Water Quality: Who Bears the Burden?

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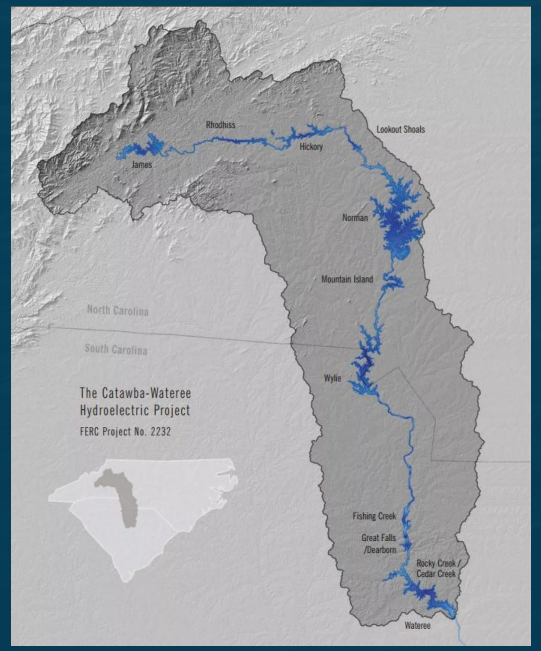
Tom Gallo, WQR, Inc.

CATAWBA WATEREE WATER MANAGEMENT GROUP

WATER QUALITY ASSESSMENT

Water for All Summit 2023

FLOW



Issues to Tackle

How do we evaluate water quality and identify impairments?

How does the pollutant(s) of concern matter?

Are site-specific differences in waterbodies taken into account?

What is the process for addressing impairments?

What are the implications of not resolving impairments?

Who bears the burden to address water quality issues?

How can you participate and what can you do to help?

A PROBLEM WELL-STATED IS HALF-SOLVED

CHARLES KETTERING

Water Quality Problem Definition and Solution Identification Can Be Humbling

- Well stating/defining an instream water quality problem is rarely easy
- One stretch of a river
- An entire river
- A large lake
- An estuary
- Natural systems are extremely complex and constantly changing

Our water quality modeling tools are only as good as the assumptions that underly them

Some assumptions are measured

Others are estimated from national literature or using best professional judgment

Water Quality Problem Definition and Solution Identification Can Be Humbling

Public utilities are usually in no man's land

They are constantly trying to balance competing interests

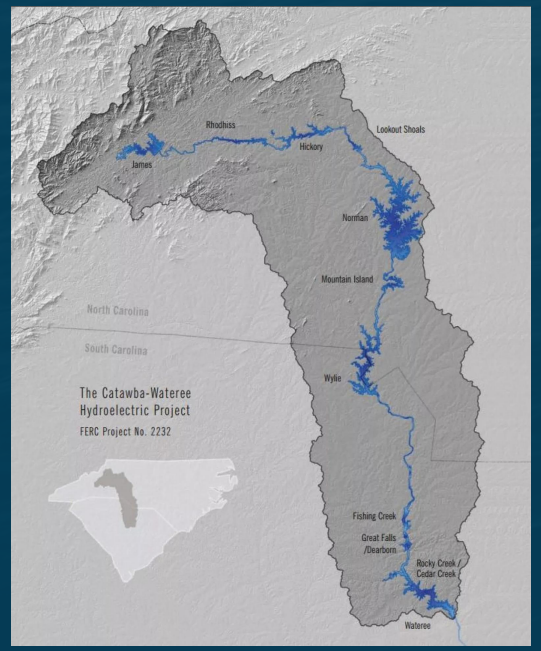
- Drinking water
- Wastewater
- Stormwater

- Making it all affordable, especially for low and fixed income households
- Ensuring we address environmental justice issues
- Constant environmental and public health environmental triage – within broader societal considerations and needs

- Where regulatory consequences are significant (expensive and/or have community development implications) we especially want to ensure our solutions will hit the mark because we will lose public support if an expensive solution misses the mark

FLOW

•That is a bit of the practical backdrop to the seven questions we will explore with you today.



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WATER QUALITY STANDARDS

Water quality assessment begins with water quality standards. States and other jurisdictions adopt water quality standards under the Clean Water Act

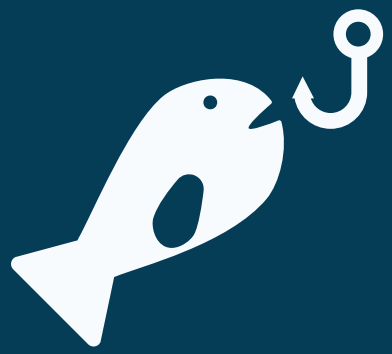
Two important elements:

1) **Designated Uses** assigned to waters (for example swimming, drinking, support of aquatic life)

2) **Criteria** or thresholds that protect aquatic life and humans from exposure to levels of pollution that may cause adverse effects

Common Designated Uses

Drinking Water



Aquatic Life
and
Fishing

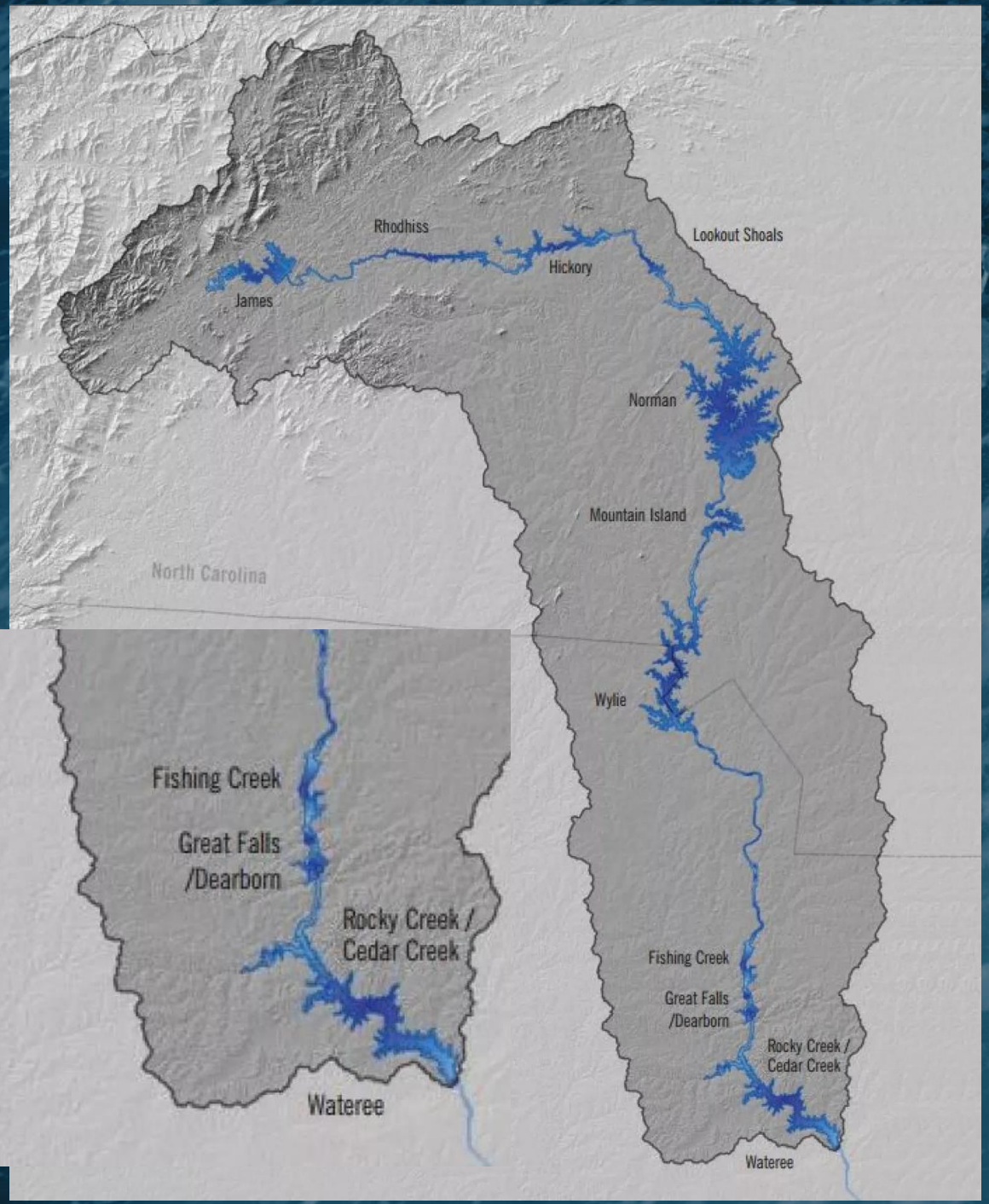
Recreation

Trout Waters

Suitable for supporting reproducing trout populations and a cold water balanced indigenous aquatic community of fauna and flora. for primary and secondary contact recreation and as a source for drinking water supply . Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. Suitable also for industrial and agricultural uses.

Shellfish Harvesting Waters

Suitable for primary and secondary contact recreation, crabbing, and fishing. Also suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora.



Lower Catawba River Basin South Carolina

FRESHWATERS SUITABLE FOR:

PRIMARY AND SECONDARY CONTACT RECREATION

DRINKING WATER SUPPLY

FISHING AND THE SURVIVAL AND PROPAGATION OF A BALANCED INDIGENOUS AQUATIC COMMUNITY OF FAUNA AND FLORA

INDUSTRIAL AND AGRICULTURAL USES

Login Website Registration

21 Tournaments in 2021 on Lake Wateree

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CATT SC - Lake Wateree Opens

Nov

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Tournament Results Lake Wateree, SC Open Nov 13, 2021

November 15, 2021 - 7:41 pm

Wateree Open Final Tournament – $130 Entry, $50 Sidepot Must enter 5 Opens to be eligible to enter the Open

Continue Reading

Tournament Results Lake Wateree, SC Open Oct 16, 2021

October 17, 2021 - 9:36 am

Next Lake Wateree Open is Nov 13th at Clearwater Cove Marina! Butch Williams & David Ethridge win with 10.96 lbs!

Continue Reading

Tournament Results Wateree, SC Open O 2021

October 9, 2021 - 10:14 pm

Next Lake Wateree Open i Clearwater Cove Marina! T PHANTOM OUTDOORS In Classic will take place

Continue Reading

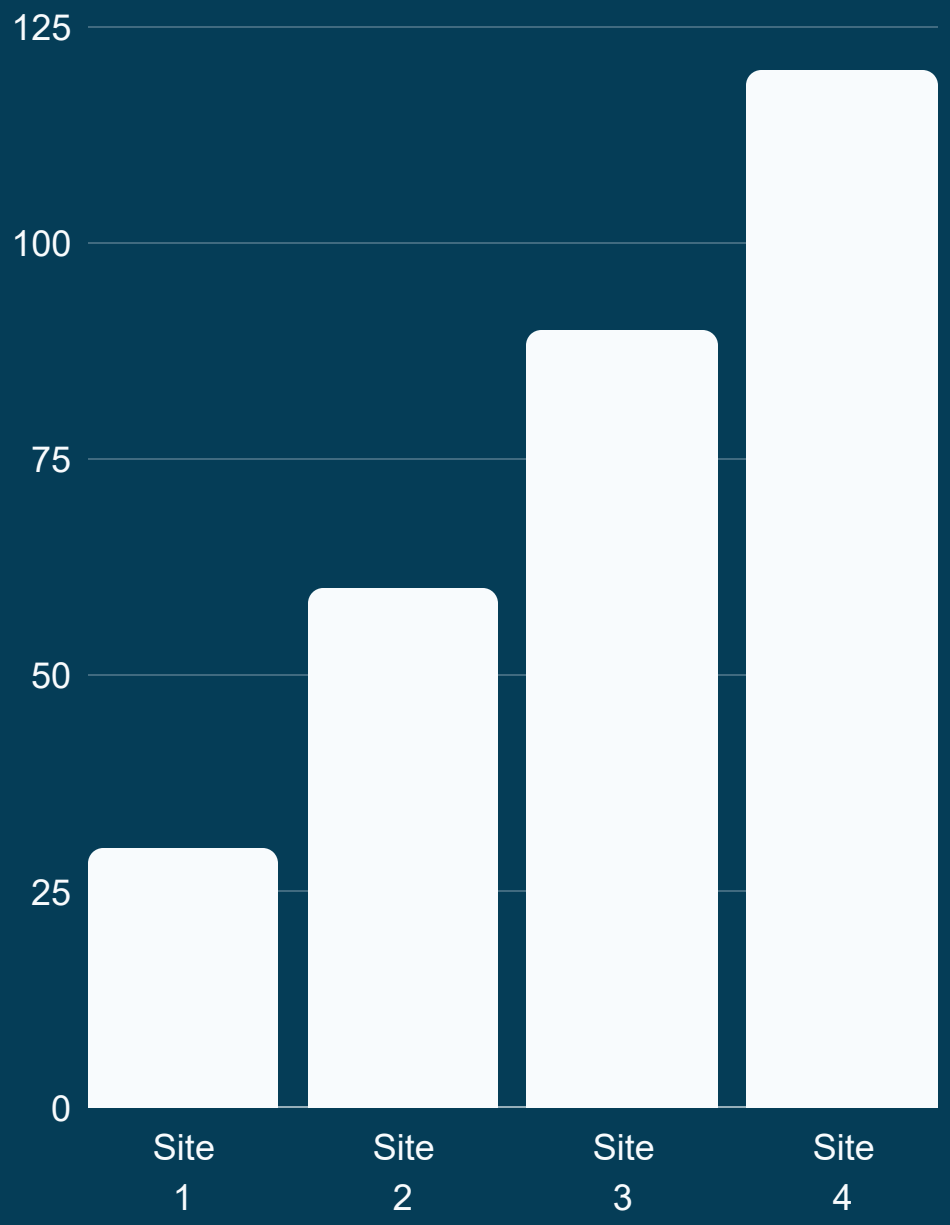
View All Lake Wateree Opens News

CRITERIA TO PROECT DESIGNATED USES

PRIMARY POLLUTANTS	CAUSAL POLLUTANTS	RESPONSE VARIABLES
Metals	Nitrogen	Aquatic Insects
Lead	Phosphorus	Algae
Road Salt	Biological Oxygen Demand	pH
Vinyl Chloride		Dissolved Oxygen
PFAS/PFOS		

Criteria Details

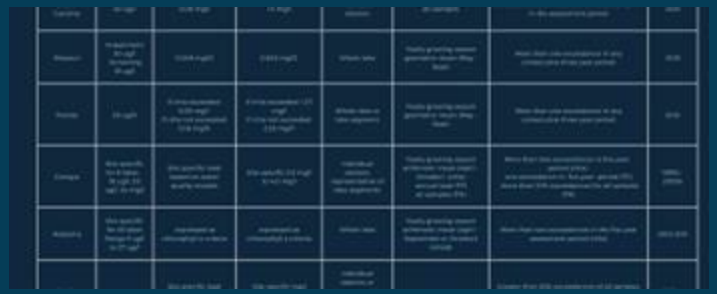
Criteria should include the assessment period and the frequency exceedances that can occur and still be protective of the designated uses



State	Chlorophyll a	Total Phosphorus	Total Nitrogen	Spatial Assessment	Temporal Assessment	Frequency Assessment	Year
South Carolina	40 ug/l	0.06 mg/l	1.5 mg/l	Individual stations	All samples	Greater than 25% exceedances of all samples in the assessment period	2001
Missouri	Impairment 30 ug/l Screening 18 ug/l	0.049 mg/l2	0.843 mg/l2	Whole-lake	Yearly growing season geometric mean (May - Sept)	More than one exceedance in any consecutive three year period	2018
Florida	20 ug/l1	If chla exceeded: 0.05 mg/l If chla not exceeded: 0.16 mg/l1	If chla exceeded: 1.27 mg/l If chla not exceeded: 2.23 mg/l1	Whole-lake or lake-segment	Yearly growing season geometric mean (May - Sept)	More than one exceedance in any consecutive three year period	2012
Georgia	Site specific for 6 lakes. 18 ug/l, 20 ug/l, 24 mg/l	Site specific load based on water quality models	Site specific 3.0 mg/l to 4.0 mg/l	Individual stations representative of lake-segments	Yearly growing season arithmetic mean (April - October) (chla) annual load (TP) all samples (TN)	More than two exceedances in five year period (chla) one exceedance in five year period (TP) more than 10% exceedances for all samples (TN)	1990s - 2000s
Alabama	Site specific for 49 lakes Range 5 ug/l to 27 ug/l	expressed as chlorophyll a criteria	expressed as chlorophyll a criteria	Whole-lake	Yearly growing season arithmetic mean (April - September or October) (chla)6	More than two exceedances in the five year assessment period (chla)	2001-2011
				Individual stations or			

WATER QUALITY ASSESSMENT

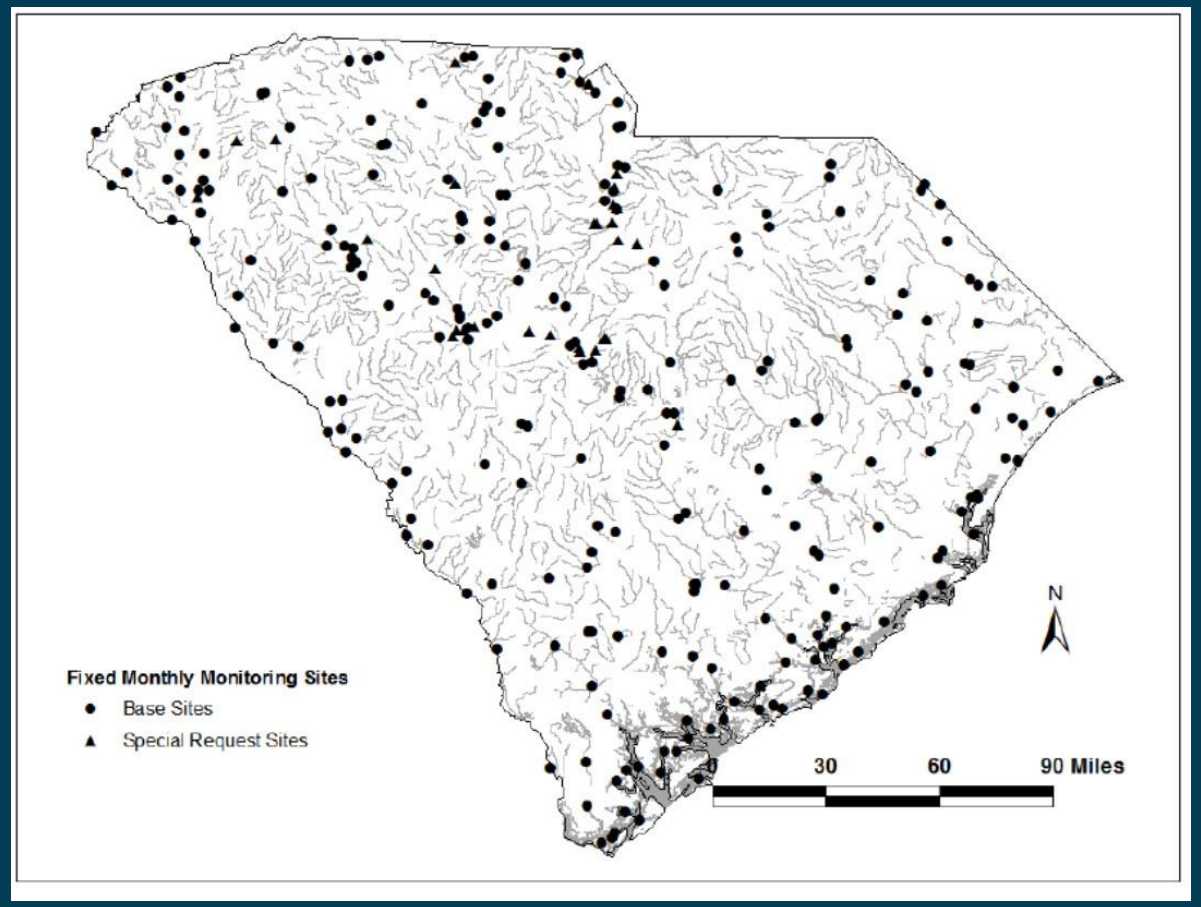
STEP 1: DESIGNATED USES

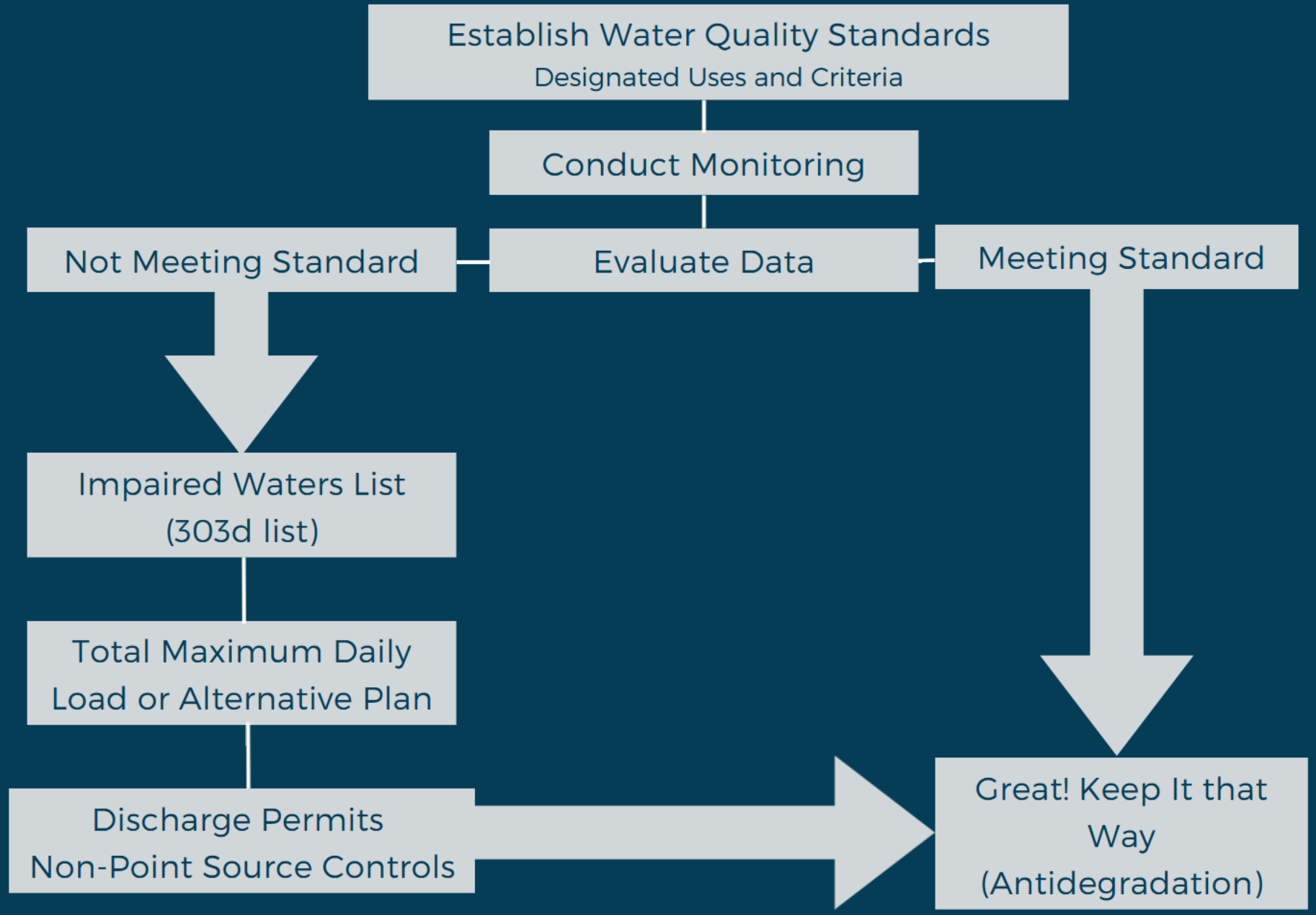


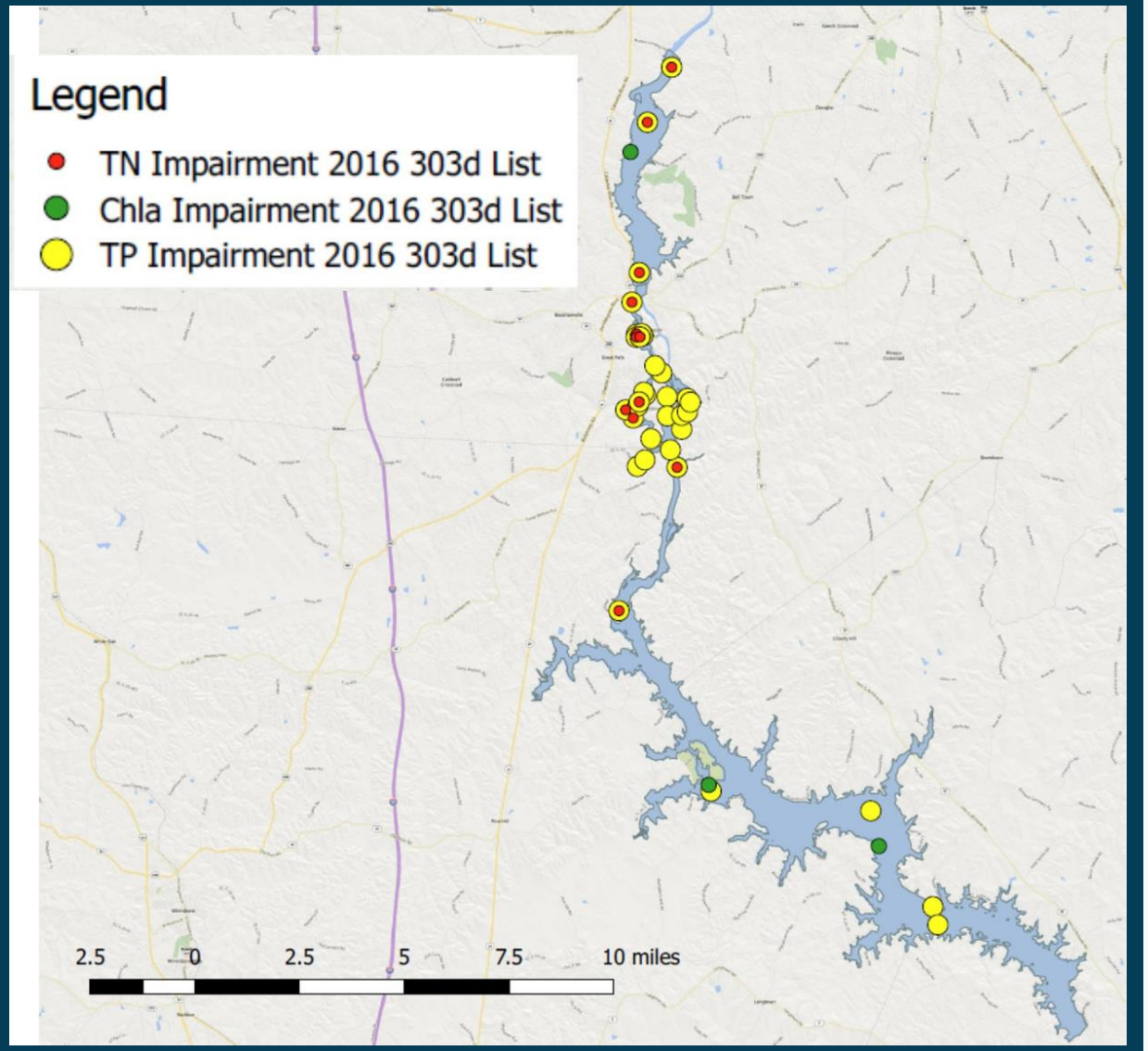
STEP 2: CRITERIA

STEP 3: EVALUATION

Water Quality Data Collection




Establish Water Quality Standards
Designated Uses and Criteria
Conduct Monitoring
Not Meeting Standard
Evaluate Data
Meeting Standard
Impaired Waters List
(303d list)
Total Maximum Daily
Load or Alternative Plan
Discharge Permits
Non-Point Source Controls
Great! Keep It that
Way
(Antidegradation)



Lower Catawba River Basin

•Considerable progress has been made in reducing phosphorus loading since 1999. The load from major point sources had declined 68% by 2012.

•But water quality standards exceedances remained and 2014 SCDHEC proposed additional 65% reduction in total phosphorus and 48% total nitrogen.

The Group was formed to address the 303(d) list nutrient and chlorophyll a impairments in the Lower Catawba River Basin through regulatory decisions which are affordable, cost-effective, and supported by sound science

LOWER CATAWBA RIVER BASIN DISCHARGES GROUP

Charlotte Water
Charlotte-Mecklenburg Storm Water Services
Chester County Wastewater Recovery
City of Lancaster
Fort Mill
Lancaster County Water and Sewer District
New-Indy Catawba LLC
Rock Hill
Union County
York County Storm Water

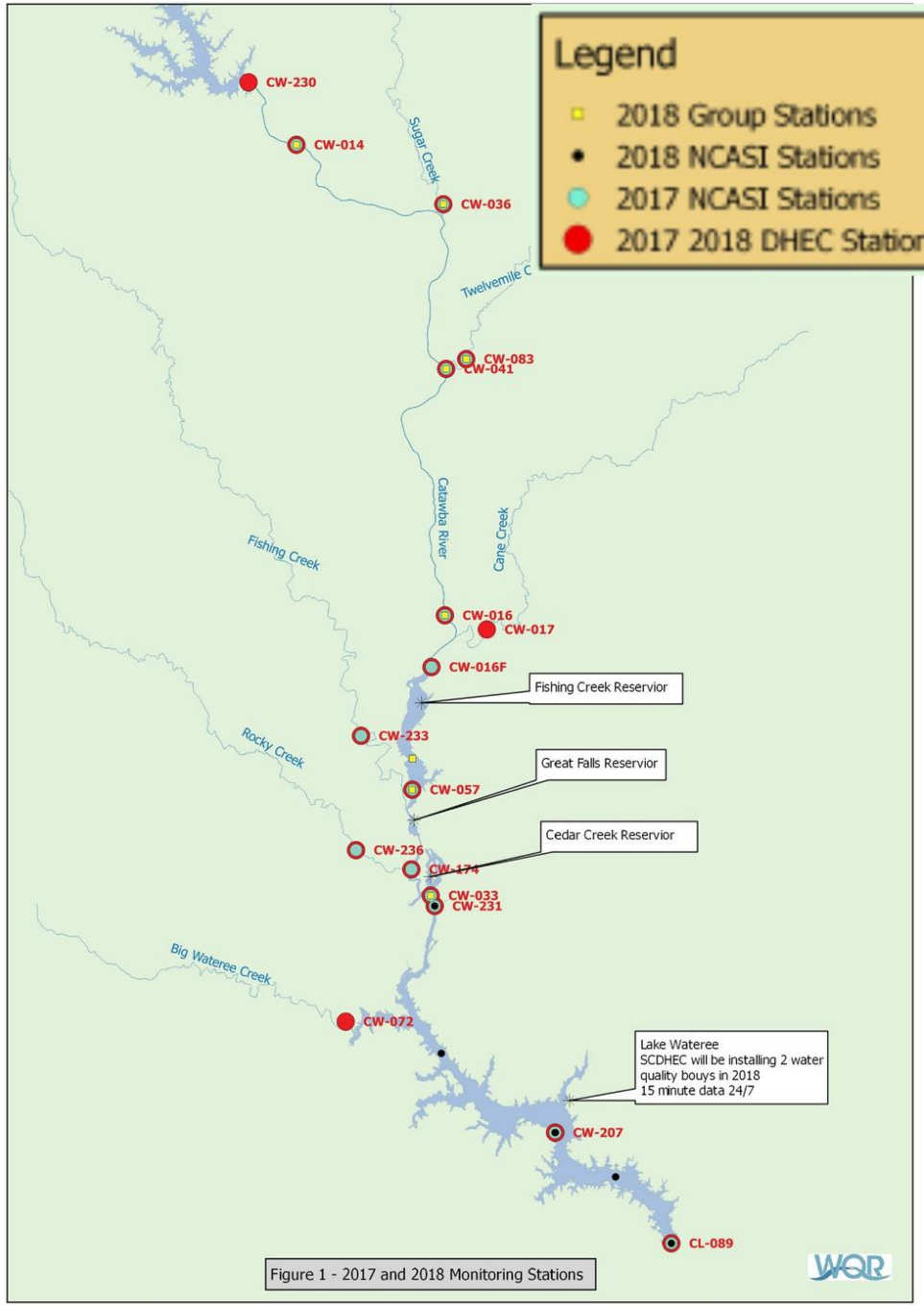
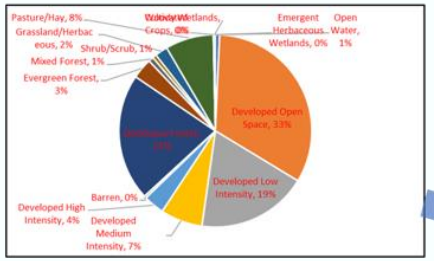
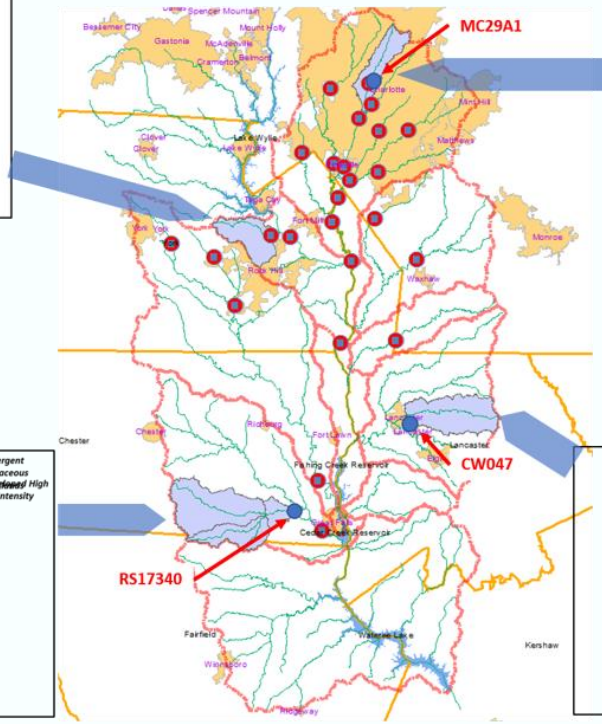


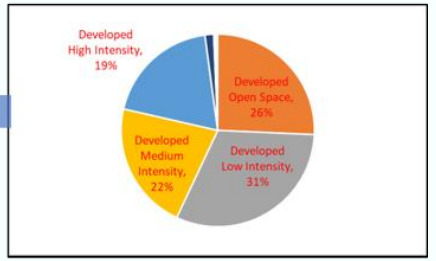
Figure 1 - 2017 and 2018 Monitoring Stations

Watershed Assignments to Derive Background Concentrations and Loadings

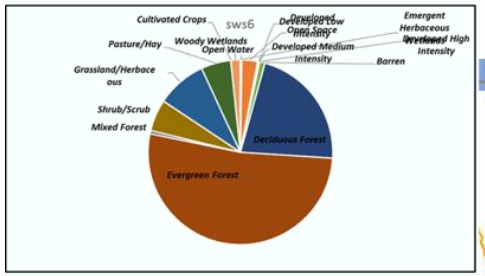


Low-medium intensity urban
(Big Dutchman Creek)

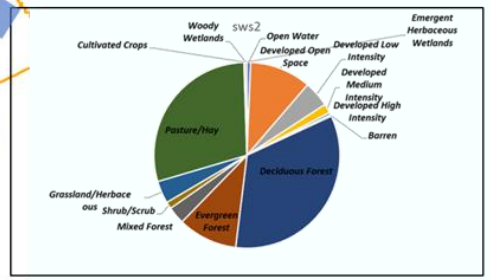




Highly urban developed land
(Little Sugar Creek)



Forest
(Little Rocky Creek)



Pasture/Hay
(Gills Creek)

dhec

2019 Lower Catawba Field Program

TMDL/Modeling and Aquatic Science Programs

May 30, 2019

South Carolina Department of Health and Environmental Control

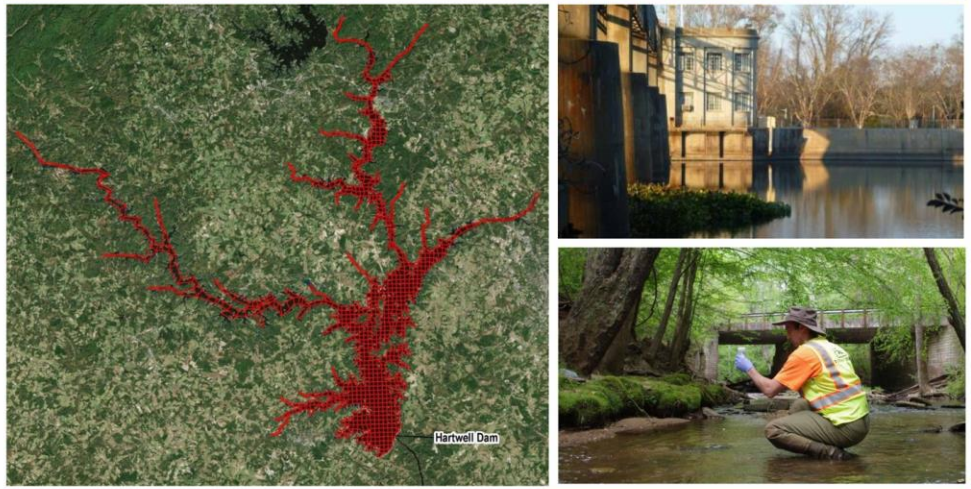
Healthy People. Healthy Communities.

SOLICITATION RESPONSE

dhec
Healthy People. Healthy Communities.

Lower Catawba Basin Model Development

South Carolina Department of Health and Environmental Control
Request for Proposal 5400024173



November 3, 2022

SC DHEC – Division of Procurement Services
Bureau of Business Management
301 Gervais Street
Columbia, SC 29201

TETRA TECH

Introduction

The South Carolina Department of Health and Environmental Control (DHEC) Environmental Affairs (EA) Bureau of Water (BOW) 303d, TMDL, and Modeling Section (TMDL Group) is seeking to establish a contract with a consulting firm to develop a linked watershed and river and lake hydrodynamic model and water quality model for the Lower Catawba River Basin in north central South Carolina. The Lower Catawba River Basin extends from the tailrace at Lake Wylie through Lake Wateree and includes Hydrologic Unit Code level 8 03050103 and the upper part of 03050104 down to Lake Wateree dam. Specifically, the models will represent the Lower Catawba watershed, the Catawba River and the four hydroelectric reservoirs and associated lake arms in the system (Fishing Creek Reservoir, Great Falls Reservoir, Cedar Creek Reservoir, and Lake Wateree). Loading Simulation Program in C++ (LSPC) has been selected as the preferred watershed model. Environmental Fluid Dynamics Code (EFDC) has been selected as the preferred hydrodynamic and water quality model. The planned modeling period will ensure that meteorological conditions, anthropogenic changes in the watershed, and flow regulations are accounted for. The model simulation period is tentatively January 2007 through October 2022. The model calibration period will be tentatively January 2017 through October 2022 to match the period with the most intensive field data collection efforts. The verification period is tentatively the ten-year window of January 2007 through December 2016. Skills assessment including model-to-data statistical comparisons will be completed for both calibration and validation processes. Specific modeling periods and other details will be determined as part of quality assurance project plan (QAPP) development.

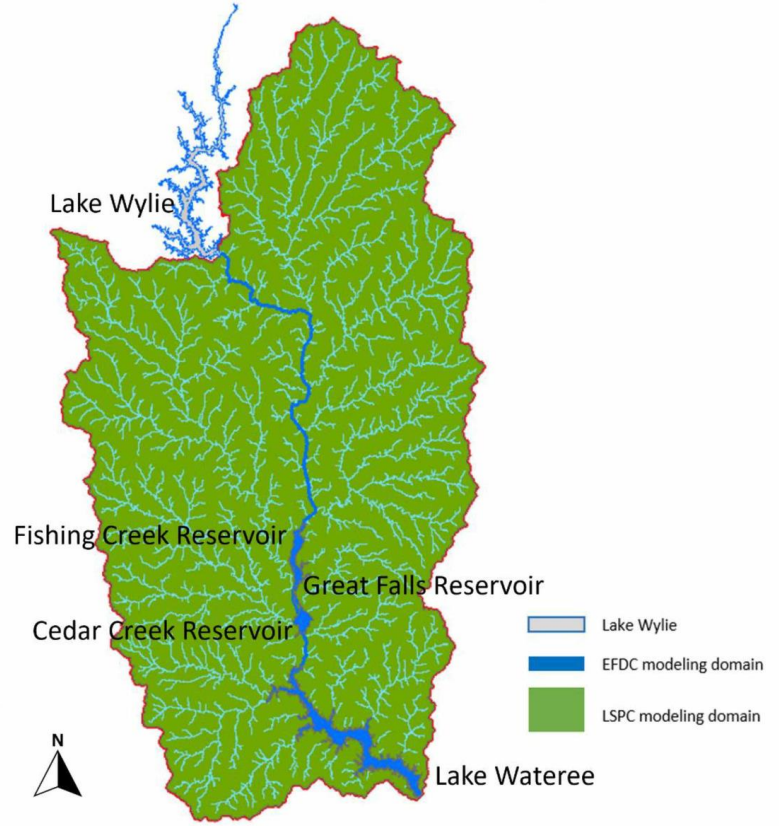


Figure: The Lower Catawba River Basin is highlighted in green and coincides with the expected LSPC watershed model footprint. The EFDC hydrodynamic and water quality models will include the Catawba River from the tailrace below Lake Wylie through the Lake Wateree dam. The EFDC model domain is highlighted in blue. Lake Wylie will not be modeled; hydrodynamic and water quality data at the Lake Wylie dam tailrace will be a model boundary.

WHAT ARE THE IMPLICATIONS OF NOT RESOLVING IMPAIRMENTS?

WHY WE NEED TO ADDRESS IMPAIRMENTS

- Impacts to public health
- Unsafe recreation
- More difficult treatment of drinking water

- Impacts to aquatic communities
  - Economic costs due to loss of aquatic communities (i.e., fisheries)

- Community impacts
  - Unaddressed water quality impairments can limit community growth and development due to restrictions on permitting new or expanded discharges to impaired waters
  - Federal and State law require that we address impaired waters
    - Again, the laws impose restrictions on regulated entities discharging to impaired waters

Who bears the burden to address water quality issues?

Who Bears the Burden of Impaired Waters

Aquatic Life

People who rely on the waters for:

- Drinking water
- Fishing
- Recreation
- Economic livelihood

Who Bears the Burden of Impaired Waters

- **Regulated point sources typically bear a disproportionate burden of the necessary controls to address impairments**
- **Non-point sources are increasingly targeted**
  - Historically, we have offered a wide range of carrots to address, for example, impacts from agriculture
  - Significant success in some part of the Country through these programs
- **Some impairments are due to sources that are:**
  - Local;
  - Statewide,
  - Regional or even
  - National (such as mercury impairments east of I-95 due to mid-West coal fired Power plant emissions)

Who Bears the Burden of Impaired Waters

- Unique local government role
  - Regulated (drinking water, wastewater, and stormwater) by federal and State governments
  - But, co-regulator with States and US EPA in managing non-domestic discharges to publicly-owned sewers and construction-related stormwater released into public storm sewers

How can you participate and what can you do to help?

How Can You Participate and Help?

- Many opportunities to participate to ensure that a water quality problem of concern to you is well defined and that affordable and cost-effective solutions have been identified
- Alert your community and/or DHEC to unusual discharges that you may encounter to waters in your community
- Consider collecting water quality data (after working with DHEC to ensure you will use proper procedures) to support DHEC's monitoring program for waters of concern
- Help with public outreach programs focused on water quality issues

How Can You Participate and Help?

- Start at Home: What happens on your property affects nearby waterbodies
  - Fertilizing your lawn
  - Managing storm water
  - Making sure your sewer lateral is in decent shape
- Support efforts to better define the true water quality problems (nitrogen, phosphorous, other? What about the ratio of TN and TP) behind any impairments
  - We need regulatory responses to water quality issues to hit the mark, especially requirements that affect public sources (wastewater, stormwater, etc.) as we need to spend limited public dollars effectively.
- Support reasonable regulation of non-point sources as well as cost-share programs

CATAWBA WATEREE WATER MANAGEMENT GROUP

THANK YOU

Water for All Summit 2023