

## Study for the Ongoing Assessment of Water Quality in Falls of the Neuse Reservoir: 2017 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 2017.

### Methods

A detailed study plan can be found at <https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/intensive-survey-branch/falls-jordan-lakes-monitoring>. A total of 12 monitoring stations on Falls Lake were sampled monthly in 2017. Chemical samples were collected as a composite from the photic zone, a depth equal to twice the Secchi depth, and analyzed for total phosphorus (TP), total nitrogen (TN), total organic carbon (TOC), ammonia (NH<sub>3</sub>), nitrate + nitrite (NO<sub>3</sub>+NO<sub>2</sub>), total Kjeldahl nitrogen (TKN), turbidity, and chlorophyll *a* (chl<sub>a</sub>) (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 multiparameter 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), chl<sub>a</sub> (µg/L), and turbidity (NTU) from the photic zone; DO (mg/L) and pH (s.u.) from surface readings. Data summaries are calculated from 12 sampling events (n). Percent exceedance of state fresh surface water quality standards is shown for each station. Exceedance is defined as chl<sub>a</sub> >40 µg/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 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	12	0.04	0.72	39.4	5.7	9.16	7.6
Min	12	0.03	0.61	22.0	3.2	6.60	6.9
Max	12	0.05	0.83	94.0	7.4	12.80	8.3
n > Standard			3	0	0	0	0
% Exceedance			25.0%	0.0%	0.0%	0.0%	0.0%
% Confidence			88.9%	N/A	N/A	N/A	N/A

NEU019L							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.03	0.71	39.3	5.2	9.14	7.5
Min	12	0.03	0.58	21.0	3.1	7.00	7.1
Max	12	0.04	0.82	75.0	7.4	12.80	8.2
n > Standard			5	0	0	0	0
% Exceedance			41.7%	0.0%	0.0%	0.0%	0.0%
% Confidence			99.6%	N/A	N/A	N/A	N/A

NEU019P							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.69	36.9	4.9	8.72	7.4
Min	12	0.02	0.56	17.0	3.2	5.90	7.0
Max	12	0.31	0.86	81.0	6.9	11.50	7.9
n > Standard			3	0	0	0	0
% Exceedance			25.0%	0.0%	0.0%	0.0%	0.0%
% Confidence			88.9%	N/A	N/A	N/A	N/A

NEU020D							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.03	0.70	25.5	4.6	8.65	7.5
Min	12	0.02	0.52	13.0	3.0	4.10	6.9
Max	12	0.05	0.86	72.0	6.2	11.50	8.1
n > Standard			1	0	0	0	0
% Exceedance			8.3%	0.0%	0.0%	0.0%	0.0%
% Confidence			28.2%	N/A	N/A	N/A	N/A

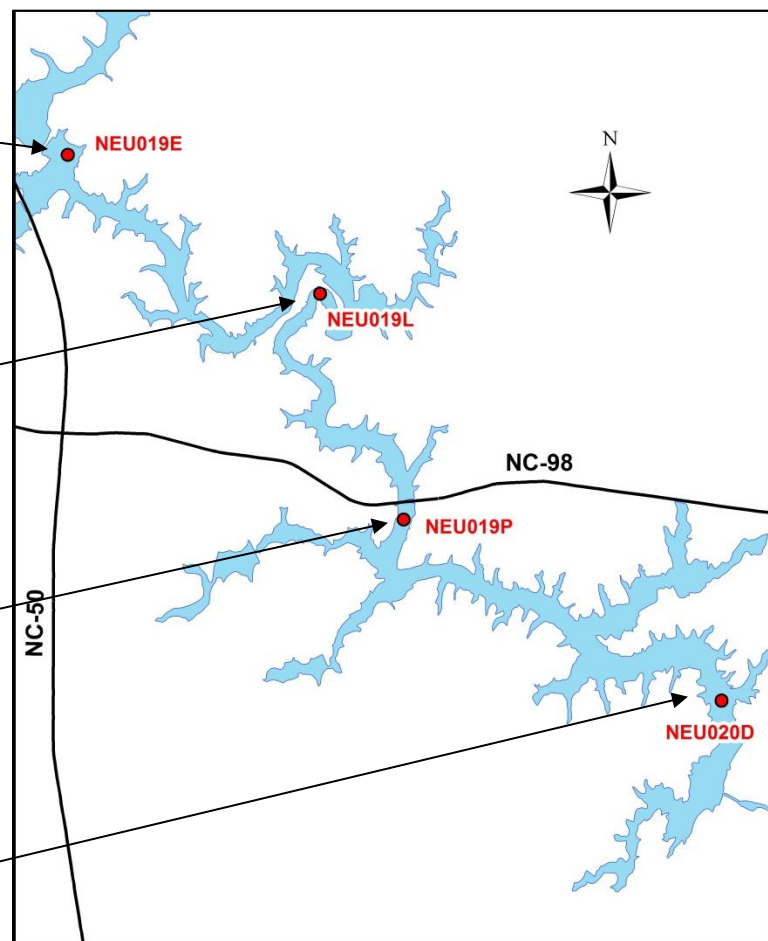
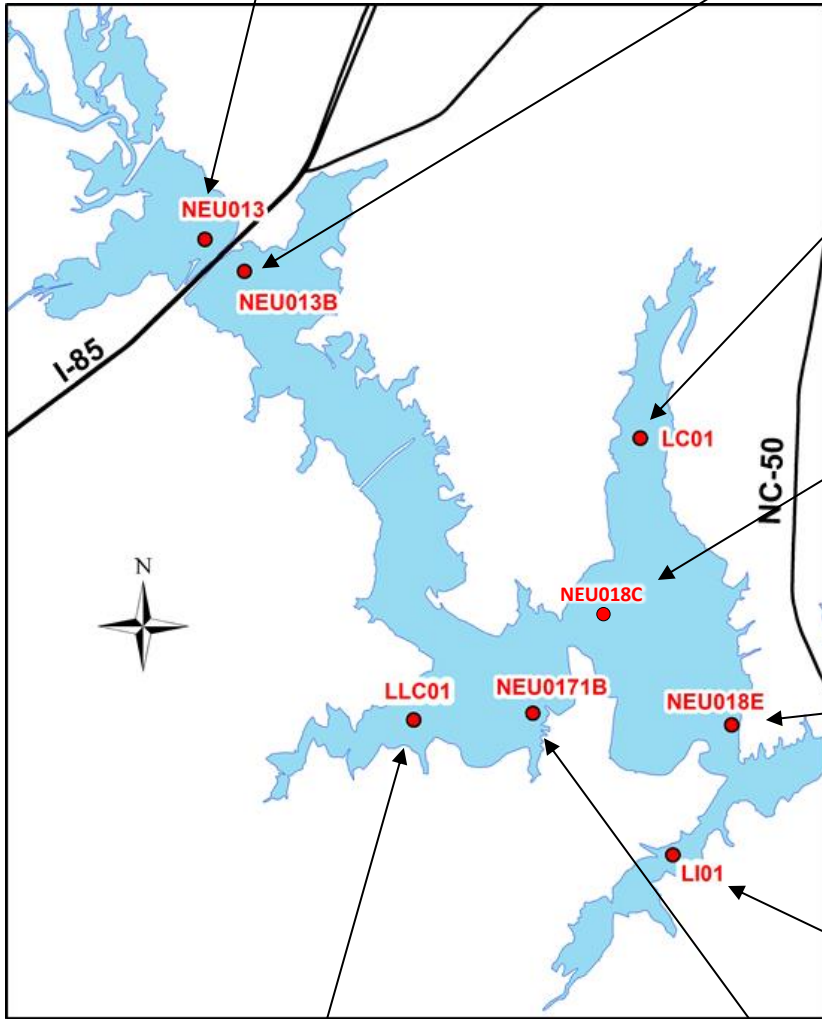


Figure 1. Lower Falls Lake

NEU013							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.10	0.99	N/A	29.6	9.34	7.6
Min	12	0.05	0.74	N/A	15.0	6.60	7.0
Max	12	0.18	1.25	N/A	60.0	12.70	8.8
<i>n</i> > Standard				N/A	7	0	0
% Exceedance				N/A	58.3%	0.0%	0.0%
% Confidence				N/A	100.0%	N/A	N/A

NEU013B							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.08	0.90	40.1	20.7	9.38	7.6
Min	12	0.06	0.78	16.0	16.0	5.60	7.0
Max	12	0.10	1.12	72.0	32.0	12.60	8.3
<i>n</i> > Standard				6	3	0	0
% Exceedance				50.0%	25.0%	0.0%	0.0%
% Confidence				99.9%	88.9%	N/A	N/A



LC01							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.75	36.5	8.1	8.85	7.6
Min	12	0.04	0.68	24.0	5.5	5.20	7.1
Max	12	0.06	0.79	68.0	10.0	12.50	7.9
<i>n</i> > Standard				3	0	0	0
% Exceedance				25.0%	0.0%	0.0%	0.0%
% Confidence				88.9%	N/A	N/A	N/A

NEU018C							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.04	0.75	41.7	6.9	9.03	7.6
Min	12	0.03	0.66	24.0	4.4	6.90	7.1
Max	12	0.05	0.84	99.0	9.2	11.90	7.8
<i>n</i> > Standard				4	0	0	0
% Exceedance				33.3%	0.0%	0.0%	0.0%
% Confidence				97.4%	N/A	N/A	N/A

NEU018E							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.04	0.72	41.6	6.8	9.52	7.5
Min	12	0.03	0.64	22.0	4.4	7.40	6.9
Max	12	0.05	0.79	94.0	8.8	12.90	8.4
<i>n</i> > Standard				4	0	0	0
% Exceedance				33.3%	0.0%	0.0%	0.0%
% Confidence				97.4%	N/A	N/A	N/A

LI01							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.75	42.1	9.0	9.06	7.4
Min	12	0.04	0.66	25.0	6.5	5.60	0.0
Max	12	0.06	0.87	76.0	12.0	12.20	7.8
<i>n</i> > Standard				4	0	0	0
% Exceedance				33.3%	0.0%	0.0%	0.0%
% Confidence				97.4%	N/A	N/A	N/A

Figure 2. Upper Falls Lake

LLC01							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.06	0.79	41.3	9.5	9.05	7.6
Min	12	0.04	0.70	23.0	7.2	4.60	7.0
Max	12	0.10	0.90	82.0	12.0	12.30	8.0
<i>n</i> > Standard				5	0	0	0
% Exceedance				41.7%	0.0%	0.0%	0.0%
% Confidence				99.6%	N/A	N/A	N/A

NEU0171B							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.77	40.0	9.4	9.28	7.5
Min	12	0.04	0.69	25.0	6.9	7.00	7.1
Max	12	0.06	0.88	67.0	12.0	12.50	7.9
<i>n</i> > Standard				5	0	0	0
% Exceedance				41.7%	0.0%	0.0%	0.0%
% Confidence				99.6%	N/A	N/A	N/A