.)

Dr. McKenna's reliance on a study of intermittent desert washes in Victorville that "flow only a few days each year after large storms" also does not support excluding return flows from irrigated farmland in the Basin. (*See* 10 RT 2099:19–2101:8; Ex. 1230 at p. 1.)

6. *His specific yield and model criticisms of the TWG do not quantify a route to 7,650 AFY.*

Dr. McKenna criticized polygon methods, Ramboll model artifacts, and specific yield assumptions. But he acknowledged that Mr. Teasdale's measured 0.20 specific yield was "within the range" for sands and gravels. (9 RT 2041:4–23.) He did not recompute Mr. Teasdale's Basin-wide analysis using a supported alternative specific yield dataset and obtain 7,650 AFY. Nor did he show that correcting the identified Ramboll model artifacts would reduce the independent change in storage result by roughly one-half.

His specific yield criticism also does not affect the safe yield estimate of Dr. Tonkin, who based his estimate upon net recharge, which is unaffected by specific yield. (*See* 4 RT 819:13–820:4, 831:13–833:1, 874:3–9, 916:21–918:12; Ex. 123 at pp. 30–34, 37–39.)

Dr. McKenna's reliance on Brown & Caldwell's historical 8,822 AFY model result likewise does not answer Mr. Teasdale's modern analysis. Brown & Caldwell did not use the 2014–2023 base period, the expanded well network, current pumping disclosures, Ramboll 2025 specific yield values, or Mr. Teasdale's site-specific data. (*See* 10 RT 2091:11–2092:6; Ex. 67 at pp. 25, 28–29.) A different model built for a different purpose and period cannot veto direct evidence of current Basin response.

The common defect in both opposing expert cases is the absence of a quantified analytical bridge. They identify uncertainty in the TWG work, but uncertainty is not evidence that 7,650 AFY is correct. Neither expert performed a current Basin-wide calculation using supported assumptions that produced the proposed 7,650 AFY number independent of the inherited DRI target.

VII. CRITICISMS OF THE TWG'S ANALYSES IDENTIFY MANAGEABLE UNCERTAINTY, NOT A BASIS FOR 7,650 AFY.

The TWG used multiple lines of evidence and analysis to manage and minimize the uncertainty that inheres in determining safe yield using one dataset or method. This multi-lines-of-evidence approach is consistent with a fundamental principle of scientific inquiry: when independent methods of analysis converge on the same result, it strengthens confidence in the result. By evaluating safe yield through multiple datasets, analyses, and modeling approaches, the TWG tested whether the resulting estimates were consistent across different lines of investigation. The fact that these independent approaches produced substantially similar results provides important corroboration and increases confidence that the resulting safe yield estimates reflect actual basin conditions rather than the limitations or biases of any single method.

A. Polygon and Interpolation Uncertainty was Reduced through Multiple Configurations and a Substantially Expanded Well Network.

Dr. Kincaid correctly observed that any polygon method requires assigning measured groundwater levels to areas between wells and that specific yield is estimated. (8 RT 1759:3–19.) Those are transparent sources of uncertainty. They do not make the method unreliable, particularly when compared with a recharge approach that requires separate estimates of every inflow and outflow, none of which can be directly measured at basin scale.

The TWG tested configuration uncertainty rather than ignoring it. The TWG Safe Yield Paper used extended 85-polygon and independently designed 81-polygon configurations. Mr. Teasdale then refined both. His approach 1 used more than 150 well observations and spatial interpolation; where more than one reliable well existed within a polygon, the additional data refined the groundwater surface. His approach 2 used one representative well per polygon in a separately designed configuration. (*See*, *supra*, § IV.B.5.)

The results reflect strong agreement. Across Brown & Caldwell and Ramboll 2025 specific yield datasets, Mr. Teasdale's four calculations ranged from 14,200 to 15,700 AFY. The two preferred Ramboll 2025 calculations were 15,100 and 15,700 AFY. (7 RT 1439:7–1443:26; Ex. 85 at pp. 50–55; Exs. 529, 531; Dem. Ex. 607 at pp. 6, 60–61.) The effect of changing

polygon configuration and water-level treatment is therefore quantified in the record and is nowhere near the approximately 7,750 AFY reduction required to reach 7,650.

The IWVGA's own use of Thiessen polygons is also probative. The IWVGA relies on the same general spatial method in its annual reports. (6 RT 1383:15–1385:12, 1388:7–1389:4; 7 RT 1405:17–1408:5, 1408:25–1409:17 [safe yield of 10,500 AFY and 14,800 AFY using the IWVGA's Thiessen polygon method from its annual reports to calculate groundwater storage change and applying DRI 2020 specific yield values and Ramboll 2025 specific yield values, respectively]; *see, e.g.*, Ex. 576/948 at pp. 36–39, 68; Ex. 944 at pp. 14–16; Ex. 945 at pp. 23–26; Ex. 950 at pp. 36–38; Dem. Ex. 607 at pp. 11–12; *see also* 7 RT 1422:9–1423:14.) The IWVGA's disagreement concerns inputs and implementation, not the legitimacy of calculating storage change from polygons.

B. Mr. Teasdale Quantitatively Tested the 2019 Earthquake Issue and Found No Material Effect.

The opposition suggested that the July 2019 earthquakes may have distorted groundwater levels. Mr. Teasdale performed two sensitivity analyses demonstrating no material effect.

Under the first method, he used trends from adjacent polygons and re-ran the safe yield calculations. The effect ranged from a decrease of approximately 100 AFY in some cases to increases of approximately 300 to 400 AFY in others, depending on year and configuration. (7 RT 1457:20–1459:2; *see* Dem. Ex. 217 at pp. 18–19.) Under the second method, he extrapolated pre-earthquake trends; the resulting safe yield increased by only approximately 0.3 to 1.1 percent. (7 RT 1459:3–1460:14; *see* Dem. Ex. 217 at pp. 20–22.) He concluded that earthquake-related changes did not materially affect the Basin-wide estimate. (7 RT 1460:15–22; *see* Dem. Ex. 217 at p. 23; *see also* 3 RT 495:2–20, 497:16–498:1, 555:21–557:16; 7 RT 1449:8–1456:13; Dem. Ex. 217 at pp. 3–10, 14.)

That quantified result answers the criticism. Even the largest tested effect is a small fraction of the difference between 15,400 and 7,650 AFY.

C. Faults were Incorporated into the Spatial Analysis and Did Not Invalidate the Basin-Wide Trends.

The polygon configurations did not ignore known faults. The IWVGA's own 77-polygon configuration aligned certain boundaries with faults, and Mr. Teasdale preserved those boundaries when extending coverage to 85 polygons. (7 RT 1405:17–1406:16, 1450:5–12.) His independently designed 81-polygon approach supplied a cross-check that was not dependent on the same geometry. The comparable results show that fault treatment did not control the answer.

At the scale of the safe yield question, the relevant issue is whether the available wells and polygon boundaries reasonably capture spatially variable groundwater-level change. The use of two configurations, fault-aligned boundaries, more than 150 well observations, and sensitivity testing supplies substantial evidence that they do.

D. Ramboll's Flooded Cells and Other Model Artifacts Do Not Undermine the Independent Change in Storage Evidence or Dr. Tonkin's Analysis.

Dr. McKenna criticized "flooded cells" in the 2025 Ramboll model, particularly near Rose Valley inflow. Dr. Bedekar explained that the high-head cells were a numerical artifact of assigning inflow to a small number of cells and the artifact could be reduced by distributing the inflow among different layers or across more cells in the model. He confirmed that the flooded cells do not mean that water sits on the surface; rather, "the way MODFLOW calculates, ingests that inflow, it just calculates a really high head at the edge as a means to push that water through the system." Ultimately, Dr. Bedekar testified that the flooded cells do not materially change safe yield because the inflow inputs into the 2025 Ramboll model were calculated independent of the model (*i.e.*, BCM and other studies); as a separate calculation independent of the model, the inflows remain the same; and the model was being used to test the Basin's response to that inflow. (6 RT 1205:11–1208:19.)

No party contends that the Ramboll model is perfect. The important point is its evidentiary role. The TWG's principal safe yield evidence is the change in storage analyses and Dr. Tonkin's independent analysis. The model is an independent corroborating tool. A localized artifact in one model does not erase the measured pumping and groundwater-level data

underlying Mr. Teasdale's analyses, the corrected IWVGA annual report result, the corrected McGraw application of Anderson and Epstein, or Dr. Tonkin's separate water budget, all of which support a finding far above 7,650 AFY. (*See* 4 RT 779:17–780:3.)

E. Variability in the Historical Literature Favors Current Measured Basin Response over a Preferred Legacy Estimate.

Prior studies of the Basin dating back to 1913 were prepared for different purposes, covered different areas and time periods, and included different recharge components. Their total estimates ranged widely. (1 RT 51:23–55:18, 54:6–18; 3 RT 534:7–14, 635:22–638:16; 4 RT 791:8–801:14, 908:13–909:2; *see* Ex. 4 at pp. 8–17; Exs. 208, 546; *see also* Dem. Ex. 410.) That variability does not make 7,650 AFY a prudent default. It demonstrates that separately estimating each uncertain component has not produced a stable answer.

The TWG responded rationally: review the literature to identify plausible components and ranges, then use modern pumping and groundwater-level data to measure the combined Basin response. (3 RT 534:7–14, 638:8–16; *see also* 3 RT 554:7–21.) The historical literature supplies context and cross-checks; it does not displace direct modern evidence.

F. The Opposition's Criticisms are Often Limited to Particular Inputs and Do Not Undermine the Multiple Independent Corroborating Analyses.

Many of the opposition's criticisms are specific to a particular input, dataset, or refinement. They therefore cannot simply be carried over to the other analyses that reach comparable safe yield results using different inputs. That distinction is important because the TWG evidence was deliberately tested across different polygon configurations, specific yield datasets, a separate BCM recharge analysis, and modeling corroboration. Mr. Teasdale explained that the various calculations produce somewhat different results, as one would expect, but collectively show a consistent range of approximately 14,100 to 16,000 AFY—not 7,650 AFY. (7 RT 1443:19–26; *see also* 4 RT 744:21–26.)

Criticism directed at the Ramboll 2025 specific yield values illustrates the point. Those criticisms have no application to the analyses using different specific yield datasets, as summarized in Table 2 above, or to Dr. Tonkin's independent analysis that did not involve

specific yield inputs at all. (4 RT 916:21–918:18.) The same limitation applies to criticism of the North Brown Road/Meadowbrook site-specific analysis, which does not impact the TWG's earlier 14,300 AFY calculation, Dr. Tonkin's independent recharge-based calculation, or the 2025 Ramboll model. An input-specific criticism should be given only input-specific weight; it is not a basis for disregarding independent, corroborating analyses that do not depend on the criticized input.

VIII. NUMERICAL GROUNDWATER MODELING EVIDENCE REJECTS 7,650 AFY.

A. The Ramboll Model Recognizes Mountain-Front Recharge as the Basin's Main Recharge and Uses Time-Varying, Physically Based Inflows to Directly Account for It, Rather than a Fixed Long-Term Recharge Target that Does Not Explicitly Account for It.

The Basin is a mountain-front recharge-driven system. (1 RT 187:11–23, 191:24–26; 3 RT 611:14–19; 4 RT 771:9–26; 6 RT 1275:9–12; 7 RT 1581:8–10, 1607:3–7; Ex. 21 at p. 20; Ex. 24 at p. 135; Ex. 955 at p. 20.) The TWG used the most reliable modeling method that directly addresses mountain-front recharge—*i.e.*, the statewide BCM. (*See* 2 RT 464:25–465:3; 4 RT 777:10–19, 817:16–818:2, 819:24–820:4, 914:20–915:9; Ex. 123 at pp. 30–32.) The IWVGA/United States method did not explicitly account for mountain-front recharge and practically ignored it through use of McGraw applying the Anderson and Epstein/BBRM methods and then adjusting it with a missing 2-D model. Unlike the BCM, DWR does not list the BBRM as a recommended tool for estimating recharge. (*See* 4 RT 824:20–826:18, 869:3–14; 9 RT 1904:11–15; 10 RT 2111:23–2113:9, 2118:3–2119:3, 2121:8–14.)

Dr. Bedekar[10] testified that the Ramboll groundwater flow model includes time-varying mountain-front recharge, runoff, and stream percolation, Rose Valley inflow, agricultural return flow, wastewater percolation, periodic releases, and aqueduct and distribution system leakage. (5 RT 1128:1–21; *see also* 4 RT 830:18–833:1.) The natural surface-water and recharge components are derived from the statewide BCM, which simulates how precipitation and

[10] Dr. Bedekar works regularly with DWR. (5 RT 1116:4–20, 1119:16–1120:8, 1121:9–18; Ex. 41 at pp. 1–3, 7, 9.)

temperature (primarily based on PRISM data) are partitioned among runoff, groundwater recharge, snowpack, ET, and other processes. (*See* 2 RT 463:13–22, 466:21–467:4; 4 RT 773:17–26, 775:10–13, 804:10–13, 817:16–818:2, 824:20–825:5, 826:23–829:20, 831:6–12; 5 RT 1128:14–1129:18; Ex. 97 at pp. 41–43; Ex. 123 at pp. 30–32; *see also* 4 RT 836:1–5.)

The difference from the DRI approach is fundamental. Ramboll allows wet and dry years to produce different inflows. By contrast, the DRI framework retained a 7,650 AFY long-term target and adjusted distribution around it, rendering it incapable of reproducing actual wet-year inflows. (5 RT 1126:16–22, 1129:23–1130:9, 1131:25–1137:20, 1139:14–1143:18; Exs. 243A, 244A, 245A, 246A, 249A; *see*, *supra*, § V.A; *see also* 4 RT 833:23–835:26, 853:20–854:13, 914:20–915:9; 6 RT 1213:21–1214:11; Exs. 421A, 422A.) A model using physically based, time-varying inflows is better equipped to reproduce observed wet-year groundwater-level responses.

Mr. Parker[11] also initiated development of a locally calibrated BCM with the USGS in 2015. (2 RT 461:24–463:3, 463:26–465:12, 467:5–13; 3 RT 519:3–520:14.) For several reasons, however, the TWG opted not to use the locally calibrated BCM for the 2025 Ramboll Model: the USGS did not issue its final report until March 2026; prior to that, the USGS merely had a draft and the parties' models in this case were exchanged in April 2025 (Third Amended CMO [ROA 1967], May 20, 2026, p. 3); the locally calibrated BCM has limited data, as the USGS does not keep it up to date as the USGS does for the statewide BCM; and the locally calibrated BCM only runs through 2010, while the statewide BCM offers data through the present that captures what the climate is doing currently. (*See* 2 RT 465:13–466:15; 3 RT 520:17–26, 521:5–25, 665:18–24; 4 RT 774:1–775:5, 776:7–24, 839:24–840:20; Ex. 242 at pp. 17, 21; Ex. 363 at pp. 4, 9.)

The opposition attempted to characterize the results of the statewide BCM and local BCM as widely divergent. But Dr. Tonkin analyzed both, compared their mountain-front recharge estimates, and found that they produced essentially the same result. (*See* 4 RT 773:5–775:5, 776:22–24, 801:3–14; 5 RT 955:24–956:3, 976:5–978:9; Ex. 363 at p. 23; Dem. Ex. 410.)

[11] Though Mr. Parker does not consider himself a modeler—*i.e.*, he does not work hands on with the modeling code—he does understand modeling principles. (3 RT 487:14–20, 564:16–565:3.)

The significant difference in results highlighted between the two BCMs was only the result of failing to compare the same time period: the statewide BCM yielded an average mountain-front recharge for 1980–1985 of 14,200 AFY; the local BCM yielded an average mountain-front recharge of 8,680 AFY for 1981–2010. (*Compare* Ex. 97 at p. 42 *with* Ex. 363 at p. 23; *see* 3 RT 579:15–581:17; 4 RT 799:13–800:3.)

B. The 2025 Ramboll Groundwater Model's Geometry and Aquifer Properties are Grounded in Modern Basin Data.

Ramboll developed a Basin-specific hydrogeologic conceptual framework using AEM (airborne electromagnetic) survey data, seismic reflection, lithologic logs, borehole information, and prior studies. That framework supplied the model's geometry, hydrogeologic zones, thickness, and spatial aquifer property interpretation. (Ex. 97 at pp. 9, 28–33, 58–67; 3 RT 523:3–531:16; 4 RT 783:1–9; 5 RT 1144:10–1146:1; 6 RT 1221:9–1222:3; *see* Exs. 366A, 367; Dem. Ex. 365; *see generally* Ex. 363.)

Dr. Bedekar testified that Ramboll's calibrated specific yield values of approximately 0.08, 0.09, and 0.11 fall within a plausible 0.05 to 0.15 range for the Basin's mixed sediments. The model reasonably matched groundwater elevations, and its specific yield and specific storage values were physically supportable. (6 RT 1194:15–1196:2; *see* 5 RT 1149:22–1153:21, 1155:22–1160:3; Exs. 251A, 252A, 259A; Dem. Ex. 254.) Those values also align with the independent datasets used in the change in storage analyses. (*See* 7 RT 1433:12–23, 1467:8–23; *see*, *supra*, § IV.B.6.)

The DRI model presented the opposite pattern. Its 2020 specific yield was anomalously high; its 2025 values were materially revised; and Dr. Bedekar found its 2025 specific storage values too high, physically unreasonable, and inconsistent with scientific literature and site-specific data from the Basin. The need to release excessive water from storage is consistent with inflows constrained too low. (5 RT 1140:23–1141:9, 1143:19–1144:4, 1153:22–1161:13; 6 RT 1174:20–1181:10, 1182:9–1186:9, 1196:4–12; 7 RT 1434:20–1435:6, 1435:19–1438:11; 10 RT 2147:6–2150:8; Exs. 253A, 255A, 256A, 257A, 258A, 259A; Dem. Ex. 254; Dem. Ex. 607 at pp. 54–55.) This reflects calibration overfitting around the assumption of recharge fixed at 7,650

AFY. (*See* 6 RT 1183:23–1184:18; 9 RT 1896:19–1897:24.) When those assumptions are constrained within physically reasonable bounds, the model is unable to reproduce observed groundwater levels without materially increasing recharge. (*See* 6 RT 1186:17–1192:9, 1193:2–1194:10; Exs. 260A, 261A, 262A.)

Figure 4. Spatial Distribution of Specific Yield in the DRI 2020 Model

Source: Ex. 990 at p. 37, fig. 22

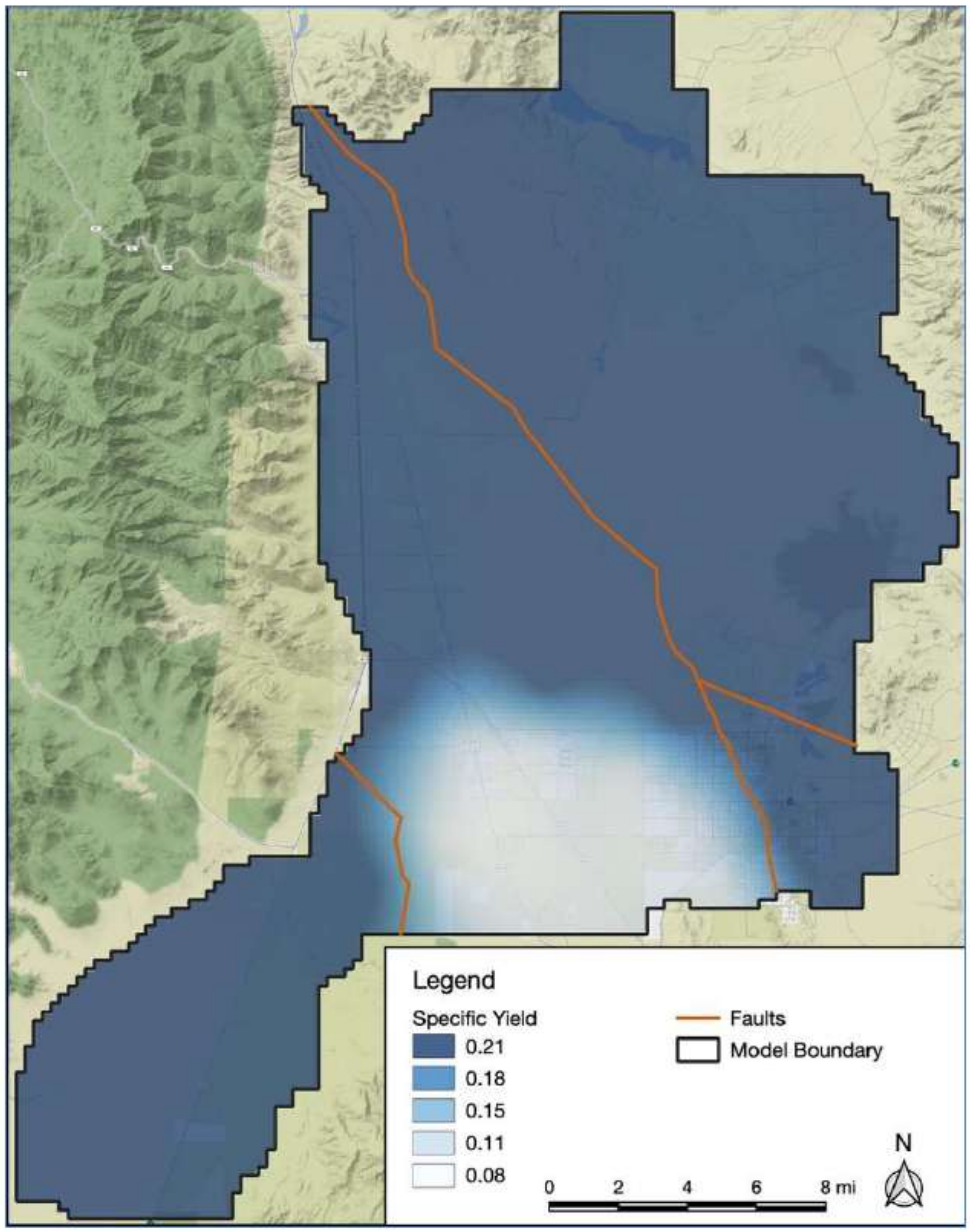


Figure 22. Spatial distribution of specific yield obtained by kriging in the calibrated transient-historical model. All model layers are assigned the same spatial distribution of specific yield. Refer to Figure 3 for the names of the fault segments.

Figure 5. Revised Layer-Specific Yield Distribution in the DRI 2025 Model

Source: Ex. 24 at p. 76, fig. 5-9

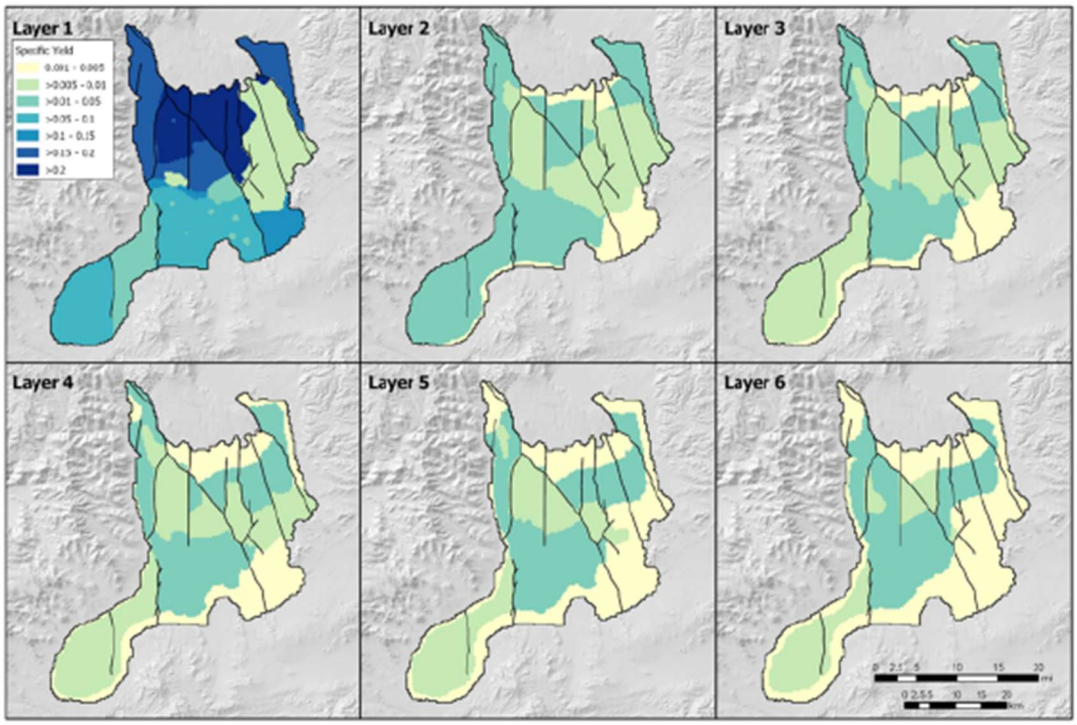


Figure 5-9. Calibrated specific yield fields for the six model layers, and the tectonic block model faults used to define aquifer property zone.

C. Ramboll's Groundwater Flow Model, Dr. Tonkin's Analysis Using the BCM, Correct Application of Anderson and Epstein, and the Change in Storage Analyses are Mutually Corroborating, Not Circular.

The Ramboll model, Dr. Tonkin's analysis, correct application of Anderson and Epstein, the TWG's change in storage analyses, and Mr. Teasdale's change in storage analyses share some underlying data, but they do not simply restate the same calculation. Ramboll solved groundwater flow through a 3-D numerical grid using independently derived inflows and aquifer properties. Dr. Tonkin separately evaluated the water budget using the BCM. He also corrected McGraw's—and Dr. Kincaid's and Dr. McKenna's—incorrect application of Anderson and Epstein. The TWG and Mr. Teasdale independently determined safe yield from recorded pumping and measured storage change across polygons. Their comparable results therefore provide meaningful cross-checks.

The Court need not choose the 2025 Ramboll model as perfect or exclusive. The relevant finding is narrower: every modern, data-based modeling analysis in the record yields a result materially above 7,650 AFY. The modeling evidence therefore cannot support the IWVGA/United States' proposal.

IX. THE BROADER PHYSICAL RECORD PROVIDES CONTEXT AND DOES NOT SUPPORT A 7,650 AFY FINDING.

A. The Basin's Large Volume of Groundwater in Storage is Relevant Context, Although Storage is Not Itself Renewable Safe Yield.

The amount of groundwater in storage is relevant to the physical consequences of pumping and to whether pumping will cause eventual depletion of the basin. The size of the aquifer and quantity of groundwater in storage are material context when considering eventual depletion. (*San Fernando*, *supra*, 14 Cal.3d at p. 280 ["overdraft occurs only if extractions . . . exceed its safe yield plus any such temporary surplus" derived from groundwater in storage].) Storage functions as a physical buffer, allowing demands to be met during dry periods by drawing on water accumulated during wetter periods and allowing the Basin to absorb short-term imbalances between inflows and outflows without immediate or irreversible impacts on groundwater availability. (1 RT 27:21–28:7, 58:2–25, 67:23–68:13, 71:10–16, 134:7–135:6; 4 RT 785:22–786:9, 913:4–25, 914:9–19; Ex. 123 at p. 41.)

B. Multiple Independent Analyses Demonstrate the Basin Contains a Substantial Volume of Groundwater in Storage.

The TWG evaluated groundwater in storage through multiple independent methods and consistently concluded that the Basin contains a substantial groundwater reserve.

The TWG estimated approximately 66.89 million acre-feet ("MAF") of total groundwater in hydrogeologic zones 1 through 3 (some of which is accessible and some of which would require additional infrastructure); approximately 37.53 MAF of fresh groundwater in those zones (some of which is accessible and some of which would require additional infrastructure); and approximately 14.55 MAF of fresh groundwater in the two shallowest zones (which is readily accessible using existing wells or new wells screened within those zones). (Ex. 5 at pp. 34–38;

see 1 RT 58:2–11, 59:3–6, 60:13–26, 62:9–22, 63:11–67:2, 102:4–22, 103:15–17; 3 RT 533:18–534:2, 534:24–535:7, 536:23–538:12; Exs. 209, 210, 211, 212, 213, 371; Dem. Ex. 368.) Dr. Tonkin independently estimated approximately 51 MAF of total groundwater, excluding confined storage and the deepest hydrogeologic zone. (4 RT 913:26–914:19; Ex. 123 at pp. 10, 40–41; Dem. Ex. 448.)

The estimates differ because they use different boundaries, zones, and assumptions, but they agree that the Basin contains a very large reserve. That reserve does not support permanent mining. But it does show why safe yield must be assessed over a representative period and why temporary storage losses in dry years must be evaluated together with recoveries in wet years rather than treated as immediate proof of eventual depletion. Given the volume of groundwater in storage and current projections of potential water use, there is no current threat of an appreciable depletion in storage over the next 20 years or more. (1 RT 121:4–14.)

C. The GSP Significantly Underestimates Groundwater in Storage.

The TWG also reviewed the IWVGA's analysis in the GSP of total groundwater in storage. The IWVGA did not consider storage in the entire Basin; it only considered about 15 percent of the Basin. The IWVGA did not perform any new work; instead, it relied on an estimate from 1993. In the GSP, the IWVGA concluded there are 2.3 MAF of available groundwater in storage. (3 RT 538:13–539:24; *see* Dem. Ex. 372.)

D. The Trial Did Not Establish Widespread Shallow Well Failure or Another Basin-Wide Impact that Compels 7,650 AFY.

"The aquifer talks to us in the language of water levels." (1 RT 48:14–49:2.) Anthony Brown of Aquilogic studied shallow well impacts with the TWG. They evaluated 857 domestic and public supply wells using construction data, historical groundwater elevations (2003–2023), and projected conditions. The analysis applied stated vulnerability, mitigation, and dry well thresholds and compared projected groundwater elevations with those thresholds. (*See* Ex. 204 at pp. 6–9; *see also* 1 RT 75:13–76:11, 77:4–24.) The study did not identify widespread shallow well failure across the Basin. (1 RT 76:12–77:24, 82:15–83:1, 83:18–84:5, 87:5–20; 3 RT 494:4–26; *see* 3 RT 492:20–493:14; Ex. 204 at pp. 10–12, 15–19, 25–29, 31–35, tables 1–2, figs. 5–14.)

That evidence does not mean localized impacts are impossible or that no well will require mitigation. Those issues can be addressed through monitoring, localized management, or later physical solution provisions. The narrower point is that the IWVGA and United States did not connect a demonstrated Basin-wide physical impact to a 7,650 AFY threshold. A lower safe yield number cannot be inferred merely from the existence of declining levels in selected areas; it must be supported by a reasoned Basin-wide analysis.

The same is true of subsidence and water quality concerns. Those effects are important if demonstrated and causally connected to pumping. But the trial record did not include a quantified analysis showing that 14,300 to 15,400 AFY would cause any significant and unreasonable Basin-wide result, or that 7,650 AFY would avoid it. The Court should not use unquantified management concerns as a substitute for the safe yield evidence.

X. THE COURT SHOULD ADOPT 15,400 AFY OR, AT MINIMUM, A FINDING NO LOWER THAN 14,300 AFY.

The evidence should be evaluated as a series of converging checks:

- Mr. Teasdale's preferred modern change in storage analyses yield 15,100 and 15,700 AFY, averaging **15,400 AFY**. (7 RT 1425:23–1426:3, 1439:7–1443:26; Ex. 85 at pp. 50–55.)
- Ms. Wicks independently testified that **15,400 AFY is reasonable** under the representative 2014–2023 base period and updated specific yield evidence. (3 RT 701:10–702:11.)
- The TWG Safe Yield Paper concluded **14,300 AFY** after applying two polygon configurations and multiple specific yield datasets. (Ex. 3 at pp. 25–30; *see* 3 RT 698:15–16, 542:3–546:22, 547:17–549:25, 550:15–554:21; 7 RT 1441:7–1442:7.)
- The IWVGA annual report method yields approximately **10,500 AFY** even with DRI 2020 specific yield values, and approximately **14,800 AFY** when specific yield values are replaced with Ramboll 2025 specific yield values. (6 RT 1383:15–1385:12, 1388:7–1389:4, 1405:17–1409:17; 7 RT 1409:7–17.)

- Dr. Tonkin's independent water budget using the physically based BCM for Basin inflows yields approximately **14,375 AFY**. (4 RT 916:21–919:1; Ex. 123 at pp. 31, 37–39.)
- The Ramboll model, using time-varying BCM inflows and physically reasonable storage properties, corroborates a safe yield materially **above** 7,650 AFY. (5 RT 1128:1–1129:18; 6 RT 1194:15–1196:2.)

Every modern data-based line of evidence rejects 7,650 AFY. The opposition reaches that number only by following the same inherited assumption through different documents, models, and selective expert discussions. The Court should not mistake repetition for independent confirmation.

XI. PROPOSED CLOSING FINDINGS

For the reasons stated above, the TWG Parties respectfully request that the Court make findings substantially as follows:

1. The controlling definition of safe yield is the maximum amount of groundwater that can be extracted annually, year after year, under a set of conditions without eventually depleting the basin. (*Santa Maria*, *supra*, 211 Cal.App.4th at p. 279; *San Fernando*, *supra*, 14 Cal.3d at p. 278.)

2. Current safe yield should be determined from a representative modern base period using the most complete, accurate, and current information available, including present cultural conditions, recorded pumping, measured groundwater levels, return flows, and other inflows to the extent they affect the aquifer, and supported storage properties.

3. The 2014–2023 period is a reasonable and representative base period because it spans ten years, includes wet and dry years, approximates long-term average precipitation, reflects current conditions, and provides materially improved pumping and groundwater-level data.

4. The change in storage method is reliable for the Basin because it applies conservation of mass to recorded pumping and measured groundwater-level response and thereby reflects the combined effect of inflows and outflows without requiring each component to be estimated separately.

5. Mr. Teasdale's use of two polygon configurations, more than 150 well observations, current pumping data, Brown & Caldwell and Ramboll specific yield datasets, pressure transducer information, and site-specific North Brown Road testing data reasonably addressed spatial and parameter uncertainty.

6. The specific yield values used in Mr. Teasdale's analyses are supported by Basin lithology, Brown & Caldwell, Kunkel & Chase, Ramboll 2024 and 2025, DRI's revised 2025 values, and site-specific field evidence. The 2020 DRI specific yield values are an outlier and materially depress the IWVGA annual report calculation.

7. Dr. Tonkin conducted an independent water balance analysis relying on the physically based BCM, developed independently by experts at the USGS, to calculate mountain-front recharge—the key source of recharge to the Basin. He reproduced and evaluated the BCM, comparing the results with observed data to validate them.

8. Mr. Teasdale's refined change in storage analyses support a current safe yield of approximately 15,400 AFY; the TWG Safe Yield Paper, the historical literature, the cross-check IWVGA annual report calculation, the corrected Anderson and Epstein analyses, Dr. Tonkin's independent water budget, and the Ramboll model independently corroborate a safe yield no less than 14,300 AFY.

9. The 7,650 AFY figure is not an independent current safe yield determination. It originated through an unavailable 2-D DRI/McGraw calibration in 2016, was transferred into materially different later models as a fixed aggregate recharge input, and was carried into the GSP and subsequent reports.

10. Calibration of later models while holding 7,650 AFY fixed does not independently validate that input, particularly where specific yield values changed materially and the DRI model did not reproduce observed wet-year behavior.

11. The TAC process did not establish a binding technical consensus that 7,650 AFY is the current safe yield. The number functioned as a working modeling assumption adopted amid acknowledged uncertainty and GSP deadline constraints.

12. The GSP, DWR's administrative review, and the 2026 Technical Report do not bind the Court's safe yield determination. Any prima facie effect under Code of Civil Procedure section 845, subdivision (d)(4) is limited to rebuttable physical facts and, in all events, is rebutted by the trial evidence concerning 7,650 AFY.

13. Dr. Kincaid's incomplete model review, selective literature average, exclusion of anthropogenic recharge, multiple uses of the same 7,650 AFY assumption, and arbitrary 15 percent ET reduction do not reliably establish his proposed low range.

14. Dr. McKenna's attempted empirical corroboration, flawed Owens Valley analogy, selected historical period, and inconsistent lag-time argument do not independently establish 7,650 AFY. Correcting the identified omissions and errors produced results that encompass or exceed the TWG range.

15. The earthquake, fault, interpolation, polygon, ET, and modeling artifact criticisms do not materially alter the TWG's converging safe yield evidence and do not provide a quantified basis for reducing safe yield to 7,650 AFY.

16. The current safe yield of the Indian Wells Valley Groundwater Basin is approximately **15,400 AFY and no less than 14,300 AFY.**

XII. CONCLUSION

The record presents two starkly different paths, but only one path leading to the correct result. The IWVGA/United States path begins and ends with 7,650 AFY, an inherited value generated through an unavailable 2016 calibration, held fixed while models and parameters changed, and repeated through the GSP and later reports. The TWG path begins with measured current Basin response: recorded pumping, groundwater levels, representative hydrology, lithology-based storage properties, multiple change in storage analyses, an independent water budget, and separate modeling. The TWG path ends with 15,400 AFY, and no less than 14,300

AFY. In all events, the Court should find that the record compels a safe yield materially higher than 7,650 AFY.

California law requires the maximum annual withdrawal sustainable under current conditions without eventual depletion. The record supports approximately 15,400 AFY, and in no event less than 14,300 AFY. The Court should so find.

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