

Summary of the Fauquier County Water Summit

Participants included members of the Fauquier County Board of Supervisors, Fauquier County Planning Commission, Fauquier County Water and Sanitation Authority, and the Town of Warrenton

September 23, 2014 - 10:00 a.m. - 2:15 p.m. at the Warrenton Visitor's Center, 33 N. Calhoun Street

Objectives for the Meeting:

- Identify Major Issues Facing the County Regarding Public Water Supply
- Identify a Path Forward to Resolve the Issues Together

Executive Summary of Results:

Key Issues Identified and Discussed

County Goals: The County's Comprehensive Plan include goals for concentrating growth in and around service districts, planning for necessary public facilities and utilities through public and private cooperation, and protecting critical environmental resources for future generations.

Water Quantity and Quality: Will the supply of groundwater be adequate to meet long term needs, and will it be adequately protected from contaminants?

The Nature of Groundwater: The County depends entirely on groundwater resources derived from fractured bedrock aquifers. The availability of groundwater is dependent upon subsurface geologic conditions. The County can't change the underlying geology or control the rate or pattern of groundwater recharge.

Protection of County Investments: The County and WSA have invested over \$100 million in water infrastructure throughout the Service Districts, but little or no money on protecting the wells that serve that infrastructure.

The Relationship of Land Use to Groundwater: Certain Service Districts within the County are potentially threatened by either the presence of land uses that could, or have, adversely impact groundwater quality and/or are within areas where current or future groundwater withdrawals may exceed recharge rates. The County has not defined the groundwater recharge areas for its existing wells. Leaks of chemicals into the ground can go unnoticed until they contaminate public water sources. Changes in land use can adversely impact groundwater quality. Yet the County has few land use policies that protect its critical groundwater resources.

Management: How should policy, management and funding responsibilities be divided between the County and the WSA in order to ensure adequate quantity, quality, distribution, and cost of providing water to the County's residents and businesses?

Key Outcomes of the Discussion

The participants of the three bodies reached broad consensus on the following propositions:

1. We support the comprehensive plan goal of long-term water protection.
2. We support the need for a long-term water protection plan.
3. The next step is for the Board of Supervisors to establish a Technical Committee to define the scope, process, and procedures for preparing the water protection plan.

Detailed Summary of Results:

Welcome and Introductions

Shortly after 10:00 a.m., Board of Supervisors Chairman Chester Stribling opened the meeting and welcomed the participants and guests. He noted that water is an important issue to the County and its residents, and that this is an important meeting. He said he hoped that this meeting would bring some cooperation on this issue.

Director of Community Development Kimberley Fogle reviewed the objectives and agenda for the meeting, introduced the three presenters, and introduced facilitator Milt Herd.

Mr. Herd reviewed the procedures for the meeting and framed the overall issue and major topics (“why are we here today?”). This included the following key points:

- Consider the Short Term and On-Going Activities for Developing and Providing Water:
 - Exploring quality supply areas
 - Acquiring rights
 - Developing production wells
 - Treating water to ensure quality standards
 - Delivering water to customers
- Consider Other Activities Needed for Ensuring and Preserving Groundwater Resources:
 - Exploring and developing additional supply sources
 - Evaluating and defining recharge areas for production wells
 - Pursuing and implementing wellhead protection approaches
 - Prioritizing and undertaking groundwater monitoring
- Explore:
 - What level of commitment is necessary and appropriate to these activities?
 - What are the appropriate roles for the County and FCWSA?
 - Who should take the lead in each area?
 - How should funding responsibility be shared?
- Identify What Next Steps Should We Take to Maintain Momentum.

Ms. Fogle then asked participants to briefly introduce themselves, and then turned to the two presenters for the morning session.

Presentations and Discussion – The Big Picture: Understanding What We’ve Done and Where We Are

Summary of Presentation by David Nelms, Groundwater Specialist, U.S.G.S

Mr. Nelms explained the relationship between precipitation and groundwater levels, stressing that it is a direct and dynamic relationship. He explained that geology is the “vessel” that collects groundwater from rainfall, snowfall, and some absorption from streams. He said that precipitation rates - particularly during the January to April time period – are a critical determinant of groundwater recharge levels, and that snow is particularly important.

He noted that the 2011 earthquake produced significant changes in the groundwater levels in the eastern U.S., with 36 of 48 sampled wells dropping, and 12 rising, although the groundwater level rose in the sample well in Fauquier County.

He explained that there is a direct correlation between annual rates of precipitation, mean stream flow, and mean base flow (groundwater discharge or “rejected groundwater”). You want to sustain flow in streams in order to maintain groundwater levels. When the streams flow during droughts, it indicates groundwater coming up and flowing in the stream.

He said that often 30% to 50% of precipitation is lost to evapotranspiration before it can get into the groundwater supply. You need to understand the source of your groundwater supply. He said it’s difficult to define precisely “how many houses you can build” in terms of groundwater supply. He showed data and analysis for Warren County, as an example. Although the percentage of recharge used to support houses seems like a small percentage of the total recharge, the actual impact of development on groundwater supply can be significant and it depends a lot on the area being considered, as well as other variables.

Summary of Presentation by Jamie Emery, Emery & Garrett Groundwater Investigations

Groundwater Supply

Mr. Emery cited a mission statement recently proposed for Loudoun County which is relevant to Fauquier: “...to facilitate and enhance the short term and long term protection of water resources for the *next generation* of users....”

He explained that Fauquier County is geologically split between the Blue Ridge, Culpeper and Piedmont basins. He said the rocks in these different geologies produce different groundwater characteristics. He pointed out that groundwater is found in the fractures of the rocks, and it’s those fractures that we’re looking for when we drill wells.

He noted that groundwater withdrawals are most significant from within the County’s Service Districts, but that groundwater withdrawals also occur from other public community water systems (such as some schools and restaurants), as well as individual rural residential wells, totaling over 4,000 wells in the County.

Out of the 42 inches of annual rainfall in the County, only about six to ten inches contribute to groundwater recharge.

He noted the three major watersheds in the County: Goose Creek, Broad Run/Cedar Run, and Rappahannock.

The key factor isn't just how much water you're taking out of the watershed but rather where you're taking it out relative to where you are in the watershed or how much is available that you can use. Unfortunately, Service Districts are not neatly overlain over the best portions of a watershed drainage area because that wasn't the key factor in deciding the original location of those districts.

Key questions:

- 1) Is there enough water available?
- 2) Is there enough groundwater recharge to satisfy full "Build Out" needs?
- 3) Are there concerns about contaminant threats adversely impairing groundwater quality?

Fauquier County's goals in the Comprehensive Plan:

- "To concentrate and guide growth in and around service districts, villages, and settlements."
- "To plan for necessary public facilities and utilities through public and private cooperation with incentives for extending water and sewer to those service districts presently without such services, and to establish priorities for service implementation."
- "To protect critical environmental resources and to maintain renewable natural resources (water) so that they are not degraded but remain viable for future generations."

In the year 2000, there was an average of about 1 person per acre of land in the service districts. At full build out, the forecast would be an average of about 2.4 people per acre.

If we assume an average of six inches of net annual groundwater recharge, we would exceed the recharge in the Marshall Service District, we would use 86% in Bealeton, and 74% in Remington, for example. This compares to a typical goal of using only 50% of the net recharge. However, if we include the land area outside of, but within a mile radius of the Service Districts as a source for groundwater, the percentage use at build out is greatly mitigated, to only 20% in Marshall, 19% in Bealeton, and 17% in Remington, for example.

Threats to Groundwater Quality

He showed maps of potential contaminant threats, noting that many of them are within the Service Districts, which reinforces the benefit of obtaining supplies from outside of the Service District boundaries. He noted that the Marshall area has the greatest need for urgent focus on groundwater protection, followed by Bealeton, and then New Baltimore.

Groundwater Protection

He pointed out that FCWSA and County have invested in excess of \$100,000,000 dollars (\$100 million) in wells and infrastructure throughout all of the Service Districts, which includes pump stations/pipelines/water tanks/treatment systems etc. Yet there has been zero money spent on protecting those wells that serve that infrastructure (except in Bealeton where we did a small study with DEQ funding during the earthquake of 2011).

He noted that Fauquier County depends entirely on groundwater resources derived from fractured bedrock aquifers for public, industrial, agricultural, and domestic water supplies. Since the availability of groundwater resources is dependent upon subsurface geologic conditions and because population growth is continually pressing forward, Fauquier County should be concerned that future land use decisions may interfere with the future availability and quality of these groundwater resources. (For instance, if growth causes dense residential or commercial development on land where the best groundwater resources are available, those groundwater resources may be lost forever.)

Because we can't change the geology, we have to do the best we can with what we know, including working cooperatively with the private sector and residents on land use plans that are compatible with protecting groundwater resources in the years to come. He emphasized that *you do not have to pass groundwater protection ordinances in order to make a difference in protecting groundwater resources.*

Key issues cited by Mr. Emery:

- Certain Service Districts within the County are potentially threatened by either the presence of land uses that could, or have, adversely impact groundwater quality and/or are within areas where groundwater withdrawals (needed to meet future growth) may exceed groundwater recharge rates. Those areas designated as "Sensitive" will require additional and detailed investigation.
- Fauquier County has not defined the Groundwater Recharge Areas for their Existing Groundwater Production Wells.
- Fauquier County has few land use policies that serve to protect the groundwater resources that the County depends entirely upon for potable water supply,
- Spills and leaks of chemicals into the ground can go unnoticed until they contaminate public water sources.
- Changes in land use can adversely impact groundwater quality.
- It is necessary to understand the impacts that land uses can have on groundwater quality and use Best Management Practices to the extent that is reasonable/possible to prevent spills and leaks of contaminants into the groundwater system.

Thus, in order to protect groundwater resources that are used for potable drinking water supply it is necessary to accurately determine the Zone of Recharge Contribution to a public supply production well.

He suggested these Major Steps:

- A. Hydrologic Evaluation
- B. Conduct Geophysical Surveys – Select Monitoring Wells/Springs at Best Available Target Locations within Study Areas
- C. Install New Monitoring Wells
- D. Groundwater Testing, Determination of Groundwater Recharge Area
- E. Develop Groundwater Use Management and Protection Plan

He described the process that Augusta County used to develop a groundwater monitoring plan to assure that contaminated groundwater is not migrating to production wells, and recommended that Fauquier take similar steps with their production wells.

He noted that potential contaminant threats within groundwater development areas are moderate to high in the Marshall area, high in the Opal area, and moderate in the Bealeton, New Baltimore, and Warrenton areas.

He emphasized that the County needs to ensure that groundwater is sufficiently available to meet the already determined build-out needs of the Service Areas. Also, if you are spending money on evaluating sewer service, you should have an equal understanding of the potential for developing groundwater sources. We cannot change the geology but we can plan land use to protect resources.

Based upon this information, he recommended that during the next five years, the County:

- Commit to a long range plan of water supply management and protection.
- Define specific groundwater recharge zones surrounding key production wells located in “Sensitive Water Supply Areas”
- Carry-out groundwater protection studies at key public groundwater withdrawal sites and incorporate such data into the County’s Land Use Management Plan in order to protect the County’s infrastructure assets.
- Groundwater studies should first be completed in Marshall, Bealeton, New Baltimore and Opal Service Districts as these have been designated as the most “Sensitive Groundwater Protection Areas” as part of the Water Resource Management Plan.
- Identify remaining groundwater resources that can be developed both within and directly outside the existing Service District boundaries to meet future water supply demands.
- Develop County-wide groundwater monitoring program and establish a drought water supply management plan.

Discussion

Bob Lee: County Board has said it needs to do something to protect our groundwater, but more has been said than done. I’m hopeful that the County Board, WSA and the Town will collaborate to do something to map and protect existing sources.

Chester Stribling: Does the earthquake affect the recharge area?

Emery: We had a 10-foot rise in groundwater levels in Bealeton right after the earthquake in 2011. However, the sanitary seal of the well took a hit and some contamination occurred.

Focazio: Earthquakes are rare, but pumping wells also change recharge areas. Thus, we need a monitoring program.

Question: How did Clarke County get started in their monitoring efforts?

Nelms: They were motivated by a severe drought, coupled with high growth, and resulting concerns of citizens.

Alm: How do we make this a priority before our “backs are against the wall”? And what does it cost to identify our recharge area and put in monitoring wells.

Emery: Even in New Hampshire (“live free or die”), they have strict well-permitting procedures. Prioritize where you want to go, and take steps to protect your assets.

Herd: What is the main barrier to progress?

Trumbo: Money.

Alm: We could do more to conserve our water as well.

Nelms: Water use in the Service Districts is “consumptive” because it includes sewer treatment which takes it out of the watershed, whereas domestic wells essentially recycle the water back into the ground from where it was withdrawn. Wells and recharge areas are not always static – major withdrawals can cause bore holes to become connected. And you want to balance well locations so withdrawals don’t draw from each other.

Graham: Quality of water may not be good even if quantity is good.

Emery: Monitoring wells let you know if you need to modify land uses to protect a public water source from a contamination source.

Alm: WSA says it doesn’t have the money to map recharge areas? Whose job is it?

Emery: This is a constant discussion between utilities and county governments. It’s an issue of day-to-day responsibilities and long-term planning responsibilities. Historically, in most localities, the County government deals with long term planning and the utility deals with day-to-day operations. In Loudoun, the authority (Loudoun Water) does both, although this may change, as the Board is getting more involved.

Garreau: Land use implications are huge.

Emery: You can develop land above groundwater withdrawal areas. We just have to be smart – maximize the ability to get it back into the ground, while also minimizing impervious cover.

Question: How do you deal with old data?

Emery: Because of the economic recession, we haven’t seen much activity since 2007, so we’ve had a “pass,” and thus our numbers are not that far off. But as the economy rebounds, we have to be on par with what’s going to happen.

Focazio: When we defined “full build-out” it didn’t account for recharge areas, or what we’re hearing today.

Alm: Are other counties requiring permeable surfaces?

Emery: Yes, there are some counties that are working to require best management practices to encourage recharge.

Fauquier County Water and Sanitation Authority (FCWSA)

After a brief lunch break, participants reconvened for a presentation by Cheryl St. Amant, Associate General Manager, Operations, for the FCWSA.

Ms. St. Amant began by reviewing the “integrated water picture.” This is a global point of view. She talked about the overlap of potable water, wastewater, and stormwater – the intersection of these elements is “integrated watercycle management”.

She said that water supply issues include quantity (exploratory), and quality (treatment and protection).

Regarding exploration for new sources, she said that WSA requests the County’s assistance in funding the expenses associated with drilling and long term pump tests of public water source exploration.

Regarding treatment and protection, quality drivers including regulations and land use are resulting in the need for the installation of treatment systems and wellhead protection measures.

She gave an overview of the WSA system, including capacity, connections and systems analysis.

Virginia Department of Health (VDH) determines the capacity of all permitted waterworks, defined in terms of equivalent residential connections (ERC) as measured in gallons per day (gpd). 1 ERC = 400 gpd.

She reviewed the capacities in each of the various community systems in the County. She then reviewed the status of the connections to the various systems, indicating that we are somewhat over-connected, particularly in New Baltimore, but also in Bealeton and Remington.

The water system analysis looks at quantity and quality, beginning with supply and demand. When 60% of permitted capacity is used, planning begins; at 75% usage, construction begins; at 90% VDH will issue a notice of violation and require new sources. The quality side is driven by regulation. The limits of contaminants are being lowered; contaminants come from previous land uses as well as increased development. WSA does a lot of testing of contaminant levels in all parts of each system.

She then discussed the WSA Capital Improvement Plan for FY 2015. She reviewed the systems for New Baltimore, Bealeton, Marshall, and those systems under “regulatory watch.” For each system, there are issues about groundwater development, supply and demand, and planned projects.

New Baltimore. The area has 13 mapped groundwater zones with nine primary and four secondary zones with a potential additional supply of up to 1.65 to 3.4 mgd in the ground, in addition to the 1.1 mgd currently used.

Groundwater Development Methodology

Phase I	General Assessment; Identify Zones
Phase 2	Geophysical Surveys; Identify potential wells
Phases 3&4	Test Well Drilling; Conversion to Production Well
Phase 5	Long Term Pump Tests

She reviewed the existing wells and noted that six of the nine require treatment, and thus groundwater development must continue in the New Baltimore area to meet future demand. She summarized the cost of future water supply and exploration work, which totals a little over \$2,000,000, of which \$810,000 is unfunded. To meet projected demand, WSA needs to add a capacity of 292,000 gpd or the equivalent of 730 ERC in the next 5 years. They intend to expand capacity through a combination of supply projects, treatment projects, and storage projects, at a total 5-year capital cost of over \$8 million.

Bealeton. The area currently has three wells in service, a 500,000 gallon storage tank, and a permitted supply of 469,600 gpd, limited by source. The additional future connections needed over the next five years total 482 with a total demand of 192,800 gpd. They plan to bring on five new wells during the next four years totaling 244,000 gpd, or 610 ERC. She noted that the earthquake changed the aquifer capacity but they have to make that case to VDH and get approval. WSA will be adding a microfiltration treatment system to address bacteriological and arsenic issues at a cost of \$2.5 to 3.0 million. The five-year capital improvement program totals more than \$3.5 million.

Marshall. The area has six known potential sources, but WSA does not own these wells. There are currently seven wells, of which four are active, permitted at 355,920 gpd, with a storage capacity of 502,000 gallons. There are 601 current connections using 240,400 gpd, and although the permit allows up to 355,920 gpd, we know that the effective capacity is really 307,920 or 770 ERC because three of the permitted wells having been taken out of service due to quality issues. So we're okay right now, but we know that additional well capacity will be needed to meet future demand. Looking at supply and demand, we need to add 132,000 gpd over the next four years or the equivalent of 330 ERC. Groundwater development work will need to continue in Marshall to meet current and future demand. The five-year CIP totals about \$750,000.

Systems with Regulatory Issues. Ms. St. Amant reviewed five systems that require treatment: Paris (bacteriological), Turnbull (arsenic), The Plains, Bethel, and Botha (Nitrite/Nitrate).

In summary, Ms. St. Amant said that WSA needs the County's assistance in funding the expenses associated with drilling and long term pump tests of public water source exploration. She noted that exploratory funding allows you to be proactive and provide maximum efficiency and benefit to residents, whereas not funding it will put the County in a reactive posture, and produce unplanned growth, ad hoc systems, and a loss of economies of scale.

A key issue is how we protect existing wells, and how do we make our system more robust. Quality drivers including regulations and land use are resulting in the need for the installation of treatment systems and wellhead protection measures. Funding to produce and protect groundwater quality is a discussion area. Exploratory costs are \$100,000 per well, whereas treatment costs are \$200,000 up to \$3,000,000.

Discussion

Mr. Herd posed the original questions to the participants, beginning with what might the County be able to commit to in terms of water supply. One option is affirm the County's comprehensive plan goal of protecting water quality for the long term, and possibly to commit to undertaking a plan for water supply protection. A second question is the issue of the roles of the County and WSA, and finally the question of what should be the immediate next step.

Stribling: The County is committed to the Opal water system, although we're not in the water business. We need to determine how to fund it. We are aiming to be proactive to support economic development.

Alm: Long-term, we need to map the re-charge areas and set-up monitoring wells, so when we look at land use proposals, we have the necessary data. This could be funded in the CIP over a long period of time.

Lee: Years ago we looked at the area around Warrenton to see which areas should be served by the Town and which by the WSA. It may be time to look at that again.

Emery: If everyone could agree that an overall water supply plan for the County is needed, maybe we could start that process.

Meadows: We've established that funding is a problem – people need to understand the gravity of the issue and that the effort serves everyone in the County – public education may be the first step.

Graham: In the past, the Board of Supervisors has funded the WSA's research of sites for water exploration, prior to turning over to the WSA for further exploration [and development]. I think it was about \$200,000 per year, but was terminated due to the economy and the results of the research at that point.

Meadows: We are now in a drought – it's a crisis - so now is a good time to address it, as Mr. Nelms suggested.

Herd: The issue is how much do you want to do - or consider doing - in terms of planning, at this stage? We have heard several suggestions so far:

- Do a water supply protection plan
- Start with mapping recharge areas
- Initiate a public education program

Comment: Regarding public education, we haven't heard much of the public health issue – we want to avoid a health crisis.

Alm: The Town of Warrenton, with its reservoir, is a big part of the puzzle, but something we haven't talked much about, but which should be included in our planning.

Tucker (Town of Warrenton): We've developed a strategic water supply plan, and our main source is the reservoir. We update it every five years. We want to be self-sufficient.

Herd: I'm hearing the following key points:

- We need to commit funding for various improvements
- We need public education about the need
- We need to take specific planning actions like mapping
- We need to pursue economic development purposes

What can we say about next steps?

White (DEQ): Make sure you have your data accessible at a later time. It's all valuable.

Garreau: What specifically do we mean by wellhead protection? What does that look like? What does it mean to the agricultural community outside of the service districts?

Emery: You have to know where your water is coming from, and you allow different land uses depending on proximity to the wellhead. This is a relatively cheap solution compared to a four million dollar treatment system. Protection techniques would vary from district to district and from service districts to rural areas – that would be part of the water supply plan.

Focazio: Consider establishing a technical committee to make some recommendations about how to proceed with our water planning.

Granger: The public awareness aspect is interesting, because twenty percent of our County population gets its water from the Town of Warrenton and will thus wonder how they are affected and the implications of raising money for this. People will ask "are we making good decisions" about protecting water and using the water we have? We don't know anything about our recharge rates or the big picture, so I'm totally behind doing a long-range plan, as well as short-term actions. New Baltimore really concerns me, i.e., with Raymond Farm and Warrenton Chase we're pulling water out of the New Baltimore district and putting it into the Warrenton district.

Graham: Your statistics aren't accurate.

Granger: I'm just saying that we need to be intelligent about how we explain our actions to residents.

Herd: The previously suggested Technical Committee could be the entity to "scope" the plan – define the process, next steps, etc. Naming that Committee could be the next step.

Citizen: There are a lot of County residents who would be very helpful and would work on this. It's amazing to have all of you in the same room. We're grateful.

Emery: If we could walk out of this room today and say a water supply plan is needed, that would be an accomplishment – we can work out the particulars later.

Herd: So it looks like there are three areas of agreement today:

- We support the comprehensive plan goal of long-term water protection
- We support the need for a long-term water protection plan
- The next step is to establish a Technical Committee to define the scope, process, and procedures for preparing the water protection plan.

[There were no objections to this proposition]

Alm: We need some milestones, so it's not just a "bridge to nowhere".

Herd: What's the best way to form that Committee? Would the executive officers coordinate on that?

McCulla: The Water Supply Plan would ultimately be a County Plan adopted by the Board of Supervisors, so the Technical Committee should be established by the Board, but that's not to say that appropriate members of the Planning Commission and other people with knowledge in this area wouldn't be placed on the Committee - but it should be a Board-appointed Committee.

Herd: Does that make sense to you all? [There were no objections]

Okay, that's good, so the Board will establish the Committee, based on what we've heard today.

2:15 pm Recap and Adjournment

Ms. Fogle thanked participants and announced that Mr. Emery's and Ms. St. Amant's powerpoint presentations would be on the County's website. The meeting was adjourned at approximately 2:15 p.m.