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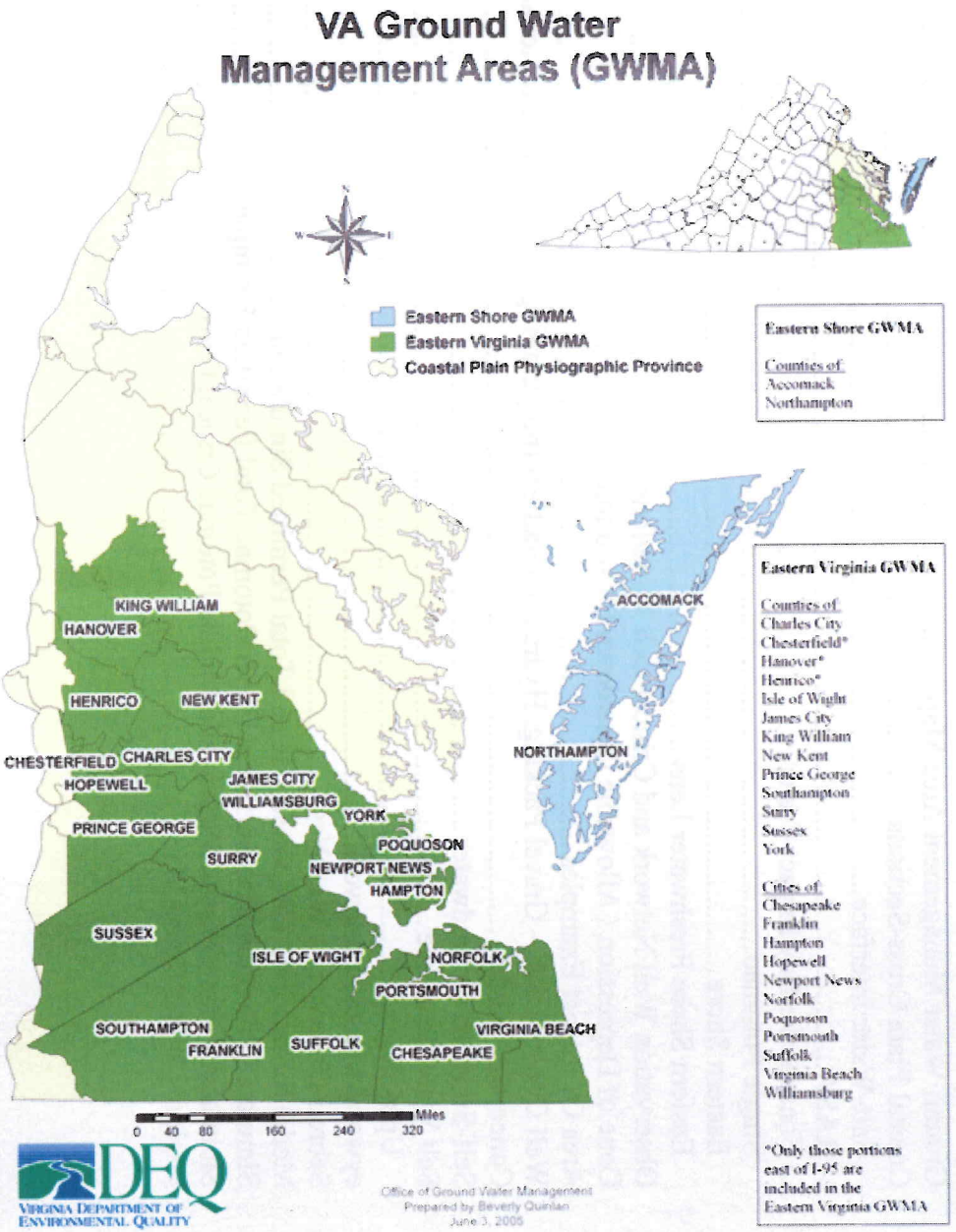
Ground Water Management Area Maps

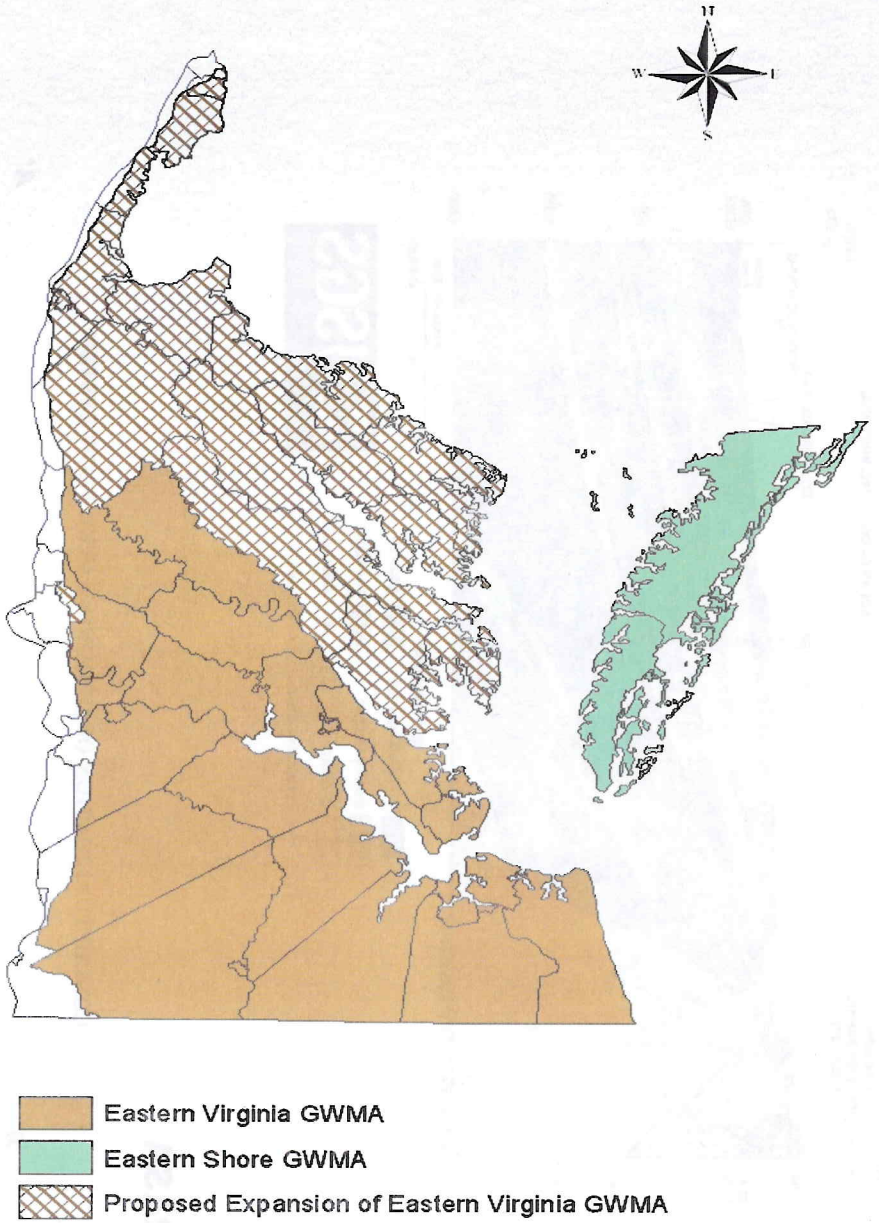
Virginia Ground Water Management Areas

Initiated by Board motion or petition received from any county, city or town in area, when...

1. GW levels are declining.
2. Well interference is occurring.
3. Supply may be overdrawn.
4. Adverse changes to water quality have occurred or are expected.



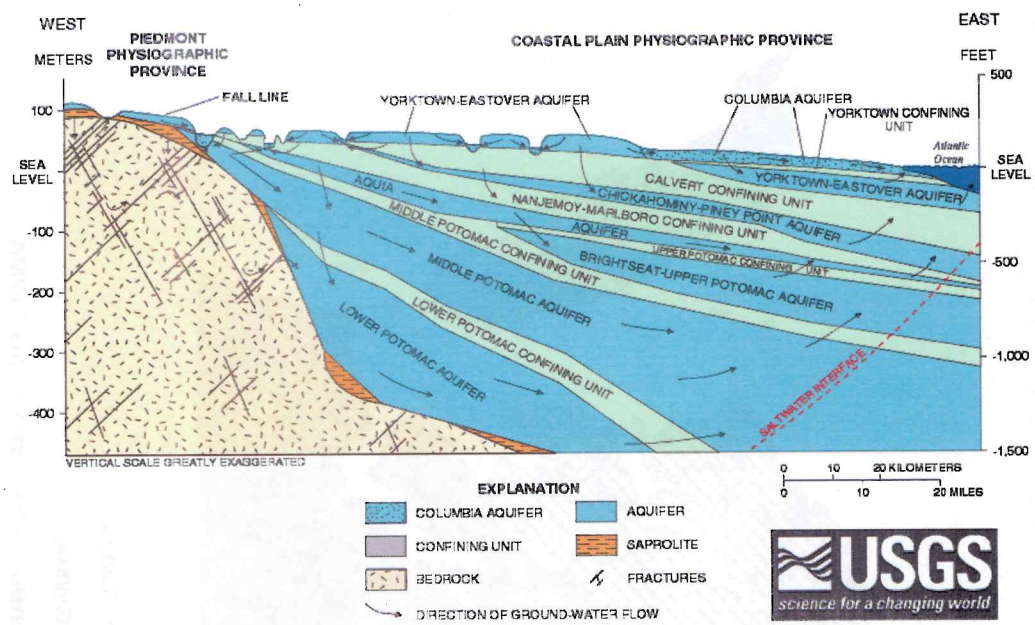
Proposed Expansion of the Eastern Virginia Groundwater Management Area 9VAC25-600



Coastal Plain Cross-Sections

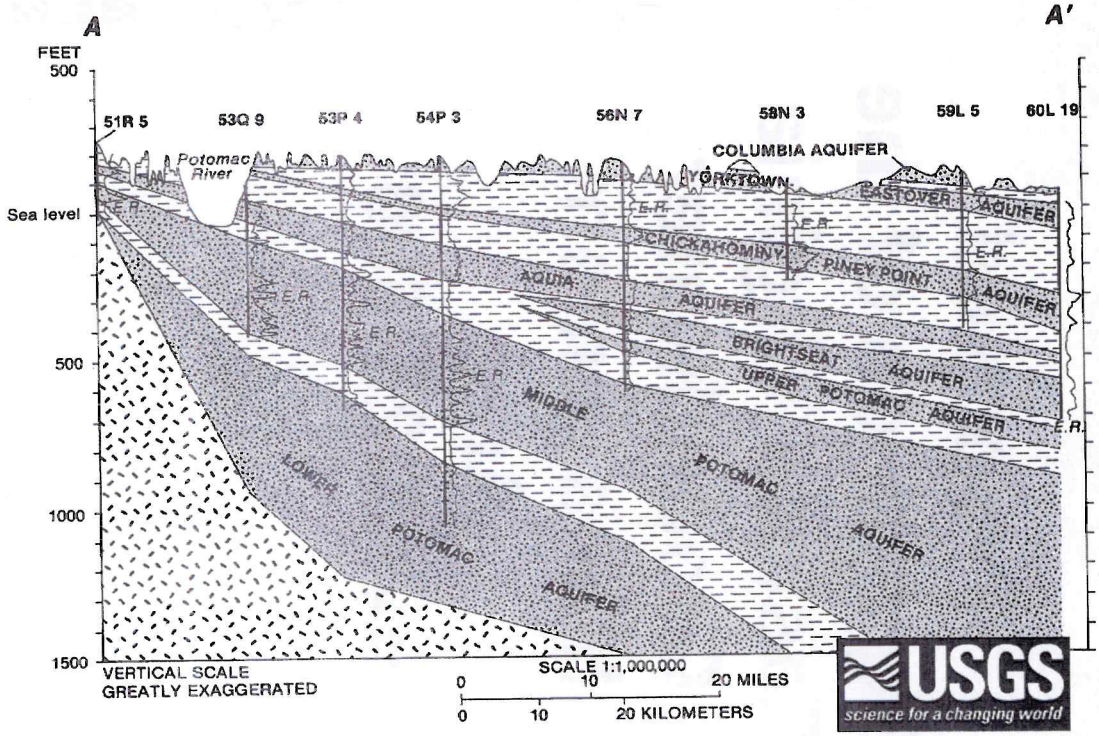
Salt-Water Interface

Modified from McFarland (1999)

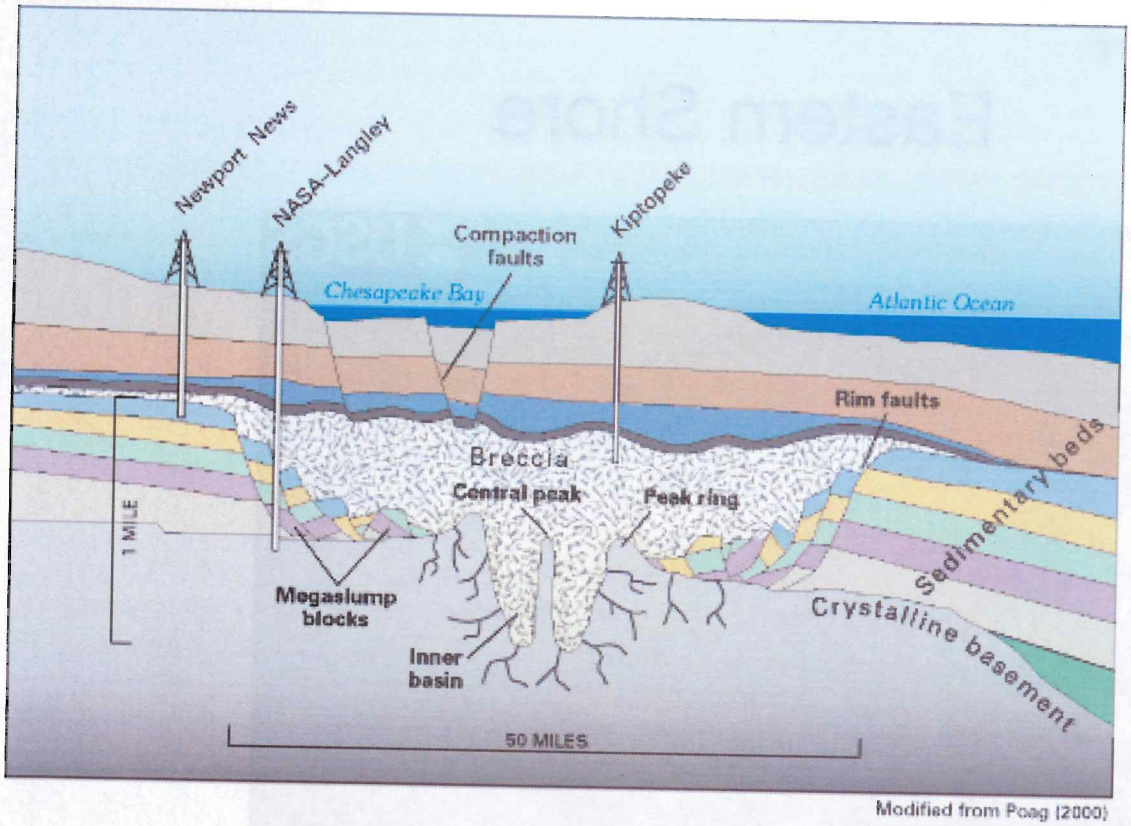


RASA

CONCEPTUALIZATION OF GROUND-WATER FLOW SYSTEM



Chesapeake Bay Impact Crater



Modified from Poag (2000)

Single Potomac

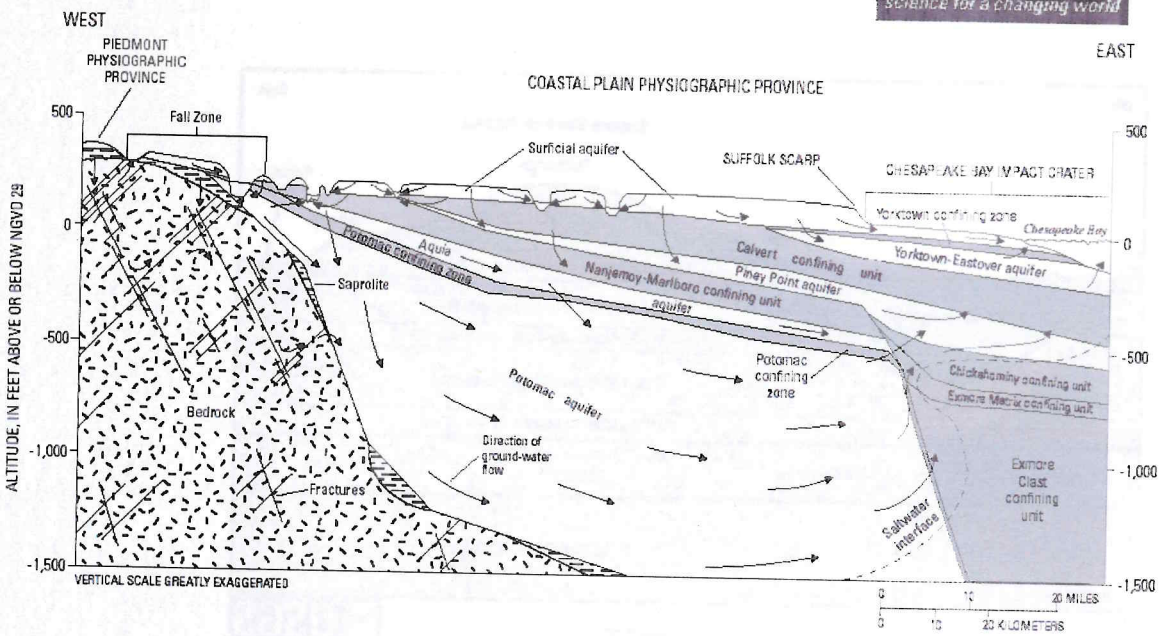


Figure 2. Generalized hydrogeologic section and directions of ground-water flow in the Virginia Coastal Plain (altitude relative to National Geodetic Vertical Datum of 1929).

Eastern Shore

Eastern Shore

Eastern Shore Freshwater Lens

Eastern Shore of Virginia

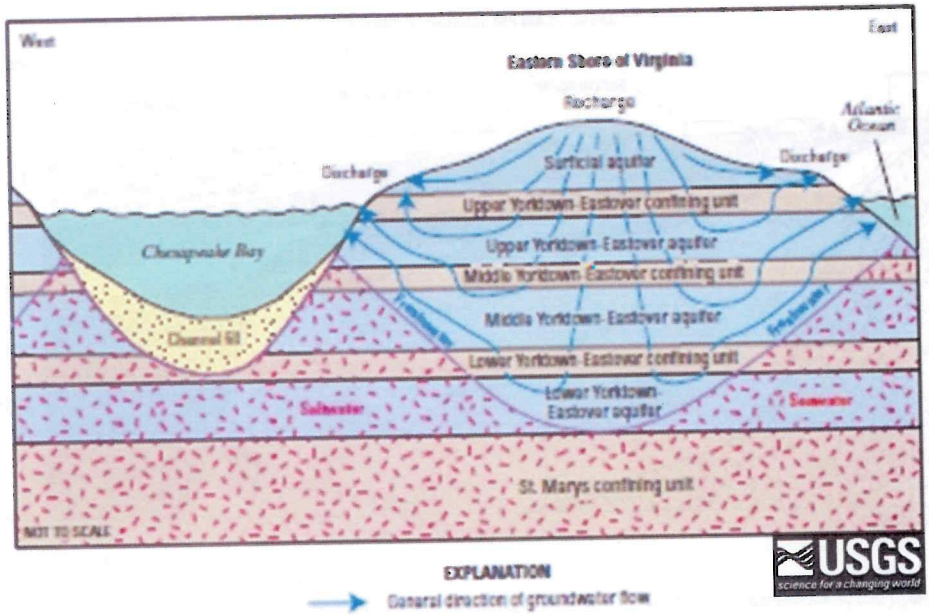
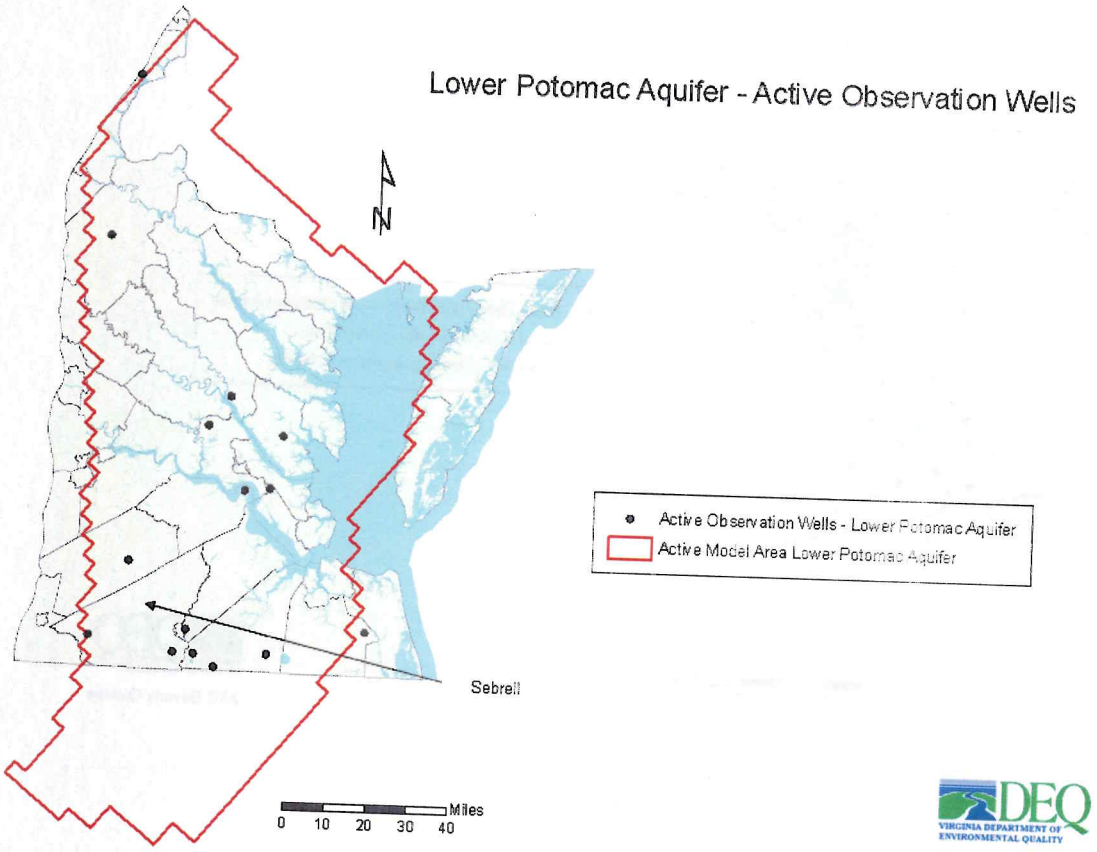
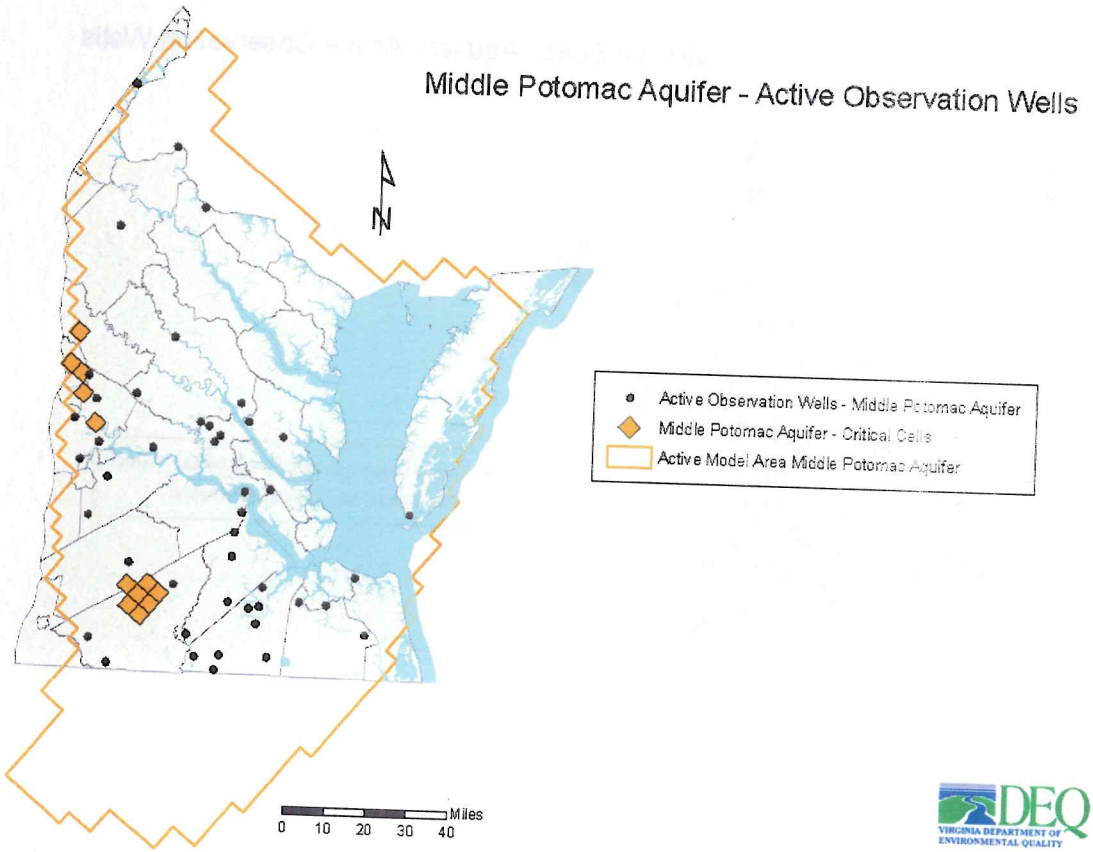
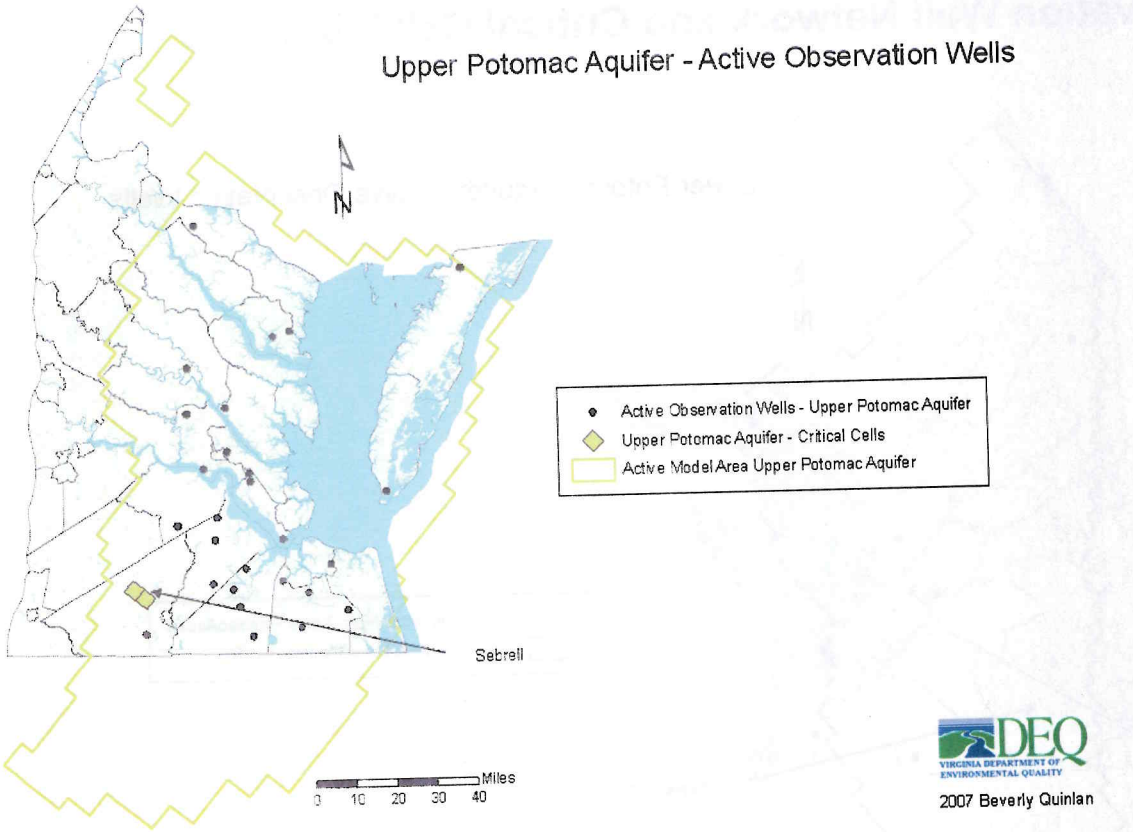


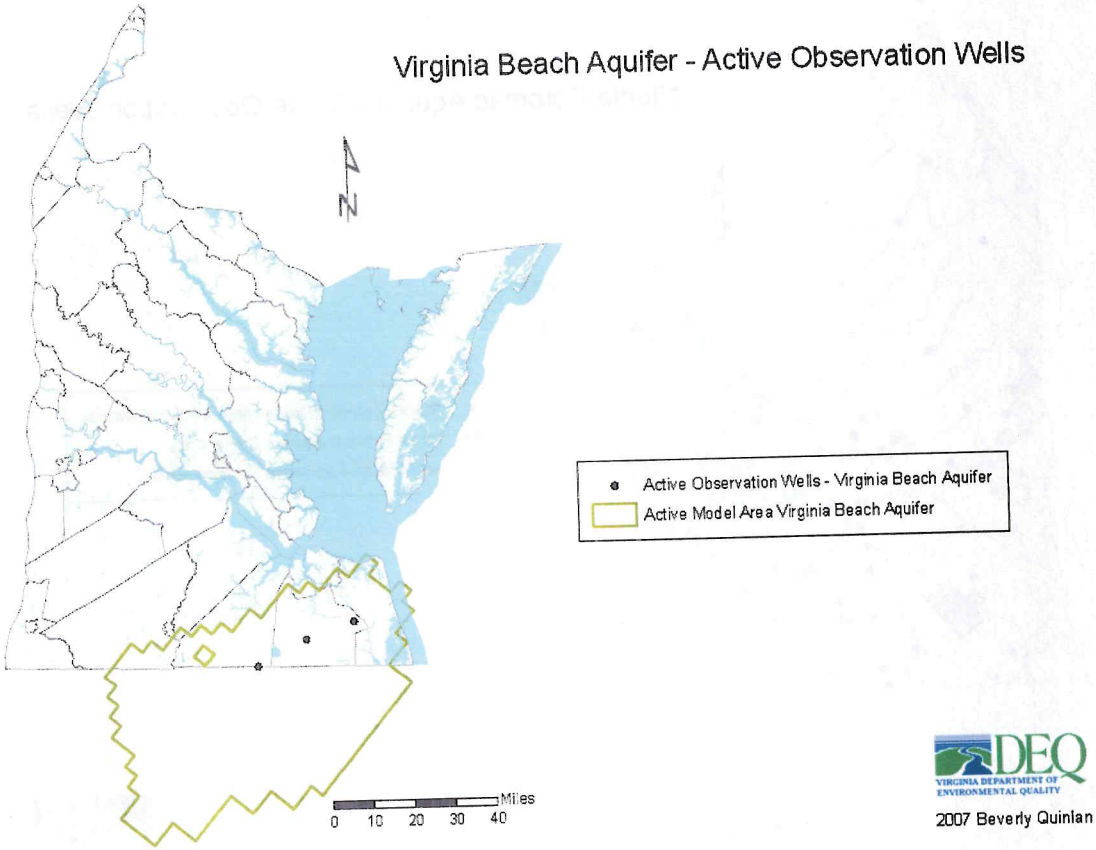
Figure 14. Schematic diagram of groundwater flow of the Eastern Shore of Virginia.

Observation Well Network and Critical Cell Violations






Upper Potomac Aquifer - Active Observation Wells
N
Active Observation Wells - Upper Potomac Aquifer
Upper Potomac Aquifer - Critical Cells
Active Model Area Upper Potomac Aquifer
Sebrell
Miles
0 10 20 30 40
DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
2007 Beverly Quinlan


Virginia Beach Aquifer - Active Observation Wells
N
Active Observation Wells - Virginia Beach Aquifer
Active Model Area Virginia Beach Aquifer
Miles
0 10 20 30 40
DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
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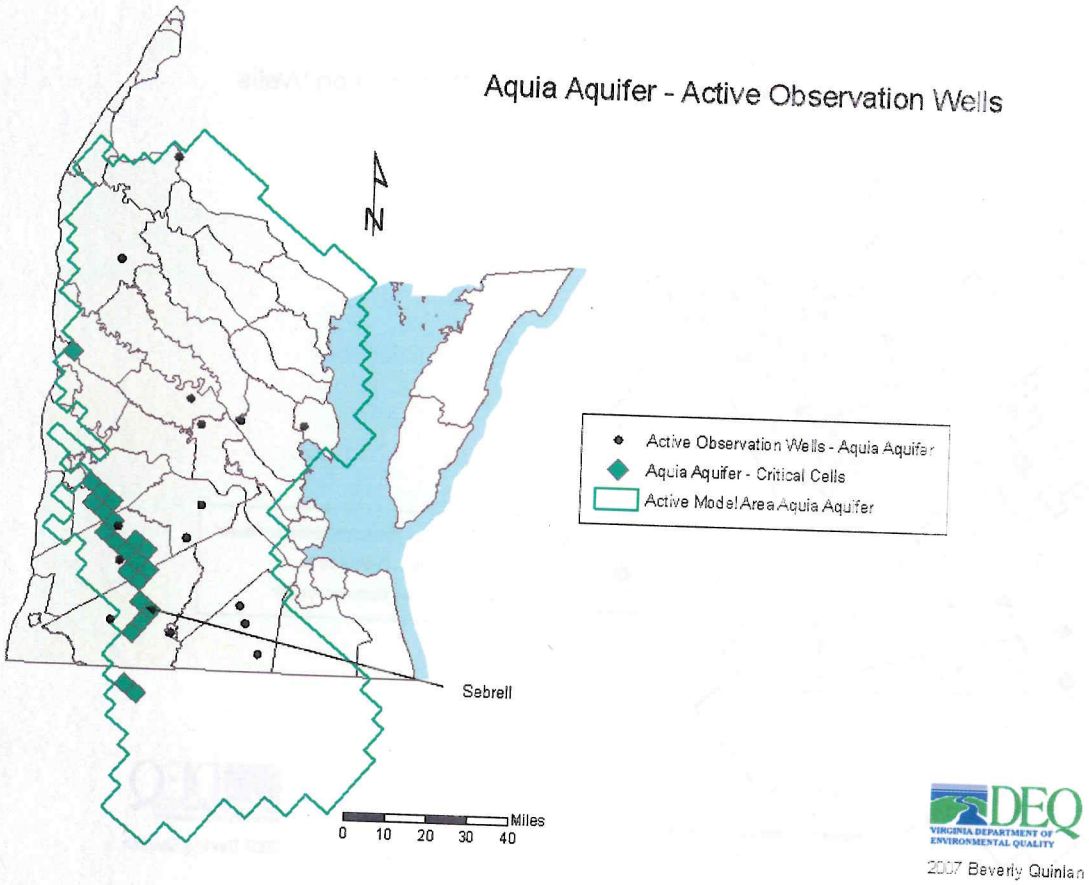
Aquia Aquifer - Active Observation Wells
N
Active Observation Wells - Aquia Aquifer
Aquia Aquifer - Critical Cells
Active Model Area Aquia Aquifer
Sebrell
Miles
0 10 20 30 40
DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
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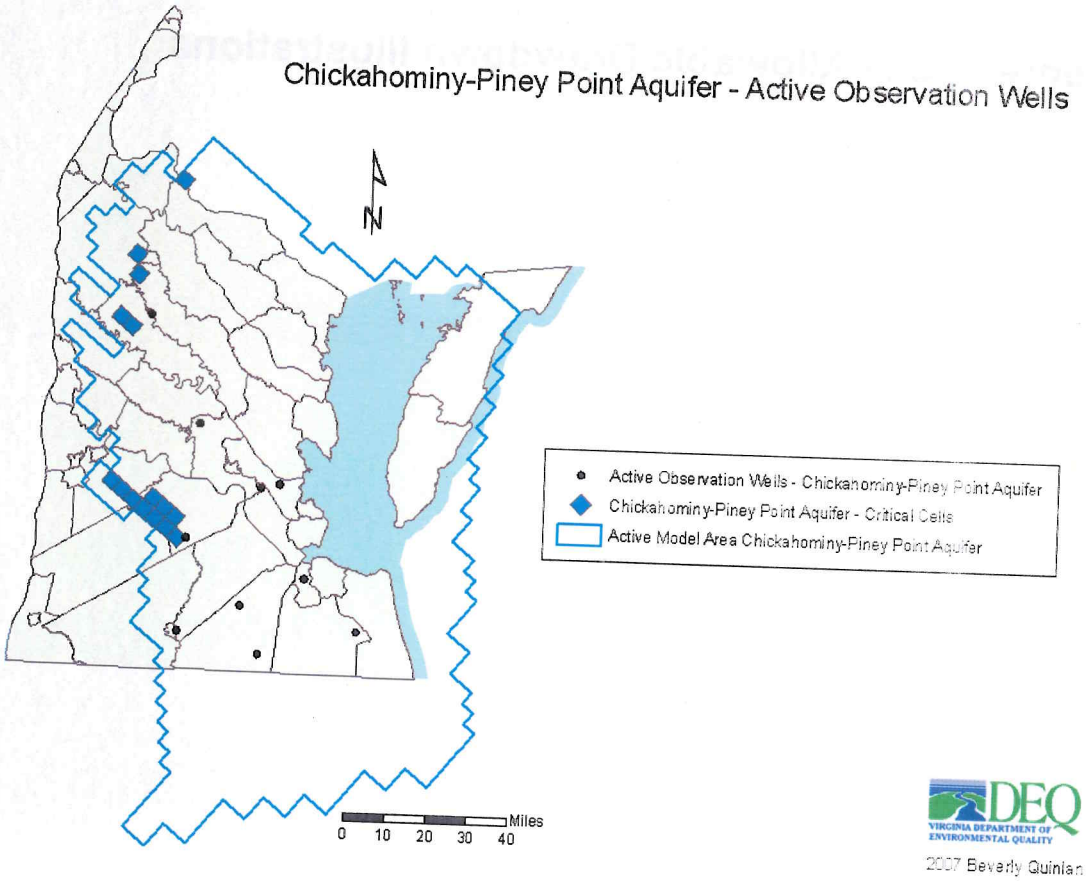
Chickahominy-Piney Point Aquifer - Active Observation Wells
N
Active Observation Wells - Chickahominy-Piney Point Aquifer
Chickahominy-Piney Point Aquifer - Critical Cells
Active Model Area Chickahominy-Piney Point Aquifer
Miles
0 10 20 30 40
DEQ
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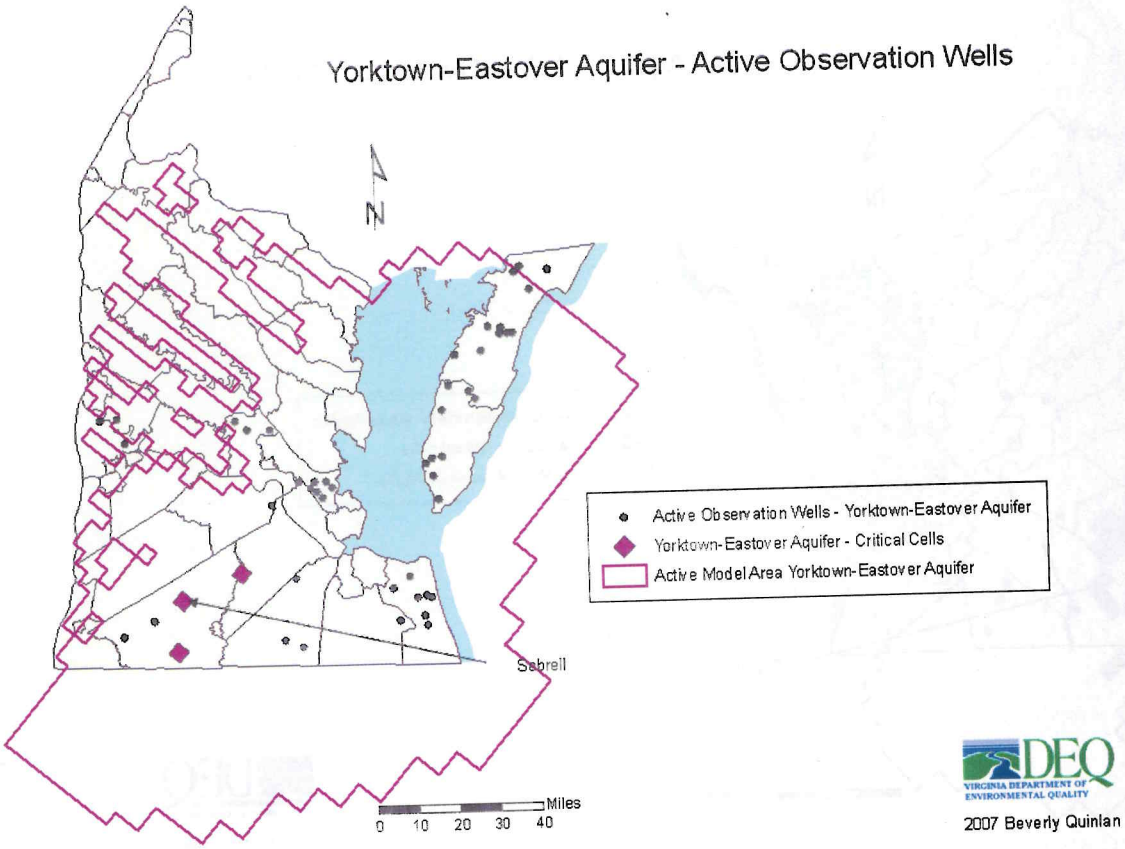
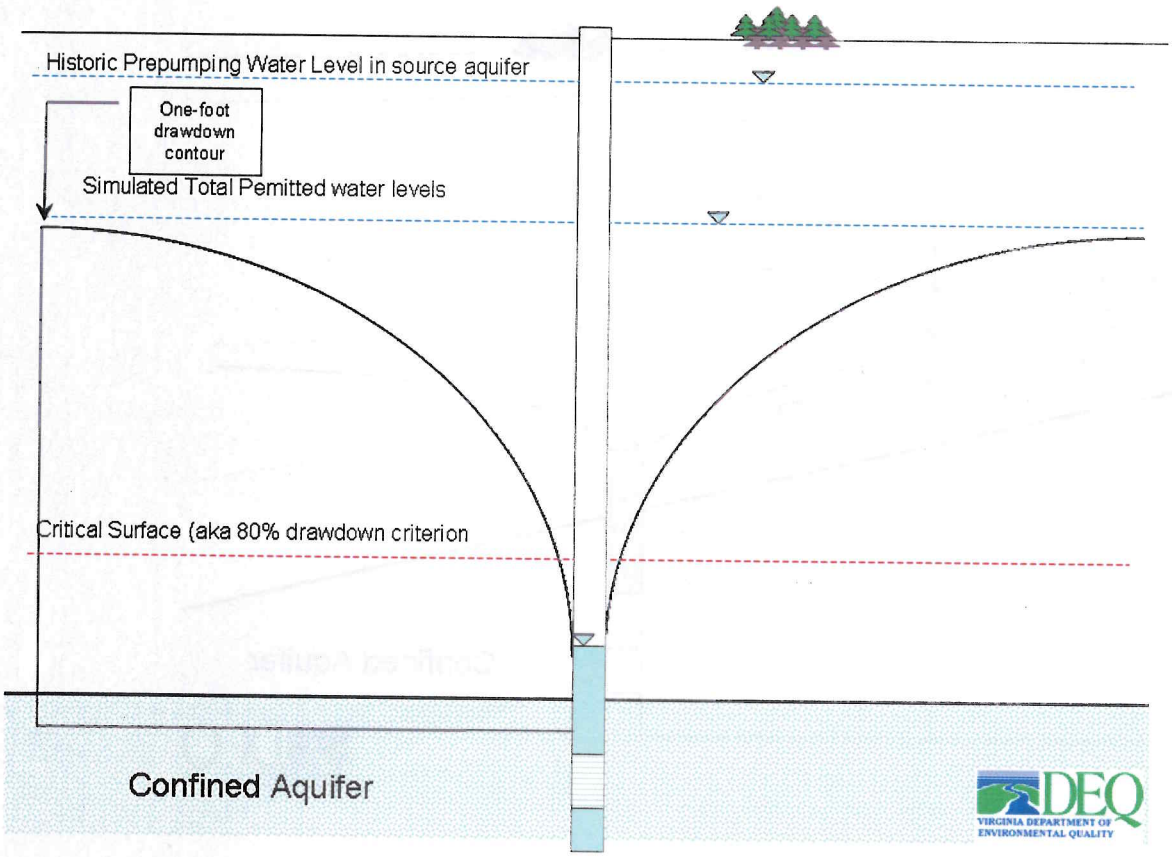
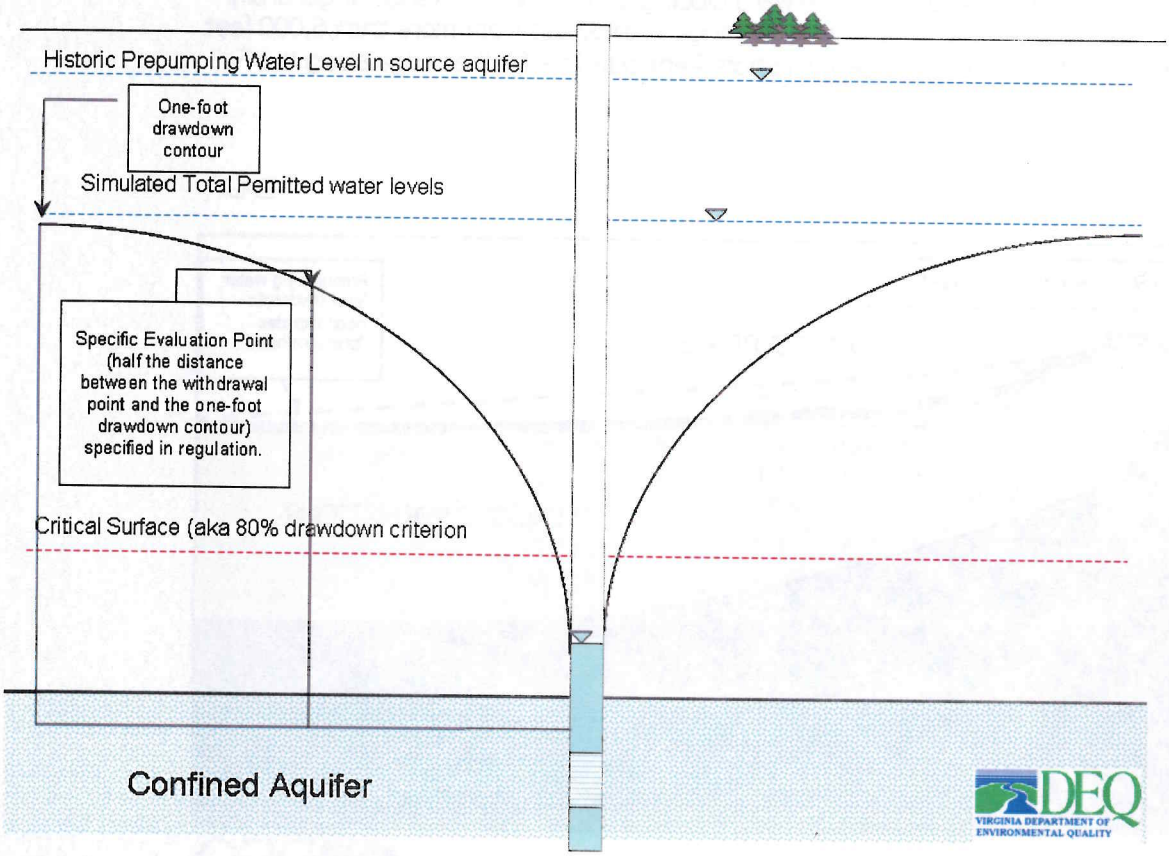


Cone of Depression / Allowable Drawdown Illustrations


Historic Prepumping Water Level in source aquifer
One-foot drawdown contour
Simulated Total Pemitted water levels
Critical Surface (aka 80% drawdown criterion
Confined Aquifer
DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY


Historic Prepumping Water Level in source aquifer
One-foot drawdown contour
Simulated Total Pemitted water levels
Specific Evaluation Point (half the distance between the withdrawal point and the one-foot drawdown contour) specified in regulation.
Critical Surface (aka 80% drawdown criterion
Confined Aquifer
DEQ
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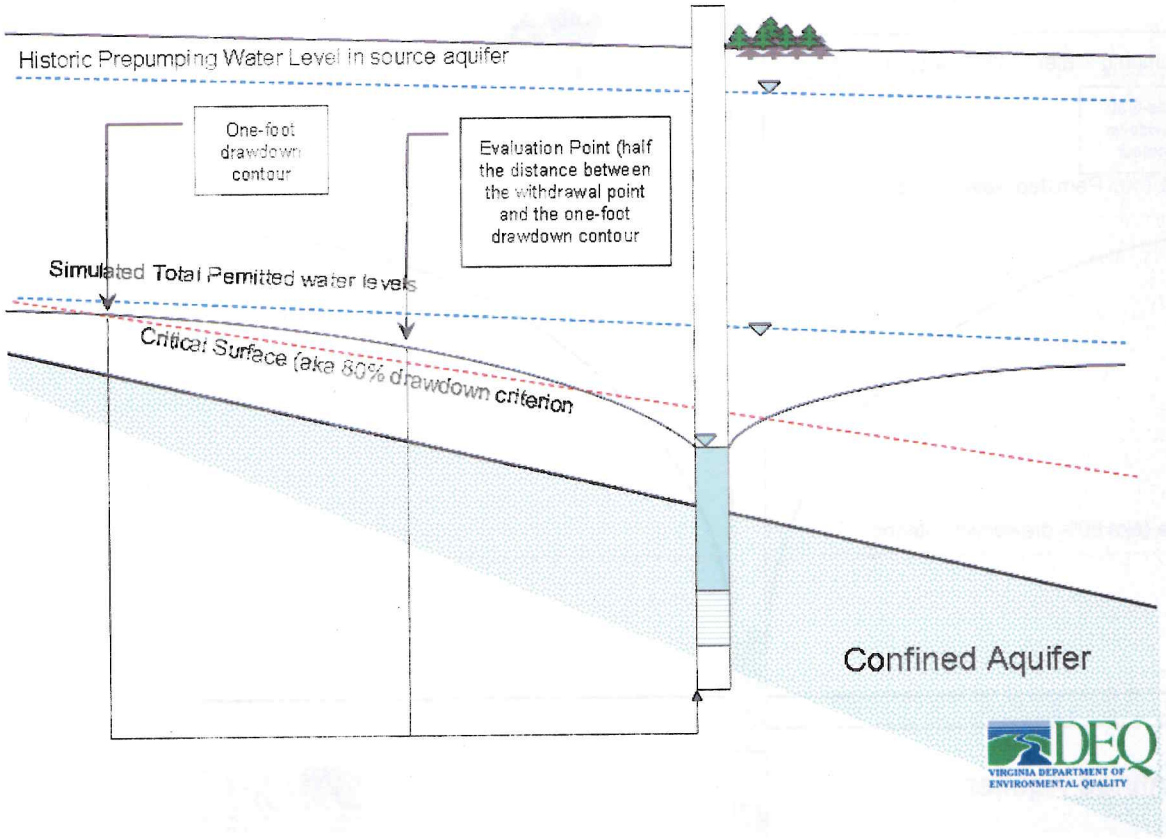
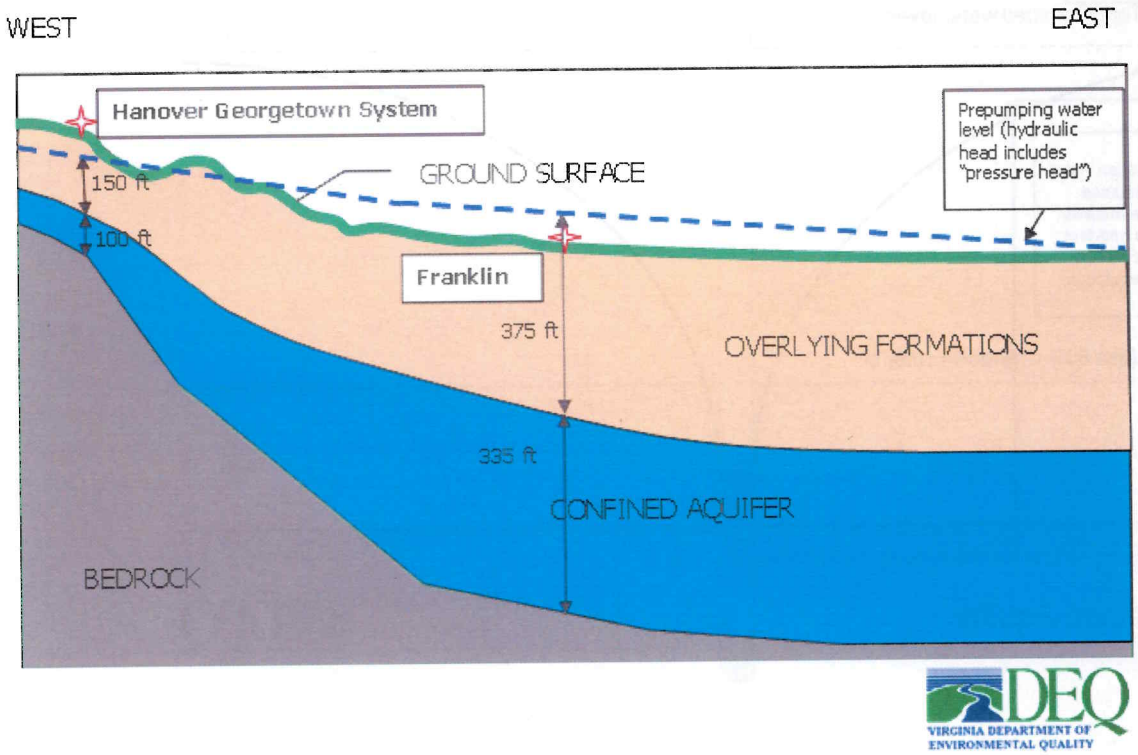


The Virginia Coastal Plain consists of an eastward dipping and thickening wedge of generally unconsolidated sands and clays. The sediments range in thickness from more than 6,000 feet beneath the northeastern part of the Eastern Shore Peninsula to a feather edge along the Fall Line.



Area Of Impact Examples

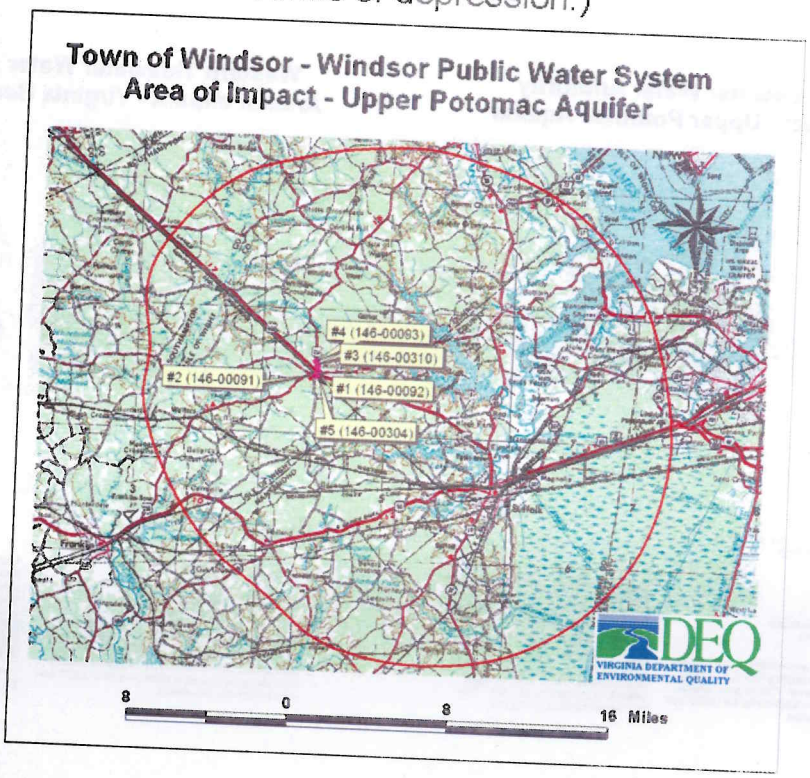
Area of Impact
(one-foot drawdown contour)

- "Area of impact" means the areal extent of each aquifer where more than one foot of drawdown is predicted to occur due to a proposed withdrawal.

- AKA "mitigation area": In cases where the area of impact does not remain on the property owned by the applicant or existing ground water withdrawers will be included in the area of impact, the applicant shall provide and implement a plan to mitigate all adverse impacts on existing ground water users.

AOI = Mitigation Area

(This is a VCPM evaluation of 600,000 gpd in an area of coalescing cones of depression.)



WTWA 8,344,575 gpd

3,045,770,000 gallons per year

Western Tidewater Water Authority
Area of Impact - Lower Potomac Aquifer

Area of Impact

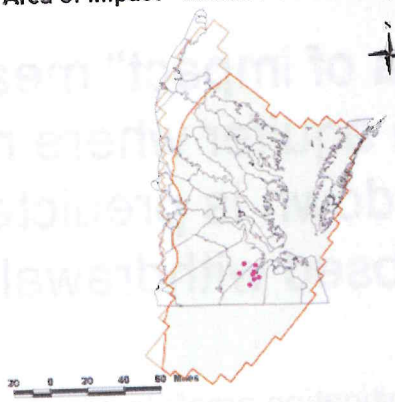
Lower Potomac Aquifer Model Boundary

Simulated drawdown at or exceeding one foot in the Lower Potomac aquifer resulting from a 8,345,000 gpd multi-aquifer withdrawal. The Virginia Coastal Plain Model developed in Modflow by the USGS was used to simulate drawdowns.

Technical Evaluation performed by
Robin Patton
Office of Water Resources Management
May 20, 2004

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Western Tidewater Water Authority
Area of Impact - Middle Potomac Aquifer



Area of Impact

Middle Potomac Aquifer Model Boundary

Simulated drawdown at or exceeding one foot in the Middle Potomac aquifer resulting from a 8,345,000 gpd multi-aquifer withdrawal. The Virginia Coastal Plain Model developed in Modflow by the USGS was used to simulate drawdowns.

Technical Evaluation performed by
Robin Patton
Office of Water Resources Management
May 20, 2004

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VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Large Withdrawals Impact Multiple Aquifers…

Western Tidewater Water Authority
Area of Impact - Upper Potomac Aquifer

Area of Impact

Upper Potomac Aquifer Model Boundary

Simulated drawdown at or exceeding one foot in the Upper Potomac aquifer resulting from a 8,345,000 gpd multi-aquifer withdrawal. The Virginia Coastal Plain Model developed in Modflow by the USGS was used to simulate drawdowns.

Technical Evaluation performed by
Robin Patton
Office of Water Resources Management
May 20, 2004

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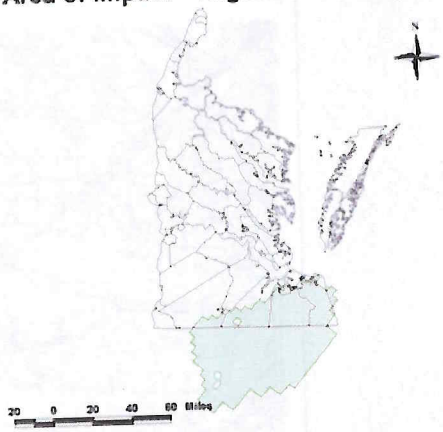
Western Tidewater Water Authority
Area of Impact - Virginia Beach Aquifer



Area of Impact

Virginia Beach Aquifer Model Boundary

Simulated drawdown at or exceeding one foot in the Virginia Beach aquifer resulting from a 8,345,000 gpd multi-aquifer withdrawal. The Virginia Coastal Plain Model developed in Modflow by the USGS was used to simulate drawdowns.

Technical Evaluation performed by
Robin Patton
Office of Water Resources Management
May 20, 2004

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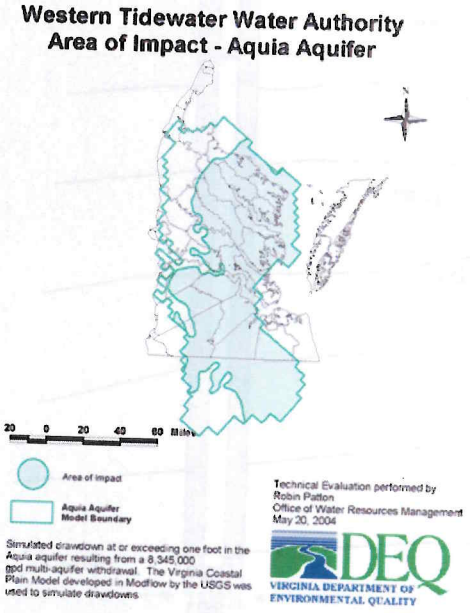
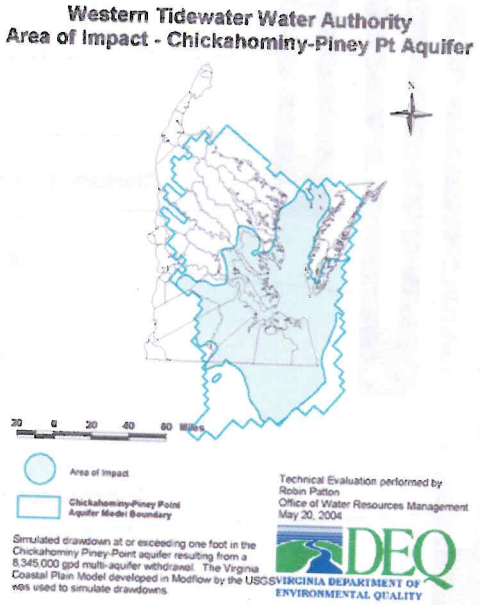
Leaky Aquifers or Semi-confining Units contribute water to the source aquifer…





Well Construction – Gravel Packing, Hydraulic Gradient (no pumping and with local/regional impacts)