

**Catawba-Wateree Water Management Group
2011 Five-Year Projects Strategic Plan**

January 13, 2011

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Catawba-Wateree Water Management Group

Five-Year Projects Strategic Plan

Background

Beginning in June 2003, more than 160 stakeholders joined with Duke Energy Carolinas, LLC (Duke) in an extensive relicensing process that developed an agreement (Comprehensive Relicensing Agreement (CRA)) addressing the continued operation of Duke's Catawba-Wateree Hydro Project (Project) and management of the basin's water supplies.

The CRA anticipates a 50-year term for the Project's New License, and relicensing studies concluded that over that term, the demands on both the basin's water supply and the Project's storage capability will increase significantly and approach or exceed the storage limits that the Project can provide during certain drought situations.

In its Section 5.0 and Appendix N, the CRA calls for the establishment of the Catawba-Wateree Basin Water Management Group (CW-WMG or Group) and defines its purposes, objectives, and membership structure – a group of voluntary members that contribute dues to the CW-WMG.

The CW-WMG will identify, fund, and manage projects that will help ecologically preserve, extend, and enhance the capabilities of the Catawba-Wateree (C-W) River Basin to provide water resources for human needs (water supply, power production, industry, agriculture, and commerce) of the waterway. The Group will strive to improve coordination of efforts and the pooling of resources to accomplish its objectives.

Purpose of the CW-WMG Projects Strategic Plan

The CRA also calls for the development of a running Five-Year Projects Strategic Plan (Plan); the first one was approved by the CW-WMG in December 2007. Because a primary function of the CW-WMG is to develop, fund, and manage projects that will further the Group's mission, the Plan is intended to provide strategic direction for the Group capturing the results of the Group's deliberations on the types of projects it will undertake and how the projects will be funded by dues collected from its Members.

Overview of the CW-WMG Projects Strategic Plan

The Plan provides for some projects to be funded/completed within one year and for others that span multiple years. Funds are shown in the year in which they are expected to be paid out. CW-WMG Bylaws do not allow for borrowing or encumbrance of future revenue, so contracts for multi-year projects must include termination provisions in the event future funds are not available or the project must be based on funds on-hand.

One on-going project supports the US Geological Survey's (USGS) installation, operation and maintenance of groundwater monitoring wells to enhance the implementation of the Low Inflow Protocol. Except for this groundwater monitoring project, administrative expenses and grants approved by the CW-WMG for projects driven by others, all of the projects in the Plan are presented in the context of three areas of work. Each of the three project categories also has a committee of CW-WMG

Members assigned to provide leadership for project planning and implementation for that category. The three project categories are:

- Demand-Side Norms, Trends and Opportunities
- Supply-Side Opportunities
- System-Wide Drought Preparation and Management

A number of the projects in the Plan anticipate hiring and funding consultants to perform the work under the direction of the CW-WMG or its Members. The CW-WMG may use administrative support and/or project management consultants to assist in the procurement and management of consultants to perform work identified in the Plan. Some projects may be completed by in-kind work of the Members and their staffs and will therefore not require expenditures by the CW-WMG. Of course, some projects will include both in-kind and consultant support.

The Plan consists of brief project descriptions in each of the three categories, and all of the projects are summarized in a spreadsheet that indicates the years when the projects might be undertaken and an estimate of the yearly expenditures for each project. According to the CW-WMG Bylaws, the Group can change elements of the Plan at any time during the year.

Demand-Side Norms, Trends and Opportunities

Goals

The goals for the Demand-Side Norms, Trends and Opportunities category are to:

1. Extend water supply by:
 - Identifying and monitoring consumption trends;
 - Developing strategies to manage consumption trends;
2. Develop a better understanding of demand-side economic dependencies (e.g., landscapers, golf courses); and
3. Develop strategies for long-term, measureable improvements in water use efficiency.

Purpose

Use demand-side management tools over the long-term to make the C-W Basin a model for efficient water use.

Objectives

1. Know how Catawba-Wateree Basin water is being used

Quantify monthly water consumption and water reuse trends for users of C-W Basin water into the four broad categories of municipal, industrial, power generation, and agricultural/irrigation. The municipal category should be divided into the four sub-

categories of residential, industrial (i.e. water supplied by municipality), commercial and institutional. Specifically:

- a. To the extent feasible and by 2011, organize 2005 data from the relicensing Water Supply Study and annual water system data provided to Duke from 2006 through 2010 to fit the data reporting format and categories/sub-categories identified by the Demand Side Committee in 2010.

Note: On April 13, 2010, the CW-WMG passed a motion that CW-WMG Members agreed to provide a breakdown of water consumption into the categories proposed by the Demand Side Committee to the extent feasible on an annual basis.

- b. Update the 2006 Water Supply Study to include a comparison of the actual water withdrawal and return data to the projections from the 2006 study, updated water withdrawal and return projections for the term of the New License and a revised CHEOPS™ model (including revised inflow hydrology, natural evaporation, critical intake elevations and sedimentation projections) to show modeled Low Inflow Protocol (LIP) occurrences. (Note: The CW-WMG may choose to have Duke Energy hire the consultant and reimburse Duke Energy for the cost).
- c. Resources and Schedule – CW-WMG to hire consultant to update the 2006 Water Supply Study and the CHEOPS™ model in 2013-2014. Note: Since the New License will confirm important operating parameters for the Project (e.g., normal operating bands for lake levels, flow release requirements, etc.), the Water Supply Study and CHEOPS™ model updates will be delayed beyond 2013-2014 if necessary until the New License has been issued and any administrative or legal challenges of any water quantity related requirements have been completed.

2. Understand the state of the practice for demand-side management and water use efficiency

- a. Complete the benchmarking study that was initiated in 2009 to identify the current demand-side management (DSM) programs that are being used by CW-WMG Members as well as over two dozen public water systems in the United States. Describe the relative levels of success of DSM programs and their potential applicability to the C-W Basin. (Note: This study was completed in 2009-2010).
- b. Complete the Lakefront Smart Irrigation Study that was initiated in 2009 to estimate water withdrawals from the basin by lakefront property owners for the purpose of lawn irrigation, and to evaluate the effectiveness of “smart” irrigation controllers in reducing landscape watering as measured against watering benchmarks without smart controllers. At the conclusion of the study, a survey of study participants will be conducted to receive feedback on how the study was conducted and their preferences regarding relevant irrigation technologies implemented. A group of 36 lakefront homeowners was identified and water use metering was initiated on all 36 irrigation systems located on Lakes Hickory, Norman and Wylie.
- c. Quantify the water use amounts for the golf courses that withdraw water directly from C-W Project reservoirs. Request that golf courses, by January

31 of each year, to the extent possible, report to Duke monthly water use data for the previous calendar year. Duke will annually prepare a report for CW-WMG review by March 31 on golf course water withdrawals for the previous calendar year.

- d. Resources and Schedule –The Lakefront Smart Irrigation Study is being conducted by NC State University from 2009 through spring 2012. Duke Energy Carolinas is making additional contributions to the CW-WMG in 2009 through 2011 above its annual dues to support the Lakefront Smart Irrigation Study so that the CW-WMG's net cost for the Lakefront Smart Irrigation Study is the lesser of \$25,000 per year for three years or ½ the annual cost of the Lakefront Smart Irrigation Study.

3. Set appropriate, measurable goals to drive improvement

Establish goals for water use efficiency improvements for the C-W Basin and also establish regular procedures to measure progress toward achieving the goals and periodically revisit appropriateness of the goals.

- a. Consider the current state of water use in the C-W Basin in the context of the Benchmarking Survey of Current Successful Water Demand Management Programs completed in 2010, and assess how CW-WMG Members should best focus efforts to manage demand.
- b. Establish a small number of goals and measures (e.g., 3 to 5) to improve water use efficiency which are achievable while stretching beyond the status quo.
- c. Appropriately consider regional parameters and economic impacts and dependencies of demand-side management tools in goal-setting and plan development. Water use categories should be considered in setting goals.
- d. Determine process for monitoring, measuring and reporting progress toward achieving goals and for changing direction if needed.
- e. Consider partnerships with universities for providing monitoring and measuring service.
- f. Resources and Schedule – CW-WMG will complete Objective 3 through facilitated sessions in 2011.

4. Develop Action Plan

Develop a prioritized action plan to meet the established water use efficiency goals. Specifically:

- a. Focus on actions that make the most efficient use of economic resources first (i.e., the actions that provide the best opportunity per dollar spent from the CW-WMG Fund).
- b. Action plan is not limited to simply implementing things that others are already doing (i.e., research or first-of-a-kind actions that have a relatively high success potential should also be considered).
- c. Plan should also give special consideration to actions that would improve efficient use of both water and energy.

- d. Plan should incorporate sharing of lessons-learned and best practices between Duke's demand-side energy management programs and water intake owners' water use efficiency programs.
- e. Plan should include dissemination of information on landscape management for water savings developed by the "Water-Wise Works!" program.
- f. Establish target dates and mechanisms for future plan updates.
- g. Resources and Schedule – CW-WMG will complete this Objective 4 initially through facilitated sessions in 2011.

5. Critique Goals and Action Plan

Coordinate a critical review by an independent set of large water intake owners, representative water users, applicable governmental agencies, and/or other selected water resources experts.

- a. Potential reviewers include but are not limited to:
 - i. NC Water Resources Research Institute and/or SC Water Resources Research Institute
 - ii. American Water Works Association Peer Review
 - iii. Large water intake owners or other organizations that participated in the benchmarking effort
 - iv. Consumer advocacy groups
 - v. State agencies in the Carolinas or other states
 - vi. Bi-State Catawba River Advisory Commission
 - vii. North Carolina Green Industry Council
 - viii. State Water Infrastructure Commission (NC)
 - ix. South Carolina Water Resources Center (Clemson)
 - x. SC Green Building Council
- b. Resources and Schedule – In 2012, CW-WMG to contract or otherwise arrange for the independent reviews, ensure that written feedback is summarized and make any appropriate adjustments to the goals and plan.

6. Communicate Action Plan and facilitate stakeholder participation

Communicate the goals and plan with key stakeholders and evaluate potential cost-sharing efforts, incentives and complementary activities to drive achievement of the established demand-side management goals.

- a. Prepare and distribute a final action plan that incorporates or otherwise addresses the review comments received from Objective 5.
- b. Key stakeholders include but are not limited to:
 - i. State and local governments (staff and elected officials)
 - ii. Water system customers
 - iii. Bi-State Catawba River Advisory Commission

- iv. EPA WaterSense™ Partners
 - v. Others that provided data in the benchmarking and independent critique efforts
- c. Potential partners to help implement the plan include but are not limited to:
- i. Government grant programs
 - ii. Universities and public schools
 - iii. Other 501(c)(3) organizations
 - iv. Professional organizations
- d. Seek appropriate incentives to encourage plan implementation (e.g., C-W CW-WMG dues credits for Members that make extraordinary progress toward meeting or exceeding certain demand-side management goals, permitting or financial incentives for water system and intake owners that meet their goals, etc.).
- e. Resources and Schedule – CW-WMG will complete Objective 6 in 2012-2013. Printing and binding of the plan will be contracted by the CW-WMG.
7. Evaluate Effectiveness of Action Plan
- a. Evaluate which aspects of the Action Plan are working well, which are not effective and should be revised or eliminated, and identify additional action steps that were not previously identified.
 - b. Resources and Schedule - CW-WMG will complete Objective 7 through facilitated sessions in 2015.

Supply-Side Opportunities

Goals

The goals for the Supply-Side Opportunities category are to:

1. Improve usable supply by:
 - Identifying and developing remediation strategies to resolve usable storage constraints,
 - Optimizing locations and depth related operational flexibility of water intakes (independent of jurisdictional boundaries);
2. Optimize return locations and effluent quality (independent of jurisdictional boundaries);
3. Develop regional water supply source strategies that:
 - Lay the foundation for basin-wide planning,
 - Improve operational flexibility,
 - Align supply sources with service areas; and

4. Support environmental and economic objectives.

Purpose

Develop plans and strategies that increase the reliability, usefulness, and safe yield of the C-W lake system. These plans and strategies should be useful for water users in long-term planning and development of their systems and to policymakers as a source of information to support policy decisions.

Work Completed and In-Progress

The CW-WMG contracted with Centralina COG in 2008 to compile existing data into a GIS-based map of the CW-WMG Member organization service areas and water supply facilities. That work was completed in 2009.

In 2009, CW-WMG selected HDR Engineering to conduct research on the potential to increase the safe yield of the C-W lake system. CW-WMG Member organizations, HDR, and Charlotte-Mecklenburg Utilities have collaborated to seek matching funds for this project from the Water Research Foundation. The scope of the project includes research on how climate change should be reflected in safe yield calculations, how the safe yield is determined, and ways that the safe yield could be increased. This work is currently underway and is projected to be completed in 2011.

Objectives

1. Determine issues relative to the safe yield of the Catawba-Wateree River including impacts of climate change and ways the safe yield can be increased.
 - a. Complete research related to extending the safe yield of the C-W lake system. (On-going project-Items i, ii, iii to be reported and addressed in project final report)
 - i. Provide best practice guidance for defining water supply safe yields in multi-use, multi-reservoir systems
 - ii. Define an approach for integrating impacts of climate change on future safe yield estimates
 - iii. Identify strategies for increasing the safe yield from similar reservoir systems
 - iv. Provide quantitative and qualitative review of financial, environmental and public impacts of strategies to increase the safe yield.
 - b. Conduct monitoring and analysis to determine the effect that sedimentation is having on the usable storage in C-W reservoirs.
 - i. Conduct annual bathymetric surveys at each representative site to determine loss of volume each year
 - ii. Compare storage loss rate to previous CHEOPS™ modeling assumptions

- iii. Adjust storage loss rate assumptions as necessary for future CHEOPS™ modeling
 - iv. Develop long-term program to validate storage loss rate assumptions
 - v. Provide information about the impact erosion is having on water supply to agencies responsible for erosion control.
2. Develop a Water Supply Master Plan for the Catawba-Wateree River Basin.
- a. Phase I
 - i. Develop “big-picture” view of served and unserved areas of the basin and who the water supply providers are
 - ii. Inventory current and upcoming water supply projects in the basin and impacts they may have
 - iii. Identify basin-wide supply issues and near-term opportunities
 - iv. Identify stakeholders and how they should be involved in plan development
 - v. Develop framework and schedule for completion of the plan in conjunction with updates to the CHEOPS™ model, the 2006 Water Supply Study or other basin-wide water supply models and reports.
 - b. Phase II
 - i. Full scope to be determined in Phase I
 - ii. Identify technically reasonable water supply options at conceptual and planning level.
 - iii. Consider results from other studies, plans, and research completed by the CW-WMG, CW-WMG Members, and others.
 - c. Phase III
 - i. Full scope to be determined in Phases I & II
 - ii. Achieve regional consensus on plan recommendations.
 - iii. Provide for periodic updates to the plan.
3. Evaluate and report on contingency opportunities in cases where an intake(s) became inoperable due to reduced storage during a drought (beyond LIP Stage 3 contingencies). (Note: This project will be coordinated with the System-Wide Drought Preparation and Management Committee.)

- a. Evaluate water intake capabilities with reservoirs below current Critical Intake Elevations
 - b. Prioritize opportunities to take intakes out of service by temporary or permanent interconnects.
 - c. Determine how the Project could be operated in LIP Stage 4.
 - d. Identify capabilities and needs of additional storage off the main stem of the C-W River.
 - e. Develop an implementation plan for all water withdrawers.
4. Evaluate impact of IBTs already approved against safe yield. Promote wastewater discharge to the Catawba-Wateree River for expanded service areas. Evaluate impact of ecological flow requirements.
 5. Conduct river basin hydraulic model, with projection that it will meet North Carolina Division of Water Resources (NCDWR) and South Carolina Department of Health and Environmental Control (SCDHEC) requirements.

System-Wide Drought Preparation and Management

Goals

The goals for the System-Wide Drought Preparation and Management category are to:

1. Improve the effectiveness and coordination of water management including drought preparation and management:
 - a. Develop a CW-WMG identity and technical capability to support multiple communications vehicles for CW-WMG Members, water suppliers generally, the public and specific audiences;
 - b. Improve availability and coordination of relevant drought and water management information;
 - c. Share LIP Stage 4 response matrix with large customers;
 - d. Provide periodic information for stakeholders including managing conservation measures on a normal basis and drought response;
 - e. Develop better understanding of overall water use in the Basin;
 - f. Develop better understanding of effective water use reduction strategies.
2. Improve communications with Water Users at various LIP Stages:
 - a. Develop a joint, basin-wide drought communications plan (consistent, basin-wide messages, creative ads, media relations, community relations, etc.);
 - b. Evaluate effectiveness of LIP response actions by compiling site-specific reductions and measures taken.
 - c. Improve drought response actions by evaluating how to spread the reduction actions requested over the entire user base versus strictly lawn

watering, car washing pools, etc. Communicate to all users how to conserve.

Purpose

Improve basin-wide water management including drought preparation and management by public water suppliers and improve customer response over the long-term by educating residents, political structures and public water users on the importance of conservation and management of this natural resource.

Objectives

1. Improve the effectiveness and coordination of drought preparation and management

- a. Develop a CW-WMG identity and technical capability to support multiple communications vehicles for CW-WMG Members, water suppliers generally, the public and specific audiences.
 - 1) Develop C-W Basin logo to “brand” the CW-WMG conservation measures. Potentially use CMU material as example or documents customized for CW-WMG Member usage.
 - 2) Create a Web site including public pages to provide information with external audiences and password-protected pages for exchanging information among the CW-WMG Members.
 - Web site could display current Stage of LIP, conservation tips, and success stories as the first access page.
 - Web site password protected pages could be used to share information real-time, water demands, usage and projections.
 - Develop Listserv of CW-WMG Primary Members and Alternates for rapid communication and response.
 - Create a Listserv for all public water suppliers and Duke to communicate measures they have implemented.

Resources and Schedule – Initial logo and website development were completed in 2009. Routine Website maintenance will continue indefinitely.

b. Improve availability and coordination of relevant water management information

- 1) Continue sending monthly updates of LIP Stage declarations.
- 2) E-mail goals of conservation measures necessary at each LIP Stage.
- 3) Communicate monthly the efforts each water supplier is taking to address appropriate LIP Stage declarations.
- 4) Develop and circulate appropriate water conservation literature to each water supplier. Library of tools and messages to be distributed in appropriate seasons or specific to focus group.
- 5) Update ordinances to reflect the LIP requirements as agreed to in the CRA and get written confirmations that all systems’ adopted Ordinances include LIP Stages, measures and goals.

Resources and Schedule – Most activities will be accomplished with in-kind support. Administrative Consultant support will be required for some activities. Meeting this objective will require continuous action.

c. Enforcement of LIP Water Use Restrictions

- 1) Develop a library of enforcement plans.
- 2) Develop comparison table showing each enforcement action and frequency it appears in plans.
- 3) Evaluate effectiveness of LIP response actions including compiling site-specific reductions and measures taken. Perform evaluation of past drought to determine if we met LIP goals.
- 4) Conduct evaluation to determine if Basin met the intended reductions during drought response.

Resources and Schedule – Will combine CW-WMG in-kind services plus consultant support. Evaluation of consultant work on c.3 and 4 will be completed in 2011.

d. Coordinate Water Saving Programs with Large Users – discuss more with Group, get strategies.

- 1) Individual suppliers to compile data for all large water customers.
- 2) Communicate regularly with identified commercial or municipal users explaining the LIP and the need for conservation and drought response measures. Initiate water conservation mailers to large water users. WPCOG and CCOG building Public Education information.
- 3) Ask them to identify specific measures that would be effective at their locations.
- 4) Identify contacts to use when drought response measures are needed.

Resources and Schedule – Will combine CW-WMG in-kind services plus consultant support if needed; will be completed in 2012.

2. Offer workshop and other targeted activities to explore:

- a) The Impacts of Decision Making On Municipal Finances During A Drought
 - 1) Audience – elected officials, government managers, and regional agencies.
 - 2) Content – How polices (Water Supply Plans, withdrawals/discharges, LIP, rate plans, annexation) affect revenue and regional cooperation and develop innovative policies and plans to minimize revenue shortfalls
- b) Water Conservation – Working Green in the Catawba River Basin
 - 1) Audience – Public, local, state agencies, local government
 - 2) Content – programs and initiatives water suppliers are implementing to improve efficiencies and encourage sustainability; exploring opportunities for community wide applications. Develop educational series on water conservation tailored for this audience.
- c) Develop separate presentations for topics; Conservation Track for customers and Government Track.

- d) Compile Loss Water for individual systems in basin.

3. Opportunities to improve water use efficiency:

- a) Maintain current Local Water Supply Plan usage information and projections.
- b) Maintain individual supplier Loss Water calculations for all systems. To be supplied by the system in February of each year.
- c) Study and characterize all types of water use over the customer base. Evaluate residential and commercial use as well as inside and outside water uses.

Resources and Schedule –In-kind services/Consultant will be used to compile individual LWSP usage by all classification types. Then commission a study that will characterize all types of water use by systems' customers in 2011-2012.

4. Develop Joint, Basin-wide Communication Plan.

- a. Create and implement easy-to-understand water conservation participation measures.
- b. Design ads and copy for various collaterals: (photos from all over basin & have local)
 - 1) Videos of what we do with water on CD's. Produce for Basin-wide dissemination and content and shown across the basin explaining how water is treated, handled, managed and conserved.
 - 2) Newsprint; and
 - 3) Media TV markets (Charlotte and appropriate SC stations); and
- c. Develop educational series for schools, civic groups and Chambers of Commerce.
- d. Review all opportunities for Grant support on projects to educate public, such as Women's Impact Fund – Shower Head Replacement Project – Grant application & Public awareness.

Resources and Schedule – Will require consultant support from the Western Piedmont Council of Governments (WPCOG) and the Centralina Council of Governments (CCOG); the major initial development effort was completed in 2010. Research from COGs to be evaluated in conjunction with HDR study of Effective Measures and Demand Side Committee Benchmarking Study to target material production in 2011 an