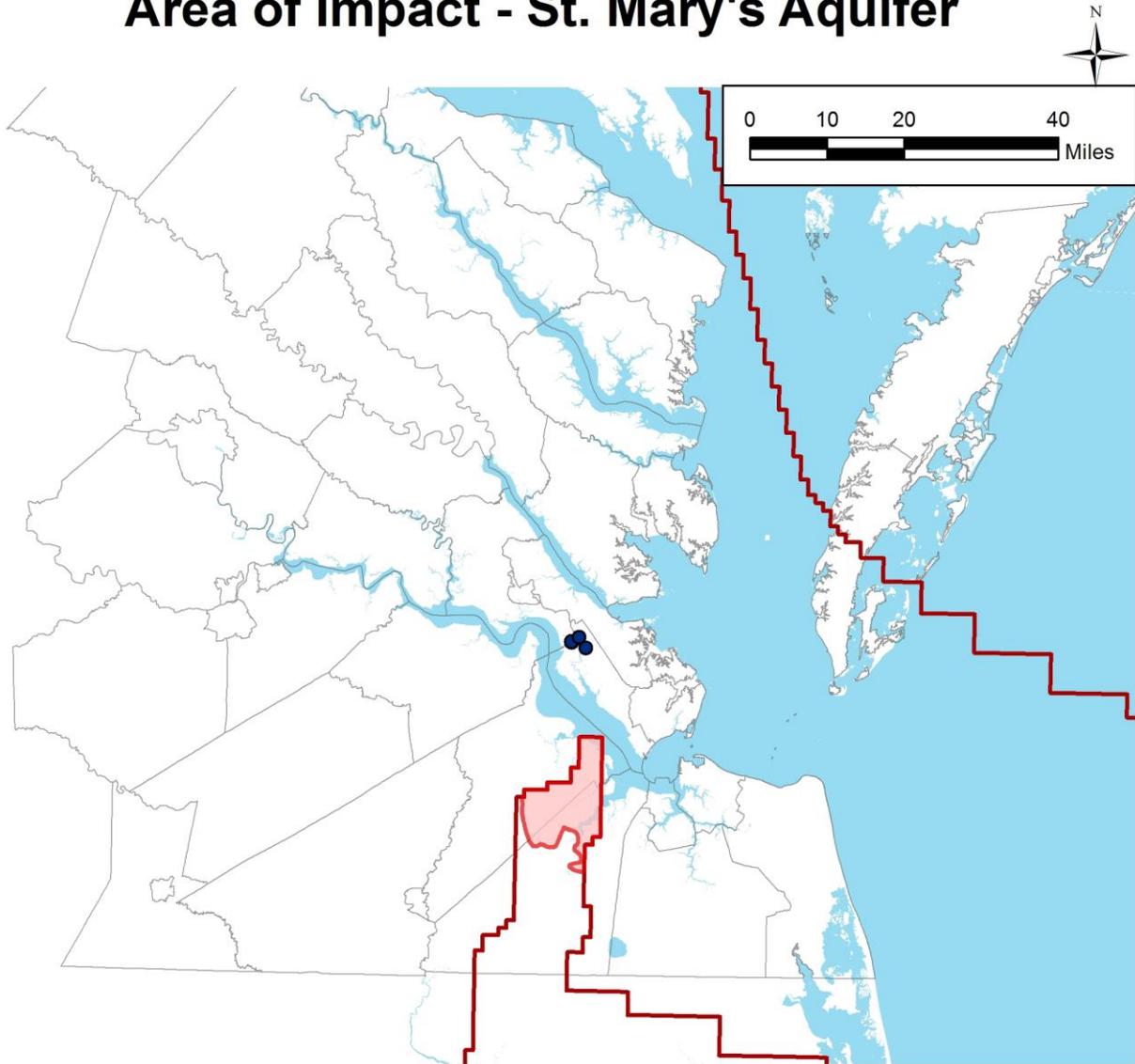


Newport News Water Works Area of Impact - St. Mary's Aquifer



- Newport News Water Works Wells
- ⊕ St. Mary's Active Model Area
- ⊕ St. Mary's AOI

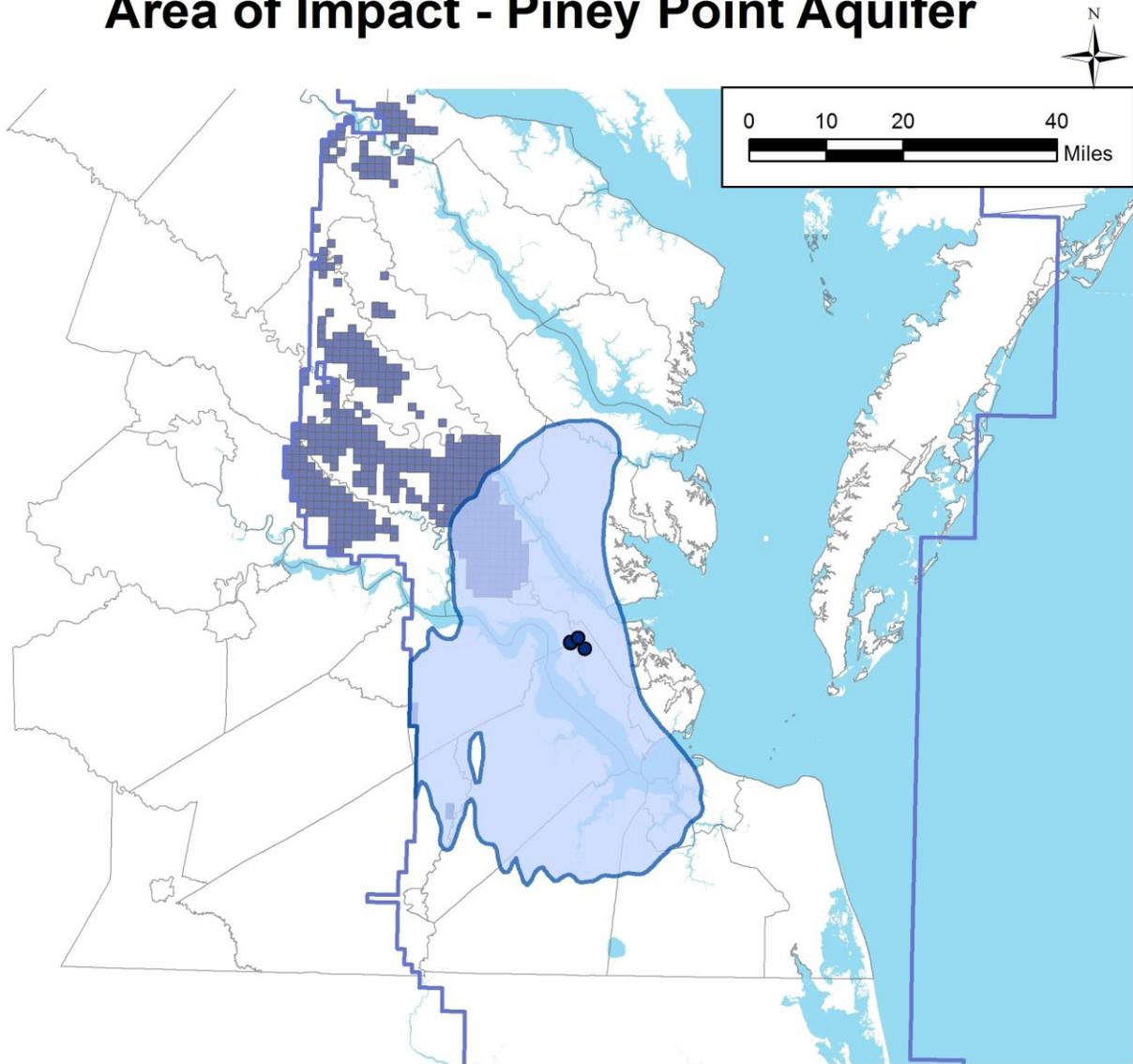
Simulated drawdown at or exceeding one foot in the St. Mary's aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer.

The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

Technical Evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Water Supply
September 2, 2015



Newport News Water Works Area of Impact - Piney Point Aquifer



- Newport News Water Works Wells
- Piney Point Active Model Area
- Piney Point AOI
- Piney Point Critical Cells (2015 Simulation)

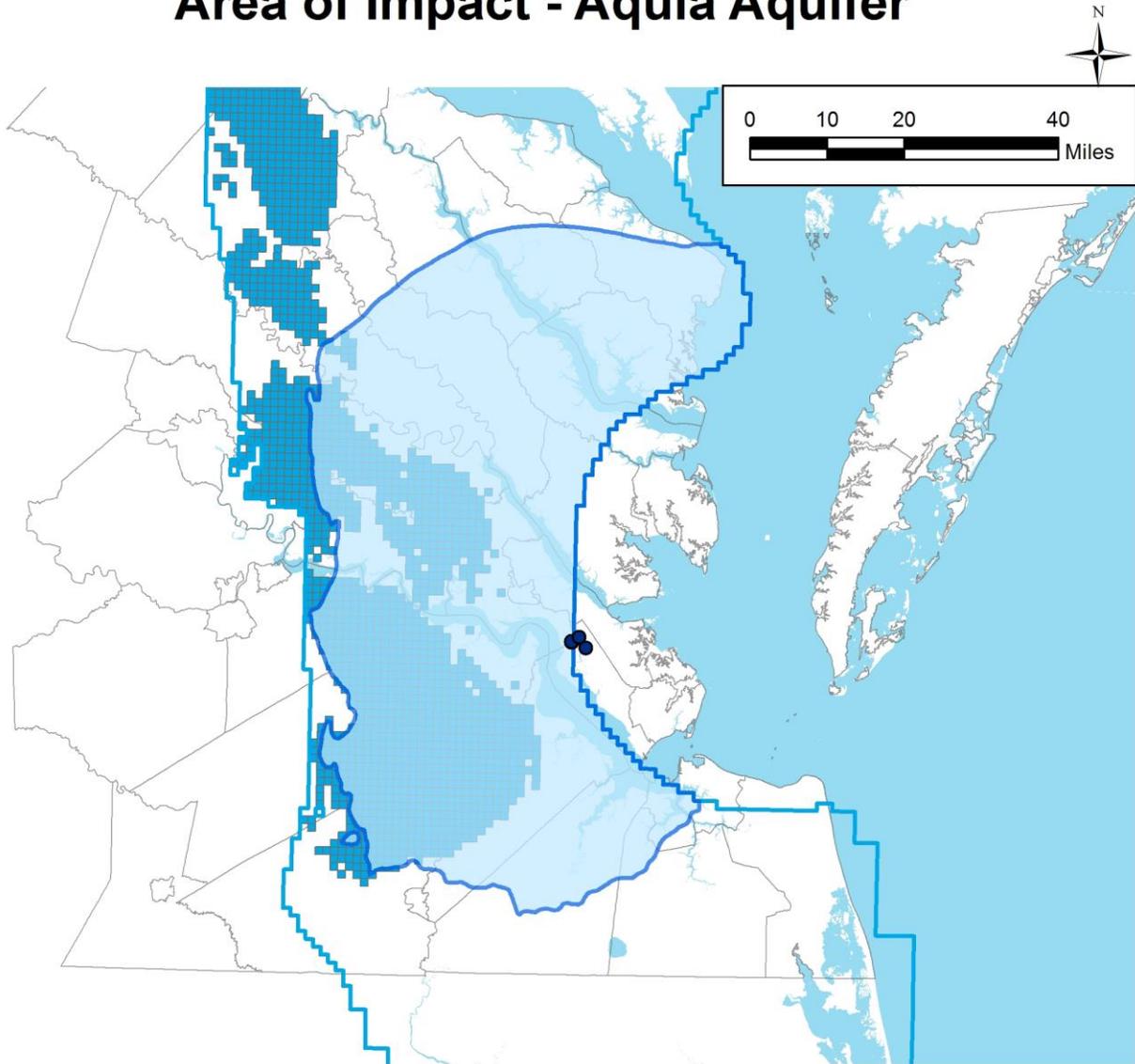
Simulated drawdown at or exceeding one foot in the Piney Point aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer.

The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

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Newport News Water Works Area of Impact - Aquia Aquifer



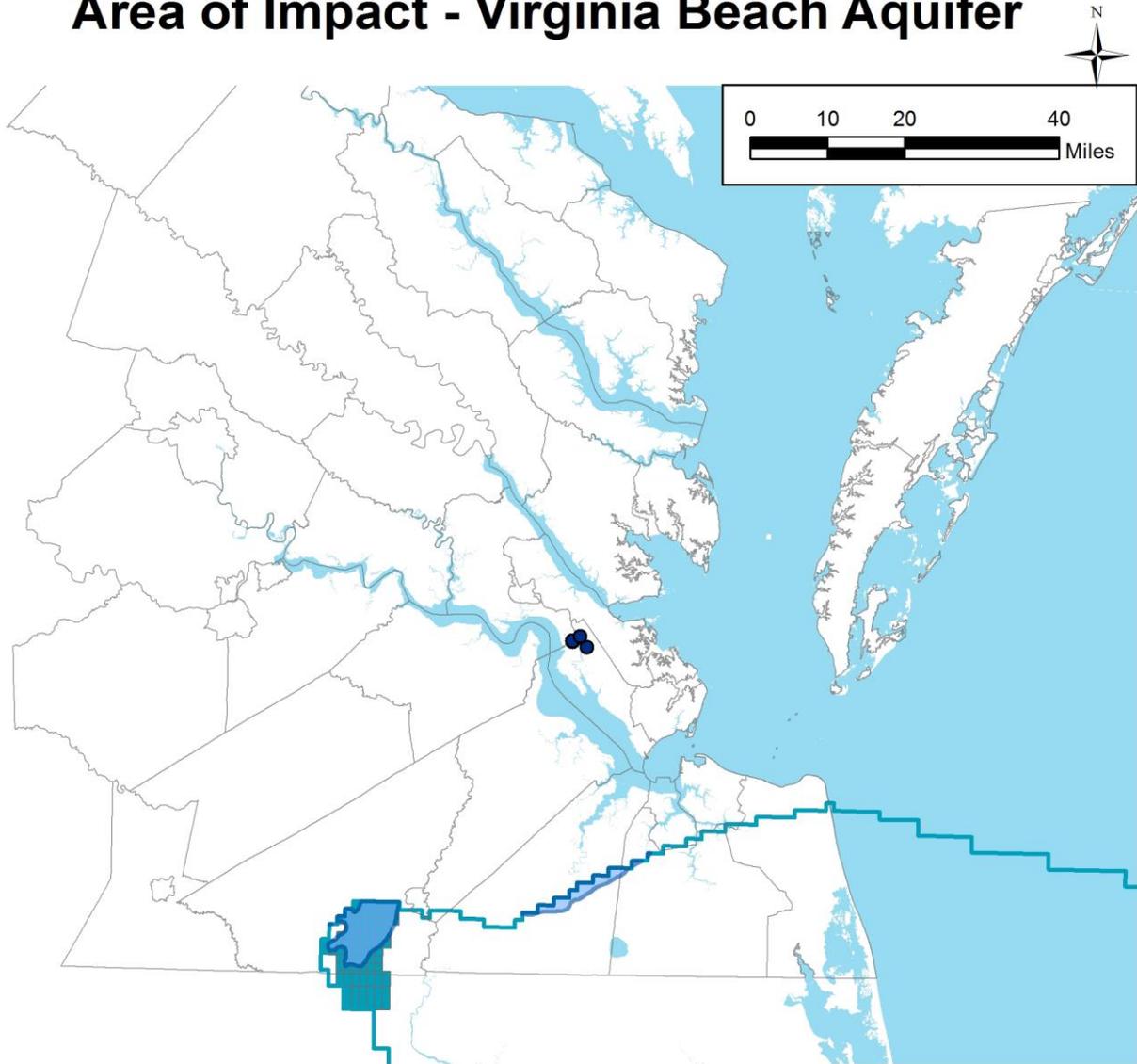
- Newport News Water Works Wells
- Aquia Active Model Area
- Aquia AOI
- Aquia Critical Cells (2015 Simulation)

Simulated drawdown at or exceeding one foot in the Aquia aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer. Maximum area of one-foot influence extends to the layer boundary. The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

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September 2, 2015



Newport News Water Works Area of Impact - Virginia Beach Aquifer



- Newport News Water Works
- Virginia Beach Active Model Area
- Virginia Beach AOI
- Virginia Beach Critical Cells (2015 Simulation)

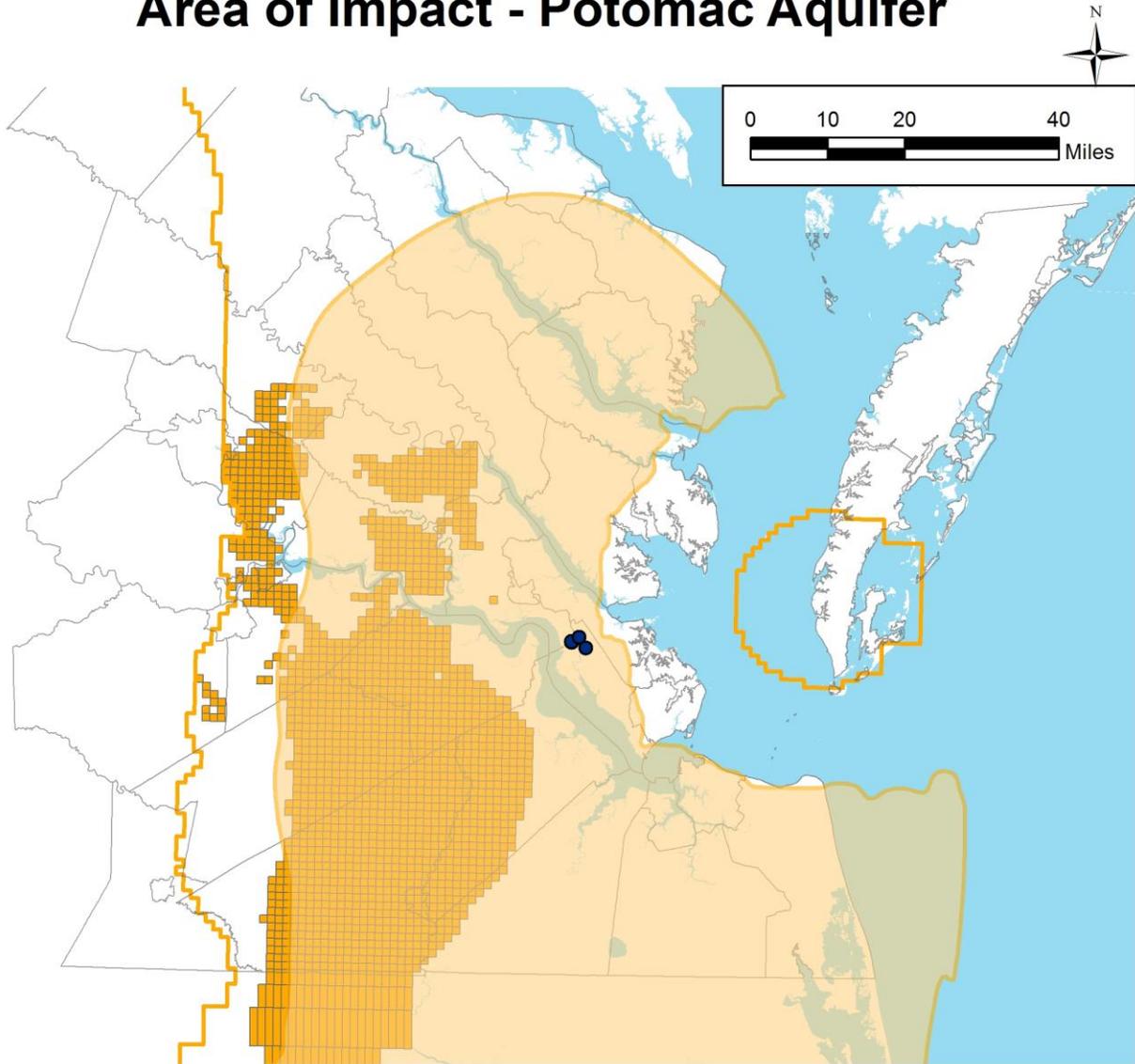
Simulated drawdown at or exceeding one foot in the Virginia Beach aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer.

The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

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Newport News Water Works Area of Impact - Potomac Aquifer

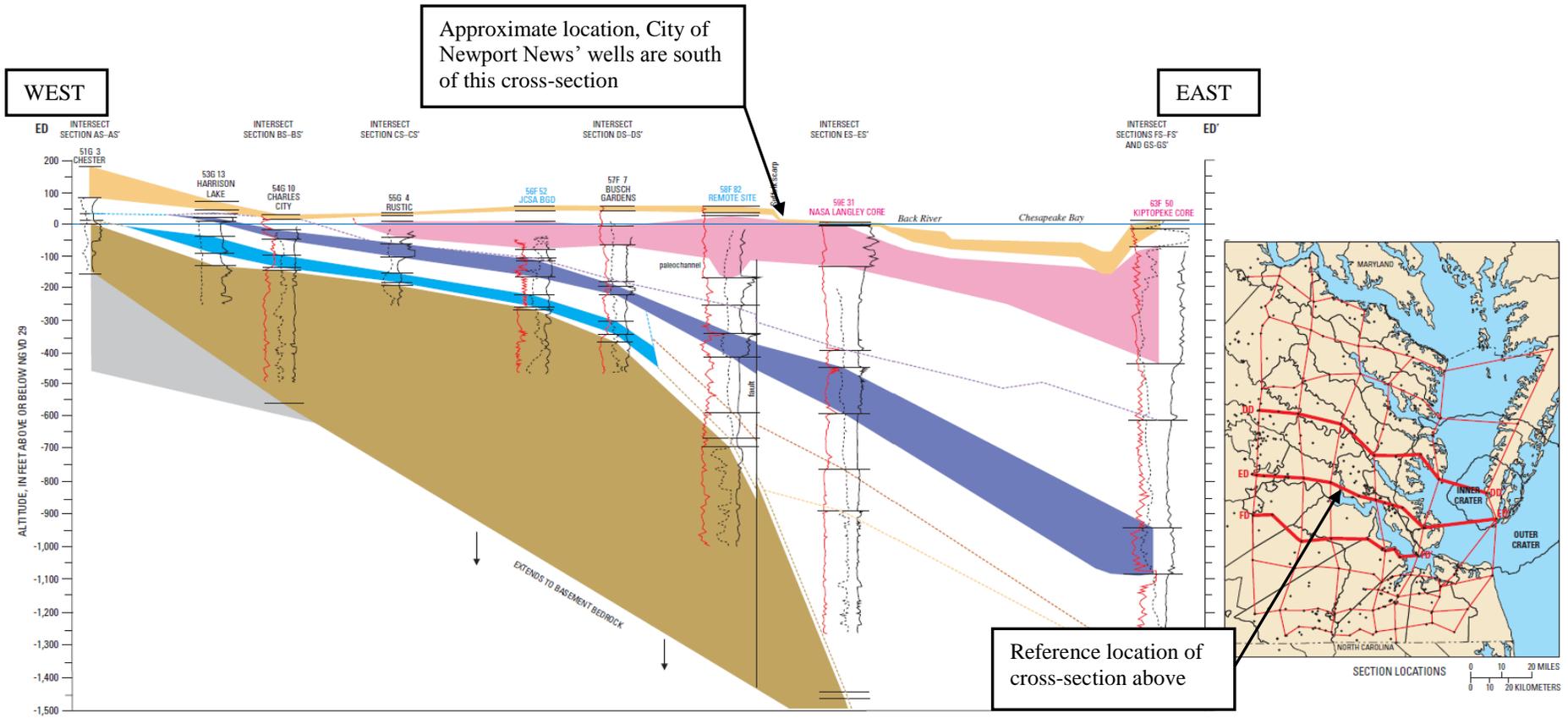


- Newport News Water Works Wells
- Potomac AOI
- Potomac Active Model Area
- Potomac Critical Cells (2015 Simulation)

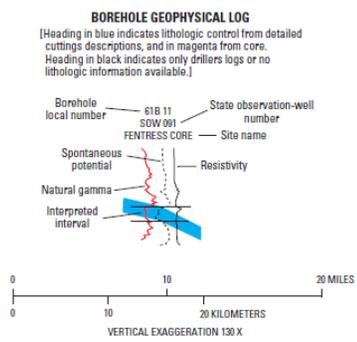
Simulated drawdown at or exceeding one foot in the Potomac aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer. Maximum area of one-foot influence extends to the layer boundary. The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

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- EXPLANATION**
- [Aquifers are shown by solid colors. Confining units and zones are shown by intervening blank areas following the sequence below. Where adjacent confining units or zones are in direct contact, the top surface of the unit or zone is shown by dashed lines.]
- Surficial aquifer
 - Yorktown confining zone
 - Yorktown-Eastover aquifer
 - Saint Marys confining unit
 - Saint Marys aquifer
 - Calvert confining unit
 - Piney Point aquifer
 - Chickahominy confining unit
 - Exmore Matrix confining unit
 - Exmore Clast confining unit
 - Nanjemoy-Marlboro confining unit
 - Virginia Beach aquifer
 - Upper Conomanian confining unit
 - Potomac confining zone
 - Potomac aquifer
 - Basement bedrock

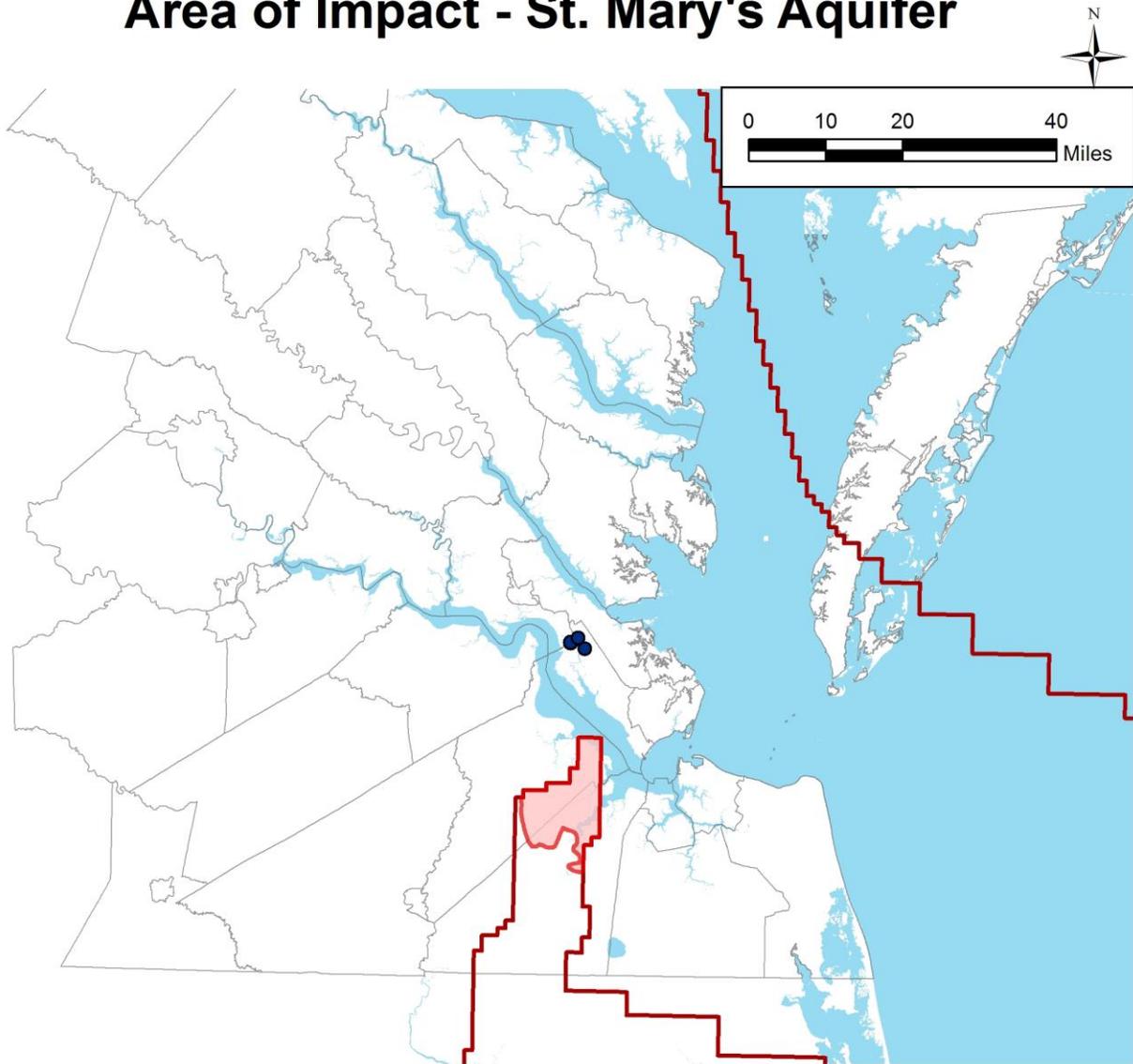


Coastal Plain (2006) Cross Section ED-ED' from USGS Professional Paper 1731.

Appendix- Virginia Coastal Plain Groundwater Initiative

The *Virginia Coastal Plain Model Optimization Simulations* report on file with the VA DEQ outlines a number of permit pumping reductions investigated as part of the Virginia Coastal Plain Groundwater Initiative (VACPGWI). Out of the scenarios investigated for the VACPGWI, the simulation with the largest 14 GWMA withdrawals reduced to 57% of their total permitted pumping values for the duration of the 50 year simulation produced the largest reduction of critical cells per gallon of pumping reduction. Further modeling revealed that when the largest 14 users were reduced 57% all the critical cells within Southampton and York counties and the majority of critical cells within Sussex County were removed. Below, the AOIs produced as outlined above in the *Model Results* section of this report are compared to the critical cells produced by the VACPGWI simulation. This comparison demonstrates that if the permitted amount for each of the largest 14 GWMA withdrawals was reduced by 57% the City of Newport News' requested withdrawal amount would satisfy the 80% drawdown criterion.

Newport News Water Works Area of Impact - St. Mary's Aquifer



- Newport News Water Works Wells
- ⊕ St. Mary's Active Model Area
- ⊕ St. Mary's AOI

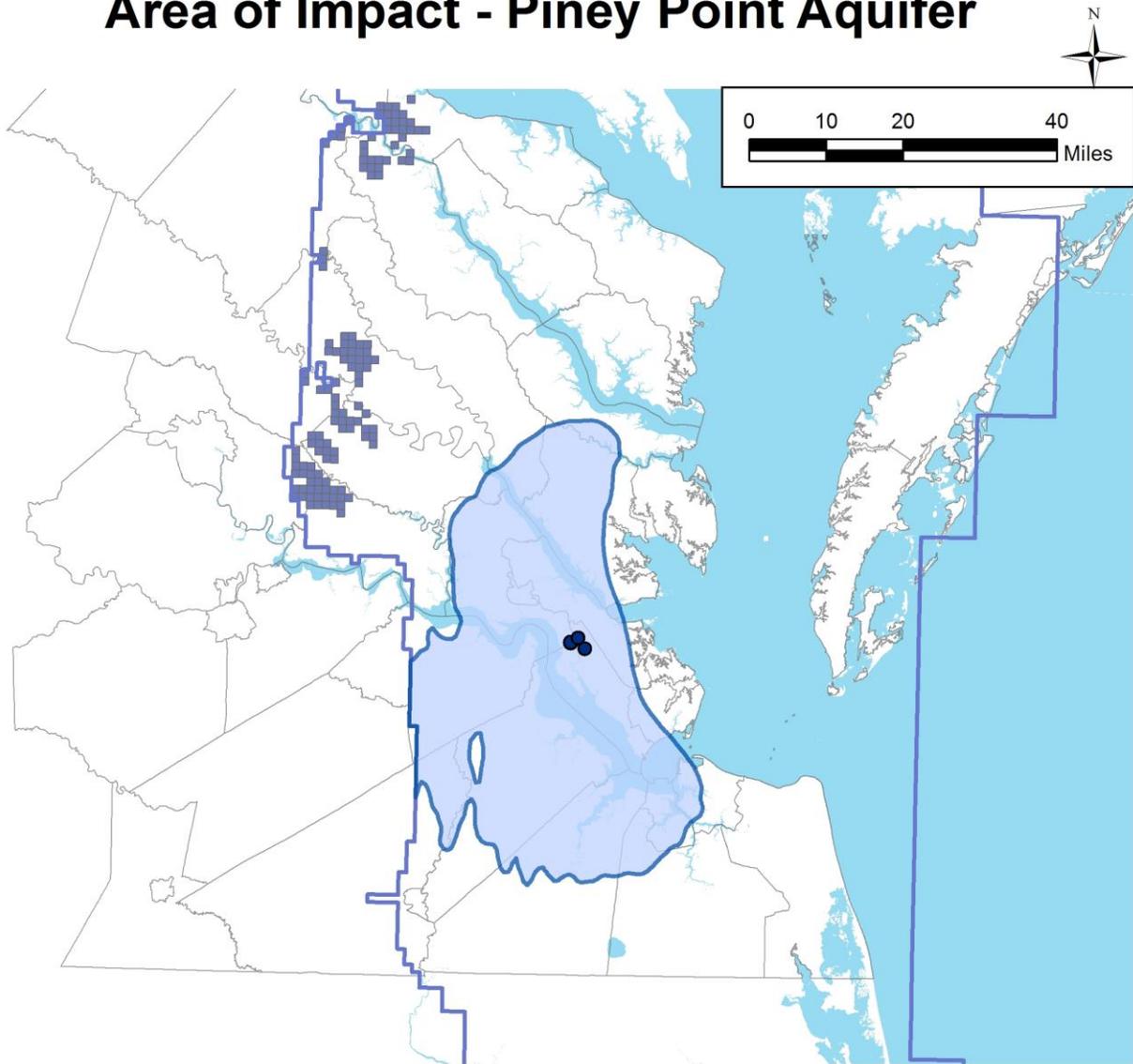
Simulated drawdown at or exceeding one foot in the St. Mary's aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer.

The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

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Newport News Water Works Area of Impact - Piney Point Aquifer



- Newport News Water Works Wells
- Piney Point Active Model Area
- Piney Point AOI
- Piney Point Critical Cells (VACPGIW)

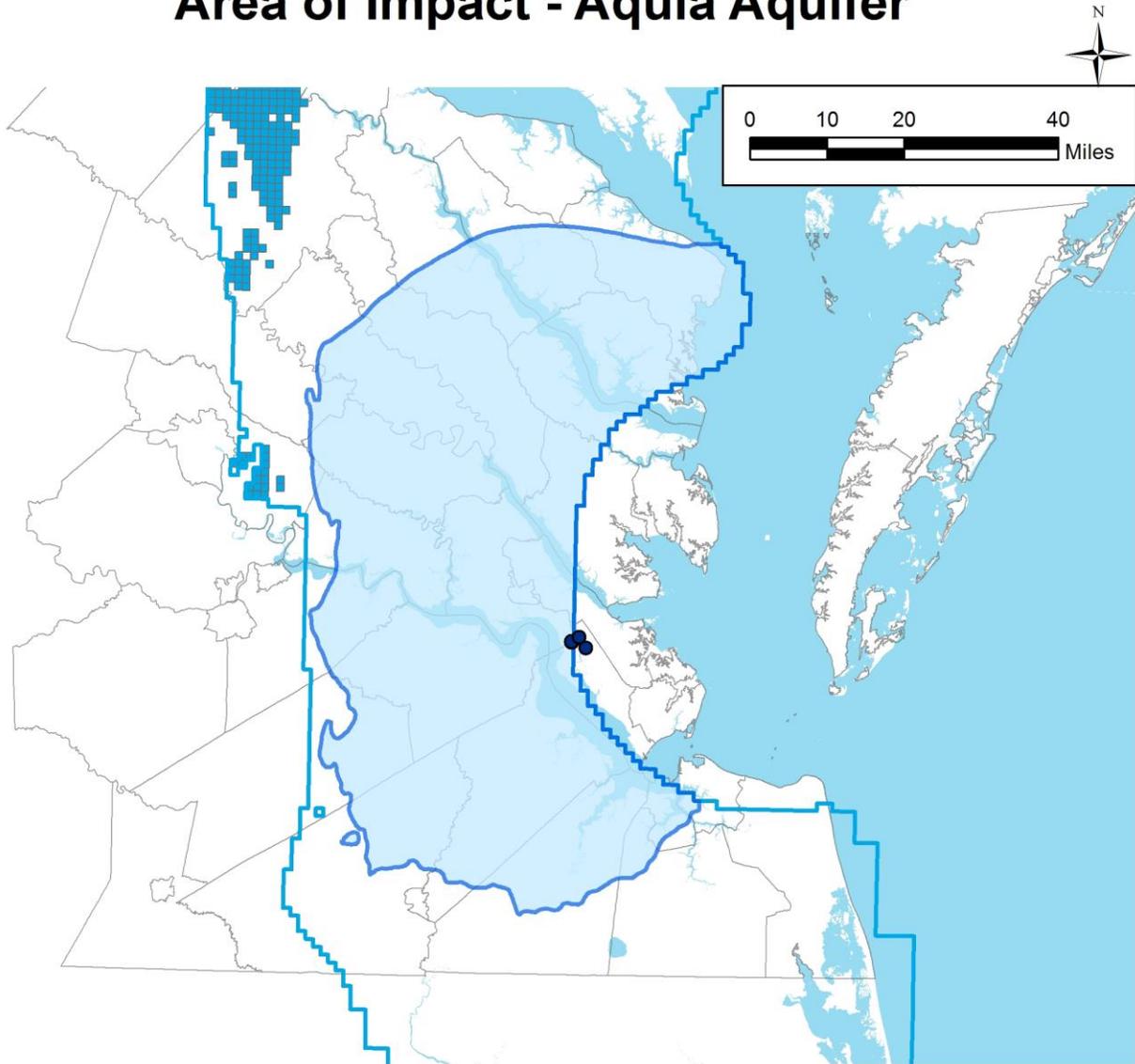
Simulated drawdown at or exceeding one foot in the Piney Point aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer.

The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

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Newport News Water Works Area of Impact - Aquia Aquifer



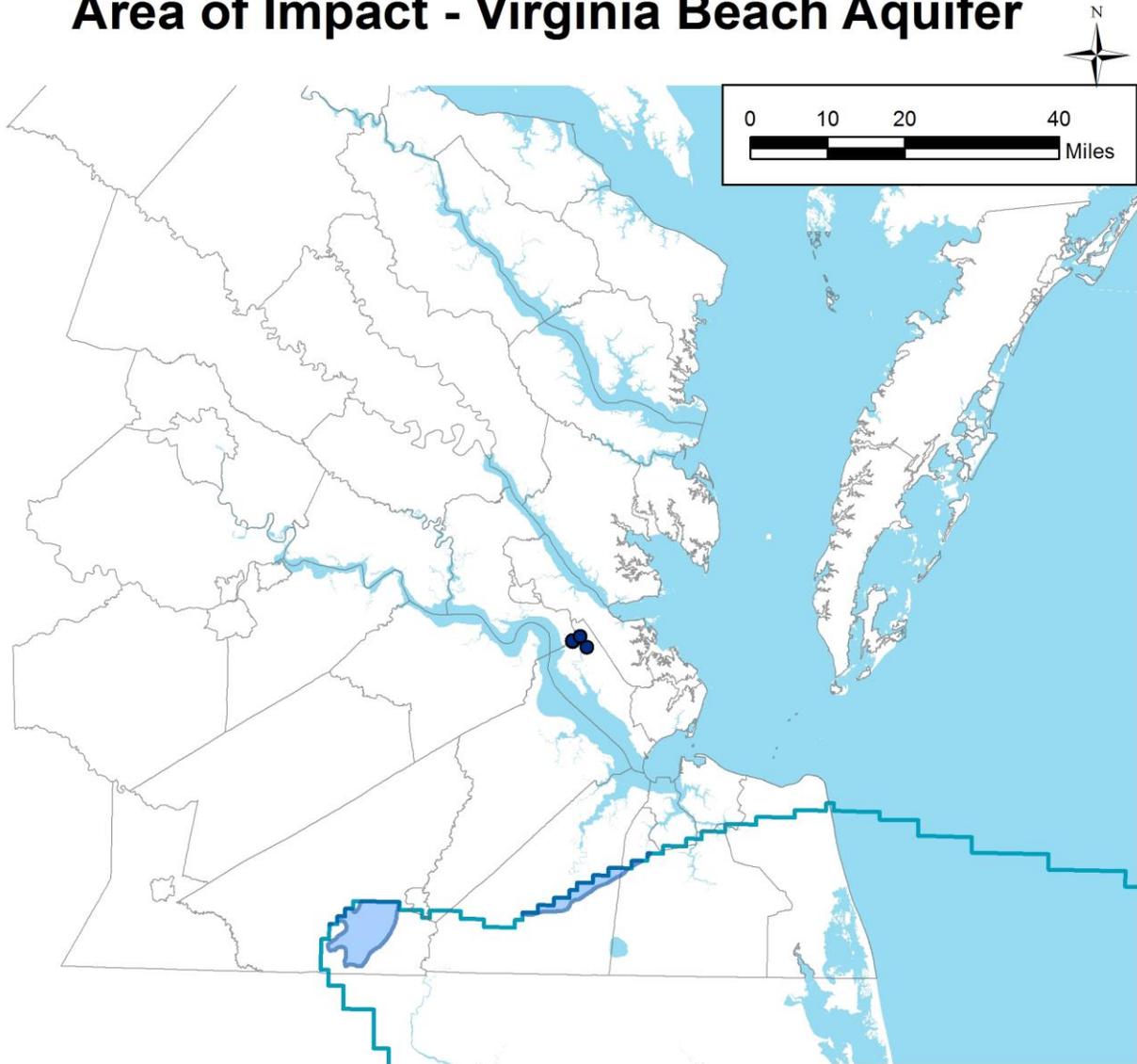
- Newport News Water Works Wells
- Aquia AOI
- Aquia Active Model Area
- Aquia Critical Cells (VACPGWI)

Simulated drawdown at or exceeding one foot in the Aquia aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer. Maximum area of one-foot influence extends to the layer boundary. The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

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Newport News Water Works Area of Impact - Virginia Beach Aquifer



- Newport News Water Works
- Virginia Beach Active Model Area
- Virginia Beach AOI
- Virginia Beach Critical Cells (VACPGWI)

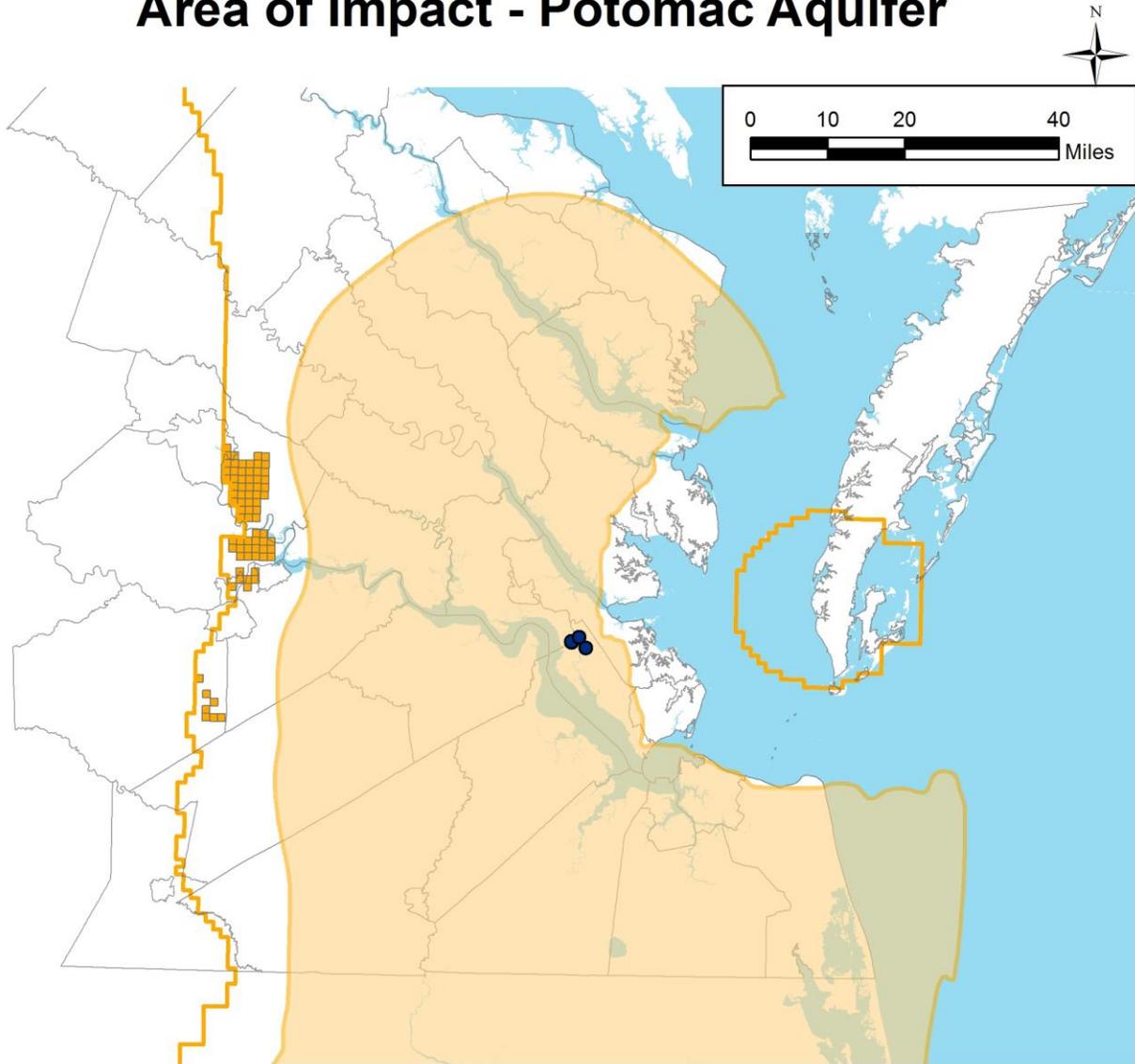
Simulated drawdown at or exceeding one foot in the Virginia Beach aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer.

The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

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Newport News Water Works Area of Impact - Potomac Aquifer



- Newport News Water Works Wells
- Potomac AOI
- Potomac Active Model Area
- Potomac Critical Cells (VACPGWI)

Simulated drawdown at or exceeding one foot in the Potomac aquifer resulting from a 50 year simulation of a 2,200,000 gpd withdrawal from the Potomac aquifer. Maximum area of one-foot influence extends to the layer boundary. The VAHydro-GW Model developed in SEAWAT by the USGS was used to simulate drawdown.

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