

Paying for Nutrient Management in Falls Lake Summary of First Year Research

In year one of the Falls Lake Nutrient Management Study, the EFC leveraged the experience from the 3-year Jordan Lake Nutrient Management Study to form a foundation for work in the Falls Lake Watershed. In the first year of studying Falls Lake, the EFC has begun to identify key differences between Jordan and Falls Lake Watersheds to determine if a governance and finance model that is successful in one watershed may necessarily be successful in the other. An answer to this question will help us continue to support Jordan Lake One Water.

Year One Research Questions

The EFC engaged with stakeholders, and reviewed literature and the Falls Lake Rules. We sought to understand if Falls Lake is inherently less fragmented and more collaborative than Jordan from a nutrient management standpoint. We also continue to explore whether there are existing revenue tools in the Falls Lake Watershed that are being underutilized. Specific tasks for year one included:

1. Write an overview of the Falls Lake Rules as they pertain to the financial responsibilities for stakeholders in the watershed;
2. Start the development of an inventory of existing costs associated with, and revenue earmarked for, nutrient management within the Falls Lake Watershed;
3. Engage with the UNRBA and learn about its role in regulatory compliance. Closely follow the UNRBA Path Forward Committee's development of an Interim Alternative Implementation Approach;
4. Engage with as many stakeholder local governments as possible to identify the existing and future streams of revenue for nutrient management.
5. Start the development of a 'revenueshed' for existing rates, fees, and tax schedules for local governments. Improve upon the 'revenueshed' by adding a component that visualizes the affordability for the typical household of raising revenues for nutrient management using existing mechanisms.

1. Overview of Falls Lake Rules and Estimated Costs

The NC Environmental Management Commission (EMC) adopted the Falls Lake Nutrient Management Strategy in 2011 to reduce nutrient loading to the Falls Lake Reservoir. The Rules establish two stages for nutrient reduction goals: Stage I, which was estimated to cost \$605 million and focused on the Lower Falls Reservoir and Stage II, which broadens in objective to the entire Falls Lake Reservoir and was estimated to cost \$946 million. The Rules were set to transition from Stage I to Stage II on January 15, 2021, but Stage II has been delayed.

All cost estimates in this report come from the Fiscal Analysis for Proposed Nutrient Strategy for Falls of Neuse Reservoir prepared by the North Carolina Division of Water Quality Planning Section and are in 2010 dollars (July 14, 2010).

Stage I: The overall objective of Stage I is to, at minimum, achieve and maintain nutrient-related water quality standards in the Lower Falls Reservoir as soon as possible but no later than January 15, 2021 and to improve water quality in the Upper Falls Reservoir. The total estimated cost for compliance with Stage I among all parties, watershed-wide is \$605 million (in 2010 dollars).

Stage II: The overall objective of Stage II is to achieve and maintain nutrient-related water quality standards throughout Falls Reservoir. This is estimated to require a reduction of 40 and 77 percent in average annual mass loads of nitrogen and phosphorus, respectively. The resulting Stage II allowable loads to Falls Reservoir from the watersheds of Ellerbe Creek, Eno River, Little River, Flat River, and Knap of Reeds Creek shall be 658,000 pounds of nitrogen per year and 35,000 pounds of phosphorus per year. Stage II requires implementation of additional controls in the Upper Falls Watershed beginning no later than January 15, 2021 to achieve nutrient-related water quality standards throughout Falls Reservoir by 2041 to the maximum extent technically and economically feasible. The total estimated cost for compliance with Stage II among all parties watershed-wide is \$946 million (in 2010 dollars).

Each sector has separate requirements under both stages. The sectors are as follows:

I. Rule .0277 Stormwater Management for New Development

All local governments must implement stormwater management programs for new development activities, which are designed to meet nutrient loading rate targets of 2.2 lbs/acre/year total nitrogen and 0.33 lbs/acre/year total phosphorus. Any developer of greenfield development has the option of offsetting up to 50 percent of the reduction load by funding offsite offset measures, which must be equivalent to onsite measures.¹ To ensure that the integrity of receiving waters and associated riparian buffers are not affected by erosive flows, at a minimum, the new development cannot result in a net increase in peak flow leaving the site from pre-development

¹ North Carolina Division of Water Quality. Fiscal Analysis for Proposed Nutrient Strategy for Falls of Neuse Reservoir. 14 June 2010.

conditions for the one-year, 24-hour storm event. Proposed new development shall demonstrate compliance with the riparian buffer protection requirements.

Most of the costs associated with the new development rule falls on developers. The estimated cost of compliance with this rule is between \$5 million and \$10 million per year for developers and about \$90,000 per year for local governments.²

II. Rule .0278 Stormwater management for existing development

All local governments must develop and implement a program to reduce loads from existing developed lands to 2006 baselines. In Stage I existing development (ED), a local government subject to this Rule should implement a load reduction program that provides estimates of, and plans for offsetting by calendar year 2020, nutrient loading increases from lands developed after the baseline period and not subject to the requirements of the local government's Falls Lake new development stormwater program. For these post-baseline existing developed lands, the current loading rate shall be compared to the loading rate for these lands prior to development for the acres involved, and the difference shall constitute the load reduction need in annual mass load, in pounds per year. Alternatively, a local government may assume uniform pre-development loading rates of 2.89 pounds/acre/year N and 0.63 pounds/acre/year P for these lands. Stage I ED requirements have not yet been set by the EMC and DWR.

If Stage I reduction objectives for existing development are not achieved, a local government's initial Stage II load reduction program should achieve additional annual reductions in nitrogen and phosphorus loads greater than or equal to the average annual additional reductions achieved in the highest three years of implementation of Stage I or provide for an annual expenditure that equals or exceeds the average annual amount the local government has spent to achieve nutrient reductions from existing development during the highest three years of implementation of Stage I.

DEQ estimated that the total costs of implementing Stage I ED over 10-years would be \$225 million in 2010 dollars, about \$22 million per year. The total cost of implementing Stage II would be \$776 million watershed-wide, or \$51 million per year.

III. Rule .0279 Wastewater discharge requirements

This rule distributes the total point source of loading goals to the 3 existing large wastewater discharges in the upper watershed (see Figure 3) and establishes concentration limits for 2 large private plants in lower watershed. Stage I requires a reduction of 20 percent total nitrogen (TN) and 40 percent total phosphorus (TP). Stage II requires a 40 percent reduction in TN and 77 percent TP. The projected cost for wastewater discharge compliance was \$249 million for Stage I and \$229 million for Stage II in 2010 dollars.

² North Carolina Division of Water Quality. Fiscal Analysis for Proposed Nutrient Strategy for Falls of Neuse Reservoir. 14 June 2010.

IV. Rule .0280 Agriculture

This rule establishes collective nitrogen and phosphorus reduction goals for agricultural operations. A 20 percent reduction in TN and 40 percent reduction in TP is to be achieved by 2021 in Stage 1. A 40 percent reduction in TN and a 77 percent reduction in TP is to be achieved in Stage 2 by 2036. Costs for agriculture compliance were estimated to be \$6.6 million for Stage I and \$6.1 million for Stage II in 2010 dollars.

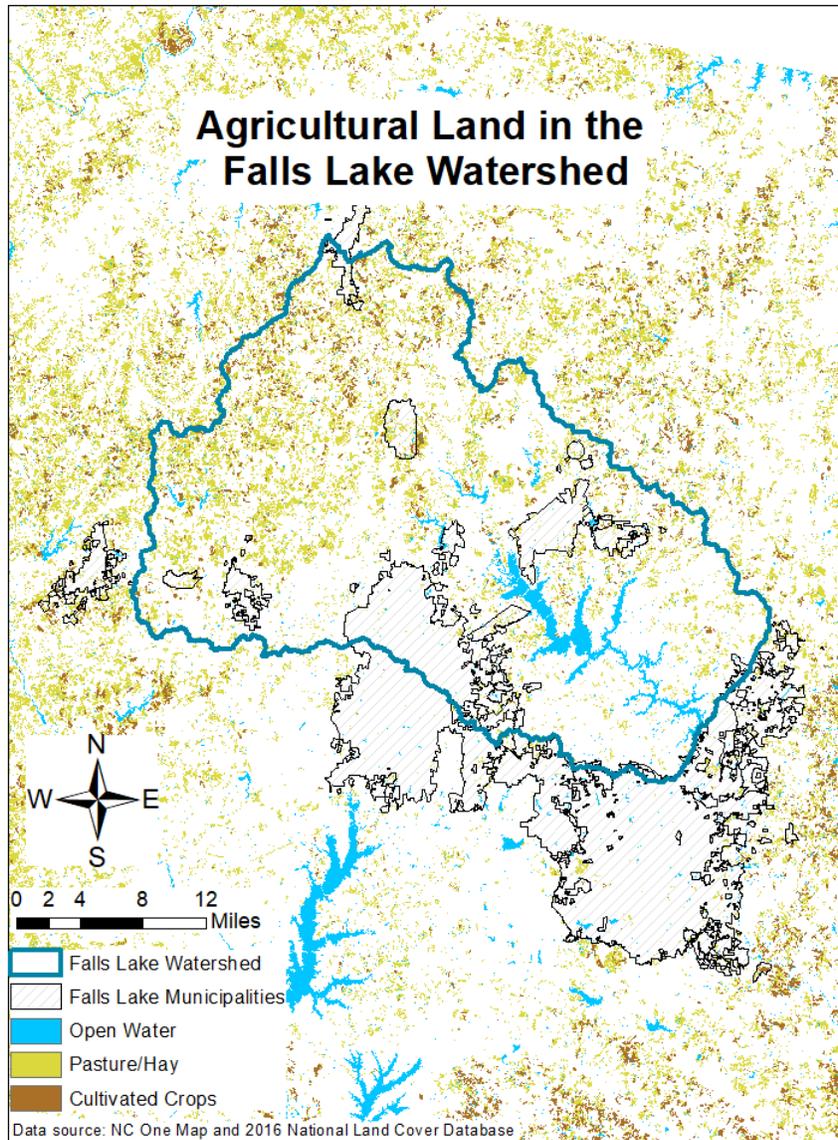


Figure 1. Agricultural land in the Falls Lake watershed is concentrated in the upper watershed.

V. Rule .0281 Stormwater requirements for state and federal entities

This rule establishes requirements for state and federal entities that are like Rules .0277 and .0278 for both new and existing development. NCDOT is subject to unique requirements but must still meet buffer requirements. Additionally, NCDOT must complete six retrofits per year on existing roadways pursuant to Rule .0278.

VI. Rule .0282 Options for offsetting nutrient loads

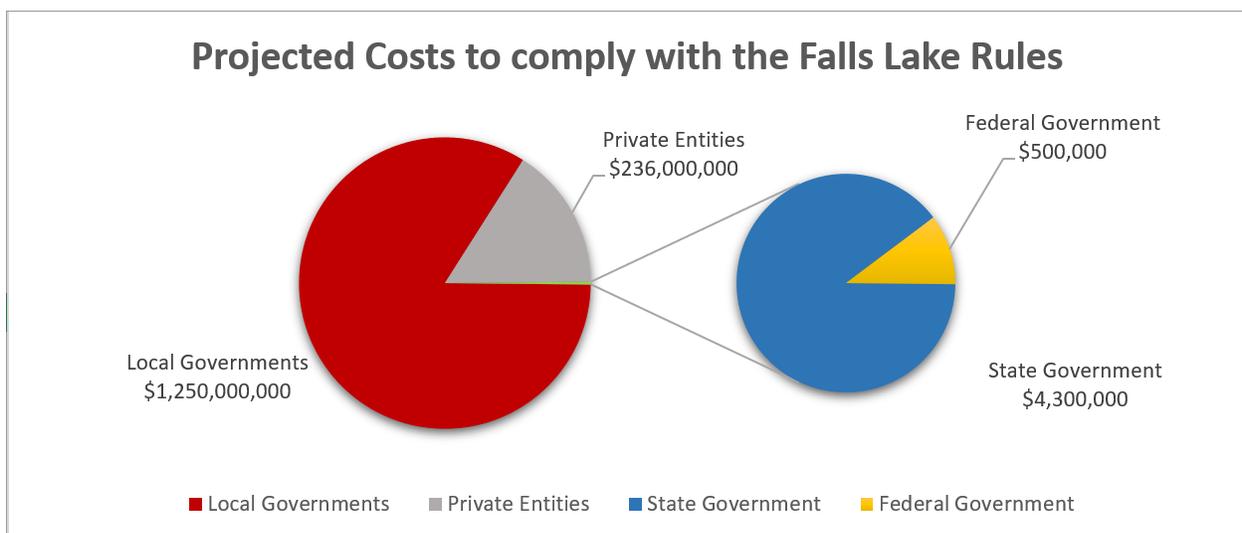
This rule provides parties the option to purchase reduction credits from other reduction sources or private sellers, which is like nutrient trading which is used in the Neuse and Tar-Pamlico strategies. Minimum on-site reductions must be met before seeking credits elsewhere. For example, Rule .0277 requires that developers meet 50 percent of nutrient reduction on-site before purchasing credits off-site.

VII. Rule .0283 Fertilizer management

Three years after effective date, all applicators of fertilizer must have completed nutrient management training offered by the Cooperative Extension office or follow an approved nutrient management plan. This rule does not apply to residential application of fertilizers.

A. Overview of Cost Burden

Overall, most of the cost for compliance with both Stage I and Stage II falls on the local governments in the Falls Lake Watershed. The 2010 estimate for local governments responsibility was \$1.25 billion, \$236 million for private entities, \$4.3 million for the State government, and \$500,000 for the federal government. These values are based on 30-year estimates with high levels of uncertainty. Cost burdens are subject to change with the delay of Stage I ED and Stage II requirements and with any shift in rule requirements.



B. Rules Re-Examination

NC Session Law 2018-5 requires the Environmental Management Commission to review the Falls Water Supply Nutrient Strategy, Rules .0275 through .0282 and Rule .0315. These include Stormwater Management for New Development, Stormwater Management for Existing Development, Wastewater Discharge Requirements, Agriculture, Stormwater Requirements for State and Federal Entities, and Options for Offsetting Nutrient Loads.

Stage I Existing Development (ED) requirements have not yet been set by the EMC or DWR. Stage II is delayed until the Rules are modified and adopted following the completion of the Falls Lake Nutrient Management Study.³ The re-adoption process for the Rules must be started by the EMC by December 31, 2024.⁴

Additionally, the Rules allow for a re-examination of Stage II reduction requirements if certain steps are met. According to the UNRBA, all steps for re-examination have been met.⁵

³ NC Session Law 2018-5

⁴ Ibid.

⁵ Draft Program Document: Stage I Existing Development (ED) Interim Alternative Implementation Approach (IAIA). 8 June 2020.

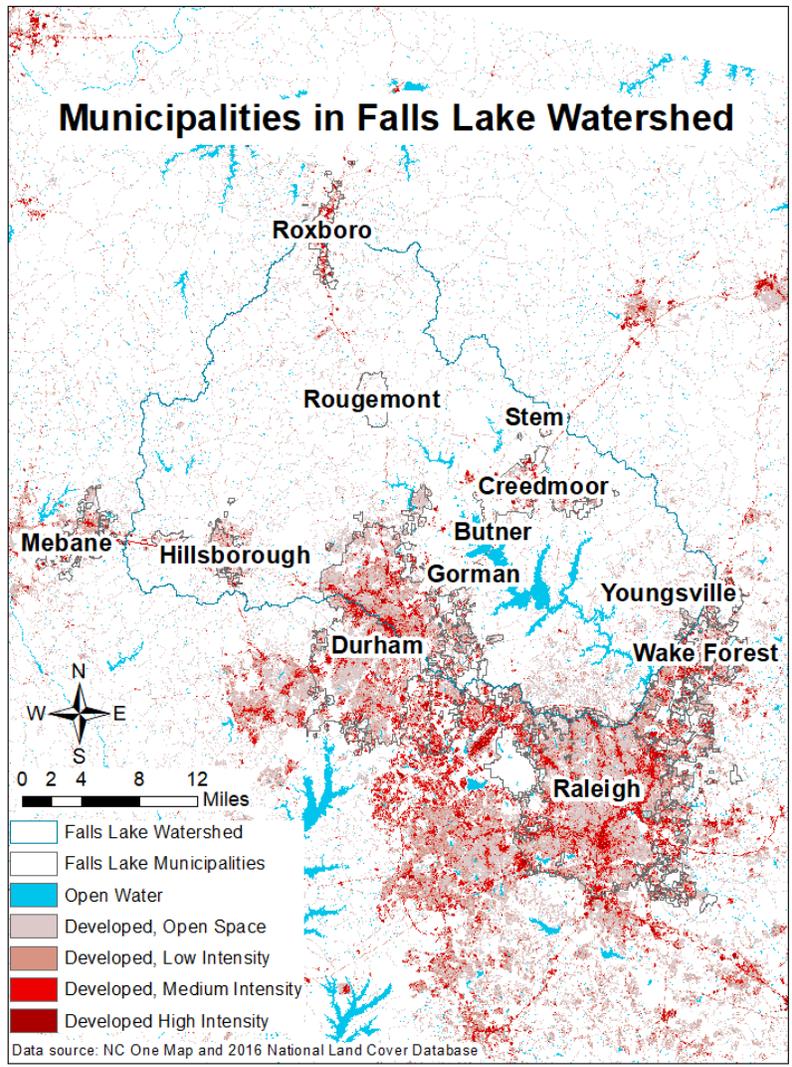


Figure 2. Municipalities in the Falls Lake watershed. Urban development is marked as red on the map. Additional jurisdictions include Orange, Granville, Person, Franklin, Durham, and Wake County.

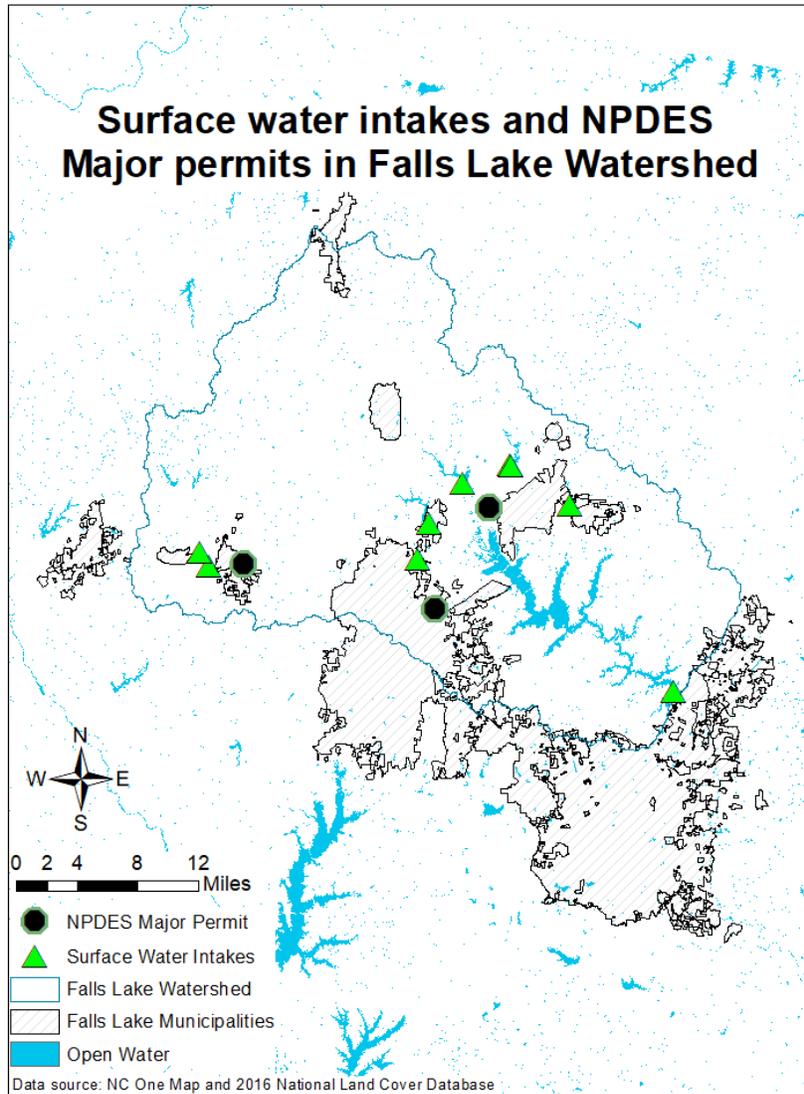


Figure 3. Surface water intakes and National Pollution Discharge Elimination System (NPDES) major permits. The major permits are for WWTPs in Hillsborough, Durham, and Granville County.

2. Inventory of Existing Costs and Earmarked Revenues

The EFC continues to inventory existing costs associated with complying with the Falls Lake Rules in our stakeholder interview process. We are also working to identify anticipated future costs of compliance with the rules and the plan each stakeholder has developed to pay for these costs, referred to in the title of this section as “earmarked revenues.”

I. Wake Forest

Wake Forest contributed \$9,715.29 to the UNRBA for dues in fiscal year 2020. Under the IAIA, the town would contribute \$13,692 annually, which will come out of the general fund, as Wake Forest does not currently have a stormwater enterprise fund or stormwater fee. Wake Forest receives water and wastewater service from Raleigh Water, through which customers pay a watershed protection fee used to fund the Upper Neuse Clean Water Initiative.

II. Durham County

Durham County has approved the creation of a stormwater enterprise fund and the implementation of a stormwater fee effective fiscal year 2021. The proposed annual operating budget is \$800,000 which was reduced from the originally proposed \$2.5 million because of the anticipated economic impact of Covid-19 on Durham County residents. The stormwater enterprise fund will support capital projects throughout Durham County, as well as an expansion of the staffing capacity within the stormwater department, which previously relied upon stormwater permitting fees.

The original estimate for Durham County to fully comply with the Falls Lake and Jordan Lake Rules was about \$70 million.

III. Hillsborough

Hillsborough spent \$16 million to upgrade their WWTP to comply with Stage I requirement for wastewater discharge. Hillsborough identified that this upgrade (which received national recognition for nutrient reduction) exceeds their requirement, therefore, they now have credit for future reduction requirements. Under the IAIA approach, Hillsborough’s annual contribution to the UNRBA would be \$34,221 in addition to their annual dues of \$24,725. They express support the IAIA approach as a way to contribute to large and effective efforts in partnership with other jurisdictions. They pay for the UNRBA dues and projects from their stormwater enterprise fund. The stormwater enterprise fund had \$659,000 in revenues in FY 2019.

3. Engage with UNRBA Path Forward Committee on the IAIA

We have attended the meetings for the UNRBA Path Forward Committee, which is leading the development of the UNRBA Interim Alternative Implementation Approach (IAIA). The IAIA is an alternative option set forth by the UNRBA to achieve compliance with the Stage I Existing Development. The IAIA offers an investment-based approach to compliance with Stage I ED, rather than the nutrient reduction-based approach within the Rules.

Among UNRBA members, Stage I requirements for nutrient loading from agriculture and major point sources, such as wastewater treatment plants, have been met.⁶ The total reductions from these sources is greater than the combined reduction goals within Stage I for both point sources and existing development. Recognizing this, the UNRBA is proposing the IAIA to allow joint compliance under Stage I ED for UNRBA members that participate in the IAIA. Under the IAIA, participants would contribute funds based on the same formula currently used by the UNRBA for its dues. This formula assigns funding responsibility based on a flat fee for all members, water allocation from Falls Lake, and land area within the Falls Lake Watershed. The current funding amount for the IAIA is based on a proposal from Granville County that they would be willing to contribute \$100,000 annually. Based on this calculation, if all members choose to participate in the IAIA, annual financial commitment would be \$1.5 million. Participants can get credit towards their contribution by investing in IAIA eligible projects within their own jurisdiction.

Table 1: Commitment Levels for Local Governments under Stage I ED IAIA⁷

Member	Annual Funding Level	Member	Annual Funding Level
Town of Butner	\$23,393	Town of Hillsborough	\$34,221
City of Creedmoor	\$16,926	Orange County	\$161,943
City of Durham	\$337,587	Person County	\$114,394
Durham County	\$133,300	City of Raleigh	\$466,081
Franklin County	\$19,058	Wake County	\$88,968
Granville County	\$100,453	Town of Wake Forest	\$13,692

As proposed, the IAIA would not achieve compliance for Stage II ED, which is set to be re-evaluated by the EMC and DWR following the completion of the Fall Lake Nutrient Management

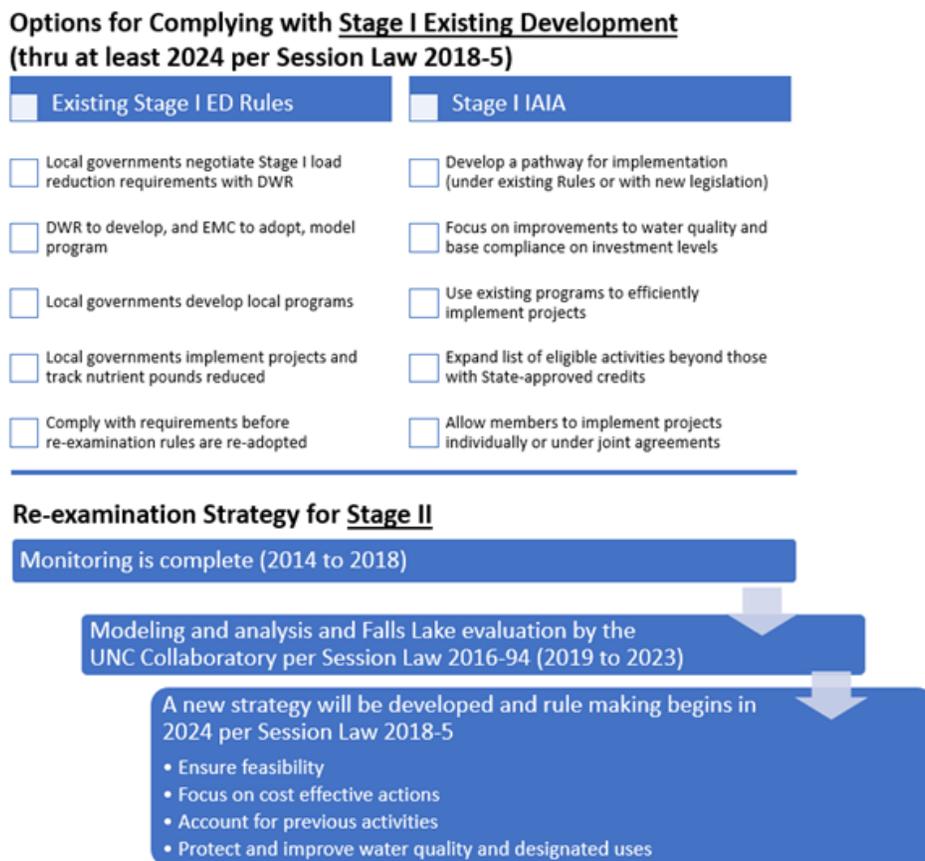
⁶ Draft Program Document: Stage I Existing Development (ED) Interim Alternative Implementation Approach (IAIA). 8 June 2020.

⁷ Ibid.

Study. Separately, the UNRBA is also evaluating options for joint compliance under Stage II of the Falls Lake Rules. These re-evaluations will be informed by the monitoring component of this Study and the science, policy, and finance recommendations that come from it. The UNRBA is working to ensure that all nutrient reduction actions taken within the IAIA will be creditable under the readopted Falls Lake Rules.

Currently, UNRBA lacks the ability to pool IAIA contributions and spend this revenue on decentralized projects throughout the watershed. Instead, participants that contribute funds to the IAIA pool would need to spend the funds using interlocal agreements or by funding existing local organizations, such as the local Soil and Water District, County Health Departments, School Districts, watershed improvement associations, and land conservation groups. In this manner, the funds do not actually enter a pool, per se. They are raised, spent, and accounted for by each of the participants within the IAIA and under the terms of an interlocal agreement entered into by the participating members.⁸

Figure 4: Stage I Existing Development Compliance Options and Stage II Re-examination Strategy⁹



⁸ Draft Program Document: Stage I Existing Development (ED) Interim Alternative Implementation Approach (IAIA). 8 June 2020.

⁹ Ibid.

4. Engage with Stakeholders

The EFC has interviewed three local governments in the Falls Lake Watershed to understand the measures they took because of the Falls Lake Rules, the costs of those measures, and their view of the UNRBA, among other things. So far, we have interviewed staff from Hillsborough, Durham County, and Wake Forest, and plan to complete at least five more with jurisdictions in the Falls Lake Watershed.

I. Wake Forest

For Wake Forest, the main measure taken in response to the Falls Lake Rules was the writing of their stormwater and erosion ordinance. Their constituents receive water services from Raleigh Water, which charges a watershed protection fee. They view the UNRBA very positively, saying that it would cost them much more than their membership fee to hire a consultant to do the work that UNRBA does. They view the cost as worthwhile and are working to ensure that the public officials understand the benefit as well.

II. Durham County

Like Wake Forest, Durham County's main response to the Falls Lake Rules has been to implement a new development ordinance and specify acceptable nutrient loads for new development. In addition, they have also created a stormwater utility in response to the anticipated costs associated with both the Jordan Lake and Falls Lake Rules. The Stormwater Utility will collect a stormwater fee and use the money to plan and save for larger projects in the coming years. Like Wake Forest, they noted the value of the UNRBA to do the work that they do not have the time or money to do. Durham County also noted that the UNRBA provides resources for communicating to the board of commissioners. However, they are eager to see UNRBA implement capital projects in addition to the modeling and monitoring work it supports. Durham County stormwater currently supports the IAIA for achieving more on-the-ground results and has expressed the willingness to contribute to the IAIA by implementing projects within Durham County.

III. Hillsborough

Hillsborough has undertaken several projects in response to the Falls Lake Rules, most notably upgrading their wastewater treatment plant. Though this and other projects (replacing sewer lines, moving a facility out a floodplain) probably would have happened eventually, they were implemented sooner because of the Falls Lake Rules. Staff at Hillsborough have tried to complete projects that 'check multiple boxes', such as reducing erosion as well as providing opportunities for community education and engagement. They also view the UNRBA favorably, noting that the organization can engage with big stakeholders (such as environmental and agricultural groups) in a way that the small municipalities are not able.

5. Development of the Falls Lake 'Revenueshed'

The EFC has begun the development of a 'revenueshed' for raising revenue for nutrient management in Falls Lake. Funding mechanisms under examination include property tax, water and wastewater rates, stormwater fees, sales tax, water allocation fees, and a fee for watershed protection modeled off Raleigh Water's watershed protection fee.

Research in the next year will include adding a recreation or hunting and fishing 'revenueshed' to the water quality and water supply 'revenuesheds' proposed in the Jordan Lake Nutrient Management Study. The EFC is examining case studies across the country for how revenues from state park admissions, hunting and fishing licenses, and personal property tax on boats and boat trailers may be used to fund water quality initiatives.

Ongoing Support Work With JLOW

The EFC continues to support the work done by the Jordan Lake One Water (JLOW) Financial Structure Workgroup, and our Executive Director, Erin Riggs, sits on the Advisory Committee.

The Governance Structure Workgroup has proposed a model like UNRBA for a watershed organization in Jordan Lake. Currently, UNRBA lacks the ability to pool and spend money within jurisdictions within the watershed. This will need to be addressed moving forward. Our work with the JLOW Financial Structure Workgroup includes financial modeling of potential revenue generation for JLOW using the UNRBA funding model, which calculates each member's dues based on water allocation, land area, and a flat fee. We estimate that using this model, JLOW would raise \$1.86 million in annual dues.

Additionally, we interviewed Matthew Flynn, the Stormwater Development Manager for the Town of Cary. The town council approved the creation of a watershed protection fund within their water enterprise fund. The watershed protection fund will receive an annual contribution of \$765,000 through fiscal year 2041. Matthew Flynn has indicated that the Town plans to let the watershed protection fund grow in anticipation of using this money to meet the Town's future commitment to the finance and governance model that JLOW recommends.

Conclusion

The cost burden associated with the Falls Lake Rules is significant, and local governments are responsible for the majority of these costs. The fiscal analysis performed by the Division of Water Quality in 2007 for Jordan Lake suggests similar costs for compliance to that in the fiscal analysis for Falls Lake in 2010. The total cost of compliance was estimated to be \$905 million in Jordan Lake and \$1.54 billion in Falls Lake. However, according to the Division, cost estimates are conservatively high values, therefore there is reason to suggest that the actual costs in Falls Lake, as of 2010, would be less than the estimated \$1.54 billion.¹⁰ With \$1.25 billion (81 percent of total costs) falling on local governments, it is very clear why the UNRBA is working so hard to implement an interim alternative implementation approach to Stage I ED and work with the EMC and DWR to re-examine Stage II ED. No matter the outcome of the IAIA and re-examination process, local governments will be responsible for significant costs associated with nutrient management, especially for existing development.

The EFC will continue its work in the next two years to examine these costs, receive input from stakeholders and decision makers, and ultimately produce a set of recommendations for how local governments can meet the costs of a nutrient management strategy under the rules. To support this, we will complete the development of the 'revenuehed' tool and use the model to demonstrate a set of scenarios for how revenue may be generated under existing or modified revenue generation frameworks. Our research will include a deeper dive into expanding the Raleigh Watershed Protection Fee and implementing a revenue generation mechanism associated with recreation. Finally, we will address the affordability implications for watershed residents associated with each revenue generation technique that we model in the 'revenuehed' tool.

The starting point in the Falls Lake Watershed is different than in the Jordan Lake Watershed, as local governments have been communicating as active members of the UNRBA since 1996. We will continue to follow the UNRBA Pathforward Committee and their work with the IAIA. The EFC will also meet with DWR and receive their input on the IAIA, and we will finish our stakeholder interviews and summarize the watershed-wide buy in for nutrient management and address any concerns and uncertainties that exist.

¹⁰ North Carolina Division of Water Quality. Fiscal Analysis for Proposed Nutrient Strategy for Falls of Neuse Reservoir. 14 June 2010.