

**UNRBA Board of Directors** 

## Monitoring Program Status Update March 21, 2018



# **Routine Monitoring Update**

March 2018



#### **Routine Monitoring Status**

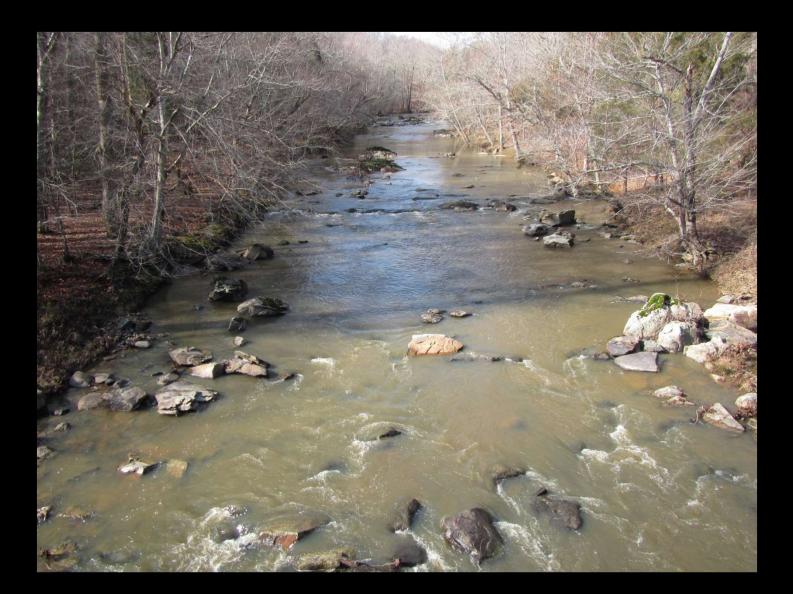
Date	Sample Collection	Sample Analysis	Data Review	Posted to Database
Aug – Dec 2014	✓	✓	✓	✓
Jan - Dec 2015	✓	✓	✓	✓
Jan - Dec 2016	✓	✓	✓	✓
Jan – Dec 2017	✓	✓	✓	✓
January 2018	✓	✓		
February 2018	✓			

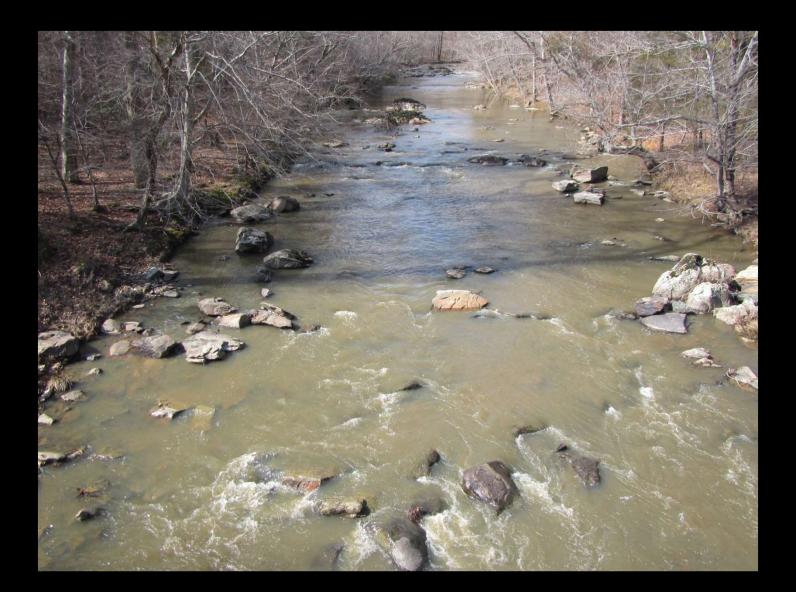
As of December 2017, the UNRBA has generated 41 months, 3 full growing seasons, and 3 full calendar years of water quality data.

#### Little River at Johnson Mill Rd (Jurisdictional Station JB06) August 2014

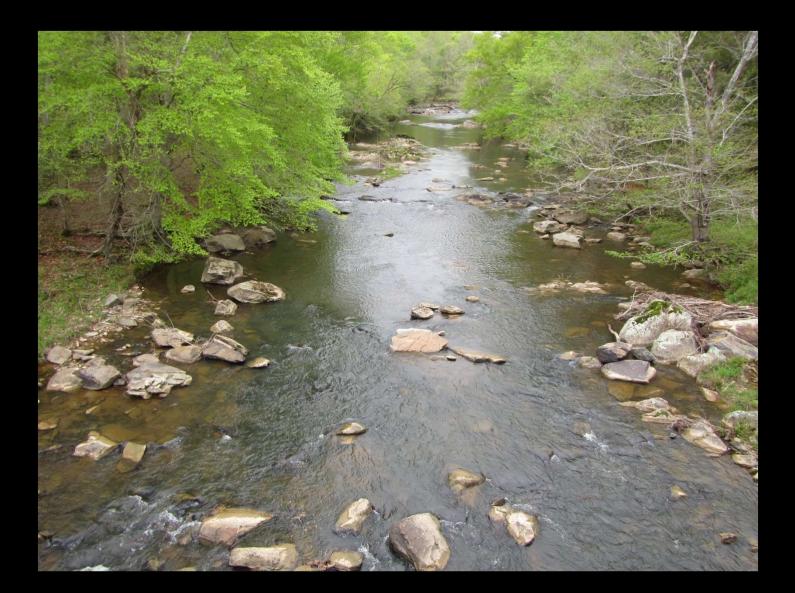


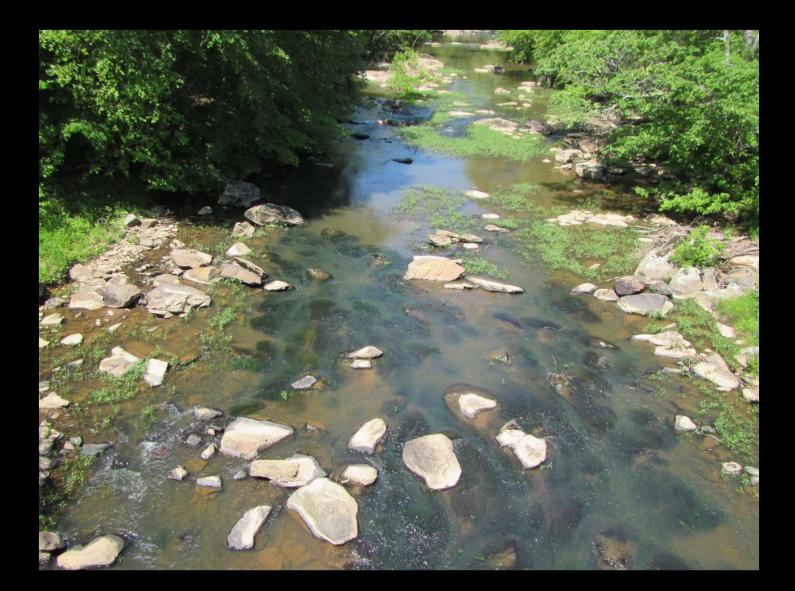


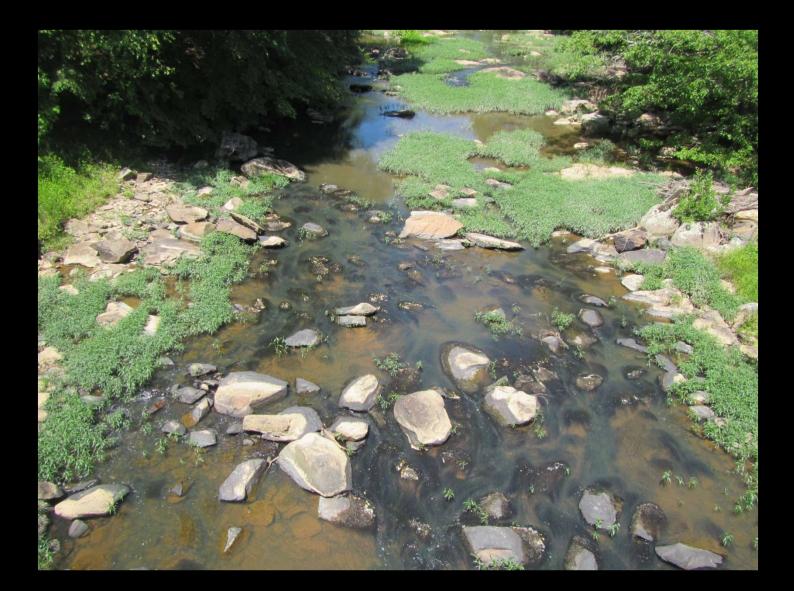


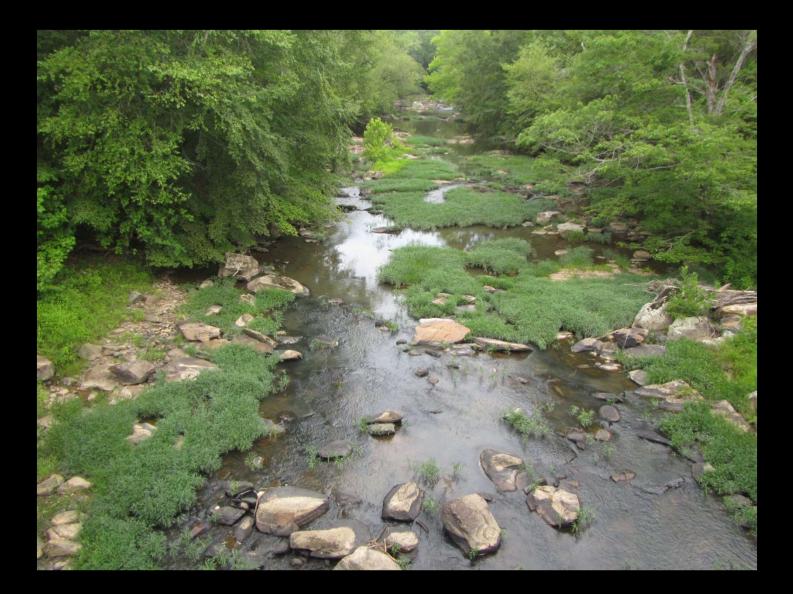






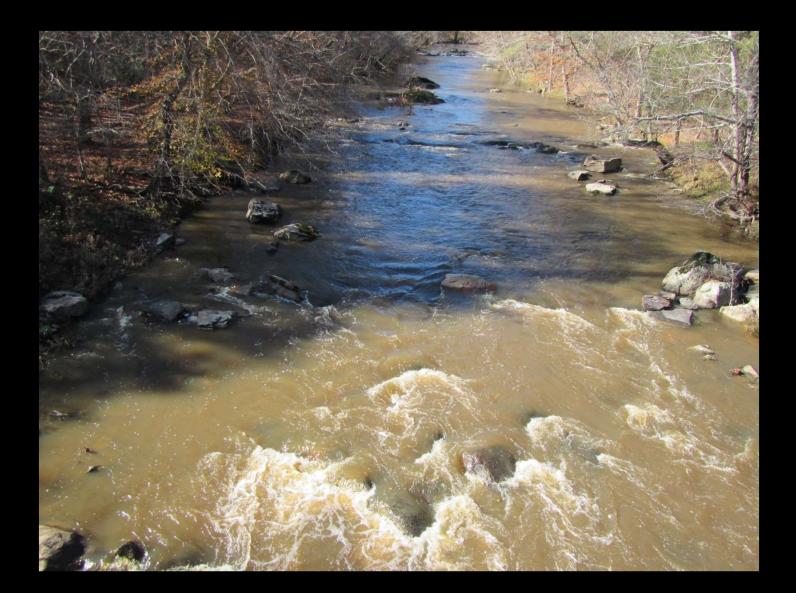


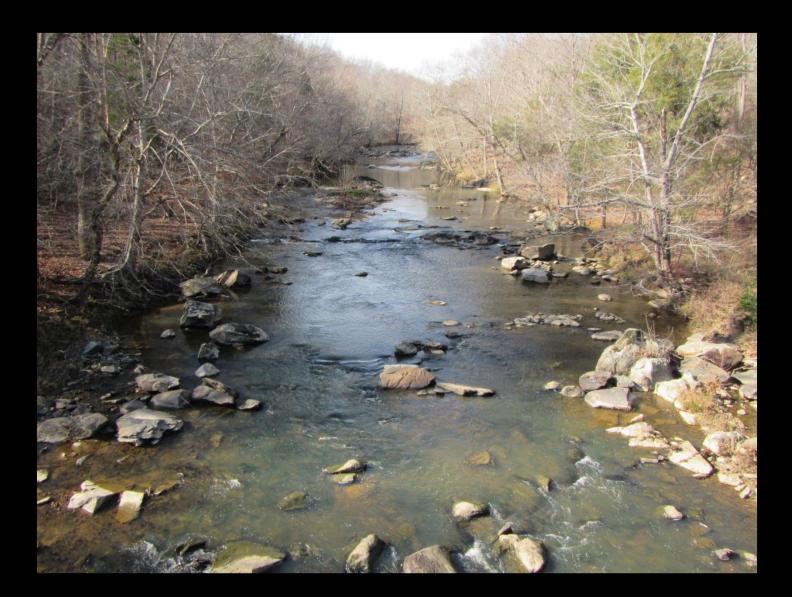


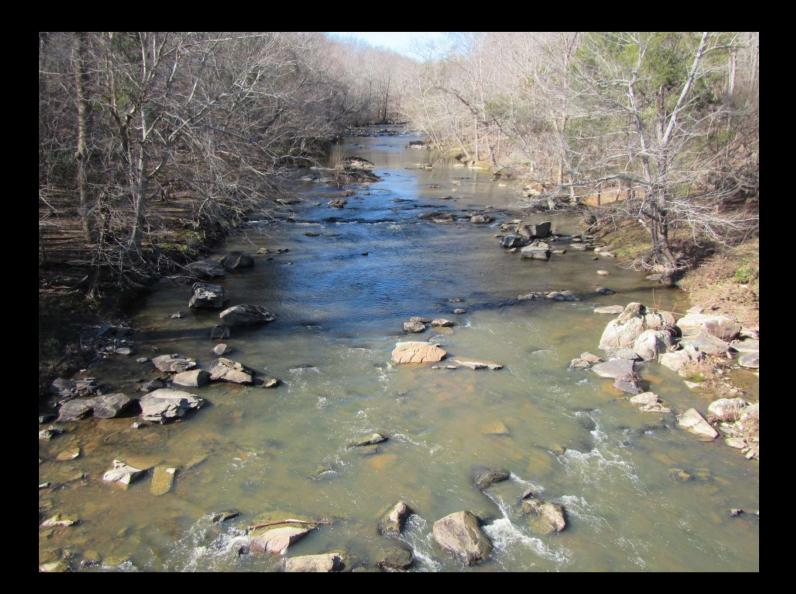


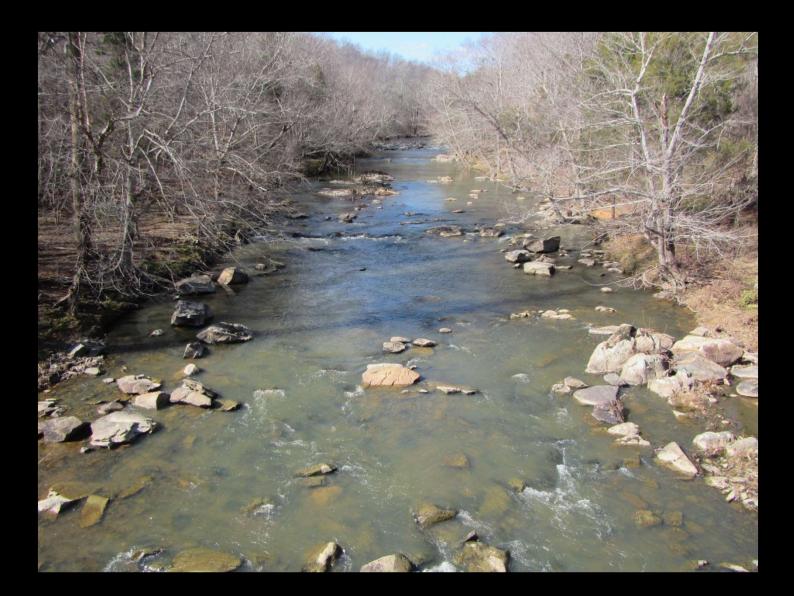




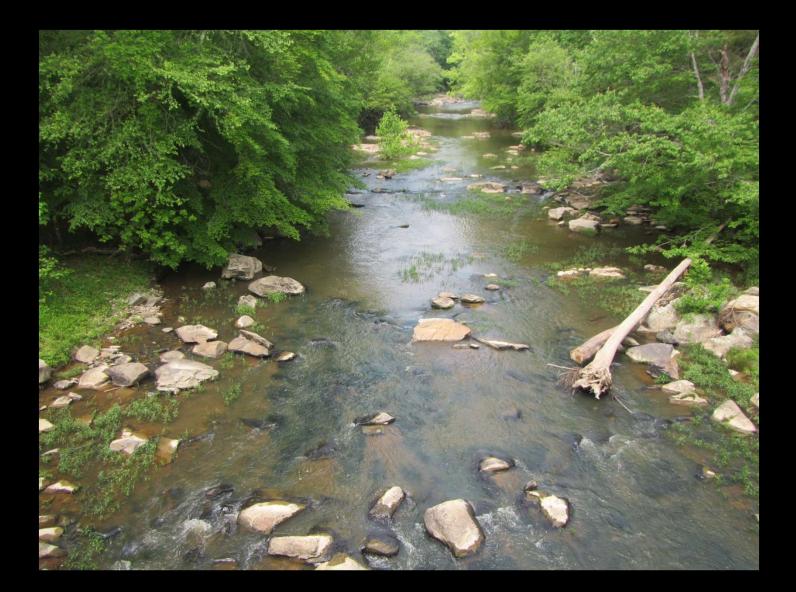




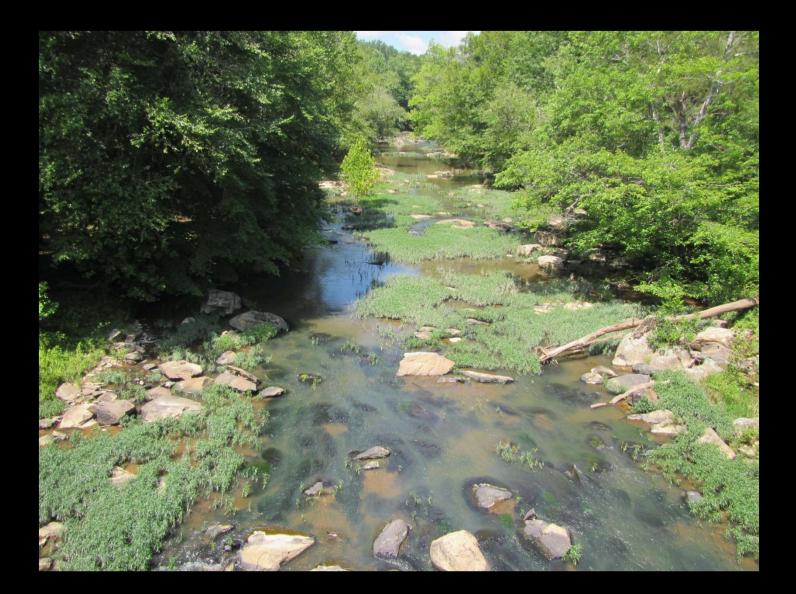


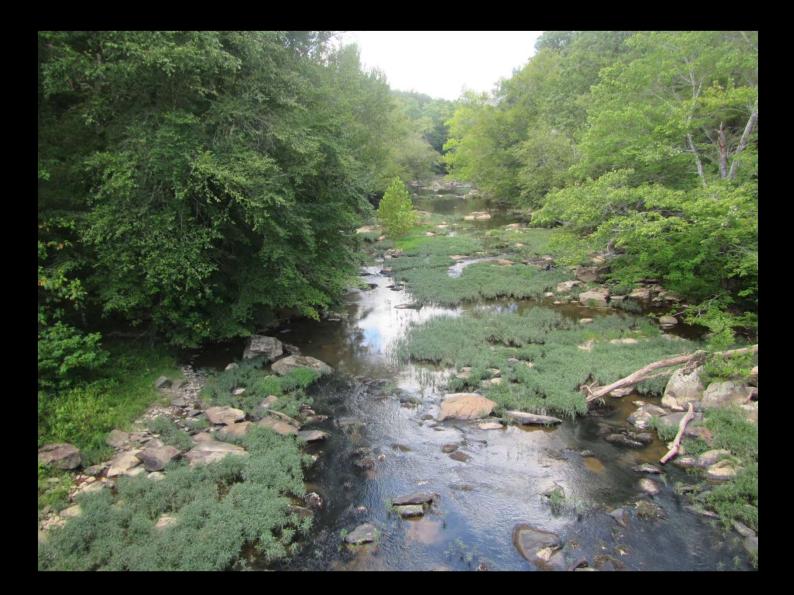




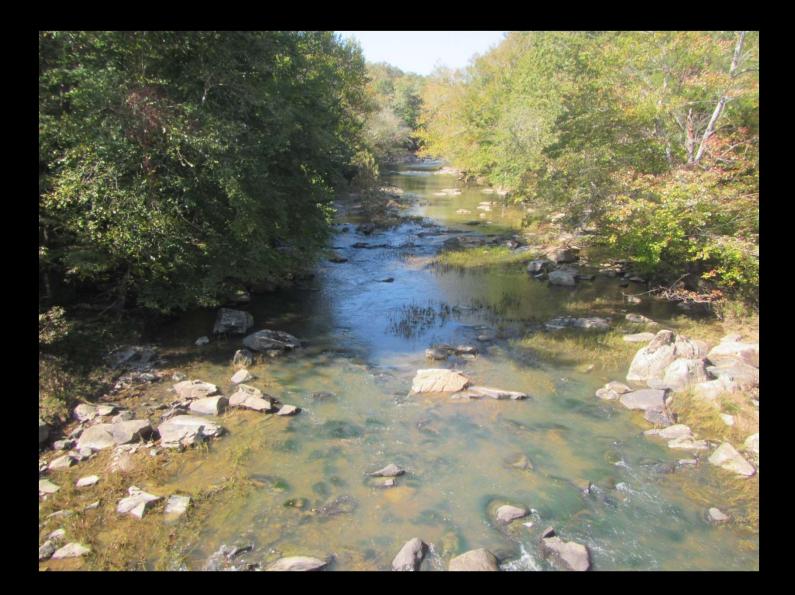






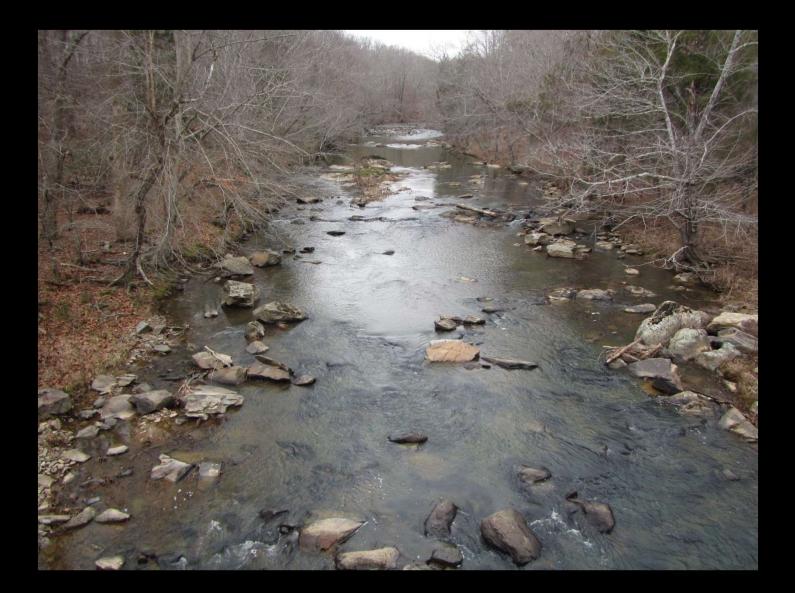




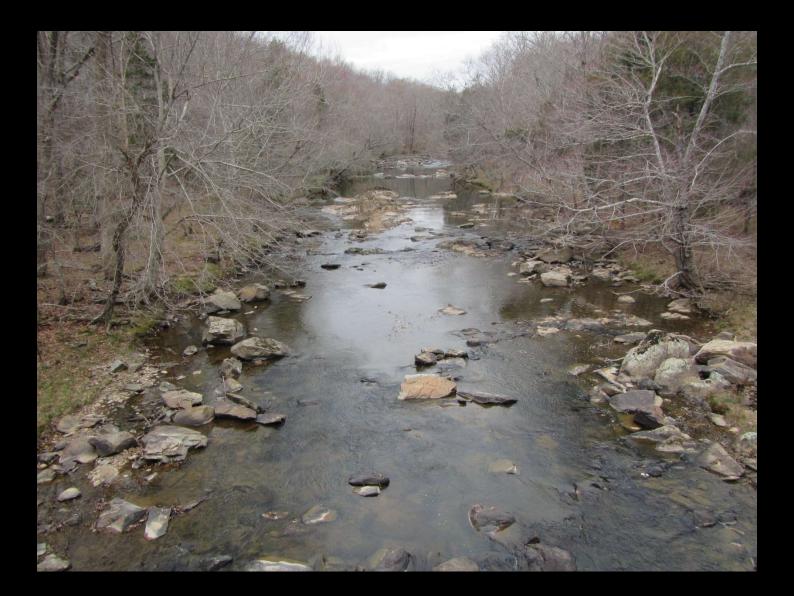


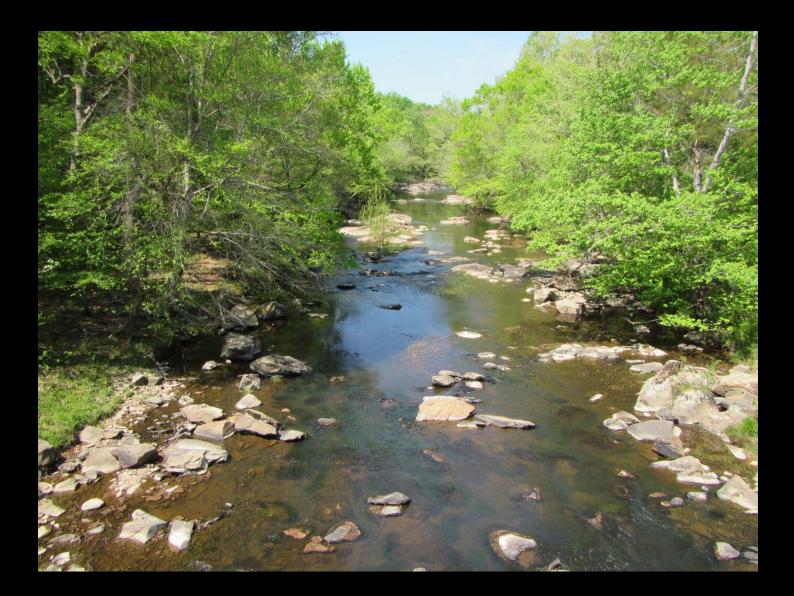


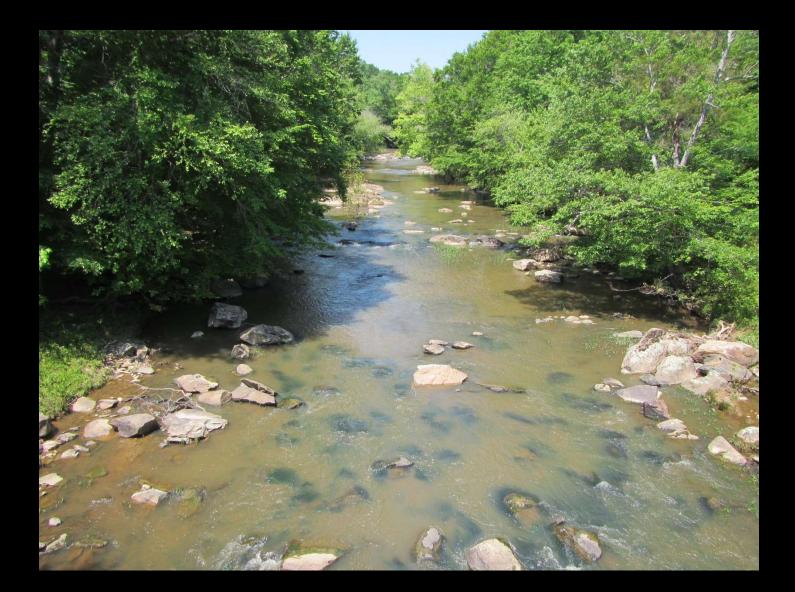


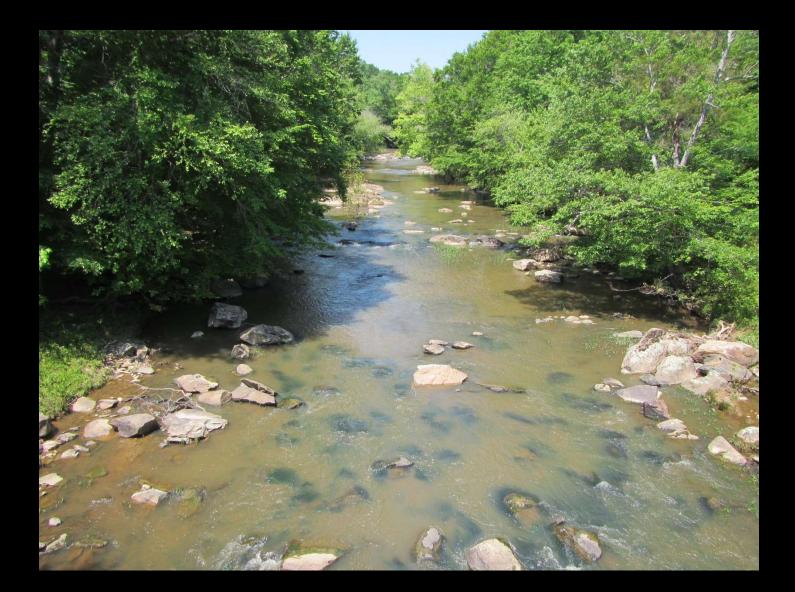




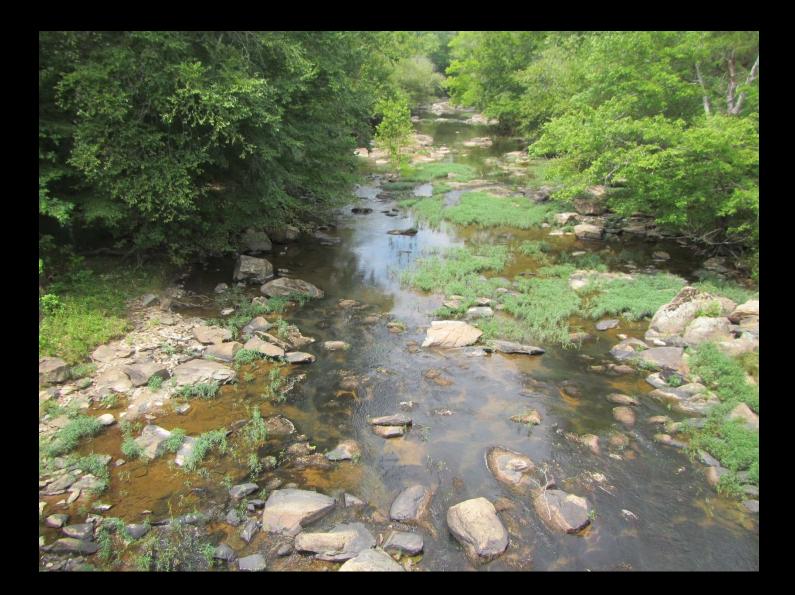


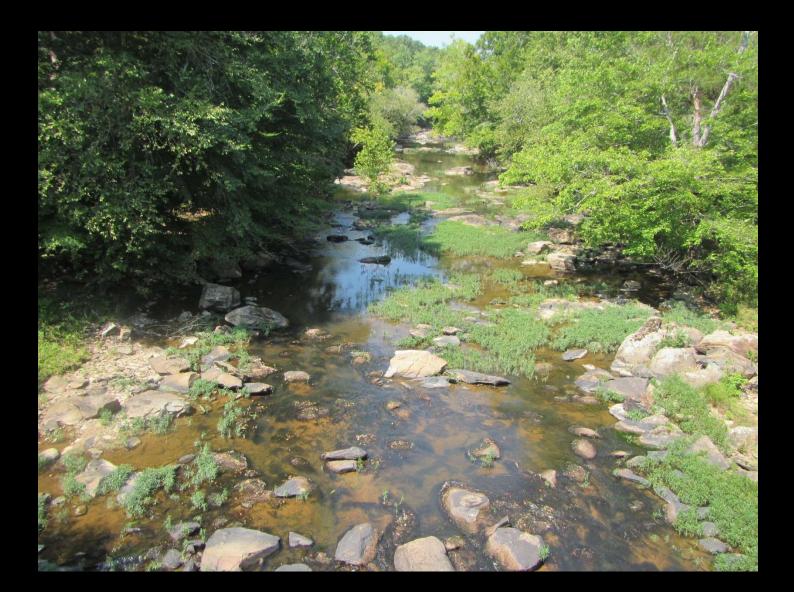


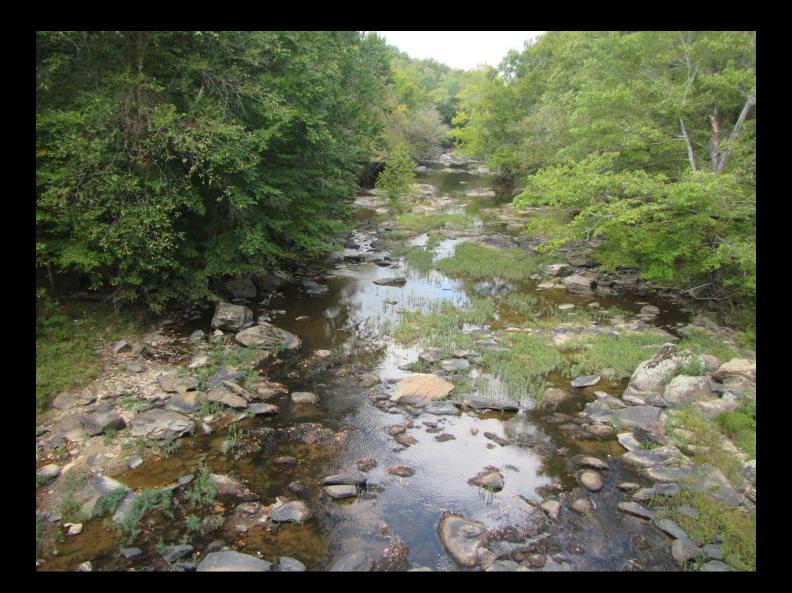














#### Little River at Johnson Mill Rd (Jurisdictional Station JB06) November 2017



## **Special Studies Update**

March 2018



### **High Flow Sampling**

- The first High Flow sampling event of FY2018 was on January 23.
- A second event was conducted on January 29

## **Sediment Study**

- Dr. Marc Alperin (UNC) is completing his report this week on sediment sampling and analysis
- To be included in the Annual Report
- Results will be provided to the modeling team

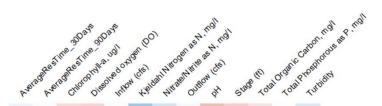
### **Monitoring Program Activities Ahead**

- Annual Report in preparation
  - Due to PFC in April 2018
  - Working with SME's and modeling team on content
  - More extensive analysis than in prior reports

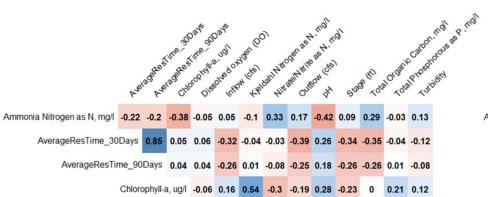
#### **Exploring Relationships Among Parameters**

	Outflow, cfs	Avg. Residence Time, 90 Days	Avg. Residence Time, 30 Days	Blue-green Algae	Chrysomonads	Cryptomonads	Diatoms	Dinoflagellates	Euglenoids	Green Algae	Prymnesiophytes	\$
NEU013B	0.56	-0.51	-0.59	-0.21	-0.02	0.15	-0.29	0.04	-0.24	-0.05	0.22	Stage, ft
		-0.36	-0.47	-0.19	-0.09	0.22	-0.25	-0.02	-0.10	-0.27	0.10	Outflow, cfs
			0.87	0.01	0.11	0.00	0.52	-0.16	0.13	0.28	-0.01	Avg. Residence Time, 90 Days
Outflow, cfs	0.60			0.13	0.19	-0.13	0.40	-0.10	0.03	0.30	0.04	Avg. Residence Time, 30 Days
Avg. Residence Time, 90 Days	-0.49	-0.22			0.03	0.00	-0.12	-0.04	0.44	0.32	-0.02	Blue-green Algae
Avg. Residence Time, 30 Days	-0.51	-0.36	0.79			0.20	0.10	0.16	-0.04	0.15	0.02	Chrysomonads
Ammonia Nitrogen as N, mg/l	0.24	0.16	-0.21	-0.13			-0.01	0.06	0.11	-0.03	0.18	Cryptomonads
Chlorophyll-a, ug/l	-0.46	-0.32	0.53	0.43	-0.35			-0.17	0.03	0.33	0.04	Diatoms
Dissolved oxygen, mg/l	0.18	0.19	-0.07	-0.18	0.09	-0.23			-0.01	0.02	0.08	Dinoflagellates
Kjeldahl Nitrogen as N, mg/l	-0.75	-0.30	0.56	0.52	-0.40	0.61	-0.43			0.28	-0.02	Euglenoids
Nitrate/Nitrite as N, mg/I	0.02	0.35	-0.16	-0.28	0.27	-0.30	0.51	-0.08			0.13	Green Algae
Total Organic Carbon, mg/l	0.23	0.47	0.03	-0.25	-0.03	-0.06	0.31	0.02	0.29			
Total Phosphorous as P, mg/l	-0.72	-0.26	0.53	0.41	-0.22	0.50	-0.34	0.85	0.18	0.00		
Turbidity	-0.56	-0.09	0.22	0.12	0.16	0.13	-0.15	0.55	0.47	0.03	0.79	
	Stage, ft	Outflow, cfs	Avg. Residence Time, 90 Days	Avg. Residence Time, 30 Days	Ammonia Nitrogen as N, mg/l	Chlorophyll-a, ug/l	Dissolved oxygen, mg/l	Kjeldahl Nitrogen as N, mg/l	Nitrate/Nitrite as N, mg/I	Total Organic Carbon, mg/l	Total Phosphorous as P, mg/l	

#### **Exploring Relationships Among Parameters**



Ammonia Nitrogen as N, mg/l	0.05	0.02	-0.16	-0.19	-0.02	0.34	0.15	0.03	-0.32	-0.23	-0.14	-0.01	0.12
AverageResTime_30Days		0.84	0.14	0.01	-0.35	-0.1	0.03	-0.41	0.04	-0.28	-0.31	-0.25	-0.26
AverageResTime_90Days 0.			0.17	0	-0.27	0.01	-0.03	-0.28	0	-0.23	-0.24	-0.14	-0.19
Chlorophyll-a, ug/l				0.28	0.26	0.43	0.07	-0.1	0.12	-0.11	-0.01	0.18	-0.09
Dissolved oxygen (DO) 0.14 -0.01 0.52 0.1								0.1	0.17	0.17	0.22	0.35	0.31
Inflow (cfs) 0.15 0.1 0.18 -0.15 0.26 0.22										0.21	0.13		
Kjeldahl Nitrogen as N, mg/l 0.04 0.1 -0.12 -0.2 0.29										0.45	0.29		
Nitrate/Nitrite as N, mg/l 0.11 -0.2 0.1 0.15										0.35	0.53		
Outflow (cfs) -0.19 0.47 0.3											0.28	0.37	
Lower – Below Hwy 50 pH 0.01 -0.21										-0.28	-0.39		
Stage (ft) 0.3											0	0.07	
Total Organic Carbon, mg/l											, mg/l	0.52	0.59
Total Phosphorous as F										, mg/l	0.67		



- Dissolved oxygen (DO) 0.07 -0.29 0.39 0.01 0.29 -0.03 0.27 0.07 0.02
  - Inflow (cfs) -0.04 0.16 0.14 -0.23 0.24 0.21 0.01 0.04
  - Kjeldahl Nitrogen as N, mg/l -0.36 -0.07 0.09 -0.25 0.13 0.44 0.43
    - Nitrate/Nitrite as N, mg/l 0.18 -0.36 -0.01 0.2 0.14 0.33
  - Outflow (cfs) -0.35 0.56 0.39 -0.01 0.11

Upper – Above Hwy 50

- pH -0.28 -0.24 -0.08 -0.24
  - Stage (ft) 0.31 -0.14 -0.1
  - Total Organic Carbon, mg/l 0.18 0.18
    - Total Phosphorous as P, mg/l 0.61

### **Monitoring Program Activities Ahead**

- Developing options for changes to Routine Monitoring after October 2018
  - Working closely with ED and SMEs
  - Bring options to Path Forward Committee in March
    - Looking at various combinations of reducing <u>frequency</u>, <u>stations</u>, <u>parameters</u> and the associated data management and reporting.
  - Include refined recommendations in Annual Report
  - Develop estimated monitoring budget for FY2019 and forecast for 2020

### **Other Activities**

- Considering additional efforts to address Designated Use support
  - Addressing the Biological Integrity facet of the standard, for example
  - Working with ED and SMEs, the MRSW and the PFC
  - Assessing available information and data
  - Considering whether supplemental data acquisition or analysis may be warranted
- Evaluating UNRBA Monitoring Program findings relative to analyses and reporting by others.

# **Questions ?**



