Weiss Reservoir Report 2016 & 2019

Rivers and Reservoirs Monitoring Program

Alabama Department of Environmental Management

Field Operations Division
Rivers and Reservoirs Unit
April 2022

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LIST OF ACRONYMS

A&I	Agricultural and Industrial Water Supply
ADEM	Alabama Department of Environmental Management
AGPT	Algal Growth Potential Test
APCo	Alabama Power Company
CHL *a*	Chlorophyll *a*
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

Weiss Dam was the first dam built as a part of an Alabama Power Company construction program that further developed the Coosa River in the late 1950s and 1960s. Construction began in 1958 and was finished three years later. The 27,780 acre reservoir is located in northeast Alabama in Cherokee County. Weiss Reservoir provides a number of valuable resources to the area, including hydroelectricity, flood control, irrigation, and drinking water. The reservoir is also well known for its excellent fish and wildlife habitats.

Weiss Reservoir was placed on Alabama's 1996 Clean Water Act (CWA) §303(d) list of impaired waters for not meeting its Public Water Supply (PWS)/Swimming (S)/Fish & Wildlife (F&W) water use classifications. The reservoir was listed for impairments caused by priority organics (PCBs), nutrients, pH, and organic enrichment/dissolved oxygen (OE/DO). USEPA approved delisting Weiss for OE/DO and pH in the 2000 and 2004 §303(d) lists, respectively, based on intensive monitoring data. In 2004, USEPA approved two TMDLs for Weiss Reservoir, addressing PCB and nutrient impairments (ADEM 2004). After additional years of monitoring and with the development of the Coosa Lakes TMDL, a revised Weiss Reservoir nutrient TMDL was approved by the USEPA in 2008 (US EPA 2008). In 2016, the upper reservoir from the Spring Creek embayment up to the Alabama/Georgia state line was listed on Alabama's CWA §303(d) list of impaired waters for pathogens (*E. coli*) impairment from sources outside of the state.

The Alabama Department of Environmental Management (ADEM) monitored Weiss Reservoir as part of the 2016 and 2019 assessments of the Coosa River basin 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 the Field Operations Division of the ADEM. The current objectives of this program are to provide data that can be used to assess current water quality conditions, to 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 2017 Monitoring Strategy (ADEM 2017).

Specific water quality criteria for nutrient management were implemented in 2001 at two locations on Weiss (ADEM Admin. Code R. 335-6-10-.11). These criteria represent a growing season mean (Apr-Oct) chlorophyll *a* concentration that is protective of the reservoir's designated uses. These criteria limits are denoted in Table 1.

The purpose of this report is to summarize data collected at nine stations in Weiss Reservoir during the 2016 and 2019 growing seasons and to evaluate trends in mean lake trophic status and nutrient concentrations using ADEM's historic dataset. Monthly and/or 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 historical data and established criteria.

METHODS

Sampling stations were selected using historical data and previous assessments (Figure 1). Specific location information can be found in Table 1. Weiss was sampled in the dam forebay, mid reservoir, and upper reservoir (transition area). Since Weiss is the first reservoir of the Coosa River chain, a station was also established at the stateline to monitor incoming water quality. Tributary embayment stations monitored include: Spring, Cowan, and Big Nose Creeks and Little and Chattooga Rivers.

Water quality sampling was conducted at monthly intervals, April-October. All samples were collected, preserved, stored, and transported according to procedures in the ADEM Field Operations Division Standard Operating Procedures (ADEM 2019), Surface Water Quality Assurance Project Plan (ADEM 2018a), and Quality Management Plan (ADEM 2018b).

Mean growing season TN, TP, chl *a*, and TSS were calculated to evaluate water quality conditions at each site. Monthly concentrations of these parameters were graphed with the closest available Alabama Power Company (APCo) discharge data and ADEM's previously collected data to help interpret the 2016 and 2019 results.

Figure 1. Weiss Reservoir with sampling locations. A description of each sampling location is provided in Table 1.

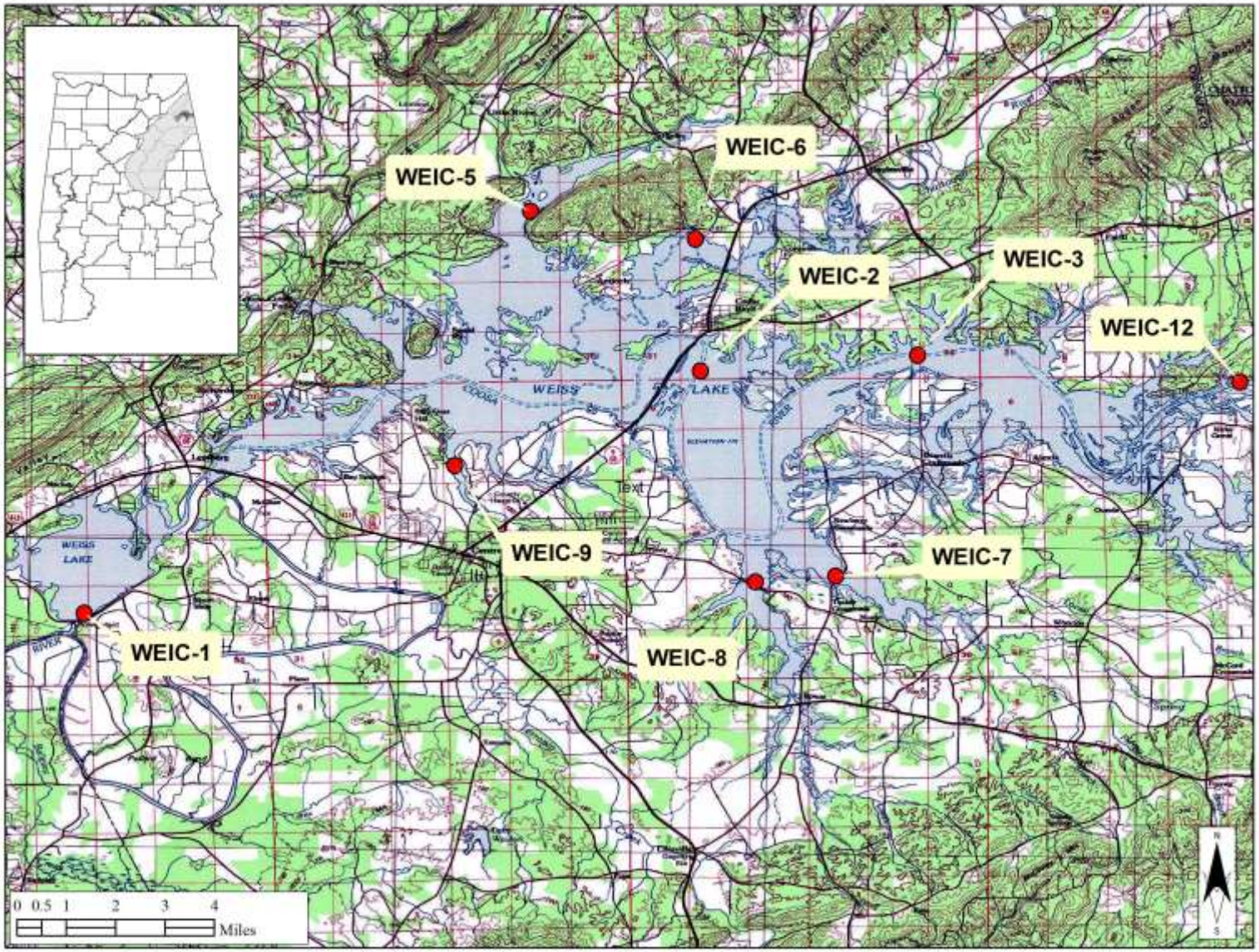


Table 1. Descriptions for the monitoring stations in 2016 and 2019 for Weiss Reservoir.

HUC	County	Station Number	Report Designation	Waterbody Name	Station Description	Chl *a* Criteria	Latitude	Longitude
031501051003	Cherokee	WEIC-1*	Lower	Coosa R	Deepest point, main river channel, power dam forebay.	20 μg/L	34.13481	-85.79105
031501051002	Cherokee	WEIC-2*	Mid	Coosa R	Deepest point, main river channel, immediately upstream of causeway at Cedar Bluff.	20 μg/L	34.20574	-85.61050
031501050207	Cherokee	WEIC-3	Upper	Coosa R	Deepest point, main river channel, at power line crossing upstream of Spring Creek.		34.21032	-85.54680
031501050807	Cherokee	WEIC-5	Little R	Little R	Deepest point, main river channel, Little River embayment, LRM 12.5		34.25246	-85.66027
031501050605	Cherokee	WEIC-6	Chattooga R	Chattooga R	Deepest point, main river channel, Chattooga River embayment, CRM 12.5		34.24432	-85.61203
031501050304	Cherokee	WEIC-7	Spring Cr	Spring Cr	Deepest point, main creek channel, Spring Creek embayment, downstream of Cherokee Co. Hwy. 31 bridge.		34.14568	-85.57082
031501050303	Cherokee	WEIC-8	Cowan Cr	Cowan Cr	Deepest point, main creek channel, Cowan Creek embayment, downstream of Cherokee Co. Hwy. 16 bridge.		34.14400	-85.59433
031501051002	Cherokee	WEIC-9	Big Nose Cr	Big Nose Cr	Deepest point, main creek channel, Big Nose Creek embayment, approximately 0.5 miles upstream of lake confluence.		34.17799	-85.68243
031501050206	Cherokee	WEIC-12	State line	Coosa R	Deepest point, main river channel, Alabama/Georgia stateline.		34.20244	-85.45240

*Growing season mean Chl a criteria implemented at this station in 2001

RESULTS

Growing season mean graphs for TN, TP, chl *a*, and TSS are provided in this section (Figures 2-5). Monthly graphs for TN, TP, chl *a*, TSS, DO, and TSI are also provided (Figures 6-11, and 18-19). Mean monthly discharge is included in monthly graphs for TN, TP, chl *a*, TSS, and TSI as an indicator of flow and retention time in the months sampled. AGPT results appear in Table 2. Depth profile graphs of temperature, DO, and conductivity appear in Figures 12-17. Summary statistics of all data collected during 2016 and 2019 are presented in Appendix Tables 1 and Appendix Table 2, respectively. The tables contain the minimum, maximum, median, mean, and standard deviation of each parameter analyzed.

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

In 2016, the highest mean growing season TN value among mainstem stations was calculated for the state line station, with concentrations decreasing further downstream (Figure 2). Spring Creek showed the highest mean TN among embayment stations. In 2019, the highest mean growing season TN value among mainstem stations was recorded in the upper station. The highest concentration among the embayment stations was in the Chattooga River. Monthly TN concentrations reached historical highs in August at the stateline station, in April at the upper station, and in October at the mid station in 2016. (Figure 6). In 2019, monthly TN concentrations reached historic highs in April at the state line, mid, and lower stations.

The highest mean growing season TP value among mainstem stations was calculated for the state line station in 2016 (Figure 3). Concentrations appeared to decrease downstream. In 2019, the lower station had the highest mean TP concentrations among mainstem stations. The Chattooga River had the highest TP concentration among embayment stations in both 2016 and 2019. With the exception of the Chattooga River, growing season mean TP concentrations appeared to decrease over time, with 2019 values among the lowest measured reservoir-wide. All

monthly TP concentrations for mainstem stations were at or below historical means throughout the growing season during both 2016 and 2019 (Figure 7).

In 2016, the highest mean growing season chl *a* values calculated among mainstem and embayment stations were the state line and Spring Creek stations, respectively (Figure 4). The state line and upper stations reached the highest mean chl *a* concentrations on record in 2016. In 2019, the highest mean growing season chl *a* value calculated among mainstem stations was in the mid station, while the highest concentration among embayment stations was in the Chattooga River. Except for Chattooga River and Big Nose Creek, mean chl *a* concentrations were higher in 2016 than in 2019. Concentrations in Spring Creek, Cowan Creek, and Little River appeared to have decreased 2000-2019. Specific water quality criteria for nutrient management have been established for the lower and mid stations in Weiss Reservoir. The growing season mean chl *a* concentrations for both stations have consistently been above criteria limits. The mid station exceeded criteria in 2016 and 2019, while the lower station exceeded in 2019 only. In 2016, monthly chl *a* concentrations reached historic highs in September and October at the state line station, in April, May, September, and October at the upper station, and in October at the lower station (Figure 8). In 2019, concentrations reached a historic low at the upper station in April.

In both 2016 and 2019, the highest mean growing season TSS values among mainstem and embayment stations were for the mid and Chattooga River stations, respectively (Figure 5). Mean TSS concentrations in the state line and upper stations appeared to decrease since 2013. With the exception of Spring Creek, mean TSS values in the embayment stations appeared to decrease from 2005-2019. Monthly TSS concentrations were at or below historic means most months sampled in both 2016 and 2019, reaching historic lows on several sampling dates (Figure 9). In 2016, historic low TSS concentrations were measured in May at the upper station and in October at both the mid and lower stations. In 2019, historic lows were measured in April, July, August, and October at the upper station and in April at the mid station.

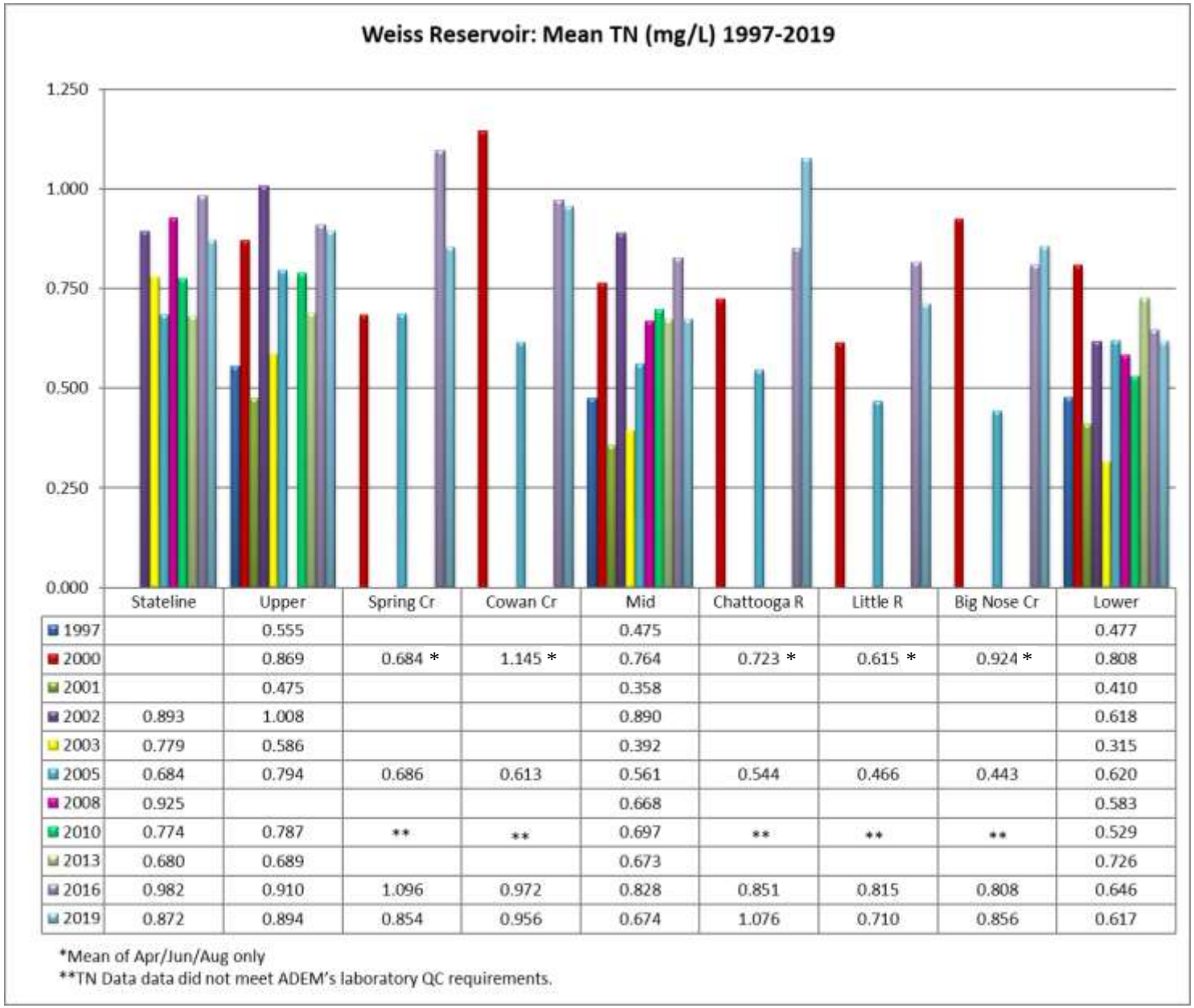
In 2019, AGPT samples were collected at the upper, mid, and lower mainstem reservoir stations (Table 2). Results indicated that the lower and mid stations were nitrogen-limited, while the upper station was phosphorus-limited. With the exception of phosphorus-limiting conditions in the upper station in April 2001 and August 2019, upper, mid, and lower stations have

remained nitrogen-limited all years monitored. Raschke and Schultz (1987) found that maximum standing crop (MSC) values below 5.0 mg/L are considered to be protective of reservoir and lake systems. Historic AGPT results in both the lower and mid stations average 5.21 mg/L MSC and 5.71 mg/L MSC, respectively, which are just above 5.0 mg/L MSC. The state line and upper stations were closer to 20.0 mg/L MSC, the value that Raschke and Schultz (1987) defined as protective of flowing stream and river systems.

All mainstem and embayment stations on Weiss Reservoir were at or above ADEM's DO criteria limit of 5.0 mg/L at 5.0 ft (1.5 m) in all months sampled during both the 2016 and 2019 growing seasons (ADEM Admin. Code R. 335-6-10-.09) (Figures 10 and 11). Based on monthly DO profiles, in 2016 anoxic conditions existed at depths greater than 6.0 m in the lower and mid stations during July. Anoxic conditions also existed at the state line station during July and August at depths greater than 8.0 m (Figures 12-14). Highest water temperatures at all three stations were observed in July. In 2019, anoxic conditions existed in the mid station during September at depths greater than 8.0 m (Figures 15-17). The lower and mid stations showed stratification April-June and August-October. The state line station was stratified in May and in August-September. Highest water temperatures in 2019 were measured in July.

TSI values calculated using monthly chl *a* concentrations and Carlson's Trophic State Index show that all stations sampled in Weiss Reservoir were generally eutrophic throughout the April-October growing season in 2016 (Figure 18). In 2019, the mid station, Cowan Creek, and Big Nose Creek were eutrophic throughout the growing season (Figure 19). The state line and upper stations were eutrophic all months except April and May. Spring Creek was mesotrophic in April and then increased to eutrophic the remainder of the sampling season. The Chattooga River was eutrophic all months except May, which was oligotrophic. Little River was mesotrophic April-June and increased to eutrophic July-October.

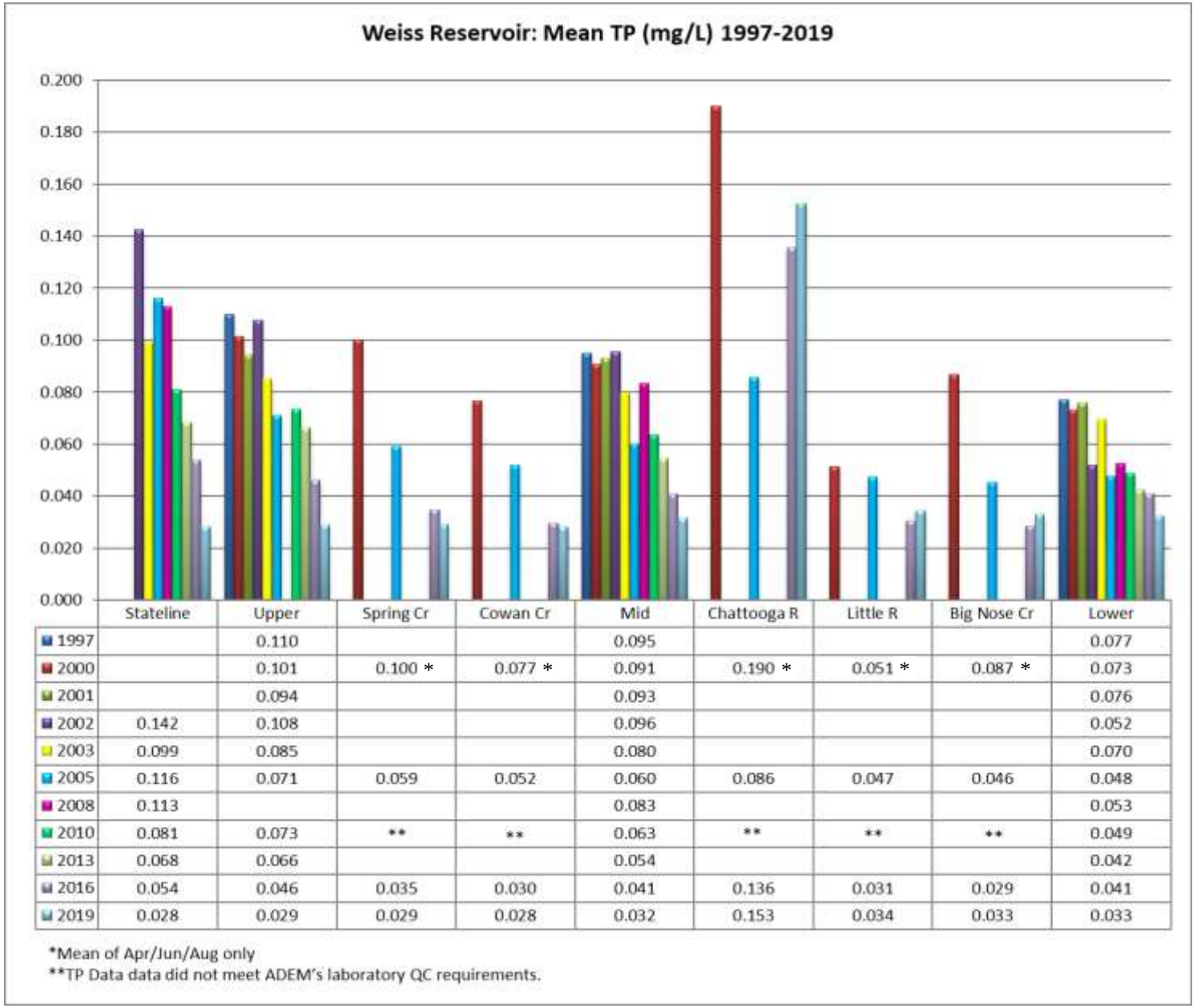
Figure 2. Mean growing season TN measured in Weiss Reservoir, April-October, 1997-2019. Bar graphs consist of multiple stations, illustrated from upstream to downstream as the graph is read from left to right.



	Stateline	Upper	Spring Cr	Cowan Cr	Mid	Chattooga R	Little R	Big Nose Cr	Lower
1997		0.555			0.475				0.477
2000		0.869	0.684 *	1.145 *	0.764	0.723 *	0.615 *	0.924 *	0.808
2001		0.475			0.358				0.410
2002	0.893	1.008			0.890				0.618
2003	0.779	0.586			0.392				0.315
2005	0.684	0.794	0.686	0.613	0.561	0.544	0.466	0.443	0.620
2008	0.925				0.668				0.583
2010	0.774	0.787	**	**	0.697	**	**	**	0.529
2013	0.680	0.689			0.673				0.726
2016	0.982	0.910	1.096	0.972	0.828	0.851	0.815	0.808	0.646
2019	0.872	0.894	0.854	0.956	0.674	1.076	0.710	0.856	0.617

*Mean of Apr/Jun/Aug only
**TN Data data did not meet ADEM's laboratory QC requirements.

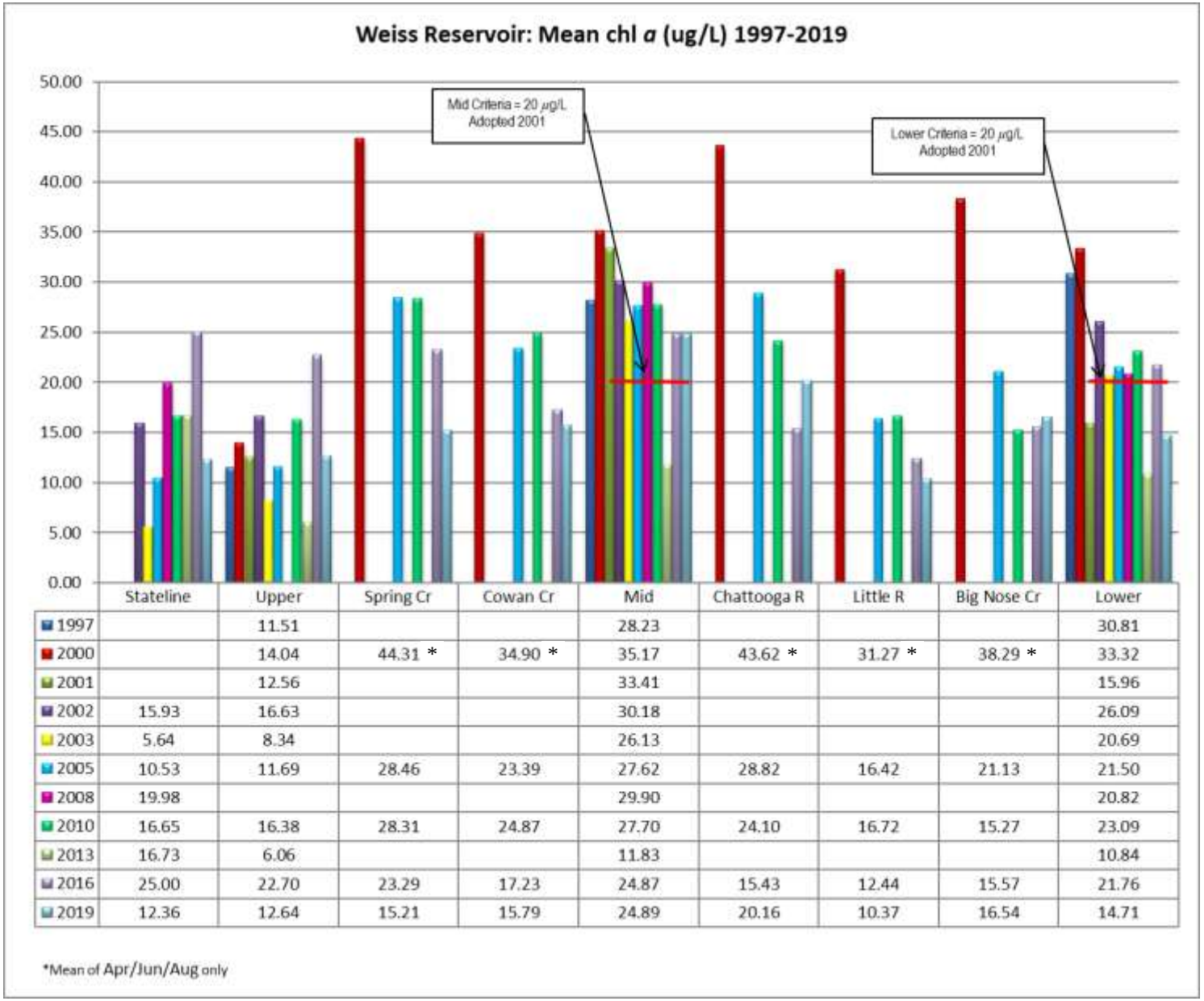
Figure 3. Mean growing season TP measured in Weiss Reservoir, April-October, 1997-2019. Bar graphs consist of multiple stations, illustrated from upstream to downstream as the graph is read from left to right.



	Stateline	Upper	Spring Cr	Cowan Cr	Mid	Chattooga R	Little R	Big Nose Cr	Lower
1997		0.110			0.095				0.077
2000		0.101	0.100 *	0.077 *	0.091	0.190 *	0.051 *	0.087 *	0.073
2001		0.094			0.093				0.076
2002	0.142	0.108			0.096				0.052
2003	0.099	0.085			0.080				0.070
2005	0.116	0.071	0.059	0.052	0.060	0.086	0.047	0.046	0.048
2008	0.113				0.083				0.053
2010	0.081	0.073	**	**	0.063	**	**	**	0.049
2013	0.068	0.066			0.054				0.042
2016	0.054	0.046	0.035	0.030	0.041	0.136	0.031	0.029	0.041
2019	0.028	0.029	0.029	0.028	0.032	0.153	0.034	0.033	0.033

*Mean of Apr/Jun/Aug only
**TP Data data did not meet ADEM's laboratory QC requirements.

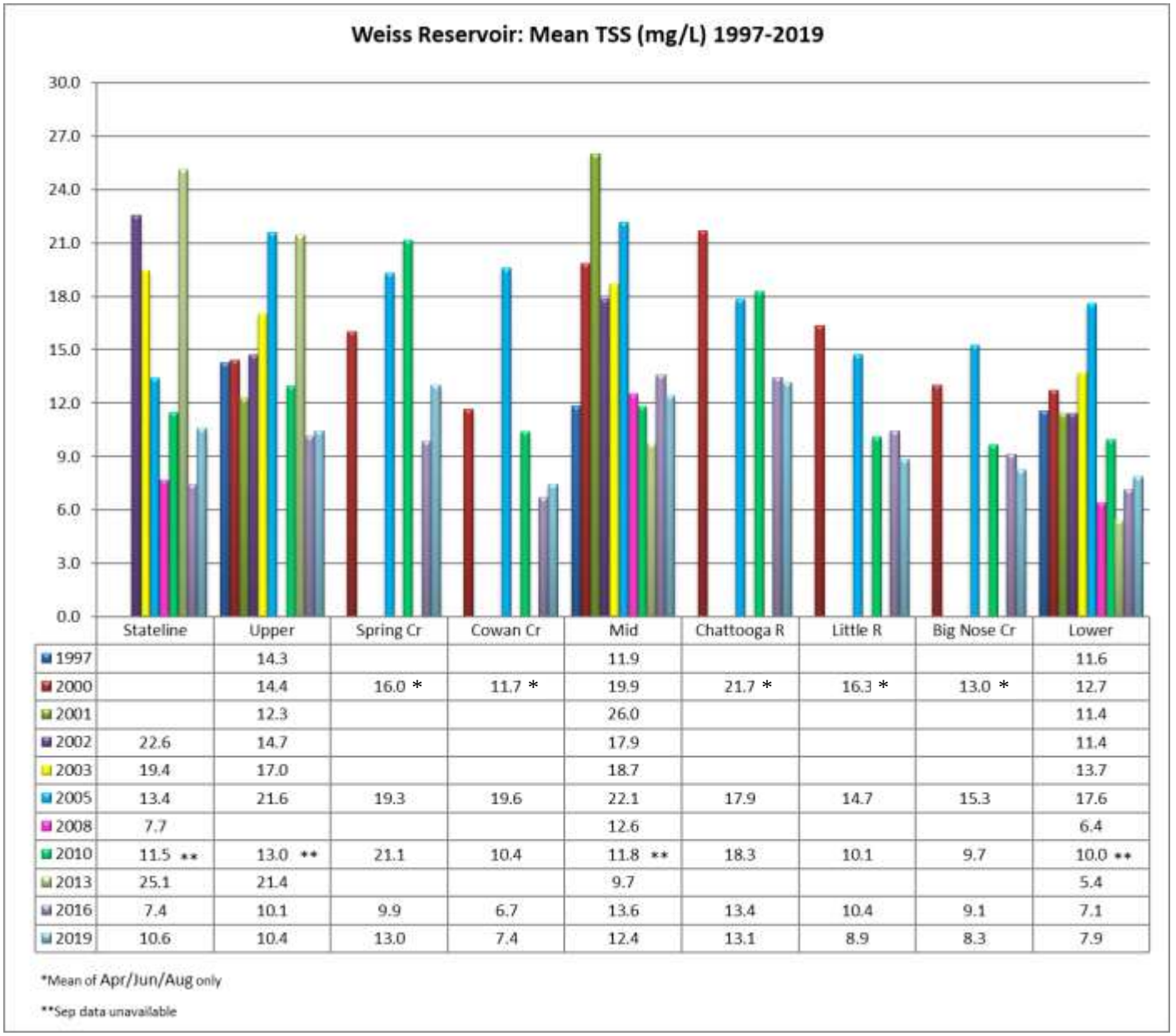
Figure 4. Mean growing season chl *a* measured in Weiss Reservoir, April-October, 1997-2019. Bar graphs consist of multiple stations, illustrated from upstream to downstream as the graph is read from left to right.



	Stateline	Upper	Spring Cr	Cowan Cr	Mid	Chattooga R	Little R	Big Nose Cr	Lower
1997		11.51			28.23				30.81
2000		14.04	44.31 *	34.90 *	35.17	43.62 *	31.27 *	38.29 *	33.32
2001		12.56			33.41				15.96
2002	15.93	16.63			30.18				26.09
2003	5.64	8.34			26.13				20.69
2005	10.53	11.69	28.46	23.39	27.62	28.82	16.42	21.13	21.50
2008	19.98				29.90				20.82
2010	16.65	16.38	28.31	24.87	27.70	24.10	16.72	15.27	23.09
2013	16.73	6.06			11.83				10.84
2016	25.00	22.70	23.29	17.23	24.87	15.43	12.44	15.57	21.76
2019	12.36	12.64	15.21	15.79	24.89	20.16	10.37	16.54	14.71

*Mean of Apr/Jun/Aug only

Figure 5. Mean growing season TSS measured in Weiss Reservoir, April-October, 1997-2019. Bar graphs consist of multiple stations, illustrated from upstream to downstream as the graph is read from left to right.



	Stateline	Upper	Spring Cr	Cowan Cr	Mid	Chattooga R	Little R	Big Nose Cr	Lower
1997		14.3			11.9				11.6
2000		14.4	16.0 *	11.7 *	19.9	21.7 *	16.3 *	13.0 *	12.7
2001		12.3			26.0				11.4
2002	22.6	14.7			17.9				11.4
2003	19.4	17.0			18.7				13.7
2005	13.4	21.6	19.3	19.6	22.1	17.9	14.7	15.3	17.6
2008	7.7				12.6				6.4
2010	11.5 **	13.0 **	21.1	10.4	11.8 **	18.3	10.1	9.7	10.0 **
2013	25.1	21.4			9.7				5.4
2016	7.4	10.1	9.9	6.7	13.6	13.4	10.4	9.1	7.1
2019	10.6	10.4	13.0	7.4	12.4	13.1	8.9	8.3	7.9

*Mean of Apr/Jun/Aug only

**Sep data unavailable

Figure 6. Monthly TN concentrations measured in Weiss Reservoir, April-October 2016 and 2019 vs. average monthly discharge. Monthly discharge acquired from APCo at Weiss Dam. Each bar graph depicts monthly changes in each station. The historic mean (1990-2019) and min/max ranges are also displayed for comparison. The "n" value equals the number of datapoints included in the monthly historic calculations.

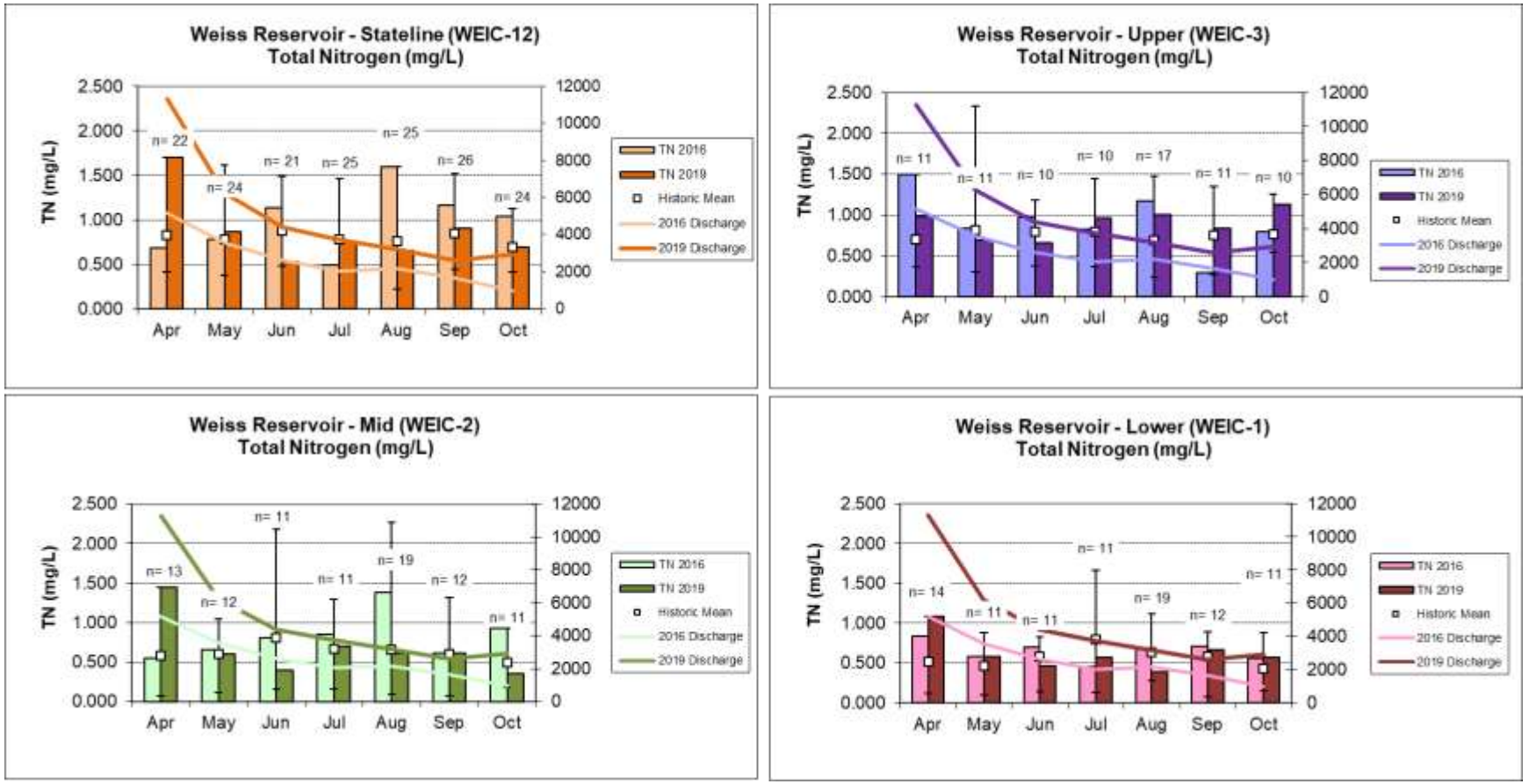


Figure 7. Monthly TP concentrations measured in Weiss Reservoir, April-October 2016 and 2019 vs. average monthly discharge. Monthly discharge acquired from APCo at Weiss Dam. Each bar graph depicts monthly changes in each station. The historic mean (1990-2019) and min/max ranges are also displayed for comparison. The "n" value equals the number of datapoints included in the monthly historic calculations.

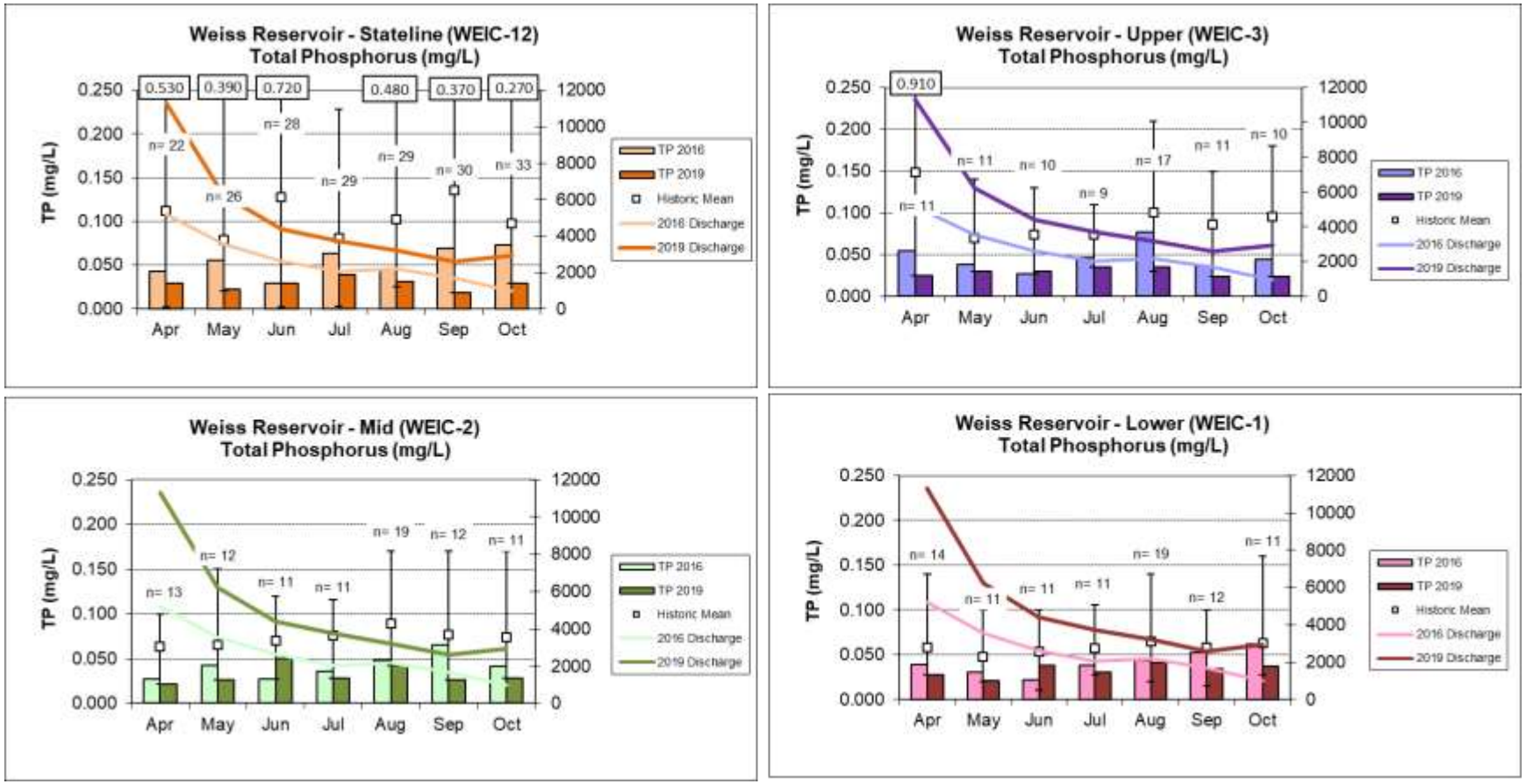


Figure 8. Monthly chl *a* concentrations measured in Weiss Reservoir, April-October 2016 and 2019 vs. average monthly discharge. Monthly discharge acquired from APCo at Weiss Dam. Each bar graph depicts monthly changes in each station. The historic mean (1990-2019) and min/max ranges are also displayed for comparison. The "n" value equals the number of datapoints included in the monthly historic calculations.

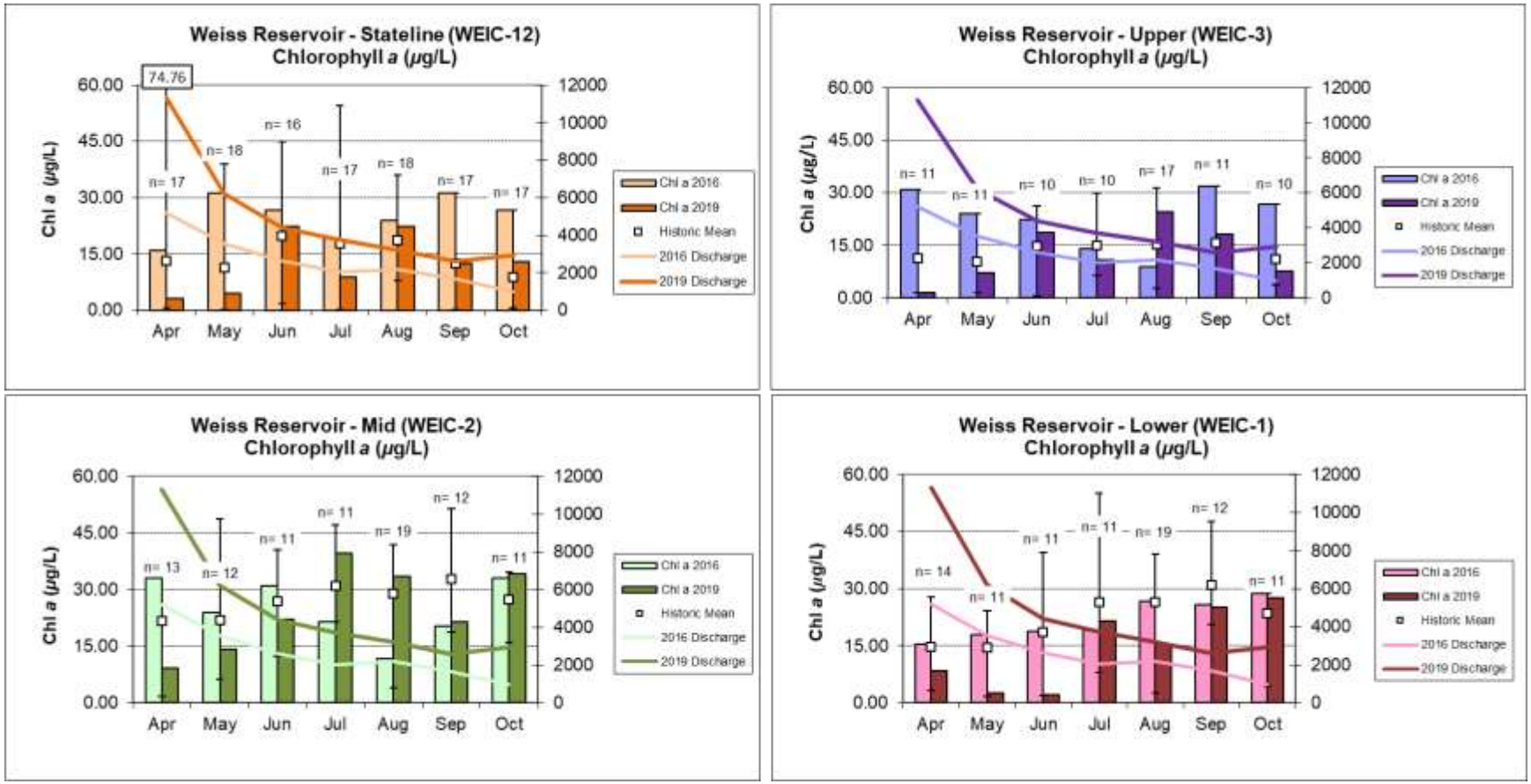


Figure 9. Monthly TSS concentrations measured in Weiss Reservoir, April-October 2016 and 2019 vs. average monthly discharge. Monthly discharge acquired from APCo at Weiss Dam. Each bar graph depicts monthly changes in each station. The historic mean (1990-2019) and min/max ranges are also displayed for comparison. The "n" value equals the number of datapoints included in the monthly historic calculations.

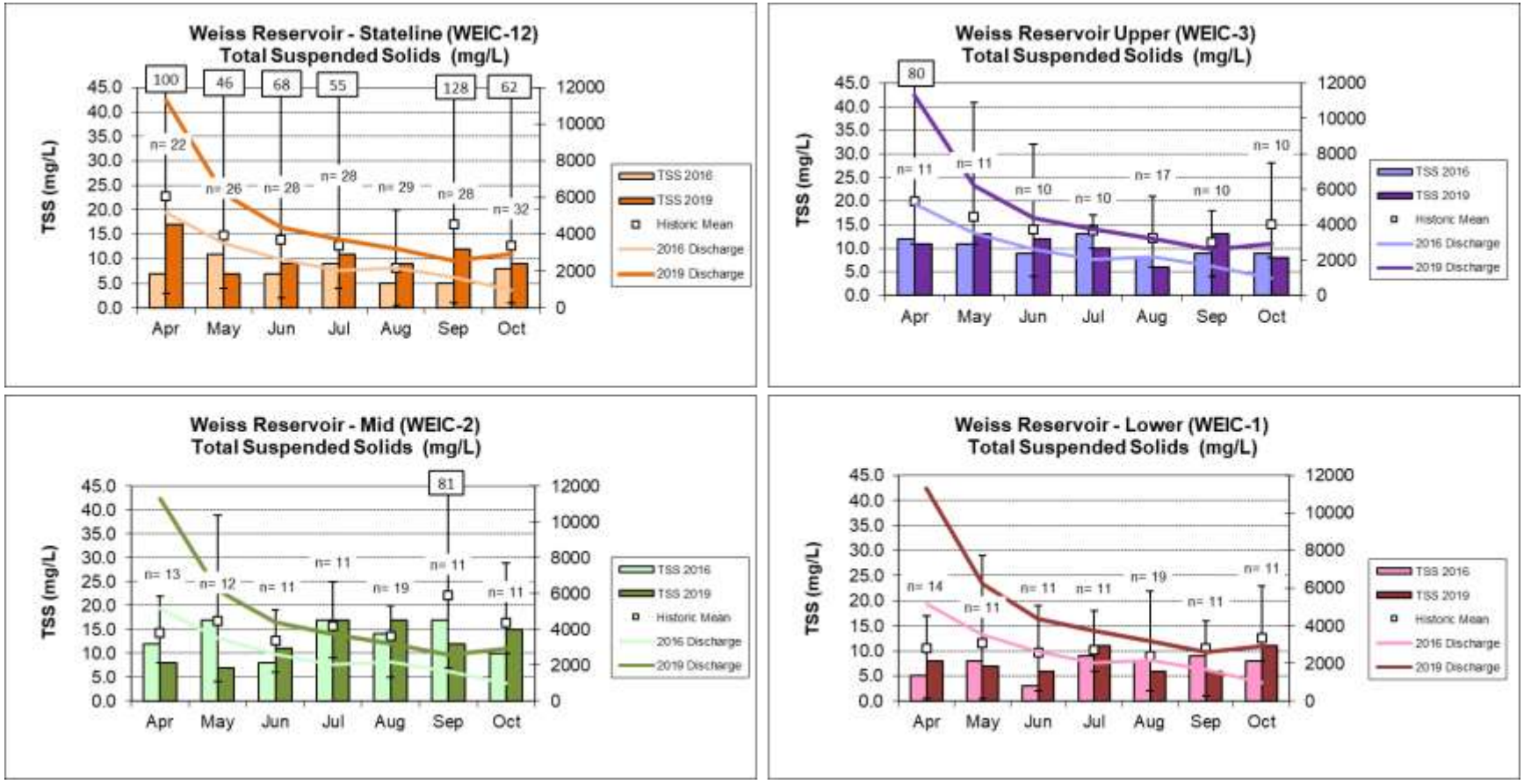
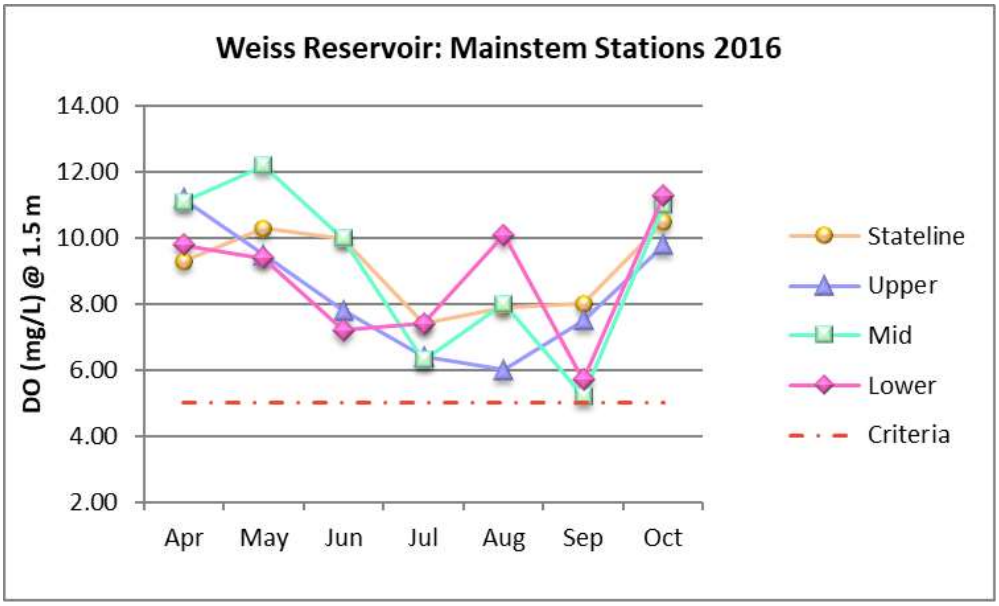


Table 2. Algal growth potential test results (expressed as mean Maximum Standing Crop (MSC) or dry weights of *Selenastrum capricornutum* in mg/L) and limiting nutrient status. Mean standing crop (MSC) values below 5 mg/L are considered to be protective in reservoirs and lakes; MSC values below 20 mg/L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

	WEIC-1 (Lower)		**WEIC-2 (Mid)**		**WEIC-3 (Upper)**		**WEIC-12 (Stateline)**	
	Limiting Nutrient	Mean MSC	Limiting Nutrient	Mean MSC	Limiting Nutrient	Mean MSC	Limiting Nutrient	Mean MSC
8/1997	NITROGEN	6.82	NITROGEN	5.68	NITROGEN	25.54	---	---
8/2000	NITROGEN	8.35	NITROGEN	5.59	NITROGEN	28.32	---	---
4/2001	NITROGEN	6.11	NITROGEN	6.89	PHOSPHORUS	22.60	---	---
5/2001	NITROGEN	5.24	NITROGEN	5.29	NITROGEN	31.55	---	---
6/2001	NITROGEN	4.26	NITROGEN	3.69	NITROGEN	16.56	---	---
7/2001	NITROGEN	6.01	NITROGEN	11.36	NITROGEN	27.64	---	---
8/2001	NITROGEN	4.46	NITROGEN	4.05	NITROGEN	20.44	---	---
9/2001	NITROGEN	2.96	NITROGEN	5.37	NITROGEN	25.78	---	---
10/2001	NITROGEN	2.77	NITROGEN	3.05	NITROGEN	23.92	---	---
8/2005	NITROGEN	4.73	NITROGEN	5.69	NITROGEN	18.20	NITROGEN	39.4
8/2010	---	---	---	---	---	---	PHOSPHORUS	21.2
8/2019	NITROGEN	5.61	NITROGEN	6.13	PHOSPHORUS	12.4	---	---

Figure 10. Monthly DO concentrations at 1.5 m (5 ft) for Weiss Reservoir stations collected April-October 2016. ADEM Water Quality Criteria pertaining to reservoir waters require a minimum DO concentration of 5.0 mg/L at this depth (ADEM Admin. Code R. 335-6-10-.09).



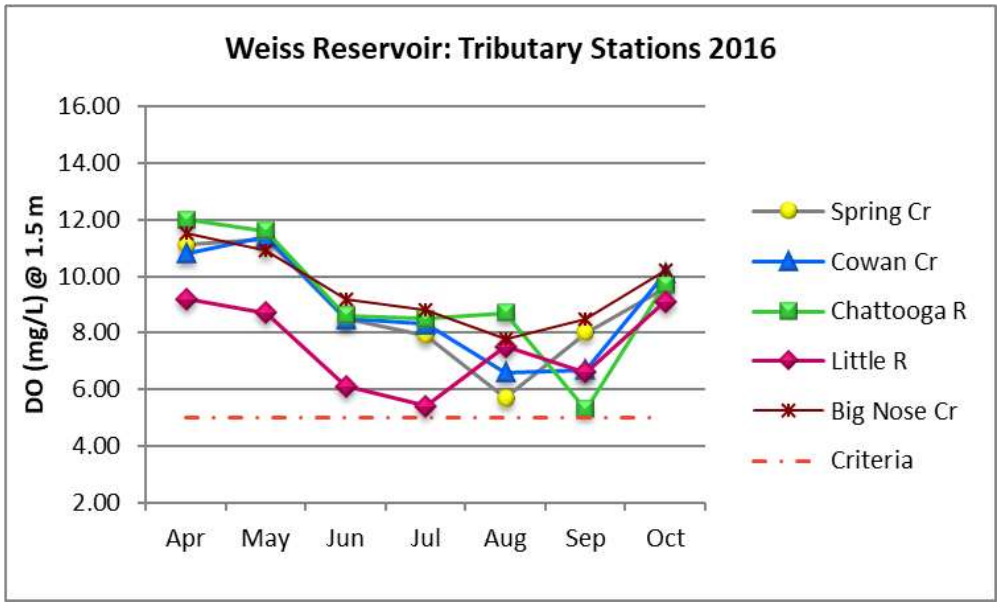
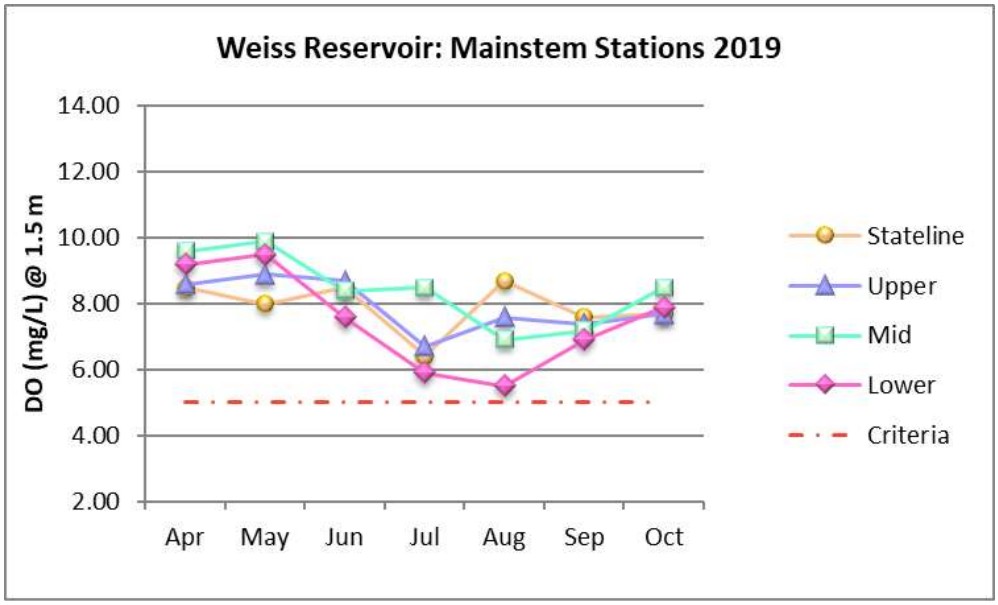


Figure 11. Monthly DO concentrations at 1.5 m (5 ft) for Weiss Reservoir stations collected April-October 2019. ADEM Water Quality Criteria pertaining to reservoir waters require a minimum DO concentration of 5.0 mg/L at this depth (ADEM Admin. Code R. 335-6-10-.09).



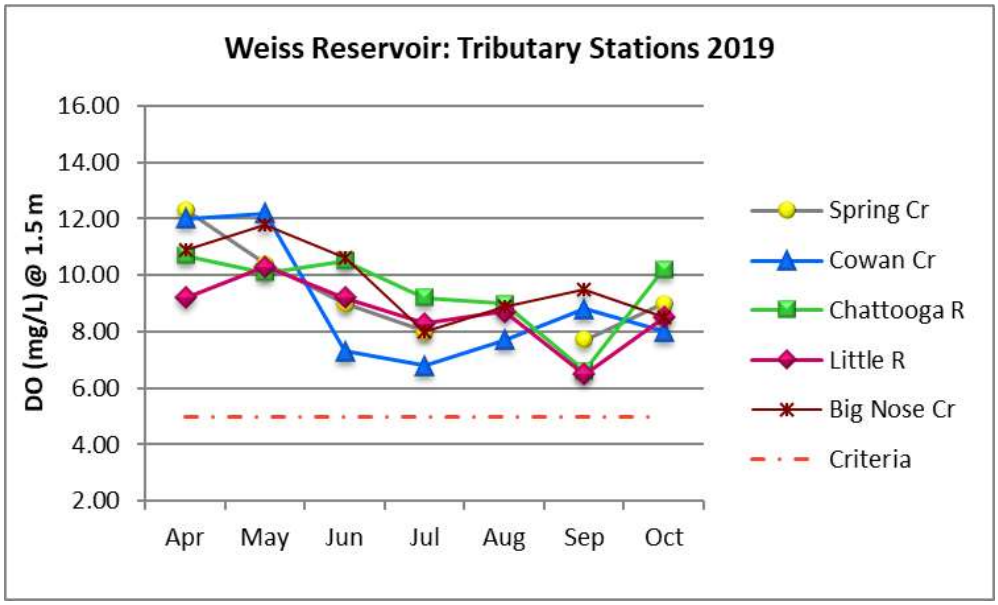


Figure 12. Monthly depth profiles of dissolved oxygen, temperature, and conductivity in the lower Weiss Reservoir station, April-October 2016.

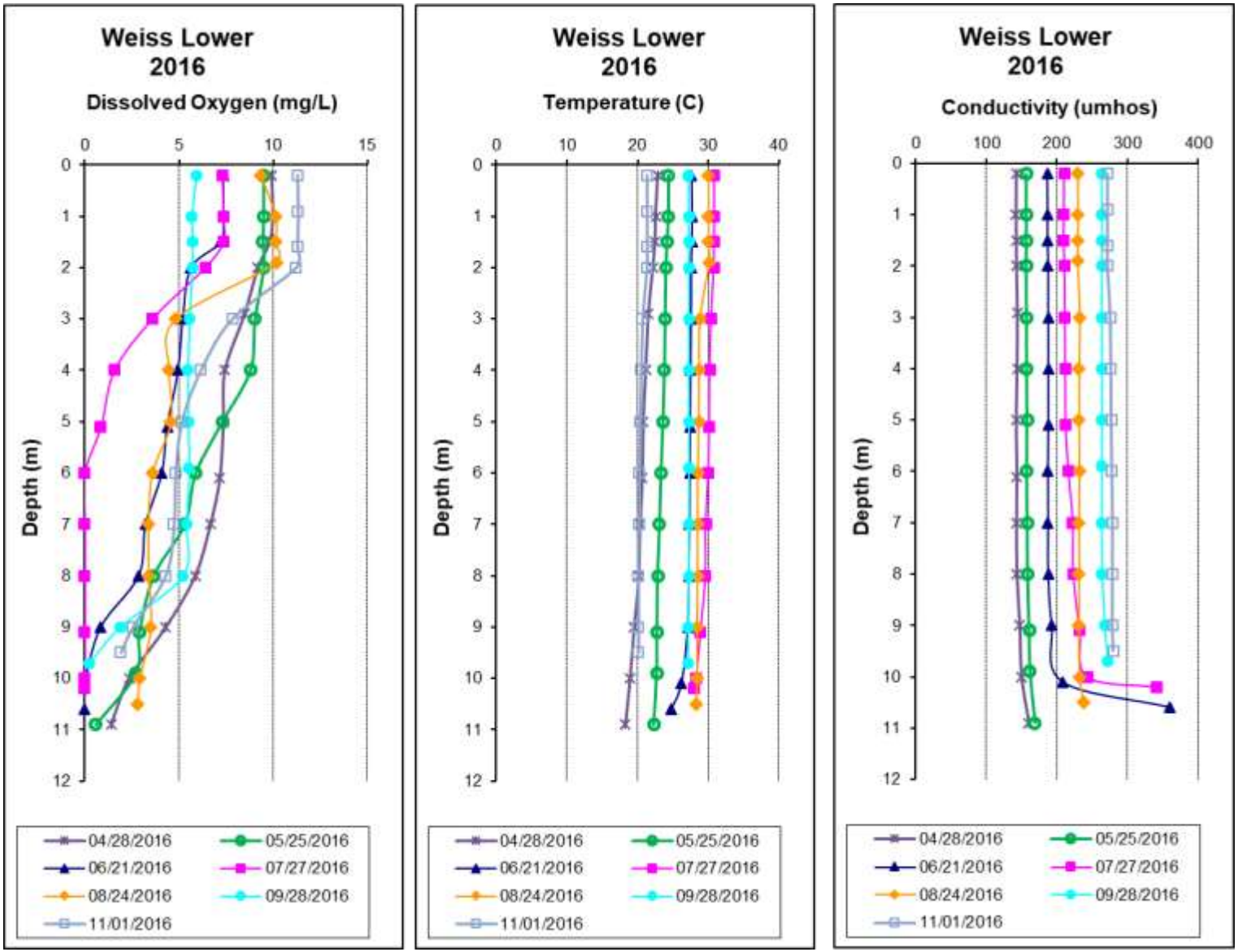


Figure 13. Monthly depth profiles of dissolved oxygen, temperature, and conductivity in the mid Weiss Reservoir station, April-October 2016.

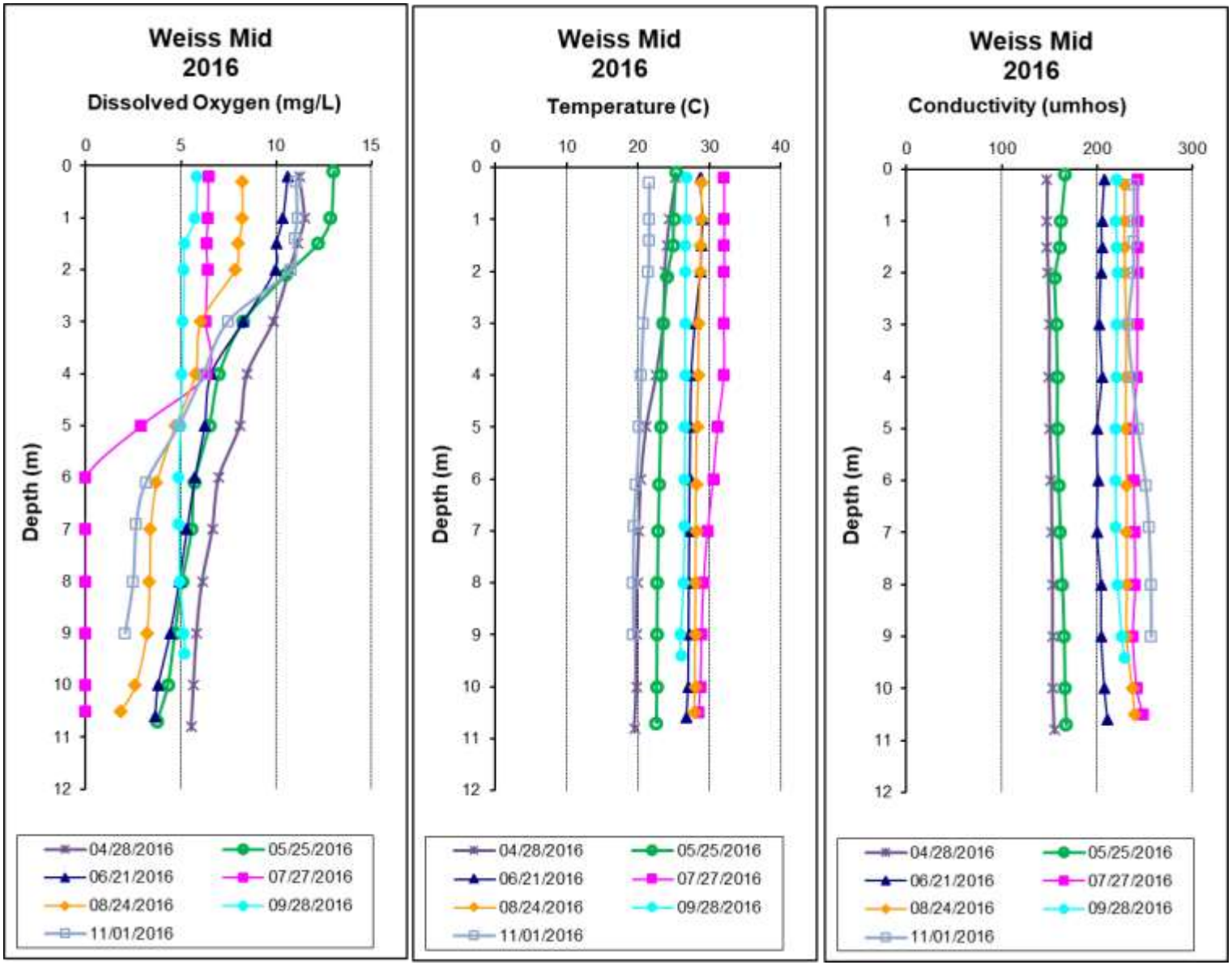


Figure 14. Monthly depth profiles of dissolved oxygen, temperature, and conductivity in the state line Weiss Reservoir station, April-October 2016.

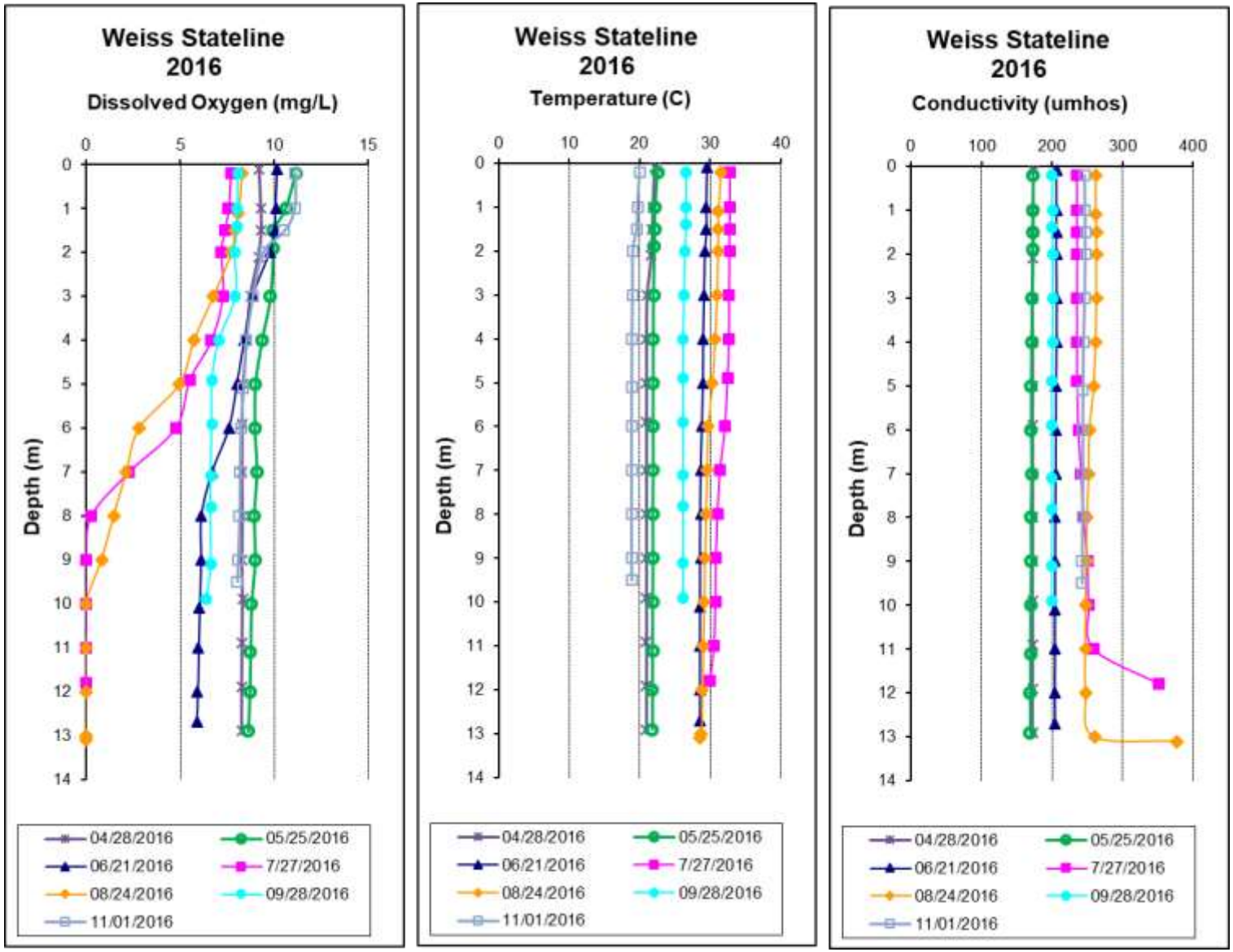


Figure 15. Monthly depth profiles of dissolved oxygen, temperature, and conductivity in the lower Weiss Reservoir station, April-October 2019.

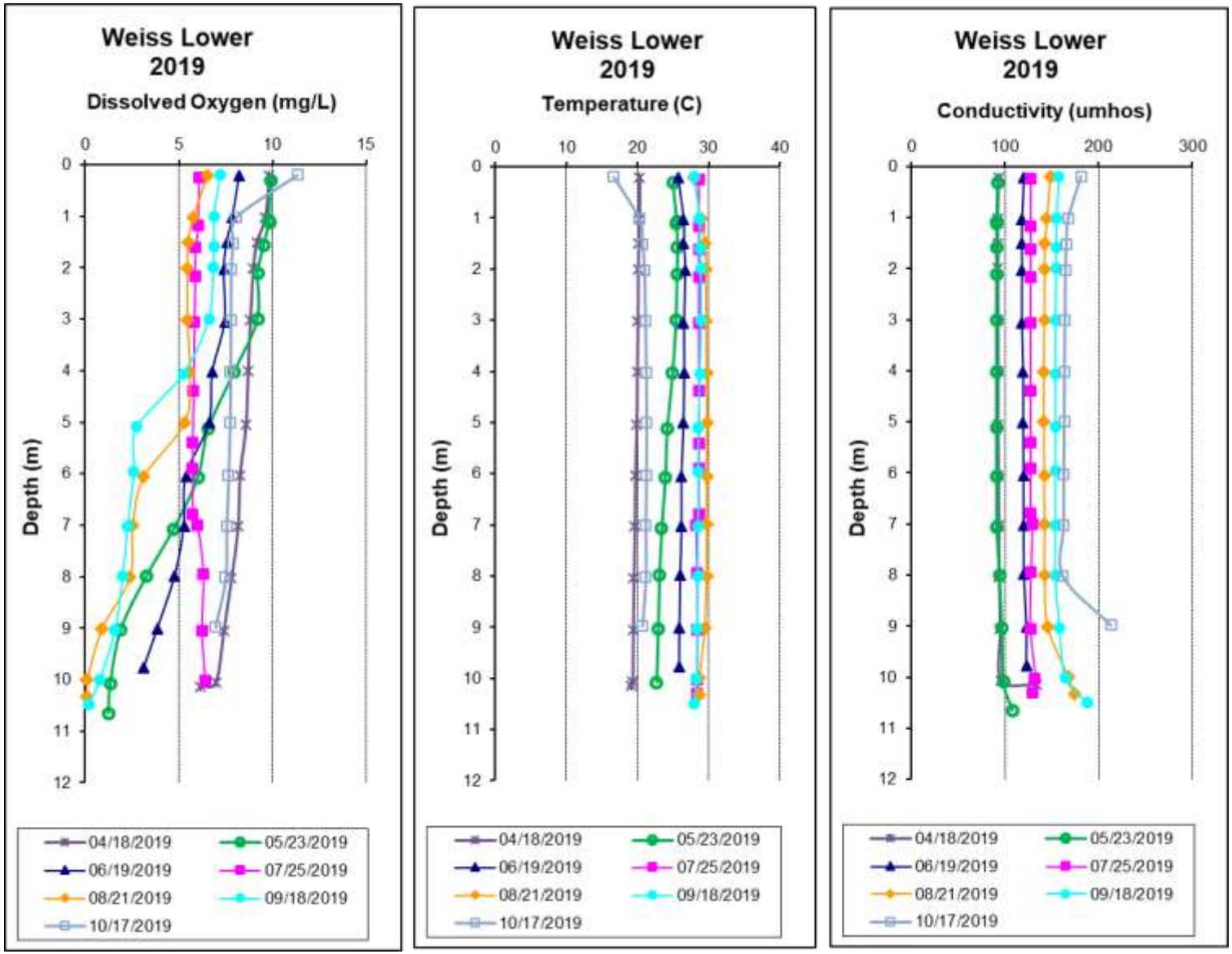


Figure 16. Monthly depth profiles of dissolved oxygen, temperature, and conductivity in the mid Weiss Reservoir station, April-October 2019.

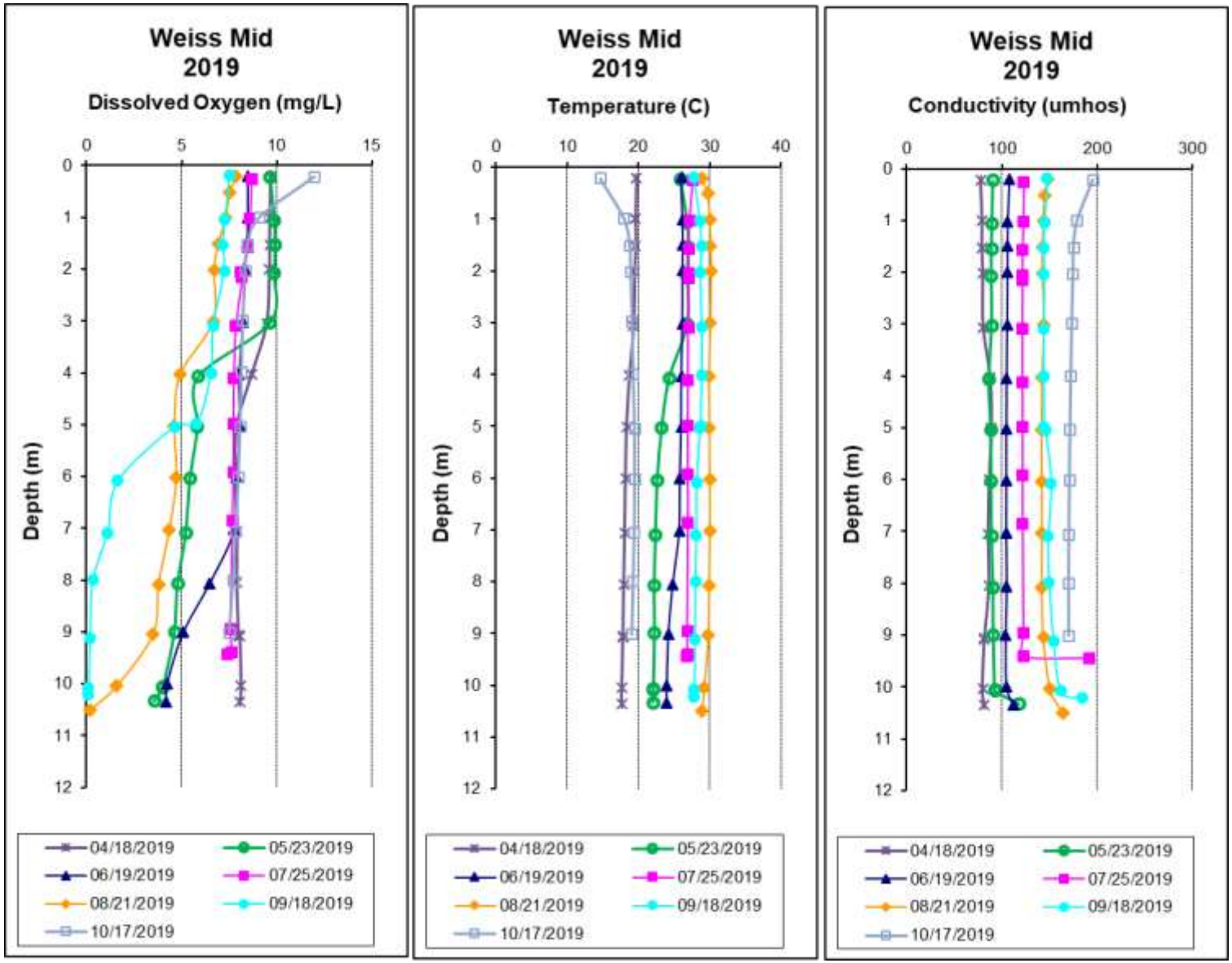


Figure 17. Monthly depth profiles of dissolved oxygen, temperature, and conductivity in the state line Weiss Reservoir station, April-October 2019.

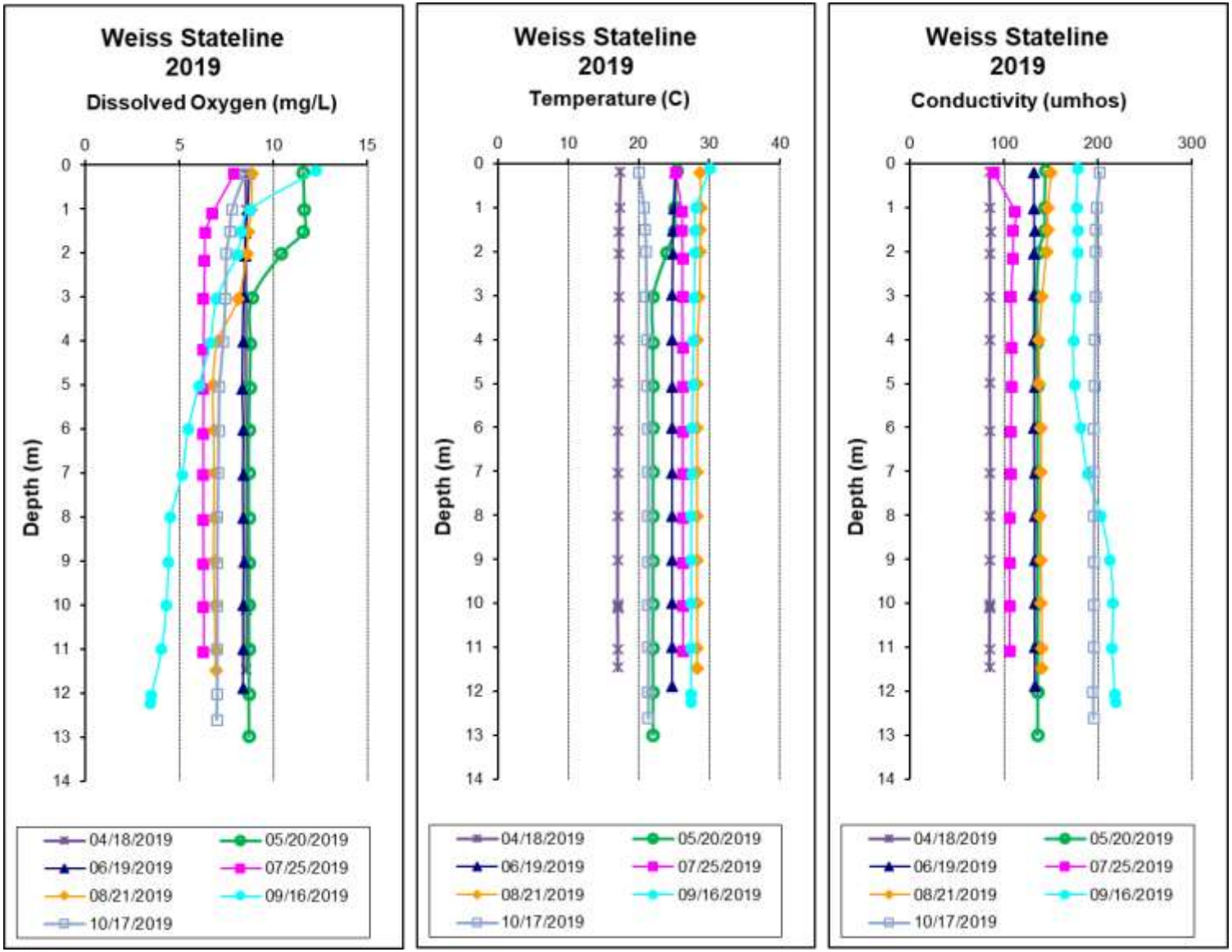


Figure 18. Monthly TSI values calculated for mainstem and tributary Weiss Reservoir stations in 2016 using chl *a* concentrations and Carlson's Trophic State Index calculation (Carlson 1977). Monthly discharge acquired from APCo at Weiss Dam.

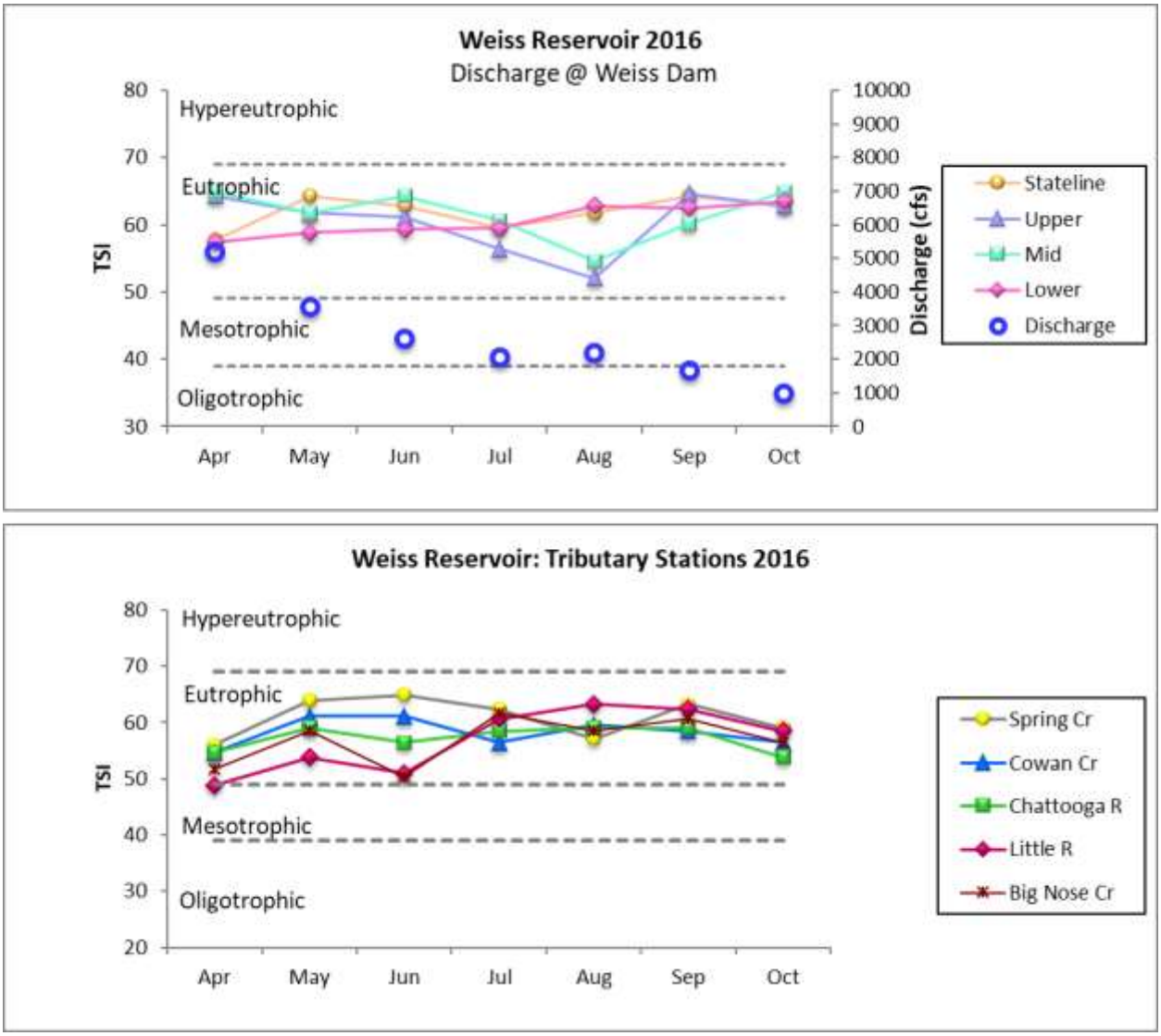
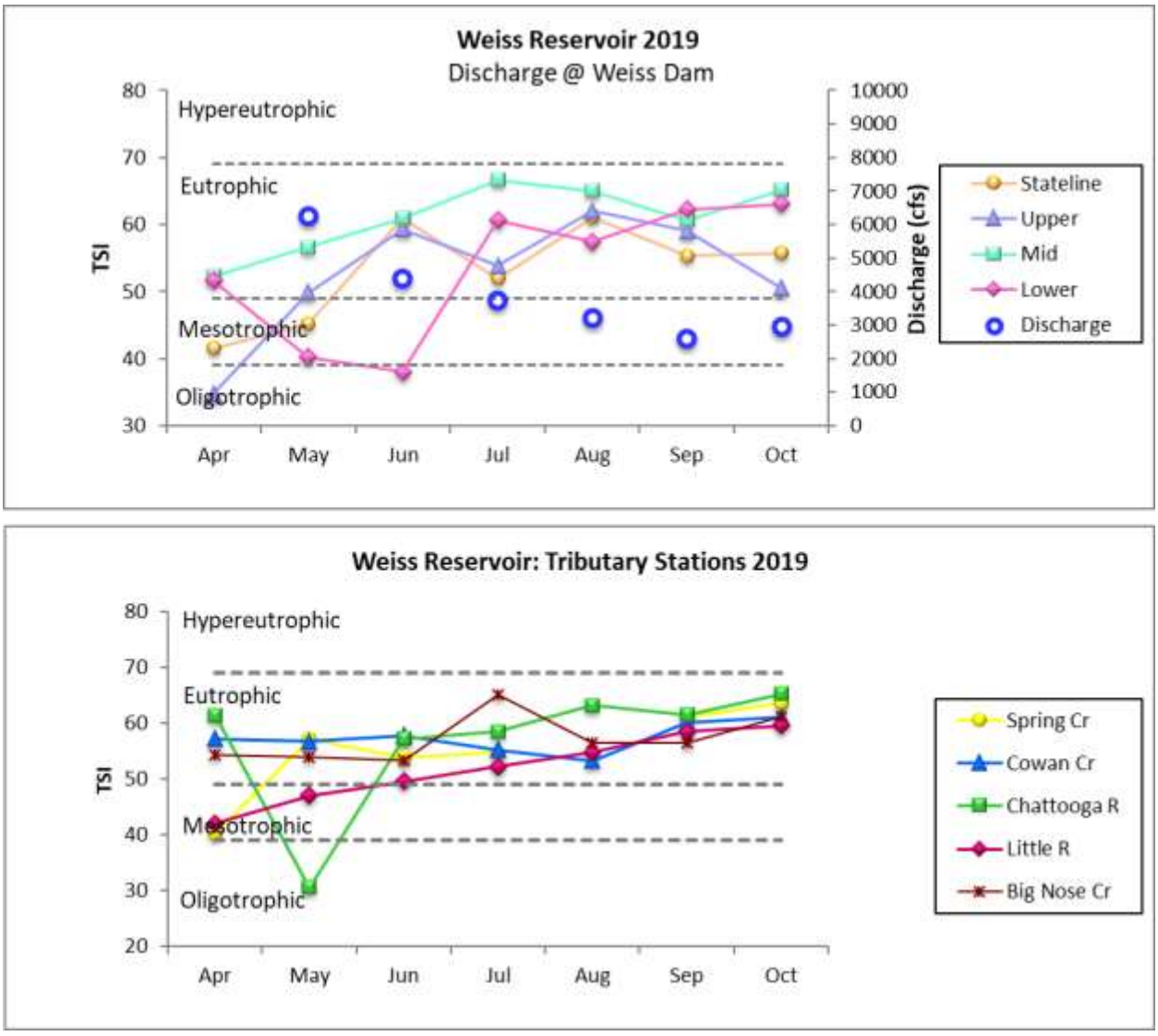


Figure 19. Monthly TSI values calculated for mainstem and tributary Weiss Reservoir stations in 2016 using chl *a* concentrations and Carlson's Trophic State Index calculation (Carlson 1977). Monthly discharge acquired from APCo at Weiss Dam.



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APPENDIX

Appendix Table 1. Summary of Weiss Reservoir water quality data collected April-October, 2016. Minimum (min) and maximum (max) values calculated using minimum detection limits when results were less than this value. Median (med), 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	Avg	SD
WEIC-1	**Physical**							
	Turbidity (NTU)	7		6.4	16.1	7.1	8.5	3.4
	Total Dissolved Solids (mg/L)	7		79.0	174.0	131.0	130.6	31.3
	Total Suspended Solids (mg/L)	7		3.0	9.0	8.0	7.1	2.3
	Hardness (mg/L)	4		69.1	90.9	79.1	79.6	9.0
	Alkalinity (mg/L)	7		60.7	89.3	79.3	76.9	11.4
	Photic Zone (m)	7		1.97	3.90	3.41	3.18	0.70
	Secchi (m)	7		0.53	1.06	0.98	0.89	0.20
	Bottom Depth (m)	7		9.5	10.9	10.6	10.3	0.6
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.007	0.030	0.004	0.007	0.005
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.002	0.022	0.002	0.005	0.008
	Total Kjeldahl Nitrogen (mg/L)	7		0.455	0.814	0.677	0.641	0.119
	Total Nitrogen (mg/L)[J]	7	<	1.374	2.508	0.678	0.646	0.124
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.002	0.003	0.002	0.002	0.001
	Total Phosphorus (mg/L)	7		0.022	0.062	0.039	0.041	0.013
	CBOD-5 (mg/L)	7	<	2.0	2.2	1.0	1.3	0.5
	Chlorides (mg/L)	7		4.4	19.9	10.4	11.1	5.7
	Biological							
	Chlorophyll a (mg/m³)	7		15.50	28.70	19.10	21.76	5.17
	E. coli (MPN/DL)[J]	4	<	1	1	1	1	0
WEIC-2	**Physical**							
	Turbidity (NTU)	7		10.8	22.5	13.8	14.9	4.0
	Total Dissolved Solids (mg/L)	7		79.0	161.0	129.0	121.4	27.4
	Total Suspended Solids (mg/L)	7		8.0	17.0	14.0	13.6	3.7
	Hardness (mg/L)	4		76.4	88.4	82.8	82.6	5.6
	Alkalinity (mg/L)	7		62.1	82.7	73.9	73.1	7.7
	Photic Zone (m)	7		1.24	3.16	2.21	2.24	0.71
	Secchi (m)	7		0.38	0.75	0.66	0.61	0.15
	Bottom Depth (m)	7		9.0	10.8	10.5	10.2	0.7
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.007	0.030	0.004	0.007	0.005
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.002	0.115	0.002	0.020	0.042
	Total Kjeldahl Nitrogen (mg/L)	7		0.542	1.380	0.810	0.808	0.279
	Total Nitrogen (mg/L)[J]	7	<	1.644	4.143	0.812	0.828	0.280
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.003	0.009	0.004	0.004	0.002
	Total Phosphorus (mg/L)	7		0.027	0.065	0.041	0.041	0.013
	CBOD-5 (mg/L)	7	<	2.0	3.0	2.2	1.9	0.9
	Chlorides (mg/L)	7		5.2	16.4	14.8	12.6	4.5
	Biological							
	Chlorophyll a (mg/m³)	7		11.60	32.90	24.00	24.87	7.92
	E. coli (MPN/DL)[J]	4	<	1	1	1	1	0

Station	Parameter	N		Min	Max	Med	Avg	SD
WEIC-3	**Physical**							
	Turbidity (NTU)	7		9.0	17.6	10.2	11.7	2.9
	Total Dissolved Solids (mg/L)	7		80.0	158.0	114.0	118.6	25.7
	Total Suspended Solids (mg/L)	7		8.0	13.0	9.0	10.1	1.9
	Hardness (mg/L)	4		77.4	110.0	87.7	90.7	14.4
	Alkalinity (mg/L)	7		65.1	83.3	72.6	73.8	7.0
	Photic Zone (m)	7		2.19	3.93	2.51	2.69	0.57
	Secchi (m)	7		0.60	1.03	0.76	0.77	0.14
	Bottom Depth (m)	7		6.7	9.1	8.8	8.3	1.0
	Chemical							
	Ammonia Nitrogen (mg/L)[J]	7	<	0.007	0.030	0.004	0.012	0.011
	Nitrate+Nitrite Nitrogen (mg/L)	7		0.121	0.341	0.263	0.243	0.071
	Total Kjeldahl Nitrogen (mg/L)	7	<	0.037	1.320	0.700	0.666	0.400
	Total Nitrogen (mg/L)	7	<	0.860	4.503	0.833	0.910	0.373
	Dis Reactive Phosphorus (mg/L)[J]	7		0.005	0.018	0.012	0.011	0.006
	Total Phosphorus (mg/L)[J]	7		0.027	0.077	0.044	0.046	0.016
	CBOD-5 (mg/L)	7	<	2.0	3.0	2.0	1.8	0.8
	Chlorides (mg/L)	7		5.6	37.6	13.3	15.2	10.7
	Biological							
	Chlorophyll a (mg/m³)	7		8.90	32.00	24.00	22.70	8.57
	E. coli (MPN/DL)[J]	4	<	1	13	1	4	6
WEIC-5	**Physical**							
	Turbidity (NTU)	7		5.2	15.2	11.7	11.2	3.2
	Total Dissolved Solids (mg/L)[J]	6		105.0	287.0	153.0	168.5	66.2
	Total Suspended Solids (mg/L)	7		4.0	15.0	10.0	10.4	3.7
	Hardness (mg/L)	4		86.1	105.0	89.2	92.4	8.8
	Alkalinity (mg/L)	7		37.0	104.0	74.5	74.0	22.8
	Photic Zone (m)	7		1.80	4.47	2.36	2.60	0.91
	Secchi (m)	7		0.56	1.50	0.72	0.80	0.33
	Bottom Depth (m)	7		5.9	7.9	6.3	6.6	0.8
	Chemical							
	Ammonia Nitrogen (mg/L)[J]	7	<	0.012	0.024	0.009	0.013	0.007
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.009	0.106	0.025	0.030	0.036
	Total Kjeldahl Nitrogen (mg/L)	7		0.546	1.040	0.799	0.785	0.187
	Total Nitrogen (mg/L)[J]	7	<	1.816	3.195	0.804	0.815	0.180
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.004	0.022	0.002	0.006	0.007
	Total Phosphorus (mg/L)	7		0.016	0.056	0.027	0.031	0.015
	CBOD-5 (mg/L)	7	<	2.0	2.0	1.0	1.2	0.4
	Chlorides (mg/L)[J]	7		1.5	15.4	7.8	8.0	4.7
	Biological							
	Chlorophyll a (mg/m³)	7		3.20	23.50	15.00	12.44	6.93
	E. coli (MPN/DL)[J]	4		1	21	2	6	10

Station	Parameter	N		Min	Max	Med	Avg	SD
WEIC-6	**Physical**							
	Turbidity (NTU)	7		8.2	28.0	16.4	16.3	6.9
	Total Dissolved Solids (mg/L)[J]	6		189.0	397.0	260.5	281.8	82.6
	Total Suspended Solids (mg/L)	7		6.0	25.0	14.0	13.4	7.0
	Hardness (mg/L)	4		109.0	139.0	121.5	122.8	14.2
	Alkalinity (mg/L)	7		89.3	140.0	100.0	107.1	20.7
	Photic Zone (m)	7		1.49	2.95	1.92	2.11	0.52
	Secchi (m)	7		0.40	1.20	0.61	0.66	0.26
	Bottom Depth (m)	7		2.6	3.9	3.4	3.3	0.4
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.012	0.018	0.009	0.009	0.001
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.009	0.110	0.027	0.033	0.036
	Total Kjeldahl Nitrogen (mg/L)	7		0.544	1.080	0.764	0.817	0.202
	Total Nitrogen (mg/L)[J]	7	<	1.646	3.254	0.874	0.851	0.202
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.004	0.020	0.007	0.009	0.006
	Total Phosphorus (mg/L)[J]	7		0.055	0.274	0.136	0.136	0.079
	CBOD-5 (mg/L)	7	<	2.0	2.3	1.0	1.4	0.6
	Chlorides (mg/L)	7		7.6	33.2	14.9	18.3	9.6
	Biological							
	Chlorophyll a (mg/m³)	7		10.70	18.20	17.10	15.43	3.28
	E. coli (MPN/DL)[J]	4	<	1	8	2	3	3
WEIC-7	**Physical**							
	Turbidity (NTU)	7		5.8	22.1	15.0	13.6	5.7
	Total Dissolved Solids (mg/L)[J]	6		101.0	163.0	149.0	142.0	23.5
	Total Suspended Solids (mg/L)	7		5.0	14.0	10.0	9.9	3.6
	Hardness (mg/L)	4		88.6	104.0	96.6	96.5	6.5
	Alkalinity (mg/L)	7		46.8	82.0	66.2	64.1	14.3
	Photic Zone (m)	7		1.56	3.49	2.15	2.24	0.67
	Secchi (m)	7		0.45	1.03	0.73	0.74	0.20
	Bottom Depth (m)	7		2.9	4.5	3.9	3.9	0.6
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.012	0.086	0.009	0.020	0.029
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.009	0.058	0.007	0.019	0.023
	Total Kjeldahl Nitrogen (mg/L)	7		0.573	1.980	0.962	1.077	0.458
	Total Nitrogen (mg/L)[J]	7	<	1.863	5.961	0.966	1.096	0.445
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.004	0.021	0.004	0.006	0.007
	Total Phosphorus (mg/L)	7		0.014	0.056	0.033	0.035	0.014
	CBOD-5 (mg/L)	7	<	2.0	2.4	2.2	1.9	0.6
	Chlorides (mg/L)	7		3.7	20.7	12.9	12.1	6.4
	Biological							
	Chlorophyll a (mg/m³)	7		13.40	33.10	25.60	23.29	7.72
	E. coli (MPN/DL)[J]	4	<	1	32	2	9	15

Station	Parameter	N		Min	Max	Med	Avg	SD
WEIC-8	**Physical**							
	Turbidity (NTU)	7		6.4	10.7	8.1	8.6	1.7
	Total Dissolved Solids (mg/L)[J]	6		108.0	167.0	144.5	140.3	20.6
	Total Suspended Solids (mg/L)	7		3.0	10.0	7.0	6.7	2.3
	Hardness (mg/L)	4		88.5	101.0	92.3	93.5	6.0
	Alkalinity (mg/L)	7		44.6	78.4	61.9	63.1	13.6
	Photic Zone (m)	7		1.80	3.48	2.35	2.44	0.60
	Secchi (m)	7		0.58	1.08	0.75	0.80	0.17
	Bottom Depth (m)	7		6.0	8.2	6.9	7.1	0.9
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.012	0.018	0.009	0.009	0.001
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.009	0.081	0.017	0.027	0.028
	Total Kjeldahl Nitrogen (mg/L)	7		0.620	1.310	0.896	0.945	0.226
	Total Nitrogen (mg/L)[J]	7	<	1.874	3.944	0.938	0.972	0.225
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.004	0.021	0.002	0.007	0.008
	Total Phosphorus (mg/L)	7		0.016	0.045	0.029	0.030	0.009
	CBOD-5 (mg/L)	7	<	2.0	2.3	2.1	1.7	0.7
	Chlorides (mg/L)	7		5.7	19.9	12.6	12.3	5.5
	Biological							
	Chlorophyll a (mg/m³)	7		11.70	22.40	17.10	17.23	4.28
	E. coli (MPN/DL)[J]	4	<	1	11	1	3	5
WEIC-9	**Physical**							
	Turbidity (NTU)	7		6.8	13.9	9.0	9.8	2.6
	Total Dissolved Solids (mg/L)[J]	6		113.0	188.0	145.5	147.5	28.1
	Total Suspended Solids (mg/L)	7		6.0	13.0	9.0	9.1	2.2
	Hardness (mg/L)	4		84.4	107.0	90.7	93.2	9.7
	Alkalinity (mg/L)	7		33.6	87.6	63.8	63.0	20.0
	Photic Zone (m)	7		1.96	4.00	2.45	2.80	0.74
	Secchi (m)	7		0.60	1.31	0.70	0.84	0.27
	Bottom Depth (m)	7		2.9	4.6	3.8	3.8	0.6
	Chemical							
	Ammonia Nitrogen (mg/L)[J]	7	<	0.012	0.027	0.009	0.013	0.008
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.009	0.030	0.007	0.010	0.009
	Total Kjeldahl Nitrogen (mg/L)	7		0.562	1.080	0.820	0.799	0.191
	Total Nitrogen (mg/L)[J]	7	<	1.700	3.330	0.824	0.808	0.198
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.004	0.021	0.002	0.006	0.007
	Total Phosphorus (mg/L)	7		0.014	0.053	0.028	0.029	0.013
	CBOD-5 (mg/L)	7	<	2.0	2.6	1.0	1.6	0.7
	Chlorides (mg/L)	7		3.7	20.6	11.0	12.2	5.9
	Biological							
	Chlorophyll a (mg/m³)	7		7.48	23.50	17.10	15.57	6.04
	E. coli (MPN/DL)[J]	4		1	6	3	3	3

Station	Parameter	N		Min	Max	Med		Avg	SD
WEIC-12	**Physical**								
	Turbidity (NTU)	7		7.8	10.8	8.4		8.9	1.2
	Total Dissolved Solids (mg/L)	7		88.0	140.0	110.0		112.7	20.3
	Total Suspended Solids (mg/L)	7		5.0	11.0	7.0		7.4	2.2
	Hardness (mg/L)	1						76.7	
	Alkalinity (mg/L)	7		64.4	83.8	76.1		74.1	6.5
	Photic Zone (m)	7		2.63	3.43	2.89		2.94	0.32
	Secchi (m)	7		0.71	0.96	0.80		0.82	0.10
	Bottom Depth (m)	7		9.5	13.1	12.7		11.8	1.5
	Chemical								
	Ammonia Nitrogen (mg/L)	7	<	0.007	0.030	0.004		0.010	0.008
	Nitrate+Nitrite Nitrogen (mg/L)	7		0.180	0.585	0.395		0.408	0.130
	Total Kjeldahl Nitrogen (mg/L)	7		0.231	1.200	0.449		0.574	0.333
	Total Nitrogen (mg/L)	7		1.473	4.785	1.034		0.982	0.366
	Dis Reactive Phosphorus (mg/L)[J]	7		0.003	0.043	0.020		0.024	0.016
	Total Phosphorus (mg/L)	7		0.029	0.073	0.055		0.054	0.016
	CBOD-5 (mg/L)	7	<	2.0	2.4	1.0		1.4	0.6
	Chlorides (mg/L)	7		6.2	20.5	14.1		12.6	4.7
	Total Metals								
	Aluminum (mg/L)[J]	1						0.193	
	Iron (mg/L)	1						0.209	
	Manganese (mg/L)[J]	1						0.037	
	Dissolved Metals								
	Aluminum (mg/L)	1	<				<	0.106	
	Antimony (µg/L)	1	<				<	0.4	
	Arsenic (µg/L)[J]	1						0.7	
	Cadmium (µg/L)	1	<				<	0.385	
	Chromium (µg/L)[J]	1						0.459	
	Copper (µg/L)[J]	1						1.632	
	Iron (mg/L)	1	<				<	0.063	
	Lead (µg/L)	1	<				<	0.4	
	Manganese (mg/L)	1	<				<	0.004	
	Nickel (µg/L)	1	<				<	0.705	
	Selenium (µg/L)	1	<				<	0.5	
	Silver (µg/L)	1	<				<	0.478	
	Thallium (µg/L)	1	<				<	0.4	
	Zinc (µg/L)[J]	1						4.145	
	Biological								
	Chlorophyll a (mg/m³)	7		16.00	31.20	26.70		25.00	5.75
	E. coli (MPN/DL)[J]	7	<	1	4	2		2	2

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

Appendix Table 2. Summary of Weiss Reservoir water quality data collected April-October, 2019. Minimum (min) and maximum (max) values calculated using minimum detection limits when results were less than this value. Median (med), 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	Avg	SD
WEIC-1	**Physical**							
	Turbidity (NTU)	7		6.0	12.8	7.9	8.9	2.4
	Total Dissolved Solids (mg/L)	7		60.0	102.0	95.0	84.3	18.0
	Total Suspended Solids (mg/L)	7		6.0	11.0	7.0	7.9	2.3
	Hardness (mg/L)	4		59.5	66.7	63.5	63.3	3.1
	Alkalinity (mg/L)	7		48.1	67.6	57.3	57.4	7.1
	Photic Zone (m)	7		2.32	4.16	3.27	3.29	0.64
	Secchi (m)	7		0.84	1.37	1.02	1.08	0.20
	Bottom Depth (m)	7		9.0	10.6	10.3	10.1	0.6
	Chemical							
	Ammonia Nitrogen (mg/L)[J]	7	<	0.004	0.017	0.008	0.009	0.006
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.003	0.216	0.015	0.052	0.078
	Total Kjeldahl Nitrogen (mg/L)	7		0.383	0.866	0.552	0.565	0.161
	Total Nitrogen (mg/L)[J]	7	<	1.154	3.246	0.571	0.617	0.224
	Dis Reactive Phosphorus (mg/L)	7	<	0.005	0.005	0.002	0.002	0.000
	Total Phosphorus (mg/L)	7		0.021	0.041	0.034	0.033	0.007
	CBOD-5 (mg/L)[J]	7	<	2.0	2.0	1.0	1.0	0.0
	Chlorides (mg/L)	7		3.6	9.4	7.3	6.6	2.2
	Biological							
	Chlorophyll a (mg/m³)	7		2.14	27.50	15.50	14.71	10.49
	E. coli (MPN/DL)[J]	4	<	1	1	1	1	0
WEIC-2	**Physical**							
	Turbidity (NTU)	7		10.6	19.4	16.8	15.0	3.8
	Total Dissolved Solids (mg/L)	7		54.0	100.0	91.0	82.3	19.0
	Total Suspended Solids (mg/L)	7		7.0	17.0	12.0	12.4	4.1
	Hardness (mg/L)	4		53.4	65.5	61.6	60.5	5.5
	Alkalinity (mg/L)[J]	7		40.9	63.7	56.7	53.1	9.1
	Photic Zone (m)	7		1.50	3.38	2.20	2.29	0.66
	Secchi (m)	7		0.44	1.11	0.72	0.75	0.24
	Bottom Depth (m)	7		9.0	10.5	10.3	10.0	0.6
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.004	0.016	0.008	0.005	0.003
	Nitrate+Nitrite Nitrogen (mg/L)	7	<	0.003	0.384	0.076	0.107	0.132
	Total Kjeldahl Nitrogen (mg/L)	7		0.216	1.060	0.608	0.567	0.274
	Total Nitrogen (mg/L)	7	<	1.050	4.332	0.610	0.674	0.362
	Dis Reactive Phosphorus (mg/L)	7	<	0.005	0.005	0.002	0.002	0.000
	Total Phosphorus (mg/L)	7		0.021	0.050	0.028	0.032	0.010
	CBOD-5 (mg/L)[J]	7	<	2.0	2.2	1.0	1.2	0.4
	Chlorides (mg/L)	7		4.0	13.0	7.7	7.5	3.1
	Biological							
	Chlorophyll a (mg/m³)	7		9.15	39.70	22.20	24.89	11.25
	E. coli (MPN/DL)[J]	4	<	1	5	1	2	2

Station	Parameter	N		Min	Max	Med	Avg	SD
WEIC-3	**Physical**							
	Turbidity (NTU)	7		10.4	14.8	12.0	12.4	1.6
	Total Dissolved Solids (mg/L)	7		56.0	114.0	87.0	86.1	20.7
	Total Suspended Solids (mg/L)[J]	7		6.0	13.0	11.0	10.4	2.6
	Hardness (mg/L)	4		48.7	61.7	60.0	57.6	6.0
	Alkalinity (mg/L)	7		41.6	60.7	56.0	53.1	7.8
	Photic Zone (m)	7		1.88	3.19	2.62	2.58	0.43
	Secchi (m)	7		0.53	1.11	0.85	0.83	0.19
	Bottom Depth (m)	7		6.8	9.3	7.6	7.7	0.8
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.004	0.016	0.008	0.005	0.003
	Nitrate+Nitrite Nitrogen (mg/L)	7		0.200	0.479	0.374	0.381	0.098
	Total Kjeldahl Nitrogen (mg/L)	7		0.299	0.799	0.509	0.513	0.179
	Total Nitrogen (mg/L)	7		1.983	3.378	0.962	0.894	0.171
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.005	0.016	0.002	0.006	0.005
	Total Phosphorus (mg/L)	7		0.024	0.035	0.030	0.029	0.005
	CBOD-5 (mg/L)[J]	7	<	2.0	2.0	1.0	1.0	0.0
	Chlorides (mg/L)	7		3.7	19.2	6.0	7.8	5.4
	Biological							
	Chlorophyll a (mg/m³)	7		1.53	24.60	10.70	12.64	8.10
	E. coli (MPN/DL)	4		1	6	2	3	3
WEIC-5	**Physical**							
	Turbidity (NTU)	7		6.6	13.2	7.9	8.9	2.5
	Total Dissolved Solids (mg/L)	7		42.0	132.0	88.0	89.1	31.9
	Total Suspended Solids (mg/L)	7		5.0	17.0	6.0	8.9	4.7
	Hardness (mg/L)	4		63.2	80.3	69.4	70.6	8.7
	Alkalinity (mg/L)	7		25.1	76.6	65.0	58.1	19.4
	Photic Zone (m)	7		2.18	3.82	3.10	3.08	0.62
	Secchi (m)	7		0.79	1.62	1.04	1.11	0.32
	Bottom Depth (m)	7		6.2	7.8	7.2	7.2	0.5
	Chemical							
	Ammonia Nitrogen (mg/L)[J]	7	<	0.004	0.057	0.022	0.024	0.018
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.008	0.180	0.004	0.044	0.069
	Total Kjeldahl Nitrogen (mg/L)[J]	7	<	0.075	2.860	0.375	0.666	0.995
	Total Nitrogen (mg/L)[J]	7	<	0.124	8.625	0.379	0.710	0.987
	Dis Reactive Phosphorus (mg/L)	7	<	0.006	0.006	0.003	0.003	0.000
	Total Phosphorus (mg/L)	7		0.011	0.053	0.044	0.034	0.018
	CBOD-5 (mg/L)[J]	7	<	2.0	3.9	1.0	1.6	1.1
	Chlorides (mg/L)[J]	7		1.3	6.9	4.2	4.1	2.4
	Biological							
	Chlorophyll a (mg/m³)	7		3.20	19.20	9.08	10.37	5.99
	E. coli (MPN/DL)[J]	4	<	1	49	5	14	23

Station	Parameter	N		Min	Max	Med	Avg	SD
WEIC-6	**Physical**							
	Turbidity (NTU)	7		9.9	18.6	12.7	13.3	3.1
	Total Dissolved Solids (mg/L)[J]	7		131.0	262.0	158.0	171.3	42.7
	Total Suspended Solids (mg/L)[J]	7		10.0	17.0	13.0	13.1	2.5
	Hardness (mg/L)	4		88.4	99.3	98.0	95.9	5.2
	Alkalinity (mg/L)	7		89.8	112.0	94.9	97.9	7.6
	Photic Zone (m)	7		1.84	3.15	2.34	2.37	0.46
	Secchi (m)	7		0.63	1.43	0.88	0.95	0.30
	Bottom Depth (m)	7		3.5	4.1	3.8	3.8	0.2
	Chemical							
	Ammonia Nitrogen (mg/L)[J]	7		0.024	0.041	0.038	0.036	0.006
	Nitrate+Nitrite Nitrogen (mg/L)[J]	7	<	0.008	0.343	0.058	0.117	0.137
	Total Kjeldahl Nitrogen (mg/L)	7	<	0.075	3.010	0.651	0.958	0.970
	Total Nitrogen (mg/L)[J]	7	<	0.140	9.042	0.667	1.076	0.971
	Dis Reactive Phosphorus (mg/L)	7	<	0.006	0.006	0.003	0.003	0.000
	Total Phosphorus (mg/L)	7		0.075	0.278	0.149	0.153	0.068
	CBOD-5 (mg/L)[J]	7	<	2.0	4.4	1.0	2.0	1.4
	Chlorides (mg/L)	7		4.8	13.5	7.4	8.0	3.0
	Biological							
	Chlorophyll a (mg/m³)	7	<	1.00	34.20	23.00	20.16	10.78
	E. coli (MPN/DL)[J]	4		1	1	1	1	0
WEIC-7	**Physical**							
	Turbidity (NTU)	6		6.3	26.1	11.6	13.3	6.8
	Total Dissolved Solids (mg/L)	6		76.0	129.0	87.0	94.5	20.8
	Total Suspended Solids (mg/L)[J]	6		8.0	21.0	12.0	13.0	4.7
	Hardness (mg/L)	3		59.8	71.5	60.6	64.0	6.5
	Alkalinity (mg/L)	6		49.5	62.1	57.2	56.5	5.0
	Photic Zone (m)	6		1.41	2.98	2.47	2.38	0.55
	Secchi (m)	6		0.72	1.44	0.83	0.99	0.32
	Bottom Depth (m)	6		4.0	4.7	4.5	4.5	0.3
	Chemical							
	Ammonia Nitrogen (mg/L)[J]	6	<	0.004	0.031	0.022	0.018	0.013
	Nitrate+Nitrite Nitrogen (mg/L)	6	<	0.008	0.199	0.074	0.076	0.068
	Total Kjeldahl Nitrogen (mg/L)	6	<	0.075	2.900	0.437	0.778	1.052
	Total Nitrogen (mg/L)	6	<	0.124	8.904	0.510	0.854	1.056
	Dis Reactive Phosphorus (mg/L)	6	<	0.006	0.006	0.003	0.003	0.000
	Total Phosphorus (mg/L)	6		0.021	0.042	0.026	0.029	0.008
	CBOD-5 (mg/L)[J]	6	<	2.0	4.4	1.8	2.2	1.5
	Chlorides (mg/L)	6		3.0	12.1	5.6	6.2	3.2
	Biological							
	Chlorophyll a (mg/m³)	6		2.67	28.80	13.35	15.21	9.23
	E. coli (MPN/DL)[J]	3		1	76	1	25	43

Station	Parameter	N		Min	Max	Med	Avg	SD
WEIC-8	**Physical**							
	Turbidity (NTU)	7		5.8	19.3	7.4	9.1	4.9
	Total Dissolved Solids (mg/L)	7		69.0	131.0	89.0	92.4	20.8
	Total Suspended Solids (mg/L)	7		3.0	15.0	7.0	7.4	4.0
	Hardness (mg/L)	4		57.4	68.8	62.2	62.6	5.3
	Alkalinity (mg/L)	7		44.6	57.5	55.7	52.9	5.6
	Photic Zone (m)	7		1.83	3.36	3.23	2.91	0.57
	Secchi (m)	7		0.74	1.36	1.03	1.08	0.23
	Bottom Depth (m)	7		6.4	8.0	7.3	7.4	0.6
	Chemical							
	Ammonia Nitrogen (mg/L)[J]	7		0.007	0.083	0.015	0.026	0.027
	Nitrate+Nitrite Nitrogen (mg/L)	7	<	0.008	0.178	0.071	0.077	0.068
	Total Kjeldahl Nitrogen (mg/L)	7	<	0.075	2.940	0.671	0.879	0.949
	Total Nitrogen (mg/L)	7	<	0.278	9.033	0.833	0.956	0.958
	Dis Reactive Phosphorus (mg/L)	7	<	0.006	0.006	0.003	0.003	0.000
	Total Phosphorus (mg/L)	7		0.018	0.041	0.025	0.028	0.009
	CBOD-5 (mg/L)[J]	7	<	2.0	3.9	1.0	1.8	1.1
	Chlorides (mg/L)[J]	7		2.8	13.6	7.0	6.9	3.5
	Biological							
	Chlorophyll a (mg/m³)	7		10.10	22.40	15.00	15.79	4.30
	E. coli (MPN/DL)[J]	4		1	13	4	6	5
WEIC-9	**Physical**							
	Turbidity (NTU)	7		4.7	12.7	7.7	7.9	2.7
	Total Dissolved Solids (mg/L)	7		67.0	109.0	92.0	90.6	14.7
	Total Suspended Solids (mg/L)	7		3.0	12.0	8.0	8.3	3.0
	Hardness (mg/L)	4		56.8	70.3	63.0	63.3	6.2
	Alkalinity (mg/L)	7		44.8	61.8	56.9	55.0	6.2
	Photic Zone (m)	7		2.36	3.76	2.89	3.11	0.60
	Secchi (m)	7		0.82	2.04	0.98	1.21	0.48
	Bottom Depth (m)	7		3.8	4.7	4.4	4.4	0.4
	Chemical							
	Ammonia Nitrogen (mg/L)[J]	7	<	0.004	0.052	0.026	0.025	0.016
	Nitrate+Nitrite Nitrogen (mg/L)	7	<	0.008	0.186	0.004	0.040	0.070
	Total Kjeldahl Nitrogen (mg/L)[J]	7	<	0.075	2.890	0.556	0.816	0.992
	Total Nitrogen (mg/L)	7	<	0.124	8.682	0.560	0.856	1.002
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.006	0.006	0.003	0.003	0.000
	Total Phosphorus (mg/L)	7		0.018	0.044	0.033	0.033	0.009
	CBOD-5 (mg/L)[J]	7	<	2.0	3.9	1.0	1.6	1.1
	Chlorides (mg/L)	7		3.3	10.6	5.5	6.2	2.3
	Biological							
	Chlorophyll a (mg/m³)	7		10.10	33.60	13.90	16.54	8.60
	E. coli (MPN/DL)[J]	4	<	1	10	3	4	4

Station	Parameter	N		Min	Max	Med	Avg	SD
WEIC-12	**Physical**							
	Turbidity (NTU)	9		8.2	16.6	9.7	10.9	3.1
	Total Dissolved Solids (mg/L)	7		50.0	123.0	101.0	98.7	24.4
	Total Suspended Solids (mg/L)	7		7.0	17.0	9.0	10.6	3.3
	Hardness (mg/L)	1					62.9	
	Alkalinity (mg/L)	7		44.2	69.0	56.4	58.1	9.8
	Photic Zone (m)	7		2.23	3.15	2.91	2.81	0.35
	Secchi (m)	7		0.73	1.13	0.97	0.93	0.15
	Bottom Depth (m)	9		10.2	13.0	11.9	11.8	0.8
	Chemical							
	Ammonia Nitrogen (mg/L)	7	<	0.004	0.031	0.008	0.009	0.010
	Nitrate+Nitrite Nitrogen (mg/L)	7		0.240	0.551	0.453	0.436	0.097
	Total Kjeldahl Nitrogen (mg/L)	7	<	0.200	1.230	0.311	0.436	0.372
	Total Nitrogen (mg/L)	7	<	1.596	5.094	0.762	0.872	0.385
	Dis Reactive Phosphorus (mg/L)[J]	7	<	0.005	0.025	0.009	0.010	0.007
	Total Phosphorus (mg/L)	7		0.018	0.039	0.029	0.028	0.007
	CBOD-5 (mg/L)[J]	7	<	2.0	2.0	1.0	1.0	0.0
	Chlorides (mg/L)	7		4.0	16.0	8.4	9.9	4.4
	Total Metals							
	Aluminum (mg/L)	1					0.311	
	Iron (mg/L)	1					0.354	
	Manganese (mg/L)[J]	1					0.026	
	Dissolved Metals							
	Aluminum (mg/L)	1	<			<	0.023	
	Antimony (µg/L)	1	<			<	1.5	
	Arsenic (µg/L)	1	<			<	0.7	
	Cadmium (µg/L)	1	<			<	0.726	
	Chromium (µg/L)	1	<			<	0.793	
	Copper (µg/L)	1	<			<	1.190	
	Iron (mg/L)	1	<			<	0.063	
	Lead (µg/L)	1	<			<	0.7	
	Manganese (mg/L)	1	<			<	0.004	
	Nickel (µg/L)	1	<			<	1.960	
	Selenium (µg/L)	1	<			<	1.9	
	Silver (µg/L)	1	<			<	1.350	
	Thallium (µg/L)	1	<			<	0.6	
	Zinc (µg/L)	1	<			<	2.340	
	Biological							
	Chlorophyll a (mg/m³)	7		3.05	22.40	12.50	12.36	7.74
	E. coli (MPN/DL)	7		1	71	10	22	24

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