

Robin Patton VA DEQ

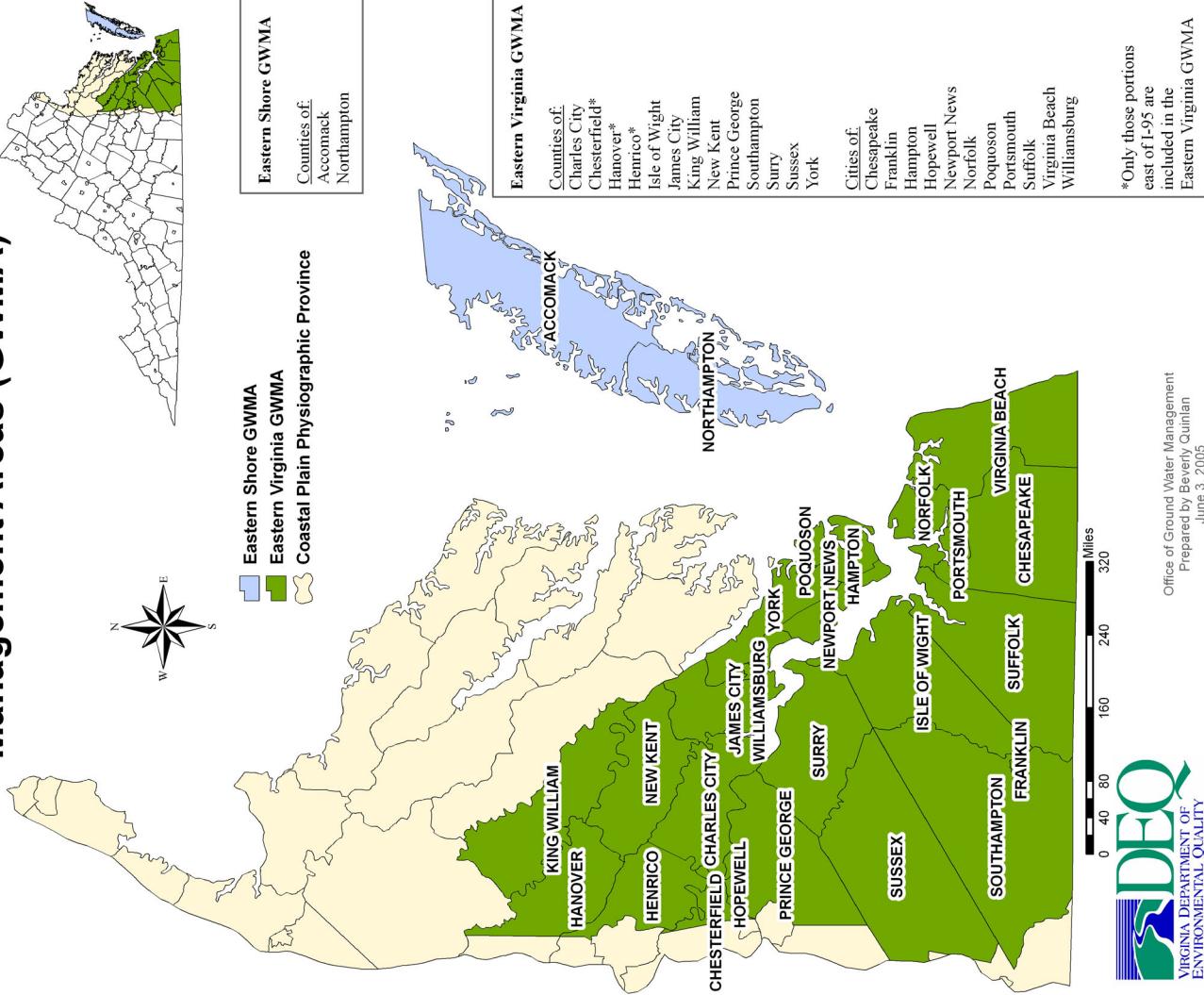


Ground Water Withdrawal Permit Program

- ▶ Under the Ground Water Management Act of 1992, Virginia manages ground water through a program which regulates withdrawals in **Ground Water Management Areas (GWMA)**.
- ▶ Currently, there are two Ground Water Management Areas in the state. Both are in the Coastal Plain.
 - Eastern Virginia GWMA (E of I95 and S of the Mattaponi and York rivers)
 - Eastern Shore GWMA (Accomack and Northampton counties)
- ▶ Any person or entity wishing to withdraw 300,000 gallons or more in any month in a declared management area must obtain a permit.

Virginia Ground Water Management Areas

VA Ground Water Management Areas (GWMA)



Evolution of the Virginia Withdrawal Permitting Program

► GWA 73

- applied to industrial, commercial, and municipal uses
- permits issued for largest use day
- amounts based on the capacity of well
- first Ground Water Management Area declared ~ 1976

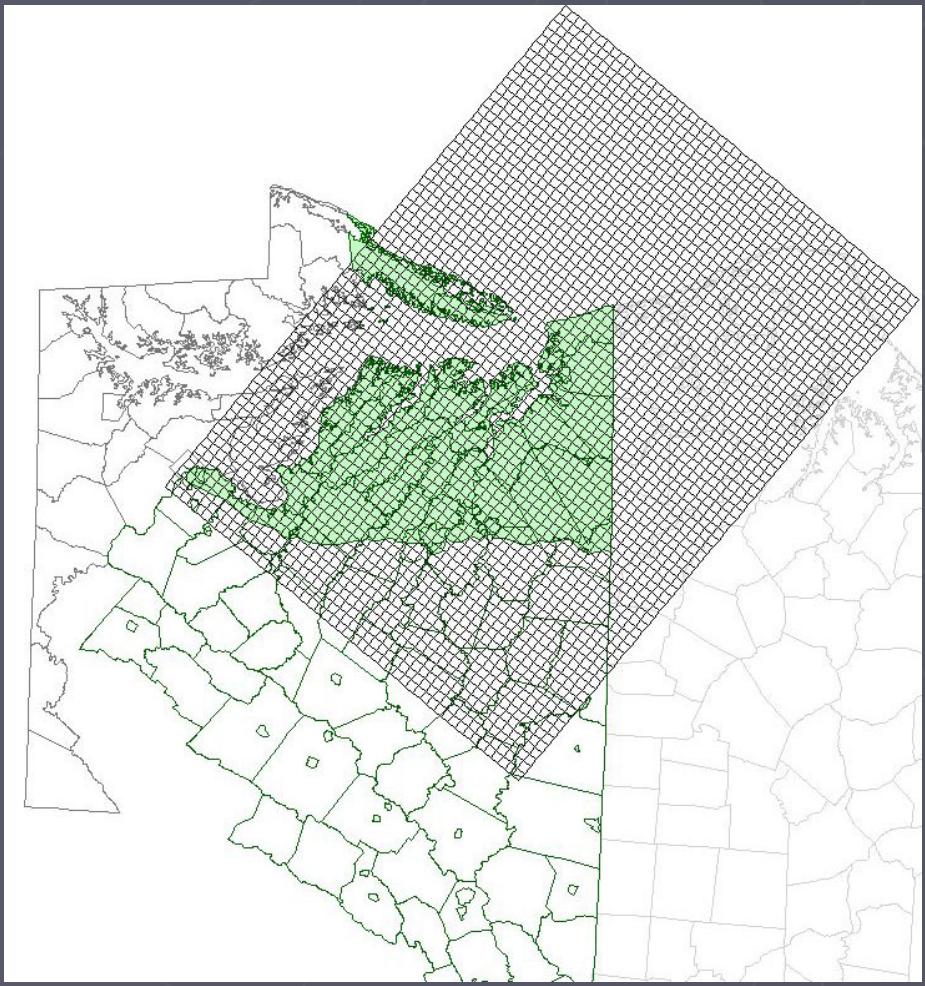
► GWMA 92

- added agriculture to list of regulated uses
- permits issued based on need rather than capacity
- required technical evaluation of impacts
- USGS regional models used to evaluate impacts resulting from the combined effects of all lawful withdrawals

It is the purpose of this Act to recognize and declare that the right to reasonable control of all ground water resources within this Commonwealth belongs to the public and that in order to conserve, protect and beneficially utilize the ground water of this Commonwealth and to ensure the public welfare, safety and health, provision for management and control of ground water resources is essential.

GWMA 1992

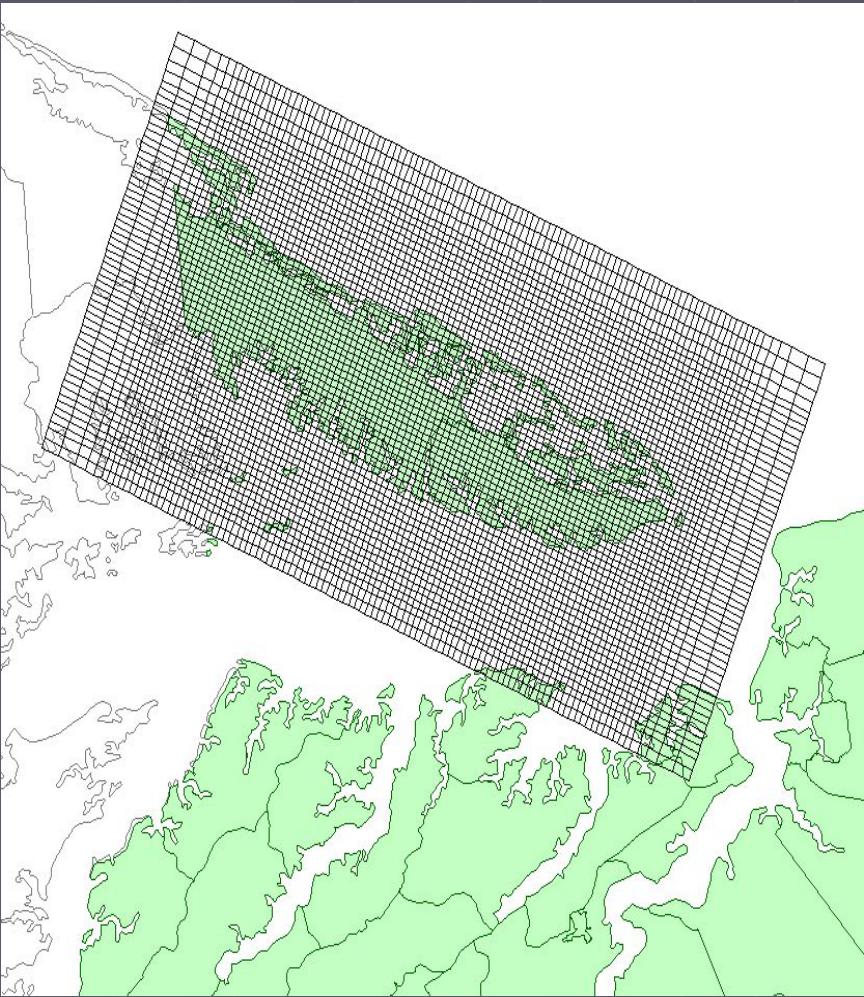
Virginia Coastal Plain Model



- Developed by USGS
in early 80's
- Refined and GIS
developed in early
90's
- Simulates 9 confined
aquifers + constant
head water table
- Cell sides 3.5 miles
- MODFLOW

Eastern Shore Sharp Model

- Developed by USGS in late 90's to look at several pumping scenarios
- Simulates the Yorktown aquifer as 3 confined aquifers
- Simulates salt water boundary as a sharp interface
- Cell side 0.5 miles
- USGS SHARP



VCPM Annual Simulations

► Water Use

- Identifies data gaps/defines data managed
 - Compare to actual water levels
- Total Permitted
 - To develop baseline for regulatory requirement to assess impacts for proposed withdrawals in combination with all existing lawful withdrawals
 - To identify areas where water levels are predicted to fall below 80% drawdown criterion
 - Authority for obtaining data in WD regulated areas

Current Regulations – Regional Staff

- ▶ serves as the primary contact for the applicant
- ▶ evaluates the proposed withdrawal mount to insure it is the least required to support beneficial use
 - works with the applicant to develop a site specific Water Conservation and Management Plan
- ▶ insures that the source aquifer is the lowest water quality necessary for the use
- ▶ insures the required technical information is adequately submitted
 - well construction
 - geophysics
 - test data
- ▶ works with characterization staff to determine maximum depth for pump settings

Current Regulations – Modeling Staff

- evaluates technical information submitted to determine site-specific hydraulic parameters
- determines AOI (Area Of Impact - where one foot or more of drawdown is predicted to occur as result of proposed withdrawal for any aquifer affected)
 - ▶ small or water table well fields require 2-d analysis
 - ▶ site-specific 3-d may be necessary
 - ▶ largest withdrawals require USGS regional models
- evaluates for allowable drawdown in conjunction with all other lawful withdrawals
 - ▶ water levels are not allowed to drop below 80% of predevelopment pressure head
- evaluates potential for adverse changes to WQ
 - ▶ Reversal of Flow
 - ▶ Upcoming

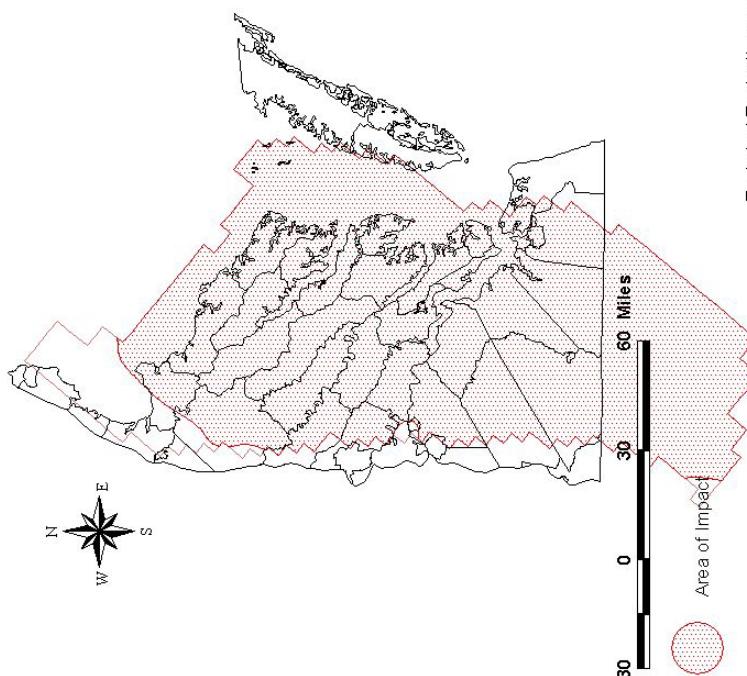
Town of Windsor - Windsor Public Water System Area of Impact - Upper Potomac Aquifer



Permit – max 10 year term

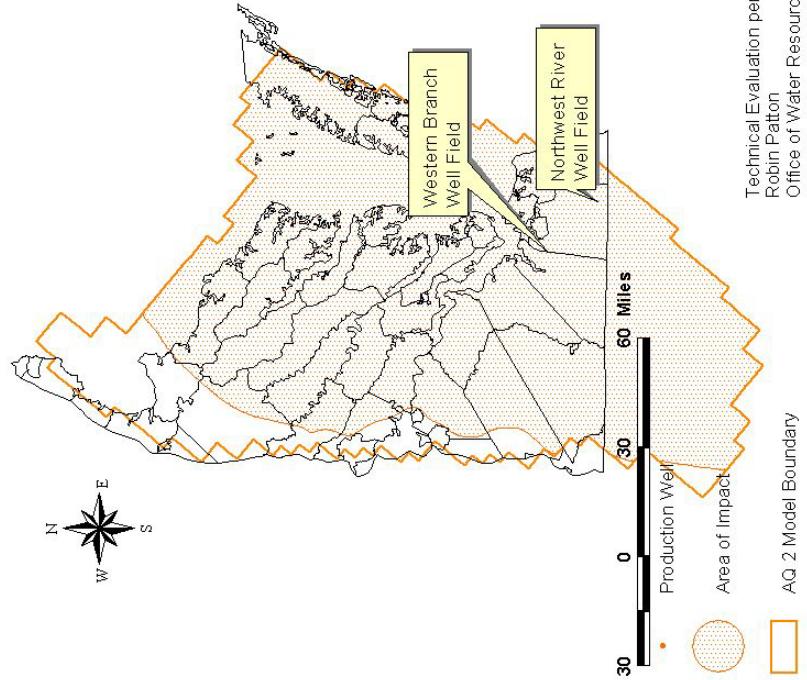
- Specifies limits on WD
 - annual
 - monthly
 - source aquifer
 - location
- Includes the Water Conservation & Management Plan
- Contains Reporting Requirements
 - metered withdrawals
 - other special conditions (ex water levels, water quality, etc)
- Includes the Mitigation Plan – applies to AOIs
 - Permittee has rebuttal assumption of responsibility for negative impacts to existing users within the area

City of Chesapeake Area of Impact - Lower Potomac Aquifer



Simulated drawdown at or exceeding one foot in
the Lower Potomac aquifer resulting from a 11,000,000
gpd multi-aquifer withdrawal. The Virginia Coastal Plain
Model developed in Modflow by the USGS was used
to simulate drawdowns.

City of Chesapeake Area of Impact - Middle Potomac Aquifer



Simulated drawdown at or exceeding one foot in
the Middle Potomac aquifer resulting from a 11,000,000
gpd multi-aquifer withdrawal (9,710,000 gpd from the
Middle Potomac aquifer). The Virginia Coastal Plain
Model developed in Modflow by the USGS was used
to simulate drawdowns.

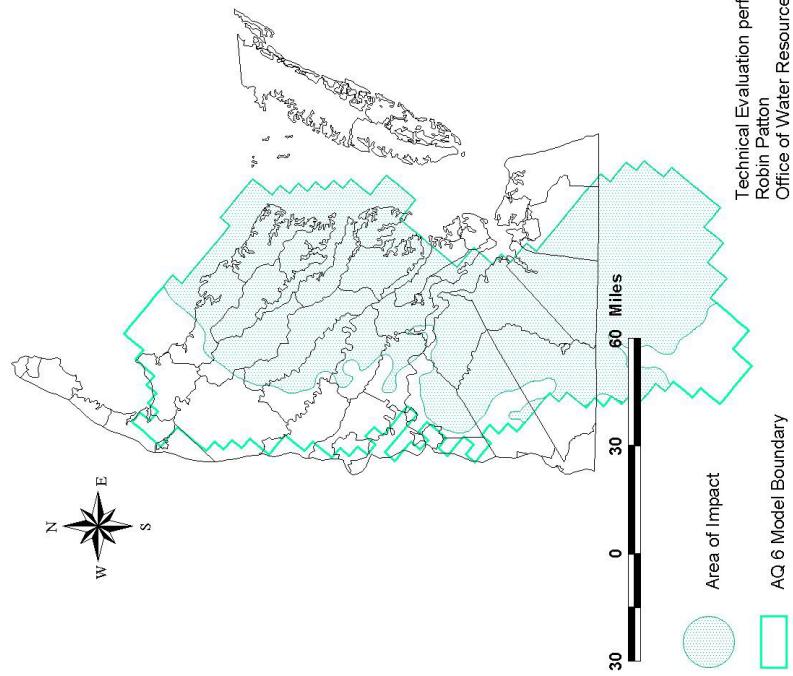


Technical Evaluation performed by
Robin Patton
Office of Water Resources Management
October 11, 2002



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City of Chesapeake Area of Impact - Aquia Aquifer

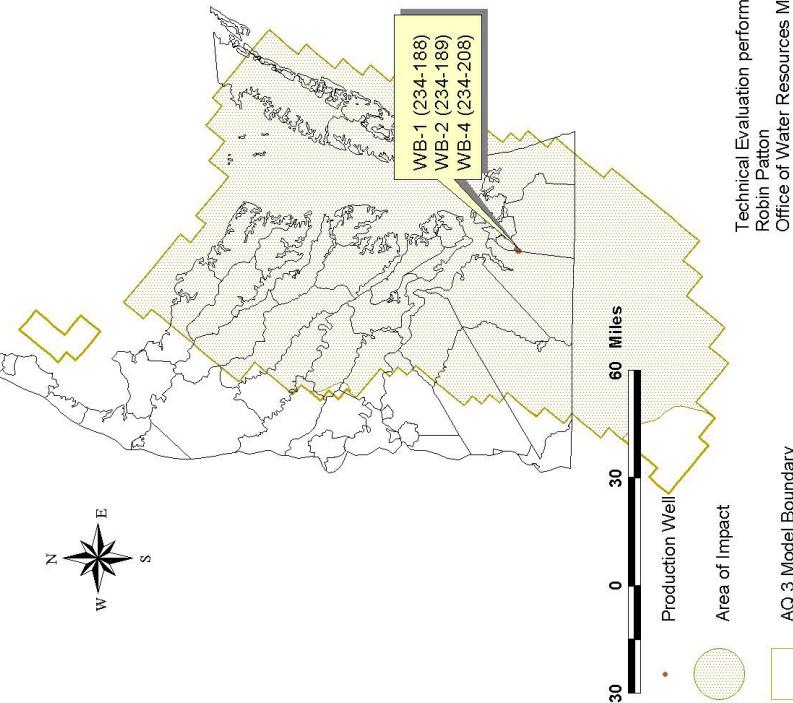


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Office of Water Resources Management
October 11, 2002



Simulated drawdown at or exceeding one foot in
the Aquia aquifer resulting from a 11,000,000 gpd
multi-aquifer withdrawal. The Virginia Coastal Plain
Model developed in Modflow by the USGS was used
to simulate drawdowns.

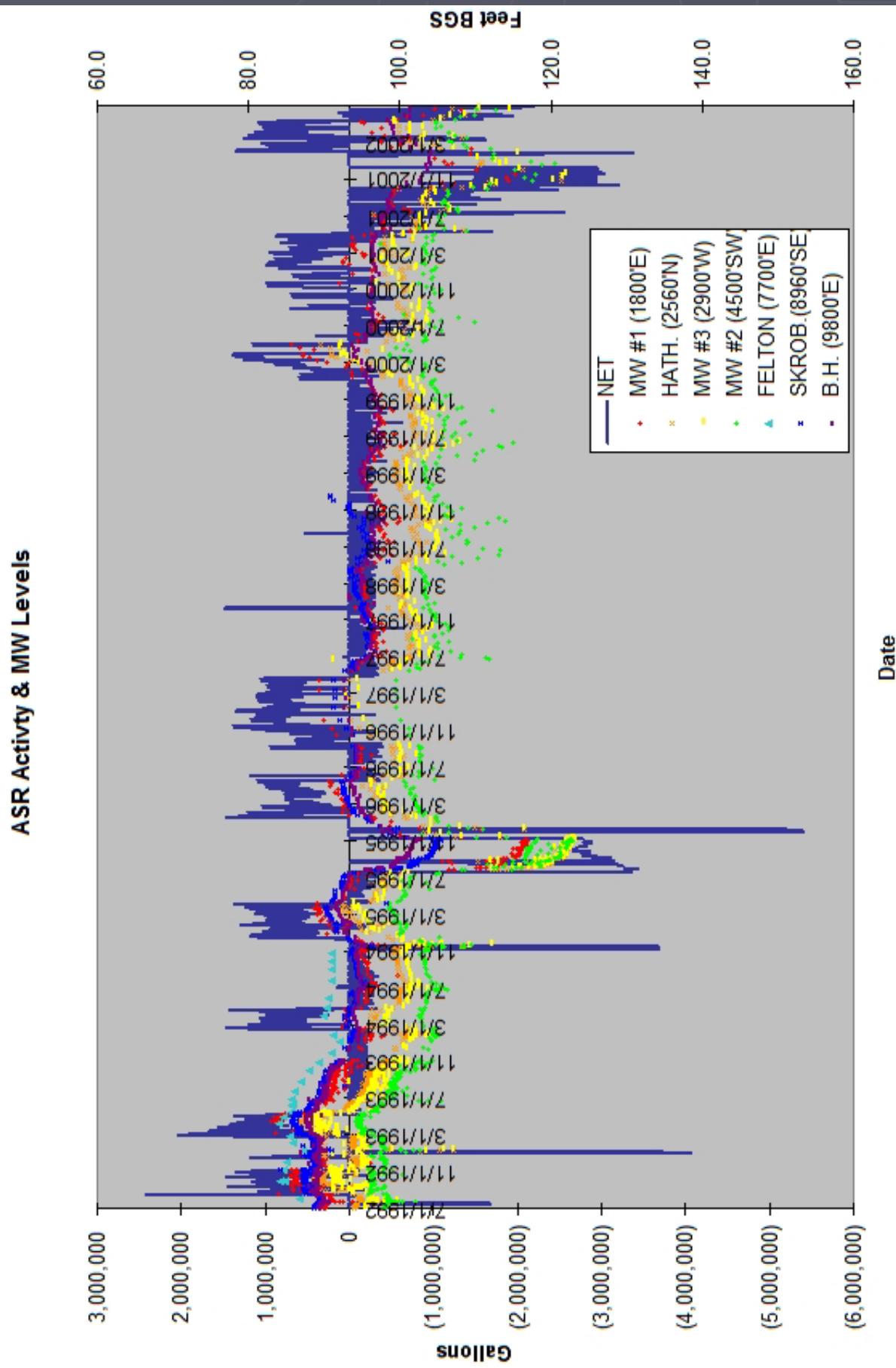
City of Chesapeake Area of Impact - Upper Potomac Aquifer



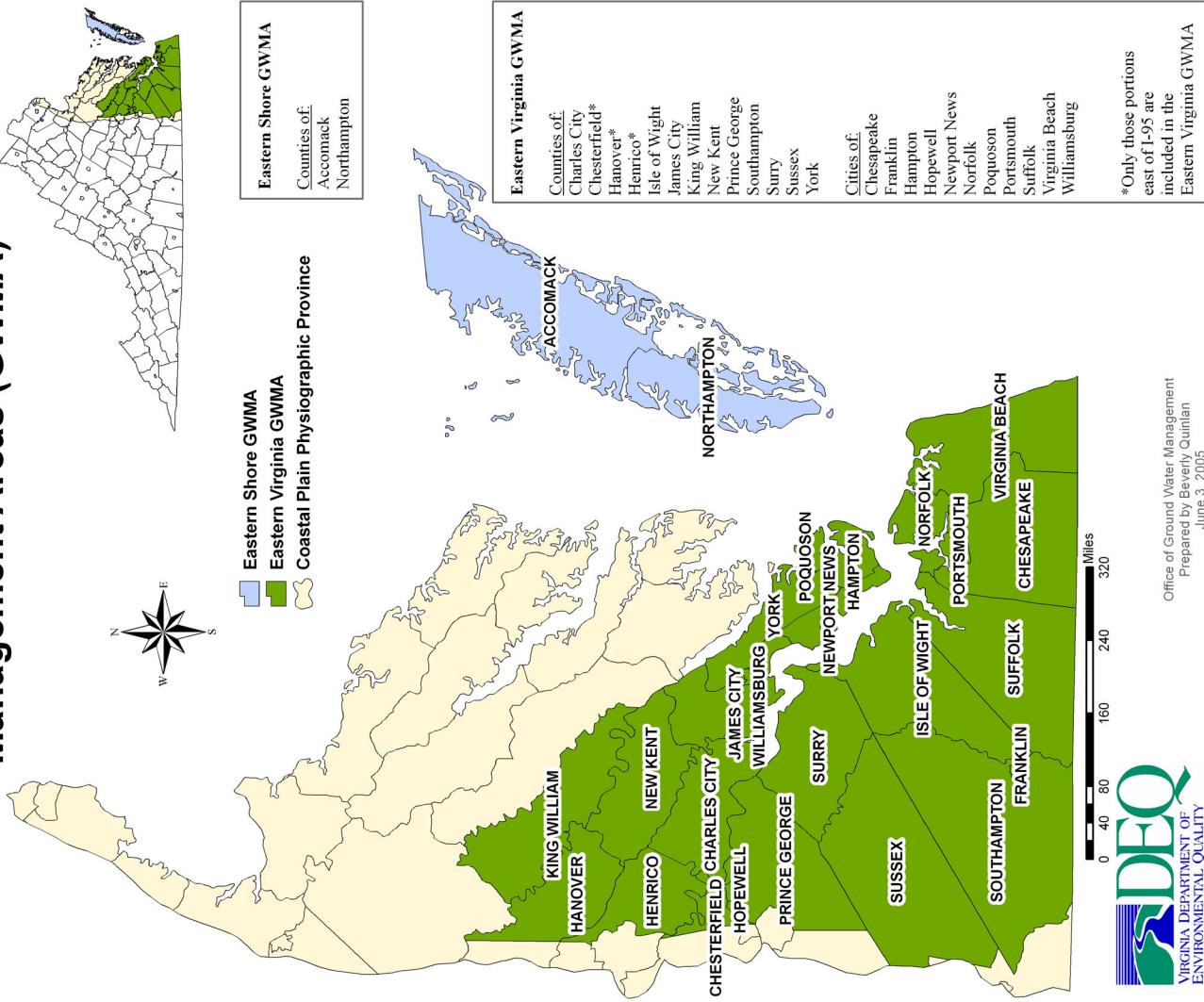
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Simulated drawdown at or exceeding one foot in the
Upper Potomac aquifer resulting from an 11,000,000
gpd multi-aquifer withdrawal (1,290,000 gpd from the
Upper Potomac aquifer). The Virginia Coastal Plain
Model developed in Modflow by the USGS was used
to simulate drawdowns.



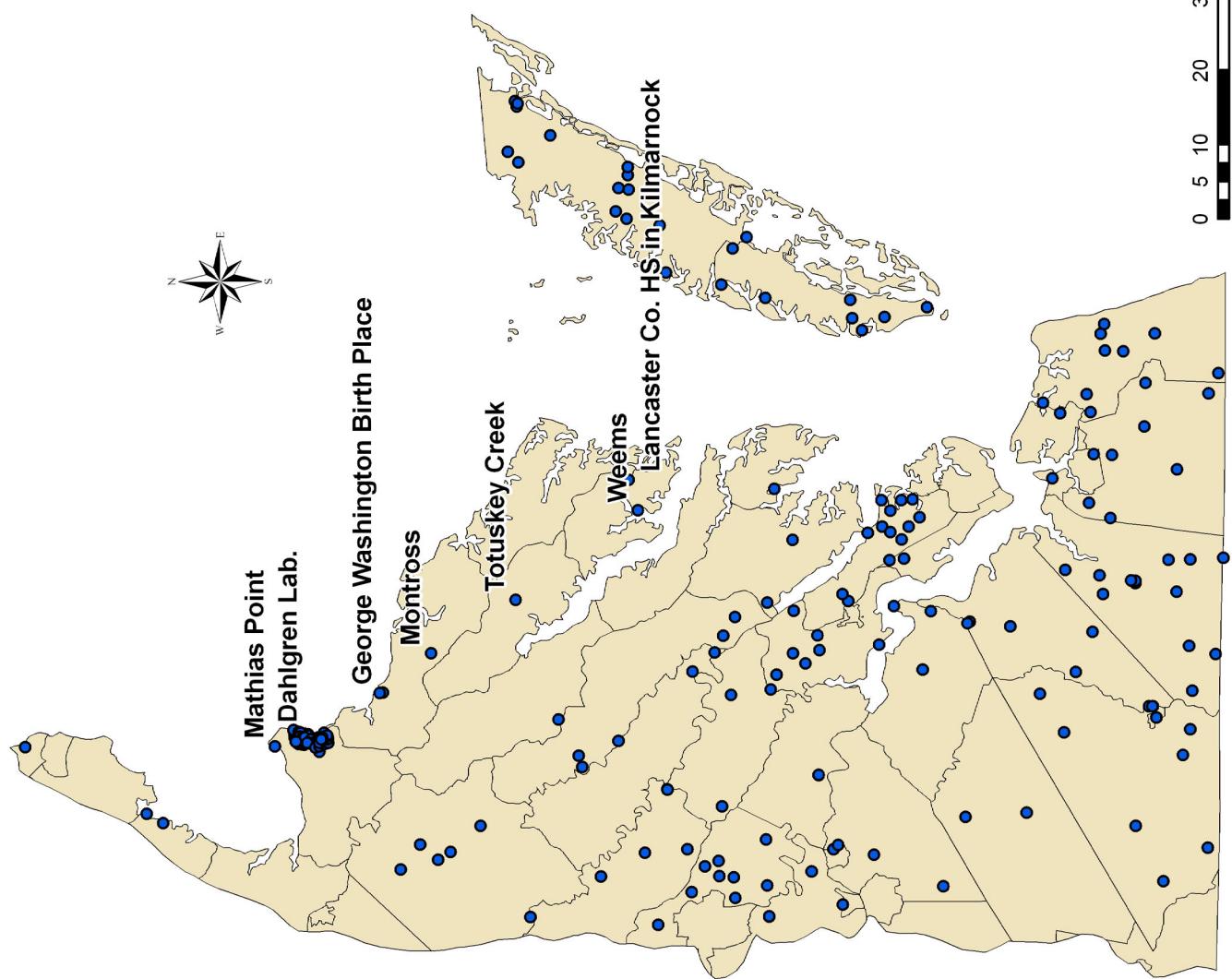
Virginia Ground Water Management Areas



Office of Ground Water Management
Prepared by Beverly Quinlan
June 3, 2005



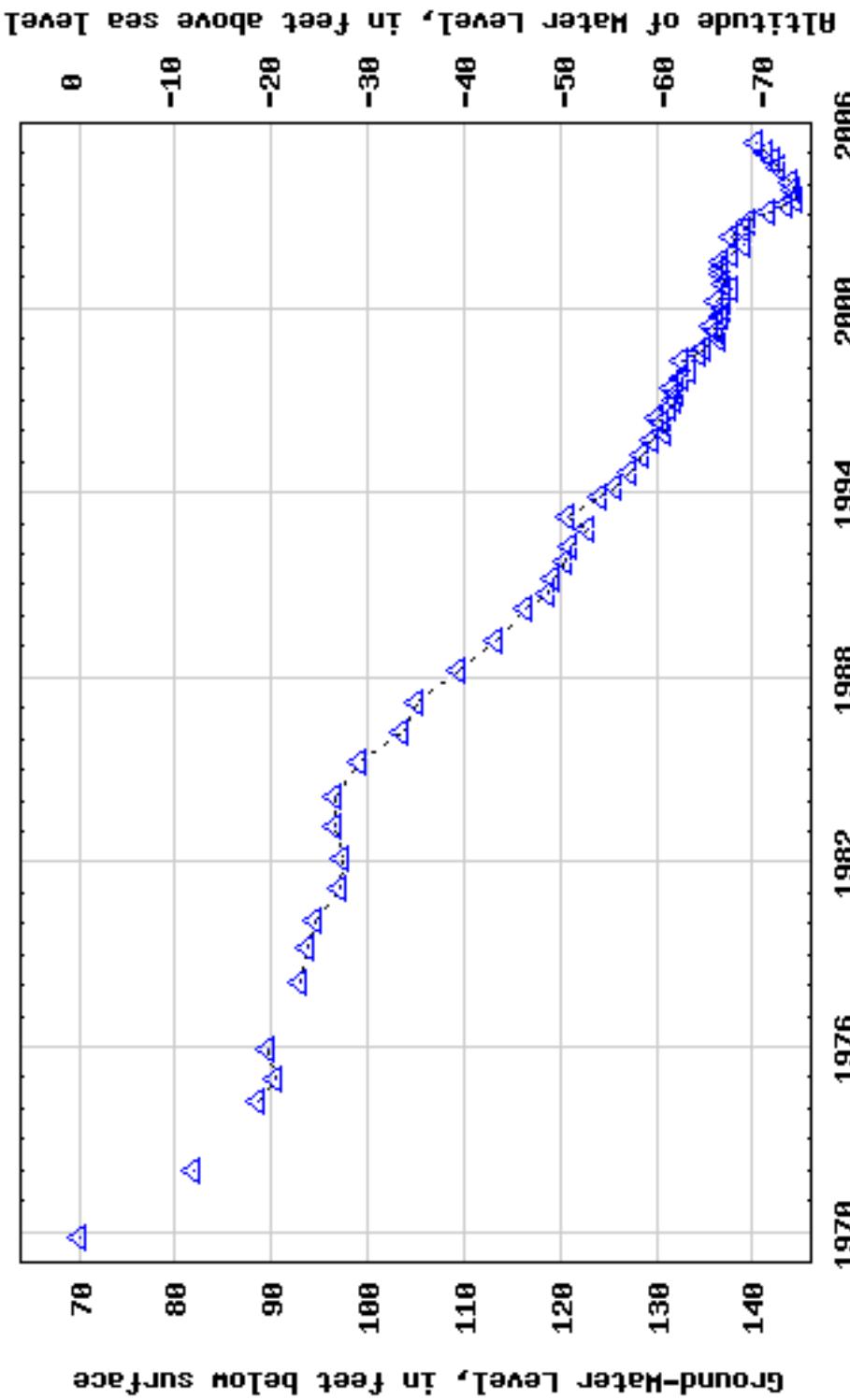
VA Coastal Plain Ground Water Level Network Wells





Mathias Point Observation Well Middle Potomac Aquifer

USGS 38234107703240154R 2

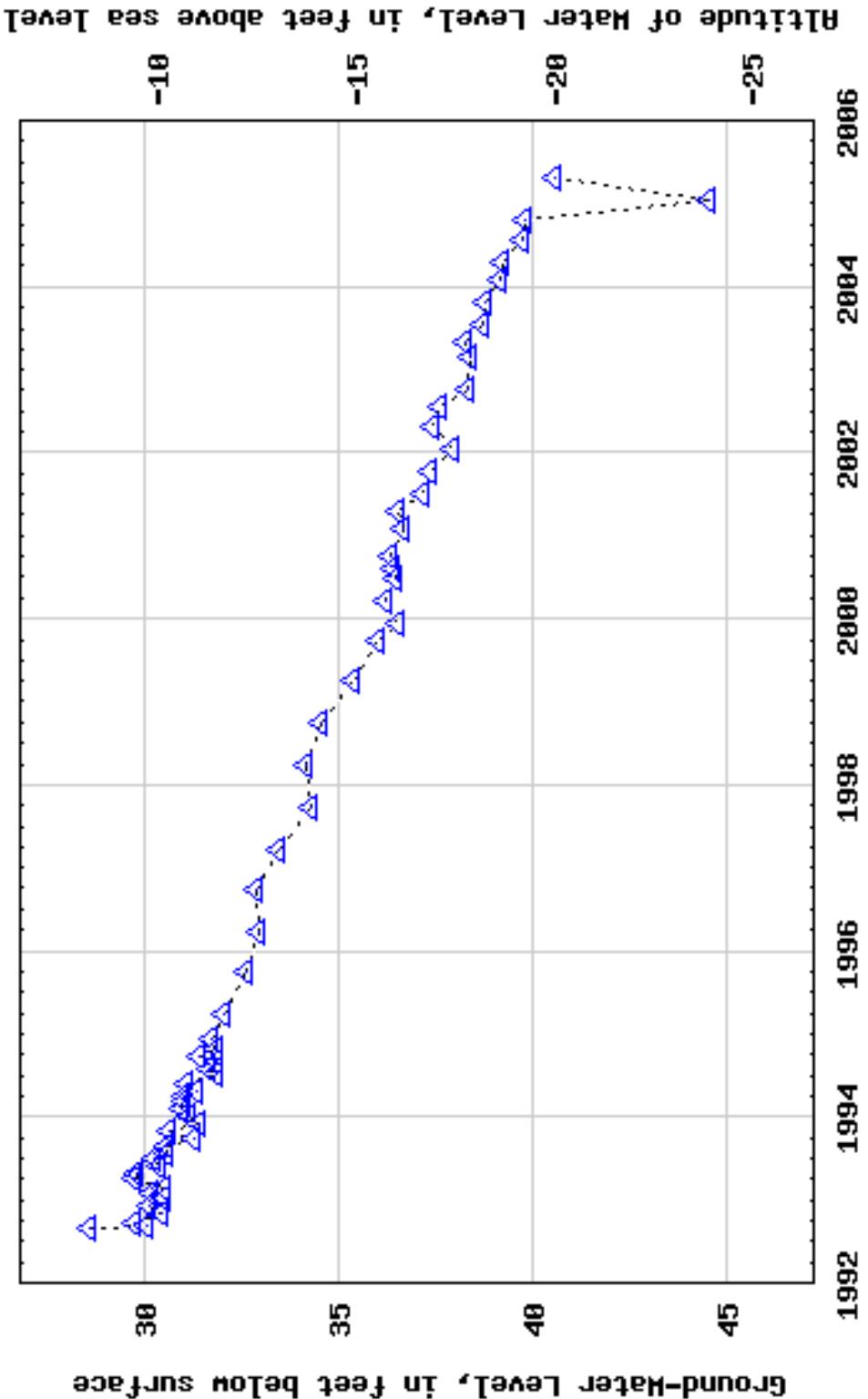


Provisional Data Subject to Revision



Dahlgren Observation Well Aquia Aquifer

USGS 382129077005801 54Q 21

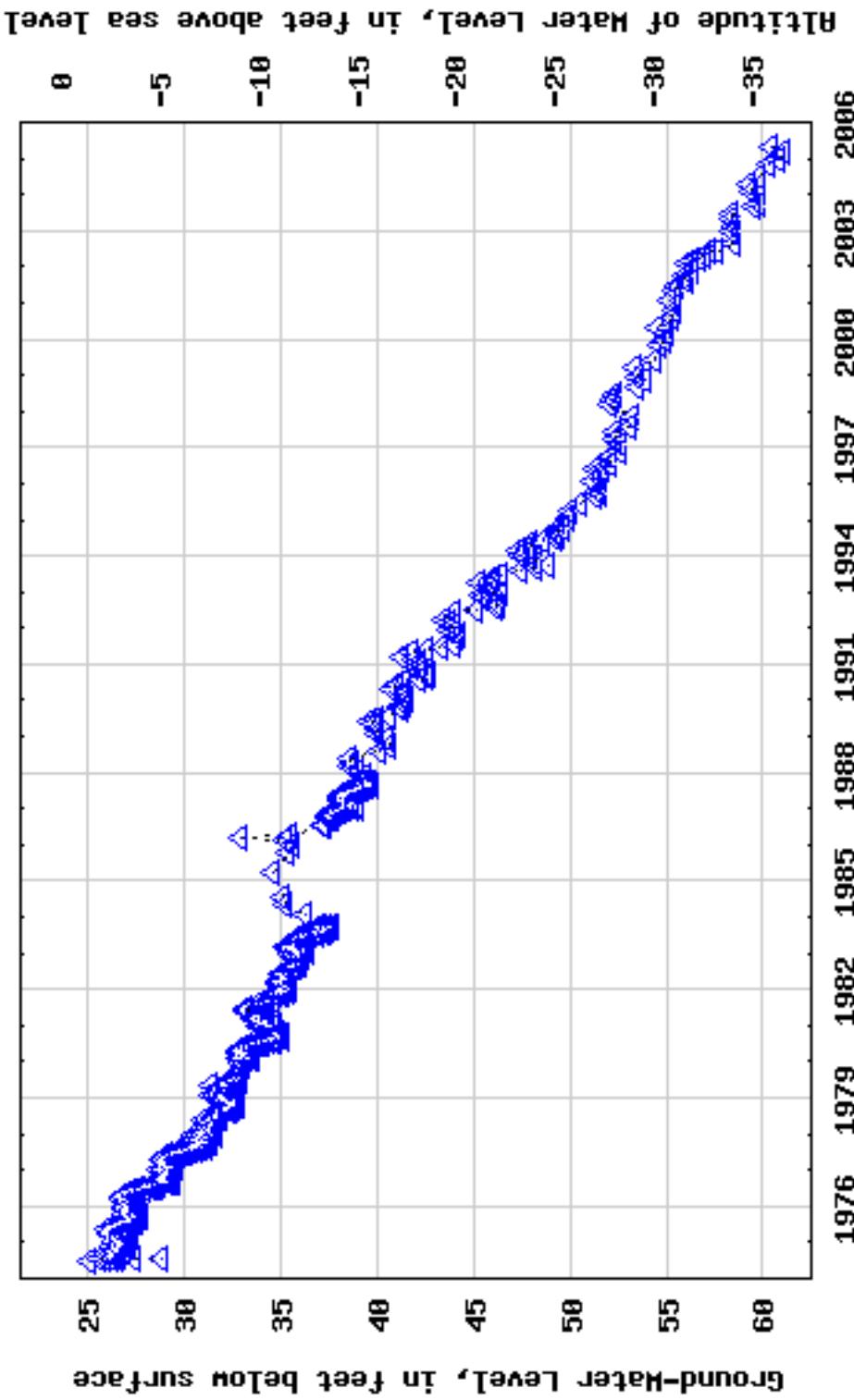


Provisional Data Subject to Revision



George Washington Birthplace Middle Potomac Aquifer

USGS 381110076550501 55P 5

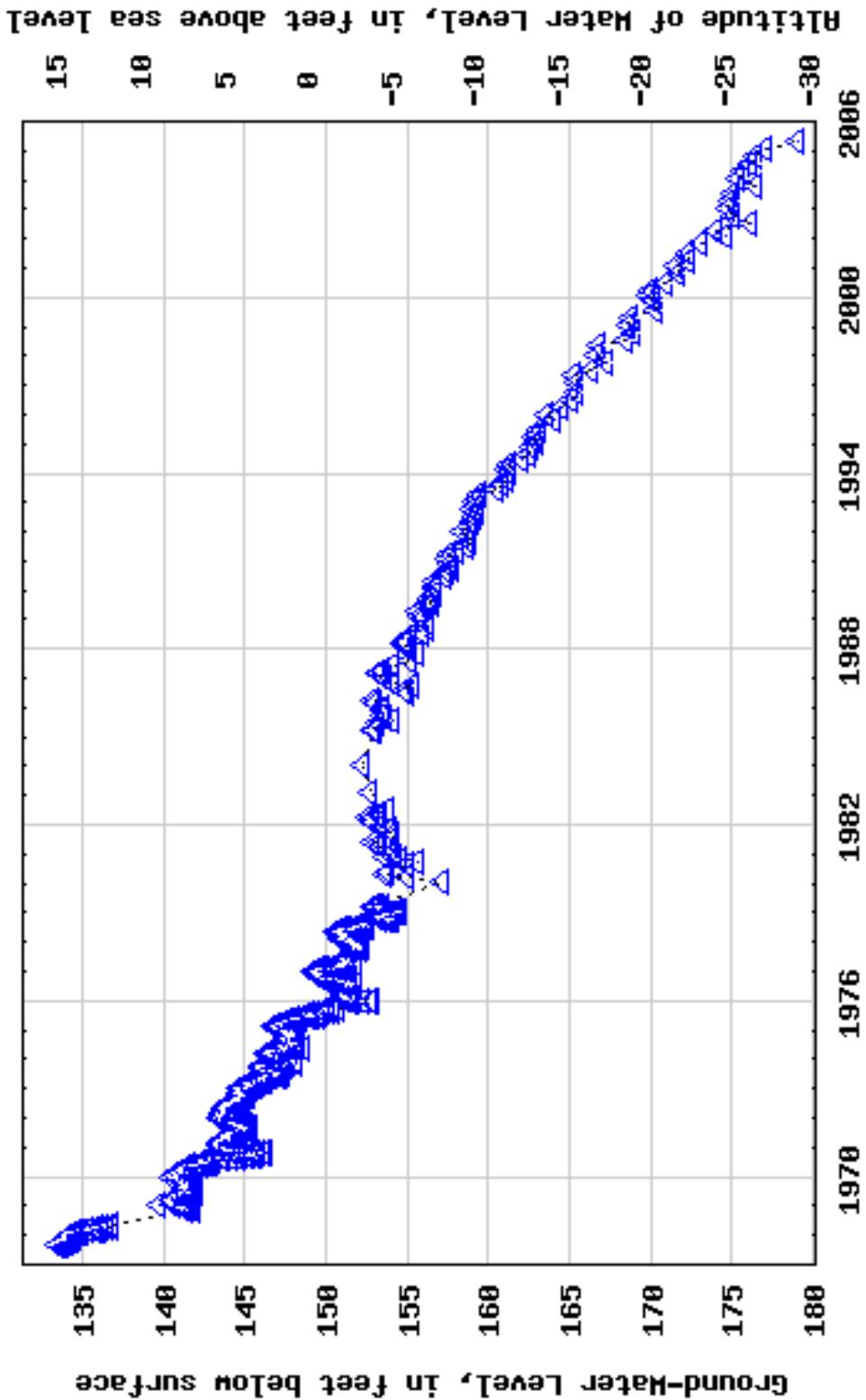


Provisional Data Subject to Revision



Montross Observation Well Upper Potomac Aquifer

USGS 380538076490801 56N 1 SOW 016

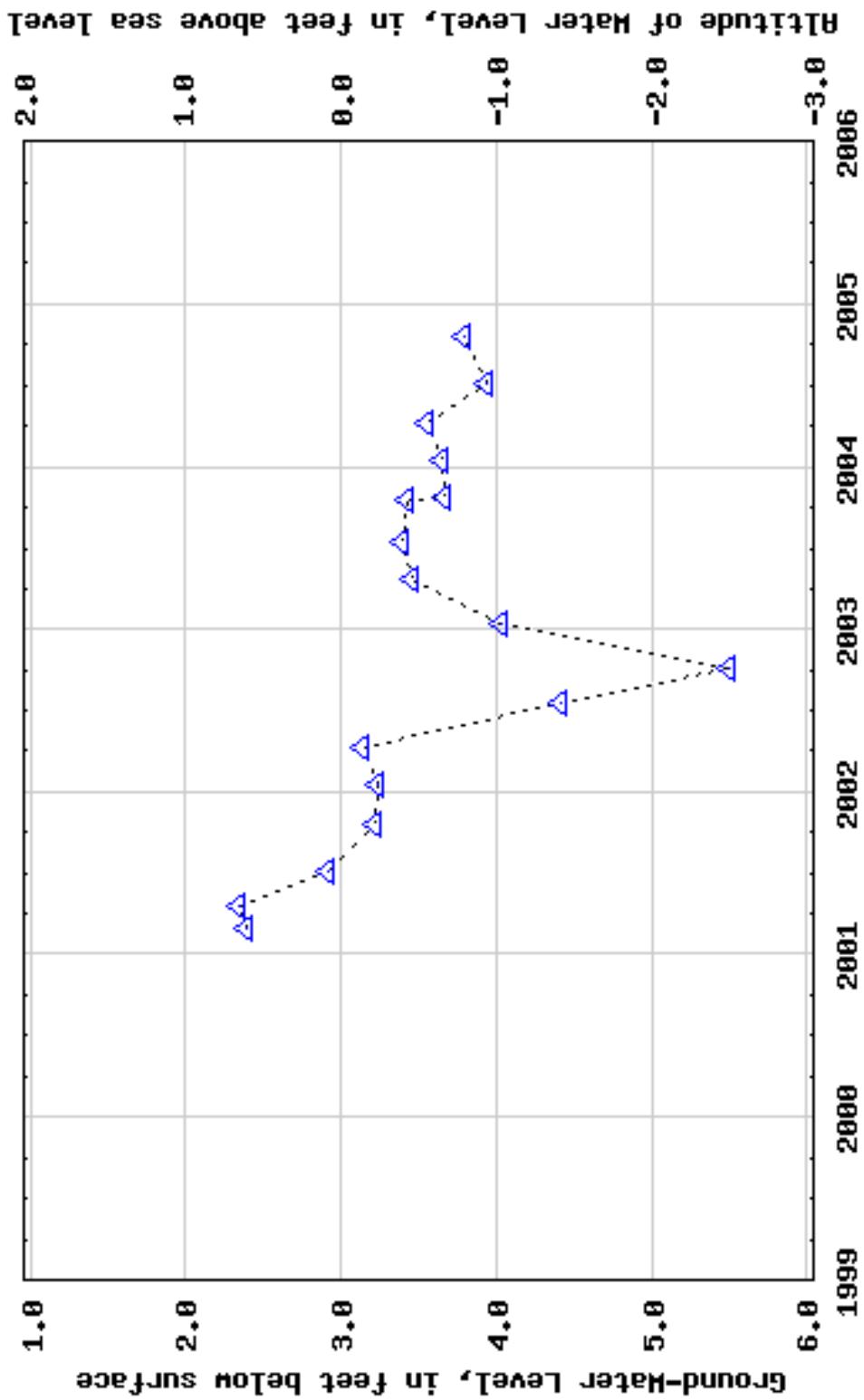


Provisional Data Subject to Revision



Totusky Creek Observation Well Chick-Piney Point Aquifer

USGS 375523076431801 57M 4

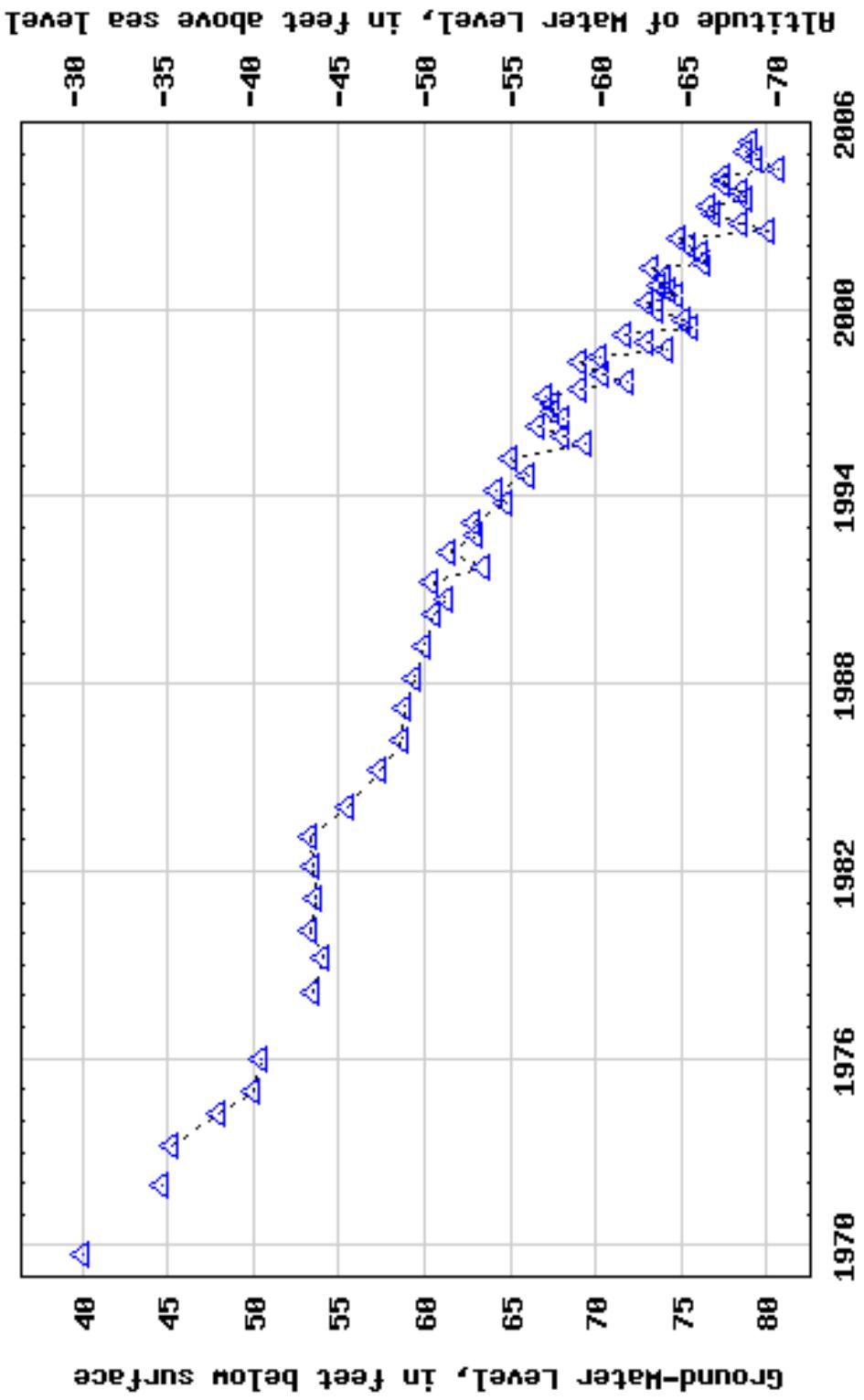


Provisional Data Subject to Revision



Weems Observation Well Upper Potomac Aquifer

USGS 374142076272701 59K 9

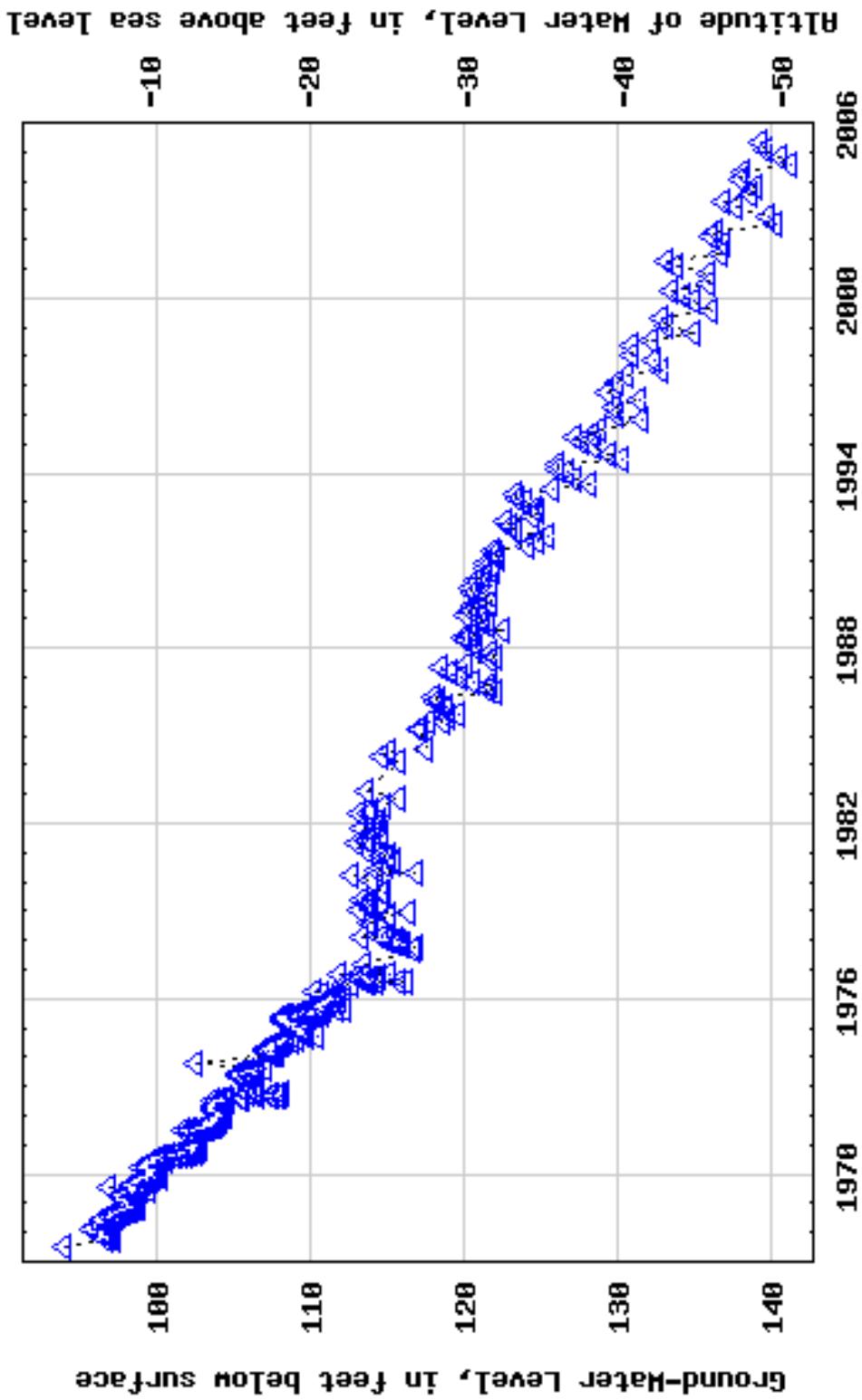


Provisional Data Subject to Revision



Lancaster HS Observation Well Upper Potomac Aquifer

USGS 374249076230101 59K 1 SOW 015



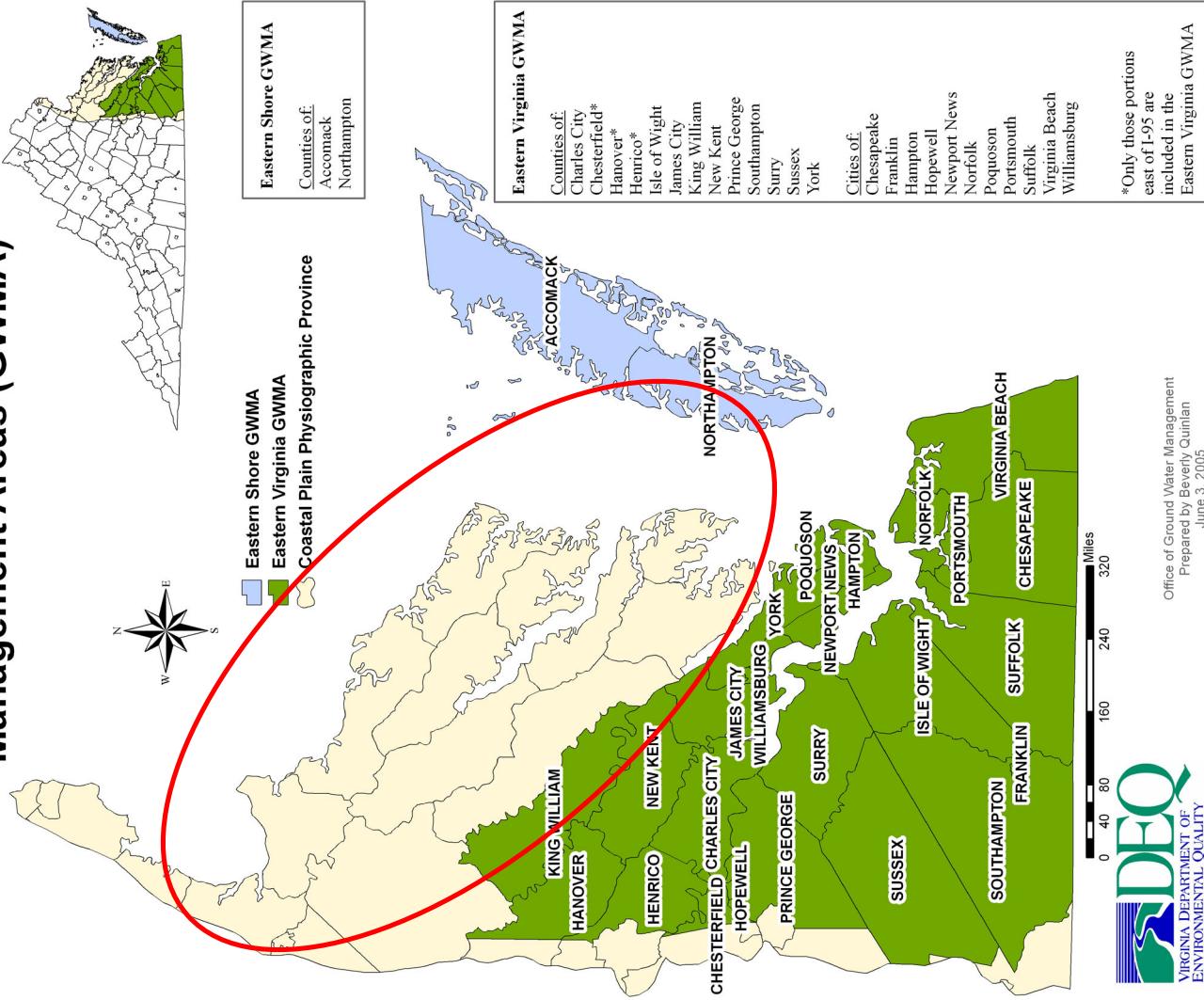
Provisional Data Subject to Revision

Virginia Ground Water Management Areas

**Northern Neck and
Middle Peninsula
are
NOT in a GWMA**

- Regional model extends well beyond GWMA and so do predicted impacts
- Yearly effort made to research wells outside of GWMA and include in regional model and data system

VA Ground Water Management Areas (GWMA)



Office of Ground Water Management
Prepared by Beverly Quinlan
June 3, 2005

