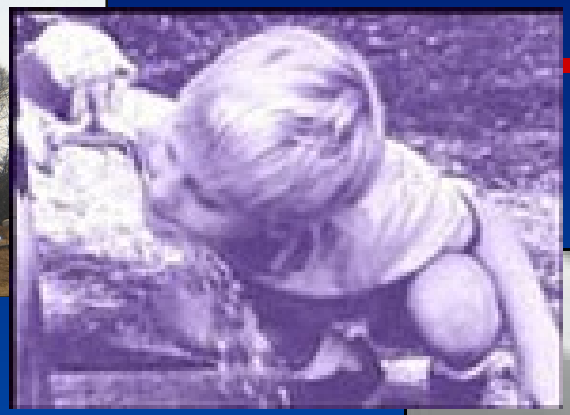
Water Resource Advisory Committee to the Charles County Commissioners



November 28, 2006

Charles County Maryland
Where Eagles Fly™

Origin & Purpose of the WRAC:

To address water supply concerns of County citizens that were raised by the September 2005 Maryland Geological Survey Presentation to the Charles County Commissioners.

Charge of the WRAC:

To assist staff with the collection of data and research and provide input to further study water supply and water quality issues, and to educate the public on impacts of using water from the Washington Suburban Sanitary Commission (WSSC).

WRAC Members:

Chuck Beall, Chairman
Richard Dempsey
Richard Moran
Cheryl Thomas

Elmer Biles
Steve Elder
Vic Newman
Larry Wooster

Technical Assistance from:

David Drummond, MD Geological Survey
Mary Frey, NAVSEA Indian Head, MD
Matthew Pajerowski, MD Dept of the Environment
Marcia Smith, MD Dept of the Environment

Charles County Staff:

Jerry Michael
Gary Davis
Michael Hinchy
Jason Groth
Audrey Marshall

- **Members were appointed by the Charles County Commissioners, March of 2006**

Issue:

Water levels continue to decline in the groundwater aquifers in Southern Maryland.

Maryland Geological Survey (MGS) has stated that wells in *some* areas of Charles County may have *limited* "productive capabilities" if the current trends continue in the Magothy and Patapsco Aquifers.

MGS has stated that Charles County should evaluate alternative water-supply options such as the use of the Patuxent Aquifer, or replacing the current production well fields with new wells in the Patapsco aquifers farther southeast.

The Approach of the WRAC:

The WRAC and County staff gathered area groundwater data from both published sources and institutional knowledge of the Members.

- **Coordination with local jurisdictions**
- **Coordinated with NAVSEA - Indian Head Base**
- **Coordinated with Maryland Department of the Environment**
- **Coordinated with the Maryland Geological Survey**
- **Coordinated with the Charles County Department of Health**
- **Coordinated with Local Well Drilling Professional**
- **Gathered Data from Published Groundwater Data Sources**

Strategy to address Water Supply Issue:

The Committee evaluated a series of water supply alternatives, operational measures, and conservation measures for both the Public Water System and Private Well Users.

Outline of Report:

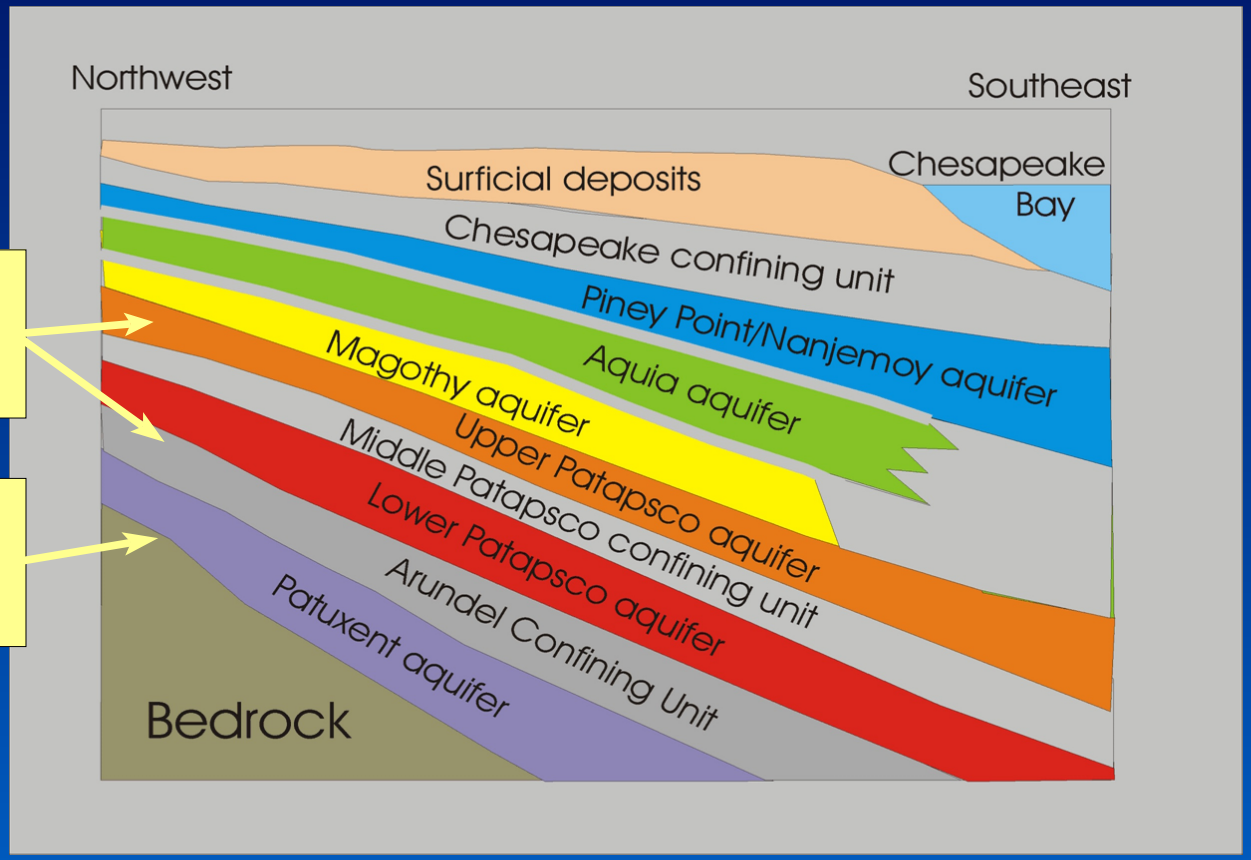
- **Options for supply**
  - Groundwater
  - Surface Water
- **Operational Measures**
  - Well Fields & Operational Optimization
  - Increasing Ground & Elevated Water Storage
  - Aquifer Storage Recovery (Artificial Aquifer Recharge)
- **Conservation & Demand Management Measures**
  - Conservation Strategies
  - Water Re-use (Greywater)
- **Water Security & Reliability**
- **Private Well Strategies (Individual and Community Wells)**
  - Conservation Measures
  - Conversion to the Public System
  - Well Construction Requirements
- **Recommendation (Immediate, Short, Mid, and Long Term)**

Options for Supply:

1. Groundwater - water from confined aquifers

Current Public Supply

Potential Increase in Patuxent Aquifer Use



Patuxent Aquifer

The County currently withdraws 3% of the water for the public water system from the Patuxent Aquifer.

To make this shift, it is recommended that the County complete the following:

- **New Groundwater study needed to explore greater use of this aquifer**
- **Connection to the Chapman State Park Wells (Patuxent Aquifer)**
- **New production wells in the Patuxent Aquifer**

Options for Supply:

2. Surface Water - water from rivers and streams

- **Additional Connection to WSSC (Washington Suburban Sanitary Commission)**
- **County Operated Surface Water Treatment Plant**
- **County Operated Reservoir**

Additional Connection to WSSC

The County can negotiate with WSSC to add an additional 5.0 million gallons per day (mgd) of water to the public water system.

- **County currently has a connection for up to 1.4 mgd**
- **Additional connection could be made at US 301 and County Line**
- **Additional 5.0 mgd of water could possibly allow Waldorf Wells to greatly reduce pumping from the aquifers**
- **Short Term Implementation possible due to minimal infrastructure needs**
- **Evaluation of water blending will be needed**
- **Must negotiate billing rates and ability to meet water demand**

County Operated Surface Water Plant

The County may wish to investigate the use of a County Operated surface water plant.

- **An evaluation/study of feasibility of a surface water plant is needed**
- **Costs must be determined, including infrastructure and property**
- **Cost per benefit ratio must be determined**
- **Cost of Reverse Osmosis or other filtration needed**
- **Location would need to be determined**

Reservoir

A County Reservoir is another option for water supply.

- **Previous County Study indicated that land topography of the County makes a reservoir difficult**
- **Land purchase and associated costs make this option unlikely**
- **Costs of impoundment must be evaluated**
- **Location of reservoir must be determined if found feasible**

Operational Measures:

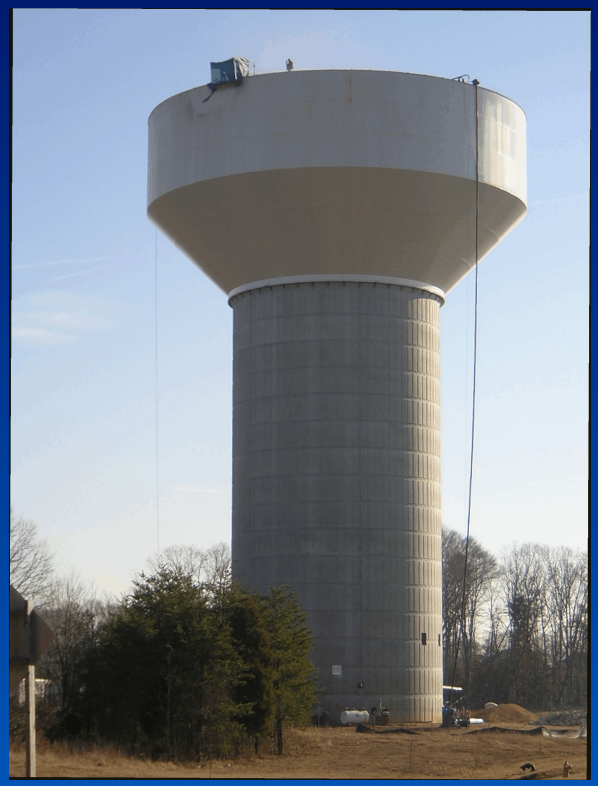
1. Well Fields & Operational Optimization

- **County currently operates a series of groundwater wells to supply public water**
- **County could determine the feasibility of a well field based on productive capability of an aquifer in various locations**
- **Through the rotation of well pumping, the County may be able to reduce the impacts to the aquifer**
- **A determination of the impacts to nearby water supplies will be needed**

Operational Measures:

2. Increase Storage (Elevated and Ground)

- County is able to rest well pumping by using stored water
- Provides supply when demand is high
- Cost per benefit will need to be determined
- Appropriate locations will need to be determined



Operational Measures:

3. Aquifer Storage Recovery (ASR)

- **ASR consists of pumping water back into aquifers through existing wells**
- **Sources of water could be surface water or stored groundwater**
- **A feasibility study would be needed to determine the affect of this water on the aquifer/coastal plain sediments**
- **Has been used for several decades in other northwestern states**

Conservation & Demand Management Measures:

1. Conservation Strategies

- **Water Conserving Fixtures to reduce water use in homes/businesses**
- **Graduated Billing based on water use (higher rates for higher uses)**

Conservation & Demand Management Measures:

2. Water Re-Use (Greywater)

- **Greywater is treated effluent from wastewater treatment plants**
- **The use of this water source can reduce potable water uses**
- **Uses include:**
  - Golf Course Irrigation
  - Industrial Cooling Purposes
  - Landscape Irrigation (Commercial and Residential)
- **An evaluation of infrastructure needs and costs must be completed**

Water Security and Reliability:

An evaluation of the security and reliability should be completed for each option described in this report.

- **Water sources must be consistently reliable**
  - Reliable in cases of drought
  - Reliable in cases of high demand
- **Water Sources must be safe and secure**
  - Sources must be evaluated for water safety

Private Well Strategies:

1. Private Individual Wells

- **Private wells share many of the same aquifers as the public water system and may have to compete for the water**
  - Strategies must be developed to reduce impacts to individual private wells
- **Private Well owners are responsible for a new if their well fails**
- **Education strategies should be developed to assist homeowners**
- **Investigate a program to assist private homeowners to connect to public system**
- **Additional considerations for Well Construction Standards**
  - Local agencies should work closely with the State to re-evaluate the current standards for construction of telescoping wells
  - Greater education needed to homeowners regarding telescoping wells and their limitations

Private Well Strategies:

2. Private Water Companies

- **Over 60 Private Water Companies in Charles County**
  - Many have failing infrastructure
  - Many cannot afford the needed improvements
  - Systems are no longer permitted in Charles County
- **Educational campaign needed to promote conservation to private water users**
  - Promote the use of water conserving fixtures
  - Promote the reduction of excess water use
- **Conversion to Public Water System**
  - Many systems wish to connect to the Public Water System but lack the financial ability
  - Funding assistance program may be necessary
  - Improvement to the existing petition program greatly needed

Recommendations:

The WRAC has the following recommendations in order of time frame (immediate, short-term, mid-term, and long-term):

- **Immediate (0 to 6 months)**
  - County Water Resource Coordinator - County staff position needed as the "go-to" person for all water resource needs, including outreach and education, project management, and study coordination.

- **Short Term (0 to 5 years)**
  - Demand Management/Water Conservation Strategy - implement graduated billing rate structure and educational program to promote water conservation.
  - Connection to WSSC - additional 5.0 mgd of water will allow county wells to rest.
  - Connection to Chapman State Park Wells - additional well capacity in the Patuxent aquifer will help meet water demand while minimizing affects on area private wells.
  - Aquifer Storage Recovery (ASR) Feasibility Study - to determine the feasibility of ASR in Charles County and the necessary steps to implement this conservation program.
  - Well Field Feasibility Study - determine if a well field is a sustainable option for mid-term to long-term public water supply.

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Recommendations:

Continued...

- **Short Term (0 to 5 years)**
  - Water System Interconnections - Investigate and develop a water system interconnection strategy for both private water systems and individual private wells.
  - Community Water System Assistance Program - Develop a program to assist existing Community/Private Water Systems to meet the growing demand of State requirements.
  - Additional Monitoring Wells - Coordinate the installation of additional wells to observe the fluctuations in groundwater levels.
  - Installation of Back-up Generators at Well Sites - Install back-up generators at all well sites within the public water systems in case of a power failure.
  - Water Conservation Program - Develop a program to educate and encourage the public to conserve water and promote water re-use measures.

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Recommendations:

Continued...

- **Mid-Term (5 to 10 years)**
  - Well Field Implementation - If found feasible, construct a well field and associated infrastructure for sustainable public water supply.
  - Aquifer Storage Recovery (ASR) Implementation - If found feasible, construct the associated infrastructure to implement this artificial aquifer recharge strategy.
  - Water Re-use Feasibility Study - Conduct a study to determine costs and infrastructure needs for effluent water re-use, reducing demands on potable water resources.

- **Long Term (10-15+ years)**
  - Additional WSSC Allocation - In addition to the short-term 5.0 mgd of water from WSSC, the County should seek an additional allocation to meet future water demands.
  - Surface Water Treatment Plant Study - Determine the feasibility of a surface water treatment plant within the County to meet long-term water demands.