

**.....A Summary of Efforts to Protect the South Fork Rivanna Reservoir  
1965 - 1999**

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The extraordinary efforts made by Albemarle County and the City of Charlottesville to protect the South Fork Rivanna Reservoir and preserve this most vital public drinking water supply cover a period of more than thirty years.

**1960s: A New Reservoir**

Charlottesville's rapid growth during the 1950's and several consecutive dry years resulted in the need for a greater water supply and increased capacity for water treatment. Land was purchased in 1962 and water production from the new South Fork Rivanna Reservoir (SFRR) began in 1966. The problems foretold by the State Department of Health in 1965 as to the possibility of early eutrophication began to surface immediately. The first of several fish kills in the reservoir and its tributaries occurred in 1969, and there was public outcry about the terrible taste and smell of the water.

**Problems:**

1. The city did not purchase enough land around the banks of the reservoir to enable it to control and protect its own water supply.
2. Albemarle County, in whose jurisdiction the watershed of the reservoir lay, did not have in place at that time a Zoning Ordinance that could effectively control land use there.
3. Members of the Albemarle County Board of Supervisors did not agree that the City's water supply was the County's responsibility.
4. When Albemarle did adopt its first Zoning Ordinance in 1968, high density zoning was placed on land adjacent to the east end of the reservoir,

**1970s: Immediate Problems, Studies and Politics**

In 1969 and 1970, Charlottesville and Albemarle were attempting to secure funds from the State Water Control Board (SWCB) for wastewater treatment and water supply treatment facilities. In 1971, the SWCB turned down the requests for funding until the localities formed a joint authority. As a result, the Rivanna Water and Sewer Authority (RWSA) was formed in 1973. Its purpose was to develop and maintain facilities for providing a drinking water supply system for the City and County and to deal with the pollution of the Basin.

Charlottesville City Council, on July 1, 1974, passed a resolution asking the County to either halt all land development in the reservoir area or, at the very least, implement low-density zoning and conservation-oriented land use there. The County Board feared such controls would

severely limit growth in the County.

Also in July, 1974, environmental scientists from the University of Virginia reported that the SFRR was very sick and that in ten to fifteen years, without help, the water would be undrinkable. The Planning Commission recommended to the Board of Supervisors that a study of the SFRR problem be made.

In October, 1974, an advisory committee charged with aiding in a study of the reservoir's pollution problems, recommended a two-year, \$200,000 study. The problem: where was the funding source?

In the meantime, a study prepared by the Environmental Protection Agency entitled "Study of the Crozet Interceptor" was released by the RWSA in March, 1975, and concluded that the SFRR was, indeed, suffering from "accelerated pollution". The EPA consultant's report suggested options to correct the identifiable point source pollution to the SFRR, one of which was to construct a sewage interceptor line that would not include service to areas in the watershed sensitive to accelerated growth. The EcolSciences, Inc. report for the EPA showed that there could be significant land use impact were an interceptor to be constructed because it would encourage development along its path west of the City in the watershed, "would seriously undermine and jeopardize" the county's efforts to contain urban sprawl, and restrictions on development "would be difficult to sustain."

The RWSA agreed in May, 1975, to fund the proposed two-year study (later known as the "Betz Study") through an increase in water rates. The Betz Study had as its purpose to determine the current condition of the reservoir and the cause of that condition, to correlate the sources of nutrients and sediment with land use in the surrounding watershed area and to calculate the contribution of nutrients by the various land uses. The Board of Supervisors adopted the "Soil Erosion and Sedimentation Ordinance", effective June 30, 1975, amended in September, 1975 to restrict development on slopes in excess of 15% in the SFRR watershed.

A 15-day moratorium, later extended to 28 days, was imposed by the Board on August 6, 1975, on any intensive development in the SFRR basin. At the same time, the Board created a "Blue Ribbon Commission" to determine whether placing land-use controls on development would suffice instead of a moratorium. The committee's report in September concluded that existing land-use controls supplemented by their Interim Guidelines and vigorously enforced would be sufficient for the period of the reservoir study.

The RWSA recommended at this time in its "Initial Water Quality Management Study" a plan that included reservoir management, water treatment modifications, point and nonpoint source controls and watershed monitoring. Questions remained as to whether there was expertise available to guarantee the success of these recommendations as a solution to the complex problem.

Attempts to develop land adjacent to the reservoir had begun in 1974 and resulted in a

series of lawsuits involving both the Albemarle County Board of Supervisors, staff, and county citizens in their attempts to protect the reservoir as the major public water supply. SWCB Pollution Control Specialist M. D. Phillips wrote in a letter to the County on December 16, 1974 concerning the proposed Evergreen development that, pending the development of another water source, "the quality of the existing reservoir should be protected to the maximum.ö

At the same time, State Health Department Director of Sanitary Engineering Erich H. Bartsch wrote, concerning the same development proposal, "this department is of the opinion that a development of this nature would, indeed, be detrimental to the reservoir which is already experiencing problems. . . Storm runoff, especially the first flush, would contain many pollutants which could be detrimental to the quality of the water in the reservoir. . . The first flush would contain many heavy metals, which are a result of the exhaust of internal combustion engines; pesticides; herbicides; nutrients; and, during periods of winter snowfall, salts, . siltation resulting during and after construction would also pose a serious problem."

It was noted also by the State Health Department's Assistant Resident Engineer of the Lexington Regional Office, Stephen Young, that "Charlottesville doesn't really have another water source. The Rivanna is the life of Charlottesville."

In January, 1976, a Board of Supervisors consisting of four newly elected members and two incumbents, all of whom had campaigned on conservation measures for the watershed, halted all urban construction within a twenty-five square mile area in the reservoir watershed and directed the Planning Commission to begin down zoning of any high-density residential, commercial or industrial land in the moratorium area and to revise the Comprehensive Plan to designate those areas as agricultural or conservation areas instead of urban areas.

In February, 1976 the John McNair and Associates engineering report on the Crozet Interceptor recommended providing sewer service to Ivy and Crozet but routing it out of the Ivy Creek area to decrease the potential for development in environmentally sensitive areas.

Betz Environmental Engineers, Inc. presented a draft report to the RWSA's study advisory committee in February, 1977. Preliminary recommendations included a comprehensive watershed management program and relatively rigid controls on development covering the whole South Rivanna Watershed.

The EPA awarded the RWSA a Lake Restoration Grant in March, 1977, and the Browne 1979 study funded by this grant later concluded that reservoir aeration, agricultural grass waterways, and residential sedimentation ponds could stabilize the reservoir and perhaps improve it.

Camp, Dresser, & McKee had been contracted by the RWSA to study alternative water sources, and that consultant's report in 1977 showed few sites of sufficient size that warranted consideration as either an alternative or a supplemental source of water. The solution of a pipeline to the James River then had a total price tag in 1982 dollars of \$66,000,000.

The Betz Study was published in June, 1977. It showed that, of pollutant contributors which could be controlled, residential development was at the top of the list. It showed that developed land contributed seven times the phosphate pollution as undeveloped land. Acting on the recommendations of the Water Quality Management Study (Betz Study), the Board adopted on September 29, 1977, an "Ordinance for Protection of Public Drinking Water Impoundments," applicable to all water supply watersheds in the county and known as the Runoff Control ordinance. This ordinance, one of the most advanced local ordinances for the protection of public drinking water in the country at that time, was an attempt to control phosphate runoff and sedimentation by physical devices and setback requirements designed to limit post-development runoff from property to pre-development limits in both quality and quantity.

The November, 1977 Board of Supervisors election had as its focus the protection of the South Fork Rivanna Reservoir and resulted in a Board even more strongly in favor of strict regulation of development in the watershed.

Changes in the Comprehensive Plan and the Zoning Ordinance in 1977 and 1978 placed stronger emphasis on protecting the SFRR and the Buck Mountain Creek and Piney Creek watersheds as future supplemental water supply sources.

The Board of Supervisors formed a Watershed Management Plan Committee in 1978. This committee's report, "Browne and Watershed Planning Committee, 1979," recommended: the creation of the position of Watershed Management Official; the implementation of erosion and sedimentation control measures by the Virginia Department of Highways and Transportation as specified in its manual; and best management practices for farming and forestry. The Watershed Management Plan Committee presented a Watershed Management Plan to the Board in September, 1979, a comprehensive plan incorporating management techniques for all activities in watershed areas.

The conclusion of the Lake Restoration Study (Browne 1979) filed in May, 1979, was that in order to reduce nonpoint source loads, comprehensive land use controls were necessary throughout the watershed.

In September, 1979 the position of Watershed Management Official was created.

In 1976, the Nature Conservancy held an option on 80 acres adjacent to the reservoir. The City, County, and the Virginia Commission for Outdoor Recreation provided funds to purchase that land. In 1980 an additional 81.5 acres was purchased from the Conservancy to expand this wildlife habitat, now known as the Ivy Creek Natural Area, to be preserved in its natural state for city and county citizens.

1980: A "Clean Lake" and an Interceptor

At the end of 1980, a massive down-zoning was accomplished by the Board of Supervisors, placing most of the Rivanna Reservoir watershed into a rural status in order to reduce residential and commercial developments' runoff impact on the reservoir. This action was

appealed all the way to the Virginia Supreme Court but the County prevailed since the purpose of watershed protection was a firmly established basis for the downzoning.

In April, 1982, the County received the "Guidelines for the Preparation and Review of Runoff Control Permit Applications," prepared by F.X. Browne Associates, Inc., Environmental Consultants, necessary to implement the Runoff Control Ordinance

The 208 Watershed Management Study of the South Rivanna Reservoir, completed in May 1982, concluded that the South Fork Rivanna Reservoir was still eutrophic, and that this condition appeared to be constant. The study refined analyses of pollutant sources to the reservoir and developed an annual pollutant budget. The study recommended further study and ultimate implementation of regional sedimentation ponds within the watershed and modifications to the Runoff Control ordinance.

At the time the 208 study was released, the RWSA secured phase II of a Clean Lakes grant through the Environmental Protection Agency. The purpose of the grant was to implement several of the recommendations of the 208 study as well as the Watershed Management Plan, including implementation of agricultural best-management practices (BMPs) within the watershed, implementation of highway runoff measures, and continuation of a water quality monitoring program on the reservoir.

The Clean Lakes grant ultimately funded 67 agricultural best management practices in the watershed, various highway runoff projects (primarily erosion control), and continued monitoring of the reservoir. In addition, a phase II extension of the grant included \$300,000 in cost share funds to construct a regional sedimentation basin on Lickinghole Creek to control both agricultural and development-related runoff from the Crozet area.

In 1987, the Clean Lakes grant was extended in order to allow time to study the cost-effectiveness and pollutant-removal effects of constructing one regional basin versus four smaller subregional basins in the Crozet area. Based on analyses by F.X. Browne and Albemarle County, it was demonstrated that the large, regional basin would be more cost-effective per developable acre and would remove more pollutants than the four smaller basins. This issue, and the matter of whether to build the Lickinghole Basin at all, received much scrutiny during the next several years by the County, City, RWSA, Army Corps of Engineers, and EPA. Ultimately in 1989, the County determined to supplement the EPA funding in order to construct the regional facility, with construction and operation responsibilities given to RWSA.

Meanwhile, RWSA implemented another watershed plan objective with the construction of the Crozet Interceptor, completed in 1987. The major sewer line carries point source and septic discharges out of the Crozet area (and the SFRR watershed) and into the Moores Creek Wastewater Plant. This represented a major capital project to relieve the SFRR of major point source pollutant loads.

1990s: Watershed Management

In 1991, Albemarle County became the first non-Tidewater locality to adopt provisions of the Chesapeake Bay Preservation Act to protect stream buffers. While this resulted in an ordinance with County-wide application, one of its benefits was further protection in the reservoir watershed. The ordinance established 100 foot wide stream buffers along all perennial streams.

In 1993, F.X. Browne released the final report for the Phase II Clean Lakes program. Based on a long record of monitoring, the report concluded that eutrophication in the reservoir was stable, and that management activities appeared to having a positive impact. The report recommended monitoring of the Lickinghole Basin, once it has been completed, on-going monitoring of the reservoir, and continued implementation of the 208 Watershed Management Study.

Also, in 1993, the Lickinghole Basin was constructed east of Crozet upstream from the confluence of Lickinghole Creek and the Mechums River. Based on permitting requirements, the basin included 15 acres of constructed wetlands. The completion of this regional basin constituted another major step in controlling pollutant loads from this sub-basin. The Crozet Interceptor is instrumental in eliminating point source discharges (such as that from Con-Agra), while the Lickinghole Basin controls nonpoint sources, such as agriculture and development runoff.

Upon completion of the Lickinghole Basin, RWSA signed a contract extension with F.X. Browne to conduct monitoring on the new basin to evaluate its pollutant removal effectiveness, as well as continued monitoring of the SFRR. This monitoring was conducted by County and RWSA staff from 1994 to 1998. The data have been sent to F.X. Browne for analysis and a report is forthcoming. On-going monitoring of the constructed wetlands is also taking place in conjunction with the Army Corps of Engineers.

In 1994, the County began a process to update and amend its water-related programs, including the Runoff Control ordinance. While the ordinance had been quite innovative at the time of its original adoption, it had several shortcomings, as pointed out by F.X. Browne, County staff, and a study on County water programs by Dewberry & Davis. A focus group of interested parties was assembled to evaluate the various water programs, including erosion and sediment control, reservoir protection, stormwater management, and stream buffer protection. In 1998, the County adopted a new Water Protection Ordinance. Positive effects of this new program for the reservoir watershed include the extension of stream buffers and more thorough application of BMPs to development sites.

At this point in time, many of the activities envisioned in the original watershed management plan have been adopted and implemented. The phase II cycle of activities associated with the Clean Lakes Program will come to an end with the publication of the final F.X. Browne report on the Lickinghole Basin.

It is time to reassess management activities for the reservoir watershed and coordinate these actions with the on-going future water supply permitting process being undertaken by RWSA. Part of the permitting process has included a study by Black and Veatch on the condition

and future of the Rivanna Reservoir. They found that the Reservoir has lost one fifth of its capacity since it was constructed 30 years ago. Instead of today's safe yield of 11.8 million gallons of water per day (MGD), the reservoir will have a safe yield of about 8 MGD by 1015 and only 3.9 MGD by 2040, even assuming present protective ordinances continue. Possible future actions include: refined modeling and monitoring activities; sediment reduction projects (such as streambank restoration; increased maintenance and monitoring efforts of existing stormwater detention structures; and increased use of incentive programs for riparian buffers and best management practices.

In order to coordinate these future actions, a new position was created within the County Department of Engineering & Public Works to supplement the existing Water Resources Manager. The new "Watershed Manager" will focus exclusively on the management of the reservoir watersheds, and will work closely with RWSA and the County on these projects. The new Watershed Manager will begin work on February 1, 1999.