NC Policy Collaboratory

PROJECT BRIEF
March 2020

UNC FALLS LAKE NUTRIENT MANAGEMENT STUDY

***Lead Faculty Researcher**: Mike Piehler, UNC Institute for the Environment*

BACKGROUND

In 2016, the NC General Assembly approved legislation for UNC-Chapel Hill to conduct a research study of nutrient management strategies and to create a comprehensive analysis of existing water quality data for Jordan Lake and Falls Lake.

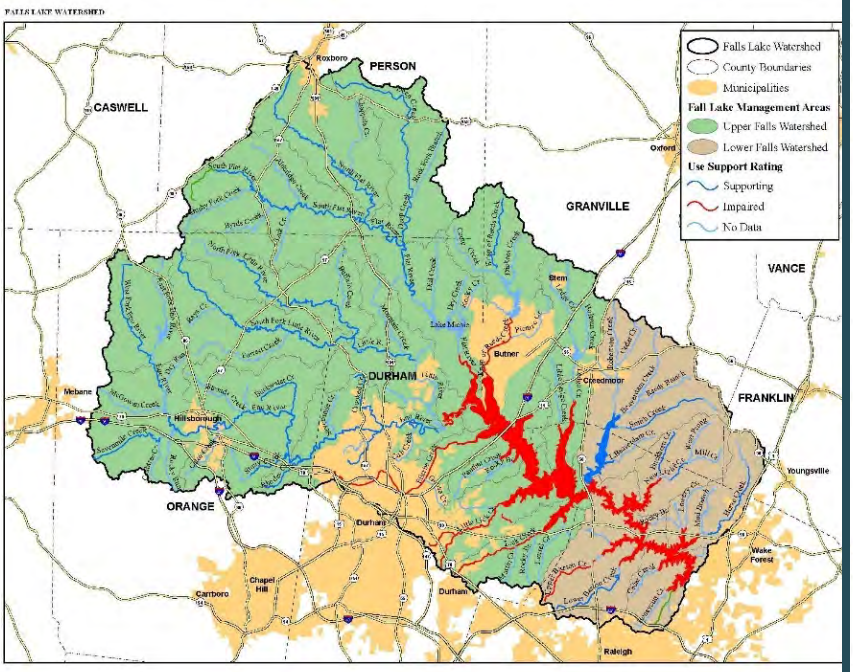

Figure 1, Map of Falls Lake Watershed, Source: NCDEQ

Pursuant to the legislation, the study team first focused on Jordan Lake but beginning in the fall of 2019 the research shifted to Falls Lake.

Six counties make up the Falls Lake watershed. Falls Lake serves as a drinking water source for Raleigh and its surrounding areas. It is a reservoir that was created when the Army Corps of Engineers built a dam on the Neuse River in 1981. The lake was designed to serve as a regional water supply, to prevent flooding, and to help protect water quality downstream of the lake during droughts. Falls Lake later proved to be a great recreational location for the area and its residents.

The Falls Lake Nutrient Management Study follows the multi-year Jordan Lake study. The research from the first three years of the study in Jordan Lake will be used as a starting point to identify opportunities to build on research issues that are relevant to Falls Lake.

CURRENT STATUS

The research team just concluded its final report for Jordan Lake, which can be found at: nutrients.web.unc.edu. The research team is transitioning to a more focused evaluation of Falls Lake through a variety of research projects, which are outlined on the following pages.

The study team is required to submit to the North Carolina General Assembly an Interim Update on the Falls Lake Study in December of 2020.

PROJECT COMPONENTS

A team of university researchers are conducting a number of distinct research projects related to the water quality in Falls Lake and throughout the watershed. In addition, projects are underway that will also examine potential financial and policy options to reduce nutrient pollution and improve the water quality of Falls Lake.

The following projects are in collaboration with three universities, which consist of the University of North Carolina at Chapel Hill, North Carolina State University, and East Carolina University.

Financing Nutrient Management in the Falls Lake Watershed

- The main goal of this project is to develop a cost and revenue inventory, and a 'revenueshed' tool. A revenueshed tool will show flow of current and potential revenue that may be used for nutrient reduction.

Defining the Balance Between Cyanobacterial N Fixation and Denitrification

- This relationship between bacteria is crucial because denitrification is the natural process that removes excess nitrogen from ecosystems. This project will determine nitrogen fixation measurements in Falls Lake and will ultimately provide crucial information on the natural balance of nitrogen

Evaluating Suspended Sediment Inputs

- Suspended sediments influence not only drinking water quality, but also provide an insight into other water processes such as carbon and nutrient cycles in Falls Lake. By measuring sediment loads as a result of water discharge, deposition and sedimentation rates will be recorded to provide a better understanding of sediment fluxes in the Falls Lake system.

Effects of Land Use and Stream Network Dynamics on Water Quality

- This project will examine the source of nutrient loading and the effects of land use on the water quality of Falls Lake, and specifically identify the source of high nutrient loading after storms in urban environments.

Cyanotoxin Presence and Year-Round Dynamics

- Cyanobacterial Harmful Algal Blooms (CyanoHABs) have a damaging impact on NC drinking water, fisheries, tourism and food web resilience, yet it is unknown if these blooms exist or pose a concern for the Falls Lake system. Sampling will take place in the lake to determine the level common cyanotoxins present.

Green-Street Retrofit Study

- Green streets are transportation areas where low-impact development is used to reduce stormwater runoff and nutrient loads. This research component will examine the potential for water quality improvements from a green-street implementation.

Community Engagement for Integrated Stormwater Management Implementation

- Public participation creates a positive impact on the policy process of governmental and institutional projects. This study will explore the impact of community engagement in the process of green infrastructure implementation on private properties.

Quantifying Sediment Nutrient Processing

- Collecting sediment cores will determine nitrogen fluxes, sediment oxygen demand, and describe nutrient changes to inform research-based policy management.

Falls Lake In Situ Water Circulation Study

- Water flow measurements are necessary to model water quality in the lake. This project will continuously measure crucial water properties (movement, temperature, pH, etc.).

Influence of Onsite Wastewater Nutrient Inputs and Validate Watershed Models

- This report will develop watershed models and a suggested monitoring strategy that will determine the influence of septic systems on nutrient levels in Falls Lake

For more information about the UNC Falls Lake Study and other Collaboratory projects please visit: Collaboratory.unc.edu