Path Forward Committee Meeting
Butner Town Hall, February 7, 2023

Agenda

- Opening Comments, Agenda Review/Revisions
- DWR Request for Information from Falls Lake Local Governments Regarding SNAP Submission Process
- Modeling Status and Project Budget Amendment for FY2023
- Gathering Data from Local Governments to Support the Cost Benefit Analysis
- Developing Recommendations for a Revised Nutrient Management Strategy and a Petition for a Site-Specific Chlorophyll-a Water Quality Standard
- Communications Support
- Other Status Items
- Closing

DWR Request for Information from Falls Lake Local Governments Regarding SNAP Submission Process

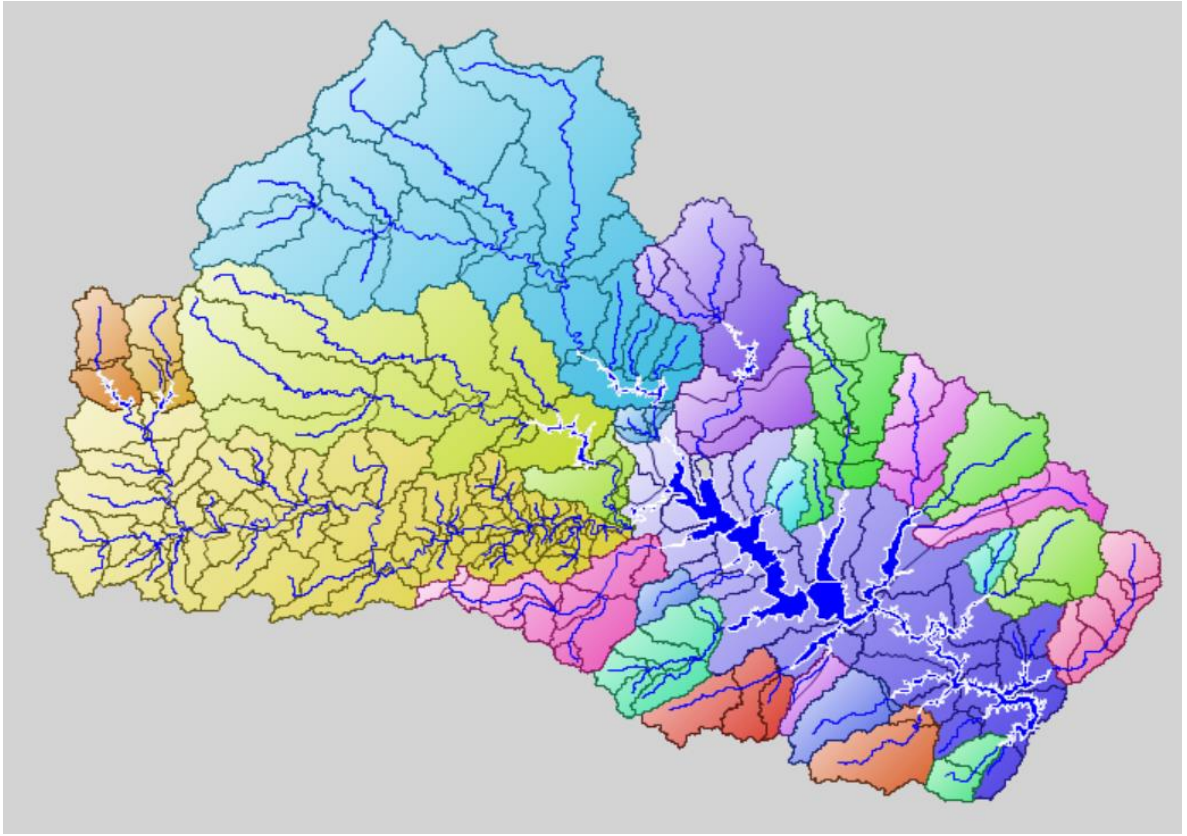
DWR Request for Information from Falls Lake Local Governments Regarding SNAP Submission Process

- DWR is requesting input from the UNRBA members on this issue.
- DWR has received input on the proposed revised SNAP tool from an engineer that indicates DWR should consider local governments stormwater application submission processes and requirements.
- There is concern that the proposed SNAP tool revisions could make things more complicated.
- One of the changes is the removal of the print function to provide hard copies for submittal, which the engineer indicates is required (perhaps for placement of the PE license stamp or seal).
- DWR will request feedback on this issue during the meeting.

Modeling Status

WARMF Model Training

- On Monday February 6th, the modeling team held a training workshop on the new WARMF model GUI for DWR modeling staff and UNRBA members who expressed interest in the training.



Watershed Model Report

- The modeling team has compiled and addressed MRSW comments in a redline draft that is being reviewed by Forrest and Michelle
- A number of the MRSW comments were best addressed by running sensitivity analyses with the calibrated model
- Sensitivity analyses and model scenarios were selected based on discussions with the Scenario Screening Group, MRSW, PFC, and the Board
- Watershed scenarios are also being summarized in the main report and described in Appendix H
- After Forrest and Michelle review the revisions, it will be distributed to the MRSW for review and additional comment (late February)
- Following refinements in response to the 2nd MRSW review, a clean version will be provided to the PFC for review, comment, and approval (mid March)
- Following additional refinements, the document will be formally submitted to DWR along with the model executable, input files, and output files (April)

Increase and Decrease Rainfall (+/- 20 percent)

- **Dry to average rainfall**
  - Precipitation inputs multiplied by 0.8 (20 percent less)
  - Best match to conditions for
    - DWR watershed model (2005 to 2007)
    - US Forest Service monitoring studies (2008 to 2013)
  - Compares progress relative to the requirements in the Falls Lake Rules under more similar conditions
- **Evaluating a very wet hydrologic condition (in progress)**
  - Precipitation inputs multiplied by 1.2 (20 percent more)
  - Assessment of increased storm sizes and frequencies

Falls Lake in 2007, photo courtesy of Southeast Regional Climate Center

Flat River during a high flow sampling event during the UNRBA Study Period

Hypothetical Removal of Humans with Land Conversion to Forests – Average to Wet Rainfall

- Removes human inputs - point sources, onsite wastewater treatment systems, and fertilizer application
- Instantly converts all land uses to forests (except wetlands)
- Other model inputs or watershed characteristics not changed
  - Meteorology, atmospheric deposition, soil chemistry and hydrologic soil properties are not changed
  - Streambank stability characteristics are not changed
  - Presence of other watershed impoundments (also may run without these other lakes and reservoirs)
- Provides lowest hypothetical loading to Falls Lake under average to wet rainfall and simulates resulting lake water quality
- This does not significantly affect the near lake drainage area
  - Currently 83% forests, wetlands, or open water
  - Overland flow with no stream transport
- Based on feedback from the January PFC meeting, this scenario will be evaluated with watershed impoundments in place

Hypothetical Removal of Humans with Land Conversion to Forests – Dry to Average Rainfall

- Evaluation of the model predictions for the hypothetical removal of humans with land conversion to forests under the average to wet rainfall condition led to inquiries about what would happen under the dry to average rainfall condition
- This scenario uses the same assumptions described on the previous slide but with 20 percent less precipitation
- Combines dry to average hydrologic condition with the all forest/no human inputs scenarios
- Provides the hypothetical watershed condition for hydrologic conditions that more closely match those used to develop the Falls Lake Rules
- In progress

Increase and Decrease Rates of Atmospheric Deposition (+/- 25 percent)

- Affects all land uses and the lake itself
- All constituents simulated by WARMF in either wet or dry atmospheric deposition are affected
  - Multiply by 0.75 for 25% reduction
  - Multiply by 1.25 for 25% increase
- Evaluates model uncertainty with spatial variability in rates
- Evaluates also potential impacts of further air quality improvements (already have seen a reduction of TN deposition of 26% if you compare 2006 to 2017 (“average” rainfall years)
- Note that only 21 percent of TN applied to the watershed is delivered to Falls Lake during average to wet hydrologic conditions and 16 percent of TP

Comparison of Delivered Loads to Falls Lake

- The following tables show the total loads delivered to Falls Lake from either the
  - Entire Watershed (~492 thousand acres)
  - Upper five tributaries (~316 thousand acres, 64% of area)
- Only the upper five tributaries were assigned load allocations in the Falls Lake Rules
- Allowable loads and baseline loads were based on year 2006 conditions (Falls Lake Rules)
  - Baseline loads based on observed flows and tributary water quality data from the five largest tributaries
  - 2006 was within the historic drought period, but that year had three very large storms and the total was close to the average amount for the watershed
  - Water quality observations used to set the load allocations reflect inputs of fertilizer, atmospheric deposition, and WWTP discharges present during the baseline period

Scenario Variants (Table Columns)

- **Land uses** - 2015 to 2018, 2006*, or “all forests and wetlands”
- **Rainfall** - average to wet based on the 6-hr precipitation inputs for the 2015 to 2018 model, dry to average rainfall where each of the 6-hr precipitation inputs is multiplied by 0.8, or very wet where each of the 6-hr precipitation inputs is multiplied by 1.2
- **Human inputs** (other than atmospheric deposition) - 2015 to 2018 inputs, 2006 inputs, or “none” to represent the “all forests and wetlands” condition
- **Rates of atmospheric deposition -** based on data collected near the watershed for 2015 to 2018, the 2015 to 2018 rates multiplied by 0.75 to represent 25 percent less atmospheric deposition, the 2015 to 2018 rates multiplied by 1.25 to represent 25 percent more atmospheric deposition, or the 2006 conditions inherently captured in the baseline tributary monitoring data.

**The land use imagery used to develop the DWR model was based on 2001 National Land Cover Data.*

Total Nitrogen (TN) Delivered Loads from the ENTIRE WATERSHED

Short Name	Land use	Rainfall	Human Inputs	Atm. Dep.	TN lb/yr[1]
UNRBA Study Period	2015-18	Avg. to wet	2015-18	2015-18	1,656,361 (recent load)
20% less rainfall	2015-18	**Dry to avg.**	2015-18	2015-18	1,078,331 (**35% lower**)
20% more rainfall	2015-18	Very wet	2015-18	2015-18	In progress
25% less atm. dep	2015-18	Avg. to wet	2015-18	-25%	1,574,429 (5% lower)
25% more atm. dep	2015-18	Avg. to wet	2015-18	+25%	1,730,978 (5% higher)
All Forest, study period rainfall	**Forest**	Avg. to wet	**None**	2015-18	1,243,640 (**25% lower**)
All Forest, 20% less rainfall	**Forest**	**Dry to avg**	**None**	2015-18	In progress

1. Loads are presented to the single pound for comparisons across the model report and appendices that present the data in various categories. This reporting is not to infer precision in the modeling results.

35% lower delivered TN loads to Falls Lake when rainfall is 20% lower.
25% lower delivered TN loads to Falls Lake under the hypothetical condition if rainfall is average to wet.

Total Phosphorus (TP) Delivered Loads from ENTIRE WATERSHED

Short Name	Land use	Rainfall	Human Inputs	Atm. Dep.	TP lb/yr[1]
UNRBA Study Period	2015-18	Avg. to wet	2015-18	2015-18	183,717 (recent load)
20% less rainfall	2015-18	**Dry to avg.**	2015-18	2015-18	106,894 (**42% lower**)
20% more rainfall	2015-18	Very wet	2015-18	2015-18	In progress
25% less atm. dep	2015-18	Avg. to wet	2015-18	-25%	182,259 (1% lower)
25% more atm. dep	2015-18	Avg. to wet	2015-18	+25%	184,586 (1% higher)
All Forest, study period rainfall	**Forest**	Avg. to wet	**None**	2015-18	177,630 (**3% lower**)
All Forest, 20% less rainfall	**Forest**	**Dry to avg**	**None**	2015-18	In progress

1. Loads are presented to the single pound for comparisons across the model report and appendices that present the data in various categories. This reporting is not to infer precision in the modeling results.

42% lower delivered TP loads to Falls Lake when rainfall is 20% lower.
6% lower delivered TP loads to Falls Lake under the hypothetical condition if rainfall is average to wet.

TN Delivered Loads from ONLY the Upper FIVE Tributaries

Short Name	Land use	Rainfall	Human Inputs	Atm. Dep.	TN lb/yr
UNRBA Study Period	2015-18	Avg. to wet	2015-18	2015-18	1,032,000 (recent load)
20% less rainfall	2015-18	**Dry to avg.**	2015-18	2015-18	646,000 (**37% lower**)
20% more rainfall	2015-18	Very wet	2015-18	2015-18	In progress
25% less atm. dep	2015-18	Avg. to wet	2015-18	-25%	990,000 (4% lower)
25% more atm. dep	2015-18	Avg. to wet	2015-18	+25%	1,069,000 (4% higher)
All Forest, study period rainfall	**Forest**	Avg. to wet	**None**	2015-18	725,000 (**30% lower**)
All Forest, 20% less rainfall	**Forest**	**Dry to avg**	**None**	2015-18	In progress
Baseline Loads[1]	2006	2006	2006	2006	1,096,700
Stage II Allowable Loads[2]	2006	Not stated	2006	2006	658,000

1. Baseline loads were estimated by DWR based on gaged flows and twice-monthly tributary water quality sampling.
2. Stage II allowable loads are prescribed by the Rules for the upper five tributaries.

37% lower delivered TN loads to Falls Lake when rainfall is 20% lower.
30% lower delivered TN loads to Falls Lake under the hypothetical condition if rainfall is average to wet.

TN Delivered Loads from ONLY the Upper FIVE Tributaries

Short Name	Land use	Rainfall	Human Inputs	Atm. Dep.	TN lb/yr
UNRBA Study Period	2015-18	Avg. to wet	2015-18	2015-18	1,032,000 (recent load)
20% less rainfall	2015-18	Dry to avg.	2015-18	2015-18	646,000 (37% lower)
20% more rainfall	2015-18	Very wet	2015-18	2015-18	In progress
25% less atm. dep	2015-18	Avg. to wet	2015-18	-25%	990,000 (4% lower)
25% more atm. dep	2015-18	Avg. to wet	2015-18	+25%	1,069,000 (4% higher)
All Forest, study period rainfall	Forest	Avg. to wet	None	2015-18	725,000 (30% lower)
All Forest, 20% less rainfall	Forest	Dry to avg	None	2015-18	In progress
Baseline Loads[1]	2006	2006	2006	2006	1,096,700
Stage II Allowable Loads[2]	2006	Not stated	2006	2006	658,000

1. Baseline loads were estimated by DWR based on gaged flows and twice-monthly tributary water quality sampling.
2. Stage II allowable loads are prescribed by the Rules for the upper five tributaries.

★ Delivered TN to Falls Lake for the "UNRBA study period" is similar to the baseline loads prescribed in the Rules based on 2006. Even though rainfall and stream flows increased, delivered nutrient loads did not.

TN Delivered Loads from ONLY the Upper FIVE Tributaries

Short Name	Land use	Rainfall	Human Inputs	Atm. Dep.	TN lb/yr
UNRBA Study Period	2015-18	Avg. to wet	2015-18	2015-18	1,032,000 (recent load)
20% less rainfall	**2015-18**	**Dry to avg.**	**2015-18**	**2015-18**	**646,000** (37% lower)
25% less atm. dep	2015-18	Avg. to wet	2015-18	-25%	990,000 (4% lower)
25% more atm. dep	2015-18	Avg. to wet	2015-18	+25%	1,069,000 (4% higher)
All Forest, study period rainfall	Forest	Avg. to wet	None	2015-18	725,000 (30% lower)
All Forest, 20% less rainfall	Forest	Dry to avg	None	2015-18	In progress
Baseline Loads[1]	2006	2006	2006	2006	1,096,700
Stage II Allowable Loads[2]	2006	Not stated	2006	2006	658,000

1. Baseline loads were estimated by DWR based on gaged flows and twice-monthly tributary water quality sampling.
2. Stage II allowable loads are prescribed by the Rules for the upper five tributaries.

★ **Stage II allocations for TN would be met for a dry to average rainfall condition under current watershed conditions and improvements.**

TP Delivered Loads from ONLY the Upper FIVE Tributaries

Short Name	Land use, Inputs	Rainfall	Human Inputs	Atm. Dep.	TP lb/yr
UNRBA Study Period	2015-18	Avg. to wet	2015-18	2015-18	109,100 (recent load)
20% less rainfall	2015-18	**Dry to avg.**	2015-18	2015-18	59,000 (**46% lower**)
20% more rainfall	2015-18	Very wet	2015-18	2015-18	In progress
25% less atm. dep	2015-18	Avg. to wet	2015-18	-25%	108,600 (0.5% lower)
25% more atm. dep	2015-18	Avg. to wet	2015-18	+25%	109,100 (no change)
All Forest, study period rainfall	**Forest**	Avg. to wet	**None**	2015-18	103,000 (**6% lower**)
All Forest, 20% less rainfall	**Forest**	**Dry to avg**	**None**	2015-18	**In progress**
Baseline Loads[1]	2006	2006	2006	2006	106,000
Stage II Allowable Loads[2]	2006	Not stated	2006	2006	35,000

1. Baseline loads were estimated by DWR based on gaged flows and twice-monthly tributary water quality sampling.
2. Stage II allowable loads are prescribed by the Rules for the upper five tributaries.

46% lower delivered TP loads to Falls Lake when rainfall is 20% lower.
Only 6% lower delivered TP loads to Falls Lake under the hypothetical condition if rainfall is average to wet.

TP Delivered Loads from ONLY the Upper FIVE Tributaries

Short Name	Land use, Inputs	Rainfall	Human Inputs	Atm. Dep.	TP lb/yr
UNRBA Study Period	2015-18	Avg. to wet	2015-18	2015-18	109,100 (recent load)
20% less rainfall	2015-18	Dry to avg.	2015-18	2015-18	59,000 (46% lower)
20% more rainfall	2015-18	Very wet	2015-18	2015-18	In progress
25% less atm. dep	2015-18	Avg. to wet	2015-18	-25%	108,600 (0.5% lower)
25% more atm. dep	2015-18	Avg. to wet	2015-18	+25%	109,100 (no change)
All Forest, study period rainfall	Forest	Avg. to wet	None	2015-18	103,000 (6% lower)
All Forest, 20% less rainfall	Forest	Dry to avg	None	2015-18	In progress
Baseline Loads[1]	2006	2006	2006	2006	106,000
Stage II Allowable Loads[2]	2006	Not stated	2006	2006	35,000

1. Baseline loads were estimated by DWR based on gaged flows and twice-monthly tributary water quality sampling.
2. Stage II allowable loads are prescribed by the Rules for the upper five tributaries.

★ **Delivered TP to Falls Lake for the "UNRBA study period" is similar to the baseline loads prescribed in the Rules based on 2006. Even though rainfall and stream flows increased, delivered nutrient loads did not increase signficantly.**

TP Delivered Loads from ONLY the Upper FIVE Tributaries

Short Name	Land use, Inputs	Rainfall	Human Inputs	Atm. Dep.	TP lb/yr
UNRBA Study Period	2015-18	Avg. to wet	2015-18	2015-18	109,100 (recent load)
20% less rainfall	2015-18	Dry to avg.	2015-18	2015-18	59,000 (46% lower)
20% more rainfall	2015-18	Very wet	2015-18	2015-18	In progress
25% less atm. dep	2015-18	Avg. to wet	2015-18	-25%	108,600 (0.5% lower)
25% more atm. dep	2015-18	Avg. to wet	2015-18	+25%	109,100 (no change)
All Forest, study period rainfall	Forest	Avg. to wet	None	2015-18	103,000 (6% lower)
All Forest, 20% less rainfall	**Forest**	**Dry to avg**	**None**	2015-18	**In progress**
Baseline Loads[1]	2005-7	Dry to avg	2005-7	2005-7	106,000
Stage II Allowable Loads[2]	2005-7	Not stated	2005-7	2005-7	35,000

1. Baseline loads were estimated by DWR based on gaged flows and twice-monthly tributary water quality sampling.
2. Stage II allowable loads are prescribed by the Rules for the upper five tributaries.

<u>To possibly meet Stage II TP allocations</u> would require dry to average rainfall conditions and the hypothetical removal of humans with instant conversion to forest, followed by at least 25 years of stabilization.

Key Findings from the Watershed Analyses - Loading

- The driver of loading is hydrology - 20% lower rainfall yields
  - 35% less TN
  - 42% less TP
- Under average to wet rainfall (like 2015 to 2018)
  - Even the hypothetical removal of humans with instant land conversion to forests does not achieve Stage II allocations for either TN or TP
- For dry to average rainfall (similar to 2005 to 2007)
  - TN loads have achieved Stage II allocations
  - Stage II allocations for TP are not feasible
- The Stage II allocations in the Rules are not feasible and did not consider the hydrology of the baseline period (historic drought)

Comparison of Lake Water Quality Among Scenarios

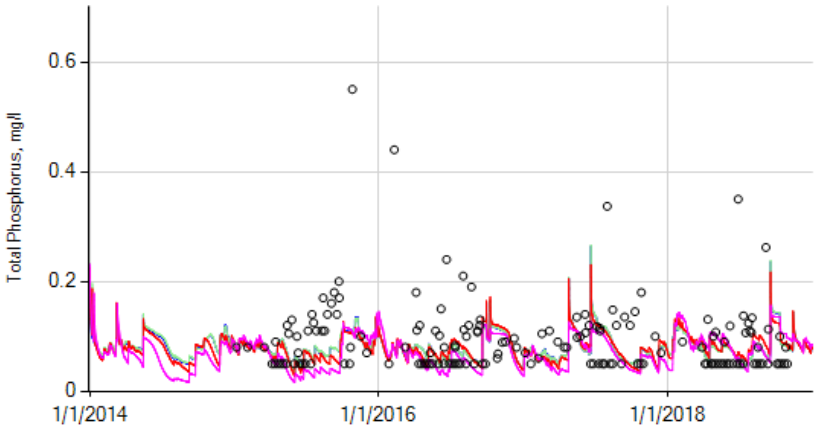
- The following slides show screen captures from WARMF
  - Figures start in 2014 not 2015 like earlier presentations
  - 2014 does not have the same level of detail for input data
  - 2014 observations are not included in the model interface
- Default colors are not easy to discern and will be changed for the formal reporting
- Comparative statistics have not yet been processed (e.g., percent of time simulated chlorophyll-a exceeds the criterion of 40 µg/L)

Many Interacting Processes are Affected by Scenarios

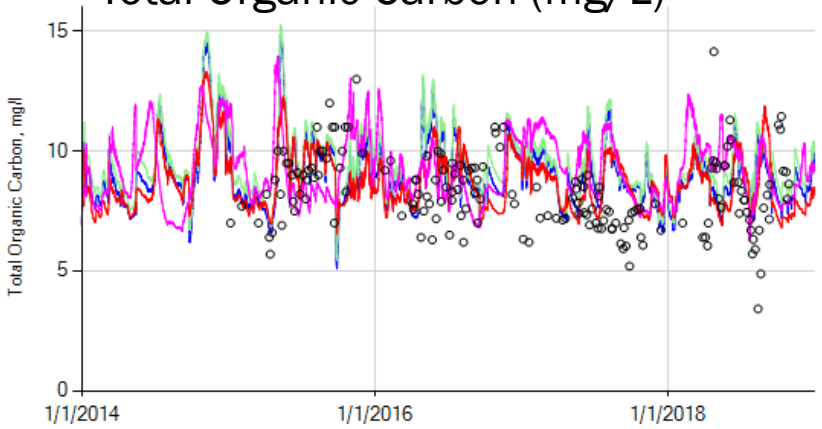
- Lower rainfall delivers less loading from the watershed but
  - Increases the residence time in Falls Lake allowing
    - Inorganic forms of N and P released from lake sediments to more stagnant waters
    - More algal growth
  - May shift accumulation of nutrients in the watershed to be washed out during later storm events (spikes may shift)
- Converting land to forests changes the types of nutrients delivered (more sediment bound) which is less available to algae
- Biological processes in upstream impoundments will also be affected by shifted forms of nutrients, so less processing
- Less nitrate available for denitrification in the All Forest scenario

Segment 1 – WARMF Lake Scenario Comparison

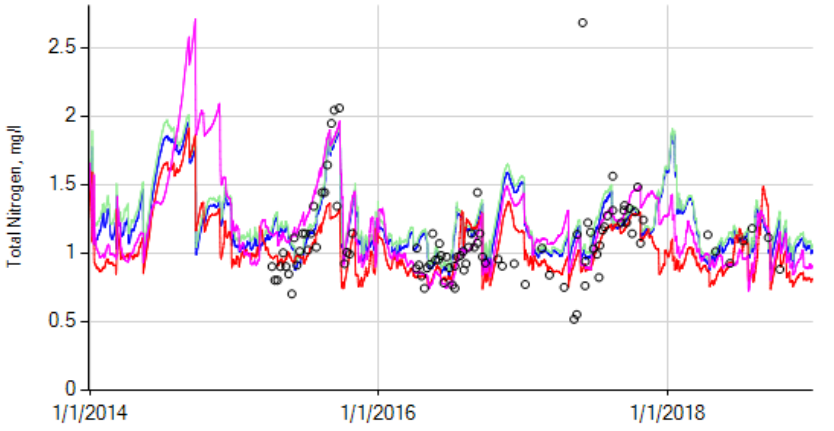
Total Phosphorus (mg/L)



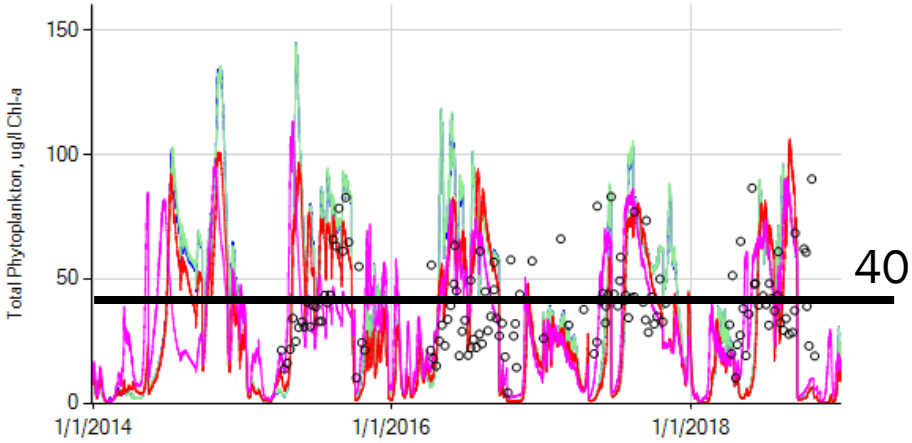
Total Organic Carbon (mg/L)



Total Nitrogen (mg/L)



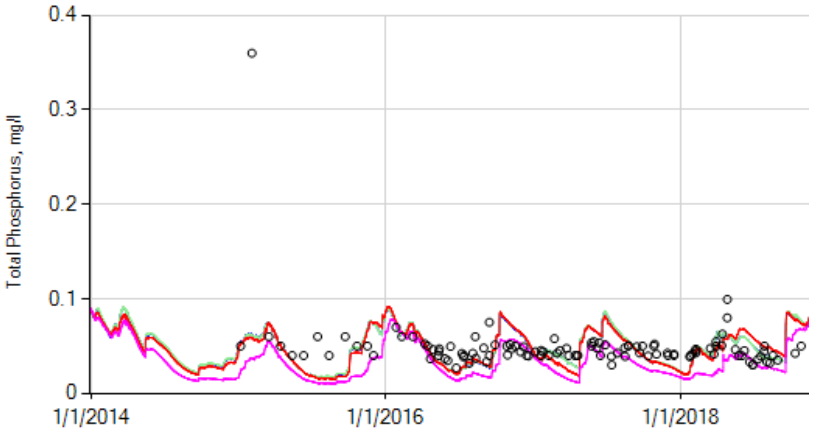
Chlorophyll-a (µg/L)



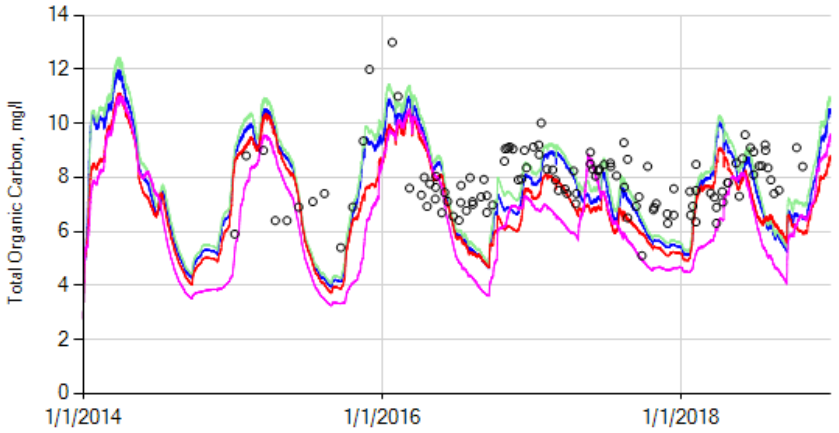
Blue – Calibrated Model
Red – All Forest
Green – 20% Less Rainfall
Pink – All Forest, 20% Less Rainfall

Segment 4 – WARMF Lake Scenario Comparison

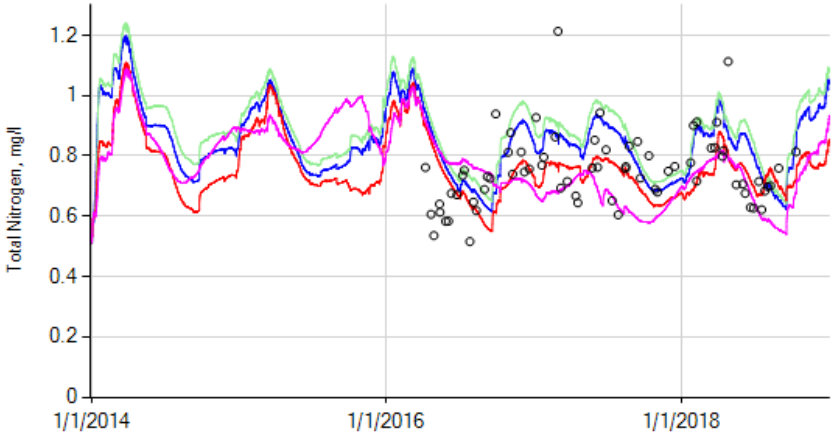
Total Phosphorus (mg/L)



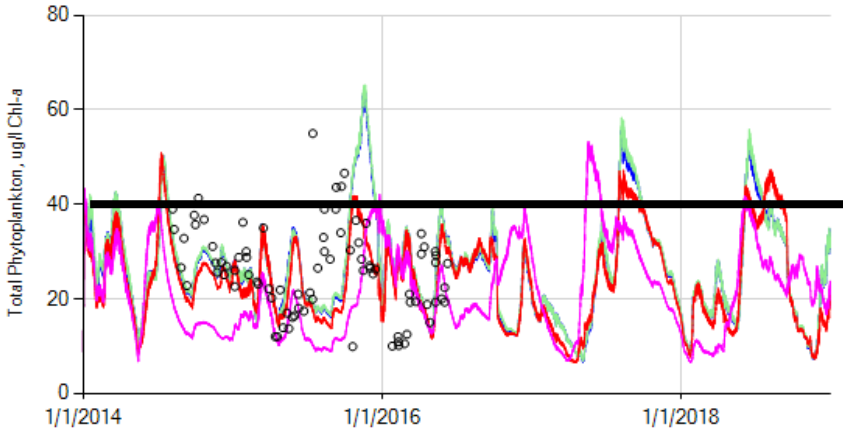
Total Organic Carbon (mg/L)



Total Nitrogen (mg/L)



Chlorophyll-a (µg/L)



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Blue – Calibrated Model

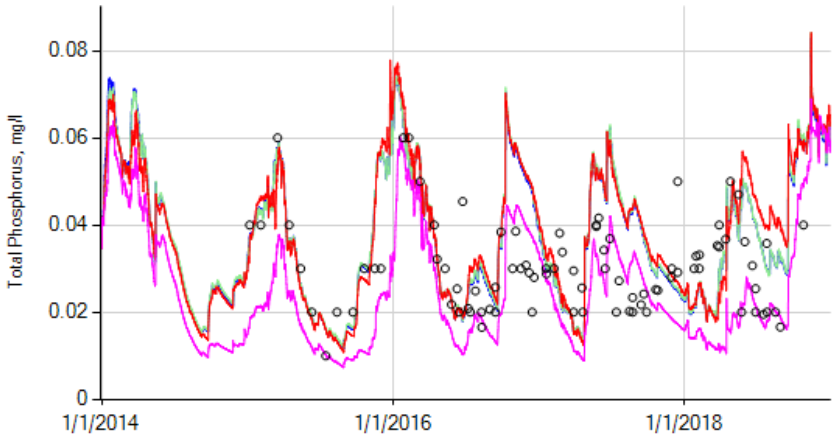
Red – All Forest

Green – 20% Less Rainfall

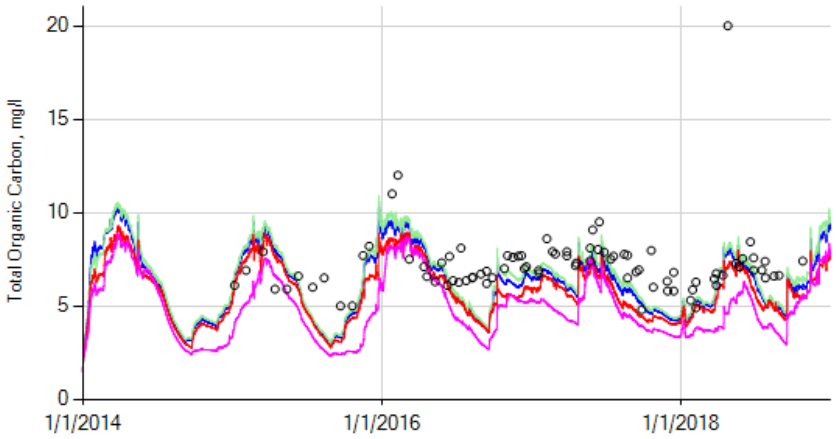
Pink – All Forest, 20% Less Rainfall

Segment 6 – WARMF Lake Scenario Comparison

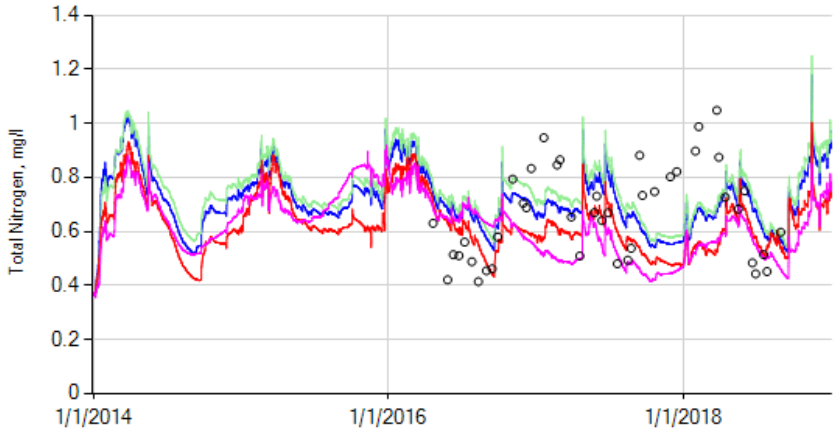
Total Phosphorus (mg/L)



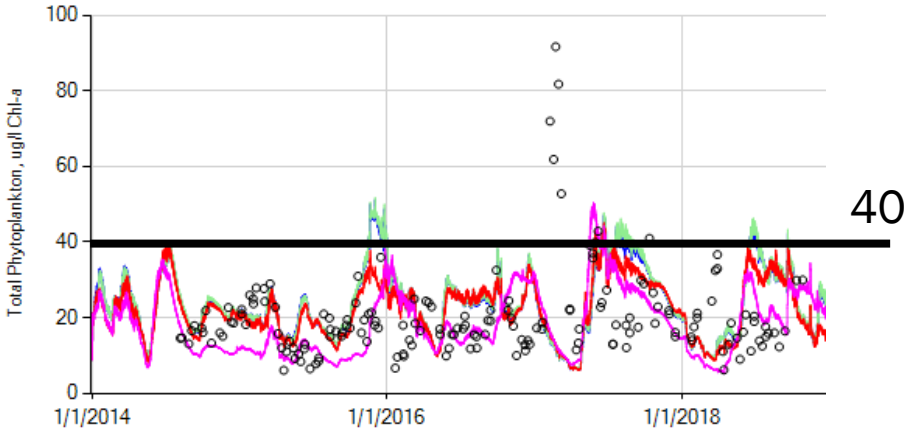
Total Organic Carbon (mg/L)



Total Nitrogen (mg/L)



Chlorophyll-a (µg/L)



Blue – Calibrated Model

Red – All Forest

Green – 20% Less Rainfall

Pink – All Forest, 20% Less Rainfall

Preliminary Findings from WARMF Lake Analyses

- Simulated lake water quality is not drastically different among the scenarios, especially Segment 1
  - All scenarios frequently exceed chl-a criterion in Segment 1
  - Exceedances decrease downstream for all scenarios
- The maximum simulated concentrations are not always caused by the same scenario (complex interactions)
  - All forest, 20% less rainfall sometimes has highest chlorophyll-a concentrations and sometimes has lowest (Segment 4)
- Forms of nutrients delivered are different
  - E.g., sediment bound TP is less available to algae
  - Even though TN and TP lake concentrations may be similar or even higher, the chlorophyll-a concentrations may be lower because the form is less available

WARMF Lake and EFDC Modeling Status

- WARMF Lake Model calibration was approved at the November 2022 MRSW meeting
  - Revised statistics were presented at the January 2023 MRSW that uses a warm start file for the watershed and resets initial conditions in Falls Lake
  - WARMF Lake simulations based on the scenarios and sensitivity analyses discussed above are underway
- EFDC Model calibration was approved at the January 2023 MRSW meeting
  - EFDC simulations based on the scenarios and sensitivity analyses discussed will be underway soon

Statistical/Bayesian Modeling Status

- The modeling team has conducted an extensive effort to compile, merge, review, and format datasets for the statistical model.
- The Technical Advisors Workgroup (TAW) met on January 31st to review several datasets that pertain to Falls Lake
  - Spatial and temporal resolution and trends
  - Data gaps
  - Categories
- The TAW will continue to work through the remaining datasets and then review relationships and correlations among the data
- Plan to bring preliminary model results to the PFC in April and May

Lake Model Reporting Status

- The modeling team is continuing to draft sections and appendices of the lake modeling report.
- The lake modeling report will include technical appendices for each lake model
- Sections of the draft lake model report will be reviewed by the MRSW in late spring 2023
- We have worked with the MRSW and subject matter experts on time series comparisons to observed lake data

Gathering Data from Local Governments to Support the Cost Benefit Analysis

Gathering Data from Local Governments to Support the Cost Benefit Analysis

- An important component of the re-examination is understanding the costs of past and possible future actions in the watershed as well as the benefit in terms of nutrient load reductions and improvements in lake water quality.
- We will review existing information and reports gathered so far and then request information from the PFC and others to fill in gaps and get a higher level of detail.
- Our subject matter expert economist is Ashley Abernethy, who started on this project while she was a Cardno
- Ashley now owns her own consulting firm called Brindle Creek

Example Questions to Gather Data for the Cost Benefit Analysis

- How much has been spent to reduce nutrient loading to Falls Lake, and how much load reduction was accomplished?
- How much would additional actions costs, and how much additional load reduction could be accomplished?
- What is the difference in lake water quality relative to what has already been implemented to what additional actions could be implemented?
- What non-monetized costs and benefits should be considered?
- Other questions???

Ways to Use a Cost Benefit Analysis

- Determine the point of diminishing returns on additional actions in terms of lake water quality
- If an investment-based implementation approach is continued, identify
  - Appropriate level of spending to accomplish goals
  - Benefits to the lake
  - Benefits to the local waterbodies
  - Prioritized actions in terms of costs and benefits
- What other information would be helpful to the local governments and their decision making?

Initial Phase of Data Gathering – Major Wastewater Treatment Plants (WWTPs)

- Upgrades at each facility since baseline (2006)
  - What were the costs and nutrient reductions achieved?
  - Major wastewater treatment plants have significantly reduced nutrient loading: 24% for TN and 69% for TP
  - DWR 2021 Status Report for Falls Lake provides a summary of this information
- Feasible additional upgrades – projected costs and nutrient reductions
- Unfeasible, theoretical upgrades - projected costs and nutrient reductions
- Cost would include capital, operational, and maintenance costs as well as greenhouse gas emissions for energy intensive upgrades, etc.

Initial Phase of Data Gathering – Water Treatment Plant (EM Johnson)

- Upgrades since baseline –
  - Costs (included non-monetized)
  - Benefits - drinking water quality improvements, compliance risks managed, etc.
- Feasible additional upgrades – projected costs and drinking water improvements/compliance
- Unfeasible, theoretical upgrades - projected costs and drinking water improvements/compliance
- Cost would include capital, operational, and maintenance costs as well as greenhouse gas emissions for energy intensive upgrades, etc.
- Modeling team has two past studies assessing TOC and treatment costs (2009 and 2012) that provide some of this information – updates?

Initial Phase of Data Gathering – Existing Development

- Projects since baseline – costs and nutrient load reductions
  - Most of the existing development retrofits that occurred before IAIA were funded by City of Durham (~350 projects)
  - Durham County Soil and Water has funded stream restoration and SCM projects with cost data and nutrient reductions provided in their annual reports.
  - Town of Hillsborough and others have also conducted retrofit projects.
  - Raftelis maintains a project list for the upper jurisdictions
  - Project-level costs for Year 1 of IAIA
  - Bill Hunt (2012) study for Ellerbe Creek that provided costs and nutrient reductions for implementation of projects (some of those may be accounted for in the City of Durham retrofits noted above)
- Feasible additional upgrades – projected costs and nutrient reductions
- Unfeasible, theoretical upgrades - projected costs and nutrient reductions

Approach for Initial Phase of Data Gathering

- Compile the existing available information
  - If you have reports or other written information, please send to amatos@brwncald.com and ashley@brindlecreek.com
- Team will develop a data request form for distribution to appropriate contacts for each data type
- Set up a call with contacts to discuss information compiled and data gaps
- Compile and summarize available information for review by the PFC
- Follow up calls with contacts to fill additional gaps

Next Phase Data Gathering

- Agriculture
  - We will meet with agricultural representatives before we start gathering this data pertaining to costs and benefits
- New development
- Minor wastewater treatment plants
- Stream bank restoration - Durham County Soil and Water, Collaboratory and other researchers (Doll, McKhee, Wegman, etc.)
- Other potential eligible activities for the revised nutrient management strategy
- Others?

Developing Recommendations for a Revised Nutrient Management Strategy and a Petition for a Site-Specific Chlorophyll-a Water Quality Standard

Development of Principles and Concepts for a Revised Strategy

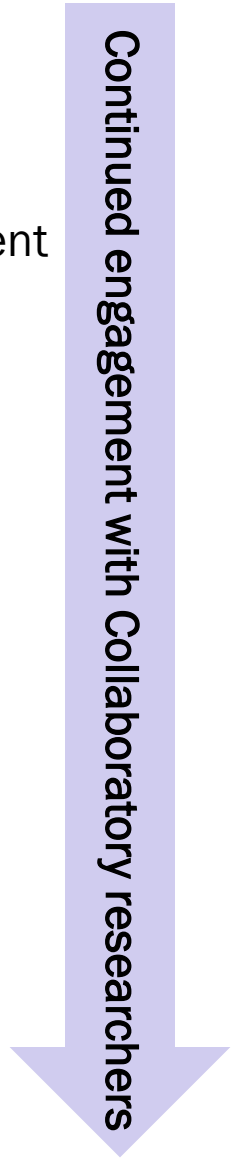
- The UNRBA has compiled preliminary concepts for developing the recommendations for a revised nutrient management strategy.
- The PFC will continue to discuss and refine over the coming months.
- The PFC has discussed principles and concepts for the revised strategy during its November, December, and January meetings.
- These discussion notes will be used to develop a preliminary draft ("strawman") document that the PFC will review at their March meeting.
- The development of principles and concepts for review and approval by the PFC will lead to specific recommendations for revised rules.
- The UNRBA will work in cooperation with DEQ and DWR to consider specific rule modifications, the revised strategy, and petition for site-specific chlorophyll-a standard
- The UNRBA and other stakeholders have identified an expanded list of stakeholders to being reaching out to

Petition for Site-Specific Chlorophyll-a Criteria and Evaluations of Legal Approaches

- The subject matter experts continue to evaluate other State's site-specific standards for chlorophyll-a and nutrient-related standards.
- Dr. Marty Lebo continues to integrate his work into the statistical modeling and regulatory support efforts.
- The modeling efforts will also inform development of an appropriate, attainable site-specific criteria
- The legal group met after the January Board meeting to discuss options for a pathway to a revised strategy and the development of a site-specific standard proposal/petition

Timeline for Developing Recommendations

- November 2022 through January 2023
  - Discuss preliminary draft concepts for revised strategy, legal strategy, potential study bill, etc.
- February and March 2023
  - Discuss preliminary results of statistical model and strawman document
- Spring 2023
  - Draft concepts document
  - Expand stakeholder engagement
  - Meet with DWR and EPA
- Summer 2023
  - Propose needed legislation; update draft recommendations package
- Fall 2023
  - Stakeholder workshop to review a final draft document
  - Provide our report to the Collaboratory for reference
- December 2023 - Legislative requirements for Submittals
  - NC Policy Collaboratory final Falls Lake report
  - Submittals from other groups (UNRBA)
- DWR to begin rule making within 6 months/no later than December 2024
  - DWR to begin their stakeholder process
- DWR anticipates rules readoption by 2026/2027



Communications Outreach and Preparation

Communications Outreach and Preparation

- Continued engagement with DWR and Collaboratory researchers (meeting planning underway)
- WRRI Falls Lake Session
  - March 2023
- Workshop with DWR/NC Policy Collaboratory/NGOs
  - Spring 2023
- Joint symposium with NC Policy Collaboratory
  - Late Spring 2023
- UNRBA Technical Stakeholder Workshop
  - Summer 2023
- Forum to discussed final draft strategy
  - Fall 2023
- Recent staff changes at member local governments highlight the need for UNRBA engagement from multiple staff across the levels of each local government.

Communications Outreach and Preparation

- The Executive Director will continue to reach out to local government staff to identify needs and support staff with implementation of the IAIA Program and participation in developing the revised nutrient management strategy.
- The Year 1 annual report for the IAIA program including the number and types of projects has been posted to the UNRBA website
- CGC members suggested a follow up press release to highlight this information
- Planning a press release on the Neuse River of the Year for the upper part of the watershed following event details from American Rivers
  - The Board suggests including the Year 1 IAIA Report and the 2022 UNRBA Status Report as part of this release
- BC communications staff have been identified to support development of press releases and videos

Other Status Items

Ongoing Items

- More intensive outreach and stakeholder engagement and management of expectations and resources—A lot to do between now and recommendations in 2023
- Ongoing DEQ/DWR Items
  - Continued engagement with staff and leadership
  - Building agreement with timeline for EPA outreach
  - MOA
  - Neuse Watershed Model Information Session – Delivery Factors for WWTP—Update provided by John Huisman

Future Meetings as Currently Scheduled:

Next PFC Meeting: March 7, 2023

Next BOD Meeting: March 15, 2023, 9:30 AM to Noon

Closing Comments
Additional Discussion