PORTERVILLE
IRRIGATION DISTRICT

GSA
GROUNDWATER SUSTAINABILITY AGENCY

BOARD MEETING AGENDA

Thursday, January 15, 2026, Convenes at 3:00 p.m.

http://www.portervilleid.org / PIDGSA@ocsnet.net

22086 Avenue 160, Porterville, CA 93257

Web Meeting Attendance Available for Interested Parties:

Join Zoom Meeting
https://us06web.zoom.us/j/84319138554?pwd=Hqg55JSbhXYCHv2fZcEod0b6GeF67c.1

Meeting ID: 843 1913 8554
Passcode: Hu9n5p
One tap mobile
+16694449171,,6707587901#,,,,*478530# US
+17207072699,,6707587901#,,,,*478530# US

----------**AGENDA**----------

Action items are listed in **bold**.

1. CALL TO ORDER

Roll Call
Flag Salute

All items on this agenda, whether or not expressly listed for action, may be deliberated upon and may be subject to action by the Board of Directors. The Board of Directors may consider agenda items in any order. Materials related to an item on this agenda submitted to the Board of Directors after distribution of the agenda packet are available for public inspection at the Porterville Irrigation District, 22086 Avenue 160, Porterville, CA 93257, during regular business hours.

2. PUBLIC COMMENT

At this time, members of the public may comment on any item not appearing on the agenda. Under state law, matters presented under this item cannot be discussed or acted upon by the Board at this time. For items appearing on the agenda, the public is invited

to provide comments at the time the Board considers the item. Any person addressing the Board will be limited to a maximum of three (3) minutes, or at the Chairman's discretion. At all times, please state your name for the record.

3. ANNOUNCEMENTS

4. CONSENT CALENDAR

- **a. Consider Approval of November 17, 2025, GSA Board Minutes (Action).**
- **b. Consider Approval of Thomas Harder & Co. Proposed Scope of Work and 2026 Budget Costs for Hydrogeological Services in the Tule Subbasin, Budgeted by Acreage 3.26% for a Cost of $24,313.73 (Action).**
- **c. Consider Approval of 4Creeks Proposed 2026 Budget for Tule Subbasin Coordination Agreement Related Services Budgeted by Acreage 3.26% for a Cost of $26,686.03 (Action).**

5. ADMINISTRATION

- **a.** Water Year 2026 Sustainable Yield Allocation Setting (Announcement).

6. REPORTS FROM COMMITTEES

- **a.** No Report, January 1, 2026, Stakeholder Committee Meeting was Canceled.
- **b.** Tule Subbasin Managers Group Report from January 6, 2026 Meeting.
- **c.** Tule Subbasin Policy Group Report from January 12, 2026 Meeting.

7. CLOSED SESSION: No closed session.

8. CLOSED SESSION ITEMS: No Report.

- **a.** Report Action Taken in Closed Session Required by Government Code 54957.1

9. NEXT MEETING DATE

a. Next Regular Meeting – Thursday, February 19, 2026, at 2:00 p.m.

10. ADJOURNMENT

A person with a qualifying disability under the Americans with Disabilities Act of 1990 may request that the PIDGSA provide a disability-related modification or accommodation to participate in any public meeting. Such assistance includes appropriate alternative formats for the agendas and agenda packets used for any public meetings of the GSA. Requests for such assistance and for agendas and agenda packets shall be made in person, by telephone, facsimile, or written correspondence to the General Manager of the Porterville Irrigation District GSA at (559) 782-6321, at least 48 hours before a public meeting.

Agenda Item 4.a

CONSENT CALENDAR
Staff Report to the Porterville Irrigation District GSA Board of Directors

Subject: CONSENT CALENDAR / Consideration and approval of December 18, 2025, GSA Board Minutes (Action).

Submitted By: General Manager

PORTERVILLE
IRRIGATION DISTRICT
GSA
GROUNDWATER SUSTAINABILITY AGENCY

MINUTES OF THE
GSA BOARD OF DIRECTORS
MEETING HELD DECEMBER 18, 2025

At approximately 2:00 p.m. on December 18, 2025, at the Porterville Irrigation District, Board Room, President Eric Borba called to order the meeting of the Board of Directors of the Porterville Irrigation District Groundwater Sustainability Agency ("PIDGSA"). The meeting was also conducted remotely for members of the public.

Members Present: Eric Borba, David Gisler
Timothy Witzel Brett McCowan

Members Absent:

Others Present: Michael Knight, *GSA Manager*
Sean Geivet, *District Manager*
Aubrey Mauritson, *District Legal Counsel*
Nick Keller, *District Engineer*
Jeff Row, *District Secretary-Treasurer*

List of signed-in attendees:
Blake Wallace Seth Bowser
Jason Guthrie Douglas Jackson
Jace Vanderham

1. CALL TO ORDER

President Eric Borba called the meeting to order at 2:00 p.m.
Flag salute, Michael Knight.

2. PUBLIC COMMENT

DRAFT

President Borba opened the floor for public comments. No public comments were received.

3. ANNOUNCEMENTS

No announcements provided.

4. CONSENT CALENDAR

a. Consider Approval of November 17, 2025, GSA Board Minutes.

Action: Motion by Director Witzel, seconded by Vice-President Gisler, to approve the GSA Minutes of November 17, 2025. Motion carried unanimously.

5. ADMINISTRATION

a. Water Year 2025-2026 Sustainable Yield Allocation Setting.

The GSA Manager provided an informational overview regarding the Water Year 2025–2026 Sustainable Yield Allocation. The update summarized the applicable allocation methodologies consistent with the Tule Subbasin Coordination Agreement and referenced the technical memorandum prepared by 4Creeks, Inc.

The Board was advised that the allocation is being presented as an announcement item, with continued coordination underway while localized consultant review efforts proceed.

No formal Board action was requested or taken.

6. REPORTS FROM COMMITTEES

a. No Report, December 4, 2025, Stakeholder Committee Meeting was Canceled.

No report was provided, as the December 4, 2025, Stakeholder Committee meeting was canceled.

7. CLOSED SESSION: No closed session.

8. CLOSED SESSION ITEMS: No Report.

a. Report Action Taken in Closed Session Required by Government Code 54957.1.

There was no reportable action pursuant to Government Code Section 54957.1.

9. NEXT MEETING DATE

a. Next Regular Meeting – Thursday, January 15, 2025, at 2:00 p.m.

DRAFT

The next regular meeting of the Porterville Irrigation District Groundwater Sustainability Agency Board of Directors is scheduled for Thursday, January 15, 2025, at 2:00 p.m.

10. ADJOURNMENT

There being no further business before the Board, President Borba adjourned the meeting at 2:20 p.m.

Respectfully submitted,

_____
Michael Knight, GSA General Manager

DRAFT

Agenda Item 4.b

CONSENT CALENDAR
Staff Report to the Porterville Irrigation District GSA Board of Directors

Subject: CONSENT CALENDAR / Consider Approval of Thomas Harder & Co. Proposed Scope of Work and 2026 Budget Costs for Hydrogeological Services in the Tule Subbasin, Budgeted by Acreage 3.26% for a Cost of $24,313.73 (Action).

Submitted By: General Manager

The Porterville Irrigation District Groundwater Sustainability Agency (PID GSA) is a signatory to the Tule Subbasin Coordination Agreement and participates jointly with other GSAs in basin-wide hydrogeological, modeling, monitoring, and regulatory compliance activities required under the Sustainable Groundwater Management Act (SGMA).

Thomas Harder & Company has served as the primary hydrogeological consultant to the Tule Subbasin since the development of the original groundwater flow model and continues to provide technical support for annual reporting, land subsidence evaluation, mitigation planning, and response to State Water Resources Control Board (SWRCB) probationary requirements.

On January 8, 2026, TH&Co submitted a proposed Scope of Work and Cost Estimate for Calendar Year 2026 hydrogeological services applicable to all Tule Subbasin GSAs.

Services Applicable to PID GSA

While the scope of work is implemented at the Tule Subbasin level, PID GSA directly benefits from and relies upon the following components:

- Groundwater level monitoring and data processing for Subbasin RMS wells
- Annual SGMA reporting and data analysis supporting PID GSA compliance
- Land subsidence analysis, including coordination related to the Friant-Kern Canal and southern subsidence areas
- Mitigation planning support for community, municipal, and agricultural wells
- Groundwater flow model updates used to evaluate sustainable yield, pumping impacts, and management actions
- Technical coordination and engagement with SWRCB staff during the probationary period

Participation in a unified Subbasin consultant team ensures methodological consistency, regulatory defensibility, and cost efficiency for PID GSA.

The total proposed cost for Tule Subbasin hydrogeological services in 2026 is $745,820.

Costs are allocated among the participating GSAs based on relative Subbasin acreage, consistent with the adopted cost-sharing methodology.

- PID GSA Proportional Share: 3.26%
- PID GSA Total 2026 Cost: $24,313.73
- Quarterly Cost (Approximate): $6,078.43 per quarter

This allocation reflects PID GSA's proportional benefit from basin-wide technical services and aligns with prior-year allocation practices. The costs include PID GSA's share of annual reporting, monitoring, mitigation planning, implementation of the coordination agreement, and authorized groundwater model updates.

Staff recommends that the GSA Board:

Approve the Porterville Irrigation District Groundwater Sustainability Agency's participation in the Tule Subbasin-wide professional services agreement with Thomas Harder & Company (TH&Co) for 2026 hydrogeological services, including approval of PID GSA's proportional cost share of $24,313.73, and authorize the GSA Manager to execute related agreements and payment obligations consistent with the approved allocation.

January 8, 2026

Tule Subbasin Groundwater Sustainability Agencies
c/o Mr. David De Groot
324 S. Santa Fe Street, Suite A
Visalia, California 93292

Re: Proposed Scope of Work and Cost Estimate for Calendar Year 2026 Hydrogeological Services in the Tule Subbasin

Dear Mr. De Groot,

As per the request of the Tule Subbasin Groundwater Sustainability Agencies (GSAs), Thomas Harder and Company (TH&Co) has prepared this scope of work and cost estimate to provide hydrogeological support services in the Tule Subbasin (the Subbasin). The scope of work and cost is proposed to cover the 2026 calendar year.

Our detailed scope of work is as follows:

Task 1: Administration/Coordination

TH&Co will prepare and attend Tule Subbasin Stakeholder (Subtask 1.1) and Manager Meetings (Subtask 1.2). The budget for this task assumes two in-person and two remote Stakeholder Meetings and six in-person and six remote Manager Meetings.

General project management (Subtask 1.3) includes planning, coordination, and communication to direct resources and respond to inquires related to Subbasin activities. The budget for this task assumes a level effort similar to those of previous years.

Task 2: Groundwater Level Monitoring

TH&Co has historically provided groundwater level monitoring services for monitoring wells equipped with pressure transducers. These services have included:

- Downloading and periodic maintenance of pressure transducers,

- Processing of transducer data, and
- Coordination with 4 Creeks to ensure data are incorporated into the Tule Subbasin Database.

There are currently 14 wells in the subbasin monitoring network equipped with continuous groundwater level monitoring transducers: TSMW-1L, TSMW-4U and 4L, TSMW-5U and 5L, TSMW-6L and 6SM, ETGSA-01U, and 01L, LTRID-01U, 01M, and 01L, and PIDGSA-01U and 01L. TH&Co downloads the data from the transducers on a quarterly basis, processes the data into spreadsheet format, and transmits the data to 4 Creeks. There has also been a need for periodic technical troubleshooting of the transducers requiring correspondence with the manufacturer.

Task 3: Tule Subbasin Annual Report

TH&Co will finish preparing the 2024/25 Tule Subbasin Annual Report in early 2026 and begin work on the 2025/26 Tule Subbasin Annual Report in late 2026. Therefore, the budget for this task is equivalent to the effort to prepare one individual annual report but the work is split roughly in half for two different annual reports. The budget for this task assumes that additional work will be authorized for the following year to complete the 2025/26 Tule Subbasin Annual Report. The work will include:

- Subtask 2.1 - Process groundwater level data, prepare groundwater contours maps for Spring and Fall of both the Upper and Lower Aquifers (four total maps), and update hydrographs and tables for RMS wells.
- Subtask 2.2 – Process land subsidence data, prepare maps with benchmark survey and DWR InSAR data, and update tables for land subsidence RMSs.
- Subtask 2.3 – Prepare groundwater extraction, surface water supplies, and total water use tables based on analyses of available evapotranspiration (ET), precipitation, surface water delivery, and metered pumping data.
- Subtask 2.4 – Prepare groundwater storage analysis of the upper aquifer based on available groundwater level data and of the lower aquifer based on land subsidence data.
- Subtask 2.5 – Prepare and compile the Annual Report text, figures, tables, appendices, and attachments.

The cost estimate assumes that 4Creeks will provide applicable text, figures, and tables for the Water Quality and Progress Towards Implementation sections and submit the report and supporting data to the DWR SGMA portal. The cost estimate assumes one draft, one draft final for review and comment by stakeholders, and one final report.

Task 4: Supporting Technical Analyses for Coordination Agreement

TH&Co will conduct supporting technical analyses to update and implement the Subbasin Coordination Agreement and its attachments. The work is expected to include the following and is organized to follow the components and task numbers in the Tule Subbasin GSP Dashboard (as of 3-Dec-25):

Component #1 – Governance Restructure
No work envisioned under this component.

Component #2 – Mitigation Plan

- Task 4.a – Analysis and support for community and municipal well risk assessment. Expected to include support for a public water system risk assessment, compiling a database of wells, developing a Small Community Well Proactive and Protection Plan, analyzing potential impacts and the costs of impacts, and implementation of the plans.
- Task 4.b – Critical infrastructure risk assessment due to land subsidence.
- Task 4.c. – Analysis and support for non-drinking water wells (i.e. agricultural and industrial) risk assessment including cost estimates for potential mitigation.
- Task 5 – Support to develop criteria for determining probable cause of impacts including groundwater levels, water quality, and land subsidence.
- Task 6 – Support for stakeholder outreach and workshops including preparation for and attendance of meetings as requested by the GSAs and response to comments.
- Task 7 – Incorporate relevant changes from the updated mitigation plan as well as State Water Resources Control Board (SWRCB) comments into Attachment 4 of the Coordination Agreement (Sustainable Management Criteria for Groundwater Levels in the Tule Subbasin).

Component #3 – Land Subsidence SMC Coordination

- Task 1 – TH&Co will provide support to GSAs to coordinate the land subsidence sustainable management criteria and management plans of the GSAs near the Friant-Kern Canal.
- Task 2 – Analysis and support for the Southern Land Subsidence Study Area (SLSSA). The cost estimate assumes that work will include coordination, approach development, and analytical (i.e. non-numerical) modeling and efforts (e.g. analysis of existing land subsidence, pumping, and groundwater level data).
- Task 3 – Coordination, analysis, and support for the Land Subsidence Technical Working Group (TWG). The work will include:
    - Coordinate TWG Meetings
    - Prepare TWG Meeting Agendas
    - Moderate TWG Meetings

- Prepare TWG Meeting Minutes
- Coordinate Technical Analyses to Support Policy Goals/Address SWRCB Deficiencies
- Conduct Analyses Where Appropriate
- Review and Comment on Technical Analyses by Other Consultants in the TWG
- Provide Moderation on Technical Disputes Between Consultants
- Report Out TWG Recommendations to the Manager Group
- Report Out Technical Recommendations to the Policy Coordination Group
- Provide Technical Support to the Policy Coordination Group

Component #4 – Water Quality SMC Coordination

- Task 2 – Support to update groundwater quality SMC including updates to the Subbasin Monitoring Plan and Subbasin Setting (Attachments 1 and 2 of the Coordination Agreement) with information provided by 4Creeks.

Component #5 – Interconnected Surface Water SMC Development

- Task 1 – Support to fill data gaps related to interconnected surface water including identifying new monitoring well and gage locations and installing groundwater level pressure transducers in existing wells.

Component #6 – Groundwater Flow Model Update

- Task 1 – A scope of work and cost estimate to update the model was prepared in April 2025 and is included as **Attachment A**. The Tule Subbasin GSAs authorized TH&Co to conduct Task 2, 7 and 8 in 2025. This work is now substantially complete.

  For calendar year 2026, TH&Co is proposing to conduct Tasks 3, 4, 5 and 6 of the scope of work in **Attachment A**. The estimated cost for this work is $163,740.

Other

- Task 1 – Prepare and attend meetings with the SWRCB and SWRCB staff. Cost estimate assumes three remote meetings and one in-person meeting in Sacramento.

The budget for these tasks assumes a level of effort based on our current understanding of the requirements from the DWR and SWRCB, anticipated timeline for conducting the work, and continued level of communication with stakeholders. Changes in these conditions, or other unforeseen conditions, may result in tasks being under or over the projected budget.

COST ESTIMATE

The total estimated cost for hydrogeological support services in 2026, as outlined above, is $745,820 and is summarized in **Table 1**. The cost estimate is allocated to each GSA

I appreciate the opportunity to provide consulting services to the Tule Subbasin GSAs. If you have any questions regarding this scope of work, don't hesitate to contact me at (714) 779-3875.

Sincerely,

Thomas Harder, P.G., C.HG.
Principal Hydrogeologist

Cost Estimate for Hydrogeological Services
Tule Subbasin 2026

Task/ Subtask	Description	Principal Hydro-Geologist $260/hr	Associate Hydro-geologist $230/hr	Senior Hydro-geologist $190/hr	Project Geologist $165/hr	Staff Geo-scientist $145/hr	Graphics $130/hr	Clerical $100/hr	Total Labor	Reim-bursable Expenses	Total Cost	Approximate Cost by Quarter			
												Q1	Q2	Q3	Q4
1	**Administration/Coordination**														
1.1	Preparation for and Attendance at TAC Meetings (Assume 4; 2 in person)	24	24		20	20			$17,960		$17,960	$4,490	$4,490	$4,490	$4,490
1.2	Preparation for and Attendance at Manager Meetings (Assume 12; 6 remote attendance; 6 in person)	96	48	24	24				$44,520		$44,520	$11,130	$11,130	$11,130	$11,130
1.3	General Project Management	40	40	20				12	$24,600		$24,600	$6,150	$6,150	$6,150	$6,150
								Subtotal Task 1	**$87,080**	**$0**	**$87,080**	**$21,770**	**$21,770**	**$21,770**	**$21,770**
2	**Groundwater Level Monitoring**														
2.1	Download Pressure Transducers Quarterly	4		16		256			$41,200	$4,500	$45,700	$11,425	$11,425	$11,425	$11,425
2.2	Transducer Troubleshooting and Set Up Telemetry	8		28		80			$19,000		$19,000	$4,750	$4,750	$4,750	$4,750
								Subtotal Task 2	**$60,200**	**$4,500**	**$64,700**	**$16,175**	**$16,175**	**$16,175**	**$16,175**
3	**Tule Subbasin Annual Report**														
3.1	Process groundwater level data, prepare groundwater contours maps for Spring and Fall of both the Upper and Lower Aquifers (four total maps), and update hydrographs and tables for RMS wells	12	1	16	32	160			$34,870		$34,870	$8,718	$8,718	$8,718	$8,718
3.2	Process land subsidence data, prepare maps with benchmark survey and DWR InSAR data, and update tables for land subsidence RMSs	2	1	8	16	32			$9,550		$9,550	$2,388	$2,388	$2,388	$2,388
3.3	Prepare groundwater extraction, surface water supplies, and total water use tables	2	4	16	40	16			$13,400		$13,400	$3,350	$3,350	$3,350	$3,350
3.4	Prepare groundwater storage analysis of the upper aquifer and lower aquifer	6		24	16	32			$13,400		$13,400	$3,350	$3,350	$3,350	$3,350
3.5	Prepare and compile the Annual Report text, figures, tables, appendices, and attachments	14	10	40	24	60	16	8	$29,080		$29,080	$7,270	$7,270	$7,270	$7,270
								Subtotal Task 3	**$100,300**	**$0**	**$100,300**	**$25,075**	**$25,075**	**$25,075**	**$25,075**

Cost Estimate for Hydrogeological Services
Tule Subbasin 2026

Task/ Subtask	Description	Principal Hydro-Geologist $260/hr	Associate Hydro-geologist $230/hr	Senior Hydro-geologist $190/hr	Project Geologist $165/hr	Staff Geo-scientist $145/hr	Graphics $130/hr	Clerical $100/hr	Total Labor	Reim-bursable Expenses	Total Cost	Approximate Cost by Quarter			
												Q1	Q2	Q3	Q4
4	**Supporting Technical Analyses for Coordination Agreement**														
Dashboard Component #1 – Governance Restructure															
Dashboard Component #2 – Mitigation Plan															
4.a	Small Community and Municipal Well Risk Assessment and Plans								$30,000		$ 30,000	$ 7,500	$ 7,500	$ 7,500	$ 7,500
4.b	Critical Infrastructure Risk Assessment due to Land Subsidence								$10,000		$ 10,000	$ 2,500	$ 2,500	$ 2,500	$ 2,500
4.c	Non-Drinking Water Wells Risk Assessment and Cost Estimates								$20,000		$ 20,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000
5	Develop Standard Criteria for Determining Probable Cause of Impact								$30,000		$ 30,000	$ 7,500	$ 7,500	$ 7,500	$ 7,500
6	Stakeholder Outreach and Workshops								$10,000		$ 10,000	$ 2,500	$ 2,500	$ 2,500	$ 2,500
7	Edits to Attachment 4 to the Coordination Agreement								$5,000		$ 5,000	$ 1,250	$ 1,250	$ 1,250	$ 1,250
Dashboard Component #3 – Land Subsidence SMC Coordination															
1	Friant-Kern Canal Land Subsidence Management Plan (LSManP)								$10,000		$ 10,000	$ 2,500	$ 2,500	$ 2,500	$ 2,500
2	Technical Support to Establish SMCs in the Southern Land Subsidence Study Area (SLSSA)								$25,000		$ 25,000	$ 6,250	$ 6,250	$ 6,250	$ 6,250
3	Land Subsidence Technical Working Group (TWG)								$120,000		$ 120,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000
4	Edits to Attachment 6 to the Coordination Agreement								$10,000		$ 10,000	$ 2,500	$ 2,500	$ 2,500	$ 2,500
Dashboard Component #4 – Water Quality SMC Coordination															
2	Update Monitoring Plan and Subbasin Setting (Attachments 1 and 2 to the Coordination Agreement)								$10,000		$ 10,000	$ 2,500	$ 2,500	$ 2,500	$ 2,500
Dashboard Component #5 – Interconnected Surface Water SMC Development															
1	Support to Fill Data Gaps								$40,000		$ 40,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Dashboard Component #6 – Groundwater Flow Model Update															
1	Update Groundwater Flow Model[1]								$163,740		$ 163,740	$ 40,935	$ 40,935	$ 40,935	$ 40,935
Other															
1	State Water Resources Control Board (SWRCB) and SWRCB Staff Meetings								$10,000		$ 10,000	$ 2,500	$ 2,500	$ 2,500	$ 2,500
								Subtotal Task 4	**$ 493,740**		**$ 493,740**	**$ 123,435**	**$ 123,435**	**$ 123,435**	**$ 123,435**

Cost Estimate for Hydrogeological Services
Tule Subbasin 2026

Task/ Subtask	Description	Principal Hydro-Geologist $260/hr	Associate Hydro-geologist $230/hr	Senior Hydro-geologist $190/hr	Project Geologist $165/hr	Staff Geo-scientist $145/hr	Graphics $130/hr	Clerical $100/hr	Total Labor	Reim-bursable Expenses	Total Cost	Approximate Cost by Quarter			
												Q1	Q2	Q3	Q4
[1] This budget includes Tasks 3, 4, 5, and 6 of the Model Update Scope of Work in Attachment A								**Total**	**$ 741,320**	**$ 4,500**	**$ 745,820**	**$ 186,455**	**$ 186,455**	**$ 186,455**	**$ 186,455**

Cost Allocation of Hydrogeological Services

GSA	Percentage Relative to Subbasin Area	GSA Allocation of Hydrogeological Services Cost	GSA Allocation of Hydrogeological Services Cost by Quarter			
Alpaugh Irrigation District	3.03%	$22,598.35	$5,649.59	$5,649.59	$5,649.59	$5,649.59
Delano-Earlimart Irrgation District	12.06%	$89,945.89	$22,486.47	$22,486.47	$22,486.47	$22,486.47
~~Eastern Tule~~	~~31.00%~~	~~$231,204.20~~	~~$57,801.05~~	~~$57,801.05~~	~~$57,801.05~~	~~$57,801.05~~
City of Porterville	3.28%	$24,462.90	$6,115.72	$6,115.72	$6,115.72	$6,115.72
Porterville Irrigation District	3.26%	$24,313.73	$6,078.43	$6,078.43	$6,078.43	$6,078.43
Saucelito Irrigation District	4.14%	$30,876.95	$7,719.24	$7,719.24	$7,719.24	$7,719.24
Terra Bella Irrigation District	2.90%	$21,628.78	$5,407.20	$5,407.20	$5,407.20	$5,407.20
Tule East	17.42%	$129,921.84	$32,480.46	$32,480.46	$32,480.46	$32,480.46
Kern-Tulare Water District	1.81%	$13,499.34	$3,374.84	$3,374.84	$3,374.84	$3,374.84
Lower Tule River Irrigation District	22.01%	$164,154.98	$41,038.75	$41,038.75	$41,038.75	$41,038.75
Pixley Irrigation District	14.70%	$109,635.54	$27,408.89	$27,408.89	$27,408.89	$27,408.89
Tri-County Water Authority	14.47%	$107,920.15	$26,980.04	$26,980.04	$26,980.04	$26,980.04
Teapot Dome Water District	0.63%	$4,698.67	$1,174.67	$1,174.67	$1,174.67	$1,174.67
Vandalia Water District	0.29%	$2,162.88	$540.72	$540.72	$540.72	$540.72
Total	**100.00%**	**$745,820**	**$186,455**	**$186,455**	**$186,455**	**$186,455**

Thomas Harder & Co.
Groundwater Consulting

Attachment A

April 22, 2025

Tule Subbasin Technical Advisory Committee
Attn: Mr. David De Groot
324 S. Santa Fe Street, Suite A
Visalia, California 93292

Re: Draft Proposed Approach and Scope of Work to Update and Refine the Tule Subbasin Groundwater Flow Model

Dear Mr. De Groot,

As per the request of the Tule Subbasin Technical Advisory Committee (TAC), Thomas Harder and Company (TH&Co) has prepared this scope of work and cost estimate to update and refine the Tule Subbasin groundwater flow model. The Tule Subbasin groundwater flow model was developed in 2018 and 2019 and updated in 2020 to inform preparation of the Groundwater Sustainability Plans (GSPs) for each of the Groundwater Sustainability Agencies (GSAs) in the Tule Subbasin. The current version of the model has been calibrated to measured data through September 2019. Work to update the model in 2023 was started but, at the direction of the TAC, was not completed to focus efforts on addressing GSP comments from the State Water Resources Control Board (SWRCB).

Objective

The primary purpose of the current version of the model has always been to estimate the Subbasin's Sustainable Yield and simulate the effectiveness of planned projects and management actions designed to eliminate overdraft and minimize/avoid land subsidence under average hydrologic conditions in the implementation period (i.e. 2020 to 2040) and long-term planning horizon (i.e. to 2070). The objective of the proposed work is to expand on this primary purpose to address additional, new priorities brought about by the September 17th, 2024 ruling of the SWQCB to place the Tule Subbasin on probation. These new priorities include using the model to also assess:

1. residual (delayed) land subsidence in response to future varied hydrologic conditions (i.e. wet and dry); and

2. potential depletions of interconnected surface water (ISW) in response to pumping.

As part of this effort, data collected since September 2019, including a revised future projection, will be incorporated into the model. Given the availability of 5 years of additional data (i.e., October 2019 through September 2024), along with refining the model to address the new, additional priorities, it will be necessary to recalibrate the model. As such, our proposed scope can be generally described as updating and recalibrating the model. Specifically, our proposed scope of work and cost estimate is predicated on the following potential uses for the revised model in 2025:

1. Analysis of land subsidence, including assistance in land subsidence managed areas (e.g. Friant-Kern Canal (FKC), Southern Land Subsidence Study Area (SLSSA), and the western Tule Subbasin) and analysis of residual/delayed subsidence.
2. Analysis of depletions of ISW due to pumping to inform the development of Sustainable Management Criteria (SMC) for ISW conditions.
3. Analysis of groundwater level impacts to domestic and small water system wells.
4. Evaluating the impacts of individual projects and/or management actions on the Sustainable Yield of the subbasin.
5. Evaluations of additional projects and management actions, as needed and directed by the TAC.

Through our work on the model in the last year, TH&Co has identified recommended refinements to improve the model. We have prioritized the potential revisions and updates into recommended Tasks 1 through 18 below. These tasks cover the changes that are likely to have the greatest potential to improve the model for use as a decision support tool.

In addition to the recommended tasks, we have included Optional Task A which provides an outline to prepare and analyze future project scenarios that could be performed after the model update and Optional Tasks B and C which are intended to improve model calibration.

Scope of Work

Task 1: Project Coordination and Meetings

The work outlined herein will be coordinated with technical representatives from the Tule Subbasin GSAs (the Technical Working Group). TH&Co will coordinate regular bi-weekly (once every two weeks) meetings to provide updates, review assumptions and interim results, receive feedback, and answer questions. The topics, discussion, feedback, and action items from each meeting will be documented via meeting minutes that will be circulated to the GSA managers

within one week of the meeting. Work progress and interim results will be presented at regular GSA manager meetings, TAC meetings, and, as requested, GSA Board meetings.

Task 2: Obtain Supplemental Data

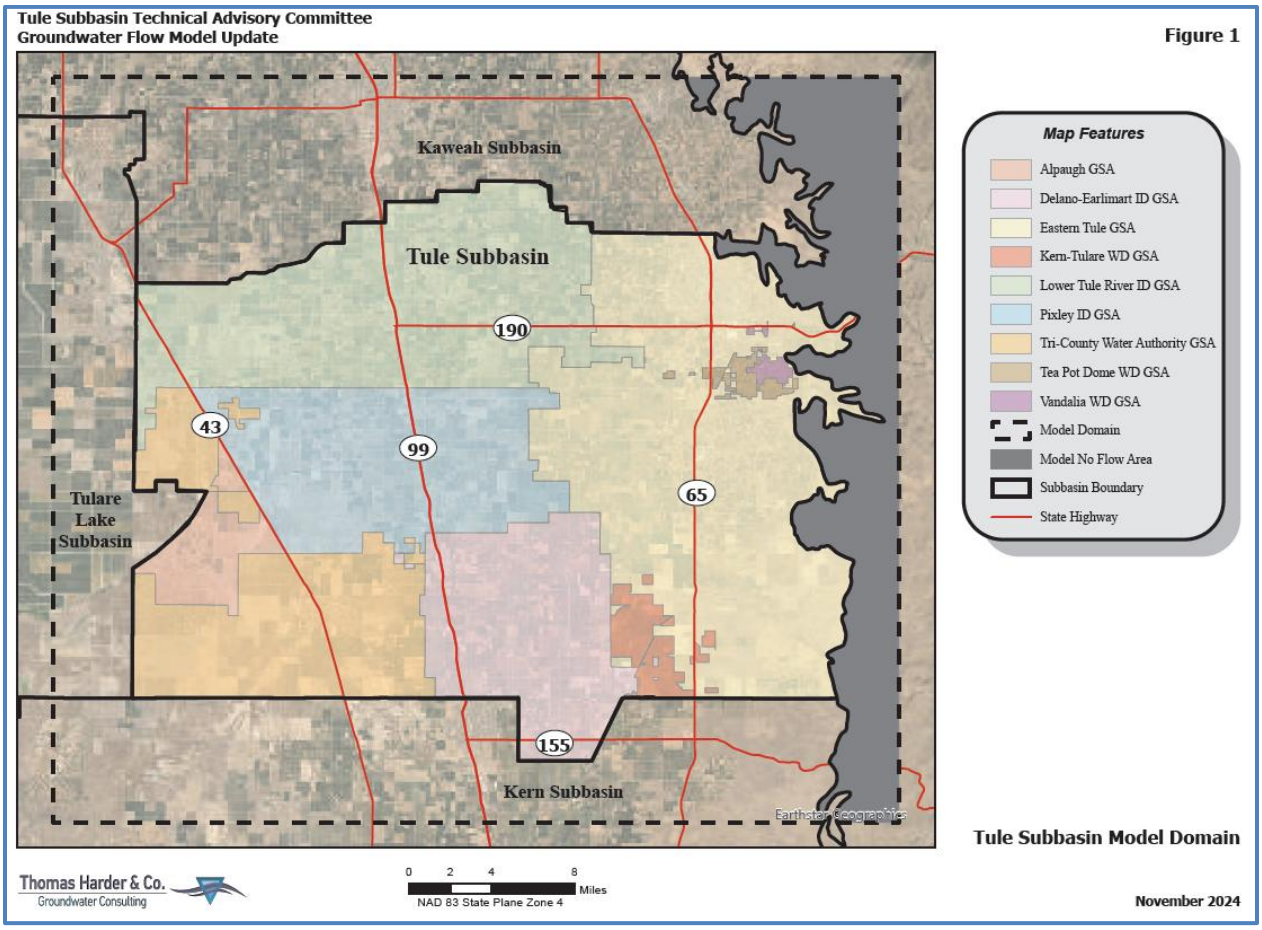
TH&Co will obtain supplemental data necessary to update the model from October 2019 through September 2024 (i.e. Water Year [WY] 2020 through WY 2024). It is noted that these data have already been mostly compiled for Tule Subbasin Annual Reports. Data from the portions of neighboring Subbasins within the model domain (see Figure 1) will be collected from publicly available resources or through direct data requests.

The supplemental data needed to revise the model include, but are not limited to, the following:

- Surface water data
  - Tule River flows and diversions from the Tule River Association (TRA)
  - Deer Creek flows from the United States Geological Survey (USGS)
  - Deer Creek diversions from the SWRCB
  - Friant-Kern Canal deliveries from the United States Bureau of Reclamation (USBR)
  - Annual Water Use Summaries from Lower Tule River Irrigation District and Pixley Irrigation District, and
  - Angiola Water District (AWD) surface deliveries
  - Elk Bayou diversions from the Kaweah Delta Water Conservation District
- Groundwater production data
  - Cities of Porterville, Delano, Tulare, and Corcoran
  - Communities of Allensworth, Alpaugh, Ducor, East Porterville, Lindsay, Pixley, Poplar-Cotton Center, Richgrove, Strathmore, Terra Bella, Teviston, Tipton, and Woodville
  - AWD, Terra Bella Irrigation District (TBID), Vandalia Water District (VWD), Delano-Earlimart Irrigation District (DEID), and Corcoran Irrigation District (CID)
  - Creighton Ranch well field
- Evapotranspiration and precipitation raster data from LandIQ
- Wastewater treatment plant outflows
  - City of Porterville
- Groundwater levels
  - Tule Subbasin TAC
  - Irrigation and Water Districts
  - City of Porterville
  - SGMA Data Viewer
- Land Subsidence data

- Benchmark data from Tule Subbasin TAC
- InSAR data from the DWR
- Extensometer compaction data from the USGS
- Continuous GPS (CGPS) data from UNAVCO

TH&Co will coordinate the data collection with managers from each GSA and other agencies, as necessary.



Task 3: Update Model Calibration Period

Current Model: The calibration ("historical") period extends from October 1986 through September 2019 with monthly stress periods. Stress components that change over time ("time-variant components") include surface water supplies and uses, precipitation, evapotranspiration, metered groundwater production, and mountain block/front recharge. These stresses are inflows to, and outflows from, the groundwater and are collectively referred to as "time-variant flux boundary conditions". Time-variant groundwater elevation ("head") boundary conditions are generally located inside the northern, western, and southern perimeter of the model domain.

TH&Co will append the existing model input files to extend the model calibration period from October 2019 through September 2024. Consistent with the current calibration approach, the updated model will use monthly stress periods; therefore, 60 calibration stress periods will be appended to the model to bring the calibration period through September 2024. Using data obtained from Task 2, TH&Co will update the following time-variant flux boundary conditions:

- Surface water supplies and uses
  - Tule Subbasin Supplies: Tule River, Deer Creek, White River, and Imported Water
  - Kaweah Subbasin Supplies: Kaweah River and Imported Water
  - Tulare Lake Subbasin Supplies: Kings, Kaweah, and Tule Rivers
  - Kern Subbasin Supplies: Imported Water
  - Uses: Surface deliveries, canal losses, basin recharge
- Precipitation
- Evapotranspiration
- Reported and estimated municipal groundwater production
  - Cities of Porterville, Tulare, Delano, and Corcoran
  - Communities of Allensworth, Alpaugh, Ducor, East Porterville, Lindsay, Pixley, Poplar-Cotton Center, Richgrove, Strathmore, Terra Bella, Teviston, Tipton, and Woodville
- Other Metered Production
  - AWD, TBID, VWD, DEID, and CID
  - Creighton Ranch wellfield

The current model uses the specified head boundary (CHD) package and well (WEL) package to simulate perimeter boundary conditions. The CHD package is used for the northern, western, and southern perimeter areas whereas the WEL package is used to simulate mountain front/block recharge along the eastern perimeter (i.e. the western margin of the Sierra Nevada Mountains). The time-variant head boundary conditions will be revised by assigning heads to cells along the boundary of the Tule Subbasin. TH&Co will evaluate the CHD and WEL packages in the context of potentially converting them to the general head boundary (GHB) package.

Task 4: Update Model Calibration Targets

Current Model: Fifty-one groundwater level targets are used for calibration. There are a total of 114 subsidence targets which include 45 points with InSAR data at wells, 68 additional points with InSAR data, and 2 CGPS stations. One compaction target is included in the model with data from the USGS extensometer.

TH&Co will update and revise the model groundwater level and subsidence calibration targets. TH&Co will make the following changes:

- Update the current groundwater elevation calibration targets with new data.
- Add new groundwater elevation calibration targets with up to 100 new wells identified in the Tule Subbasin Monitoring Plan.
- Add groundwater elevation calibration targets with up to 30 new wells in the Upper Tule River and Upper Deer Creek areas in support of future analyses of depletions of ISW due to pumping.
- Add new land subsidence calibration targets at the 61 benchmarks installed since 2020 that are used as land subsidence Representative Monitoring Sites (RMSs). Data from the surveys at the benchmarks will be included as potential calibration targets.
- Using the DWR InSAR land subsidence data from 2015 through 2024:
    - Update the current land subsidence targets.
    - Add land subsidence calibration targets at the 61 RMS benchmarks. DWR InSAR data will be included as potential targets. The relative weighting of data from the benchmark surveys as compared to those from DWR InSAR will be determined during the calibration process.
    - Add a new network of land subsidence targets. Proposed to add one target every 4,000 ft for a total of approximately 2,300 points.
    - Add land subsidence targets every 1,320 ft (1/8 mile) along the FKC within the Tule Subbasin.
- Update the Porterville and Delano CGPS land subsidence calibration targets.
- Update the USGS extensometer compaction calibration target.

Task 5: Incorporate Delayed Interbeds to the Subsidence Package

Current Model: Land subsidence is simulated in the model with the Subsidence and Aquifer-System Compaction (SUB) package. Land subsidence in the SUB package of the model is a function of the effective stress of the aquifer system and changes in hydraulic head.

Non-recoverable (i.e., irreversible or inelastic) land subsidence occurs in the SUB package when the change in effective stress under a given hydraulic head condition exceeds the previous maximum effective stress (or pre-consolidation stress) of the aquifer system. This maximum effective stress can generally be defined by the previous lowest groundwater level, herein referred to as the "critical head."

The current configuration does not implement the delayed subsidence capability of the SUB package.

TH&Co will incorporate the delayed interbeds into the SUB package to simulate the slow dissipation of heads in the interbeds and the resulting residual land subsidence. It is anticipated that incorporating delayed interbeds will improve land subsidence calibration results in the

historical period and will be used to inform land subsidence and groundwater level SMCs in the future projection. Further, it will allow for the estimation of residual land subsidence after groundwater levels stabilize or rise, where and when those conditions occur.

TH&Co will develop initial input files and ranges of parameters for the following parameters:

- Starting head of delay interbeds
- Preconsolidation head for delay interbeds
- Initial elastic and inelastic compaction of delay interbeds
- The number and thickness of individual interbeds for delay interbeds

Data considered to develop the initial subsidence input parameter values may include:

- USGS Central Valley Hydrologic Model version 2 (CVHM2)[1]
- 1D compaction modeling east of Tulare by Lees and Knight (2022)[2]
- Recent data from the Deer Creek and Friant-Kern Canal USGS extensometer
- Historical published data and analysis of extensometers from the USGS[3,4]
- Data and analysis of residual subsidence from other parties
- Existing model parameters

Final parameters will be developed during calibration.

Task 6: Incorporate the Streamflow Routing Package

Current Model: Streamflows, diversions, and infiltration losses for Tule River, Porter Slough, Deer Creek, and White River are included in the model using a combination of externally reported or estimated values. For example, infiltration losses for the Upper Tule River (i.e. from Success Dam to Oettle Bridge) are based on an accounting of inflows and outflows from the river as reported by the TRA. In the model, these reported monthly infiltration values are added via the Recharge Package evenly for the cells along this portion of the river.

TH&Co will incorporate the Tule River, Porter Slough, Deer Creek, and White River into model with the Streamflow Routing (SFR) Package. The SFR package calculates recharge losses in the stream channels based on measured surface water flow rates and streambed conductance. It is

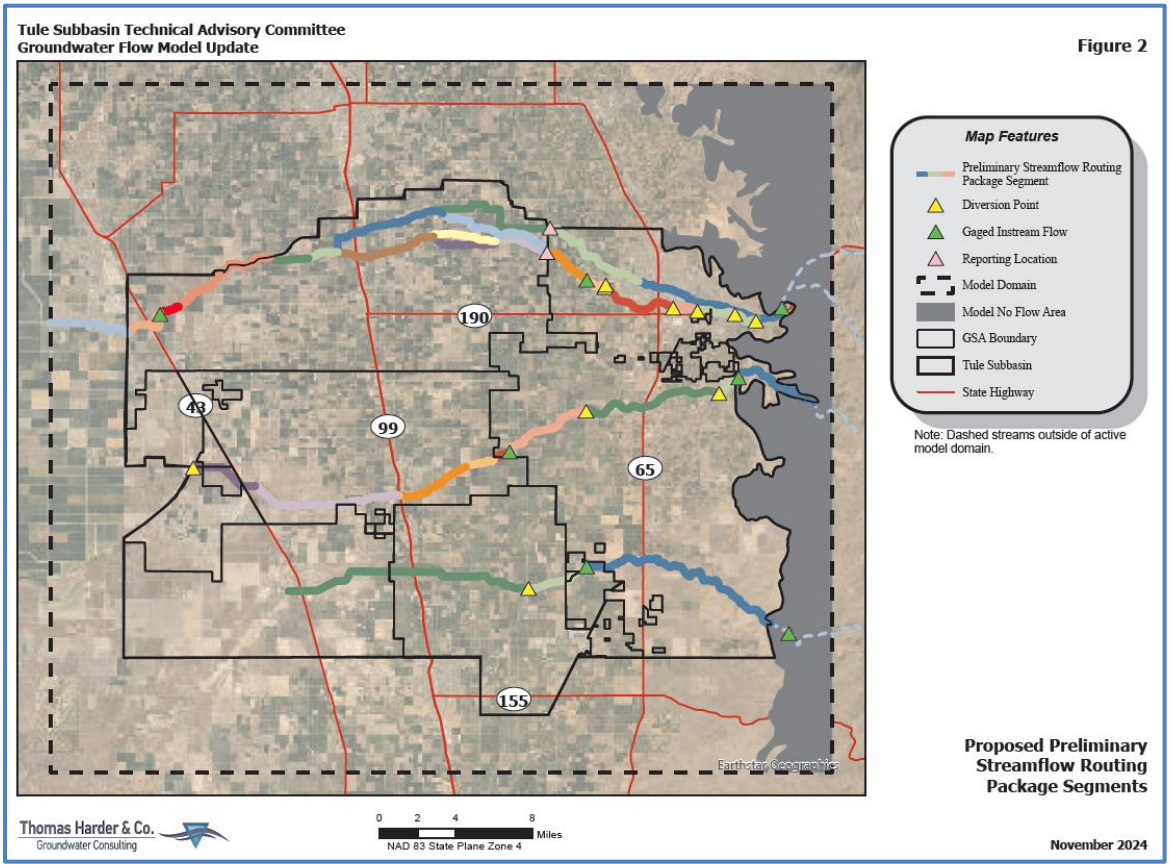
[1] Faunt, C.C., 2022, Central Valley Hydrologic Model version 2 (CVHM2): Model Setup Files: U.S. Geological Survey data release, https://doi.org/10.5066/P97XBULI.
[2] Lees, M., Knight, R., and Smith, R., 2022. Development and Application of a 1D Compaction Model to Understand 65 Years of Subsidence in the San Joaquin Valley. Water Resources Research, 58, e2021WR031390.
[3] Ireland, R.L., Poland, J.F., and Riley, F.S., 1984. Land Subsidence in the San Joaquin Valley, California, as of 1980. U.S. Geological Survey Professional Paper 437-I.
[4] Lofgren, B.E., and Klausing, R.L., 1969. Land Subsidence Due to Ground-Water Withdrawal Tulare-Wasco Area California. USGS Professional Paper 437-B.

anticipated that incorporating the SFR will allow for more representative stream/river losses spatially and temporally and will estimate the amount of groundwater discharging to surface water (if any). It is envisioned that the updated model with the SFR package will be used later to conduct pumping/no pumping scenarios to estimate potential depletions of interconnected surface water (ISW) due to pumping which will inform ISW SMC development. The scope of work to conduct the ISW analysis would be prepared after the model has been updated, refined, and recalibrated.

A preliminary configuration of stream segments and diversion points is shown on Figure 2. Segments are comprised of 'reaches', which are cell-specific. As proposed, reach-specific parameters do not vary over time and include streambed length, elevation, slope, thickness, and hydraulic conductivity. Segment-specific parameters are time-variant and include flow, upstream and downstream width, and roughness (Manning's coefficient).

Flow terms to the Subbasin for the Tule River, Deer Creek, and White River will be that reported at Success Dam, Fountain Springs, and East of Ducor gaging stations, respectively. These flow terms will be specified only for the first reach of the segments defining the Tule River, Deer Creek, and White River. Flow will not be specified for subsequent downstream segments but rather will be tracked, along with river stage, as part of the calibration process. Diversions from the segments, including into Porter Slough, will be based on reported data from the TRA and local agencies (e.g. LTRID and Pixley ID). Diverted water will be treated as non-routed deliveries in the model, and therefore, canals will not be simulated in the SFR package.

Streambed length, elevation, slope, and upstream and downstream width will be based on analysis of LiDAR elevation data and aerial imagery whereas streambed hydraulic conductivity, roughness (Manning's coefficient), and thickness will be based on literature values and refined during calibration.



Task 7: Refine Model Water Budget Areas

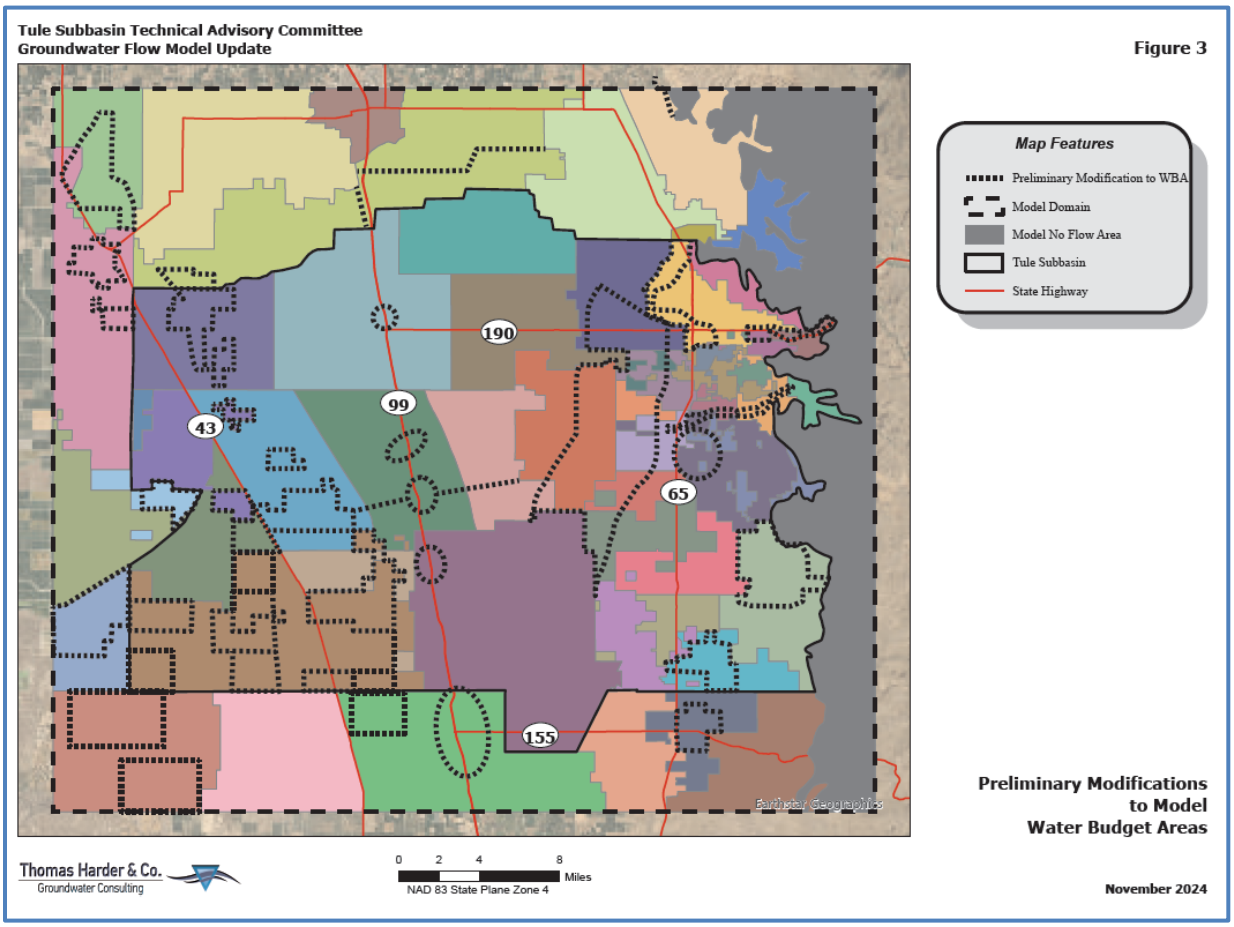
Current Model: The model utilizes the Farm Model Process (FMP) package to simulate the agricultural water budget, which is based on the concept of Water Budget Areas (WBAs). WBAs are simulated farms (see the color-shaded areas on Figure 3). WBAs account for the application, consumption and movement of water at the land surface in irrigated agricultural areas where pumping is not metered and therefore must be estimated. To that end, given inputs such as consumptive use, precipitation, surface deliveries, and irrigation efficiency, groundwater pumping within each WBA is calculated by the FMP process and then distributed evenly to the wells assigned to that WBA. The current model uses 56 WBAs primarily based on jurisdictional boundaries (e.g. Irrigation Districts).

To improve model calibration and provide flexibility to simulate potential future projects and management actions, TH&Co will refine some of the existing Water Budget Areas (WBAs) into smaller WBAs to better account for the spatial distribution of agricultural pumping and return flow. Proposed preliminary WBA changes are shown 4with dashed lines below on Figure 3. WBAs will be modified based on feedback from stakeholders. Proposed changes include:

- Subdivide larger (e.g. on the order of 2 mi^2 or larger) non-irrigated areas (e.g. Pixley Wildlife Refuge, City of Delano, areas adjacent to the upper Tule River).
- Subdivide areas that transition from irrigated to non-irrigated or vice versa over the historical calibration period (e.g. in portions of TCWA's Southeast Management Area).
- Subdivide areas within the Eastern Tule GSA Land Subsidence Management Area (LSMA).
- Subdivide areas within the proposed SLSSA based on initial modeling results from a separate analysis expected by Spring 2025.

Potential other revisions include:

- Revising the LTRID and Pixley ID WBAs based on a review of parcel-specific surface delivery data.
- Revising other areas based on additional projects or management actions not currently incorporated into the model.



Task 8: Revise Model Layers

Current Model: Model layers were developed based on analysis of five hydrogeologic cross sections extended through the model domain. The cross sections were developed based on driller's logs, geophysical logs, and well construction information. The top of Layer 1 is the ground surface as imported from USGS Digital Elevation Models (DEMs) averaged for each 1,000 ft x 1,000 ft cell.

Model Layer 1 corresponds to the Upper Aquifer. The bottom of Layer 1 was selected to correlate with the top of the Corcoran Clay, where it exists, and is generally shallower than the top of perforations for most wells in the eastern part of the Tule Subbasin. The thickness of Layer 1 ranges from less than 100 feet in an area north of Porterville to approximately 450 feet near Corcoran.

Layer 2 generally corresponds to the Corcoran Clay, where it exists, primarily west of Highway 99. The thickness of Layer 2 ranges from approximately 50 feet at the base of the Sierra Nevada Mountains in the eastern model domain to approximately 500 feet in the western part of the model domain.

Layer 3 generally corresponds to the Lower Aquifer. This aquifer ranges in thickness from less than 250 feet at the base of the Sierra Nevada Mountains to approximately 2,000 feet in the northwest model domain.

Layer 4 generally correlates to deeper marine sedimentary deposits in the eastern portion of the Tule Subbasin. This layer is generally considered a relatively low permeability unit separating the overlying Lower Aquifer (Layer 3) from the underlying Santa Margarita Formation aquifer (Layer 5). However, some wells in the eastern portion of the basin are perforated within it. The thickness of Layer 4 ranges from less than 250 feet along the model edges to greater than 1,700 feet in the south-central model area.

Layer 5 represents the Santa Margarita Formation and upper portion of the Olcese Formation in the eastern part of the Tule Subbasin. The thickness of this layer ranges from 0 to 1,000 feet thick. (The bottom of Layer 4 is also no-flow where Layer 5 is absent.)

Based on new data it is proposed to modify the model layers as follows:

- Revise top of Layer 1 based on LiDAR data collected by the USGS in 2021. In general, this will raise the top of Layer 1 10 to 30 feet in the portion of the model west of Highway 99 and will change the top of Layer 1 by less than 10 feet east of Highway 99.
- Porterville Area: Refine the bottom of layers 1, 2, and 3 based on a localized analysis of lithologic logs. This analysis will also support the inclusion of the SFR package (Task 6).

In general, the bottom of Layer 1 will be raised and the bottoms of layers 2 and 3 are expected to be lowered.

- Central and Western Subbasin: Refine the bottom of layers 1, 2, and 3 based on new geophysical logs and nested monitoring well data. In general, it is envisioned that the bottom of layers 1 and 2 will be lowered and the bottom of layer 3 will be raised.
- Southeast Subbasin: Refine the layers to better follow the subsurface geologic units of the Pliocene Deposits, Olcese Sands, and Santa Margarita Formation.

Task 9: Incorporate Available GSA Well Registration Data

Current Model: Given the large number of agricultural wells in the Tule Subbasin and the lack of well registration programs when the model was developed, it was not practical to incorporate actual wells explicitly into the model. Rather, the model invokes a surrogate approach that involves incorporating four agricultural "farm wells" per square mile (numbered by township-range-section and denoted as A through D). The perforation intervals for the wells were based on a statistical analysis of DWR Well Completion Reports (i.e. driller's logs), where the overall perforation interval range for each WBA was subdivided into quartiles (i.e. four representative perforation intervals) and the quartile perforation interval was assigned to each of the four representative agricultural wells in each mile-square section of each WBA.

It is our understanding that several GSAs, including TCWA, have started well registration programs. TH&Co will replace the surrogate model "farm wells" with available well registration data for actual wells including well locations, period of activity (i.e. construction date), well depth and perforation interval. Wells will be assigned to the Water Budget Area in which they are located. Pumping rates/volumes will be calculated in the Model by the Farm Package. Reported pumping rates will be compared to model calculated pumping rates. Inferred model wells will be used to supplement well registration data spatially and temporally based on best available data to fill in gaps in coverage due to reporting deficiencies. As the number of wells to incorporate explicitly into the model is unknown, the cost for this task assumes that data for 500 wells will be available by Spring 2025 in order to be incorporated into the model.

Task 10: Prepare More Detailed Surface and Groundwater Budgets for Angiola Water District

Current Model: AWD surface water deliveries and groundwater pumping data were incorporated into the model using the data readily available at the time the model was constructed and with some simplifying assumptions for the temporal and spatial distribution of the supplies. AWD serves areas within the Tule and Tulare Lake Subbasins. Surface water and groundwater supplies are area-weighted (?) over the entire calibration period. The model does not incorporate surface (i.e. pond) storage during wet periods where surface water is held in ponds during the winter and

"pumped off" during the growing season in spring and summer. These growing season pumping rates are based on an assumed monthly distribution of reported annual values which may not be representative over the entire historical period.

TH&Co will prepare more detailed surface water and groundwater budgets of the AWD. The water budgets will reconcile inflows (groundwater production and surface water deliveries) with outflows (deliveries, surface water exports, and groundwater exports) as well as surface storage. The temporal distribution of AWD surface water and groundwater exchanges between the Tule and Tulare Lake subbasins will be clarified.

TH&Co will prepare initial water budgets based on available data for review and comment by AWD. The scope includes one in-person meeting at AWD's offices in Corcoran to review available data and obtain institutional knowledge regarding historical AWD operations. Results of the analysis will be incorporated into the historical model period and used to inform the future projection.

Task 11: Incorporate and Refine Other Metered Production

Current Model: Groundwater production for Vandalia Water District (VWD), Teapot Dome Water District (TDWD), and Terra Bella Irrigation District (TBID) is currently addressed using hypothetical "farm wells" to pump the agricultural irrigation demand in these areas.

Groundwater pumping for the cities of Tulare, Delano, and Corcoran are based on annual data provided or assumed from available Urban Water Management Plans. Well-by-well and monthly production is not currently included in the model.

Municipal water demand for smaller community water systems (e.g., Earlimart) is estimated using an assumed per capita water demand and census population data.

It is our understanding that VWD operates 17 wells, TDWD operates two wells, and TBID operates approximately 20 wells. Well locations and perforation intervals for some of these wells have already been compiled. For this task, TH&Co will verify and update the well locations and perforation intervals as-needed and incorporate well-by-well and monthly production data, as available.

Groundwater production for the cities of Tulare, Delano, and Corcoran will be updated based on the following:

- Obtain available well location, construction and production data from the cities,
- Incorporate the well locations and perforation intervals into the model, and
- Incorporate well-by-well and monthly production data, as available.

TH&Co will request well-by-well and monthly production data from these communities. TH&Co will also use the SWRCB's electronic Annual Reporting (eAR) data portal to obtain monthly data from community water systems, as available. Groundwater production for periods for which reported values are not available may be adjusted based on system-specific available data.

Locations and perforation intervals for wells used by community water systems will be incorporated into the model based on well data provided for those systems. Where not available, TH&Co will use the Department of Drinking Water's well database and driller's logs as available. City of Porterville wells constructed since 2019 will be incorporated into the model based on data provided by the city.

A list of water systems to be revised in the model is as follows:

- Allensworth CSD
- Alpaugh CSD
- City of Corcoran
- City of Delano
- Ducor CSD
- City of Lindsay
- Pixley PUD
- Poplar CSD
- Richgrove PUD
- Strathmore PUD
- Terra Bella Irrigation District (Municipal Service)
- Tipton CSD
- City of Tulare
- Woodville PUD

Additionally, groundwater pumping for Earlimart PUD, Teviston CSD, and the Porterville Development Center will be incorporated into the model based on available data.

Task 12: Prepare More Detailed Surface and Groundwater Budgets for the Porterville Area

Current Model: Multiple water and wastewater entities operate in the Porterville Area, herein referred to as the City of Porterville and the unincorporated community of East Porterville.

Groundwater production and WWTP effluent from the City of Porterville are incorporated explicitly in the model. Components not explicitly accounted for include system losses, outdoor water use, and return flow.

Water demand in East Porterville has historically been met using private domestic wells. The current model estimates water demand using an assumed per capita water demand and census population data and applies that demand to several hypothetical wells.

Finally, East Porterville sewer services are provided by Porter Vista PUD which sends wastewater to the City of Porterville's WWTP. Also, water demand for the Porterville Development Center is provided by private wells; however, sewer services are provided by the City of Porterville.

TH&Co will prepare a surface water and groundwater budget of the City of Porterville and East Porterville water and wastewater systems. The water budgets will reconcile inflows (groundwater production and wastewater influent) with outflows (system losses, outdoor water use, indoor water use, and wastewater treatment plant effluent). The scope for this task includes one meeting with the City of Porterville.

Also, beginning in 2017, the City of Porterville, with assistance from state funding, began several consolidation projects where private parcels or small water systems were connected to the City's water system to replace their own wells. Since that time, hundreds of homes in East Porterville transitioned from private domestic wells to the City of Porterville water system. It is our understanding the City has also consolidated Beverly Grand Mutual Water, Porterville Trailer Park, Central Mutual Water Company, and the Golden Key Apartments with other projects in progress. The water budgets completed under this task would reduce estimated private domestic pumping in East Porterville and other areas at rates and timelines consistent with the connection efforts.

Task 13: Incorporate and Refine Other Surface Water Operations

TH&Co will incorporate the following surface water operations into the model based on best available data:

- Incorporate surface water inflows to the Tule River from Elk Bayou using data provided by the Kaweah Delta Conservation District (KDWCD)
- Incorporate recharge operations by Boswell in the Tule and Kaweah Subbasins based on data provided by Boswell, LTRID, and KDWCD as-available
- Incorporate historical Deer Creek diversions by JG Boswell Company based on data from the SWRCB's Electronic Water Rights Information Management System (eWRIMS)
- Incorporate recharge basins constructed since 2019 including those constructed as part of water banks (e.g. Homer recharge operations).
- Incorporate the expanded DEID Turnipseed recharge basins
- Incorporate the TBID recharge basin located near the Friant-Kern Canal
- Check and refine Alpaugh Irrigation District diversions as warranted.

Flooding and associated groundwater recharge that occurred during 2023 will be incorporated into the water budget and modeled with the recharge package based on the best available data. Volumes of recharge will be estimated based on wetted areas over time multiplied by infiltration rate. Areas of standing water will be mapped using LandIQ evapotranspiration data and/or the United States Geological Survey's (USGS's) Landsat Dynamic Surface Water Extent (DSWE) satellite data. Initial infiltration rates will be assumed and finalized during calibration. Total infiltration will be compared to available surface water data.

Task 14: Revise Estimates of Riparian Evapotranspiration

Current Model: Riparian evapotranspiration (ET) is estimated in the water budget using assumed annual rates for the Tule River, Upper Deer Creek, and Upper White River areas. The rates were based on estimated annual rates for cottonwoods in Arizona's San Pedro River[5] and areas within the Subbasin based on areal imagery.

In support of future work to analyze depletions of ISW due to pumping, TH&Co will revise the estimates of riparian ET along and near the Tule River, Deer Creek, and White River channels. ET estimates will be based on the area of riparian vegetation and monthly rates (e.g. inches per month) associated with specific vegetation types. Areas will be based on the mapped vegetation identified in the 2024 ISW Technical Memorandum (Attachment 7 of the Coordination Agreement[6]). Modifications to the mapped vegetation may be made based on review of aerial imagery or other available information (e.g. GDE Pulse). Monthly ET rates will be based on ITRC (2015)[7] which provides monthly ET rates for multiple vegetation types specific to the California Central Valley. The results of the analysis will be incorporated into the model as reductions in flows within the SFR package or pumping of shallow (e.g. 20-ft deep) hypothetical wells. At this time, it is not anticipated to incorporate the Evapotranspiration (EVT) package into the model due to the relatively coarse (1,000 ft x 1,000 ft) cell size of the model.

Task 15: Calibration

It is expected that the revisions to the model described above will affect the model calibration. As such, the model will be recalibrated to reflect the new data and revised approach. Calibration is the process to minimize the difference between measured and model-generated groundwater levels, land subsidence, compaction, and stream flows.

The calibration process will be conducted by manually adjusting input parameters followed by automated parameter adjustment using supplemental software (e.g. PEST[8]).

The calibration will be assessed in two ways: 1) visual inspection of calibration hydrographs, land subsidence charts, and streamflow charts and 2) consideration of calibration statistics, with the

[5] Leenhouts, J.M., Stromberg, J.C., and Scott R.L., 2005. *Hydrologic Requirements of and Consumptive Ground-Water Use by Riparian Vegetation along the San Pedro River, Arizona*. USGS Scientific Investigations Report 2005-5163. https://pubs.usgs.gov/publication/sir20055163.

[6] TH&Co, 2024. Technical Support for Addressing State Water Resources Control Board Comments Regarding Interconnected Surface Water in the Tule Subbasin. Prepared for the Tule Subbasin Technical Advisory Committee. Dated July 2024.

[7] Irrigation Training and Research Center, 2015. Evapotranspiration from Natural Vegetation in the Central Valley of California: Monthly Grass Reference-Based Vegetation Coefficients and the Dual Crop Coefficient Approach. Published in Journal of Hydrologic Engineering, January 20, 2015. https://digitalcommons.calpoly.edu/bae_fac/106/.

[8] Note that PEST stands for "Parameter ESTimation".

first way being self-explanatory, qualitative, and generally subjective. With respect to the second way, the calibration statistics used for this analysis will include at a minimum, the correlation coefficient and normalized root mean square error (NRMSE).

TH&Co proposes to use one or more variants of PEST++[9], which refers to a suite of software programs that are the most recent update of "PEST". It is anticipated that PEST++-ENSI and/or PEST++-IES will be used as both variants allow for adjustment of many thousands of parameters to calibrate a model without incurring the computational burden of doing so as is the case with other PEST variants. It is noted that PEST++-IES also simplifies uncertainty analysis in that it generates a user-specified number of calibrated models ("realizations") as part of the calibration process.

It is anticipated that the following parameters will be varied to calibrate the model:

- Layer property flow (LPF) package: layer-specific hydraulic conductivities, storage coefficients, and anisotropy ratios;
- Subsidence (SUB) package: elastic storage, inelastic storage, critical head, starting head of delay interbeds, preconsolidation head for delay interbeds, initial elastic and inelastic compaction of delay interbeds, and the thickness of individual interbeds;
- Farm Model Process (FMP) package: crop consumptive use, irrigation efficiency
- Stream-flow Routing (SFR) package: segment- and reach-specific streambed thicknesses and conductances and segment- and stress period-specific roughness coefficients, upstream widths, and downstream widths;
- Recharge (RCH) package: stress period- and zone-specific recharge rates;
- General head boundary (GHB) package: layer-specific conductances and layer- and stress period-specific heads;
- Multi-node well 2 (MNW2) package: well radius and screened intervals of hypothetical farm wells; and
- Basic (BAS) package: the layer-specific 'SHIFT_STRT' keyword parameter for starting heads (initial conditions).

[9] White, J.T., Hunt, R.J., Fienen, M.N., and Doherty, J.E., 2020. *Approaches to Highly Parameterized Inversion: PEST++ Version 5, a Software Suite for Parameter Estimation, Uncertainty Analysis, Management Optimization and Sensitivity Analysis: U.S. Geological Survey Techniques and Methods* 7C26, 52 p. https://pubs.usgs.gov/publication/tm7C26

Given the assumption that aquifer parameters are spatially correlated, pilot points[10] along with the PEST spatial interpolation utility program PLPROC[11] (Doherty, 2020), will be used to assign the cell-specific values to the aquifer parameters varied by PEST. It is anticipated that for the 5-layer model, 10,000 to 20,000 pilot points will be used.

A plausible range of values for each of the parameters will be assigned to each of the pilot points. The magnitude of the range assigned to each parameter at each pilot point varied will be based on the quality of the data in the vicinity of the pilot point. For example, pilot points near wells with controlled pumping test data will be given a smaller range than those in areas with no available pumping test data.

Some parameters are expected to be correlated with horizontal hydraulic conductivity ('kh'). Therefore, they will be expressed as functions of 'kh' based on literature values and professional judgment within PEST to maintain a reasonable degree of consistency among such parameters. For example, soils with high 'kh' values generally have high 'sy' values; conversely, soils with high 'kh' values generally have low 'ske' values.

The model will be calibrated consistent with currently accepted practices. Statistics of model calibration and time series charts of model generated versus measured groundwater levels, land subsidence, compaction, and streamflow will be included in the model report in Task 18.

Task 16: Revise Future Projection Input Files

Current Model: The future projection utilizes a 51-yr projection from 2019/20 through 2069/70 using annual stress periods. Projects and management actions were incorporated into the model. Some management actions were modified for the 2024 Subbasin Setting but the majority of projects in management actions are as they were planned in 2019 to 2020.

Baseline stream flow, diversions, and imported water deliveries for the future projection model were based on the 20-year average of historical stream flows measured or estimated between water years 1990/91 and 2009/10. The baseline streamflow on the major streams were adjusted to account for projections of future climate change using the DWR's CalSim-II model.

[10] Doherty, J., 2003. *Groundwater Model Calibration using Pilot Points and Regularization. Groundwater*, Volume 41, No. 2, March - April.

[11] Doherty, J., 2020. *PLPROC: A Parameter List Processor*. Watermark Numerical Computing and National Centre for Groundwater Research and Training, Australia. May 2020.

Projected surface water deliveries from the Friant-Kern Canal were based on climate adjusted historical average deliveries from 1990/91 to 2009/10 provided by the Friant Water Authority[12] and modified with proxy years to fill in data gaps.

An average hydrology was chosen for the future projection as it is clearer to see the effect of projects and management actions on groundwater elevations.

TH&Co will prepare a 50-year future projection from 2024/25 through 2073/74. The projection will incorporate monthly (not annual) stress periods. Projects and management actions will be verified and updated based on input from the GSAs. It is envisioned that TH&Co will prepare two primary scenarios. The first will use an average hydrology to allow for an "apples to apples" comparison to the existing model to assess the effect of the aforementioned revisions on the model results. The second will use a repeated hydrology to better assess predicted groundwater levels and subsidence under projected wet and dry conditions and compare those to the applicable SMC.

The configuration of the repeated hydrology scenario will be developed as part of this task and with input from the Technical Working Group. That said, it is envisioned that portions of the 39-year calibration period will be repeated, (e.g. 2000 to 2024 repeated two times). It is also expected that one DWR climate change central tendency will be used for the entire period. Finally, assumptions for imported water deliveries will be revised based on feedback from stakeholders and the Friant Water Authority and if new data are available at the time.

The scope of work assumes that the results of the scenarios will be used to inform potential changes to the planned projects and management actions and/or SMCs. For example, if upper aquifer groundwater level minimum thresholds are projected to be exceeded in a given area during a drought, revised projects and management actions in that area may be incorporated and/or the SMC methodology may be revised. The iterative process of preparing additional scenarios, processing the results, and presenting the results to stakeholders is not included in this scope of work.

Task 17: Refine Future Model Boundary Conditions

Current Model: Boundary conditions in the future project were based on analyses of historical hydrographs at perimeter wells and a projected trend of groundwater levels assuming an average hydrology and elimination of groundwater level declines over SGMA's implementation period (e.g. 2020 to 2040).

[12] Friant Water Authority, 2018. Technical Memorandum – Estimate of Future Friant Division Supplies for use in Groundwater Sustainability Plans, California.

Groundwater flow at the boundaries of the model will be simulated using time-varying heads. To maintain consistency with respect to adjacent subbasins for future groundwater conditions, TH&Co will develop assumed boundary conditions based on the same repeated hydrology used for the Tule Subbasin model and adjust the projected groundwater levels to eliminate groundwater level declines over the remaining implementation period consistent with neighboring basin groundwater level projections.

The scope assumes development of one set of future model boundary conditions. Input from the Technical Working Group will be incorporated into analysis. Additional scenarios with different boundary condition assumptions are not included in this scope of work.

Task 18: Reporting

TH&Co will prepare a report that summarizes the updated model. Specifically, the report will include:

- A summary of model revisions,
- Results of model calibration with the revised model,
- Revised historical and future water budget tables for the Subbasin and each GSA,
- Historical groundwater level, land subsidence, and streamflow time series charts showing measured and model-generated values through September 2024 for all calibration targets and RMSs within the Subbasin,
- Future projection groundwater level, land subsidence, and streamflow time series charts showing model-generated values through 2074 for all calibration targets and RMSs within the Subbasin.
- Appropriate color-flood charts showing projected land subsidence across the Tule Subbasin for representative time periods (e.g. 2024 to 2040 and 2040 to 2074), and
- A profile chart along the Friant-Kern Canal showing the historical and future land subsidence.

The budget for this task includes development and submittal of one draft version of the model summary report for review and comment (electronic submittal only). Upon incorporation of comments, TH&Co will generate one final version of the report (electronic submittal only).

Optional Tasks

Optional Task A: Prepare and Analyze Future Project Scenarios to Evaluate Projects

TH&Co will set up and run future projection scenarios, as needed, by the Tule Subbasin TAC or the individual GSAs. The primary purpose of the future projections is to evaluate different projects

that the Subbasin or individual GSAs want to consider for evaluating future groundwater levels, land subsidence, minimum thresholds, measurable objectives, and sustainability goals. In general, for each scenario, the GSAs will need to provide groundwater pumping and recharge (i.e. managed recharge) over the 50-year planning horizon.

Graphics to be provided depend on the location, timing, and purpose of the scenario but in general it is anticipated that graphics could include:

- Groundwater level and/or land subsidence time series charts
- Groundwater level and/or land subsidence color flood maps showing absolute values or differences
- Land subsidence profiles along the Friant-Kern Canal or other infrastructure
- Water budget tables or charts
- Scenario-specific zone budget analyses

It is noted that the cost and schedule of each scenario will depend on the complexity of the scenario and the required output graphics. A scenario-specific cost estimate will be developed for each request submitted.

Optional Task B: Extend Starting Historical Calibration Period

TH&Co will shift the model start time from October 1986 to October 1921 (i.e. water year 1921/22) to extend the starting historical calibration period. TH&Co proposes to utilize quarterly stress periods for 65 water years (total of 260 stress periods). The primary source of data will be the USGS Central Valley Hydrologic Model version 2 (CVHM2)[13] which starts in October 1921. TH&Co will use inputs and outputs from the model as a basis for:

- Starting heads
- Boundary conditions
- Historical precipitation
- Historical surface water deliveries and streamflows
- Historical agricultural ET/water demand
- Historical non-agricultural groundwater pumping (e.g. urban)

Other readily available data sources used to supplement CVHM2 data may include:

- Historical Tule River diversions from the Tule Rivers Association
- Historical Tule River, Deer Creek, and White River flows from the USGS stream gages

[13] Faunt, C.C.; Traum, J.A.; Boyce, S.E.; Seymour,W.A.; Jachens, E.R.; Brandt, J.T.; Sneed, M.; Bond, S.;Marcelli, M.F. Groundwater Sustainability and Land Subsidence in California's Central Valley. Water 2024, 16, 1189. https://doi.org/10.3390/w16081189

- Historical Kaweah River diversions from the Kaweah Delta Water Conservation District
- Historical imported water deliveries from the Friant Water Authority
- Historical surface water supplies/deliveries from local irrigation districts

Budget for this task also includes additional effort for Project Management, updating calibration targets (groundwater levels, subsidence, compaction, and streamflow), calibration, and reporting.

Optional Task C: Develop and Couple Soil-Water-Balance (SWB) Model

TH&Co will develop a Soil-Water Balance (SWB) model to estimate spatial and temporal values of groundwater recharge due to precipitation. The model will use the USGS SWB code[14]. The the outputs from the SWB model will be used as inputs to the groundwater flow model (i.e. the model will be "coupled" with the groundwater flow model). The results of the SWB model will replace the current estimates of precipitation recharge using the method described in Williamson et al. (1989)[15]. Inputs and data sources to the SWB model include:

- Daily precipitation from the Western Regional Climate Center (WRCC), the Tule Rivers Association, the California Irrigation Management Information System (CIMIS), or others.
- Gridded precipitation from METRIC, LandIQ, or others
- Soil type from the United States Department of Agriculture (USDA)
- Digital elevation model (DEM) using the current model Layer 1 top surface

TH&Co will review model results and compare them to previous estimates. TH&Co will plot appropriate statistics to identify outliers and adjust model parameters as needed. Budget for this task also includes additional effort for future projection input files and reporting.

Cost Estimate

The proposed budget for the above recommended scope of work is a not-to-exceed amount of $698,000 and will be conducted on a time-and-materials basis in accordance with our billing rates shown on Table 1. Optional Tasks B and C are $380,000 and $100,000, respectively and if both are authorized the total budget would be $1,178,000.

[14] Westenbroek, S.M., Kelson, V.A., Dripps, W.R., Hunt, R.J., and Bradbury,K.R., 2010, SWB—A modified Thornthwaite-Mather Soil-Water-Balance code for estimating groundwater recharge: U.S. Geological Survey Techniques and Methods 6–A31, 60 p.
[15] Williamson, A.K., Prudic, D.E., and Swain, L.A., 1989. Ground-Water Flow in the Central Valley, California. USGS Professional Paper 1401-D.

Schedule

The proposed schedule to conduct this scope of work, based on an assumed start date of June 1, 2025, is shown on Figure 4 below.

Tule Subbasin Technical Advisory Committee

DRAFT
Figure 4

Proposed Schedule to
Update and Refine the Tule Subbasin Groundwater Flow Model

	Task	2025							2026										
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1	Project Management and Correspondence	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	Obtain Supplemental Data	X	X	X	X														
3	Update Model Calibration Period		X	X	X	X													
4	Update Model Calibration Targets		X	X	X	X													
5	Incorporate Delayed Interbeds to the Subsidence Package					X	X	X											
6	Incorporate the Streamflow Routing Package					X	X	X											
7	Refine Model Water Budget Areas		X	X	X														
8	Revise Model Layers	X	X	X	X														
9	Incorporate Available GSA Well Registration Data				X	X	X												
10	Prepare More Detailed Water Budgets for Angiola WD					X	X	X	X										
11	Incorporate and Refine Other Metered Production					X	X	X	X										
12	Prepare More Detailed Water Budgets for the Porterville Area					X	X	X											
13	Incorporate and Refine Other Surface Water Operations						X	X	X										
14	Revise Estimates of Riparian Evapotranspiration								X										
15	Calibration									X	X	X	X	X	X				
16	Revise Future Projection Input Files												X	X	X	X	X	X	
17	Refine Future Model Boundary Conditions									X	X	X							
18	Reporting															X	X	X	X

Thomas Harder & Co.
Groundwater Consulting

April 2025

The schedule does not include Optional Tasks B and C which are anticipated to add 2 and 8 months to the schedule, respectively.

It is noted that the schedule assumes reasonably prompt communication and input from stakeholders. As the model development process is iterative, additional changes, analyses, and scenarios may extend the schedule.

I appreciate the opportunity to provide consulting services to the Tule Subbasin Technical Advisory Committee. If you have any questions regarding this scope of work, don't hesitate to contact me at (714) 779-3875.

Sincerely,

Ben Lewis, P.G., C.HG.
Associate Hydrogeologist

Jim Van de Water, P.G., C.HG.
Principal Hydrogeologist

Thomas Harder, P.G., C.HG.
Principal Hydrogeologist

Cost Estimate for Hydrogeologic Services to Update and Refine the Tule Subbasin Groundwater Flow Model

Task	Description	Estimated Cost
1	**Project Management and Correspondence**	
	Bi-weekly meetings with Technical Working Group, presentations to Tule TAC and Managers	$47,000
2	**Obtain Supplemental Data**	
	Obtain surface water, groundwater production, evapotranspiration, precipitation, WWTP, groundwater level, and land subsidence data for Tule Subbasin and portions of neighboring subbasin within the Model Domain	$14,560
3	**Update Model Calibration Period**	
	Update recent historical calibration period from October 2019 through September 2024 including surface water supplies and uses, evapotranspiration, municipal and other metered groundwater production; update groundwater level and mountain block recharge boundary conditions	$51,260
4	**Update Model Calibration Targets**	
	Update and add new groundwater level, land subsidence, and compaction calibration targets	$31,160
5	**Incorporate Delayed Interbeds to the Subsidence Package**	
	Develop initial input files and incorporate delayed interbeds into the subsidence package	$37,400
6	**Incorporate the Streamflow Routing Package**	
	Develop initial input files and incorporate the Tule River, Porter Slough, Deer Creek, and White River into the model with the SFR package	$43,920

Cost Estimate for Hydrogeologic Services to Update and Refine the Tule Subbasin Groundwater Flow Model

Task	Description	Estimated Cost
7	**Refine Model Water Budget Areas**	
	Subdivide model Water Budget Areas based on historical and potential future land use differences	$22,160
8	**Revise Model Layers**	
	Revise model layers based on new data and/or more detailed analysis	$43,920
9	**Incorporate Available GSA Well Registration Data**	
	Incorporate up to 500 agricultural wells from GSA well registration programs	$34,460
10	**Prepare More Detailed Surface and Groundwater Budgets for Angiola W**	
	Revise temporal distribution of surface water supplies and groundwater pumping	$24,760
11	**Incorporate and Refine Other Metered Production**	
	Incorporate and/or refine Vandalia WD, Tea Pot Dome WD, Terra Bella ID, Tulare, Delano, Corcoran, and community water system groundwater production	$35,360
12	**Prepare More Detailed Surface and Groundwater Budgets for the Porterv**	
	Revise pumping, WWTP inflows, and water use estimates for the City of Porterville and East Porterville	$29,360
13	**Incorporate and Refine Other Surface Water Operations**	
	Incorporate Elk Bayou, Boswell recharge, Boswell Deer Creek diversions, new recharge basins, and 2023 Tulare Lake flooding	$24,960
14	**Revise Estimates of Riparian Evapotranspiration**	
	Revise riparian ET estimates based on ITRC (2015) rates and detailed vegetation maps	$18,800

Cost Estimate for Hydrogeologic Services to Update and Refine the Tule Subbasin Groundwater Flow Model

Task	Description	Estimated Cost
15	**Calibration**	
	Manual and automated (PEST) calibration of model parameters to improve groundwater level, land subsidence, and stream flow calibration	$95,800
16	**Revise Future Projection Input Files**	
	Prepare two updated 50-yr future projections using average and repeated hydrologies and updated Projects and Management Actions	$75,000
17	**Refine Future Model Boundary Conditions**	
	Develop future boundary conditions with repeated hydrology and assumed elimination of groundwater level declines over time	$37,520
18	**Reporting**	
	Preparation of one draft (electronic submittal) and one final (electronic submittal) report summarizing the update model	$30,600
		$ 698,000

Cost Estimate for Hydrogeologic Services to Update and Refine the Tule Subbasin Groundwater Flow Model

Task	Description	Estimated Cost
Optional Tasks		
A		
	Prepare and Analyze Future Project Scenarios to Evaluate Projects	Not Available
B		
	Extend starting historical calibration period back to October 1921 using USGS's CVHM2 model and other readily available data as a basis. Includes additional effort for Project Management, updating calibration targets, calibration, and reporting	$380,000
C		
	Develop and Couple Soil-Water-Balance (SWB) Model to estimate spatial and temporal values of groundwater recharge from precipitation. Includes additional effort for future projection input files and reporting.	$100,000

Agenda Item 4.c

CONSENT CALENDAR
Staff Report to the Porterville Irrigation District GSA Board of Directors

Subject: CONSENT CALENDAR / Consider Approval of 4Creeks Proposed 2026 Budget for Tule Subbasin Coordination Agreement Related Services Budgeted by Acreage 3.26% for a Cost of $26,686.03 (Action).

Submitted By: General Manager

The Porterville Irrigation District Groundwater Sustainability Agency (PID GSA) is a signatory to the Tule Subbasin Coordination Agreement and participates collaboratively with other GSAs to meet Sustainable Groundwater Management Act (SGMA) requirements at the subbasin level.

To support ongoing SGMA implementation, monitoring, reporting, coordination agreement administration, and regulatory compliance, the Tule Subbasin GSAs have historically relied on professional consulting services. 4Creeks, Inc. has prepared a detailed scope of work and cost estimate for Calendar Year 2026 covering subbasin-wide coordination, monitoring, reporting, and technical support services.

The proposed scope and associated budget are summarized in the attachment to Item 4.c 4Creeks Cost Estimate for Coordination Agreement Related Services (CY 2026)**.**

The proposed scope of work includes five primary service categories supporting Tule Subbasin SGMA obligations:

1. Subbasin Meetings, Administration, Grants, and Outreach
    - Monthly GSA manager coordination meetings
    - Quarterly stakeholder meetings
    - Coordination with DWR, SWRCB, counties, and NGOs
    - Grant application support and administration
    - DAC and resident outreach, including bilingual materials
    - Subbasin website hosting and general project management
2. Monitoring
    - Semi-annual groundwater level monitoring
    - Semi-annual groundwater quality monitoring, including lab analysis
    - Exceedance monitoring and notification to domestic well owners
    - Annual land subsidence benchmark surveys
    - Monitoring network development and reporting
3. Groundwater Sustainability Plan (GSP) Annual Reporting
    - Data coordination and analysis
    - Groundwater quality SMC analysis
    - Preparation and submittal of the Annual Report to DWR
4. Technical and Administrative Support for the Coordination Agreement
    - Governance restructuring support

- GSA facilitation meetings
- Land subsidence SMC coordination
- TSCA Attachment 5 development
- Mitigation plan development
- Claims evaluation and reporting
- Coordination with neighboring subbasins and agencies
- Coordination Agreement updates and revisions

5. Data Management System (DMS)
    - Monitoring data management
    - Data summary reporting
    - DMS hosting services

These services collectively support SGMA compliance, inter-GSA coordination, regulatory reporting, and risk reduction related to groundwater sustainability and subsidence management.

The total Tule Subbasin budget proposed by 4Creeks for Calendar Year 2026 is $818,590, inclusive of labor and reimbursable expenses.

Costs are allocated among participating GSAs based on each agency's percentage of subbasin acreage. PID GSA's proportional share is calculated as follows:

- PID GSA Acreage Percentage: 3.26%
- PID GSA Cost Share: $26,686.75

This amount is consistent with the allocation table included in the attachment and reflects PID GSA's proportional participation in subbasin-wide SGMA activities.

Approval of this agreement ensures that PID GSA continues to meet its obligations under the Tule Subbasin Coordination Agreement and SGMA. The proposed scope reflects ongoing regulatory requirements, increasing coordination demands, and continued focus on groundwater quality, subsidence monitoring, and stakeholder engagement.

The acreage-based cost allocation provides a fair and transparent method for distributing shared subbasin expenses, and PID GSA's share remains proportionate to its relative size within the Tule Subbasin.

Staff recommends that the GSA Board:

Authorize the GSA Manager to execute an agreement with 4Creeks, Inc. for professional, technical, and administrative services in support of Tule Subbasin SGMA coordination activities for Calendar Year 2026, with GSA's proportional cost share not to exceed $26,686.75, representing 3.26% of the total subbasin budget.

Attachment Item 4.c

Exhibit A - 4Creeks Cost Estimate for Coordination Agreement Related Services
Calendar Year 2026

Task	Description	Principle Engineer $252	Principal Water Consultant $215	Senior Water Consultant $175	Water Consultant $144	Associate Water Consultant $118	Project Manager/ Coord. $149	GIS Manager $149	GIS Analyst/ Developer $124	GIS Tech. $108	2-Man Survey Crew (PV) $400	Project Tech. II $113	Project Techn. I $98	Outreach Coord. $129	Total Labor	Reimburse Expense	Total Cost
1	**Subbasin Meetings/Administration/Grants/Outreach**																
1.1	Monthly Managers Meetings & Prep	48	84		28		42								$ 40,446.00		$ 40,446.00
1.2	Quarterly Stakeholder Meetings & Prep	18	24		8		12		12						$ 14,124.00		$ 14,124.00
1.3	SWRCB/DWR Meetings	18	24				12								$ 11,484.00		$ 11,484.00
1.4	Misc. Meeting Representing the Subbasin (Intra Subbasin Meetings, Meeting with the County, Meeting with NGOs, etc.)	12	24				12								$ 9,972.00		$ 9,972.00
1.5	Grant Applications	4	20				50		10						$ 13,998.00		$ 13,998.00
1.6	Awarded Grant Administration		20				80								$ 16,220.00		$ 16,220.00
1.7	DAC and Resident Outreach (Bi-langual material prep & community engagement)		10				20							50	$ 11,580.00		$ 11,580.00
1.8	Tule SGMA Website Hosting		5				20								$ 4,055.00	$ 2,500.00	$ 6,555.00
1.9	General Project Management	20	60												$ 17,940.00		$ 17,940.00
														Subtotal Subbasin Meetings/Administration	**$ 139,819.00**	**$ 2,500.00**	**$ 142,319.00**
2	**Monitoring**																
2.1	Semi-Annual Groundwater Level Monitoring (127 wells 2x per well; Landowner Coordination; Data requests)		10		30	500	5						20		$ 68,175.00		$ 68,175.00
2.2	Semi-Annual Groundwater Quality Monitoring (time and mileage for 49 wells 2x per year; Landowner coordination; Data requests)		10		20	400	5						25		$ 55,425.00		$ 55,425.00
2.3	Semi-Annual Groundwater Quality Monitoring (Lab costs for 49 wells 2x per year @ $1,000 per sample; Lab coordination)		2		5	40									$ 5,870.00	$ 98,000.00	$ 103,870.00
2.4	Exceedance Groundwater Quality Monitoring (assumes 10 exceedance per monitoring event)		10		25	60							60		$ 18,710.00	$ 10,000.00	$ 28,710.00

Exhibit A - 4Creeks Cost Estimate for Coordination Agreement Related Services
Calendar Year 2026

Task	Description	Principle Engineer $252	Principal Water Consultant $215	Senior Water Consultant $175	Water Consultant $144	Associate Water Consultant $118	Project Manager/ Coord. $149	GIS Manager $149	GIS Analyst/ Developer $124	GIS Tech. $108	2-Man Survey Crew (PV) $400	Project Tech. II $113	Project Techn. I $98	Outreach Coord. $129	Total Labor	Reimburse Expense	Total Cost
2.5	Semi-Annual Groundwater Quality Results Notice Letter to Domestic Well Owners				5	10	5						25		$ 5,095.00		$ 5,095.00
2.6	Annual Land Subsidence Benchmark Survey (97 benchmarks)		4		20	25	5				200				$ 87,435.00		$ 87,435.00
2.7	Semi-Annual Monitoring Reports and Techncial Meetings		10		20	40		10	20						$ 13,720.00		$ 13,720.00
2.8	On-going Monitoring Network Development		10		20	40	40						40		$ 19,630.00		$ 19,630.00
														Subtotal Monitoring	**$ 274,060.00**	**$ 108,000.00**	**$ 382,060.00**
3	**Groundwater Sustainability Plan Annual Reports**																
3.1	GSA Data Coordination		5		15	20	20								$ 8,575.00		$ 8,575.00
3.2	Groundwater Quality SMC Analysis		10		20	40	10								$ 11,240.00		$ 11,240.00
3.3	Annual Report Text (GWQ, Implementation)	4	15		20	40									$ 11,833.00		$ 11,833.00
3.4	Annual Report Figures (GWQ, Implementation)	2	5		5		20	10	20						$ 9,249.00		$ 9,249.00
3.5	Annual Report Submittal				5										$ 720.00		$ 720.00
														Subtotal Annual Report	**$ 41,617.00**	**$ -**	**$ 41,617.00**
4	**Technical/ Administration Support for Coordination Agreement**																
4.1	Goverance Restructure	20	40				50								$ 21,090.00		$ 21,090.00
4.2	Individual GSA Facilitation Meeting for Coordination Agreement	18	24				12								$ 11,484.00		$ 11,484.00
4.3	Land Subsidence SMC Coordination	20	60												$ 17,940.00		$ 17,940.00
4.4	TSCA Attachment 5 Develoment	10	30		40	40		10	10	10					$ 23,260.00		$ 23,260.00
4.5	Mitigation Plan Developemnt		50		50	50		10	10	10					$ 27,660.00		$ 27,660.00
4.6	Claim Evaluations & Reports (assumes 10-claims per year)	10	50		20	50	100	10	25						$ 41,540.00		$ 41,540.00
4.7	Coordination w/ TBWF &SHE	10	50			40									$ 17,990.00		$ 17,990.00
4.8	Coordination Agreement Revisions	50	100												$ 34,100.00		$ 34,100.00
														Subtotal Coordination Agreement Technical/ Administration	**$ 195,064.00**	**$ -**	**$ 195,064.00**

Exhibit A - 4Creeks Cost Estimate for Coordination Agreement Related Services
Calendar Year 2026

Task	Description	Principle Engineer $252	Principal Water Consultant $215	Senior Water Consultant $175	Water Consultant $144	Associate Water Consultant $118	Project Manager/ Coord. $149	GIS Manager $149	GIS Analyst/ Developer $124	GIS Tech. $108	2-Man Survey Crew (PV) $400	Project Tech. II $113	Project Techn. I $98	Outreach Coord. $129	Total Labor	Reimburse Expense	Total Cost
5	**Data Management System**																
5.1	Monitoring Data Management					25	40	10	10	10					$ 12,720.00		$ 12,720.00
5.2	Monitoring Data Summary Reports					10	40	30	100	100					$ 34,810.00		$ 34,810.00
5.3	DMS Hosting														$ -	$ 10,000.00	$ 10,000.00
														Subtotal DMS	**$ 47,530.00**	**$ 10,000.00**	**$ 57,530.00**
														Total	**$ 698,090.00**	**$ 120,500.00**	**$ 818,590.00**

GSA	Percentage of Subbasin Acreage	4Creeks
Alpaugh ID	3.03%	$ 24,803.28
Delano-Earlimart ID	12.06%	$ 98,721.95
~~Eastern Tule~~	~~31.00%~~	~~$ 253,762.90~~
ETGSA (COP)	3.28%	$ 26,849.75
Porterville ID	3.26%	$ 26,686.03
Saucelito ID	4.14%	$ 33,889.63
Terra Bella ID	2.90%	$ 23,739.11
Tule East	17.42%	$ 142,598.38
Kern-Tulare WD	1.81%	$ 14,816.48
Lower Tule River ID	22.01%	$ 180,171.66
Pixley ID	14.70%	$ 120,332.73
Tri-County WA	14.47%	$ 118,449.97
Teapot Dome WD	0.63%	$ 5,157.12
Vandalia WD	0.29%	$ 2,373.91

Agenda Item 5.a

ADMINISTRATION
Staff Report to the Porterville Irrigation District GSA Board of Directors

Subject: ADMINISTRATION / Water Year 2026 Sustainable Yield Allocation Status Update (Announcement).

Submitted By: General Manager

In accordance with Article IV of the PID GSA Rules and Regulations, the General Manager is required to determine annual groundwater allocations based on technical evaluation of basin conditions and consistency with the Tule Subbasin Groundwater Sustainability Plan (GSP) and Coordination Agreement.

The Water Year 2026 Sustainable Yield allocation framework was previously presented to the PID GSA Board and stakeholders at the December 18, 2025, meeting as the allocation. Following that meeting, the PID GSA Technical Group completed final coordination with the Tule Subbasin GSAs to ensure alignment with Subbasin-wide assumptions and methodologies. As part of this coordination, refinements were made to the Native Sustainable Yield component to align with the Tule Subbasin and other Coordination Agreement members, and the precipitation component was updated to reflect long-term estimated precipitation for lands within the PID GSA.

The final allocations, as documented in the January 9, 2026, Technical Memorandum prepared by 4Creeks, Inc., maintain regulatory compliance, reflect local hydrologic conditions, and support continued progress toward groundwater sustainability while providing certainty and transparency for landowners.

The PID GSA Rules and Regulations, adopted by the Board in September 2025, establish two Sustainable Yield allocation methodologies available to landowners:

1. Groundwater Extraction-Based Sustainable Yield Allocation, and
2. Evapotranspiration (ET)-Based Sustainable Yield Allocation.

Pursuant to Section 4.02 of the Rules and Regulations, the General Manager is required to determine annual allocations using data and calculations developed by the PID GSA Technical Group and consistent with the Tule Subbasin Coordination Agreement and groundwater flow model.

Water Year 2026 allocations apply to the period of October 1, 2025, through September 30, 2026.

Allocation Methodologies

The Technical Memorandum evaluates Sustainable Yield using the two allocation methodologies

adopted by the PID GSA.

1. Groundwater Extraction Sustainable Yield Allocation

The Tule Subbasin Coordination Agreement establishes an allowable Sustainable Yield for groundwater pumping of 130,000 acre-feet annually across 475,895 acres of irrigated land within the Subbasin. This results in a Subbasin-wide extraction-based allocation of:

- 0.27 acre-feet per acre

This methodology incorporates groundwater inflow components, including areal precipitation recharge, streambed infiltration, mountain-block recharge, and return flows from groundwater pumping.

2. Evapotranspiration (ET) Sustainable Yield Allocation

The ET-based allocation accounts for consumptive use and is composed of two components:

Native Sustainable Yield

Native Sustainable Yield represents the portion of groundwater inflow attributable to natural channel losses and underflow from the Sierra Nevada Mountains. Following coordination with Tule Subbasin GSAs after December 18, 2025, the Native Sustainable Yield component was refined to ensure consistency with Subbasin-wide assumptions reflected in the Coordination Agreement.

- Native Sustainable Yield Allocation: 0.15 acre-feet per acre

Total Precipitation

Because ET measurements capture total consumptive use regardless of water source, non-groundwater inputs must be explicitly allocated to isolate applied groundwater use. The precipitation component reflects the long-term average total precipitation, derived from calibrated weather stations within and adjacent to the PID GSA and spatially interpolated across District lands.

- 34-year average (1991–2025) precipitation for PID GSA: 0.86 acre-feet per acre

This value reflects estimated precipitation conditions specific to the PID GSA and was finalized following completion of technical reconciliation after the December 18, 2025, meeting.

Total ET-Based Sustainable Yield Allocation:

- 1.01 acre-feet per acre

This Announcement serves as a setting of the Water Year (WY) 2026 Sustainable Yield allocations for the Porterville Irrigation District Groundwater Sustainability Agency (PID GSA), as presented in the January 9, 2026, Technical Memorandum prepared by 4Creeks, Inc., and

authorizes the General Manager to implement the allocations in accordance with the PID GSA Rules and Regulations and will be reflective in PID Basinsafe accounts.

TECHNICAL MEMORANDUM

To: Porterville ID GSA Board of Directors

From: Don Tucker – 4Creeks, Inc.

cc: Sean Geivet – Porterville ID GSA General Manager

Date: January 12, 2026

Re: **Porterville ID GSA – Water Year 2026 Sustainable Yield Allocations**

In accordance with the current Porterville Irrigation District (PIDGSA or GSA) Rules and Regulations adopted by the Board of Directors, the following technical memorandum summarizes the proposed Water Year 2026 (October 2025 through September 2026) groundwater allocations made available for landowners within the GSA. Article IV. Allocation of Water, Section 4.02 Determination of Allocations of the Rules and Regulations states the following:

> *"Each year by October 1, or as soon as reasonably practical, the General Manager shall determine the allocations available for use within the PID GSA based on PID GSA Technical Group's data and calculations regarding whether the PID GSA GSP's Minimum Thresholds or Measurable Objectives require allocation adjustments. In providing such data and calculations to the General Manager, the PID GSA Technical Group shall use the methodologies and calculations defined in this Article 4."*

Further, Section 4.03 Sustainable Yield Allocation of Article IV describes the Sustainable Yield allocations based on the landowner elected measurement methodologies in conformance with the Tule Subbasin Coordination Agreement[1] and developed using the Tule Subbasin groundwater flow model. The two Sustainable Yield allocation methodologies consist of:

(a) Groundwater Extraction Sustainable Yield Allocation
(b) Evapotranspiration (ET) Sustainable Yield Allocation

Table 1 describes the groundwater inflow components of the projected Tule Subbasin water budgets included for each of the Sustainable Yield allocation methodologies.

Table 1- Sustainable Yield Water Budget Components

Groundwater Inflow Components of the Tule Subbasin Projected Water Budget	Extraction Sustainable Yield	Consumptive Sustainable Yield
Inflow from Areal Recharge of Precipitation	✓	
Inflow from Infiltration of Runoff in Stream Beds	✓	✓
Inflow from Mountain-Block Recharge	✓	✓
Inflow from Return Flow of Applied Water from Groundwater Pumping	✓	

[1] *Tule Subbasin Coordination Agreement (2022); Attachment 2 – Tule Subbasin Setting, Section 2.3.2. – Sustainable Yield*

Groundwater Extraction Sustainable Yield Allocation

Section 2.3.2.3, Attachment 2 – Basin Setting of the 2022 Tule Subbasin Coordination Agreement, describes the allowable groundwater pumping Sustainable Yield the Tule Subbasin as 130,000 acre-feet annually and is available for 475,895 acres within the Tule Subbasin, amounting to **0.27 acre-feet per acre.**

Evapotranspiration (ET) Sustainable Yield Allocation

ET Sustainable Yield allocation is comprised of the following two components:

(A) Native Sustainable Yield. ET based measurements methodology only captures the portion of water consumed by the crop, and neglects inefficiencies such as the portion of total precipitation that areal recharges and return flows of applied water from groundwater pumping. Therefore, these groundwater inflow components of the projected water budget are not allocated as part of Sustainable Yield under an ET model. Only natural channel loss water within the Tule River, Porter Slough, Deer Creek, and White River channels and the calculated underflow from the Sierra Nevada Mountains are included in the Native Sustainable Yield allocation.

Section 2.3.2.3, Attachment 2 – Basin Setting of the 2022 Tule Subbasin Coordination Agreement, describes the consumptive (Native) Sustainable Yield within the Tule Subbasin, which amounts to **0.15 acre-feet per acre**.

(B) Total Precipitation. ET measurements do not distinguish between the source of water that is either applied irrigation (groundwater or surface water) or natural occurring precipitation, therefore, it is necessary to allocate the non-groundwater sources to be able to deduct to the portion of ET made up by applied groundwater. This includes surface water deliveries, which are credited to individual landowners monthly by the district and total precipitation.

Total precipitation is calculated as the long-term average total precipitation from calibrated weather stations within and adjacent to the PID GSA, interpolated to lands within PID GSA. The 34-year average (1991-2025) for PID GSA is **0.86 acre-feet per acre.**

The Water Year 2026 ET Sustainable Yield allocation, comprised of Native Sustainable Yield plus Total Precipitation for PID GSA, amounts to **1.01 acre-feet per acre**.

Water Year 2026 Sustainable Yield allocations for PID GSA are presented by allocation methodology in **Table 2**.

Table 2 - Water Year 2026 Sustainable Yield Allocation by Allocation Methodology

Allocation Component	Evapotranspiration Allocation *(AF/acre)*	Extraction Allocation *(AF/acre)*
A. Native Sustainable Yield	0.15	0.27
B. Total Precipitation	0.86	NA
Sustainable Yield	**1.01**	**0.27**

Agenda Item 6.b

REPORTS FROM COMMITTEES
Staff Report to the Porterville Irrigation District GSA Board of Directors

Subject: REPORTS FROM COMMITTEES / Tule Subbasin Managers Group Report from January 6, 2026 Meeting (Informational).

Submitted By: General Manager

The Tule Subbasin Managers Group is a coordination forum consisting of management staff from the groundwater sustainability agencies (GSAs) within the Tule Subbasin. The group meets regularly to coordinate SGMA implementation activities, consultant work programs, grant administration, State Water Resources Control Board (SWRCB) communications, and policy-level issues elevated to the Tule Subbasin Policy Group.

The most recent Managers Group meeting was held on January 6, 2026, with a follow-up discussion from the December 17, 2025, meeting. Key agenda items included implementation grant amendments, monitoring requirements, SWRCB engagement, GSP deficiency response efforts, and preliminary discussion of Calendar Year 2026 consultant budgets and scopes of work.

1. Calendar Year 2026 Budget and Scope of Services

Consultants TH&Co and 4Creeks presented draft Calendar Year 2026 scopes of work and budget proposals for Tule Subbasin-wide services. These scopes generally include:

- GSP implementation support
- Annual reporting and regulatory compliance
- Groundwater quality technical support
- Land subsidence coordination and modeling
- Monitoring program support
- Facilitation and policy group coordination

At the Managers Group level, the discussion focused on cost trends, efficiencies, and alignment of consultant roles. Several GSAs, including PID GSA, indicated that their governing boards have not yet taken formal action on the proposed 2026 budgets.

Managers acknowledged that formal feedback and approval must occur at each GSA's home board and that Managers Group discussions are informational and advisory only.

2. Need for GSA Board Feedback and Direction

The Managers Group identified the need for each GSA to:

- Place 2026 consultant budgets and scopes on upcoming board agendas
- Provide formal feedback, questions, or requested refinements
- Notify the subbasin consultants once board actions occur

This step is critical to maintaining coordinated subbasin-wide implementation while respecting each GSA's independent governance and budget authority.

3. State and Regulatory Coordination Updates

Additional updates provided at the Managers Group included:

- Ongoing engagement with the State Water Resources Control Board regarding GSP deficiencies and probationary status
- Efforts to establish more regular, non-technical management-level meetings with SWRCB staff
- Coordination through the Tule Subbasin Policy Group on land subsidence, modeling assumptions, and groundwater quality response strategies
- Monitoring updates, including a potential phased approach to increased groundwater level data collection using existing transducer-equipped wells

These efforts continue to require coordinated consultant support and policy-level alignment.

For PID GSA specifically:

- The proposed 2026 scopes and budgets are budget planning items that require Board-level review and approval prior to implementation
- Feedback provided by the PID GSA Board will be incorporated into subbasin-wide coordination efforts

This informational update is intended to keep the Board apprised of regional coordination activities and upcoming decision points.

This concludes the informational update regarding recent activities and coordination efforts of the Tule Subbasin Managers Group, including discussion of Calendar Year 2026 consultant scopes of work and the upcoming need for PID GSA Board feedback and approval.