

June 2009 NC DWQ Chlorophyll *a* Round Robin

Currently, 40 miles and 112,000 acres of surface waters in North Carolina are impaired due to chlorophyll *a*, a chemical parameter used to assess the phytoplankton population (2008 Draft NC Impaired Waters List). These impairments lead to the development of TMDLs and increased regulation, often at significant costs to both the state and the stakeholders in the watershed. It is important that the North Carolina Division of Water Quality (NC DWQ) understands the quality of the data used to make these decisions.

Because of the lack of performance evaluation samples for the parameter to test the entire chlorophyll *a* analysis, NC DWQ conducted a chlorophyll *a* round robin in August 2007 involving the state's certified laboratories as well as other academic and governmental laboratories. Seventeen laboratories in all analyzed eight surface water samples for chlorophyll *a* concentration. Analysis of the results indicated significant inconsistencies with the quality of the data. The division used the results of that round robin to work with laboratories to improve analyses.

The data presented within this report represent the third chlorophyll *a* round robin that was held in July 2009. Seventeen laboratories participated, each analyzing eight samples. All eight samples were collected from Triangle area waterbodies.

Experimental

Sampling

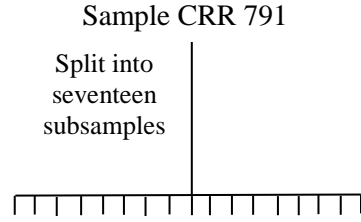
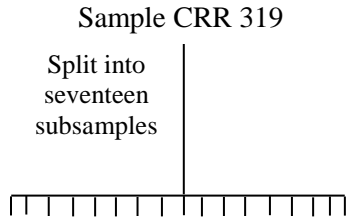
On July 15, 2009, NC DWQ staff collected eight grab samples from four area waterbodies. The locations are presented on page 2. Samples were placed in light protected carboys and transported on ice to NC DWQ's Environmental Sciences Section (ESS).

At ESS, each of the eight samples were split into seventeen 500 mL subsamples using a churn splitter to be sent to participating laboratories. Every sample was churned for two minutes prior to splitting and was continually churned during the split. Splitter facet was purged prior to sample collection. The order in which the subsamples were split from the samples was randomized in an effort to control bias. Subsamples were put in amber HDPE bottles, than placed on ice and were either delivered to laboratories by NC DWQ staff (in-state laboratories) or shipped overnight (out-of-state laboratories).

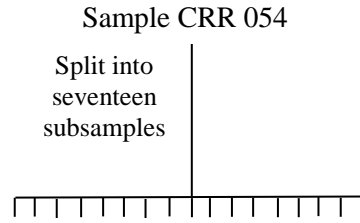
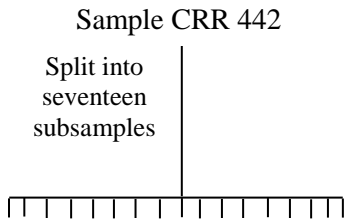
Analysis

Participating laboratories were asked to analyze the eight samples according to their Standard Operating Procedures for chlorophyll *a* analysis. Each was also asked to complete a questionnaire concerning the analysis. The answers to the questionnaire and the data from the study are found on pages 4 through 9. Analyses of the data are presented graphically on pages 10 and 11.

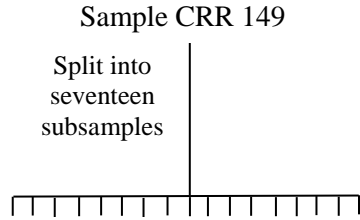
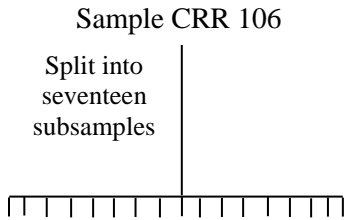
**Ellerbe Creek (Falls of the Neuse Reservoir)- By boat, DWQ monitoring station
36.06800, -78.79500**



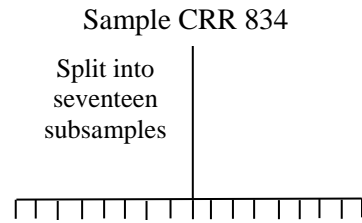
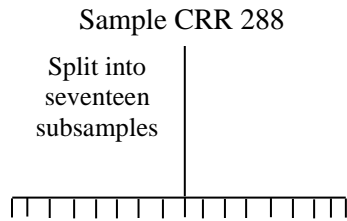
**Bass Lake - Dock
35.64246, -78.80538**



**Lake Wheeler – Lake Wheeler Park Boat Dock
35.69326, -78.70078**



**Raleigh Area Pond
35.79725, -78.68619**



Participating Laboratories

The laboratories were referred to by ID throughout the round robin.

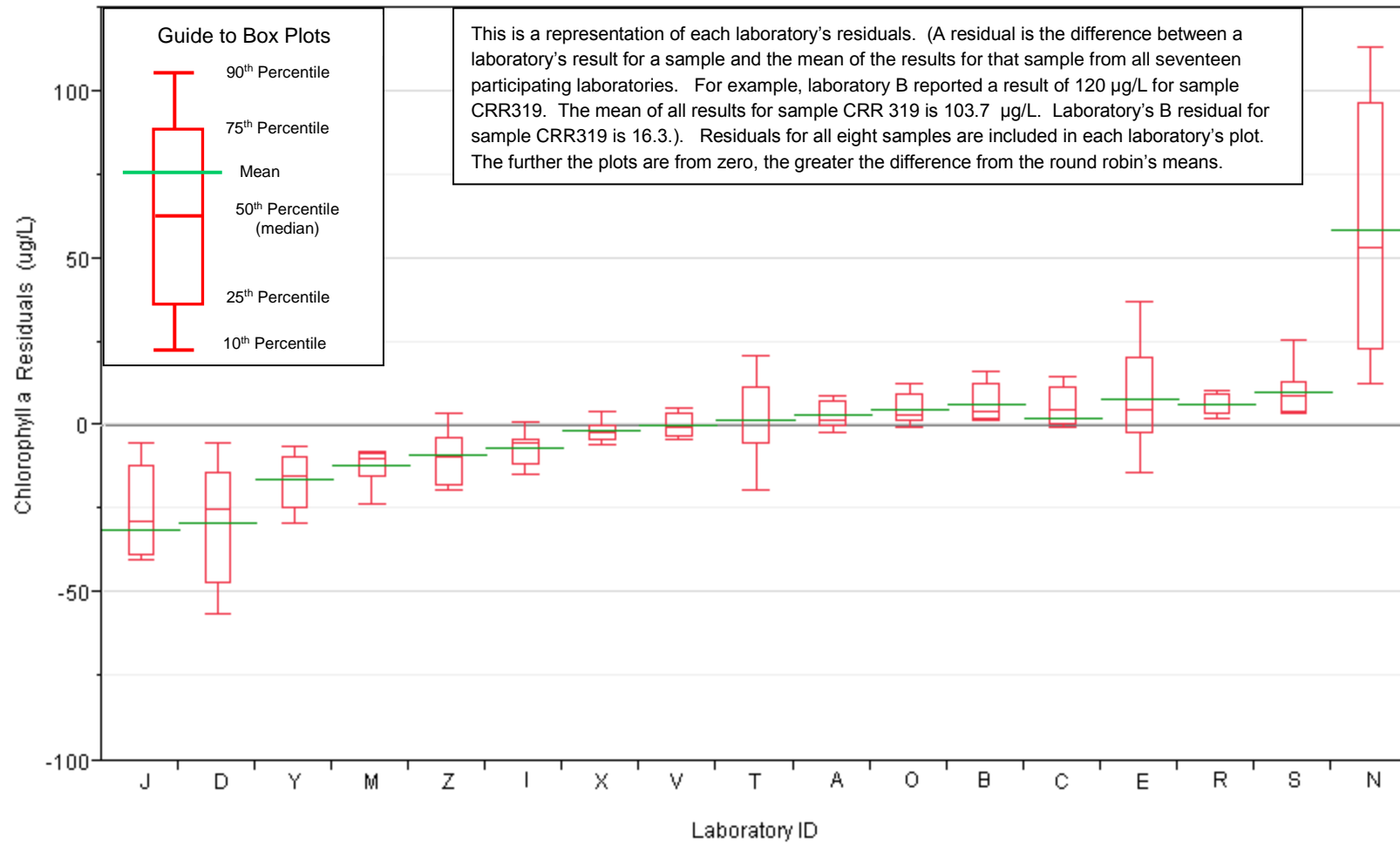
Charlotte-Mecklenburg Utilities Division – Hal Marshall Laboratory
Columbia Analytical
City of Durham Water and Wastewater Laboratory
NC DWQ Laboratory
East Carolina University Department of Biology
Environment 1
EPA Science and Ecosystems Support Division
Florida Department of Environmental Protection
Meritech
NCSU Center for Applied Aquatic Ecology
NOAA Center for Coastal Fisheries and Habitat Research
Research and Analytical
Tennessee Department of Health
Tritest
UNC Institute for Marine Sciences
UNCW Center for Marine Sciences
USGS

NC DWQ appreciates the time and cooperation of each participating laboratory.

June 2009 Chlorophyll *a* Round Robin Results

Laboratory ID	Falls Lake		Bass Lake		Lake Wheeler		Raleigh Area Pond	
	CRR319	CRR791	CRR442	CRR054	CRR106	CRR149	CRR288	CRR834
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Z	86.1	95.1	48.4	47.6	18.4	19.8	96.1	n/a
X	99.6	108.8	49.5	49.8	29.2	28.2	90.2	91.3
Y	74.9	88.1	40.8	35.3	22.3	21.1	78.0	68.3
C	107.0	129.3	55.5	57.6	41.4	28.9	63.4	94.2
R	110.9	125.2	56.5	57.3	32.3	31.3	99.6	97.3
V	100.0	120.0	50.0	51.0	28.0	26.0	93.0	92.0
J	70.1	31.9	18.9	27.2	7.0	23.9	83.4	47.2
O	110.0	125.0	55.0	51.0	30.0	31.0	96.0	100.0
S	113.0	140.0	56.0	60.0	33.6	33.5	106.0	99.2
I	91.0	99.8	45.4	46.4	24.3	25.2	87.2	88.3
D	55.0	58.0	32.0	32.0	16.0	24.0	52.0	58.0
M	93.4	98.4	40.0	43.4	20.7	20.0	68.8	77.9
E	128.9	151.7	54.4	54.7	35.3	35.4	78.2	84.1
T	98.0	95.5	65.3	53.9	35.9	29.5	88.6	108.0
A	113.0	121.0	53.4	52.1	26.7	29.3	94.8	94.8
N	192.0	227.8	113.9	96.1	49.8	57.0	192.0	99.7
B	120.0	129.0	54.0	53.0	31.0	32.0	100.0	93.0

Note: N/A = Sample was lost during shipment



2009 Round Robin

