

Study for the Ongoing Assessment of Falls of the Neuse Reservoir 2013 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). Data for load reduction estimates are not part of this particular study. This report summarizes sample results collected in 2013.

Methods

A detailed study plan can be found at <http://portal.ncdenr.org/web/wq/fallsjordan>. This study has 11 stations that 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 (TOC), ammonia (NH₃), nitrate + nitrite (NO₃+NO₂), 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. Results for each duplicate station were averaged and used as a single result for data analyzed in 2013. Physical measurements of dissolved oxygen (DO), temperature, pH and conductivity were collected through the water column in one meter (m) increments with a multiparameter meter.

Results

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 (average), minimum and maximum concentrations for TP, TN, 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 with the respective percent confidence for 2013 samples. All nitrate + nitrite and ammonium data below detection (< 0.02 mg/L) were entered as 0.01 mg/L to calculate TN values.

Figure 1. Lower Falls Lake 2013 Results

NEU019E							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.04	0.80	33	6.8	9.0	7.6
Min	12	0.04	0.73	20	4.6	6.1	6.3
Max	12	0.05	0.89	47	11	12	8.7
<i>n</i> > standard			2	0	0	0	0
% Exceedance			17%	0%	0%	0%	0%
% Confidence			66%	n/a	n/a	n/a	n/a

NEU019L							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.05	0.78	29	6.8	8.5	7.5
Min	12	0.02	0.66	6.1	4	6.1	6.4
Max	12	0.06	0.96	46	14	11	8.6
<i>n</i> > standard			2	0	0	0	0
% Exceedance			17%	0%	0%	0%	0%
% Confidence			66%	n/a	n/a	n/a	n/a

NEU019P							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.04	0.78	27	5.7	8.6	7.4
Min	12	0.02	0.59	6.5	3.6	5.9	6.4
Max	12	0.06	1.01	47	9	12	8.4
<i>n</i> > standard			1*	0	0	0	0
% Exceedance			9%	0%	0%	0%	0%
% Confidence			31%	n/a	n/a	n/a	n/a

NEU020D							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.03	0.77	19	5.1	8.9	7.6
Min	12	0.02	0.57	5.5	3.3	4.9	6.5
Max	12	0.04	0.92	38	8.6	13	8.5
<i>n</i> > standard			0	0	0	0	0
% Exceedance			0%	0%	0%	0%	0%
% Confidence			n/a	n/a	n/a	n/a	n/a

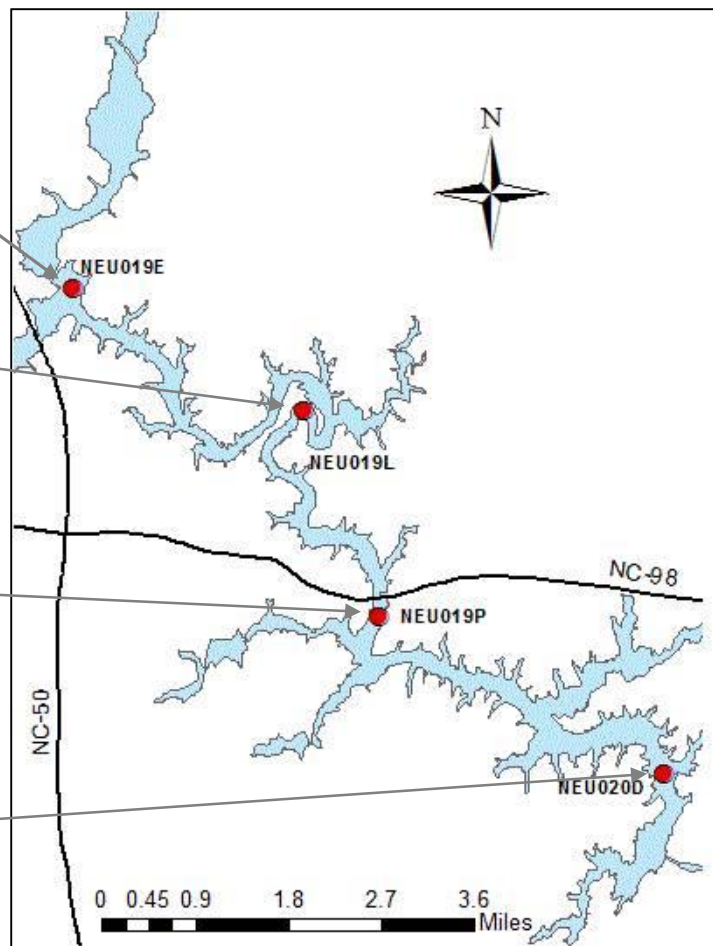
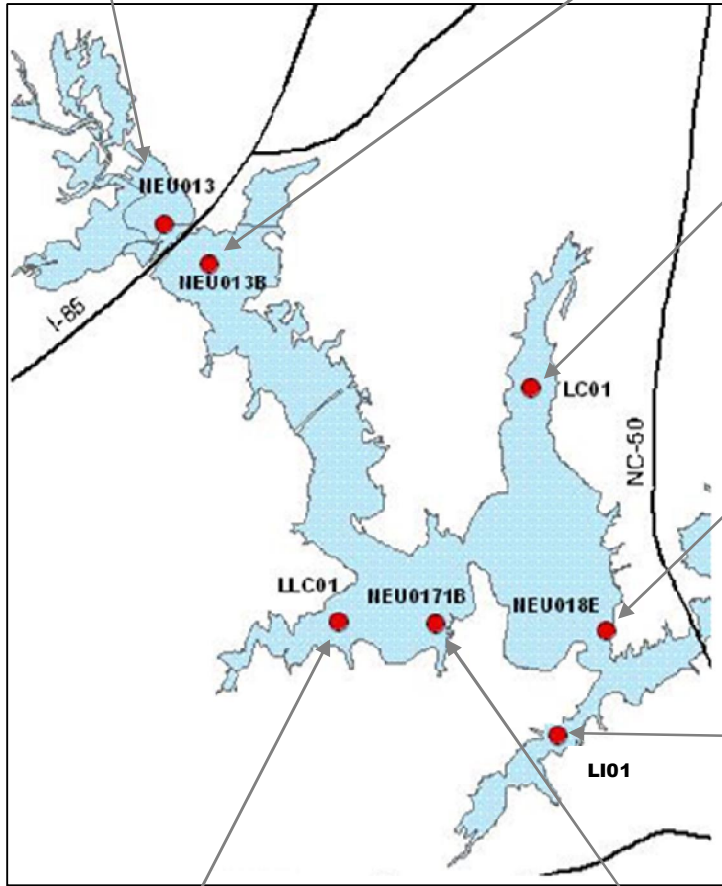


Figure 2. Upper Falls Lake 2013 Results

NEU013							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.10	1.06		24	10	7.4
Min	12	0.07	0.75		16	5.7	5.6
Max	12	0.16	1.41		40	14	8.3
<i>n > standard</i>			<i>n/a</i>	5	0	1	
% Exceedance			<i>n/a</i>	42%	0%	8%	
% Confidence			<i>n/a</i>	100%	<i>n/a</i>	28%	

NEU013B							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.10	0.94	39	22	9.6	7.3
Min	12	0.07	0.72	26	8	4.8	5.8
Max	12	0.27	1.11	52	39	14	8.3
<i>n > standard</i>				3*	5	0	1
% Exceedance				27%	42%	0%	8%
% Confidence				89%	100%	<i>n/a</i>	28%



LC01							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.06	0.81	36	10	9.6	7.5
Min	12	0.04	0.69	24	7.4	5.0	6.3
Max	12	0.06	0.89	58	13	13	8.5
<i>n > standard</i>				5*	0	0	0
% Exceedance				45%	0%	0%	0%
% Confidence				100%	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>

NEU018E							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.05	0.81	33	8.7	9.7	7.7
Min	12	0.04	0.69	24	5.2	6.0	6.1
Max	12	0.08	0.97	50	16	13	9.0
<i>n > standard</i>				3	0	0	0
% Exceedance				25%	0%	0%	0%
% Confidence				89%	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>

LI01							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.05	0.83	34	9.5	9.4	7.6
Min	12	0.04	0.73	19	6.4	6.1	6.2
Max	12	0.06	1.00	46	15	13	8.7
<i>n > standard</i>				3	0	0	0
% Exceedance				25%	0%	0%	0%
% Confidence				89%	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>

LLC01							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.08	0.84	38	11	9.5	7.2
Min	12	0.05	0.67	26	6.4	4.6	5.9
Max	12	0.30	0.97	54	19	12	8.3
<i>n > standard</i>				5*	0	0	1
% Exceedance				45%	0%	0%	8%
% Confidence				100%	<i>n/a</i>	<i>n/a</i>	28%

NEU0171B							
	n	TP	TN	Chla	Turb	DO	pH
Mean	12	0.06	0.83	36	11	9.66	7.3
Min	12	0.04	0.73	23	7.3	5.0	5.7
Max	12	0.10	0.96	62	17	12	8.7
<i>n > standard</i>				4	0	0	1
% Exceedance				33%	0%	0%	8%
% Confidence				97%	<i>n/a</i>	<i>n/a</i>	28%

*Represents 11 chlorophyll *a* samples