Study for the Ongoing Assessment of Water Quality in Falls of the Neuse Reservoir
2018 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 (WS-IV,B;NSW,CA) 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 2018.

Methods

A detailed study plan can be found by following the URL at the end of this document. A total of 12 monitoring stations on Falls Lake were sampled monthly in 2018. Chemical samples were collected as a composite from the photic zone and analyzed for total phosphorus (TP), total nitrogen (TN), ammonia (NH_3), nitrate + nitrite (NO_3+NO_2), total Kjeldahl nitrogen (TKN), turbidity, and chlorophyll *a* (Chla) (excluding site NEU013). 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 sonde. Surface readings (0.15m) for physical parameters were used in data analysis.

Results

One-year summary results are presented by station for the two management areas: Lower Falls Lake (Figure 1) and Upper Falls Lake (Figure 2). The tables display 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 surface readings. Data summaries are calculated from 11 sampling events (n) for most sites. Sampling was not conducted in September due to Hurricane Florence. Sites NEU013 and NEU013B were not sampled in January due to site inaccessibility from ice cover. Percent exceedance of state fresh surface water quality standards is 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. as outlined by North Carolina 15A NCAC 02B Water Quality Standards for Surface Waters. All nitrate + nitrite and ammonia data below the analytical detection limit (< 0.02 mg/L) were quantified as 0.01 mg/L to calculate TN values.

NEU019E

	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.05	0.79	28.6	9.8	9.2	7.3
Min	11	0.03	0.53	9.0	5.0	6.1	6.3
Max	11	0.08	1.01	54.0	28.0	12.9	8.0
n > Standard				*3*	*1*	*0*	*0*
% Exceedance				*27.3%*	*9.1%*	*0.0%*	*0.0%*
% Confidence				*91.0%*	*31.4%*	*N/A*	*N/A*

NEU019L

	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.04	0.76	25.6	8.8	8.9	7.2
Min	11	0.02	0.62	7.4	3.1	6.3	6.4
Max	11	0.06	0.99	46.0	24.0	12.6	7.6
n > Standard				*2*	*0*	*0*	*0*
% Exceedance				*18.2%*	*0.0%*	*0.0%*	*0.0%*
% Confidence				*69.7%*	*N/A*	*N/A*	*N/A*

NEU019P

	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.04	0.76	25.8	8.0	8.8	7.1
Min	11	0.02	0.57	8.8	3.2	6.1	6.5
Max	11	0.07	0.97	51.0	20.0	12.2	7.6
n > Standard				*2*	*0*	*0*	*0*
% Exceedance				*18.2%*	*0.0%*	*0.0%*	*0.0%*
% Confidence				*69.7%*	*N/A*	*N/A*	*N/A*

NEU020D

	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.03	0.75	17.5	6.4	8.6	7.1
Min	11	0.02	0.52	9.0	2.9	5.3	6.6
Max	11	0.05	0.94	33.0	13.0	11.6	7.6
n > Standard				*0*	*0*	*0*	*0*
% Exceedance				*0.0%*	*0.0%*	*0.0%*	*0.0%*
% Confidence				*N/A*	*N/A*	*N/A*	*N/A*

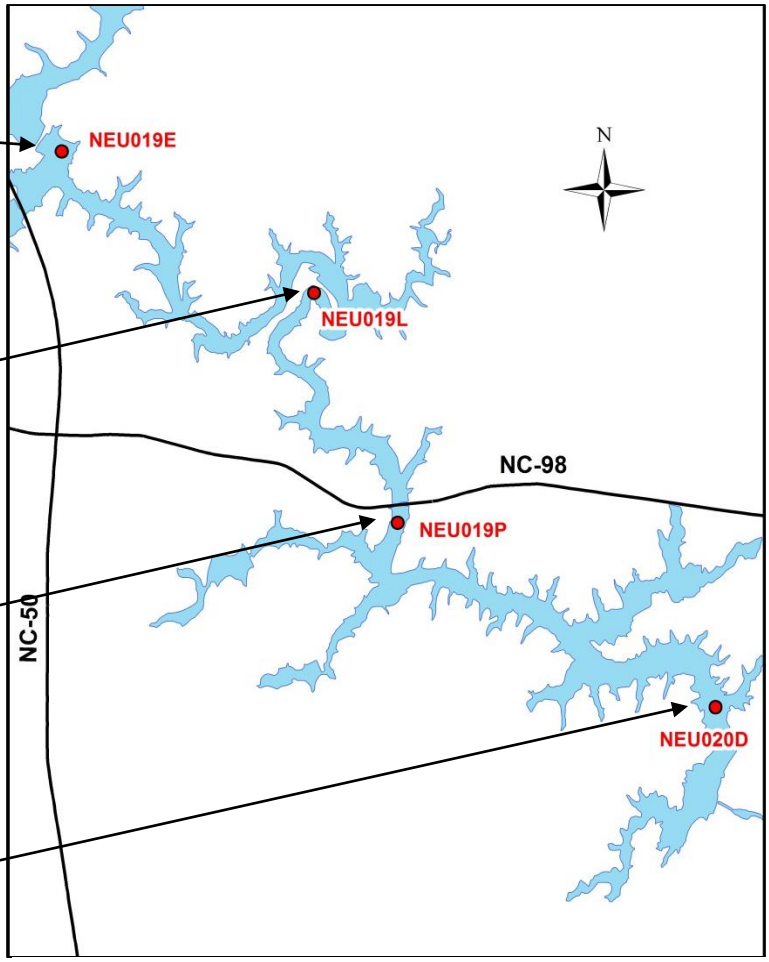

Figure 1. Lower Falls Lake

NEU013	n	TP	TN	Chla	Turbidity	DO	pH
Mean	10	0.11	1.02	N/A	31.4	8.9	7.3
Min	10	0.08	0.87	N/A	20.0	5.1	6.8
Max	10	0.35	1.23	N/A	50.0	11.5	8.0
n > Standard				*N/A*	*6*	*0*	*0*
% Exceedance				*N/A*	*60.0%*	*0.0%*	*0.0%*
% Confidence				*N/A*	*100.0%*	*N/A*	*N/A*

NEU013B	n	TP	TN	Chla	Turbidity	DO	pH
Mean	10	0.08	1.01	42.2	26.2	9.7	7.5
Min	10	0.06	0.87	5.5	13.0	5.0	6.8
Max	10	0.10	1.29	98.0	50.0	11.9	8.9
n > Standard				*4*	*6*	*0*	*0*
% Exceedance				*40.0%*	*60.0%*	*0.0%*	*0.0%*
% Confidence				*98.7%*	*100.0%*	*N/A*	*N/A*

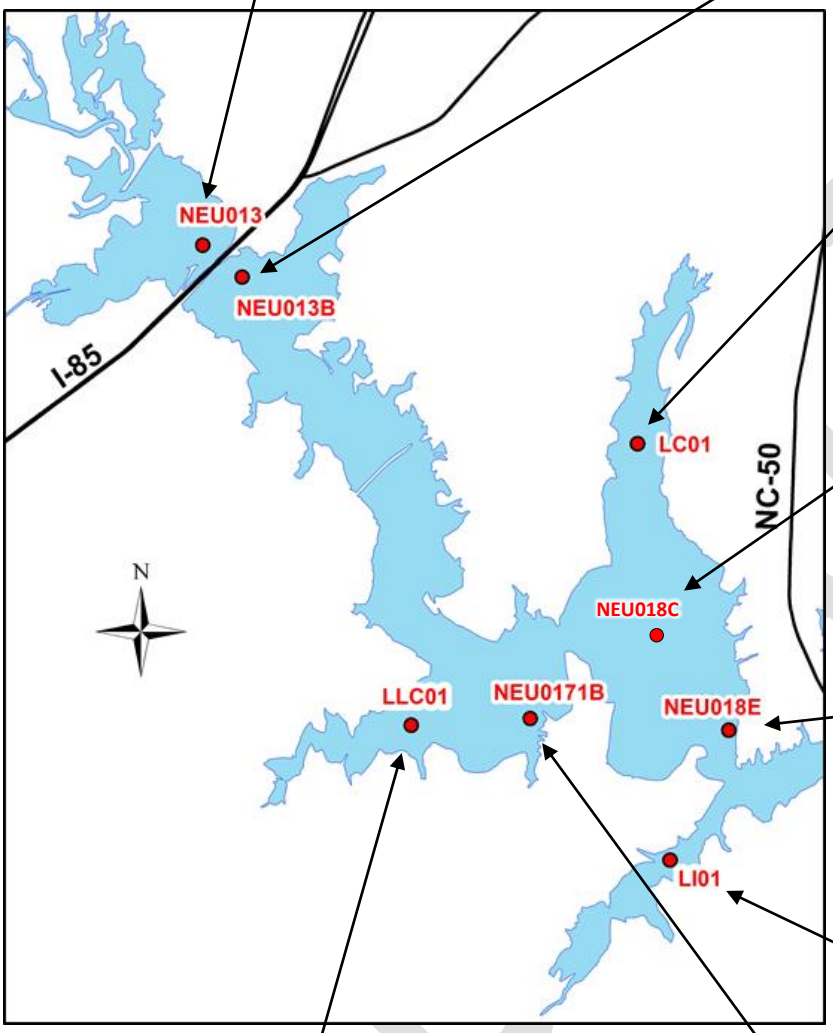

Figure 2. Upper Falls Lake

LC01	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.05	0.84	32.4	10.9	9.4	7.3
Min	11	0.03	0.69	14.0	6.2	5.3	6.3
Max	11	0.08	1.01	74.0	25.0	13.1	8.4
n > Standard				*2*	*0*	*0*	*0*
% Exceedance				*18.2%*	*0.0%*	*0.0%*	*0.0%*
% Confidence				*69.7%*	*N/A*	*N/A*	*N/A*

NEU018C	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.05	0.78	33.6	11.1	9.7	7.5
Min	11	0.04	0.00	9.0	6.0	6.2	6.6
Max	11	0.07	1.01	81.0	24.0	13.1	8.3
n > Standard				*2*	*0*	*0*	*0*
% Exceedance				*18.2%*	*0.0%*	*0.0%*	*0.0%*
% Confidence				*69.7%*	*N/A*	*N/A*	*N/A*

NEU018E	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.05	0.83	32.8	10.5	9.4	7.4
Min	11	0.03	0.67	11.0	5.8	5.5	6.3
Max	11	0.08	1.03	72.0	25.0	12.6	8.1
n > Standard				*3*	*0*	*0*	*0*
% Exceedance				*27.3%*	*0.0%*	*0.0%*	*0.0%*
% Confidence				*91.0%*	*N/A*	*N/A*	*N/A*

LI01	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.06	0.86	31.1	20.9	9.3	7.3
Min	11	0.04	0.73	13.0	6.7	6.2	0.0
Max	11	0.10	1.06	57.0	60.0	13.2	8.2
n > Standard				*3*	*2*	*0*	*0*
% Exceedance				*27.3%*	*18.2%*	*0.0%*	*0.0%*
% Confidence				*91.0%*	*69.7%*	*N/A*	*N/A*

LLC01	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.06	0.89	33.3	16.6	9.7	7.5
Min	11	0.04	0.72	8.8	6.4	5.9	6.8
Max	11	0.10	1.11	96.0	37.0	13.4	8.7
n > Standard				*1*	*2*	*0*	*0*
% Exceedance				*9.1%*	*18.2%*	*0.0%*	*0.0%*
% Confidence				*31.4%*	*69.7%*	*N/A*	*N/A*

NEU0171B	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.06	0.89	36.5	14.8	9.8	7.6
Min	11	0.05	0.74	7.7	7.7	6.1	6.9
Max	11	0.09	1.05	94.0	36.0	13.2	8.6
n > Standard				*3*	*1*	*0*	*0*
% Exceedance				*27.3%*	*9.1%*	*0.0%*	*0.0%*
% Confidence				*91.0%*	*31.4%*	*N/A*	*N/A*

https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/intensive-survey-branch/falls-jordan-lakes-monitoring