February 21, 2014

Mission H_2O
Groundwater Management Options for Eastern Virginia Groundwater Management Area

INTRODUCTION

At the September 2013 meeting of the State Water Commission, the Virginia Department of Environmental Quality ("DEQ") proposed several long and short term options for managing ground water supplies in the Eastern Virginia Groundwater Management Area. The Mission H_2O Groundwater Subgroup was formed so that municipal, industrial and agricultural water users, along with water supply consultants, could collaborate on groundwater management strategies within the Eastern Virginia Groundwater Management Area. A consensus based approach to water resources planning and conjunctive water management increases the chance for successfully implementing groundwater management actions that are equitable, affordable, and provide far reaching benefits locally, regionally, and Statewide. Mission H_2O is committed to working with DEQ to find collaborative solutions to groundwater management.

To that end, MH_2O's immediate recommendation is that DEQ form an Eastern Virginia Groundwater Advisory Committee to evaluate the current management objectives and criteria, and the policy options that could be used to achieve these objectives and criteria. A proposed two-year work plan for such a group is attached.

The criteria and options discussed in this paper relate solely to the Eastern Virginia Groundwater Management Area. While some of these options may be useful in other groundwater management areas, each groundwater management area is unique, with different geological and hydrological features, as well as different base of users, management goals, alternative water sources and needs.

ESTABLISHING OBJECTIVES FOR GROUNDWATER MANAGEMENT

When assessing groundwater management options, it is important to have a clear understanding of the goals those options should be meeting. Currently, DEQ makes groundwater withdrawal permitting decisions based on one primary criterion: avoiding the 80% drawdown. During recent presentations on the health of the Potomac Aquifer, DEQ has pointed to additional goals/criteria: avoiding saltwater intrusion, avoiding land subsidence, and preventing the decline in water levels. There may be other criteria that are relevant. In addition to evaluating the appropriate criteria, analysis of how, where and when groundwater withdrawals impact those criteria is needed. Triggers could be established for certain management options based on that evaluation. In other words, if water levels go below X (or if water withdrawals go above Y), then certain management options become applicable.

Data from DEQ's observation wells shows that, at current actual withdrawal rates, water levels over much of the Coastal Plain are rising, even several years after a temporarily shuttered significant withdrawer resumed operations (*see* Figure 1, below). A better understanding is needed about the long-term sustainability of this trend. If current water withdrawals are determined to be sustainable, the question becomes how to manage growth, or how to deal with future water needs. The options appropriate to address this question are different than the options appropriate in a situation where current withdrawals are exceeding the identified management criteria.

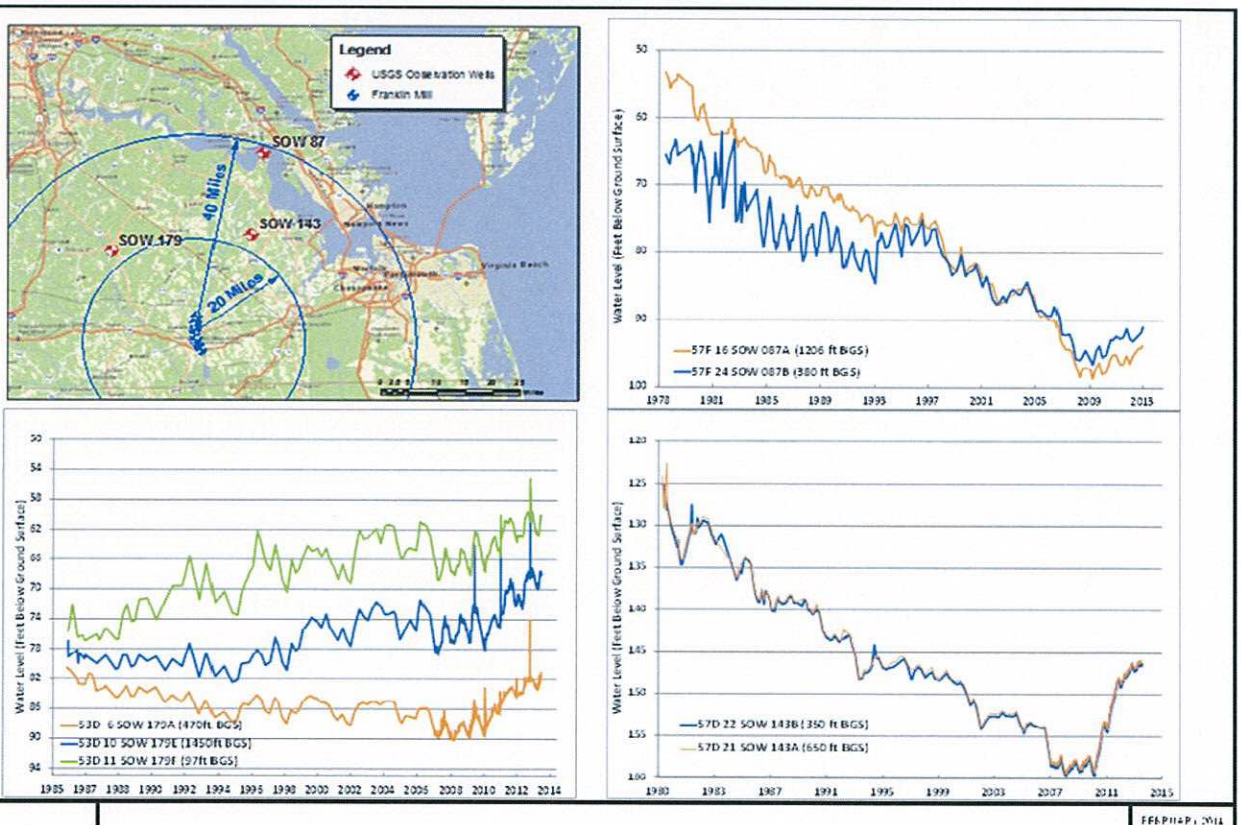

FIGURE 1

Another question to consider is whether the same criteria should apply throughout the Eastern Virginia Groundwater Management Area. There is a strong case to be made that withdrawals along the Fall Line should be subject to different management criteria than withdrawals elsewhere in the Coastal Plain. The aquifer is much thinner in this area, which means that the withdrawals are less likely to cause land subsidence or to create significant cones of depression. Additionally, withdrawals in the fall line area are likely not the cause of saltwater intrusion. Ultimately, the impact to the groundwater resource of water level declines along the fall line is not the same as impacts from water level declines further to the east. Under many criteria, the impacts to the resource from declining water levels along the fall line are less.

Additional analysis is needed to determine why there is a significant gap between actual withdrawals and permitted withdrawals. Answering this question will influence decisions about the appropriate management options.

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PROPOSED WORK PLAN FOR ADVISORY COMMITTEE

I. Monitoring and Data Needs on Health of Aquifer

A. Establish Data Needs

B. Identify Options for Obtaining Needed Data

C. Evaluate Groundwater Level Trends Based on Current Water Withdrawal

D. Evaluate Current Conditions in Aquifer

E. Analyze Current Management Criteria and Evaluate Other Potential Criteria

i. 80% Drawdown
ii. Saltwater Intrusion
iii. Land Subsidence
iv. Water Levels
v. Other
vi. Carve Out for Fall Line

II. Analyze the Connection Between Critical Areas and Actual versus Permitted Withdrawals to Narrow Down the Solutions and Conduct Cost Benefit Analysis

A. Evaluate Actual Withdrawals versus Permitted Withdrawals
i. Identify Capacity Permitted for Drought
ii. Identify Capacity Permitted for Growth
iii. Evaluate Whether Capacity Created by Declining Use

B. Evaluate Unpermitted Withdrawals/Future Water Needs

C. Evaluate Water Supply Planning Information

D. Develop Options Such as Alternate Sources or Regional Recharge for Critical Areas and Permittees

E. Conduct Cost-Benefit Analysis of Solutions

III. Evaluation of Regulatory Framework/Impediments to Management Solutions

A. Regulatory Impediments to Artificial Groundwater Recharge

B. Technical Impediments to Water Reclamation and Reuse

C. Financial Impediments to Use of Alternative Sources

D. Evaluate Ability to Require Use of Public Water System

IV. Consideration of Policy Options (see attached table)

MH2O PRELIMINARY EVALUATION OF EASTERN VIRGINIA GROUNDWATER MANAGEMENT AREA MANAGEMENT/POLICY OPTIONS

Option	Pros	Cons	Other
Evaluate of Current Management Approach – Immediate			
Identify data gaps and how to fill them	• Builds upon existing efforts • Provides better information for decision-making • If done through a collaborate process, may result in quicker and more efficient process	• Cost • Time	Current data shows that groundwater levels continue to rise over much of the Coastal Plain even after pumping was reinstated at a large withdrawer that had previously been shuttered. Continued, increased monitoring is needed to help determine whether existing actual water use is sustainable, meaning that the options for management should focus on how to address growth; or whether changes are needed to current withdrawals.
Evaluate management goals	• Ensures realistic/accurate management goals • Allows for a collaborative review and prioritization of management goals • Evaluate how goals relate to environmental concerns • Consider applicability of goals throughout the Eastern Virginia Groundwater Management Area	• Additional study, data and information will be needed. • Such studies are expensive	
Spread out pumping – continue technical research with USGS on sustainable withdrawal locations and quantities	• Potentially less expensive than finding alternative sources of water • Provides greater opportunity for collaboration and optimization of the resource • More targeted approach for problem areas	• May only be a short-term solution • Cost and administrative burden • Insufficient data to determine best well placement • Won't relieve issues at the fall line	
State serve as lead on coordinating siting and permitting of surface water storage projects,	• Fits within existing water supply planning framework • Encourages collaboration on projects, including seeking funding and permitting • Provides long-term solution/alternative source	• There may be impediments in the federal permitting process • Potential for there to be more significant environmental impacts as compared to other alternative sources	
Establish a groundwater mitigation requirement (beyond the mitigation traditionally required in permits)	• Provides an incentive for conservation and collaboration on alternatives to groundwater withdrawals	• No clear understanding of what mitigation might entail, or how to tailor it to be most meaningful • Difficult to quantify cost of aquifer use reduction versus cost of implementing alternative sources • DEQ regulations inhibit aquifer recharge projects	

Create Opportunities for Collaboration Among Groundwater Users – Immediate			
Form stakeholder advisory committee for the Eastern Virginia Groundwater Management Area	• Provides DEQ with technical resource for data and evaluation of options • Engages stakeholders in defining the problem and developing solutions • Creates buy-in from the public	• Time	Establishing a framework for collaborative management will be useful not only in assessing current conditions and options but in addressing future needs due to climate change, drought conditions, etc.
Coordinate Permit Cycles (Issue Permits in Regional or Aquifer Groupings)	• Promotes collaborative efforts, both with respect to finding better conservation options and alternative water sources, reuse opportunities and even timing of withdrawals depending on the type of uses • Enables more efficient selection of sites and funding for monitoring wells • Allows for better planning by water users and for economic development and growth • Better evaluation/ coordination of withdrawals in a given area of the management area	• DEQ has limited resources to manage the permitting with the current permit cycles; having all permit applications come in at once may not be something DEQ could manage without outside consulting assistance or increased staffing • Could exclude ideas from being exchanged with non-permitted users • Potential for conflict between municipalities and industrial/agricultural users depending on how the permit cycles are grouped	
Establish Groundwater User Management Groups	• Encourages development of solutions not possible on an individual basis • Allows input from all stakeholders • Greater buy-in from participants because they helped create the solution (and agreed to the definition of the problem) • Provides incentives for reducing groundwater use • Less resource-intensive for DEQ	• No clear authority or incentive for managing groundwater if used in isolation	
Provide Incentives for Developing Alternative Water Sources and/or Artificial Groundwater Recharge - Immediate			
Develop Funding Options	• Identifies resources available to support management efforts • Eliminates the "me vs. them" mentality, by enabling water users to partner in search of funding sources	• Funding sources may be insufficient • Difficult to quantify cost of aquifer use reduction versus cost of implementing alternate sources • DEQ regulations inhibit artificial aquifer recharge opportunities	All of these options will be helpful going forward. A comprehensive evaluation of incentives, to include pricing options, permit fees, mitigation options, etc., has never been conducted.
Require Demonstration of Water Conservation	• May be a more economical approach • Ensures efficient use of groundwater	• The majority of water users have already implemented conservation measures, so may not be any real reductions achieved unless can target unpermitted withdrawers • May only be a short-term solution • No mechanism to credit front-end conservation • Pricing of water does not incentivize lower usage	
Develop incentives for artificial groundwater recharge	• Improves long-term sustainable use of the aquifer • Recharge strategies can also be used to create hydraulic barriers related to degradation scenarios such as saltwater intrusion • Successfully used in other states	• Many recharge strategies are land intensive and/or would require legislative/regulatory changes to implement	

Market-Based Groundwater Management – Long Term If Needed for Growth			
Establish a Cap and Trade System	• Allows for a cost-effective means of achieving water reduction where the least expensive reduction options will be pursued first	• Economics will dictate priority of uses • Need a means to oversee and manage trades • Difficult to set a cap; the cap might be different for different areas of the aquifer	Such approaches will likely be best in a scenario where current uses are sustainable and a framework for managing growth is needed.
Develop total maximum withdrawal capacity (like a TMDL but for water withdrawals)	• Creates a more neutral framework for allocation discussions • Enables identification of management goals into set targets • Have a model in the TMDL program • May streamline management for DEQ	• Difficult to establish a maximum withdrawal rate because that maximum might change depending on the season or depending on the criteria considered • Would require extensive overhaul of current state code provisions and regulations relating to groundwater management	
Impose Restrictions on Groundwater Use – Long Term and Only as Last Resort			
Moratorium on new permits	• Protects existing water users • Provides certainty as to how much water is available and to whom	• Negative impacts on growth/economic development • Does not address management criteria or impacts at current withdrawal levels • No incentive to optimize aquifer usage other than passing the model	These options are a last resort, needed only in the circumstance where current withdrawals are not sustainable.
Develop an across-the-board water use reduction target and implementation schedule	• Applies to all users equally, no dispute or discussion about priority of uses • Provides certainty that groundwater use will be reduced	• Eliminates flexibility in achieving goals • Fails to provide direction for how goal is to be achieved • Ignores prior reductions already achieved • More costly option, as water users will look for alternatives individually instead of collaboratively • Imposes a reduction on all without regard to degree or area of impact • Impediment to growth and economic development	
Maximize use of available surface water or other alternative water sources	• Existing infrastructure already exists • In many cases, permits have already been granted for the water • More efficient use of the system • Eliminates unpermitted discharges and unaccounted for withdrawals	• Could eliminate capacity that was being held in reserve for economic growth/development • Could have a financial impact on smaller users • Cost	