



## Technical Memorandum

**To:** Eastern Idaho Water Rights  
Coalition

Modeling Committee Meeting  
January 8, 2025

**From:** Thane Kindred, GIT  
Rocky Mtn. Environmental

**Date:** February 13, 2025  
**RMEA Project No.:** 11-0147

**Subject:** Eastern Snake Hydrologic  
Modeling Committee

Dear Coalition Members:

On January 8, 2025, Thane Kindred, a representative of Rocky Mountain Environmental Associates Inc. (RMEA) participated in the meeting of the Eastern Snake Hydrologic Modeling Committee (ESHMC) on behalf of the Eastern Idaho Water Rights Coalition (EIWRC). The meeting was held in a hybrid format with attendees participating both in person and remotely. RMEA chose to attend remotely to control costs but also on the basis that, other than IDWR personnel, all others participated remotely as well. The last meeting was also a hybrid format in September of 2024.

This letter reports the proceedings of the January meeting. The agenda and presented materials are available at:

<https://research.idwr.idaho.gov/files/projects/espam/browse/meetings/2025-ESHMC/20250108/>

RMEA has archived these files available to date, in case on-line availability should be become unavailable.

Important take-aways from this meeting and from internal RMEA discussion regarding the meeting are as follows:

- Mile Post 31 (MP 31) is one of Idaho's most successful recharge basins. The discussions during the meeting seem to suggest that IDWR is hoping to replicate this success at other locations. Though the success of MP 31 should be acknowledged, replicating this recharge basin may prove difficult. Additionally, the success of MP 31 in terms of recharge quantity may be related to an increased risk of aquifer impacts from both chemical and biologic sources. As water users across southern and eastern Idaho work to implement more recharge programs, both the successes and potential concerns of MP 31 should be considered.

- Jennifer Sukow continues her work to improve the calibration methods used in the model. The changes Sukow presents are largely positive, and the transparent nature of her work is commendable. The work she is doing will likely result in improvement of the model.

Attendance

The meeting was well attended. The attendance lists presented in this letter are based on RMEA notes taken during the meeting as the IDWR list has not been posted to date:

- Jennifer Sukow, Idaho Department of Water Resources (IDWR);
- Michael McVey, IDWR.

These other member participants attended remotely:

<b>Name</b>	<b>Affiliation and/or Representing</b>
Bob Turner	Idaho Ground Water Appropriators (IGWA)
Caitlyn Swanson	
Clarence Robison	University of Idaho
David Hoekema	IDWR
Neal Farmer	IDWR
Davis Jeffery	
Ethan Geisler	
Greg Sullivan	Spronk Water Engineers, Inc
Jeremy Dalling	USBR
Jennifer Cuhaciyen	
Justin Ferguson	
Sophia Sigsted	Lynker, on behalf of IGWA
Thane Kindred	RMEA on behalf of EIWRC
Willem Schreuder	Principia Mathematica on behalf of Idaho Power & Surface Water Interests

The meeting did not include introductions and the Webex meeting interface did not give associations, so these names are supplied from memory, or not at all, if we were unfamiliar with the participant.

Discussions during the meeting were friendly and cordial. As it was difficult to see in-person attendees and it was not possible to view remote attendees, RMEA was not aware of body language and/or visual cues from participants.

Presentations and Discussions

The agenda included three presentations:

1. *Walcott drawdown and MP 31 recharge*– Neal Farmer
2. *New model calibration targets* – Jennifer Sukow

### 3. *Model calibration update* – Jennifer Sukow

Though all three presentations were eventually made, the majority of the meeting time was spent on the first presentation, leaving little time for the remaining two. The following details are kept brief. More details can be provided upon request.

1. *Walcott drawdown and MP 31 recharge*: Despite the title of this presentation listing Walcott drawdown first, Neal Farmer spent most of his time discussing MP (mile post) 31 recharge. MP 31 is located east of Jerome and has been one of (if not the) state's flagship recharge site since 2013 when it was initially used by the Idaho Water Resource Board (IWRB). In this presentation, Farmer showed data explaining how and why MP 31 is successful as a recharge basin. Farmer showed pictures of deep crevasses that have now formed in the basin, likely as a result of sediment washout surrounding near-surface basalt features. These washout crevasses allow water to quickly enter the aquifer. Later in the presentation, Willem Schreuder hypothesized that aquifer parameters, such as transmissivity, have changed in this region (as a result of recharge) thus allowing increased recharge rates. Farmer indicated that in most basins, a "sediment cap" is formed at or near the surface that results in slower recharge rates, but that the washout observed may indeed have caused changes of transmissivity in the aquifer.

As one of the more successful recharge basins in Idaho, IDWR seems to be interested in MP 31 as an example of how to manage recharge sites in other parts of the state. As RMEA has reflected on this presentation, the success of MP 31, in terms of recharge quantity, stands out as something that should be recognized. However, there are also aspects of the recharge that may be difficult to replicate. Specifically, the washout observed likely requires the presence of near subsurface basalt features that may or may not be present at other potential recharge basins. Additionally, RMEA is concerned that the washout that seems to allow increased recharge rates may put the aquifer at risk for unintended impacts to aquifer water quality. The sediment that exists along the bottom of most recharge basins act as a filtration system that prevents most bacteria and contaminants from entering the aquifer. Without said sediment filter, impacted water may more readily enter the aquifer, where it may be difficult or near impossible to remove.

RMEA will continue to monitor IDWR's attitude toward recharge as it will likely impact how entities in eastern Idaho continue to plan their mitigation strategies in the coming years.

2. *New model calibration targets*: Possibly the most important part of building a groundwater model is the calibration step that works to make the model an accurate representation of the aquifer. This is done in part by establishing a series of known parameters, like groundwater levels and/or discharge from a spring, that the model must meet. These known parameters are called calibration targets by ground water modelers. In this presentation, Jennifer Sukow recommended adding calibration targets to the model in two ways. First, she added new target locations with the goal of filling data gaps. In total, she suggested adding 34 locations spread throughout the model boundary. Second,

Sukow suggested adding a number of “new” parameters by which she could judge the model. Schreuder challenged Sukow’s addition of these parameters by pointing out that these “new” parameters are not truly “new.” In response, Sukow indicated that Schreuder was correct. The “new” parameters represent a different way of looking at parameters that are already included in calibration. The addition of these parameters is to constrain the changes that PEST (parameter estimation software) makes when calibrating the model. Additionally, having the model calibrate to these parameters helps Sukow to understand the changes that PEST is making.

At the end of this presentation, Sophia Sigsted asked to see intermediate runs to explore how individual targets affect the model results. Sukow resisted this advice saying that running the model is non-trivial and that performing intermediate model runs will add a lot of time to her work. Sigsted did not argue with Sukow over this point, but past discussions with Sigsted suggest that she did not agree with Sukow on this point.

In past letters (specifically see the one dated June 9, 2023) RMEA has indicated that PEST can be used to greatly enhance model accuracy, though its use in the model has, in our opinion, not always been defensible. The fact that Sukow is willing to look at how PEST affects the model and make appropriate adjustments is both admirable and anticipated to be beneficial to the model.

3. *Model calibration update:* In this presentation Sukow indicated that she would be reconfiguring the pilot points used in future versions of the model. Pilot points are selected locations within the model boundary where an aquifer parameter (or a set of aquifer parameters) are estimated. These aquifer parameters can then be interpolated across the model boundary. Sukow indicated that the new configuration would include points at 10-mile intervals with additional points where the model struggles to make accurate predictions.

At first glance, adding additional pilot points to areas where aquifer parameters vary seems beneficial, however upon reflection RMEA is concerned about the use of these points in the development of the model. The statistical interpolation tools used rely heavily on the similarity between points that are spatially close to each other, a property known as autocorrelation. By only adding pilot points to areas where aquifer parameters are known to vary, Sukow may be artificially decreasing autocorrelation across the aquifer. This artificial decrease in autocorrelation, should it indeed occur as a result of these additional pilot points, would decrease the accuracy of the interpolation tools and thus decrease the accuracy of the model. There was not sufficient time to discuss this concern during the meeting, so I (Thane Kindred) contacted Sukow via email to express these concerns. Sukow responded cordially and indicated that she would look further into the interpolation methods used by the model. She also indicated that this may be a topic for discussion in future ESHMC meetings.

#### Next Meeting

At the end of this meeting, Sukow indicated that the next meeting may be exclusively focused on model calibration. The next meeting is currently scheduled for early in May, 2025, but a specific

date has not yet been set. IDWR committee personnel have not yet indicated that this meeting will be hybrid, but it seems likely that future meetings will keep the same format as recent ones.

We appreciate the opportunity to do this work and look forward to serving EIWRC in the future. Feel free to contact us either by email or by phone if there are any questions or if you would like to discuss these topics further.

Thanks,

A handwritten signature in blue ink that reads "Thane R Kindred". The signature is fluid and cursive.

Thane Kindred  
Staff Geologist

Reviewed by

A handwritten signature in blue ink that reads "W. Roger Warner". The signature is bold and cursive.

W. Roger Warner  
Principal Hydrologist