

## **Protection of Charlotte-Mecklenburg's Drinking Water Source**

Mountain Island Lake on the Catawba River is the primary drinking water source for the City of Charlotte and Mecklenburg County. In 2016, an average of 80 million gallons of water a day was withdrawn from Mountain Island Lake to provide drinking water to over 800,000 residents in Charlotte-Mecklenburg. This raw drinking water source has always been of excellent quality throughout its use for the past 100 years by the City of Charlotte. However, beginning in the 1990s degraded water quality conditions were detected in McDowell Creek Cove located on Mountain Island Lake approximately two (2) miles upstream of the City of Charlotte's intake (see Attachment 1). These degraded conditions were significant enough to cause concerns regarding degradation of the source water. Water quality monitoring data collected by Charlotte-Mecklenburg Storm Water Services (CMSWS) revealed the primary source of this degradation to be increased total suspended solid and nutrient levels in storm water runoff caused by significant increases in impervious area associated with rapid population growth in the McDowell Creek Watershed located in the Town of Huntersville (see Attachment 2). Water quality modeling of the watershed revealed that with continued development the concentration of pollutants in the Cove would more than double by 2020. These degraded conditions were predicted to occur with future development despite the fact that this development would be required to comply with N.C.'s water supply watershed protection rules. These rules require the installation of conventional storm water control measures, such as wet ponds and detention basins, when built-upon area for a development exceeds 24%. Based on CMSWS's modeling results, these conventional storm water controls were ineffective at handling the extreme conditions in the McDowell Creek Watershed. CMSWS determined that the mitigation of the negative water quality impacts in McDowell Creek Cove would require the implementation of "Low Impact Development" (LID) techniques that infiltrate, filter, store, use, evaporate, and detain storm water runoff. The downside of the use of such techniques is that they can double the cost for the installation of storm water treatment systems at new developments.

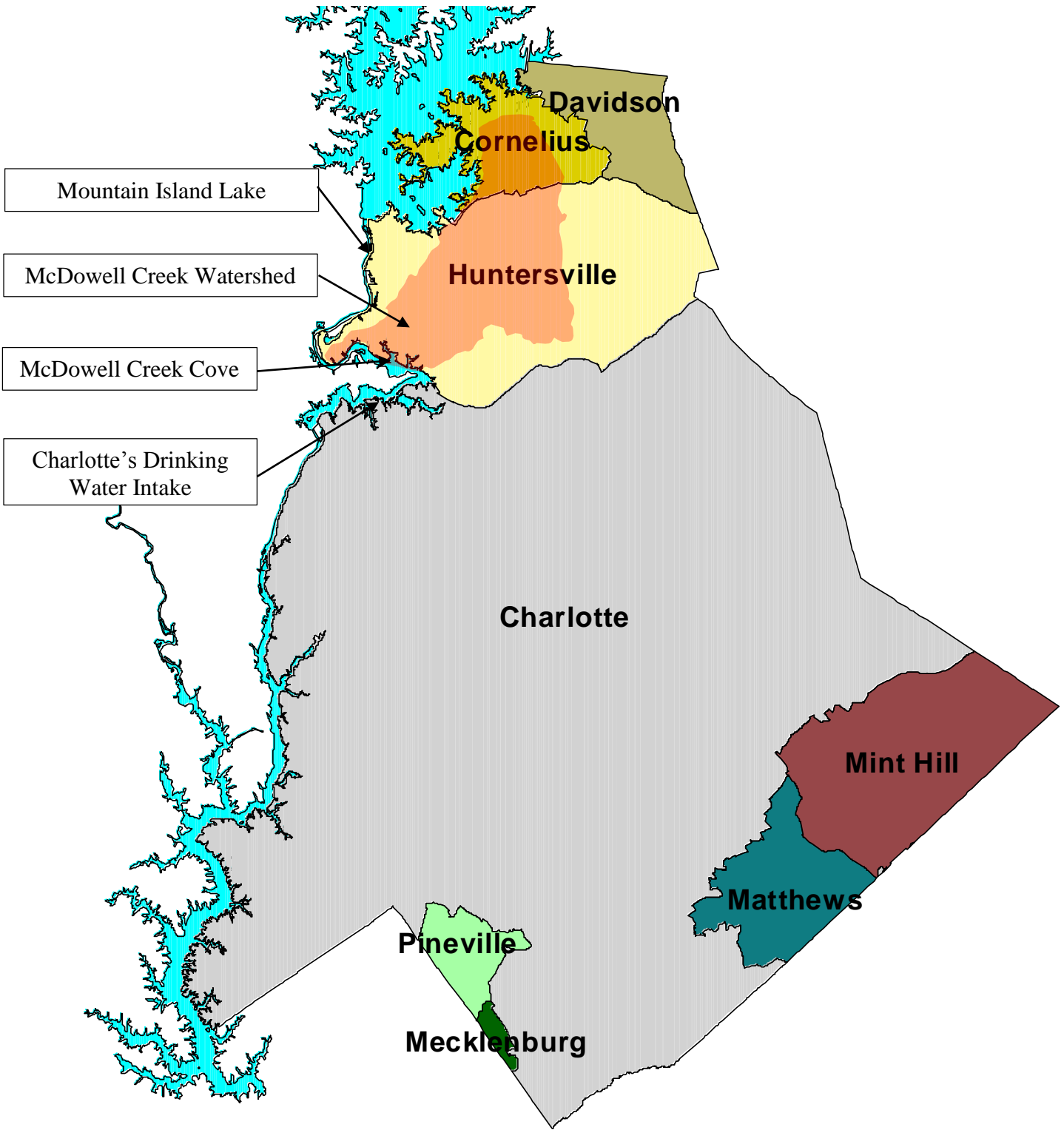
Beginning in 2001, CMSWS worked closely with the Town of Huntersville to develop LID criteria for incorporation into land development activities in the McDowell Creek Watershed. In February 2003, these efforts culminated in the adoption by the Town of an ordinance requiring the use of LID techniques for all new development, redevelopment and expansions that include the creation or addition of greater than 5,000 square feet of new impervious area. The ordinance is available at the following website: <http://stormwater.charmeck.org> (select Regulations, Huntersville, Post-Construction (PCSO), and Huntersville Zoning Ordinance). Huntersville's LID Ordinance is significantly more effective at preventing negative water quality impacts from storm water runoff compared to the State's water supply watershed protection rules. Modeling performed by CMSWS revealed that the ordinance would effectively mitigate the negative water quality impacts observed in McDowell Creek Cove. In support of the Town's commitment to LID, CMSWS developed the necessary design criteria and performed numerous educational workshops for the development community to ensure effective implementation of the new ordinance. In addition, CMSWS pledged to fund the installation of best management practices in the McDowell Creek Watershed to restore degraded conditions. In December 2005, CMSWS completed a watershed management plan in support of this effort. This plan is available at the above website (select Projects, Pollution Control, Watershed Improvement, Watershed Planning, and McDowell Creek Watershed Management Plan). To date, CMSWS has completed 12

projects in the watershed totaling \$6,305,483, including five (5) structural best management practices retrofitted into existing developments as well as five (5) stream and two (2) buffer restoration projects. Two additional stream restoration projects are currently being planned and designed (see Attachment 3).

Since the LID Ordinance was adopted in 2003, CMSWS has continued to monitor water quality conditions in McDowell Creek and Cove, including performing continuous automated monitoring for the past 10 years. This automated monitoring data standardized for annual rainfall reveals a reduction in the total suspended solid load from an estimated 7,527 tons/year in 2006 to 3,619 tons/year in 2015, which represents a decrease of 5%/year for a 50% total reduction over the 10-year period. Monitoring data further reveals a 25% reduction in nutrient levels in McDowell Creek Cove. These reductions in pollution levels have occurred as the watershed continues to experience unprecedented growth. This data reveals that the combination of Huntersville's LID Ordinance and the implementation of CMSWS's watershed management plan have effectively mitigated the threat to Charlotte-Mecklenburg's drinking water source at Mountain Island Lake from increased impervious area and storm water pollutant loads in the McDowell Creek Watershed located upstream.

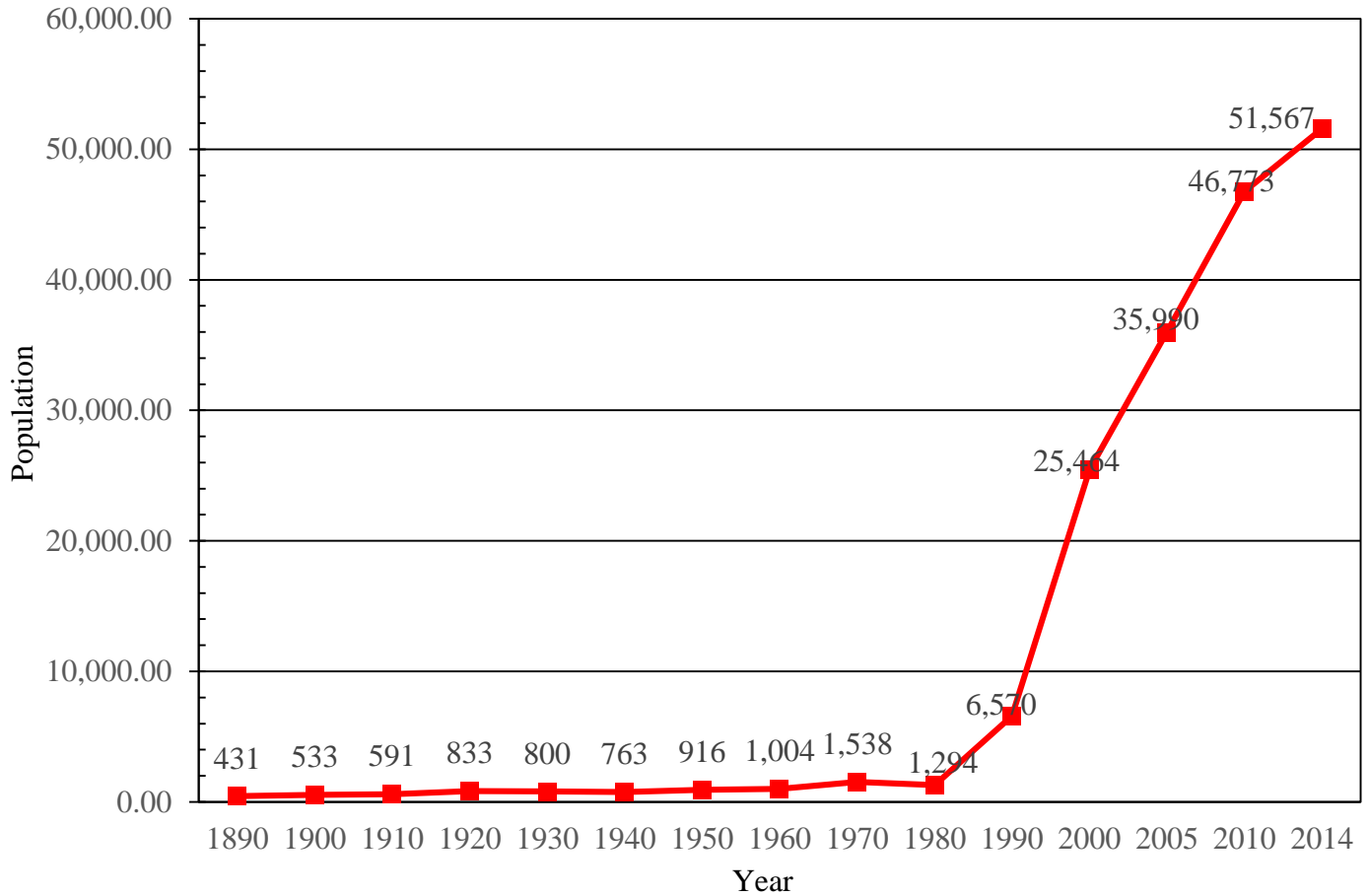
**Attachment 1**

**Map of Area in Mecklenburg County**



## Attachment 2

### Population Growth in the Town of Huntersville (Data Source: US Census)



#### Annual Growth Rate:

[1890-1900] +**2.15** %/year  
[1900-1910] +**1.04** %/year  
[1910-1920] +**3.49** %/year  
[1920-1930] **-0.4** %/year  
[1930-1940] **-0.47** %/year  
[1940-1950] +**1.84** %/year  
[1950-1960] +**0.92** %/year  
[1960-1970] +**4.36** %/year  
[1970-1980] **-1.71** %/year  
[1980-1990] +**17.64** %/year  
[1990-2000] +**14.51** %/year  
[2000-2005] +**7.16** %/year  
[2005-2010] +**5.38** %/year  
[2010-2014] +**2.47** %/year

### Attachment 3

## Projects Completed by Charlotte-Mecklenburg Storm Water Services in the McDowell Creek Watershed

