

2011 Demopolis Reservoir Report
Rivers and Reservoirs Monitoring Program



Field Operations Division
Environmental Indicators Section
Aquatic Assessment Unit
April 2014

Rivers and Reservoirs Monitoring Program

2011

Demopolis Reservoir

Tombigbee River Basin

**Alabama Department of Environmental Management
Field Operations Division
Environmental Indicators Section
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LIST OF ACRONYMS

A&I	Agriculture and Industry water supply use classification
ADEM	Alabama Department of Environmental Management
AGPT	Algal Growth Potential Test
APCo	Alabama Power Company
CHL <i>a</i>	Chlorophyll <i>a</i>
DO	Dissolved Oxygen
F&W	Fish and Wildlife
MAX	Maximum
MDL	Method Detection Limit
MIN	Minimum
MSC	Mean Standing Crop
NTU	Nephelometric Turbidity Units
OAW	Outstanding Alabama Waters
ONRW	Outstanding National Resource Water
PWS	Public Water Supply
QAPP	Quality Assurance Project Plan
RRMP	Rivers and Reservoirs Monitoring Program
S	Swimming and Other Whole Body Water-Contact Sports
SD	Standard Deviation
SOP	Standard Operating Procedures
TEMP	Temperature
TN	Total Nitrogen
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TSI	Trophic State Index
TSS	Total Suspended Solids
USACE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

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INTRODUCTION

Demopolis Reservoir was constructed in the early 1950s by the U.S. Army Corps of Engineers. Located near the city of Demopolis in Marengo County, the 10,000 acre impoundment is the largest reservoir in the Tombigbee/Black Warrior system, extending 48 miles up the Black Warrior River and 53 miles up the Tombigbee River.

The Alabama Department of Environmental Management (ADEM) monitored Demopolis Reservoir as part of the 2011 assessment of the Escatawpa, Mobile and Tombigbee River basins under the Rivers and Reservoirs Monitoring Program (RRMP). ADEM began monitoring lake water quality statewide in 1985, followed by a second statewide survey in 1989. In 1990, the Reservoir Water Quality Monitoring Program (now known as RRMP) was initiated by ADEM. The current objectives of this program are to provide data that can be used to assess current water quality conditions, identify trends in water quality conditions and to develop Total Maximum Daily Loads (TMDLs) and water quality criteria. Descriptions of all RRMP monitoring activities are available in ADEM's 2012 Monitoring Strategy (ADEM 2012).

Specific water quality criteria for nutrient management was implemented in 2005 at one location on Demopolis Reservoir. This criterion represents the maximum growing season mean (April-October) chlorophyll *a* (chl *a*) concentration allowable while still fully supporting the reservoir's Public Water Supply, Swimming, and Fish and Wildlife [(PWS/S/F&W)] use classifications.

The purpose of this report is to summarize data collected at seven stations in Demopolis Reservoir during the 2011 growing season and to evaluate trends in mean lake trophic status and nutrient concentrations using ADEM's historic dataset. Monthly and mean concentrations of nutrients [total nitrogen (TN); total phosphorus (TP)], algal biomass/productivity [chl *a*; algal growth potential testing (AGPT)], sediment [total suspended solids (TSS)], and trophic state [Carlson's Trophic State Index (TSI)] were compared to ADEM's existing data and established criteria.

METHODS

Sampling stations were determined using historical data and previous assessments ([Fig. 1](#)). Specific location information is listed in [Table 1](#). Demopolis was sampled in the dam forebay, mid and upper reservoir areas. Tributary embayment stations monitored include: Noxubee River, Trussels Creek, Brush Creek, and Factory Creek.

Water quality assessments were conducted at monthly intervals, May-October. Assessments scheduled in April were postponed due to devastating tornadoes that affected most of the basin, resulting in two water quality assessments conducted in May. All samples were collected, preserved, stored, and transported according to procedures in the ADEM Field Operations Division Standard Operating Procedures (ADEM 2011), Surface Water Quality Assurance Project Plan (ADEM 2008a) and Quality Management Plan (ADEM 2008b).

Mean growing season TN, TP, chl *a*, and TSS were calculated to evaluate water quality conditions at each site. For mainstem stations, monthly concentrations of these parameters were graphed with the closest available USGS flow data and ADEM's previously collected data to help interpret the 2011 results.

Figure 1. Demopolis Reservoir with 2011 sampling locations. A description of each sampling locations provided in Table 1.

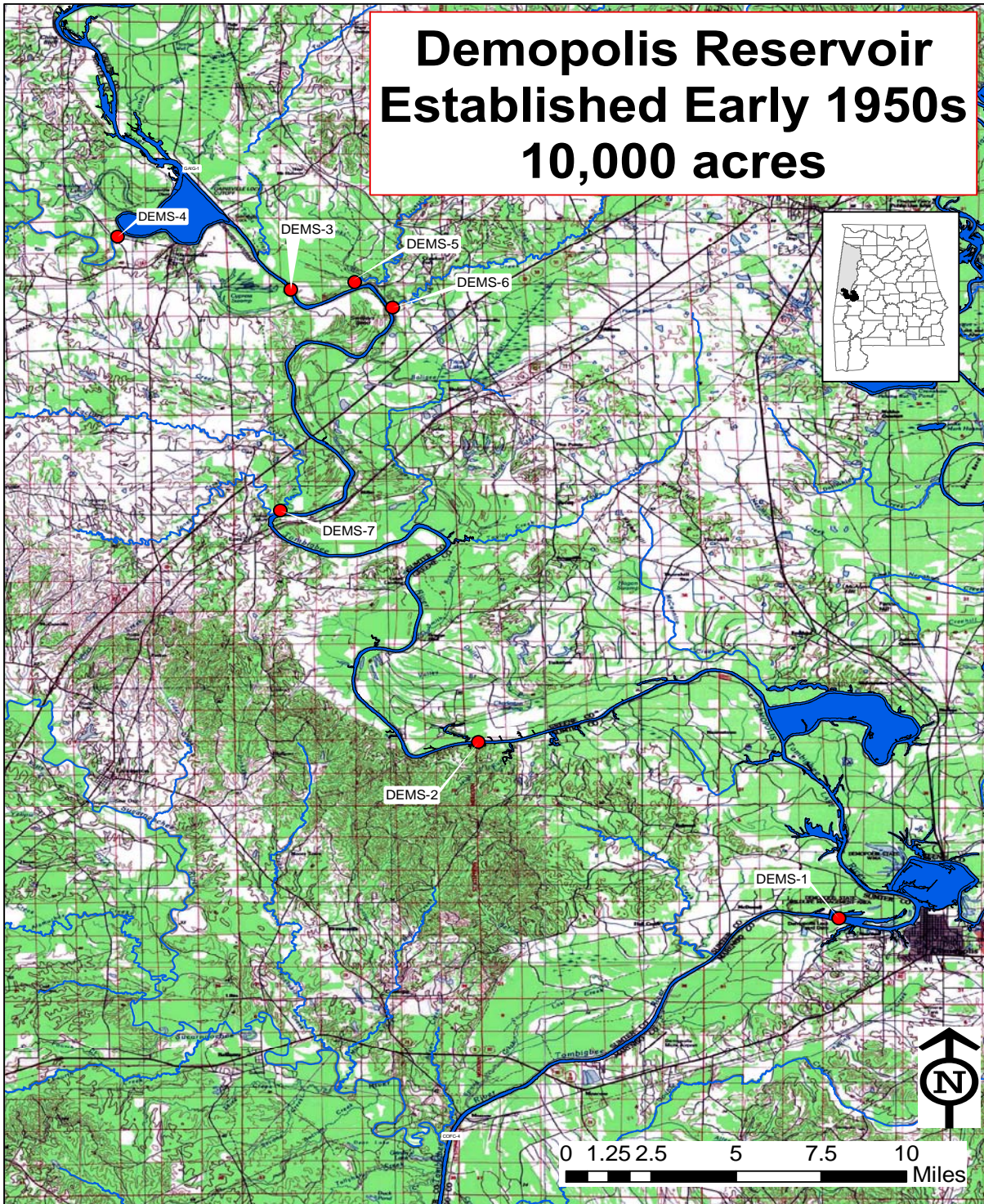


Table 1. Descriptions of the 2011 monitoring stations in Demopolis Reservoir.

Demopolis Reservoir								
HUC	County	Station Number	Report Designation	Waterbody Name	Station Description	Chl <i>a</i> Criteria	Latitude	Longitude
031602010401	Sumter	DEMS-1*	Lower	Tombigbee R	Lower reservoir. Deepest point, main river channel, dam forebay.	10 µg/l	32.5201	-87.8748
031601060707	Greene	DEMS-2	Mid	Tombigbee R	Mid reservoir. Deepest point, main river channel. Downstream of Cobb Creek confluence.		32.5994	-88.0281
031601060609	Greene	DEMS-3	Upper	Tombigbee R	Upper reservoir. Deepest point and main river channel approx. two miles downstream of Tubbs Creek confluence.		32.8036	-88.1078
031601081102	Sumter	DEMS-4	Noxubee R	Noxubee R	Deepest point, Noxubee River channel, approx. 1 mile upstream of Tombigbee River confluence.		32.8274	-88.1816
031601060606	Greene	DEMS-5	Trussels Cr	Trussels Cr	Deepest point, main creek channel, Trussels Cr embayment, approx. 0.5 miles upstream of confluence with Tombigbee River.		32.8070	-88.0807
031601060607	Greene	DEMS-6	Brush Cr	Brush Cr	Deepest point, main creek channel, Brush Cr embayment, approx. 0.5 miles upstream of confluence with Tombigbee River.		32.7954	-88.0646
031601060702	Sumter	DEMS-7	Factory Cr	Factory Cr	Deepest point, main creek channel, Factory Cr embayment, approx. 0.5 miles upstream of confluence with Tombigbee River.		32.7040	-88.1122

*Growing season mean chl *a* criterion established at this station in 2005

RESULTS

Growing season mean graphs for TN, TP, chl *a* and TSS are provided in this section ([Figs. 2-5](#)). Monthly graphs for TN, TP, chl *a*, TSS, DO, and TSI are also provided ([Figs 6-10, & 13](#)), with mean monthly discharge included as an indicator of flow and retention time in the months sampled. AGPT results appear in [Table 2](#). Depth profile graphs of temperature, conductivity and DO appear in [Figs. 11-12](#). Summary statistics of all data collected during 2011 are presented in [Appendix Table 1](#). The table contains the minimum, maximum, median, mean, and standard deviation of each parameter analyzed.

Stations with the highest concentrations of nutrients, chlorophyll, and TSS are noted in the paragraphs to follow. Though stations with lowest concentrations may not be mentioned, review of the graphs included in this report will indicate these stations that may be potential candidates for reference waterbodies and watersheds.

In 2011, the highest growing season mean TN was calculated for the Noxubee R station ([Fig. 2](#)). The mean TN concentrations at the lower, mid, Brush Cr, and Trussels Cr stations were higher in 2011 than in the previous growing season that these stations were sampled. The mean TN concentration at Factory Cr, Upper, and Noxubee R stations decreased in concentration from previous growing season means. Highest monthly TN concentrations occurred in May for all mainstem stations ([Fig.6](#)). Historic high monthly TN concentrations occurred at the upper station in July, and May at the lower station. At the mid station, monthly concentrations were above historic means in all month sampled, reaching historic highs in June and August.

In 2011, the highest growing season mean TP was calculated for the Noxubee R station ([Fig. 3](#)). The Noxubee R and Brush Cr growing season mean TP concentrations were higher than previous growing season concentrations. The mean TP concentrations at upper, Trussels, mid, and lower stations decreased from previous growing season means. Highest monthly TP concentrations occurred in May for all mainstem stations ([Fig.7](#)). All monthly TP concentrations at mainstem stations were below historic mean values.

In 2011, the highest growing season mean chl. *a* was calculated for the Factory Cr station ([Fig 4](#)). The Trussels Cr and Brush Cr growing season mean chl. *a* concentrations increased

from the previous growing sampling seasons. All other station growing season mean chl *a* concentrations decreased. The mean chl *a* concentration in lower Demopolis station was below the established criterion. Monthly concentrations were at or below historic means in most months ([Fig. 8](#)).

In 2011, the highest growing season mean TSS value was calculated for the Brush Cr station ([Fig. 5](#)). All other stations TSS mean values were lower in 2011 than in the previous sampling year. Overall, growing season mean TSS concentrations at all mainstem stations concentrations have generally decreased since 2001. Monthly TSS concentrations at the mainstem stations were similar to or below the mean historic values ([Fig. 9](#)). Highest values were reached in May at the upper and lower stations while the mid station peaked in October.

AGPT results for the upper, mid, and lower stations indicated nitrogen limited conditions in 2011, while in previous years the lower station was phosphorus limited ([Table 2](#)). In 2011, mean standing crop at the lower station was above 5.0 mg/L, the value that Raschke et al. (1996) defined as protective of reservoir and lake systems.

Dissolved oxygen concentrations at the Factory and Trussels Cr stations were below the ADEM Criteria limit of 5.0 mg/L at 5.0 ft (1.5 m) (ADEM Admin. Code R. 335-6-10-.09) ([Fig. 10](#)). All other measurements of dissolve oxygen concentrations met the criteria limit. Profiles of the mainstem stations show some stratification in August at both stations. However, the water column was generally mixed throughout the sampling season ([Figs. 11-12](#)). Highest temperatures were reached June-August.

TSI values were calculated using monthly chl *a* concentrations and Carlson's Trophic State Index. The Factory Cr station had the highest trophic state, reaching upper eutrophic conditions in May, July and August ([Fig. 13](#)). The mainstem stations varied between oligotrophic and eutrophic conditions.

Figure 2. Mean growing season TN measured in Demopolis Reservoir, May-October, 2001-2011. Stations are illustrated from upstream to downstream as the graph is read from left to right.

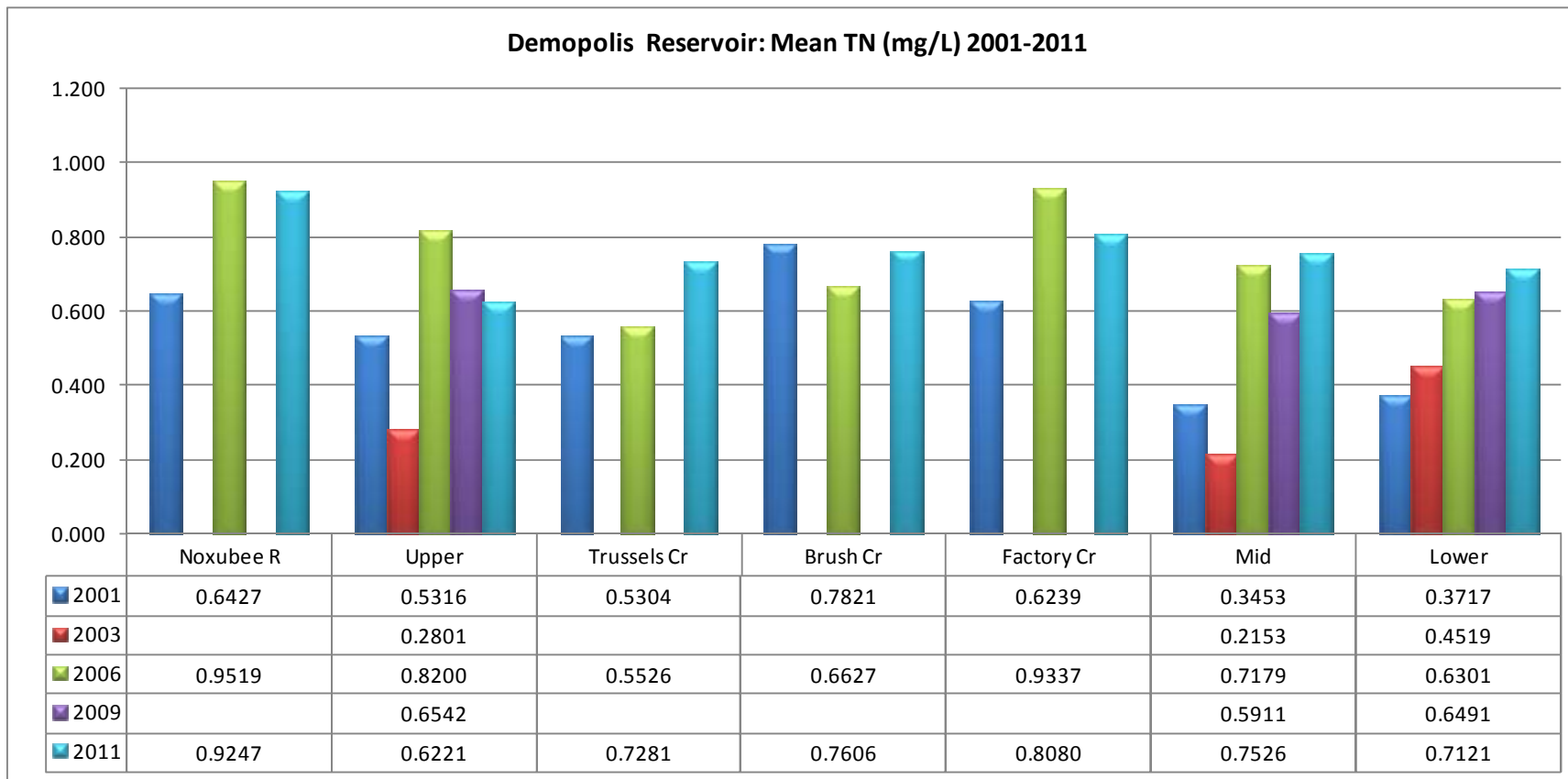


Figure 3. Mean growing season TP measured in Demopolis Reservoir, May-October, 2001-2011. Stations are illustrated from upstream to downstream as the graph is read from left to right.

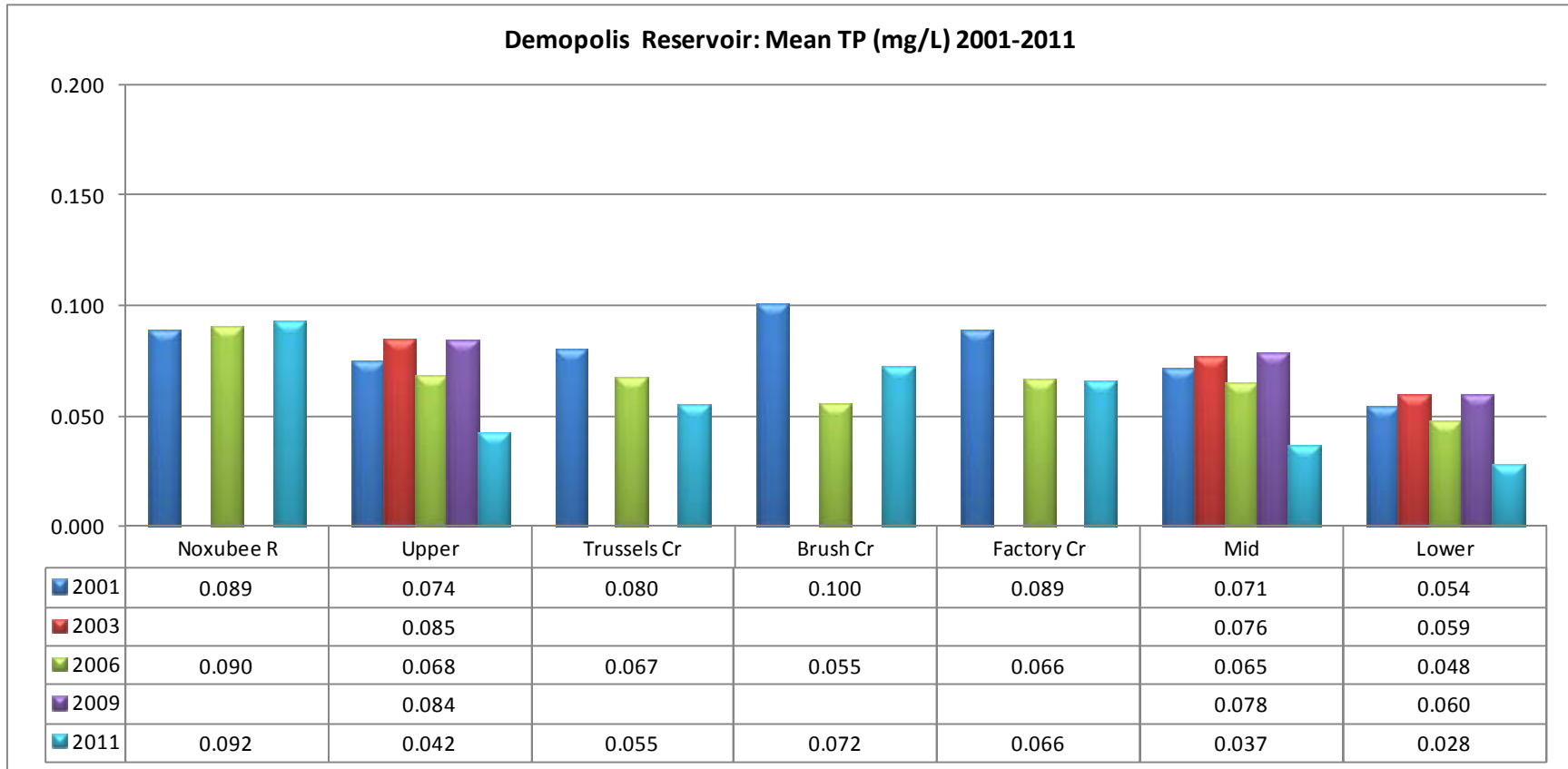


Figure 4. Mean growing season chl *a* measured in Demopolis Reservoir, May-October, 2001-2011. Stations are illustrated from upstream to downstream as the graph is read from left to right.

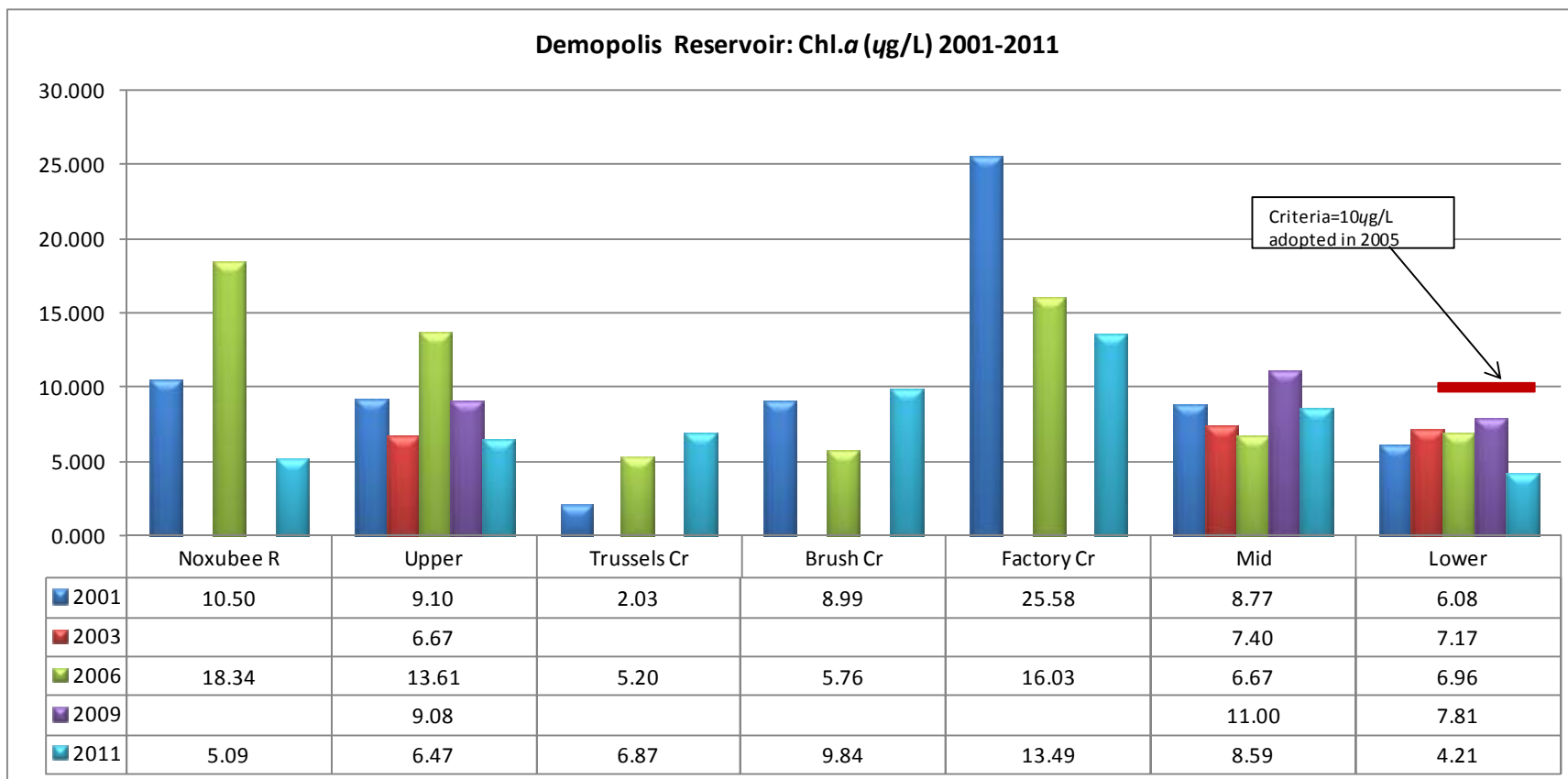


Figure 5. Mean growing season TSS measured in Demopolis Reservoir, May-October, 2001-2011. Stations are illustrated from upstream to downstream as the graph is read from left to right.

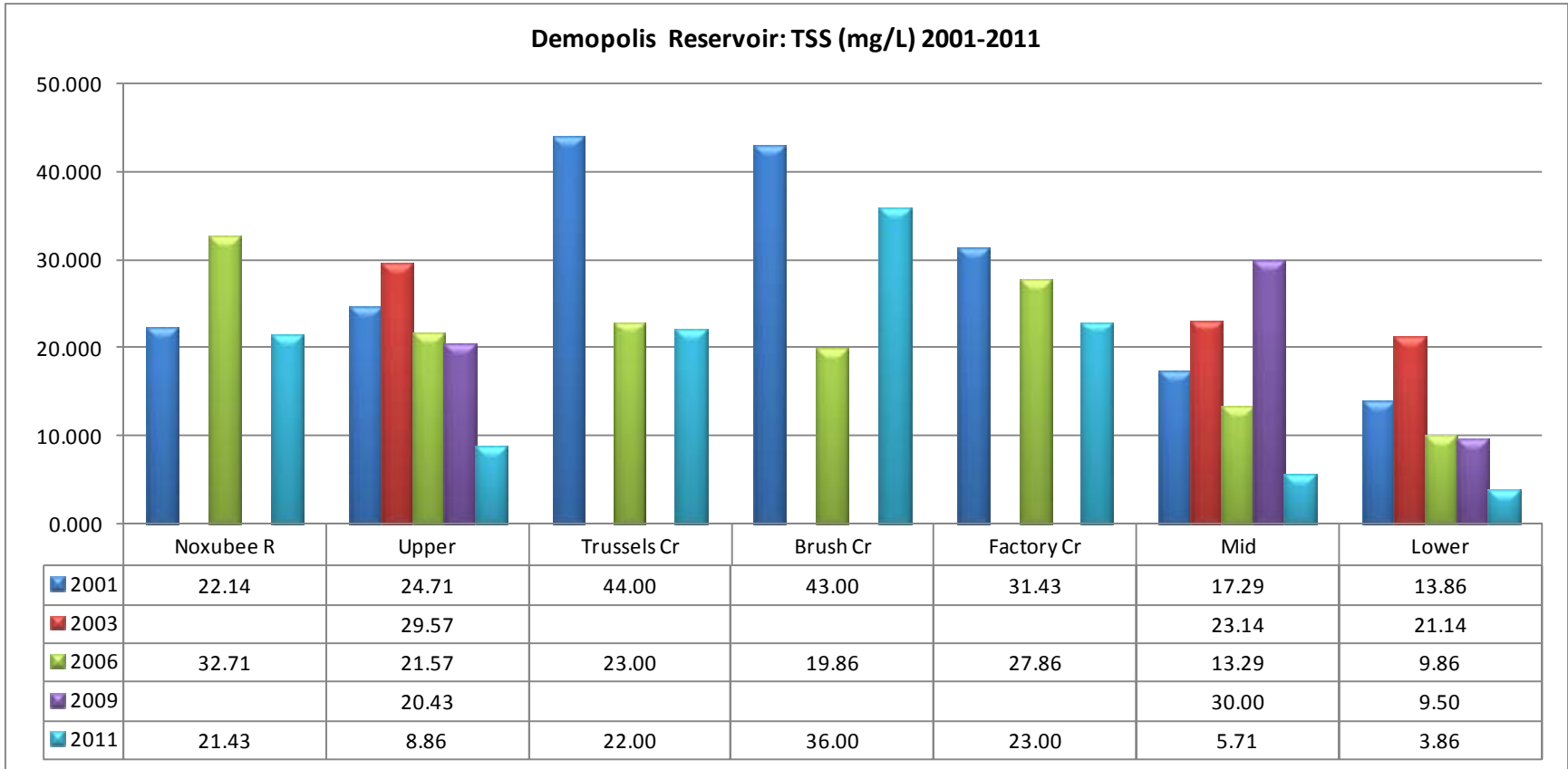


Figure 6. Monthly TN concentrations measured at upper, mid, and lower station in Demopolis Reservoir, May-October 2011 vs. average monthly discharge. Monthly discharge acquired from USGS Tombigbee R gauge at Demopolis Reservoir Dam. Each bar graph depicts monthly changes in each station. The historic mean (1992-2011) and min/max ranges are also displayed for comparison. The “n” value equals the number of datapoints included in the monthly historic calculations.

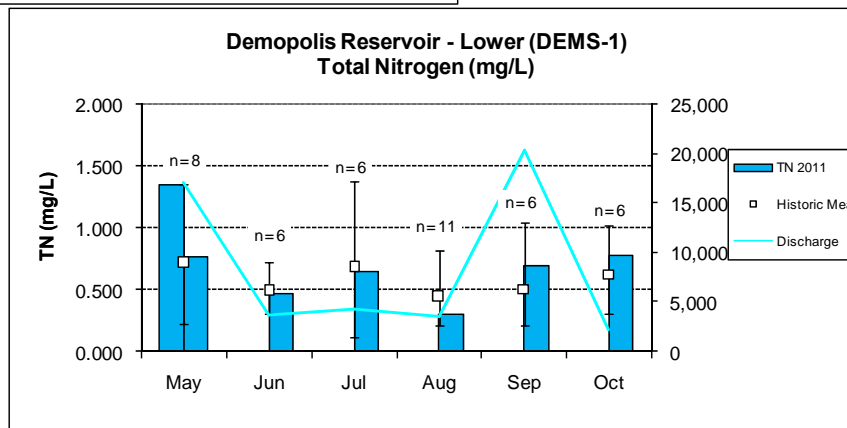
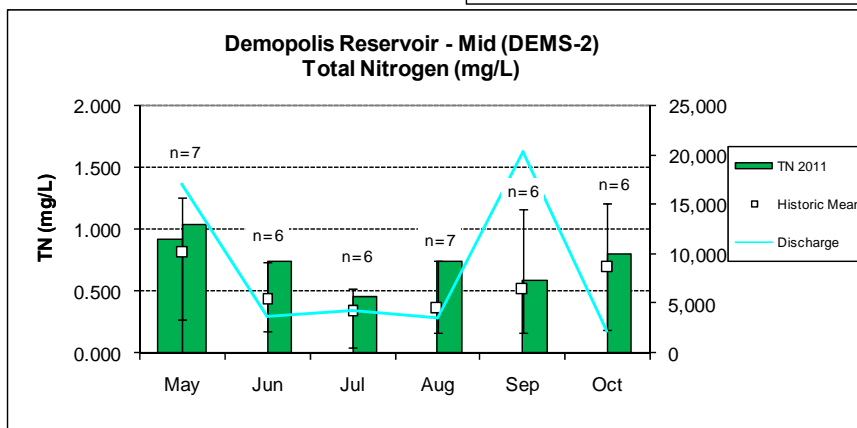
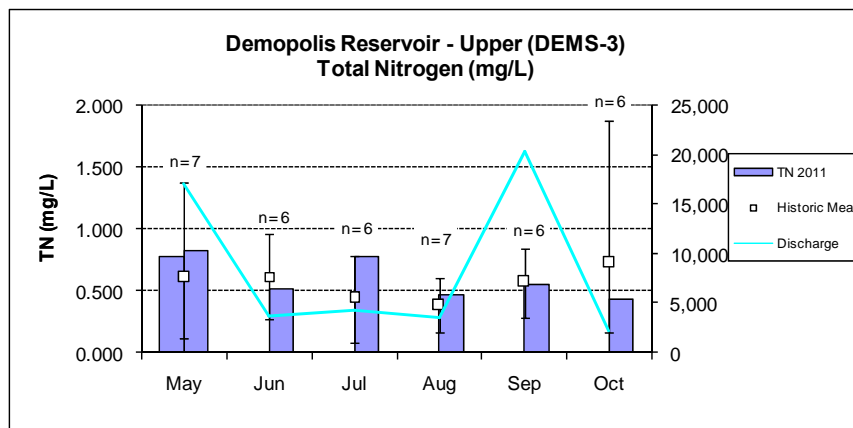


Figure 7. Monthly TP concentrations measured at upper, mid, and lower station in Demopolis Reservoir, May-October 2011 vs. average monthly discharge. Monthly discharge acquired from USGS Tombigbee R gauge at Demopolis Reservoir Dam. Each bar graph depicts monthly changes in each station. The historic mean (1992-2011) and min/max ranges are also displayed for comparison. The “n” value equals the number of datapoints included in the monthly historic calculations.

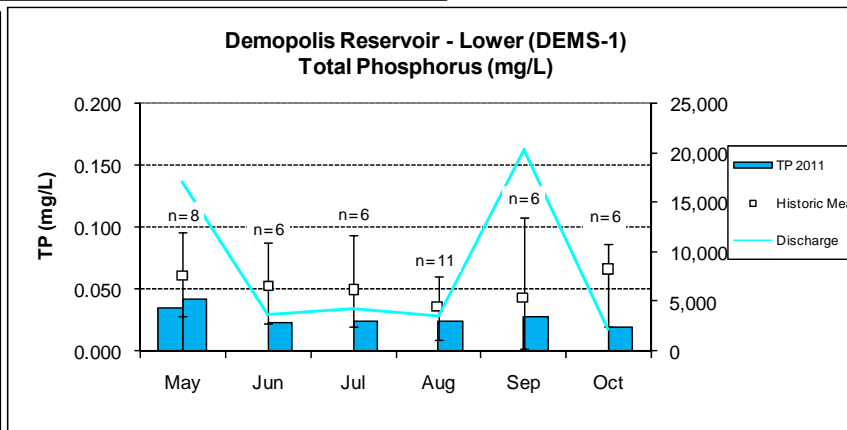
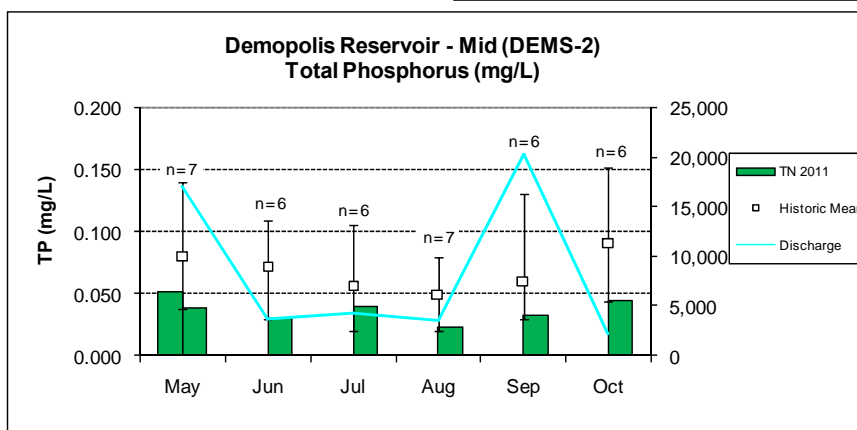
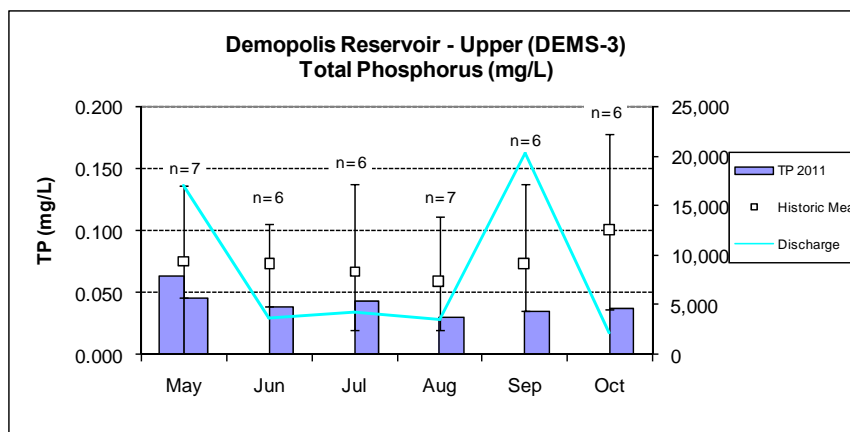


Figure 8. Monthly chl *a* concentrations measured at upper, mid, and lower station in Demopolis Reservoir, May-October 2011 vs. average monthly discharge. Monthly discharge acquired from USGS Tombigbee R gauge at Demopolis Reservoir Dam. Each bar graph depicts monthly changes in each station. The historic mean (1992-2011) and min/max ranges are also displayed for comparison. The “n” value equals the number of datapoints included in the monthly historic calculations.

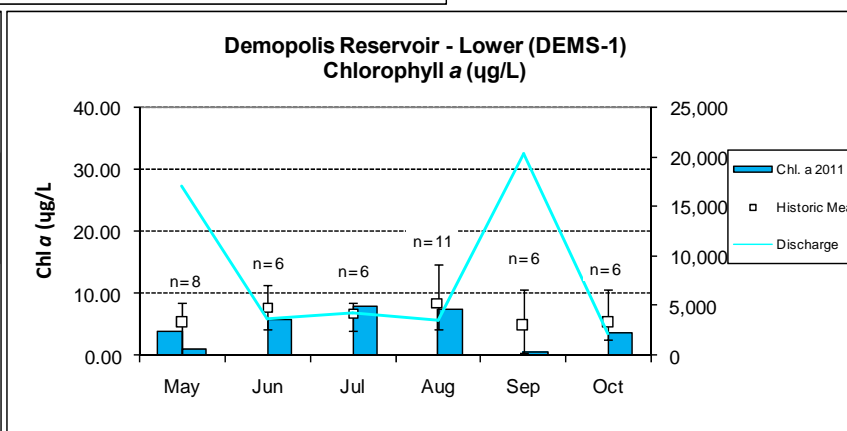
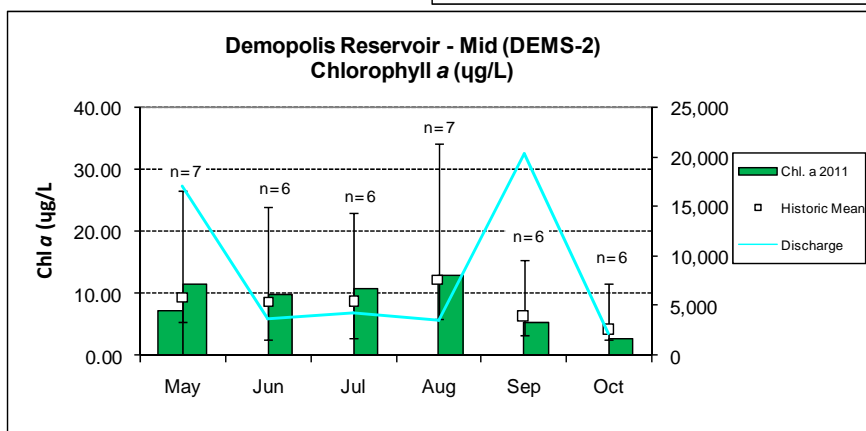
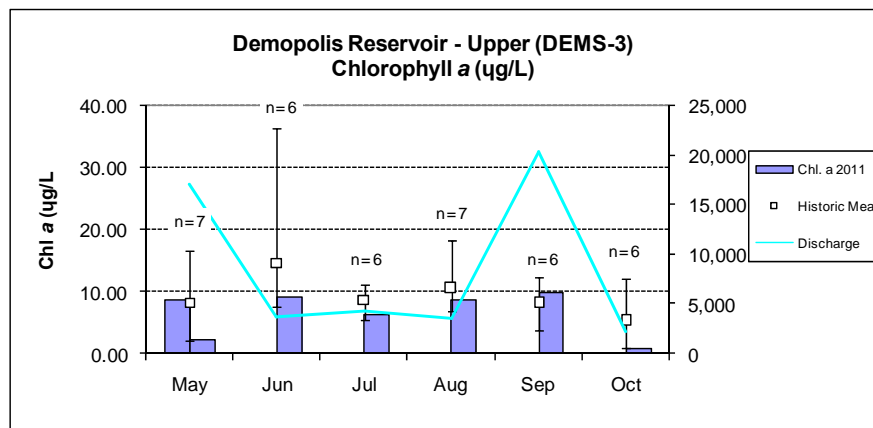


Figure 9. Monthly TSS concentrations measured at upper, mid, and lower station in Demopolis Reservoir, May-October 2011 vs. average monthly discharge. Monthly discharge acquired from USGS Tombigbee R gauge at Demopolis Reservoir Dam. Each bar graph depicts monthly changes in each station. The historic mean (1992-2011) and min/max ranges are also displayed for comparison. The “n” value equals the number of datapoints included in the monthly historic calculations.

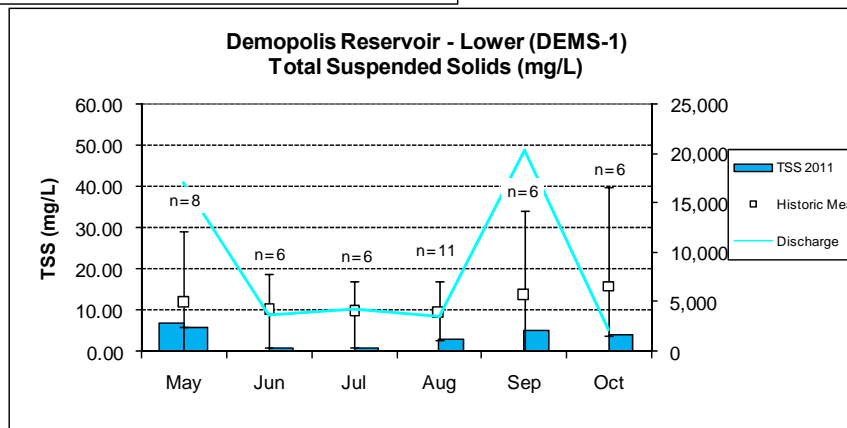
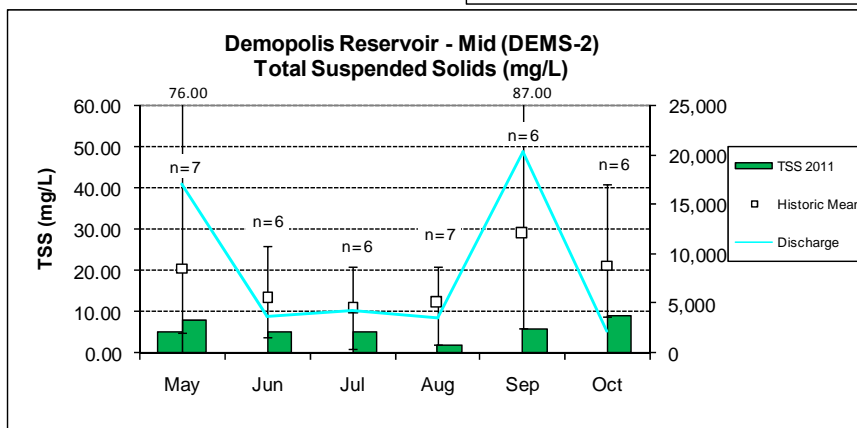
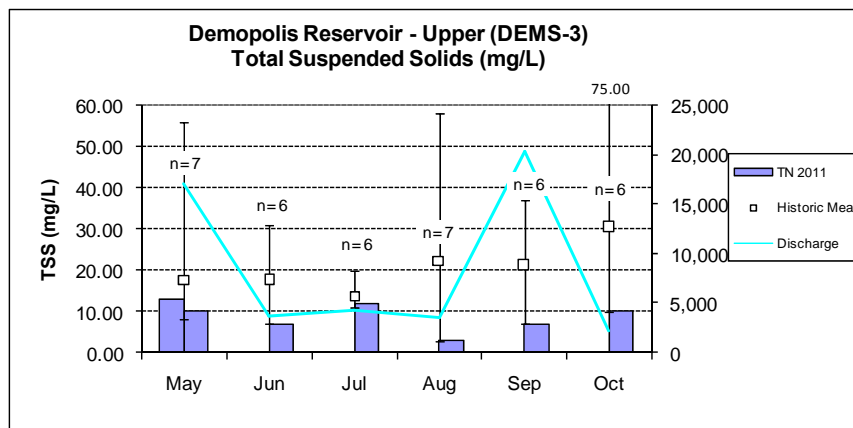


Table 2. Algal growth potential test results (expressed as mean Maximum Standing Crop (MSC) dry weights of *Selenastrum capricornutum* in mg/L) and limiting nutrient status. MSC values below 5 mg/l are considered to be protective in reservoirs and lakes; MSC values below 20 mg/L are considered protective of flowing streams and rivers. (Raschke and Schultz 1987).

Station	2001 Control mean MSC	2001 Limiting Nutrient	2006 Control mean MSC	2006 Limiting Nutrient	2011 Control mean MSC	2011 Limiting Nutrient
Upper	3.53	Nitrogen	2.97	Nitrogen	1.28	Nitrogen
Mid	3.57	Phosphorus	3.71	Nitrogen	2.39	Nitrogen
Lower	3.91	Phosphorus	5.92	Phosphorus	7.76	Nitrogen

Figure 10. Monthly DO concentrations at 1.5 m (5 ft) for Demopolis Reservoir stations collected May-October 2011. ADEM Water Quality Criteria pertaining to reservoir waters require a DO concentration of 5.0 mg/L at this depth (ADEM 2011).

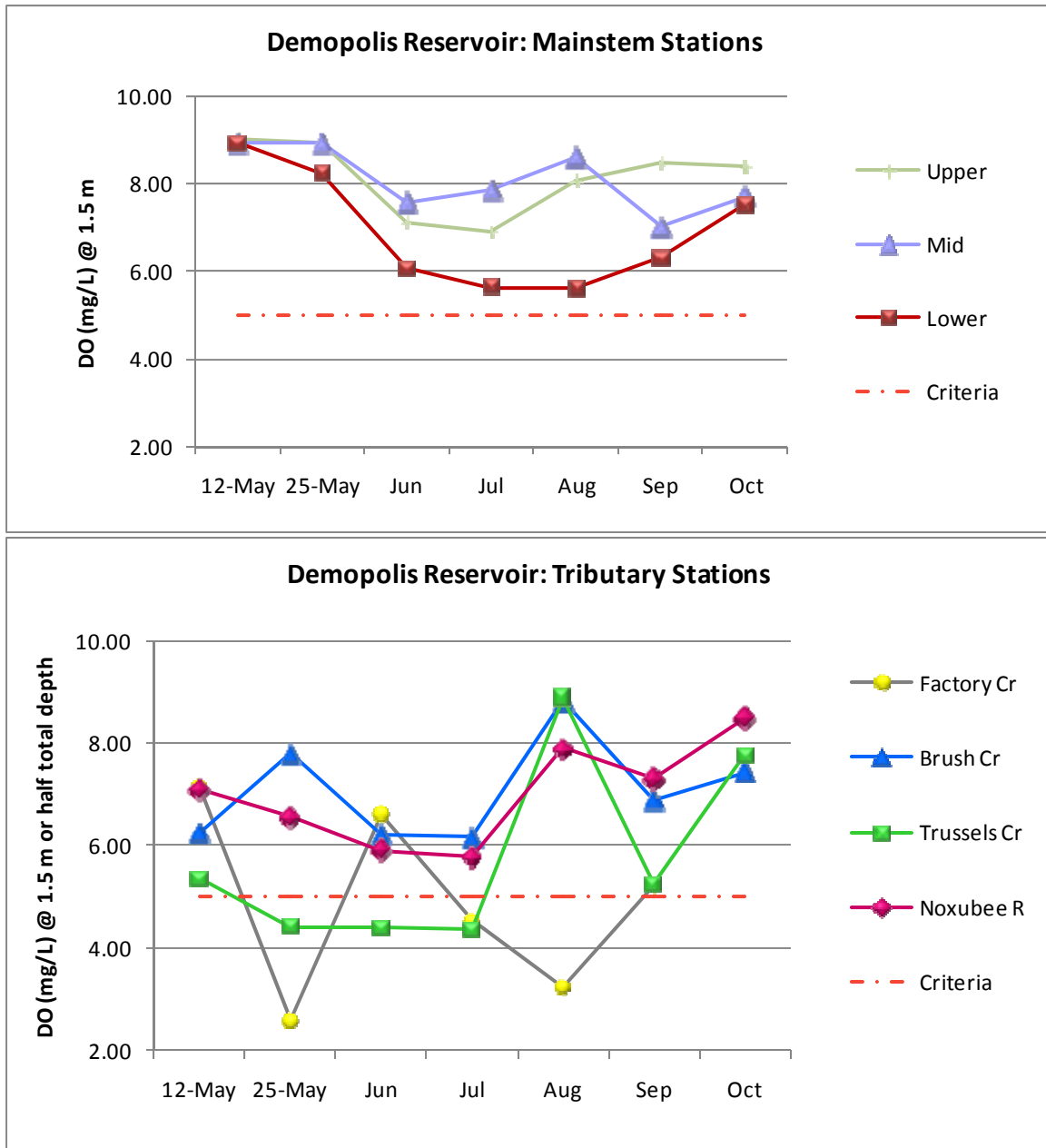


Figure 11. Monthly depth profiles of dissolved oxygen, temperature, and conductivity in the mid Demopolis Reservoir station, May-October 2011.

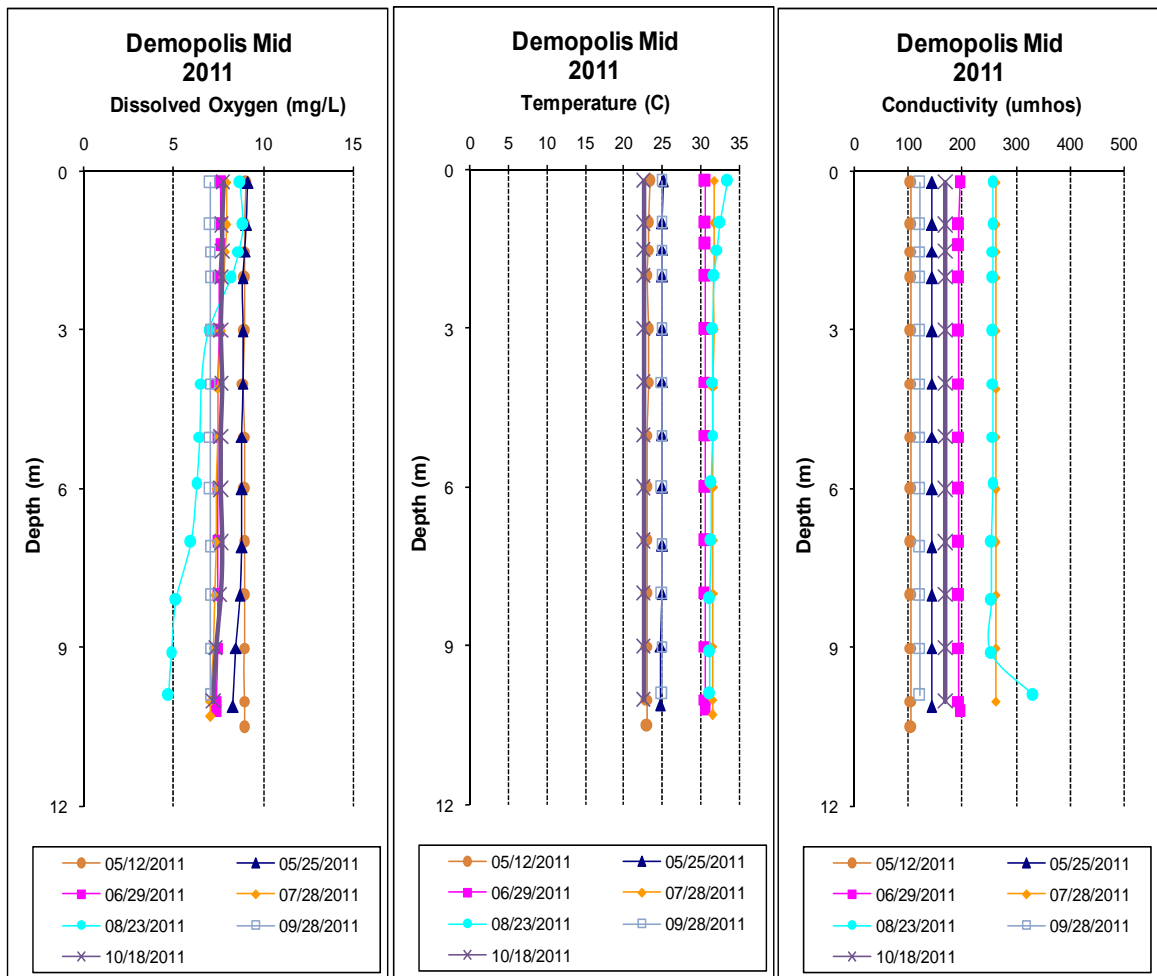


Figure 12. Monthly depth profiles of dissolved oxygen, temperature, and conductivity in the lower Demopolis Reservoir station, May-October 2011.

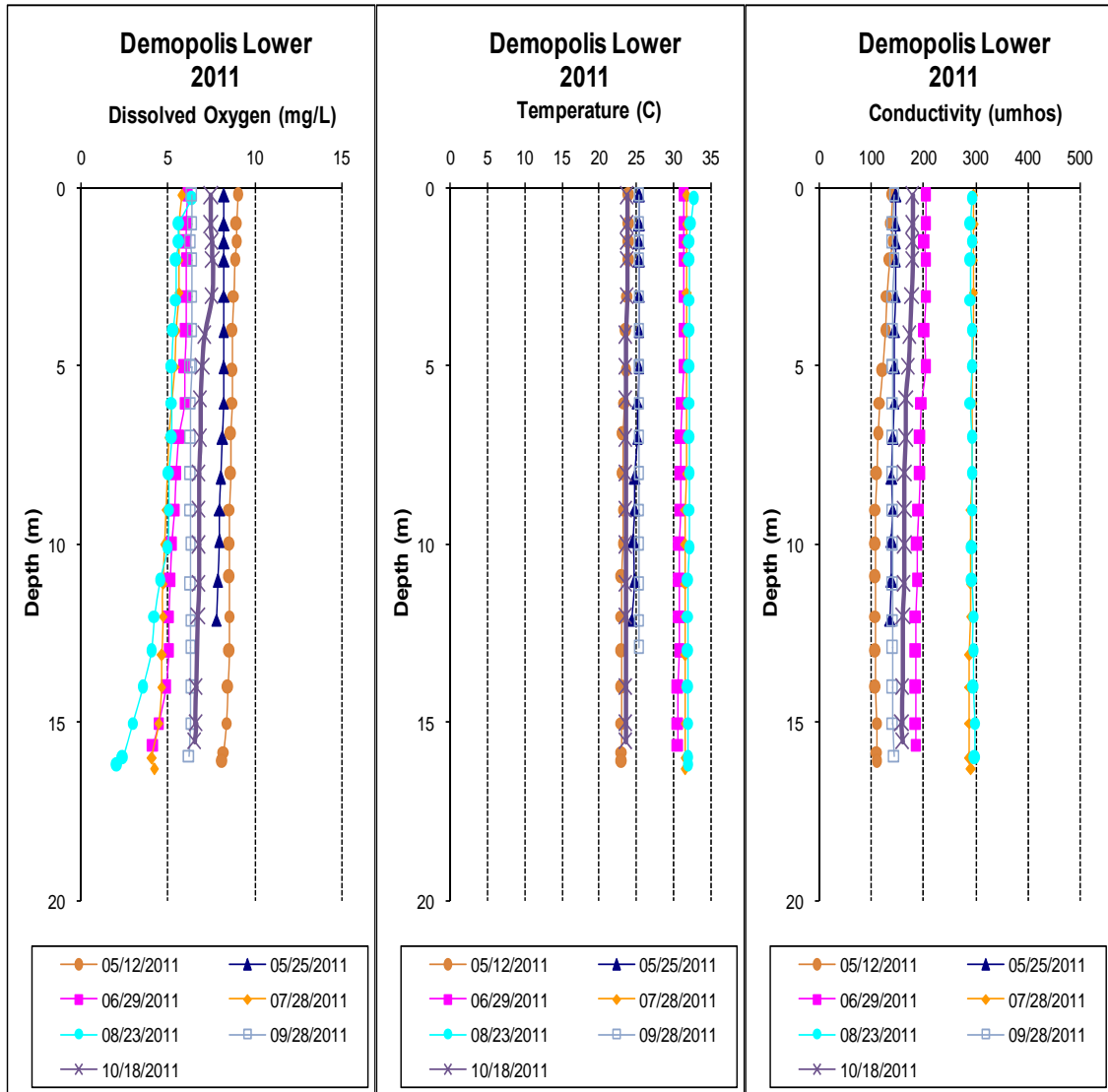
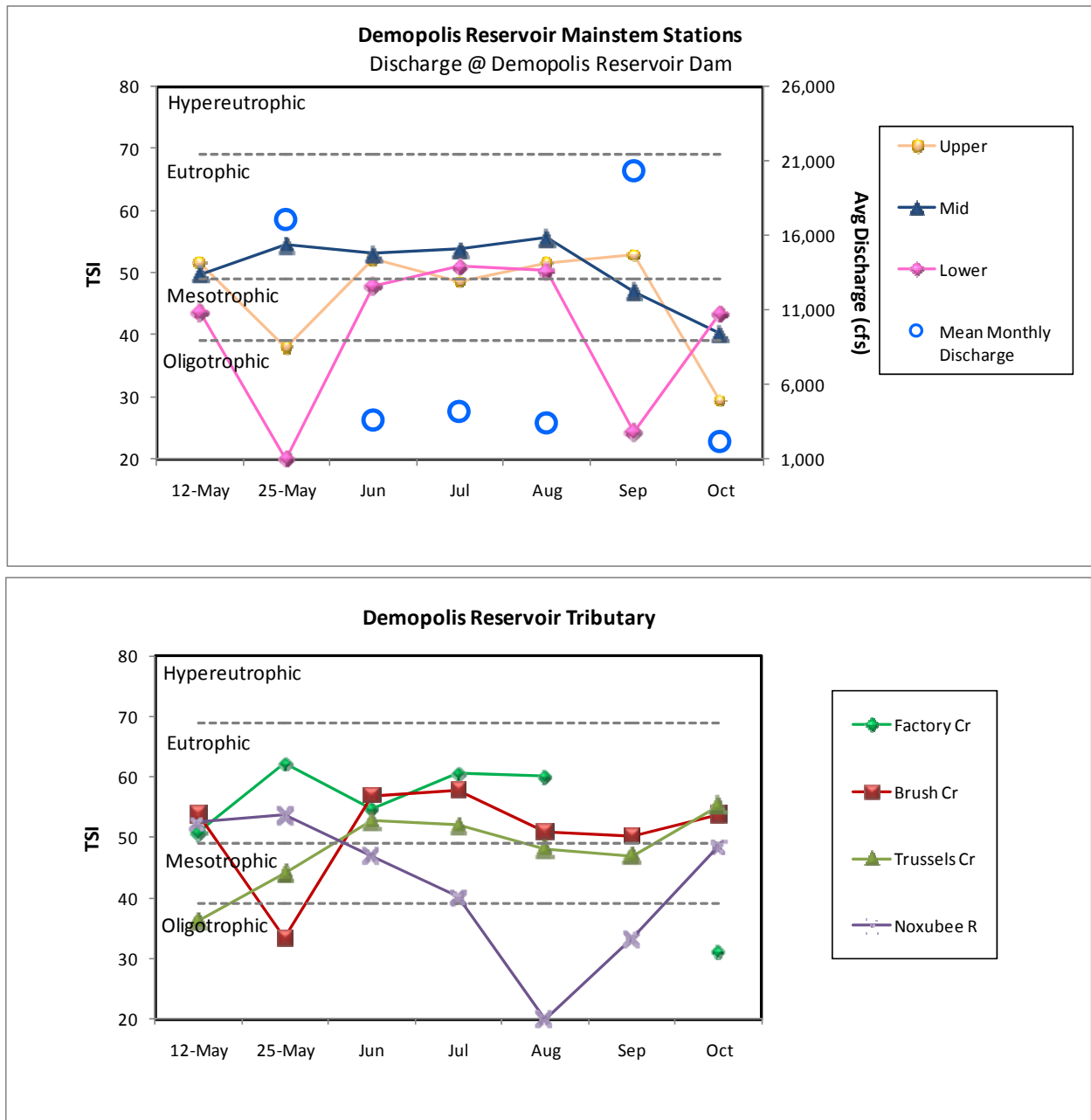


Figure 13. Monthly TSI values calculated for mainstem and tributary Demopolis Reservoir stations using chl *a* concentrations and Carlson's Trophic State Index calculation. Monthly discharge acquired from USGS Tombigbee R gauge station at Demopolis Dam.



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APPENDIX

Appendix Table 1. Summary of water quality data collected May-October, 2011. Minimum (Min) and maximum (Max) values calculated using minimum detection limits when results were less than this value. Median, mean, and standard deviation (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value.

Station	Parameter	N	Min	Max	Med	Mean	SD
DEMS-1	Physical						
	Turbidity (NTU)	8	6.7	15.9	10.3	10.8	3.4
	Total Dissolved Solids (mg/L)	7	98.0	178.0	122.0	132.0	32.5
	Total Suspended Solids (mg/L)	7	1.0	7.0	4.0	3.9	2.3
	Hardness (mg/L)	4	44.5	84.1	54.6	59.5	17.6
	Alkalinity (mg/L)	7	31.7	61.6	38.5	43.8	11.2
	Photic Zone (m)	7	2.13	3.51	3.36	2.96	0.60
	Secchi (m)	7	0.62	1.21	1.10	0.98	0.22
	Chemical						
	Ammonia Nitrogen (mg/L)	7	< 0.005	0.007	0.002	0.003	0.000
	Nitrate+Nitrite Nitrogen (mg/L)	7	0.043	0.362	0.138	0.185	0.136
	Total Kjeldahl Nitrogen (mg/L)	7	0.254	0.996	0.437	0.527	0.242
	Total Nitrogen (mg/L)	7	0.297	1.346	0.694	0.712	0.328
	Dissolved Reactive Phosphorus (mg/L) ^J	7	0.004	0.007	0.005	0.005	0.001
	Total Phosphorus (mg/L)	7	0.020	0.042	0.024	0.028	0.008
	CBOD-5 (mg/L)	7	< 2.0	2.0	1.0	1.0	0.0
	Chlorides (mg/L)	7	5.9	30.6	9.9	14.5	8.9
	Biological						
	Chlorophyll a (ug/L)	7	< 0.10	8.01	3.81	4.21	3.14
	E. coli (mpn/100mL) ^J	3	1	57	4	21	32
DEMS-2	Physical						
	Turbidity (NTU)	8	6.4	22.9	15.2	14.1	5.8
	Total Dissolved Solids (mg/L)	7	96.0	170.0	128.0	126.9	25.0
	Total Suspended Solids (mg/L)	7	2.0	9.0	5.0	5.7	2.3
	Hardness (mg/L)	4	38.3	75.1	53.6	55.2	16.1
	Alkalinity (mg/L)	7	31.6	62.4	45.5	45.0	10.8
	Photic Zone (m)	7	1.53	3.68	2.20	2.50	0.84
	Secchi (m)	7	0.58	1.24	0.81	0.85	0.24
	Chemical						
	Ammonia Nitrogen (mg/L)	7	< 0.005	0.007	0.002	0.003	0.000
	Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.002	0.159	0.055	0.065	0.051
	Total Kjeldahl Nitrogen (mg/L)	7	0.420	0.980	0.737	0.688	0.202
	Total Nitrogen (mg/L)	7	< 0.455	1.035	0.741	0.753	0.193
	Dissolved Reactive Phosphorus (mg/L) ^J	7	0.004	0.012	0.007	0.007	0.003
	Total Phosphorus (mg/L)	7	0.023	0.051	0.038	0.037	0.009
	CBOD-5 (mg/L)	7	< 2.0	2.2	1.0	1.2	0.4
	Chlorides (mg/L)	7	5.1	30.6	12.0	15.6	9.7
	Biological						
	Chlorophyll a (ug/L)	7	2.67	12.82	9.92	8.59	3.67
	E. coli (mpn/100mL)	3	< 1	7	1	3	4

Station	Parameter	N	Min	Max	Med	Mean	SD	
DEMS-3	Physical							
	Turbidity (NTU)	7	7.9	26.9	14.9	15.3	6.2	
	Total Dissolved Solids (mg/L)	7	106.0	170.0	138.0	132.6	23.1	
	Total Suspended Solids (mg/L)	7	3.0	13.0	10.0	8.9	3.4	
	Hardness (mg/L)	4	41.3	82.5	54.7	58.3	18.6	
	Alkalinity (mg/L)	7	33.1	56.4	42.5	44.3	9.3	
	Photic Zone (m)	7	1.62	3.64	2.24	2.49	0.80	
	Secchi (m)	7	0.37	1.15	0.77	0.79	0.27	
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.005	0.007	0.002	0.003	0.000
	Nitrate+Nitrite Nitrogen (mg/L) ^J	7		0.004	0.261	0.084	0.099	0.083
	Total Kjeldahl Nitrogen (mg/L)	7		0.349	0.790	0.459	0.523	0.157
	Total Nitrogen (mg/L) ^J	7		0.433	0.829	0.550	0.622	0.168
	Dissolved Reactive Phosphorus (mg/L) ^J	7		0.006	0.009	0.009	0.008	0.002
	Total Phosphorus (mg/L)	7		0.030	0.063	0.039	0.042	0.011
	CBOD-5 (mg/L)	7	<	2.0	2.0	1.0	1.0	0.0
	Chlorides (mg/L)	7		5.1	36.1	16.8	17.3	10.2
	Biological							
	Chlorophyll a (ug/L)	7		0.89	9.79	8.54	6.47	3.58
	E. coli (mpn/100mL)	3		5	14	10	10	4
DEMS-4	Physical							
	Turbidity (NTU)	7	14.3	88.9	37.9	45.6	25.4	
	Total Dissolved Solids (mg/L) ^J	7	126.0	342.0	138.0	170.3	77.8	
	Total Suspended Solids (mg/L) ^J	7	8.0	33.0	19.0	21.4	9.3	
	Hardness (mg/L)	4	47.9	68.2	64.6	61.3	9.4	
	Alkalinity (mg/L)	7	44.7	67.1	59.4	57.7	9.0	
	Photic Zone (m)	7	0.82	1.90	1.37	1.35	0.36	
	Secchi (m)	7	0.18	0.88	0.40	0.46	0.24	
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.005	0.007	0.002	0.003	0.000
	Nitrate+Nitrite Nitrogen (mg/L)	7		0.072	0.861	0.220	0.309	0.266
	Total Kjeldahl Nitrogen (mg/L)	7		0.365	1.130	0.561	0.616	0.281
	Total Nitrogen (mg/L)	7		0.611	1.553	0.759	0.925	0.367
	Dissolved Reactive Phosphorus (mg/L) ^J	7		0.017	0.041	0.024	0.029	0.011
	Total Phosphorus (mg/L)	7		0.048	0.145	0.096	0.092	0.033
	CBOD-5 (mg/L)	7	<	2.0	2.0	1.0	1.0	0.0
	Chlorides (mg/L)	7		5.4	10.0	6.0	6.7	1.6
	Biological							
	Chlorophyll a (ug/L)	7	<	0.10	10.68	5.34	5.09	4.00
	E. coli (mpn/100mL)	3		23	196	127	115	87

Station	Parameter	N	Min	Max	Med	Mean	SD
DEMS-5	Physical						
	Turbidity (NTU)	7	7.7	53.3	27.6	27.2	15.6
	Total Dissolved Solids (mg/L)	7	102.0	166.0	126.0	131.1	24.7
	Total Suspended Solids (mg/L)	7	6.0	32.0	27.0	22.0	10.6
	Hardness (mg/L)	4	46.7	84.2	66.5	66.0	15.9
	Alkalinity (mg/L)	7	43.2	76.6	64.8	62.6	12.5
	Photic Zone (m)	7	0.20	0.60	0.40	0.40	0.13
	Secchi (m)	7	0.20	0.60	0.40	0.40	0.13
	Chemical						
	Ammonia Nitrogen (mg/L)	7	< 0.005	0.178	0.088	0.080	0.073
	Nitrate+Nitrite Nitrogen (mg/L)	7	< 0.002	0.102	0.062	0.059	0.037
	Total Kjeldahl Nitrogen (mg/L)	7	0.160	1.010	0.780	0.669	0.310
	Total Nitrogen (mg/L)	7	< 0.161	1.044	0.842	0.728	0.318
	Dissolved Reactive Phosphorus (mg/L) ^J	7	0.005	0.011	0.008	0.008	0.002
	Total Phosphorus (mg/L)	7	0.023	0.081	0.060	0.055	0.020
	CBOD-5 (mg/L)	7	< 2.0	2.3	1.0	1.3	0.6
	Chlorides (mg/L)	7	4.7	37.6	11.4	13.3	11.3
	Biological						
	Chlorophyll a (ug/L)	7	1.78	12.46	6.01	6.87	3.65
	E. coli (col/100mL)	3	44	411	172	209	186
	DEMS-6	Physical					
Turbidity (NTU)		7	11.4	47.2	32.2	29.2	12.7
Total Dissolved Solids (mg/L)		7	104.0	184.0	128.0	135.7	27.4
Total Suspended Solids (mg/L)		7	10.0	66.0	34.0	36.0	23.2
Hardness (mg/L)		4	45.2	83.4	59.0	61.6	16.2
Alkalinity (mg/L)		7	42.8	64.6	55.9	54.7	6.8
Photic Zone (m)		7	0.30	1.00	0.60	0.67	0.24
Secchi (m)		7	0.30	1.00	0.60	0.67	0.24
Chemical							
Ammonia Nitrogen (mg/L)		7	< 0.005	0.153	0.029	0.043	0.054
Nitrate+Nitrite Nitrogen (mg/L)		7	< 0.002	0.279	0.086	0.116	0.088
Total Kjeldahl Nitrogen (mg/L)		7	0.404	0.861	0.709	0.644	0.195
Total Nitrogen (mg/L)		7	< 0.475	0.997	0.859	0.761	0.220
Dissolved Reactive Phosphorus (mg/L) ^J		7	0.007	0.010	0.008	0.008	0.001
Total Phosphorus (mg/L)		7	0.036	0.114	0.064	0.072	0.028
CBOD-5 (mg/L)		7	< 2.0	2.1	1.0	1.3	0.5
Chlorides (mg/L)		7	10.0	36.7	15.6	18.0	9.0
Biological							
Chlorophyll a (ug/L)		7	1.34	16.02	10.68	9.84	4.90
E. coli (mpn/100mL)		3	51	387	52	164	194

Station	Parameter	N	Min	Max	Med	Mean	SD	
DEMS-7	Physical							
	Turbidity (NTU)	7	15.6	43.8	30.6	30.7	8.8	
	Total Dissolved Solids (mg/L)	7	146.0	226.0	168.0	176.3	33.8	
	Total Suspended Solids (mg/L)	7	12.0	36.0	21.0	23.0	9.0	
	Hardness (mg/L)	4	54.4	99.4	72.5	74.7	18.7	
	Alkalinity (mg/L)	7	54.2	139.0	68.9	86.2	33.2	
	Photic Zone (m)	7	1.10	1.80	1.39	1.44	0.24	
	Secchi (m)	7	0.30	0.58	0.49	0.46	0.10	
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.005	0.044	0.002	0.009	0.016
	Nitrate+Nitrite Nitrogen (mg/L) ^J	7	<	0.002	0.107	0.025	0.040	0.043
	Total Kjeldahl Nitrogen (mg/L)	7		0.583	1.110	0.639	0.768	0.210
	Total Nitrogen (mg/L) ^J	7	<	0.605	1.197	0.746	0.808	0.222
	Dissolved Reactive Phosphorus (mg/L) ^J	7		0.006	0.012	0.009	0.009	0.002
	Total Phosphorus (mg/L)	7		0.036	0.080	0.066	0.066	0.015
	CBOD-5 (mg/L)	7	<	2.0	4.7	1.0	1.7	1.4
	Chlorides (mg/L)	7		6.7	35.3	18.8	19.0	9.2
	Biological							
	Chlorophyll a (ug/L)	7		1.07	25.37	11.75	13.49	9.02
	E. coli (mpn/100mL)	2		8	18	13	13	7

J=one or more of the values provided are estimated; < = Actual value is less than the detection limit