Study for the Ongoing Assessment of Falls of the Neuse Reservoir
2016 Results

Purpose

The objective of this study is to evaluate progress in attainment of water quality standards and use support in Falls of the Neuse Reservoir (Falls Lake) as required by the Falls water supply nutrient strategy (15A NCAC 02B.0275) (i.e. the "Falls Lake Rules"). This report summarizes sample results collected in 2016.

Methods

A detailed study plan can be found here. A total of 12 monitoring stations were sampled monthly for one year. Chemical samples were collected from the photic zone and analyzed for total phosphorus (TP), total nitrogen (TN), total organic carbon, ammonia (NH_3), nitrate + nitrite (NO_3+NO_2), total Kjeldahl nitrogen (TKN), turbidity, and chlorophyll *a* (Chla). Duplicate samples were collected at one station per sampling event on a rotating schedule for quality control. Physical measurements of dissolved oxygen (DO), temperature, pH, and conductivity were collected through the water column in one meter (m) increments with a mulitparameter meter.

Results

One year summary results are presented by station in the two management areas, Lower Falls Lake (Figure 1) and Upper Falls Lake (Figure 2). These figures show annual mean, minimum, and maximum concentrations for TP (mg/L), TN (mg/L), Chla (µg/L), and turbidity (NTU) from the photic zone; DO (mg/L) and pH (s.u.) from a depth of 0.15 m (surface sample). Data summaries are calculated from twelve sampling events (n = 12). Percent exceedance of state water quality standards are shown for each station. Exceedance is defined by Chla >40 ug/L; Turbidity >25 NTU; DO <4 mg/L; pH >9 or <6 s.u. All nitrate + nitrite and ammonia data below detection (< 0.02 mg/L) were quantified as 0.01 mg/L to calculate TN values.

Figure 1. Lower Falls Lake 2016 Results

NEU019E	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.77	23.8	11.0	8.75	7.5
Min	12	0.03	0.61	9.9	5.1	4.78	6.7
Max	12	0.07	0.97	35.0	27.0	11.41	8.6
n > Standard				*0*	*1*	*0*	*0*
% Exceedance				*0.0%*	*8.3%*	*0.0%*	*0.0%*
% Confidence				*n/a*	*28.2%*	*n/a*	*n/a*

NEU019L	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.04	0.74	19.8	10.2	8.57	7.4
Min	12	0.02	0.55	8.0	3.7	5.73	6.8
Max	12	0.06	0.93	32.0	22.0	11.33	8.5
n > Standard				*0*	*0*	*0.0*	*0.0*
% Exceedance				*0.0%*	*0.0%*	*0.0%*	*0.0%*
% Confidence				*n/a*	*n/a*	*n/a*	*n/a*

NEU019P	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.04	0.78	19.5	10.5	8.42	7.3
Min	12	0.02	0.58	11.0	3.6	5.11	6.7
Max	12	0.06	0.98	27.0	23.0	11.76	8.3
n > Standard				*0*	*0*	*0*	*0*
% Exceedance				*0.0%*	*0.0%*	*0.0%*	*0.0%*
% Confidence				*n/a*	*n/a*	*n/a*	*n/a*

NEU020D	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.03	0.72	17.6	9.2	8.24	7.4
Min	12	0.02	0.51	9.6	3.2	5.48	6.8
Max	12	0.06	0.95	25.0	19.0	11.44	8.5
n > Standard				*0*	*0*	*0*	*0*
% Exceedance				*0.0%*	*0.0%*	*0.0%*	*0.0%*
% Confidence				*n/a*	*n/a*	*n/a*	*n/a*

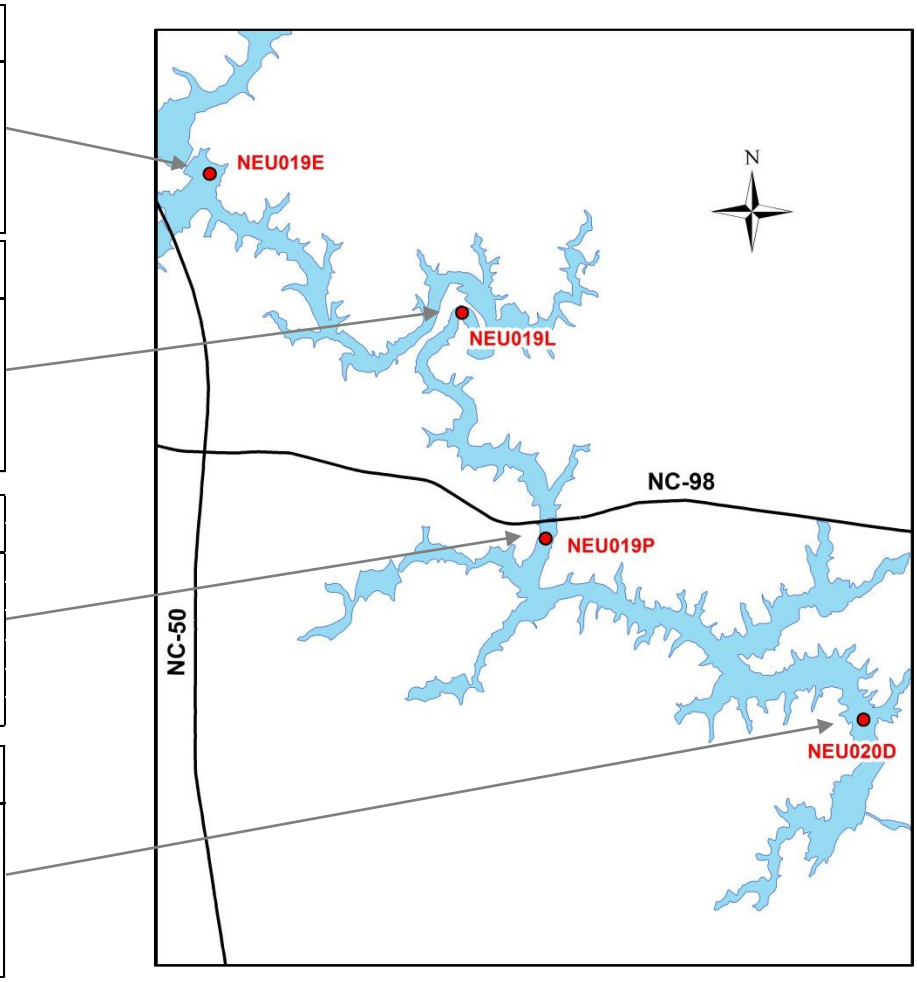
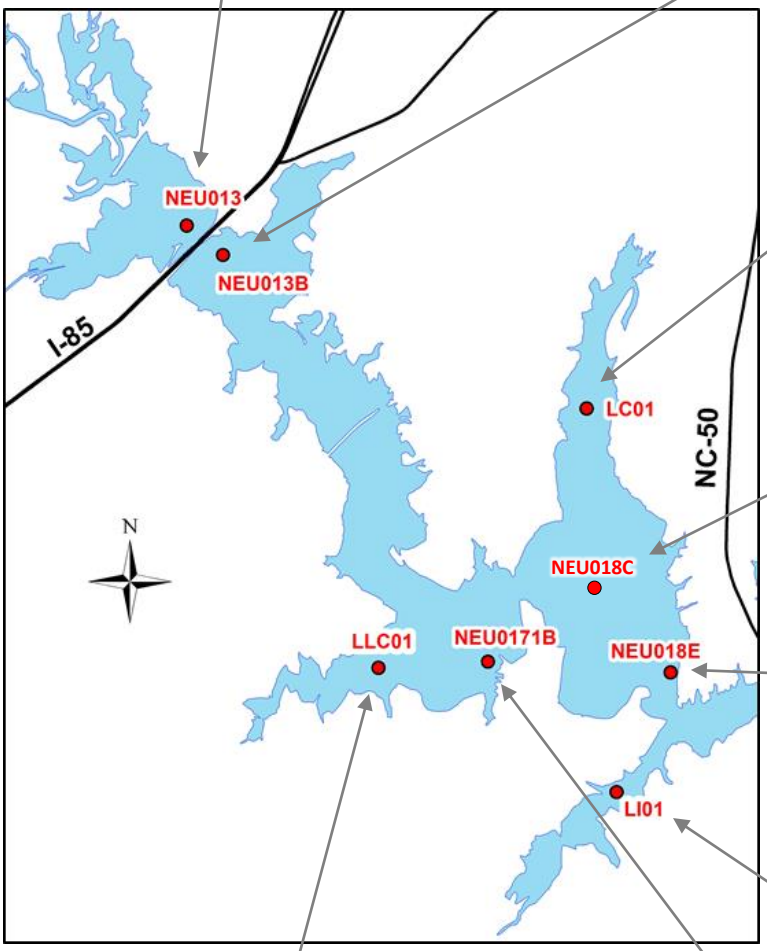


Figure 2. Upper Falls Lake 2016 Results

NEU013	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.12	0.92	n/a	27.1	9.29	7.6
Min	12	0.05	0.80	n/a	8.6	4.36	6.6
Max	12	0.44	1.21	n/a	50.0	13.00	9.3
n > Standard				*n/a*	*5*	*0*	*1*
% Exceedance				*n/a*	*41.7%*	*0.0%*	*8.3%*
% Confidence				*n/a*	*99.6%*	*n/a*	*28.2%*

NEU013B	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.07	0.87	31.5	24.3	9.57	7.5
Min	12	0.05	0.77	5.8	11.0	6.78	6.9
Max	12	0.10	1.00	55.0	45.0	13.60	8.3
n > Standard				*3*	*5*	*0*	*0*
% Exceedance				*25.0%*	*41.7%*	*0.0%*	*0.0%*
% Confidence				*88.9%*	*99.6%*	*n/a*	*n/a*



LC01	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.77	23.8	11.6	9.11	7.5
Min	12	0.04	0.63	9.8	5.7	3.29	6.9
Max	12	0.06	0.97	30.0	23.0	11.80	8.5
n > Standard				*0*	*0*	*1*	*0*
% Exceedance				*0.0%*	*0.0%*	*8.3%*	*0.0%*
% Confidence				*n/a*	*n/a*	*28.2%*	*n/a*

NEU018C	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.04	0.78	24.2	11.7	9.19	7.6
Min	12	0.03	0.64	9.0	5.6	5.26	7.0
Max	12	0.06	0.99	38.0	28.0	12.00	8.7
n > Standard				*0*	*1*	*0*	*0*
% Exceedance				*0.0%*	*8.3%*	*0.0%*	*0.0%*
% Confidence				*n/a*	*28.2%*	*n/a*	*n/a*

NEU018E	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.77	28.3	11.7	9.48	7.6
Min	12	0.03	0.61	10.0	5.3	7.47	6.5
Max	12	0.07	0.97	66.0	26.0	12.20	8.5
n > Standard				*1*	*1*	*0*	*0*
% Exceedance				*8.3%*	*8.3%*	*0.0%*	*0.0%*
% Confidence				*28.2%*	*28.2%*	*n/a*	*n/a*

LI01	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.77	29.1	20.2	9.24	7.6
Min	12	0.04	0.55	16.0	5.8	6.30	6.8
Max	12	0.09	0.91	47.0	65.0	11.90	8.4
n > Standard				*2*	*3*	*0*	*0*
% Exceedance				*16.7%*	*25.0%*	*0.0%*	*0.0%*
% Confidence				*65.9%*	*88.9%*	*n/a*	*n/a*

LLC01	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.20	0.81	28.4	14.4	9.61	7.6
Min	12	0.04	0.66	8.1	6.9	6.93	6.9
Max	12	1.80	0.95	51.0	34.0	12.70	8.7
n > Standard				*2*	*2*	*0*	*0*
% Exceedance				*16.7%*	*16.7%*	*0.0%*	*0.0%*
% Confidence				*65.9%*	*65.9%*	*n/a*	*n/a*

NEU0171B	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.08	0.80	28.2	15.4	9.32	7.5
Min	12	0.04	0.63	7.8	7.4	6.13	6.9
Max	12	0.33	0.95	48.0	34.0	12.60	8.5
n > Standard				*2*	*2*	*0*	*0*
% Exceedance				*16.7%*	*16.7%*	*0.0%*	*0.0%*
% Confidence				*65.9%*	*65.9%*	*n/a*	*n/a*