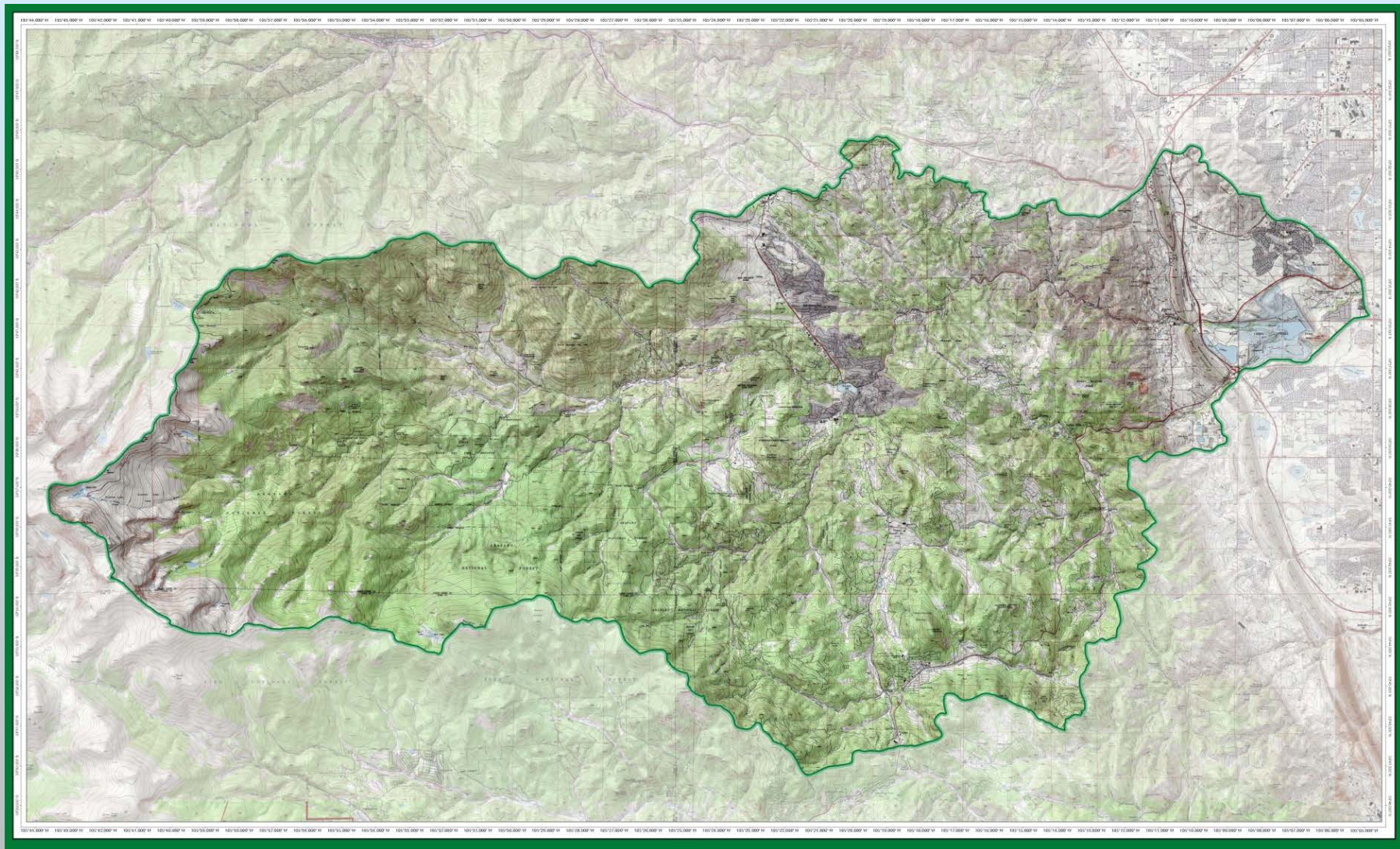


The Bear Creek Watershed Association protects & restores water & environmental quality within the Bear Creek Watershed from the effects of land use.



Operational Bear Creek Watershed 2017



- 100 STREAM MONITORING SITES
- BEAR CREEK RESERVOIR
 - INFLOW TURKEY CREEK
 - INFLOW BEAR CREEK
 - OUTFLOW SITE 45
 - SITE 90 INPUT BARR/MILTON
- EVERGREEN LAKE
- SUMMIT LAKE (MT EVANS)
- OTHER WQ FEATURES





100 Monitoring Sites



© 2010 Google
Image U.S. Geological Survey
Image © 2010 DigitalGlobe
elev 8044 ft

Google

lat 39.617104° lon -105.383926°

2002

Eye alt 29.33 mi

2017 ESTIMATES RECREATION USE BCW

- RECREATIONAL USERS BEAR CREEK PARK > 600,000
- PEOPLE TRAVELING TO MT. EVANS > 185,000
- WILDERNESS ACCESS > 25,000
- USERS DENVER MOUNTAIN PARKS > 225,000
- USERS EVERGREEN LAKE > 300,000
- JEFFERSON COUNTY OPEN SPACE > 80,000
- ATTENDEES & VISITORS RED ROCKS/MORRISON > 1.3 MILLION
- BEAR CREEK PARK SWIM BEACH USE > 750 PER WEEKEND
- FISHING > 65,000 PEOPLE PER YEAR

BCWA Fact Sheet 35 Recreational Uses in BCW

BCW Total Species

Common Sport Fish *Other Reported Fish*

16

14



BCWA 2017 WATERSHED PLAN

- ONLINE DECISION SUPPORT PROGRAM
- ELECTRONIC ONLINE WATERSHED PLAN
 - 36 POLICIES
 - 59 FACT SHEETS
 - 22 DATA MASTERS
 - 34 INFORMATIONAL MAPS
 - 26-YRS OF RULEMAKING & STANDARDS
 - 31 PROGRAM DOCUMENTS
 - >100 LINKED REPORTS & DOCUMENTS
 - 18 WASTEWATER MANAGEMENT SUMMARIES
 - + OTHER INFORMATIONAL, METHODS, PROGRAM GUIDANCE, TECHNICAL SERIES, SPECIAL STUDIES, ANNUAL MONITORING PLANS
- PHOTO LIBRARY
- QUARTERLY NEWSLETTER (>350)
- NPS EDUCATION
- MEMBERSHIP SPECIAL PROGRAMS

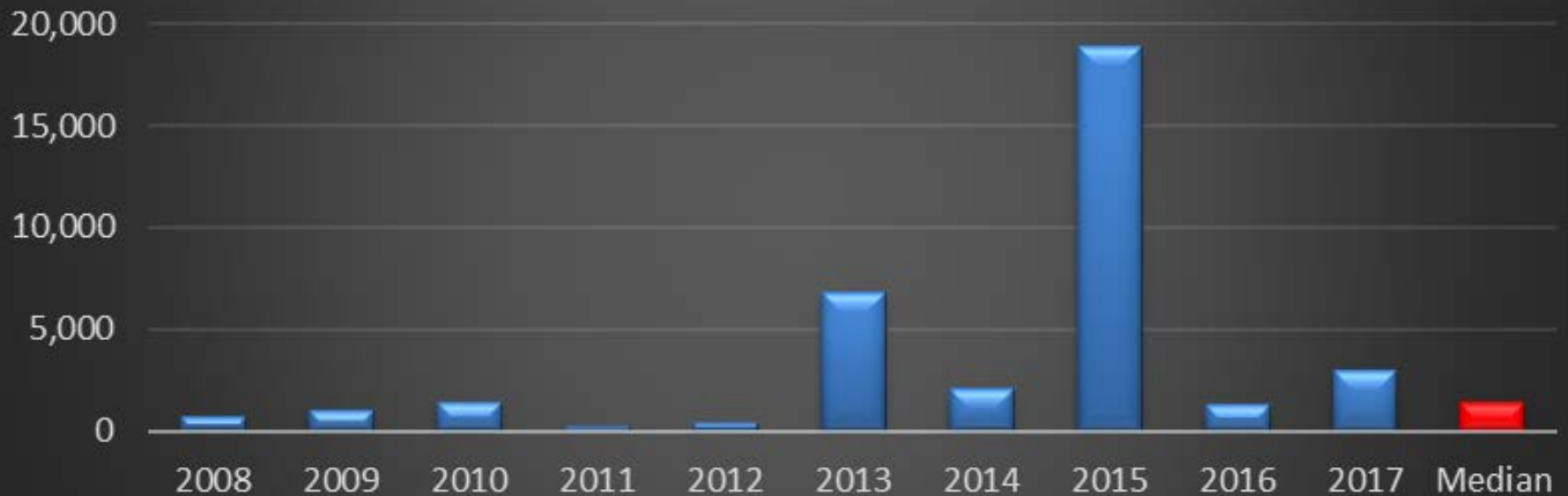


Members & Participants	Wastewater Discharger	2017 Participation
<u>Counties</u>		
Jefferson County		Active
Clear Creek County		Active
<u>City and Towns</u>		
City of Lakewood		Active
Town of Morrison	Yes	Active
<u>Water & Sanitation Districts</u>		
Aspen Park Metropolitan District	Yes	Active
Conifer Sanitation Association	Yes	Active
Evergreen Metropolitan District	Yes	Active
Forrest Hills Metropolitan District	Yes	Active
Genesee Water & Sanitation District	Yes	Active
Geneva Glen	Yes	Dues Paid, Not Active
Jefferson County School District	Yes	Active
Kittredge Water & Sanitation District	Yes	Active
Tiny Town Foundation, Inc.	Yes	Dues Paid, Not Active
West Jefferson County Metropolitan District	Yes	Active
<u>Other Member</u>		
Denver Water Department		Active
<u>Participant Agencies</u>		
Denver Environmental Health		Attended
U.S. Army Corps of Engineers		Not Active
Jefferson Conservation District		Active
WQCD		Attended

2017 ANNUAL REPORT

- WQCC SUMMARY
 - STATUS OF WATER QUALITY (NORMAL YEAR)
 - STATUS OF WQ GOALS & STANDARDS (TEMPERATURE)
 - PHOSPHORUS TRADING PROGRAM (3 TRADE POLICIES)
- BEAR CREEK WATERSHED ASSOCIATION PROGRAM

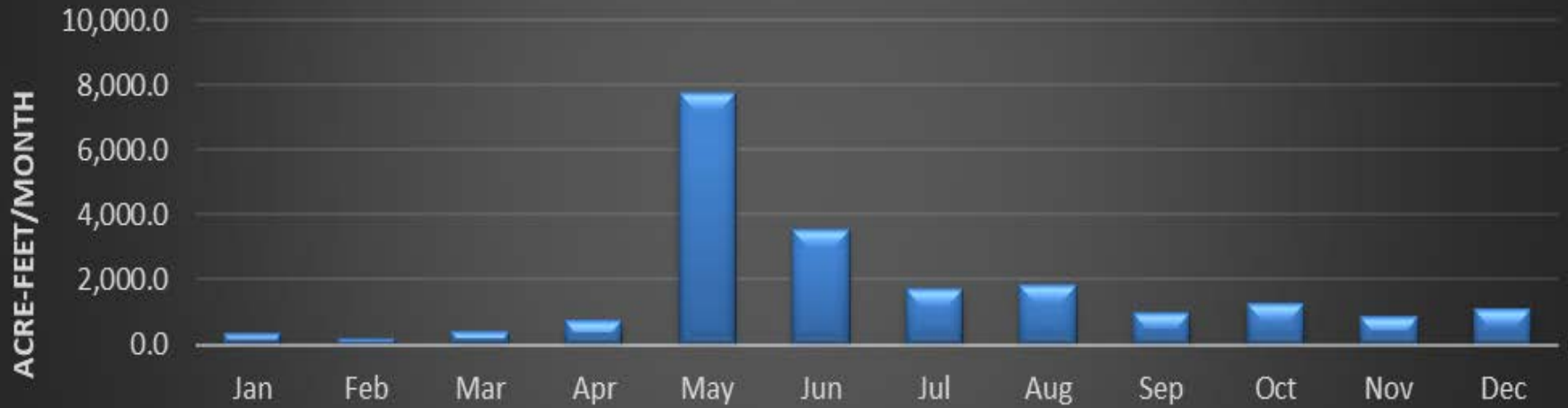
BCR Total Phosphorus Deposition



- Average seasonal total phosphorus of 61.8 $\mu\text{g/L}$ in BCR exceeds the 22.2 $\mu\text{g/L}$ goal-standard
- Average seasonal chlorophyll-a of 22.5 $\mu\text{g/L}$ was over the 12.2 $\mu\text{g/L}$ standard
- Trophic status of the reservoir remains at the Eutrophic-Hypertrophic boundary based on Carlson and Walker indices
- Seasonal average reservoir temperature (-1/2-2m) = 20.0°C with no exceedances of the WAT or DM
- Lake aeration maintained dissolved oxygen levels (-1/2-2m) at or above 6.0 mg/L throughout most of the growing season
- Late season blue-green algal blooms
- Recreational fishing remained active



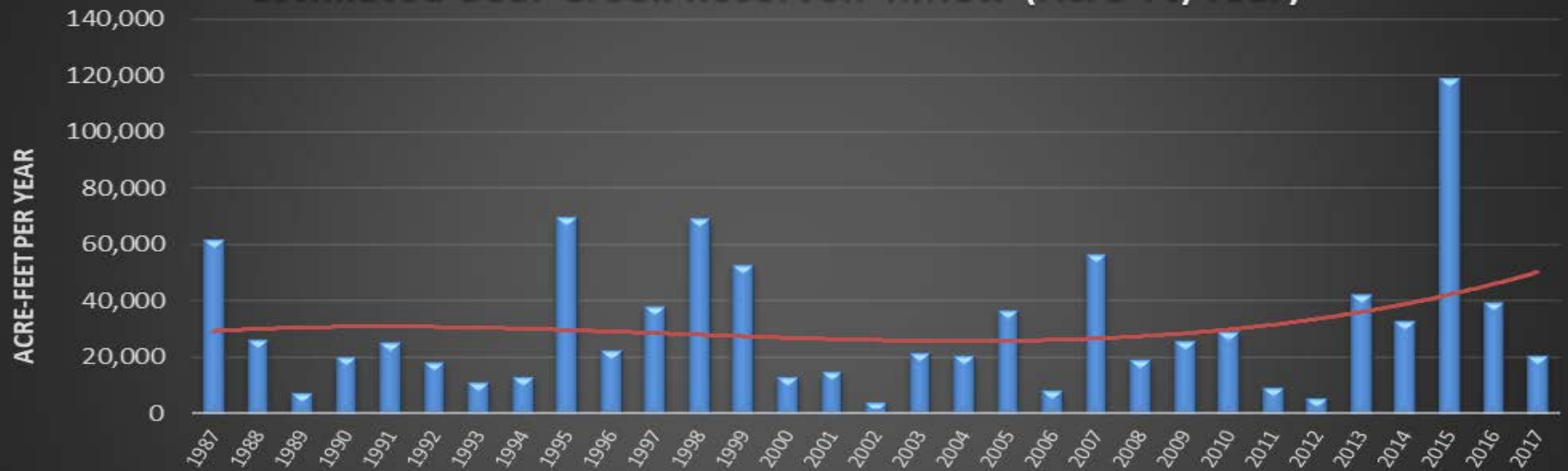
Bear Creek Reservoir 2017 In-Flow Estimates



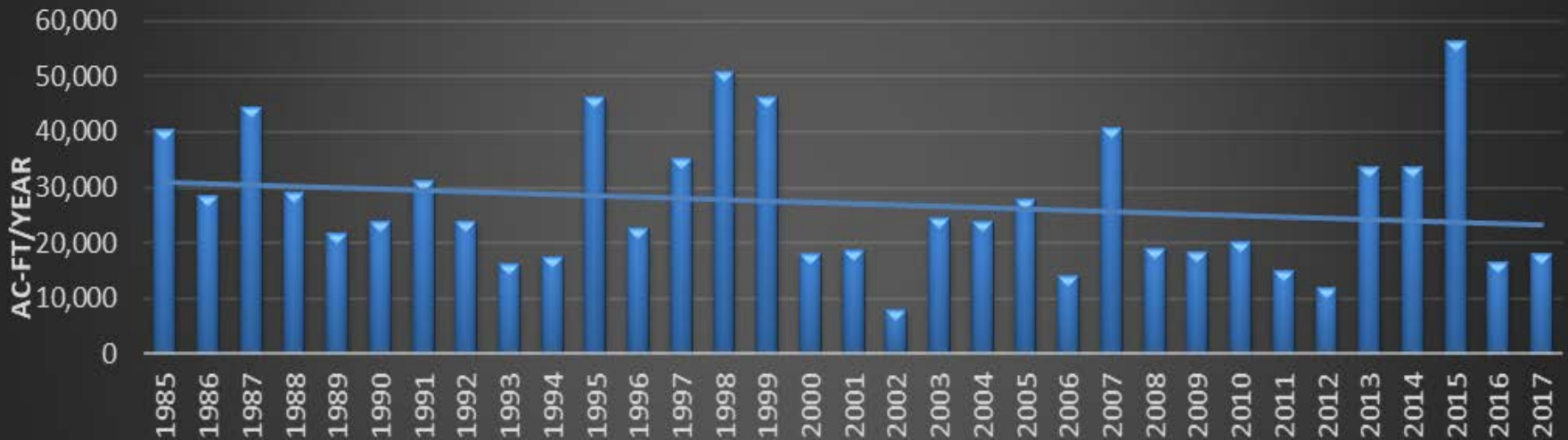
Bear Creek Reservoir Pool Level



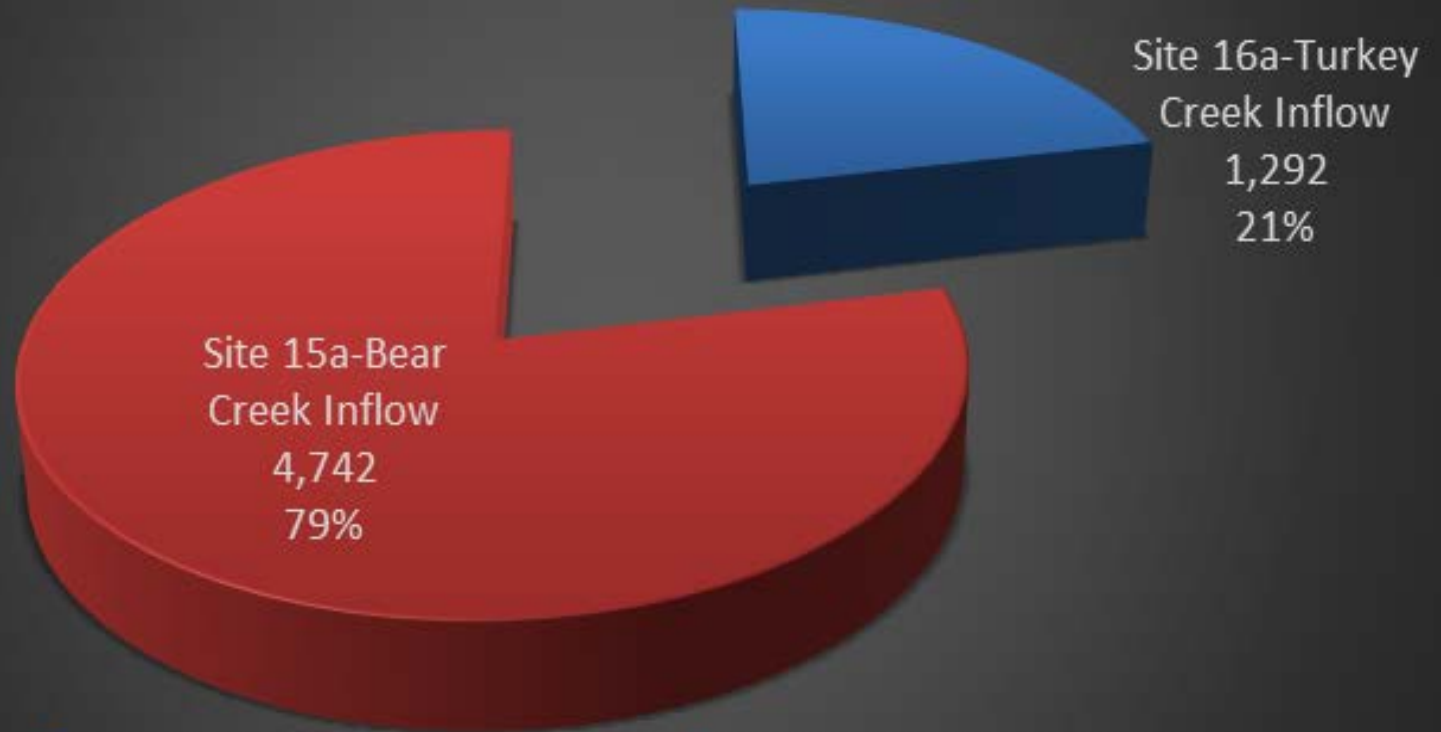
Estimated Bear Creek Reservoir Inflow (Acre-Ft./Year)



USGS 06710385 BEAR CREEK ABOVE EVERGREEN, CO



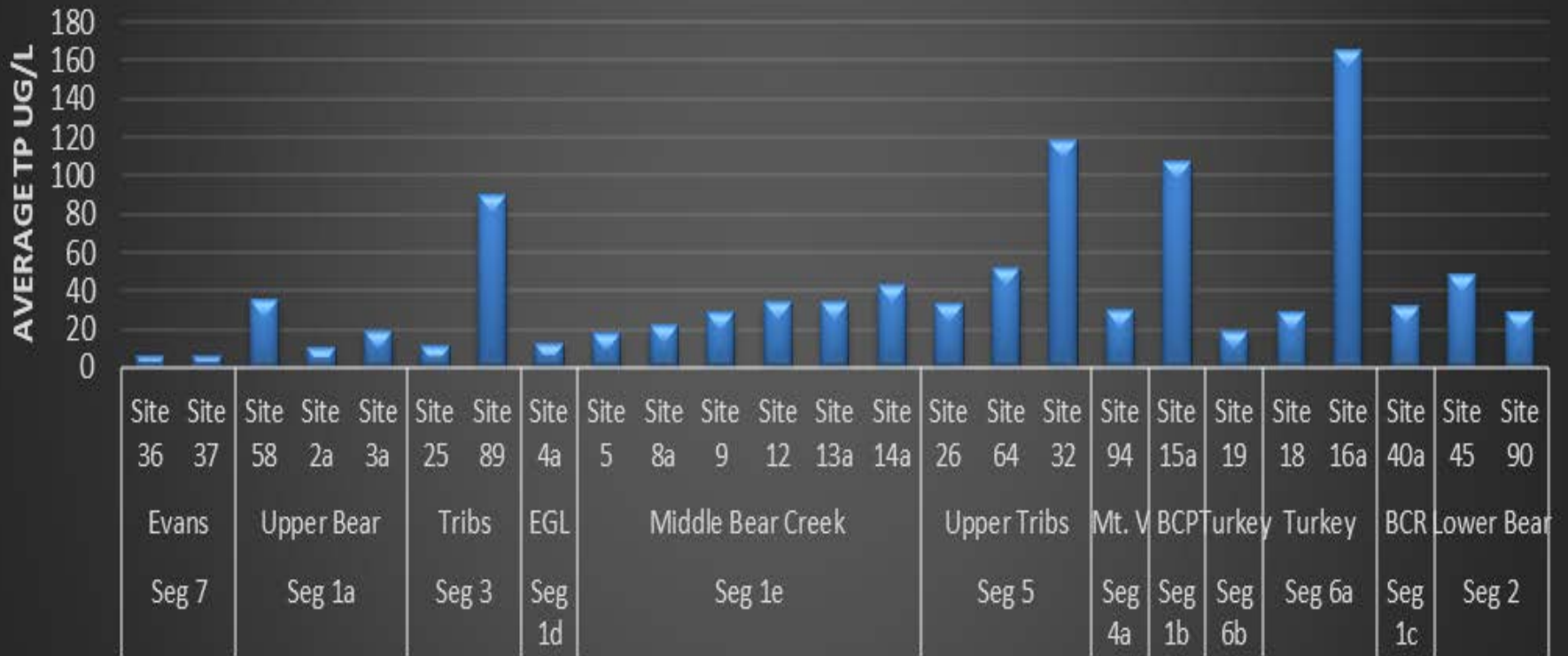
BCR Total Phosphorus Load (Pounds, %)



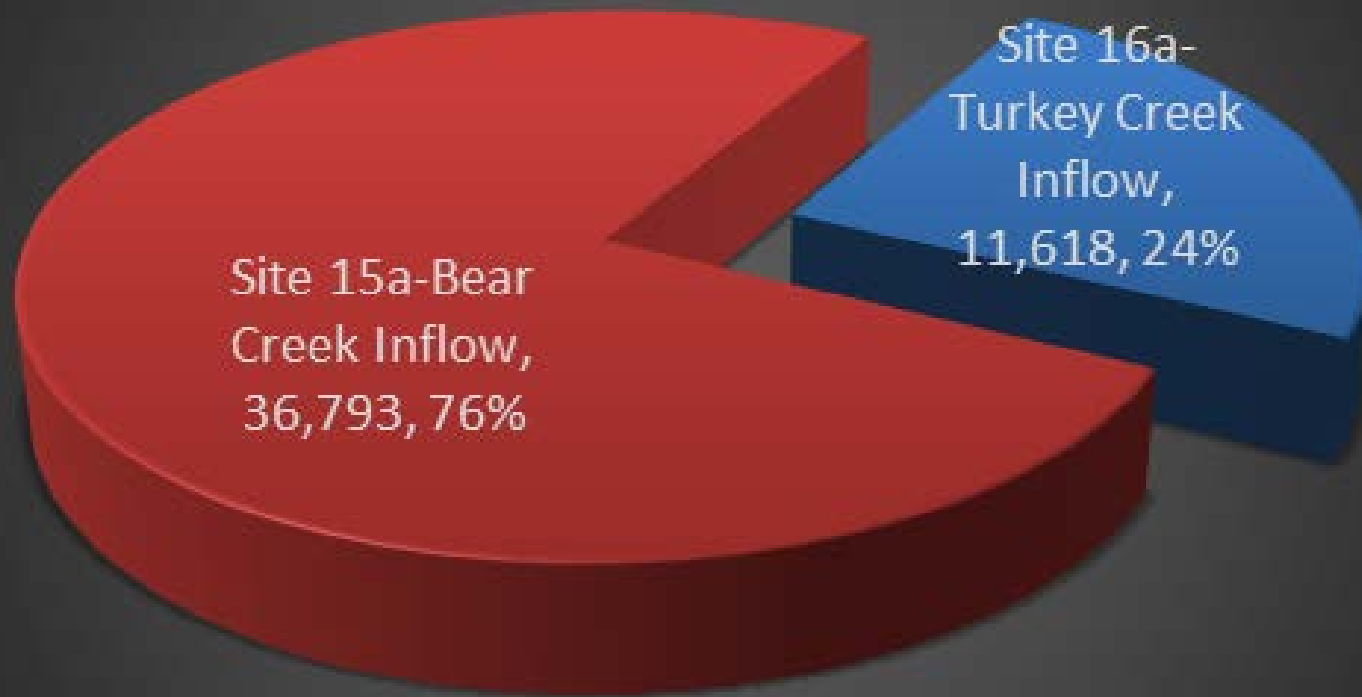
Site 16a-Turkey Creek Inflow

Site 15a-Bear Creek Inflow

Average Total Phosphorous Watershed



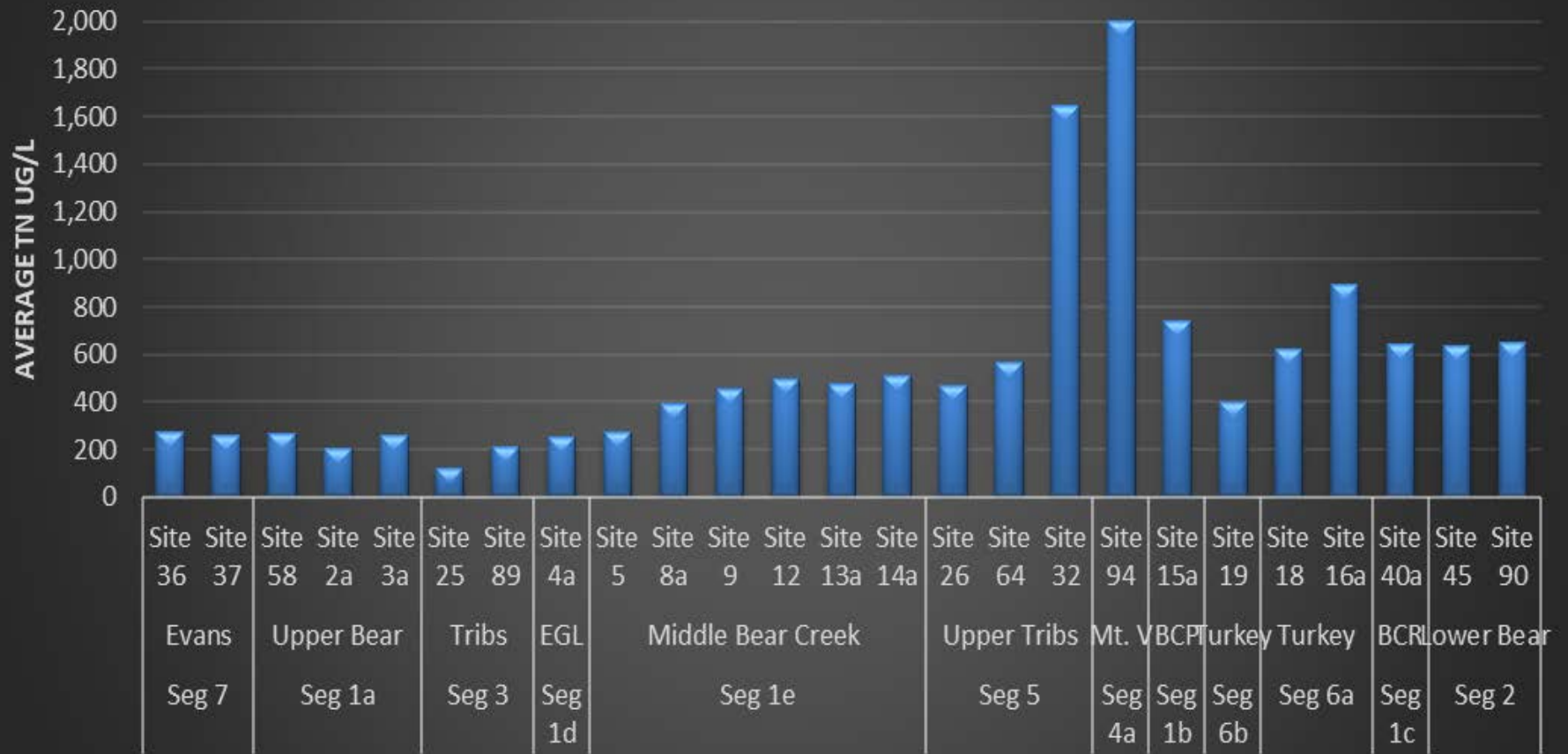
Total Nitrogen Pounds



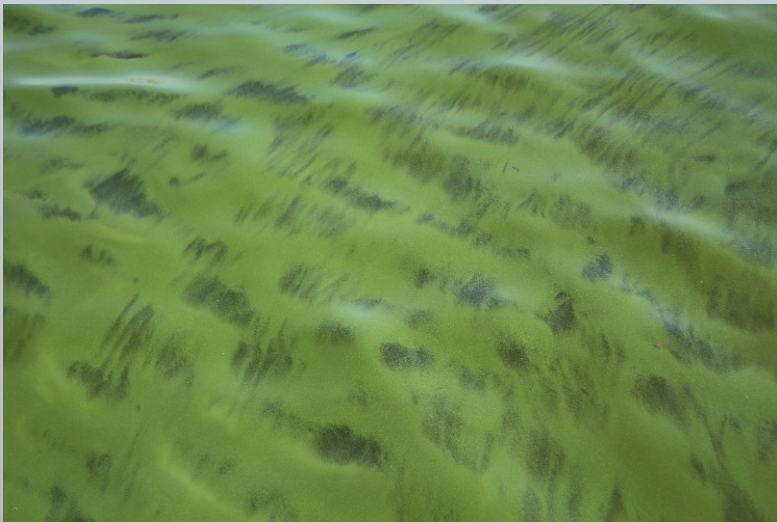
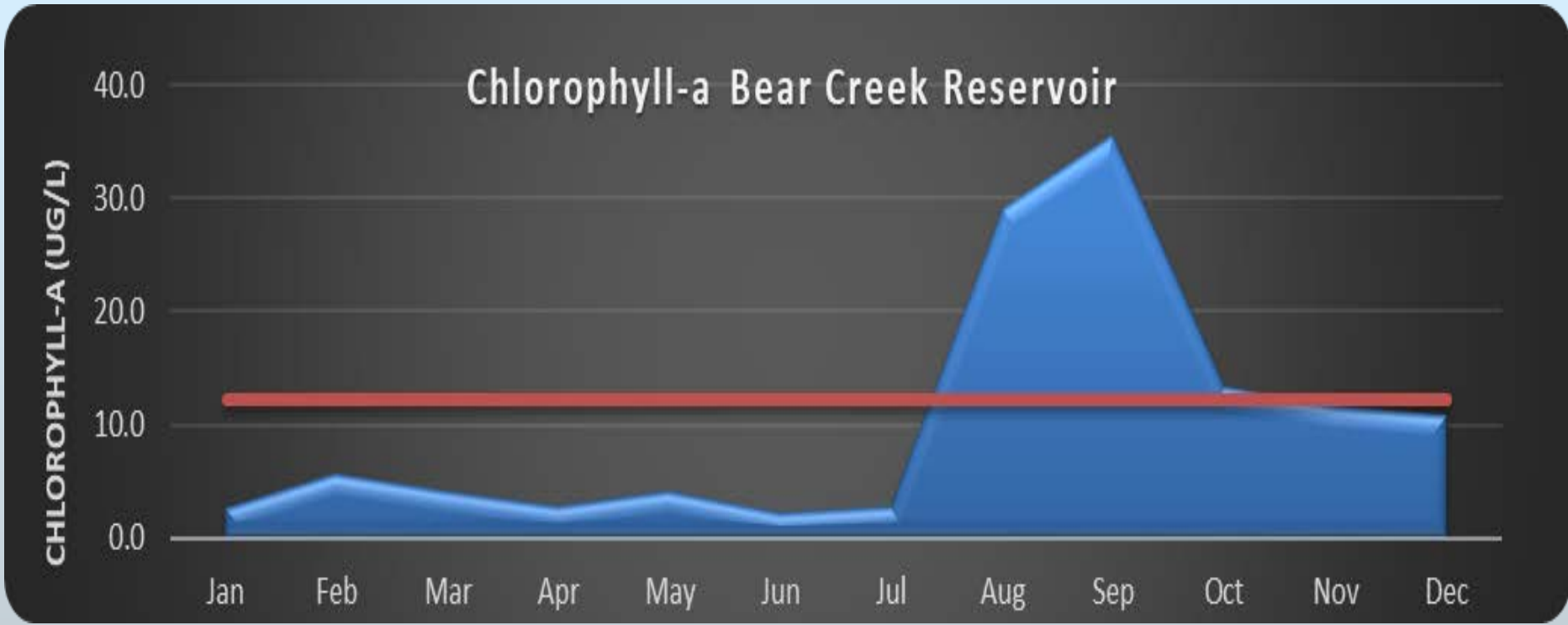
Site 16a-Turkey Creek Inflow

Site 15a-Bear Creek Inflow

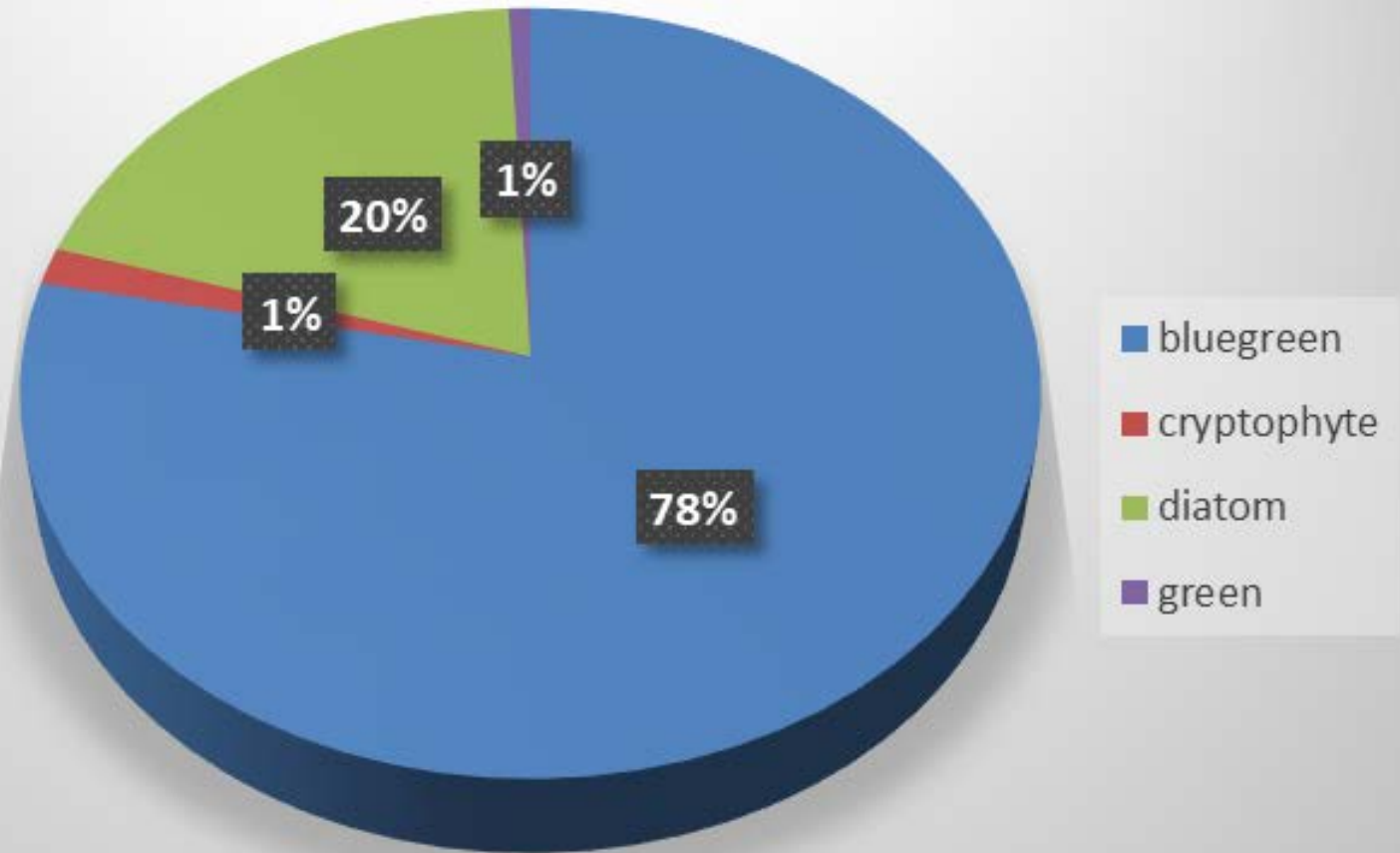
Average Total Nitrogen Watershed



	2017 Total Phosphorus Loading (Pounds)				
	Total TP Load	PS	%PS	NPS	%NPS
Turkey Creek Drainage	1,292	84	1.4%	1,208	93%
Bear Creek Drainage	4,742	1,007	16.7%	3,734	79%
Discharged into Reservoir	6,034	1,092	18.1%	4,942	82%
Site 45 Outflow BCR	3,051				
BCR Total Phosphorus Deposition	2,983				
Site 90 - Lower Bear Creek	2,081				

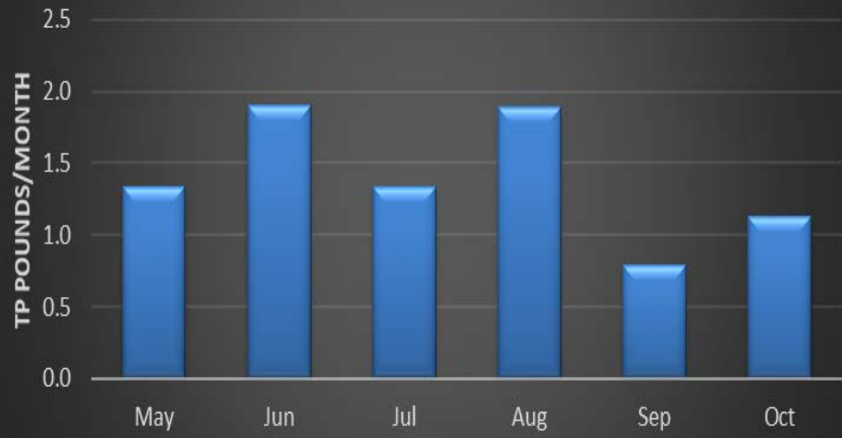


Seasonal Ave Biovolume, $\mu\text{m}^3/\text{mL}$

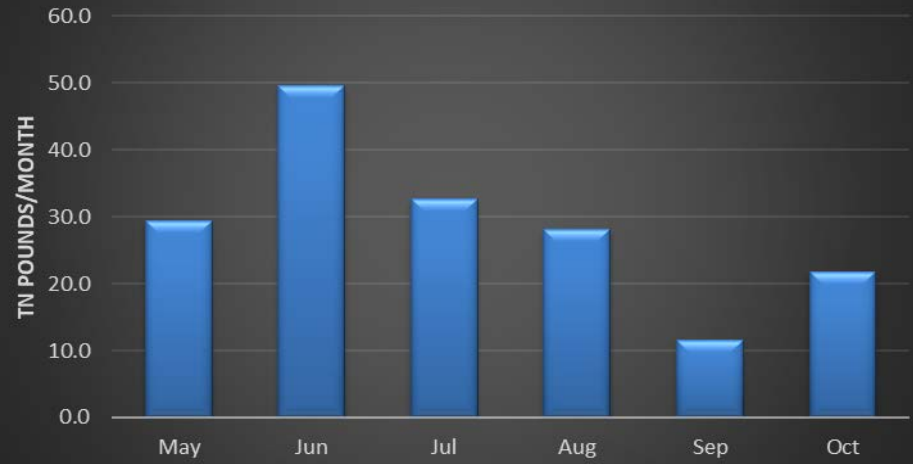


Sample Date	10-Jul-17	8-Aug-17	11-Sep-17
Total Density (#/mL)	1,804	16,791	76,359
Total Biovolume ($\mu\text{m}^3/\text{mL}$)	2,413,448	4,248,160	3,607,883
Trophic State Index	56.2	60.3	59.1

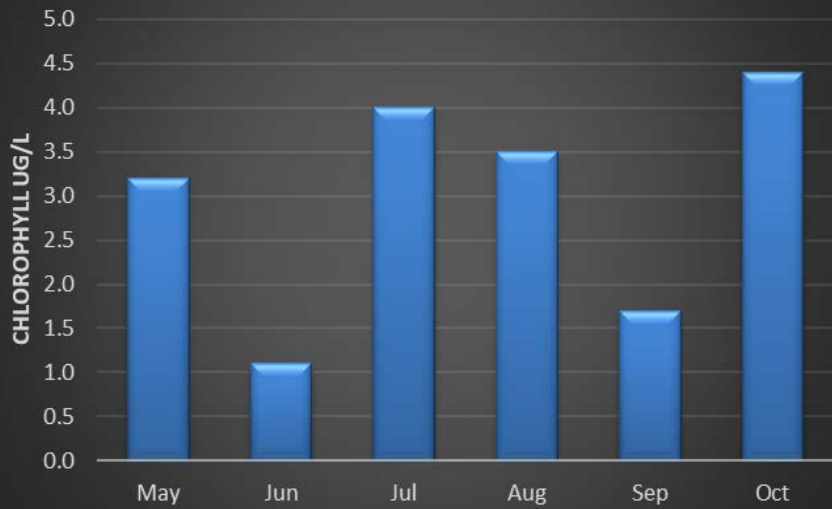
Total Phosphorus, Pounds/month



EGL Total Nitrogen Loading



EGL Chlorophyll a



Bear Creek Watershed Wastewater Treatment Plants by Drainage Basin	WQCC Adopted Phosphorus WLA Pounds/ year	2017 Discharged Phosphorus Pounds/year	% Allocation Used by WWTF
Bear Creek Drainage			
Jefferson County Schools – Mt. Evans Outdoor Lab	20	4.76	24%
Brook Forest Inn ¹	5	22	440%
Evergreen Metropolitan District	1,500	250.73	17%
West Jefferson County Metro District	1,500	268.33	18%
Kittredge Sanitation and Water District	240	47.39	20%
Genesee Water and Sanitation District	1,015	318.67	31%
Forest Hills Metropolitan District	80	21.35	27%
Town of Morrison	600	74.19	12%
Bear Creek Total	4,960	1,007.42	20%
Turkey Creek Drainage			
Conifer Metropolitan District	40	3.7	9%
Conifer Sanitation Association	40	0.95	2%
Aspen Park Metropolitan District	40	6.9	17%
Jefferson County Schools - Conifer High School	110	3.9	4%
Geneva Glen ²	5	19.96	399%
Bear Creek Development Corp. - Tiny Town ³	5	Hauling Columbia	
Turkey Creek Total	240	35.41	15%
Total Operational Facilities Lbs./year	5,200	1,042.83	20%
Reserve Pool ⁴	55	0	0%
Total Phosphorus Wasteload lbs./year	5,255		

1-Brook Forest Inn - Compliance Advisory, Reported Effluent Violation Notice of Significant Non-Compliance by WQCD. Exceeded phosphorus concentration limits and pounds as reported by WQCD. No compliance action by WQCD enforcement section.

2-Geneva Glen - Compliance Agreement. Exceeded phosphorus concentration limits and pounds as reported to WQCD. New LAMP in progress. No compliance action by WQCD enforcement section.

3-Records from Columbia Sanitary show they hauled 131,400 gallons in the 2017 operation season

4- The reserve pool in the Control Regulation is 2 pounds of total phosphorus, the 55 pounds listed by the BCWA includes pounds from closed treatment facilities (Singing River Ranch (30), The Fort Restaurant (18), Bear Creek Cabins (5))

Segment	Cold-season		Warm Season	
Segment 3	9 °C WAT	13 °C DM	17 °C WAT	21.2 °C DM
# Exceedances	0	15	0	0
% Compliance	100%	94%	100%	100%
Segment 1a	9 °C WAT	13 °C DM	17 °C WAT	21.2 °C DM
# Exceedances	3	10	0	0
% Compliance	94%	97%	100%	100%
Segment 1d	9 °C WAT	13 °C DM	17 °C WAT	21.2 °C DM
# Exceedances			0	0
% Compliance			100%	100%
Segment 1e	9 °C WAT	13 °C DM	17 °C WAT	21.2 °C DM
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 1b	9 °C WAT	13 °C DM	17 °C WAT	21.2 °C DM
# Exceedances	0	1	0	0
% Compliance	100%	99%	100%	100%
Segment 5	9 °C WAT	13 °C DM	17 °C WAT	21.2 °C DM
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 6a	9 °C WAT	13 °C DM	17 °C WAT	21.2 °C DM
# Exceedances	0	1	0	0
% Compliance	100%	99%	100%	100%
Segment 6b	9 °C WAT	13 °C DM	17 °C WAT	21.2 °C DM
# Exceedances	0	0		
% Compliance	100%	100%		
Segment 2	13.7°C WAT	14.3°C DM	27.5°C WAT	28.6°C DM
# Exceedances	0	0	0	1
% Compliance	100%	100%	100%	100%
Segment 1c	9°C WAT	13°C DM	23.3°C WAT	23.8°C DM
# Exceedances	2	0	0	0
% Compliance	0%	100%	100%	100%

ADAPTIVE MANAGEMENT PROGRAM

- NONPOINT SOURCE LOADING & TRACKING
- COYOTE GULCH - TRADING
- SEPTIC SYSTEMS – KERR & CUB
- TRACKING MANAGEMENT PRACTICES
- ZONING AND PLANNING REVIEWS FOR BMPS
- LOCAL PRESENTATIONS, EDUCATION PROGRAMS
- FLOOD RESTORATION PRACTICES
- ASSIST LAND-OWNERS
- ASSIST INVASIVE SPECIES PROGRAMS
- GREEN INFRASTRUCTURE PROJECTS
- WILDFIRE ASSESSMENT
- SOURCE WATER PROTECTION
- TRIBUTARY LOADING STUDIES
- EROSION CONTROL REVIEWS
- ONLINE ADAPTIVE MANAGEMENT
- CLIMATE MODELING

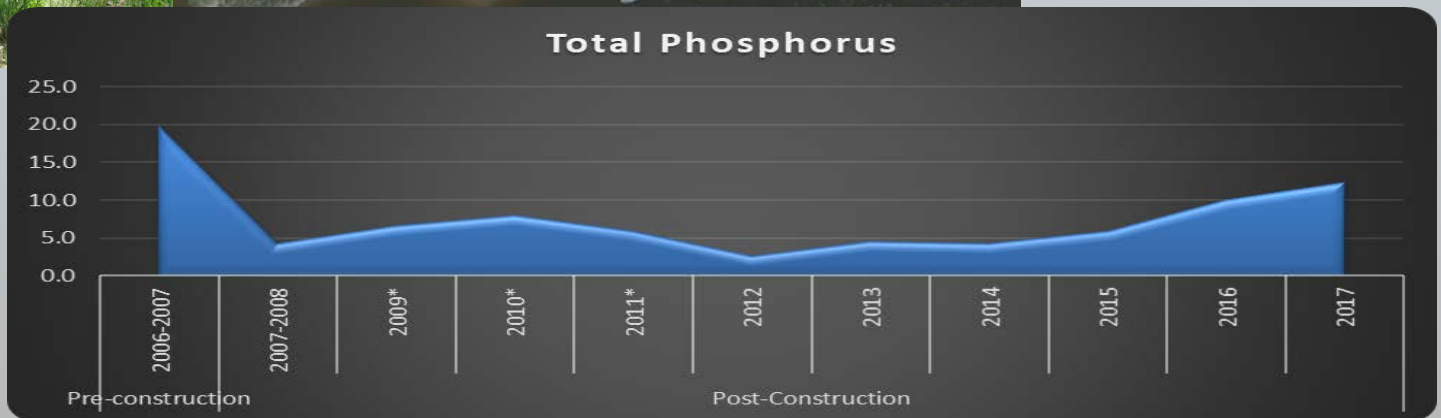


COYOTE GULCH

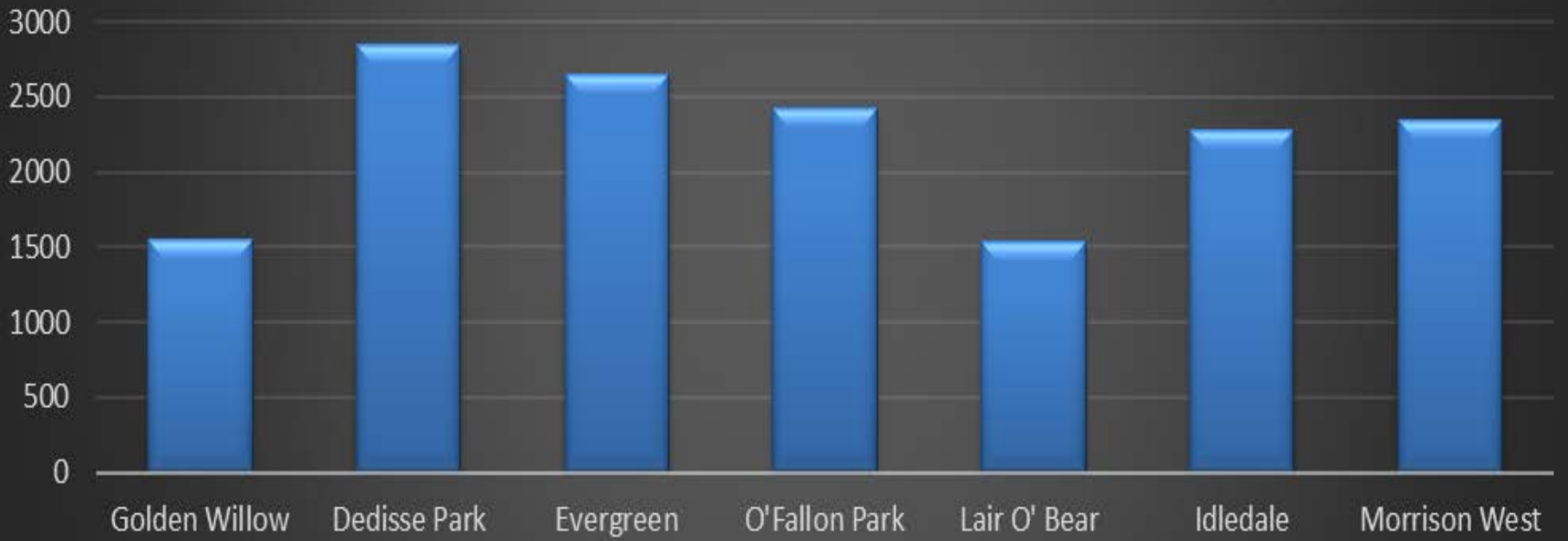


2006-2017

Trade Pounds = 80.4



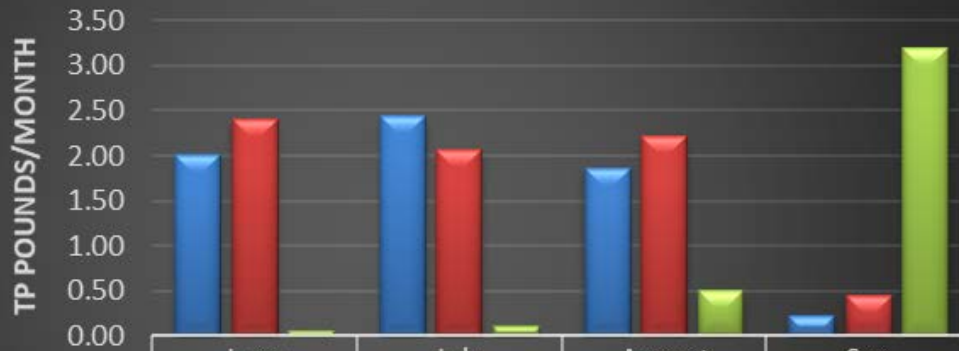
2017 Total Fish (No/Mile)



WQCD Station ID	BCWA Station ID	Location	Biotype	MMI							
				200 9	201 0	201 1	201 2	201 4	201 5	201 6	201 7
5756a	15a	BCLP @ bridge	Transition					66.4	59.1	67.0	56.4
122	14a	Morrison @ Gage	Transition	69.8	80.5	74.5	72.9	48.8	73.5	72.0	63.9
122C	13a	Idledale	Transition	62.1	69.8	57.1	68.0	59.3	59.2	50.0	62.2
122a	12	Lair O' Bear	Transition	58.5	62.2	56.4	51.3	49.5	72.2	46.0	62.9
122b	9	O' Fallon	Transition	53.6	57.7	45.5	49.9	44.8	59.1	57.0	60.1
5762	8b	BCC @ Bridge	Transition	55.6	39.1	51.1	44.3	49.6	62.3	59.0	57.4
5763	5	Little Bear	Transition	52.3	56.6	42.9	40.0	56.2	68.9	75.0	38.4
5764	3a	Keys @ bridge	Mountain	38.6	36.9	45.3	46.9	43.9	63.6	37.0	57.9
5768d	2a	Golden Willow	Mountain				71.9	60.8	56.6	65.0	58.1
5768c	58	Mt Evans Wilderness	Mountain			55.5	72.5	67.0	53.8	67.0	75.6
BCWA90	90	Wadsworth	Transition							55.0	39.9



Total Phosphorus



	June	July	August	Sep
■ site 36 through Culverts	2.01	2.44	1.86	0.23
■ site 37 - Bear Creek	2.41	2.06	2.21	0.45
■ Site 63 - Bottom Fen	0.06	0.10	0.50	3.20

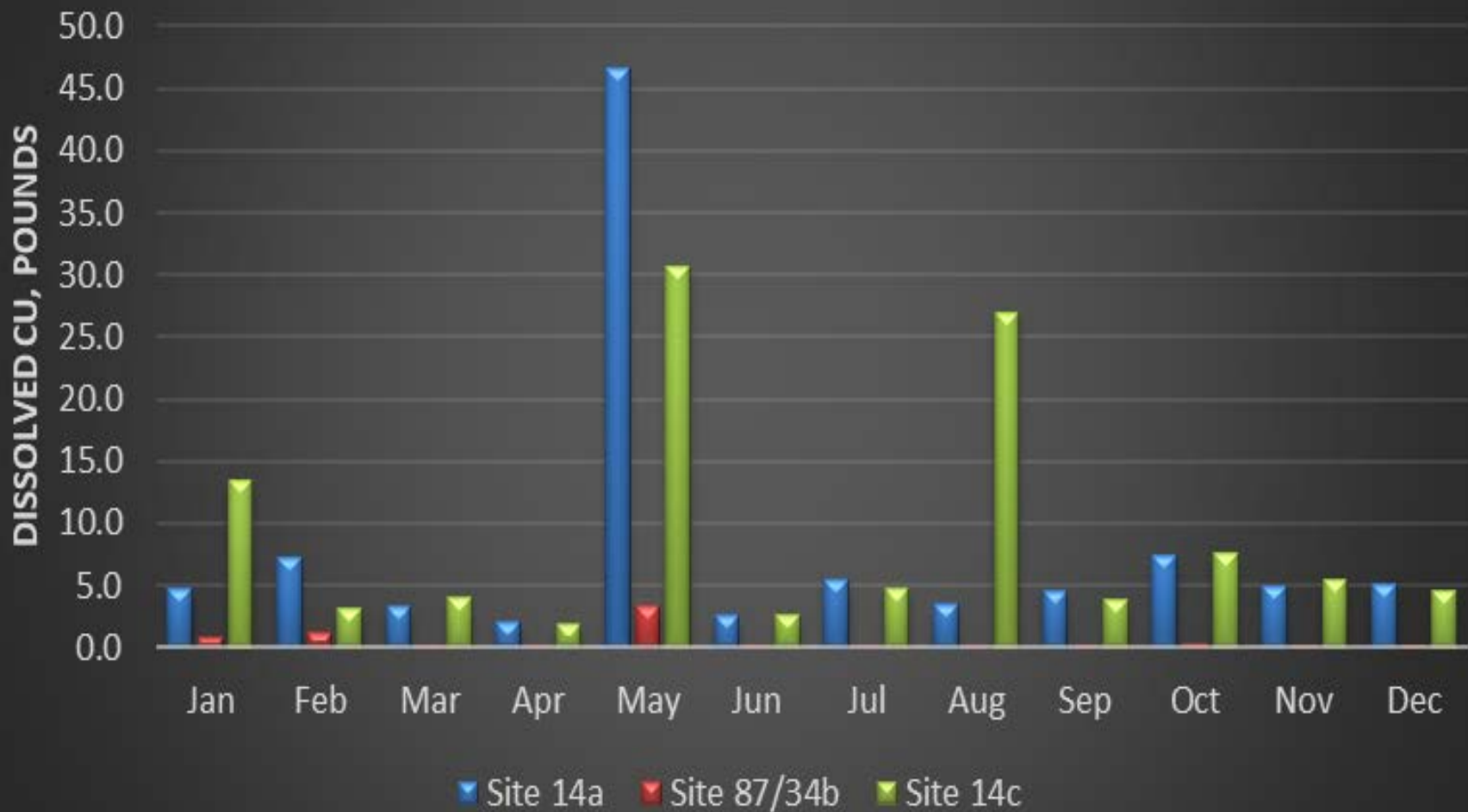


Total Nitrogen



	June	July	August	Sep
■ site 36 through Culverts	89.3	90.2	84.4	13.6
■ site 37 - Bear Creek	105.7	90.2	90.6	18.9
■ Site 63 - Bottom Fen	0.3	0.1	0.7	3.2

Dissolved Copper, Pounds/Month



BCWA spent 2.2 million on regulation directed programs
1.3 million on data & monitoring efforts
28-years of data & studies to support good science
>2 million on water quality improvement projects

Discharger members have spent >21 million dollars on WWTFs

BCWA has 78.5 years worth of voluntary efforts

WQCD enforcement staff stated the monitoring provisions of Regulation #74 are not enforceable.

WQCD enforcement staff stated the nonpoint source provisions of Regulation #74 are not enforceable.

