

Study for the Ongoing Assessment of Water Quality in B. Everett Jordan Lake: 2018 Results.

Purpose:

The objective of this study is to evaluate progress in reducing nutrient and nutrient-related pollution in B. Everett Jordan Lake (WS-IV,B;NSW,CA), as required by the Jordan Lake water supply nutrient strategy (15A NCAC 02B.0262) (i.e. the “Jordan Lake Rules”). This report summarizes results of samples collected in 2018.

Methods:

The detailed Jordan Lake study plan can be found by following the URL at the end of this document. 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 2018. All stations were sampled at minimum once per month throughout the year. Sampling was not conducted in September due to Hurricane Florence. Sites CPF081A1C and CPF086C were not sampled in January due to site inaccessibility from ice cover. Chemical samples were collected as a composite from the photic zone and analyzed for total phosphorus (TP), total nitrogen (TN), ammonia (NH₃), nitrate + nitrite (NO₃+NO₂), total Kjeldahl nitrogen (TKN), turbidity, and chlorophyll *a* (chl_a). 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 multparameter 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), chl_a (µg/L), and turbidity (NTU), DO (mg/L), and pH (s.u.). Data summaries are calculated from 11 sampling events (n) for most sites. Percent exceedance of state fresh surface water quality standards is shown for each station. Exceedance is defined by chl_a >40 µg/L; turbidity >25 NTU; DO <4 mg/L; pH >9 or <6 s.u. 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.

CPF086C							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	10	0.07	1.13	51.10	12.80	9.33	7.8
Min	10	0.05	0.79	20.00	6.30	5.20	6.8
Max	10	0.08	1.67	97.00	23.00	13.50	8.8
<i>n</i> > Standard				8	0	0	0
% Exceedance				80.0%	0.0%	0.0%	0.0%
% Confidence				100.0%	N/A	N/A	N/A

CPF081A1C							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	10	0.08	1.11	51.30	16.58	9.05	7.7
Min	10	0.06	0.74	18.00	7.80	5.20	6.6
Max	10	0.11	1.48	110.00	30.00	12.40	8.5
<i>n</i> > Standard				8	2	0	0
% Exceedance				80.0%	20.0%	0.0%	0.0%
% Confidence				100.0%	73.6%	N/A	N/A

CPF086F							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.07	1.13	46.36	11.03	9.84	7.8
Min	11	0.05	0.80	21.00	6.50	6.20	6.9
Max	11	0.10	1.61	70.00	22.00	13.10	8.8
<i>n</i> > Standard				7	0	0	0
% Exceedance				63.6%	0.0%	0.0%	0.0%
% Confidence				100.0%	N/A	N/A	N/A

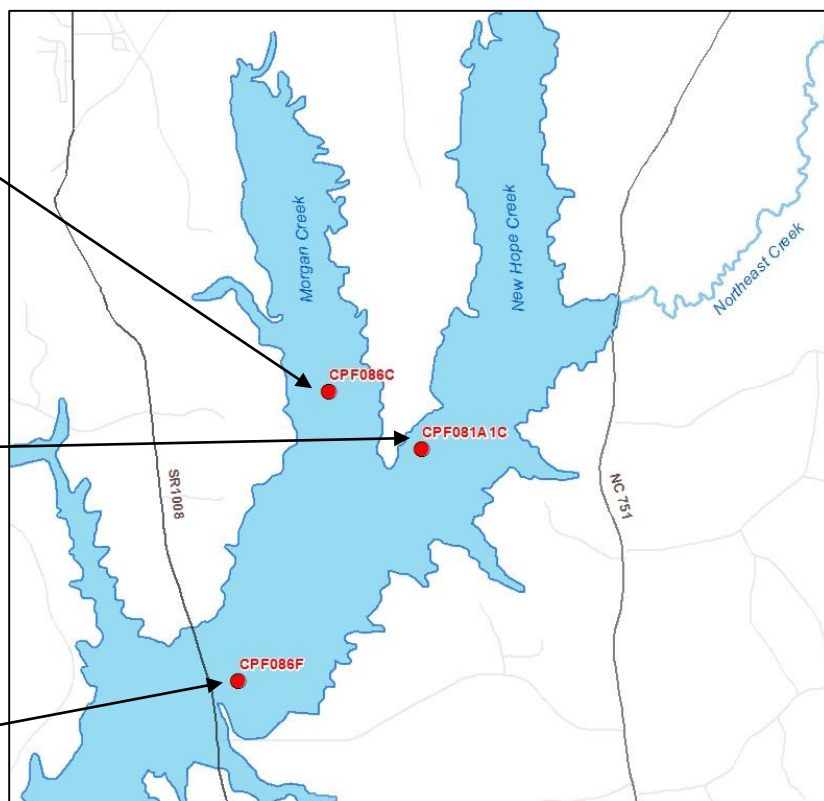
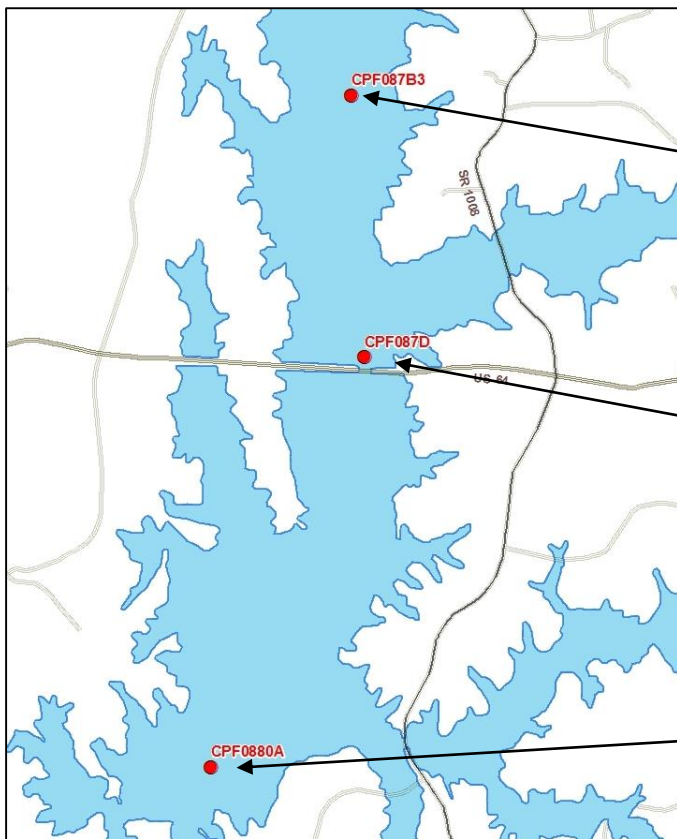


Figure 1. Upper New Hope Section of Jordan Lake



CPF087B3							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.05	0.98	37.27	7.17	9.51	7.7
Min	11	0.04	0.77	22.00	3.90	6.40	6.6
Max	11	0.06	1.27	51.00	13.00	13.30	8.8
<i>n > Standard</i>				4	0	0	0
<i>% Exceedance</i>				36.4%	0.0%	0.0%	0.0%
<i>% Confidence</i>				98.1%	N/A	N/A	N/A

CPF087D							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.05	0.97	29.36	6.84	9.32	7.6
Min	11	0.03	0.74	18.00	3.80	6.60	6.7
Max	11	0.06	1.24	39.00	11.00	12.20	8.4
<i>n > Standard</i>				0	0	0	0
<i>% Exceedance</i>				0.0%	0.0%	0.0%	0.0%
<i>% Confidence</i>				N/A	N/A	N/A	N/A

CPF0880A							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.05	1.06	31.09	8.05	9.30	7.7
Min	11	0.03	0.67	13.00	3.40	4.20	6.5
Max	11	0.07	1.58	48.00	18.00	12.20	8.5
<i>n > Standard</i>				3	0	0	0
<i>% Exceedance</i>				27.3%	0.0%	0.0%	0.0%
<i>% Confidence</i>				91.0%	N/A	N/A	N/A

Figure 2. Lower New Hope Section of Jordan Lake

CPF055C							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.09	1.38	20.21	17.52	9.49	7.6
Min	11	0.04	0.90	4.50	3.40	5.80	6.4
Max	11	0.16	2.06	43.00	50.00	11.50	8.5
<i>n > Standard</i>				1	3	0	0
<i>% Exceedance</i>				9.1%	27.3%	0.0%	0.0%
<i>% Confidence</i>				31.4%	91.0%	N/A	N/A

CPF055D							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.08	1.28	19.12	15.81	9.57	7.9
Min	11	0.04	0.80	6.30	3.00	6.80	6.7
Max	11	0.16	1.97	39.00	50.00	11.90	8.7
<i>n > Standard</i>				0	2	0	0
<i>% Exceedance</i>				0.0%	18.2%	0.0%	0.0%
<i>% Confidence</i>				N/A	69.7%	N/A	N/A

CPF055E							
	n	TP	TN	Chla	Turbidity	DO	pH
Mean	11	0.07	1.25	31.00	10.97	9.55	7.7
Min	11	0.04	0.81	14.00	3.40	4.90	6.7
Max	11	0.12	1.98	100.00	21.00	11.50	9.3
<i>n > Standard</i>				1	0	0	1
<i>% Exceedance</i>				9.1%	0.0%	0.0%	9.1%
<i>% Confidence</i>				31.4%	N/A	N/A	31.4%

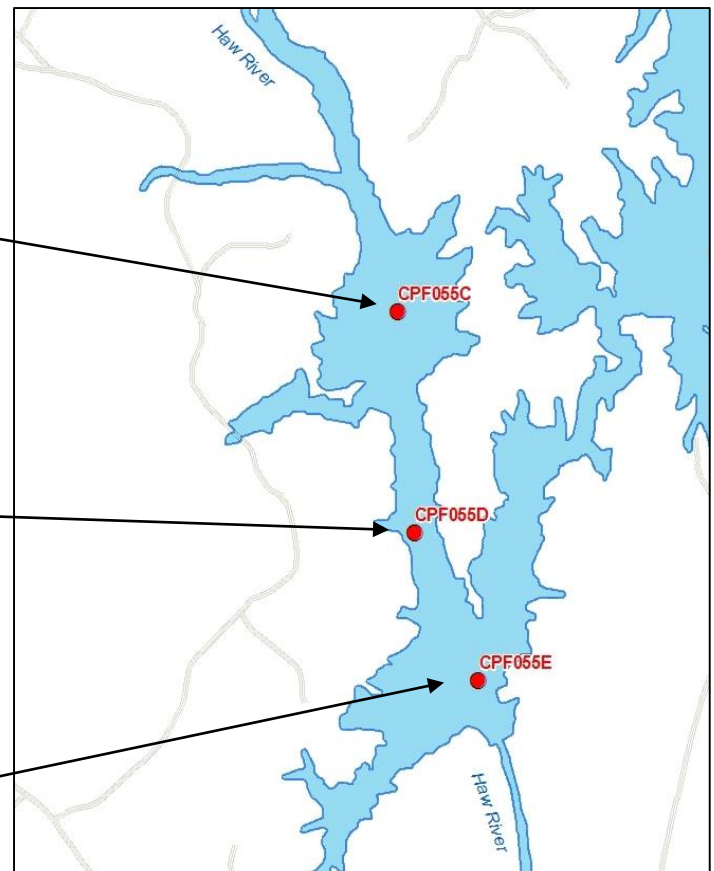


Figure 3. Haw River Arm of Jordan Lake

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