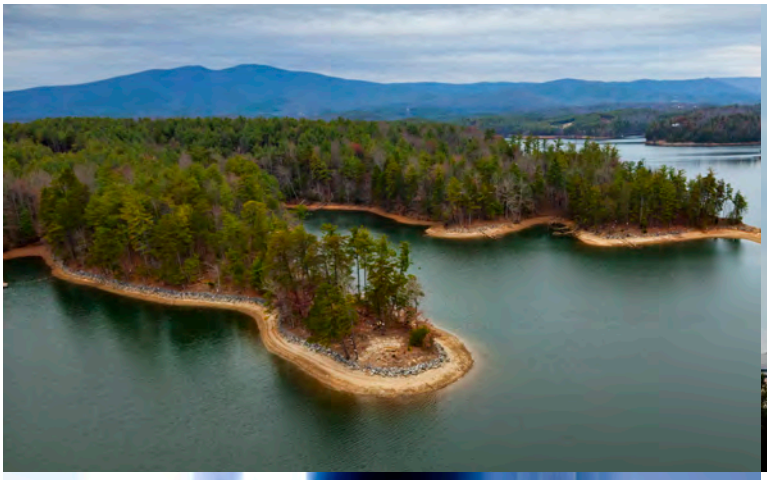

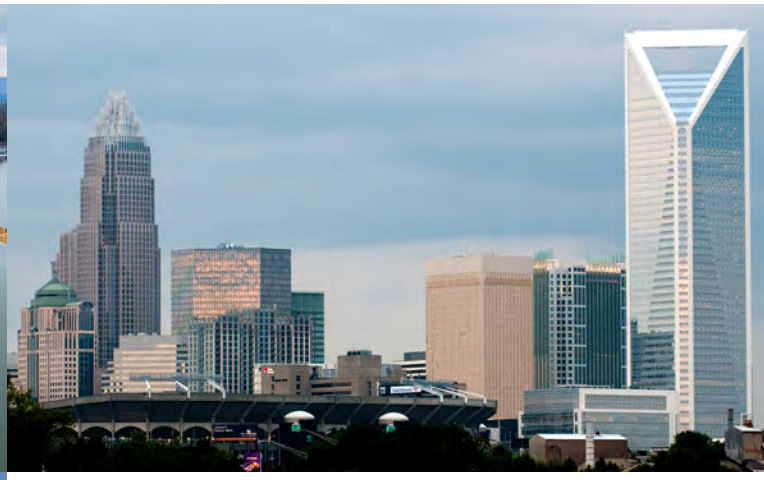

# Catawba-Wateree River Basin Water Supply Master Plan

CATAWBA WATEREE WATER MANAGEMENT GROUP

HDR

McKIM&CREED

May
2014

# Catawba-Wateree River Basin
# Water Supply Master Plan


## About the Catawba-Wateree Water Management Group

The Catawba-Wateree Water Management Group (CWWMG) is a 501C-3 non-profit organization that heralds a mission:

> "*to identify, fund, and manage projects that will help preserve, extend, and enhance the capabilities of the Catawba-Wateree River Basin to provide water resources for human needs while maintaining the ecological integrity of the waterway.*"

The CWWMG has 19 members, one member representing each of the eligible 18 public water utilities in North and South Carolina that operate water intakes on either a reservoir or regulated river reach of the main stem, and one member representing Duke Energy Carolinas LLC (Duke Energy). The organization was borne out of the most recent Catawba-Wateree Hydroelectric Project relicensing process completed by Duke Energy. The eligible water users include public water systems that have the installed capacity to withdraw 100,000 gallons per day or more from the Catawba-Wateree River Basin's reservoirs and/or regulated river reaches.

The CWWMG members pay annual dues to fund projects and initiatives to achieve the mission statement of the organization. The CWWMG serves 4,750 square miles that drain into the Catawba River, providing water for neighbors from Morganton, NC to Camden, SC. Water use in this region is critical for public water supply, power production, industrial needs, agriculture, and irrigation. Incorporated in 2007, the CWWMG mission recognizes that, without excellent stewardship and change, the Catawba-Wateree River Basin may not meet future anticipated needs related to water supply, as documented during the recent relicensing process.

CWWMG members meet regularly to formulate strategies and projects to help understand and address the Basin's water challenges. Additionally, the CWWMG seeks collaborative partnerships with other water use stakeholders to help fund, manage, and oversee the projects and initiatives undertaken. To date, this Catawba-Wateree River Basin Water Supply Master Plan represents the most comprehensive analysis and results oriented body of work completed by the CWWMG.

More information about the CWWMG and a summary of projects and information are available at **catawbawatereewmg.org**.

# Catawba-Wateree River Basin Water Supply Master Plan

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**Catawba-Wateree Water Management Group**
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Jointly sponsored by:

**North Carolina Department of Environment and Natural Resources**
Raleigh, North Carolina

**South Carolina Department of Natural Resources**
Columbia, South Carolina

**Duke Energy Foundation**
Charlotte, North Carolina

# 1.0 Executive Summary

## 1.1 Introduction

The Catawba-Wateree River Basin (Basin) has long provided a source of water to sustain human existence in the foothills and piedmont of North and South Carolina. The river derives its name from the Catawba and Wateree Indian Tribes that made this area their home prior to the European settlement of the Americas. The surface waters of the Basin have played a critical role in the development of key areas in North and South Carolina (see Figure 1-1). Today, nearly two million people depend on the river and its tributaries for safe drinking water, power generation, industrial processes, crop and livestock production, recreation, and other uses. Previous studies have indicated that by mid-century (i.e., 2050), the safe yield for many of the Basin's reservoirs will be exhausted. This water supply limitation creates significant challenges for those who depend on the river, and it makes continued population and economic growth beyond that point unsustainable.

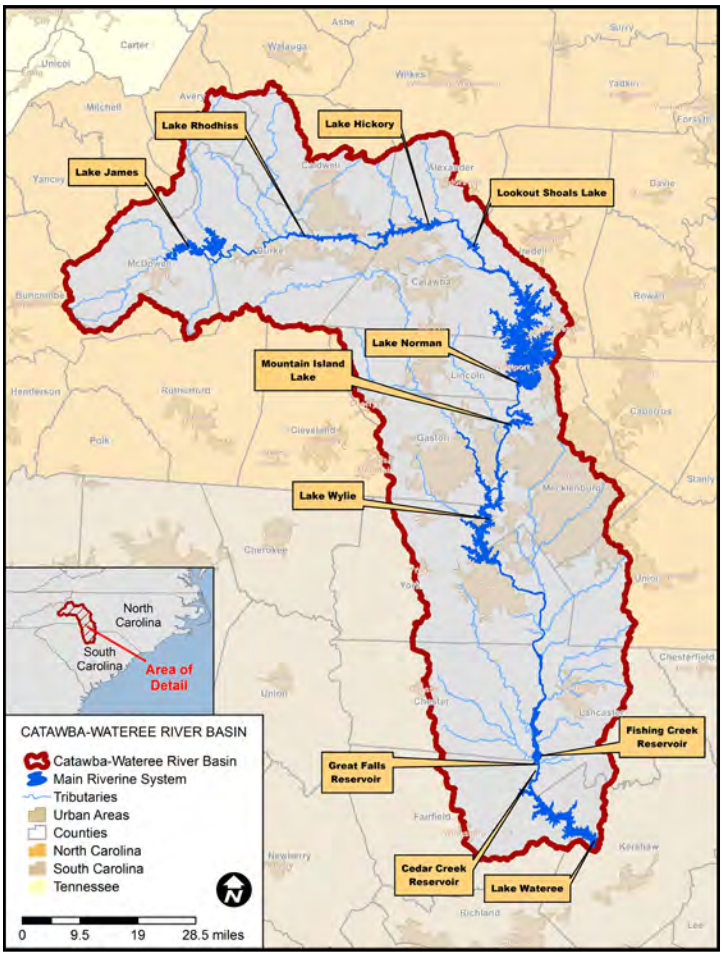


**Figure 1-1 Catawba-Wateree River Basin**

The Catawba-Wateree Water Management Group (CWWMG) has completed this Catawba-Wateree River Basin Water Supply Master Plan (Master Plan) recognizing that solutions to this water supply dilemma could take decades to implement. The purpose of this Master Plan is to protect, preserve, and extend the available water supply in the Catawba-Wateree River and its 11 reservoirs. The work effort, results, and recommendations outlined herein have been guided by the CWWMG membership, a water supply modeling team comprised of regulatory officials from North and South Carolina, and an outside Stakeholder Advisory Team (SAT).

## 1.2 Project Co-Sponsors

In support of its mission, the CWWMG seeks to collaborate with co-sponsors to help fund its initiatives and projects, and enhance communication with all stakeholders interested and involved with the management of water resources in the Basin. The CWWMG was successful in securing outside funding support for the Master Plan to offset nearly two-thirds of the project cost as presented in Table 1-1 below.

**Table 1-1 Funding Co-Sponsors for the Master Plan**

| Organization | Funding support ($) |
|---|---|
| North Carolina Department of Environment and Natural Resources | $400,000 |
| South Carolina Department of Natural Resources | $250,000 |
| Duke Energy Foundation | $200,000 |
| **Total** | **$850,000** |

## 1.3 Stakeholder Advisory Team

As part of this Master Plan, the SAT was assembled to allow for advisory level input by key organizations that have an interest in the future planning efforts for the Basin (see Table 1-2). The CWWMG's intent for the SAT was to ensure a broader level of input from a diverse group of interested stakeholders.

**Table 1-2 Stakeholder Advisory Team Member Organizations**

| SAT Member Organizations | | |
|---|---|---|
| Catawba Regional Council of Governments (COG) | Mt. Island Lake Marine Commission | The NC Conservation Fund |
| Centralina Regional COG | NC Division of Water Resources | Newton, NC |
| Western Piedmont Regional COG | NC Wildlife Resources Commission | Kershaw County, SC |
| Isothermal Regional COG | SC Dept. of Health & Env. Control | Resolute Forest Products |
| Central Midlands COG | SC Department of Natural Resources | International Paper |
| Lake Norman Marine Commission | Catawba Wateree Relicensing Coalition | Siemens Westinghouse |
| Lake Wylie Marine Commission | | |

Furthermore, the SAT has been asked to help broadly communicate the recommendations and conclusions of the Master Plan and work as an advocate for full implementation.

## 1.4 Future Water Use Projections

This Master Plan includes detailed future water use withdrawal and return projections to the year 2065 (~50 years) for public water and wastewater suppliers, Duke Energy, industrial users, and agricultural and irrigation uses. This analysis included projections for ~225 withdrawal and return entities/locations. These detailed water use projections were then extrapolated to the year 2115 for water modeling purposes. Accurately projecting future water use is foundational to ensuring a sustainable water supply in the Basin. Table 1-3 summarizes the net withdrawals (withdrawals minus returns) for each subbasin over the planning period. Base Year rates represent data from the most recent available years for which withdrawals and returns were recorded. The most recent year for a given water user typically ranged between 2010 and 2011.

**Table 1-3 Projected Annual Average Net Withdrawal Rates by Subbasin (in mgd)**

| Reservoir | Base Year[1] | Year | | | | | |
|---|---|---|---|---|---|---|---|
| | | 2015 | 2025 | 2035 | 2045 | 2055 | 2065 |
| **Net Withdrawals** | | | | | | | |
| James | 5 | 5 | 6 | 6 | 6 | 7 | 7 |
| Rhodhiss | 14 | 14 | 15 | 16 | 17 | 18 | 19 |
| Hickory | 11 | 12 | 13 | 20 | 22 | 24 | 26 |

**Table 1-3 (con't)**

| Reservoir | Base Year[1] | Year | | | | | |
|---|---|---|---|---|---|---|---|
| | | 2015 | 2025 | 2035 | 2045 | 2055 | 2065 |
| Lookout Shoals | 3 | 4 | 5 | 5 | 6 | 7 | 8 |
| Norman | 61 | 65 | 74 | 80 | 102 | 112 | 125 |
| Mountain Island | 109 | 114 | 132 | 153 | 171 | 187 | 205 |
| Wylie | 44 | 46 | 43 | 35 | 34 | 34 | 33 |
| Fishing Creek | -62 | -69 | -71 | -72 | -78 | -45 | -47 |
| Great Falls | -1 | -1 | -1 | -2 | -2 | -3 | -4 |
| Cedar Creek | -1 | -1 | -1 | -1 | -1 | -1 | -2 |
| Wateree | 4 | 5 | 7 | 8 | 45 | 47 | 49 |
| **Total** | **189** | **195** | **221** | **248** | **323** | **386** | **419** |

[1] Base Year rates represent data from the most recent available years for which withdrawals and returns were recorded. The most recent year for a given water user typically ranged between 2010 and 2011.

As illustrated in Table 1-3, the overall net withdrawal for the entire Basin is expected to increase from approximately 189 mgd (293 cubic feet per second (cfs)) to 419 mgd (650 cfs) by the year 2065. This represents an increase of approximately 122 percent, or an annual growth rate of 1.49 percent.

Figure 1-2 provides a comparison of the Basin's net withdrawal projections made as part of this Master Plan with those developed as part of Duke Energy's Catawba-Wateree Hydroelectric Relicensing Project Water Supply Study published in April 2006 (2006 Water Supply Study). As illustrated, the overall net withdrawal projections for the Master Plan are approximately 15 to 30 percent lower than those previously calculated. This reduction in net withdrawal is largely attributable to reduced plans for interbasin transfers, lower agricultural demand, and per capita water use reductions by utilities over the past few years.

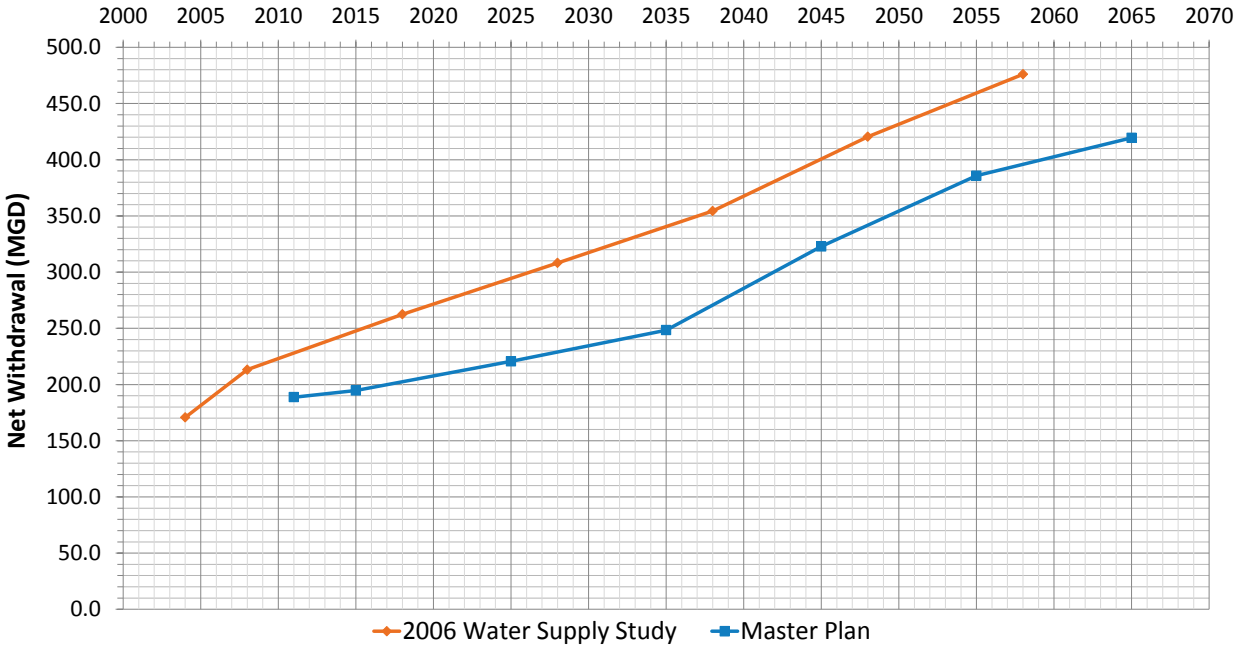


**Figure 1-2 Master Plan Net Withdrawal Projections Comparison with 2006 Water Supply Study (in units of mgd)**

Figures 1-3 and 1-4 provide a comparison by subbasin of 2065 net withdrawals and the net withdrawal distribution by water use category, respectively.

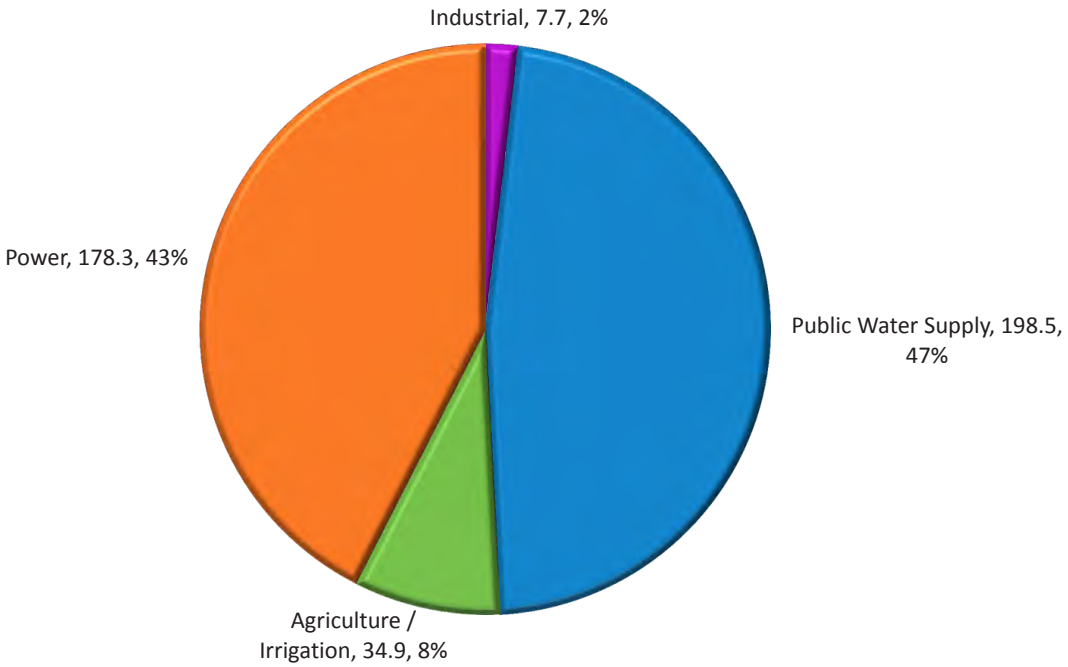


**Figure 1-3 Year 2065 Net Withdrawal by Water User Category for the Basin (in units of mgd and % of total)**

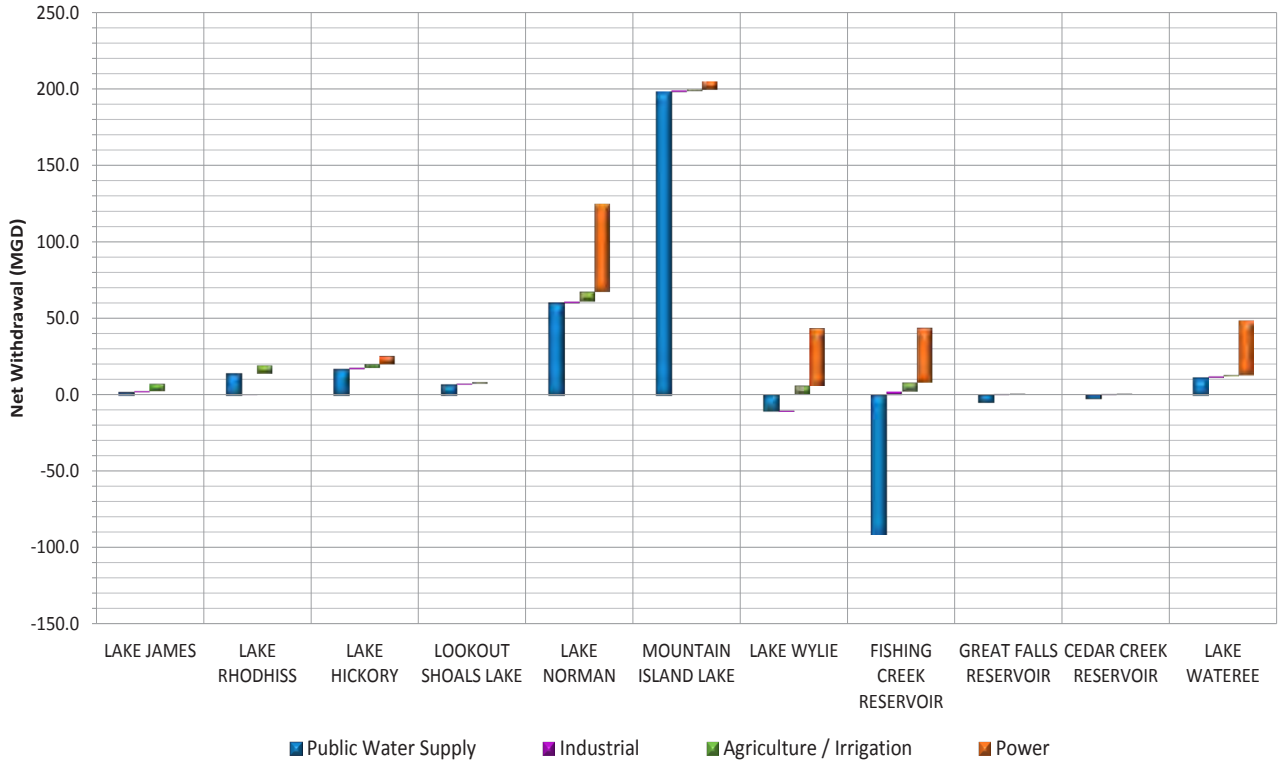


**Figure 1-4 Year 2065 Net Withdrawal for Water User Categories by Subbasin (in units of mgd)**

As illustrated in these figures, approximately 90 percent of the water use in 2065 is projected to be for public water supply and power production, with a large percentage of that in the middle part of the Basin's reservoir system.

## 1.5 Future Operating Scenarios and Water Yield Modeling

This Master Plan provides a framework to promote the effective management of the Basin's water supply and stewardship of its water resources. In addition, the recommendations are expected to extend the available water supply within the Basin and prolong the future time frame in which water supply may be limited. Previous hydrologic modeling using the Computerized Hydroelectric Operations and Planning Software (CHEOPS™) model indicated water use limitations by mid-century (~2050). This previous modeling effort was based on an inflow dataset period of record from 1929 to 2003, with the 2001-2003 period determined as the Drought of Record.

This Master Plan updates the inflow dataset through 2010 and captures the years 2007–2009 as the new Drought of Record. The CWWMG and SAT determined that a moderate level of climate change impact should also be integrated into the operating conditions to be used for future water use planning. This climate change impact includes a gradual temperature increase of 0.6° F per decade (a total increase of 3.2° F between the Base Year and 2065) which translates to ~11 percent increase in lake evaporation between the Base Year and 2065. It is believed that the CWWMG is one of the first planning organizations in the region to begin incorporating the potential impact of climate change on future water use planning. The more intense Drought of Record and higher evaporative losses due to climate change have the effect of reducing the safe yield values previously documented and induce greater strain on the limited water supply. Other minor CHEOPS modeling updates defined herein were also included in the updated model to better reflect the actual operating conditions of the system. Together, these parameters form the Baseline Scenario used for Master Plan modeling.

Twenty-six individual future operating scenarios were evaluated in eight distinct categories:

- Population growth sensitivity
- Climate change sensitivity
- Public water supplier water use efficiency measures
- Power industry consumptive water use changes
- Critical intake modifications
- Effluent flow recycling from point source returns
- Modified reservoir operations
- Low Inflow Protocol (LIP) modifications

Following the analysis of individual scenarios and water yield enhancement strategies, 10 integrated scenarios were developed for various planning cases which shape the recommendations set forth in the Master Plan. Multiple individual scenarios and/or strategies were combined to form an integrated scenario and subsequently modeled to determine the effect on water yield for a combination or suite of scenarios and strategies. This approach allows Master Plan recommendations to be evaluated for a series of yield enhancement strategies in an effort to maximize water yield in the Basin. Three classifications of integrated scenarios were established: Planning Case, Best Case, and Worst Case.

The Planning Case represents the basis for development and evaluation of integrated scenarios in this Master Plan. It includes population growth and associated water use projections as well as the base level of climate change described in the Baseline Scenario above. The Best Case scenario represents the impact of lower population growth (and associated water demand) and no impact of

climate change. The Worst Case scenario represents the impact of higher population growth (and associated water demand) and an even greater impact of climate change. Water yield enhancement strategies were then applied to each of these cases in an effort to enhance or extend the available water supply. Figure 1-5 summarizes the scenarios and strategies for the Planning Case, Best Case, and Worst Case model runs.

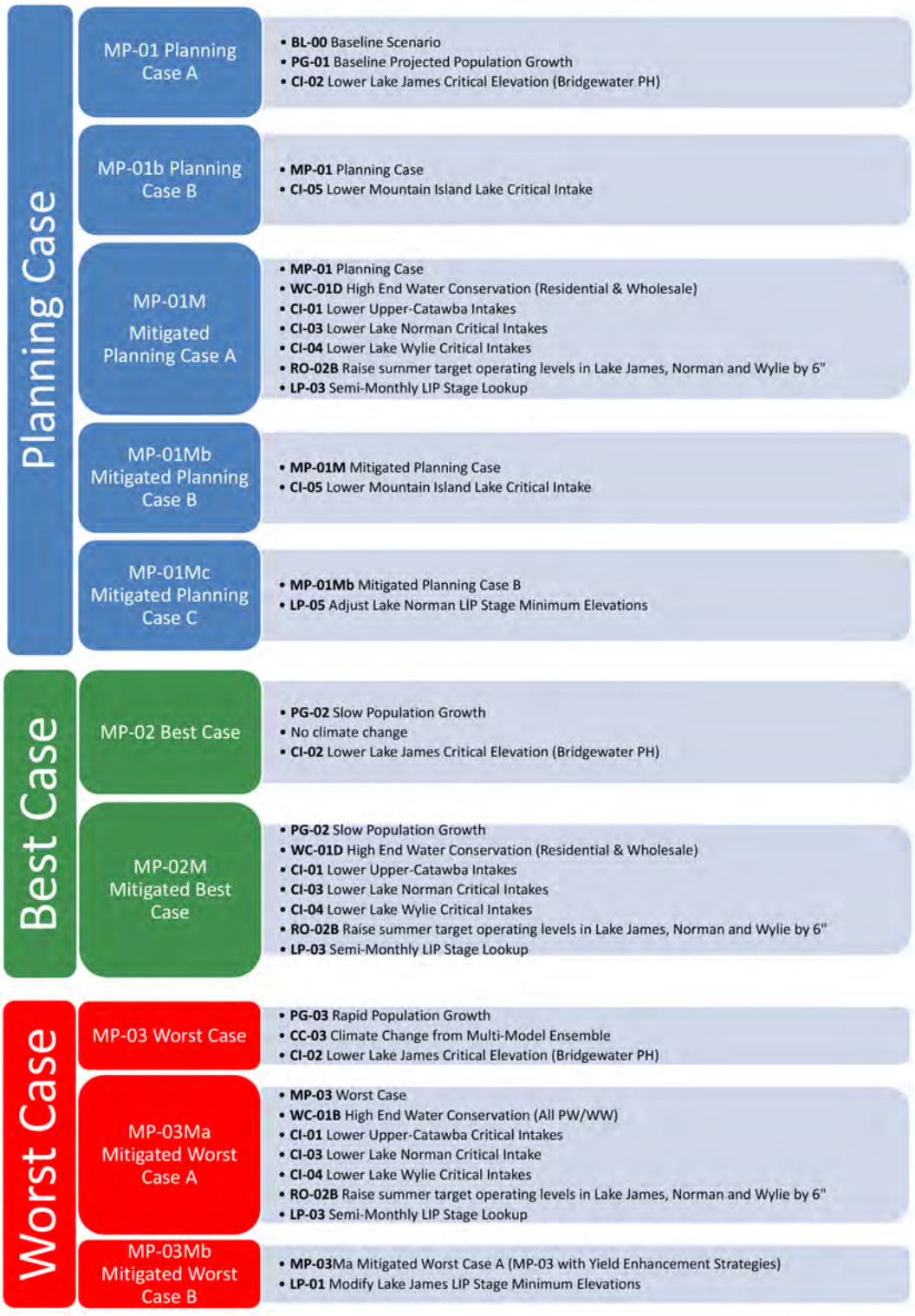


**Figure 1-5 Scenarios and Strategies Used for Integrated Planning Cases**

Table 1-4 summarizes the modeled impact on safe yield for the integrated scenarios presented in Figure 1-5.

**Table 1-4 Basinwide Yield Summary for Simulated Integrated Planning Scenarios**

| Scenario | Description | Safe yield (mgd) | Projection year to reach safe yield |
|---|---|---|---|
| MP-01 | Planning Case A | 660 - 719 | 2055 - 2065 |

| Scenario | Integrated Planning Scenarios | Change in safe yield vs Planning Case[1] (mgd) | Yield enhancement vs Planning Case (years) |
|---|---|---|---|
| MP-01b | Planning Case B | 0 | 0 |
| MP-01M | Mitigated Planning Case A | 139 | 30 |
| **MP-01Mb** | **Mitigated Planning Case B (Recommended)** | **204** | **40** |
| MP-01Mc | Mitigated Planning Case C | 269 | 50 |
| MP-02 | Best Case | ~0 | 20 |
| MP-02M | Mitigated Best Case | >74 | 50 + |
| MP-03 | Worst Case | -169 | -40 |
| MP-03Ma | Mitigated Worst Case A | -78 | -20 |
| MP-03Mb | Mitigated Worst Case B | 26 | -10 |

Notes:

[1] Change in safe yield calculated as the difference between the safe yield range midpoint (average) for a given scenario and the safe yield range midpoint for the Planning Case (i.e., MP-01).

This Master Plan recommends that Mitigated Planning Case B (MP-01Mb) is adopted as the planning scenario for implementation by the CWWMG. This scenario and its associated water yield enhancement strategies improve the safe yield by over 200 mgd (vs. Planning Case A) and extends water yield by 40-50 years, potentially to the year 2105 as illustrated by Figure 1-6.

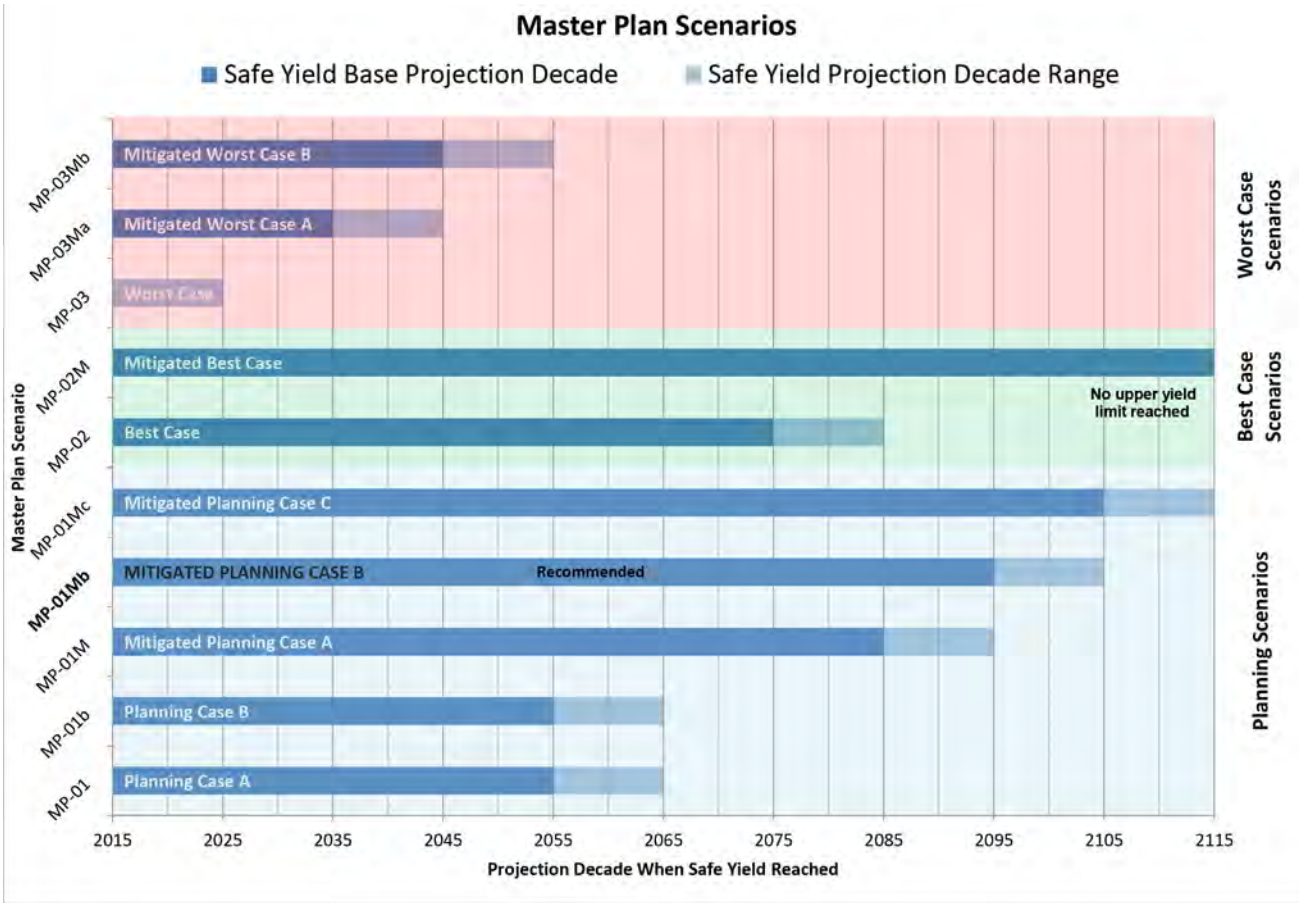


**Figure 1-6 Associated Projection Decades to Reach Safe Yield**

Mitigated Planning Case B (MP-01Mb) includes implementation of the following strategies detailed in the Master Plan:

- WC-01D: High-end water use efficiency and demand management by residential and wholesale water utility customers.
- CI-01, CI-03, and CI-04: Lower raw water intakes in the upper Basin (Hickory, Long View, and Valdese), Lake Norman (McGuire Nuclear Station), and Lake Wylie (Clariant Corporation, confidential industry, and Belmont).
- CI-05: Recognition of the new critical intake elevation on Mountain Island Lake due to Riverbend Steam Station retirement.
- RO-02B: Raise the summer target operating levels by six inches in Lake James, Lake Norman, and Lake Wylie.
- LP-03: Semimonthly (or more frequent) LIP stage lookup.

This recommended planning scenario delivers on the primary objective of this Master Plan by extending water yield to the next century and provides a sustainable water supply for future generations.

A proposed implementation schedule is included in Table 1-5. Recommended actions could be completed on a faster timeline, but should be completed by the dates shown. Further, it should be noted that ongoing monitoring of hydrologic conditions, water use projections, and updates of this Master Plan may necessitate additional actions or modified timelines.

**Table 1-5 Proposed Implementation Schedule for Recommended Planning Scenario (MP-01Mb)**

| Action | Schedule | | | | | |
|---|---|---|---|---|---|---|
| | 2015 | 2025 | 2035 | 2045 | 2055 | 2065 |
| High-end Water Use Efficiency (WC-01D) | Implement | Continue Monitor | Continue Monitor | Continue Monitor | Reduction Goal Year 2055 | |
| Lower Upper Catawba Intakes (CI-01) | Feasibility/ Predesign | Financing/ Permitting | Design and Construction | Complete by 2045 | | |
| Lower Mt. Island Riverbend Critical Intake (CI-05) | Recognition of Change | | | | | |
| Lower Lake Norman Critical Intake (CI-03) | | | | Operations Change | | |
| Lower Lake Wylie Critical Intakes (CI-04) | Feasibility/ Predesign | Financing/ Permitting | Design and Construction | Complete by 2045 | | |
| Raise Summer Target Operating Levels by 6" (RO-02B) | Evaluate Impacts of Change | Modify CRA* (if needed) | | | | |
| Semimonthly LIP Stage Lookup (LP-03) | Operations Change | | | | | |

* Comprehensive Relicensing Agreement

An additional outcome of the extensive modeling and workshops completed was a decision to protect the extensive storage in Lake James from being used to extend water yield in the Planning Case. That is, modeling analysis indicates that water yield failure may be realized downstream while storage is still available in Lake James. While adjustments to the LIP stage minimum lake levels in Lake James may provide access to water volume earlier for downstream needs, it was collectively decided to maintain the existing stage minimums, thereby preserving the storage. This approach affords the recommended Mitigated Planning Case B a measure of conservatism as a protection against future droughts that may be worse than the current Drought of Record.

## 1.6 Water Supply Regionalization

CWWMG members already practice regional cooperation with many of the water systems having some form of water purchase or mutual aid agreement in place to support water supply needs. While additional opportunities may exist, maintaining autonomy for many of the water systems remains the largest hurdle for regionalization. The CWWMG has already generated numerous benefits from regionalized collaboration including information and resource sharing, completing projects that support better management of the Basin's water resources, and enhancing water use efficiency and public outreach. Regional cooperation in areas such as reducing per capita water use, lowering or consolidation of intakes, and reducing sediment infill may be the best opportunities to realize additional benefits from regionalization and cooperation in the future.

## 1.7 Water Use Efficiency

The CWWMG finalized a Water Use Efficiency Plan for the Basin in April 2014 which outlines measurable goals to drive water use efficiency improvements and provides appropriate action plans to meet those goals. This Master Plan expands on that effort by documenting current water use efficiency success in the Basin and evaluating future water use reduction strategies. Table 1-6 summarizes the results of the analysis for residential water utility per capita use which was used to develop water use efficiency strategies WC-01C and WC-01D for low- and high-end residential and wholesale water conservation.

**Table 1-6 Residential Per Capita Use Rates Aggregated by Subbasin (Historical and Strategies WC-01C and WC-01D)**

| | 2006 WSS (2002 Data) Average Per Capita Use (gpd/person) | Current (2008-2011) Average Per Capita Use (gpd/person) | WC-01C Low-End Conservation: Average Per Capita Use (gpd/person) | WC-01D High End Conservation: Average Per Capita Use (gpd/person) |
|---|---|---|---|---|
| **Sub-Basin** | **Residential** | | | |
| Lake James | 53 | 56 | 56 | 53 |
| Lake Rhodhiss | 59 | 80 | 72 | 64 |
| Lake Hickory | 79 | 68 | 65 | 58 |
| Lookout Shoals Lake | 58 | 54 | 54 | 51 |
| Lake Norman | 121 | 85 | 78 | 70 |
| Mountain Island Lake | 129 | 97 | 88 | 78 |
| Lake Wylie | 76 | 76 | 71 | 64 |
| Fishing Creek Reservoir | | 68 | 65 | 58 |
| Lake Wateree | | 74 | 69 | 62 |
| **BASIN-WIDE AVERAGE** | **113** | **85** | **78** | **70** |

Table 1-6 illustrates the change in total utility per capita use from 2002 to the 2008-2011 time frame for each subbasin. During this time, residential per capita use fell from 113 gallons per day per person to 85 gallons per day per person, a reduction of 25 percent. Strategy WC-01D is included in the Master Plan's recommended planning scenario, Mitigated Planning Case B (MP-01Mb). Under the recommended goal of WC-01D, the per capita use rate would be 70 gallons per person per day, representing an additional 18 percent reduction from the 2008-2011 values.

## 1.8 Regulatory Agency Coordination with CHEOPS Modeling

North Carolina's decision to fund this work was driven, in part, by the need for the North Carolina Division of Water Resources (NCDWR) to have an Environmental Management Commission (EMC) approved hydrologic model in the Basin compliant with legislative statute NC SL 2010-143. This water quantity modeling legislation requires that the models have certain inputs and provides flexibility for future modification. The EMC also requires that the hydrologic model development be completed through an open stakeholder process. To ensure that the updated CHEOPS model for the Basin would meet the requirements of NC SL 2010-143, and other desired functional requirements by the NCDWR, a modeling technical team (MTT) was assembled to provide input and review of CHEOPS water model enhancements.

The MTT's role was to identify and prioritize necessary enhancements to the model, review results of the completed work, lead a stakeholder process, and ensure compliance with NC SL 2010-143. Working collaboratively, the MTT led development of a more robust CHEOPS model that has increased functionality (e.g., addition of tributary nodes for withdrawal/return points), greater flexibility (e.g., universal on/off switch for water shortage response plans), and faster processing times. It is anticipated that the model developed by the CWWMG for this Master Plan will be approved by the EMC in the fall of 2014.

It is important to note the CHEOPS model is already the model specified for this Basin in the United States Supreme Court Case Settlement Agreement dated December 3, 2010 (*South Carolina v. North Carolina, No. 138)* (2010 Settlement Agreement). It is also important to note that the EMC is expected to approve the revised CHEOPS model but it is not being asked to approve the Master Plan at this time.

## 1.9 Geographical Information System Update

In order to document water withdrawals and returns in the Basin, a geographic information system (GIS) database was updated and expanded for this Master Plan. This GIS database includes a flow modification points layer which defines point source water withdrawals and returns and a basin layer that delineates each of the watersheds for the 11 reservoirs. This GIS database can be utilized

for future water use planning and analysis.

## 1.10 Enhancement of the Low Inflow Protocol

The LIP provides trigger points and procedures for how the Catawba-Wateree Hydroelectric Project will be operated by Duke Energy, as well as water withdrawal reduction measures and goals for other water users, during periods of low inflow (i.e., drought conditions). In order to ensure continuous improvement of the LIP and its future implementation during low inflow periods, the Catawba-Wateree Drought Management Advisory Group (CW-DMAG) is tasked with periodic review, evaluation, and recommendations for updates to the document.

The CWWMG had several reasons to review the LIP for potential revisions as part of this Master Plan. First, many of the CW-DMAG organizations are also members of the CWWMG. Second, given the newness of the LIP and the extensiveness of the 2007-2009 drought, many lessons were learned that could be quickly incorporated into a revision. Next, the CWWMG meets more frequently and has greater opportunity to evaluate and propose revision recommendations to the CW-DMAG for consideration. Finally, extensive water quantity modeling by the CWWMG has illustrated that the LIP is currently the most critical tool available to the region in protecting and preserving water supply during drought conditions.

This Master Plan recommends 11 subject area revisions for the LIP, several of which are already being voluntarily implemented by the CW-DMAG. These revisions include the following:

- Updating critical reservoir elevations
- Updating CW-DMAG membership
- Modifying LIP trigger metrics
- Updating water withdrawal data collection and reporting requirements
- Providing LIP stage declaration flexibility of more than once per month
- Revising water use reduction response times for Duke Energy and public water suppliers
- Evaluating water use reduction goals for public water suppliers

It is proposed that each of these recommendations be submitted to the CW-DMAG for consideration and potential approval. Given the critical importance of the LIP to protecting and preserving water supply in the Basin, it is recommended that these revisions be vetted, as required, through the stakeholder process and submitted to FERC for approval soon after a new license is issued and becomes final for Duke Energy's Catawba-Wateree Hydroelectric Project.

## 1.11 Water Quality Modeling – Future Considerations

This Master Plan does not include water quality modeling. However, it does include a review of previous water quality modeling initiatives for the Basin, a survey and shortlist of applicable models, and a strategy for the CWWMG to move forward with water quality modeling in the future.

## 1.12 Regulatory Issues

A survey and summary of historical and current federal and state (both North and South Carolina) regulations impacting water supply was completed for this Master Plan. With a membership of 18 public water supply utilities and Duke Energy, the CWWMG is positioned to have a leadership role in planning the future water use in the Basin.

This Master Plan makes the following specific recommendations to improve the effectiveness of the CWWMG as a leading water resource planning organization for the Basin:

- Create an external task force to build relationships with elected officials and regulators
- Host roundtable discussions with legislators and regulatory officials

- Seek appointment for members to regulatory advisory groups
- Collaborate with like-minded organizations in North and South Carolina to create a larger, stronger voice for water supply issues
- Collaborate with other groups like the American Water Works Association (AWWA) and the Water Environment Federation (WEF) to respond to proposed regulation

These actions will help the CWWMG achieve its mission through future water resource planning, regulatory, and legislative decision-making.

## 1.13 Raw Water Intake Contingency Planning

This Master Plan lays the foundation for the development of sound, comprehensive raw water intake contingency plans for CWWMG public water suppliers. A review of each public water supply intake condition, potential vulnerabilities, and existing contingency plan was conducted by the CWWMG. A priority ranking was given to the water utilities based on the evaluation and assessment of the criticality of each intake relative to providing adequate water supply during periods of low flow. Each utility's intake was ranked as high, medium, or low priority based on an objective scoring system. This research also identified a number of contingency opportunities already leveraged by CWWMG members, and other strategies to be considered by water utilities in development of formal plans. The CWWMG is now initiating a separate project for development, or formalization, of raw water intake contingency plans, as needed.

**Raw water intake contingency plan development is key to sound future water supply planning**

## 1.14 Project Identification and Funding

This Master Plan provides a decision framework that will assist the CWWMG with identifying and rating projects based upon its strategic objectives. This decision matrix allows for a logical and objective process for project selection, as well as an evaluation of projects on their own merit before comparing with other projects. A brief description of various grants and loans funding organizations that may be considered for future projects is also outlined herein.

## 1.15 Public Awareness and Education

The following recommendations are given to support the CWWMG's public awareness, education, and outreach programs:

- Create and distribute a concise press release of this Master Plan
- Hire a public relations/marketing individual or firm
- Create an ad hoc external relations task force
- Raise awareness through conference presentations
- Develop partnerships with other organizations (e.g., North Carolina American Water Works Association and the North Carolina Water Environment Association (NC AWWA-WEA) and WEF)
- Make meetings more accessible, including to elected and regulatory officials

These recommendations parallel much of what was identified in the *Organizational Five-Year Self-Assessment, a* study completed for the CWWMG by The Lee Institute in November 2013.

## 1.16 Summary

This Master Plan is the most comprehensive water supply planning document completed to date for the Catawba-Wateree River Basin. Further, it has been completed through extensive collaboration with CWWMG, SAT, and MTT members. The recommendations outlined herein serve to ensure a sustainable water supply and continued growth and development for current and future generations.

It is important to note that this Master Plan is primarily designed to ensure adequate water supply and is intended to operate in the larger context of other existing and future plans, regulations, and requirements pertaining to the Basin. While the Master Plan does not directly address flow and water issues related to a healthy environment and ecosystem, nor recreation and economic interests, it is designed at the least to be compatible with those interests and in most cases enhance those interests.

This Master Plan will be updated as appropriate by the CWWMG at least every 10 years to ensure it remains a living document. Also, the CWWMG expects to have significant discussions with governmental officials, the SAT, other advisory groups, and stakeholders concerning this Master Plan in 2014, and those discussions will likely identify ideas for improving on this initial version. Following completion of those additional discussions and considering funding availability, the CWWMG will decide if a near-term revision of the Master Plan is needed to ensure its effective implementation.

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