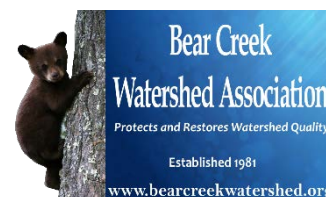


Technical Memorandum BCWA



Date: February 8, 2017
To: Bear Creek Watershed Association
From: Russell N. Clayshulte, Manager
Re: BCWA TM 2016.04 BCR 2016 Summary

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Table 1 BCR Summary Statistics

Bear Creek Reservoir 2016 - Summary Statistics

Reservoir Growing Season July to September

Reservoir Monitoring Parameters	Reservoir
Chlorophyll (Site 40)	
Average Growing Season Chlorophyll-a [ug/l (-1m)]	14.6
Average Annual Chlorophyll-a [ug/l (-1m)]	10.1
Peak Chlorophyll-a [ug/l]	23.9
Total Phosphorus	
Average Annual Total Phosphorus [ug/l]: Water Column	63
Average Annual Total Phosphorus [ug/l] -1m	39
Average Annual Total Phosphorus [ug/l] -10m	93
Growing Season Total Phosphorus [ug/l]: Water Column	95
Growing Season Total Phosphorus [ug/l]: -1m	57
Growing Season Total Phosphorus [ug/l]: -10m	134
Peak Annual Total Phosphorus [ug/l] Water Column	422

Total Nitrogen	
Average Annual Total Nitrogen [ug/l]: Water Column	784
Average Total Nitrogen [ug/l]: -1m	759
Average Total Nitrogen [ug/l]: -10m	799
Growing Season Total Nitrogen [ug/l]: Water Column	670
Growing Season Total Nitrogen [ug/l]: -1m	669
Growing Season Total Nitrogen [ug/l]: -10m	671
Clarity (All Profiles)	
Average Annual Secchi Depth (meters)	1.22
Growing Season Average Secchi Depth (meters)	0.66
Dissolved Oxygen (site 40 Profile)	
Annual Average at -1/2m - 2m [mg/l]	8.56
Seasonal Average at -1/2 - 2m [mg/l]	6.80
Seasonal Minimum at -1/2 - 2m [mg/l]	4.62
pH	
Annual Average at -1/2m - 2m [mg/l]	8.18
Seasonal Average at -1/2 - 2m [mg/l]	8.10
Seasonal Maximum at -1/2 - 2m [mg/l]	8.91
Specific Conductance	
Annual Average at -1/2m - 2m [uS/cm]	398
Seasonal Average at -1/2 - 2m [us/cm]	615
Seasonal Minimum at -1/2 - 2m [us/cm]	261
Phytoplankton Species	
Phytoplankton Co-dominant Species - Site 40 (July- October 2016)	Aphanizomenon flos-aquae
	Cladophora sp.
	Cryptomonas erosa
	Cymbella minuta
	Cymbella mexicana
	Diatoma vulgare
	Microcystis aeruginosa
	Melosira ambigua
	Melosira granulata
	Melosira varians
	Rhoicosphenia curvata
	Synedra ulna
Peak Phytoplankton	
<i>Aphanizomenon flos-aquae</i>	Density cells/ml = 29,006
<i>Aphanizomenon flos-aquae</i>	Peak Biovolume (um ³ /mL) = 40,202,900
Loading - Annual Pounds	
Total Nitrogen -Total Load In to BCR	84,580
Total Nitrogen -Total Load From BCR	90,227
Total Nitrogen -Total Deposition into BCR	-5,646
Total Phosphorus -Total Load In to BCR	5,657
Total Phosphorus -Total Load From BCR	4,369
Total Phosphorus -Total Deposition into BCR	1,288

Table 2 2016 Summary Compared to Long-Term Trends

Parameter		2016	91-2016 Mean	91-2016 Median
Chlorophyll-a (ug/L)	Top	10.1	12.5	13.5
Total Nitrogen ug/l	Top	759	733	759
	Bottom	799	435	728
	Water Column	779	368	752
Total Phosphorus (ug/L)	Top	38.7	70.1	39.3
	Bottom	92.8	54.3	61.0
	Water Column	66	30.5	50.7
Secchi Depth (m)	Top	1.2	2.1	2.2

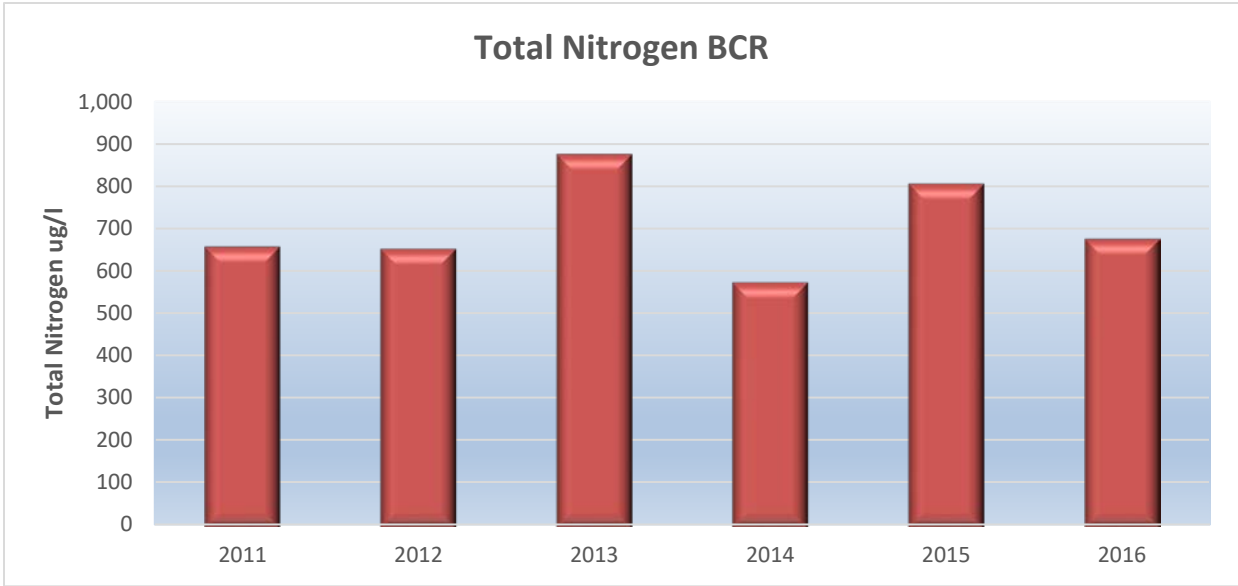


Figure 1 Total Nitrogen BCR

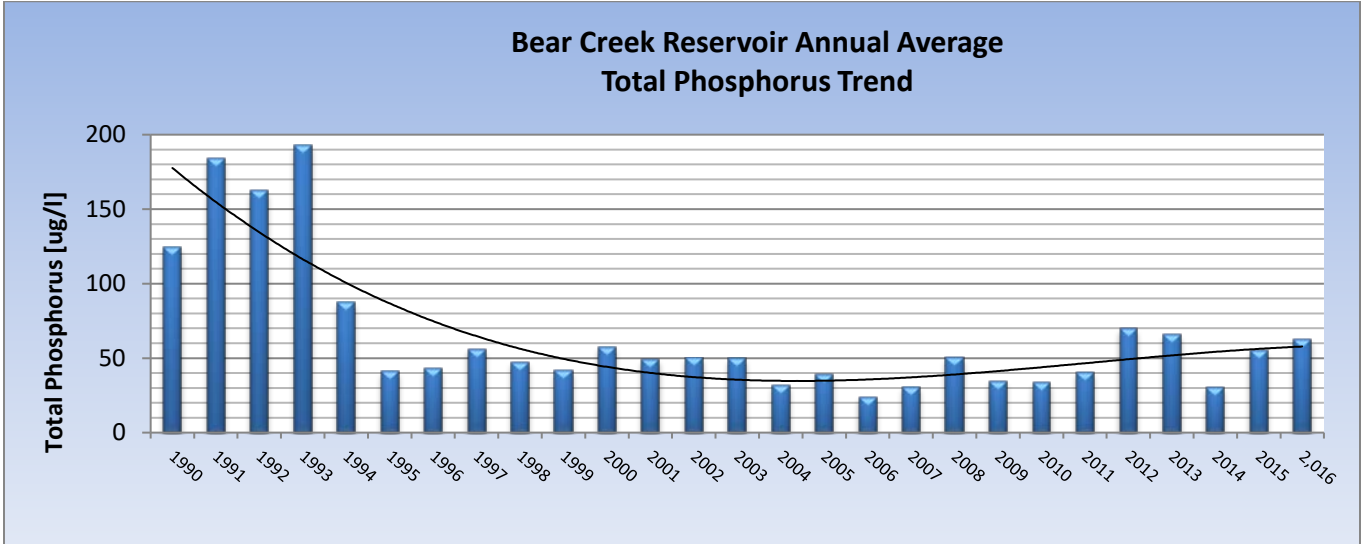


Figure 2 Total Phosphorus BCR

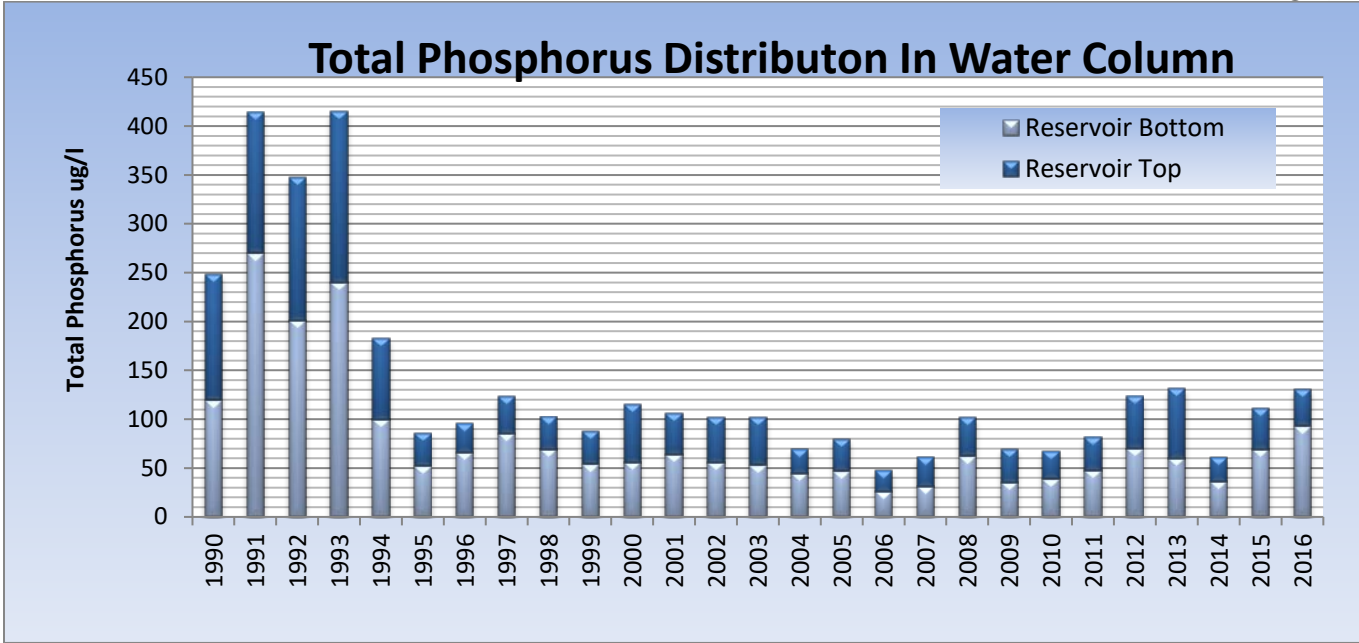


Figure 3 Total Phosphorus Distribution within Water Column

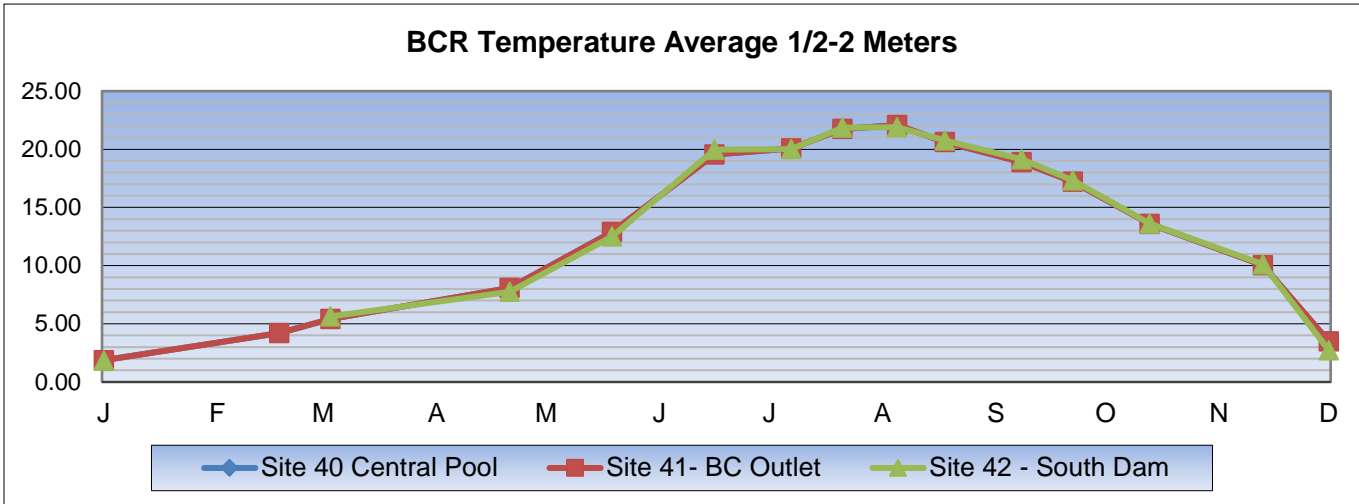


Figure 4 BCR Temperature

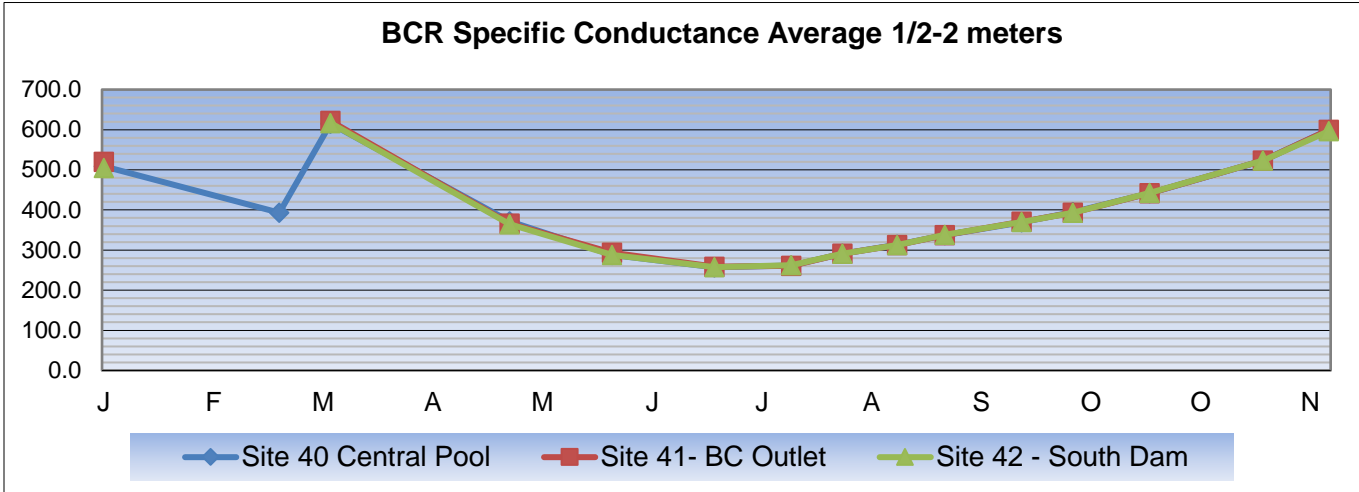


Figure 5 BCR Specific Conductance

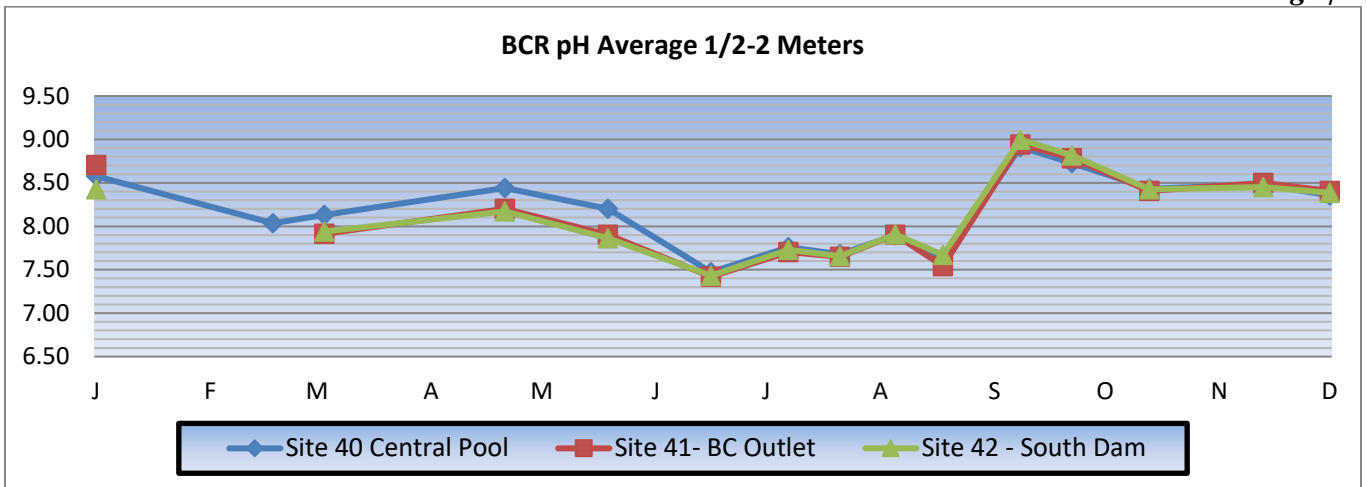


Figure 6 BCR pH

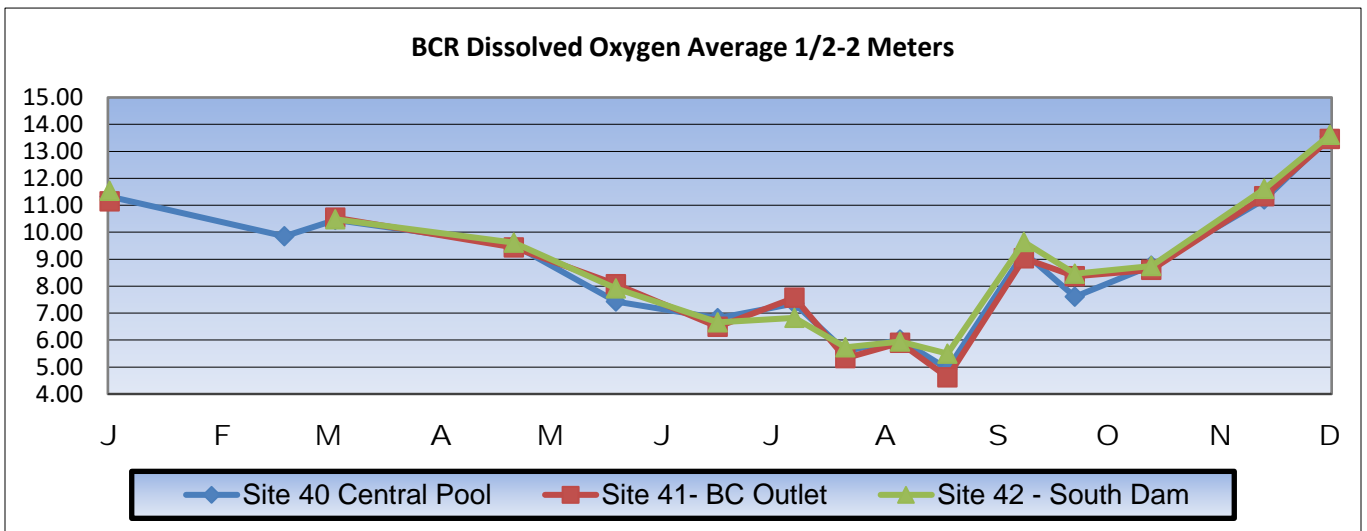


Figure 7 BCR Dissolved Oxygen

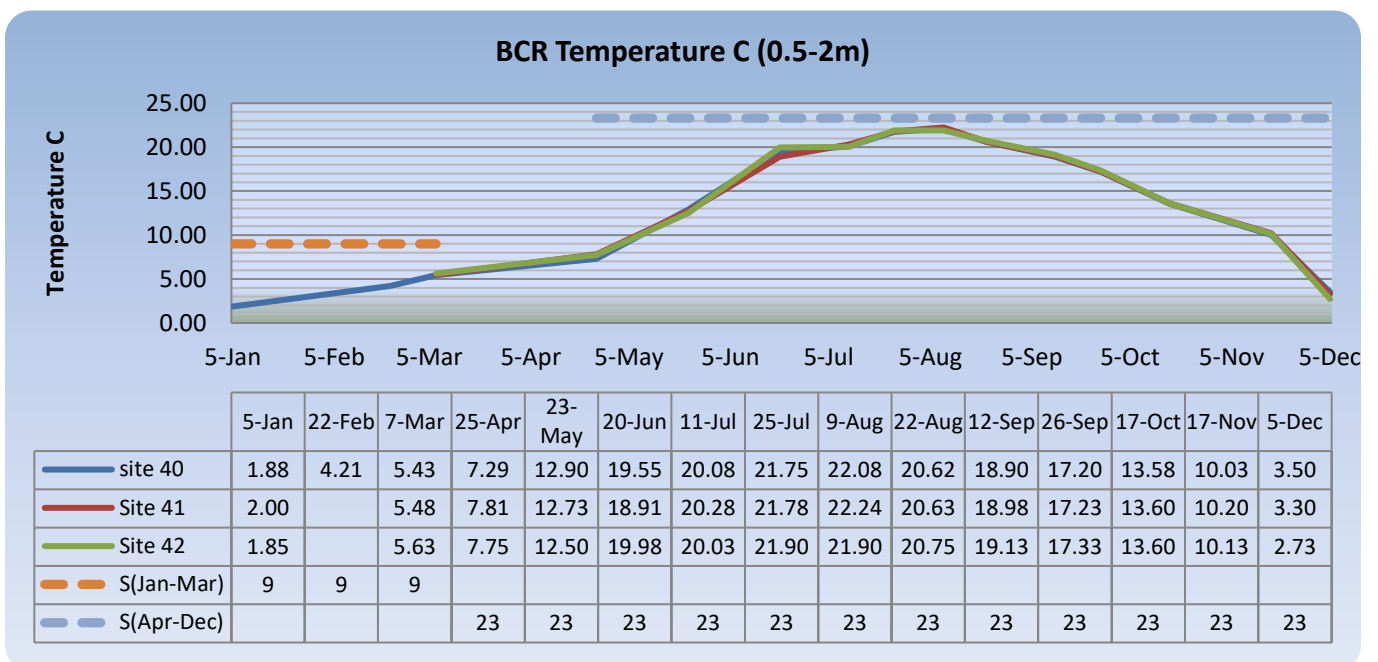


Figure 8 BCR Temperature Compliance

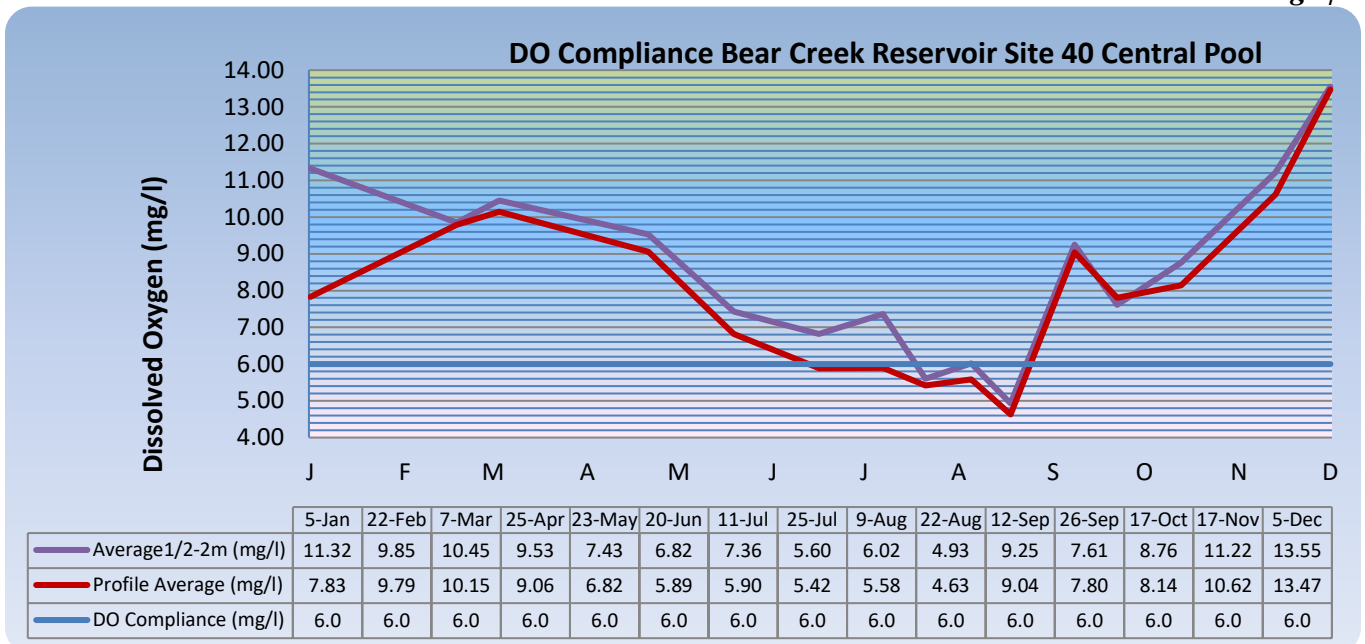


Figure 9 BCR Dissolved Oxygen Compliance

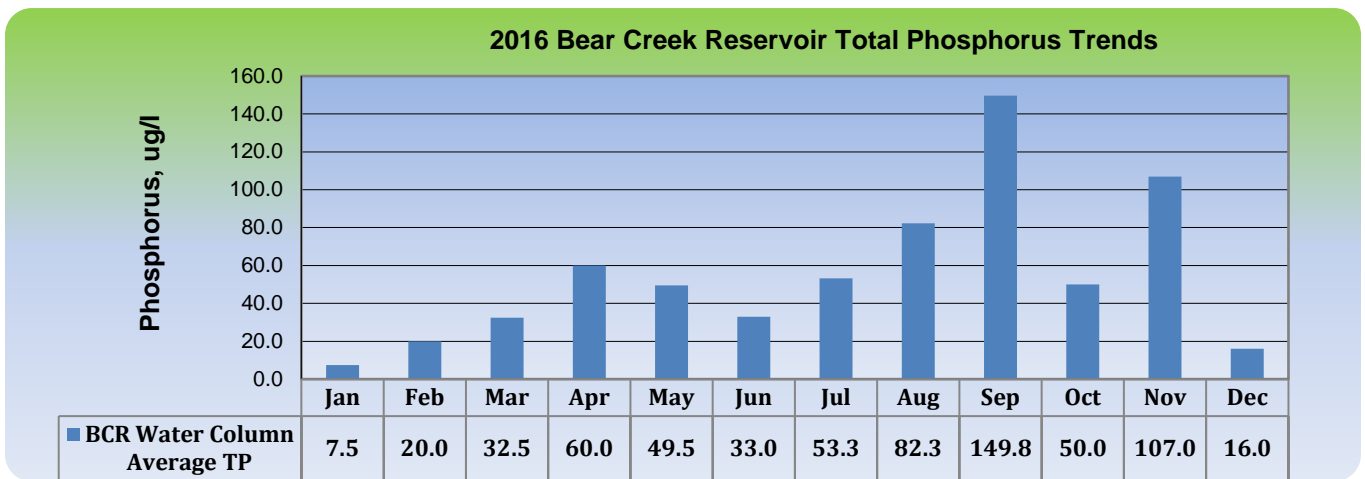


Figure 10 BCR Total Phosphorus

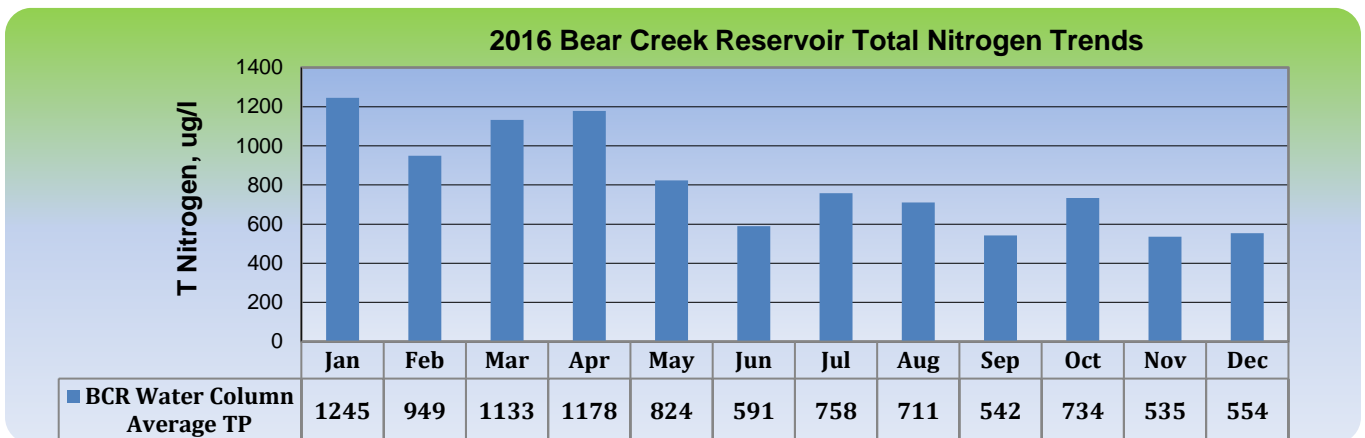


Figure 11 BCR Total Nitrogen

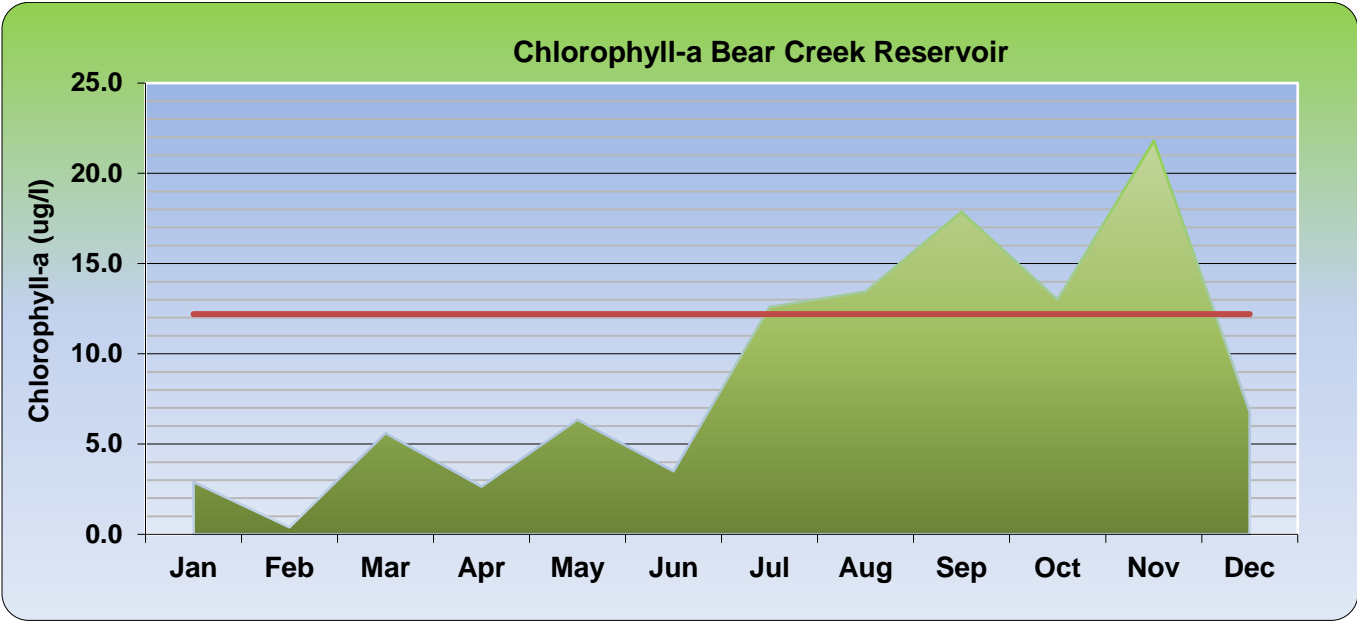


Figure 12 BCR Chlorophyll-a

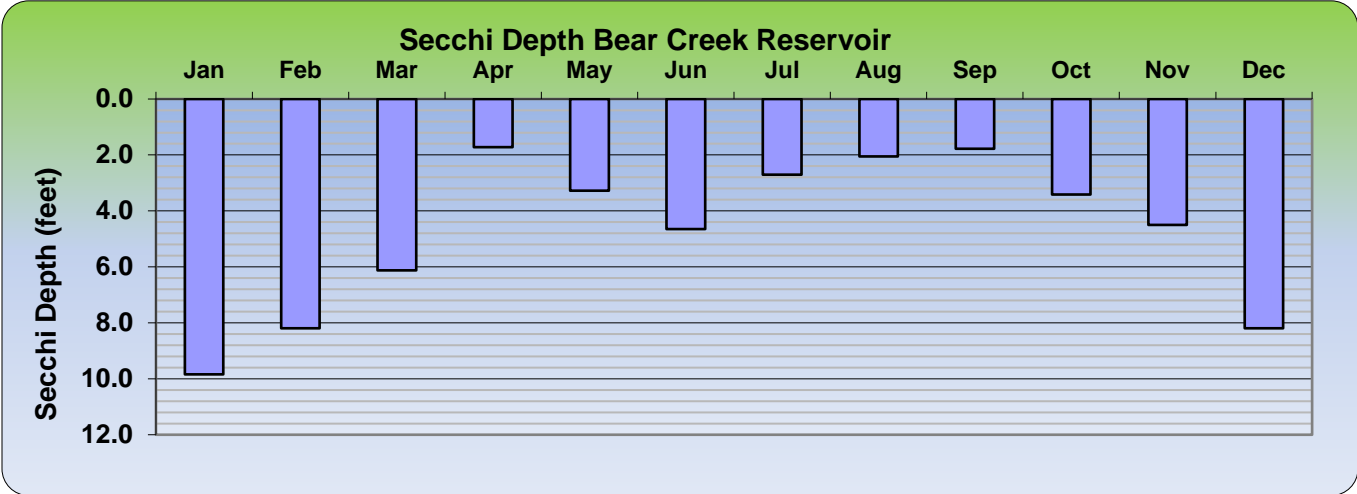


Figure 13 BCR Secchi Depth

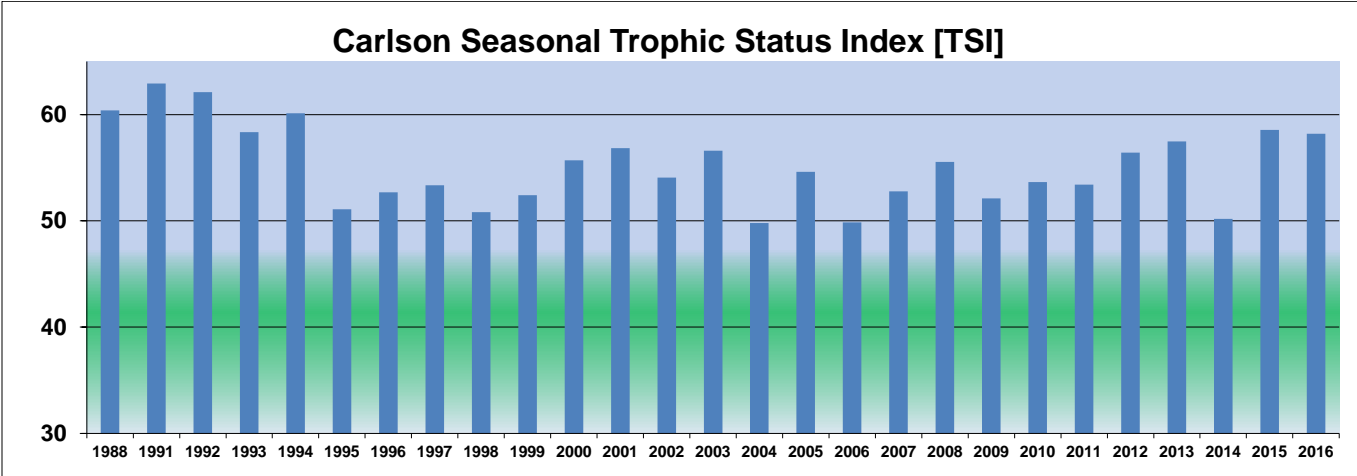


Figure 14 BCR Carlson TSI

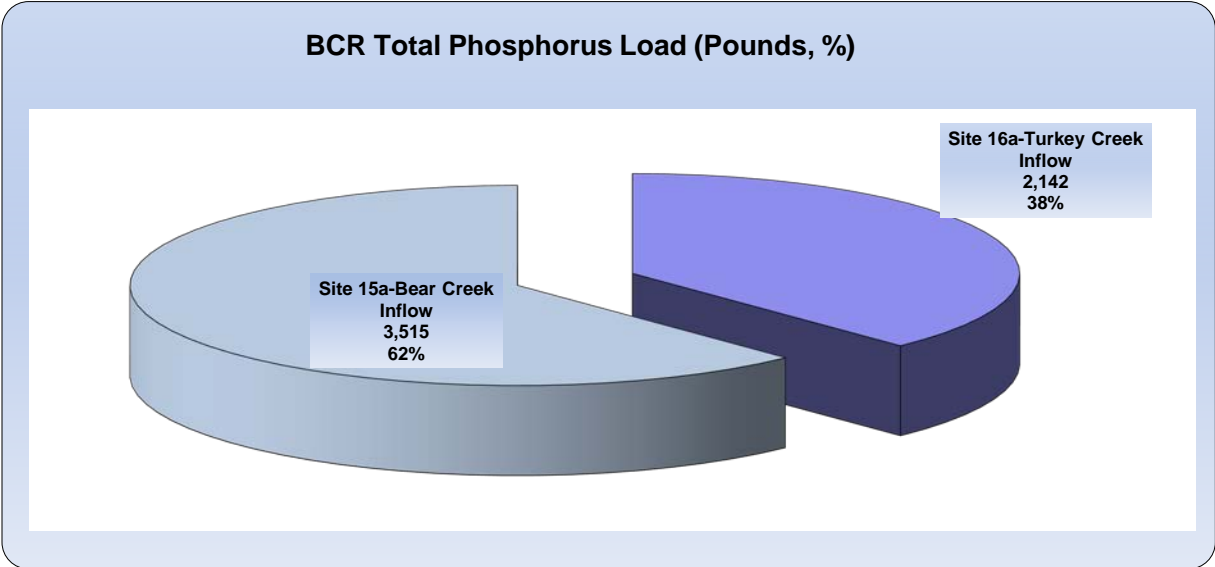


Figure 15 BCR Total Phosphorus Pounds

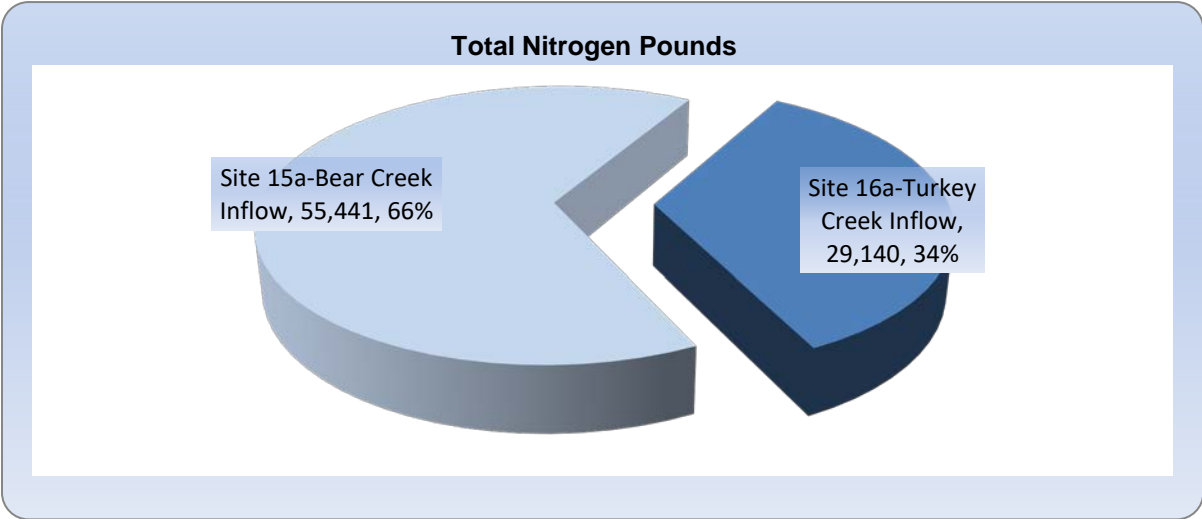


Figure 16 BCR Total Nitrogen Load

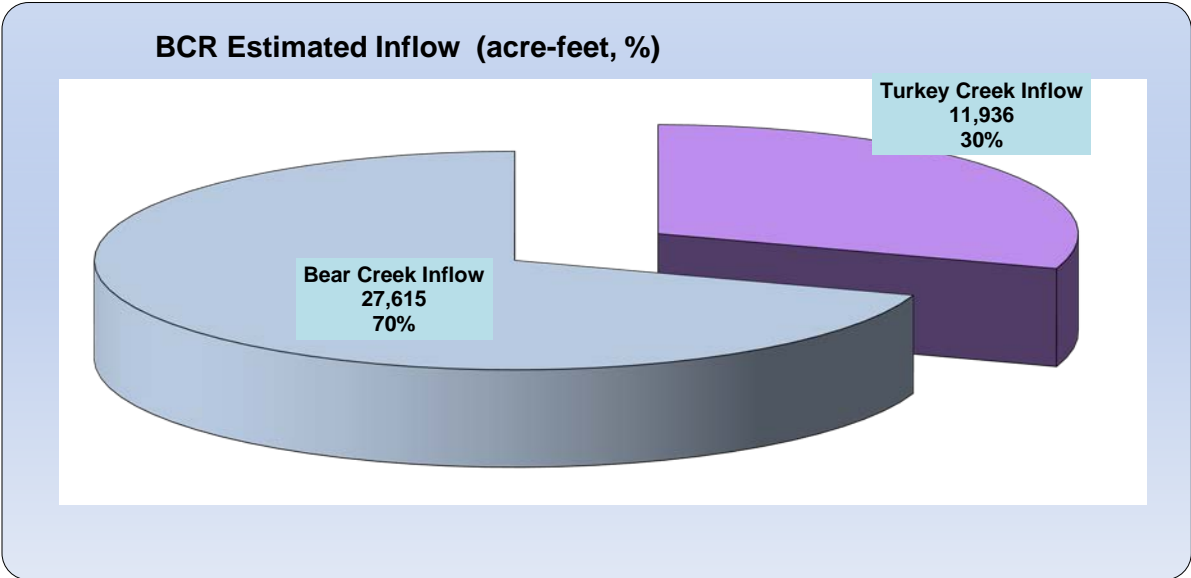


Figure 17 BCR Estimated Inflow