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Attorneys for Defendant, Cross-Complainant, & Cross-Defendant
INDIAN WELLS VALLEY WATER DISTRICT

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF ORANGE, CIVIL COMPLEX CENTER

MOJAVE PISTACHIOS, LLC; et al.,

Plaintiffs,

v.

INDIAN WELLS VALLEY WATER
DISTRICT; et al.,

Defendants.

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

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

**TECHNICAL WORKING GROUP
PARTIES' PROPOSED SPECIAL
MASTER CANDIDATES FOR PHASE 2
TRIAL RECOMMENDATION ON SAFE
YIELD; DECLARATION OF DOUGLAS
J. EVERTZ**

RELATED TO ROA 1959, 2122

Date: October 30, 2026

Time: 1:30 p.m.

Dept.: CX101

INDIAN WELLS VALLEY WATER
DISTRICT,

Cross-Complainant,

v.

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

Cross-Defendants.

SEARLES VALLEY MINERALS INC.,

Cross-Complainant,

v.

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

Cross-Defendants.

Complaint Filed: November 19, 2019
District Cross-Complaint: June 16, 2021
Searles Cross-Complaint: August 17, 2021
Phase 1 Trial Date: April 28, 2025
Phase 2 Trial Date: June 8, 2026

1 The Indian Wells Valley Water District (“District”), Searles Valley Minerals Inc.¹
2 (“Searles”), and the Meadowbrook Dairy entities² (collectively, “TWG Parties”) respectfully
3 request that the Court appoint Anthony D. Daus III, PG, BCES, Vice President & Principal
4 Hydrogeologist at GSI Environmental, as special master for the phase 2 trial (“Phase 2 Trial”).

5 The TWG Parties support Mr. Daus’ appointment for multiple reasons:

- 6 1. Mr. Daus expressed interest in the assignment and explained that he is at a
7 point in his career where he can limit his practice to only taking assignments
8 that interest him.
- 9 2. Mr. Daus is available and appears capable of completing the assignment in a
10 timely matter because he is selective in accepting assignments.
- 11 3. Mr. Daus has his own internal team; those who may offer Mr. Daus
12 substantive assistance are all in-house at GSI Environmental with Mr. Daus.
- 13 4. Mr. Daus’ hourly rate is lower than Dr. Maxwell’s rate.
- 14 5. The TWG Parties are comfortable with Mr. Daus despite his current work for
15 the United States Navy, his prior work for the law firm representing the City
16 of Ridgecrest and Indian Wells Valley Groundwater Authority, and his current
17 work in other matters where he is adverse to counsel for Searles.
- 18 6. Mr. Daus is California- and Orange County-based.

19
20 ¹ On October 21, 2026, Searles moved this Court to substitute 5E SVM Operations Company,
21 LLC (“5E”) for Searles for all purposes in this action and related cases. On October 1, 2026,
22 Searles and 5E entered into a Water Assets Assignment Agreement whereby Searles assigned
23 and transferred all of its water rights, including those water rights in the Indian Wells Valley
24 Groundwater Basin, to 5E. The United States Bankruptcy Court for the District of Delaware
25 approved the sale by order entered September 21, 2026, in Case No. 26-10966-BLS. Searles’
undersigned legal counsel will continue to represent 5E in this action. A hearing is set on
Searles’ motion for substitution on November 20, 2026. Until that motion is resolved, Searles
remains the named party in all filings in this action.

26 ² Meadowbrook Dairy Real Estate, LLC, a California Limited Liability Company; Big Horn
27 Fields, LLC, a California Limited Liability Company; Brown Road Fields LLC, a California
28 Limited Liability Company; Highway 395 Fields, LLC, a California Limited Liability Company;
and The Meadowbrook Mutual Water Company, a California corporation (collectively,
“Meadowbrook”).

7. One of the other candidates proposed by the TWG Parties, Bryan Bondy, is highly qualified; however, through his interview and disclosures, the TWG Parties learned that Mr. Bondy has a current professional relationship with counsel for the City and the Authority on more than one matter. (See, *infra*, p. 9, § I.B(4).)

I. TWG PARTIES' PROPOSED CANDIDATES

On September 16, 2026, the TWG Parties proposed the following three candidates for special master to counsel for all parties who participated in the Phase 2 Trial on safe yield ("Phase 2 Trial Parties"):

- (a) Anthony D. Daus III, PG, BCES, Vice President & Principal Hydrogeologist at GSI Environmental;
- (b) Bryan Bondy, MS, President at Bondy Groundwater Consulting; and
- (c) Reed M. Maxwell, Ph.D., Professor at Princeton and Director of the Integrated Groundwater Modeling Center.

(Evertz Decl., ¶ 2, Exh. F, p. 1.) Counsel for all the Phase 2 Trial Parties participated in separate "interviews" of the three candidates on October 5, 2026. (Evertz Decl., ¶ 4.) The City's counsel, who also currently serves as acting counsel for the Authority, confirmed that the TWG Parties proposed "reasonable" candidates and, as a result, the City and the Authority would not be proposing any candidates of their own. (Evertz Decl., ¶ 3.)

Attached for each candidate is background information, including a proposed rate sheet; the name(s) of anyone who may provide substantive assistance to the candidate on this assignment; the candidate's CV; the CV(s) of anyone who will assist the candidate substantively; and the identity of any party, attorney, or witness to the Phase 2 trial with whom the candidate has worked previously, including a very brief statement of the matter on which the candidate worked. (Evertz Decl., ¶¶ 5–8, Exhs. K–M.)

- Mr. Daus: Exhibit L;
- Mr. Bondy: Exhibit M;
- Dr. Maxwell: Exhibit K.

1 **A. Anthony D. Daus III, PG, BCES:**

2 **(1) *Hourly Rates***

3 Mr. Daus stated his hourly rates as follows:

- 4 • Anthony Daus: \$375
- 5 • Dr. Sorab Panday: \$320
- 6 • Dr. Hort: \$235

7 We have several more junior staff that we would potentially use
8 for tasks like data reduction, graphics, etc... Their hourly rates are
9 typically between \$150 and \$200 depending on the assignment and
10 the seniority of the staff person.

11 (Evertz Decl., ¶ 7, Exh. L, p. 1.) Mr. Daus also provided a rate sheet. (*Id.* at p. 40.)

12 **(2) *Anyone Who May Provide Substantive Assistance***

13 Mr. Daus identified those who may provide substantive assistance to him on this
14 assignment as follows:

15 Other staff that may work on this assignment in a substantive role
16 could include Dr. Panday and Dr. Hort in addition to more junior
17 staff. Dr. Panday would advise on modeling and quantitative
18 analysis and Dr. Hort would assist with the overall analysis under
19 my direction. If other senior staff work on the assignment, I will
20 clear that with the parties. A brief bio of my team is provided
21 below.

22 **Anthony (Tony) Daus**, PG, Principal Hydrogeologist has
23 worked on groundwater supply related projects in California
24 for more than 40 years. Currently his engagements [include]
25 water supply evaluations in the Central and West Coast Basins
26 in Los Angeles County, the San Jacinto Basin, Cuyama Basin,
27 Westside Subbasin, Kern and Tulare Subbasins, and
28 Twentynine Palms Valley Basin. These projects include tasks

1 such as development of hydrologic conceptual models, water
2 budget and safe yield analysis, optimization of pumping and
3 managed aquifer recharge projects to improve groundwater
4 resilience, and basin characterization. Many of these projects
5 include application of groundwater models or data science
6 techniques to quantify water budgets under current and
7 projected hydrologic conditions.

8 **Sorab Panday**, PhD, Principal Engineer, is a subject matter
9 expert in groundwater modeling and groundwater/surface water
10 modeling and the lead author or co-author of several
11 MODFLOW codes including MODFLOW-USG, MODFLOW-
12 NWT, and MODFLOW 6. Dr. Panday has worked throughout
13 California on various water resources assignments including
14 safe yield analysis, groundwater/surface water interactions, and
15 optimization of water resources development. Mr. Daus and
16 Dr. Panday have collaborated for nearly 20 years on projects
17 throughout the US and internationally. He is the 2015 recipient
18 of the M. King Hubbert Award, presented by the National
19 Ground Water Association and the 2022 Lifetime Achievement
20 Award from the California Groundwater Resources
21 Association. He was also elected as a Member of the National
22 Academy of Engineering (NAE) in 2017 for the development
23 of computer code for solving complex groundwater problems.

24 **Hiroko Hort**, PhD, PE, Senior Engineer specializes in
25 groundwater modeling and analysis including water resources
26 management. Her experience includes basin safe yield
27 estimation using IWFM for Cuyama Basin, hydrologic
28 conceptual model development for Eastern Municipal District,

1 calibration of coupled surface water-groundwater models
2 (HSPF/MODFLOW) using PEST for Tampa Bay Water, fate
3 and transport modeling for multiple Department of Defense
4 sites, and simulation-optimization for well siting and aquifer
5 recharge projects for Water Replenishment District of Southern
6 California.

7 (*Id.* at pp. 1–2.)

8 **(3)** *Curriculum Vitae*

9 Mr. Daus provided a copy of his CV and those of Dr. Panday and Dr. Hort. (*Id.* at pp. 11
10 [Daus], 18 [Panday], 37 [Hort].)

11 **(4)** *Disclosures*

12 Mr. Daus provided the following disclosures on the identity of any party, attorney, or
13 witness to the Phase 2 Trial with whom he has worked previously, including a very brief
14 statement of the matter on which he worked:

15 **Aleshire & Wynder, LLP:** I have been involved with two matters
16 over the past 10 years with Aleshire & Wynder.

- 17 • Worked with attorney Norman Dupont on the CAM Carson
18 matter in 2025. This was environmental litigation regarding
19 development of a former landfill in Carson, California.
- 20 • Worked with attorney Christine Carson in 2020 on the Jeff
21 Smith v. Idyllwild Water District on a water rights proceeding
22 before the State Water Resources Control Board.

23 **US Navy:** As I mentioned on the phone call, I am the Principal
24 Investigator for a multi-year R&D project to develop a managed
25 aquifer recharge (MAR) decision support system for the US Navy.
26 As part of this R&D project, we will apply the modeling tool to
27 two Navy installations. The China Lake installation is not one of
28

1 the facilities included in this project. This project started last year
2 and is scheduled to end in 2027.

3 (*Id.* at p. 2.)

4 **B. Bryan Bondy, MS:**

5 **(1) *Hourly Rates***

6 Mr. Bondy stated his hourly rate as \$300 per hour. (Evertz Decl., ¶ 8, Exh. M, p. 9.) He
7 also provided a rate sheet for GSI Water Solutions, Inc., the firm he may use to provide him with
8 substantive assistance. (*Id.* at p. 10.)

9 **(2) *Anyone Who May Provide Substantive Assistance***

10 Mr. Bondy identified those who may provide substantive assistance to him on this
11 assignment as follows:

12 If appointed, I may be assisted by GSI Water Solutions Inc. under
13 an existing mutual services agreement between our firms. GSI
14 Water Solutions Inc. and I have a longstanding working
15 relationship and have completed numerous projects together over
16 the past decade. I may utilize GSI Water Solutions Inc.'s staff in
17 two primary ways. First, they may assist with inventorying,
18 organizing, and summarizing the expert reports to streamline my
19 review and evaluation. Second, I may have GSI Water Solutions
20 Inc. staff assist me with reviewing and evaluating numerical
21 models relied upon by experts, particularly if I determine that it is
22 necessary to review model files or run the models to prepare my
23 opinion. Using GSI Water Solutions Inc.'s staff at lower labor
24 rates can help reduce the overall project cost and will help shorten
25 the schedule. Mr. Tim Thompon [sic] will serve as GSI Water
26 Solutions Inc.'s Principal in Charge. Mr. Thompson and I have a
27 history of working together on projects and he will work closely
28

1 with me to ensure the appropriate staff are assigned to support my
2 work.

3 (*Id.* at p. 6.) He further identified GSI Water Solutions Inc. staff who may support him: Tim
4 Thompson, Andres Lapostol, Tim Nicely, and Ailco Wolf. (*Ibid.*)

5 (3) *Curriculum Vitae*

6 Mr. Bondy provided a copy of his CV and those of Mr. Thompson, Mr. Lapostol, Mr.
7 Nicely, and Mr. Wolf. (*Id.* at pp. 11 [Bondy], 18 [Thompson], 28 [Lapostol], 30 [Nicely], 32
8 [Wolf].)

9 (4) *Disclosures*

10 Mr. Bondy provided the following disclosures on the identity of any party, attorney, or
11 witness to the Phase 2 Trial with whom he has worked previously, including a very brief
12 statement of the matter on which he worked:

13 Attorneys:

14 • *Aleshire & Wynder, LLP:*

15 Upper Ventura River Groundwater Agency is a common
16 client. Keith Lemieux serves as General Counsel, and I serve
17 as the contract Executive Director. Alex Lemieux and Phillip
18 W. Hall have also assisted Keith Lemieux on this matter.

19 Similarly, GSI Water Solutions, Inc. and Aleshire & Wynder,
20 LLP (Phillip Hall) have Santa Ynez River Valley
21 Groundwater Basin Eastern Management Area as a common
22 client.

23 • *Best Best & Krieger LLP:*

24 I am a retained expert consultant on a confidential matter. I
25 have interfaced with all four attorneys listed (Eric L. Garner,
26 Jeffrey V. Dunn, Wendy Y. Wang, Alison K. Toivola) on this
27 matter.
28

- *Richards Watson & Gershon:*

GSI Water Solutions, Inc. provided expert witness services for unlisted attorneys at this firm in a matter involving the City of Solvang.

Witnesses:

- *Anthony Brown of Aquilogic Inc.:*

Aquilogic, Inc. and my firm are both retained by the same law firm in a confidential matter.

I also serve alongside Dr. Bob Abrams of Aquilogic, Inc. on two technical committees that operate pursuant to the Las Posas Valley Basin Judgment. We represent different clients on those committees.

- *Stephen Johnson, P.E., of Stetson Engineers Inc.:*

Tim Thompson of GSI Water Solutions, Inc. collaborated with Mr. Johnson on several projects approximately a decade ago.

- *Lauren Wicks, PG, of Geoscience Support Services, Inc.:*

Geoscience and I were both retained by the same law firm during the Las Posas Valley Basin adjudication. Dennis Williams was a designated expert, and I served as an expert consultant.

I serve on the Technical Review Panel for the Cadiz Project, which is responsible for reviewing implementation of the monitoring and contingency plan for the Project, which is currently performed by Geoscience.

(*Id.* at pp. 7–8.)

1 **C. Reed M. Maxwell, Ph.D.:**

2 **(1) *Hourly Rates***

3 Dr. Maxwell stated his hourly rates as follows:

4 My current rates: \$550/hour regular consulting, \$825/hour on the
5 record depo and trial testimony.

6 (Evertz Decl., ¶ 6, Exh. K, p. 1.)

7 **(2) *Anyone Who May Provide Substantive Assistance***

8 Dr. Maxwell identified Dr. Lauren Foster, Ph.D., PG, of Neptune and Co. as someone
9 who may provide him with substantive assistance on this assignment. He stated, “[Dr. Lauren
10 Foster] and the Neptune modeling team can assist me if/as needed.” (*Ibid.*)

11 **(3) *Curriculum Vitae***

12 Dr. Maxwell provided a copy of his CV and that of Dr. Foster. (*Id.* at pp. 7 [Maxwell],
13 34 [Foster].)

14 **(4) *Disclosures***

15 Dr. Maxwell provided the following disclosures on the identity of any party, attorney, or
16 witness to the Phase 2 Trial with whom he has worked previously, including a very brief
17 statement of the matter on which he worked:

18 Matt Tonkin, SSPA; O’Melveny, possible phase 2 engagement for
19 OPV Coalition, et al. v. Fox Canyon Groundwater Management
20 Agency, et al. Santa Barbara County Superior Court;
21 Anthony Brown, Aquilogic; Brownstein, engaged in a confidential
22 matter.

23 (*Id.* at p. 1.)

24 **II. OTHER PROPOSED CANDIDATES**

25 The Authority, the City, and the United States have not proposed any special master
26 candidates. (Evertz Decl., ¶ 10.)

1 DATED: October 23, 2026

MURPHY & EVERTZ LLP

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3
4 By: /s/ Douglas J. Evertz

5 Douglas J. Evertz
6 Emily L. Madueno

7 Attorneys for Defendant, Cross-Complainant, &
8 Cross-Defendant
INDIAN WELLS VALLEY WATER DISTRICT

9 DATED: October 23, 2026

FENNEMORE LLP

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11
12 By: /s/ Derek R. Hoffman

13 Derek R. Hoffman
14 Sean T. Hood

15 Attorneys for Defendants & Cross-Defendants
16 MEADOWBROOK DAIRY REAL ESTATE, LLC;
17 BIG HORN FIELDS, LLC; BROWN ROAD FIELDS,
LLC; HIGHWAY 395 FIELDS, LLC; and THE
MEADOWBROOK MUTUAL WATER COMPANY

18 DATED: October 23, 2026

BEST BEST & KRIEGER LLP

19
20
21 By: /s/ Jeffrey V. Dunn

22 Eric L. Garner
23 Jeffrey V. Dunn
24 Alison K. Toivola

25 Attorneys for Defendant, Cross-Defendant, &
26 Cross-Complainant
27 SEARLES VALLEY MINERALS INC.
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DECLARATION OF DOUGLAS J. EVERTZ

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1. I am an attorney, a member of the State Bar of California, and authorized to practice law in California. I am a partner of Murphy & Evertz LLP, 650 Town Center Drive, Suite 550, Costa Mesa, California 92626. My firm serves as co-counsel of record for Defendant, Cross-Complainant, and Cross-Defendant Indian Wells Valley Water District (“District”) in the above-captioned case. I have personal knowledge of the facts set forth below.

2. On September 16, 2026, I sent an email to counsel for all parties who participated in the phase 2 trial on safe yield (“Phase 2 Trial Parties”). Attached as Exhibit F is a true and correct copy of my email. In my email on behalf of the Technical Working Group parties (the District, Searles Valley Minerals, and the Meadowbrook Dairy entities), I proposed a list of three qualified candidates to serve as special master for the phase 2 trial:

- (a) Anthony D. Daus III, PG, BCES, Vice President & Principal Hydrogeologist at GSI Environmental;
- (b) Bryan Bondy, MS, President at Bondy Groundwater Consulting; and
- (c) Reed M. Maxwell, Ph.D., Professor at Princeton and Director of the Integrated Groundwater Modeling Center. (Exh. F, p. 1.)

3. On October 1, 2026, I participated in a meet and confer meeting via Teams with counsel for all parties active in Phase 2. At one point during the meeting, someone asked counsel for the City of Ridgecrest, who also currently serves as acting counsel for the Indian Wells Valley Groundwater Authority, whether the Authority, the City, or the United States would propose other candidates for special master. Counsel responded that they did not believe they needed to propose any other candidates because the TWG Parties have proposed “reasonable” candidates.

4. On October 5, 2026, I participated in separate “interviews” via Teams with the three candidates proposed by the Technical Working Group parties. Counsel for all the Phase 2 Trial Parties participated in all three interviews.

1 5. Following the interviews, on October 5, 2026, Emily Madueno of my office
2 separately emailed the three candidates on behalf of all the Phase 2 Trial Parties. I was copied
3 on Ms. Madueno's emails, along with counsel for all the Phase 2 Trial Parties. Attached
4 collectively as Exhibit J are true and correct copies of Ms. Madueno's separate emails to the
5 three candidates, along with the attachment that accompanied each of the emails. In her email,
6 Ms. Madueno requested each candidate provide additional information: (a) provide a proposed
7 rate sheet; (b) provide the name(s) of anyone who may provide substantive assistance to the
8 candidate on this assignment; (c) provide a copy of the candidate's CV, together with the CV(s)
9 of anyone who will assist the candidate substantively; and (d) identify any parties, attorneys, or
10 witnesses from a list of the Phase 2 Trial Parties, their counsel, and the witnesses with whom the
11 candidate has worked previously, including a very brief statement of the matter on which the
12 candidate worked. (Exh. J, pp. 1, 7, 13.)

13 6. On October 6, 2026, I received an email from Dr. Maxwell in response to Ms.
14 Madueno's email. Attached as Exhibit K is a true and correct copy of Dr. Maxwell's email with
15 two attachments.

16 7. On October 7, 2026, I received an email from Mr. Daus in response to Ms.
17 Madueno's email. Attached as Exhibit L is a true and correct copy of Mr. Daus' email with four
18 attachments.

19 8. On October 12, 2026, I received an email from Mr. Bondy in response to Ms.
20 Madueno's email. Attached as Exhibit M is a true and correct copy of Mr. Daus' email with one
21 attachment.

22 9. On October 14, 2026, I called Keith Lemieux, the City's counsel, who also
23 currently serves as acting counsel for the IWVGA. During our conversation, Mr. Lemieux told
24 me that all three candidates proposed by the TWG Parties are "good" and "qualified."

25 10. As of the signing of this declaration, I have not received any proposed candidates
26 from the City, the Authority, or the United States.

1 I declare under penalty of perjury under the laws of the State of California that the
2 foregoing is true and correct.

3 Executed this 23rd day of October 2026, at Costa Mesa, California.

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6 Douglas J. Evertz
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EXHIBIT F

From: Doug Evertz <Devertz@murphyevertz.com>
Sent: Wednesday, September 16, 2026 9:53 AM
To: Kyle Brochard; James L. Markman (jmarkman@rwglaw.com); Jacob Metz; Keith Lemieux; Alex Lemieux; Phillip Hall; Coleman, Judith (ENRD); Penalosa, Alexa (ENRD); Eric Garner; Jeffrey Dunn; Alison K. Toivola (alison.toivola@bbklaw.com); Hood, Sean; Hoffman, Derek
Cc: Jim Worth; Emily Madueno
Subject: Indian Wells Valley Adjudication--Special Master Candidates

All,

The District, Searles, and Meadowbrook propose recommending the following three candidates to the Court to serve as special master. In no particular order:

- Anthony D. Daus III, PG, BCES, Vice President & Principal Hydrogeologist at GSI Environmental (https://www.gsienv.com/gsi_staff/anthony-d-daus-p-g-bces/);
- Bryan Bondy, MS, President at Bondy Groundwater Consulting (<https://www.linkedin.com/in/bryan-bondy-06342060/>); and
- Reed M. Maxwell, Ph.D., Professor at Princeton and Director of the Integrated Groundwater Modeling Center (<https://maxwell.princeton.edu/>).

The District, Searles, and Meadowbrook object to Samuel Boland-Brien, the candidate recommended by the SWRCB, serving as special master.

We can confirm that no one working on behalf of the District, Searles, or Meadowbrook has had any unilateral contact regarding this case with any of the three candidates listed above.

We look forward to discussing these candidates with you tomorrow during our meeting and confer.

Doug

Douglas J. Evertz

Partner

650 Town Center Drive · Suite 550 · Costa Mesa, CA 92626

Voice: (714) 277-1702 | Fax: (714) 277-1777

www.MurphyEvertz.com

Murphy & Evertz

A t t o r n e y s a t L a w





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EXHIBIT K

Emily Madueno

From: reed maxwell <reed.maxwell@gmail.com>
Sent: Tuesday, October 6, 2026 12:52 PM
To: Emily Madueno
Cc: Jim Worth; Doug Evertz; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com); Jeffrey V. Dunn; Alison K. Toivola (alison.toivola@bbklaw.com); dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com); kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com); Keith Lemieux; Alex Lemieux; Phillip Hall; Coleman, Judith (ENRD); Alexa Penalosa
Subject: Re: Indian Wells Valley Adjudication - Special Master Candidate
Attachments: maxwell.cv-6-Oct-26.pdf; Foster_L_resume_2026_2-pg_edited.pdf

Hi Emily and everyone-

I really enjoyed speaking with you all as well, thanks for making the time to meet. My CV is attached. Here's the information you requested:

1. My current rates: \$550/ hour regular consulting, \$825 / hour on the record depo and trial testimony
2. I've reached out to Dr. Lauren Foster of Neptune and Co. She and the Neptune modeling team can assist me if/as needed. Her CV is attached, we will update with other Neptune staff if/when we all move forward. Lauren can be the POC for now.
3. (attached)
4. Current COIs from your list: Matt Tonkin, SSPA; O'Melveny, possible phase 2 engagement for OPV Coalition, et al. v. Fox Canyon Groundwater Management Agency, et al. Santa Barbara County Superior Court; Anthony Brown, Aquilogic; Brownstein, engaged in a confidential matter

Let me know if you need anything else, thanks much

Reed

(note that I've switched to my gmail, please use this for correspondence moving forward)

From: Emily Madueno <emadueno@murphyevertz.com>
Date: Monday, October 5, 2026 at 4:14 PM
To: Reed Maxwell <reedmaxwell@princeton.edu>
Cc: Jim Worth <jim@mhwslegal.com>, Doug Evertz <Devertz@murphyevertz.com>, "Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com)" <eric.garner@bbklaw.com>, "Jeffrey V. Dunn" <jeffrey.dunn@bbklaw.com>, "Alison K. Toivola (alison.toivola@bbklaw.com)" <alison.toivola@bbklaw.com>, "dhoffman@fennemorelaw.com" <dhoffman@fennemorelaw.com>, "shood@fennemorelaw.com" <shood@fennemorelaw.com>, "James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com)" <jmarkman@rwglaw.com>, "kbrochard@rwglaw.com" <kbrochard@rwglaw.com>, "Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com)" <jmetz@rwglaw.com>, Keith Lemieux <klemieux@awattorneys.com>, Alex Lemieux <alemieux@awattorneys.com>, Phillip Hall <phall@awattorneys.com>, "Coleman, Judith (ENRD)" <Judith.Coleman@usdoj.gov>, Alexa Penalosa <alexa.penalosa@usdoj.gov>
Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Dear Reed,

On behalf of all the parties, we enjoyed speaking with you earlier today.

As mentioned during our meeting, please:

1. Provide a proposed rate sheet;
2. Provide the name(s) of anyone who may provide substantive assistance to you on this assignment;
3. Provide a copy of your CV, together with the CV(s) of anyone who will assist you substantively; and
4. Identify any parties, attorneys, or witnesses on the attached list with whom you have worked previously, including a very brief statement of the matter on which you worked.

We look forward to hearing from you within the next week with the information requested above. We would appreciate receiving the information by Monday, October 12th.

Thank you again for taking the time to meet with us.

Best regards,
Emily

Emily L. Madueno

Partner

650 Town Center Drive • Suite 550 • Costa Mesa, CA 92626

Voice: (714) 277-1707 | Fax: (714) 277-1777 | Mobile: (661) 618-0522

www.MurphyEvertz.com

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recipient, please delete the e-mail and any attachments without reading, printing, copying, or forwarding it, and please notify us.

From: Reed M. Maxwell <reedmaxwell@princeton.edu>

Sent: Saturday, September 26, 2026 3:34 AM

To: Emily Madueno <emadueno@murphyevertz.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>

Subject: Re: Indian Wells Valley Adjudication - Special Master Candidate

Hi Emily- thanks much, I've accepted the invite and look forward to talking with you (all).

Reed

From: Emily Madueno <emadueno@murphyevertz.com>

Date: Friday, September 25, 2026 at 5:35 PM

To: Reed Maxwell <reedmaxwell@princeton.edu>

Cc: Jim Worth <jim@mhwslegal.com>, Doug Evertz <Devertz@murphyevertz.com>, "Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com)" <eric.garner@bbklaw.com>, "Jeffrey V. Dunn" <jeffrey.dunn@bbklaw.com>, "Alison K. Toivola (alison.toivola@bbklaw.com)" <alison.toivola@bbklaw.com>, "dhoffman@fennemorelaw.com" <dhoffman@fennemorelaw.com>, "shood@fennemorelaw.com" <shood@fennemorelaw.com>, "James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com)" <jmarkman@rwglaw.com>, "kbrochard@rwglaw.com" <kbrochard@rwglaw.com>, "Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com)" <jmetz@rwglaw.com>, Keith Lemieux <klemieux@awattorneys.com>, Alex Lemieux <alemieux@awattorneys.com>, Phillip Hall <phall@awattorneys.com>, "Coleman, Judith (ENRD)" <Judith.Coleman@usdoj.gov>, Alexa Penalosa <alexa.penalosa@usdoj.gov>, "reed.maxwell@gmail.com" <reed.maxwell@gmail.com>

Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Good afternoon, Reed:

Thank you for your interest and for providing your availability. I will circulate a calendar invite for a Teams meeting on October 5 at 1:30 p.m. (Eastern) / 10:30 a.m. (Pacific).

Have a great weekend, and we look forward to speaking with you.

Best regards,

Emily

Emily L. Madueno

Partner

650 Town Center Drive • Suite 550 • Costa Mesa, CA 92626

Voice: (714) 277-1707 | Fax: (714) 277-1777 | Mobile: (661) 618-0522

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From: Reed M. Maxwell <reedmaxwell@princeton.edu>

Sent: Friday, September 25, 2026 5:34 AM

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Subject: Re: Indian Wells Valley Adjudication - Special Master Candidate

Hi Emily-

Thanks for reaching out, this looks like a very interesting and exciting opportunity. I am interested but need more information to make a decision regarding my fit and bandwidth. My availability is below.

Next week I have availability on the 28th, 11am to 1pm (EDT) is the best window. I lecture and have meetings the 29th and am traveling internationally the 30th-2nd and offline.

The week of the 5th I can am available between 130 and 5pm (EDT) on the 5th and until noon (EDT) on the 9th.

I'm looking forward to discussing this further, thanks much

Reed

Reed M. Maxwell, Ph.D.

William and Edna Macaleer Professor

Department of Civil and Environmental Engineering

High Meadows Environmental Institute

Director, Integrated GroundWater Modeling Center

From: Emily Madueno <emadueno@murphyvertz.com>
Date: Thursday, September 24, 2026 at 4:30 PM
To: Reed Maxwell <reedmaxwell@princeton.edu>
Cc: Jim Worth <jim@mhwslegal.com>, Doug Evertz <Devertz@murphyvertz.com>, "Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com)" <eric.garner@bbklaw.com>, "Jeffrey V. Dunn" <jeffrey.dunn@bbklaw.com>, "Alison K. Toivola (alison.toivola@bbklaw.com)" <alison.toivola@bbklaw.com>, "dhoffman@fennemorelaw.com" <dhoffman@fennemorelaw.com>, "shood@fennemorelaw.com" <shood@fennemorelaw.com>, "James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com)" <jmarkman@rwglaw.com>, "kbrochard@rwglaw.com" <kbrochard@rwglaw.com>, "Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com)" <jmetz@rwglaw.com>, Keith Lemieux <klemieux@awattorneys.com>, Alex Lemieux <alemieux@awattorneys.com>, Phillip Hall <pball@awattorneys.com>, "Coleman, Judith (ENRD)" <Judith.Coleman@usdoj.gov>, Alexa Penalosa <alexa.penalosa@usdoj.gov>
Subject: Indian Wells Valley Adjudication - Special Master Candidate

Dear Dr. Maxwell:

Our firm represents a party to the Indian Wells Valley Groundwater Basin adjudication, which is currently pending in Orange County Superior Court. A second phase of trial on safe yield was held in June 2026.

At the conclusion of the phase 2 trial, the Court informed the parties that it intends to appoint a special master. The Court would like the special master to make a written recommendation of his or her best estimate of the basin's safe yield based on the trial record.

We are reaching out to you as a possible candidate to serve as the court-appointed special master.

The parties would like to meet with you to explore your interest in the appointment and your availability to take on the assignment. Please let us know your availability for a Zoom/Teams meeting during the weeks of September 28th or October 5th if you are interested in the assignment.

Thank you, and we look forward to hearing from you.

Best regards,
Emily

Emily L. Madueno

Partner

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Reed Mailer Maxwell *Curriculum Vitae*

William and Edna Macaleer Professor of Engineering and Applied Science
Professor *Civil and Environmental Engineering and the High Meadows Environmental Institute*
Director *Integrated Groundwater Modeling Center*

Princeton University

reedmaxwell@princeton.edu

maxwell.princeton.edu

Address Department of Civil and Environmental Engineering
E415 Engineering Quadrangle
Princeton University
Princeton, New Jersey 08544

Summary Bio Reed Maxwell is the William and Edna Macaleer Professor of Engineering and Applied Science, and a Professor in Civil and Environmental Engineering (CEE) and the High Meadows Environmental Institute (HMEI) at Princeton University. He also directs the Integrated Groundwater Modeling Center (IGWMC). His research interests are focused on understanding connections within the hydrologic cycle and how they relate to water quantity and quality under anthropogenic stresses. He was the 2020 Henry Darcy Distinguished Lecturer, is an elected Fellow of the American Geophysical Union, was the 2018 Boussinesq Lecture and the 2017 School of Mines Research Award recipient. He has authored more than 200 peer-reviewed journal articles and teaches classes on integrated hydrology, fluid mechanics and modeling terrestrial water flow. At Princeton he currently leads a research group of graduate students, postdoctoral researchers and staff housed within CEE and HMEI. Over his career he has collaborated with and mentored 17 PhD students and 21 MS thesis students. Prior to coming to Princeton, Dr. Maxwell was faculty at the Colorado School of Mines and a postdoc and then staff in the Hydrologic Sciences group at Lawrence Livermore National Laboratory. He holds a Ph.D. degree in Environmental Water Resources from the Civil and Environmental Engineering Department at the University of California, Berkeley.

Education

Ph.D. 1998 University of California, Berkeley, CA. Civil and Environmental Engineering

M.S. 1994 University of California, Los Angeles, CA. Mechanical Engineering

B.S. 1992 University of Miami, Coral Gables, FL. Mechanical Engineering

Employment History

2/23-present William and Edna Macaleer Professor of Engineering and Applied Science, Princeton University, Princeton, NJ.

9/20-present Professor of Hydrology, Department of Civil and Engineering and High Meadows Environmental Institute, Princeton University, Princeton, NJ.

4/13-8/20 Professor, Department of Geology and Geological Engineering, Colorado School of Mines, Golden, CO.

8/16-8/19 Rowlinson Professor of Hydrology, Department of Geology and Geological Engineering, Colorado School of Mines, Golden, CO.

6/11- present Director, Integrated Groundwater Modeling Center

3/10-3/13 Associate Professor, Department of Geology and Geological Engineering, Colorado School of Mines, Golden, CO.

1/09-3/10 Assistant Professor, Department of Geology and Geological Engineering, Colorado School of Mines, Golden, CO.

10/07-1/09 Physicist and Deputy Group Leader, Hydrologic Sciences Group, Lawrence Livermore National Laboratory, LLNS, Livermore, CA.

5/05-9/07 Deputy Group Leader, Hydrologic Sciences Group, University of California, Lawrence Livermore National Laboratory, Livermore, CA.

10/02-9/07 Physicist, Environmental Sciences Division, University of California, Lawrence Livermore National Laboratory, Livermore, CA.

4/01-10/02 Research Assistant Professor, School of Environmental Science, Engineering and Policy, Drexel University, Philadelphia, PA (20% time)

4/00-3/01 Postdoctoral Research Associate, School of Environmental Science, Engineering and Policy, Drexel

University, Philadelphia, PA. (30% time)
6/00-10/02 Physicist, Earth and Environmental Sciences, University of California, Lawrence Livermore National Laboratory, Livermore, CA. (70% time)
5/98-5/00 Postdoctoral Staff Member, Earth and Environmental Sciences, University of California, Lawrence Livermore National Laboratory, Livermore, CA. (70% time after 4/1/00)

Honors and Awards

- Henry Darcy Distinguished Lecturer (2020)
- Elected Fellow, American Geophysical Union (2019)
- Boussinesq Lecture (2018)
- Colorado School of Mines Senior Research Award (2017)
- Innovyze Excellence in Computational Hydraulics/Hydrology Award (Advisor, awarded to J. Jefferson, 2016)
- Colorado School of Mines Outstanding Faculty in Hydrology (2016)
- Belle van Zuylen, Endowed Chair (sabbatical appointment), Utrecht University, (2015)
- Colorado School of Mines Outstanding Faculty in Hydrology (2014)
- SPOT Award Lawrence Livermore National Laboratory, (2008)

Mentorship

Summary: More than 40 graduate students, 20 postdocs, and a wide range of research staff mentored. Former group members have positions in academia, national laboratories, government agencies and consulting companies. (Listed in chronological order)

Postdocs and Staff, Princeton, Current

1. *Lisa Gallagher*, 10/15-present, Research Associate. Education and Outreach Specialist IGWMC.
2. *Mohammad Afzal Shadab* 8/24-present, Princeton FFPS Fellow, Postdoctoral Scholar.
3. *Xiao Xia Liang*, 4/25-present, Postdoctoral Scholar.
4. *Amy Defnet*, 11/21-present, Research Software Engineer.
5. *William Hasling*, 11/21-present, Sr Research Software Engineer.
6. *George Artavanis*, 5-23-present, Research Software Engineer.
7. *Howard Cohen*, 8/23-present, IGWMC Project Coordinator and Administrator.
8. *Jasmine Pinchinat*, 11/23-present, Community Organizer and Digital Outreach.
9. *Danyka Byrnes*, 6/26-present, CPRA NSERC Canada Postdoctoral Fellow, large scale water quality (co-advise with Jeff McDonnell).

Staff Alums

1. *Sophia Seo*, (Mines) 6/11-6/14, Research Associate. Assistant Director IGWMC, Education and Outreach Liaison.
2. *Michael Morse*, (Mines) 8/14-5/18, Research Associate. Assistant Director IGWMC, Education and Outreach Coordinator.
3. *Laura Condon*, (Mines) 9/15-12/15, Research Associate.
4. *Tara Kelley*, 3/21-8/22, IGWMC Project Manager and Administrator (HMEI).
5. *Calla Chennault*, 10/20-9/22, Research Software Engineer (CEE).

Postdoctoral Researchers Alums

1. *Stefan J. Kollet*, (LLNL) 1/04-6/05. Dr. Kollet is currently a Professor at the University of Bonn, Germany and a senior staff scientist and center director in the National Laboratory (F-Z) Jülich, Germany.
2. *Shadi Moqbel*, (Mines) 3/09-4/10. Dr. Moqbel is currently an Associate Professor at the University of Jordan.
3. *Ian M. Ferguson*, (Mines) 8/09-4/11. Dr. Ferguson is currently group lead of and staff in the Water Resources Group, Technical Services Center, US Bureau of Reclamation.
4. *Brian Kirsch*, (Mines) 11/11-12/13. Dr. Kirsch is currently working as a consultant at Write Water Engineers.
5. *Sonya Lopez*, (Mines) 6/12-9/14. Dr. Lopez is currently a (full) Professor at California State University, Los Angeles.

6. *Nicholas Engdahl*, (Mines) 1/13-8/14. Dr. Engdahl is currently an Associate Professor at Washington State University.
7. *Lindsay Bearup*, (Mines) 8/14-12/15. Dr. Bearup is currently staff in Water Resources Group, Technical Services Center, US Bureau of Reclamation.
8. *Inge de Graaf*, (Mines) 9/15-3/17. Dr. de Graaf is currently an Associate Professor at Wageningen University, NL.
9. *Basile Hector*, (Mines) 11/16-6/17. Dr. Hector is currently staff at the IRD in Grenoble, France.
10. *Mohammad Danesh-Yazdi*, (Mines) 2/17-2/18. Dr. Danesh-Yazdi is currently an Associate Professor at Sharif University, Iran.
11. *Hoang Tran*, (Princeton) 3/19-1/22, Dr. Tran is currently staff at the Pacific Northwest National Laboratory.
12. *Peyman Abbaszadeh*, 1/22-9/23, Dr. Abbaszadeh is currently an Assistant Professor at Portland State University.
13. *Elena Leonarduzzi*, 9/20-1/24, Dr. Leonarduzzi is research staff at Eidg. Forschungsanstalt WSL and MeteoSwiss.
14. *Chen Yang*, 9/20-5/24, Dr. Yang is an Associate Professor at Sun Yat-Sen University.
15. *Danielle Tijerina*, 5/24-8/24, Dr. Tijerina is research staff at CUAHSI.
16. *Yueling Ma*, 1/22-12/25, Dr. Ma is research staff at FZ-Juelich, Germany.
17. *Mario Soriano, Jr.* 6/22-6/25, Dr. Soriano is an Assistant Professor at the National University of Singapore.

Ph.D. Students, Current

1. *Nicholas Jadallah* Environmental Engineering. 8/21-present. Characterizing and simulating groundwater pumping in the Upper Colorado.
2. *Harry Stone* Environmental Engineering. 8/22-present. Understanding western water issues through fieldwork and modeling.
3. *Cathy Wang* Environmental Engineering. 8/22-present. Water quality implications for managed aquifer recharge in agricultural systems.
4. *Amelia Peebles* Environmental Engineering. 7/23-present. Subgrid parameterization for surface water flow in hydrologic models.
5. *Marie-Joe Sawma* Environmental Engineering. 8/24-present. Machine learning emulation of large scale hydrologic models.
6. *Louisa Pawusch* Environmental Engineering with an Applied Mathematics Minor. 7/25-present. Machine learning and large-scale hydrologic modeling.
7. *Maria Fleury* Environmental Engineering. 7/26-present. Data, model and remote sensing synthesis of water use over Brazil.
8. *Riley Cole* Environmental Engineering. 7/26-present. Remote sensing of woody plant response to groundwater and snow.
9. *José Gescilam Uchôa* VSRC Princeton, PhD Candidate EESC-USP. 7/26-7/27. Impact of land use and climate change on hydrological flows between groundwater and surface water in the Guarani Aquifer outcrop zone (Advisor: Edson Cezar Wendland).

PhD Alums

1. *John Williams*, Hydrology, Fall 2012. Dissertation Title: *Building A Better Wind Forecast: A Stochastic Forecast System Using A Fully-Coupled Hydrologic-Atmospheric Model*. Dr. Williams is currently faculty at California State University, Los Angeles.
2. *Adam Atchley*, Hydrology, Spring 2013. Dissertation Title: *Simulating Geochemical Reactive Transport In Physically And Chemically Heterogeneous Aquifers: Implications For Co2 Risk Assessment And Uncertainty*. Dr. Atchley is currently scientific staff, Los Alamos National Laboratory, Computational Hydrology Group.
3. *Steven Meyerhoff*, Hydrology, Spring 2013. Dissertation Title: *Understanding Heterogeneity And Data Assimilation In Karst Groundwater Surface Water Interactions: The Role Of Geophysics And Hydrologic Models In A Semi-Confined Aquifer*. Dr. Meyerhoff is currently Senior Technical Staff at Itasca Denver.
4. *Erica Siirila-Woodburn*, Hydrology, Spring 2013. Dissertation Title: *On the interplay between scaling small-scale reactions, mixing, and aquifer heterogeneity: Human health risk implications*. Dr. Woodburn is currently staff at Lawrence Berkeley, National Laboratory.
5. *Lindsay Bearup*, Hydrology, Summer 2014. Dissertation Title: *Changing Flow, Transport, And Geochemistry In The Mountain Pine Beetle-Killed Forests Of Rocky Mountain National Park*. (Co-advise with J. McCray). Now at US

Bureau of Reclamation, Water Resources Planning and Operations Support Group.

6. *Laura Condon* Hydrology, Summer 2015. Dissertation Title: *The Role Of Large Scale Water Management In Natural Systems: Connections, Interactions And Feedbacks*. Dr. Condon is currently a Professor at University of Arizona, Hydrology and Atmospheric Sciences Dept.
7. *Jennifer Jefferson* Hydrology, Spring 2016. Dissertation Title: *Exploring sensitivities of latent heat parameterizations using a coupled, integrated hydrologic model*. Dr. Jefferson is currently with the State of Wisconsin, Department of Natural Resources.
8. *James Gilbert* Hydrology, Summer 2016. Dissertation Title: *Exploring Catchment Connections with Integrated Hydrologic Models: System Interactions and Responses to Groundwater Extraction and Climate Change in the San Joaquin River Basin*. Dr. Gilbert is currently staff at NOAA.
9. *J. Tim Fry* Hydrology, Spring 2017. Dissertation Title: *High resolution modeling for water quantity and quality, understanding the role of green infrastructure best management practices in ultra urban environments: Connections, feedbacks and interactions*. Dr. Fry is currently staff with Enguity.
10. *J. Joeseeph Beisman* Hydrology, Spring 2018. Dissertation Title: *Balancing geochemistry and hydrology mountain systems under stress: Hydrogeochemical model development and application to pyrite weathering in alpine hillslopes*. (Co-Advise with Alexis Navarre-Sitchler). Dr. Beisman is currently staff at Oak Ridge National Laboratory.
11. *Lauren Foster* Hydrology, Summer 2018. Dissertation Title: *Modeling Climate Change Impacts To Rocky Mountain Headwater Hydrology*. Dr. Foster is currently senior staff at Neptune.
12. *Katherine Markovich* Hydrologic Sciences, (UC Davis), Summer 2018. Dissertation Title: *Integrating quantitative tools for improving conceptual models of alpine hydrogeology*. (co-advise with G. Fogg). Dr. Markovich is currently at Intera.
13. *Bryant Reyes* Environmental Engineering. Summer 2019. Dissertation Title: *Anthropogenic impacts on the water and energy balance of an urban semi-arid environment*. (co-advise with Terri Hogue). Dr. Reyes is currently staff at RMS.
14. *Mary Michael Forrester* Hydrology, Spring 2020. Dissertation Title: *Understanding Water Fluxes Through Land, Vegetation and Air with Coupled Atmospheric and Hydrologic Modeling at Extreme Scales*. Dr Forrester is now a PostDoc at NASA.
15. *Anna Ryken* Hydrology, Spring 2021. Dissertation Title: *Constraining evapotranspiration and understanding ET drivers and limitations in a mountain headwaters system*. Dr. Ryken is a Colorado River Technical Specialist at the Colorado Water Conservation Board.
16. *Lauren Thatch* Hydrology, Fall 2021. Dissertation Title: *Water management modeling within integrated hydrologic models: Process development and insights on water use impacts throughout the hydrologic cycle*. Dr. Thatch is now at US Bureau of Reclamation, Water Resources Planning and Operations Support Group.
17. *Danielle Tijerina-Kruezer* Environmental Engineering. May 2024. Dissertation Title: *NAVIGATING LARGE-SCALE HYDROLOGY: ADVANCEMENTS IN MODEL DEVELOPMENT, EVALUATION, AND APPLICATION*. Dr. Tijerina-Kruezer is currently research staff at CUAHSI.

MS Alums

Jackson Swilley Environmental Engineering. 8/21-12/22. Development and testing continental scale subsurface architecture.

MS Thesis Alums

1. *Steven Meyerhoff*, Hydrology, Spring 2010. Thesis Title: *An integrated surface-subsurface model to approximate runoff for heterogeneous slopes*.
2. *Erica Siirila*, Hydrology, Fall 2010. Thesis Title: *A quantitative methodology to assess the risks to human health from CO2 leakage into groundwater*.
3. *Laura Condon* Hydrology Spring 2012. Thesis Title: *The impact of subsurface conceptualization on land energy fluxes and regional water budgets*.
4. *Sophia Wolfenden* Hydrology Fall 2012. Thesis Title: *Watering the central valley: Modeling water flow and the affects of irrigation in the san joaquin valley, california using parflow*.
5. *Kimberly Bandy-Baldwin* Hydrology, Spring 2012. Thesis Title: *Investigation of groundwater-surface water interactions at selected sites along the rio grande using high frequency pressure observations*.

6. *Michael Sweetenham* Hydrology, Spring 2013. Thesis Title: *Assessing the timing and magnitude of precipitation-induced seepage into tunnels bored through fractured rock.*
7. *J. Joseph Beisman* Hydrology, Spring 2014. Thesis Title: *High-Resolution Reactive Transport: A Parallel Hydrogeochemical Model.*
8. *Colin Penn* Hydrology, Spring 2014. Thesis Title: *Green to Grey: Modeling Hydrological Responses to Mountain Pine Beetle Tree Mortality in Heterogeneous Terrain.*
9. *Christine Pribulick* Hydrology, Spring 2015. Thesis Title: *A High Resolution, Integrated Approach to Modeling Climate and Vegetation Change Impacts to a Mountain Headwaters Catchment using ParFlow.*
10. *Nicole Bogenschuetz* Hydrology, Spring 2016. Thesis Title: *The Effect of the Mountain Pine Beetle on Slope Stability, Soil Moisture, and Root Strength.*
11. *Mary Michael Forrester* Hydrology, Summer 2016. Thesis Title: *Ecohydrologic Response and Atmospheric Feedbacks from Beetle-induced Transpiration Losses in Colorado Headwaters.*
12. *Caitlin Collins* Hydrology, Spring 2018. Thesis Title: *Using an Integrated Hydrology Model to Elucidate Plant Water Use in a Headwaters Research Catchment.*
13. *Annette Hein* Hydrology, Spring 2018. Thesis Title: *Drought on the North American High Plains: Modeling Effects of Vegetation, Temperature and Rainfall Perturbations on Regional Hydrology.*
14. *Anna Ryken* Hydrology, Spring 2018. Thesis Title: *Sensitivity and Model Reduction of Simulated Snow Processes: Contrasting Observational and Parameter Uncertainty to Improve Prediction.*
15. *Lauren Thatch* Hydrology, Spring 2018. Thesis Title: *Untangling Water Management and Groundwater Extraction Signals in the California Central Valley: An Integrated Hydrologic Model and Remote Sensing Synthesis Approach.*
16. *Danielle Tijerina* Hydrology, 2018. Thesis title: *Improving U.S. National water modeling: An intercomparison of two high-resolution, continental scale models, ParFlow-CONUS and the National Water Model v1.2 configuration WRF-Hydro.*
17. *Rachel Corrigan* Hydrology, Spring 2019. Thesis title: *Towards a better representation of the subsurface across the continental us: Developing hydraulic conductivity datasets for integrated hydrologic models.*
18. *Sarah Trutner* Hydrology, Spring 2019. Thesis title: *Understanding scale impacts of heterogeneity and topography on water and energy fluxes in mountain meadows using a fully-integrated hydrologic model.*
19. *Jackson Swilley* Hydrology, Spring 2021. Thesis title: *A validation and comparison of approaches to mapping hydraulic conductivity at the continental scale using the Upper Colorado river basin as a testbed.*
20. *Louisa Pawusch* Uni Stuttgart, Princeton VSRC. 2/24-12/24. Thesis Title: *HydroStartML: Reducing the Spin-up Time of Hydrological Simulations by Integrating Machine Learning Techniques.*
21. *Maria Fleury* Environmental Engineering. 8/24-5/26. Thesis Title: *High resolution estimates of water table depth across Brazil: Insights into model behavior and data challenges.*

Undergrad Interns and Thesis Advisees chronological

1. *Maria Fleury* CEE '22, Sr Thesis: Changing water availability in the Sao Francisco River Basin, Brazil: exploring the role of expanding agriculture and climate change.
2. *Sinar Bitar* CEE '22, Sr Thesis: The Influence of COVID-19 on Air and Water Quality Levels in the State of New York
3. *Isabel Rodrigues* GEO '23, HMEI summer intern (2022)
4. *Ashley Cao* CEE '23, HMEI summer intern (2022), Sr Thesis: Using Field-Informed Hydrologic Modeling to Understand Species-specific Plant Water Stress under Differing Climate Scenarios
5. *Jane Castleman* COS '24, HMEI summer intern (2023)
6. *Akhil Paulraj* COS '25, HMEI summer intern (2023)
7. *Sam Melton* CEE '23, Sr Thesis: Modeling Hydrological Effects of Green Infrastructure in Urban Parks
8. *Nicole Martin* CEE '23, Sr Thesis: On Sunken Land: The Environmental and Social Impacts of the Itaipu Hydroelectric Dam in Brazil
9. *Wiley Kohler* Math '25, HMEI summer intern (2023), JP (2024): A Local-Search Inversion for Soil Hydraulic Properties in a Mountainous Headwater Catchment
10. *Sarah Burbank* COS '25, HMEI summer intern (2023)
11. *Ashley DeFrates* CEE '25, HMEI summer intern (2023)
12. *Jamie Kim* CEE '24, HMEI summer intern (2023), Sr Thesis: Using a Regression-Enhanced Random Forest Model to Improve Groundwater Monitoring and Management
13. *Madeleine Burns* CEE '24, Sr Thesis: Estimation of Snow Water Equivalent Using Long Short-Term Memory

Networks in the Western United States

14. *Leila Grant* CEE '24, Sr Thesis: Hydrological Modeling to Determine Climate Sensitivity of Saltwater Intrusion in Coastal Agriculture
15. *Alex Moosbrugger* CEE '24, Sr Thesis (co-advise with Chris Greig in ACEE): Decarbonizing Decarbonization: Analyzing Maritime Shipping Routes of Zero-Carbon Fuel and Natural Resources Key to a Net-Zero Future
16. *Brooke Beers* CEE '25, HMEI summer intern (2024)
17. *Ella Colby* COS '26, HMEI summer intern (2024)
18. *Siddhant Porwal* COS '27 HMEI summer intern (2024)
19. *Ashley DeFrates* CEE '25, Sr Thesis: Transpiration Across Elevations: Modeling the Impact of Climate Change on Plant Groundwater Use at Mountainous Headwaters
20. *Brooke Beers* CEE '25, Sr Thesis: Plants on the Peak: Field and Remote Sensing Variables in Alpine Biodiversity Models
21. *David van Velden* CEE '25 AY Intern (2024-5), Sr Thesis: Groundwater Vulnerability to Contamination from Abandoned Oil and Gas Wells in the Appalachian Basin Region
22. *Caroline Brown* CEE '27, current sr thesis
23. *Kelsey Campbell* CEE '27, current sr thesis

Publications

Summary: *n=203, Google Scholar H-Index of 70, greater than 22,000 citations.*

*(# indicates postdoc author, * indicates graduate student author, ** indicates undergraduate student author, R.M. Maxwell in bold, ! indicates most downloaded article in Science Direct, AGU, etc)*

Refereed Journal Articles

1. **Maxwell, R.M.**, S.D. Pelmulder, A.F.B. Tompson, and W.E. Kastenberg, On the Development of a New Methodology for Groundwater-Driven Health Risk Assessment. *Water Resources Research*, 34(4), 833-847, doi:10.1029/97WR03605, 1998.
2. **Maxwell, R.M.**, and W.E. Kastenberg, Stochastic Environmental Risk Analysis: An Integrated Methodology for Predicting Cancer Risk from Contaminated Groundwater. *Stochastic Environmental Research and Risk Assessment*, 13(1-2), 27-47, doi:10.1007/s004770050030, 1999.
3. **Maxwell, R.M.** and W.E. Kastenberg, A Model for Assessing and Managing the Risks of Environmental Lead Emissions. *Stochastic Environmental Research and Risk Assessment*, 13(4), 231-250, doi:10.1007/s004770050041, 1999.
4. Rubin, Y., A. Sun*, **R.M. Maxwell**, and A. Bellin, The concept of block effective macrodispersivity and a unified approach for grid-scale and plume-scale dependent transport. *Journal of Fluid Mechanics*, 395, 161-180, doi:10.1017/S0022112099005868, 1999.
5. **Maxwell, R.M.**, W.E. Kastenberg, and Y. Rubin, A methodology to integrate site characterization information into groundwater-driven health risk assessment. *Water Resources Research*, 35(9), 2841-2856, doi:10.1029/1999WR900103, 1999.
6. Tompson, A.F.B., S.F. Carle, N.D. Rosenberg, and **R.M. Maxwell**, Analysis of groundwater migration from artificial recharge in a large urban aquifer: A simulation perspective *Water Resources Research*, 35(10), 2981-2998, doi:10.1029/1999WR900175, 1999.
7. Anspaugh, L.R., K.I. Gordeev, I.A. Likhtarev, **R.M. Maxwell**, S.L. Simon, Movement of Radionuclides in Terrestrial Ecosystems by Physical Processes, *Health Physics*, 82(5), 669-679, doi:10.1097/00004032-200205000-00013, 2002.
8. Tompson AFB., C.J. Bruton, G.A. Pawloski, D.K. Smith, W.L. Bourcier, D.E. Shumaker A.B. Kersting, S.F. Carle and **R.M. Maxwell**. On the evaluation of groundwater contamination from underground nuclear tests. *Environmental Geology*. 42(2-3):235-247, doi:10.1007/s00254-001-0493-8, 2002.
9. **Maxwell, R.M.**, C. Welty, and A.F.B. Tompson. Streamline-based simulation of virus transport resulting from long term artificial recharge in a heterogeneous aquifer, *Advances in Water Resources*, 25(10), 1075-1096, doi:10.1016/S0309-1708(03)00074-5, 2003.
10. **Maxwell, R.M.** and N.L. Miller. Development of a coupled land surface and groundwater model. *Journal of Hydrometeorology*, 6(3), 233-247, doi:10.1175/JHM422.1, 2005.
11. Kollet#, S.J. and **R.M. Maxwell**. Integrated surface-groundwater flow modeling: A free-surface overland flow boundary condition in a parallel groundwater flow model. *Advances in Water Resources*, 29(7), 945-958,

- doi:10.1016/j.advwatres.2005.08.006, 2006.
12. **Maxwell, R.M.**, Welty, C. and R.W. Harvey, R.W., Revisiting the Cape Cod Bacteria Injection Experiment Using a Stochastic Modeling Approach, *Environmental Science and Technology* 41(15), doi:10.1021/es062693a, 5548-5558, 2007.
 13. **Maxwell, R.M.**, Chow, F.K. and Kollet#, S.J., The groundwater-land-surface-atmosphere connection: soil moisture effects on the atmospheric boundary layer in fully-coupled simulations, *Advances in Water Resources*, 30(12), doi:10.1016/j.advwatres.2007.05.018, 2447-2466, 2007.
 14. **Maxwell, R.M.**, Carle, S.F. and Tompson, A.F.B., Contamination, Risk, and Heterogeneity: On the Effectiveness of Aquifer Remediation, *Environmental Geology*, 54:1771-1786, doi:10.1007/s00254-007-0955-8, 2008.
 15. Kollet#, S.J. and **Maxwell, R.M.**, Capturing the influence of groundwater dynamics on land surface processes using an integrated, distributed watershed model, *Water Resources Research*, 44:W02402, doi:10.1029/2007WR006004, 2008.
 16. **Maxwell, R.M.** and Kollet, S.J., Quantifying the effects of three-dimensional subsurface heterogeneity on Hortonian runoff processes using a coupled numerical, stochastic approach. *Advances in Water Resources*, 31(5), 807-817, doi:10.1016/j.advwatres.2008.01.020, 2008.
 17. Kollet#, S.J. and **Maxwell, R.M.** Demonstrating fractal scaling of baseflow residence time distributions using a fully-coupled groundwater and land surface model. *Geophysical Research Letters* 35, L07402, doi:10.1029/2008GL033215, 2008.
 18. **Maxwell, R.M.** and Kollet, S.J. Interdependence of groundwater dynamics and land-energy feedbacks under climate change. *Nature Geoscience* 1(10) 665-669, doi:10.1038/ngeo315, 2008.
 19. Lobell, D., Bala, G. Mirin, A., Phillips, T., **Maxwell, R.M.** and Rotman, D. Regional differences in the influence of irrigation on climate. *Journal of Climate* 22(8) 2248-2255, doi:10.1175/2008JCLI2703.1, 2009.
 20. de Barros*, F.P.J., Rubin, Y. and Maxwell, R.M. The concept of comparative information yield curves and their application to risk-based site characterization. *Water Resources Research* 45, W06401, doi:10.1029/2008WR007324, 2009.
 21. **Maxwell, R.M.**, Tompson, A.F.B. and Kollet, S.J. A Serendipitous, Long-Term Infiltration Experiment: Water and Tritium Circulation Beneath the CAMBRIC Trench at the Nevada Test Site. *Journal of Contaminant Hydrology* 108(1-2) 12-28, doi:10.1016/j.jconhyd.2009.05.002, 2009.
 22. Kollet#, S.J., Cvijanovic, I., Schuettemeyer, D., **Maxwell, R.M.**, Moene, A.F. and Bayer P. The Influence of Rain Sensible Heat and Subsurface Energy Transport on the Energy Balance at the Land Surface. *Vadose Zone Journal*, doi:10.2136/vzj2009.0005, 2009.
 23. Frei*, S., Fleckenstein, J.H., Kollet#, S.J. and **Maxwell, R.M.** Patterns and dynamics of river-aquifer exchange with variably-saturated flow using a fully-coupled model. *Journal of Hydrology* 375(3-4), 383-393, doi:10.1016/j.jhydrol.2009.06.038, 2009.
 24. **Maxwell, R.M.** Coupled surface-subsurface modeling across a range of temporal and spatial scales, *Vadose Zone Journal* , doi:10.2136/vzj2009.0117, 2009.
 25. Sulis*, M., Meyerhoff*, S.B., Panniconi, C., **Maxwell, R.M.**, Putti, M. and Kollet#, S.J. A comparison of two physics-based numerical models for simulating surface water-groundwater interactions, *Advances in Water Resources* 33(4), 456-467, doi:10.1016/j.advwatres.2010.01.010, 2010.
 26. Kollet, S.J., **Maxwell, R.M.**, Woodward, C.S., Smith, S.G., Vanderborght, J., Vereecken, H., and Simmer, C. Proof-of-concept of regional scale hydrologic simulations at hydrologic resolution utilizing massively parallel computer resources, *Water Resources Research*, 46, W04201, doi:10.1029/2009WR008730, 2010.
 27. Ferguson#, I.M. and **Maxwell, R.M.** The role of groundwater in watershed response and land-surface feedbacks under climate change. *Water Resources Research* 46, W00F02, doi:10.1029/2009WR008616, 2010.
 28. **Maxwell, R.M.** Infiltration in arid environments: Spatial patterns between subsurface heterogeneity and water-energy balances. *Vadose Zone Journal* , 9, 970-983, doi:10.2136/vzj2010.0014, 2010.
 29. Rihani*, J.F., **Maxwell, R.M.** and Chow, F.K. Coupling Land Surface and Groundwater Processes: Idealized Simulations to Identify Effects of Terrain and Subsurface Heterogeneity on Land Surface Energy Fluxes. *Water Resources Research* , 46, W12523, doi:10.1029/2010WR009111, 2010.
 30. **Maxwell, R.M.**, Lundquist, J.K., Mirocha, J., Smith, S.G., Woodward, C.S. and Tompson, A.F.B. Development of a coupled groundwater-atmospheric model. *Monthly Weather Review* , 139(1), 96-116, doi:10.1175/2010MWR3392, 2011.
 31. Ferguson#, I.M. and **Maxwell, R.M.** Hydrologic and land-energy feedbacks of agricultural water management practices. *Environmental Research Letters* , 6, 014006, doi: 10.1088/1748-9326/6/1/014006, 2011.

32. Atchley*, A.L. and **Maxwell, R.M.** Influences of subsurface heterogeneity and vegetation cover on soil moisture, surface temperature, and evapotranspiration at hillslope scales. *Hydrogeology Journal* , 19(2), 289-305, doi:10.1007/s10040-010-0690-1, 2011.
33. Daniels*, M.H. **Maxwell, R.M.** and Chow, F.K. An algorithm for flow direction enforcement using sub-grid scale stream location data. *ASCE Journal of Hydrologic Engineering* , 16, 677, doi:10.1061/(ASCE)HE.1943-5584.0000340, 2011.
34. Kollat*, J.S., Reed, P.M. and **Maxwell, R.M.** Many-Objective Groundwater Monitoring Network Design Using Bias-Aware Ensemble Kalman Filtering and Evolutionary Optimization. *Water Resources Research*, 47, W02529, doi:10.1029/2010WR009194, 2011.
35. Williams*, J.L. III and **Maxwell, R.M.** Propagating subsurface uncertainty to the atmosphere using fully-coupled, stochastic simulations. *Journal of Hydrometeorology* , 12, 690-701, doi:10.1175/2011JHM1363.1, 2011.
36. Meyerhoff*, S.B. and **Maxwell, R.M.** Quantifying the effects of subsurface heterogeneity on hillslope runoff using a stochastic approach. *Hydrogeology Journal* , 19:1515-1530, doi:10.1007/s10040-011-0753-y, 2011.
37. **Maxwell, R.M.** and Anspaugh, L.R., An improved model for the prediction of resuspension. *Health Physics* , 101(6) 722-730, doi:10.1097/HP.0b013e31821ddb07, 2011.
38. Major*, E., Benson, D.A., Revielle, J., Ibrahim*, H., Dean*, A., **Maxwell, R.M.**, Poeter, E. and Dogan, M. Comparison of Fickian and temporally non-local transport theories over many scales in an exhaustively sampled sandstone slab. *Water Resources Research* , 47, W10519, 14pp, doi:10.1029/2011WR010857, 2011.
39. Siirila*, E.R., Navarre-Sitchler#, A.K., **Maxwell, R.M.**, and McCray, J.E. A quantitative methodology to assess the risks to human health from CO2 leakage into groundwater. *Advances in Water Resources*, 36(2), 146-164, doi:10.1016/j.advwatres.2010.11.005, 2012.
40. Siirila*, E.R. and **Maxwell, R.M.** Evaluating effective reaction rates of kinetically driven solutes in large-scale, statistically anisotropic media: human health risk implications. *Water Resources Research*, 48, W04527, 23pp, doi:10.1029/2011WR011516, 2012.
41. Siirila*, E.R. and **Maxwell, R.M.** A new perspective on human health risk assessment: Development of a time dependent methodology and the effect of varying exposure durations. *Science of the Total Environment*, 431, 221-232, doi:10.1016/j.scitotenv.2012.05.030, 2012.
42. Bearup*, L.A., Navarre-Sitchler#, A.K., **Maxwell, R.M.**, McCray, J.E. Kinetic metal release from competing processes in aquifers. *Environmental Science and Technology*, 46(12), 6539-6547, [doi:10.1021/es203586y](http://dx.doi.org/10.1021/es203586y), 2012.
43. Benson, D.A., Atchley*, A.L., **Maxwell, R.M.**, Poeter, E., Ibrahim, H. , Dean, A., Revielle, J., Dogan, M., Major, E. Reply to Comment on “Comparison of Fickian and temporally non-local transport theories over many scales in an exhaustively sampled sandstone slab.” *Water Resources Research*, 48, W07802, 5pp, doi:10.1029/2012WR012004, 2012.
44. Ferguson#, I.M. and **Maxwell, R.M.** Human impacts on terrestrial hydrology: Climate Change versus pumping and irrigation. *Environmental Research Letters*, 7 044022, doi:10.1088/1748-9326/7/4/044022, 2012.
45. Meyerhoff*, S.B., Karaoulis, M., Fiebig, F., **Maxwell, R.M.**, Revil, A., Martin, J.B., and Graham, W.D. Visualization of conduit-matrix conductivity differences in a karst aquifer using time-lapse electrical resistivity. *Geophysical Research Letters*, 39, L24401, doi:10.1029/2012GL053933, 2012.
46. Benson, D.A., **Maxwell, R.M.**, Poeter, E., Ibrahim, H. , Dean, A., Revielle, J., Dogan, M., Major, E. Reply to comment by T. R. Ginn on “Comparison of Fickian and temporally nonlocal transport theories over many scales in an exhaustively sampled sandstone slab” *Water Resources Research*, 49, 2:1196, doi:10.1002/wrcr.20090, 2013.
47. de Rooij#, R., Graham, W., Maxwell, R.M. A particle-tracking scheme for simulating pathlines in coupled surface-subsurface flows. *Advances in Water Resources* 53:7-18, doi:10.1016/j.advwatres.2012.07.022, 2013.
48. Atchley*, A.L., **Maxwell, R.M.** and Navarre-Sitchler#, A.K. Linking complex geochemical and hydrological processes using streamlines for highly-resolved, reactive transport CO2 leakage scenarios. *Advances in Water Resources*, 52:93-106, doi:10.1016/j.advwatres.2012.09.005, 2013.
49. Navarre-Sitchler#, A.K., **Maxwell, R.M.**, Siirila*, E.R., Hammond, G.H. and Lichtner, P.C. Elucidating geochemical response of shallow heterogeneous aquifers to CO2 leakage using high-performance computing: implications for monitoring of CO2 sequestration. *Advances in Water Resources*, 53:45-55, doi:10.1016/j.advwatres.2012.10.005, 2013.
50. **Maxwell, R.M.** A terrain-following grid transform and preconditioner for parallel, large-scale, integrated hydrologic modeling. *Advances in Water Resources*, 53:109-117, doi:10.1016/j.advwatres.2012.10.001, 2013.
51. Keyes, D.E., L. C. McInnes, C. Woodward, W. Gropp, E. Myra, M. Pernice, J. Bell, J. Brown, A. Clo, J. Connors, E.

- Constantinescu, D. Estep, K. Evans, C. Farhat, A. Hakim, G. Hammond, G. Hansen, J. Hill, T. Isaac, X. Jiao, K. Jordan, D. Kaushik, E. Kaxiras, A. Koniges, K. Lee, A. Lott, Q. Lu, J. Magerlein, **R.M. Maxwell**, M. McCourt, M. Mehl, R. Pawlowski, A.P. Randles, D. Reynolds, B. Rivière, U. Rude, T. Scheibe, J. Shadid, B. Sheehan, M. Shephard, A. Siegel, B. Smith, X. Tang, C. Wilson and B. Wohlmuth Multiphysics simulations: Challenges and opportunities. *International Journal of High Performance Computing Applications*, 27(1):4-83, doi:10.1177/1094342012468181, 2013.
52. Mikkelsen*, K.M., **Maxwell, R.M.**, Ferguson#, I.M., McCray, J.E., Stednick, J.D., Sharp, J.O. Mountain pine beetle infestation impacts: Modeling water and energy budgets at the hill-slope scale. *Ecohydrology*, 6(1), 64-72, doi:10.1002/eco.278, 2013.
 53. Mikkelsen*, K.M. Dickenson, E.R, **Maxwell, R.M.**, McCray, J.E., and Sharp, J.O. Adverse water quality impacts from climate-induced forest die-off. *Nature Climate Change*, 3, 218-222, doi:10.1038/nclimate1724, 2013.
 54. Taylor, R.G Scanlon, B., Doell, P., Rodell, M., van Beek, R., Wada, Y., Longuevergne, L., Leblanc, M., Famiglietti, J.S., Edmunds, M., Konikow, L., Green, T.R., Chen, J., Taniguchi, M., Bierkens, M.F.P., MacDonald, A., Fan, Y., **Maxwell, R.M.**, Yechieli, Y., Gurdak, J.J., Allen, D., Shamsudduha, M., Hiscock, K., Yeh, P.J.-F., Holman, I. and Treidel, H. Groundwater and climate change. *Nature Climate Change*, 3, 322-329, doi:10.1038/nclimate1744, 2013.
 55. Grebel, J.E., Mohanty, S.K., Torkelson, A.A., Boehm, A.B. Higgins, C.P., **Maxwell, R.M.**, Nelson, K.L., Sedlak, D.L. Engineered Infiltration Systems for Urban Stormwater Reclamation. *Environmental Engineering Science*, 30(8) 437-454, doi:10.1089/ees.2012.0312, 2013.
 56. Atchley*, A.L., **Maxwell, R.M.** and Navarre-Sitchler, A.K. Human health risk assessment of CO2 leakage into overlying aquifers using a stochastic, geochemical reactive transport approach. *Environmental Science and Technology*, 47(11), 5954-5962, doi:10.1021/es400316c, 2013.
 57. Mikkelsen*, K.M., Bearup*, L.A., **Maxwell, R.M.**, Stednick, J.D., McCray, J.E. Sharp, J.O. Bark beetle infestation impacts on nutrient cycling, water quality and interdependent hydrological effects. *Biogeochemistry*, doi:10.1007/s10533-013-9875-8, 2013.
 58. Condon*, L.E. and **Maxwell, R.M.** Implementation of a linear optimization water allocation algorithm into a fully integrated physical hydrology model. *Advances in Water Resources*, 60, 135-147, doi:10.1016/j.advwatres.2013.07.012, 2013.
 59. Condon*, L.E., **Maxwell, R.M.** and Gangopadhyay, S. The impact of uncertainty in subsurface conceptualization on land energy fluxes. *Advances in Water Resources*, 60, 188-203, doi:10.1016/j.advwatres.2013.08.001, 2013.
 60. Williams*, J.L. III, **Maxwell, R.M.** and Delle Monache, L. Development and verification of a new wind speed forecasting system using an Ensemble Kalman Filter data assimilation technique in a fully coupled hydrologic and atmospheric model. *Journal of Advances in Modeling Earth Systems*, 5(4) 785-800, doi:10.1002/jame.20051, 2013.
 61. Meyerhoff*, S.B., **Maxwell, R.M.**, Graham, W.D. and Williams, J.L. III Improved Hydrograph Prediction Through Subsurface Characterization: Conditional Stochastic Hillslope Simulations. *Hydrogeology Journal*, doi:10.1007/s10040-014-1112-6, 2014.
 62. **Maxwell, R.M.**, Putti, M., Meyerhoff*, S.B., Delfs, J.-O., Ferguson, I.M., Ivanov, V., Kim, J., Kolditz, O., Kollet, S.J., Kumar, M., Lopez, S., Niu, J., Paniconi, C., Park, Y.-J., Phanikumar, M.S., Shen, C., Sudicky, E.A., and Sulis, M. Surface-subsurface model intercomparison: A first set of benchmark results to diagnose integrated hydrology and feedbacks. *Water Resources Research*, 50(2) 1531-1549, doi:10.1002/2013WR013725, 2014.
 63. Condon*, L.E. and **Maxwell, R.M.** Groundwater-fed irrigation impacts spatially distributed temporal scaling behavior of the natural system: A spatio-temporal framework for understanding water management impacts. *Environmental Research Letters*, 9(3), 034009, doi:10.1088/1748-9326/9/3/034009, 2014.
 64. Engdahl#, N.B. and **Maxwell, R.M.** Approximating groundwater age distributions using simple streamtube models and multiple tracers. *Advances in Water Resources*, 66, 19-31, doi:10.1016/j.advwatres.2014.02.001, 2014.
 65. Meyerhoff*, S.B., **Maxwell, R.M.**, Revil, A., Martin, J.B., Karaoulis, M. and Graham, W.D. Characterization of groundwater and surface water mixing in a semi-confined karst aquifer using time-lapse electrical resistivity tomography. *Water Resources Research*, 50(3) 2566-2585, doi:10.1002/2013WR013991, 2014.
 66. Condon*, L.E. and **Maxwell, R.M.** Feedbacks between managed irrigation and water availability: Diagnosing temporal and spatial patterns using an integrated hydrologic model. *Water Resources Research*, 50(3) 2600-2616, doi:10.1002/2013WR014868, 2014.
 67. Bearup*, L.A., **Maxwell, R.M.**, Clow, D.W., and McCray, J.E. Hydrological effects of forest transpiration loss in bark beetle-impacted watersheds. *Nature Climate Change*, 4, 481-486 doi:10.1038/NCLIMATE2198, 2014.
 68. Cui, Z., Welty, C. and **Maxwell, R.M.** Modeling Nitrogen Transport and Transformation in Aquifers Using a Particle-Tracking Approach. *Computers and Geosciences*, 70, 1-14, doi:10.1016/j.cageo.2014.05.005, 2014.

69. Bearup*, L.A., Mikkelsen, K.M., Wiley, J.F., Navarre-Sitchler, A.K., **Maxwell, R.M.**, Sharp, J.O. and McCray, J.E. Metal fate and partitioning in soils under bark beetle-killed trees. *Science of the Total Environment*, 496 348-357, doi:10.1016/j.scitotenv.2014.07.052, 2014.
70. Atchley*, A.L., Navarre-Sitchler, A.K. and **Maxwell, R.M.** The Effects of Physical and Geochemical Heterogeneity on Hydro-geochemical Transport and Effective Reaction Rates. *Journal of Contaminant Hydrology*, 165 53-46, doi:10.1016/j.jconhyd.2014.07.008, 2014.
71. Osei-Kuffuor, D., **Maxwell, R.M.** and Woodward, C.S. Improved Numerical Solvers for Implicit Coupling of Subsurface and Overland Flow. *Advances in Water Resources*, 74 185-195, doi:10.1016/j.advwatres.2014.09.006, 2014.
72. Srivastava, V., Graham, W.D., Muñoz-Carpena, R. and **Maxwell, R.M.** Insights on geologic and vegetative controls over hydrologic behavior of a large complex basin: Global Sensitivity Analysis of an Integrated Parallel Hydrologic Model. *Journal of Hydrology*, 519b 2238-2257, doi:10.1016/j.jhydrol.2014.10.020, 2014.
73. Siirila-Woodburn*, E.R. and **Maxwell, R.M.** A heterogeneity model comparison of highly resolved statistically anisotropic aquifers. *Advances in Water Resources*, 75, 53-66, doi:10.1016/j.advwatres.2014.10.011, 2015.
74. Bierkens, M.F.P., Bell, V., Burek, P., Chaney, N., Condon*, L.E., David, C., de Roo, A., Doell, P., Drost, N., Famiglietti, J., Florke, M., Gochis, D., Houser, P., Hut, R., Keune, J., Kollet, S., **Maxwell, R.M.**, Reager, J., Samaniego, L., Sutandudjaja, E., van de Giesen, N., Winsemius, H., and Wood, E. Hyper-resolution global hydrological modelling: what's next? *Hydrologic Processes*, 29(2), 310-320, doi:10.1002/hyp.10391, 2015.
75. Engdahl#, N.B. and **Maxwell, R.M.** Quantifying changes in age distributions and the hydrologic balance of a high-mountain watershed from climate induced variations in recharge. *Journal of Hydrology*, 522, 152-162, doi:10.1016/j.jhydrol.2014.12.032, 2015.
76. Bhaskar, A.S. Welty, C., **Maxwell, R.M.** and Miller, A.J. Untangling the effects of urban development on subsurface storage in Baltimore. *Water Resources Research*, 51,2, 1158-1181, doi:10.1002/2014WR016039, 2015.
77. Kirsch#, B.R. and Maxwell, R.M. The Use of a Water Market to Minimize Drought-Induced Losses in the Bay Area of California. *Journal- American Water Works Association*, 107,5, doi:10.5942/jawwa.2015.107.0066, 2015.
78. Seck, A. Welty, C., and **Maxwell, R.M.** Spin-up behavior and effects of initial conditions for an integrated hydrologic model. *Water Resources Research*, 51, doi:10.1002/2014WR016371, 2015.
79. Beisman*, J.J., **Maxwell, R.M.**, Navarre-Sitchler, A.K., Steefel, C.I., and Molins Rafa, S. ParCrunchFlow: An Efficient, Parallel Reactive Transport Simulation Tool for Physically and Chemically Heterogeneous Saturated Subsurface Environments. *Computational Geosciences*, 19(2), 403-422, doi:10.1007/s10596-015-9475-x, 2015.
80. **Maxwell, R.M.**, Condon*, L.E. , and Kollet, S.J. A high resolution simulation of groundwater and surface water over most of the continental US with the integrated hydrologic model ParFlow v3. *Geoscientific Model Development*, 8, 923-937, doi:10.5194/gmd-8-1-2015, 2015.
81. Condon*, L.E., Hering, A.S. and **Maxwell, R.M.** Quantitative assessment of groundwater controls across major US river basins using a multi-model regression algorithm. *Advances in Water Resources*, 82, 106-123, doi:10.1016/j.advwatres.2015.04.008, 2015.
82. Rihani*, J., Chow, F.K., and **Maxwell, R.M.** Isolating Effects of Terrain and Soil Moisture Heterogeneity on the Atmospheric Boundary Layer: Idealized simulations to diagnose land-atmosphere feedbacks. *Journal of Advances in Modeling Earth Systems*, 7(2), 915-937, doi:10.1002/2014MS000371, 2015.
83. Jefferson*, J.L. and **Maxwell, R.M.** Evaluation of simple to complex parameterizations of bare ground evaporation. *Journal of Advances in Modeling Earth Systems*, 7, 1-15, doi:10.1002/2014MS000398, 2015.
84. Jefferson*, J.L., Gilbert*, J.M., Constantine, P.G. and **Maxwell, R.M.** Active subspaces for sensitivity analysis and dimension reduction of an integrated hydrologic model. *Computers and Geosciences*, 83, 127-138, doi:10.1016/j.cageo.2015.07.001, 2015.
85. Clark, M.P., Fan, Y., Lawrence, D.M., Adam, J.C., Bolster, D., Gochis, D.J., Hooper, R.P., Kumar, M., Leung, L.R., Mackay, D.S., **Maxwell, R.M.**, Shen, C., Swensen, S.C., Zeng, X. Improving the representation of hydrologic processes in Earth System Models. *Water Resources Research*, 51, doi:10.1002/2015WR017096, 2015.
86. Condon*, L.E. and **Maxwell, R.M.** Evaluating the relationship between topography and groundwater using outputs from a continental scale integrated hydrology model. *Water Resources Research*, 51, doi:10.1002/2014WR016774, 2015.
87. Brooks, P.D., Chorover, J., Fan, Y., Godsey, S.E., **Maxwell, R.M.**, McNamara, J.P., Tague, C. Hydrological Partitioning in the Critical Zone: Recent Advances and Opportunities for Developing Transferrable Understanding of Water Cycle Dynamics. *Water Resources Research*, 51, doi:10.1002/2015WR017039, 2015.
88. Reyes*, B., **Maxwell, R.M.** and Hogue, T.S. Impact of lateral flow and spatial scaling on the simulation of semi-arid

- urban land surfaces in an integrated hydrologic and land surface model. *Hydrologic Processes*, doi:10.1002/hyp.10683, 2015.
89. Ferguson#, I.M., Jefferson*, J.L., **Maxwell, R.M.** and Kollet, S.J. Effects of Root Water Uptake Formulation on Simulated Water and Energy Budgets at Local and Basin Scales. *Environmental Earth Sciences*, 75(15), doi:10.1007/s12665-015-5041-z, 2016.
 90. **Maxwell, R.M.**, Condon*, L.E., Kollet, S.J., Maher, K., Haggerty, R., and Forrester*, M.M. The imprint of climate and geology on the residence times of groundwater. *Geophysical Research Letters*, 43, doi:10.1002/2015GL066916, 2016.
 91. Bearup*, L.A., **Maxwell, R.M.** and McCray, J.E. Hillslope response to insect-induced land-cover change: an integrated model of end-member mixing. *Ecohydrology*, 9, 195-203, doi:10.1002/eco.1729, 2016.
 92. Foster*, L.M., Bearup#, L.A., Molotch, N.P., Brooks, P.D. and **Maxwell, R.M.** Energy Budget Increases Reduce Mean Streamflow More Than Snow-Rain Transitions: Using integrated modeling to isolate climate change impacts on Rocky Mountain hydrology. *Environmental Research Letters*, 11(40), doi:10.1088/1748-9326/11/4/044015, 2016.
 93. Lopez#, S.R. and **Maxwell, R.M.** Identifying Urban Features from LiDAR for a High-Resolution Urban Hydrologic Model. *Journal of the American Water Resources Association*, 52:3, 756-768, doi:10.1111/1752-1688.12425, 2016.
 94. Markovich*, K.H., **Maxwell, R.M.** and Fogg, G.E. Hydrogeological response to climate change in alpine hillslopes. *Hydrological Processes*, doi:10.1002/hyp.10851, 2016.
 95. Penn*, C.A., Bearup#, L.A., **Maxwell, R.M.** and Clow, D.W. Numerical experiments to explain multi-scale hydrological responses to mountain pine beetle tree mortality in a headwater watershed. *Water Resources Research*, 52:4, 3143-3161, doi:10.1002/2015WR018300, 2016.
 96. Gilbert*, J.M., Jefferson*, J.L., Constantine, P.G. and **Maxwell, R.M.** Global spatial sensitivity of runoff to subsurface permeability using the active subspace method. *Advances in Water Resources*, 92, 30-42, doi:10.1016/j.advwatres.2016.03.020, 2016.
 97. Kurtz, W., He, G., Kollet, S.J., **Maxwell, R.M.**, Vereecken, H. and Hendricks Franssen, H.-J. TerrSysMP-PDAF (version 1.0): A modular high-performance data assimilation framework for an integrated land surface-subsurface model. *Geoscientific Model Development*, 9, 1341-1360, doi:10.5194/gmd-9-1341-2016, 2016.
 98. Kenwell, A., Navarre-Sitchler, A., Prugue, R., Spear, J.R., Hering, A.S., **Maxwell, R.M.**, Carroll, R.W.H., Williams, K.H. Using geochemical indicators to distinguish high biogeochemical activity in floodplain soils and sediments. *Science of the Total Environment*, 563-564, 386-395, doi:10.1016/j.scitotenv.2016.04.014, 2016.
 99. **Maxwell, R.M.** and Condon, L.E. Connections between groundwater flow and transpiration partitioning. *Science*, 353:6297, 377-380, doi:10.1126/science.aaf7891, 2016.
 100. Pribulick*, C.E., Foster*, L.M., Bearup, L.A., Navarre-Sitchler, A.K., Williams, K.H., Carroll, R.W.H., and **Maxwell, R.M.** Contrasting the hydrologic response due to land cover and climate change in a mountain headwaters system. *Ecohydrology*, 9:8, 1431-1438, doi:10.1002/eco.1779, 2016.
 101. Kollet, S., Sulis, M., **Maxwell, R.M.**, Paniconi, C., Putti, M., Bertoldi, G., Coon, E.T., Cordano, E., Endrizzi, S., Kikinzon, E., Mouche, E., Mügler, C., Park, Y-J, Stisen, S., Sudicky, E., The Integrated Hydrologic Model Intercomparison Project, IH-MIP2: A second set of benchmark results to diagnose integrated hydrology and feedbacks, *Water Resources Research*, 53(1), 867-890, doi:10.1002/2016WR019191, 2017.
 102. Jefferson*, J.L., **Maxwell, R.M.**, Constantine, P.G. Exploring the sensitivity of photosynthesis and stomatal resistance parameters in a land surface model. *Journal of Hydrometeorology*, 18(3):897-915, doi:10.1175/JHM-D-16-0053.1, 2017.
 103. Gilbert*, J.M. and **Maxwell, R.M.** Examining regional groundwater-surface water dynamics using an integrated hydrologic model of the San Joaquin River basin. *Hydrology and Earth System Sciences*, 21, 923-947, doi:10.5194/hess-21-923-2017, 2017.
 104. Condon, L.E. and **Maxwell, R.M.** Systematic shifts in Budyko relationships caused by groundwater storage changes. *Hydrology and Earth System Sciences*, 21, 1-19, doi:10.5194/hess-21-1-2017, 2017.
 105. Sulis, M., Williams, J.L., Shrestha, P., Diederich, M., Simmer, C., Kollet, S.J., and **Maxwell, R.M.** Coupling groundwater, vegetation, and atmospheric processes: a comparison of two integrated models. *Journal of Hydrometeorology*, 18:1489-1511, doi:10.1175/JHM-D-16-0159.1, 2017.
 106. Winnick, M., Carroll, R.W.H., Williams, K.H., **Maxwell, R.M.**, Dong, W. and Maher, K. Snowmelt controls on concentration-discharge relationships and the balance of oxidative and acid-base weathering fluxes in an alpine catchment, East River, Colorado. *Water Resources Research*, 53(3) 2507-2523, doi:10.1002/2016WR019724, 2017.
 107. Sweetenham* M.G., **Maxwell, R.M.** and Santi, P.M. Assessing the timing and magnitude of precipitation-induced seepage into tunnels bored through fractured rock. *Tunnelling and Underground Space Technology*, 65:62-75,

doi:10.1016/j.tust.2017.02.003, 2017.

108. Gilbert*, J.M., **Maxwell, R.M.** and Gochis, D.J. Effects of water table configuration on the planetary boundary layer over the San Joaquin River watershed, California. *Journal of Hydrometeorology*, 18:1471-1488, doi:10.1175/JHM-D-16-0134.1, 2017.
109. Fry*, T.J. and **Maxwell, R.M.** Evaluation of distributed BMPs in an Urban Watershed: High resolution modeling for Stormwater Management. *Hydrological Processes*, 31(15):2700-2712, doi:10.1002/hyp.11177, 2017.
110. Fan, Y., Leung, L.R., Duan, Z., Wigmosta, M.S., **Maxwell, R.M.**, Chambers, J.Q. and Tomasella, J. Influence of landscape heterogeneity on water available to tropical forests in an Amazonian catchment and implications for modeling drought response. *Journal of Geophysical Research - Atmospheres*, 16(27):8410-8426, doi:10.1002/2017JD027066, 2017.
111. McDowell, N.G., Michaletz, S. T., Bennett, K.E., Solander, K.C., Xu, C., **Maxwell, R.M.** and Middleton, R.S. Predicting chronic climate-driven disturbances and their mitigation. *Trends in Ecology and Evolution*, 33(1):15-27, doi:10.1016/j.tree.2017.10.002, 2018.
112. Danesh-Yazdi#, M., Klaus, J., Condon, L.E., and Maxwell, R.M. Bridging the gap between numerical solutions of travel time distributions and analytical storage selection functions. *Hydrological Processes*, doi:10.1002/hyp.11481, 2018.
113. **Maxwell, R.M.**, Navarre-Sitchler, A.K. and Tonkin, M. Forward: Modeling for Sustainability and Adaptation. *Groundwater*, 56:4, 515-516, doi:10.1111/gwat.12795, 2018.
114. Gilbert*, J.M. and **Maxwell, R.M.** Contrasting warming and drought in snowmelt-dominated agricultural basins: revealing the role of elevation gradients in regional response to temperature change. *Environmental Research Letters*, 13:7, doi:10.1088/1748-9326/aacb38, 2018.
115. Hubbard, S.S., Williams, K.H., Agarwal, D., Banfield, J., Beller, H., Bouskill, N., Brodie, E., Carroll, R., Dafflon, B., Dwivedi, D., Falco, N., Faybishenko, B., **Maxwell, R.M.**, Peter Nico, P., Steefel, C., Steltzer, H., Tokunaga, T., Tran, P.A., Wainwright, H. and Varadharajan C. The East River, CO Watershed: A Mountainous Community Testbed for Improving Predictive Understanding of Multi-Scale Hydrological-Biogeochemical Dynamics. *Vadose Zone Journal*, 17(1):1-25, doi:10.2136/vzj2018.03.0061, 2018.
116. Forrester*, M.M., **Maxwell, R.M.**, Bearup, L.A., and Gochis, D.J. Forest Disturbance Feedbacks from Bedrock to Atmosphere Using Coupled Hydro-Meteorological Simulations Over the Rocky Mountain Headwaters. *Journal of Geophysical Research-Atmospheres*, 123:9026-9046, doi:10.1029/2018JD028380, 2018.
117. Gou, S., Miller, G. R., Saville, C., **Maxwell, R.M.**, and Ferguson, I.M. Simulating groundwater uptake and hydraulic redistribution by phreatophytes in a high-resolution, coupled subsurface-land surface model. *Advances in Water Resources*, 121:245-262, doi:10.1016/j.advwatres.2018.08.008, 2018.
118. Reyes*, B., Hogue, T.S. and **Maxwell, R.M.** Urban irrigation suppresses land surface temperature and changes the hydrologic regime in semi-arid regions. *Water*, 10(11), doi:10.3390/w10111563, 2018.
119. Fry*, T. and **Maxwell, R.M.** Using a distributed hydrologic model to improve the green infrastructure parameterization used in a lumped model. *Water*, 10(12), doi:10.3390/w10121756, 2018.
120. **Maxwell, R.M.**, Condon, L.E., Danesh-Yazdi#, M. and Bearup, L.A. Exploring source water mixing and transient residence time distributions of outflow and evapotranspiration with an integrated hydrologic model and Lagrangian particle tracking approach. *Ecohydrology*, 12(1):e2042, doi:10.1002/eco.2042, 2019.
121. Foster*, L.M. and **Maxwell, R.M.**, Sensitivity analyses of hydraulic conductivity and Manning's n parameters lead to new method to scale effective hydraulic conductivity across model resolutions. *Hydrological Processes*, 33(3):332-349, doi:10.1002/hyp.13327, 2019.
122. Condon, L.E. and **Maxwell, R.M.** Modified priority flood and global slope enforcement algorithm for topographic processing in physically based hydrologic modeling applications. *Computers and Geosciences*, 126:73-83, doi:10.1016/j.cageo.2019.01.020, 2019.
123. Maples*, S., Fogg, G.E. and **Maxwell, R.M.** Modeling managed aquifer recharge processes in a highly heterogeneous, semi-confined aquifer system. *Hydrogeology Journal*, 1-20, doi:10.1007/s10040-019-02033-9, 2019.
124. Hein*, A., Condon, L.E. and **Maxwell, R.M.** Evaluating the relative importance of precipitation, temperature and land-cover change in the hydrologic response to extreme meteorological drought conditions over the North American High Plains. *Hydrology and Earth System Sciences*, 23:1931-1950, doi:10.5194/hess-23-1931-2019, 2019.
125. Markovich*, K.H., Dahlke, H.E., Arumi, J.L., **Maxwell, R.M.** and Fogg, G.E. Bayesian hydrograph separation in a minimally gauged alpine volcanic watershed in central Chile. *Journal of Hydrology*, 575:1288-1300, doi:10.1016/j.jhydrol.2019.06.014, 2019.

126. Condon, L.E. and **Maxwell, R.M.** Simulating the sensitivity of evapotranspiration and streamflow to large-scale groundwater depletion. *Science Advances*, 5(6) eaav4574, doi:10.1126/sciadv.aav4574, 2019.
127. Cottrell, S., Mattor, K.M., Morris, J.L., Fettig, C.J., McGrady, P., Maguire, D., James, P.M.A., Clear, J., Wurtzebach, Z., Wei, Y., Brunelle, A., Western, J., **Maxwell, R.M.**, Rotar, M., Gallagher, L., and Roberts, R. Adaptive capacity in social-ecological systems: a framework for addressing bark beetle disturbances in natural resource management. *Sustainability Science*, 1-13, doi:10.1007/s11625-019-00736-2, 2019.
128. Ryken*, A., Bearup, L.A., Jefferson, J., Constantine, P. and **Maxwell, R.M.** Sensitivity and model reduction of simulated snow processes: contrasting observational and parameter uncertainty to improve prediction. *Advances in Water Resources*, 135:103473, doi:10.1016/j.advwatres.2019.103473, 2020.
129. Wilusz, D. C., Harman, C. J., Ball, W. B., **Maxwell, R.M.** and Buda, A. R. Using particle tracking to understand flow paths, age distributions, and the paradoxical origins of the inverse storage effect in an experimental catchment. *Water Resources Research*, 56, e2019WR025140, doi:10.1029/2019WR025140, 2020.
130. **Maxwell, R.M.** Water colour and climate. *Nature Climate Change*, 10:102-103, doi:10.1038/s41558-019-0683-6, 2020.
131. Condon, L.E., Atchley A.L., and **Maxwell, R.M.** Evapotranspiration depletes groundwater under warming over the contiguous United States. *Nature Communications*, 11:873, doi:10.1038/s41467-020-14688-0, 2020.
132. Reyes*, B., Hogue, T.S. and **Maxwell, R.M.** Urban irrigation in the modeling of a semi-arid urban environment: Ballona Creek watershed, Los Angeles, California. *Hydrological Sciences Journal*, doi:10.1080/02626667.2020.1751846, 2020.
133. Forrester*, M.M. and **Maxwell, R.M.** Impact of lateral groundwater flow and subsurface lower boundary conditions on atmospheric boundary layer development over complex terrain. *Journal of Hydrometeorology*, 21(6):1133-1160, doi:10.1175/JHM-D-19-0029.1, 2020.
134. Thatch*, L.M., Gilbert, J.M. and **Maxwell, R.M.** Integrated hydrologic modeling to untangle the impacts of water management during drought. *Groundwater*, 58:377-391, doi:10.1111/gwat.12995, 2020.
135. de Graaf#, I.E.M., Condon, L.E., and **Maxwell, R.M.** Hyper-resolution continental-scale 3D-aquifer parameterization for groundwater modelling. *Water Resources Research*, 56, e2019WR026004, doi:10.1029/2019WR026004, 2020.
136. Tran#, H., Zhang, J., Cohard, J.-M., Condon, L.E., and **Maxwell, R.M.** Simulating groundwater-streamflow connections in the Upper Colorado River Basin. *Groundwater*, 58:392-405, doi:10.1111/gwat.13000, 2020.
137. Tonkin, M., Hill, M., **Maxwell, R.M.**, and Zhen, C. Groundwater Modeling and Beyond: MODFLOW-and-More-2019 Special Issue. *Groundwater*, 58:325-326, doi:10.1111/gwat.12999, 2020.
138. Kuffour, B.N.O., Engdahl, N.B., Woodward, C.S., Condon, L.E., Kollet, S.J. and **Maxwell, R.M.** Simulating coupled surface-subsurface flows with ParFlow v3.5.0: capabilities, applications, and ongoing development of an open-source, massively parallel, integrated hydrologic model. *Geoscientific Model Development*, 13:1373-1397, doi:10.5194/gmd-13-1373-2020, 2020.
139. Maples*, S., Foglia, L., Fogg, G.E. and **Maxwell, R.M.** Sensitivity of Hydrologic and Geologic Parameters on Recharge Processes in a Highly-Heterogeneous, Semi-Confined Aquifer System. *Hydrogeology and Earth Systems Sciences*, 24:2437-2456, doi:10.5194/hess-24-2437-2020, 2020.
140. Yang#, C., Li, H.-L., Fang, Y., Cui, C., Wang, T., Zheng, C., Leung, Z.-R., **Maxwell, R.M.**, Zhang, Y.-K., and Yang, X. Effects of groundwater pumping on ground surface temperature: A regional modeling study in the North China Plain. *Journal of Geophysical Research - Atmospheres*, 125:e2019JD031764, doi:10.1029/2019JD031764, 2020.
141. Foster*, L.M., Williams, K.H., and **Maxwell, R.M.** Resolution matters when modeling climate change in headwaters of the Colorado River. *Environmental Research Letters*, 51:10, doi:10.1088/1748-9326/aba77f, 2020.
142. Leonarduzzi#, E., **Maxwell, R.M.**, Mirus, B. and Molnar, P. Numerical analysis of the effect of subgrid variability in a physically-based hydrological model on runoff, soil moisture, and slope stability. *Water Resources Research*, 57, e2020WR027326, doi:10.1029/2020WR027326, 2021.
143. Maavara T., Siirila-Woodburn E.R., Maina F., **Maxwell R.M.**, Sample J.E., Chadwick K.D., et al. Modeling geogenic and atmospheric nitrogen through the East River Watershed, Colorado Rocky Mountains. *PLoS ONE* 16(3): e0247907, doi:10.1371/journal.pone.0247907, 2021.
144. Zhang, J., Condon, L. E., Tran, H., and **Maxwell, R. M.**: A national topographic dataset for hydrological modeling over the contiguous United States, *Earth System Science Data*, 13:3263-3279, doi:10.5194/essd-13-3263-2021, 2021.
145. Yang#, C., Zhang, Y.-C., Liang, X., Olschanowsky, C., Yang, Y., and **Maxwell, R.M.**, Accelerating the Lagrangian particle tracking of residence time distributions and source water mixing towards large scales. *Computers and Geosciences*, 151:104760, doi:10.1016/j.cageo.2021.104760, 2021.

146. Tijerina*, D., Condon, L., FitzGerald, K., Dugger, A., O'Neill, M. M., Sampson, K., Gochis, D.J., and **Maxwell, R.M.** Continental hydrologic intercomparison project, phase 1: A large-scale hydrologic model comparison over the continental United States. *Water Resources Research*, 57, e2020WR028931, doi:10.1029/2020WR028931, 2021.
147. O'Neill*, M.M.F., Tijerina*, D., Condon, L., and **Maxwell, R.M.** Assessment of the ParFlow-CLM CONUS 1.0 integrated hydrologic model: evaluation of hyper-resolution water balance components across the contiguous United States. *Geoscientific Model Development*, 14, 7223-7254, doi:10.5194/gmd-14-7223-2021, 2021.
148. Gallagher L.K., Williams J.M., Lazzeri D., Chennault C., Jourdain S., O'Leary P., Condon L.E., and **Maxwell R.M.** Sandtank-ML: An Educational Tool at the Interface of Hydrology and Machine Learning. *Water*, 13(23):3328, doi:10.3390/w13233328, 2021
149. Cooley D., **Maxwell R.M.** and Smith S.M., Center Pivot Irrigation Systems and Where to Find Them: A Deep Learning Approach to Provide Inputs to Hydrologic and Economic Models. *Frontiers in Water*, 3:786016, doi:10.3389/frwa.2021.786016, 2021.
150. Tran#, H., Leonarduzzi#, E., De la Fuente, L., Hull, R.B., Bansal, V., Chennault, C., Gentine, P., Melchior, P., Condon, L.E., and **Maxwell, R.M.** Development of a Deep Learning Emulator for a Distributed Groundwater-Surface Water Model: ParFlow-ML. *Water*, 13(23), 3393, doi:10.3390/w13233393, 2021.
151. Condon, L. E., Kollet, S., Bierkens, M. F. P., Fogg, G. E., **Maxwell, R. M.**, Hill, M. C., Fransen, H.-J. H., Verhoef, A., Van Loon, A. F., Sulis, M., and Abesser, C. Global groundwater modeling and monitoring: Opportunities and challenges. **Water Resources Research**, 57: e2020WR029500, doi:10.1029/2020WR029500, 2021
152. Gleeson, T., Wagener, T., Doell, P., Zipper, S. C., West, C., Wada, Y., Taylor, R., Scanlon, B., Rosolem, R., Rahman, S., Oshinlaja, N., **Maxwell, R.**, Lo, M.-H., Kim, H., Hill, M., Hartmann, A., Fogg, G., Famiglietti, J. S., Ducharme, A., de Graaf, I., Cuthbert, M., Condon, L., Bresciani, E., and Bierkens, M. F. P.: GMD perspective: The quest to improve the evaluation of groundwater representation in continental- to global-scale models, *Geoscientific Model Development*, 14:7545-7571, doi:10.5194/gmd-14-7545-2021, 2021.
153. **Maxwell, R.M.**, Condon, L.E., Mechior, P. A Physics-Informed, Machine Learning Emulator of a 2D Surface Water Model: What Temporal Networks and Simulation-Based Inference Can Help Us Learn about Hydrologic Processes, *Water*, 13:3633, doi:10.3390/w13243633, 2021.
154. Ryken*, A., Gochis, D.G., and **Maxwell, R.M.** Unraveling groundwater contributions to evapotranspiration and constraining water fluxes in a high-elevation catchment. *Hydrological Process*, 36:1, e14449. DOI:10.1002/hyp.14449 also Authoria preprint DOI:10.22541/au.160974909.94645181/v1, 2022.
155. Tran#, H., Zhang, J., O'Neil*, M.M.F., Ryken*, A., Condon, L.E. and **Maxwell, R.M.** A hydrological simulation dataset of the Upper Colorado River Basin from 1983 to 2019. *Scientific Data*, 9:16, DOI:10.1038/s41597-022-01123-w, 2022.
156. Yang#, C., **Maxwell, R.M.**, Richard Valent, R. Accelerating the Lagrangian simulation of water ages on distributed, multi-GPU platforms: The importance of dynamic load balancing, *Computers & Geosciences*, 166:105189, DOI:10.1016/j.cageo.2022.105189, 2022.
157. Carroll, R. W. H., Deems, J., **Maxwell, R.M.**, Sprenger, M., Brown, W., Newman, A., Beutler, C., Bill, M., Hubbard, S. S., and Williams, K. H. Variability in observed stable water isotopes in snowpack across a mountainous watershed in Colorado. *Hydrological Processes*, 36:8, e14653, DOI:10.1002/hyp.14653, 2022.
158. Gallagher L.K., Farley A.J., Chennault C., Cerasoli S., Jourdain S., O'Leary P., Condon L.E. and **Maxwell R.M.** The ParFlow Sandtank: An interactive educational tool making invisible groundwater visible. *Frontiers in Water*, 4:909918, DOI:10.3389/frwa.2022.909918, 2022.
159. Leonarduzzi#, E., Tran, H.V., Bansal, V., Hull, R., De La Fuente, L., Bearup, L.A., Melchior, P., Condon, L.E. and **Maxwell, R.M.** Training machine learning with physics-based simulations to predict 2D soil moisture fields in a changing climate. *Frontiers in Water*, DOI:10.3389/frwa.2022.927113, 2022.
160. Condon, L.E., Farley, A., Jourdain, S., O'leary, P., Avery, P., Gallagher, L., Chennault, C., and **Maxwell, R.M.** ParFlow Sand Tank: A tool for groundwater exploration. *Journal of Open Source Education*, 5:55, 179, DOI:10.21105/jose.00179, 2022.
161. Carroll, R. W. H., Deems, J., Sprenger, M., **Maxwell, R.M.**, Brown, W., Newman, A., Beutler, C. and Williams, K. H. Modeling Snow Dynamics and Stable Water Isotopes Across Mountain Landscapes. *Geophysical Research Letters*, 49, e2022GL098780, DOI:10.1029/2022GL098780, 2022.
162. Gupta, A., Reverdy, A., Cohard, J.-M., Hector, B., Descloitres, M., Vandervaere, J.-P., Coulaud, C., Biron, R., Liger, L., **Maxwell, R.M.**, Valay, J.-G., and Voisin, D. Impact of distributed meteorological forcing on simulated snow cover and hydrological fluxes over a mid-elevation alpine micro-scale catchment, *Hydrology and Earth System Science*, 27, 191-212, DOI:10.5194/hess-27-191-2023, 2023.
163. Yang#, C., Ponder, C., Wang, B., Tran#, H., Zhang, J., Swilley*, J., Condon, L.E., and **Maxwell, R.M.** Accelerating the

- Lagrangian particle tracking in hydrologic modeling to continental-scale. *Journal of Advances in Modeling Earth Systems*, 15, e2022MS003507, DOI:10.1029/2022MS003507, 2023.
164. Yang#, C., **Maxwell, R.M.**, McDonnell, J., Yang, X., and Tijerina-Kreuzer*, D. The role of topography in controlling evapotranspiration age. *Journal of Geophysical Research: Atmospheres*, 128, e2023JD039228, DOI:10.1029/2023JD039228, 2023.
 165. Jiao, J., Zhang, Y., Miller, S., **Maxwell, R.M.**, Nguyen, M.C., Parsekian, A.D., and Flinchum, B.A. Integrated Hydrological Modeling of the No-Name Watershed, Medicine Bow Mountains, Wyoming, *Hydrogeology Journal*, DOI:10.1007/s10040-023-02712-8, 2023.
 166. Tran, H., Yang#,C., Condon, L.E. and **Maxwell, R.M.** The Budyko shape parameter as a descriptive index for streamflow loss, *Frontiers in Water*, DOI:10.3389/frwa.2023.1258367, 5:1258367, 2023.
 167. Swilley*, J., Tijerina-Kreuzer*, D., Tran, H., Zhang, Y., Yang#,C., Condon, L.E. and **Maxwell, R.M.** Continental scale hydrostratigraphy: comparing geological data products to analytical solutions, *Groundwater*, DOI:10.1111/gwat.13354, 18p, 2023. also available as a preprint
 168. Tijerina-Kreuzer*, D., Swilley*, J., Tran, H., Zhang, Y., West, B., Yang#,C., Condon, L.E. and **Maxwell, R.M.** Continental scale hydrostratigraphy: basin-scale testing of alternative data-driven approaches, *Groundwater*, DOI:10.1111/gwat.13357, 18p, 2023. also available as a preprint
 169. Yang#,C., Tijerina-Kreuzer*, D., Tran, H., Condon, L.E. and **Maxwell, R.M.** A high-resolution, 3D groundwater-surface water simulation of the contiguous US: Advances in the integrated ParFlow CONUS 2.0 modeling platform, *Journal of Hydrology*, DOI:10.1016/j.jhydrol.2023.130294,626B:130294, 2023. also available as a preprint
 170. Ma#,Y., Leonarduzzi#, E., Defnet, A., Melchior, P., Condon, L.E. and **Maxwell, R.M.** Water Table Depth Estimates over the Contiguous US Using a Random Forest Model, *Groundwater*, DOI:10.1111/gwat.13362, 10p, 2023.
 171. Soriano Jr#, M. and **Maxwell, R.M.** Spatial aggregation effects on the performance of machine learning metamodels for predicting transit time to baseflow. *Environmental Research Communications*, DOI:10.1088/2515-7620/ad0744, 5(11):115002 2023.
 172. Bennett, A., Tran#, H., De la Fuente, L., Triplett, A., Ma#, Y., Melchior, P., **Maxwell, R.M.**, and Condon L.E. Spatio-temporal machine learning for regional to continental scale terrestrial hydrology. *Journal of Advances in Modeling Earth Systems*, 16, e2023MS004095. DOI:10.1029/2023MS004095, 2024.
 173. Triplett, A., Artavanis, G., Hasling, W., **Maxwell, R.M.**, Defnet, A., Johnson, A., Lytle, W., Bennet, A., Leonarduzzi #, E., Gallagher, L., and Condon, L.E. SubsetTools: A Python package to subset data to build and run ParFlow hydrologic models. *Journal of Open Source Software*, 9(99), 6752. DOI:10.21105/joss.06752, 2024.
 174. Defnet, A., Hasling, W., Condon, L.E., Johnson, A., Artavanis, G., Triplett, A., Lytle, W., and **Maxwell, R.M.** hf_hydrodata: A Python package for accessing hydrologic simulations and observations across the United States. *Journal of Open Source Software*, 9(99), 6623, DOI:10.21105/joss.06623, 2024.
 175. Hull, R., Leonarduzzi#, E., De La Fuente, L., Viet Tran #, H., Bennett, A., Melchior, P., **Maxwell, R. M.**, and Condon, L. E.: Simulation-Based Inference for Parameter Estimation of Complex Watershed Simulators, *Hydrology and Earth Systems Science*, 28(20):4685-4713, DOI:10.5194/hess-2023-264, 2024.
 176. Ma#, Y., Koch, J., and **Maxwell, R.M.** Using Random Forests to Explore the Feasibility of Groundwater Knowledge Transfer between the Contiguous US and Denmark. *Environmental Research Communications*, 6:121005, DOI:10.1088/2515-7620/ad9b08, 2024.
 177. Kim**, J., Ma#, Y., and **Maxwell, R.M.** Integrating Groundwater Pumping Data with Regression-Enhanced Random Forest Models to Improve Groundwater Monitoring and Management in a Coastal Region, *Frontiers in Water*, 6:1509945, DOI:10.3389/frwa.2024.1509945, 2024.
 178. Hill, M.C., **Maxwell, R.M.**, and Tonkin, M. Groundwater Modeling in a Changing World: MODFLOW-and-More 2022 Special Issue. *Groundwater*, 62(1):4-5, doi:10.1111/gwat.13378, 2024.
 179. Yang#, C., Condon, L.E., and **Maxwell, R.M.** Unraveling groundwater-stream connections over the continental United States, *Nature Water*, DOI:10.1038/s44221-024-00366-8, 2025.
 180. West, B.D., **Maxwell, R.M.**, and Condon, L.E. A scalable and modular reservoir implementation for large-scale integrated hydrologic simulations, *Hydrol. Earth Syst. Sci.*, 29, 245-259, DOI:10.5194/hess-29-245-2025, 2025.
 181. Peebles*, A. and **Maxwell, R.M.** Subgrid Channel Formulation in Integrated Surface-Subsurface Hydrologic Model, *Frontiers in Water*, 6:1520913, DOI:10.3389/frwa.2024.1520913, 2025.
 182. Berkelhammer, M., Page, G., Zurek, F., Still, C., Carbone, M., Talavera, W., Hildebrand, L., Byron, J., Inthabandith, K., Kucinski, A., Carlson, M., Foss, K., Brown, W., Carroll, R., Simonpietr, A., Worsham, M., Breckheimer, I., Ryken*, A., **Maxwell, R.M.**, Gochis, D., Raleigh, M., Small, E., Williams, K.H., Canopy structure modulates the sensitivity of

subalpine forest stands to interannual snowpack and precipitation variability, *Hydrology and Earth Systems Science*, 29, 701-718, doi:10.5194/hess-29-701-2025, 2025.

183. Zaoua Maina, F., Rosen, D., Abbaszadeh#, P., Yang#, C., Kumar, S., Rodell, M., **Maxwell, R.M.** Integrating the interconnections between groundwater and land surface processes through the coupled NASA Land Information System and ParFlow environment. *Journal of Advances in Modeling Earth Systems*, 17:e2024MS004415, DOI:10.1029/2024MS004415, 2025.
184. Soriano#, M.A., Jaajoco, P., Carroll, B., **Maxwell, R.M.**, and Carruth, A. Public discourses and personal narratives of learning from disaster. *npj Climate Action*, 4:20, doi:10.1038/s44168-025-00227-4, 2025.
185. Yang, C., Jia, Z., Xu, W., Wei, Z., Zhang, X., Zou, Y., McDonnell, J., Condon, L., Dai, Y., and **Maxwell, R.M.** CONCN: A high-resolution, integrated surface water-groundwater ParFlow modeling platform of continental China, *Hydrology and Earth Systems Science*, 29:2201-2218, doi:10.5194/hess-29-2201-2025, 2025.
186. Triplett, A., Bennett, A., Condon, L. E., Melchior, P., and **Maxwell, R. M.** A deep-learning based parameter inversion framework for large-scale groundwater models. *Geophysical Research Letters*, 52, e2024GL114285, doi:10.1029/2024GL114285, 2025.
187. Pawusch*, L., Scheurer, S., Nowak, W., and **Maxwell, R.M.** HydroStartML: A combined machine learning and physics-based approach to reduce hydrological model spin-up time, *Advances in Water Resources*, 206:105124, doi:10.1016/j.advwatres.2025.105124, 2025.
188. Muñoz-Vega, E., Bogen, H.R., Richard-Cerda, J.C., **Maxwell, R.M.**, and Schulz, S. Influence of hydraulic conductivity conceptualization and unsaturated flow parameters for an integrated hydrological model. *Water Resources Research*, 61, e2025WR040785, doi:10.1029/2025WR040785, 2025.
189. Abbaszadeh#, P., Zaoua Maina, F., Yang#, C., Rosen, D., Kumar, S., Rodell, M., and **Maxwell, R.M.** Coupling the ParFlow Integrated Hydrology Model within the NASA Land Information System: a case study over the Upper Colorado River Basin, *Hydrology and Earth System Sciences*, 29:5429-5452, doi:10.5194/hess-29-5429-2025, 2025.
190. Kollet, S., Belleflamme, A., Condon, L., Fahad, M., Goergen, K., **Maxwell, R.**, and Naz, B. Global groundwater modeling: Proof-of-concept of 3D variably saturated flow simulation at kilometer resolution, *Journal of Hydrology X*, 100213, doi:10.1016/j.hydroa.2025.100213, 2025.
191. Ma#, Y., Condon, L.E., Koch, J., Bennett, A., Defnet, A., Tijerina-Kreuzer, D., Melchior, P., and **Maxwell, R.M.** High resolution US water table depth estimates reveal quantity of accessible groundwater. *Communications Earth & Environment*, 7:45, doi:10.1038/s43247-025-03094-3, 2026.
192. Burns**, M. and **Maxwell, R.M.** Comparing Snow Water Equivalent Estimations from Long Short-Term Memory Networks and Physics-Based Models in the Western United States. *Water Resources Research*, 62:e2025WR041178, doi:10.1029/2025WR041178, 2026.
193. Yang, C., Sun, A., Zhang, S., Dai, Y., Kollet, S., and **Maxwell, R.M.** Twenty Years of Trials and Insights: Bridging Legacy and Next Generation in ParFlow and Land Surface Model Coupling, *Geoscientific Model Development*, 19, 1849–1866, doi:10.5194/gmd-19-1849-2026, 2026.
194. Ma#, Y., Tijerina-Kreuzer, D., Defnet, A., Artavanis, G., Condon, L., and **Maxwell, R.M.** A Prototype Hyper-Resolution Groundwater Digital Twin for the Contiguous United States: Integrating Physics-Based Modeling, Machine Learning, and Observations. *Journal of Hydrology*, 671:135189, doi:10.1016/j.jhydrol.2026.135189, 2026.
195. Jadallah*, N. and **Maxwell, R.M.** Model-based disaggregation of satellite-based total water storage anomalies for the Upper Colorado River Basin. *Journal of Hydrology*, doi:10.1016/j.jhydrol.2026.135839, 2026.
196. Pourreza Ahmadi, S.F., Sahoo, B., Yang, C., **Maxwell, R.M.**, and Xia, M. Impact of Groundwater-Surface Water Interaction on the Chesapeake Bay Density, Stratification and Mixing under Normal and Extreme Weather Conditions. *Journal of Geophysical Research: Oceans*, 131:e2026JC024172, doi:10.1029/2026JC024172, 2026.
197. Ma#, Y., Tijerina-Kreuzer, D., Defnet, A., Bennett, A., Melchior, P., Condon, L.E., **Maxwell, R.M.** Data challenges in large-scale transient groundwater modeling using machine learning, *Advances in Water Resources*, 217:105453, doi:10.1016/j.advwatres.2026.105453, 2026.
198. Peebles*, A., Leonarduzzi, E., Condon, L.E., and **Maxwell, R.M.**, A hybrid machine learning and physics-based approach to model high-resolution inundation, *Journal of Hydrology*, 679B:136246, doi:10.1016/j.jhydrol.2026.136246, 2026.
199. Fleury*, M.P., Ma, Y., and **Maxwell, R.M.** High resolution estimates of water table depth across Brazil: insights into model behavior and data challenges, *Environmental Research Letters*, doi:10.1088/1748-9326/ae9bd7, 2026.
200. Soriano Jr.#, M.A., Warren, J.L., Wang*, Y.C., van Velden**, D., Lin, S., **Maxwell, R.M.**, and Saiers, J.E. Higher odds of produced-water-like chemistry in groundwater vulnerable to shale gas spills. *Nature Sustainability*, doi:10.1038/s41893-026-01933-5, 2026.

201. Stone*, H. and **Maxwell, R.M.** Vegetation groundwater use drives streamflow declines in Colorado River headwaters. *Communications Earth & Environment*, doi:10.1038/s43247-026-04045-2, 2026.
202. Liu, J., Schneider, R.J.M., Trolborg, L., Ma, Y., **Maxwell, R.M.**, Koch, J. A National Scale Hybrid Machine Learning Model for Enhanced Groundwater Depth Estimation, *Water Resources Research*, doi:10.1029/2026WR043414, *in press*, 2026.
203. **Maxwell, R.M.** Land surface model snow formulation sensitivity and a solar-zenith-angle snow covered area scheme evaluated across the western United States, *Journal of Hydrology*, doi:10.1016/j.jhydrol.2026.136567, *in press*, 2026.

Books and Book Chapters

Pinder, G.F., D.E. Dougherty, A.N. Findikakis, R.M. Greenwald, G.P. Karatzas, **R.M. Maxwell**, A.S. Mayer, D.B. McLaughlin, R.C. Peralta, D.M. Rizzo, B.J. Wagner, K.M. Yager and W. W-G. Yeh, Optimization and Modeling for Remediation and Monitoring, chapter in *Environmental Modeling and Management: Theory, Practice and Future Directions*, C.C. Chein, M.A. Medina, G.F. Pinder, D.R. Reible, B.E. Sleep and C. Zheng, eds, DuPont Company, Today Media, 2002.

Teaching and Related Activities

Summary: More than 13,000 contact hours since 2009, a mix of undergraduate and graduate courses. Princeton quality-of-course scores average 4.3 out of 5 across 10 courses, 2021-2026.

Teaching at Princeton University

Brief descriptions for regularly offered classes

CEE 586 / ENV 586- Physical Hydrology. *A graduate level hydrology class with a focus on on processes, derivations and project-based modules with real-world applications.*

CEE 306 / ENV 318- Hydrology: Water and Climate. *A undergraduate level hydrology class with a focus on on processes, understanding the broad picture of human water challenges using modern approaches.*

Table of Courses taught at Princeton University

Term	Course	Credits	Students	Eval*
Fall 2020	NGWA Henry Darcy Distinguished Lecturer			NA
Spring 2021	CEE 599a / ENV 599 Understanding Hydrology and Environmental Engineering through Teaching	3	2	5.0
Fall 2021	CEE 586 / ENV 586 Physical Hydrology	3	4	4.5
Fall 2021	CEE 478 Senior Thesis	-	2	NA
Spring 2022	CEE 306 / ENV 318 Hydrology: Water and Climate	3	34	4.07
Fall 2022	CEE 586 / ENV 586 Physical Hydrology	3	11	3.9
Fall 2022	CEE 478 Senior Thesis	-	3	NA
Spring 2023	CEE 306 / ENV 318 Hydrology: Water and Climate	3	31	4.33
Fall 2023	CEE 586 / ENV 586 Physical Hydrology	3	7	4.5
Fall 2023	CEE 478 Senior Thesis	-	4	NA
Spring 2024	CEE 306 / ENV 318 Hydrology: Water and Climate	3	61	4.0
Fall 2024	CEE 586 / ENV 586 Physical Hydrology	3	8	4.5
Fall 2024	CEE 478 Senior Thesis	-	3	NA
Spring 2025	CEE 306 / ENV 318 Hydrology: Water and Climate	-	18	4.01
Fall 2025	<i>Sabbatical leave, no teaching</i>			NA
Spring 2026	CEE 306 / ENV 318 Hydrology: Water and Climate	3	23	4.25
Fall 2026	CEE 586 / ENV 586 Physical Hydrology	3	9	<i>pending</i>

*Office of registrar *Quality of Course* score

Teaching at Colorado School of Mines

Brief descriptions for regularly offered classes

GEGN 351- Geological Fluid Mechanics. *A required, junior level, undergraduate engineering fluid mechanics with a hydro/geo spin. Meets all ABET engineering fluids requirements; has recitation section taught by TA (managed by me); redeveloped from existing course in 2009.*

GEGN 582- Integrated Surface Water Hydrology. *A required, graduate level, hydrology class that spans the shallow subsurface to lower atmosphere. Focus is on processes, derivations and project-based modules with real-world applications. Required for all Hydrologic Science and Engineering graduate students, typically taken first semester of MS degree. Developed as a completely new course in 2009.*

Table of Courses taught while at Colorado School of Mines

Term	Course	Credits	Students
Spring 2009	GEGN 351 Geological Fluid Mechanics	3	40
Spring 2009	GEGN 598a Processes and Scaling in Hydrology	1	15
Fall 2009	GEGN 582 Integrated Surface Water Hydrology	3	26
Spring 2010	GEGN 351 Geological Fluid Mechanics	3	38
Spring 2010	GEGN 598 Integrated Surface Water Modeling	3	10
Fall 2010	GEGN 582 Integrated Surface Water Hydrology	3	24
Fall 2010	GEGN 585 Fluid Mechanics for Hydrology	2	10
Spring 2011	GEGN 351 Geological Fluid Mechanics	3	40
Spring 2011	GEGN 598a Hydrology of the Western United States	1	14
Fall 2011	GEGN 582 Integrated Surface Water Hydrology	3	24
Fall 2011	GEGN 585 Fluid Mechanics for Hydrology	2	11
Fall 2011	ESGN 501 Environmental Risk Analysis	3	13
Spring 2012	GEGN 351 Geological Fluid Mechanics	3	45
Fall 2012	GEGN 582 Integrated Surface Water Hydrology	3	25
Fall 2012	ESGN 501 Environmental Risk Analysis	3	15
Spring 2013	GEGN 598 Linking Hydrologic and Atmospheric Models*	3	15
Fall 2013	GEGN 582 Integrated Surface Water Hydrology	3	25
Fall 2013	GEGN 585 Fluid Mechanics for Hydrology	2	15
Spring 2014	GEGN 351 Geological Fluid Mechanics	3	55
Fall 2014	GEGN 582 Integrated Surface Water Hydrology	3	25
Fall 2014	GEGN 585 Fluid Mechanics for Hydrology	2	15
Spring 2015	GEGN 598 Linking Hydrologic and Atmospheric Models*	3	10
Fall 2015	<i>Sabbatical leave</i>		
Spring 2016	<i>Sabbatical leave</i>		
Fall 2016	GEGN 582 Integrated Surface Water Hydrology	3	20
Fall 2016	HNRS 450a Naked Trees, Killer Beetles, and Dirty Water**	3	9
Fall 2017	GEGN 582 Integrated Surface Water Hydrology	3	20
Spring 2018	GEGN 351 Geological Fluid Mechanics	3	40
Fall 2018	GEGN 582 Integrated Surface Water Hydrology	3	17
Spring 2019	GEGN 351 Geological Fluid Mechanics	3	34
Fall 2019	GEGN 582 Integrated Surface Water Hydrology	3	21
Spring 2020	<i>NGWA Henry Darcy Distinguished Lecturer</i>		

* Delivered as part of an NSF IGERT, collaboratively with UC Davis

** Delivered as part of an NSF WSC, collaboratively with CSU

K-12 and Community Education and Outreach

Directed incredibly active K-8 / K-12 outreach program with full-time staff and several student volunteers with direct interaction with more than 10,000 students and curriculum development and teacher trainings impacting more than 80,000 students.

Research Support

Summary: *\$21M total since joining academia in 2009, annual expenditures around \$1.7M / year for the past five years. Almost entirely federally funded, peer-reviewed, grants that have enabled amazing science.*

Grant Funding

Maxwell, R.M. (PI), Atchley, A. (CoPI), Gallagher, M. (CoPI) Advancing conservation through a synergy of drone-based remote sensing and fine scale modeling: de-tangling topography, soil moisture and shallow groundwater on vegetation resiliency. US DOD SERDP RC25-4949, \$250K, 11/1/24-8/31/26.

Maxwell, R.M. (PI), Condon, L.E. (CoPI), Gupta, H. (CoPI), Castronova, A. (CoPI) Collaborative Research: Frameworks: Building a national integrated watershed evaluation framework: A community platform to improve model evaluation and decision making. US National Science Foundation OAC-CSSI-2410992, \$3.8M, 9/1/24-8/31/28 (\$2,646,047 Princeton).

Condon, L.E. (CoLead), **Maxwell, R.M. (CoLead)**, NSF National Artificial Intelligence Research Resources (NAIRR): HydroGEN: National Hydrology AI Digital Twin Pilot (Supplement). US National Science Foundation DCL 24-093 NAIRR Demonstration Project, NSF-2134892, \$500K, 9/1/24-8/31/25.

Maxwell, R.M. (PI), Xia, M. (CoPI), A Framework to Better Understand Coastal Flooding in the Mid-Atlantic Region: How Groundwater May Play an Unseen Role in Climate Impacts to Estuarine Systems, Princeton University PACRI Program, \$105K, 9/22-8/24.

Condon, L.E. (PI), **Maxwell, R.M. (PI)**, Melchior, P. (CoPI), Merchant, N. (CoPI), NSF Convergence Accelerator Phase 2 - Track D: Hidden water and extreme events: HydroGEN, a physically rigorous machine learning platform for hydrologic scenario generation. US National Science Foundation C-Accel 2134892, \$5M, 9/15/21-9/14/25.

Maxwell, R.M. (PI), Condon, L.E. (CoPI), Smith, S. (CoPI), Gallagher, L. (CoPI), Kroepsch, A. (CoPI), INFEWS/T1: Groundwater and the future of sustainable agriculture - balancing economic, energy, and water constraints on food production. US National Institute of Food and Agriculture, \$2.3M, 9/1/20-8/30/25.

Kumar, S. (PI), **Maxwell, R.M.**, Rodell, M., Dunlap, R., Zaitchik, B., Santanello, J., An advanced coupled surface-subsurface hydrologic modeling and data assimilation system using LIS and ParFlow, NASA MAP 80NSSC20K1714, 9/15/2020-8/15/2025, (\$368K Princeton).

O'Leary, P. (PI), **Maxwell, R.M.** (CoPI), Condon, L.E. (CoPI). Cloud/Web-based Advanced Modeling and Simulation Turnkey High-Performance Computing Environment for Surface and Subsurface Science, US DOE Office of Science SBIR, \$1.5M, 3/1/20-2/28/24 (\$300K Princeton).

Maxwell, R.M. (PI), Condon, L.E. (CoPI), Zheng, C. (NSF-China PI). Collaborative Research: Sustainability in the Food-Energy-Water nexus; integrated hydrologic modeling of tradeoffs between food and hydropower in large scale Chinese and US basins. US National Science Foundation NSF-1805160, \$500K US funding, 9/1/18-8/30/24 (\$243,132 Princeton).

Moulton, D. (PI), Molins, S. (CoPI), Painter, S. (CoPI), **Maxwell, R.M.** (CoPI), Condon, L.E. (CoPI), Chen, X. (CoPI). IDEAS-Watersheds, US DOE Office of Science, \$3.4M, 9/1/22-8/30/25 (\$600K Princeton)

Hubbard, S., Williams, K.H., Agarwall, D., Banfield, J., Beller, H., Bouskill, N., Brodie, E., Long, P., **Maxwell, R.M.**, Nico, P., Steefel, C., Seltzer, H., Tokunaga, T., Wainright, H., Watershed Function Science Focus Area: Biogeochemical Dynamics from Genomes to Watershed Scales, \$20M, 9/1/20-8/30/24, US DOE Office of Science SBR (\$600K Princeton).

Condon, L.E. (PI), **Maxwell, R.M. (PI)**, Melchior, P. (CoPI), Merchant, N. (CoPI), O'Leary, P. (CoPI), NSF Convergence Accelerator - Track D: Hidden Water and Hydrologic Extremes: A Groundwater Data Platform for Machine Learning and Water Management. US National Science Foundation C-Accel 2040542, \$1M, 9/15/20-6/15/21.

Maxwell, R.M. (PI), Condon, L.E. (CoPI), Olschanowsky, C. (CoPI), Tarboton, D.G. (CoPI), Altintas, I. (CoPI), Bales, J. (CoPI), Constantine, P. (CoPI), et al. Collaborative Research: Framework: Software: NSCI : Computational and data innovation implementing a national community hydrologic modeling framework for scientific discovery. US National Science Foundation OAC-1835903, \$3.6M, 10/1/18-9/30/23 (\$901,394 Princeton).

Moulton, D. (PI), Molins, S. (CoPI), Painter, S. (CoPI), **Maxwell, R.M.** (CoPI), Condon, L.E. (CoPI), Chen, X. (CoPI). IDEAS-Watersheds, US DOE Office of Science SBR, \$3.4M, 9/1/20-8/30/22 (\$300K Princeton)

Moulton, D. (PI), Molins, S. (CoPI), Painter, S. (CoPI), **Maxwell, R.M.** (CoPI), Condon, L.E. (CoPI), Chen, X. (CoPI). IDEAS-Watersheds, US DOE Office of Science SBR, \$3.4M, 9/1/18-8/30/20 (\$600K to Mines)

Hubbard, S., Williams, K.H., Agarwall, D., Banfield, J., Beller, H., Bouskill, N., Brodie, E., Long, P., Maxwell, R.M., Nico, P., Steefel, C., Seltzer, H., Tokunaga, T., Wainright, H., Watershed Function Science Focus Area: Biogeochemical Dynamics from Genomes to Watershed Scales, \$20M, 9/1/16-8/30/19, US DOE Office of Science SBR (\$1M to Mines).

Maxwell, R.M. (PI), D. Gochis (CoPI), L.A. Bearup (CoPI) Diagnosing dominant controls on carbon exchanges in high altitude, western U.S. headwaters. US Department of Energy Biological and Ecological Research, \$200K, 9/1/16-8/30/18.

Andrews-Hanna, J. (PI), **Maxwell, R.M.** (CoPI), Soto, A (CoPI) The hydrology, climate, and sedimentary deposits of Meridiani Planum and Gale Crater, NASA \$277,766, 5/1/2015 to 4/30/2018.

Maher, K. (PI), Druhan, J. (CoPI), **Maxwell, R.M.** (CoPI) A Multiscale Approach to Modeling Carbon and Nitrogen Cycling within a High Elevation Watershed. DOE TES/SBR, \$570,000 (\$40K to CSM), 08/01/2015-07/31/2017.

Visser, A. (PI), Tompson, A.F.B. (CoPI), Osuna, J. (CoPI), **Maxwell, R.M.** (CoI), Conklin, M. (CoI) Tracking Water through the Critical Zone to assess Drought Vulnerability, Lawrence Livermore National Lab LDRD Program, \$1.62M (\$120K to CSM), 10/1/14-9/30/17.

Heroux, M. (PI), McInnes, L.C. (PI), Moulton, D. (PI), Bernholdt, D. (CoPI), Scheibe, T. (CoPI), Williams, S. (CoPI), Yang, U.M. (CoPI) and **Maxwell, R.M.** (CoPI), Interoperable Design of Extreme-scale Application Software (IDEAS), \$10M (\$1330K CSM), US Department of Energy Advanced Scientific Research and Biological and Ecological Research, LAB 14-0001, 9/1/14-8/30/17. *Note Maxwell is lead PI of Use Case 3 "Hydrologic, Land Surface, and Atmospheric Process Coupling over the Continental U. S." which is supported at \$1M over two years: 9/1/15-8/31/17.*

Maxwell, R.M. (PI), Navarre-Sitchler, A.K. (CoPI), Singha, K. (CoPI) Coupled reactive transport and floodplain modeling of nutrient cycling. Part of Lawrence Berkeley National Laboratory's (LBNL) Subsurface Biogeochemistry Research (SBR) Sustainable Systems Scientific Focus Area (SFA 2.0), US DOE / LBNL \$750K, 9/1/13-8/30/16.

Maxwell, R.M. (PI), Matching Funds for WSC-Category 2 Collaborative: Water Quality and Supply Impacts From Climate-Induced Insect Tree Mortality and Resource Management in the Rocky Mountain West, Colorado Higher Education Competitive Research Authority (CHECRA), State of Colorado \$375K 9/1/12-8/30/17

Maxwell, R.M. (PI), Sharp, J.O., Navarre-Sitchler, A.K., Stednick, J., Dickenson, E., Celement, J. WSC-Category 2 Collaborative: Water Quality and Supply Impacts From Climate-Induced Insect Tree Mortality and Resource Management in the Rocky Mountain West, NSF Water Sustainability and Climate \$2.9M (\$2.3M CSM) 9/1/12-8/31/17

Fogg, G. (PI), Chen, S-H, Lubell, M., Lund, J., **Maxwell, R.M.**, (Co PIs), IGERT: Climate Change, Water and Society, National Science Foundation IGERT program, DGE-1069333 \$3.2M, (\$330K CSM) 9/1/11-8/31/16.

McCray, J. (PI) and **Maxwell, R.M.**, Sharp, J.O. Water Quality Impacts of the Mountain Pine Beetle Infestation in the Rocky Mountain West: Heavy Metals and Disinfection Byproducts (2011CO245G) NIWR/USGS National Competitive Grant Program, \$140,162, 9/1/11-8/31/14

Maxwell, R.M. (PI), Navarre-Sitchler, A.K. (CoPI), Coupling of PARFLOW and CrunchFlow for High Resolution Reactive Transport Modeling of Variably Saturated Flow, US DOE / LBNL \$126K, 8/29/11-8/28/13.

Maxwell, R.M. Lead, N4 "Aquifer storage, treatment, and harvesting of stormwater for distributed reuse: Coupled modeling, laboratory and field studies" and U1.1 "Integrated Regional Water Models (Bay Area and Front Range)" in NSF Engineering Research Center for Re-Inventing America's Urban Water Infrastructure, Luthy, R. PI, US National Science Foundation, ERC-1028968, 8/1/11, Y1 funding \$3.25M (Stanford, UC Berkeley, CSM, NM State), \$84K -- Maxwell Y1 portion, \$258K -- Maxwell Y2 (13% CSM portion of ~\$1.2M).

Maxwell, R.M. Lundquist, J.K., DellaMonache, L., Michalekes, J and Williams, J. A fully-coupled ground water-land surface-atmospheric modeling system and ensemble data assimilation for wind energy predictions., CREW, \$40K 5/1/11-5/1/12.

Maxwell, R.M. An integrated hydrologic model intercomparison workshop to develop community benchmark problems. National Science Foundation Hydrologic Sciences, EAR-1126761, \$25K 3/1/11-9/1/11.

Reed, P.M. and **Maxwell, R.M.** Massively Parallel Simulation & Evaluation of Hydrologic Monitoring, Prediction, and Management Systems under Uncertainty, LRAC TeraGrid resource proposal, 6 Million SUs (CPU-Hours) allocated on Ranger and Lonestar (7/4/10-7/3/11).

McCray, J. (PI), **Maxwell, R.M.** (Co-PI), Stitchler, A. (Co-PI), Training Graduate and Undergraduate Students in Simulation and Risk Assessment for Carbon Sequestration, U.S. Department of Energy, Geologic Sequestration Training and Research, \$300K, 1-10 to 12-12.

Yates, D. (PI), Gochis, D. (Co-PI), Exploring Climate Change and Other Uncertainties on the Water/Irrigation Transfer and Distribution Water Project of Olmos, Lambayeque, Inter American Development Bank, **Maxwell, R.M.** (Co-I) \$30K to CSM, 9-09 to 9-10.

McCray, J. (PI) and **Maxwell, R.M.** (Co-PI) Risk-Based Decision Making for Assessing Potential Impacts of Geologic CO₂ Sequestration on Drinking-Water Sources, U.S. Environmental Protection Agency, \$900K, Jan-10 to Dec-12.

Welty, C. (PI), **Maxwell, R.M.**, (Co-PI) Kaushal, S., Band, L. Groffman, P. Integrating Real-Time Chemical Sensors into Understanding of Groundwater Contributions to Surface Water in a Model Urban Observatory, National Science Foundation, Environmental Engineering, CBET-0854307 \$481K total, Aug-09 to July-11.

Graham, W. (PI-UF) and **Maxwell, R.M.** (PI-CSM) Collaborative Research: High Resolution Sensor Networks for Quantifying and Predicting Surface-Groundwater Mixing and Nutrient Delivery in the Santa Fe River, Florida. National Science Foundation Hydrologic Sciences, EAR-0854516 \$500K total, \$90K CSM, Aug-09 to July-11

Lundquist, J.K. (PI), **Maxwell, R.M.** (co-PI), Chow, F.K. (Co-PI) Forecasting Methods for Tall Turbines, U.S. Department of Energy, \$550K, \$105K to CSM 9-09 to 12-10.

Maxwell, R.M. (PI) Regional Climate Prediction for National Security, LLNL Climate Initiative \$110K, Mar-09 to Sep-10.

Reed, P.M. and **Maxwell, R.M.** Grid-Enabled Hydrologic Systems Monitoring, Prediction, and Management under Uncertainty, LRAC TeraGrid resource proposal, 3 Million SUs allocated on Ranger and Lonestar.

Maxwell, R.M. (PI), Chow, F.K., Tompson, A.F.B., Duan, Q. Application of a Terrestrial Hydrologic Cycle Simulator at Sub-Continental Scales, LLNL Computing Grand Challenge Proposal, 50,000 CPU-hours/week allotment.

Welty, C (PI), Miller, AJ (Co-PI), McGuire (Co-PI), **RM Maxwell** (C-PI), J Smith (Co-PI), R Shedlock (Co-PI), Integrating Real-Time Sensor Networks, Data Assimilation, and Predictive Modeling to Assess the Effects of Climate Variability on Water Resources in an Urbanizing Landscape, NOAA, Broad Agency Announcement – OAR, \$2.9M total budget, \$50K to RM Maxwell at CSM, 9/1/07-8/31/10.

Welty, C (lead PI, UMBC), Miller, AJ (Co PI), Hanlon, B. (Co PI), **Maxwell, R.M.** (Co PI), Smith, J. (PI, Princeton), Jantz, C. (PI, Shippensburg), Drzyzga, S. (Co I), Fisher, G. (PI, USGS), Collaborative Research: Dynamic coupling of the water cycle with patterns of urban growth. NSF Biocomplexity/Dynamics of Coupled Natural and Human Systems, 8/07-8/10, \$1.5M total budget.

Bales, R. (PI), Conklin, M., Harmon, T., Guo, Q., **Maxwell, R.** (co-I) and Duffy, P., Integrated measurements and modeling of Sierra Nevada water budgets. UC Campus-Laboratory Joint Research Program, UCOP. FY06-07 \$100K

Maxwell, R.M. Dominguez Channel Modeling and Analysis for Pollutant Transport and Total Maximum Daily Loads. U.S. Department of Energy, Fossil Energy Office, FEW0088, FY06 \$125K

Maxwell, R.M. (PI), Kollet, S.J., Chow, F.K. and Duan, Q. LLNL LDRD, A dynamically-coupled groundwater, land surface and regional climate model to predict seasonal watershed flow and groundwater response. FY06 \$339K

Maxwell, R.M. Dominguez Channel Modeling and Analysis for Pollutant Transport and Total Maximum Daily Loads. U.S. Department of Energy, Fossil Energy Office, FEW0088, FY05 \$85K

Maxwell, R.M. (PI), Kollet, S.J. Duan, Q and Taylor, J. LLNL LDRD, A dynamically-coupled groundwater, land surface and regional climate model to predict seasonal watershed flow and groundwater response, FY05 \$215K.

Maxwell, R.M. Dominguez Channel Modeling and Analysis for Pollutant Transport and Total Maximum Daily Loads. U.S. Department of Energy, Fossil Energy Office, FEW0088, FY04 \$195K

Maxwell, R.M. Dominguez Channel Modeling and Analysis for Pollutant Transport and Total Maximum Daily Loads. U.S. Department of Energy, Fossil Energy Office, FEW0088, FY03 \$151K

Maxwell, R.M. Dominguez Channel Modeling and Analysis for Pollutant Transport and Total Maximum Daily Loads. U.S. Department of Energy, Fossil Energy Office, FEW0088, FY02 \$50K

LLNL Programmatic Support

Maxwell, R.M. (Subtask PI), Lundquist, J., Woodward, C.S. and Mirocha, Regional Climate Prediction and Adaptation: Subtasks on PF.WRF and Climate Impacts on the Hydrologic Cycle, LLNL Strategic Initiative, \$400K for subtask FY08.

Q. Duan and **R.M. Maxwell**, Flood hazard analysis for Yucca Mountain Repository Surface Facilities. USDOE/BSC/YMP Nevada Operations Office, FY07, \$186K

G. Pawloski, (Program Leader/PI), **R.M. Maxwell** (Co-I) Underground Test Area (UGTA) Program, Analytical evaluation of unsaturated tests for possible exclusion from CAU transport modeling. USDOE Environmental Management (EM) Nevada Operations Office, FY07 \$130K.

G. Pawloski, (Program Leader/PI), A.F. Tompson, S.F. Carle **R. Maxwell** (Co-I) Underground Test Area (UGTA) Program, Yucca Flat CAU, unclassified hydrologic source term modeling. USDOE Environmental Management (EM) Nevada Operations Office, FY07 \$822K.

G. Pawloski (Program Leader/PI), A.F. Tompson, **R.M. Maxwell** (Co-I), S.F. Carle and M. Zavarin, Phase II, Transient Cambrian Hydrologic Source Term modeling. USDOE Environmental Management (EM) Nevada Operations Office. FY04-06.

G. Pawloski (Program Leader/PI), **R.M. Maxwell** (Co-I), Impacts of Test Heat from Underground Nuclear Tests on Pahute Mesa. USDOE Environmental Management (EM) Nevada Operations Office, FY02

Professional Activities and Service

Summary: Dedicated citizenship and service to science. Service to journals, long-standing external advisory boards, federal funding review panels, departmental service and shared governance. Highlights include community building through five, large specialty conferences and two intercomparison workshops; service as president of the Mines' Faculty Senate; and substantial service as a reviewer.

Journal Editorships

- Associate Editor, Water Resources Research Oct 1, 2009-Dec 31, 2013
- Associate Editor, Hydrogeology Jan 1, 2010-Dec 31, 2013
- Associate Editor, Vadose Zone Journal Jan 1, 2010-Dec 31, 2012

Journal Special Issues Edited

- Guest Editor, *Vadose Zone Journal*, for the special section Coupled surface-subsurface modeling across a range of temporal and spatial scales (2009).
- Guest Editor, *Hydrology and Earth System Sciences* (HESS), for the Eric Wood Special Issue, 5/16 - 1/18.
- Guest Editor in Chief, *Groundwater*, for the Modflow and More 2017 Special Section, 6/17-6/18.
- Guest Editor, *Groundwater*, for the Modflow and More 2019 Special Section, 6/19-6/20.
- Guest Editor, *Groundwater*, for the Modflow and More 2022 Special Section, 6/22-6/23.

Journal Peer-Review

Reviewer for between 20-30 articles per year, regularly including: *Science*, *Nature*, *Nature Climate Change*, *Nature Geoscience*, *Nature Communications*, *PNAS*, *Environmental Research Letters*, *Geophysical Research Letters*, *Water Resources Research*, *Hydrological Processes*, *Ecohydrology*, *Advances in Water Research*, *HESS*, and *Computers and Geosciences*.

Conferences, Workshops and Conference Sessions Convened and Chaired

Convened (six international conferences on hydrologic modeling with between 200-300 attendees)[<https://igwmc.princeton.edu/modflow/>], chaired and co-chaired the first two integrated hydrologic model intercomparison workshops, numerous conference sessions, etc.

- Maxwell, R.M., Tonkin, M., Condon, L.E. and Gallagher, L. Groundwater Modeling and More, 2026: From Raindrop to Reservoir. June 7-10, 2026, Princeton, NJ.
- Maxwell, R.M., Gallagher, L., Cohen, H., Hill, M., Zheng, C. and Tonkin, M. ModFlow and More, 2024: AI, Global Change, and the Future of Groundwater Modeling. June 2-5, 2024, Princeton, NJ.
- Maxwell, R.M., Gallagher, L., Hill, M., Zheng, C. and Tonkin, M. ModFlow and More, 2022: Hydrologic Modeling in a Changing World. June 5-8, 2022, Princeton, NJ.
- Maxwell, R.M., Gallagher, L., Hill, M., Zheng, C. and Tonkin, M. ModFlow and More, 2019: Groundwater Modeling and Beyond. June 2-5, 2019, Golden, CO.
- Maxwell, R.M., Morse, M., Gallagher, L., Hill, M., Zheng, C. and Tonkin, M. ModFlow and More, 2017: Modeling for Sustainability and Adaptation. May 21- 24, 2017, Golden, CO.
- Maxwell, R.M., Hill, M., Zheng, C. and Tonkin, M. ModFlow and More, 2015: Modeling a Complex World. May 31-June 3, 2015, Golden, CO.
- Kollet, S.J., Maxwell, R.M., The Second Integrated Model Intercomparison Workshop (IHMIP), Bonn, Germany, 2014.
- Maxwell, R.M., Hill, M., Zheng, C. and Tonkin, M. ModFlow and More, 2013: Translating Science into Practice. June 2-5, 2013, Golden, CO.
- Poeter, E., Maxwell, R.M., Hill, M. and Zheng, C. ModFlow and More, 2011: Integrated Hydrologic Modeling, June 5-8, 2011, Golden, CO.
- Maxwell, R.M. Integrated hydrologic model intercomparison workshop. Golden, CO, March 2011.
- Maxwell, R.M. and Ferguson, I.M. Climate Change and Groundwater: Anthropogenic Effects and Regional Feedbacks on Hydrology and Water Resources, National Groundwater Association Groundwater Summit; Denver, CO; April 2010
- Maxwell, R.M. Coupled Surface-Subsurface Modeling across a Range of Temporal and Spatial Scales, GSA Annual Meeting, Session T21, Portland OR, October 18-21, 2009.
- Mace, R. Maxwell, R.M., Wehrmann, A. Organization Committee for the National Groundwater Association Theis Conference on Groundwater and Climate Change, Boulder, CO, Oct 2-5, 2009.
- Maxwell, R.M. and Kollet, S.J. Computational Approaches to Coupled Modeling of Groundwater, the Land Surface and Lower Atmosphere, SIAM Geosciences Meeting, Leipzig, Germany, June 15-18, 2009.
- Maxwell, R.M. and Putti, M. Coupled Surface-Subsurface Modeling across a Range of Temporal and Spatial Scales, Computational Methods in Water Resources XVII, July 6-10, 2008.
- Kollet, S, Maxwell, R.M., Yang, Z-L and Yeh P. Interactions of the Groundwater Land Surface Atmosphere System: Observations, Theory, and Modeling From Local to Global Scale, Eos Trans AGU, Fall Meeting Suppl. Session H24D, 2007.
- Tauxe, J. and Maxwell, R.M. Environmental Transport Studies at Radionuclide-Contaminated Sites. Eos Trans. AGU, 82(47), Fall Meet. Suppl., Abstract H21D, 2001.
- Maxwell, R.M. and Kastenberg, W.E. Use of Risk-Based Approaches in the Assessment and Management of Groundwater Resources. Eos Trans. AGU, Fall Meet. Suppl., Abstract H12E, 1999.

Service, Princeton University

- Princeton University Search Committee for Interdisciplinary Data Science (2024-present)
- Princeton University Committee on Conference and Faculty Appeal (2024-present)

- Princeton Research Software Engineering Steering Committee (2022-present)
- Princeton Institute for Computational Science & Engineering Steering Committee (2023-present)
- Search Committee Member, CEE Energy, water, infrastructure (2024-2025)
- Search Committee Member, ACEE Decarbonization (2023-2024)
- Search Committee Chair, CEE Urban, Water, Robotics search (2021-2022)
- SEAS BSE Advisor (August 2021-present)
- Hack Fellowship Applicant Reviewer (April 2021)
- HMEI Faculty Seminar Presenter (May 2021)
- Participated in the HMEI Grants Manager Interviews (May 2021)
- Henry Horn Prize Video Reviewer (May 2021, May 2022)
- Princeton Energy and Climate Scholars (PECS) Faculty Advisor (August 2021-Present)
- HMEI DEI Committee (August 2021-May 2022)
- HMEI Advisory Committee (August 2022-May 2023)
- Director, HMEI Integrated GroundWater Modeling Center (July 2020-Present)

Committees, Departmental, Colorado School of Mines

- Departmental Promotion and Tenure Committee, Chair (2014-2019)
- Undergraduate Curriculum Program Committee (2009-2019)
- GGE Promotion and Tenure Committee (3/12-present), Chair 8/15-8/17
- Search Committee Chair, Assistant Professor in Low Temperature Aqueous Geochemistry (2012)
- Search Committee Member, Assistant/Associate Professor in Groundwater Engineering (2012)
- GGE Department Undergraduate Program Curriculum Committee (1/09-5/12)
- GGE Graduate Admissions Committee (3/09-6/09)

Committees, Campus-Wide, Colorado School of Mines

- Faculty Senate President (2017-2018)
- Faculty Senate (2016-2018)
- Budget Committee (2016-2018)
- Faculty Senate Graduate Council HSE Representative (2009-2012)
- Faculty Senate Research Council HSE Representative, (2012-2013)
- External Search Committee Member, Assistant/Associate/Full Professor in Computer Science (2016/17)
- External Search Committee Member, Green Endowed Chair in Exploration Geophysics (2014/15)
- External Search Committee Member, Assistant/Associate Professor in Water Resources (CEE, 2012)
- Search Committee Member, Provost, (2018)
- HSE Graduate Admissions Committee (2009-2015; Chaired 2011-2015)

External Review and Advisory Panels

- National Science Foundation (NSF, USA) INFEWS China Review Panel, Washington, D.C., 2020.
- National Science Foundation (NSF, USA) INFEWS China Review Panel, Washington, D.C., 2019.
- Department of Energy, Office of Science Early Career Award Panel, Washington, DC, 2017.
- National Science Foundation (NSF, USA) Hydrologic Sciences Review Panel, Washington, D.C., Oct 26-28, 2016.
- Science Advisory Panel, Orange County Groundwater Replenishment System, (2016-present)
- Science Advisory Panel, Forscherzentrum Jülich, Jülich, DE, July 20-22, 2015
- Department of Energy, Office of Science Early Career Award Panel, Washington, DC, Jan 2014.
- National Science Foundation (NSF, USA) Hydrologic Sciences Review Panel, Washington, D.C., Oct 16-18, 2013.
- Department of Energy, Los Alamos National Laboratory (DOE-LANL), Laboratory-Directed Research (LDRD) External Review Panel (Chair), Los Alamos, NM, Jan 2013.
- National Science Foundation (NSF, USA) Hydrologic Sciences Review Panel, Washington, D.C., Oct 17-19, 2012.
- Helmholtz Association (Germany), Scientific Advisory Committee / Review and Advisory Panel for the Water Science Alliance, Berlin, Germany, July 8-13, 2012.

- Helmholtz Association (Germany), Scientific Advisory Committee / Review Panel for the Water Science Alliance, Frankfurt, Germany, February 22-23, 2012.
- Department of Energy (DOE, USA) ASCEM Review Panel, Sante Fe, NM Aug, 2011.
- Helmholtz Association (Germany), Scientific Advisory Committee for the Water Science Alliance, Berlin, Germany, July 13-14, 2011.
- National Science Foundation (NSF, USA) Hydrologic Sciences Review Panel, Washington, D.C., Oct 6-8, 2010.
- Department of Energy (DOE, USA) INCITES Review Panel, Washington, D.C. Sep 20, 2010.
- Helmholtz Association (Germany), Scientific Advisory Committee for the Water Science Alliance, Berlin, Germany, July 13-14, 2010.
- Department of Energy (DOE, USA) Office of Science IFRC (Integrated Field Research Challenge) review panel 2010
- Department of Energy (DOE, USA) INCITES Review Panel, Washington, D.C. Sep 21, 2009.
- Department of Energy (DOE, USA) Workshop on Complex Systems, Washington, D.C. Aug 3-5, 2009.
- Community Surface Dynamics Modeling System (CSDMS) CSDMS Cyberinformatics and Numerics Working Group (1/09-present)
- American Geophysical Union; member of the Groundwater Committee 12/99- 12/04.
- American Society of Civil Engineering; member of the Ground Water Management Committee, also a member of the task committee for Long Term Monitoring 6/00- 1/02
- DuPont Corporation, Modeling and Management of Emerging Environmental Issues Workshop 2000 served as a member of the expert panel on Optimization and Modeling for Remediation and Monitoring.

Professional Presentations

Summary: 100's of invited seminars and keynotes, 1000's of conference presentations. Conference presentations are no longer tracked, below a selection of seminar and keynote presentations. Highlights include the 2020 Henry Darcy Distinguished Lecture Series, the 2018 Boussinesq Lecture, and many of the lectures linked to videos, below.

Invited Seminars, Keynotes and Workshops

2020 Henry Darcy Distinguished Lecture

The Henry Darcy Lecture Series was established in the mid 1980's and distinguished lecturers are chosen each year to give a large number of (~50) presentations worldwide. I offered three lectures in 2020; NGWA recorded all three and published them in 2026:

- 2020 Darcy Lecture: Hydrology from the bottom up, how groundwater shapes the water cycle, NGWA Henry Darcy Distinguished Lecture, recorded 2020, published 2026.
- 2020 Darcy Lecture: Hydrology in the supercomputing age, NGWA Henry Darcy Distinguished Lecture, recorded 2020, published 2026.
- 2020 Darcy Lecture: Killer beetles, naked trees, and dirty water, NGWA Henry Darcy Distinguished Lecture, recorded 2020, published 2026.

Selected recorded Lectures with links

- The challenges of groundwater simulation and opportunities for terrestrial hydrologic modeling at the national scale, with Laura Condon, Invited Talk, Google Modeling Talks series, August 2025, online.
- Accelerating continental-scale groundwater simulation with a fusion of machine learning, integrated hydrologic models and community platforms, Plenary Talk, 2023 NSF I-GUIDE Forum, October 5, 2023, Columbia University, New York, NY.
- Adventures in developing community modeling platforms: HydroFrame and HydroGEN, with Laura Condon, CSDMS Webinar, April 2022, online.
- 2020 Darcy Lecture: Hydrology from the bottom up, how groundwater shapes the water cycle, NGWA Henry Darcy Distinguished Lecture, recorded 2020, published 2026.
- 2020 Darcy Lecture: Hydrology in the supercomputing age, NGWA Henry Darcy Distinguished Lecture, recorded 2020, published 2026.
- 2020 Darcy Lecture: Killer beetles, naked trees, and dirty water, NGWA Henry Darcy Distinguished Lecture, recorded 2020, published 2026.

- Scientific discovery through computational hydrology, Invited Lecture, Global Institute for Water Security Distinguished Seminar Series, Sep, 2019, Saskatoon, Canada.
- Scientific discovery through computational hydrology, Invited Keynote, 4th Cargèse Summer School: Flow and Transport in Porous and Fractured Media, June 25th - July 7th 2018, Cargèse, France.
- Using models to upscale runoff generation processes, Invited Lecture, 4th Cargèse Summer School: Flow and Transport in Porous and Fractured Media, June 25th - July 7th 2018, Cargèse, France.

List of Invited Presentations

Invited Seminar, CISL/RAL, NCAR, 6/26, Boulder, CO, USA
 Invited Seminar, CSIRO, 11/25, Australia
 Public Lecture, Flinders University, 11/25, Adelaide, Australia
 Invited Keynote, 6th TALENTA Conference on Engineering, Science and Technology (TALENTA CEST 2025), 11/25, Medan, Indonesia (recorded keynote)
 Invited Talk (with L. Condon), SIAM Conference on Mathematical and Computational Issues in the Geosciences (GS25), 10/25, Baton Rouge, LA, USA
 Invited Keynote, US-RSE'25 Conference, 10/25, Philadelphia, PA, USA
 Invited Talk (with L. Condon), Artificial Intelligence and Digital Twins for Earth Systems (AIDT4ES) Workshop, Oden Institute, University of Texas, 9/25, Austin, TX, USA
 Invited Talk, Google Modeling Talks series, 8/25, online
 Plenary Lecture, COUPLED PROBLEMS 2025, 5/25, Villasimius, Italy
 Invited Seminar, Utah State University, 1/25, Logan, UT, USA
 Invited Talk, 10th World Water Forum, 5/24, Bali, Indonesia
 Invited Talk, Gates Foundation, 5/24
 Invited Briefing (with L. Condon), President's Council of Advisors on Science and Technology (PCAST), 3/24
 Invited Talk (with L. Condon), Foundation for Food and Agriculture Research (FFAR), 3/24
 Invited Webinar, Canada One Water, 2/24, online
 Invited Talk, S.S. Papadopoulos and Associates Annual Retreat, 10/23
 Invited Seminar, CEE Department, University of California, Berkeley, 10/23, Berkeley, CA, USA
 Invited Seminar, Forschungszentrum Jülich, 10/23, Jülich, Germany
 Plenary Talk, NSF I-GUIDE Forum, 10/23, Columbia University, New York, NY, USA
 Invited Seminar, New Mexico Tech, 8/23, Socorro, NM, USA
 Invited Seminar, University of Pittsburgh, 6/23, Pittsburgh, PA, USA
 Invited Talk, Gordon Research Conference on Catchment Science: Interactions of Hydrology, Biology and Geochemistry, 6/23, Andover, NH, USA
 Invited Talk, Chris Milly Symposium, GFDL, 1/23, Princeton, NJ, USA
 Invited Talk, Groundwater Symposium, University of Copenhagen, 11/22, Copenhagen, Denmark
 Invited Webinar, Groundwater Resources Association of California, 11/22, online
 Invited Seminar, Penn State University, 10/22, State College, PA, USA
 Invited Seminar, Harvard University, 10/22, Cambridge, MA, USA
 Invited Seminar, Massachusetts Institute of Technology, 10/22, Cambridge, MA, USA
 Invited Webinar, CSDMS, 4/22, online
 Invited Seminar, Stanford University, 2/22, Stanford, CA, USA
 Invited Faculty Seminar, High Meadows Environmental Institute, Princeton University, 5/21, Princeton, NJ, USA
 Invited Talk, SimTech Cluster of Excellence, University of Stuttgart, 4/21, online
 Invited Seminar, CEE Department, Columbia University, 2/19, NY, USA
 Invited Lecture, ERCA Winter School, 1/19, Grenoble, France
 Invited Seminar, Hydrologic Sciences, University of Nevada, 11/18, Reno, NV, USA
 Invited Seminar, IIHR Hydrosience and Engineering, University of Iowa, 4/18, Iowa City, IA, USA
 Invited Seminar, Southern University of Science and Technology, 10/18, Shenzhen, China
 Invited Keynote, Human Water Use Symposium, Beijing Normal University, 10/18, Beijing, China
 2018 Boussinesq Lecture, 10/18, Utrecht, NL
 Invited Seminar, Princeton University, 8/18, Princeton, NJ, USA
 Invited Keynote, Terrestrial Systems Symposium, 3/18, Bonn, Germany

Invited Seminar, IGA, 6/18, Grenoble, France
 Invited Keynote, HPC Fall School, Bonn, Germany, 10/10/16
 Invited Keynote, Impact of Groundwater in Earth system Models, Paris France, 10/4/16
 Invited seminar, CU Boulder, Boulder, CO USA, 2/2016
 Invited Keynote, Workshop on coupled hydrological modeling, Padova Italy, 9/23/15
 Invited Seminar, Rocky Mountain Biological Laboratory, Gothic, CO, 8/11/15
 Invited seminar, Luxembourg Institute for Science and Technology (LIST), Luxembourg, 7/13/15
 Invited seminar, Joseph Fourier University, Genoble, FR, 6/23/15
 Invited seminar, University of Stuttgart, Stuttgart, DE, 7/16/15
 Invited talk and panel participation, google.org workshop on water, Mountain View, CA USA, 7/3/15
 Invited seminar, Penn State University, State College, PA USA, 5/15
 Invited seminar, Stanford University, Stanford, CA USA, 5/7/15
 Invited seminar, Oregon State University, Corvallis, OR USA, 5/6/15
 Invited seminar, Portland State University, Portland, OR USA, 5/5/15
 Invited Keynote, International Conference Conference on Computational Methods in Water Resources (CMWR), June, 2014, Stuttgart, Germany
 Invited Seminar Speaker, CEE, University of Colorado, Boulder, 4/24/13
 Invited Seminar, Texas A&M University, 11/13, College Station, TX, USA
 Invited Seminar Speaker, CEE, Duke University, 4/16/13
 SOACS Invited Seminar Speaker, UC Davis, 10/14/11
 Invited Seminar Speaker, INSTAAR, CU-Boulder, 2/21/11
 Invited Keynote, 1st Water Research Horizon Conference, BBAW, Berlin, Germany, 7-14-10.
 Department of Energy SBR PI Annual Meeting, Invited Presentation in Modeling Session, 3-30-10
 CSM Distinguished Lecture Series 3-26-10
 University of Florida, 9-10-09 *UF-Smallwood Distinguished Scholar Seminar*
 University of Bonn, 6-18-09 *Meteorological Institute Invited Seminar*
 NCAR, 4-16-09 *RAL Invited Seminar*
 UNL, 2-25-09, Invited Seminar, Spring 2009 Water Seminar Series.
 UCSB-CSDMS 3-3-09 Invited presentation to the Modeling Working Group
 Penn State, 3-08, CEE Department Seminar
 Baltimore Ecosystem Study Group, 6/07, Quarterly Science Meeting
 UC Berkeley, 10/06 CEE Department Seminar
 University of Illinois, UC, 6/06 CEE Department Seminar
 LBNL, 4/04 Earth Science Department Seminar
 Drexel, 6/01 SESEP Department Seminar
 Drexel, 5/00 SESEP Department Seminar
 Northwestern University, 4/00, CEE Department Seminar
 US EPA 1/00, Office of Research Invited Seminar
 US NRC, 1/00, Invited Seminar
 UNC Chapel-Hill, 11/99, SPH Seminar.
 Univ of Ill, CU, 10/99, Department Seminar
 Univ Ill, Chicago 10/99, Department Seminar
 UCSB Bren School, 2/99 Department Seminar
 UC Berkeley, 4/98 Nuclear Engineering Department Seminar.

Professional Certification

Certified as an Engineering Intern by the State of Florida Department of Professional Regulation

LAUREN FOSTER, PhD, PG



Education

Ph.D., Hydrologic Sciences and Engineering, Colorado School of Mines, Golden

B.A., Physics, Colorado College, Colorado Springs

Experience

Dr. Lauren Foster is a computational hydrologist and Project Manager with extensive experience modeling climate, surface, and subsurface processes at multiple scales with multiple codes. She manages teams of statisticians and hydrogeologists to develop and deliver complex modeling projects on time and on budget. During her career, she has coordinated interdisciplinary teams, including climate scientists, historians, economists, and regulators, to tackle questions at the interface of physical and social sciences. Her primary research areas include climate impacts to sustainable water supplies; developing workflows for effective calibration of physically based models in high-dimensional parameter space; and the fate, transport, and treatment of deep groundwater plumes.

Experience Highlights

- Project management
- Hydrological and climate modeling
- Presentations and communication
- Data and sensitivity analysis
- System interaction
- Subsurface fate and transport modeling
- AI application and tools

Neptune and Company

2018 to present: Hydrologist and Environmental Manager

Computational Hydrologist

- Learning agility to quickly use new software, programming languages, and cutting-edge tools
- Build and evaluate numerical, ML/AI, and statistical models for clients independently and on a team.
- Develop and lead research and development projects for multiple staff resulting in publications.
- Supervised the implementation and software engineering of multiple 1000+ core HPC clusters.

Project Manager

- Manager and Principal Investigator, LANL groundwater plume modeling for DOE/N3B (6 years, ~\$8.2M): directed hydrologists, statisticians, and computer scientists to build and improve a predictive model for regulatory compliance.
- Aligned model product and purpose with diverse stakeholders, from the regulator and an Independent Review Team to the Santa Fe County Commissioner and the Pueblo de San Ildefonso.
- Manager and technical lead for two commercial water-rights projects (~\$2.4M and ~\$500K), directing a multi-model approach to sustainable pumping export rates and building litigation-ready models.
- Water Program Growth Lead: strategic plan to expand existing federal markets (~\$10M) and establish new commercial markets (~\$5M in new California contracts).
- Proposed and managed an internal R&D project developing machine-learning surrogates for physics-based models (paper in preparation).

SPOUTS of Water Social startup and NGO in Kampala, Uganda. 2017: Impact Director

- Founded new impact department to legitimize efforts of both NGO and Ltd., resulting in increased capacity to secure grants, investors, and quantitative analysis to inform efficient decision making.

- Developed new model for NGO resulting in redesigned business strategy to shift from small, disparate projects to a scalable program able to impact entire communities and reach across the country.

Lawrence Berkeley National Lab 2017 to 2018: Department of Energy Graduate Researcher

- Hyper-resolution modeling resulted in publishing new mathematical formula for scale-effective model parameterization in topographically complex regions.

Colorado School of Mines

2014 to 2018: Research Assistant, supervisor: Reed Maxwell (reedmaxwell@princeton.edu)

- Built and used numerical models and HPC systems to diagnose climate change impacts in Colorado River headwaters that affect Southwestern United States water supplies.
- Independently raised over \$200,000 in fellowships and awards.
- As president of graduate group, tripled yearly funding, launched first department merchandise, and managed 10-person team.
- Co-planned and ran 2-day water scarcity conference (100 attendees) with experts from business, policy, and science sectors.
- 2015: Internship at National Center for Atmospheric Research (NCAR) to delineate uncertainty in meteorological datasets derived from different downscaling methodologies. Supervisor: David Gochis.

Selected Publications

[In preparation] Morphey, M., T. Smiley, L. Gains-Germain, and **L.M. Foster**. Evaluating Groundwater Emulators in Systems with Uncertain Source Conditions. *Water*.

Foster, L.M., K.H. Williams, and R.M. Maxwell. (2020). Resolution Matters when Modeling Climate Change in Headwaters of the Colorado River. *Environmental Research Letters*.
<https://doi.org/10.1088/1748-9326/aba77f>

Selected Presentations

[Scientific Advisory Committee and Featured Presentation] **Foster, L.M.** (June 2026). Conceptual Modeling in the Age of AI or How AI Can Make Us Better Scientists. *Groundwater Modeling and More, Princeton, NJ*. <https://youtu.be/xt4hc5JVQkM>

[Invited Panelist] **Foster, L.M.** (August 2025). Environmental Statistics & Data Science: Where do we go from here? *Joint Statistical Meetings*.

[Scientific Advisory Committee and Featured Presentation] **Foster, L.M.** (June 2024). Unraveling Complexity: How Numerical Models and AI Can Work Together to Expand the Frontiers of Hydrologic Research. *MODFLOW and More, Princeton, NJ*. <https://youtu.be/SnX9DsVMh3U>

[Invited Speaker and Panelist] **Foster, L.M.** (February 2024). Where and when numerical models vs. machine learning approaches excel in a changing climate. *The Future of Water Conference, Groundwater Resources Association of California*.

[Commencement Speaker] **Foster, L.M.** (2018). Communicating science in an era of fake news, scientific doubt, and ideological echo chambers. *Commencement Speech, Colorado School of Mines*.
<https://youtu.be/-RMR5qEjkG0?t=2046>

EXHIBIT L

Emily Madueno

From: Anthony Daus <addaus@gsi-net.com>
Sent: Wednesday, October 7, 2026 8:11 AM
To: Emily Madueno
Cc: Jim Worth; Doug Evertz; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com); Jeffrey V. Dunn; Alison K. Toivola (alison.toivola@bbklaw.com); dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com); kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com); Keith Lemieux; Alex Lemieux; Phillip Hall; Coleman, Judith (ENRD); Alexa Penalosa
Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate
Attachments: Daus_Anthony_CV.pdf; Panday_Sorab_CV.pdf; Hort_Hiroko_CV.pdf; GSI_Std_Rates_Table1_2026.pdf

Good Morning All,

I have arranged the responses in the same order of your request.

No. 1: Billing Rates

As requested, GSI's current rate sheet is attached. The specific hourly rates for my project team are provided below.

- Anthony Daus: \$375
- Dr. Sorab Panday: \$320
- Dr. Hort: \$235

We have several more junior staff that we would potentially use for tasks like data reduction, graphics, etc... Their hourly rates are typically between \$150 and \$200 depending on the assignment and the seniority of the staff person. There is not additional charge for depositions or trial testimony.

No.2: Additional Staff

Other staff that may work on this assignment in a substantive role could include Dr. Panday and Dr. Hort in addition to more junior staff. Dr. Panday would advise on modeling and quantitative analysis and Dr. Hort would assist with the overall analysis under my direction. If other senior staff work on the assignment, I will clear that with the parties. A brief bio for my team is provided below.

Anthony (Tony) Daus, PG, Principal Hydrogeologist has worked on groundwater supply related projects in California for more than 40 years. Currently his engagements water supply evaluations in the Central and West Coast Basins in Los Angeles County, the San Jacinto Basin, Cuyama Basin, Westside Subbasin, Kern and Tulare Subbasins, and. Twentynine Palms Valley Basin. These projects include tasks such as development of hydrologic conceptual models, water budget and safe yield analysis, optimization of pumping and managed aquifer recharge projects to improve groundwater resilience, and basin characterization. Many of these projects

include application of groundwater models or data science techniques to quantify water budgets under current and projected hydrologic conditions.

Sorab Panday, PhD, Principal Engineer, is a subject matter expert in groundwater modeling and groundwater/surface water modeling and the lead author or co-author of several MODFLOW codes including MODFLOW-USG, MODFLOW-NWT, and MODFLOW 6. Dr. Panday has worked throughout California on various water resources assignments including safe yield analysis, groundwater/surface water interactions, and optimization of water resources development. Mr. Daus and Dr. Panday have collaborated for nearly 20 years on projects throughout the US and internationally. He is the 2015 recipient of the M. King Hubbert Award, presented by the National Ground Water Association and the 2022 Lifetime Achievement Award from the California Groundwater Resources Association. He was also elected as a Member of the National Academy of Engineering (NAE) in 2017 for the development of computer code for solving complex groundwater problems.

Hiroko Hort, PhD, PE, Senior Engineer specializes in groundwater modeling and analysis including water resources management. Her experience includes basin safe yield estimation using IWFM for Cuyama Basin, hydrologic conceptual model development for Eastern Municipal District, calibration of coupled surface water-groundwater models (HSPF/MODFLOW) using PEST for Tampa Bay Water, fate and transport modeling for multiple Department of Defense sites, and simulation-optimization for well siting and aquifer recharge projects for Water Replenishment District of Southern California.

No. 3: CVs for me, Dr. Panday and Dr. Hart are attached.

No. 4: Parties, attorneys, or witnesses with whom I have previously worked.

Aleshire & Wynder, LLP: I have been involved with two matters over the past 10 years with Aleshire & Wynder.

- Worked with attorney Norman Dupont on the CAM Carson matter in 2025. This was environmental litigation regarding development of a former landfill in Carson, California.
- Worked with attorney Christine Carson in 2020 on the Jeff Smith v. Idyllwild Water District on a water rights proceeding before the State Water Resources Control Board.

US Navy: As I mentioned on the phone call, I am the Principal Investigator for a multi-year R&D project to develop a managed aquifer recharge (MAR) decision support system for the US Navy. As part of this R&D project, we will apply the modeling tool to two Navy installations. The China Lake installation is not one of the facilities included in this project. This project started last year and is scheduled to end in 2027.

If you have any questions, please feel free to contact me at any time.

Best,

Tony

Anthony Daus, PG

Vice President/Principal Hydrogeologist

GSI Environmental Inc.

O 951.808.3699 | C 949.244.1981

From: Emily Madueno <emadueno@murphyevertz.com>

Sent: Tuesday, October 6, 2026 12:13 PM

To: Anthony Daus <addaus@gsi-net.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>

Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Good afternoon, Tony,

Thanks for asking. Responses to your questions:

- I am assuming that I can limit that to those I have worked with (rather than the firm). Is this acceptable?

Yes.

- Can I limit that history to say the last 5 years?

Please provide the last 10 years.

Thank you again.

Best regards,

Emily

Emily L. Madueno

Partner

650 Town Center Drive • Suite 550 • Costa Mesa, CA 92626

Voice: (714) 277-1707 | Fax: (714) 277-1777 | Mobile: (661) 618-0522

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From: Anthony Daus <adtaus@gsi-net.com>

Sent: Tuesday, October 6, 2026 5:49 AM

To: Emily Madueno <emadueno@murphyevertz.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>

Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Good Morning,

A couple of questions regarding request #4 (the list of parties I have worked with in the past):

- I am assuming that I can limit that to those I have worked with (rather than the firm). Is this acceptable?
- Can I limit that history to say the last 5 years?

Tony

Anthony Daus, PG

Vice President/Principal Hydrogeologist

GSI Environmental Inc.

☎ 951.808.3699 | ☎ 949.244.1981

From: Anthony Daus

Sent: Monday, October 5, 2026 1:53 PM

To: 'Emily Madueno' <emadueno@murphyevertz.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa

<alexa.penalosa@usdoj.gov>

Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Thank you Emily,

I enjoyed speaking with the parties. I will have this information to you in the next few days.

If any other questions come up, please feel free to reach out to me.

Thanks for the opportunity to help with this interesting matter.

Tony

Anthony Daus, PG

Vice President/Principal Hydrogeologist

GSI Environmental Inc.

O 951.808.3699 | C 949.244.1981

From: Emily Madueno <emadueno@murphyevertz.com>

Sent: Monday, October 5, 2026 1:12 PM

To: Anthony Daus <addaus@gsi-net.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>

Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Dear Tony,

On behalf of all the parties, we enjoyed speaking with you earlier today.

As mentioned during our meeting, please:

1. Provide a proposed rate sheet;
2. Provide the name(s) of anyone who may provide substantive assistance to you on this assignment;
3. Provide a copy of your CV, together with the CV(s) of anyone who will assist you substantively; and

4. Identify any parties, attorneys, or witnesses on the attached list with whom you have worked previously, including a very brief statement of the matter on which you worked.

We look forward to hearing from you within the next week with the information requested above. We would appreciate receiving the information by Monday, October 12th.

Thank you again for taking the time to meet with us.

Best regards,
Emily

Emily L. Madueno

Partner

650 Town Center Drive • Suite 550 • Costa Mesa, CA 92626

Voice: (714) 277-1707 | Fax: (714) 277-1777 | Mobile: (661) 618-0522

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From: Anthony Daus <adhaus@gsi-net.com>

Sent: Friday, September 25, 2026 3:28 PM

To: Emily Madueno <emadueno@murphyevertz.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>

Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Thanks Emily – If there are any documents you can share that would help me prepare for the call, that would be appreciated.

Have a great weekend.

Tony

Anthony Daus, PG

Vice President/Principal Hydrogeologist

GSI Environmental Inc.

O 951.808.3699 | C 949.244.1981

From: Emily Madueno <emadueno@murphyevertz.com>

Sent: Friday, September 25, 2026 2:31 PM

To: Anthony Daus <addaus@gsi-net.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>

Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

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Good afternoon, Tony:

Thank you for your interest and for providing your availability. I will circulate a calendar invite for a Teams meeting on October 5 at 9:30 a.m. (Pacific).

Have a great weekend, and we look forward to speaking with you.

Best regards,

Emily

Emily L. Madueno

Partner

650 Town Center Drive • Suite 550 • Costa Mesa, CA 92626

Voice: (714) 277-1707 | Fax: (714) 277-1777 | Mobile: (661) 618-0522

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From: Anthony Daus <adtaus@gsi-net.com>

Sent: Thursday, September 24, 2026 4:07 PM

To: Emily Madueno <emadueno@murphyevertz.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>

Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Good Afternoon Emily – I would be very pleased to help with this assignment.

My available days/times the week of September 28 and the week of October 5:

September 30: any time after 2:00
October 2: 8:00 – 9:00, 11:00 – 5:00
October 5 8:00 – 12:00
October 6: 3:00 – 5:00
October 7: 8:00 – 11:00, 2:00 – 5:00
October 8: 8:00 – 11:00
October 9: 2:00 – 5:00

Have a great weekend.

Tony

Anthony Daus, PG

Vice President/Principal Hydrogeologist

GSI Environmental Inc.

O 951.808.3699 | C 949.244.1981

From: Emily Madueno <emadueno@murphyevertz.com>

Sent: Thursday, September 24, 2026 1:29 PM

To: Anthony Daus <adhaus@gsi-net.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>

Subject: Indian Wells Valley Adjudication - Special Master Candidate

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Dear Mr. Daus:

Our firm represents a party to the Indian Wells Valley Groundwater Basin adjudication, which is currently pending in Orange County Superior Court. A second phase of trial on safe yield was held in June 2026.

At the conclusion of the phase 2 trial, the Court informed the parties that it intends to appoint a special master. The Court would like the special master to make a written recommendation of his or her best estimate of the basin's safe yield based on the trial record.

We are reaching out to you as a possible candidate to serve as the court-appointed special master.

The parties would like to meet with you to explore your interest in the appointment and your availability to take on the assignment. Please let us know your availability for a Zoom/Teams meeting during the weeks of September 28th or October 5th if you are interested in the assignment.

Thank you, and we look forward to hearing from you.

Best regards,
Emily

Emily L. Madueno

Partner

650 Town Center Drive • Suite 550 • Costa Mesa, CA 92626

Voice: (714) 277-1707 | Fax: (714) 277-1777 | Mobile: (661) 618-0522

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Anthony D. Daus III, PG, BCES

Vice President, Principal Hydrogeologist

Education

M.S. Earth Sciences
(Hydrogeology), University
of Waterloo, Waterloo,
Canada, 1984

B.S. Geology, University of
Missouri, Columbia,
Missouri, 1981

Licenses/Certifications

Professional Geologist,
California, #4267
Arizona, #24224
Board Certified
Environmental Scientist,
#60004

Honors and Awards

Pearson Medal, University of
Waterloo, 1984
Alumni of Honor, University
of Waterloo, 2007
Farvolden Lecturer,
University of Waterloo,
2010

Contact

E: addaus@gsi-net.com
O: 949.242.8264
C: 949.244.1981

Mr. Daus has worked extensively on many types of environmental assignments including due diligence, property redevelopment, expert witness and site investigation and remediation. His water resources projects include developing sustainable water supplies, permitting new facilities, conjunctive use and evaluating baseline conditions for potential water supply development.

PROJECT EXPERIENCE

Over the past 43 years, Mr. Daus has worked on hundreds of projects across the United States and worldwide. The projects are described by subject matter below.

Water Resources

Has worked on a wide variety of water resources related matters including the historical relationship between pumping rates and groundwater levels, aquifer test performance and analysis, groundwater basin management, water banking, managed aquifer recharge, sustainable yield, and water balance calculations. Evaluated water supply projects in California, Mexico, the Caribbean and the Middle East. Designed and installed high yield production wellfields in California, Mexico and South America. Assessed the impacts of various types of hydraulic boundaries on groundwater flow conditions including faults, rivers, estuaries, and lakes. Developed a groundwater model and water supply management strategies to reduce the amount of saltwater intrusion into freshwater aquifers. Evaluated surface water conditions using tools such as rating curves and base flow calculations. Developed hydrologic budgets for groundwater basins in California assessing the impacts of mining, agriculture, and managed aquifer recharge as well as other land use changes on the water resources in the region. Has provided peer review for groundwater basin management models. Participated on a team of experts developing optimal short-term and long-term water supply strategies for a large diverse water district whose resources include groundwater production wellfields, surface water supplies, urban and agricultural users, wetland protection, and a large desalinization plant. Has developed strategies for managing groundwater quality problems in drinking water supply aquifers. In California, Mr. Daus has worked on water supply projects

Computer Modeling of Groundwater Flow and Contaminant Transport

Designed and implemented groundwater flow and transport models to assist in the investigation and remediation of contaminated soil, groundwater, and surface water and to assist in developing cost allocation scenarios. These models have incorporated features such as groundwater extraction and reinjection, physical hydraulic barriers, surface water/groundwater interactions and natural attenuation. Has implemented or overseen the implementation of finite difference, finite element and analytical computer models as well as geostatistical analysis, and presented these results as part of site cleanup criteria negotiations with regulators and other potentially responsible parties. At many sites, these models

were corroborated with field performance data after the remediation program was implemented. Has provided third-party review of modeling efforts to manage contaminated groundwater resources. Has worked on developing a saltwater intrusion model for a large karst aquifer. Has provided expert testimony regarding modeling studies.

Litigation Support

Provided litigation support on matters involving soil, soil vapor, groundwater, and surface water contamination, groundwater flow, construction dewatering projects, and water resources. The environmental assignments have involved evaluating the origin, migration, and cleanup of metals, liquid petroleum hydrocarbons (including crude oil, floating product, and fuel hydrocarbon additives such as MTBE), methane, chlorinated solvents (including dense non-aqueous phase liquids), and other organic chemicals in the soil, groundwater, surface water and soil vapor. Assignments have included PRP identification, standard of care, Clean Water Act penalty calculations, contaminant source identification, cost recovery/cost allocation, NCP compliance, pollution insurance coverage, impacts or potential impacts to drinking water supplies, NRD and client defense in pollution liability claims. Mediation activities have typically involved developing cost allocation strategies and defending those strategies before other parties and their consultants. Water resources matters include opining about managed aquifer recharge, water banking, safe yield, groundwater overdraft, saltwater intrusion, basin geology, recharge, return flows and hydrologic budgets. Mr. Daus has been engaged as an expert on groundwater basin adjudication matters and in the application of groundwater modeling techniques to resolve groundwater resources disputes. Has been engaged as a testifying expert (deposition and trial) and expert consultant.

Site Investigation and Remediation

Managed the investigation and remediation of soil, soil vapor, groundwater, and surface water conditions throughout the United States and overseas. These projects often involved developing conceptual models for chemical migration from sources, such as lagoons, landfills, chemical spills, underground tanks, pipelines and chemical handling facilities, to potential sensitive receptors. At many of these sites the impact of groundwater pumping wells and surface water bodies on the fate and transport of chemicals was assessed. Chemicals investigated include wood treatment chemicals, liquid petroleum hydrocarbons, methane, fuel additives such as MTBE, landfill leachate, chlorinated organics (such as dioxin and chlorinated solvents), polycyclic aromatic hydrocarbons, 1,4-dioxane, perchlorate, hexavalent chrome, NDMA, radioactive elements, and inorganics such as nitrate, and inorganic salts. These investigations have been performed in a variety of subsurface conditions including fractured clays and glacial till, basalts, fractured granite, karst conditions, fractured porous media and porous media. He has utilized continuous coring techniques, borehole and surface geophysical methods, discrete sampling techniques and packers to develop data and assess site conditions. Has overseen the performance of a variety of testing methods including pumping tests, slug tests and vapor extraction tests. Soil, sediment and groundwater remediation technologies employed on projects have included excavation, soil vapor extraction, in situ remediation, groundwater extraction and treatment and natural attenuation.

Due Diligence Assessments

Has managed multi-property industrial and commercial due diligence property assessments across the U.S. from Hawaii and Alaska to Maine. He has worked internationally on due diligence assessments in Canada, Mexico, Central America, South America and Europe. These projects often involve managing a team of professionals with expertise in particular areas or industries. Work product typically involves developing an opinion and cost estimate for water supply, environmental and health and safety liabilities, assessing future potential environmental and safety risks, and evaluating environmental, health and safety management systems and programs. Projects have included assessments for residential, commercial and industrial properties including agricultural lands, mines and mineral processing facilities (open pit, underground, and solution mines), fossil fuel (gas, fuel oil and coal) power plants, geothermal power generating facilities, solar and wind power

generating facilities, transmission lines and substations, landfills, pulp and paper mills, oil and gas properties and facilities (leases, production wells, pipelines, pump stations and metering stations), cogeneration facilities, printing plants, timber lands and timber processing facilities, manufacturing plants and aircraft fueling facilities. Manufacturing plants have included facilities for industries including aerospace, ferrous and non-ferrous metals, wafer fabrication, biotech, food processing, and specialty chemicals.

Mining and Mining Related Projects

Provided professional geologic and hydrogeologic services on a variety of mining related projects primarily in the western U.S. The types of mines have included underground coal, limestone (cement), aggregate, and specialty minerals. The services included assessing potential environmental liabilities associated with acquisitions, evaluating water resources issues associated with mine dewatering, assessing impacts of mining operations and mineral processing on groundwater quality, and remediation of closed mines.

International Experience

Managed a water supply and wastewater disposal project for a combined cycle power plant on the Yucatan peninsula near Valladolid, Mexico. The project involved developing a fresh groundwater supply in a karst environment and designing and overseeing the construction of the water supply system. In addition, we designed and installed the wastewater disposal system (injection wells).

Managed one of the largest soil and groundwater investigation and remediation projects in Brazil. The contamination, dominated by chlorinated hydrocarbons (EDC, 1,2-DCP and 1,2,3-TCP) and inorganic salts, had impacted groundwater and surface water resources in sensitive areas along the coast of Brazil. Mr. Daus worked effectively with the local and federal environmental agencies and has presented technical material at public hearings on this project. An emergency groundwater extraction system (2000 gpm) and soil vapor extraction system were designed, installed and operated.

Provided consulting services to Petrobras in Brazil regarding crude oil and refined hydrocarbon releases to the environment from pipelines and refineries across eastern Brazil. He has instructed Petrobras business managers and engineers on conducting due diligence evaluations and managing environmental risk for refineries and pipelines.

Provided due diligence services for business transactions in Europe, the UK, Israel, Canada, Central America, South America and Mexico.

Managed a detailed baseline investigation for multiple small water sheds in southern Guam to assess the integrated relationship between groundwater and surface water. The project included developing and implementing the study program, collecting field data and developing a numerical model.

Expert consulting for a client in Sydney, Australia whose site had been impacted by chlorinated solvents. Activities included analysis of existing data, evaluation of cleanup strategies, and forensic evaluations.

Developed a guidance document and decision tool for the Inter-American Development Bank on the development of managed aquifer recharge projects in the Caribbean and neighboring Latin American Countries.

Worked with a team of experts under a contract with the Inter-American Development Bank to develop a first of its kind water bank in Mexico near Ensenada.

Provided analysis and recommendations for managing karst aquifer in Barbados for the Barbados Water Authority. This included using data science tools to assess aquifer recharge areas and amounts, and turbidity sources.

PUBLICATIONS/PRESENTATIONS

- "Interaction Between Heat Flow and Ground-Water Flow," with G. van der Kamp, A Review, University of Waterloo, Waterloo Research Institute, Project No. 109-17 (1982).
- "Comparative Error - Analysis in Finite Element Formulations of the Advection-Dispersion Equation," with E.O. Frind, and E.A. Sudicky, *Advances in Water Resources* Vol.8 (1985).
- "An Alternating Galerkin Technique for Simulation of Contaminant Transport in Complex Ground Water Systems," with E.O. Frind, *Water Resources Research* Vol. 21, No. 5 (May 1985).
- "Soil and Groundwater Remediation" in *Legal Guide to Working with Environmental Consultants*, John Wiley & Sons, Inc., David S. Machlowitz, Editor, Colorado Springs, Colorado, 1992.
- "A DNAPL Emergency Remedial Action Program in a Developing Country", presented at *Aquifer Restoration: Pump-and-Treat and the Alternatives*, NGWA National Convention, September 30 through October 2, 1992, Las Vegas, Nevada.
- "A DNAPL Emergency Remedial Action Program in a Developing Country: Part II," with Manoel M. Nobre, presented at *Chlorinated Volatile Organic Compounds in Groundwater*, October 17-20, 1993, Kansas City, Missouri.
- "How to Survive the Corrective-Action Process: A panel Presentation," with B.R. Hogin, Esq. and D. Schmall, Esq. at the *CLE International Underground Storage Tanks Conference*, San Diego, California, September 8-9, 1994.
- "Whose Hydrocarbon is it Anyway: Making Effective Use of Chemical Fingerprinting," at the *CLE International Underground Storage Tanks Conference*, San Diego, California, September 8-9, 1994.
- "Recent Developments in Environmental Cost Recovery," at the *Ninth Annual Super Symposium on Environmental Law*, March 31, 1995.
- "Environmental Health and Safety Laws and Regulations in Argentina and Brazil," at the *Latin America Environmental Laws and Regulations: Environmental Compliance and Business Opportunities*, Washington, D.C., April 3, 1995.
- "Chemical Fingerprinting of Petroleum Hydrocarbons and Implications for Cost Recovery," with B.R. Hogin, Esq., at *Solving Contaminated Property Problems in California: Strategies for minimizing Costs and Liabilities*, Marina Del Rey, California, May 5, 1995.
- "Groundwater Investigation and Remediation in Northeastern Brazil: A Case Study" at the *International Conference on Groundwater Quality: Remediation and Protection*, Prague, Czech Republic, 15-18 May 1995.
- "A DNAPL Emergency Response Action Program in a Developing County" in *Volatile Organic Compounds in the Environment*, ASTM STP 1261, Wuncheng Wang, Jerald L. Schnoor, and Jon Doi, Editors, may 1996.
- "Alco Pacifico: A Case Study for Bi-National Environmental Enforcement," with G. Bianchi, T. Simpson, and D. Eng, at the *ASCE North American Water and Environment Congress '96*, Anaheim, California, June 22-28, 1996.
- "Investigation and Remediation of a DNAPL-Contaminated Aquifer in North-Eastern Brazil," presented at *The Fifth Chemical Congress of North America*, Cancún, Quintana Roo, México, November 11-15, 1997.
- "Naturally Occurring Asbestiform Minerals – A New Dynamic in Mining", presented at the *California Mining Association Annual Meeting*, Monterey, California, May 24-25, 2001.
- "A Case Study of DNAPL Remediation in Northeastern Brazil," with B. Kent and G. B. Bianchi Mosquera, *Journal of Environmental Science and Health* Vol. A 36, No. 8 (September 2001).

- "Perchlorate Treatment Toolbox", presented at the 2003 Environmental Law Conference at Yosemite, Fish Camp, California, October 16-19, 2003.
- "Evaluating Hydrocarbon Sources in Fluvial Sediments", platform presentation at Soils, Sediments and Water, The Association of Environmental Health and Sciences (AEHS), San Diego, California, March 15-18, 2004.
- "Persistence of Residual Diesel Fuel in River Sediments", poster presentation at Soils, Sediments and Water, The Association of Environmental Health and Sciences (AEHS), San Diego, California, March 15-18, 2004.
- "Stochastic Optimization for Water Resources Management", Mok, C.M., Gorelick, S., Wanukule, N., and Daus, A., presented at American Water Resources Association 2004 Conference.
- "Comparison of Weighted-Sum and Mini-Max Objective Functions for Water Resources Optimization", Mok, C.M., Gorelick, S., Wanukule, N., and Daus, A., presented at American Water Resources Association 2004 Conference.
- "Coping with Uncertainties Associated with Simulation-Optimization Model for Water Resources Management", Mok, C.M., Wanukule, N., Gorelick, S., Der Kiureghian, A., and Daus, A., presented at American Water Resources Association Annual Conference, 2005.
- "MTBE as a Groundwater/Surface Water Tracer", Mok, C.M. and Daus, A., presented at National Ground Water Association Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Assessment, and Remediation Conference, 2005.
- "Using Principal Component and Correlation Analyses to Evaluate Impacts of Hydrocarbon Sources in Fluvial Sediments", Mok, C.M. and Daus, A., presented at National Ground Water Association Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Assessment, and Remediation Conference, 2005.
- "Stochastic Methods for Addressing Uncertainty in Optimization of Water Resources Utilization", Mok, C.M., Gorelick, S., Wanukule, N., and Daus, A., Keynote Lecture at 5th International Conference on Calibration and Reliability in Groundwater Modeling From Uncertainty to Decision Making, Netherlands, April 2005.
- "Using PCA to Evaluate Impacts of Hydrocarbon Sources in Fluvial Sediments", Mok, C.M. and Daus, A., presented at Southeast Asia Environmental Forensics Conference, Taipei, Taiwan, September, 2005.
- Numerical Model of the Inarajan and Tinaga River Basins in Support of a Potential Landfill in Inarajan, Guam", A. A. Tallman, K. E. Richards, A. C. Stringer, J. Weaver, A. Daus and J. C. Robinson, American Geophysical Union Fall Meeting, San Francisco, CA, 2008.
- "Integrated Hydrologic Study of the Inarajan and Tinaga River Basins, Inarajan, Guam", J. C. Robinson, K.E. Richards, A. Daus, EWRI Annual World Environmental and Water Resources Congress, Honolulu, HI, 2008.
- "Managing Water Supply and Quality at a Combined Cycle Gas Plant in the Yucatan", Daus, Weaver, and Talbot, at the EUEC Conference, Phoenix, Arizona, February 2009.
- "TMDLs – Balancing Science, Economic Growth and Water Quality Policy", A. Daus, ABA Conference in Keystone Colorado, March 2009.
- "Managing Water Resources in the Wild, Wild West: The Nexus of Quantity and Quality", A. Daus (invited lecture), Farvolden Lecture and Symposium, University of Waterloo, October 2010.
- "Papers to Profits: Moving Research into Practice", NGWA Groundwater Summit, April 2012.
- "Groundwater Assessment and Availability in Southern Guam", K. Richards and A. Daus, The International and National Conference on Groundwater, April 2013.
- "Developing a Sustainable Freshwater Supply in the Yucatan: Managing Brine Upconing", D. Collins, J. Weaver, and A. Daus, The International and National Conference on Groundwater, April 2013.

- "Innovative Use of TarGOST® Screening Technology to Evaluate Radius of Influence of Dye-Amended Carbon Substrate Injection", K. Howe, A. Daus, E. Bailiff and X. Zhong, Battelle, June 2013.
- "Life Cycle of Methyl tert-Butyl Ether in California Public Water Supply Wells", T. McHugh, S. Rauch, S Paquette, J. Connor and A. Daus, Environ. Sci. Technol. Lett., December 2014.
- "Aquifer Storage and Recovery: Improving Water Supply Security in the Caribbean, Opportunities and Challenges", Inter-American Development Bank, Water and Sanitation Division, Discussion Paper No. IDB-DP-00712, June 2019
- "Large-Scale Managed Aquifer Recharge in Support of California's Agriculture", International Association of Hydrogeologists, 46th Congress, Malaga Spain, September 2019
- "Managing Reservoir Releases to Promote Groundwater Recharge: The Salinas Valley Groundwater Basin", presented at Resilience through Recharge and Recovery, 17th Biennial Symposium on Managed Aquifer Recharge (BSMAR 17), October 2020.
- "Tijuana's Transborder Wastewater Crisis and Managed Aquifer Recharge", Groundwater Resources Association of California, November 2020.
- "Simulation-Optimization Approach for Siting Injection Wells in Urban Areas with Complex Hydrogeology", Mok, C.M., Carrera, B., Hort, H., Santi, L., Daus, A., Panday, S., Jones, D., Partington, B. and Ferguson, E. (2024). Groundwater, 62: 236-249. <https://doi.org/10.1111/gwat.13317>

Deposition and Trial Testimony (Since 2010)

- CAM-Carson, LLC vs. Carson Reclamation Authority, et al., Superior Court of the State of California, Case No. 20STCV16461, 2025 (deposition).
- Cuyama Basin Adjudication – Phase 1 Trial, Superior Court of the State of California, Case No.: BCV-21-101927, Phase I, 2023 (deposition).
- Steinbeck Vineyards #1, LLC, et al. v. County of San Luis Obispo, et al., Superior Court of the State of California, County of Santa Clara, No/ 1-14-cv-265039, Phase IV, 2022 (deposition and trial).
- Orange County Water District vs. Sabic Innovative Plastics U.S. LLC, et al., Superior Court of the State of California for the County of Orange, No. 30-2008-00078246 CU-TT-CXC, 2022 (deposition and trial)
- Los Angeles Unified School District v. S&W Atlas Iron & Metal Co., U.S. District Court, Central District of California, No. 2:20-cv-5330-DO-GW-SK, 2021, (deposition)
- Santa Clarita Valley Water Agency vs. Whittaker Corporation, United States District Court for the Central District of California, No. 2:18-cv-6825, 2021 (deposition and trial)
- United States of America, et al., vs. Montrose Chemical Corporation of California, et al., United States District Court, Central District of California, Western Division, No. 2:90-cv-03122-DCO(GJSx), 2020 (deposition)
- Ashland LLC, et al., vs. Samuel J. Heyman Continuing Trust for Lazarus S. Heyman, et. al., Superior Court in the State of Delaware, No. N15C-10-176-EMD CCLD, 2019 (deposition).
- Arnold Goldstein, et al., vs. Exxon Mobil Corporation, et al., United States District Court for the Central District of California, No. 2:17-cv-02477-DSF, 2019 (deposition).
- Orange County Water District vs. Unocal Corp., et al., United States District Court, Southern District of New York, Case No. 04 Civ. 4968 (SAS), 2018 (deposition).
- Steinbeck Vineyards #1, LLC, et al. v. County of San Luis Obispo, et al., Superior Court of the State of California, County of Santa Clara, No/ 1-14-cv-265039, Phase III, 2018 (deposition and trial).
- Weintraub Financial Services, Inc. vs. Frank Butler Properties, Inc., et al., Superior Court of the State of California, County of Los Angeles, No. BC529945 (deposition).

Kings River Agricultural Property Owners Association vs. Kings County Water District, Superior Court of California, County of Tulare, No. VCU 260782, 2017 (deposition and trial).

Viola Coppola, Gary Coppola and the Trust of Anthony M. Coppola v. Paragon Cleaners, et al., United States District Court, Eastern District of California, Case No. 1:11-CV-01257-AWI-BAM, 2016 (deposition).

City of Clovis vs. Shell Oil Company, et al., Superior Court of the State of California, County of San Bernardino, Case No. SCVSS 120627, 2016, (deposition).

Steinbeck Vineyards #1 LLC, et al vs. County of San Luis Obispo, et al., Superior Court of the State of California, County of Santa Clara, No. 1-14-CV-265039, Phase I, 2015 and 2016 (deposition and trial).

Wausau vs. Rexnord Industries, et al, Circuit Court of the 18th Judicial Circuit, DuPage County, Illinois, No. 03 MR 742, 2015, (deposition and trial).

Commonwealth of Puerto Rico et al. vs. Shell Oil Company et al., U.S. District Court, Southern District of New York, Case No. 07-Civ-10470 (SAS), 2014 (deposition).

KFD Enterprises, Inc. vs. City of Eureka, et al., United States District Court for the Northern District of California, Case No.: CV-08-4571 MMC, 2013 (deposition).

Orange County Water District vs. Sabic Innovative Plastics US, LLC, et al., Superior Court of California, Case No. 30-2008-00078246-CU-TT-CXC, 2013 (deposition).

Orange County Water District vs. Unocal Corp., et al., United States District Court, Southern District of New York, Case No. 04 Civ. 4968 (SAS), 2012 (deposition).

PROFESSIONAL BACKGROUND

Principal Hydrogeologist, GSI Environmental, Inc., Newport Beach, California. 2013 to present

Principal Hydrogeologist, AMEC Earth and Infrastructure, Inc., Irvine, California. 2008 to 2013

Principal Hydrogeologist, Geomatrix Consultants, Newport Beach, California. 1989 to 2008

Principal Hydrogeologist, Levine Fricke, Inc., Irvine, California. 1986 to 1989

Project Hydrogeologist, The MARK Group, Engineers and Geologists, Walnut Creek, California. 1985 to 1986

Senior Staff Geologist, Woodward-Clyde Consultants, Walnut Creek, California. 1983 to 1985

Hydrogeological Research Assistant, University of Waterloo, Waterloo, Canada. 1981 to 1983

Lab and Field Technician, University of Missouri, Columbia, Missouri. 1981



Sorab Panday, PhD

Principal Engineer

Education

Ph.D., Civil & Environmental Engineering, Washington State University, Pullman, Washington, 1989
M.S., Civil Engineering, University of Delaware, Newark, Delaware, 1986
B. Tech., Civil Engineering, Indian Institute of Technology, Bombay, India, 1984

Affiliations & Awards

American Geophysical Union; National Ground Water Association; International Association of Hydrogeologists; Groundwater Resources Association of California
M. King Hubbert Award, National Groundwater Association, 2015
Member of the National Academy of Engineering, 2017
Lifetime Achievement Award, Groundwater Resources Association of California, 2022

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Dr. Sorab Panday is a Principal Engineer at GSI Environmental with over 35 years of experience in directing, managing, developing, troubleshooting, and reviewing flow and transport models for subsurface contamination / remediation evaluations, groundwater/ surface-water interactions, and water resource management. He has worked on hydrologic and hydrogeologic modeling projects spanning a wide range of schedules and budgets. These projects involve multiple spatial and temporal scales; complex geological settings; diverse stakeholder concerns; extreme climatic conditions; unique water/contaminant management issues; and challenging numerical conditions.

Dr. Panday has provided leadership, mentorship, training and guidance on projects for client and staff; executed and managed modeling projects for various industries and government agencies; managed regulator and stakeholder modeling committees; provided expert-witness services; participated in expert panels; conducted workshops and webinars on water resource and subsurface contaminant transport modeling; and maintained effective communication with regulators and clients. He has developed code for several of the industry's state-of-the-art water resource modeling tools and is the lead author on MODFLOW-USG, as well as a contributing author for MODFLOW-NWT and MODFLOW 6 which are the latest versions of the groundwater modeling software released by the USGS. Dr. Panday is also a Visiting Research Professor at University of Nebraska, Lincoln. He publishes regularly in leading industry journals and provides review and editorial support to industry publications and conferences.

Dr. Panday is the 2015 recipient of the M. King Hubbert Award, presented by the National Ground Water Association for major science or engineering contributions to the groundwater industry through research, technical papers, teaching, and practical applications. He was also elected as a Member of the National Academy of Engineering (NAE) in 2017 for the development of computer code for solving complex groundwater problems. He is also the recipient of the 2022 Lifetime Achievement Award from the California Groundwater Resources Association for his contribution towards analyzing complex groundwater problems.

PROJECT EXPERIENCE

Water Resource Modeling

In-depth Data Review and Gap Identification for Groundwater Modeling and Integrated Water Resources Management across the Kingdom of Saudi Arabia (KSA), Ministry of Environment Water & Agriculture (MEWA), Riyadh, Saudi Arabia. Conducted an in-depth review of the existing models and data to develop advanced mathematical models of water resources to effectively achieve the objectives of the National Water Strategy

and facilitate comprehensive management, planning, and emergency preparedness for the Kingdom's water resources. Tasks involved evaluating the existing conceptual and numerical models that span the country, assessing the quality, accuracy, and consistency of the collected datasets by comparing them with established standards, guidelines, best practices, and developing roadmap for updating the groundwater models of the Kingdom.

ITRC-MAR Guidance Documents for Siting and Developing Managed Aquifer Recharge (MAR) Projects, ITRC, Washington, DC. Participated in a panel for developing guidance documents for regulators and managers to understand feasibility and guide the selection and development of MAR projects. Aside from monthly online meetings, participated in two in person meetings to develop documents, address comments and finalize the report. Also participated in sessions to prepare webinars on the guidance documents.

Preliminary Inland Injection Well Siting, Water Replenishment District, Lakewood, CA. Provided guidance and input for modifying and using an existing groundwater flow of the West Coast Basin to optimize placement of wells to inject between 1 and 4 MGD of Advanced Treated Water (ATW) subject to environmental constraints, minimum residence time to municipal well restraints, land availability and cost, and cost of additional infrastructure from existing ATW plant.

Groundwater/Surface-Water Interaction Model, Los Angeles County Sanitation Districts, CA. Project manager and principal investigator for developing a flow and transport Groundwater/Surface-Water Interaction Model (GSWIM) of the Upper Santa Clara River watershed to address chloride TMDL issues. Model highlights include use of a curvilinear grid to provide resolution near the river; parameterizing evapotranspiration and land surface properties via temporally varying land use types; and water supply systems that distribute pumped and imported water for outdoor use as per the unit demand of each land use type. The water supply systems further discharge indoor-use water (with or without treatment) to discharge locations in streams or apply it to the land surface as reuse. The model was developed and calibrated to groundwater levels, stream flows, groundwater chloride levels and stream chloride measurements for daily-averaged rainfall stresses over a 31-year period from 1975 through 2005. The model is being applied to examine the effects of various scenarios on chloride levels till 2030 and to examine various alternatives that meet the TMDL limits in an optimal manner. Provided leadership in model conceptualization, development, calibration and application; managed scope, budget and work-plans; prepared reports; provided presentations to staff and stakeholders; and attended stakeholder and technical meetings.

Density-dependent Groundwater Flow and Transport Model of the Lower Rio Grande Valley River Basin, Texas Water Development Board, Austin, TX. Developed a numerical model of the Lower Rio Grande Valley (LRGV) to evaluate the impacts of increased fresh and brackish groundwater pumping in the LRGV, as outlined in the 2016 Region M plan. The model was developed with a density-dependent flow and transport version of MODFLOW-USG and included a quad-patch refined grid around the River and irrigation canals to provide finer resolution in capturing the surface-water interactions. The model was calibrated from 1984 through 2013 using annual stress periods. The model was used to evaluate the impact of pumping on groundwater and surface-water flows and levels; salinity within the groundwater basin; and salinity of the extracted water for current and planned additional desalination plants in the area. Drawdown computations from the model for planned future desalination operations also provide estimates of compaction stresses to help evaluate the potential for land subsidence. The model was also applied towards evaluating the impact of data gaps and different conceptualizations (e.g., for faulting) within the basin.

Update of Groundwater Availability Model for the Northern Portion of the Queen City, Sparta, and Carrizo-Wilcox Aquifers, Texas Water Development Board, Austin, TX. Coordinated development of

a numerical model of the Northern portion of the Queen City, Sparta, and Carrizo-Wilcox aquifers for managing the water resource. The numerical model was developed using MODFLOW 6 and included a quad-patch refined grid along rivers to provide finer resolution in capturing surface-water interactions. The grid further included vertical coarsening with depth and displaced connections across faults. The model was calibrated from 1984 through 2013 using annual stress periods. The pumping and water level datasets were highly uncertain; therefore, the model was further used to evaluate the pumping and recharge responses of monitoring wells and determine the associated influences. The model was applied to evaluate pumping potential for desired future conditions.

Update of Groundwater Availability Model for the Southern Portion of the Queen City, Sparta, and Carrizo-Wilcox Aquifers, Texas Water Development Board, Austin, TX. Coordinated development of a numerical model of the Southern portion of the Queen City, Sparta, and Carrizo-Wilcox aquifers for managing the water resource. The numerical model was developed using MODFLOW 6 and included an oct-patch refined grid along rivers to provide finer resolution in capturing surface-water interactions laterally and vertically. The model was calibrated to predevelopment conditions and from 1985 through 2017 using annual stress periods. An ensemble of models was also constructed from the final model for potential use in evaluating uncertainties in future management scenarios. The model is being applied to evaluate desired future conditions.

City of Flagstaff 100-year Water Supply Investigation, City of Flagstaff, AZ. Principal Modeler for construction and calibration of a groundwater model for simulating the 100-year water supply for the city as per ADWR's Adequate Supply Program and proposed Hydrologic Guidelines and Proposed Rulemaking Changes. The modeled scenarios consider a mixed use of surface water, groundwater and reuse to meet its projected requirements.

Groundwater Modeling Impact Analysis at Red Gap Ranch (RGR), City of Flagstaff, AZ. Principal Modeler for construction and calibration of a groundwater model simulating various groundwater pumping scenarios from future wells in the C-Aquifer at RGR. The evaluations also considered impacts of pumping on adjacent Native American lands. Unsaturated Zone Recharge Modeling, GSI Water Solutions Inc., Portland, OR. Modeling Consultant for simulating vadose zone injection to investigate design and operational goals for injection wellfields for a large-scale Aquifer Storage and Recovery (ASR) project at Jeju Island, in Korea. Assisted with conceptualization of the system and preliminary model simulations and provided modeling staff with training and QA. The model was used to evaluate and optimize the number of wells, spacing, and well depth for injection of 6 MGD during the wet season, including maintaining perched water columns for well rehabilitation.

Unsaturated Zone Managed Aquifer Recharge Modeling, GSI Water Solutions Inc., Portland, OR. Modeling Consultant for vadose zone injection simulation used to investigate design and operational goals of injection wellfields during a large-scale Aquifer Storage and Recovery (ASR) project at Jeju Island, South Korea. Assisted with conceptualization of the system and preliminary model simulations, and provided modeling staff with training and QA. The model was used to evaluate and optimize the number of wells, spacing, and well depth for injection of 6 MGD during the wet season, including maintaining perched water columns for well rehabilitation.

Saltwater Intrusion Hydraulic Barrier Evaluation and Resource Management, West Coast Regional Water Supply Authority, West Basin, CA. Directed and conducted updating of an existing groundwater flow and transport model of the West Coast Basin Barrier Project in Los Angeles, California from SUTRA to the SEAWAT code. The model was calibrated and used to assess movement of tertiary treated wastewater injected as saltwater intrusion barriers.

Flow and Transport of Potential Solutes at the Water Table from Jet Fuel Storage Tanks, NAVFAC, Hawaii. Principal Investigator for simulating source water zones of water supply shafts and migration of potential solutes from beneath the Red Hill Facility, Oahu, Hawaii. The modeling was conducted under supervision and guidance of Subject Matter Experts (SMEs) from the US EPA and the Hawaii Department of Health. A multi-model framework was employed to address conceptual and parameter uncertainties and make allowance for divergent concerns of various stakeholders and SMEs. Provided leadership in modeling, report preparation, presentation to SMEs, and addressing difficult modeling issues with SMEs and stakeholders.

Peer Review of Groundwater Flow Models of the Salar de Atacama for Lithium Extraction Projects, Hidroestudios, Chile. Reviewer for groundwater flow models developed by Hidroestudios for Sociedad Química y Minera (SQM) to assess the potential impacts of brine extraction on important ecosystems, specifically, the lagoons and ponds in the region. Seven numerical models were developed, including two regional models of groundwater flow and four local models of density-dependent groundwater flow and salt transport. The regional models provided boundary conditions to the local models which analyzed the groundwater-lagoon interaction fluxes and the possible changes in salinity of the lagoons resulting from the project. The local models were used to predict impacts on groundwater levels to understand the effects on groundwater resources, brine concentrations, and the saltwater interface. Provided model review and guidance support to Hidroestudios to assist with renewal of environmental permits.

Peer Review of Groundwater Flow Model, Ventura County, United Water Conservation District (UWCD), Santa Paula, CA. Reviewer for UWCD's groundwater flow model development. UWCD is developing a numerical groundwater flow model of portions of Ventura County in support of efforts to estimate basin-specific sustainable yields and evaluate overdraft mitigation measures. The model is being used to support potential future groundwater extraction, recharge, and other management scenarios within the Basins. Provided review of the model development effort and continuing with ongoing, long-term guidance and review of the model for conducting uncertainty evaluations and predictive simulations for basin management and planning. Also provided support to UWCD in meetings with stakeholders and technical experts.

Review of Regional Groundwater Flow Model at Aerojet Superfund Site, Carmichael Water District, Carmichael, CA. Review regional groundwater flow model at Aerojet Superfund Site and evaluate current remediation performance as it relates to the Carmichael Water District. Identified areas of limited data and specified model improvements. Present findings to client in technical memorandum.

Brighton and Worthing Groundwater Flow Model, London, UK. Provided modeling support and review for development of a MODFLOW-USG model to simulate well and adit yields in the Chalk of the South Downs. The model is being applied in conjunction with climate models to provide predictions of future yields under changing precipitation patterns.

Integrated Surface and Subsurface Flow and Transport Modeling, National Parks Service (NPS), Everglades, FL. Project manager and principal investigator for developing a surface/subsurface flow and transport model to evaluate the Marsh Driven Operations Plan (MDOP) for the Rocky Glades, as part of the multi-billion-dollar Comprehensive Everglades Restoration Program (CERP). The MDOP is developed to manage pumping operations from the L-31N canal into adjacent detention areas to minimize drainage of the Everglades to the canal without introducing high levels of phosphorous into the Everglades ecosystem. The model was developed using MODHMS and calibrated to daily water levels at over 40 wells and gauge stations over a 3-year period. Phosphorous transport in the surface and subsurface domains was also evaluated. The model was to be used further to evaluate other MDOP systems which may be more effective in achieving several conflicting objectives including flood

prevention, drought maintenance, and ecosystem restoration. Provided technical input and supervision, managed project tasks and budgets, provided presentations and technical training to NPS staff.

Integrated Surface Water-Groundwater Model, St. Johns River Water Management District, Western Orange and Seminole Counties, Palatka, FL. Project manager and principal investigator for development and application of an integrated surface-water/subsurface water model in East-Central Florida. Performed integration of complex surface and subsurface data into a comprehensive model to investigate various conjunctive issues, including recharge areas, water movement in the system of interconnected ponds and lakes, and effects of groundwater pumping on surface-water bodies. Additional modules were developed within the MODFLOW framework of MODHMS to include the complexity of the system. Predictive analyses were conducted for transient conditions starting in 1999 and will continue through 2025, with current pumping and increased pumping estimates used to observe the effect of pumping on various lakes, wetlands, surface water bodies, spring flows and stream flows. Provided leadership to a team of hydrologists, hydrogeologists, engineers, and scientists in conducting this project, including assimilating vast quantities of information and data for model development. Managed project progress and budgets; provided technical direction; prepared reports, presentations; conducted training sessions; and communicated progress and issues regularly with the client.

Integrated Groundwater, Surface Water Modeling of Flow and Transport, U.S. EPA Gulf of Mexico Programs, Stennis Space Center, MS. Principal Investigator for conjunctive surface/ subsurface modeling study of the Mobile River Basin, LA. A MODHMS model was conceptualized and constructed for the approximately 3,000 square mile area of Hydrologic Unit Catalog (HUC) 204 and 205 surrounding and including Mobile Bay. Data for the system was obtained electronically in ArcView coverages of topography (DEMs), Land Use/Land Cover, and STATGO Soils databases which were translated appropriately for the subsurface, overland flow, and channel flow models. Simulations were performed to examine various hazard scenarios including heavy local rainfall, and effects of floods propagating down the Mobile River. Transport simulations included point and non-point of contaminants in upstream regions of the model. This model was further coupled with a coastal model to predict the associated impacts on Mobile Bay.

Integrated Tiger Bay, Bennett Swamp Model, St. Johns River Water Management District, Western Orange and Seminole Counties, Palatka, FL. Project manager for conversion of a MIKE SHE model into the MODHMS framework. The model included complex surface and subsurface interactions to determine recharge and runoff, as well as surface-water bodies such as canals, lakes, and ponds that discharge water from the domain. A comparison study was then performed between MODHMS and MIKE SHE by evaluating simulation results from both codes for the 1985 through 1999 time period. The models give comparable results, though the MODHMS model provided additional flexibility for handling operations of structures.

East-Central Florida Groundwater Modeling, St. Johns River Water Management District, Palatka, FL. Lead modeler for development and application of MODFLOW and DSTRAM regional flow and sub-regional saltwater intrusion models at several locations within the District, to meet various objectives of the District. Tasks have included conceptual model development, model calibration (manual adjustments with automatic refinement of parameters using PEST), sensitivity analyses, uncertainty analyses, predictions with uncertainty of alternate demand scenarios, and safe-yield determination. Provided hands-on training on the set-up and application of these models, as well as QA and trouble-shooting support to District staff in model evaluation of groundwater withdrawal impacts for water-supply development, consumptive use permitting and minimum flows and levels development.

Regional Groundwater Modeling for Water Supply Planning, Northwest Florida Water Management District, Havana, FL. Project manager and principal investigator for development and

application of density-dependent saltwater intrusion models. Two models – an Eastern Domain and a Western Domain – were developed covering Escambia, Santa Rosa, Okaloosa and Walton Counties, to address concerns of up-coning of deeper saline waters and of saltwater intrusion from the Gulf of Mexico. The District-wide MODFLOW model was translated onto the local grids and the complexities of chloride intrusion were subsequently introduced. Calibration was performed for steady-state pre-development and transient post-development conditions. Sensitivity analyses have been performed on various parameters, with model application for predictive simulations of various future scenarios.

Evaluation of Streamflow Reductions due to Pumping, Northwest Florida Water Management District, Havana, FL. Principal investigator for a modeling evaluation of groundwater flow and surface-water interactions in the Apalachicola-Chattahoochee-Flint River Basin. The USGS finite-element code, MODFE, was applied for simulating the basin to estimate transient streamflow reduction due to pumping, for various alternative scenarios. Sensitivity analyses were also conducted to determine the range of streamflow reductions subject to parameter uncertainty.

Review, Training, and Support Services, St. Johns River Water Management District, Palatka, FL. Reviewer and instructor. Reviewed the ECF model of McGurk and Presley, and the Volusia County model of Williams. Reviewed the drafts and final reports for these studies. Conducted an in-depth examination of the data files for the respective models, for further QA of the report and modeling effort. Provided 3-day training on conjunctive surface/subsurface modeling using MODHMS to 12 staff members of the District. The theory and application of MODHMS were discussed, proceeding in complexity from the MODFLOW framework to include the unsaturated zone, and the surficial domain (overland flow and channel flow). Density-dependent solute transport was also detailed. Hands-on exercises were conducted to exemplify the theory and familiarize staff with the processing involved with conducting complex simulations that include density processes and surface/subsurface interactions.

Saltwater Intrusion Model of the Geneva Freshwater Lens, St. Johns River Water Management District, Palatka, FL. Primary modeler for numerical modeling of saltwater intrusion. Activities involved development of the model using the finite-element density-dependent flow and solute transport code, DSTRAM, with further application for understanding the freshwater lens response to various ambient and groundwater development conditions for withdrawal permitting.

Consumptive Use Permit Consolidation, Seminole County Water Supply, Seminole County, FL. Principal investigator for developing and applying models towards evaluation of the impacts of various alternatives to current groundwater supplies including impacts of land-use changes, surface-water withdrawals, waste-water reuse for irrigation and artificial recharge via rapid infiltration basins. The East-Central Florida groundwater flow model was examined and used to evaluate the maximum groundwater withdrawals achievable without adverse impacts and that meet the growing needs of the county in conjunction with surface water supplies.

Saltwater Intrusion Study, Southwest Florida Water Management District, Brooksville, FL. Principal investigator for the Southern Water Use Caution Area (SWUCA) density-dependent saltwater intrusion modeling project. The project used the Southern District groundwater MODFLOW model already developed by the District as a starting point for the local, refined density-dependent saltwater intrusion model developed with MODHMS. The conceptual regional model was translated onto the local grid, and the complexities of chloride intrusion were successively introduced to the model, which was then calibrated for steady-state pre-development, and transient post-development conditions. Also developed the local scale model; guided calibration, sensitivity and model applications for predictive simulations; provided training on use of the model and on the theory and application of the software; and provided quality assurance oversight during application of the model by District staff.

Model Investigations for Consumptive use Permit Applications, Southwest Florida Water Management District, Brooksville, FL. Project manager responsible for the development and application of cross-sectional and 3-D DSTRAM finite-element models for predicting groundwater flow and saltwater intrusion in the Eastern Tampa Bay WUCA. Also assisted in reviewing previous MODFLOW regional and subregional groundwater modeling studies as part of the consumptive use permit (CUP) applications.

Water Resources Assessment Program HCWRAP2, Southwest Florida Water Management District, Brooksville, FL. Directed the development of MODFLOW-based regional groundwater flow and saltwater intrusion models that were used in conjunction with management optimization techniques to determine optimal locations of wells to minimize their impacts on lakes and wetlands and on the movement of the saltwater/freshwater interface. Several models were developed and calibrated which were then used with the well optimization simulations to investigate various objectives of the District.

Safe Yield Analysis of County Wellfields, Pinellas County Water System, Pinellas County, FL. Project manager for the development of a safe yield analysis model for the Eldridge-Wilde and East Lake Road wellfields operated by the County. Water management concerns included drying up of lakes and wetlands, and saltwater intrusion from the Gulf of Mexico and Tampa Bay. Developed a finite-element model using DSTRAM to investigate the effects of pumping on saltwater intrusion and the surface water impacts. Performed safe yield analyses to optimize operation with minimal intrusion of saltwater or degradation of wetlands and lakes.

Simulation of Seep and Remedial Alternatives at the Former Invista North Terminal Site, Koch Remediation & Environmental Services, Wilmington, SC. Principal Investigator for developing a groundwater flow model to evaluate and address a low-volume seep of water containing low concentrations of para-xylene. A steady-state groundwater flow model was developed and calibrated to current site conditions, and various alternative remedial measures were evaluated for effectiveness in addressing the issue. Simulations indicated that the preferred French-drain design alternative may not be effective due to low conductivity soils down-gradient from the site; however, backfilling or capping would reliably eliminate the seep even under wet weather conditions.

Model for 5-Year Dewatering Plan, Bingham Canyon Mine Kennecott Utah Copper, Utah. Under subcontract from Montgomery and Associates, assisted with model development, review and troubleshooting support for evaluating dewatering and mine planning at the mine pit using the unstructured grid code MODFLOW-USG. The groundwater model will ultimately be used to support geotechnical analyses conducted in support of ongoing mine planning and to assist in optimization of the mine dewatering system and will replace the 3-D regional model in conjunction with 2-D cross-sectional models being used for planning. Vertically and horizontally nested grids provide resolution and conduit flow mechanisms move water within the workings to simulate regional conditions and required details with one model.

Model for Mine Dewatering at the Antamina Mine, Peru. Provided model development, review and troubleshooting support for modeling of mine dewatering to estimate pumping and treatment infrastructure requirements, and the impact of dewatering to nearby surface water bodies. The model covers the entire watershed and includes linear conduit elements to evaluate fracture flow in the region. A nested grid was developed with MODFLOW-USG to provide resolution in the vicinity of the mine workings. Steady-state and transient simulations were conducted to evaluate seepage under various weather conditions to assist in mine development planning. A modeling seminar was also conducted in Peru to present the MODFLOW-USG code and provide technology transfer.

Review of Oil Sands Mine Models, Confidential Client, Alberta, Canada. Reviewed FEFLOW numerical models of oil sands mines to evaluate tailings storage and processed water storage. Modeling objectives included evaluation of transport of processed affected water using particle tracking to aid mine design and design of interception well network.

Reviews of Tailings Impoundment Models, British Columbia, Canada. Senior Reviewer at AMEC for various finite element and finite difference models constructed to evaluate containment systems to prevent tailings effluents from entering the regional groundwater system. The project locations were across British Columbia and included gold mines and sulfide deposit mines.

Contaminant Transport Modeling

Incorporating Matrix Diffusion in the New MODFLOW Flow and Transport Model for Unstructured Grids, ESTCP. Co-investigator for integrating analytical solutions to matrix diffusion processes into the latest MODFLOW software including USG-Transport and MODFLOW 6. Responsibilities included code development, testing, documentation, and assisting with implementation of the software at field sites.

Impact of Coal Bed Methane (CBM) Extraction on Regional Groundwater Systems, Department of Natural Resources and Mines, Brisbane, Queensland, Australia. Provided simulation support under a sub-contract from Watermark Numerical Computing, to evaluate the impact of CBM extraction facilities on the regional groundwater system. The gas is adsorbed onto coal bed seams under pressurized conditions. Large quantities of water are extracted to desorb gas from the seams – the operation of several such facilities can have a cumulative impact on the overlying potable water aquifers. The regional nature of the analysis precludes practical use of a multiphase simulator for analysis. Therefore, the multi-phase flow conditions were simplified and the modified equations were implemented into a customized version of the MODFLOW-USG code. Benchmark and verification simulations were conducted to validate the methodology against a rigorous multi-phase simulator. Upscaling procedures and parameterization are being investigated to evaluate large aquifer systems, 10s of thousands of kilometers in size.

Modeling Dissolution Behavior of DNAPL at the Ironton Coke Plant Site, Subcontract through AMEC for Honeywell International Inc., Golden Valley, MN. Principal Investigator for modeling conducted to support EPA's 5-year efficiency evaluation for remedial operations at the Ironton Coke Plant Site in Ironton, Ohio. DNAPL removal efforts at the site to date, have not resulted in significant decrease of the measurable subsurface DNAPL mass or of dissolved concentrations of the DNAPL components. The study evaluated the dissolution behavior of major components of a DNAPL pool at the site and compared results with simulations initiated with only residual DNAPL (assuming all mobile DNAPL could be removed). Results from the study indicated that the more soluble components would dissolve and be removed from the system with groundwater migration for both cases. However, the more insoluble components would persist as a source of downstream contamination for over 100 years even if all mobile DNAPL were instantly removed. Therefore, groundwater plume control and monitoring, as is being performed at the site, is an effective strategy and removal of the mobile DNAPL with associated treatment does not provide any significant gains over the 100 year analysis period.

Remedial Design Modeling, U.S. Army Corps of Engineers, Fort Ord, CA. Principal investigator for modeling remedial design of the contaminated site at the Fort Ord facility. A local model around the benzene plume was developed and calibrated for flow and transport conditions at the site using MODFLOW-SURFACT. The model was used to evaluate various design alternatives for pump-and-treat of the contaminant, with predictive sensitivity analysis providing uncertainty bounds on the results. Well locations were constrained to avoid drilling in adjacent ecologically sensitive areas, and well pumping was optimized to meet regulatory requirements within a period of six years of operation. Modeling served as a design guide for the project throughout the multi-year cleanup effort.

Estimation of the Volumes, Mobility, Recoverability, and Natural Depletion of LNAPL Plumes, Papa John's Cardinal Stadium Property, Louisville, Kentucky. Co-principal investigator for estimating product volumes, mobility, recoverability and natural depletion of LNAPL plumes. A GIS based mobility and volume approach was used to model LNAPL plumes in a heterogeneous aquifer setting, using the American Petroleum Institute's LNAPL Distribution and Recovery Model equation in multiple dimensions. Volumes of LNAPL were compared with the mobile volumes and the readily recoverable volumes. Mobility distributions were also evaluated to determine optimal site operations. Recoverability estimates were computed for skimming which was the most effective method at the site.

Flow and Transport Modeling of Trichloroethene (TCE) to Support Remedial and Containment Design, Confidential Client, Goodyear, AZ. Principal investigator for development, calibration, and application of groundwater flow and transport models to evaluate remedial and containment designs for pump and treat systems. The MODFLOW and MT3DMS models were used to evaluate pumping rates and well locations for effective containment, capture, and treatment of the TCE plume under various changes in aquifer recharge, municipal pumping and other operations adjacent to the site. The models are still being used to evaluate the impacts of any major hydrogeological decision at the site and in the vicinity and will be further used to evaluate source zone remediation. The models were developed and applied in an open forum that included technical representatives from stakeholders and regulators and were an important component of the remedial and containment plan.

Development of a Site-Specific Impact to Groundwater Soil Remediation Standard, Confidential Client, Roseland, NJ. Principal investigator for the development of site specific soil standards for TCE underneath the site. A SESOIL vadose zone model with normalized soil loading inputs was used to provide input to an AT123D groundwater flow model at various locations to evaluate cleanup objectives for various depths of vadose zone contamination. The site-specific objectives guided soil clean-up levels and locations required for groundwater compliance.

Flow and Transport Modeling for Massachusetts Military Reservation, U.S. Air Force Center for Environmental Excellence, Cape Cod, MA. Project manager responsible for leading a team of personnel in the development, calibration, and application of MODFLOW-based regional and plume-specific groundwater flow, particle tracking and contaminant transport models for examination of alternative remedial strategies and optimization of pump and treat systems at the site. Managed the development of appropriate modules to MODFLOW for stable solution to drying/re-wetting situations and for analyzing contaminant transport. Also provided support for preparation of presentation materials, and participated in technical and public meetings at this highly visible DOD site.

Peer Review of Modeling for Riverbed Water Quality, Fluor Hanford. Served on expert panel convened to evaluate Hanford groundwater issues related to chromium contamination within the hyporheic zone, groundwater surface water interactions, and modeling. Reviewed required reading materials, participated in a three-day technical workshop, prepared presentations, and reports of findings.

Technical Expertise on Flow and Transport Modeling, U.S. EPA Office of Radiation Programs, Carlsbad, NM. Project scientist for providing flow and transport modeling analyses support for the Waste Isolation Pilot Plant (WIPP) project. Evaluated BRAGFLOW, TOUGH2, MAGNAS, STAFF3D, and SECCO (various flow and transport codes) to analyze multi-phase flow, fracture flow and transport; provided EPA personnel training and expert support on model applications to the WIPP site; conducted independent verification of modeling investigations conducted by Sandia National Laboratory for the Performance Assessment (PA); provided other technical assistance and expertise in reviewing PA reports and models; and provided relevant EPA personnel training in principles and numerical implementation of multiphase and fracture flow and transport models for the subsurface.

Flow and Transport Modeling for Niagara Falls Storage Site, U.S. Army Corps of Engineers, Buffalo District, Buffalo, NY. Technical supervisor for vadose zone and groundwater modeling of radionuclides at the Niagara Falls Storage Site. One-dimensional unsaturated zone flow and transport models were coupled with a three-dimensional groundwater flow and transport model to analyze the fate of various radionuclides originating from the storage facility under various future scenarios. The modeling was conducted to evaluate potential migration to the river.

Flow and Contaminant Transport Investigations, U.S. Air Force Center for Environmental Excellence, Beale Air Force Base, CA. Technical supervisor for groundwater modeling project involving regional and sub-regional model calibration using Data Fusion Modeling (DFM) for flow and contaminant transport investigations within the subsurface and their interactions with adjacent streams periodically backed up by beaver dams. Provided model conceptualization, development and calibration guidance, numerical troubleshooting, report review, and quality control reviews. The model was subsequently used to evaluate site remedial operations.

Groundwater Flow Models using Data Fusion Modeling (DFM), Westinghouse Savannah River Company, Savannah River Site, SC. Project engineer for development of a groundwater flow model using Data Fusion Modeling (DFM) for the A/M Area of the Savannah River Site (SRS). Provided troubleshooting for variably-saturated flow simulations using the finite-element VAM3DF code in conjunction with DFM to calibrate a flow model, quantify its uncertainties, perform transport calibration of source area and strength, and then quantify uncertainty in transport of contaminants using Monte Carlo simulations. The modeling was part of a program aimed at better understanding the radionuclide contamination at the site and associated risk by using all available soft and hard information.

Z-area Flow and Transport Modeling of Containment System Design for Low-level Nuclear Wastes, Westinghouse Savannah River Company, Savannah River Site, SC. Co-investigator involved in performance assessment and migration potential modeling of low-level nuclear waste in the Z-area at the SRS. Performed 2-D cross-sectional and 3-D analyses of potential contaminant fate and transport from a containment system design located in the unsaturated zone above the groundwater system using a finite-element saturated/unsaturated flow and transport code VAM3D. The simulations were aimed at assessing effectiveness of a cap-and-drain system of waste burial above the water table.

Groundwater Flow and Waste Migration Modeling, Westinghouse Hanford Company, Hanford, WA. Principal investigator responsible for conducting modeling studies of the groundwater flow and waste migration in support of RI/FS activities at the 200 West area of the DOE Hanford site. The model was used to evaluate the potential migration of several contaminants at the site. Also provided training and troubleshooting of model applications.

Flow and Transport Model Development, Westinghouse Hanford Company, Hanford, WA. Project engineer involved in modeling the migration of low-level nuclear waste at the Hanford site. Tasks included developing and calibrating local and site wide models to assess the extent of contamination, evaluating proposed cleanup strategies, conceptualizations, and problem setups, and analyzing other regional and local-scale models developed by Hanford personnel. Provided training sessions to Westinghouse Hanford personnel on use of the finite-element saturated/unsaturated flow and transport code, VAM3DCG. Provided guidance and troubleshooting support to personnel applying these models for examining a variety of transport related issues.

Flow and Transport Model Applications, Bechtel Hanford Company, Hanford, WA. Project manager responsible for modeling the migration of low-level nuclear waste at the Hanford site. A site-wide model was developed to assess the extent of contamination and to evaluate proposed cleanup strategies. The transport of tritium, nitrate, iodine-129, carbon tetrachloride, TCE, chloroform, uranium, and technetium-

99 were simulated using VAM3DCG. Model sensitivity was investigated and the transport model was validated using current monitoring well concentrations. A 200-year predictive simulation was performed for all eight contaminants. Two pump-and-treat scenarios were modeled to predict the effect on future contaminant migration.

Multi-phase Modeling of Cleanup and Containment of LNAPLs at a Refinery Site, Confidential Oil Company, CA. Project manager and principal investigator responsible for conducting large-scale 3-D simulations of LNAPL contaminant movement under a refinery site. Tasks involved detailed literature searches and analysis of available data, model development and parameter estimation from various data sources, model simulations for history-matching at different time periods through several years, sensitivity analyses, and development of optimal remediation and containment strategies for free product and dissolved contaminants. The model illustrated that aggressive technologies were not better at removing LNAPL from the silty soils and that containment strategies such as skimming were the more effective.

Saturated/Unsaturated Modeling for Landfill Liner Design, EPA Office of Solid Waste, Washington, D.C. Project engineer. Performed modeling investigations of synthetic and natural landfill liner materials and designs in support of drafting guidelines for landfill liner designs.

Hazardous Waste Identification Rule (HWIR) Modeling Support, U.S. EPA Office of Solid Waste, Washington, D.C. Task manager for RCRA support contract. Responsible for conducting land disposal and oily waste data surveys, developing composite vadose-saturated zone models for performance assessment of landfills and surface impoundments under RCRA subtitles C and D, and conducting modeling analyses and risk assessment support of the Hazardous Waste Identification Rule (HWIR).

Regulatory Modeling Support, U.S. EPA Office of Solid Waste, Washington, D.C. Project engineer. Conducted a quick-response risk evaluation for the Cement Kiln Dust Rule. Conducted several simulations using the EPACMTP code to examine migration through the groundwater pathway for exposure to various metals.

Multiphase Air-Sparging Remedial Modeling, Texaco, Inc. Loma Linda, CA. Project engineer for UST site remediation project. Performed modeling analyses of pilot field study to estimate the outcome of air sparging at a service station. Responsibilities included site data collection and interpretation, multiphase model development and application, and parameter sensitivity analyses. The strategies that were evaluated showed that air sparging could spread contamination to other parts of the aquifer, and sufficient control could not be exerted by the vacuum extraction wells.

Software Development

Co-developer of the MODFLOW 6 Groundwater Flow Model released by the USGS. MODFLOW 6 uses advanced formulations for robust and efficient solution to the groundwater flow equations and includes a robust hydraulic head formulation for density dependent saltwater intrusion evaluations.

Lead Developer of the MODFLOW-USG Groundwater Flow Model, U.S. Geological Survey, Reston, VA. Co-investigator for development of the MODFLOW-USG code which is an enhancement of MODFLOW to use unstructured grids. Version 1 of the code has been released by the USGS in May 2013 with several enhancements planned for version 2 including turbulent fracture flow, contaminant transport, and saltwater intrusion simulation capabilities.

Co-Developer of the MODFLOW-NWT Groundwater Flow Model, U.S. Geological Survey, Reston, VA. Co-investigator for development of the MODFLOW-NWT code which is an enhancement of MODFLOW that overcomes drying and rewetting difficulties of unconfined solutions. The code uses an upstream-weighting formulation with a Newton Raphson linearization and other robust schemes to

provide robust solutions to highly nonlinear problems. MODFLOW-NWT is gaining in popularity since its recent release and is being used throughout the world.

Developer of MODFLOW-SURFACT and MODHMS Codes till 2007, HydroGeoLogic Inc, Reston, VA. Principal Developer of the popular commercial MODFLOW-SURFACT and MODHMS suite of codes from inception through 2007. The USGS groundwater simulation code, MODFLOW, was greatly enhanced to increase functionality and improve simulation capabilities and speed for large, complex problems.

Co-Developer of the HydroGeoSphere Integrated Groundwater, Surface Water Model, U.S. Bureau of Reclamation, Sacramento, CA. Co-investigator for development of the HydroGeoSphere code for physically-based, spatially-distributed modeling of scale-dependent investigations on agricultural plots, small watersheds, and large basins. The code is developed as an extension to the FRAC3DVS model developed at the University of Waterloo. Tasks included working with other developers on definition, design, interface, testing and documentation of surface-water flow and transport modules, and modules for interaction between the subsurface and surface systems.

Development of Multi-Phase, Non-Isothermal Model, U.S. National Science Foundation, Washington, D.C. Principal investigator on SBIR grant for development of CAMFACT, a compositional, multi-phase, non-isothermal model for NAPL contamination and remediation investigations. Tasks included delineation of required functionality and objectives, development of a robust formulation, code development, verification, benchmarking, documentation, and examination of steam injection and venting processes for remediation of LNAPL contaminants. The code handles up to seven component species that exist in one or all of up to three fluid phases in the domain. Robust nodal column assembly schemes for the Jacobian, block Orthomin solution routines, adaptive time-stepping, under relaxation formulas, and orthogonal curvilinear grid geometry were incorporated to enable solutions of field scale problems on workstations or minicomputers.

Development of a 3-D Multiphase Flow and Transport Simulator, Los Alamos National Laboratory, Los Alamos, NM. Project engineer with team for the development of MAGNAS, a 3-D multiphase flow and transport simulator. Involvement included providing input on the governing equations and code structure, coding of non-linear modules, interfacing the solver, finalizing the document, and preparing manuscripts for publication in refereed technical journals.

Development of a Finite-Element 3-D Fracture Flow and Transport Code, Sandia National Laboratory, City, NM. Co-developer of STAFF3D, a finite-element, 3-D fracture flow and transport code. A 3-component decay chain and density dependent flow and transport can be handled by the code. Dual porosity as well as discrete fracture options were provided. Orthogonal curvilinear elements and transition elements were implemented to provide a natural discretization for layered systems, irregular boundaries, and nested grids in regions of interest. Various lattice connectivity options, adaptive time-stepping and under relaxation formulas, and robust Orthomin solution schemes were used in the code to provide efficient solutions to large-scale field problems. The model was benchmarked and a documentation and a user's guide was prepared. The code primarily was developed for Sandia National Laboratories for their investigation of the Yucca Mountain site, NV. Responsibilities included code design, numerical algorithm development, and implementation, benchmarking, and documentation.

3-D Density-Dependent Flow and Transport Code Development, St. Johns River Water Management District, Palatka, FL. Co-developer of DSTRAM, a 3-D density-dependent flow and transport code intended for saltwater intrusion investigations. Responsibilities included code development, verification, validation, benchmarking, and documentation.

Saturated and Unsaturated Zone Flow and Transport Model Development, Westinghouse Savannah River Company, Savannah River Site, SC. (Prior to AMEC) Co-developer of VAM3DCG, a 3-D saturated/unsaturated zone flow and transport model. Implemented state-of-the-art techniques including curvilinear elements, transition elements (for creating nested grids), various lattice connectivity options, Newton-Raphson linearization, and robust Orthomin solution schemes. Rigorously modeled unsaturated zone physical processes such as recharge, evaporation, and plant root uptake. Assisted in algorithm development, coding, benchmarking, and documentation of the model and disseminating the effort through referred technical publications.

Litigation Support

Modeling of PFOA in Groundwater and the Water Distribution System at the Merrimack Valley Water District (MVWD), Merrimack, NH. Testifying Expert Witness in court case concerning Brown et al., v. Saint-Gobain Performance Plastics Corporation and Gwenael Busnel, US District Court of New Hampshire, Civil Action No. 1:16-CV-00242-JL (consolidated). Numerical models were developed to evaluate and simulate transport mechanisms of PFOA released at the Saint-Gobain Performance Plastic (SGPP) facility in Merrimack, New Hampshire, that may have resulted in the presence of PFOA in soil and groundwater in the vicinity of this facility. Conducted evaluation of the soil and groundwater modeling performed at the site by consultants and Plaintiff's Experts to evaluate historical environmental conditions in the water supply system and private groundwater wells. Provided deposition regarding my findings. The case is ongoing.

Intrusion of Saltwater from Cooling Canal Ponds of the Turkey Point Power Plant, Office of Public Counsel, Tallahassee, FL. Testifying Expert Witness in environmental cost recovery hearing (Docket No. 20170007-EI) to the Florida Public Service Commission (FPSC). Florida Power and Light (FPL) operates the Turkey Point Cooling Canal System (CCS) which has contaminated the underlying aquifer with hypersaline water from the CCS. FPL has agreed to implement a process to try and retract the saltwater plume. Evaluated literature and models presented by FPL consultants through the years and conducted modeling simulations to evaluate effectiveness of remedial efforts. Provided written testimony and presented findings to the FPSC.

Impact of Groundwater Pumping on Flow to Rivers and Streams in the Apalachicola, Chattahoochee, Flint (ACF) River Basin, State of Georgia, Atlanta, GA. Expert Witness in a court case concerning State of Florida v. State of Georgia, in the Supreme Court of the United States, Case No. 142, Original. Provided support to Georgia for delineating the impact of pumping within the Basin from weather related impacts to flow at the Florida-Georgia Stateline. Evaluated the weather, streamflow, and hydrogeologic data in the basin and modeled the impact of groundwater pumping on unimpaired flows (UIFs) to the rivers and streams. The UIFs for various pumping and non-pumping cases were also provided to the surface-water testifying expert for calculations that evaluated flow into Florida, considering storage in reservoirs and operations of dams within the Basin regulated by the United States Army Corps of Engineers (USACE). Plaintiff's modeling efforts and investigations were also reviewed and critiqued. Provided three full days of depositions and testified before the Special Master appointed by the Supreme Court. The Supreme Court has ruled in Georgia's favor.

GIS-Based Mobility Modeling for LNAPL at an Oil Terminal Site, BP Products North America, Inc., Green Bay, WI property. Expert witness in court case Tilot Oil, LLC v. BP Products North America, in the United States District Court Eastern District of Wisconsin, Case No. 09-C-0210. Provided two depositions on NAPL mobility modeling that was conducted in a GIS setting to provide NAPL flux estimates across the property boundary of an Oil Terminal site in support of litigation. The American Petroleum Institute's LNAPL Distribution and Recovery Model equation representing multiphase flow of LNAPL was integrated in the vertical direction over the free product thickness and applied spatially in a

GIS environment to provide mobility estimates for free product in an areally distributed manner throughout the area of investigation and specifically, across the property boundary. Plaintiff's modeling efforts were also reviewed and critiqued. The analysis and subsequent report resulted in an undisclosed settlement in the client's favor.

Model Reviews, St Johns River Water Management District, Titusville, Florida. Provided review support for models developed by all parties in this case concerning permit application for pumping from the Area IV well field in Titusville, Florida. MODFLOW and SEAWAT models were developed by the permit applicants and parties opposing the permitted withdrawals. The reviews were provided to allow the District to be unbiased in the permit application process, and to enable the District to defend their position in court.

Training and Support

Workshops and Webinars on Groundwater Flow and Solute Transport Modeling, GSI Environmental and other clients, TX. Provided workshops and webinars on groundwater flow and solute transport modeling to industry and government clients throughout the US. This includes courses with the National Ground Water Association (NGWA), Groundwater Resources Associations of various States (California, Nevada, Arizona), the US Geological Survey, and various commercial developers of Graphical User Interfaces (GUIs) for groundwater models.

MODFLOW-USG Training, Various Clients. Conduct training courses and webinars on fundamentals and application of MODFLOW-USG with various organizations including the California Groundwater Resource Association (GRA), the National Groundwater Association (NGWA), and with developers of commercial interface codes such as Groundwater Vistas, GMS and Visual MODFLOW.

Code Training and Support, HydroGeoLogic Inc, Reston, VA. Provided modeling support and training nationally and internationally, for users of MODHMS, MODFLOW-SURFACT, DSTRAM, STAFF3D, MAGNAS3D and VAM3D.

U.S. EPA Office of Radiation Programs, Carlsbad, NM. Conducted two, week-long training sessions on principles of modeling multiphase flow and transport through porous media, and on the fundamentals of fracture flow and transport.

Washington State University, Pullman, WA. Research and teaching assistant. Assisted in conducting a short course on the application of MOC, MODFLOW, PLASM, and other public domain groundwater flow and transport codes. Conducted classroom, laboratory, and tutorial sessions for first fluid mechanics course (Fundamentals of Fluid Mechanics) for 4 semesters.

University of Delaware, Newark, DE. Research and teaching assistant. Assisted in conducting NATO-ASI (Advanced Study Institute) seminars and short courses on the application of MOC, MODFLOW, PLASM, and other public domain groundwater flow and transport codes. Assisted in conducting short courses on fundamentals of modeling.

INVITED TALKS

Various forums at University of Nebraska, Lincoln, 2019. Provided seminars and guest lectures to Faculty and students in Civil Engineering and Biological Systems Engineering, as well as staff from Nebraska USGS, and from Nebraska Department of Natural Resources at different occasions on various modeling topics.

Groundwater Modelers Forum, "Pushing the Boundaries – New Issues and Applications in Groundwater Modelling," Birmingham, UK. May, 2014

“What’s New in Groundwater Modeling?” NGWA, Pillars of Groundwater Innovation Conference, Phoenix, Arizona, November 2013

MODFLOW and More, International Groundwater Modeling Center, Colorado School of Mines, Golden, Colorado, Technical Committee Member, 2006 to 2024

NGWA Conference, “Modeling for Groundwater Management and Sustainability,” Garden Grove, CA, May, 2012

PUBLICATIONS

“Modeling and Evaluation of PFOS Retention in the Unsaturated Zone above the Water Table”, H. M. Hort, E. B. Stockwell, C. J. Newell, J. Scalia IV, and **S. Panday**, Groundwater Monitoring & Remediation, 2024. doi: 10.1111/gwmr.12662.

“Time Series Analysis of Nonlinear Head Dynamics Using Synthetic Data Generated with a Variably Saturated Model”, M.A. Vonk, R.A. Collenteur, **S. Panday**, F. Shaars, and M. Bakker, Groundwater 2024, doi: 10.1111/gwat.13403.

“MODFLOW as a Configurable Multi-Model Hydrologic Simulator”, C. D. Langevin, J. D. Hughes, A. M. Provost, M. J. Russcher, and **S. Panday**, Groundwater, 2023. doi: 10.1111/gwat.13351.

“Innovative numerical procedure for simulating borehole heat exchangers operation and interpreting thermal response test through MODFLOW-USG code”, S. Barbieri, M. Antelmi, **S. Panday**, M. Baratto, A. Angelotti, L. Alberti, Journal of Hydrology 614, 2022. <https://doi.org/10.1016/j.jhydrol.2022.128556>.

“Simulating Groundwater Interaction with a Surface Water Network Using Connected Linear Networks”, C. Muffels, **S. Panday**, C. Andrews, M. Tonkin, and A. Spiliotopoulos, Groundwater, 60 (6), 2022. <https://doi.org/10.1111/gwat.13202>.

“Performance Analysis of the XMD Matrix Solver Package for MODFLOW-USG”, Ibaraki, M., Y. Zhang, R.G. Niswonger, and **S. Panday**, Groundwater, 59 (6), 2021.

“Simulation of thermal perturbation in groundwater caused by Borehole Heat Exchangers using an adapted CLN package of MODFLOW-USG”, Antelmi M, L Alberti, S Barbieri, **S. Panday**, 2021. Journal of Hydrology, <https://doi.org/10.1016/j.jhydrol.2021.126106>.

“Modeling of groundwater flow and transport in coastal karst aquifers”, N. Kresic, **S. Panday**, Hydrogeology Journal, 2020, <https://doi.org/10.1007/s10040-020-02262-3>.

“Hydraulic-Head Formulation for Density-Dependent Flow and Transport”, C.D. Langevin, **S. Panday**, A.M. Provost, Groundwater, 58(3), 2020, doi: 10:1111/gwat.12967.

“Impact of Local Groundwater Flow Model Errors on Transport and a Practical Solution for the Issue”, **S. Panday**, V. Bedekar and C.D. Langevin, Groundwater, 2017, doi: 10.1111/gwat.12627.

Axisymmetric Modeling Using MODFLOW-USG”, V. Bedekar, L. Scantlebury, **S. Panday**, 2019. Groundwater, 57(5), 772-777.

“Numerical Groundwater Modelling in Karst”, N. Kresic, and **S. Panday**, 2017. Advances in Karst Research: Theory, Fieldwork and Applications (Parise, Gabrovsek, Kaufmann and Ravbar Eds), Geological Society of London, Special Publications, 466, <https://doi.org/10.1144/SP466.12>

“Incorporating the effect of gas in modelling the impact of CBM extraction on regional groundwater systems”, D. Herckenrath, J. Doherty, and **S. Panday**, Journal of Hydrology 523, 587–60, 2015.

“A method for estimating spatially variable seepage and hydraulic conductivity in channels with very mild slopes”, M. Shanafield, R.G. Niswonger, D. E. Prudic, G. Pohll, R. Susfalk and **S. Panday**, Hydrological Processes, DOI: 10.1002/hyp.9545, 2014.

- “MODFLOW-USG version 1: An unstructured grid version of MODFLOW for simulating groundwater flow and tightly coupled processes using a control volume finite-difference formulation”, **Panday, Sorab**, Langevin, C.D., Niswonger, R.G., Ibaraki, Motomu, and Hughes, J.D., U.S. Geological Survey Techniques and Methods, book 6, chap. A45, 66 p, May 2013.
- “Future of Groundwater Modeling”, C. D. Langevin, and **S. Panday**, Invited article for Column Theme: 50th Year Tribute to Modeling: Past, Current, and Future, Groundwater, Vol. 50, No. 3, p. 333-339, doi: 10.1111/j.1745-6584.2012.00937.x, May-June 2012.
- “Improving sub-grid scale accuracy of boundary features in regional finite-difference models”, **S. Panday** and C. D. Langevin, Advances in Water Resources, Volume 41, pages 65-75, June 2012.
- “Dynamic Subtiming-Based Implicit Nonoscillating Scheme for Contaminant Transport Modeling”, Misra, C., S. T. Manikandan, S. M. Bhallamudi, and **S. Panday**, Journal of Hydrologic Engineering, Vol. 17, No. 6, June 1, 2012. ©ASCE, ISSN 1084-0699/2012/6-0-0/\$25.00, 2012.
- “Impact of Sea Level Rise on Groundwater Salinity in a Coastal Community of South Florida”, Guha, H., and **S. Panday**, Journal of the American Water Resources Association 1-19. DOI: 0.1111/j.1752-1688.2011.00630.x, 2012.
- “Approaches to the Simulation of Unconfined Flow and Perched Groundwater Flow in MODFLOW”, Bedekar, V., Niswonger, R. G., Kipp, K., **Panday, S.** and Tonkin, M., Ground Water, 49: no. doi: 10.1111/j.1745-6584.2011.00829.x, 2012.
- “MODFLOW-NWT, A Newton formulation for MODFLOW-2005”. Niswonger, R.G., **S. Panday**, and Ibaraki, Motomu, U.S. Geological Survey Techniques and Methods 6–A37, 44 p. 2011.
- “An Un-Structured Grid Version of MODFLOW”, **Panday, S.**, R.G. Niswonger, C.D. Langevin, M. Ibaraki. MODFLOW and MORE 2011 Conference, Golden, CO. 2011.
- “Local Grid Refinement with an Unstructured Grid Version of MODFLOW”, Langevin C.D., **S. Panday**, R.G. Niswonger, M. Ibaraki, S. Mehl. MODFLOW and MORE 2011 Conference, Golden, CO. 2011.
- “Simulating Dynamic Water Supply Systems in a Fully Integrated Surface–Subsurface Flow and Transport Model.” **S. Panday**, N. Brown, T. Foreman, V. Bedekar, J. Kaur, and P. S. Huyakorn. Vadose Zone Journal. 8: 858-872. Nov. 1 2009.
- “Implicit Subtime Stepping for Solving Nonlinear Flow Equations in an Integrated Surface–Subsurface System.” Young-Jin Park, E. A. Sudicky, **S. Panday**, and G. Matanga. Vadose Zone Journal. 8: 825-836. Nov. 1 2009.
- “A Spatially Distributed Hydroeconomic Model to Assess the Effects of Drought on Land Use, Farm Profits, and Agricultural Employment.” M.P. Maneta, M.O. Torres, W.W. Wallender, S. Vosti, R. Howitt, L. Rodrigues, L.H. Basso and **S. Panday**. Water Resources Research, Vol. 45, W11412, doi:10.1029/2008WR007534. November, 2009.
- “CHyMP Workshop: The Community Hydrologic Modeling Platform.” **S. Panday**. The Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) Conference, Memphis, TN. March 30 – April 1, 2009.
- “Managing Salinity in the Upper Santa Clara River System of California.” Brown, N., B.Louie, F.Guerrero, T.Foreman, **S.Panday**, V.Bedekar, and J.Kaur. Proceedings of the World Environmental and Water Resources Congress 2009: Great Rivers. May 17-21, 2009. Kansas City, Missouri, 2009.
- “Calibration of an Evapotranspiration Model to Simulate Soil Water Dynamics in a Semiarid Rangeland.” M. P. Maneta, S. Schnabel, W. W. Wallender, **S. Panday**, and V. Jetten. Hydrological Processes. 2008.

- "Application of Implicit Sub-time Stepping to Simulate Flow and Transport in Fractured Porous Media." Y.-J. Park, E.A. Sudicky, **S. Panday**, J.F. Sykes, V. Gumanasen. *Advances in Water Resources*. Vol. 31, pp. 995-1003. 2008.
- "MODFLOW SURFACT: A State-of-the-Art Use of Vadose Zone Flow and Transport Equations and Numerical Techniques for Environmental Evaluations." **S. Panday** and P. S. Huyakorn. *Vadose Zone Journal*. Vol. 7, No. 2, pp. 610-631. May 2008.
- "Solubility-limited transport of radionuclides through the unsaturated zone using MODHMS", Scott, M., D. Demarco, **S. Panday**, and E. Evans, *Proceedings of the MODFLOW-2008 Conference*, Golden, Colorado, 2008.
- "Modeling the surface-water groundwater interactions in the Peace River Basin, Florida using MODHMS", Khambhammettu, P., J. Kool, M-S. Tsou, **S. Panday**, M. Beach, *Proceedings of the MODFLOW-2008 Conference*, Golden, Colorado, 2008.
- "Modeling shallow water table evaporation in irrigated regions", Young, C.A. , W.W. Wallender, G. Schoups, G. Fogg, B. Hanson, T.H. Harter, J.W. Hopmans, R. Howitt, T. Hsiao, **S. Panday**, K.K. Tanji, S. Ustin, K. Ward, *Irrigation and Drainage Systems*, 21(2), 119-132, 2007.
- "Sustainability of irrigated agriculture in the San Joaquin Valley, California." Schoups, G., Hopmans, J.W., Young, C.A., Vrugt, J.A., Wallender, W.W., Tanji, K.K., and **Panday, S.** *Proceedings of the National Academy of Sciences of the United States of America*, 2005.
- "On the Challenge of Integrated Surface - Subsurface Flow and Transport Modeling at Multiple Catchment Scales, Innovations and New Frontiers in Hydrologic Modeling." E. A. Sudicky, R. Therrien, Y. J. Park, R. G. McLaren, J. P. Jones, J. M. Lemieux, A. E. Brookfield, D. Colautti, **S. Panday**, and V. Gumanasen. *GSA Annual Meeting*, Salt Lake City, UT, 2005.
- "A Fully Coupled Physically-Based Spatially-Distributed Model for Evaluating Surface/Subsurface Flow." **Panday, S.** and P.S. Huyakorn. *Advances in Water Resources*. Vol. 27, pp. 361 – 382, 2004.
- "Effect of Permeability and Porosity Conditioning on the Prediction of Dense Chlorinated Solvent Migration Patterns in a Highly Characterized Fluvial Aquifer." Maji, R., Sudicky, E.A., **Panday, S.** and Teutsch, G., *Geological Society of America Annual Meeting, Proceedings*, Seattle, Washington, November, 2003.
- "MODFLOW-Based Tools for Simulation of Variable-Density Groundwater Flow." Langevin, C., Oude Essink, G., **Panday, S.**, Bakker, M., Prommer, H., Swain, E., Jones, W., Beach, M., Barcelo, M. *Coastal Aquifer Management-Monitoring, Modeling, and Case Studies*. Cheng, Alexander H.D. and D. Ouazar, CRC Press. 2003.
- "Sub-timing in Fluid Flow and Transport Simulations." Bhallamudi, S. M., **Panday, S.**, and P.S. Huyakorn, *Advances in Water Resources*. Vol. 26, pp. 477 - 489. 2003.
- "Multi-Scale Conjunctive Modeling of Surface and Subsurface Flow." **S. Panday**, *MODFLOW-2003 Conference*, Golden, CO, 2003.
- "Conditional Stochastic Analysis of DNAPL Migration Patterns and Aqueous-phase Plume Transport in a Highly Characterized Fluvial Aquifer." Maji, R., E. A. Sudicky, **S. Panday**, and G. Teutsch. *Proceedings of the MODFLOW-2003 Conference*, Golden, CO, 2003.
- "Simulation of Dissolution and Vapor Partitioning from LNAPL using a MODFLOW-Compatible Transport Code." Young, S. C., T. Budge, **S. Panday**, D. Van Winkle, D. Huntley, and R. Frank. *Proceedings of the MODFLOW-2003 Conference*, Golden, CO, 2003.
- "Surface/Subsurface Modeling of Western Orange and Seminole Counties of Florida." Jones, W., **S. Panday**, S. Frost, and B. McGurk. *Proceedings of the MODFLOW-2003 Conference*, Golden, CO, 2003.

- "Comparisons of Linked and Fully Coupled Approaches to Simulating Conjunctive Surface/Subsurface Flow and Their Interactions." Fairbanks, J., **S. Panday**, and P.S. Huyakorn, Proceedings of the MODFLOW-2001 Conference, Golden, CO, 2001.
- "Rigorous Coupling of Surface Water and Vadose Zone Flow with MODFLOW." **Panday, S.**, and P.S. Huyakorn. Proceedings of the MODFLOW-98 Conference, Golden, CO, 1998.
- "A Comprehensive Three-Dimensional Numerical Model for Predicting the Transport and Fate of Petroleum Hydrocarbons in the Subsurface." Huyakorn, P.S., Y.S. Wu, and **S. Panday**, Proceedings of the Petroleum Hydrocarbons and Organic Chemicals in Groundwater Conference, Houston, TX, 1992.
- "Air Sparging: A case study in characterization, field testing, and modeling design." Beckett, G.D., D. Huntley, and **S. Panday**. Proceedings of the Petroleum Hydrocarbons and Organic Chemicals in Groundwater: Prevention, Detection and Remediation Conference and Exposition, Houston, TX, 1995.
- "A Mathematical Model of Ground Movement Due to Thaw Action in Unsaturated Soils." Corapcioglu, M.Y., and **S. Panday**. Proceedings of the Fourth International Symposium on Ground Freezing, Sapporo, Japan, 1985.
- "Thawing in Permafrost - Simulation and Verification." Corapcioglu, M.Y., and **Panday, S.** Proceedings of the Fifth International Conference on Permafrost, Trondheim, Norway, 1988.
- "Sensitivity of a Thaw Model to Various Frozen Soil Parameters." Corapcioglu, M.Y., and **Panday, S.** Proceedings of the Fifth International Symposium on Ground Freezing, Nottingham, England, 1988.
- "MODFLOW Enhancements for Robust, Reliable Simulations of Complex Environmental Flow and Contaminant Transport Situations." **Panday, S.**, and P.S. Huyakorn. Advances in Porous Media. Corapcioglu, M.Y. Volume 4, pp. 1-84, 2001.
- "DSTRAM - Density-dependent Subsurface Transport Analysis Model." Huyakorn, P.S., and **Panday, S.** Sea Water Intrusion in Coastal Aquifers - Concepts, Methods and Practices. J. Bear, A. H-D. Cheng, S. Sorek, I. Herrera, and D. Ouazar, Kluwer Academic Publishers, Chapter 10. pp. 407-409, 1999.
- "A Composite Numerical Model for Assessing Subsurface Transport of Oily Wastes and Chemical Constituents." **Panday, S.**, Wu, Y.S., Huyakorn, P.S., Wade, S.C. and Saleem, Z.A. Journal of Contaminant Hydrology. Vol. 25, pp. 36-62, 1997.
- "Considerations for Robust Compositional Simulations of Subsurface NAPL Contamination and Remediation." **Panday, S.**, Forsyth, P.A., Falt, R.W., Wu, Y.S., and Huyakorn, P.S. Water Resources Research. Vol. 31, No. 5, pp. 1273-1289, 1995.
- "Multiphase Approach to Thaw Subsidence of Unsaturated Frozen Soils: Equation Development." **Panday, S.**, and Corapcioglu, M.Y. Journal of Engineering Mechanics. Vol. 123, No. 3, pp. 448-459, 1995.
- "Solution and Evaluation of Permafrost Thaw-Subsidence Model." **Panday, S.**, and Corapcioglu, M. Y. Journal of Engineering Mechanics. Vol. 121, No. 3, pp. 460-471, 1995.
- "A Three-Dimensional Multiphase Flow Model for Assessing NAPL Contamination in Porous and Fractured Media: I Formulation." Huyakorn, P.S., **Panday, S.** and Wu, Y.S. Journal of Contaminant Hydrology. Vol. 16, pp. 109-130, 1994.
- "A Three-Dimensional Multiphase Flow Model for Assessing NAPL Contamination in Porous and Fractured Media: II Porous Medium Simulation Examples." **Panday, S.**, Wu, Y.S., Huyakorn, P.S., Springer, E.P. Journal of Contaminant Hydrology. Vol. 16, pp.131-156, 1994.

- "Theory of Phase-Separate Multicomponent Contaminant Transport in Frozen Soils." **Panday, S.**, and Corapcioglu, M.Y. Journal of Contaminant Hydrology. Vol. 16, pp. 235-269, 1994
- "Improved Three-Dimensional Finite Element Techniques for Field Simulation of Variably Saturated Flow and Transport." **Panday, S.**, Huyakorn, P.S., Therrien, R., Nichols, R.L. Journal of Contaminant Hydrology, Vol. 12, pp. 3-33, 1993.
- "Simulation of Hydrocarbon Spills in Permafrost." Corapcioglu, M.Y., and **Panday, S.** Permafrost. Vol.1, pp.100-104, 1993.
- "Compositional Multiphase Flow Models." Corapcioglu, M.Y. and **S. Panday.** Advances in Porous Media. M. Y. Corapcioglu Vol. 1, pp. 1-59, 1991.
- "Numerical Analysis of the Effects of Groundwater Development in the Geneva Area, Seminole County, Florida." **Panday, S.**, P.S. Huyakorn, J.B. Robertson, B. McGurk. Journal of Contaminant Hydrology. Vol. 12, pp. 329-354, 1991.
- "Solute Rejection in Freezing Saline Soils." **Panday, S.** and M.Y. Corapcioglu. Water Resources Research. Vol. 27, No. 1, p. 99-108, 1991.
- "A FORTRAN Microcomputer Program for Heat and Mass Transfer in Frozen Soils." **Panday, S.** and M.Y. Corapcioglu. Computers and Geosciences. Vol 15, No. 5, pp. 709-726, 1989.
- "Reservoir Transport Equations by Compositional Approach." **Panday, S.** and M.Y. Corapcioglu. Transport in Porous Media. Vol. 4, pp. 369-393, 1989.
- "Fundamental Equations for Transport Processes in Storage Reservoirs." Corapcioglu, M.Y., and **S. Panday**, Underground Storage of Natural Gas Theory and Practice, edited by M.R. Tek, Kluwer Academic Publishers, Proceedings of the NATO Advanced Study Institute, Ankara, Turkey, 2-10 May 1988.

PROFESSIONAL BACKGROUND

Research Professor, University of Nebraska-Lincoln, Lincoln, Nebraska, 2019-Present
Principal Engineer, GSI Environmental Inc., Herndon, Virginia, 2014-Present
Principal Engineer, AMEC Environment & Infrastructure, Herndon, Virginia, 2008-2013
Principal Engineer, Geomatrix Consultants, Inc., Herndon, Virginia, 2007-2008
Vice President R&D, HydroGeoLogic, Inc., Herndon, Virginia, 1989-2007



Hiroko Hort, PhD, PE

Senior Engineer

Education

PhD, Environmental
Science, The Ohio State
University, 2018
MS, Hydrologic Science and
Engineering, Colorado
School of Mines, 2013
BE, Chemical Engineering,
Tokyo University of
Agriculture and
Technology, Japan, 2011

Licenses/Certifications

Professional Engineer
(Civil), California No.
94557
EXP: 03/31/2027

Contact

E: hmhort@gsienv.com
O: 949.892.5279
C: 720.273.6364

Dr. Hort is an environmental engineer with GSI Environmental Inc. She has broad experience with environmental data analysis, computational groundwater modeling, infectious disease modeling, and soil/hydraulic property characterization.

Her experience in numerical modeling includes calibration of a coupled surface (HSPF) and groundwater (MODFLOW) model for water resources management using parameter estimation and uncertainty analysis software (PEST), estimation of basin safe yield using IWFM, development of a multiphase transport model in saline aquifers for a deep geological carbon sequestration project using TOUGH2, support the development of PHT-USG which is a coupled model of USG-Transport and PHREEQC, assessment of saltwater and freshwater mixing in stratified aquifer formation using density-dependent model, and estimation of the residence time of groundwater from land use/replenishment changes using couple surface-groundwater model (GETFLOWS). She also worked at Los Alamos National Laboratory between her M.S. and Ph.D. to investigate the integrity of rock samples and well casing to determine the sealing capacity in sequestration and fracture propagation shale gas development using a triaxial core flood system.

Furthermore, she has been supporting many environmental integrations that require data fusion, geostatistical analysis, and machine learning. Her recent work includes PFAS fate and transport modeling in the vadose zone to evaluate PFAS retention at the air-water interface, as well as groundwater modeling studies addressing PFAS. She also serves as a Board Member of the Groundwater Resources Association of California (GRA), contributing to the professional collaboration of groundwater resources management in California. She has multiple publications in peer-review journals and presentations at scientific conferences.

PROJECT EXPERIENCE

Groundwater Augmentation, Groundwater Collection System, and New Wells Site Study, Long Beach Utility Department, California USA.

Developed a simulation optimization framework that identifies optimal groundwater injection and extraction locations within a complex urban aquifer system. The analysis evaluates the number, location, and depth of wells required to achieve specified injection and extraction wells while minimizing total implementation cost and satisfying site-specific constraints.

Regional Brackish Water Reclamation Program – Phase I, Water Replenishment District, California USA.

Supported the development of local groundwater flow and transport to evaluate groundwater extraction schemes to contain the chloride plume and provide simulated influent water chloride concentrations for a planned

expansion at the desalter plant. Conducted a transfer function noise analysis to improve the model parameterization.

Hydrogeologic Conceptual Model Dominguez Gap Barrier Project – Inland Injection Well Siting Project, Water Replenishment District, California USA. Wrote a python program to investigate the optimal recycled water injection location and amount using the Artificial Bee Colony algorithm, which is based on a meta-heuristics optimization. An existing groundwater model was implemented as part of this algorithm to simulate the impacts of recycled water injections to test its interference with water level at the seawater barrier, groundwater flow directions and magnitude at injection sites, and to meet the requirements of 6-months residence time.

Hydrogeologic Conceptual Model Services, Eastern Municipal Water District, California USA. Reviewed and analyzed of lithology, aquifer geometry, and hydrostratigraphic relationships within the San Jacinto Groundwater Basin to update the hydrogeologic conceptual model to support future groundwater development projects.

Clustering and Super Hydrograph Informed Groundwater Data Analysis, Eastern Municipal Water District, California USA. Conducted a clustering and super-hydrograph-informed groundwater elevation analysis for the San Jacinto Groundwater Basin. Groundwater time-series data were transformed into similarity metrics and grouped using unsupervised machine learning techniques to identify monitoring wells exhibiting similar temporal behavior. The analysis was used to develop calibration targets for future groundwater model updates and inform optimization of the groundwater monitoring network.

Conceptual Master Plan for Subsidence Monitoring and Management for the Delta-Mendota Subbasin. San Luis and Delta Mendota Canal Water Authority, California. Prepared subsidence characterization and feasibility study of the Delta-Mendota Subbasin by conducting data compilation, analysis, and evaluation.

Two PFAS Remediation Models for Understanding and Managing PFAS in the Saturated Zone, Environmental Security Technology Certification Program, Department of War. Supported the development of REMFluor-MD, a groundwater fate and transport model specifically designed for per- and polyfluoroalkyl substances (PFAS), leveraging existing code, user interfaces, and the latest scientific understanding of PFAS fate and transport to support effective remediation decision-making at PFAS-impacted sites.

Water Resources Optimization Consulting, Tampa Bay Water, Tampa, Florida USA. For the integrated Northern Tampa Bay (INTB) region, Dr. Hort has been supporting calibration of the Integrated Hydrologic Model (IHM). The project team has calibrated the model manually and analyzed parameter uncertainty with PEST. The team is starting to apply this recalibrated model and new Monte Carlo rainfall realizations to update the Unit Response Matrix (URM). Tampa Bay Water will use the recalibrated IHM and URM analysis to support decision-making and evaluation of water resources and future water demand in the area.

Integration of the Reactive Transport Capabilities of PHREEQC into MODFLOW-USG. Navarro Research and Engineering, Colorado USA. Supported the team by evaluating the developed PHT-USG and preparing the guidance document and tutorial example problems for the users. PHT-USG is a software coupled USG-transport code that solves for flow and transport of heat and solute species using an unstructured grid with PHREEQC, the U.S. Geological Survey geochemical code for the quantification of reactive processes. The developed PHT-USG was compared to the existing geochemical model

PHT3D which is coupled with MT3DMS and PHREEQC to verify the integration of the code is done appropriately.

Engineering and Consulting Service for Caliche Carbon Capture Storage Class VI Permit Application, Texas.

Conducted multi-phase and geochemical modeling to understand the behavior of CO₂ in subsurface formation for the permit application of Class VI wells. Explored the risks of geomechanical failures of formation and identified potential leakage of CO₂. Dr. Hort also assisted in the preparation and submission of area of review multiphase computational modeling report and testing and monitoring plan.

Applicability Comparison of Two Commonly Used Modeling Systems for Simulating PFAS Fate and Transport, Air Force Civil Engineering Center.

Contributed to the development of MODFLOW-USGT-PFAS by investigating the existing study of PFAS fate and transport model in vadose zone. Examined previous studies on PFAS retention and collected parameters employed in the existing model/experiments for PFAS retention in a 1D column. These parameters were used for the validation process of the model development.

Gas Sparging Directly In Aquifers to Remove or Sequester PFAS, Strategic Environmental Research and Development Program (SERDP) ER22-3221.

Conducted the numerical modeling of PFAS fate and transport to examine the PFAS retention in the air-water interface using MODFLOW-USGT-PFAS. The multiple scenarios of different recharge rates and water level fluctuations were explored to study how they affect the total mass discharge and retention time of PFAS.

SELECTED PUBLICATIONS

Hort, H.M*, Robinson, C.E., Sawyer, A.H., Li, Y., Cardoso, R., Lee, S.A., Roff, D., Adamson, D.T. and Newell, C.J. (2024), Conceptualizing Controlling Factors for PFAS Salting Out in Groundwater Discharge Zones Along Sandy Beaches. Groundwater. <https://doi.org/10.1111/gwat.13428>

Hort, H.M*, Stockwell, E.B., Newell, C.J., Scalia, J., IV and Panday, S. (2024), Modeling and Evaluation of PFOS Retention in the Unsaturated Zone above the Water Table. Groundwater Monit R. <https://doi.org/10.1111/gwmr.12662>

Mok, C.M., Carrera, B., **Hort, H***, Santi, L., Daus, A., Panday, S., Jones, D., Partington, B. and Ferguson, E. (2023), Simulation-Optimization Approach for Siting Injection Wells in Urban Area with Complex Hydrogeology. Groundwater. <https://doi.org/10.1111/gwat.13317>

Hort, H*, Ibaraki, M., Schwartz, F. (2022). Temporal and Spatial Synchronicity in West Nile virus Cases along the Central Flyway, USA. GeoHealth, 7(5), e2022GH000708.

PROFESSIONAL BACKGROUND

Engineer, GSI Environmental Inc., Irvine, California, 2019-present

Post-master Student, Los Alamos National Laboratory, Los Alamos, NM, 2013-2014

TABLE 1
GSI Environmental Inc.

FEE

SCHEDULE

Effective
January 2026

P E R S O N N E L	H O U R L Y R A T E
Project Assistant	\$115
Project Associate	\$125
Accounting Specialist.....	\$145
Researcher	\$180
Environmental Technician	\$115
Senior Environmental Technician	\$135
CADD/Graphics Specialist.....	\$150
Construction Manager, Project Controls Specialist	\$225
GIS Specialist, Senior Data Scientist, Senior Researcher	\$200 - \$250
Engineer/Scientist/Geologist I.....	\$150 - \$165
Engineer/Scientist/Geologist II.....	\$170 - \$185
Engineer/Scientist/Geologist III.....	\$190 - \$210
Engineer/Scientist/Geologist IV	\$215 - \$230
Senior Engineer/Scientist/Geologist I	\$235 - \$255
Senior Engineer/Scientist/Geologist II	\$260 - \$280
Senior Associate.....	\$285 - \$350
Principal	\$300 - \$600
Communications Fee.....	4% of personnel costs

E Q U I P M E N T

Field Vehicle	\$150/day
Standard Sampling and Field Equipment	\$100/day
Photoionization Detector (PID).....	\$120/day
Portable Generator	\$100/day
Soil Vapor / Air Sampling Consumables.....	\$25/sample
Soil Vapor Sampling Equipment	\$150/day
Helium Shroud	\$500/day
Low-Flow Sampling Instrumentation.....	\$120/day
Submersible Pump	\$220/day
Sampling Pumps.....	\$100/day
Trimble T10/R1 Precision GPS Unit	\$175/day
QNOPY Field Software.....	\$100/day
Level C Personal Protective Equipment.....	\$45/person/day
Level D Personal Protective Equipment	\$30/person/day
Portable GC/MS.....	\$1,100/day
Rental Equipment Cost.....	cost + 15%

O T H E R E X P E N S E S

Outside Subcontractor Services	cost + 15%
Miscellaneous Expense (Travel, Shipping, Supplies, etc.).....	cost + 15%
Mileage - Private Vehicles (subject to change in accordance with IRS adjustments)	\$0.70/mile
Specialized Computer Hardware and Software Applications	\$35/hour
Insurance Certificates Cost (Specific Endorsements and/or Waiver of Subrogation)	cost + 15%

P A Y M E N T

All invoices are due and payable within 30 days of the billing date. Attorney fees, court costs, and other related expenses incurred in the collection of delinquent accounts will be paid by the client. A charge of 1.5 percent per month applies to delinquent bills.

This fee schedule applies to services rendered in 2026. Charges for all services in subsequent years will be based on a new fee schedule effective January 1 of that year.

EXHIBIT M

Emily Madueno

From: Bryan Bondy <Bryan@BondyGroundwater.com>
Sent: Monday, October 12, 2026 4:57 PM
To: Emily Madueno
Cc: Jim Worth; Doug Evertz; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com); Jeffrey V. Dunn; Alison K. Toivola (alison.toivola@bbklaw.com); dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com); kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com); Keith Lemieux; Alex Lemieux; Phillip Hall; Coleman, Judith (ENRD); Alexa Penalosa
Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate
Attachments: Bondy Groundwater - IWW Special Master Submittal 10-12-2026.pdf

Dear Emily,

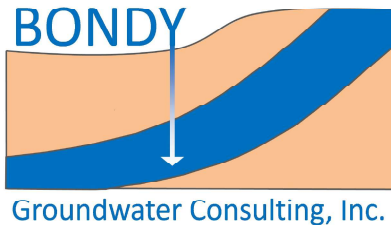
Thank you for sending the information request. Please see attached for my submittal.

Thank you for considering my firm for the Special Master role.

Best Regards,

--

Bryan Bondy, PG, CHG
Bondy Groundwater Consulting Inc.
805-212-0484
bryan@bondygroundwater.com



From: Emily Madueno <emadueno@murphyevertz.com>
Sent: Monday, October 5, 2026 1:14 PM
To: Bryan Bondy <Bryan@BondyGroundwater.com>
Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>
Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Dear Bryan,

On behalf of all the parties, we enjoyed speaking with you earlier today.

As mentioned during our meeting, please:

1. Provide a proposed rate sheet;
2. Provide the name(s) of anyone who may provide substantive assistance to you on this assignment;
3. Provide a copy of your CV, together with the CV(s) of anyone who will assist you substantively; and
4. Identify any parties, attorneys, or witnesses on the attached list with whom you have worked previously, including a very brief statement of the matter on which you worked.

We look forward to hearing from you within the next week with the information requested above. We would appreciate receiving the information by Monday, October 12th.

Thank you again for taking the time to meet with us.

Best regards,
Emily

Emily L. Madueno

Partner

650 Town Center Drive • Suite 550 • Costa Mesa, CA 92626

Voice: (714) 277-1707 | Fax: (714) 277-1777 | Mobile: (661) 618-0522

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recipient, please delete the e-mail and any attachments without reading, printing, copying, or forwarding it, and please notify us.

From: Bryan Bondy <Bryan@BondyGroundwater.com>
Sent: Friday, September 25, 2026 10:43 AM
To: Emily Madueno <emadueno@murphyevertz.com>
Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Hello again Emily. My apologies but there is a change in my availability for Thurs. 10/1. The revised availability is 2-3pm on that day. Thank you.

From: Bryan Bondy
Sent: Friday, September 25, 2026 8:05 AM
To: 'Emily Madueno' <emadueno@murphyevertz.com>
Cc: Jim Worth <jjim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>
Subject: RE: Indian Wells Valley Adjudication - Special Master Candidate

Hello Emily,

Thank you for reaching out.

This sounds like an interesting opportunity. I am interested in discussing further.

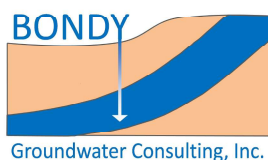
I am available as follows:

Tues. 9/29: afternoon
Wed. 9/30: 2:30-3:30 pm
Thurs. 10/1: 10-3pm
Mon. 10/5: 10 am – 5pm
Tues. 10/6: 11 am – 1pm
Wed. 10/7: 9 am - noon

Best Regards,

--

Bryan Bondy, PG, CHG
Bondy Groundwater Consulting Inc.
bryan@bondygroundwater.com



From: Emily Madueno <emadueno@murphyevertz.com>

Sent: Thursday, September 24, 2026 1:30 PM

To: Bryan Bondy <Bryan@BondyGroundwater.com>

Cc: Jim Worth <jim@mhwslegal.com>; Doug Evertz <Devertz@murphyevertz.com>; Eric Garner - Best Best & Krieger LLP (eric.garner@bbklaw.com) <eric.garner@bbklaw.com>; Jeffrey V. Dunn <jeffrey.dunn@bbklaw.com>; Alison K. Toivola (alison.toivola@bbklaw.com) <alison.toivola@bbklaw.com>; dhoffman@fennemorelaw.com; shood@fennemorelaw.com; James L. Markman - Richards, Watson & Gershon (jmarkman@rwglaw.com) <jmarkman@rwglaw.com>; kbrochard@rwglaw.com; Jacob C. Metz - Richards, Watson & Gershon (jmetz@rwglaw.com) <jmetz@rwglaw.com>; Keith Lemieux <klemieux@awattorneys.com>; Alex Lemieux <alemieux@awattorneys.com>; Phillip Hall <phall@awattorneys.com>; Coleman, Judith (ENRD) <Judith.Coleman@usdoj.gov>; Alexa Penalosa <alexa.penalosa@usdoj.gov>

Subject: Indian Wells Valley Adjudication - Special Master Candidate

Dear Mr. Bondy:

Our firm represents a party to the Indian Wells Valley Groundwater Basin adjudication, which is currently pending in Orange County Superior Court. A second phase of trial on safe yield was held in June 2026.

At the conclusion of the phase 2 trial, the Court informed the parties that it intends to appoint a special master. The Court would like the special master to make a written recommendation of his or her best estimate of the basin's safe yield based on the trial record.

We are reaching out to you as a possible candidate to serve as the court-appointed special master.

The parties would like to meet with you to explore your interest in the appointment and your availability to take on the assignment. Please let us know your availability for a Zoom/Teams meeting during the weeks of September 28th or October 5th if you are interested in the assignment.

Thank you, and we look forward to hearing from you.

Best regards,
Emily

Emily L. Madueno

Partner

650 Town Center Drive • Suite 550 • Costa Mesa, CA 92626

Voice: (714) 277-1707 | Fax: (714) 277-1777 | Mobile: (661) 618-0522

www.MurphyEvertz.com

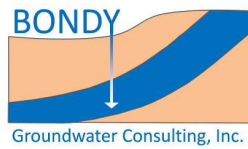
MURPHY & EVERTZ

A t t o r n e y s a t L a w



CONFIDENTIAL: Murphy & Evertz

This e-mail is sent by a law firm and may contain information that is privileged or confidential. If you are not the intended recipient, please delete the e-mail and any attachments without reading, printing, copying, or forwarding it, and please notify us.



California Professional Geologist License No. 7676
California Certified Hydrogeologist No. 821

October 12, 2026

Bryan Bondy, President
Bondy Groundwater Consulting, Inc.
10488 Graham Ct.
Ventura, CA 93004

Counsel For The Parties
c/o Emily L. Madueno, Partner
Murphy & Evertz
650 Town Center Drive, Suite 550
Costa Mesa, CA 92626

RE: Bondy Groundwater Consulting, Inc. Submittal for Special Master
Mojave Pistachios, LLC; et al. v. Indian Wells Valley Water District; et al.
Case No. 30-2021-01187275-CU-OR-CJC

Dear Counsel:

Thank you for considering my firm for the Special Master role in the above-referenced case.

If appointed, I may be assisted by GSI Water Solutions Inc. under an existing mutual services agreement between our firms. GSI Water Solutions Inc. and I have a longstanding working relationship and have completed numerous projects together over the past decade. I may utilize GSI Water Solutions Inc.'s staff in two primary ways. First, they may assist with inventorying, organizing, and summarizing the expert reports to streamline my review and evaluation. Second, I may have GSI Water Solutions Inc. staff assist me with reviewing and evaluating numerical models relied upon by experts, particularly if I determine that it is necessary to review model files or run the models to prepare my opinion. Using GSI Water Solutions Inc.'s staff at lower labor rates can help reduce the overall project cost and will help shorten the schedule. Mr. Tim Thompson will serve as GSI Water Solutions Inc.'s Principal in Charge. Mr. Thompson and I have a history of working together on projects and he will work closely with me to ensure the appropriate staff are assigned to support my work.

The remainder of this letter addresses the items requested in your email dated October 5, 2026:

1. Proposed rate sheets:

Please see Enclosure No. 1.

2. Provide the name(s) of anyone who may provide substantive assistance to you on this assignment:

GSI Water Solutions Inc. staff that may support me include Tim Thompson, Andreas Lapostol, Tim Nicely, and Ailco Wolf.

3. Provide a copy of your CV, together with the CV(s) of anyone who will assist you substantively:

Please see Enclosure No. 2

4. Identify any parties, attorneys, or witnesses on the attached list with whom you have worked previously, including a very brief statement of the matter on which you worked:

Parties: None

Attorneys:

- *Aleshire & Wynder, LLP:*

Upper Ventura River Groundwater Agency is a common client. Keith Lemieux serves as General Counsel, and I serve as the contract Executive Director. Alex Lemieux and Phillip W. Hall have also assisted Keith Lemieux on this matter.

Similarly, GSI Water Solutions, Inc. and Aleshire & Wynder, LLP (Phillip Hall) have Santa Ynez River Valley Groundwater Basin Eastern Management Area as a common client.

- *Best Best & Krieger LLP:*

I am a retained expert consultant on a confidential matter. I have interfaced with all four attorneys listed (Eric L. Garner, Jeffrey V. Dunn, Wendy Y. Wang, Alison K. Toivola) on this matter.

- *Richards Watson & Gershon:*

GSI Water Solutions, Inc. provided expert witness services for unlisted attorneys at this firm in a matter involving the City of Solvang.

Witnesses:

- *Anthony Brown of Aquilogic Inc.:*

Aquilogic, Inc. and my firm are both retained by the same law firm in a confidential matter.

I also serve alongside Dr. Bob Abrams of Aquilogic, Inc. on two technical committees that operate pursuant to the Las Posas Valley Basin Judgment. We represent different clients on those committees.

- *Stephen Johnson, P.E., of Stetson Engineers Inc.:*

Tim Thompson of GSI Water Solutions, Inc. collaborated with Mr. Johnson on several projects approximately a decade ago.

- *Lauren Wicks, PG, of Geoscience Support Services, Inc:*

Geoscience and I were both retained by the same law firm during the Las Posas Valley Basin adjudication. Dennis Williams was a designated expert, and I served as an expert consultant.

I serve on the Technical Review Panel for the Cadiz Project, which is responsible for reviewing implementation of the monitoring and contingency plan for the Project, which is currently performed by Geoscience.

Please feel free to contact me with any questions on my submittal.

Thank you again for considering my firm for the special master role.

Sincerely,

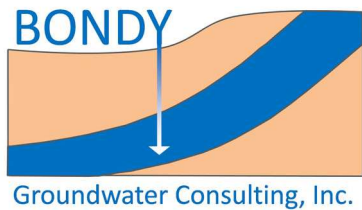


Bryan Bondy, President
Bondy Groundwater Consulting, Inc.

Enclosures:

(1) Rate Sheets

(2) CVs



Schedule of Fees

For

Special Master

Mojave Pistachios, LLC; et al. v. Indian Wells Valley Water District; et al.

Case No. 30-2021-01187275-CU-OR-CJC

Professional Hydrogeologic Services:	\$300/hour
Vehicle Mileage:	IRS Rate
Expenses:	Cost Plus 10%

Notes:

Labor rate is effective through 12/31/2026. Labor rate will increase on January 1 each year in accordance with LA CPI.

The hourly rate for providing testimony at depositions and court proceedings will be 1.5 and 2.0 times the base hourly rate, respectively.



2027 GSI Fee Schedule

Labor Category	Hourly Rate
Technical Professionals	
Principal II	\$305 – \$375
Principal I	\$280 – \$335
Senior Managing II	\$250 – \$320
Senior Managing I	\$225 – \$260
Managing II	\$195 – \$230
Managing I	\$185 – \$215
Senior Project II	\$175 – \$205
Senior Project I	\$165 – \$195
Project II	\$155 – \$185
Project I	\$145 – \$175
Staff II	\$135 – \$165
Staff I	\$125 – \$155
Other Services	
GIS/Graphics/Database	\$135 – \$190
Editor/Documents	\$135 – \$165
Administration	\$100 – \$135

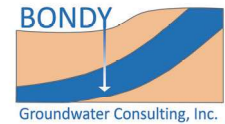
The hourly rate for trial preparation and expert witness testimony is 1.5 times the standard billing rate shown above.

Expenses

- **Mileage:** IRS authorized rate/mile plus 10 percent markup
- **Direct expenses and outside services:** Cost plus 10 percent markup
- **Enterprise GIS:** \$100 per month for the duration of use

**Hourly rates are subject to annual increases on the contract anniversary date.*

Bryan Bondy, PG, CHG
Bondy Groundwater Consulting, Inc.



YEARS OF EXPERIENCE: 30

EDUCATION

- MS, Geological Sciences (Hydrogeology)
San Diego State University
- BS, Geological Sciences (Hydrogeology)
San Diego State University
- GIS Certification
Mt. San Jacinto Junior College

ACADEMIC HONORS

- Summa Cum Laude
- Member - Phi Kappa Phi Honor Society
- Member - Phi Beta Kappa Honor Society
- Graduate of the Year Award

PROFESSIONAL REGISTRATIONS

- Professional Geologist, CA No. 7676
- Certified Hydrogeologist, CA No. 821

PROFESSIONAL HISTORY

2016- Present	President, Bondy Groundwater Consulting, Inc., Ventura County, CA
	Groundwater Manager
2012- 2016	Calleguas Municipal Water District Ventura County, CA & Freelance Hydrogeologist
2009- 2012	Senior Hydrogeologist United Water Conservation District Ventura County, CA
2005- 2009	Principal Hydrogeologist Aqui-Ver, Inc., Temecula, CA
2000- 2005	Senior Hydrogeologist Kleinfelder, Inc., Temecula, CA
1996- 2000	Staff Hydrogeologist Hargis + Assoc., Inc, San Diego, CA

PROFESSIONAL HONORS

- Fox Canyon Groundwater Management
Agency Groundwater Stewardship Award
- Kleinfelder, Inc. President's Award for
Exceptional Client Service



Bryan has 30 years of private and public sector experience conducting a wide range of groundwater projects in California, including groundwater basin studies, groundwater modeling, Sustainable Groundwater Management Act (SGMA) planning, technical advisory and peer review roles, groundwater monitoring, and water well design and construction management. Bryan has assisted clients on groundwater projects in over twenty-five

different California groundwater basins in various capacities. Bryan has performed peer reviews, served on technical advisory committees, and has provided expert consultant services in groundwater litigation cases. In 2022, Bryan was appointed by Judge Peter Kirwan to serve as Technical Advisor to the Santa Clara Superior Court in the Santa Maria Groundwater Litigation Case, the first ever appointment of a technical advisor in a groundwater litigation case in California. Bryan serves as the executive director of two Groundwater Sustainability Agencies (GSAs) and advises landowner groups on SGMA issues in eight other basins. Bryan serves on the Santa Paula Basin Pumpers Association Board of Directors and previously Chaired the City of Ventura Water Commission.

SELECTED REPRESENTATIVE EXPERIENCE

Court Appointed Technical Advisor, Santa Clara Superior Court, Santa Maria Groundwater Litigation Case No. 1-97-CV-770214.

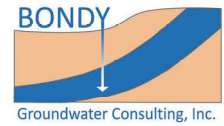
In 2022, Bryan was appointed by Judge Peter Kirwan to serve as Technical Advisor to the Santa Clara Superior Court in the Santa Maria Groundwater Litigation Case. This was the first appointment of a technical advisor in a groundwater rights case in California history.

Expert Consultant, Las Posas Valley Basin Adjudication. Bryan was a designated expert for the phase three trial and served as the client's expert on a court-approved expert panel during phase one mediation. Bryan also performed peer review of expert reports and provided deposition testimony for the phase one trial.

Litigation Support, Antelope Valley Adjudication. Bryan peer reviewed expert reports concerning the safe yield of the basin and assisted a designated expert with the safe yield determination.

Litigation Support, Kern Fan Water Bank Litigation Case. Bryan assisted a designated expert with the review and comparison of two competing groundwater models constructed by others. Through Bryan's careful evaluation of the models' water budget outputs, he was able to identify key differences in the model assumptions that explained why the models provided very different answers.

Bryan Bondy, PG, CHG
Bondy Groundwater Consulting, Inc.



Expert Consultant, Goleta Water District v. Slippery Rock Ranch. Bryan was retained, but not disclosed, to peer review the designated expert's work and provide PMK deposition testimony.

Expert Consultant, Contaminant Plume and Remediation Case, Confidential Client, California. Bryan was retained as an expert consultant by a municipal entity's legal counsel to review alleged impacts from the client's wastewater plant discharge operations on the migration of contaminant plumes and remediation efforts at a nearby Superfund (CERCLA) site. The matter is currently awaiting a hearing before the State Water Resources Control Board and may be litigated.

Litigation Support, Confidential Client, Riverside, California. Bryan constructed a groundwater flow model to evaluate the capture zone and groundwater flow paths in the vicinity of a Santa Ana Watershed Project Authority desalter well in the Arlington Basin. Modeling was performed to evaluate the likelihood for migration of dissolved-phase hydrocarbons released from a local service station to the well.

Ventura County Regional Groundwater Model Peer Review, United Water Conservation District, Santa Paula, CA. Bryan performed an independent peer review of the Ventura Regional Groundwater Model originally completed by the United States Geological Survey (USGS). The model area includes the groundwater basins that provide almost half of the water supply for Ventura County. Bryan's review revealed that the model was not accurately predicting groundwater levels in key areas of the basins, which led to a decision by the District to develop a new model.

Contract Executive Director – Upper Ventura River Groundwater Sustainability Agency. Since 2019, Bryan has served as the contract Executive Director of the UVRGSA. Bryan oversaw and contributed to the development of a Groundwater Sustainability Plan (GSP) for the Basin and now oversees GSP implementation and other agency functions.

Contract Executive Director – Mound Basin Groundwater Sustainability Agency. Since 2018, Bryan has served as the contract Executive Director of the UVRGSA. Bryan oversaw and contributed to the development of a Groundwater Sustainability Plan (GSP) for the Basin and now oversees GSP implementation and other agency functions.

Groundwater Sustainability Plan - Arroyo Santa Rosa Basin Groundwater Sustainability Agency. Bryan oversaw and contributed to the development of a Groundwater Sustainability Plan (GSP) for the Basin and

Technical Advisory Committee, Las Posas Valley Basin Adjudication Judgment. Since 2024, Bryan has served on the Technical Advisory Committee established pursuant to the Judgment. The committee is tasked with advising the Las Posas Valley Watermaster on technical aspects of the Judgment.

Technical Advisory Committee – ASR Study Group, Las Posas Valley Basin Adjudication Judgment. Since 2026, Bryan has chaired the ASR Study Group established pursuant to the Judgment. The committee is tasked with developing an operations plan for the Calleguas Municipal Water District Aquifer Storage and Recovery Project.

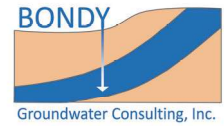
Technical Advisory Group Appointee, Fox Canyon Groundwater Management Agency (FCGMA), Ventura County, California. From 2015 - 2019, Bryan served as an appointee on the FCGMA's SGMA Technical Advisory Group. The committee was tasked with advising the Board of Directors on technical aspects of the three groundwater sustainability plans developed by the Agency.

Land Subsidence Monitoring Committee Technical Appointee, East Tule Groundwater Sustainability Agency. Bryan serves on the East Tule GSA Land Subsidence Monitoring Committee. The committee provides expert technical reviews of the land subsidence monitoring activities and reporting pertinent to the success of the groundwater sustainability plan and the proposed ~\$1 billion Friant Kern Canal subsidence mitigation project.

Technical Review Panel Appointee, Cadiz Project, Cadiz, California. Bryan serves on a panel of three experts that provides technical oversight and environmental monitoring of the Cadiz Water Conservation and Storage Project.

Technical Advisory Committee Appointee Santa Paula Basin Adjudication, Ventura County, California. Bryan is appointed by the Santa Paula Basin Pumpers Association to serve on the Santa Paula Basin Technical Advisory Committee. The committee is tasked with reviewing basin conditions and annual reporting to the Court in accordance with the groundwater rights judgment.

Bryan Bondy, PG, CHG
Bondy Groundwater Consulting, Inc.



Technical Advisor – Carpinteria Basin Groundwater Sustainability Agency. Bryan was retained by the Carpinteria Basin Groundwater Sustainability Agency to peer review the groundwater sustainability plan.

Technical Advisor - San Antonio Basin Groundwater Sustainability Agency. Bryan was retained by the San Antonio Basin Groundwater Sustainability Agency to peer review the groundwater sustainability plan.

Technical Advisor – East Tule White Area Group. Bryan advises this group of agricultural landowners concerning sustainable groundwater management act implementation in the East Tule Basin.

Technical Advisor, Santa Ynez Basin Agricultural Groundwater Users Group. Bryan advises this group of agricultural landowners concerning sustainable groundwater management act implementation in the three Santa Ynez Basin sub-basins.

Technical Advisor - Fillmore and Piru Basins Groundwater Pumpers Associations. Bryan advises this group of agricultural landowners concerning sustainable groundwater management act implementation in the basins.

Technical Advisor - Simi Valley Basin Study, City of Simi Valley, CA. Bryan peer reviewed the City’s groundwater study and provided recommendations.

Technical Advisor, Calleguas Municipal Water District, Ventura County, California. Bryan advises the District on technical matters related to the operation of the District’s groundwater aquifer storage and recovery (ASR) project. Bryan managed several studies for the District and has worked extensively with basin landowners to monitor groundwater conditions and address landowner concerns.

Technical Advisor - Groundwater Dependent Ecosystems Guidance Framework, The Nature Conservancy. As part of his service on the Fox Canyon GSA’s Technical Advisory Group, Bryan advised The Nature Conservancy during development of their guidance manual for the identification, evaluation, and consideration of Groundwater Dependent Ecosystems under SGMA. Bryan assisted with guidance manual development and a case study in the Las Posas Valley Basin. The guidance manual is used by groundwater sustainability agencies throughout the State.

Technical Advisor - Tierra Rejada Basin Landowners, Moorpark, CA. A group of landowners retained Bryan to review groundwater conditions and advise them on future groundwater supply availability.

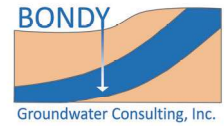
Las Posas Valley Basin Characterization and Groundwater Model, Calleguas MWD, Ventura County, California. Bryan was the technical lead and project manager for the development of a groundwater flow model of the East and South Las Posas Valley Sub-basins. The project involved a detailed characterization of the basin aquifers, geologic structures controlling groundwater flow, and development of a groundwater flow model.

Las Posas Valley Basin Groundwater Monitoring Program Development, Calleguas MWD, Ventura County, California. Bryan has worked with agricultural well owners in the Las Posas Valley Groundwater Basin to develop a voluntary groundwater monitoring program in the vicinity of the Calleguas Aquifer Storage and Recovery facilities to provide data to characterize the basin. Bryan has successfully negotiated access and monitoring agreements with agricultural landowners and other water agencies for two dozen wells in the basin. Bryan also managed the installation of five shallow groundwater monitoring wells in the basin and was the technical lead for three deep monitoring wells.

SGMA Basin Prioritization Re-Evaluation Project – Las Posas Valley Basin. Bryan, on behalf of the Las Posas Valley Groundwater Basin Users Group, worked with DWR staff to re-assess the “critical overdraft” designation of the Las Posas Valley Basin. Mr. Bondy reviewed groundwater conditions with DWR staff and recommended that the basin be reclassified. DWR staff concurred with Mr. Bondy’s recommendation, and the basin was delisted.

Stakeholder Group Advisor/Facilitator - Las Posas Valley Groundwater Basin Users Group, Ventura County, California. Bryan served as the Las Posas Valley Groundwater Basin Users Group’s technical advisor and facilitator from 2009 through 2018. During this time Bryan educated the stakeholders on the basin groundwater hydrology, groundwater management issues, and facilitated the group’s development of a proposed pumping allocation management program.

Bryan Bondy, PG, CHG
Bondy Groundwater Consulting, Inc.



Water Supply Alternatives Study, Calleguas Municipal Water District, Ventura County, CA. Bryan was the lead hydrogeologist on the District's Water Supply Alternatives Study. Working with Kennedy / Jenks Consultants, Inc. over 100 local water supply projects were identified and evaluated to increase local water resources within the Calleguas MWD service area.

Stakeholder Group Advisor/Facilitator – Oxnard / Pleasant Valley Basin Agricultural Landowners Group, Ventura County, California. Bryan was hired in 2017 by the Oxnard and Pleasant Valley Basins' agricultural landowners to facilitate development of a pumping allocation plan for the Groundwater Sustainability Plans.

Assessment of Potential Brine Discharge for Salinity Management Pipeline Phases 2D, 2E, and Phase 3 Alternatives, Calleguas MWD, Ventura County, CA. In 2014, Bryan completed a study to estimate potential concentrate discharges to provide a design basis for future Salinity Management Pipeline phases. The study involved coordination with potential dischargers, considerable data analysis, and GIS mapping.

Agricultural Irrigated Lands Group Groundwater Quality Program – Ventura County, California. Bryan is the lead hydrogeologist on the consultant team working for VCAILG to address the groundwater requirements of the 2016 Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Agricultural Lands. The program addresses nitrate issues in all Ventura County groundwater basins.

Calleguas Creek Watershed Salt and Nutrient Management Planning, Ventura County, CA. Bryan is the lead hydrogeologist for the development of salt and nutrient management plans for the nine groundwater basins located within the watershed. The planning will address salt and nutrient inputs from numerous sources, including agriculture, imported water, and five publicly owned treatment works.

Countywide Groundwater Monitoring Program Data Gaps Evaluation, County of San Luis Obispo. Bryan was the lead hydrogeologist for a data gap evaluation of the County's groundwater monitoring program. The purpose of the project was to identify data gaps in the existing groundwater monitoring program relative to the SGMA GSP regulations and BMPs.

Goleta Basin Groundwater Model Update, Goleta, California. Bryan led the review and update of the Goleta Basin groundwater model in 2014 to assist Goleta Water District with its drought water supply planning.

Goleta Basin Groundwater Management Plan Update, Goleta, California. Bryan was the lead author of the Goleta Water District's 2016 Groundwater Management Plan update.

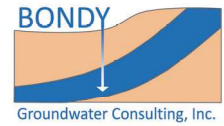
Goleta Water District Water Supply Management Plan, Goleta CA. Bondy Groundwater Consulting, Inc. teamed with Steve Bachman to prepare the 2017 Water Supply Management Plan. The plan optimizes the GWD's water supply portfolio to provide the greatest reliability at the lowest possible cost. A complex spreadsheet model of the District's water supplies and demands was developed and was integrated with the District's groundwater model to ensure that the results are consistent with groundwater storage levels.

Goleta Basin Groundwater Management Plan Update, Goleta, California. Bryan is a technical advisor and peer reviewer for Goleta Water District's 2021 Groundwater Management Plan update.

Santee – El Monte Basin Groundwater Management Study, San Diego County Water Authority, Padre Dam Municipal Water District, Riverview Water District, Lakeside Water District, Helix Water District, and City of San Diego. Bryan was the principal investigator for this study to develop information and planning tools necessary to manage the groundwater resources of the Santee-El Monte Basin. The study consisted of a hydrogeologic evaluation of the basin, water budget development, groundwater monitoring well installation, establishment of a groundwater monitoring network, groundwater quality testing, and development of a groundwater flow model for the basin.

Groundwater Modeling Evaluation of Indirect Potable Reuse, City of Santa Barbara, California. Bryan led the feasibility study of indirect potable reuse (IPR) of recycled water for the City, which included working with the U.S. Geological Survey (USGS) to conduct groundwater modeling of surface infiltration of tertiary treated recycled water, injection of advanced treated recycled water, and recovery of the water.

Bryan Bondy, PG, CHG
Bondy Groundwater Consulting, Inc.



Groundwater Modeling Analyses of Future Saugus Formation Water Supply Wells, Castaic Lake Water Agency and Valencia Water Company (VWC), Santa Clarita Valley, California. Bryan provided peer review of groundwater modeling work to evaluate siting and design alternatives for new water supply wells in the Saugus Formation to address perchlorate containment and water supply reliability issues.

Aquifer Storage and Recovery (ASR) Project, San Diego County Water Authority, San Diego, CA. An aquifer storage and recovery study was completed for the San Diego Formation. Phase I of the study included a gravity survey performed to identify sections of the San Diego Formation sufficiently thick for potable water storage and recovery. Phase II planning included the conceptualization of ASR projects, exploration scope development, and costing.

Sweetwater Authority Municipal Well Installation, San Diego, CA. A well field was constructed for the extraction and demineralization of brackish groundwater from the San Diego Formation and the Lower Sweetwater alluvial basin at the Richard A. Reynolds Groundwater Demineralization Facility for the Sweetwater Authority in National City, California. The approximate 3,600 acre-feet per year project included the drilling, geophysical logging, design, installation, and aquifer testing of five 800-foot-deep production wells in the San Diego Formation and a number of shallow alluvial wells.

Lakeside Water District Recovery Test, Lakeside, CA. The Lakeside Water District produces potable groundwater from an alluvial aquifer near Lakeside, California. A recovery test at the District's well field to estimate the hydraulic conductivity and storage coefficient of the alluvial aquifer that supplies the well field. The hydraulic properties of the aquifer were obtained to support well field design evaluations for well field expansion planning.

National City Well Field Design, National City, CA. The Sweetwater Authority produces approximately 1,000 to 2,000 acre-feet per year of potable groundwater from the San Diego Formation at the National City Well Field. The purpose of this study was to provide recommendations for the placement of a proposed well that would minimize the impact on drawdown at existing wells. Aquifer testing was performed at the well field to calculate the formation hydraulic properties and assess aquifer boundary conditions. Utilizing the derived hydraulic parameters, analytical calculations were performed to evaluate wellfield design options.

Tucker Ranch Well Construction, Ventura, CA. Bryan oversaw the drilling and construction of an agricultural water supply well for Tucker Ranch.

Kimball Ranches Well Construction, Fillmore, CA. Bryan oversaw the drilling and construction of an agricultural water supply well for Kimball Ranches.

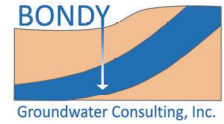
Stringfellow Superfund (CERCLA) Site Perchlorate Remedial Investigation (RI), Glen Avon, California. Bryan was the lead hydrogeologist and project manager responsible for conducting a Remedial Investigation to assess the geology and distribution of perchlorate-impacted groundwater beneath Zone 4 of the Stringfellow Hazardous Waste Site (CERCLA). Bryan reviewed previous consultants' work products and developed a conceptual hydrogeologic model of the site and prepared the RI work plan. He also oversaw and managed all remedial investigation activities. The project also included groundwater modeling to assess perchlorate transport toward the Santa Ana River.

Groundwater Flow Modeling, Former Coastal Mart #307 Modeling Project, McAllen, Texas. Bryan constructed a groundwater flow model to evaluate pumping and water injection strategies that would minimize the potential for co-mingling of the client's petroleum hydrocarbon plume with an off-site, up-gradient plume.

Groundwater Flow Modeling, Former Texaco Refinery, Casper Wyoming. Bryan constructed a numerical groundwater flow model to assess regional groundwater flow conditions in an alluvial aquifer beneath a former refinery site in Casper Wyoming. The model was used to evaluate the potential effect of different remedial measures on the groundwater gradient in the site vicinity.

Groundwater Flow Modeling, Shell Service Station, Morro Bay, California. Bryan constructed a groundwater flow model to assess regional groundwater flow and contaminant transport conditions in a coastal alluvial basin near the City of Morro Bay. Modeling was conducted to evaluate the potential for dissolved-phase impacts to the City's Well #3 from a fuel release at an upgradient service station. Bryan performed aquifer testing and data analysis in support of model construction.

Bryan Bondy, PG, CHG
Bondy Groundwater Consulting, Inc.



Site Assessment and Groundwater Flow and Transport Modeling, Delco Facility, Goleta, California. Bryan performed geologic logging and supervised the installation groundwater monitoring wells in a shallow unconfined aquifer. Performed periodic groundwater monitoring to track PCE and TCE migration and attenuation. Bryan also participated in the development and calibration of a groundwater flow model of a shallow unconfined aquifer. The model was developed to evaluate groundwater flow conditions in the shallow aquifer and to assess groundwater surface water interactions with the Goleta Slough wetlands area. Transport modeling was performed to evaluate the potential for dissolved-phase contaminant migration to environmental receptors at the slough.

LNAPL Chemical Partitioning and Longevity Modeling, Former Texaco Refinery, Casper Wyoming. Bryan evaluated the chemical flux and longevity aspects of an approximate 160-acre LNAPL plume at the former Texaco refinery in Casper Wyoming. Multiphase flow and multicomponent partitioning modeling was performed to estimate the time required for natural partitioning processes to reduce contaminant concentrations to drinking water standards.

Chatham Brothers Barrel Yard, Escondido, California. Bryan performed geologic logging and supervised the installation of soil vapor extraction, groundwater extraction, and groundwater monitoring wells at a former solvent recycling facility. Bryan evaluated groundwater flow conditions and fate and transport of PCE, TCE, and breakdown products in the multi-aquifer system. Bryan also performed periodic groundwater monitoring, prepared groundwater monitoring reports, performed operations and maintenance of the site groundwater pump-and-treat and soil vapor extraction systems.

GEC Marconi / BAE Systems Facility, San Marcos, California. Bryan performed geologic logging and supervised the installation of groundwater monitoring wells in a multi-aquifer system at a former electronics manufacturing facility. Prepared a conceptual model of groundwater flow conditions for the multi-aquifer system. Bryan performed periodic groundwater monitoring to track copper, chromium, PCE, and halogenated volatile organic compound breakdown products. Bryan prepared site investigation and groundwater monitoring reports and performed operations and maintenance of a groundwater pump-and-treat system.

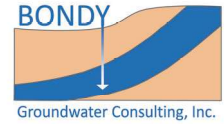
Maxwell Technologies Facility, San Diego, California. Bryan performed soil sampling to assess the extent of PCB-impacted soil. Performed geologic logging and supervised the installation of a groundwater monitoring well using air percussion drilling techniques. Performed periodic groundwater monitoring to assess the distribution of PCE, TCE, and breakdown products.

Signet Armorlite Facility, San Marcos, California. Bryan evaluated work product of previous consultants and developed a conceptual model of contaminant fate and transport for dissolved-phase halogenated volatile organic compounds and petroleum hydrocarbons. Bryan performed temporary piezometer installation and sampling, monitoring well installation, and groundwater sampling.

Port of San Diego, various locations, San Diego, California. Bryan reviewed previous consultant work products and developed site investigation plans for two Port of San Diego project sites. Bryan conducted tidal influence monitoring and evaluated tidal effects on groundwater flow patterns. Bryan conducted a CPT-LIF investigation to assess lithology and release conditions in the underground storage tank release area and performed groundwater monitoring and report preparation.

Hughes Aircraft Company Facility, Torrance, California. Bryan performed periodic groundwater monitoring of wells installed in a regional aquifer to track the migration of dissolve-phase PCE, TCE, and breakdown products.

Bryan Bondy, PG, CHG
Bondy Groundwater Consulting, Inc.



PUBLICATIONS AND PRESENTATIONS

- Beckett, G. D. and B. Bondy. 2006. *API-LNAST Users Guide Version 1.5, 2006*.
- Bondy, B. and Boehm, G. 2005. *Use of CPT-LIF Investigation Techniques and Advanced Data Visualization for Rapid and Effective Site Investigation*. Los Angeles Regional Water Quality Control Board Technical Speaker Series. March 2005.
- Bondy, B. 2011a. *The Las Posas Basin Groundwater Puzzle: Piecing Together the Big Picture*. Association of Water Agencies of Ventura County Waterwise Breakfast Speaker Series. May 2011.
- Bondy, B. 2011b. *Choosing the Appropriate Scale for Groundwater Management - Basin -Specific Planning within a Groundwater Management Agency*. 28th Biennial Groundwater Conference & 20th Groundwater Resources Association Annual Meeting. October 2011.
- Bondy, B. 2012a. *Ventura County Brackish Groundwater Desalination: Salt Management and New Water Supply*. Association of Water Agencies of Ventura County Waterwise Breakfast Speaker Series. February 2012.
- Bondy, B. 2012b, 2013, 2014, 2015, 2016, 2017, and 2018. *Ventura County Groundwater*. Association of Water Agencies of Ventura County Annual Fall Bus Tour.
- Bondy, B. 2013a. *Development of Brackish Groundwater Resources in Ventura County*. American Groundwater Trust Alternative Water Resources for Southern California Conference. Ontario, California. February 2013.
- Bondy, B. 2013b. *Calleguas MWD ASR Project*. Groundwater Resources Association of California Central Coast Quarterly Branch Meeting. Fall 2013.
- Bondy, B. 2014a. *Yes, Geology is Important! – How Faults, Folds and a Creek Created Challenges for the Las Posas Basin Aquifer Storage and Recovery Project*. Groundwater Resources Association Conference on Groundwater Issues and Water Management – Strategies Addressing Challenges of Sustainability and Drought in California. March 2014.
- Bondy, B. 2014b. *Understanding Groundwater (Groundwater 101)*. Association of Water Agencies of Ventura County Annual Symposium. April 2014.
- Bondy, B. 2015a. *Salinity Management Options for Agricultural Pumpers in the Las Posas Basin*. Association of Water Agencies of Ventura County Waterwise Breakfast Speaker Series. February 2015.
- Bondy, B. 2015b. *Water: The Resource, New Realities and Solutions*. Panelist, Water Session of the Ventura County Agricultural Summit. September 2015.
- Bondy, B. 2016. *Development of a Groundwater Pumping Allocation Methodology Under SGMA – An Early Success Story from the Las Posas Valley Basin*. American Groundwater Trust Everything Aquifers and Groundwater Management Conference. Ontario, California. February 2016.
- Bondy, B. 2016. *Groundwater Sustainability Plan Regulations...The Good, the Bad, and the Ugly*. Association of Water Agencies of Ventura County Waterwise Breakfast Speaker Series. June 2015.
- Chevron Energy Technology Company, Chemical Longevity Evaluation Guidance Document. Bryan was a contributing author of Chevron's internal chemical longevity evaluation guidance document for LNAPL releases.
- Wittman, G. and B. Bondy, 2004. *The Use of Computerized Groundwater Modeling to Design Capture Zone Well Array for the Perchlorate Remediation System in Zone 4 at the Stringfellow Superfund Site*. Groundwater Resources Association of California Perchlorate Symposium, Glendale, California. August 2004.



Tim Thompson PG, CHG

Principal Water Resources Consultant

EXPERIENCE

41 years

EDUCATION

MS, Geology, University of California, Santa Barbara

BS, Geology, University of California, Los Angeles

REGISTRATIONS

Professional Geologist,
California

Certified Hydrogeologist,
California

Registered Geologist, Arizona

QUALIFICATIONS

- Expertise in western U.S. water resource issues: supply, quality, and management
- Expertise in assessment of groundwater basin yield, water quality, natural recharge, and sustainability
- Expertise in well design, construction, and maintenance
- Expertise in stormwater treatment, water quality compliance, and TMDLs
- Litigation support and expert testimony

Tim has 41 years of experience in water resource and environmental sciences, regulatory issues, litigation support, and project management for both public-sector and private-sector clients, primarily in California, Nevada, and Arizona. His technical knowledge along with awareness of local, state, and federal regulations and policies benefit his technical assignments that include the following range of activities: groundwater basin characterization, groundwater management, production and monitoring well design and installation, reclaimed water use, conjunctive use and artificial recharge, development and implementation of long-term monitoring programs, water quality degradation, water rights disputes, water resource planning, water quantity/quality analysis and modeling, stormwater and surface water quality modeling and monitoring, stormwater treatment, and regulatory compliance. Tim is also a key member of GSI's team of groundwater specialists that helps our clients navigate the technical requirements of California's Sustainable Groundwater Management Act (SGMA).

REPRESENTATIVE PROJECTS

Technical Litigation Support, Casitas Municipal Water District, Oak View, California.

Tim provides technical support to Casitas Municipal Water District on matters related to the comprehensive adjudication of the Ventura River Watershed, including the Ventura River Watershed Groundwater Basins. This work has involved detailed technical reviews of the original and subsequent versions of the state-prepared Ventura River Watershed Groundwater-Surface Water Model.

Indirect Potable Reuse Project Implementation, City of Morro Bay, California. Tim has worked with the City of Morro Bay on the implementation of its IPR program, serving as project manager for the initial phases of program development, permitting, and hydrogeologic evaluations, and has remained involved at an advisory level through all subsequent phases of work. The IPR Program will use advanced-purified recycled water from the City's water reclamation facility for injection into the groundwater basin. GSI conducted groundwater modeling to evaluate project feasibility and managed the siting, design, and installation of the City's first pilot injection well. Work has also included securing permits, including the Groundwater Replenishment Reuse Project (GRRP) permit with California's Regional Water Quality Control Board (RWQCB) and Division of Drinking Water. The program will result in an increased supply of water for the City, reduced dependence on imported water, and improved water quality within the aquifer.

ASR Well Design/Installation, City of Woodland, California. Tim managed and directed the overall development of well design and specifications package, driller selection, installation of two ASR wells, permitting, and well testing. The project included pilot testing and monitoring of ASR well performance and aquifer response. Future expansion of the ASR program is also being planned. The program will result in an increased quality of water produced by the wells, because native groundwater is high in arsenic, hexavalent chromium, and nitrate.



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Indirect Potable Reuse Evaluations, City of Santa Barbara, California. Tim provided technical leadership and project management for this project to assess the feasibility of infiltrating and injecting advanced treated wastewater to increase groundwater supply capacity and reliability for the City. Working with the U.S. Geological Survey and its numerical groundwater model of the basin, the amount of advanced treated wastewater that could be recharged and the potential for negative impacts was evaluated under a number of climactic conditions. Several scenarios were evaluated, including simulations of injection wells along the coast as a seawater intrusion barrier. It was determined that up to 8,500 acre-feet per year (AFY) could be stored if coeval recovery pumping is established (to create aquifer storage space); and that the California Division of Drinking Water retention time requirement could be met.

ASR Well Design/Testing, City of Santa Barbara, California. Tim directed implementation of a well injection recharge project, including testing of City well performance for conversion to injection wells, and evaluation of geochemical issues of remixing of surface water and groundwater.

Well Installation Options and Water Rights Support, City of Solvang, California. Tim provides technical services to the City of Solvang related to site selection and drilling methods and overall program management for future installation of wells within the Santa Ynez River alluvial gravels. He is also supporting the City's effort to secure the associated water rights through the California State Water Resources Control Board.

Atlas BLM Section 16 Solar Project Comprehensive Groundwater Basin Analysis and Water Resources Monitoring and Mitigation Plan, Harquahala Groundwater Basin, La Paz County, Arizona. Tim is guiding and managing the project team developing the Comprehensive Groundwater Basin Analysis (CGBA) for the Atlas BLM Section 16. The objective of the CGBA was to outline the geological and hydrogeological setting in which the Project is located and evaluate the potential effects on the underlying Harquahala Groundwater Basin from which the Project will be sourcing its water for construction and operational purposes, as well as the groundwater-dependent communities and ecosystems nearby. This CGBA also included development of a basin-wide water budget and predictive Project water demand impacts analysis, through the use of numerical groundwater flow model, including a cumulative impacts analysis from all potential pumping in the Basin. A Water Resources Monitoring and Mitigation Plan (WRMMP) was also developed to specify the methodology and locations for monitoring groundwater conditions.

Jove Solar Project Comprehensive Groundwater Basin Analysis and Water Resources Monitoring and Mitigation Plan, Harquahala Groundwater Basin, La Paz County, Arizona. Tim is managing the project team developing the Comprehensive Groundwater Basin Analysis (CGBA) for the Jove Solar Project. The objective of the CGBA was to outline the geological and hydrogeological setting in which the Project is located and evaluate the potential effects on the underlying Harquahala Groundwater Basin. This CGBA also included development of a basin-wide water budget and predictive Project water demand impacts analysis, through the use of numerical groundwater flow model, including a cumulative impacts analysis from all potential pumping in the Basin. A Water Resources Monitoring and Mitigation Plan (WRMMP) was also developed to specify the methodology and locations for monitoring groundwater conditions.

Oberon Solar Project Groundwater Monitoring and Reporting, Chuckwalla Valley Groundwater Basin, Riverside County, California. Tim manages the project team conducting quarterly monitoring and reporting for the Oberon Solar Project in accordance with the project's Groundwater Monitoring, Reporting, and Mitigation Plan (GMRMP). The GMRMP is specifically intended to meet the requirements of Mitigation Measure HWQ-3, as required by the U.S. Department of Interior Bureau of Land Management Land Use Plan Amendment.

Easley Solar Project Water Supply Assessment, Chuckwalla Valley Groundwater Basin, Riverside County, California. Tim is guiding and managing the project team developing a Water Supply Assessment (WSA) for the Easley Solar Project. The objective of the WSA is to provide an evaluation of the effects of the proposed Easley Renewable Energy Project (Project) on groundwater and surface water resources, pursuant to the requirements of California Senate Bill 610 and the Desert Renewable Energy Conservation Plan Land Use Plan Amendment. WSA analyses include development of a basin-wide water budget and predictive Project water demand impacts analysis, through the use of a numerical groundwater flow model, including a cumulative impacts analysis from all potential pumping in the Basin.

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Perkins Solar Project Focused Water Supply Feasibility Study and Water Supply Assessment, Imperial Valley Groundwater Basin, Imperial County, California. Tim is guiding and managing the project team developing a Focused Water Supply Feasibility Study for the Perkins Solar Project (Project). The objective of the Feasibility Study is to identify potential locations for the construction of a Project groundwater supply well, where the well would not capture potential seepage water from the adjacent All American Canal (AAC). The Feasibility study includes the verification and update of a historical numerical transient groundwater model and simulation of predictive scenarios. The objective of the predictive scenarios is to determine whether a Project groundwater supply well could operate without capturing potential AAC seepage by simulating the Project well's zone of influence and the likely travel pathway limits of any AAC seepage. WSA is also being prepared to evaluate the effects of the proposed Project on groundwater and surface water resources, pursuant to the requirements of California Senate Bill 610, the Desert Renewable Energy Conservation Plan Land Use Plan Amendment, and California Assembly Bill 205 California Energy Commission Optional Emergency Regulations.

Emergency Supply Water Supply Alternatives Study, Phase 2.2, Calleguas Municipal Water District (Calleguas MWD), Thousand Oaks, California. Calleguas MWD developed a Water Supply Alternatives Study to evaluate range of potential projects that could be implemented to provide supply redundancy and critical infrastructure in the event of an imported water emergency outage. Projects under consideration included aquifer storage and recovery (ASR) expansion, development of additional groundwater supplies, increasing groundwater pumping, indirect potable reuse (IPR), projects related to desalters, and more. As a subconsultant to Kennedy Jenks, GSI provided hydrogeologic support to evaluate estimated yield, infrastructure needs, permitting requirements, potential for seismic resiliency, timeframe, benefits, and risks and vulnerabilities of project included in the study. Tim served as project manager and technical advisor for GSI's contributions to this project.

Wetlands and Groundwater Recharge, City of Avondale, Arizona. Tim oversaw the design, permitting, and construction of a 15,000-acre-feet per year constructed wetlands and groundwater recharge project. The 75-acre constructed wetlands facility includes more than 20 lakes that collectively treat nitrate-rich surface water, agricultural runoff, and recycled water collected by the Salt River Project (SRP) canal system to standards acceptable for groundwater recharge through 40 acres of percolation basins, and subsequent potable reuse. This project included groundwater modeling, facility design, permitting support, monitoring well installation (including design, logging, sampling, and testing), system start-up, preparation of a comprehensive operations and maintenance manual, and ongoing technical support.

Aquifer Investigation and Groundwater/Surface Water Interaction, PG&E/Diablo Canyon, San Luis Obispo County, California. Tim provided comprehensive aquifer investigation, groundwater/surface water interaction assessment, well testing and rehabilitation, and regulatory consulting services. Projects included (1) bedrock aquifer evaluation, installation of deep bedrock wells, aquifer and water quality testing, and groundwater/surface water interaction evaluation; and (2) groundwater analysis and monitoring well installation at the reactor site to characterize groundwater flow orientation and water quality in compliance with the nationwide Groundwater Protection Initiative.

Groundwater Adjudication, Antelope Valley, Los Angeles and Kern Counties, California. Tim was a court-appointed expert witness retained to calculate and report typical water use of the 3,500+ Small Pumper Class (2009 to 2015). Work involved basin-wide assessment of groundwater conditions, evaluation of existing technical work, trends in historic basin pumping. He provided testimony at trial in August 2015.

Hydrogeologic Technical Services, Los Olivos Community Services District, Los Olivos, California. Tim is helping the Los Olivos Community Services District through the transition from community-wide use of septic systems to a proposed sewer collection and treatment facility that is needed to prevent ongoing nitrate issues. Work includes the implementation of both (a) a groundwater monitoring plan, including the development and construction of a monitoring network (up to 12 wells) to characterize and evaluate the extent of nitrate contamination in the shallow alluvial aquifer, which included the construction of several new monitoring wells as well as project permitting with the RWQCB.

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Indirect Potable Reuse Evaluation, City of Tehachapi, California. Tim was project manager for detailed Indirect Potable Reuse (IPR) assessment of hydrogeologic, GRRP permitting and water quality considerations regarding the use of highly treated wastewater from the City of Tehachapi's reclamation facility for percolation into the City's adjudicated groundwater basin. Comprehensive groundwater modeling was conducted to evaluate basin conditions, retention time of the percolated water, assessment of basin-wide yield and water quality challenges.

Member of GSA Technical Advisory Committee, Montecito Water District, Santa Barbara, California. Tim was selected to join this panel of experts to provide input on the ongoing development of the Groundwater Sustainability Plan for the Montecito groundwater basin.

Groundwater Sustainability Plan, Eastern Management Area Groundwater Sustainability Agency (GSA), Santa Ynez, California. Tim provides technical analysis and project management for the development of a groundwater sustainability plan (GSP) for this GSA. Geologic complexities in this basin include potential interconnection of basin aquifers with the alluvium of the Santa Ynez River, faulting and other boundaries to flow, and assessing underflow to downstream sub-basins.

Recycled Water for Groundwater Augmentation Alternatives Evaluation, Montecito Water District, Santa Barbara, California. Tim is managing a project to help the District evaluate potential alternatives for the use of recycled water to augment its municipal water supply. The District is considering building a new water reclamation facility with the goal of producing the maximum amount of recycled water. To help the District assess how best to use this recycled water, GSI provided technical support to evaluate the potential feasibility of injecting the highly treated recycled water into local groundwater basins. GSI is conducting groundwater modeling to determine whether indirect potable reuse (IPR) via injection of advanced treated recycled water is feasible and can be conducted in a way to meet DDW regulatory requirements. GSI found that implementing IPR in the basin would involve significant risk and uncertainty and would face permitting challenges. Because of the likely limited recharge capacity, cost hurdles, and regulatory challenges, the District decided not to pursue a groundwater augmentation project.

Injection Well Design, Permitting and Testing, Water Replenishment District of Southern California, Pico Rivera, California. As part of the Groundwater Reliability Improvement Project (GRIP), recently renamed the Albert Robles Center (ARC) project, Tim and the GSI team provided technical design, permitting, and implementation support for the installation of several dedicated injection wells (and nested monitoring wells) to recharge local aquifers with highly treated wastewater from this advanced water purification facility. GSI also conducted a study to site additional injection wells. Tim's work included participation in the preparation of the comprehensive Title 22 engineering report required for Division of Drinking Water permitting.

Groundwater and Potable Water Monitoring, NRG Energy, San Bernardino County, California. At the NRG/BrightSource Ivanpah Solar Electric Generating Station, Tim manages the long-term groundwater and potable water system monitoring program required for permit compliance. Work involves regular data collection and preparation of annual reports that meet requirements established in California Energy Commission (CEC) site permit (2013 to present).

Alternative Water Supply Evaluations, Middle River Power, Victorville, California. Tim provides services to the High Desert Power Project to evaluate reliability and water quality aspects of various water supplies, including recycled water and banked groundwater to ensure compliance with CEC permit requirements and adjudicated Mojave Basin considerations. (2014 to present)

Groundwater Development Project (GDAP), Los Angeles Department of Water and Power (LADWP), Los Angeles, California. Tim and the GSI team provided hydrogeologic support to this multi-year project that includes water supply planning and investigation work in the LA Central Basin with the overall goal of increasing local groundwater supplies and increasing storage. GSI's role on the project is to provide production well and injection well capacity planning and eventually siting, design, and field support for the installation of pumping wells, IPR injection wells, and ASR wells. This

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work is being conducted in coordination with a team of technical specialists that are also evaluating distribution system capacity and water treatment needs to accommodate the increased pumping.

Groundwater Monitoring Services for the Santa Paula Water Recycling Facility, City of Santa Paula, California. Tim serves as project supervisor for GSI's efforts. As the City's hydrogeologist, GSI staff conducts all compliance-related groundwater monitoring and reporting City-owned monitoring wells and a number of nearby residential wells at the Santa Paula Water Recycling Facility. The monitoring is conducted to help the City comply with California Regional Water Quality Control Board (RWQCB) groundwater monitoring requirements. GSI also completes quarterly monitoring reports and coordination with the RWQCB. Under a separate contract, GSI assisted the City with the drilling, installation, and testing of a new monitoring well at the facility.

SGMA/GSP Preparation, Kaweah Subbasin, Tulare, California. GSI is providing SGMA support services to three GSAs in the Kaweah Subbasin located in the San Joaquin Valley. This is a critically overdrafted basin in a predominantly agricultural area covering approximately 440,000 acres. Tim is a technical advisor for this effort which has included work development of three GSPs and coordination with and outreach to each GSA in the Kaweah Subbasin to develop a framework for agreement regarding data and analysis techniques for assessing groundwater elevation, groundwater extraction, surface water supply, total water use, change in storage, water budget, and sustainable yield. Our team is currently conducting the sustainability analysis, developing sustainability criteria, and identifying strategies for achieving groundwater sustainability.

Indirect Potable Reuse Evaluation, Shea Homes, Oxnard, California. Tim conducted a detailed Indirect Potable Reuse (IPR) assessment of hydrogeologic, permitting and water quality considerations regarding the use of highly treated wastewater from the City of Oxnard's Groundwater Recovery Enhancement and Treatment (GREAT) project that would comply with GRRP permitting requirements.

Subsurface Ocean Intake Evaluations, City of Santa Barbara, California. In coordination with the City's engineering consultant (Carollo Engineers), Tim provided technical input and project leadership to the team analyzing alternative subsurface intake methods for the proposed re-construction of the City's desalination facility.

Groundwater/Surface Water Interaction, Planning Department, County of Santa Barbara, California. Tim provided groundwater/surface water interaction evaluations of riverbank well production regarding the potential impact to endangered southern California steelhead habitat from increased groundwater pumping from the banks of the Santa Ynez River.

Groundwater Management and Well Installation, City of Fillmore, California. Tim directs groundwater basin analysis; safe yield evaluations; municipal well site selection; basin-wide water quality and water supply modeling; analysis of depth-related groundwater water quality changes; water quality considerations regarding recycled water use; and well design, installation oversight, and permitting evaluation of a new water supply wellfield. Project work is ongoing. (2002 to present).

ASR Program Support, Goleta Water District, Santa Barbara, California. GSI has been helping the District to restart its ASR program, which has been idle for several years. Tim has managed this effort and has overseen the development of standard operating procedures for the District's wells that will be used to implement the ASR program. He has also provided ASR permitting support for the District's existing municipal wells, which have been updated to serve as ASR wells. The wells will improve the water supply by injecting surplus water during wet years.

Aquifer Recharge, Goleta Water District, Santa Barbara, California. Tim managed the feasibility study, design, and grant funding application for well injection of potable water into six existing District wells for this aquifer recharge project. The grant was fully funded and was one of the two highest scoring applications submitted statewide for the early 2002 round of Proposition 13 water bond funding.

Stormwater and Groundwater Support, Shea Homes, Oxnard, California. Tim provides stormwater and groundwater support for the RiverPark Development. Work includes groundwater modeling, stormwater quality modeling, California

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Environmental Quality Act (CEQA) documentation, water rights assessments, groundwater/surface water interaction, evaluation of nitrate and future water quality issues, re-abandonment of numerous oil wells, total maximum daily load (TMDL) issues, large-scale groundwater dewatering plan/Regional Board permitting, monitoring well installation, and water quality analysis of groundwater/surface water interactions.

Stormwater Quality Analysis, East Area One Project, Santa Paula, California. Tim managed an effort to evaluate the potential effects on fishery habitat conditions in the Santa Clara River that could result from the proposed development of the East Area One development. Tim was retained by Meridian Consultants to provide technical analyses in support of several detailed comment letters submitted on the Draft Environmental Impact Report (EIR) for this project.

Los Osos Creek Groundwater Replenishment Reuse Project (GRRP), Los Osos Basin Management Committee, Los Osos, California. As part of a technical team including MKN and Associates, Tim and GSI staff conducted technical assessments of feasibility and permitting considerations for a proposed Indirect Potable Reuse (IPR) program which will employ spreading basins to recharge underlying aquifers with highly treated wastewater to support stabilization of this small basin's groundwater resource. Key aspects evaluated include hydrogeologic characterization, coordination with Division of Drinking Water staff on required permitting elements, preliminary assessment of Soil Aquifer Treatment benefits, and overall project budget and schedule forecasting.

Groundwater Provenance Evaluation, City of Arcadia, California. Tim was retained as an expert witness to evaluate and testify on groundwater provenance considerations associated with a subbasin boundary in the adjudicated Raymond Basin (2013 - 2014).

Groundwater Supply Evaluation, Best, Best & Krieger (BBK), Thousand Oaks, California. In support of pre-acquisition due diligence being conducted by BBK, Tim conducted expert support services related to sustainability of groundwater supply, well reliability, and long-term drought issues at Hidden Valley Ranch.

Groundwater Evaluation, University of California (UCSB), Santa Barbara, California. Tim evaluated groundwater safe yield projections and recycled water demand forecasts as prepared by a local water purveyor (Goleta Water District) in support of UCSB's preparation of its Long-Range Development Plan EIR. Work was based on modeling scenarios and was associated with evaluation of drought period minimum supplies.

Groundwater Evaluation, Western Water Company, Moorpark, California. In support of the client's interest in developing water rights investment opportunities, Tim conducted extensive analyses of groundwater recharge options in the western and eastern portions of the Las Posas groundwater basin for determination of groundwater recharge volumetric potential and water rights investment opportunities. Evaluation involved review and analysis of existing and planned wells, water quality, water rights, and groundwater modeling conducted by the U.S. Geological Survey (USGS) and Ventura County.

Sierra Club vs. California American Water Company, Carmel, California. Tim was retained by California American to evaluate groundwater use issues associated with Endangered Species Act considerations and flow in the Carmel River (2009 - 2010).

Aquifer Recharge Study, Chino Basin, San Bernardino County, California. Tim provided technical analysis, permitting evaluation, and agency coordination for investor-funded projects focused on opportunities for recharge of imported or local water supplies into the adjudicated Chino Basin. Work included execution of a purchase agreement for a 200-acre parcel in Fontana for potential groundwater recharge of treated effluent from a nearby municipal facility, site recharge performance testing, 4-mile-long pipeline routing, water quality considerations, regulatory considerations, Chino Basin adjudication aspects, acquisition of viable recharge credits, and financial and economic projections.

Water Quality Impact Evaluation, Turlock Irrigation District (TID), Stanislaus Co., California. Tim managed the evaluation of water quality impacts to groundwater associated with a request to increase pumping for supply to the TID's Walnut Energy Center power generation facility. Work involves development of predictive effects of increased

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pumping and reporting and negotiations with the California Energy Commission's (CEC) staff to achieve amended operating conditions.

Groundwater Analyses and Expert Testimony, BrightSource, Inyo County, California. At the proposed Hidden Hills Solar Electric Generating Station (near Pahrump, Nevada), Tim managed the analyses and provided expert testimony to the CEC related to comprehensive aquifer investigations, groundwater modeling of local and regional effects, sustainable yield, well yield testing, energy facility permitting assistance, and evaluation of water right offsetting alternatives.

Aquifer and Water Supply Assessment, Gillibrand Aggregate Mine, City of Simi Valley, California. Tim provided preliminary aquifer investigation, safe yield investigations, water supply assessment development, groundwater/surface water interaction assessment, water quality, and regulatory consulting services in association with planned permit application to allow expansion of the mine in the Simi Valley area.

Water Supply Assessment, Gorman Post Ranch, Los Angeles County, California. Tim provided comprehensive aquifer and sustainable yield investigations, preparation of a Water Supply Assessment, groundwater recharge calculation, water quality, and regulatory consulting in association with this proposed development.

Groundwater Exploration, Lake Arrowhead Community Services District, San Bernardino County, California. Tim conducted a regional groundwater exploration and development project, including well site selection, structural geologic mapping and analysis, well design, permitting (county and CEQA), and installation of five bedrock wells (600 to 800 feet deep), geophysical logging, and water quality testing. Follow-on work included identification of optimal of future well sites.

Groundwater Exploration, Apex Industrial Park, Las Vegas, Nevada. At the Apex Industrial Park, Tim was project manager for a regional groundwater exploration and permitting effort resulting in installation of deep (more than 2,000 feet) bedrock wells, regional hydrogeologic evaluations, water rights filing, and water supply planning. Duties included regional geologic research and well site selection, driller selection and contracting, well logging, water quality sampling and analysis, drilling oversight, contract administration, well testing (design, operation, monitoring, and evaluation), well completion design and supervision, and preparation of final technical report. Well site selections and regional hydrogeologic analyses were conducted in four separate groundwater basins throughout the area north of Las Vegas, along with extensive water rights and federal agency coordination and planning.

Drought Mitigation Well Project, City of Santa Barbara, California. Tim managed the City's drought mitigation well drilling program, including extensive groundwater exploration and development in multiple locations:

- Mission Creek – Site selection, well logging, water quality testing, and well performance testing of three bedrock production wells (900 to 1,300 feet deep). Included installation of pipeline and power lines and all associated permitting and agency coordination.
- North Portal of Mission Tunnel – Site selection, driller contracting, well logging, water quality testing, well performance testing and well completion of deep bedrock well.
- Gibraltar Reservoir – Groundwater exploration under emergency drought-related demands including regional hydrogeologic investigations, well site selection, water quality testing, and performance testing. Project resulted in completion of five shallow alluvial production wells tapping water supplies present beneath reservoir bottom silts and muds during period when reservoir was completely dry. Time-domain electromagnetic geophysical techniques were used in well site selection.

Groundwater Management, Bear Valley Community Services District, Tehachapi, California. Tim provided services including extensive analysis of this groundwater-dependent district's needs and requirements, bedrock aquifer analyses, quantification of natural recharge, geophysical evaluations (seismic reflection/ refraction), remote sensing investigations, site selection and installation of deep bedrock, alluvial, and monitoring wells, and groundwater management advisory support.

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Groundwater/Surface Water Interaction, City of Mesquite, Nevada. Tim oversaw the groundwater/surface water interaction component of the lower Virgin River Habitat Conservation Plan, as required for regulatory compliance with Section 7 of the federal Endangered Species Act. His role included preparation of the Hydrological Monitoring and Mitigation Plan, which constitutes a long-term monitoring program developed to determine if groundwater pumping affects flows in the adjacent Virgin River.

Groundwater Exploration and Development, Green Valley County Water District, Green Valley, California. Tim managed the groundwater exploration and development program for the community of Green Valley in northern Los Angeles County. Work involved regional exploration and well site selection, design/oversight of seismic surveys, installation of a 900-foot-deep bedrock well, including contractor oversight, permitting (including U.S. Forest Service coordination), well logging, water quality testing, and wellhead treatment recommendations.

PERMITTING SUPPORT

Water Resources Support for Programmatic Environmental Impact Report (PEIR), Mosquito Vector Control Association of California Coastal Region, California. Tim provided technical report preparation and impact analyses for the groundwater and water resources sections of the PEIR for this regional evaluation of the effects of continued implementation of a suite of pesticide application and other vector control strategies. The work was prescribed in the Integrated Vector Management Programs for Alameda, Contra Costa, Marin, Sonoma, Napa, Solano, Santa Clara, and San Mateo Counties.

Permitting Support, NW Natural, Fresno and Madera Counties, California. Tim provided comprehensive permitting support to Northwest Natural and its partner PG&E for the Gill Ranch Gas Storage Project. He provided water resources, discharge permitting, groundwater analyses, and regulatory support. Key aspects of this work included preparation and submittal of "Notice of Intent" forms to the Central Valley Regional Board for anticipated water discharges associated with different aspects of the 27-mile-long pipeline installation and hydrostatic testing. Discharges were permitted under a Board order associated with discharges considered "Low Threat to Water Quality." The primary hydrostatic testing involved 1 million gallons of water that were discharged across a fallow field.

Water Resources Support, Permit/Resource Management Department, Sonoma County, California. Tim prepared water resources and water quality sections of the Preservation Ranch EIR for a proposed 19,000-acre vineyard and restoration project in northwest Sonoma County. Work involved (1) determining project impacts on water resources including groundwater, water quality, stormwater, TMDLs, and other water resources considerations; and (2) evaluating potential groundwater/surface water interactions by conducting a diagnostic pumping test to evaluate effects of pumping on flow in nearby springs.

Water Resources Analysis, Metropolitan Water District of Southern California. Tim provided water resources analysis and comprehensive geographic information system (GIS) mapping products to evaluate water supply benefits in the Imperial Valley area potentially derived from fallowing and crop water use reductions.

Permitting Support, Los Angeles Department of Water and Power, California. As project scientist for the Owens Valley Dust Mitigation program, Tim provided permitting support for wetlands certification and dewatering discharge water quality compliance issues.

LITIGATION SUPPORT

- Technical Litigation Support, Casitas Municipal Water District, Oak View, California. Tim provides technical support to Casitas Municipal Water District on matters related to the comprehensive adjudication of the Ventura River Watershed, including the Ventura River Watershed Groundwater Basins. This work has involved detailed technical reviews of the original and subsequent versions of the state-prepared Ventura River Watershed Groundwater-Surface Water Model.
- Groundwater Adjudication, Antelope Valley, Los Angeles and Kern Counties, California - Tim was a court-appointed expert witness retained to calculate and report typical water use of the 3,500+ Small Pumper Class (2009 to 2015).

Tim Thompson, PG, CHG
Principal Water Resources Consultant

Work involved basin-wide assessment of groundwater conditions, evaluation of existing technical work, trends in historic basin pumping. He provided testimony at trial in August 2015.

- BrightSource Energy – Retained as expert witness to testify before California Energy Commission on proposed project in eastern California, near Pahrump, Nevada.
- Southern California Edison (SCE) v. Sunrise Growers – Retained by SCE for evaluation of groundwater usage.
- Sleepy Valley Water Company (SVWC) v. Rainmaker Water – Retained by SVWC for water rights evaluations in a small groundwater basin.
- Ladd Construction v. Ventura County Public Works – Retained by Ventura County for litigation support regarding timing and execution of Los Angeles Regional Water Quality Board permitting.
- Santa Barbara Channel Keeper v. Venoco – Provided litigation support related to potential water quality issues associated with a proposed Paredon well drilling program.
- Keller et al. v. D.R. Horton Homes – Deposed as a fact witness for land ownership lawsuit related to water resources and permitting-related technical matters associated with timing of entitlements associated with RiverPark Development in Oxnard, California.
- IWR v. South Tahoe Public Utilities District (Arizona) – Provided expert witness technical support and mock-trial participation for land and water rights value determination in federal court condemnation case.
- Spiekerman v. City of Avondale – Deposed as a fact witness for construction timing and delays lawsuit related to timing of design document, permitting completion, and public agency review turn-around-time issues on a \$15 million construction project involving constructed wetlands, artificial recharge basins, and residential development.

DUE DILIGENCE SUPPORT

Water Supply Alternatives, The Riverside Company, Oceanside, California. In support of pre-acquisition due diligence being conducted by The Riverside Company, Tim conducted an expert review and support services related to water supply alternatives, water rights, groundwater/surface water interaction, and reverse-osmosis treatment system design alternatives and costs at HerbThyme Farms on the San Luis Rey River.

Groundwater Evaluation, Teasdale Quality Foods, Atwater, California. In support of pre-acquisition due diligence, Tim evaluated the cannery's groundwater production. Work included evaluating the reliability of yield, integrity of well and pumping facilities, vulnerability to groundwater contamination issues impacting clients' wells, Regional Water Quality Control Board's National Pollutant Discharge Elimination System (NPDES) permitting considerations for facility effluent, considerations related to partial conversion to City water supplies, and cost analysis of various physical and institutional water supply alternatives.

Groundwater and Surface Water Supply Evaluations, Calpine Company, Redlands, California. Tim provided due diligence support for Calpine's efforts to consider bidding on a partially permitted power plant site in Redlands. He conducted analyses of groundwater production potential, available surface water supplies, permitting issues, and water quality aspects that were critical to evaluating costs and timelines for installation and operation of a proposed 500-megawatt (MW) power plant. His expertise and familiarity with general water issues, groundwater conditions, regulatory/permitting requirements, and local agencies provided a valuable resource to Calpine.

Water Supply Evaluation, Calpine Company, Hudson, Colorado. Tim provided technical services for due diligence of a water supply option to cool a proposed 500-MW power generating station to be built near Hudson. Work included development and evaluation of conceptual design, feasibility studies, permitting, and engineering cost schedules.

Groundwater Recharge Evaluations, Summit Engineering, Reno, Nevada. Tim conducted detailed groundwater recharge calculations for investor-based Eco-Vision project encompassing entire northern half of State of Nevada. Developed robust GIS-based methodology to calculate natural recharge to the numerous vast groundwater basins from natural precipitation, including considerations of 30+ years of rainfall, snowpack, runoff, and evapotranspiration data.

Tim Thompson, PG, CHG
Principal Water Resources Consultant

He developed a modified approach to the soil-moisture balance technique to determine long-term recharge amounts in support of demonstrating to the Nevada Division of Water Resources State Engineers Office the presence of surplus, unallocated groundwater. The project concept included intention to wheel water down the Humboldt River for sale to potential buyers in the Reno and Carson City areas.

Groundwater Basin Evaluations, BNSF Railway, San Bernardino, California. At the BNSF InterModal Railroad Yard, Tim conducted detailed evaluations of groundwater basin characteristics, groundwater development options, water quality, wellfield design and water rights for an investor-supported groundwater development program in the Bunker Hill basin area of San Bernardino. Work included determination of potential groundwater production rates and valuation for potential resale of water to other entities.

Groundwater Analysis, Western Water Company, San Diego, California. Tim provided technical expertise in hydrogeology and groundwater resource analysis to a water investment company on a range of diverse projects. He conducted evaluations of groundwater basin capacity, groundwater banking, and water transfers for projects throughout California and the southwestern United States. Work included conducting basin analysis, investigating groundwater resource issues, and coordinating information from a variety of sources (such as U.S. Geological Survey, other consultants, and public agencies that were program partners). Projects included evaluations of water supply privatization, wastewater reuse, and alternative uses for existing groundwater resources.

WATER QUALITY/REMEDATION/NRDA

Water Quality Evaluation, Turlock Irrigation District, Stanislaus County, California. Tim managed the evaluation of potential water quality impacts to groundwater associated with a request to increase pumping for supply to the Walnut Energy Center power generation facility. Work involved development of predictive effects of increased pumping and reporting and negotiations with the CEC's staff to achieve amended operating conditions.

Hydrologic Support, California Department of Water Resources, Brawley, California. For this complicated restoration project at the Salton Sea, related to species conservation habitat development, Tim provided water resources expertise and field-based technical support to evaluate infiltration characteristics of the areas proposed for flooding and groundwater recharge.

Natural Resource Damage Assessment (NRDA) Studies, BP Americas, Houston, Texas. From 2010 - 2014, Tim managed the Water Column NRDA Technical Working Group consultant team that responded to the Deepwater Horizon oil accident in the Gulf of Mexico on behalf of BP. He provided support to the Water Column and Deep Water Benthic Communities technical groups, and participated in design, implementation, and reporting associated with NRDA studies.

Aquifer Analysis, U.S. Department of Energy, Scioto County, Ohio. At the Portsmouth Gaseous Diffusion Facility, Tim provided comprehensive aquifer analysis, multi-well pumping test analysis and hydrogeologic evaluation for input to stream remediation program targeted on historical dense non-aqueous-phase liquid (DNAPL) contamination.

Aquifer Analysis, U.S. Department of Energy (DOE), Aiken County, South Carolina. At DOE's Savannah River site, Tim provided comprehensive aquifer analysis, multi-well pumping test analysis, and hydrogeologic evaluation for a stream remediation program targeted on historical dense DNAPL contamination.



Andres Lapostol PG

Managing Hydrogeologist

EXPERIENCE

12 years

EDUCATION

BS, Geologic Sciences,
University of California – Santa
Barbara

REGISTRATIONS

Professional Geologist,
California

QUALIFICATIONS

- Groundwater modeling experience
- Groundwater sampling and reporting
- Experienced in well drilling and subcontractor oversight
- SGMA studies and GSP development
- Aquifer testing and analysis
- Experienced in field data collection
- Proficient in Microsoft Office, Groundwater Vistas, and ArcGIS
- Proficient in Spanish

Andy has 12 years of experience in the consulting industry. His focus areas include hydrogeology and geology, data management, groundwater modeling, and data and spatial analysis specifically related to groundwater sustainability, groundwater basin analysis, and water resource management. Andy's work experience includes groundwater model development and refinement, Sustainable Groundwater Management Act (SGMA) studies, groundwater sustainability plan (GSP) development and annual reporting, and indirect potable reuse (IPR) studies. Andy is experienced in groundwater and soil sampling, groundwater monitoring, drilling and subcontractor oversight, lithologic logging, and writing technical reports. He provides essential support to project managers in GSI's California offices.

REPRESENTATIVE PROJECTS

Groundwater Modeling for the Arroyo Grande Subbasin, County of San Luis Obispo, California. Andy supported the groundwater modeling effort for the Arroyo Grande Subbasin GSP as a subconsultant to an engineering firm. He developed a transient integrated surface water/groundwater model using the public domain modeling platform GSFLOW. Additionally, in collaboration with GSI, RTI International dynamically linked the GSFLOW model to a reservoir operations model (MODSIM) to simulate future Lopez Lake Dam releases based on GSFLOW modeled surface flows from contributing watersheds. The Arroyo Grande Subbasin model was extended to the coastal Santa Maria River Valley Groundwater Basin (SMRVGB) to simulate stream flow in the Arroyo Grande Creek to the ocean by repurposing the existing SMRVGB SEAWAT model. The coastal Arroyo Grande Model simulates the groundwater/surface water interactions on a daily time scale from Lopez Dam to the ocean and was qualitatively calibrated to a recently completed synoptic surface water flow study. The integrated model addresses climate change assessments to provide predictive scenarios and water budgets for SGMA's Sustainable Management Criteria (minimum thresholds and measurable objectives) to achieve sustainability in the Basin by 2042.

Groundwater Basin Key Well Index Analysis, San Luis Obispo County, Public Works Department, California. As the responsible agency for programs such as the California Statewide Groundwater Elevation Monitoring (CASGEM) and SGMA, the Public Works Department needed to establish a representative well index for each of the County's five medium- or high-priority basins. Andy supported GSI's effort to evaluate the County's water elevation monitoring program, establish data collection criteria and analytical techniques to be used to understand and present the groundwater conditions and changes in groundwater supplies, and document and effectively communicate information related to aquifer conditions and threats to groundwater supplies. Andy collected and analyzed water level measurements to produce a series of hydrographs that were used to help to create a key well index. The work resulted in the selection of key representative wells within each basin that can efficiently represent the relative health of each basin without compromising the confidentiality of the well owners.



Andres Lapostol, PG
Managing Hydrogeologist

Groundwater Sustainability Plan (GSP) Preparation, Kaweah Subbasin, Tulare, California. GSI is providing support services related to SGMA to three groundwater sustainability agencies (GSAs) in the Kaweah Subbasin located in the San Joaquin Valley. This is a critically overdrafted basin in a predominantly agricultural area covering approximately 440,000 acres. Andy is responsible for synthesizing, organizing, and maintaining an authoritative water level database for the entirety of the Kaweah Subbasin. He is using this database to create groundwater elevation contour maps, hydrographs, and other visual tools to identify and draw conclusions about groundwater level trends, surface water supply, and sustainable yield. He is also compiling a well information database for wells in and around the basin, and is helping to create a list of key wells that will be used to monitor the health of the basin over the years to come.

San Luis Obispo Valley (Edna) Groundwater Basin Characterization, San Luis Obispo County Flood Control and Water Conservation District, California. This basin characterization will provide a foundation for future SGMA efforts by the County and local stakeholders, as well as serve as the basis for developing a groundwater model. Work includes compiling available hydrogeologic data, developing a comprehensive database, analyzing geologic cross sections, conducting aquifer tests, monitoring streamflow infiltration, and overseeing monitoring well installation. For this project, Andy gathered and interpreted a wide range of lithologic and well construction data to create a series of geologic cross sections that cover the entire expanse of the San Luis Obispo Valley Groundwater Basin. He also used geographic information system (GIS) software to visualize relevant geologic data and design maps and figures.

Fringe Area Basin Characterization, San Luis Obispo County Flood Control and Water Conservation District, San Luis Obispo County, California. This project involves the hydrogeologic characterization of five geographically distinct areas that are within the Santa Maria Groundwater Basin boundaries defined by the California Department of Water Resources (DWR), but were not included in the adjudicated basin area and thus are subject to SGMA requirements. For each fringe area, GSI generated calculations of groundwater flow direction, Darcy groundwater flow quantities, well construction details, aquifer test results, and irrigated acreage. Andy gathered and interpreted a wide range of raw lithologic data to help develop geologic cross sections that contribute to GSI's understanding of the extent of hydraulic communication between the fringe areas and the adjudicated basin. He also analyzed geologic and land use data in GIS and produced the proposed basin boundary modifications for each fringe area.

Groundwater Modeling and GSP Development Support, Eastern Management Area GSA, Santa Ynez, California. Andy provided hydrogeologic and groundwater modeling support for the development of a GSP for this GSA. There are a number of complex issues in this basin that must be resolved, including analyzing potential interconnection of basin aquifers with the Santa Ynez River, evaluating complex structural geology and boundaries to flow, assessing underflow to downstream subbasins, and balancing water supply needs of various stakeholders (farmers, ranchers, grape growers, tribal governments, and domestic water users). Andy provided essential support in the development and calibration of a basinwide groundwater model using Groundwater Vistas modeling software. Andy was also responsible for synthesizing, organizing, and maintaining an authoritative well and water level database for the Eastern Management Area of the Santa Ynez Basin. He used the database to create groundwater elevation contour maps, hydrographs, and other visual tools to identify and draw conclusions about groundwater level trends, surface water supply, and sustainable yield. He also contributed to the development of a basinwide water budget by compiling and analyzing data related to historical land use and reported pumping.

Emergency Supply Water Supply Alternatives Study, Phase 2.2, Calleguas Municipal Water District (Calleguas MWD), Thousand Oaks, California. Calleguas MWD developed a Water Supply Alternatives Study to evaluate range of potential projects that could be implemented to provide supply redundancy and critical infrastructure in the event of an imported water emergency outage. Projects under consideration included ASR expansion, development of additional groundwater supplies, increasing groundwater pumping, IPR, projects related to desalters, and more. As a subconsultant to Kennedy Jenks, GSI provided hydrogeologic support to evaluate estimated yield, infrastructure needs, permitting requirements, potential for seismic resiliency, timeframe, benefits, and risks and vulnerabilities of project included in the study. Andy provided hydrogeologic technical support for this effort.



Tim Nicely PG, CHG

Senior Managing Hydrogeologist

EXPERIENCE

27 years

EDUCATION

BS, Soil Science, California Polytechnic State University, San Luis Obispo

REGISTRATIONS

Professional Geologist, California

Certified Hydrogeologist, California

QUALIFICATIONS

- Expertise in water resource management
- Expertise in assessment of groundwater basin yield, water quality, natural recharge, and sustainability
- Experience in well design, construction oversight, and maintenance
- Experience in groundwater monitoring and developing groundwater models
- Experience conducting desalination feasibility studies

Tim has 27 years of experience working with clients throughout California to manage valuable water resources. His expertise includes all aspects of hydrogeology and geology, specifically related to groundwater supply, groundwater basin analysis, and water resource management. Tim's experience includes managing and strategizing projects related to analyzing regional groundwater basins and groundwater quality studies; assessing seawater intrusion, desalination intake options, and surface water/groundwater studies; calculating perennial yield and basin water balance components; designing and overseeing construction of wellfields and monitoring wells; designing pumping tests and analyzing data; evaluating aquifer recharge options; and groundwater modeling.

REPRESENTATIVE PROJECTS

Groundwater Sustainability Plan Development, Eastern Management Area

Groundwater Sustainability Agency, Santa Ynez, Santa Barbara County. Tim served as the technical lead for the development of a GSP for this Groundwater Sustainability Agency and continues to serve in the implementation of this GSP. There are several complex issues in this basin that must be resolved, including potential interconnection of basin aquifers with the Santa Ynez River, complex structural geology and boundaries to flow, assessing underflow to downstream subbasins, and balancing water supply needs of various stakeholders (i.e., farmers, ranchers, grape growers, tribal governments, and domestic water users). Tim led the development of the hydrogeologic conceptual model, water budget, and monitoring networks sections.

Groundwater Sustainability Plan Development, Fox Canyon Groundwater Management Agency, Ventura County.

Tim was a key member of the team that assisted with the initial phases of preparation of groundwater sustainability plans (GSPs) for four basins within Ventura County. Tasks included developing the hydrogeologic baseline for each basin, establishing objectives, which were ultimately used for creating plans that are practical, adopted by stakeholders, and approved by the State of California. This was one of the first sets of GSPs statewide to be developed in response to the Sustainable Groundwater Management Act (SGMA).

Santa Ynez River Valley Groundwater Basin, Well Permit Reviews, Santa Barbara County.

In support of achieving sustainable groundwater management, Tim reviews all well permit applications for new and replacement wells within the basin's three management areas. The permit reviews are required by the California governor's Executive Order N-7-22, to ensure that any new or replacement wells will not decrease the likelihood of achieving sustainability goals within this basin.

Hydrogeologic Characterization of the Kaweah Subbasin, Tulare and Kings Counties.

Tim served as the technical lead of the team providing a hydrogeologic baseline for the creation of three GSPs within the Kaweah Subbasin of the San Joaquin Basin in Tulare and Kings Counties. Tim developed components that formed the foundation of coordination agreements between GSAs within the Subbasin, establishing objectives that are practical, to be adopted by stakeholders, and approved



Tim Nicely, PG, CHG
Senior Managing Hydrogeologist

by the State of California. To this end, Tim's team prepared all components of the water budget for the GSPs with the aim of achieving sustainability in response to SGMA. As a sub-consultant to GEI Consultants, Tim provided SGMA support services to the Mid-Kaweah and Greater Kaweah GSAs. Tim served as project manager for GSI's efforts, which included coordination with and outreach to other GSAs in the Kaweah Subbasin to develop a framework for agreement regarding data and analysis techniques for assessing groundwater elevation, groundwater extraction, surface water supply, total water use, change in storage, water budget, and sustainable yield. GSI identified data needed for SGMA GSP compliance and provided additional data collection and performed subbasin-wide groundwater modeling services to provide predictive scenarios and future water budgets. GSI then conducted a sustainability analysis, consisting of a basin characterization, water budget, and identification of strategies for achieving groundwater sustainability.

Basin Modification and Delineation/Definition of the Atascadero Subbasin, Templeton Community Services District and Atascadero Mutual Water Company, San Luis Obispo County. Tim led key technical analyses and supported a detailed geologic and hydrogeologic investigation to formally define the boundaries of a groundwater basin through extensive geologic and hydrogeologic mapping and analysis and well log review. Working with the California Department of Water Resources (DWR) in advance of the issuance of the Basin Boundary Revisions regulations, Tim helped prepare a technical report and attendant maps to formally modify and redefine the DWR Bulletin 118 basin boundaries and worked with the clients to submit the request to DWR. The submittal, based on scientific evidence, was one of the few successful scientific applications approved by DWR at that time. This new Atascadero sub-basin has enabled the two utilities to manage their groundwater resources within a definable boundary.

Expert Witness for City of Solvang, Santa Barbara County. Tim is currently serving as an expert witness on behalf of the City of Solvang in a hearing of the State Water Resources Control Board in support of the City of Solvang's change petition. The work included depositions and testimony preparation with regard to the hydrogeology and hydrogeology of the City of Solvang's wells in relation to the groundwater and surface water in the Santa Ynez River.

Aquifer Characterization and Safe Yield Analysis, Aera Energy, Pismo Beach, San Luis Obispo County. Tim conducted a groundwater basin safe yield study of an unnamed groundwater basin as part of a Supplemental Environmental Impact Report. The project included compilation of data from water and oil wells throughout the basin, preparation of geologic and hydrogeologic cross sections, groundwater level and storage volume analysis, and development of a hydrologic budget and safe yield for the basin.

Adjudicated Groundwater Basin Annual Report Preparation, Northern Cities Management Area Technical Group, Santa Maria Groundwater Basin, San Luis Obispo County. Tim served as the technical lead for the preparation and submittal of the court-mandated annual reports for the Northern Cities Management Area (composed of the Cities of Pismo Beach, Arroyo Grande, and Grover Beach, and the Oceano Community Services District [CSD]). Tim managed tasks, including sampling and monitoring of key sentry wells in the Northern Cities area to assess potential seawater intrusion and provided technical support and prepared quarterly and annual reports required by the Superior Court of California as a result of the Santa Maria Basin litigation solution.

Hydrogeologic Budget Analysis, Paso Robles Groundwater Basin, San Luis Obispo County. Tim assisted with calculation of groundwater basin safe yield by hydrologic budget and specific yield methods and assisted with GIS database compilation and creation, and report preparation.

Small-Scale Groundwater Flow and Solute Transport Modeling, Atascadero Mutual Water Company and Templeton Community Services District, San Luis Obispo County. Tim has been involved in multiple projects involving the evaluation of different scenarios of recharge in percolation ponds, their impacts on groundwater storage and groundwater quality, and the stream-aquifer interaction of the Salinas River and the channel alluvium. The projects included the collection and analysis of new and historical data (e.g., aquifer tests, boring logs, water levels, river flows); coordination with the local water providers; and evaluation of different recharge scenarios.



Ailco Wolf PG, CHG **Principal Hydrogeologist**

EXPERIENCE

26 years

EDUCATION

MS, Hydrogeology, University of Arizona – Tucson

BS, Geology, Pitzer College

REGISTRATIONS

Professional Geologist:
California

Certified Hydrogeologist:
California

QUALIFICATIONS

- Experience in watershed modeling, and groundwater and transport modeling, salt balance modeling, and developing lithological models
- Expertise in basin evaluations
- Expertise in water resource management
- Experience in well design, construction oversight, and maintenance
- Expertise in characterization of contaminant plumes
- Experience in aquifer recharge pilot testing
- Expertise in water quality sampling and analysis of lab results

Ailco has 26 years of experience in groundwater supply and basin management for clients throughout California. His expertise includes supply development with recycled water, stormwater capture, and artificial recharge projects. An experienced groundwater modeler, Ailco has conducted numerous aquifer and basin-wide studies to determine available groundwater supply by developing groundwater and watershed models to resolve groundwater and groundwater/surface water interaction issues in collaboration with involved stakeholders. Ailco is part of GSI's team of groundwater specialists that addresses the complex issues arising from California's Sustainable Groundwater Management Act (SGMA).

REPRESENTATIVE PROJECTS

Groundwater Sustainability Plan (GSP) Development and Modeling under SGMA, Santa Clarita Valley Water Agency (SCV Water), Santa Clarita Valley, California. Ailco conducted groundwater modeling in support of the development of the GSP for the Santa Clara River Groundwater Basin East Subbasin in Santa Clarita. Ailco applied a multi-layer numerical groundwater flow model using the MODFLOW-USG software to provide flexible gridding to support the technical evaluations required by SGMA rules for GSP development. His work included model construction, water budget analyses, assessments of whether the basin is currently in a long-term sustainable condition, and derivation of quantitative criteria for evaluating future basin conditions.

Groundwater Modeling for Floodplain Reconnection, The Klamath Tribes, Klamath Falls, Oregon. Ailco served as the lead groundwater modeler for an effort to identify areas where floodplain reconnection efforts in the Sprague River Basin would improve streamflow during low-flow periods, ease flooding, and improve water quality by removing pollutants and storing sediment. Ailco and the project team used an existing USGS MODFLOW regional groundwater flow model to create a locally focused model of the Sprague River watershed and then conducted quantitative evaluations of three unique floodplain reconnection concepts. The modeling team evaluated the effects of different floodplain reconnection projects by placing a series of water level targets in the model within the floodplain areas throughout each river reach and comparing the change in groundwater levels and groundwater-surface water fluxes between the final baseline model run and the project simulations.

Groundwater Modeling to Support GSP Development, San Luis Obispo County, San Luis Obispo, California. Ailco was the lead modeler for GSI's efforts to support the development of the GSP for the San Luis Obispo Valley Groundwater Basin. Ailco used the fully integrated USGS GSFLOW model to represent the complete watershed simulating the surface water, vadose zone, and groundwater/surface water interactions of the basin. The model results were used to assess strategies for achieving groundwater sustainability. The integrated model addresses climate change assessments to provide predictive scenarios and water budgets for SGMA's Sustainable Management Criteria (minimum thresholds and measurable objectives) to achieve sustainability in the Basin by 2042.



Ailco Wolf, PG, CHG
Principal Hydrogeologist

Groundwater Modeling for SGMA Support Services, Kaweah Groundwater Sustainability Agency (GSA), Tulare, California. Ailco was the lead modeler for GSI's efforts, which included coordination with and outreach to other GSAs in the Kaweah Subbasin to develop a framework for agreement regarding data and analysis techniques for assessing groundwater elevation, groundwater extraction, surface water supply, total water use, change in storage, water budget, and sustainable yield. The collected data provided the basis for new groundwater model that included climate change assessments to provide predictive scenarios and water budgets. The model results were used to assess strategies for achieving groundwater sustainability. Ailco also provided a review of the draft Mid-Kaweah GSA Groundwater Sustainability Plan.

Groundwater Modeling for the Arroyo Grande Subbasin, County of San Luis Obispo, California. Ailco led the groundwater modeling effort for the Arroyo Grande Subbasin GSP as a subconsultant to an engineering firm. He developed a transient integrated surface water/groundwater model using the public domain modeling platform GSFLOW. Additionally, in collaboration with GSI, RTI International dynamically linked the GSFLOW model to a reservoir operations model (MODSIM) to simulate future Lopez Lake Dam releases based on GSFLOW modeled surface flows from contributing watersheds. The Arroyo Grande Subbasin model was extended to the coastal Santa Maria River Valley Groundwater Basin (SMRVGB) to simulate stream flow in the Arroyo Grande Creek to the ocean by repurposing the existing SMRVGB SEAWAT model. The coastal Arroyo Grande Model simulates the groundwater/surface water interactions on a daily time scale from Lopez Dam to the ocean and was qualitatively calibrated to a recently completed synoptic surface water flow study. The integrated model addresses climate change assessments to provide predictive scenarios and water budgets for SGMA's Sustainable Management Criteria (minimum thresholds and measurable objectives) to achieve sustainability in the Basin by 2042.

Indirect Potable Reuse Project, Water Replenishment District, Pico Rivera, California. Ailco provided field management and oversight services for the design, construction, and testing of three large-diameter recharge wells and three sets of nested monitoring wells for an indirect potable reuse project. As the owner's agent, GSI provided contractor oversight, detailed documentation, quality assurance inspection, and aquifer test analysis to develop operational criteria for each well. The recharge wells will be used to inject highly treated recycled water into deep aquifers to replenish the groundwater basin. Ailco also provided project support for the siting, design, and future installation of four or more large-diameter injection wells. The injection wells will deliver increased storage capacity during peak treatment plant production and will play a role in replenishing aquifers in the LA basin. His responsibilities for this part of the project included well site evaluation, hydrogeologic interpretation, well design, and estimation.

West Coast Basin Barrier Project (WCBBP), West Basin Municipal Water District, Santa Monica, California. The WCBBP was established to protect the West Coast Ground Water Basin in Los Angeles County from seawater intrusion by creating a pressure ridge through injection. Water is injected into the aquifer by a series of 153 injection wells along the Santa Monica coastline. While at a prior firm, Ailco served as project manager and groundwater modeler for the refinement and update of the SEAWAT groundwater flow and solute transport model of the West Coast Basin Barrier Project. Improved the calibration of existing flow and solute transport model to better estimate injected recycled water residency time and potential impact on nearby production wells for annual permit requirements for the Regional Water Quality Control Board.

Atascadero Basin Groundwater Model Update and Monitoring Network Improvements, Atascadero Mutual Water Company (AMWC), Atascadero, California. Ailco is leading an effort to help AMWC develop an updated Basin-specific integrated surface water/groundwater model. Work has included refining the hydrogeologic conceptual model, including building a detailed 3-D geologic model of the Basin using Leapfrog® Works. Ailco incorporated the Leapfrog® geologic framework into MODFLOW aquifer layering scheme. To integrate surface water components into the groundwater model, Ailco made use of the recently available 270x270-meter gridded Basin Characterization Model (BCM), which is a California statewide surface water balance model developed by the U.S. Geological Survey. The BCM data set is a monthly historical dataset from 1896 through 2022 and has incorporated many climate change models up to future year of 2099. The innovative use of incorporating BCM data into a groundwater model has provided a much more cost-effective way to integrate surface water and groundwater on a monthly timeframe than other more common means of integrating surface water with separate watershed models like HSPF or GSFLOW. The BCM data as input to the groundwater model provided excellent flow calibration at the Salinas River USGS stream gage.