

# REGIONAL 50 YEAR WATER SUPPLY PLAN FOR CITY OF ROME, FLOYD COUNTY AND CITY OF CAVE SPRING

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*REFERENCES:* *Proceedings of the 2003 Georgia Water Resources Conference*, held April 23-24, 2003, at the University of Georgia. Kathryn J. Hatcher, editor, Institute of Ecology, The University of Georgia, Athens, Georgia.

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**Abstract.** The City of Cave Spring, Floyd County, and the City of Rome wanted to evaluate water supply opportunities for each entity separately and explore the possibility of joint management and development of water supply alternatives. A long-term time frame of 50 years allowed for a more thorough study of water demand and supply options. This study was undertaken both in response to House Bill 489, which outlined water service areas to ensure no duplication of service, and at the recommendation of the Georgia Environmental Protection Division (EPD). Rome and Floyd County both have water withdrawals requests pending with the EPD, and regional coordination is desired. Since the original water supply plan was finalized, EPD has provided planning level total water withdrawal allocations expectations for the entire county, which has compelled an update of the alternatives recommended. Total allowable withdrawals will likely be more common as Georgia continues to grow placing competing demands on water resources.

## INTRODUCTION

The study consisted of several tasks, which are summarized below:

- An overview of existing facilities and supplies was outlined along with current regulatory issues that impact water supply.
- A strategic planning session was held to gauge community expectations for Floyd County in the next 50 years. More than 30 local officials, county and city staff, and interested stakeholders attended and discussed population growth, future industry and business composition, and other issues.

- Population and water demand projections for 50 years were developed based on available projections and a review of surrounding counties' historical growth.
- Possible new surface and ground water supply options were identified to meet projected demand. Most major creeks in the county were evaluated for yield, quality, and availability. A short list of options was retained and evaluated further.
- Water supply alternatives were developed that integrated various surface and groundwater options to meet projected demand for each water supply system.
- An implementation plan was developed for the final recommended alternative laying out the timing of future studies and improvements.

The latter four steps are outlined below.

## METHODS

### Population and Water Demand Projections

Population and water demand projections were developed based on historic use and a combination of growth factors derived from surrounding counties. A more aggressive population growth factor was needed than other sources of population projections provided because 2000 census data and feedback from the community suggested greater than average growth for the region. Population in 2050 is estimated to be 305,000 for Floyd County for the purposes of this study. Demand projections were developed based on per capita use, non-residential use, and unaccounted for water loss. Unaccounted for water loss was reduced from a 2050 average of 15% to a 2050 average of 10% based on

feedback from EPD. Water conservation assumptions were included in the demand projections.

The study uses year 2000 as a starting point for demand projections. A peaking factor of 1.4 was used for the study based on historical data. The total combined peak water demand for year 2050 is estimated to be 50.4 mgd (see Table 1). The communities were approaching their combined permitted peak demand of 22 mgd in year 2000, however statewide outdoor watering restrictions lowered overall demand in years 2001-2002. Nonetheless, planning must begin soon to meet projected demand.

**Table 1. Peak Water Demand (mgd) in Floyd County**

Year	Rome Water System	Cave Spring Water System	Unincorporated Floyd County Water System
2000	16.65	0.98	4.72
2005	17.05	1.00	5.13
2010	17.86	1.02	5.54
2015	18.97	1.07	6.29
2020	20.68	1.12	6.96
2025	23.25	1.20	7.97
2030	25.69	1.28	8.95
2035	29.48	1.40	10.46
2040	33.18	1.50	11.83
2045	34.54	1.53	12.45
2050	35.88	1.55	12.92

### Water Supply Options Considered

Floyd County has abundant surface water sources with two major rivers (Etowah and Oostanuala) joining in the county seat of Rome. Floyd County also has reliable ground water. The long term water supply plan must rely on all sources of water including surface water, groundwater, and demand reduction from water conservation and wastewater reuse.

As a first step, a “wide net was cast” to identify the full range of surface water supply options in Floyd County. Potential new sources were identified based on drainage area, 7Q10 flows, water quality, the presence of a suitable dam site, and location relative to water demand centers, wastewater discharges, and other water intakes. Streams with sufficient flow and

no major impacts from wastewater discharges were also evaluated to determine potential reservoir yields. Hydrologic and water quality information obtained from the U.S. Geologic Survey (USGS) and Georgia EPD was assumed to be valid for use in this study.

The initial screening of the surface water supply options focused on identifying those options with the greatest potential to yield good quality water and a reasonable chance of being permitted. Specific screening criteria include:

- availability of good quality water,
- ability of Floyd County and/or Rome to implement the option,
- ability to obtain surface water withdrawal permits for the source from the EPD, and
- expectation that any land required could be acquired within the near future.

Eighteen rivers, streams, and springs were considered for direct withdrawals and for development of on-stream reservoirs, including off-stream raw water storage. Drainage area and flow data, where available, were used as preliminary indicators of potential yield. The presence of threatened or endangered species was noted as protected species will increase the degree of difficulty in permitting a potential water supply project. Water quality was indicated by a stream’s classification on Georgia EPD’s 305(b) list as supporting, partially supporting, or not supporting its designated use and from other sources.

### Alternative Water Supply Plans Developed

The future water supply plan for Floyd County, Rome, and Cave Spring will involve a combination of surface and groundwater supply sources, as well as demand reduction from water conservation and potentially, wastewater reuse. Surface and groundwater options were combined to form comprehensive long-range water supply alternatives. Nine preliminary alternatives were identified and screened based on feasibility, cost, and compatibility with Floyd County’s, Rome’s, and Cave Spring’s long-term objectives. The preliminary screening included input from Floyd County, Rome, and Cave Spring, and six alternatives were retained for further consideration. These alternatives were then subjected to economic

and non-economic evaluations. The alternative that appeared to best serve the community in terms of economic and non-economic factors was identified and then recommended for implementation.

In compiling long-range alternatives for Floyd County, Rome, and Cave Spring, several factors were considered. These included (1) the cost of water supply options, (2) the timing of options with respect to short-term and long-term implementation schedules, (3) the capacity of options and their ability to satisfy projected demands, and (4) relative withdrawals from Etowah and Oostanaula River. The following six alternatives were developed that will meet expected demand:

- **Alternative 1a**—Continue the Status Quo. County relies on groundwater and outside sources, Rome increases river withdrawals and develops groundwater, Cave Spring utilizes their spring and develops groundwater wells.
- **Alternative 1b**—Continue the Status Quo and Rome Adds Raw Water Storage. The same components as in Alternative 1a, except that Rome also builds a 50 million gallon (Mgal) raw water storage reservoir.
- **Alternative 3a**—County Develops Withdrawal on Armuchee Creek and Builds Treatment Plant. Floyd County independently develops a 10-mgd direct withdrawal from Armuchee Creek, builds and operates a 10-mgd water treatment facility (WTF), and builds a raw water storage reservoir in close proximity to the new WTF. Cave Spring utilizes their spring and develops groundwater wells.
- **Alternative 3b**—County Develops Withdrawal and storage reservoir on Armuchee Creek and Rome Treats the water. Same components as in Alternative 3a, except that Floyd County does not build a WTF or a raw water storage reservoir, but instead sells raw water from Armuchee Creek to Rome for treatment. The County then purchases the finished water from Rome.
- **Alternative 4b**—Joint Armuchee Creek Reservoir with Independent Water Treatment. Floyd County and Rome jointly impound and build an on-stream reservoir on Armuchee Creek, but treat the water separately. The County withdraws 8.8 mgd from the reservoir and treats it in a new WTF near the reservoir. Rome withdraws an additional 20.2 mgd downstream of the reservoir at

their existing intake on the Oostanaula River, and Cave Spring utilizes their spring and develops groundwater wells.

- **Alternative 6**— County Develops Withdrawal on Armuchee Creek and Rome Develops Raw Water Storage. Same components as in Alternative 3a, except that Rome also builds a 50-Mgal raw water storage reservoir at an unspecified location between the Oostanaula and Etowah Rivers.

## RESULTS

Two alternatives were recommended as meeting the water demand projections and having the highest scores in economic and non-economic criteria. Alternative 1a was the most cost effective alternative and also scored high ability to permit. Alternative 3a was more expensive but scored highly in terms of providing redundancy in the system, emergency back-up, and solving pressure related problems for Floyd County. An implementation schedule was outlined for alternative 3a, which is outlined briefly below.

### Implementation Schedule

The recommended water supply improvements associated with Alternative 3a are summarized briefly below:

- 0.6 mgd additional groundwater well capacity for Floyd County (by 2003).
- Re-rating of Rome's Bruce Hamler Water Treatment Plant (WTP) to 24 mgd (by 2005).
- 10-mgd Armuchee Creek direct withdrawal, storage reservoir, and WTP (by 2020).
- Expansion of Rome's Bruce Hamler WTP to 36 mgd (by 2031).
- Development of 0.3 mgd groundwater well by Cave Spring (by 2036).
- Development of 3.2 mgd groundwater well capacity by Rome (by 2043).

The dates presented above are estimates based on current growth projections; the actual timing of these improvements may vary depending on the actual growth in water demand experienced by each entity. The recommended improvements were expanded in the study into immediate, near-term, and long-term actions.

## DISCUSSION

Recent meetings with EPD staff concerning total allowable withdrawals from the Coosa basin in Floyd County have indicated that alternatives may need to be re-considered. EPD considered all current permitted withdrawals including agriculture, municipal, and industrial as well as draft agreements with Alabama and Florida in the ACT basin in developing a total allowable withdrawal. EPD estimates that all future additional withdrawals in Floyd County will be no more than 15.6 mgd maximum day. EPD acknowledges this is a conservative number that may increase in the future, but feels that given all factors this is the number they will stand behind for planning purposes. This study indicated 28.4 mgd of additional water supply from multiple sources will be needed to meet peak demand in 2050. Additional withdrawal may be permitted if storage is provided.

## CONCLUSIONS

The cities of Rome, Cave Spring and Floyd County have taken proactive steps to ensuring the future water supplies for their communities by identifying water supply alternatives. While two alternatives with combined water sources were recommended in the original water supply plan, new permitting withdrawal requirements obtained from EPD after the study was complete have compelled these communities to seek updated alternatives. New alternatives are still under consideration but may include a storage reservoir off one of the larger rivers as well as demand management.