- Elementary Education & Conservation Initiative
- Indoor and Outdoor Conservation Tips
- Links to web sites with additional conservation information

1.2.3. Growth

Historical demand data is shown in Table 1 below. The average Maximum Day Demand / Average Day Demand ratio is 1.6 based on 2003 data. This is comparable to other water systems the size of Boone, and will be used for future projections.

Table 1. Recent Demand Data

Year	Water Demand (MGD)		MDD/ADD	Notes
	Average Day Demand (ADD)	Maximum Day Demand (MDD)		
1992	1.490	2.292	1.54	
1995	1.439	1.820	1.26	
1996	1.421	2.397	1.69	
1997	1.523	2.589	1.70	
1998	1.515	2.242	1.48	
1999	1.579	2.964 (2.052)	1.88	1
2000	1.677	2.129	1.27	
2001	1.690	2.275	1.35	
2002	1.667	2.021	1.21	
2003	1.618	2.579 (2.257)	1.59	2
2004	1.654	2.420 (2.200)	1.46	3 & 4
2005	1.775	2.37	1.34	5
2007	1.86	2.56	1.38	
2008	1.801	2.289	1.27	

Notes:

1. The 2.964 MGD was based on a break in August of 1999.
2. The 2.579 MGD was based on a break in October of 2003.
3. The 2.420 MGD was based on a break in January of 2004.
4. The ADD is based on the first 10 months of 2004.
5. Based on ten (10) months of data.

Using the 2003 Average Day Demand and the 2002 water system user population, the total system average demand per capita is 82.6 gallons per capita per day (gpcd). Applying this to the 2030 projected water system user population, and using the average demand per capita shown above, we would estimate the 2030 Average Day Demand (ADD) to be 2.75 MGD (33,336 population x 82.6 gpcd).

The Blowing Rock connection should be evaluated as a regular bulk purchase connection for an average daily demand of 0.5 MGD.

It is further recommended for this evaluation that a 1.0 MGD average daily demand unallocated reserve should be added to the 2030 projected demand to be used for unexpected growth, industry, and bulk purchase. The total 2030 demand is therefore projected to be [(2.75 for Boone) + (0.5 for Blowing Rock) + (1.0 unallocated reserve)] × (1.6 MDD/ADD ratio) = 6.8 MGD on a MDD basis. Therefore, the intakes, plant, and possibly the raw water transmission mains need to be increased to accommodate the long-term demands.

Little reserve capacity is available until these improvements can be made. From a conservative perspective, the Town's maximum daily demand (MDD) is approximately 2.579 MGD. From an aggressive perspective, the MDD is estimated at 2.2 MGD. Therefore, from a conservative perspective based on the last five years of average and maximum daily demand data, the current reserve capacity is [(3.0 current MDD capacity) – (2.579 MDD in 2003)] ÷ (1.6 MDD/ADD ratio) = 0.26 MGD on an ADD basis. At a total system average demand per capita of 82.6 gpcd and 2 people per household, enough reserve is available to support an additional 1,574 residential housing units and associated businesses. From an aggressive perspective, the current reserve capacity is [(3.0 current MDD capacity) – (2.275 MDD in 2004)] ÷ (1.6 MDD/ADD ratio) = 0.45 MGD on an ADD basis. At a total system average demand per capita of 82.6 gpcd in 2004 and 2 people per household, enough reserve is available to support an additional 2,724 residential housing units and associated businesses.

It should be noted that when the Town's five day maximum day demand for the system reaches 2.40 MGD (80% of capacity), the North Carolina Department of Environment and Natural Resources Public Water Supply Section (NCDENR) regulations recommend that expansion planning be initiated. Assuming an ADD of 1.86 MGD in 2007 and the maximum MDD/ADD ratio from the past two years of approximately 1.38, the theoretical MDD for 2007 was 2.567 MG.

Table 2. Maximum Daily Demand Projections

Year	ADD (MGD)	MDD/ADD	Projected MDD (MGD)
2007	1.86	2.38	2.567
2008	1.9205	1.38	2.650***
2009	1.981	1.38	2.734***
2010	2.0415	1.38	2.817***

***Estimated.

Therefore, in 2006, the Town crossed NCDENR's recommended threshold for the initiation of expansion planning. Based on the fact that the Town appears to be adding an additional 0.0605 MG of consumption per year and an MDD/ADD ratio of 1.38, it is estimated that the Town needs to be under construction no later than the 2010 time frame.

2.0. ALTERNATIVES TO THE PROJECT ACTION

In a previous engineering report and study, the Town investigated over 27 different options to augment their existing water supply needs. This investigation included seven (7) sites along the Watauga River, Watauga Lake in Tennessee, the Yadkin River, lakes on Federal land, increasing the Town's existing Winkler's Creek reservoir capacity, building a new reservoir, wells, interconnections with other utilities, as well as ten (10) sites along the South Fork New River. As a result, all of the alternatives except for one were not determined to be feasible. Eight (8) of the alternatives are presented below.

2.1. Alternative A – No Action Alternative

This option is not considered to be feasible nor reliable because it will leave the Town with an aging water treatment system with increasingly frequent treatment failures due to the continuing deterioration of the existing water infrastructure. It should be noted that the present worth or equivalent annual cost of this alternative is zero. Environmental factors and/or impact to the environment would be minimal since the No Action Alternative would leave Boone with no