UNRBA Board Meeting March 16, 2016

Location: Butner Town Hall

Agenda

Introductions and Announcements—Pam Hemminger, Chair

Administrative Item

Approval of the January 27, 2015 Board Meeting Minutes

New Schedule for Monthly Path Forward Committee Meetings

Regulatory and Legislative Update --Sarah W. Collins, NC League of Municipalities

Presentation: NC DWR 2016 Falls Lake Nutrient Strategy Status Report—John Huisman

Agenda (Continued)

Actions Items

Process for Issuance of Request for Qualifications (RFQ) for Modeling Support to the UNRBA for the Stage II Reexamination Process—Michelle Woolfolk Schedule Request to Authorize the PFC to Approve RFQ for Issuance in April

Approval of the FY 2017 UNRBA Budget (Dues and Fees)

Authorization to Proceed with Submission of Comments on DWR's Draft 2016 303(d) List/Report (Degraded Stream List under Section 303 of the Federal Clean Water Act)

Agenda (Continued)

Progress Status Reports

Monitoring Program Nutrient Credits Project—Alix Matos Practice Standards Documents, Release for Review Schedule for Other Practice Standard Documents

Information Items and Reports:

PFC Report--Lindsay Mize and Kenny Waldroup

Treasurer's Report—Jimmy Clayton

Executive Director Report

Next Scheduled Board Meeting: May 18, 2016, Butner Town Hall, Beginning at 9:30 AM

Closing Comments

Pam Hemminger, Chair

Introductions and Announcements

Administrative Item: Approval of January 27, 2016 Meeting Minutes

Review of Draft Minutes
 Comments and Corrections
 Board Vote

Path Forward Committee— Standing Meeting Moved to 4th Wednesday of the Month

Regulatory and Legislative Update

Sarah W. Collins, NC League of Municipalities

Presentation: NC DWR 2016 Falls Lake Nutrient Strategy Status Report—John Huisman





2016 Status Report Falls Lake Nutrient Strategy

March 16, 2016 UNRBA Board Meeting



Falls Lake Watershed



770 sq/mi watershed located in upper Neuse River Basin Department of Environmental Quality Falls Lake Local Governments

Municipalities Butner Creedmoor Durham Hillsborough Raleigh Roxboro Stem Wake Forest

Counties

Durham Franklin Granville Orange Person Wake



Falls Nutrient Strategy History

- Strategy in place to address lake Chl-a impairment
- Rules effective January 2011
 - Require reductions from both point & nonpoint
 - Staged adaptive implementation
- Stage I (2011 2021)
 - Initial reductions watershed wide
 - Achieve standards in lower lake
- Stage II (2021 2036)
 - Additional reductions in upper watershed
 - 40% TN and 77% TP reductions
 - Achieve standards throughout lake by 2041



Requirements for Falls Status Report

- Division required to report to the EMC every 5 years
- Purpose
 - Provide update on strategy implementation
 - Evaluate changes in loading & lake water quality progress
 - Review advancements in science & control technology
- Information provided by multiple Divisions & stakeholders



Organization of 2016 Status Report

- Background & History
- Implementation & Water Quality Progress
 - Strategy Progress
 - Changes in Loading to Lake
 - Lake Improvement
- Advances in Science & Control Technology
 - Wastewater & Stormwater Treatment Technology
 - Current & Projected use of Reuse & Land Application
 - Programmatic Measures
 - Updates to Accounting Tools
 - Utilization of Nutrient Offsets
 - Changes in Atmospheric Deposition
 - Summary of Groundwater, DSF, and Septic Studies



Falls Lake Rule Requirements

Falls Lake Stage I Rule Requirements

Source	Stage I Reduction Requirements		
Wastewater	• 20% TN & 40% TP Reductions by 2016		
Agriculture	• 20% TN & 40% TP Reductions by 2021		
New Development Stormwater	 Development meet rate targets: 2.2 lbs/ac/yr TN and 0.33 lbs/ac/yr TP 		
Existing Development Stormwater	 Local Governments Conduct Inventories Reduce loads back to 2006 baseline 		
State & Federal Stormwater	 Similar to LG requirements NCDOT implements 6 retrofits per year 		



Wastewater Nitrogen Reductions

Implementation Progress



- 3 major dischargers in upper watershed
- Wastewater has achieved a 20% TN reduction as of 2014



Wastewater Phosphorus Reductions

Implementation Progress



• Wastewater has achieved a 67% TP reduction as of 2014



- Two of the three plants have invested in upgrades
- Stage I reductions also achieved through improved management of current technology
- As flows increase more advanced technology needed to maintain Stage I limits
- Plants evaluating Stage II technologies
 - Reverse Osmosis
 - Increased Wastewater Reuse
 - Anammox bacteria



Agriculture Estimated N Loss Reductions

Implementation Progress



- Agriculture estimates 35% N loss reduction as of 2013
- No increase in phosphorus loss risk



New Development Stormwater Implementation Progress

- LG's began implementing programs July 2012.
- State & Federal entities also implementing New D
- Nutrient Offset Payments as of June of 2015
 - 50,766 lbs. of nitrogen
 - 3,645 lbs. of phosphorus

	Nitrogen	Phosphorus
Total transactions	107	68
Total Credits (lbs)	50,766	3,645
Total Acres Mitigation	22.34	24.99



- Implementation Status
 - LGs submitted inventories in 2013
 - Implementation delayed to add additional credit measures
- Expanding credit measures toolbox
 - Division and UNRBA working together
 - Expect to add 16 additional creditable practices
 - Improving accounting tools
- Division to bring model program to EMC in two years
 Proposed extending Stage I to 2025 in rule revisions



Trends in Atmospheric Deposition Reductions

- Report includes deposition data and modeling results
- 15% decline N deposition estimated since 2006
 Due primarily to downward trend in nitrate deposition
- Reductions likely due to state & federal air quality initiatives
 - Clean Smokestacks Act
 - Reductions in motor vehicle emissions
- Additional reductions expected



Changes in Lake Loading Loading from Upper Watershed



- DWR estimated annual nutrient loads
- Used Ambient Monitoring Stations and USGS Flow Stations
- Upper 5 major tributaries
 - Eno River
 - Little River
 - Flat River
 - Knap of Reeds
 - Ellerbe Creek



Changes in Lake Loading (cont.) Nutrient Load from Five Upper Tributaries 2006-2014

Year	Phosphorus (Ibs/year)	Nitrogen (Ibs/year)	Flow (cfs)
2006	107,900	819,900	290
2007	82,300	691,400	241
2008	104,600	935,300	302
2013	56,200	925,700	422
2014	48,400	991,200	464

-Nitrogen load up 20% since baseline

-Phosphorus load down 55% since baseline

- 2014 was wet year with flows up 60 percent since baseline

Note: Load estimates are not available from 2009 to 2012 as budget constraints resulted in an insufficient number of sampling events to allow load estimation.

Lake Improvements: Water Quality in the Lake 2005-2007 (Before Rule Implementation)



• Ten in lake stations monitored monthly by the Division

N

Lake Improvements: Water Quality in the Lake 2011-2014 (Post Rule Implementation)



• % exceedance of chl-a standard has improved since 2011



Chlorophyll-a Distribution 2005-2007





Chlorophyll-a Distribution 2011-2014





Supplemental UNRBA Monitoring

Routine & Special Studies







- Implementation proceeding in timely fashion
- Sources on track to meet Stage I reduction goals
- Nutrient loading & water quality generally improving
- Regulated community working constructively & collaboratively with the Division





- Continue Credit Measures Work w/ UNRBA
 - Establish credit for additional 16 measures
- Complete Existing Development Model Program
 - Including load reduction assignments
 - Bring Model Program to EMC within next two years
- Next 5-year Report in 2021



QUESTIONS?



NC.

Actions Items

Process for Issuance of Request for Qualifications (RFQ) for Modeling Support to the UNRBA for the Stage II Reexamination Process

Michelle Woolfolk

The Path Forward: Increasing the Effectiveness of the UNRBA in the era of the Falls Lake Rules

Step 1. Determine what monitoring and advanced technical analyses are needed to re-examine the nutrient management strategy.

> Step 2. Execute the field monitoring effort and perform needed technical analyses to support the re-examination.

> > Step 3. Evaluate current, and potential future, regulatory programs to manage upper and lower Falls Lake for recreational, fishing, drinking water, and other uses.



regulatory support



DURHAM
regulatory support



Modeling RFQ Timeline

March

- 1 report to Path Forward Committee
- 9 RFQ Subcommittee kick off meeting
- 16 RFQ goals, process, and schedule to the Board for approval
- ?? RFQ Subcommittee meeting
- 23 RFQ approval by Path Forward Committee at new meeting date (Comments addressed before release in April)

April

?? – RFQ Subcommittee meeting to address Path Forward comments
7 or 8 – Issue RFQ during this period
28 or 29 – Qualifications due (3 week response period)

May

6 – RFQ Subcommittee complete reviews. Make recommendation for interviews

6 – Invite selected firms for interview

16 – Interviews (open to PF Committee and Board members) and recommendation of Path Forward Committee

18 – Recommendation to the Board for Approval



Approval of the FY 2017 UNRBA Budget (Dues and Fees)

Recommended UNRBA Membership Fee Schedule for FY 2016 - 17

\$ 978,800.00 Projected Revenue

Date: 3/14/16

Member	Base Rate (10%)	2015 Raw Water Demands (50%)			Jurisdiction's Land Area (40%)			FY 2016-17 Dues
	\$ 97,880.00 Wember's Sub- Share of Cost	2015 Average Raw Water Demand (MGO)	\$ 489,400.00 (%)	Nembers Sub-Share Cost	Jurisdiction's Acres Within Watershed	\$ 391,520.00 (%)	Member's Sub-Share Cost	Total Membership Dues
Town of Butner	\$ 6,991.43	NA			8,822	1.8	\$ 7,031.35	\$ 14,022.78
City of Creedmoor	6,991.43	NA			3,226	0.7	2,571.20	9,562.63
City of Durham	6,991.43	26.630	37.3	\$ 182,469.79	31,113	6.3	24,797.83	214,259.05
Durham County	6,991.43	NA			99,663	20.3	79,433.86	86,425.29
Franklin County	6,991.43	NA			5,284	1.1	4,211.48	11,202.91
Granville County	6,991.43	NA			72,019	14.7	57,400.91	64,392.34
Town of Hillsborough	6,991.43	1.337	1.9	9,161.18	3,713	0.8	2,959.35	19,111.96
Orange County	6,991.43	NA			122,067	24.8	97,290.40	104,281.83
Person County	6,991.43	NA			81,161	16.5	64,687.31	71,678.74
City of Raleigh	6,991.43	40.510	56.7	277,576.08	1,118	0.2	891.07	285,458.58
SGWASA	6,991.43	2.947	4.1	20,192.96	NA		-	27,184.39
Town of Stem	6,991.43	NA			506	0.1	403.29	7,394.72
Wake County	6,991.43	NA			61,630	12.5	49,120.63	56,112.06
Town of Wake Forest	6,991.43	NA			905	0.2	721.31	7,712.74
Total	\$ 97,880.02	71.424	100	\$ 489,400.01	491,227	100	\$ 391,519.99	\$ 978,800.02

Notes:

* Cost Allocation = 10% by uniform participation; 50% by rew water demands; and 40% by jurisdictional land area in UNRBA.

** 2015 annual daily average raw water demand reported by user systems.

*** Jurisdictional areas obtained from members, January, 2015. Percentages are calculated based on total basin acres. The towns of Mebane and Franklinton have a few acres but not enough to affect percentages. Municipal acreages do NOT include ETJs (although some municipalities may have some planning jurisdiction in ETJs, they do not collect tax revenue from these properties). SGWASA- and OAWS-owned acreages are included in their respective jurisdictional areas and are not calculated separately.

UNRBA Recommended Membership Fee Summary for FY 2016-17

Date: 3/14/16

	Membership		
Member	Fees		
	FY 2016-17		
Town of Butner	\$ 14,022.78		
City of Creedmoor	9,562.63		
City of Durham	214,259.05		
Durham County	86,425.29		
Franklin County	11,202.91		
Granville County	64,392.34		
Town of Hillsborough	19,111.96		
Orange County	104,281.83		
Person County	71,678.74		
City of Raleigh	285,458.58		
SGWASA	27,184.39		
Town of Stem	7,394.72		
Wake County	56,112.06		
Town of Wake Forest	7,712.74		
Total	\$ 978,800.02		

** Invoices will be mailed to members on or after July 1, 2016

** Membership fees are calculated as noted in Appendix A - "Dues Formula of the UNRBA By-Laws":

https://www.unrba.org/sites/default/files/UNRBA%20BYLAW5%20-%20amended%20Nov%2020%202013.pdf

Authorization to Proceed with Submission of Comments on DWR's Draft 2016 303(d) List/Report (Degraded Stream List under Section 303 of the Federal Clean Water Act)

Upper Neuse River Basin Association



DWR Clean Water Act Water Quality Status Reports

a. draft 303(d) List b. draft 305(b) Report

Chlorophyll a Review





Jay H. Sauber



NC Clean Water Act - Integrated Report (IR) 305(b) Report and the 303(d) List

305(b) informs water quality conditions to Congress and Public 303(d) list identifies waters to Congress and Public that:

- > Do not meet water quality standards and have no regulatory process in place to restore waters and attain standards
- Require development of total maximum daily load (TMDL) or other restoration plan (Falls Lake Strategy)
- > states develop list every 2 years
- NC General Statute 143B-282(c)
 - EMC has responsibility to identify impaired waters and priorities (i.e. not DWR)
 - > practically speaking EMC approves methods for 303(d) listings





What are impaired waters?

- lakes, reservoirs, rivers, and streams can be divided into water quality assessment segments
- if the designated uses <u>or</u> the water quality standards for all parameters are not met and the assessment methodology determines the waterbody is not attaining any uses <u>or</u> any WQS – then the water body segment is considered impaired and in need of restoration
- > EPA has oversight of this process





DWR Integrated Report Categories Clean Water Act Sections 305(b) and 303(d)

1-supporting standard

- 3-uncertain if standard is being met with confidence
- 4- exceeds standard with confidence has TMDL or Strategy
- 5- exceeds standard with confidence **needs** TMDL or Strategy

Falls Rules :

Sustained maintenance - two consecutive use support assessments "nutrient-related water quality standards are attained"





- > Only waters that do not have a TMDL or nutrient management strategy are on the 303(d) list.
- > Falls Lake has a management strategy
 - none of Falls Lake is actually on the 2016 303d list
 - rather Integrated Report Category 4 if impaired)





<u>Upper</u> Falls Lake assessment segments

CWA 303(d) 305(b) Reporting Category (# monitoring stations) 2016 DWR +NCSU data

to I-85 Bridge

I-85 Bridge to Panther Cr

Panther Cr to Ledge Cr

Ledge Creek Arm

Ledge Cr to Lick Creek

 $\begin{array}{c} \underline{2014} \\ 4 (1) \\ 4 (1) \\ 4 (3) \\ 4 (1) \\ 4 (2) \\ 1 (1) \\ 3 (1) \\ \end{array}$

Chlorophyll a 4-impaired 3-uncertain 1-meeting standard





Lower Falls Lake

Lick Creek Arm to Dam Lick Creek Arm Lick Cr Arm to New Light Cr Segment New Light Cr Segment New Light Cr Segment to Dam Lower Barton Creek Segment

2016 Draft 303(d) list adds: Beaverdam Reservoir as new 303(d) Category 5 impaired needing TMDL or strategy (1)

2016 Draft 2014

- 1 (5)
- XXX

 - XXX

XXX

- 1 (7) XXX
- 3(1) XXX

(# monitoring stations)

XXX

• 3 (2)

• 1 (2)

• 3(1)



Chlorophyll a 4-impaired 3-uncertain 1-meeting standard



Lower Beaverdam Reservoir 2010-2014 (below little Beaverdam Creek)

- > NCSU 1 sampling location off of pier
- > 52 observations for *chlorophyll a*
- > 11 observations > 40ug/L = 21% with 99% Confidence samples collected using upper photic zone method
- > DWR 35 year old standard method for chlorophyll collection entire photic zone



NCSU Locations – chlorophyll a









Potential Comments to DWR on draft assessment

- 1. Locations near shore <u>previously</u> excluded from assessments
- 2. Locations that used alternative collection techniques upper photic zone vs entire photic zone
- Lower lake re-segmentation

 not consistent with previous assessments
 not consistent with Falls Lake rules
 not based on management strategies
 not based on limnology



Executive Director Request Board's approval to submit comments to DWR on draft 303(d) list and 303(b) Integrated Report (IR).

Questions



Assessment Categories



Progress Status Reports Monitoring and Nutrient Credits

Monitoring Program Status Report

Nutrient Credits Project Status Report—Alix Matos

Center for WATERSHED PROTECTION



UNRBA Nutrient Credit Development Project BOD Meeting March 2016





Summary of Status for Credit Development (Task 1)









Summary of Credit Development Status

- Released credit documents for two practices out for review by NSAB and PFC
 - Bioretention device design variants
 - Level spreader filter strip design variants
- Plan to release two more in late March
 - Soil improvement / pervious area nutrient management
 - Infiltration devices sized for different design storms
- Continued policy and technical discussions on
 - Livestock exclusion
 - Land conservation
 - Buffer restoration

CENTER TO Elimination of illegal discharges WATERSHED PROTECTION





Description of Bioretention Cells

- Depressional areas constructed in the landscape
- Usually designed to treat small, impervious drainages (e.g., parking lots)
- Partially filled with sandy soils, mulch, and plants that can thrive in wet and dry conditions
- Volume provides runoff storage
- Nutrient reductions occur through processes of infiltration and filtering through sandy soils, plant uptake, and exfiltration to groundwater





Design Variants for Bioretention Cells

- Depth of soils
- Inclusion of upturned elbow to provide longer retention times
- Depth of unfilled volume (average surface ponding depth)





Description of Level Spreader Filter Strips

- Vegetated areas that treat stormwater runoff
- Usually designed to treat small, impervious drainages (e.g., parking lots)
- Concrete level spreader on the upslope end ensures that flow through the filter strip is evenly dispersed
- Nutrient reductions occur through processes of infiltration, filtering, and plant uptake



NCSU Biological & Agricultural Engineering Dept.



Design Variants for Level Spreader Filter Strip

- Dimensions
- Size relative to the design storm

Depending on the design, nutrient reductions may range from 12% to 85% for TN and 8% to 94% for TP





Description of Infiltration Devices

- Volume reduction practices designed to infiltrate stormwater into the ground over a 72 hour period
- Usually designed to treat impervious drainages (e.g., parking lots)
- Nutrient reductions occur through processes of infiltration, filtering through sandy media, and exfiltration to groundwater





Design Variants for Infiltration Devices

- Size of the system relative to a design storm
- Devices that can infiltrate larger storms receive a higher volume reduction credit
- Nutrients associated with the volume reduction are credited

Design Storm Size (inches per 24 hours)	% TN Reduction	% TP Reduction
0.5	57	57
0.75	70	70
1.0 (standard design)	79	79
1.25	85	85
1.5	90	90







Description of Soil Improvement

- Addition of topsoil or soil tillage with incorporation of compost
- Long term benefits require establishment and maintenance of healthy vegetated cover (pervious area nutrient management)
- Not applicable on high use areas that may become re-compacted (e.g., athletic fields)





Credits for Soil Improvement

- Default credit
 - Depth of improvement and age of site
 - Assume a net change in soil porosity of 5 percent
 - Volume reductions up to 65 percent
- Monitoring-based credit
 - Use bulk density tests pre and post improvement to measure actual change in soil porosity
 - Monitoring studies reported in the literature have documented runoff reductions as high as 98 percent for soil improvements





Practice	Technical Approach	Practice Standard (Credit Document)	Broader Review	Percent Complete
Level spreader filter strips d.v.		Released for broad	Comments due Mar 18 th	95
Bioretention d.v.	Finalized	review Feb. 22 nd		
Infiltration devices		To be released Mar 21 st	Comments due April 8 th	90
Soil improvement and PANM		To be released Mar 21 st	Comments due April 8 th	90
Livestock exclusion	Nearly final	Planned release in	Comments due in May/June	80
Land conservation	In development	April/May		60
Buffer restoration (urban and rural developed areas)	In development	Planned release in	Comments due in	50
Removal of illicit Awaiting local data		way/June	June/July	10
Summary of Status for UNRBA Credit Tool (Task 2)









Task Force for Tool Development

- Developed UNRBA Credit Tool to read in outputs from existing models
 - Multiple Jordan/Falls stormwater accounting tool versions (JFSAT)
 - Wake County Hybrid Tool
- Further tool development is on hold until second half of 2016
 - More information on Rules Revisions and reporting requirements
 - Integrate credit development from Task 1 for non structural practices
- Continued discussions with the agency staff about revisions to various stormwater accounting tools managed by the agency (e.g., JFSAT and StormEZ)









Discussion, Questions, and Feedback Welcome















Information Items and Reports:

PFC Report— Meetings, February 2, March 1, and Upcoming March 23

Lindsay Mize and Kenny Waldroup

Treasurer's Report—Jimmy Clayton

Upper Neuse River Basin Association, Inc. Treasurer's Report

Date: 3/102016

Balance For	ward: (per bank statement - 1/27/16)	Checking Savings	\$	80,940.50 1,002,287.81		
Debits:	Cardno (Dec 15 Inv, MDP FY 15) Cardno (Dec 15 Inv, NCDP *) Cardno (Dec 15 Inv, MDP FY 16) McGill Asso. (Jan 16 Inv) Phthisic Consulting Inc. (Jan 16 Inv) MFG Consulting, LLC (Jan 16 Inv) Sauber Water Consulting (Dec 15 Inv) Bank Charges (check fee & maintenance fee) Total Debits		\$	1,230.00 9,883.51 53,669.97 - 493.75 84.95 3,010.00 1.00 68,373.18		
Credits:	Interest (checking) Interest (savings) Transfer from Savings to Checkingto Savings Transfer from Checking to Savings		\$	11.97 176.66 75,000.00		
Account Balance (per bank statement -2/23/16) Checking Savings Total UNRBA Account Balance :		\$ \$	87,579.29 927,464.47 1,015,043.76			
Outstanding invoices/deposits in process since the close of bank statement (2/23/16):						
Debits:	McGill Asso. (Jan 16 Inv) Cardno (Jan 16 Inv, MDP FY 16) Cardno (Jan 16 Inv, MDP FY 15) Cardno (Jan 16 Inv, NCDP*)		\$	16,805.90 780.00 70,980.70 10,747.26		

	Total UNRBA Account Balance :		\$ 913,242.40
		Savings	 827,464.47
	Current Account Balances:	Checking	\$ 85,777.93
Credits:	Transfer to Checking from Savings		\$ 100,000.00
	MFG Consulting, LLC (Feb 15 Inv) Sauber Water Consulting (Feb 15 Inv) Phthisic Consulting Inc. (Feb 16 Inv)		125.00 2,170.00 192.50

* Nutrient Credit Development Project

Executive Director Report

- Work on Falls Lake Report—Meeting with DWR
 - Additional Funding from DEQ for Credits Project— Meeting With DEMLR and DWR on February 19th
- ERC Meeting on February 10th
- Status of Rules Review—Falls Lake Rules
- WRRI Annual Conference, March 17-18
- Draft 2016 303(d) List
- League Regulatory Action Committee Meeting, February 23rd
- EMC Water Quality Committee and EMC Meeting, March 9th and 10th
- NSAB Meeting, March 11th
- RFQ Workgroup March 9th
- AWWA/WEA Spring Conference, April 17-19

Next Scheduled Board Meeting: May 18, 2016, Butner Town Hall, Beginning at 9:30 AM

Closing Comments