Study for the Ongoing Assessment of Water Quality in B. Everett Jordan Reservoir: 2017 Results.

Purpose:

The objective of this study is to evaluate progress in reducing nutrient and nutrient-related pollution in B. Everett Jordan Reservoir (WS-IV,B;NSW,CA), as required by the Jordan Water Supply Nutrient Strategy (15A NCAC 02B.0262) (i.e. the "Jordan Lake Rules"). This report summarizes results of samples collected in 2017.

Methods:

The detailed Jordan Lake study plan can be found 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 nine monitoring stations that represent the three lake management areas (Upper New Hope, Lower New Hope, and Haw River) were sampled in Jordan Lake during 2017. All stations were sampled at minimum once per month throughout the year. 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), 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 sonde. Surface readings (0.15m) for physical parameters were used in data analysis.

Results:

One-year summary results are presented by station for the three management areas: Upper New Hope (Figure 1), Lower New Hope (Figure 2), and Haw River Arm (Figure 3). The tables display annual mean, minimum, and maximum concentrations for TP (mg/L), TN (mg/L), chla (µg/L), turbidity (NTU), DO (mg/L), and pH (s.u.). 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 chla >40 ug/L; turbidity >25 NTU; DO <4 mg/L; pH >9 or <6 s.u. as defined 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. Chla results at all sites in November 2017 were J2 lab qualifiers (i.e. The reported value failed to meet the established quality control criteria for either precision or accuracy, and thus are estimated values). If a value has a J2 qualifier, the value is denoted with a single asterisk. Values meeting Q1/Q2 qualifier criteria (sample hold time exceeded) are denoted with double asterisks.

CPF086C	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.08	1.21	62.1	14.6	10.8	8.4
Min	12	0.06	1.01	17.0	10.0	6.3	7.1
Max	12	0.10	1.69	110.0	19.0	14.0	9.2
n > Standard				*9*	*0*	*0*	*1*
% Exceedance				*75.0%*	*0.0%*	*0.0%*	*8.3%*
% Confidence				*100.0%*	*N/A*	*N/A*	*28.2%*

CPF081A1C	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.08	1.14	61.8	16.6	10.3	8.4
Min	12	0.05	0.88	17.0	10.0	6.2	7.3
Max	12	0.11	1.41	130.0	21.0	13.4	9.1
n > Standard				*10*	*0*	*0*	*3*
% Exceedance				*83.3%*	*0.0%*	*0.0%*	*25.0%*
% Confidence				*100.0%*	*N/A*	*N/A*	*88.9%*

CPF086F	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.07	1.05	60.0	11.8	10.1	8.2
Min	12	0.04	0.77	29.0	6.9	6.0	7.2
Max	12	0.10	1.21	89.0	15.0	12.9	9.3
n > Standard				*9*	*0*	*0*	*1*
% Exceedance				*75.0%*	*0.0%*	*0.0%*	*8.3%*
% Confidence				*100.0%*	*N/A*	*N/A*	*28.2%*

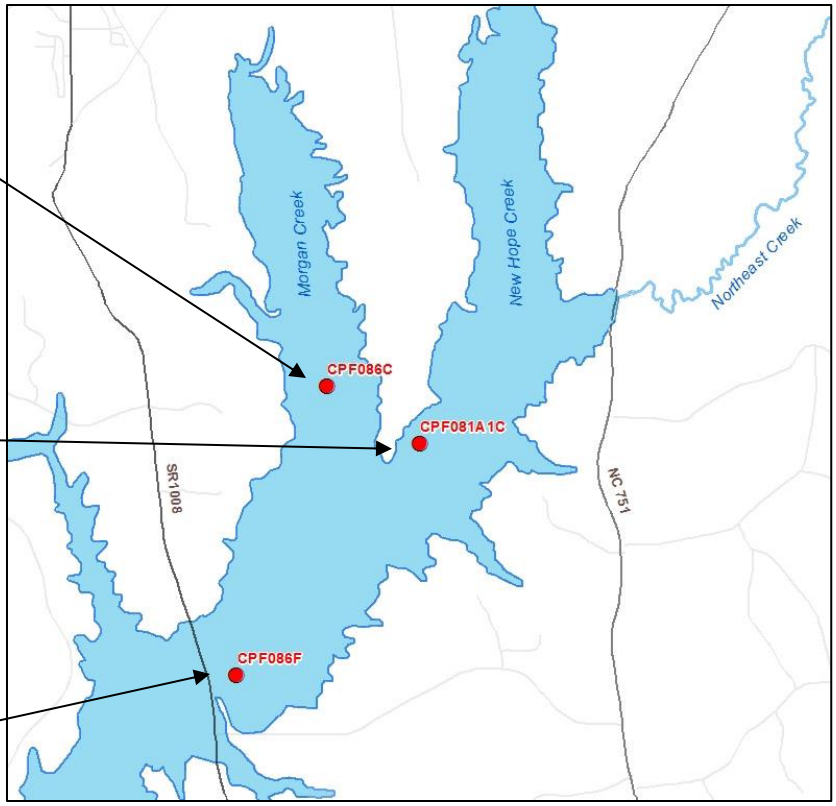

Figure 1. *Upper New Hope Section of Jordan Lake*

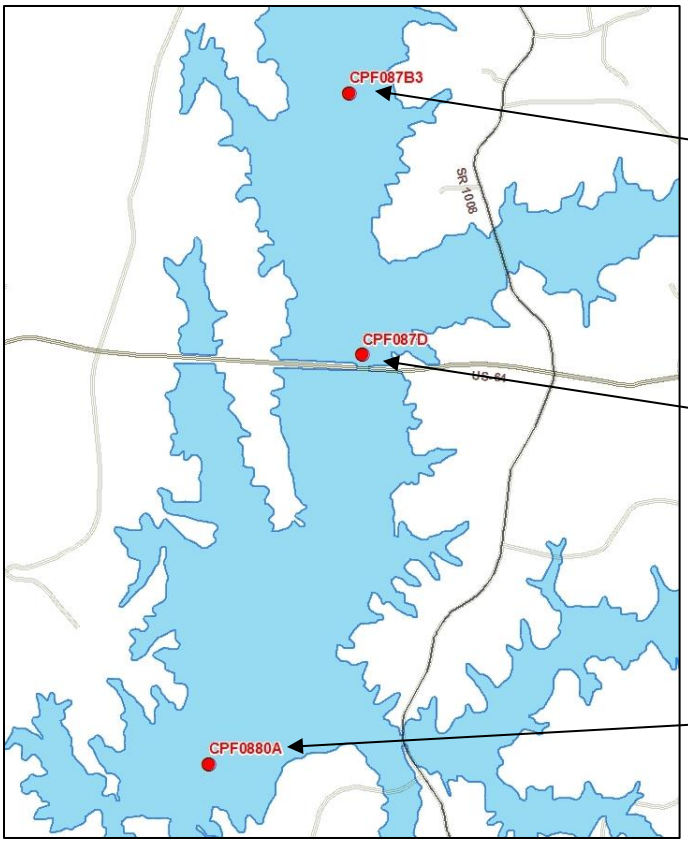

***Figure 2**. Upper New Hope Area of Jordan Lake*

CPF087B3	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.89	44.8	7.6	9.8	8.0
Min	12	0.03	0.69	24.0	4.9	5.0	7.3
Max	12	0.06	1.01	72.0	10.0	12.9	9.2
n > Standard				*7*	*0*	*0*	*1*
% Exceedance				*58.3%*	*0.0%*	*0.0%*	*8.3%*
% Confidence				*100.0%*	*N/A*	*N/A*	*28.2%*

CPF087D	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.05	0.91	42.1	7.2	9.8	8.0
Min	12	0.04	0.70	20.0	5.3	5.2	7.2
Max	12	0.06	1.21	67.0*	9.7	12.5	9.2
n > Standard				*5*	*0*	*0*	*1*
% Exceedance				*41.7%*	*0.0%*	*0.0%*	*8.3%*
% Confidence				*99.6%*	*N/A*	*N/A*	*28.2%*

*J2 qualifier

CPF0880A	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.04	0.91	36.1	6.9	9.6	8.0
Min	12	0.03	0.75	20.0	4.0	6.8	7.2
Max	12	0.06	1.07	62.0**	12.0	12.3	9.3
n > Standard				*4*	*0*	*0*	*1*
% Exceedance				*33.3%*	*0.0%*	*0.0%*	*8.3%*
% Confidence				*97.4%*	*N/A*	*N/A*	*28.2%*

**Q1/Q2 qualifier

CPF055C	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.08	1.31	41.9	18.9	10.4	8.0
Min	12	0.05	0.88	10.0	5.2	7.4	6.8
Max	12	0.22	1.64	88.0**	95.0	13.8	9.3
n > Standard				*6*	*2*	*0*	*2*
% Exceedance				*50.0%*	*16.7%*	*0.0%*	*16.7%*
% Confidence				*99.9%*	*65.9%*	*N/A*	*65.9%*

**Q1/Q2 qualifier

CPF055D	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.07	1.27	35.9	16.8	9.8	8.0
Min	12	0.04	0.88	15.0	3.7	4.2	7.0
Max	12	0.21	1.56	82.0**	95.0	13.4	9.5
n > Standard				*3*	*2*	*0*	*2*
% Exceedance				*25.0%*	*16.7%*	*0.0%*	*16.7%*
% Confidence				*88.9%*	*65.9%*	*N/A*	*65.9%*

**Q1/Q2 qualifier

CPF055E	n	TP	TN	Chla	Turbidity	DO	pH
Mean	12	0.06	1.18	35.8	14.2	9.8	8.0
Min	12	0.04	0.76	16.0	3.8	5.4	7.1
Max	12	0.17	1.57	72.0**	85.0	14.3	9.5
n > Standard				*6*	*1*	*0*	*2*
% Exceedance				*50.0%*	*8.3%*	*0.0%*	*16.7%*
% Confidence				*99.9%*	*28.2%*	*N/A*	*65.9%*

**Q1/Q2 qualifier

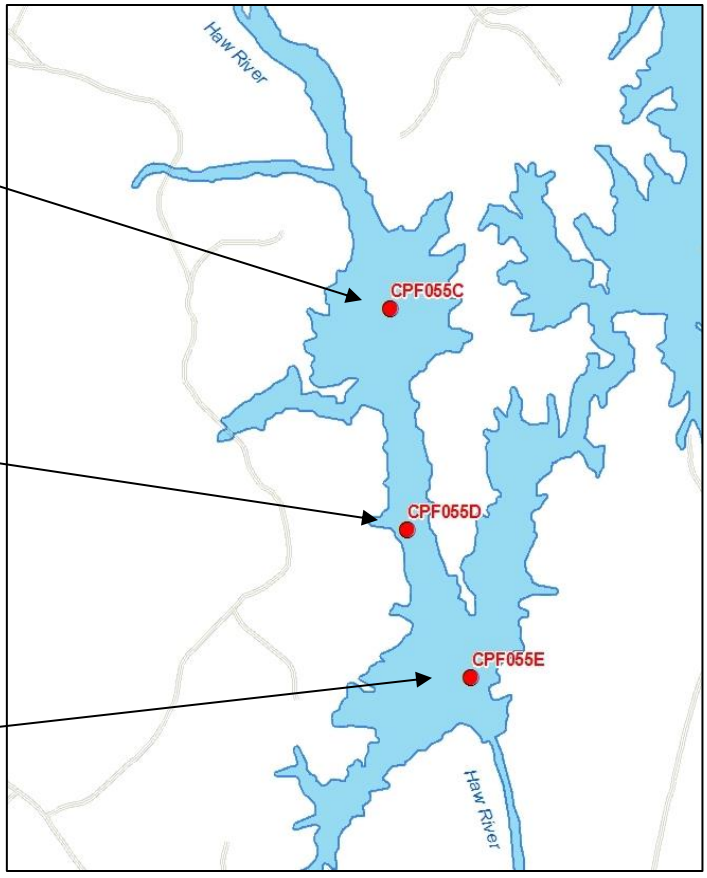

***Figure 3.** Haw River Arm of Jordan Lake*