

**EASTERN VIRGINIA GROUNDWATER MANAGEMENT ADVISORY  
COMMITTEE AND THE DEPARTMENT OF ENVIRONMENTAL  
QUALITY**

Bank of America Building, 3<sup>rd</sup> Floor Multipurpose Meeting Room, 1111 East Main Street,  
Richmond, VA 23219

**November 28, 2023  
10:30 AM**

**FINAL MEETING MINUTES**

<b>Committee Members Present</b>	
John Aulbach – Aqua Virginia	Kurt Stephenson – Virginia Tech
Dan Holloway - HRSD	Nathan Thomson – James River Association
Robert Pickett – NN SWCD	Bryce Young – King George County
Doug Powell – James City County	Andrea Wortzel – Mission H2O

*For the record, the following members were absent from the meeting: Chief Steve Adkins – Chickahominy Tribe; Mark Bennett – USGS; Nina Butler – WestRock; Hope Culpit – SERCAP; Patrick Fanning – Chesapeake Bay Foundation, Zach Jacobs – Virginia Farm Bureau; David Jurgens – City of Chesapeake; Whitney Katchmark – Hampton Roads Planning District Commission; Stewart Leeth – Smithfield Foods; John Loftus – VA Economic Development Partnership; Keith Martin – Chamber of Commerce; Christopher Miller – King George County; Al Moor – Western Tidewater Water Authority; John O’Dell – VA Well Drillers Association; Mike Rolband – DEQ; Stephen Schoenholtz – VA Water Research Center; Dr. Karen Shelton – VDH; Kellan Singleton – Accomack – Northampton PDC; Robert Wayland – Citizen-at-Large*

<b>Department of Environmental Quality Staff Present</b>	
Brendon Brogan	Wes Myers
Scott Bruce	Bill Norris
Koltyn Caricofe	Matt C. Richards
Weedon Cloe	Eric Seavey
Allison Dorsey	Dallin Walker
Liz McKercher	

<b>Interested Parties</b>	
Ken Bannister - KBJW	Jason Early - SANTEC
Glanda Booth - Tauxemont Community Association	Ivy Ozmon – Hampton Roads Planning District Commission
Brad Copenhaver – VA Agribusiness	Robert J. Surovell – Tauxemont Community Association

## **Meeting Notes**

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### **Welcome and Introductions:**

Mr. Weedon Cloe, Manager of the DEQ Office of Water Supply, convened the meeting at 10:30 AM. He welcomed members to the Fall Meeting of the Eastern Virginia Groundwater Management Advisory Committee. He noted that the Office of Water Supply is responsible for managing both the groundwater and surface water resources of the state. The office is also involved in drought monitoring and various other things related to Virginia’s water resources and water supply. He noted that members of the DEQ Groundwater Characterization Team as well as members of the Water Supply and Analysis Team in attendance at today’s meeting.

Committee members and interested parties introduced themselves and the organizations they represented.

### **Meeting Agenda:**

Mr. Cloe went over the planned meeting agenda outline.

- Presentation by Todd Wood with Aquaveo – 2022 – 2023 Annual Simulation of Reported Use and Total Permitted Groundwater Levels
- Open floor for public comment

### **Presentation (Remote Presentation):**

Weedon Cloe introduced Todd Wood. Todd is a consulting engineer for DEQ with Aquaveo. He has worked for Aquaveo for 15 years as a water resources engineer. Aquaveo is a private consulting firm out of Provo, Utah that specializes in hydrogeologic, hydraulic and hydrology modeling. They are our first and foremost authority when it comes to our groundwater modeling.

Todd Wood with Aquaveo provided an overview of their 2022-2023 Annual Simulation of Reported Use and Total Permitted Groundwater Levels report for Virginia. He noted that he would be presenting an update their efforts on updating the multi-coastal plain as well as the Eastern Shore models that were completed a couple of months ago.

He provided an outline of the materials for his presentation. The presentation will include some general information about the models; what the models are; where they are located and how they are constructed; then there will be some discussion about the reported use versus total permitted results and what those terms mean; then we will talk about critical cells since that term comes up in the presentation and throughout the various aspects of the modeling efforts and then a look at the results. The 2023 results will include the Coastal Plain which includes both the 2022 reported

use results as well as the 2023 Total Permitted results. Then the presentation will look at the results from the Eastern Shore Model.

Todd reviewed the slides with the group. His presentation included the following:

- The Coastal Plain model includes about 770,000 cells in the grid pattern and the majority of the cells are one square mile. There are some larger cells that are located outside of the area that the model is applied to.
- The Eastern Shore model only covers the Eastern Shore portion of eastern Virginia. Even though this model covers a smaller area it includes a greater number of cells. It includes about 1 million more cells. That is because the cells in the grid for this area are 1,000 square feet.
- Both models were developed by the USGS to simulate groundwater levels, groundwater flow and to predict changes that can occur based on different scenarios.
- Aquaveo has taken these models and have updated them each year with the latest information available. Those updates include two versions of each of these models. So, there are actually four models being used.
- The first version of each model is called the Reported Use Model. The Reported Use Model essentially just uses the latest reported well pumping amount at each facility. It takes that latest amount and just projects that into the future using the last five years of reported pumping. So, we take the historic portion of the model which is everything before the projected portion which began in January of 2023. The information that is collected about pumping is really for the previous year, so the 2022 pumping information is what is incorporated and then the projection is made 50 years into the future. The reported use simulation uses the last five years. So, in this case that is 2018 through 2022. The model uses the last five years of pumping, it takes an average value at each well and it just repeats that value 50 years into the future. The end of this year's simulations goes through the end of 2072.
- The Total Permitted Use Simulation is the same process as that used for Reported Use except that instead of using the five-year average in the 50-year projected portion, it will instead use the total permitted amount for each facility proportionally distributed across the different wells. It just repeats that maximum value 50 years into the future.
- Defining a Critical Cell: First thing we have to look at is the top of the aquifer. Each aquifer has a top elevation. There are multiple aquifers in each of the models and the aquifers are a little different in each of the models. Then in addition to the "top of the aquifer" we also have a "ground surface elevation". So, if we think about those two elevations, the critical surface is really just a function of those two surfaces. The critical surface is defined as 80% of the distance from the ground surface down to the top of the aquifer. Any water level or any cell in either of the models has a water surface that drops below that critical surface is defined as a "critical cell". Critical cells are tracked closely.

- Additional information not covered in this summary presentation about maps, any aquifers and any scenarios not covered in this presentation are included in the full annual report that has been developed and that is available from the department.
- **Coastal Plain Reported Use:** The question that we are trying to answer is how much water was withdrawn from the Coastal Plain Model in 2022? A brief summary of the reported use simulation was discussed with the group. This simulation shows patterns over time and includes the value that was developed from the model last year as well as the total reported use from the model for the Coastal Plain Model. That figure is broken down into the Virginia Reported Use from 2022 and then there is the Maryland and North Carolina Reported Use for the same period. There is a small portion of each of these states included in the Coastal Plain Model. The pattern for this simulation has stayed fairly consistent over the last decade. It has essentially stabilized. This year's use value is very similar to last year's value. Note that there was a slight increase in the reported use value last year. The 2022 Reported Use is very close to what was reported in 2021. This portion of the report also includes a visualization of some of the bigger users in the Coastal Plain. The break down of these larger users includes International Paper and West Rock as well as the rest of the groundwater initiative facilities and their reported use and how that has changed over the years. Again, this year's value is very similar to last year's value. The report also looked at the reported use values from the perspective of where the water was coming from as far as from which aquifer. In looking through the information on the various aquifers and the reported use values the distribution is very similar to that reported in last year's report, with only slight differences. The Potomac Total Reported Use went up slightly. The distribution among the other aquifers is very similar. There was a slight drop in the reported use from the Aquia but the other aquifers were essentially the same. The total reported use increased slightly from last year but is very similar. About 88% of the total reported use from the Coastal Plain Model is coming from the Potomac. The report also includes a visualization of the reported use by county in the form of essentially a "heat map" where the warmer the color, the more water that was reported in 2022 and the cooler colors represent lower amounts that were pumped. The top three counties are King William, Isle of Wight and Suffolk. The report also looked at the groundwater levels in the aquifers. The critical cells are shown as "yellow cells" on the report graphs. The report also identifies those cells where the water level has not only dropped below the critical surface, but has also dropped below the aquifer top elevation. These cells are shown as "red" in the graphs. These are the "extra critical" cells. The majority of the critical cells and then all of the cells that have gone below the aquifer top elevation are in the fall zone along the western edge of the model. The report also includes a "difference map" which shows how the water levels are different this year then last year's reported use. In these maps "blue" means that the water use has increased since last year and "red" means it has decreased.
- **Coastal Plain Total Permitted Use:** The question that we are trying to address in this simulation is how much water is permitted to be withdrawn? This is essentially a look at what the values would be if everyone pumped the maximum amount that they were permitted to withdraw from the Coastal Plain in 2023. Tables showing the total permitted amount by Groundwater Initiative Permitted Wells and then Non-Permitted Reported Use Wells as well as the Maryland and North Carolina Reported Use for the Coastal Plain were presented as part of the summary report. The average withdrawal from Groundwater Initiative Wells in 2023 decreased very slightly but is essentially the same as last year's

amount. The report also provides a breakdown of the withdrawals by county and/or city and the percentage of their total permitted use that they are withdrawing. The total permitted use withdrawals are also provided by aquifer.

- The take-away is that there is not a whole lot of difference between the values and simulation from last year and this year for the Coastal Plain.
- **Eastern Shore Model – Reported Use:** The same questions and scenarios addressed for the Coastal Plain were also presented and discussed for the Eastern Shore Model. The pattern for the Eastern Shore is a little different than that for the Coastal Plain. There have been some oscillations over the last few years with a general trend upward. This last year there has been a bit of an uptick across both Accomack and Northampton Counties. The reported use values for the Eastern Shore over the previous two years has gone up slightly. There have been some patterns in use up and down and some oscillations where we have some peaks and valleys in use but over the last several years there has been a trend upwards in the Virginia Reported Use for the Eastern Shore Model. This information was also presented and discussed by aquifer. The total reported use for the Eastern Shore has increased in 2022.
- **Eastern Shore – Total Permitted Use:** The same questions and scenarios address for the Coastal Plan were also presented and discussed for the Eastern Shore Model. There is an increase across the board in the report in the Total Permitted 2023 simulations for the Eastern Shore. In terms of “reported use”, in Accomack County approximately 68% of the Total Permitted is actually being used, while in Northampton the total being used is approximately 49%. So, for the Eastern Shore the total of the reported use as a percentage of the permitted use is approximately 63%. For the first time, there have been some critical cells that have shown up as part of this year’s simulation. These critical cells have shown up in the Upper Yorktown (5 critical cells) and the Middle Yorktown Aquifers (3 critical cells).
- **Eastern Shore – Chloride Concentrations:** This is an evaluation that is done in the simulation for the Eastern Shore but not the Coastal Plain models. This simulation and evaluation look at the patterns of how much saltwater intrusion or patterns of saltwater intrusion are happening along the coast. The maps in the report show “blue” where there is basically freshwater and “red” where there is saltwater, so that you can see the interface between them and where we have chloride concentrations that are encroaching on the coastline. The report also includes “differences” maps that the total permitted chloride concentrations versus the reported use of chloride concentrations by aquifer. The “blue” areas are where there are less chloride concentrations and the “red”, “yellow” and “orange” areas are where there is a positive increase in concentrations.

### Questions:

- **What explains the new “hot spots/critical cells” that show up in the Eastern Shore Model simulation in the Yorktown Aquifer?** There are five critical cells in the Upper Yorktown and three in the Middle Yorktown. The critical cells in the Upper Yorktown are right at Tysons. The Total Permitted Use for Tysons increased significantly this year. So, these critical cells were expected due to that increase. The water levels prior to that increase were pretty close to the critical level already. The substantial increase in the Total Permitted Use for Tyson’s resulted in those critical cells in this model/simulation. For the Middle

Yorktown there were three critical cells. These cells are pretty close to Purdue, which is the other big user in the area. There was no change in the Total Permitted Use for Purdue, but the water levels were already really close to the critical level. The critical cells could just be a combined effect of increases in withdrawals at other nearby facilities, including possibly the increase at Tyson's.

- **Increases in Use – Clarification: Were those increases in withdrawal amounts were the result of changes in permitted amounts?** Yes, the increases were the result of changes in the Total Permitted Use as identified in the permits for the facility.
- **Regarding the “critical cells” identified in the presentation along the Fall Zone”, what is the basis for those? Are they “historic” or “natural cells”? How many of those “critical cells” would be naturally occurring critical cells due to the shallowness of the aquifer at that point versus critical cells caused by withdrawals?** There are certain cells that are “critical” even if we were to turn off all pumping. Those cells are would be “critical” when we turn off all pumping are referred to as “historic critical cells”. The “critical cells” represented in the presentation are those that are created due to permitted withdrawals. There are certain cells that are “critical” even if we were to turn off all pumping. Those cells that would be “critical” if we were to turn off all pumping are referred to as “historic critical cells”. The map as presented does not label which critical cells are historic cells along the edge of the “Fall Zone.”
- **In terms of “withdrawals”, are things relatively steady? Is it correct that there have not been big changes in water levels or withdrawals? Is that because of withdrawal patterns? Is there evidence of any recharge effecting this amount? Was the steadiness seen in the withdrawal amounts comparing last year to this year the result of “static withdrawals” or are they related to “recharge”?** Something to keep in mind when looking at the data presented in the report is that those linear contour lines represent 30-to-40-foot intervals, so you really can't get the full picture just by looking at those maps, because those contour intervals are very large. It is hard to see any differences at that scale. There are differences and the differences are pretty much on par with what we have seen over the last several years. So, there are differences but they tend to be more localized and are harder to see. To be able to see those differences, you have to look at the whole picture. You need to look at the breakdowns by county and by aquifer and the differences maps. As far as the changes in water levels go, over all the water levels have remained relatively stable, but that being said, there have been changes at the local level and at a local scale. In regard to “recharge”, each year the recharge values are updated based on the latest data available. All the results presented in this report are reflective of changes in recharge information that has been collected and incorporated into the models. The question of whether the changes in withdrawals are large or small really depends on the scale that you are looking at and the way that you are looking at the results.
- **Critical Cells on the Eastern Shore: Would those new critical cells identified on the Eastern Shore as a result of the Tyson's and Purdue operations have been predicted during the technical analysis performed prior to permitting?** Technical evaluations were done for both operations in the last year. The technical evaluation of Purdue was done most recently. Yes, those critical cells did show up during the technical evaluations for the permits. The technical evaluation for Tyson's was done a few years ago That was the first time that Tyson's had been permitted.

**ACTION ITEM:** The department will make this summary report as well as the full report on the findings of the 2022 – 2023 Annual Simulation of Reported Use and Total Permitted Groundwater Levels available to the Advisory Committee as well as members of the interested public.

**Committee Comments:**

- **Andrea Wortzel with Mission H2O** – This committee had made some recommendations with respect to studying “groundwater trading” and there was a report that was generated on the potential for “groundwater trading”. She requested that the concept of “groundwater trading” be considered as a topic for discussion at the next or a future meeting of this advisory committee, so that the committee could review the recommendations and consider whether this was something worth pursuing. Other members agreed that “groundwater trading” should be considered for discussion at a future meeting of the committee. Weedon Cloe responded that if this is something that the committee members would like discussed, the topic could be addressed at a future meeting.

**ACTON ITEMS:** Andrea Wortzel will provide a link to or a copy of the Groundwater Trading” Report to share with the group.

**Public Comments:**

- **Glenda Booth – Tauxemont Community Association - What are the implications of this report for DEQ and its permitting decisions? What advice do you have for entities that have to get permits.?** Weedon Cloe responded that these reports are paramount and form the foundation of the agencies permitting decisions. These reports are reviewed and discussed with our Office of Water Withdrawal Permitting. Having the ability to look at and identify new critical cells that are formed and to identify changes in groundwater surface levels allows us to make better decisions related to permitting. It also helps in identifying potential causes for these changes in groundwater levels and why these critical cells are forming.
- **Glenda Booth – Tauxemont Community Association - What does that mean?** Weedon Cloe responded that it means that we have the data now to support permitting decisions that are empirical, that are derived from a model based on actual observations.
- **Glenda Booth – Aquifers: There was a report, three or four years ago that said in general that the aquifers were declining and that withdrawals were being done at an unsustainable rate. Is that still the case?** Weedon Cloe responded that he would like to think that DEQ has been doing a better job of permitting these establishments. DEQ has certainly turned up the volume on the review and approval of permits, where in the past they may have languished for years and folks were going off of historic permits and maybe the permits weren’t as technically sound. Today permits applications and permits are looked at with a high degree of certainty and scrutiny. Eric Seavey added that DEQ definitely add it into the permits, especially for the larger users, especially in the area of investigations for alternate sources other than the confined aquifer systems, especially for the Potomac. Weedon Cloe noted that the DEQ Groundwater staff is very much involved in helping to provide some technical guidance to some of the new permittees by going out and assisting them in the siting and the establishment of monitoring wells. We are trying to do a better job.

- **Andrea Wortzel – Mission H2O - EVGWMAC Member: Future Meeting Topic – This discussion has been good and some good points have been made. There were a series of actions that were taken in the 2017 time period when the aquifer was identified as being over allocated to try to bring that under better control. Could we look at some “heat maps” from the 2017 time period versus what we are seeing today to help identify those changes at a future meeting? From the reports that we have received recently it does appear that things have improved and maybe showing that visually might help to confirm that assumption.** Weedon Cloe noted that was a good idea. Certainly, looking at things on a longer time line of five or 10 years, versus a comparison of last year’s versus this year’s data, might be very helpful in visualizing whether or not the changes have been positive rather than negative.

#### **Next Committee Meeting:**

Mr. Cloe suggested that the next meeting of the advisory committee be in February. The meeting will either be at the Bank of America Building or possibly at an alternate location to be determined.

#### **Approval of Meeting Minutes:**

The committee approved the notes/minutes from the June 15, 2023 meeting of the EVGWMAC with the notation of one spelling correction.

#### **Adjournment:**

Weedon Cloe thanked all of the members of the committee and the interested public and Todd Wood for his presentation and closed the meeting. The meeting was adjourned at 11:37 AM.