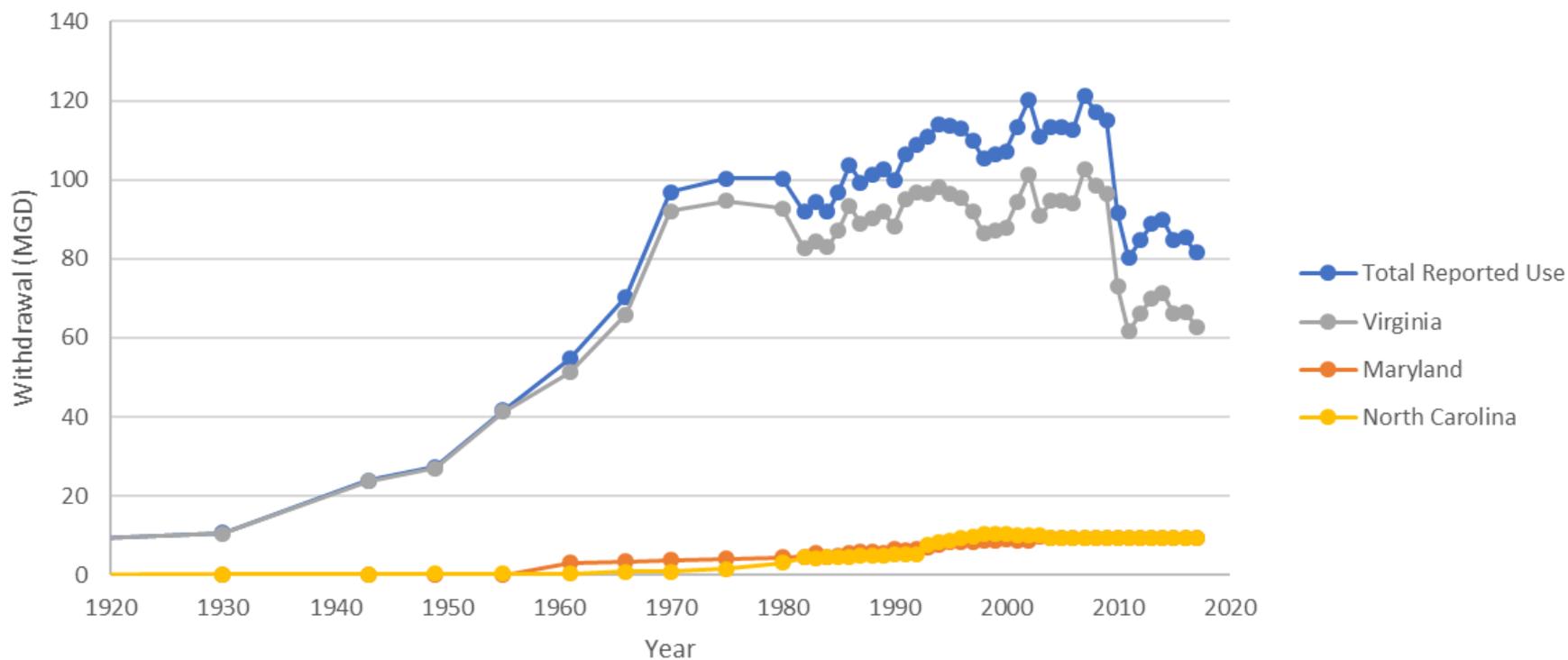


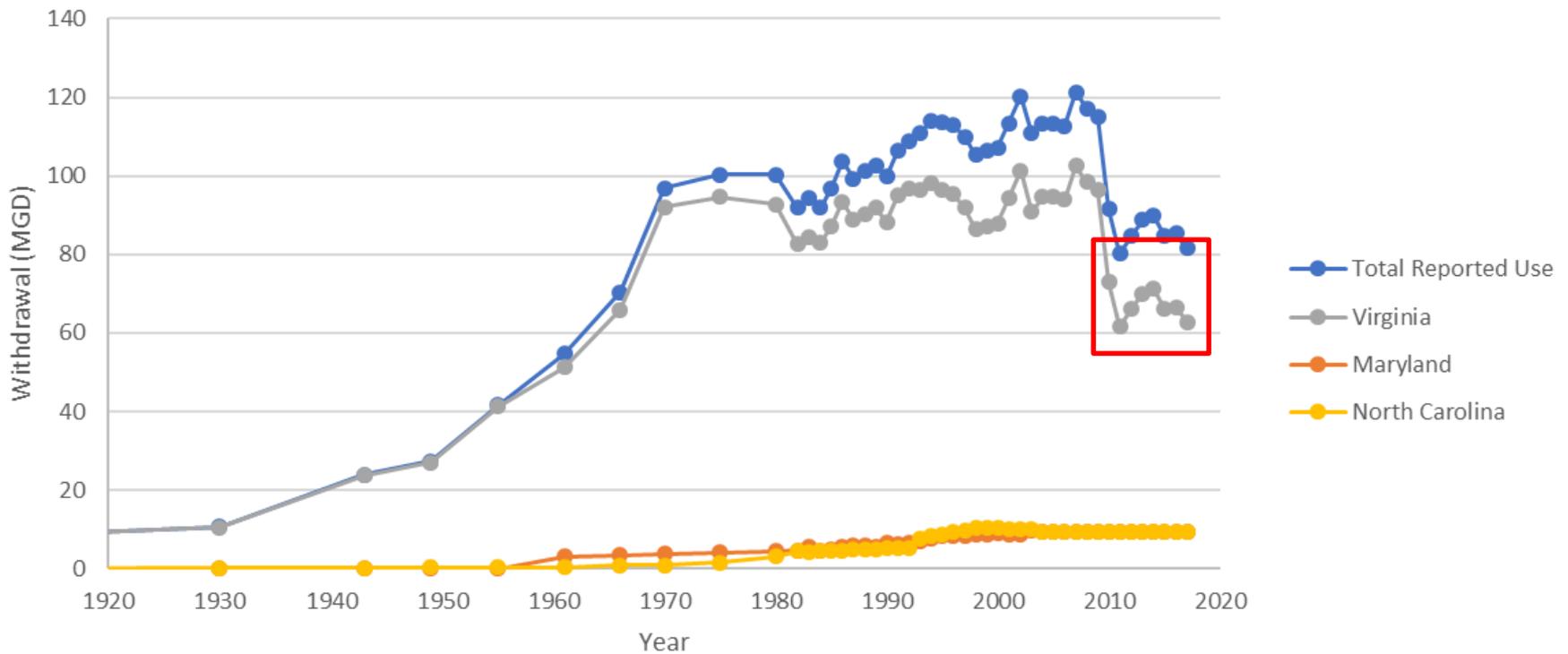
VCPM: 2017-2018 ANNUAL SIMULATION OF REPORTED AND TOTAL PERMITTED USE



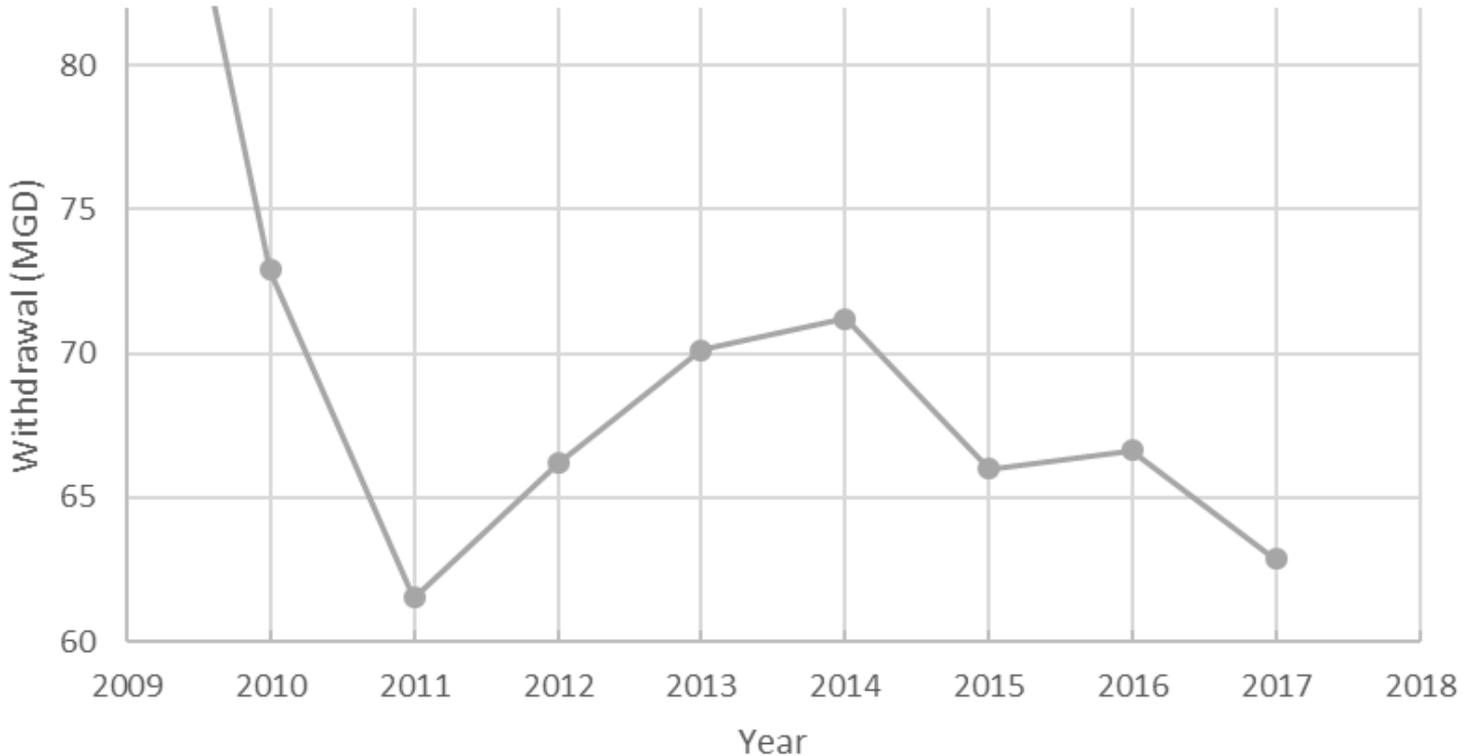
Groundwater Withdrawals from Confined Aquifers in VAHydro-VCPM (MGD)



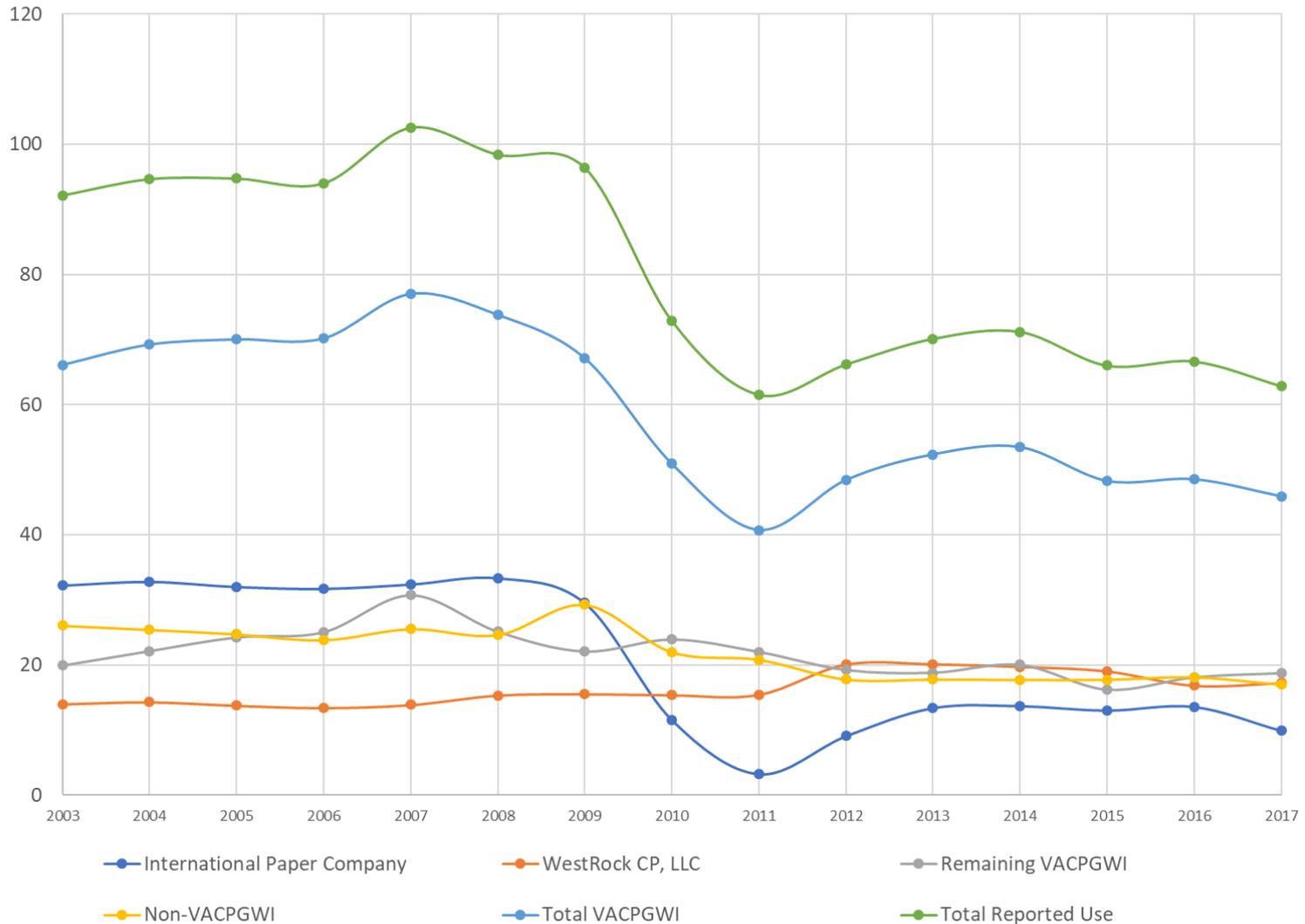
Groundwater Withdrawals from Confined Aquifers in VAHydro-VCPM (MGD)



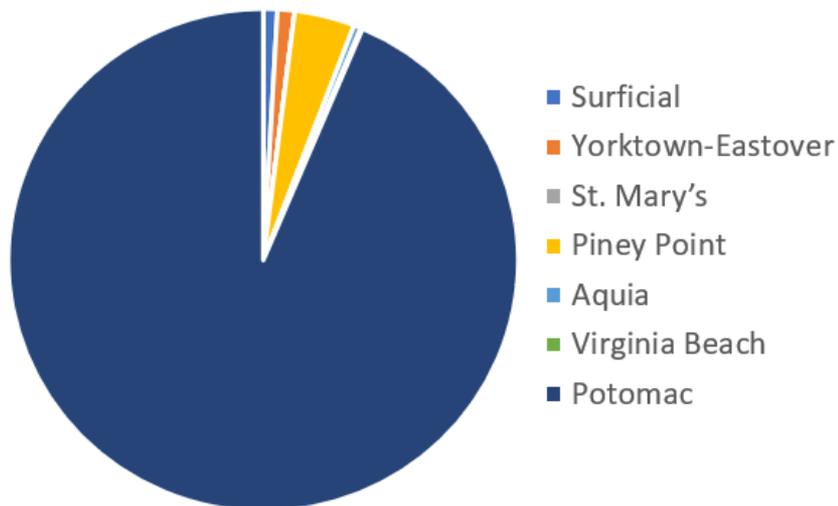
VA - Groundwater Withdrawals from Confined Aquifers in VAHydro-VCPM (MGD)

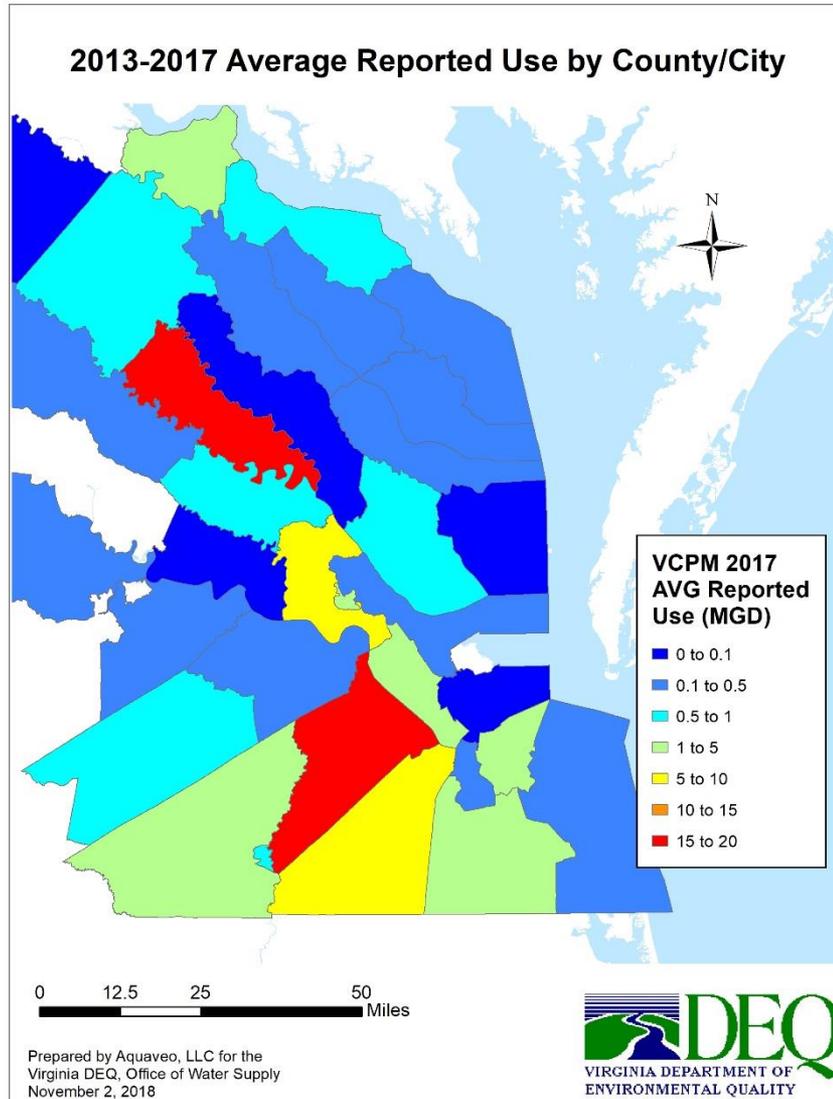


VAHydro-VCPM Reported Use Summary 2003-2017



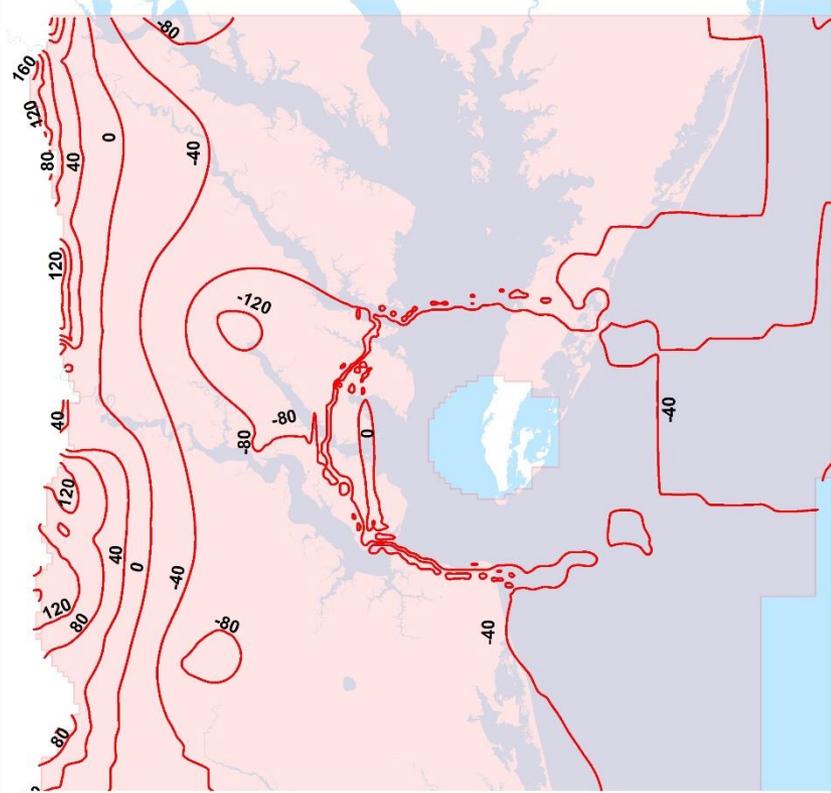
Aquifer	2016 VA Reported Use (MGD)	2017 VA Reported Use (MGD)	2013-2017 VA Reported Use (MGD)	Use Allocated to Model (%)
Surficial	0.56	0.50	0.61	0.89%
Yorktown-Eastover	0.69	0.76	0.74	1.09%
St. Mary's	0	0	0	0.00%
Piney Point	2.92	3.25	2.59	3.82%
Aquia	0.28	0.23	0.31	0.46%
Virginia Beach	0.06	0.07	0.07	0.11%
Potomac	62.14	58.07	63.6	93.64%
TOTAL	66.65	62.88	67.97	100.00%





City/County	2013-2017 Average Reported Use Allocated to Model (MGD)	Use Allocated to Model (%)
Caroline	0.95	1.40%
Charles City	0.06	0.09%
City of Chesapeake	3.23	4.75%
Chesterfield	0.22	0.32%
Essex	0.47	0.69%
Franklin City	0.9	1.32%
Gloucester	0.62	0.91%
City of Hampton	0.01	0.01%
Hanover	0.46	0.68%
Henrico	0	0.00%
Isle of Wight	15.96	23.48%
James City	5.05	7.43%
King and Queen	0.05	0.07%
King George	1.25	1.84%
King William	20.14	29.63%
Lancaster	0.37	0.54%
Mathews	0.01	0.01%
Middlesex	0.16	0.24%
New Kent	0.75	1.10%
City of Newport News	1.38	2.03%
City of Norfolk	0.09	0.13%
Northumberland	0.26	0.38%
City of Portsmouth	0.31	0.46%
Prince George	0.3	0.44%
Richmond County	0.36	0.53%
Southampton	3.45	5.08%
Spotsylvania	0.02	0.03%
City of Suffolk	7.24	10.65%
Surry	0.48	0.71%
Sussex	0.77	1.13%
City of Virginia Beach	0.16	0.24%
Westmoreland	0.87	1.28%
City of Williamsburg	1.22	1.79%
York	0.37	0.54%
TOTAL	67.97	100.00%

**Simulated Potentiometric Contours
Potomac Aquifer
2017 Reported Use Simulation**



Contour elevations are in feet relative to mean sea level (msl) and at 40 ft intervals.

- Potentiometric Water Level Contours
- Potomac Aquifer Model Boundary

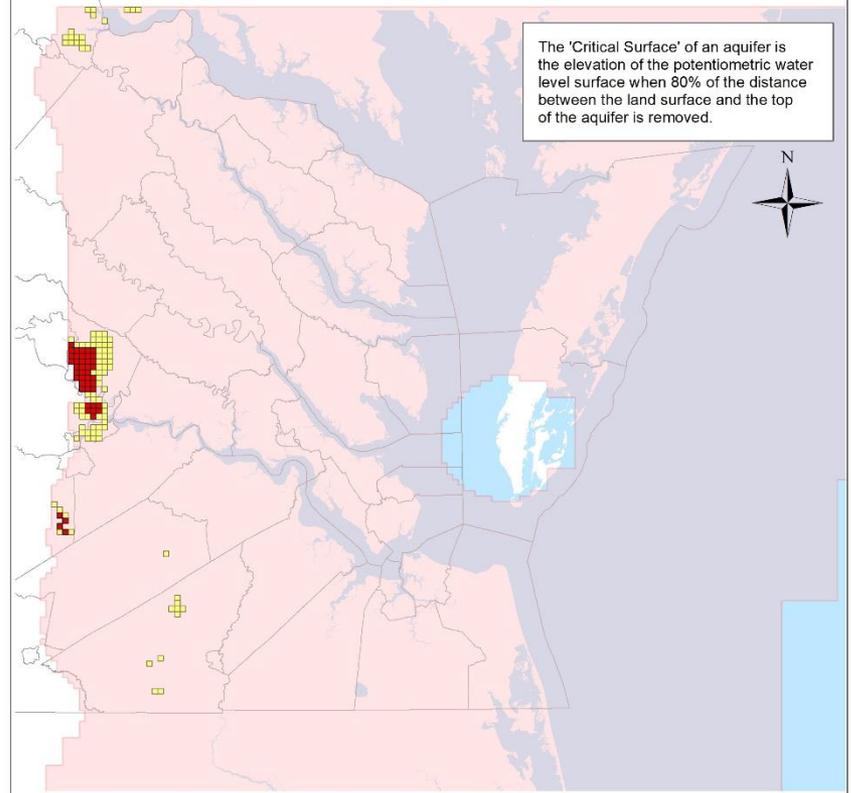


Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018



**2017 Reported Use Simulation - Potomac Aquifer
Simulated Water Levels Below the Critical Surface and Below the Aquifer Top**

The 'Critical Surface' of an aquifer is the elevation of the potentiometric water level surface when 80% of the distance between the land surface and the top of the aquifer is removed.



- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Potomac Aquifer Model Boundary



Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018



**Simulated Potentiometric Contours
Virginia Beach Aquifer
2017 Reported Use Simulation**



Contour elevations are in feet relative to mean sea level (msl) and at 40 ft intervals.

- Potentiometric Water Level Contours
- Virginia Beach Model Boundary

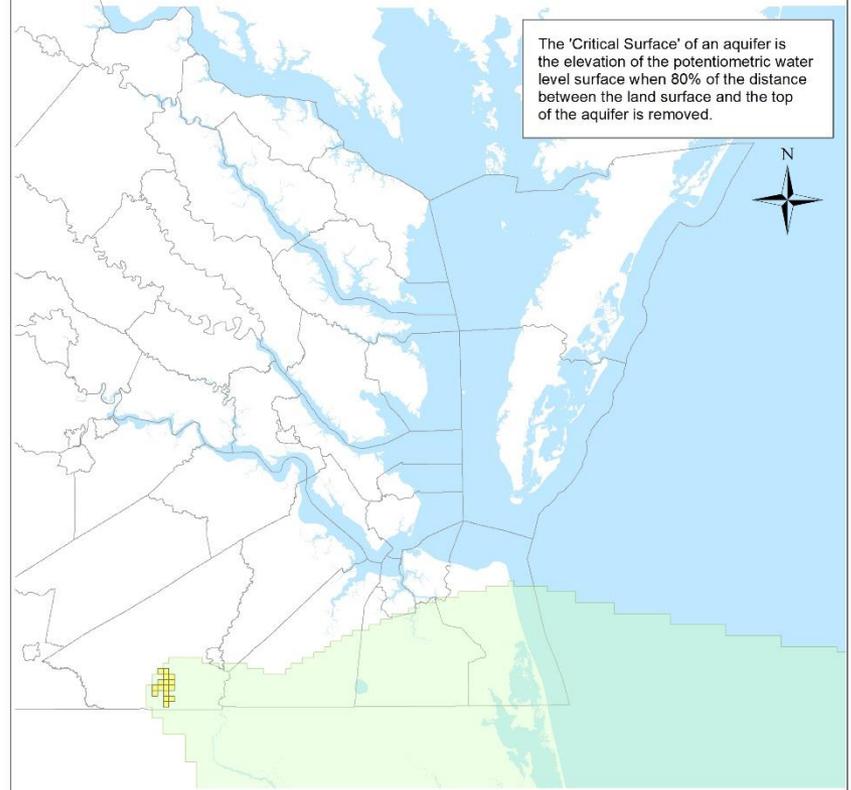


Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018



**2017 Reported Use Simulation - Virginia Beach Aquifer
Simulated Water Levels Below the Critical Surface and Below the Aquifer Top**

The 'Critical Surface' of an aquifer is the elevation of the potentiometric water level surface when 80% of the distance between the land surface and the top of the aquifer is removed.

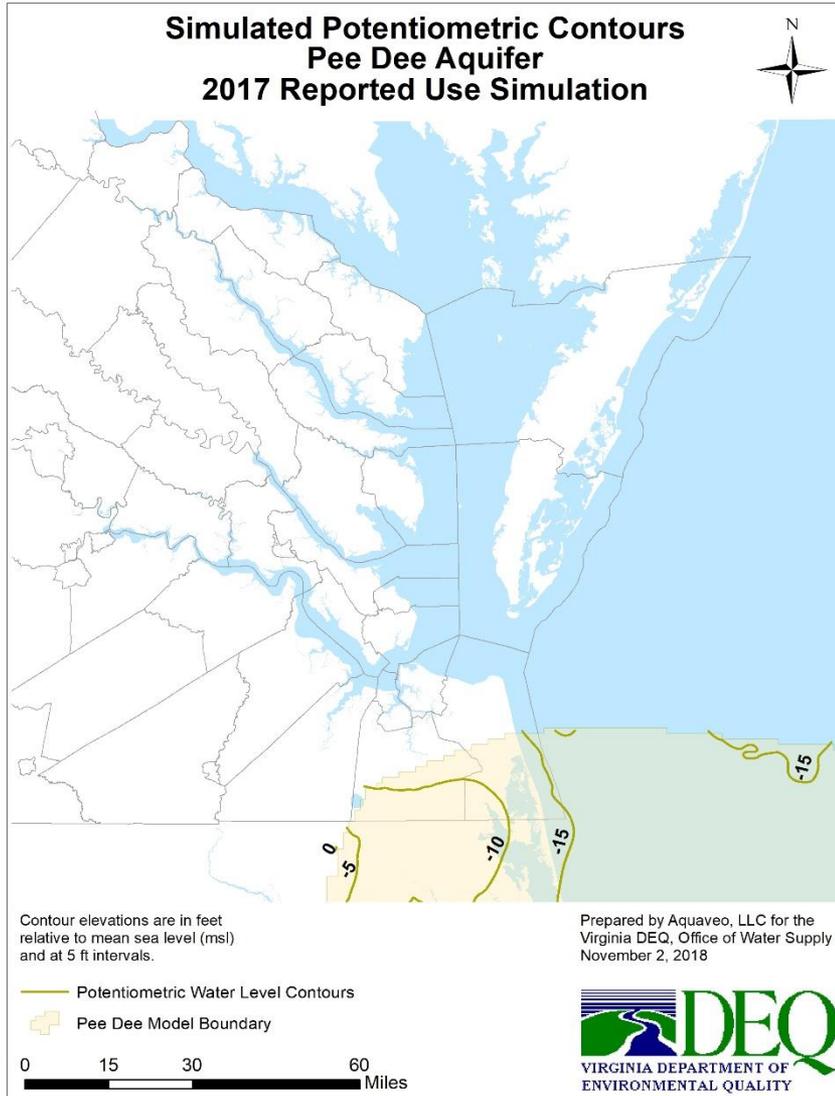


- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Virginia Beach Model Boundary

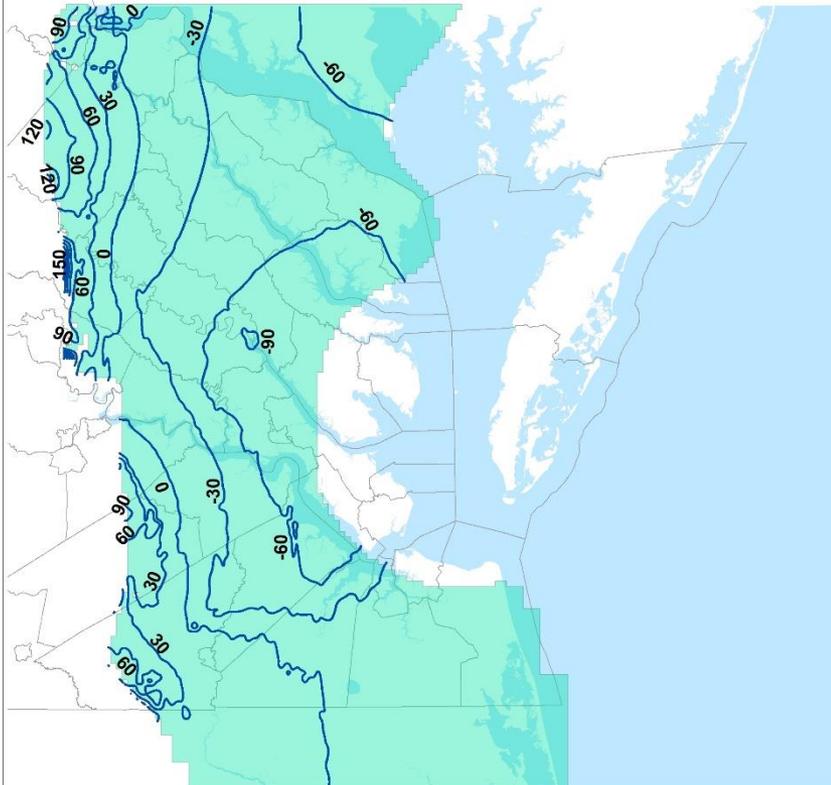


Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
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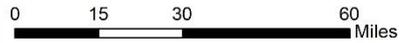


**Simulated Potentiometric Contours
Aquia Aquifer
2017 Reported Use Simulation**



Contour elevations are in feet relative to mean sea level (msl) and at 30 ft intervals.

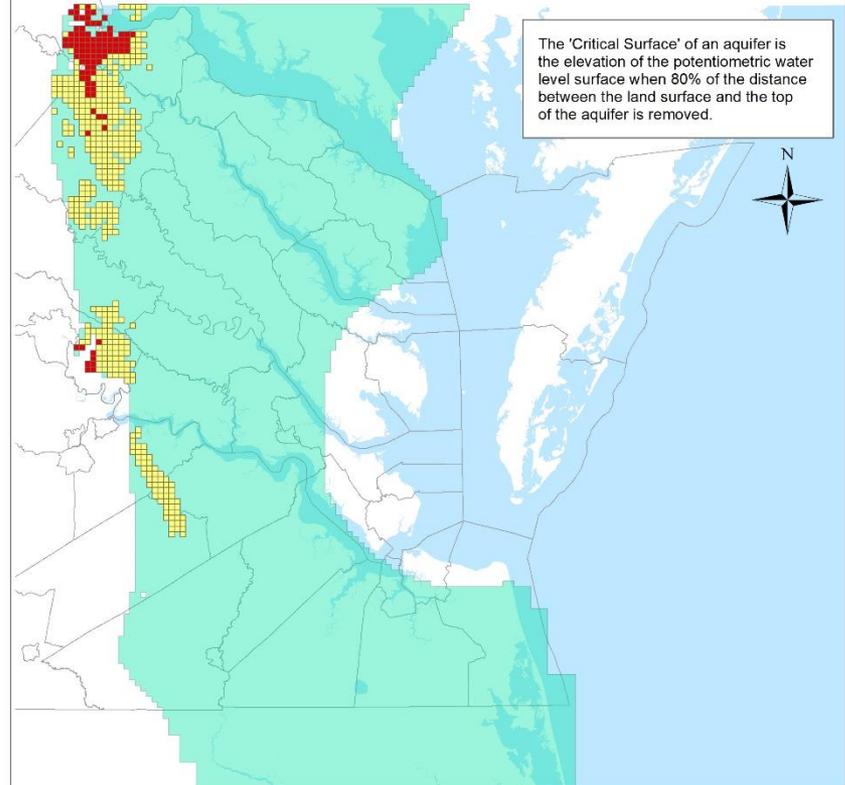
- Potentiometric Water Level Contours
- Aquia Aquifer Model Boundary



Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018

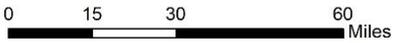


**2017 Reported Use Simulation - Aquia Aquifer
Simulated Water Levels Below the Critical Surface and Below the Aquifer Top**



The 'Critical Surface' of an aquifer is the elevation of the potentiometric water level surface when 80% of the distance between the land surface and the top of the aquifer is removed.

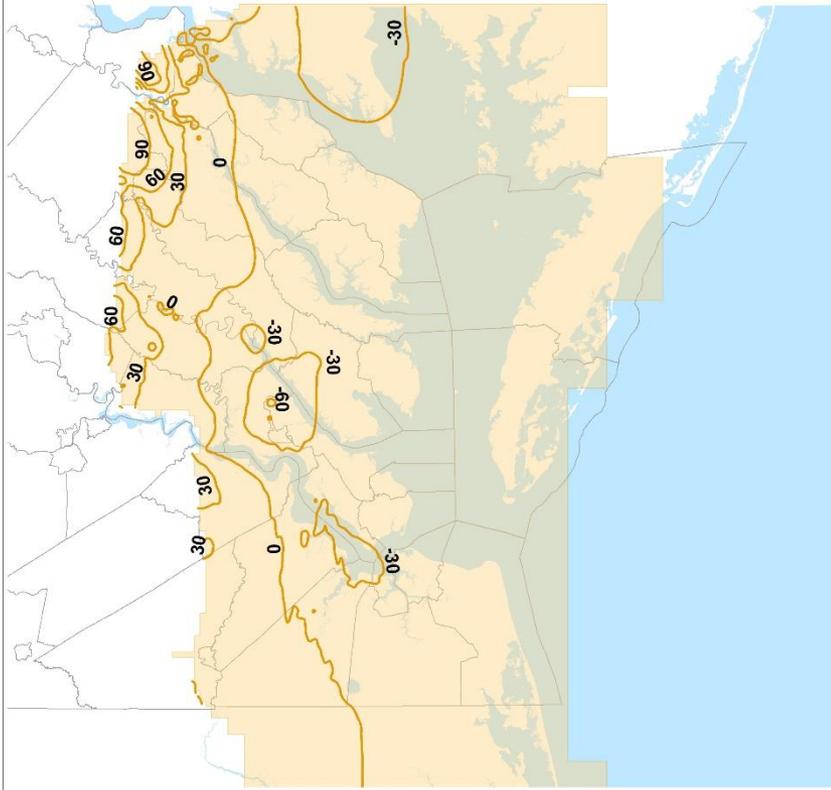
- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Aquia Aquifer Model Boundary



Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018

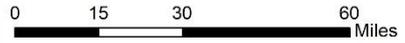


**Simulated Potentiometric Contours
Piney Point Aquifer
2017 Reported Use Simulation**



Contour elevations are in feet relative to mean sea level (msl) and at 30 ft intervals.

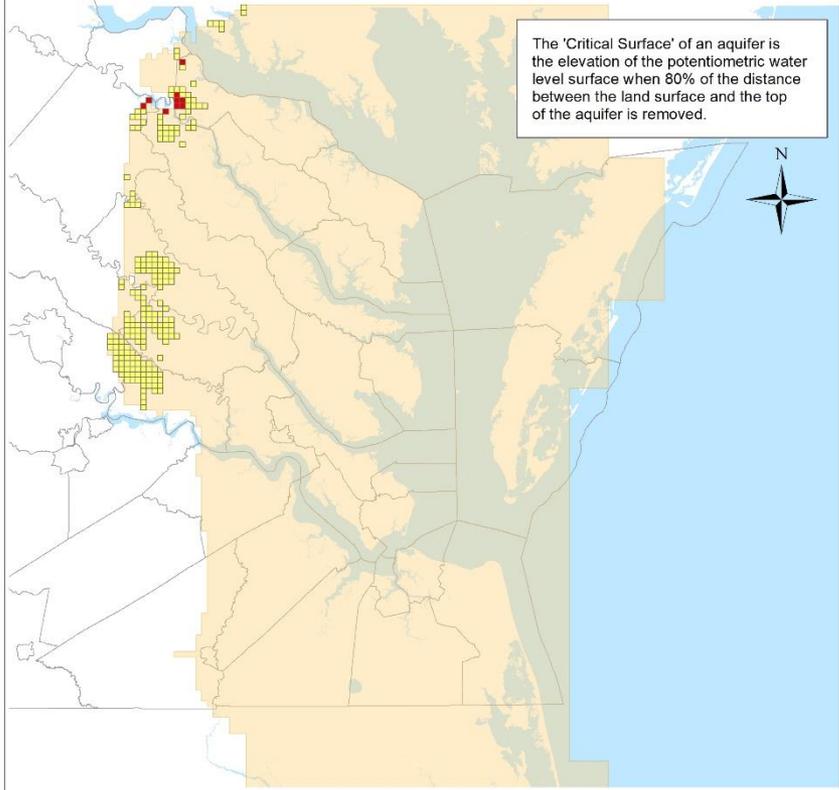
-  Potentiometric Water Level Contours
-  Piney Point Aquifer Model Boundary



Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply November 2, 2018



**2017 Reported Use Simulation - Piney Point Aquifer
Simulated Water Levels Below the Critical Surface and Below the Aquifer Top**

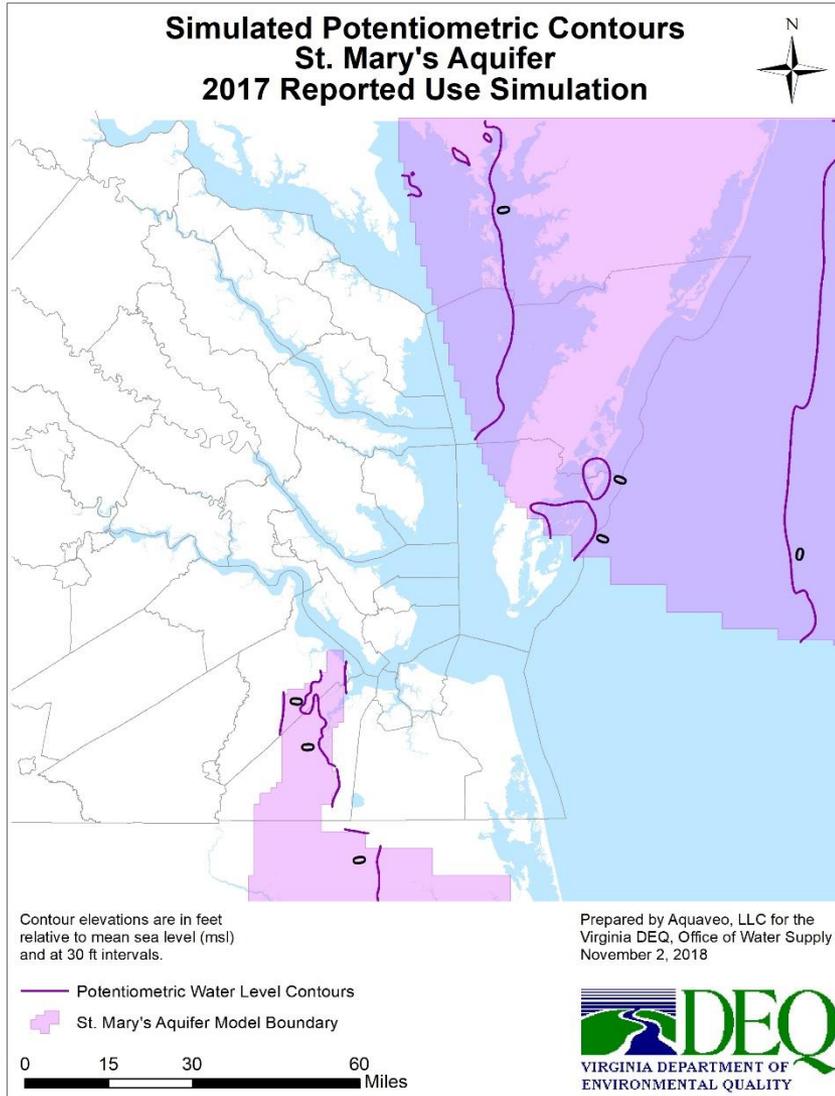


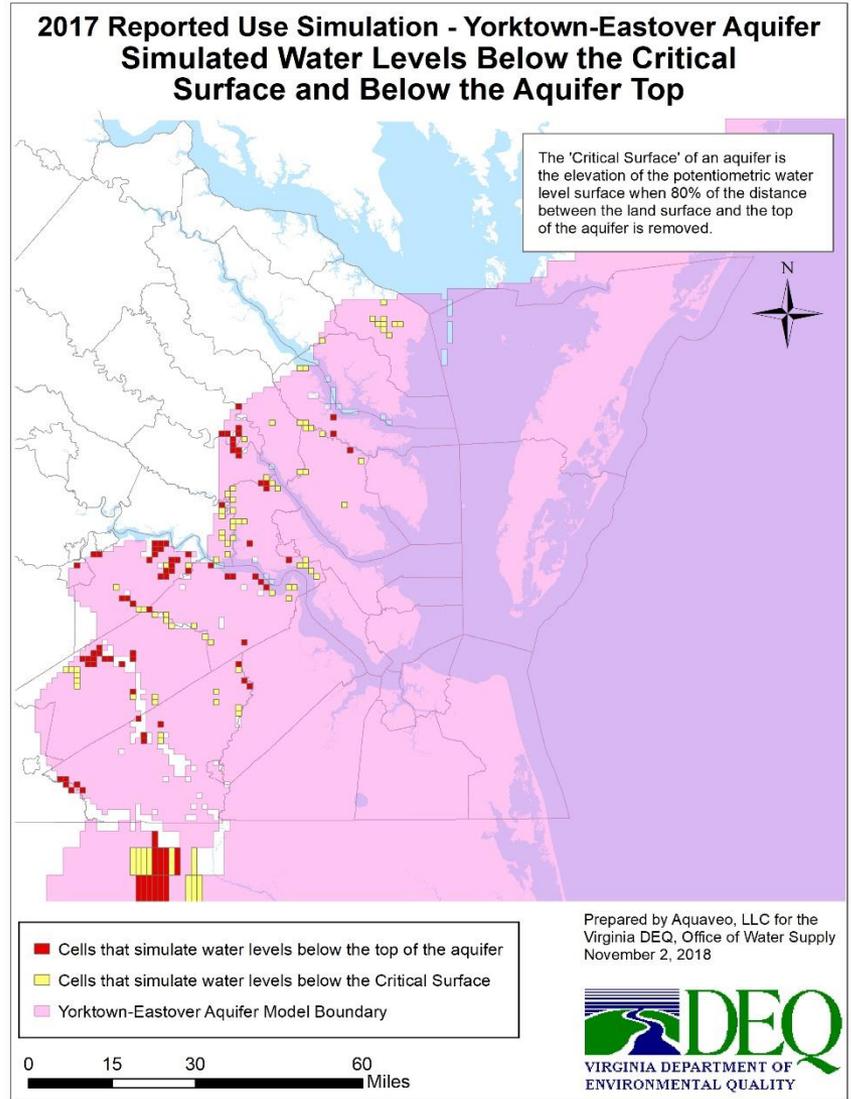
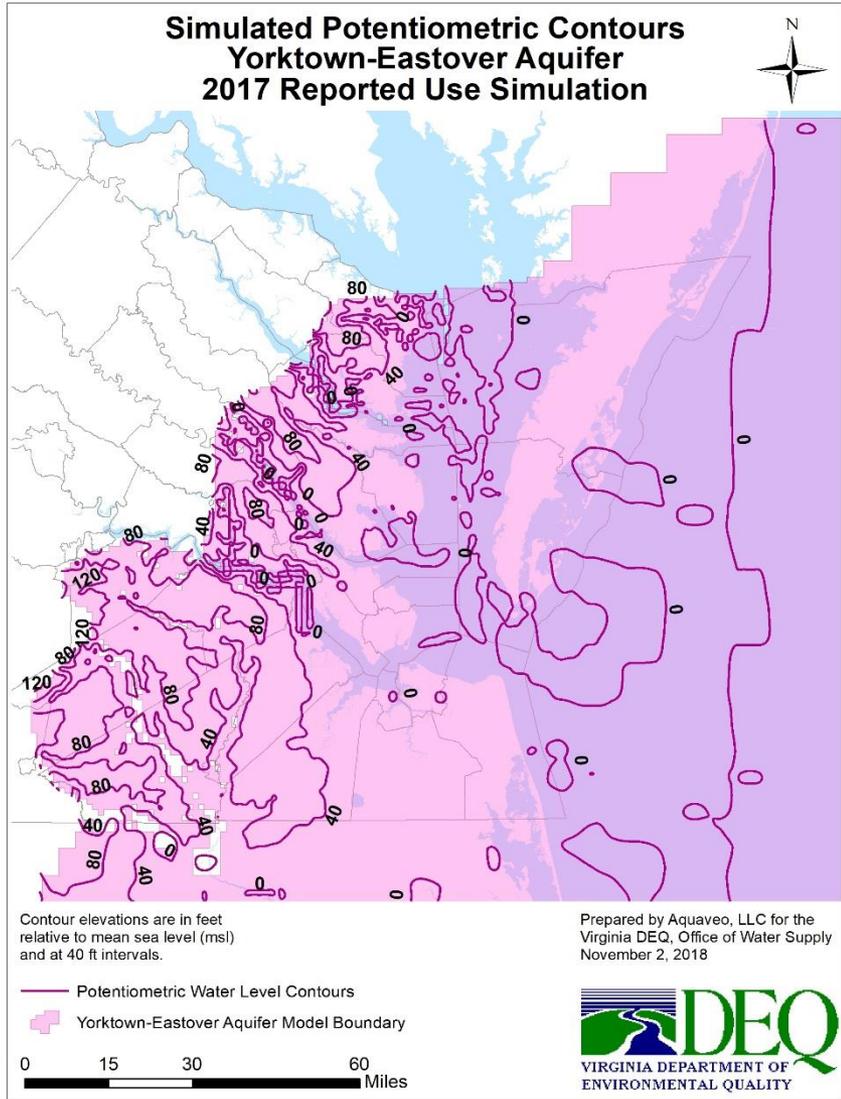
-  Cells that simulate water levels below the top of the aquifer
-  Cells that simulate water levels below the Critical Surface
-  Piney Point Aquifer Model Boundary



Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply November 2, 2018



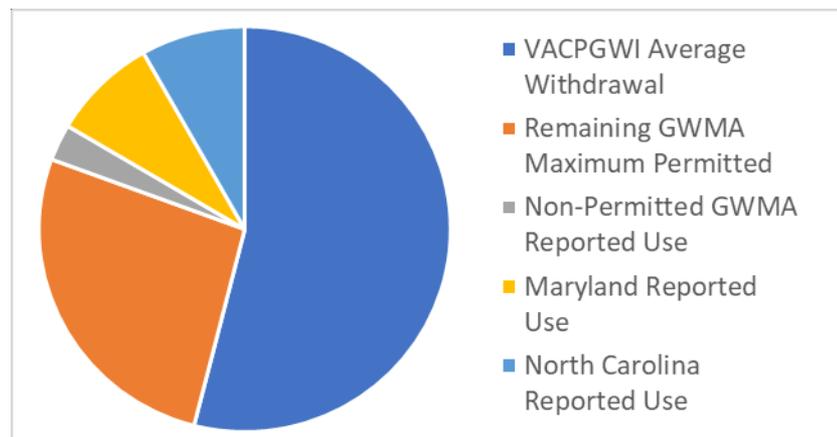
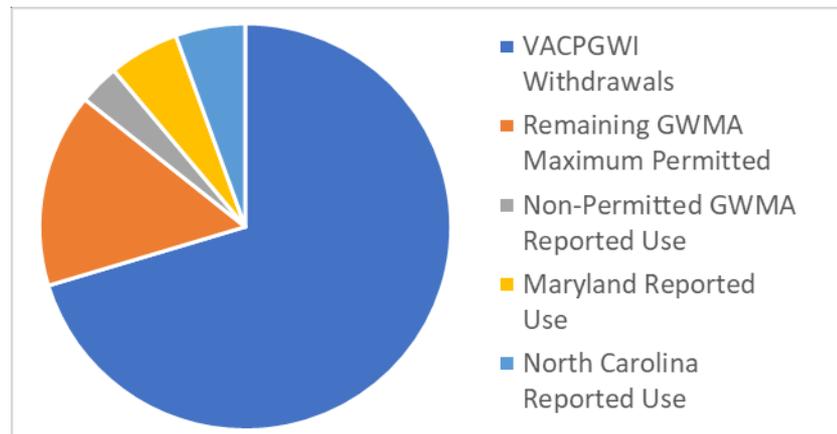




Withdrawal Source	2015 Total Permitted (MGD)	Use Allocated to Model (%)
VACPGWI Average Withdrawal	119.2	70.32%
Remaining GWMA Maximum Permitted	26.2	15.46%
Non-Permitted GWMA Reported Use	5.4	3.19%
Maryland Reported Use	9.4	5.55%
North Carolina Reported Use	9.3	5.49%
TOTAL	169.5	100.00%

Withdrawal Source	2017 Total Permitted (MGD)	Use Allocated to Model (%)
VACPGWI Average Withdrawal	61.2	54.00%
Remaining GWMA Maximum Permitted	30.2	26.60%
Non-Permitted GWMA Reported Use	3.3	2.90%
Maryland Reported Use	9.4	8.30%
North Carolina Reported Use	9.3	8.20%
TOTAL	113.4	100.00%

Withdrawal Source	2018 Total Permitted (MGD)	Use Allocated to Model (%)
VACPGWI Average Withdrawal	60.9	53.30%
Remaining GWMA Maximum Permitted	31.9	27.90%
Non-Permitted GWMA Reported Use	2.8	2.40%
Maryland Reported Use	9.4	8.20%
North Carolina Reported Use	9.3	8.10%
TOTAL	114.3	100.00%

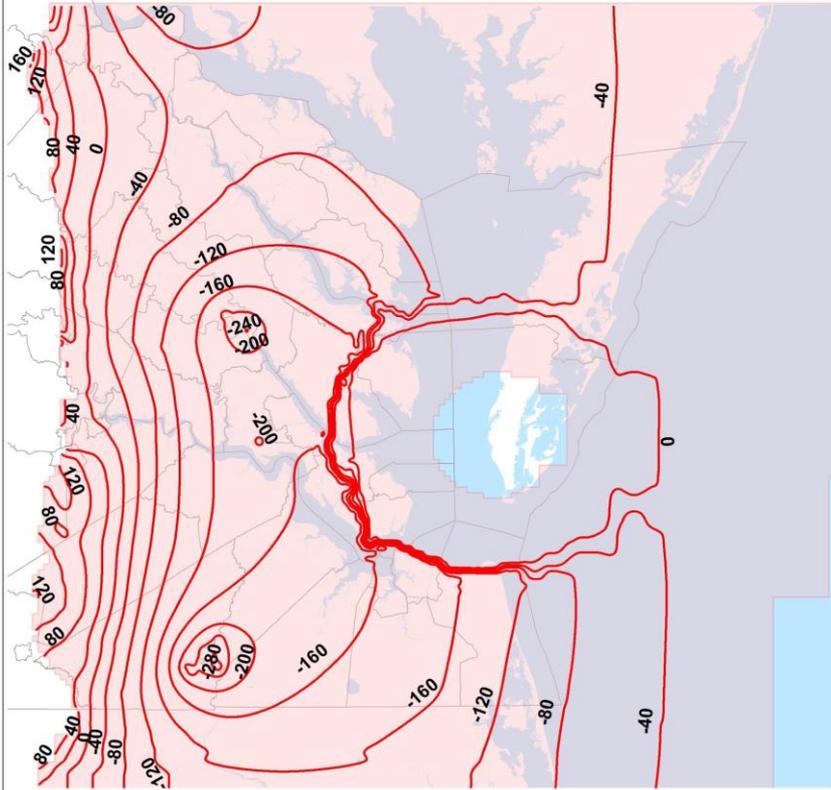


City/County	2013-2017 Average Reported Use (MGD)	2018 Total Permitted Amount (MGD)	RU/TP
Caroline	0.95	1.14	83.3%
Charles City	0.06	0.1	60.0%
City of Chesapeake	3.23	4.23	76.4%
Chesterfield	0.22	0.25	88.0%
Essex	0.47	0.44	106.8%
Franklin City	0.9	1.4	64.3%
Gloucester	0.62	0.99	62.6%
City of Hampton	0.01	0.26	3.8%
Hanover	0.46	0.7	65.7%
Henrico	0	0	-
Isle of Wight	15.96	24.88	64.1%
James City	5.05	6.46	78.2%
King and Queen	0.05	0.07	71.4%
King George	1.25	1.82	68.7%
King William	20.14	22.29	90.4%
Lancaster	0.37	0.56	66.1%

Mathews	0.01	0.02	50.0%
Middlesex	0.16	0.26	61.5%
New Kent	0.75	2.38	31.5%
City of Newport News	1.38	7.4	18.6%
City of Norfolk	0.09	0.1	90.0%
Northumberland	0.26	0.36	72.2%
City of Portsmouth	0.31	1.86	16.7%
Prince George	0.3	0.66	45.5%
Richmond County	0.36	0.34	105.9%
Southampton	3.45	4.8	71.9%
Spotsylvania	0.02	0.02	100.0%
City of Suffolk	7.24	15.57	46.5%
Surry	0.48	0.74	64.9%
Sussex	0.77	1.53	50.3%
City of Virginia Beach	0.16	0.54	29.6%
Westmoreland	0.87	1.23	70.7%
City of Williamsburg	1.22	1.25	97.6%
York	0.37	0.7	52.9%
TOTAL	67.97	105.35	64.5%



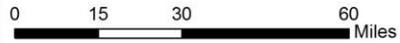
**Simulated Potentiometric Contours
Potomac Aquifer
2015 Total Permitted Simulation**



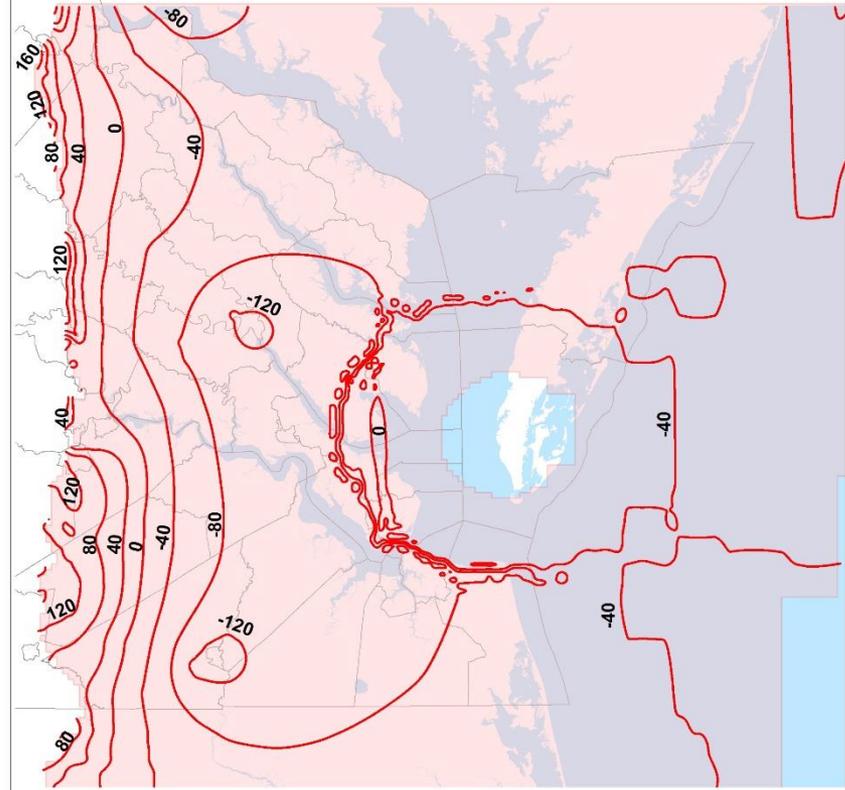
Contour elevations are in feet relative to mean sea level (msl) and at 40 ft intervals.

Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply September 1, 2015

-  Potentiometric Water Level Contours
-  Potomac Aquifer Model Boundary



**Simulated Potentiometric Contours
Potomac Aquifer
2018 Total Permitted Simulation**



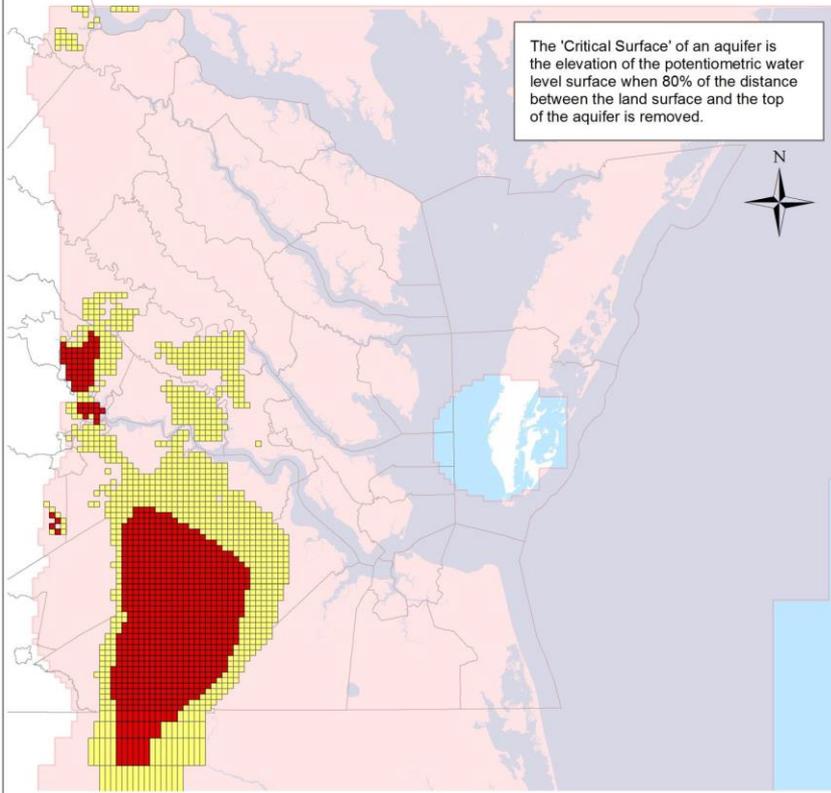
Contour elevations are in feet relative to mean sea level (msl) and at 40 ft intervals.

Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply November 2, 2018

-  Potentiometric Water Level Contours
-  Potomac Aquifer Model Boundary



**2015 Total Permitted Simulation - Potomac Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**



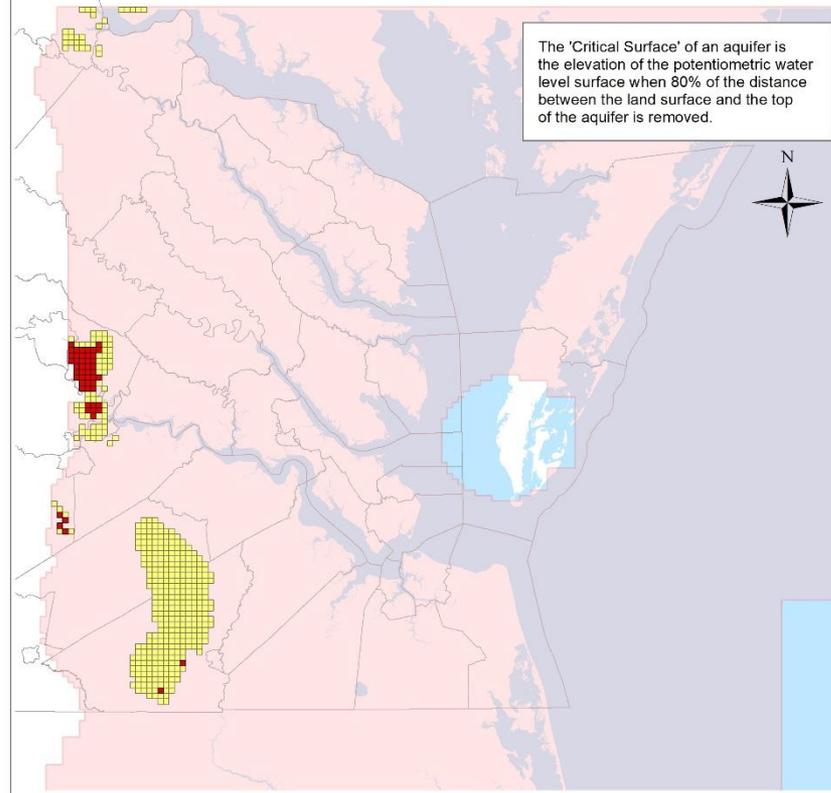
The 'Critical Surface' of an aquifer is the elevation of the potentiometric water level surface when 80% of the distance between the land surface and the top of the aquifer is removed.

- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Potomac Aquifer Model Boundary



Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
September 1, 2015

**2018 Total Permitted Simulation - Potomac Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**

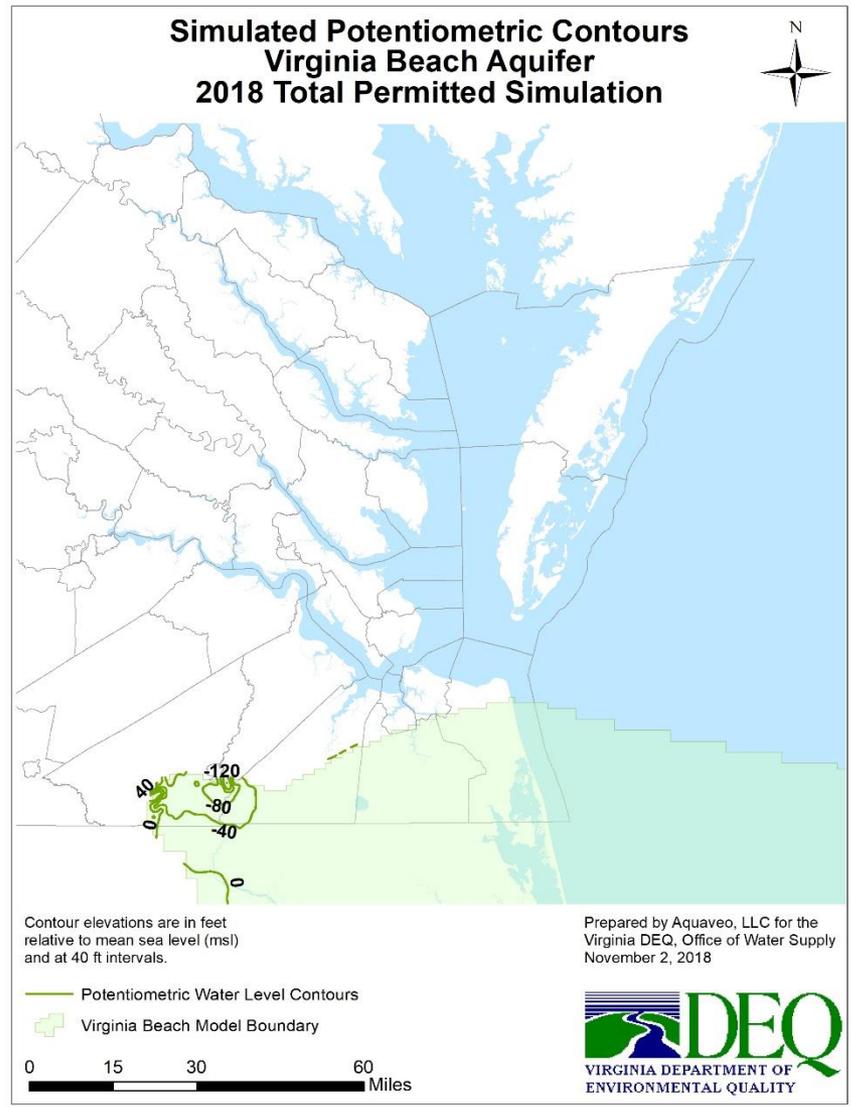
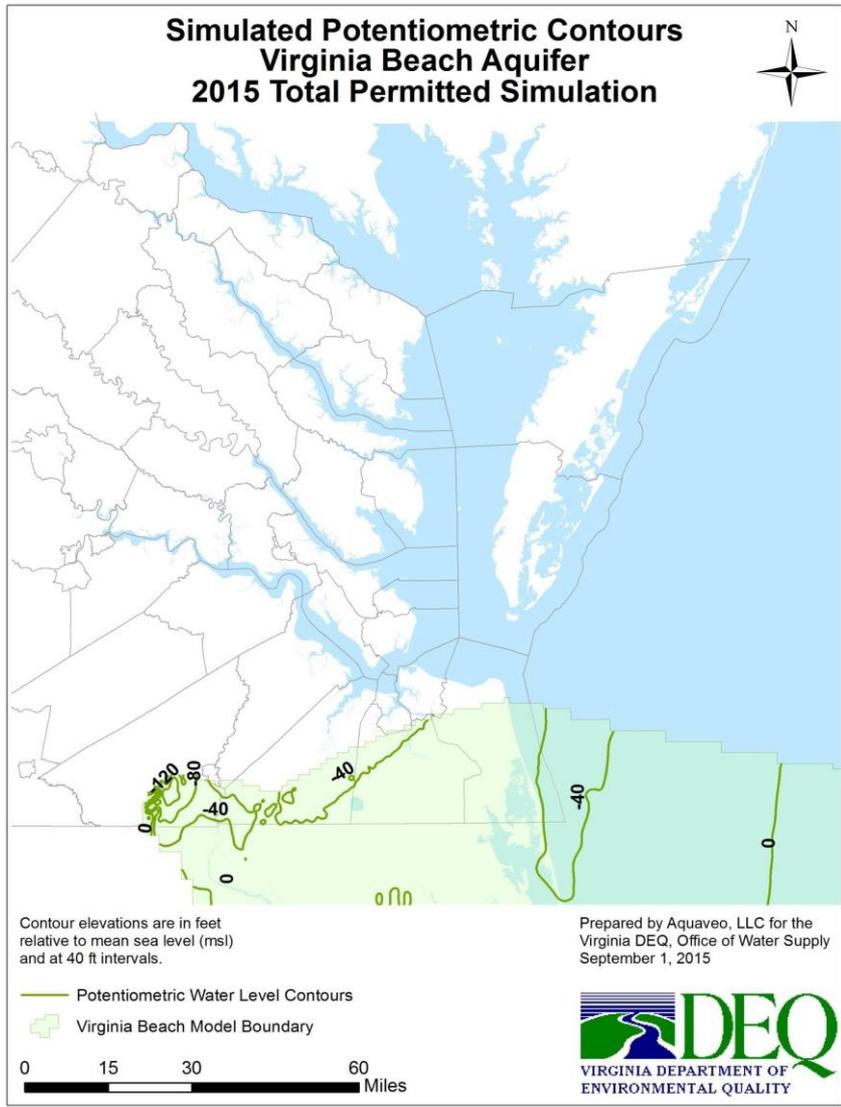


The 'Critical Surface' of an aquifer is the elevation of the potentiometric water level surface when 80% of the distance between the land surface and the top of the aquifer is removed.

- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Potomac Aquifer Model Boundary



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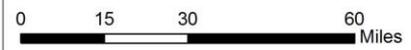


**2015 Total Permitted Simulation - Virginia Beach Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**

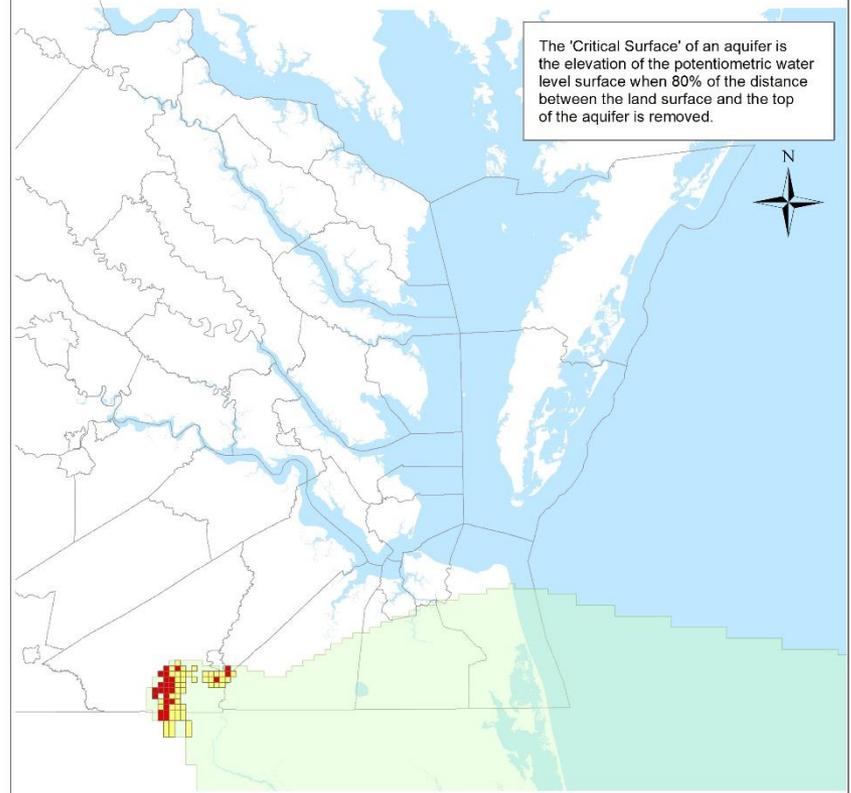


- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Virginia Beach Model Boundary

Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
September 1, 2015



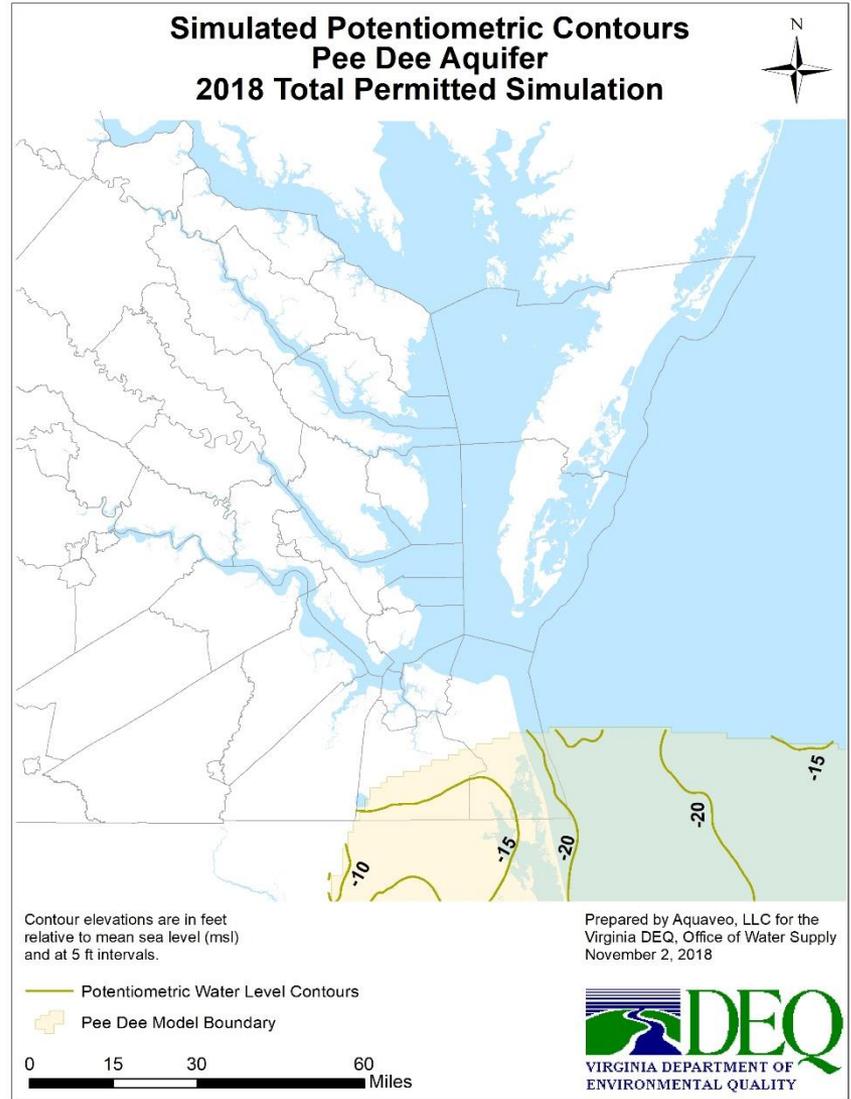
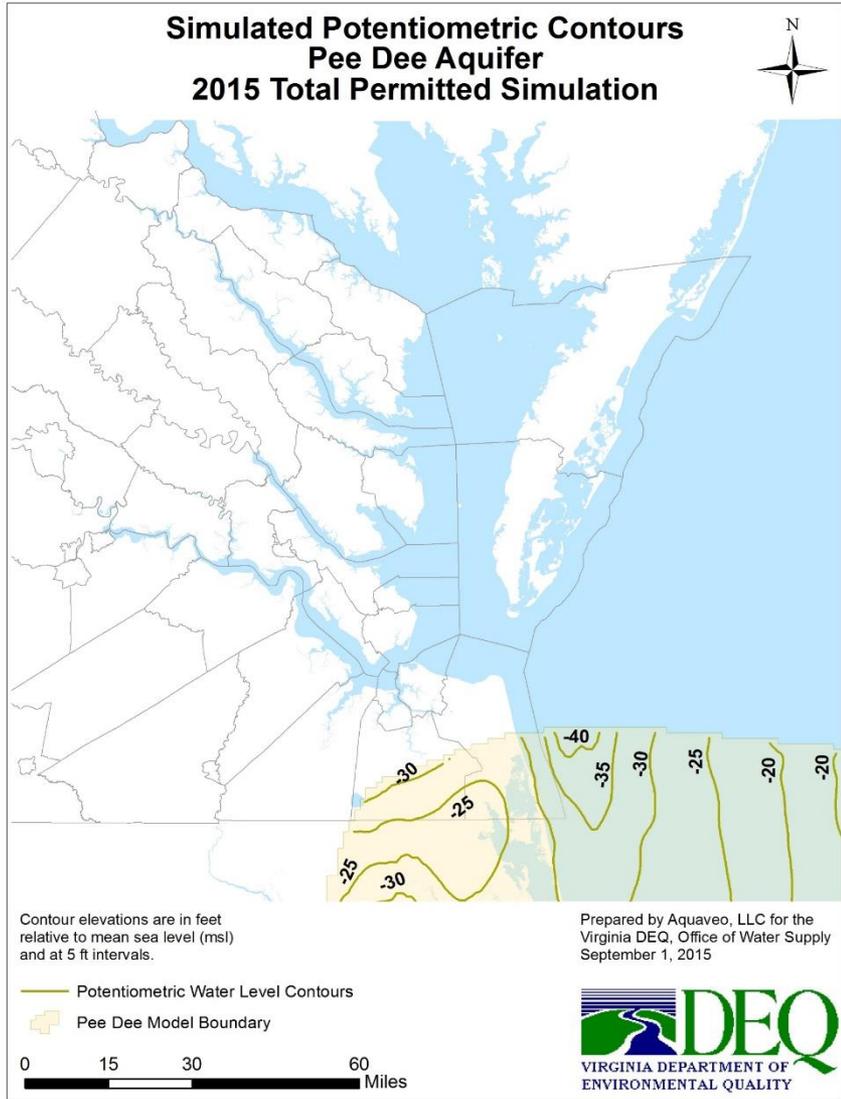
**2018 Total Permitted Simulation - Virginia Beach Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**



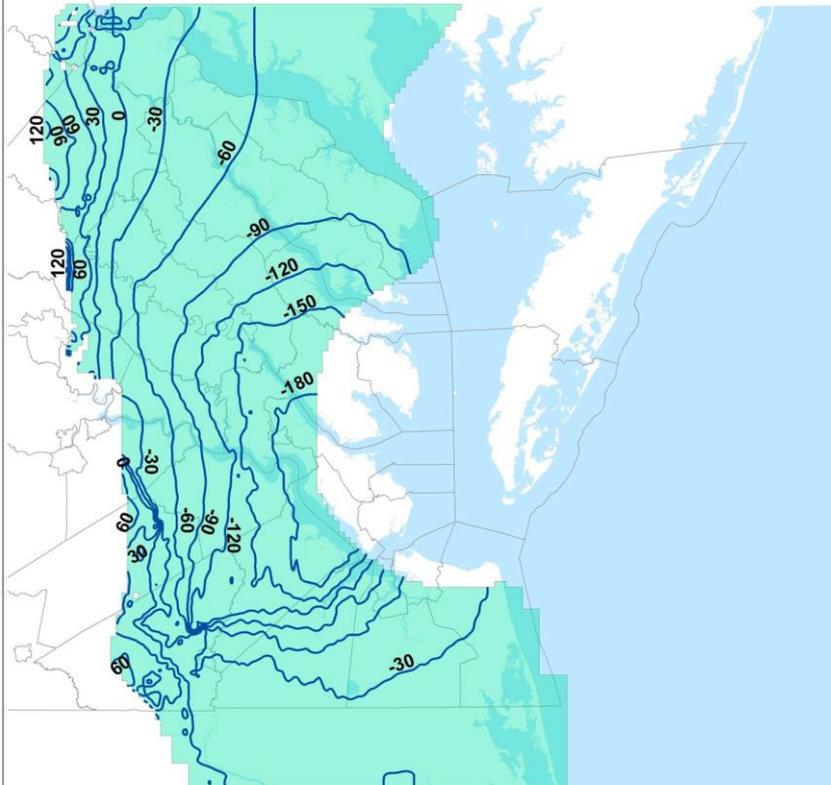
- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Virginia Beach Model Boundary

Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018





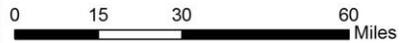
**Simulated Potentiometric Contours
Aquia Aquifer
2015 Total Permitted Simulation**



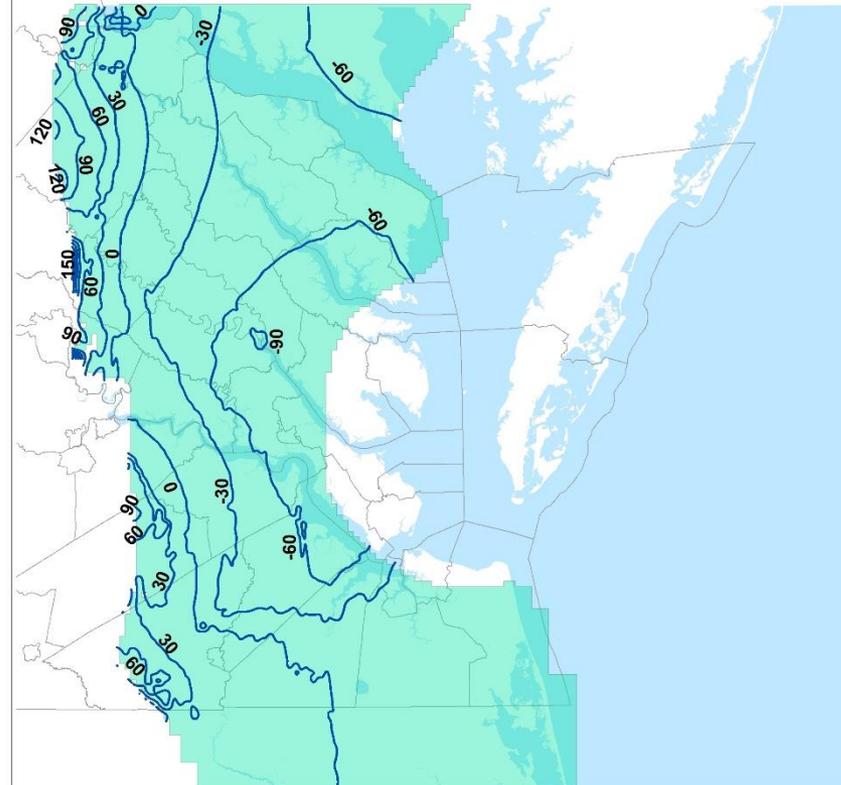
Contour elevations are in feet relative to mean sea level (msl) and at 30 ft intervals.

Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
September 1, 2015

-  Potentiometric Water Level Contours
-  Aquia Aquifer Model Boundary



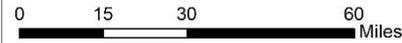
**Simulated Potentiometric Contours
Aquia Aquifer
2017 Reported Use Simulation**



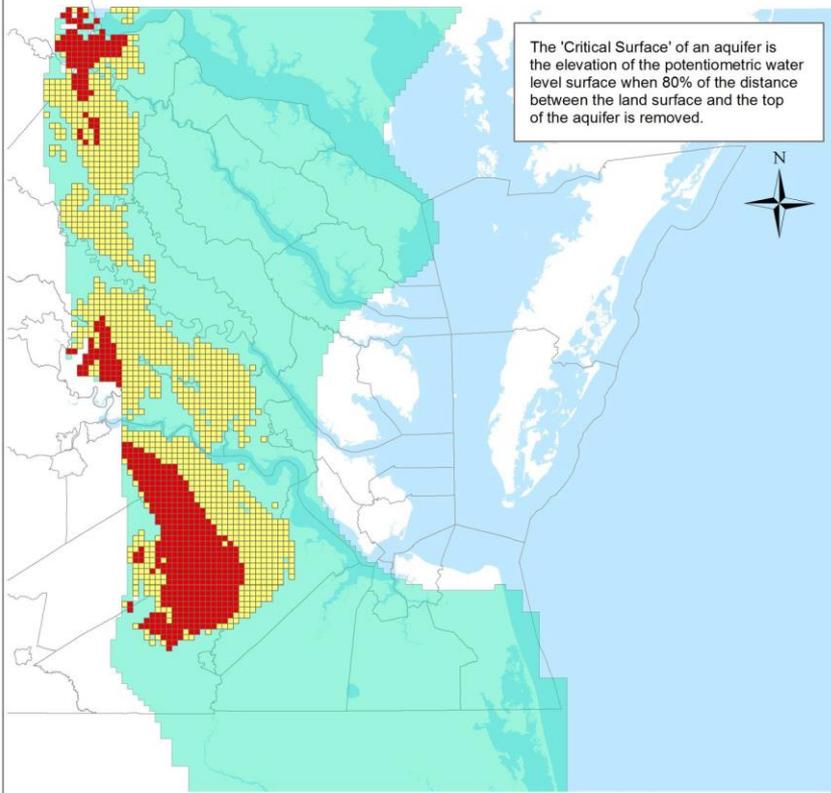
Contour elevations are in feet relative to mean sea level (msl) and at 30 ft intervals.

Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018

-  Potentiometric Water Level Contours
-  Aquia Aquifer Model Boundary



**2015 Total Permitted Simulation - Aquia Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**



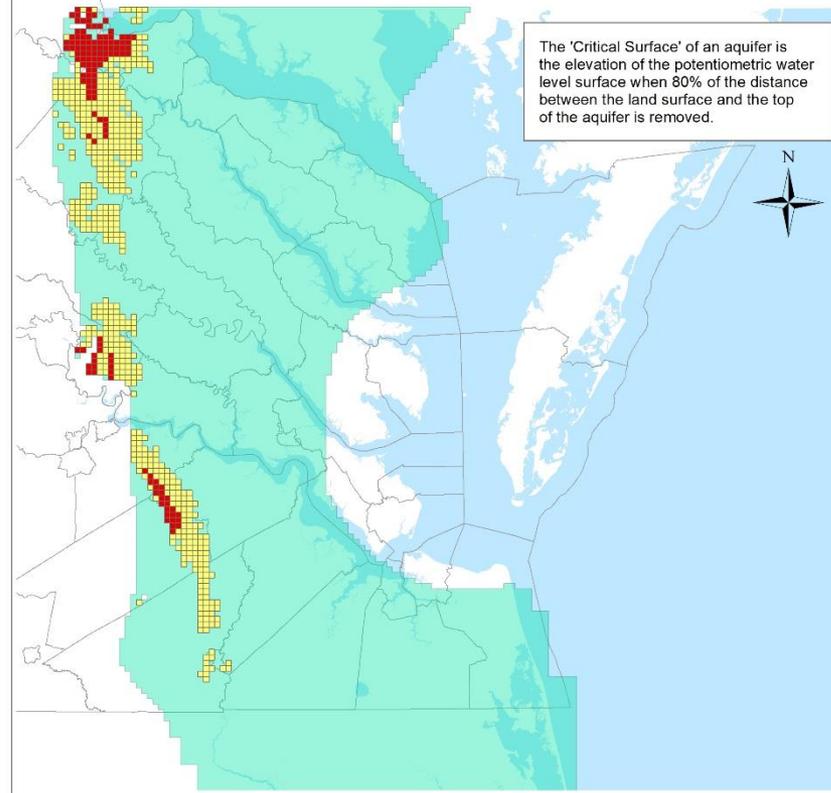
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- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Aquia Aquifer Model Boundary



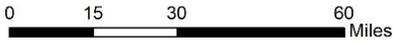
Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
September 1, 2015

**2018 Total Permitted Simulation - Aquia Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**

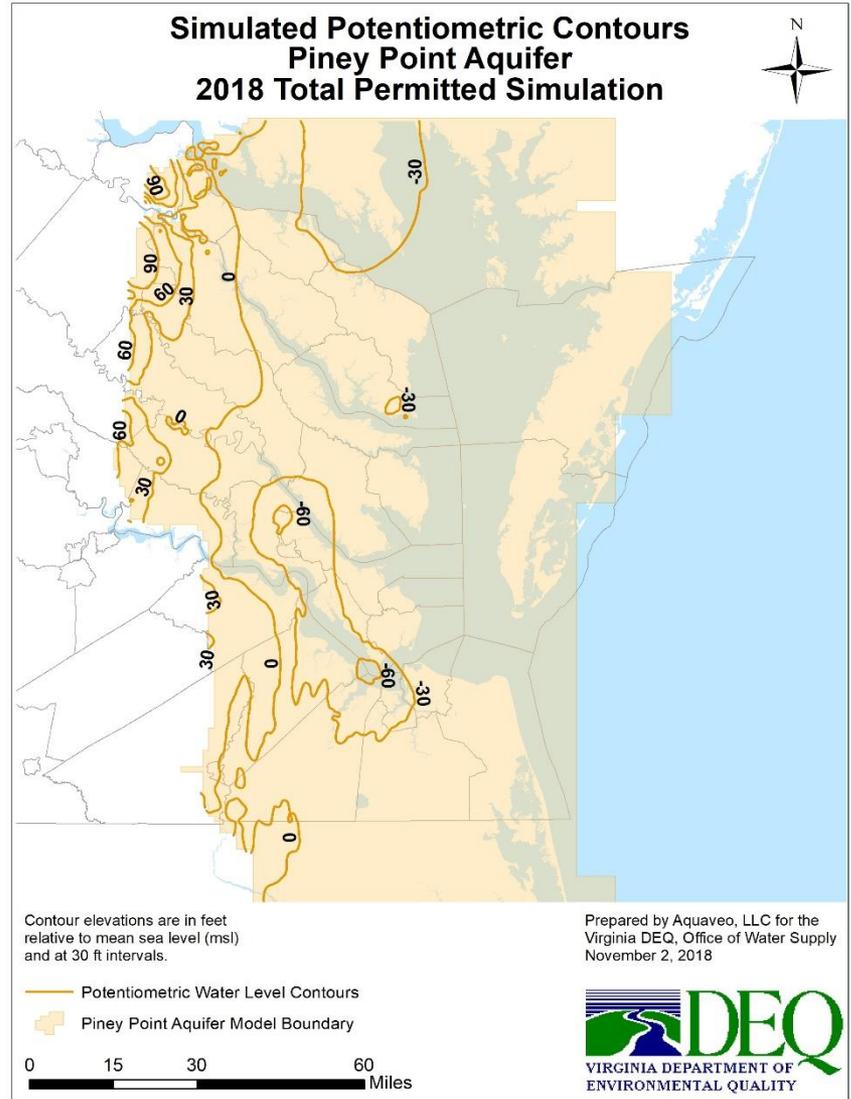
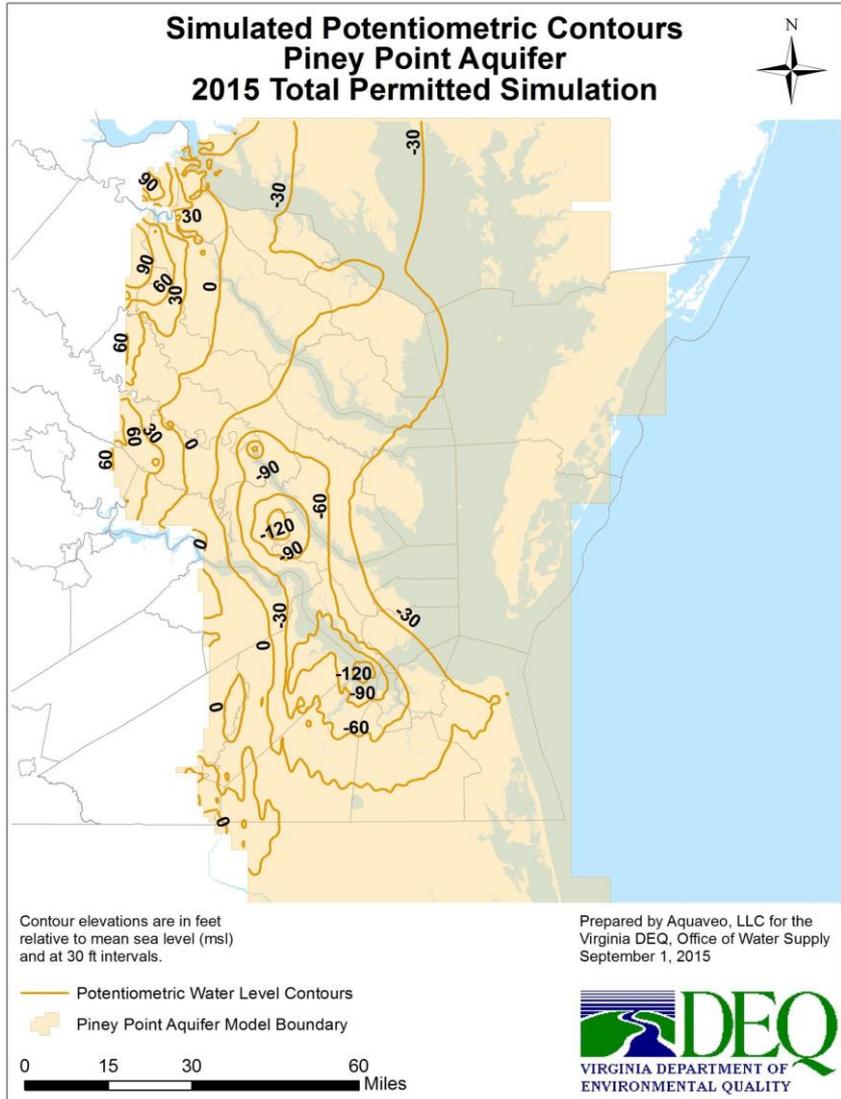


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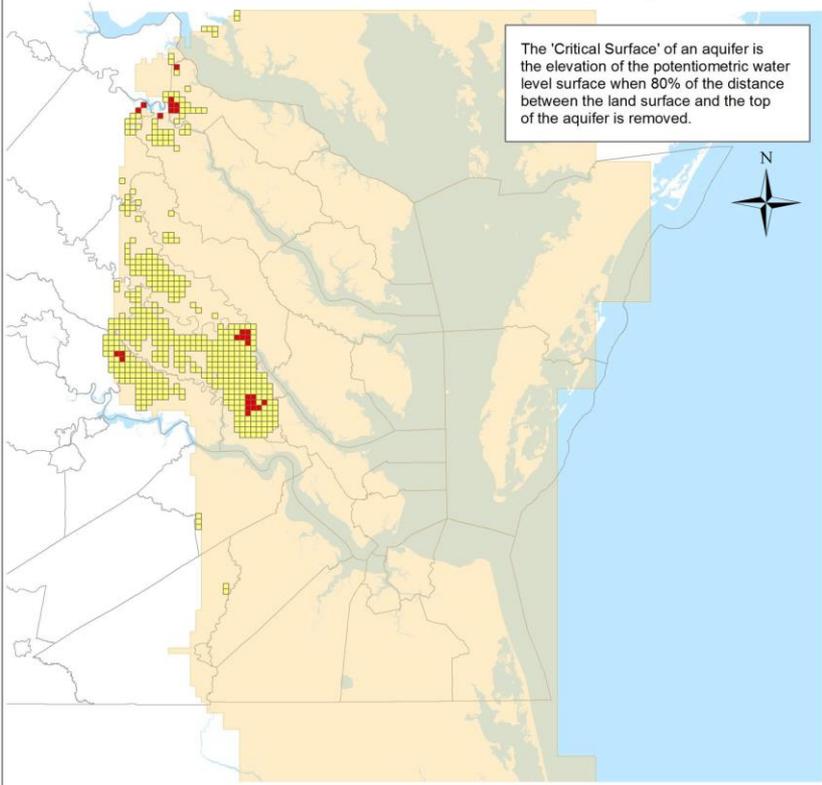
- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Aquia Aquifer Model Boundary



Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018

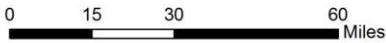


**2015 Total Permitted Simulation - Piney Point Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**



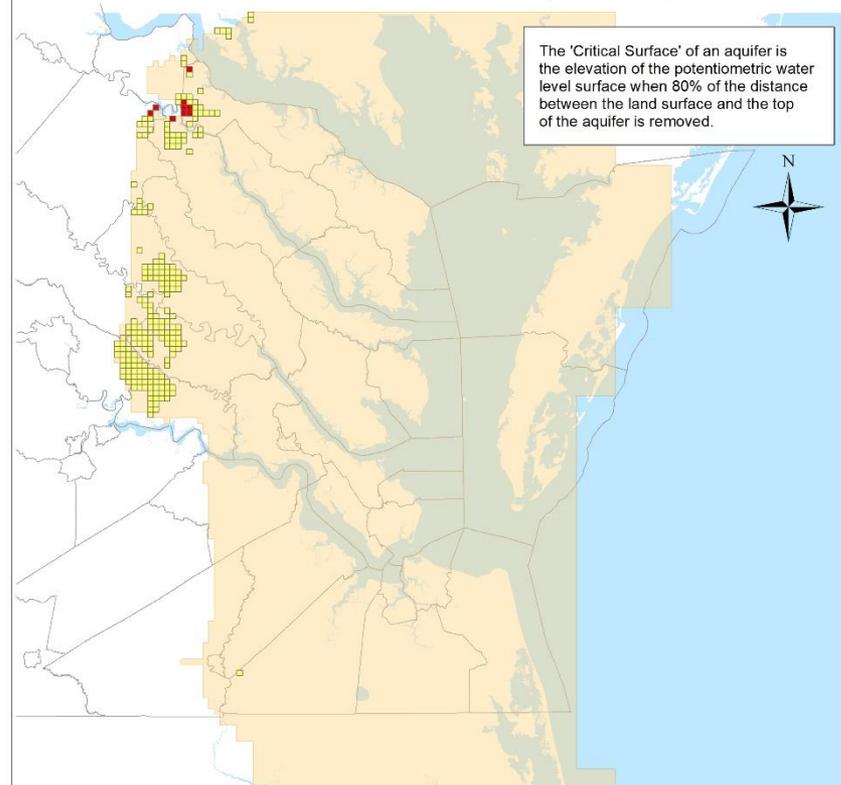
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- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Piney Point Aquifer Model Boundary



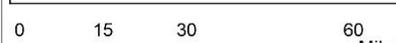
Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
September 1, 2015

**2018 Total Permitted Simulation - Piney Point Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**

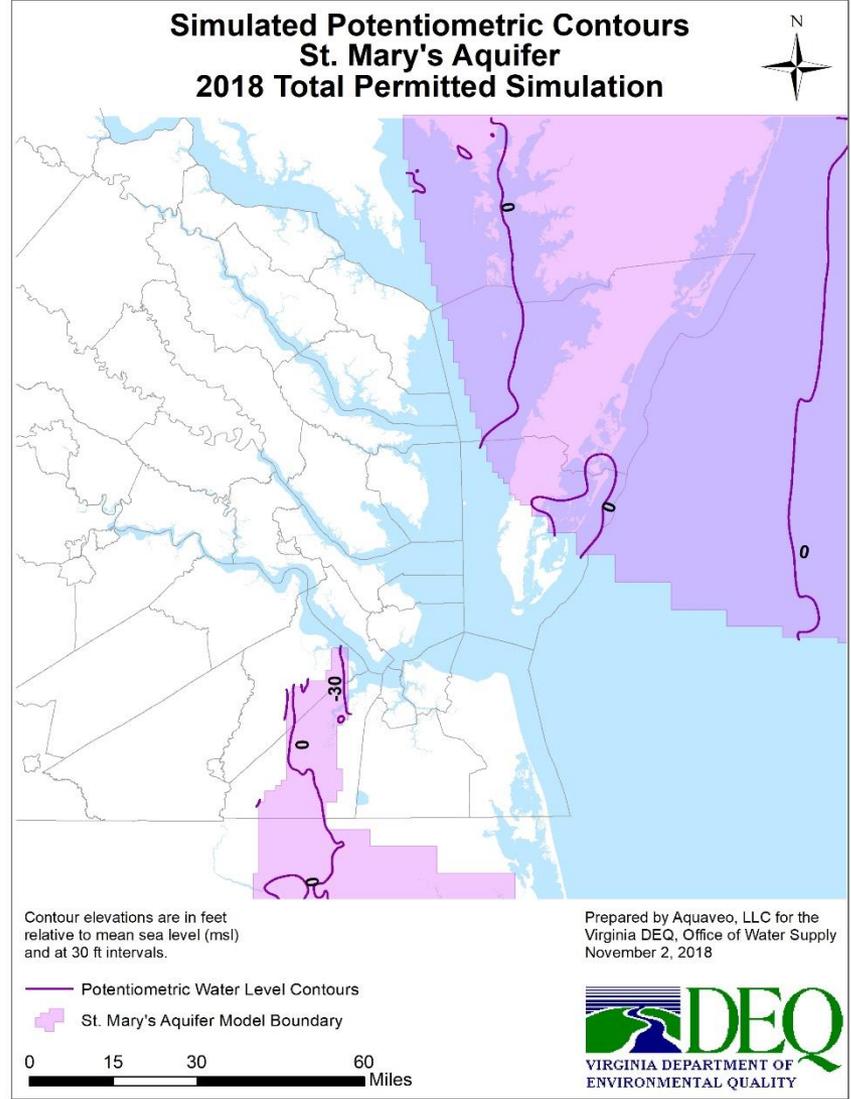
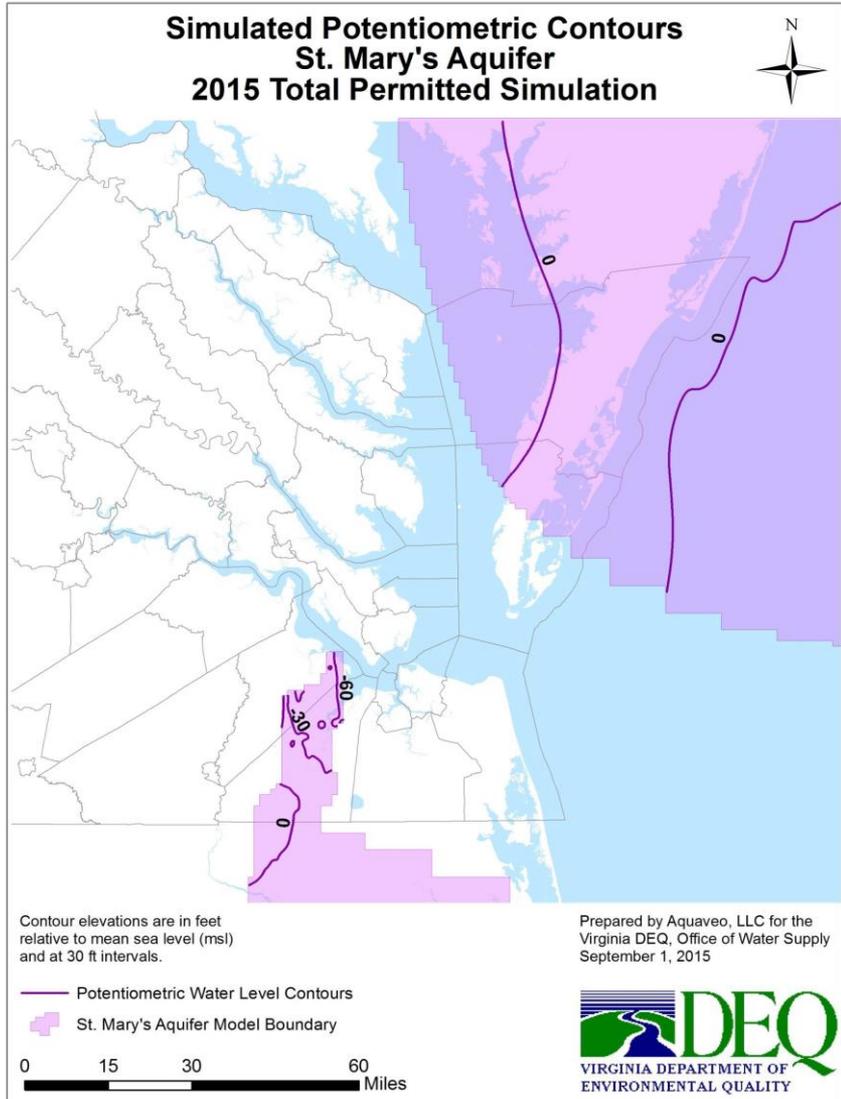


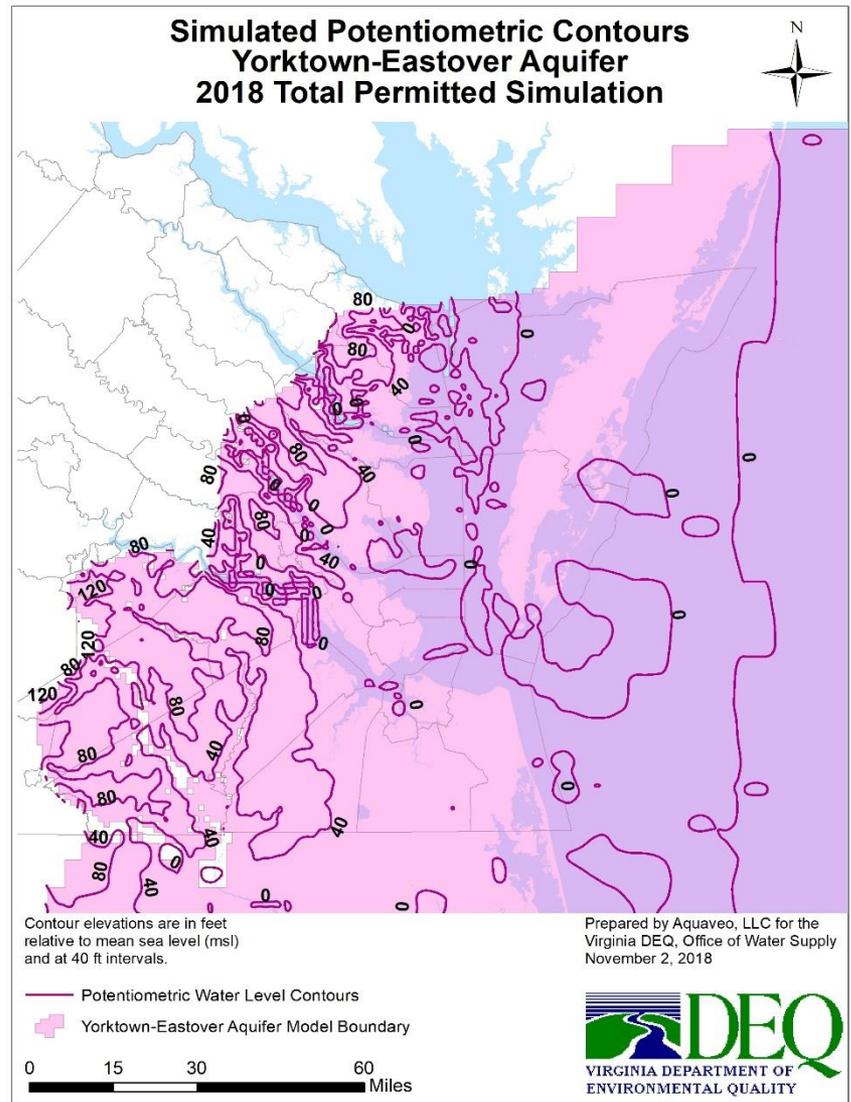
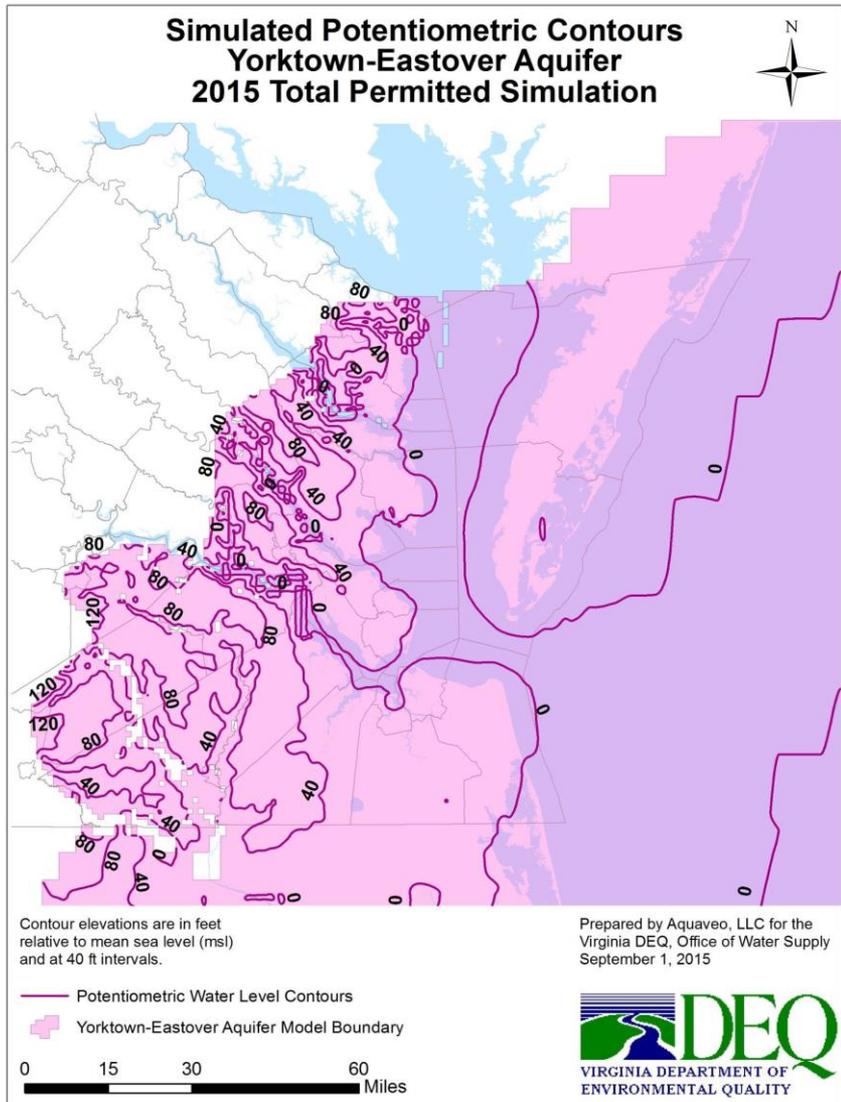
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- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Piney Point Aquifer Model Boundary

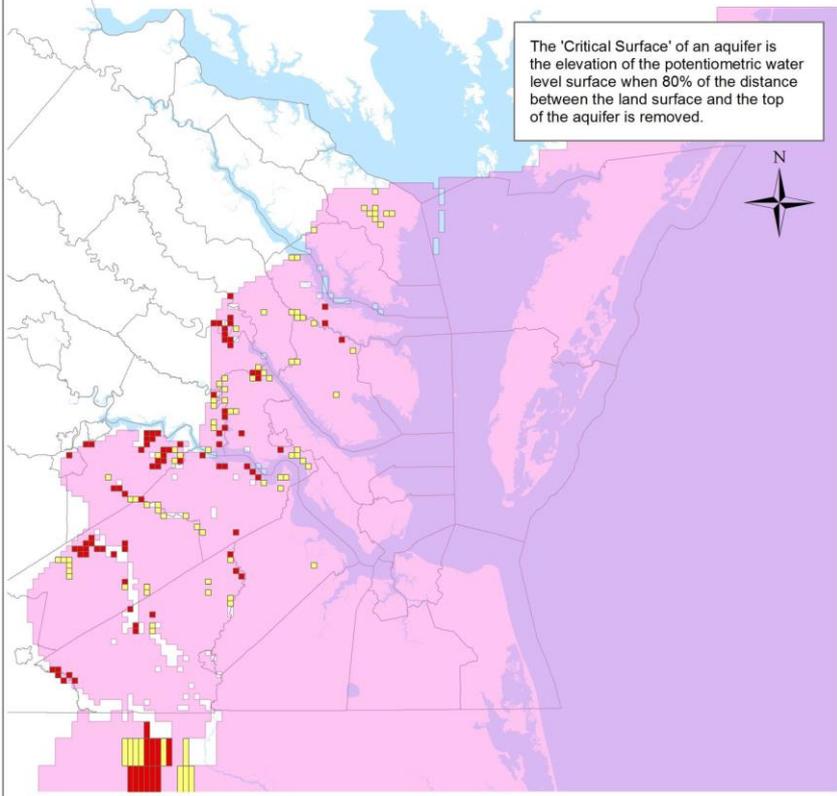


Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018





**2015 Total Permitted Simulation - Yorktown-Eastover Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**

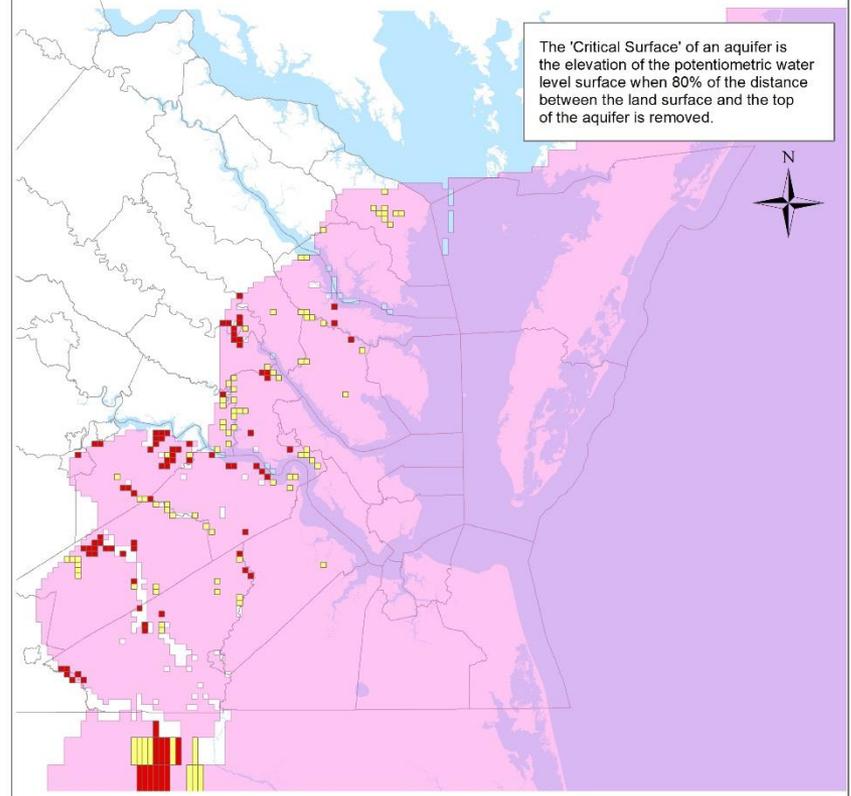


- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Yorktown-Eastover Aquifer Model Boundary

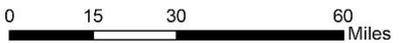


Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
September 1, 2015

**2018 Total Permitted Simulation - Yorktown-Eastover Aquifer
Simulated Water Levels Below the Critical
Surface and Below the Aquifer Top**



- Cells that simulate water levels below the top of the aquifer
- Cells that simulate water levels below the Critical Surface
- Yorktown-Eastover Aquifer Model Boundary



Prepared by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
November 2, 2018