

Future Water Supply Alternatives

Example for basin but could be presented by HUC-8

Franklinton County Public Utility

Franklinton County Public Utility has contract for surface water transfer from Kerr Lake in Roanoke River basin, and from Franklinton and Louisburg in Tar River basin. The total contract amount is 3.43 mgd. Based on the model simulation results presented in chapter 4 estimates that its demand with respect to supply shows no deficits. However, the 2030 demand projected to be more than this contract amount; hence need to find a new water supply source in near future.

Rocky Mount

Rocky Mount is one of the larger systems in the Tar basin relies solely on surface water withdrawn from Tar River reservoir and Tar River main stream. The model simulation results presented in chapter 4 shows that in overall, the Tar River basin faces no deficits with current demand and operation condition for 2010. However, a small deficit for the City of Rocky Mount was estimated for 2030 and 2060 future demand scenarios. With drought plan active, the City's average deficit amount estimated was slightly reduced from 0.35 mgd to 0.3 mgd for 2060 demand scenario. During drought or low flow conditions the City indirectly uses water from naturally fed quarries as its second source. During the advancement of drought stages, demand is reduced gradually and in stage 3 drought conditions, 10 cfs of water is pumped from the quarries to the river below the Tar River Reservoir Plant to flow downstream and it is then withdrawn at Sunset Avenue Plant to supplement the demand. Rocky Mount's drought stages are determined based on the probability of the reservoir level being below at certain levels within the next 12 weeks forecast horizons. Without efficient monitoring, drought managements and operations, and additional reliable sources, the City might still face small shortage during its high demand periods due to increased monthly pattern in summer months. According to LWSP submitted for 2010, Rocky Mount reported to have combined 30.9 mgd of supply, of which 12.9 mgd from Tar River reservoir considering 50 year safe yield [NS -OASIS SY estimate??] and 18 mgd from Tar River considering 20% of the 7Q10 flow or 7 day low flow with 10 years return period [7Q10 plot from R program at this location below the quarries– or any gage??]. It seems that from overall annual usage perspective, Rocky Mount's water supply is adequate for its future demand.

GUC

The demand shortage analysis for Greenville Utility Commission (GUC) as estimated was very small amount or 0.03 mgd deficits for 2060 demand scenario which could be considered as insignificant and hence not shown in tables in chapter 4.

GUCs identified list of water supply options in regard to HB609^{1,2} includes Tar River, groundwater, banked groundwater and groundwater/Aquifer Storage Recovery (ASR) as their current available and short term water supplies. GUC has eight groundwater

¹ <http://www.ncleg.net/Sessions/2011/Bills/House/PDF/H609v6.pdf>

² http://www.ncwater.org/Water_Supply_Planning/documents/HB_609_Fact_Sheet.pdf

wells that have a combined capacity of 2.0 mgd. This water is pumped out of the ground, disinfected and pumped directly into the distribution system. In years past, the wells were relied on daily to provide supplemental water to meet the demands of the system. Today the wells are used more as a tool to meet peak demand³. State mandated 75% reductions in groundwater withdrawals from CCPCUA by 2018 are prompting greater interest in use of surface water in coastal North Carolina. GUC presented their long range water supply options to HB609 planning committee that includes banked water and ASR in addition to Tar River and groundwater as their current available water supplies. Moreover, water quality of groundwater has also raised concerns.

GUC has been using Cretaceous banked water that has been approved to withdraw since 2006. **[NS - elaborate the banking process in another section]**. Amount approved for withdraw is the difference between approved base rate and the reduction for each year based on 5- year block of 25 % reduction rates as per CCPCUA rules. ASR injection process has been started since ASR well completed in 2010. ASR's projected peak capacity is 1.4 mgd. As water is injected to ASR well, this amount is considered as a credit to the bank account for GUC. After the calculation done based on these debit-credits a balance amount is available for GUC's next year's withdrawal account. Table 5-5 below shows the summary of the cretaceous water bank statement sent to GUC in 2012 for 2011 data year as an example.

Table **Error! No text of specified style in document.**-1: Summary of Cretaceous Water Bank use for 2011, millions of gallons per year

[NS – how does this accounting assure safe withdrawal from the sources?]

Water Bank Years	Approved Base Rate less Reduction	Aquifer Storage Recovery Injection Amount	Transfer Amount	Debit (Annual Water Use)	Credit	Balance
8/1/2004-7/31/2005	439.664400			3.093776		
8/1/2005-7/31/2006	439.664400			1.452137		
8/1/2006-7/31/2007	439.664400			0.957729	438.706671	438.706671
8/1/2007-7/31/2008	439.664400			7.623617	432.040783	870.747454
8/1/2008-7/31/2009	329.748300			0.780045	328.968255	1,199.715709
8/1/2009-7/31/2010	329.748300			2.744835	327.003465	1,526.719174
8/1/2010-7/31/2011	329.748300	76.829500	6.387250	8.624520	391.566030	1,918.285204
8/1/2011-7/31/2012	329.748300					
8/1/2012-7/31/2013	329.748300					

³ <http://www.guc.com/About/WaterTreatmentprocess.aspx>

8/1/2013-7/31/2014	219.832200					
8/1/2014-7/31/2015	219.832200					
8/1/2015-7/31/2016	219.832200					
8/1/2016-7/31/2017	219.832200					
8/1/2017-7/31/2018	219.832200					
8/1/2018-7/31/2019	109.916100					

Regional water supply planning with adjacent systems has come about due to the CCPCUA and the necessity for these systems to find alternate water sources. GUC has current and future contract to sale water to the neighboring public water suppliers within and outside of Tar River basin. Nearly one third and one fourth of its demands are contracted to supply as interbasin transfer (IBT) to Farmville, Greenville and Winterville respectively for 2030 and 2060 demands. With the existing infrastructure and 22.5 mgd capacity water treatment plant which is equal to 32% of the 7Q10 flow at intake location, GUC will be in need for expansion of the plant in near future before 2030. GUC's intake is located upstream of Greenville USGS gage. Withdrawal from this intake is sometimes disrupted due to salinity issues for the location of the intake in tidally influenced river reach. Therefore, increasing regional water supply needs have further emphasized the need for a better understanding of water availability in the Tar River. Moreover, future plant expansion requests would need for a flow study of the Tar River.

In 2008, GUC initiated a planning study to evaluate the issues associated with flow conditions. The flow study was combined with developing models and methods to assess water quantity as well as water quality and habitat conditions, and to quantify the potential effects of water withdrawals and possible constraints to future water use in the Tar River. One of the study objectives was to characterize risk to public water supply associated with upstream movement of the freshwater/saltwater interface, especially under critical drought condition. Summary of the accomplishments and findings from the Lower Tar – Pamlico River Model developed during this study presented by GUC in April of 2012 indicated that even under severe low flow condition experienced in 2007 and 2008 hydrologic condition with a 2050 withdrawal; salinity does not encroach upstream to the GUC WTP intake⁴.

GUC's identified list of sources of their long term water supply options in regard to HB609 includes Tar River, groundwater, banked groundwater, groundwater/ASR and Roanoke River, and also brackish water sources from groundwater sources and Pamlico River and acquisitions/ mergers with other public suppliers⁵.

⁴ Technical Memo # 6 – Draft Model Documentation for the Lower Tar – Pamlico River Model.

⁵ GUC's report "Long Range Water Supply Options HB606Meeting 9-27-2012.pdf" prepared by HDR

Similar to water treatment plant expansion, wastewater treatment plants also need expansion over long term. Table 5-2 presents model demand dependent discharge flows as simulated. This shows that the wastewater discharge permits are within the range of the predicted near and long term discharge amount for all systems except for GUC. The long term 2060 predicted discharge for GUC will be more than the discharge permit itself.