The Community Water Supply Plan: A Personal Perspective

Liz Palmer, ICF Board member

During the past 11 years, I have been witness to, and an active citizen participant in, the development of this Community's future water supply plan. It is a plan that evolved in a cauldron of arduous, painstaking work by government officials; public input and debate among scores of citizens; and, State level oversight. Ultimately, the final plan was approved by the Rivanna Water and Sewer Authority (RWSA), the Albemarle County Service Authority (ACSA), the Charlottesville City Council, the Albemarle County Board of Supervisors and the Department of Environmental Quality (DEQ). While I cannot detail within the scope of this paper every aspect of the plan's development, it is my hope that sharing my personal experience, might lead others to share my confidence and pride in what this Community has produced.

Citizen Involvement

Local water supply planning began in earnest in the mid 1990's, and from the start, citizen involvement was a hallmark of the process. I began following the process in 1997, when I first saw references to water supply options and when I first began attending community meetings relating to water supply. In order to follow the process closely, I joined the League of Woman Voters Natural Resource Committee which was, at the time, the most active and knowledgeable local citizens group in matters concerning water supply planning and watershed protection. It was through the League that I made frequent public comment.

Also early on, a citizens' ad hoc committee was formed to discuss water supply and watershed protection issues. This ad hoc committee was successful in convincing the City Council and the Board of Supervisors to convene a Joint Meeting to hear citizen watershed protection concerns. Later, when the RWSA scheduled a series of initial meetings with Federal and State Regulators, but declined to admit members of the public to these meetings, citizens scheduled a meeting of their own with the Regulators to express citizen watershed protection concerns and objectives. Still later, as the planning process seemed to be drawing to an uncertain conclusion, the Piedmont Environmental Council assembled yet another group of citizens, and citizen organizations, bent upon keeping our water supply within our South Fork Rivanna watershed. This was not only to provide higher quality water but would also serve as an important incentive to protect our watershed for generations to come.

Perhaps my most poignant memory of citizen involvement and activism was a rally organized in Scottsville to protest the future water supply alternative involving piping water from the James River to the Urban Area. Well over a hundred people assembled at the farmers' market on the banks of the James. Live Blue Grass music was provided, and a very fat Beagle paraded wearing a T-shirt on which was written, "Stop the Pipeline." Then, in an organized moment, the Mayor

of Scottsville led the crowd to the foot of the Bridge over the James, traffic was stopped, and a banner was hoisted high over the road, proclaiming, "Stop the Pipeline." I went home that afternoon with fresh bread from the farmers' market and a great sense of pride in our community and the democratic way.

The conclusion I wish you to draw from this brief recitation of citizen involvement, is that our future water supply plan was not railroaded by indifferent local and state bureaucrats, and foisted upon a passive public. At City, County and State levels, private citizens played a significant role in guiding the process. We were able to do so, in large measure, because of the responsive and open policies of our elected officials and involved government agencies.

Early History of Local Water Supply

Until 1947, this Community drew its water supply primarily from the Ragged Mountain Reservoirs, constructed at the turn of the 20th Century, and from a pipeline constructed in 1925 to deliver water from the headwaters of the Moormans River. Then, as now, community realization dawned that our perennial problem would not be water supply, but rather, water storage sufficient for periods of severe drought. Additional storage capacity was provided in 1947 by construction of the Sugar Hollow Reservoir, and in 1966 by construction of the South Fork Rivanna Reservoir (SFRR).

The Rivanna Water and Sewer Authority (RWSA) was formed by the City and the County in 1972, six years after completion of the SFRR. Some have characterized its formation as the result of a shotgun wedding between the City and the County because a united front was required by the Federal government for applications for Federal grants funding sewage treatment infrastructure. Shortly after RWSA's formation, the City turned the operations and maintenance of the SFRR over to RWSA, but retained ownership of the land. Today the RWSA maintains primary infrastructure such as reservoirs, water and wastewater treatment facilities, and large transmission lines. RWSA wholesales water to the City Public Works department and the Albemarle County Service Authority (ACSA). These organizations, in turn, retail water to customers and maintain secondary water and sewer lines.

When the South Fork Rivanna Reservoir (SFRR), a run-of-the river reservoir, was completed in 1966, it was known to have a limited life span due to heavy sedimentation. At the time, however, local government believed it was the best solution for the community. The SFRR draws from a large drainage area, almost entirely within our County's borders. The SFRR would be upstream from and close to the population center. With no other apparent alternative, the City purchased the land and the project went forward. By the early 1980's there was pressure to plan for a future when the reservoir would no longer have adequate capacity. For this reason, land on Buck Mountain Creek was purchased in 1983 to meet future demand and replace the lost capacity in the SFRR.

The Sediment

There is still much to find out about the precise causes of SFRR sediment accumulation, but there have been some studies and, of course, observation by those who live, work, and boat along the reservoir and its tributaries. A large percentage of the sediment clearly comes from the shores and beds of the rivers draining into the SFRR, most likely as the result of clear cutting of forested land, and other predatory land use practices dating back over 100 years. In the past, farmers eliminated forests to plant crops, graze animals, and sell timber. Today, deforestation for private residences, insufficient buffers, cattle in streams, driveways on steep slopes and fording of waterways are among the modern sources of stream bank erosion and sedimentation. Some suggest that the past and present land use practices each contribute about 50% to the current problem. Samples of the sediment taken to date, albeit small samples, suggest that it is made up of 50% sand and 50% "fines"(silt and clay), with little organic material, making it ill-suited for agricultural purposes. Many have suggested that the sediment could be used for construction "fill" but little is known about its compaction properties or other measurements of suitability.

Back to the Future Water Supply Plan

This Community's early solution to the loss of storage capacity in the SFRR was simply to build a new reservoir at Buck Mountain. This option was nixed by Federal and State Regulators in the late 90's early in the planning process. The "James Spinymussel," an endangered and sentinel species of river health, resided in the Buck Mountain Creek. In addition, times had changed on the Federal and State regulatory front, bringing the construction of new reservoirs into disfavor especially when other water supply options are available. For those of us in the environmental community, building a new reservoir in the same watershed subject to the similar sedimentation pressures was unreasonable. We were relieved to have this option removed from the list.

Choosing a Water Supply Alternative

An intensive process then began. Consultants would identify a myriad of water supply options. Surely some option either by itself or in combination with others would emerge as the perfect solution to our water storage woes. Many of the alternatives suggested were fanciful. Others appeared to have merit. What we realized early on was that they were all just vague suggestions until reviewed by qualified engineers, federal and state regulators and financial experts. One by one they would be either modified and advanced or dropped completely.

Each alternative was examined to determine the "safe yield" that it would add to the system. Safe yield is a measure of the available storage of a system during the worst drought of

record. Hydrologists and engineers modeled what each option could provide, based on storage volume and flow data.

A demand analysis was performed so that planners would know how much water would be needed for the future. The State Water Control Board provided guidelines on how to determine demand, how long to plan for, and how to choose an alternative by balancing practicality (cost to rate payers) and environmental cost. Regulators [the DEQ, the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers, the Virginia Department of Game and Inland Fisheries, the Virginia Department of Conservation and Recreation, and the Virginia Department of Health] also weighed in from the vantage of their individual expertise.

So many water supply alternatives were discussed and reviewed at length, it would be impossible for me to go through them all here. The larger papers produced by consultants are posted on the RWSA website and much of the process can be gleaned from those reports. As a citizen involved in the process, I can say that those reports do not do justice to the volume of work done by RWSA officials, consultants, elected officials, and citizens during this long process. I will hit the highlights of alternatives advanced and/or preferred by citizens in order to illustrate the process.

Dredging for Water Supply (my personal favorite for years)

Dredging of the SFRR seemed the most reasonable and obvious solution. After all, reservoirs around the country are dredged. A land owner in the area was willing to discuss taking the dredged material for drying. The airport had future plans to expand and needed millions of dollars worth of fill for runway construction. Regulators seemed OK with the basics.

Then RWSA came out with estimates of the amazing volume of sediment that would have to be removed to restore capacity and information on how it would be transported from the dredger in the middle of the reservoir to a drying area and then removed from the site. The invasiveness of the scenario was overwhelming but citizens countered the negatives wherever they could. Citizens contacted dredging companies, and mayors and directors of water authorities in communities where dredging had been done. Citizens even did financial studies. RWSA was urged to investigate further. I was a vocal critic of the RWSA at the time and argued strongly for an analysis of the sediment's material properties so that we could explore potential uses and thereby better understand the cost of disposal. There were actually 3 different Directors of the RWSA during this period. RWSA's present director, Tom Frederick did not take charge until June of 2004 so interaction between citizens and the RWSA was often less than ideal during

transition periods. And of course the RWSA was preoccupied with dealing with the drought in 2001 and 2002, further slowing the process.

The Death of Dredging to Restore Capacity

I finally cried uncle with the publication of the consultants' report in 2004. See http://www.rivanna.org/community2.htm. While I and others remain convinced that future maintenance of the SFRR is an absolute Community obligation, it became clear that dredging is not the panacea we had all been hoping for to solve our future water storage needs. Some of the insurmountable negatives surrounding this alternative are as follows:

Hardship to surrounding residents and recreational users: there are different types of dredging methods. Regulators were likely to approve only the hydraulic method for environmental and water quality reasons. This would result in a slower removal of the material and necessitate the presence of the dredger in the reservoir for several months out of the year for many years to come. The dredger could operate only during the warmer months to avoid ice. This hydraulic method of dredging would produce liquid slurry which would need to be pumped *via* pipes up to a flat, at least football sized, drying area. Although an adjacent landowner may have been willing to allow a ravine to be used for the sediment drying, such an offer would not have satisfied regulators' requirement for a flat drying area. Other areas on the reservoir were looked at as possible sites. All had some issue with proximity, access, slope or availability. Also, odor control would be a significant issue and noise from the dredger and pumps would need to be controlled. Numerous truck loads per day (number dependent on size of truck chosen) would have to travel on Earlysville road. Would living with dredging be like living in a construction site for years? What would be the potential problems associated with pumps, pipes, and trucks working on the sediment removal?

Sustainability: Because the material would continue to accumulate even while we were dredging, the solution would not be long lasting. Would my children or grandchildren be starting all over again?

Timing: When would the airport need the fill (if its properties were found suitable)? Would there be timing issues. Material could take up to 2 years to dry and we were limited as to how much we could remove each year because of the method of removal. We would have a continual process of pumping, drying, and hauling that nevertheless might not produce the required amount at the required time.

Cost and Safe Yield: Dredging the SFRR back to its original capacity alone would not meet the requirements determined by the demand analysis. Therefore, dredging would have to be

combined with other alternatives. If we could not sell the sediment mixture for enough money to offset the cost, the inclusion of dredging in any combination of alternatives would be substantially more expensive than any other viable alternative.

What happens if we don't dredge? At one point in all this discussion, the LWV NRC, invited two well respected county employees, our then watershed manager and his boss, to meet with us and others to explain what the SFRR would look like if no dredging took place. They painted a pretty picture of a river running through a wetland. That was hard for me to buy. I had canoed on Ivy Creek in a dry hot summer and seen the algae and experienced the unpleasant odors. We were told that the South Fork Rivanna River would be different due to the high volume of water passing through. And we could always do maintenance dredging if needed. Although I have a great deal of confidence in both these former County employees' opinion, I still believe that more evaluation must be done to assure that we will not leave our children and grandchildren with an expensive burden.

I do however understand that we must, as a community, evaluate the future of the SFRR outside of the water supply planning process. What do we want the SFR reservoir to look like and how do we want to use it? Will the UVA crew team continue to row on the South Fork or will they be able to move over to the new Ragged Mountain Reservoir? We are told that the SFRR will always retain some water storage capacity and will continue to be a source of drinking water. The addition of a wetlands area could provide bird habitat and improve water quality. But what will it look like in the interim? Who will pay for maintenance dredging if needed? Should we be spending money on preserving capacity for drinking water or spending money restoring the area to a state where natural processes can take over with minimal human intervention?

Other Water Supply Alternatives

Another popular alternative was a piece meal one where we increased the interconnectivity of the reservoirs, utilizing Chris Green Lake, Lake Albemarle, and Beavercreek Reservoir for the urban area and place a bladder on the SFR Dam. This sounded good. The math seemed to work for the projected safe yield. Then we found that we could not put the bladder on the SFR Dam because it would back water up into Buck Mountain Creek and kill the spinymussel. A mathematical error was also found in calculations for storage capacity obtained with the bladder which further doused this alternative.

Then there was Ragged Mountain Reservoir (RMR) and pump storage that involved taking water from the Mechums River for storage at RMR. The Ragged Mountain Reservoir Dam would be raised 45 feet. This was popular until it was found that restrictions on withdrawal from the Mechums would cause unacceptable refill times for the enlarged RMR.

The James River pipeline was an option that morphed into something quite different as it was evaluated. When first proposed, it was a standalone project in which we would put a treatment plant in Scottsville and eventually stop using the RMR and the Sugar Hollow Reservoir. We might be able to cooperate with neighboring counties to reduce costs. As engineers advanced this option it became obvious that the pipeline to the urban area would be too long to carry treated water and maintain quality. Raw water would have to be piped. Places for treatment facilities were evaluated. The O'Hill treatment plant was the most reasonable choice. Then the DEQ expressed concern that we may be limited in withdrawal during droughts. This is when RMR entered the picture as an impoundment for this option. Because this option was not advanced further, studies to find out how much water would be available and thereby determine the size of RMR were never done.

There was significant public opposition to this option. We would be drinking water from downstream of Lynchburg, A city known to have aging sewers, a combined stormwater and sewer system and problems with overloading of the wastewater treatment plant during heavy rainfall. RWSA assured citizens that the water could be treated to a high standard. But many questioned this and felt as though contaminants existed that would not be removed with present wastewater treatment methods. Many in the community demanded that we stay in our watershed for our drinking water.

Coming Together

At this point no alternative seemed both viable and acceptable to the community. A general consensus had emerged that using the Ragged Mountain Reservoir for additional water storage made sense, much as it did at the turn of the 20th Century. This reservoir is not a run-of-the river reservoir but instead fills a natural "bowl" created by the Ragged Mountains, and thus is afforded protection against sedimentation. The lower dam in any case required attention for dam safety reasons. With a drainage area of only 1.9 square miles, few streams would be adversely affected, and the existing hiking trails could be raised to a higher elevation. The major problem, however, and the same problem with which this Community wrestled in the early part of the 20th Century, was where to get the water to fill these reservoirs at a higher pool level. An answer to this question emerged from the citizenry.

It is now generally known that a member of The Nature Conservancy came forward with the idea to provide inflow to a refurbished Ragged Mountain Reservoir by building a pipeline to it from the SFRR. At present, this Community uses only about 3% of the inflow in SFRR to meet consumptive demand, with 97% of the water spilling over the SFRR dam during periods of normal rainfall. (See, http://www.albemarle.org/upload/images/forms_center/departments/community_development/forms/Water_Resources/Water_Resources_SFRR_History_Summary_EMAIL_version.pdf)

Therefore, during periods of normal weather, abundant water would be available to meet the inflow needs of the Ragged Mountain Reservoir. During periods of severe drought, the enlarged Ragged Mountain Reservoir would provide the necessary storage, with the added advantage of being able to treat the water at Observatory Hill Treatment Plant, or returning it *via* the pipeline to the SFRR Treatment Plant. This idea was immediately embraced by everyone.

Citizens who were most concerned with water quality were happy. Environmentalists whose focus was our reliance on the North and South Fork of the Moormans River, in the headwaters of the watershed, were happy because the Sugar Hollow pipeline would eventually be decommissioned and near natural flow would be restored to the Moormans. Environmentalists who focused on land use were happy because it kept the community's water supply in our watershed furthering their ability to lobby for more protective land use policy. The business community representatives and those most concerned with price and availability were satisfied because the community would meet the future water supply needs for a price comparable to the lowest cost alternatives.

Those of us in the environmental community who had followed the water supply plan closely for many years (League of Woman Voters Natural Resource Committee, Friends of the Moormans River, Piedmont Environmental Council, and representatives from the Southern Environmental Law Center) were satisfied with the basic plan. There were still details to work out with respect to timing of projects, in stream flow specifications, etc., but the basic plan was one that afforded the maximum preservation of the watershed. The problem of the SFRR was still to be worked out but by this time it was recognized that the fate of the SFRR was a Community decision apart from long range water supply planning.

For me, finalization of our future water supply plan, and approval by this Community's governing bodies and State government, was the culmination of 11 years of civic involvement on a level I have never before experienced. It was a tremendous example of people with vastly different values and objectives coming together, to find common ground. I learned a great deal about engineering, government policy, hydrology, stream biology, and human nature in the process, and am most grateful for the opportunity to participate. This is our home and our watershed!!

.