BCWA DR2019 - *BCWA Data Report*

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TABLE OF CONTENTS

I. BCWA Sampling Program 5
Data Report Purpose 5
BCWA PGO31 5
II. Association Data Record 7
Data Management 7
Depositories 7
Electronic Transfers WQCD/ Depositories 7
Reports, Technical Memorandum and Specialized Spreadsheets 7
Spreadsheets in Master Data Series Updated 2019 7
Fact Sheets in Watershed Plan Updated 2019 8
Policies in Watershed Plan Updated 2019 9
Map Series in Watershed Plan Updated 2019 10
III. Bear Creek Reservoir 2019 Data 11
IV. P3-Summary Bear Creek Watershed 2019 Monitoring Data 13
Overview 13
Sampling and Monitoring Program Notes 13
Temperature Compliance *13*
Segment 8 (Site 36,76,95, and 63) and Segment 7 (Sites 37) *15*
Segment 3 (Site 25) *15*
Segment 1a (Sites 1a, 2, 3a) *15*
Segment 1d (Sites 4b, 4c and 4d) *15*
Segment 1e (Sites 5, 7, 8a, 9, 12, and 13a) *15*
Segment 1b (Sites 15a) *15*
Segment 5 (26) *15*
Segment 6a (Sites 16a and 18) *15*
Segment 6b (Site 19) *15*
Segment 2 (Site 45) *15*
Segment 1c (Site 40 Profile) *15*
Wastewater treatment plant effluents *15*
Water Quality Compliance 16
Segment 7 (Site 37, 76, 95, and 63) *17*
Segment 8 (Sites 36) *17*
Segment 3 (Site 25) *17*
Segment 1a (Sites 58, 2a and 3a) *17*
Segment 1d (Sites 4a, 4b, 4c, 4d and 4e) *17*
Segment 1e (Sites 5, 8a, 9, 12, 13a and 14a) *17*
Segment 1b (Sites 15a) *17*
Segment 5 (Sites 26, 32a, and 64) *17*
Segment 6a (Sites 16a and 18) *17*
Segment 6b (Site 19) *17*
Segment 2 (sites 45and 90) *17*
Summary 18
Temperature Compliance 18
Water Quality Compliance 18
Watershed Monitoring 19
WWTP Effluent Temperature and Water Quality 19
Other Small Treatment Facilities 21
Bear Creek Stream Segments 21
Segment 8 (Mt Evans Wilderness) *21*
Segment 7 (Sites 37, 76, 95, and 63) *21*

Segment 1a (Above Evergreen Lake) *22*
Segment 1d (Evergreen Lake) *24*
Segment 1e (Main stem below Evergreen Lake and Above Harriman Diversion) *28*
Segment 1b (Below Harriman Diversion) (Site 15a) *31*
Segment 3 ..... *32*
Segment 5 ..... *32*
Turkey Creek Stream Segments (Segment 6a South Turkey Creek) *33*
Segment 6b (North Turkey Creek) *35*
Segment 1c: Bear Creek Reservoir Temperature Summary 2019 ..... *35*
Bear Creek Reservoir Profile Station (Site 40T 1.0) *36*
Segment 2 ..... *37*
USGS Stream Flow Data Tables **38**
Weather Data **45**
Stream Flow vs. Local Weather **46**

LIST OF TABLES

Table 1 **2019 Technical Memorandum of the Association** **5**
Table 2 **Bear Creek Reservoir Data Summary** **12**
Table 3 **Bear Creek Watershed 2019 Temperature Compliance by Segment** **14**
Table 4 **Total Number of Temperature Measurements (Not Including WWTP)** **15**
Table 5 **WWTP Number of Temperature Measurements 2019** **16**
Table 6 **WWTP Logger summary 2019** **16**
Table 7 **Bear Creek Watershed 2019 Water Quality Compliance by Monitored Segment** **16**
Table 8 **Evergreen Metropolitan District (Site 20)** **19**
Table 9 **West Jefferson County Metropolitan District (Site 21)** **19**
Table 10 **Kittredge Sanitation and Water District (Site 22)** **20**
Table 11 **Genesee Water and Sanitation District (Site 23)** **20**
Table 12 **Town of Morrison (Site 24)** **21**
Table 13 **Summit Lake Site 36 (In Summit Lake near outlet) Segment 8** **21**
Table 14 **Summary Sites 37, 76, 95 and 63** **21**
Table 15 **(Site 37) Mount Evans Main stem ¼ mile downstream** **22**
Table 16 **(Site 76) Between 2 large ponds on east side of Summit Lake outfall. Segment 8** **22**
Table 17 **(Site 95) Segment 8 South Fen Reference site** **22**
Table 18 **(Site 63) Segment 8 Below site 36, above 2nd pond, middle of 1st pond** **22**
Table 19 **Segment 1a Summary** **22**
Table 20 **Below Mount Evans Wilderness (Site 58)** **23**
Table 21 **Golden Willow Rd (Site 2a)** **23**
Table 22 **Above Evergreen Lake, at CDOW site (Site 3a)** **24**
Table 23 **Segment 1d Summary** **24**
Table 24 **Evergreen Lake Profile station 0.5 meters (Site 4A)** **25**
Table 25 **Evergreen Lake, 1.0m below surface, near dam (Site 4b)** **25**
Table 26 **Evergreen Lake, 1.5m below surface, near dam (Site 4c)** **26**
Table 27 **Evergreen Lake, 2.0m below surface, near dam (Site 4d)** **26**
Table 28 **Evergreen Lake, 2.5m below surface, near dam (Site 4e)** **27**
Table 29 **Evergreen Lake, 3.0m below surface, near dam (Site 4f)** **27**
Table 30 **Evergreen Lake, 3.5m below surface, near dam (Site 4g)** **27**
Table 31 **Evergreen Lake, 4.0m below surface, near dam (Site 4h)** **27**
Table 32 **Evergreen Lake, 5.0m below surface, near dam (Site 4i)** **27**
Table 33 **Evergreen Lake, 6.0m below surface, near dam (Site 4j)** **28**
Table 34 **Segment 1e Summary** **28**
Table 35 **Downtown Evergreen, at CDOW site (Site 5) LOGGER REMOVED AND TAKEN** **28**
Table 36 **Bear Creek Cabins (Site 8a)** **29**

Table 37 O'Fallon Park (site 9) 29
Table 38 Liar O' the Bear Park (Site 12) 30
Table 39 Idledale (Shady Lane-Site 13a) 30
Table 40 West End of Morrison (Site 14a) 30
Table 41 East End of Morrison (Site 14c) 31
Table 42 Segment 1b Summary 31
Table 43 Segment 3 Summary (Site 25) 32
Table 44 Segment 5 Summary 32
Table 45 Upper Troublesome Creek (site 64) 33
Table 46 Lower Troublesome Creek (Site 32) 33
Table 47 Cub Creek Mouth (Site 26) 33
Table 48 Segment 6a Summary 33
Table 49 South Turkey Creek in Bear Creek Lake Park (Site 16a) 34
Table 50 Aspen Park Metropolitan District, South Turkey Creek (Site 18) 34
Table 51 Conifer Metropolitan District, North Turkey Creek (Site19) 35
Table 52 Segment 1c Data logger Summary 35
Table 53 Bear Creek Reservoir Profile Station (Site 40T 0.5) 36
Table 54 Bear Creek Reservoir Profile Station (Site 40T 1.0) 36
Table 55 Bear Creek Reservoir Profile Station (Site 40T 1.5) 36
Table 56 Bear Creek Reservoir Profile Station (Site 40T 2.0) 36
Table 57 Summary (sites 45 and 90) 37
Table 58 Site 90 West of Wadsworth bridge 37
Table 59 Site 45 Below Trace Weir at spillway of Bear Creek Reservoir 38
Table 60 2019 May Bear Creek Evergreen vs. Historic Bear Creek Flow 38
Table 61 2019 June Bear Creek Evergreen vs. Historic Bear Creek Flow 39
Table 62 2019 July Bear Creek Evergreen vs. Historic Bear Creek Flow 40
Table 63 2019 August Bear Creek Evergreen vs. Historic Bear Creek Flow 40
Table 64 2019 September Bear Creek Evergreen vs. Historic Bear Creek Flow 41
Table 65 2019 May Bear Creek Morrison vs. Historic Bear Creek Flow 42
Table 66 2019 June Bear Creek Morrison vs. Historic Bear Creek Flow 42
Table 67 2019 July Bear Creek Morrison vs. Historic Bear Creek Flow 43
Table 68 2019 August Bear Creek Morrison vs. Historic Bear Creek Flow 44
Table 69 2019 September Bear Creek Morrison vs. Historic Bear Creek Flow 44
Table 70 Weather Data May-September 2019 Summary 45
Table 71 2019 Weather Data vs. Historical Weather Data (57 years 1961-2019) 45
Table 72 2019 May Bear Creek Evergreen vs. Weather Data 46
Table 73 2019 June Bear Creek Evergreen vs. Weather Data 47
Table 74 2019 July Bear Creek Evergreen vs. Weather Data 47
Table 75 2019 August Bear Creek Evergreen vs. Weather Data 48
Table 76 2019 September Bear Creek Evergreen vs. Weather Data 49

List of Figures

Figure 1 Bear Creek Watershed 6
Figure 2 Bear Creek Reservoir with Sampling Stations 11
Figure 3 Bear Creek Park with BCWA Sampling Sites 12

I. BCWA Sampling Program

Data Report Purpose

The Bear Creek Watershed Association (Association) collects annual water quality data from multiple sampling locations throughout the watershed. The monitoring program has four major water quality and environmental data generating elements:

1. Bear Creek Reservoir water quality characterization including source inputs from Bear Creek and Turkey Creek and reservoir discharge consistent with the intent of the Bear Creek Reservoir Control Regulation # 74 and as defined in the **BCWA PGO31** ***Water Monitoring Program and Sample Analyses Plan Version 2019.01, BCWA January 9, 2019, and subsequent annual updates.***

2. Bear Creek Watershed surface water characterizations during selected months beginning at the headwaters of both Bear Creek and Turkey with a primary focus on nutrients and base field parameters, which is also defined in the **BCWA PGO31 Water Monitoring Program and Sample Analyses Plan Version 2019.01, BCWA January 9, 2019, and subsequent annual updates.**

3. Bear Creek Watershed surface water temperature characterization by major stream segments for both the cold and warm seasons, which is also defined in the **BCWA PGO31 Water Monitoring Program and Sample Analyses Plan Version 2019.01, BCWA January 9, 2019, and subsequent annual updates.**

4. Special water quality characterization and analyses studies on a site-specific basis.

The Association provides multiple reporting documents designed to meet the multiple functions of various groups and to specifically address elements of the Bear Creek Watershed association electronic Watershed Plan (See BCWA PGO1-Master Index List for listing of all documents that are incorporated into the Watershed Plan and BCWA PGO2 Document categories). The Association produces an annual report that addresses program elements identified in the control regulation and the Bear Creek Watershed Plan. The Association also produces an executive summary of the annual report to meet reporting requirements of the Water Quality Control Commission. The Association produces an annual series of technical memoranda designed to summarize the site-specific studies and data results for any given year (Table 1).

Table 1	2019 Technical Memorandum of the Association
TM2019.01	Sediment Survey BCR
TM2019.02	UBCW Summary
TM2019.03	Coyote Gulch Summary
TM2019.04	BCR Summary Statistics and Graphs
TM2019.05	MBCW 2017 Nutrient Summary
TM2019.06	P1 Summary
TM2019.07	Barr Milton TMDL Summary
TM2019.08	EGL Summary
TM2019.09	BCR Phytoplankton Summary
TM2019.10	Fishery Summary
TM2019.11	Macroinvertebrates
TM2019.12	Copper Study
TM2019.13	Regulation 85 Summary

This data report is a summary of the watershed characterization program with a primary focus on the annual temperature data record. The data report summarizes the temperature and water quality compliance record for the annual program. This data report summaries information used in the annual report, technical memorandum, information series, fact sheets or program guidelines and operations documents.

BCWA PGO31

A generally continuous collection of surface quality data began in 1990 for the Bear Creek Watershed (Figure 1). Data collection includes specific chemical, physical and biological parameters. Data is collected monthly

and bi-monthly at Bear Creek Reservoir and along Turkey Creek and Bear Creek, and at selected months in the watershed. The Association meets water quality data sampling and analyses objectives established in the Bear Creek Reservoir Control Regulation # 74. The BCWA monitoring program is contained in an annually updated Sample Analyses Plan (**BCWA PGO31 Water Monitoring Program and Sample Analyses Plan Version 20198.01, BCWA January 9, 2019, and subsequent annual updates.**).

The *BCWA PGO31 Bear Creek 2019 Sample Plan Version 2019.01* is posted on the Association website monitoring page at www.bearcreekwatershed.org. The monitoring plan is reviewed annually and updated as appropriate. The Water Quality Control Division staff reviews the annual monitoring plan (generally in December) and proposes changes as appropriate. The dual review is consistent with the requirements of the *Bear Creek Control Regulation #74*.

The 2019 data results are contained in the MSD*2019 P1-P4 Master Spreadsheet* posted on the Association website monitoring page and a specific watershed spreadsheet for the temperature data. Monthly summary reports are provided to the Association Board and these data files are also posted to the website. Selected data and a summary of the water quality management program is presented in the BCWA AR*2019 BCWA Annual Report WQCC (BCWA,* May 2020*),* which is also posted with previous Association annual reports.

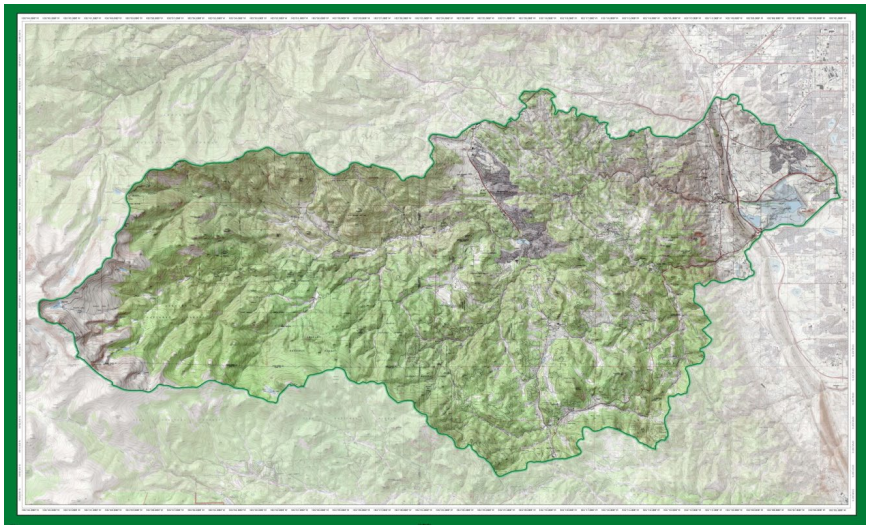

Figure 1 Bear Creek Watershed

The Association maintains five distinct types of monitoring efforts to characterize water and environmental quality within the Bear Creek Watershed*:*

P1- Routine water quality monitoring at Bear Creek Reservoir (multiple vertical stations), Turkey Creek inflow to reservoir, Bear Creek inflow to reservoir, and reservoir discharge into lower Bear Creek. The P1 sites are long-term reference monitoring sites consistent with the intent of the monitoring program outlined in the Bear Creek Reservoir Control Regulation #74.

P2- Supplemental sampling of restoration or other project specific sites (e.g., Coyote Gulch in cooperation with the City of Lakewood). These types of monitoring efforts can be either of limited duration, or long-term on a site-specific basis, and generally these programs monitor for specific parameters of interest to the project.

P3- Watershed surface water monitoring along Bear Creek and Turkey Creek drainages for site-specific characterizations (e.g., temperature trends, nutrient loading, flow studies). These are interim and long-term monitoring sites for watershed characterizations. Watershed monitoring stations include both long-term reference sites where multi-year data is desirable, and target sites that may provide only a couple years of data. The nutrient monitoring is on a watershed basis that begins near Summit Lake and extents through Bear Creek Reservoir.

P4- Supplemental environmental characterizations of Bear Creek watershed including, but not limited to macroinvertebrates, flow analysis, habitat characterizations, fishery evaluations, system productivity or other environmental factors that potentially affect fisheries or watershed health.

P5- Wastewater treatment facility, nutrient sampling consistent with regulation #85, from opted in facilities.

II. Association Data Record

Data Management

Large quantities of varied data were collected during the Program: Monthly stream monitoring and sampling, laboratory results, thirty-minute temperature measurements from data loggers, wastewater treatment plant effluent process control and permit monitoring data (from five larger treatment plants), weather statistics and stream flows. All data are stored on an office computer. Most the data are organized and analyzed in Excel spreadsheets. Data is backed up to a server.

Depositories

The Association data is located at two different locations. Watershed data collected with the assistance of EMD staff is maintained on computer systems at the EMD offices (Limited years). All raw watershed data is electronically forwarded from EMD staff to the Manager as an excel spreadsheet for data summary and analyses. RNC Consulting LLC maintains all monitoring data for all Association monitoring programs. Data is kept on a computer with back-up to an external hard drive. Additionally, a back-up set of data is kept on flash drives.

Electronic Transfers WQCD/ Depositories

1. Spreadsheet watershed QA/QC spreadsheet data only (WQCD - 4); depositories (2)
2. Spreadsheet watershed QA/QC spreadsheet with summary information and standard analyses (WQCD - 2); depositories (2)
3. Temperature record (WQCD - 2); depositories (2);
4. WQCC annual report, 2019 Data Report; (WQCD - 2), depositories (2)

Reports, Technical Memorandum and Specialized Spreadsheets

The Association produces an annual data summary of watershed data, ongoing technical memorandum, a MSD*2019 P1-P4 Master Spreadsheet (February 2020)* that includes data analyses and raw data for Bear Creek Reservoir and the watershed nutrient collection program. The Association transmits this data report to the Water Quality Control Division Staff (Association website www.bearcreekwatershed.org).

All the Association annual reporting documents are available electronically and posted on the website. However, not all data can be posted due to size limitations. The annual temperature record is very large and kept in spreadsheets and is available only on request. The Association provides multiple reporting documents designed to meet the multiple functions of various groups. The reporting helps member entities with reporting to their respective boards, commissions and groups. There is also a citizen interest in the watershed and reporting helps keep the public informed. Many educational groups visit the watershed and it has become a widely used supplemental classroom. The Association supplies water quality and environmental materials for various educational uses, as well as offers watershed classes to special interest groups and schools.

Spreadsheets in Master Data Series Updated 2019

MSD1998	P1 Master Spreadsheet
MSD1999	P1 Master Spreadsheet
MSD2000	P1 Master Spreadsheet
MSD2001	P1 Master Spreadsheet
MSD2002	P1 Master Spreadsheet
MSD2003	P1 Master Spreadsheet
MSD2004	P1 Master Spreadsheet

MSD2005	P1 Master Spreadsheet
MSD2006	P1 Master Spreadsheet
MSD2007	P1 Master Spreadsheet
MSD2008	P1 Master Spreadsheet
MSD2009	P1-P4 Master Spreadsheet
MSD2010	P1-P4 Master Spreadsheet
MSD2011	P1-P4 Master Spreadsheet
MSD2012	P1-P4 Master Spreadsheet
MSD2013	P1-P4 Master Spreadsheet
MSD2014	P1-P4 Master Spreadsheet
MSD2015	P1-P4 Master Spreadsheet
MSD2016	P1-P4 Master Spreadsheet
MSD2017	P1-P4 Master Spreadsheet
MSD2018	P1-P4 Master Spreadsheet
MSD2019	P1-P4 Master Spreadsheet
MSD01	BCWA Site ID Historical Master
MSD02	Macroinvertebrate Summary
MSD03	BCW Flow & Watershed Record
MSD04	Total phosphorus & WS Nutrient Master Record
MSD05	Evergreen Lake BCWA Data Master
MSD06	Site 45 Data Summary
MSD07	Sheridan Data Record BCWA
MSD08	TIN Watershed
MSD09	Program Master
MSD10	BCWA Master WWTF and IFS
MSD11	Coyote Gulch Data Master
MSD12	Kerr Swede Master
MSD13	Turkey Creek Flow
MSD14	WLA Working
MSD15	Master Dues Budget
MSD16	BCWA Attendance Log Master
MSD17	Phytoplankton Master
MSD18	Bear Creek Fishery Master
MSD19	Copper Data Base
MSD20	Cost Share Structure

Fact Sheets in Watershed Plan Updated 2019

Fact Sheet 1	BCWA Overview
Fact Sheet 2	BCR Sedimentation
Fact Sheet 3	BCR Sediment & Water Quality
Fact Sheet 4	Pine Beetle
Fact Sheet 5	BCR Dam Facts
Fact Sheet 6	BCR Aeration
Fact Sheet 7	BCR Sample Sites
Fact Sheet 8	Evergreen Lake
Fact Sheet 9	Signs Geocache
Fact Sheet 10	Control Regulation 74
Fact Sheet 11	Zebra Mussel Program
Fact Sheet 12	Fish Species
Fact Sheet 13	Water Quality is Better
Fact Sheet 14	Flood Recovery Tips
Fact Sheet 15	Watershed Sampling
Fact Sheet 16	September 2013 Flood

Fact Sheet 17	Health, Hydrology & Sediments
Fact Sheet 18	Flood Score Card
Fact Sheet 19	EHS Rain Garden
Fact Sheet 20	Instream Flow Rights
Fact Sheet 21	Pollutants of Concern 303d
Fact Sheet 22	Pollutants of Concern Watershed
Fact Sheet 23	Evergreen Medical Take-back Program
Fact Sheet 24	Coyote Gulch Trade Pounds
Fact Sheet 25	Major Physical Features BCW
Fact Sheet 26	BCW Watershed Demographics
Fact Sheet 27	BCW Segments
Fact Sheet 28	BCW Stream Standards
Fact Sheet 29	BCW Stream Classifications
Fact Sheet 30	BCW T&E Species
Fact Sheet 31	TMDL Status
Fact Sheet 32	BCW Macroinvertebrates
Fact Sheet 33	BCW Segment Temperature Standards
Fact Sheet 34	New Morrison WWTF
Fact Sheet 35	Recreational Use Types
Fact Sheet 36	Larger Mammals
Fact Sheet 37	Smaller Mammals
Fact Sheet 38	BCR Phytoplankton
Fact Sheet 39	BCW E. Coli
Fact Sheet 40	Genesee Dam
Fact Sheet 41	Wastewater Demographics
Fact Sheet 42	BCR Zooplankton
Fact Sheet 43	BCW Evergreen Audubon Bird Atlas
Fact Sheet 44	CCC Transfer Station 2014
Fact Sheet 45	BCW Embeddedness Estimator
Fact Sheet 46	BCW Periphyton Estimator
Fact Sheet 47	New BCR Aeration System
Fact Sheet 48	Wetlands, Fens and WQ BCW
Fact Sheet 49	Coal-Tar Alternatives
Fact Sheet 50	Reducing Risk of E Coli Contamination of Streams
Fact Sheet 51	Reducing Risk of E Coli Contamination of Waterbodies
Fact Sheet 52	Mt Evans Fen WQ
Fact Sheet 53	BCR 2015 Regulation 38 Update
Fact Sheet 54	2015 303(d) List
Fact Sheet 55	BCW Buchanan Ponds
Fact Sheet 56	Climate Model UBCW
Fact Sheet 57	Cyanotoxins
Fact Sheet 58	Cyanobacteria Guide BCR
Fact Sheet 59	Basic BCW Metrics 2017
Fact Sheet 60	Managing Harmful Algal Blooms
Fact Sheet 61	HABs Exposure and Risks
Fact Sheet 62	BCR Aeration System Operation
Fact Sheet 63	2014 BCR Aeration System Evaluation
Fact Sheet 64	Post Fire Response

Policies in Watershed Plan Updated 2019

Policy 1	Trading Program
Policy 2	Site Application Review
Policy 3	4 step Review Policy
Policy 4	BC Manure Management

Policy 5	Meeting Attendance and E-Distribution
Policy 6	BCWA Weighted Vote
Policy 7	Evergreen Lake Temperature By-Pass
Policy 8	Bear Creek Reservoir Aeration
Policy 9	Aspen Park Conifer Wastewater Policy
Policy 10	Water Quality Monitoring Tiers
Policy 11	Vault & SS Disposal Systems
Policy 11s	Supplement ISDS Vault Regulations
Policy 12	Vision Mission & Targets
Policy 13	Watershed Boundary
Policy 14	Data Collection in BCW
Policy 15	Nonpoint Source Strategies and BMPs
Policy 16	Membership
Policy 17	Recycling Support
Policy 18	Illegal Material Dumping as a Pollutant in Bear Creek Watershed
Policy 19	Nutrient Trading Program Eligibility
Policy 20	Preferred Management Strategies for EGL and BCR
Policy 21	Online Management System
Policy 22	Project Evaluation Process
Policy 23	System of WWTF
Policy 24	DMR Reporting (WWTF)
Policy 25	Water Reuse and Conservation
Policy 26	Point to Point Trade Administration
Policy 27	Source Water Protection Plans
Policy 28	BCWA Watershed Plan
Policy 29	BCWA Integration with Other Planning Efforts
Policy 30	Financial Plan
Policy 31	BCWA Estimation Reporting
Policy 32	BCWA Annual Reporting
Policy 33	BCWA Shared Cost Program
Policy 34	BCWA Phosphorus WLA Purpose
Policy 35	Membership Entity Termination and Permit Closure
Policy 36	Reservoir and Lake Management Cost Share

Map Series in Watershed Plan Updated 2019

MS01	Watershed Boundary
MS02	BCR Aeration System
MS03	BCR Sample Sites
MS04	BCR Sediment Sample Sites
MS05	Coyote Gulch Sample Sites
MS06	BCR P-1 Sample Sites
MS07	Evergreen Lake Sample Sites
MS08	Kerr-Swede Gulch Sample Sites
MS09	Composite Hazard Map
MS10	Pine Beetle Progression Map
MS11	Bear Creek 5th Order Watersheds
MS12	Wildfire Hazard Areas of Concern
MS13	Road Density Areas of Concern
MS14	Ruggedness Areas of Concern
MS15	Debris Flow & Flood Areas of Concern
MS16	Erodibility Areas of Concern
MS17	Macroinvertebrate Sites
MS18	Wastewater Treatment Plants

MS19	CDPW Fish Survey Sites
MS20	Segment 1e Sample Sites
MS21	Lower BCW Sample Sites 2014
MS22	Summit Lake Monitoring 2014
MS23	BCW Parks & Open Space
MS24	BCW Wildfire Hazards
MS25	BCW OWTS Septic System Areas
MS26	BCW Subbasin Population 2010 Census
MS27	BCW WWTF vs. OWTS areas
MS28	BCW Elevations
MS29	BCW Slope and Run-Off Potential
MS30	BCW Unpaved Roads, Pastures, Horses
MS31	BCW Jeff Co Community Plan Areas
MS32	BCW Large Animal Operations

III. Bear Creek Reservoir 2019 Data

The routine monitoring program (P1) focuses on Turkey Creek drainage and Bear Creek drainage inputs, and discharge from Bear Creek Reservoir into lower Bear Creek with a central pool characterization of the reservoir near the dam (Figure 2; BCWA site 40). The outlet structure is near BCWA site 41 with Bear Creek inflow near BCWA site 44 and Turkey Creek inflow near BCWA site 43. The reservoir chemistry and biological characterization monitoring occurs at BCWA site 40. Vertical probe samples for specific conductance, temperature, dissolved oxygen, and pH are measured at ½ and 1-meter intervals at all reservoir sites.

The current monitoring program optimizes data generation to evaluate reservoir inflow loading, trophic state changes within the reservoir, and reservoir outflow, while minimizing monitoring cost. The aeration sites are visible in Figure 2. Figure 3 shows all monitoring stations within Bear Creek Park. The Association maintains maps of recent sampling sites and wastewater treatment plant locations on the Association web site.

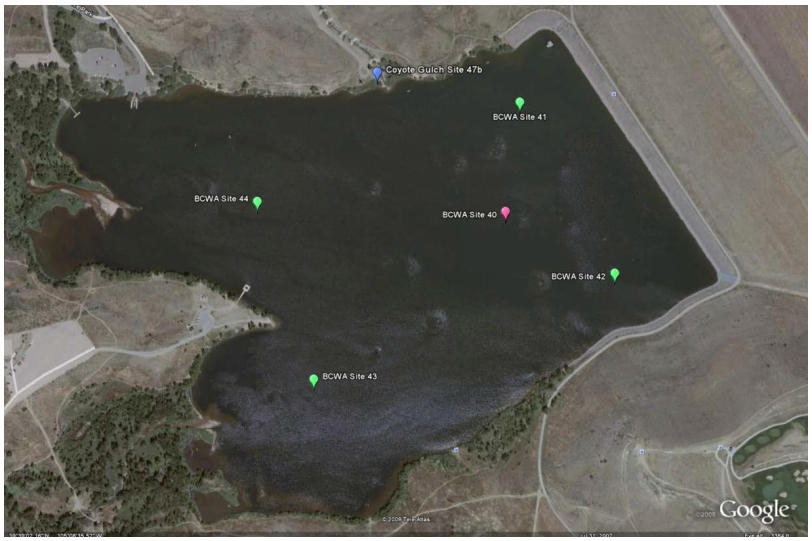

Figure 2 **Bear Creek Reservoir with Sampling Stations**

Figure 3 Bear Creek Park with BCWA Sampling Sites

The P1 monitoring program is contained in a spreadsheet titled MSD*2019 P1-P4 Master Spreadsheet.* The spreadsheet contains all data and analyses. Copies of the spreadsheet are distributed to Association membership, WQCD staff and interested parties in March/April 2020 after approval from the Association Board (Bear Creek Association April 2020). The Bear Creek Reservoir data and analyses are summarized in the annual report to the Water Quality Control Commission. Table 2 summarizes the Bear Creek Reservoir monitoring data.

Table 2 Bear Creek Reservoir Data Summary

Bear Creek Reservoir 2019 - Summary Statistics

Reservoir Growing Season July to September

Reservoir Monitoring Parameters	Reservoir
Chlorophyll (Site 40)	
Average Growing Season Chlorophyll-a [ug/l (-1m)]	13.9
Average Annual Chlorophyll-a [ug/l (-1m)]	14.8
Peak Chlorophyll-a [ug/l]	31.0
Total Phosphorus	
Average Annual Total Phosphorus [ug/l]: Water Column	65.1
Average Annual Total Phosphorus [ug/l] -1m	38.7
Average Annual Total Phosphorus [ug/l] -10m	91.5
Growing Season Total Phosphorus [ug/l]: Water Column	89.6
Growing Season Total Phosphorus [ug/l]: -1m	33.8
Growing Season Total Phosphorus [ug/l]: -10m	145.3
Peak Annual Total Phosphorus [ug/l] Water Column	543.0
Total Nitrogen	
Average Annual Total Nitrogen [ug/l]: Water Column	726
Average Total Nitrogen [ug/l]: -1m	733
Average Total Nitrogen [ug/l]: -10m	719
Growing Season Total Nitrogen [ug/l]: Water Column	467
Growing Season Total Nitrogen [ug/l]: -1m	507
Growing Season Total Nitrogen [ug/l]: -10m	428
Clarity (All Profiles)	
Average Annual Sechhi Depth (meters)	1.44
Growing Season Average Secchi Depth (meters)	1.37
Dissolved Oxygen (site 40 Profile)	
Annual Average at -1/2m - 2m [mg/l]	10.65
Seasonal Average at -1/2 - 2m [mg/l]	7.78
Seasonal Minimum at -1/2 - 2m [mg/l]	6.67
pH	
Annual Average at -1/2m - 2m [mg/l]	8.26
Seasonal Average at -1/2 - 2m [mg/l]	8.73
Seasonal Maximum at -1/2 - 2m [mg/l]	8.47
Specific Conductance	

Annual Average at -1/2m - 2m [uS/cm]	884.5
Seasonal Average at -1/2 - 2m [us/cm]	887.5
Seasonal Minimum at -1/2 - 2m [us/cm]	230.1
Phytoplankton Species	
Phytoplankton Species with >100,000 Biovolume um3/mL - Site 40 (July-October 2019)	Anabaena flos-aquae
	Aphanizomenon flos-aquae
	Microcystis aeruginosa
	Cryptomonas erosa
	Achnanthes deflexa
	Asterionella formosa
	Cymbella mexicana
	Fragilaria crotonensis
	Melosira ambigua
	Melosira granulata
	Synedra ulna
	Trachelomonas scabra
Peak Phytoplankton	
Microcystis aeruginosa	Density cells/ml = 38,843
Fragilaria crotonensis	Peak Biovolume (um^3/mL) = 2,280,056
Loading - Annual Pounds	
Total Nitrogen -Total Load In to BCR	32,236
Total Nitrogen -Total Load From BCR	26,728
Total Nitrogen -Total Deposition into BCR	5,508
Total Phosphorus -Total Load In to BCR	2,052
Total Phosphorus -Total Load From BCR	1,262
Total Phosphorus -Total Deposition into BCR	789

IV. P3-Summary Bear Creek Watershed 2019 Monitoring Data

Overview

Sampling and Monitoring Program Notes

Data organization reflects the Colorado Water Quality Control Division's segmentation and water quality standards to water bodies in the Bear Creek Watershed per Regulation 38. Sampling and monitoring data are presented for the calendar year, compared to applicable water quality standards. Site numbers identify exact locations, but are grouped into respective segments, with segment summary tables at the beginning of a segment group. All data collected is presented in table form, with summary analyses.

Temperature data loggers that were in stream segments since February 2019 in certain locations were replaced with other loggers that had already been returned from the manufacturer after being recalibrated and recertified in early February/March ready to begin collecting data at 30-min intervals. The additional loggers were sent to the manufacturer for annual recalibration and recertification. The loggers were returned to sites and programmed to begin data collection at 30-minute intervals on the days that they were placed at the sites. All loggers were downloaded after September 30, 2019. Stream and lake sampling and monitoring data, including pH, Temperature, Dissolved oxygen, Specific Conductance, Total nitrogen, Dissolved Phosphorus, Total Phosphorous, Total Suspended Solids, and Chlorophyll A were collected from May through October, at 34 sites. Stream and lake temperature data loggers were used at **25** sites, including the Evergreen Lake profile station, and the Bear Creek Reservoir profile station, excluding the five WWTPs.

Temperature Compliance

The cold- and warm-season timeframe was redefined by the adoption of Regulation 38, which assigned calendar dates by segment for cold-season and warm season regarding water quality standards for temperature. For this reporting format, the cold-season program is defined as approximately November to March, depending on specific stream segments (which are outlined in Appendix C of Reg. 74). Regarding temperature data loggers, cold-season locations included sites in all segments excluding segment 1d situated in Evergreen Lake, Segment 1C, Bear Creek Reservoir (sites 40 A,B,C,D), Segment 1e (5,8a, 9,12, 13a, and14a), and Segment 5 (Site 26). It is worth mentioning that many of these sites only recorded data during the shoulder season the month before the warm season began and post warm season. The program began in January 1of 2019 and ended on December 31

of 2019. The data presented in this report reflects the temperature measurements collected from January 1 through December 31, 2019. (This change represents the revision of reporting data collected in a calendar year, broken into cold and warm seasons).

The warm-season program locations included twenty-five sites in Bear Creek Segments 1a, 1b, 1c, 1d, 1e, 2, 3, 5, (including four totals at the Evergreen Lake profile station, and 4 total at the Bear Creek Reservoir profile station), and three sites in Turkey Creek Segments 6a and 6b. Additionally, the five major wastewater treatment plants discharging into Segment 1e (EMD and KSWD), segment 5(WJCMD and GWSD) and 1b (Morrison) were monitored. The 2019 warm-season program for temperature data collection began on April 1, May 1, and June 1, and concluded on September 30 and October 31 depending on the segment.

Temperature compliance, as compared to water quality standards, is presented by segment, roughly progressing from the upper reaches of the watershed to lower. Some sites only have temperature data collection during the warm season, while other sites have data loggers almost throughout the year.

258,646 individual temperature data points were obtained from the twenty-five data logger sites within the watershed. The evaluating criteria used to determine potential impairment of stream temperature is detailed in the tables below, specific to segment. There were **749** weekly averages calculated for the program period. 64,645 two-hour blocks were averaged, and **5,383** Daily Maximum values were calculated. **87,554** individual temperature data points were obtained from the five data loggers located in the WWTP effluents that discharge into Bear Creek Segments 1e, 5, and 1b. Recognizing that Morrison wastewater treatment facility, Evergreen Metro District, and West Jefferson County Metro District have temperature requirements in their permits, a data summary consisting of number of measurements and calculations, Weekly Average and Daily Average temperatures are presented.

Table 3 Bear Creek Watershed 2019 Temperature Compliance by Segment

Segment	Cold season		Warm Season	
Segment 3	**9°C WAT**	**13°C DM**	**17°C WAT**	**21.2°C DM**
# Exceedances	0	1	0	0
% Compliance	100%	98%	100%	100%
Segment 1a	**9°C WAT**	**13°C DM**	**17°C WAT**	**21.2°C DM**
# Exceedances	0	1	0	0
% Compliance	100%	99%	100%	100%
Segment 1d	**9.0°C WAT**	**13.0°C DM**	**18.2°C WAT**	**23.8°C DM**
# Exceedances			0	0
% Compliance			100%	100%
Segment 1e	**9°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances			0	0
% Compliance			100%	100%
Segment 1b	**9°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 5	**9°C WAT**	**13°C DM**	**18.2°C WAT**	**23.8°C DM**
# Exceedances			0	0
% Compliance			100%	100%
Segment 6a	**9°C WAT**	**13°C DM**	**18.2°C WAT**	**23.8°C DM**
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 6b	**9°C WAT**	**13°C DM**	**17°C WAT**	**21.2°C DM**
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 2	**13.7°C WAT**	**14.3°C DM**	**27.5°C WAT**	**28.6°C DM**
# Exceedances	0	0	0	2
% Compliance	100%	100%	100%	99%
Segment 1c	**9°C WAT**	**13°C DM**	**23.3°C WAT**	**23.8°C DM**
# Exceedances			0	0
% Compliance			100%	100%

Table 4 Total Number of Temperature Measurements (Not Including WWTP)

	30-minute Temps	Calculated WAT	2-hr Avg DM Calculations	Calculated DM
SEGMENT 1A	26993	77	6747	561
SEGMENT 1B	12500	36	3123	260
SEGMENT 1C	51264	152	12816	1068
SEGMENT 1D	34833	100	8708	724
SEGMENT 1E	51675	150	12912	1078
SEGMENT 2	25005	72	6249	520
SEGMENT 3	8159	24	2039	170
SEGMENT 5	9431	28	2357	196
SEGMENT 6A	25054	72	6262	520
SEGMENT 6B	13732	38	3432	286

Segment 8 (Site 36,76,95, and 63) and Segment 7 (Sites 37)

- No temperature loggers were placed in either of these segments in 2019.

Segment 3 (Site 25)

- 98% of Cold Daily Max was achieved
- 100% of Cold MWAT, and All Warm season parameters were met.

Segment 1a (Sites 1a, 2, 3a)

- 99% of Cold Season Daily Max achieved compliance
- 100% of All other parameters achieved compliance.

Segment 1d (Sites 4b, 4c and 4d)

- There were no temperature recordings for the cold season in this segment.
- 100% of Warm Season parameters were met for Daily Max and MWAT in 2019.

Segment 1e (Sites 5, 7, 8a, 9, 12, and 13a)

- All temperatures complied 100% with the temperature standards set for this segment during warm seasons.
- There were no readings for this segment during the cold season.

Segment 1b (Sites 15a)

- 100% of the recorded temperature values complied with both cold and warm season temperature standards established for this segment.

Segment 5 (26)

- 100% of Warm Season parameters were met in this segment
- There were no Cold Season data points for this segment.

Segment 6a (Sites 16a and 18)

- 100% of all parameters were met for both the cold and warm seasons.

Segment 6b (Site 19)

- 100% of all parameters were met for both the cold and warm seasons.

Segment 2 (Site 45)

- 100% of ALL cold season parameters were met.
- 100% of Warm season MWAT parameters were met and 99% of warm season DM were met.

Segment 1c (Site 40 Profile)

- 100% of Warm season parameters were met.
- There were no cold season data points taken.

Wastewater treatment plant effluents

Morrison WWTP, Evergreen Metro District, and West Jefferson County Metro District are the only treatment plants with temperature requirements in their permit, all five of the largest wastewater treatment plants have data logger measurements that have been analyzed and summarized below using the representative segment

standard of the wastewater treatment facility discharge.

Table 5 WWTP Number of Temperature Measurements 2019

	# 30-min. measurements	# Calculated WAT	# Daily Max
EMD WWTP (1e)	17497	50	365
WJCMD WWTP (5)	17497	50	365
KSWD WWTP (1e)	17520	51	365
GWSD WWTP (5)	17520	51	365
Morrison WWTP (1b)	17520	51	365
Totals (Jan 1-Dec. 31)	**87554**	**253**	**1825**

Table 6 WWTP Logger summary 2019

	Cold season		Growing Season	
Segment 1e	**9°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances	21	36	21	0
% Compliance	49%	88%	65%	100%
	Cold season		**Growing Season**	
Segment 1b	**9°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances	5	0	13	8
% Compliance	76%	100%	57%	96%
Segment 5	**9°C WAT**	**13°C DM**	**18.2°C WAT**	**23.8°C DM**
# Exceedances	34	34	12	0
% Compliance	17%	89%	80%	100%

Water Quality Compliance

Water quality compliance was determined by sampling and monitoring selected sites during the Growing season timeframe. Dissolved oxygen, pH, Total nitrogen, and Total phosphorous measurements were compared to water quality standards and anticipated standards to determine compliance.

Table 7 Bear Creek Watershed 2019 Water Quality Compliance by Monitored Segment

	Stream Std.	Stream Std.	Proposed Stream Std	Proposed Stream Std
	pH (6.5-9 SU)	DO (6.0 mg/L 2-meter	Total nitrogen 1250	Total Phosphorous (110
Segment 8				
# Exceedances	0	0	0	1
# Measurements	5	5	5	5
% Compliance	100%	100%	100%	80%
Segment 7				
# Exceedances	0	8	1	5
# Measurements	17	17	17	17
% Compliance	100%	53%	94%	71%
Segment 3				
# Exceedances	0	0	0	0
# Measurements	6	6	6	6
% Compliance	100%	100%	100%	100%
Segment 1a				
# Exceedances	0	0	0	0
# Measurements	18	18	18	18
% Compliance	100%	100%	100%	100%
Segment 1d				
# Exceedances	0	0	0	0
# Measurements	69	69	12	12
% Compliance	100%	100%	100%	100%
Segment 1e				
# Exceedances	0	0	0	1
# Measurements	40	40	34	34
% Compliance	100%	100%	100%	97%
Segment 1b				
# Exceedances	0	0	3	1
# Measurements	15	15	15	15

% Compliance	100%	100%	80%	93%
Segment 5				
# Exceedances	0	0	1	3
# Measurements	18	18	18	18
% Compliance	100%	100%	94%	83%
Segment 6a				
# Exceedances	0	0	0	1
# Measurements	21	21	21	21
% Compliance	100%	100%	100%	95%
Segment 6b				
# Exceedances	0	0	0	0
# Measurements	6	6	5	5
% Compliance	100%	100%	100%	100%
Segment 2				
# Exceedances	0	0	3	1
# Measurements	30	30	30	30
% Compliance	100%	100%	90%	97%

Segment 7 (Site 37, 76, 95, and 63)
100% of measured pH complied with stream standards. 53% of DO complied with stream standards, 94% of Total nitrogen complied with stream standards, and 71% of total Phosphorous complied with stream standards.

Segment 8 (Sites 36)
100% of measured pH complied with stream standards. 100% of DO complied with stream standards, 100% of Total nitrogen complied with stream standards, and 80% Total Phosphorous of complied with stream standards.

Segment 3 (Site 25)
100% of the measured parameters complied with water quality standards.

Segment 1a (Sites 58, 2a and 3a)
100% of the measured parameters complied with water quality standards.

Segment 1d (Sites 4a, 4b, 4c, 4d and 4e)
100% of the measured parameters complied with water quality standards.

Segment 1e (Sites 5, 8a, 9, 12, 13a and 14a)
100% of the measured parameters for pH and dissolved oxygen complied with adopted and proposed water quality standards. While 100% of the total nitrogen, and 97% of the proposed total phosphorous complied with the water quality standards.

Segment 1b (Sites 15a)
100% of pH and Dissolved Oxygen parameters measured complied with water quality standards, while total nitrogen complied 80% with the proposed water quality standard of 1250ug/L, and Total Phosphorous, complied 93% with the proposed stream standard of 110ug/L.

Segment 5 (Sites 26, 32a, and 64)
100% of the measured pH and DO values complied with the adopted water quality stream standards. While 94% of the measured total nitrogen complied with proposed water quality standard of 1250ug/L, and 83% of the measured total phosphorus complied with proposed water quality standard of 110ug/L.

Segment 6a (Sites 16a and 18)
100% of the measured pH, dissolved oxygen, and Total Nitrogen met water quality standards, and 95% of the measured total phosphorous met the proposed water quality standard of 110ug/L.

Segment 6b (Site 19)
100% of the measured parameters complied with adopted and proposed water quality standards for all parameters except total phosphorous which complied 83%.

Segment 2 (sites 45and 90)
pH, and DO, complied 100% with water quality standards, while Total nitrogen complied 90%, with proposed standard of 1250 ug/L and Total Phosphorous complied 97% with proposed water quality standard of 110 ug/L.

Summary

Temperature Compliance

Segments 1a, 1b, 1c, 1d, 1e, 2, 3, 5, and Turkey Creek Segments 6a and 6b showed no impairment during both the cold- and warm Seasons. Comparisons with adopted temperature standards resulted in **100%** compliance for the WAT and **99.5%** compliance for the DM calculated for the calendar year throughout the Watershed, utilizing the 85th percentile qualifier. Comparisons with adopted temperature standards for the Warm season resulted in **100%** compliance for the calculated WAT and **99.9%** compliance for the calculated DM. A comparison with the adopted temperature standards for the cold season resulted in **100%** compliance for the calculated WAT and **100%** compliance for the calculated DM, at the monitored locations of the Watershed, utilizing the 85th percentile qualifier. A comprehensive temperature data collection effort spanning January through December, summarized in **258,646** 30- minute measurements at 25 in-stream/lake sites throughout the watershed, excluding the WWTP facilities, provided the data for analyses.

The evaluation of the entirety of temperature data logger measurements during the calendar year at 25 sites in the Watershed from Mt. Evans Wilderness to just below Bear Creek Lake in Lakewood and Turkey Creek do not indicate that a problem exists, either man-induced or natural, when compared to water quality standards. Compliance exceedance issues only occurred during the warm season in segment **2** for the Daily Max. Compliance issues only occurred during the cold season in segment **1a** and **3** for the daily max which only occurred during the shoulder season.

Wastewater plant discharges into Bear Creek did not cause temperature impairment. A comprehensive temperature data collection effort from January 1 through December 31, 2019, summarized in **87,554** 30-minute measurements in five wastewater treatment plant effluents that discharge into Bear Creek Segment 1e and 1b, and 5 showed no evidence of thermal pollution downstream of the discharge points. Although only three of the five WWTPs that discharge into Segments 1e, 1b, and 5 have temperature discharge requirements, the resulting data collected and presented do not indicate evidence of impairment due to temperature when analyzing the downstream data.

Water Quality Compliance

Segments 1a, 1b, 1d, 1e, 2, 3, 4a, 5, 7, 8 and Turkey Creek Segments 6a and 6b showed little water quality impairment. Sampling and monitoring were performed at 42+ sites within the watershed at varying intervals ranging from samples throughout the year to sampling 1 time throughout the season. **245** measurements of pH and DO were performed at these Sites. 100% compliance for pH and Dissolved oxygen were achieved. **184** samples were analyzed for Total nitrogen and Total phosphorus. Sampling results show 96% compliance for proposed Total nitrogen of 1250ug/L and 93% compliance for proposed Total phosphorus of 110ug/L.

Wastewater plant discharges into Bear Creek result in no evidence of water quality impairment. All five larger wastewater treatment plants met discharge limits stated in their Colorado Discharge Pollutant Elimination System (CDPES) permit for pH, Total Phosphorous and Total Ammonia during 2019. Wastewater treatment plant effluents had no detrimental effect on the water quality of Segment 1e, 1b, and 5. There were no observed impairment issues or temperature issues in the Watershed due to wastewater plant effluents during the program.

Bear Creek stream flows were slightly below average when compared to historical data for the month of May at both USGS stations, above Evergreen Lake and in Morrison. The stream gage above Morrison followed the Evergreen gage values for the other months of the growing season as well. The stream flows remained above average for monthly historic averages in June and July. The remaining months, August through October showed flows that were average to historical flows.
Weather and climate in the May through September timeframe were approximately average to below average as compared to historic averages. Flows from May to September were average compared to historical average. The Average Monthly Mean temperatures were slightly higher than historical data for July through September. The Average Monthly Maximum temperatures were slightly higher for July through September. The Average Daily Minimum temperatures were slightly higher or equal to historical averages in all months.

Watershed Monitoring

WWTP Effluent Temperature and Water Quality

The Process Control and permit sampling and monitoring summaries in the tables below are annual summaries, from January through December. Data logger temperature measurements of plant effluent were obtained at the identical frequency of the in-stream data loggers (30-minute intervals) during a study period of January 1 through December 31and broken into a cold and warm season per the listing requirements. The tables are listed in a downstream direction, as the effluents enter Bear Creek, from the EMD WWTP to the Morrison WWTP. Test results for ammonia, nitrate, nitrite and phosphorous are provided by the wastewater treatment plant laboratories for EMD, WJCMD, KSWD, GWSD, and MORR and results are represented in ug/L. TIN was determined as the sum of ammonia, nitrate and nitrite. Averaged pH values are for statistical analyses only. The Town of Morrison utilizes a contract laboratory for analyses.

Table 8 Evergreen Metropolitan District (Site 20)

EMD WWTP Effluent Summary 2019									
2019 Process Control and Permit Sampling and Monitoring									
Parameter	pH, SU	Temp, °C	D. O., mg/L	Total NH3-N, ug/L	NO3-N, ug/L	NO2-N, ug/L	TIN, ug/L	Total P, ug/L	Flow, MGD
Min	6.27	6.70	0.50	43.8	242	12	850	22	0.32
Max	7.15	20.20	6.30	8210	8510	186	14064	1520	0.62
Avg	6.53	13.13	4.38	1703.18	4939.22	60.27	6772.86	275.42	0.44
Std. Dev.	0.12	4.41	0.50	1822.93	1734.68	39.52	2378.30	239.78	0.05
Measurements	263	250	249	51	51	51	47	53	365
Exceedances	0			TVS				0	N/A

Effluent Datalogger Temperature Summary: Cold Season/Warm Season 2019						
All Temperatures in °C	30-Min Temp. COLD/WARM		Daily Avg. Temp. COLD/WARM		Weekly Avg. Temp. COLD/WARM	
Min	6.79	7.9	6.85	8.0	7.18	8.6
Max	13.52	20.0	13.36	19.8	13.26	19.8
Avg	9.17	15.6	9.17	15.6	9.23	15.7
Std. Dev.	1.92	3.5	1.92	3.5	1.96	3.5
Measurements	7225	10272	151	214	20	30

[Data logger ID: EMD5 GPS Coordinates: 39.6376□N, 105.3150□W; Sampling/monitoring site is the EMD WWTP effluent. The data logger is in the UV channel just upstream of the outfall. Effluent flows directly from the UV building to Bear Creek.] Notes: Discharge permit limits for Total Ammonia (NH3-N), in ug/L are as follows: Jan.-**9,900**, Feb.-**9,900**, Mar.-**12,000**, Apr.-**13000**, May-**17,000** June-**16,000** July **9,400** Aug. **7,700** Sept.-**7,900**; Oct.-**5,700**; Nov.-**6,900**; Dec.-**9,200**; **pH 6.1-9.0**. New methodology for calculating DM and MWAT in accordance with the new permit is now in effect as of August 1, 2013.

Table 9 West Jefferson County Metropolitan District (Site 21)

WJCMD WWTP Effluent Summary 2019									
2019 Process Control and Permit Sampling and Monitoring									
Parameter	pH, SU	Temp, °C	D. O., mg/L	Total NH3-N, ug/L	NO3-N, ug/L	NO2-N, ug/L	TIN, ug/L	Total P, ug/L	Flow, MGD
Min	6.42	8.50	1.63	72.9	80	8	230	10	0.30
Max	7.24	18.60	5.00	7990	8900	135	11439	500	0.58
Avg	6.72	13.12	3.16	1311.01	1763.40	43.16	3140.41	227.23	0.44
Std. Dev.	0.13	3.25	0.42	1643.53	1769.02	28.39	2520.29	105.43	0.05
Measurements	340	240	240	59	57	57	57	57	365
Exceedances	0			TVS				0	N/A

Effluent Data Logger Temperature Summary Cold/warm Seasons 2019						
All Temperatures in °C	30-Min Temp. COLD/WARM		Daily Avg. Temp. COLD/WARM		Weekly Avg. Temp. COLD/WARM	
Min	7.90	-3.7	8.31	4.8	8.49	8.2
Max	13.35	18.9	13.17	18.6	13.11	18.4
Avg	10.10	14.9	10.09	14.9	10.14	14.9
Std. Dev.	1.46	3.0	1.45	3.0	1.48	3.0
Measurements	7225	10272	151	214	20	30

[Data logger ID: WJ6 GPS Coordinates: 39.6621□N, 105.3351□W; Sampling/monitoring site is the WJCMD

WWTP effluent. The data logger was in the end of the abandoned chlorine contact chamber. (Disinfection currently occurs by UV radiation.) The effluent flows into a ditch and joins Troublesome Gulch just outside the plant boundary. Troublesome Gulch flows to Kittredge and combines with Bear Creek at the west end of Kittredge.] Notes: Discharge permit limits for Total Ammonia (NH3-N), in ug/L are as follows: Jan.-**8000**, Feb.-**7400**, Mar.-**6800**, Apr.-**5400**, May-**5000** June-**4000** July-**3200** Aug.-**3500** Sept.-**3700**; Oct.-**4300**; Nov.-**5400**; Dec.-**7400**; **pH 6.4-9.0**. New methodology for calculating DM and MWAT in accordance with the new permit is now in effect.

Table 10 Kittredge Sanitation and Water District (Site 22)

KSWD WWTP Effluent Summary 2019									
2019 Process Control and Permit Sampling and Monitoring									
Parameter	pH, SU	Temp, °C	D. O., mg/L	Total NH3-N, ug/L	NO3-N, ug/L	NO2-N, ug/L	TIN, ug/L	Total P, ug/L	Flow, MGD
Min	6.62	3.90	1.12	68.9	140	42	3740	70	0.01
Max	7.70	20.90	17.70	9330	11000	2130	6627	560	0.08
Avg	7.01	14.03	6.43	1648.92	4435.83	214.42	5402.63	274.75	0.05
Std. Dev.	0.20	4.93	2.10	2133.73	2234.09	405.95	1059.66	134.92	0.01
Measurements	252	232	232	50	24	24	8	24	365
Exceedances	0			TVS				0	N/A

Effluent Data Logger Temperature Summary Cold/warm Seasons 2019						
All Temperatures in °C	30-Min Temp. COLD/WARM		Daily Avg. Temp. COLD/WARM		Weekly Avg. Temp. COLD /WARM	
Min	3.6	6.6	4.0	11.0	4.3	11.3
Max	14.6	23.6	14.1	21.4	13.9	21.2
Avg	9.0	17.0	9.0	17.0	8.9	17.1
Std. Dev.	3.4	3.05	3.4	2.96	3.4	2.95
Measurements	7248	10272	151	214	21	30

[Data logger ID: KSWD8 GPS Coordinates: 39.6585□N, 105.2868□W; Sampling/monitoring site is the KSWD WWTP effluent. The data logger was located near the flow-measuring flume, just upstream of the outfall. Effluent flows from the data logger location under Highway 74 to the outfall in Bear Creek.] Notes: Discharge permit limits for Total Ammonia (NH3-N), in ug/L are as follows: Jan.-**10,100**, Feb.-**4,500**, Mar.-**5,300**, Apr. **7400**, May-**10000** June-**12000** July-**5300** Aug.-**4300** Sept.-**4400**; Oct.-**5200**; Nov.-**17000**; Dec **14000**; **pH 6.0-9.0**

Table 11 Genesee Water and Sanitation District (Site 23)

GWSD WWTP Effluent Summary 2019									
2019 Process Control and Permit Sampling and Monitoring									
Parameter	pH, SU	Temp, °C	D. O., mg/L	NH3-N, ug/L	NO3-N, ug/L	NO2- N, ug/L	TIN, ug/L	Total P, ug/L	Flow, MGD
Min	6.55	8.50	6.63	0	1830	1	3590	0.27	0.13
Max	7.70	21.20	8.89	2760	12150	1160	15280	830	0.37
Avg.	7.08	14.11	7.87	377.95	5895.8	50.82	6324.6	409.00	0.25
Std. Dev.	0.20	3.47	0.59	598.57	2093.9	157.37	2144.1	172.06	0.03
Measurements	364	364	365	56	56	56	56	56	365
Exceedances	0			TVS				0	N/A

Effluent Datalogger Temperature Summary COLD/WARM Seasons 2019						
All Temperatures in °C	30-Min Temp. COLD/WARM		Daily Avg. Temp COLD/WARM		Weekly Avg. Temp COLD/WARM	
Min	8.5	9.2	8.6	9.4	8.7	9.7
Max	14.7	19.7	14.6	19.5	14.4	19.4
Avg	10.6	15.5	10.6	15.5	10.6	15.5
Std. Dev.	1.7	3.2	1.7	3.2	1.7	3.2
Measurements	7248	10272	151	214	21	30

[Data logger ID: GWSD9A GPS Coordinates: 39.6732N, 105.2712W; Sampling/monitoring site is the GWSD WWTP effluent. The data logger was in a wet well, just upstream of the outfall at the plant. Effluent flows from the data logger location into a drainage, down to and under Highway 74 at the west end of Lair o' the Bear Park, and into Bear Creek.] Notes: Discharge permit limits for Total Ammonia (NH3-N), in ug/L are as follows: Jan.-**8000**, Feb.-**8100**, Mar.-**8000**, Apr.-**6000**, May-**6000** June-**5600** July-**5000** Aug.-**4800** Sept.-**5100**; Oct.-**5500**; Nov.-**6000**; Dec.-**7100**; pH **6.5-9.0**

Table 12 Town of Morrison (Site 24)

Morrison WWTP Effluent Summary 2019									
2019 Process Control and Permit Sampling and Monitoring									
Parameter	pH, SU	Temp, °C	D. O., mg/L	Total NH3-N, ug/L	NO3- N, ug/L	NO2- N, ug/L	TIN, ug/L	Total P, ug/L	Flow, MGD
Min	6.82	4.80	5.24	60				100	0.02
Max	7.71	22.20	8.21	2780				360	0.19
Avg	7.27	13.67	6.49	527.50				199.17	0.08
Std. Dev.	0.11	5.08	0.62	856.30				87.22	0.03
Measurements	365	365	365	12				12	365
Exceedances	0		0	0				0	N/A

Effluent Datalogger Temperature Summary COLD/WARM Seasons 2019						
All Temperatures in °C	30-Min COLD/WARM		Daily Avg. Temp. COLD/WARM		Weekly Avg. Temp. COLD/WARM	
Min	3.0	8.1	5.0	9.1	6.0	11.1
Max	12.8	25.2	11.9	22.6	11.1	22.4
Avg	8.0	17.4	8.0	17.4	8.1	17.6
Std. Dev.	1.8	3.84	1.8	3.76	1.6	3.62
Measurements	7248	10272	151	214	21	30

[Datalogger ID: MORR12 GPS Coordinates: 39.6541□N, 105.1796□W; Sampling/monitoring site is the MORR WWTP effluent. The datalogger was in a wet well, just upstream of the outfall at the plant. Effluent flows from the datalogger location into a pipe, under Bear Creek Rd, and into Bear Creek.] Notes: Discharge permit limits for Total Ammonia (NH3-N), in ug/L are as follows: Jan.-**10,000**, Feb.-**8,600**, Mar.-**10,000**, Apr.-**10,000**, May-**8,600** June-**20,000** July-**30,000** Aug.-**28,000** Sept.-**28,000**; Oct.-**16,000**; Nov.-**14,000**; Dec.-**10,000**; pH 6.5-9.0

Other Small Treatment Facilities

Tiny Town and Brookforest provided no effluent summary to the BCWA.

Bear Creek Stream Segments

Sampling and monitoring were performed by Evergreen Metropolitan District personnel and watershed associates. Laboratory analyses were performed by a contract facility. A summary table for each segment is presented before individual site tables in that segment. When there is only one site per segment, the summary table is omitted. Sites where only warm season temperature data exists have Cold-season portions of the table blacked out. The following applies to all segment data tables: Existing stream standards: Table Value Standard (TVS) for total ammonia (NH3-N), chronic; 10 mg/L (10,000 ug/L) nitrate (NO3-N), chronic; pH 6.5- 9.0 SU; DO 6.0 mg/L; TIN was determined as the sum of ammonia and nitrate + nitrite. Threshold to Evaluate potential temperature impairment: WAT (Weekly Average Temperature), DM (Daily Maximum Temperature), Segment-specific; 2-HR Avg. Temperature data are calculations used to evaluate against DM.

Segment 8 (Mt Evans Wilderness)

Table 13 Summit Lake Site 36 (In Summit Lake near outlet) Segment 8

Monthly Parameter Results	pH, SU	Temp °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.1	0.4	8.7	20.8	237.0	6.0
Max	8.6	9.1	9.6	24.9	944.0	255.0
Avg	7.8	4.6	9.1	22.9	442.4	67.0
Std. Dev.	0.61	3.29	0.38	1.35	258.15	95.22
Measurements	5	5	5	5	5	5

[Monitoring station GPS Coordinates: 39.5979 □N, 105.6411 □W; Sampling /monitoring site is in Summit Lake, near outlet.]

Segment 7 (Sites 37, 76, 95, and 63)

Table 14 Summary Sites 37, 76, 95 and 63

Monthly Parameter Results	pH SU	Temp, °C	D. O., mg/L	Sp. Cd. us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	6.85	0.1	2.5	6.9	26	6

Max	8.10	10.30	10.21	57.90	4581.00	4709
Avg	7.57	5.41	6.54	29.64	580.18	351.41
Std. Dev.	0.35	3.03	2.09	12.80	1018.19	1095.52
Measurements	17	17	17	17	17	17

[Monitoring station GPS Coordinates: 39.5955 □N, 105.6334 □W; Sampling /monitoring site is in Bear Creek, downstream of outlet from Summit Lake.]

Table 15 (Site 37) Mount Evans Main stem ¼ mile downstream

Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.0	0.1	8.2	21.1	244.0	6.0
Max	8.0	8.4	10.2	33.3	345.0	18.0
Avg	7.5	4.2	9.1	26.0	297.2	11.6
Std. Dev.	0.34	2.89	0.66	4.18	39.47	5.16
Measurements	5	5	5	5	5	5

Table 16 (Site 76) Between 2 large ponds on east side of Summit Lake outfall. Segment 8

Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.6	2.5	5.7	18.2	365.0	15.0
Max	7.8	8.1	7.9	24.4	866.0	34.0
Avg	7.7	6.0	6.6	22.0	593.3	26.3
Std. Dev.	0.12	2.50	0.92	2.72	206.92	8.18
Measurements	3	3	3	3	3	3

Table 17 (Site 95) Segment 8 South Fen Reference site

Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	6.9	4.4	5.1	6.9	26.0	9.0
Max	7.7	10.3	7.6	35.9	386.0	115.0
Avg	7.5	6.8	6.2	21.0	154.0	38.5
Std. Dev.	0.37	2.42	0.93	11.72	137.75	44.24
Measurements	4	4	4	4	4	4

Table 18 (Site 63) Segment 8 Below site 36, above 2nd pond, middle of 1st pond

Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.0	0.1	2.5	29.1	215	46
Max	8.1	9.8	5.5	57.9	4581	4709
Avg	7.6	5.1	4.2	44.8	1,196.2	1,136.6
Std. Dev.	0.40	3.34	1.08	9.44	1696.30	1790.30
Measurements	5	5	5	5	5	5

Segment 1a (Above Evergreen Lake)

Table 19 Segment 1a Summary

Segment 1a Sampling/Monitoring Summary 2019						
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	6.80	0.10	9.52	35.10	152.00	6.00
Max	8.5	15.9	13.9	72	281	41
Avg	7.77	8.10	11.25	49.18	207.33	15.72
Std. Dev.	0.43	4.05	1.52	9.45	38.33	10.19
Measurements	18	18	18	18	18	18
Segment 1a Data logger Temperature Summary 2019						

All Temperatures in °C	30-Min Temp. COLD/ WARM SEASONS		Oct 1-May 31 Stream Std. WAT (9°C)	Oct 1-May 31 2-Hr Avg. Temp.	Oct 1-May 31 Stream Std. DM (13°C)	June 1-Sept 30 Stream Std. WAT (17°C)	June 1-Sept 30 2- HR Avg. Temp.	June 1-Sept 30 Stream DM (21.2 °C)
Min	-0.1	2.6	1.4	0.0	0.1	6.0	2.7	6.8
Max	13.6	19.0	8.8	13.5	13.5	15.1	18.9	18.9
Avg	5.2	11.2	5.1	5.2	7.6	11.3	11.2	13.3
Measurements	9425	17568	26	2355	195	51	4392	366
9°C WAT exceeded			0					
% Compliance WAT			100%					
13°C DM exceeded					1			
% Compliance					99%			
17°C WAT exceeded						0		
% Compliance						100%		
21.2°C DM exceeded								0
% Compliance DM								100%

Table 20 Below Mount Evans Wilderness (Site 58)

5 Monthly Sampling/Monitoring Events J u n e 1 – October 31, 2019						
Monthly Results	pH, SU	Temp, °C	D.O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	3.5	0.1	9.8	35.1	197	6.0
Max	8.5	12.3	13.9	46.2	281	23.0
Avg	7.2	6.7	11.5	40.4	227	13.8
Std. Dev.	1.67	3.57	1.65	4.19	28.62	7.34
Measurements	6	6	6	6	6	6

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. Cold/warm Season		Oct 1-May 31Stream Std. WAT (9°C)	Oct 1-May 31 2-Hr Avg. Temp.	Oct 1-May 31 Stream Std. DM (13°C)	June 1-Sept 30 Stream Std. WAT (17°C)	June 1-Sept 30 2- HR Avg. Temp.	June 1-Sept30 Stream DM (21.2) °C
Min	0.0	2.6	1.4	0.0	0.1	6.0	2.7	6.8
Max	10.3	15.0	5.5	10.2	10.2	11.6	14.9	14.9
Avg	3.6	9.3	3.7	3.6	6.0	9.4	9.3	11.4
Std. Dev.	2.6	2.4	1.4	2.6	2.7	1.9	2.4	1.9
Measurements	2373	5856	7	593	49	17	1464	122
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 17°C WAT exceeded						0		
% Compliance WAT						100%		
# 21.2 °C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Datalogger ID: L&F GPS Coordinates: 39.6234 □N, 105.4451 □W; Sampling /monitoring site is in Bear Creek, above Lost & Found (old Singing River Ranch)

Table 21 Golden Willow Rd (Site 2a)

6 Monthly Sampling/Monitoring Events M a y 1 – October 31, 2019						
Monthly Results	pH, SU	Temp, °C	DO, mg/	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	6.8	2.0	10.0	42.5	152	6
Max	8.4	14.4	13.8	61.2	258	41
Avg	7.7	8.7	11.4	49.8	188.5	17.33
Std. Dev.	0.51	3.70	1.36	6.30	37.32	12.01
Measurements	6	6	6	6	6	6
Data logger Temperature Data 2019						

All Temperatures in	30-Min Temp. Cold/warm Season		Oct 1-May 31 Stream Std. WAT (9°C)	Oct 1-May 31 2-Hr Avg. Temp.	Oct 1-May 31 Stream Std. DM (13°C)	June 1-Sept 30 Stream Std. WAT (17°C)	June 1-Sept 30 2- HR Avg. Temp.	June 1-Sept 30 Stream DM (21.2°C)
Min	-0.1	4.4	2.4	0.0	2.8	8.7	4.5	8.5
Max	13.6	17.6	8.1	13.5	13.5	14.0	17.5	17.5
Avg	5.3	11.7	5.3	5.3	8.2	11.7	11.7	14.1
Std. Dev.	3.2	2.6	1.8	3.2	2.9	1.9	2.6	2.1
Measurements	3526	5856	10	881	73	17	1464	122
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13 °C DM exceeded					1			
% Compliance DM					99%			
# 17°C WAT exceeded						0		
% Compliance WAT						100%		
# 21.2°C DM exceeded								0
% Compliance DM								100%

Table 22 Above Evergreen Lake, at CDOW site (Site 3a)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019						
Monthly Parameter	pH, SU	Temp, °C	D.O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.4	2.7	9.5	46.9	165	6
Max	8.5	15.9	13.4	72.0	261	37
Avg.	7.8	9.5	10.9	57.3	205.83	16
Std. Dev.	0.36	3.91	1.47	8.21	37.75	10.36
Measurements	6	6	6	6	6	6

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/ WARM SEASONS		Oct 1-May 31 Stream Std. WAT (9°C)	Oct 1-May 31 2-Hr Avg. Temp.	Oct 1-May 31 Stream Std. DM (13°C)	June 1-Sept 30 Stream Std. WAT (17°C)	June 1-Sept 30 2- HR Avg. Temp.	June 1-Sept 30 Stream DM (21.2°C)
Min	-0.1	5.2	3.1	0.0	2.4	9.4	5.3	8.2
Max	13.0	19.0	8.8	13.0	13.0	15.1	18.9	18.9
Avg	6.1	12.7	6.1	6.1	8.2	12.7	12.7	14.6
Std. Dev.	3.0	2.6	2.0	3.0	2.8	1.9	2.5	2.2
Measurements	3526	5856	9	881	73	17	1464	122
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13 °C DM exceeded					0			
% Compliance DM					100%			
# 17°C WAT exceeded						0		
% Compliance WAT						100%		
# 21.2°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Data logger ID: ALKDOW GPS Coordinates: 39.6331 □N, 105.3372 □W; Sampling /monitoring site in Bear Creek above Evergreen Lake, at the CDOW fish survey site.]

Segment 1d (Evergreen Lake)

Sites 4a-4j comprise a profile monitoring station in Evergreen Lake. During the study period, sampling and monitoring were performed monthly at the individual site locations at this profile station. This data is presented below. Also, during the study period temperature data collected with data loggers at the individual site locations were analyzed and compared to state water quality standards.

Table 23 Segment 1d Summary

Segment 1d Sampling/Monitoring Summary 2019						
Monthly Results	pH, SU	Temp, °C	DO mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.08	4.8	4.21	53.7	204	10

Max	8.52	17.2	11.94	186.5	319	52
Avg	7.67	12.10	9.38	75.46	256.67	22.92
Std. Dev.	0.35	3.66	1.42	26.54	33.92	13.74
Measurements	69	69	69	69	12	12

Segment 1d Data logger Temperature Summary 2019							
All Temperatures in °C	30-Min Temp. WARM SEASONS	Oct 1-May 31 Stream Std. WAT (9°C)	Oct 1-May 31 2-Hr Avg. Temp.	Oct 1-May 31 Stream Std. DM (13°C)	June 1-Sept 30 Stream Std. WAT (17°C)	June 1-Sept 30 2- HR Avg. Temp.	June 1-Sept 30 Stream DM (21.2°C)
Min	5.7				7.8	5.9	7.5
Max	20.9				17.6	20.4	20.4
Avg	13.2				13.4	13.2	14.2
Measurements	34833				100	8708	724
# 18.2°C WAT					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance							100%

Table 24 Evergreen Lake Profile station 0.5 meters (Site 4A)

6 Monthly Sampling/6 Monitoring Events May 1-Oct. 31, 2019							
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen,	Total phosphorus ug/L	Chlorophyll A ug/L
Min	7.22	5.6	8.06	54.2	204	11	1.8
Max	8.52	17.2	11.94	120.8	319	21	8
Avg	8.0	12.9	9.8	74.1	253.8	15.0	4.3
Std. Dev.	0.47	3.84	1.30	22.56	35.13	3.65	2.19
Measurements	7	7	7	7	6	6	6

Data logger Temperature Summary 2019							
All Temperatures in °C	30-Min Temp. WARM SEASON	Jan 1-Mar 31 Stream Std. WAT (9 °C)	Jan 1-Mar 31 2-Hr Avg. Temp.	Jan 1-Mar 31 Stream Std. DM (1 °C 3)	Apr 1-Dec. 31 Stream Std. WAT (19.3 °C)	Apr 1-Dec 31 2-HR Avg. Temp.	Apr 1-Dec 31 Stream DM (23.8 °C)
Min	6.4				8.6	6.4	7.8
Max	20.9				17.6	20.4	20.4
Avg	13.5				13.7	13.5	14.6
Std. Dev.	3.4				3.1	3.4	3.4
Measurements	8709				25	2177	181
# 18.2°C WAT					0		
% Compliance					100%		
# 23.8°C DM							0
% Compliance DM							100%

[Monitoring station/Datalogger ID: EMD2A GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, on the surface, near the EMD WTP intake.] N/A* indicates temp. readings not taken.
N/A** Indicates no sampling at this location.

Table 25 Evergreen Lake, 1.0m below surface, near dam (Site 4b)

6 Monthly Sampling/6 Monitoring Events May 1-Oct. 31, 2019							
Monthly Parameter Results	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm			
Min	7.26	5.4	8.03	54.4			
Max	8.26	16.9	11.76	120.2			
Avg	7.8	12.7	9.6	74.0			
Std. Dev.	0.36	3.86	1.17	22.40			
Measurements	7	7	7	7			

Data logger Temperature Summary 2019							
All Temperatures in °C	30-Min Temp. WARM SEASON	Jan 1-Mar 31 Stream Std. WAT (9 °C)	Jan 1-Mar 31 2-Hr Avg. Temp.	Jan 1-Mar 31 Stream Std. DM (13 °C)	Apr 1-Dec. 31 Stream Std. WAT (19.3 °C)	Apr 1-Dec 31 2-HR Avg. Temp.	Apr 1-Dec 31 Stream DM (23.8 °C)

Min	6.4				8.5	6.4	7.7
Max	19.3				17.3	18.9	18.9
Avg	13.3				13.5	13.3	14.3
Std. Dev.	3.3				3.1	3.3	3.3
Measurements	8708				25	2177	181
# 18.2°C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							100%

[Monitoring station/Data logger ID: EMD2B GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, 1.5m below surface, near the EMD WTP intake.]

Table 26 Evergreen Lake, 1.5m below surface, near dam (Site 4c)

6 Monthly Sampling/6 Monitoring Events May 1-Oct. 31, 2019							
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm			
Min	7.19	5.4	7.57	53.9			
Max	8.17	16.9	11.69	120.4			
Avg	7.8	12.5	9.4	74.0			
Std. Dev.	0.33	3.79	1.35	22.55			
Measurements	7	7	7	7			

Data logger Temperature Summary 2019							
All Temperature in °C	30-Min Temp. WARM SEASON	Jan 1-Mar 31 Stream Std. WAT (9 °C)	Jan 1-Mar 31 2-Hr Avg. Temp.	Jan 1-Mar 31 Stream Std. DM (13 °C)	Apr 1-Dec. 31 Stream Std. WAT (19.3 °C)	Apr 1-Dec 31 2-HR Avg. Temp.	Apr 1-Dec 31 Stream DM (23.8 °C)
Min	6.2				8.3	6.4	7.7
Max	19.0				17.2	18.8	18.8
Avg	13.1				13.3	13.1	14.1
Std. Dev.	3.3				3.1	3.3	3.2
Measurements	8708				25	2177	181
# 18.2°C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							100%

[Monitoring station/Data logger ID: EMD2C GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, 2.5m below the surface, near the EMD WTP intake.]

Table 27 Evergreen Lake, 2.0m below surface, near dam (Site 4d)

6 Monthly Sampling/6 Monitoring Events May 1-Oct. 31, 2019							
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm			
Min	7.18	5.3	7.94	54			
Max	8.09	16.6	11.57	120.4			
Avg	7.7	12.3	9.6	74.0			
Std. Dev.	0.30	3.71	1.16	22.53			
Measurements	7	7	7	7			

Data logger Temperature Summary 2019							
All Temperature in °C	30-Min Temp. WARM SEASON	Jan 1-Mar 31 Stream Std. WAT (9 °C)	Jan 1-Mar 31 2-Hr Avg. Temp.	Jan 1-Mar 31 Stream Std. DM (13 °C)	Apr 1-Dec. 31 Stream Std. WAT (19.3 °C)	Apr 1-Dec 31 2-HR Avg. Temp.	Apr 1-Dec 31 Stream DM (23.8 °C)
Min	5.7				7.8	5.9	7.5
Max	18.9				17.0	18.7	18.7
Avg	12.9				13.1	12.9	13.7
Std. Dev.	3.3				3.1	3.3	3.1
Measurements	8708				25	2177	181
# 18.2°C WAT					0		

% Compliance					100%		
# 23.8°C DM							0
% Compliance							100%

[Monitoring station/Datalogger ID: EMD2D GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, 3.5m below the surface, near the EMD WTP intake.]

Table 28 Evergreen Lake, 2.5m below surface, near dam (Site 4e)

6 Monthly Monitoring Events May 1-Oct. 31, 2019				
Monthly Parameter Results	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm
Min	7.13	5.3	7.6	53.8
Max	8	16.4	11.66	120.4
Avg	7.7	12.1	9.6	73.9
Std. Dev.	0.30	3.60	1.26	22.57
Measurements	7	7	7	7

[Monitoring station/Datalogger ID: EMD4E GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, 2.5m below the surface, near the EMD WTP intake.]

Table 29 Evergreen Lake, 3.0m below surface, near dam (Site 4f)

6 Monthly Monitoring Events May 1-Oct. 31, 2019				
Monthly Parameter Results	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm
Min	7.13	5.3	7.63	53.7
Max	7.94	16.5	11.68	120.7
Avg	7.6	12.0	9.5	73.9
Std. Dev.	0.28	3.55	1.26	22.69
Measurements	7	7	7	7

[Monitoring station/Datalogger ID: EMD4f GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, 3.0m below the surface, near the EMD WTP intake.]

Table 30 Evergreen Lake, 3.5m below surface, near dam (Site 4g)

6 Monthly Monitoring Events May 1-Oct. 31, 2019				
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm
Min	7.11	5.2	7.6	54
Max	7.94	16.4	11.68	120.3
Avg	7.6	11.9	9.4	73.9
Std. Dev.	0.29	3.53	1.27	22.54
Measurements	7	7	7	7

Monitoring station/Datalogger ID: EMD4g GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, 3.5m below the surface, near the EMD WTP intake.]

Table 31 Evergreen Lake, 4.0m below surface, near dam (Site 4h)

6 Monthly Monitoring Events May 1-Oct. 31, 2019				
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm
Min	7.1	5.2	7.88	53.9
Max	7.87	16.4	11.51	127.4
Avg	7.6	11.9	9.3	74.9
Std. Dev.	0.28	3.52	1.14	24.66
Measurements	7	7	7	7

Monitoring station/Datalogger ID: EMD4h GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, 4.0m below the surface, near the EMD WTP intake.]

Table 32 Evergreen Lake, 5.0m below surface, near dam (Site 4i)

6 Monthly Sampling/6 Monitoring Monthly Monitoring Events May 1-Oct. 31, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.08	5	7.42	53.7	213	10
Max	7.84	16.2	11.68	139.1	317	52

Avg	7.5	11.7	9.1	76.5	259.5	30.8
Std. Dev.	0.25	3.48	1.34	28.34	32.43	15.45
Measurements	7	7	7	7	6	6

Monitoring station/Datalogger ID: EMD4i GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, 5.0m below the surface, near the EMD WTP intake.]

Table 33 Evergreen Lake, 6.0m below surface, near dam (Site 4j)

6 Monthly Monitoring Events May 1-Oct. 31, 2019				
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm
Min	7.08	4.8	4.21	53.7
Max	7.75	15.3	11.43	186.5
Avg	7.5	10.7	8.4	87.1
Std. Dev.	0.24	3.17	2.29	46.31
Measurements	6	6	6	6

Monitoring station/Data logger ID: EMD4j GPS Coordinates: 39.6314 □N, 105.3231 □W; Sampling /monitoring site in Evergreen Lake near the dam, 6.0m below the surface, near the EMD WTP intake.]

Segment 1e (Main stem below Evergreen Lake and Above Harriman Diversion)

Table 34 Segment 1e Summary

Segment 1e Sampling/Monitoring Summary 2019						
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.26	0	8.66	64.9	85	7
Max	8.84	18.9	13.92	425.6	867	152
Avg.	7.96	11.49	10.50	142.72	366.88	34.79
Std. Dev.	0.30	4.75	1.52	79.77	144.82	24.02
Measurements	40	40	40	40	34	34

Segment 1e Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/ WARM SEASON		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 -Hr. Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (19.3°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 Stream DM (23.8°C)
Min		0.1				3.5	0.1	1.5
Max		21.6				18.5	21.5	21.5
Avg.		12.4				12.4	12.4	14.4
Measurements		51675				150	12912	1078
# 19.3°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

Table 35 Downtown Evergreen, at CDOW site (Site 5) LOGGER REMOVED AND TAKEN

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019						
	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.4	7.3	9.0	64.9	85	7
Max	8.3	17.4	12.3	123.0	298	25
Avg	7.9	12.4	10.3	77.2	210.7	15.7
Std. Dev.	0.26	3.44	1.42	20.59	73.40	5.41
Measurements	6	6	6	6	6	6

SITE 5 Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASON		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std.	Apr 1-Oct 31 2- HR Avg. Temp.	Apr 1-Oct 31 Stream DM
Min		1.5				3.5	1.5	3.3
Max		21.0				17.5	20.4	20.4
Avg		12.3				12.3	12.3	13.5

Std. Dev.		4.4				4.3	4.4	4.3
Measurements		9431				28	2357	196
# 19.3°C WAT						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

Monitoring station/Data logger ID: LTLBAR GPS Coordinates: 39.6327 °N, 105.3183 °W; Sampling /monitoring site in Bear Creek near the west end of public parking lot, across from the Little Bear, CDOW fish survey site.]

Table 36 Bear Creek Cabins (Site 8a)

9 Monthly Sampling/Monitoring Events March - November, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.5	7.2	8.7	71.9	239	18
Max	8.3	18.9	12.3	137.6	442	43
Avg.	7.8	12.9	10.1	94.3	359.17	28
Std. Dev.	0.29	3.79	1.51	21.97	82.61	9.98
Measurements	6	6	6	6	6	6

Site 8a Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/ WARM SEASON		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (19.3°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct31 Stream DM (23.8°C)
Min		1.2				3.9	1.3	4.2
Max		21.2				17.6	21.0	21.0
Avg.		12.4				12.4	12.4	14.1
Std. Dev.		4.4				4.2	4.4	4.2
Measurements		9430				28	2357	196
# 19.3°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Data logger ID: BCCDOW GPS Coordinates: 39.6425°N, 105.3084°W; Sampling/ monitoring site at bridge above the Bear Creek Cabins WWTP effluent discharge, at the CDOW fish survey site.

Table 37 O'Fallon Park (site 9)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.8	6.5	8.8	82.7	202	14
Max	8.3	18.4	12.9	160.4	418	44
Avg	8.0	12.9	10.6	113.5	315.33	32.83
Std. Dev.	0.16	3.76	1.58	25.47	64.80	10.62
Measurements	6	6	6	6	6	6

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASON		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (19.3°C)	Apr 1-Oct 31 2- HR Avg. Temp.	Apr 1-Oct 31 Stream DM
Min		0.8				4.3	0.8	4.8
Max		21.0				17.7	20.7	20.7
Avg		12.2				11.8	12.2	14.4
Std. Dev.		4.7				4.3	4.6	4.3
Measurements		7367				20	1841	153
# 19.3°C WAT						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Data logger ID: OFPDOW GPS Coordinates: 39.6564N, 105.2917W; Sampling/ monitoring site north

side of the creek above ETU restoration site, at the CDOW fish survey site.]

Table 38 Liar O' the Bear Park (Site 12)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.8	5.6	9.0	93.4	351	31
Max	8.3	17.1	13.9	173.5	644	55
Avg	7.9	12.7	10.6	137.5	438.5	42.17
Std. Dev.	0.15	3.80	1.80	31.08	101.33	9.42
Measurements	6	6	6	6	6	6

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASON		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std.	Apr 1-Oct 31 2- HR Avg. Temp.	Apr 1-Oct 31 Stream DM
Min		0.2				4.5	0.2	5.6
Max		21.5				17.8	21.4	21.4
Avg		12.2				12.5	12.2	14.6
Std. Dev.		4.6				4.0	4.6	4.3
Measurements		9210				26	2302	191
# 19.3°C WAT						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Data logger ID: LOBDOW GPS Coordinates: 39.6672N, 105.2687W; Sampling/ monitoring site in Bear Creek at the end of main path to Bear Creek from the parking lot, at the CDOW fish survey site.]

Table 39 Idledale (Shady Lane-Site 13a)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.7	5.7	8.8	92.6	307	22
Max	8.2	16.7	12.9	186.2	622	56
Avg	7.9	12.6	10.4	141.5	424.67	36.17
Std. Dev.	0.15	3.56	1.55	35.87	109.81	11.78
Measurements	6	6	6	6	6	6

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/ WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31. 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (19.3°C)	Apr 1-Oct 31 2-HR	Apr 1-Oct 31 Stream DM (23.8°C)
Min		0.1				4.8	0.1	5.8
Max		21.6				18.0	21.5	21.5
Avg		12.5				12.4	12.5	14.9
Std. Dev.		4.6				4.2	4.6	4.3
Measurements						27	2306	192
# 19.3°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Data logger ID: IDLE GPS Coordinates: 39.6621°N, 105.2406°W; Sampling/ monitoring site in Bear Creek at the CDOW fish survey site.]

Table 40 West End of Morrison (Site 14a)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019						
Monthly Parameter Results	pH, SU	Temp C	DO, mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.3	0.0	9.3	103	276	24
Max	8.8	15.8	13.0	425.6	867	152

Avg	8.2	7.8	10.9	232.5	496	63.50
Std. Dev.	0.41	5.65	1.22	102.92	223.83	51.64
Measurements	10	10	10	10	4	4

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/ WARM		Nov 1-Mar 31 Stream Std. WAT	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 (23.8°C)
Min		0.1				5.5	0.2	1.5
Max		21.1				18.5	21.0	21.0
Avg		13.1				12.9	13.1	14.8
Std. Dev.		4.4				4.1	4.4	4.3
Measurements		7009				21	1749	150
# 19.3°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Datalogger ID: MORR10 GPS Coordinates: 39.6529□N, 105.2003□W; Sampling/ monitoring site west end of Morrison, at the gated bridge to Denver Mountain parks Headquarters, at the CDOW fish survey site.]

Table 41 East End of Morrison (Site 14c)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019						
Monthly	pH,	Temp °C	D. O.,	Sp. Cd., us/cm	CU ug/L	CaCO3 mg/L
Min						
Max						
Avg						
Std. Dev.						
Measurements						

Segment 1b (Below Harriman Diversion) (Site 15a)

Table 42 Segment 1b Summary

Segment 1b Sampling/Monitoring Summary 2019						
Monthly Parameter Results	pH, SU	Temp, °C	DO., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.21	0.30	8.45	130.00	334.00	16.00
Max	8.67	17.30	12.82	604.00	2028.00	121.00
Avg	8.25	9.07	10.42	312.73	798.80	42.47
Std. Dev.	0.37	5.99	1.66	149.82	464.90	27.52
Measurements	15	15	15	15	15	15

Segment 1b Data logger Temperature Summary 2019								
All Temperatures in C	30-Min Temp. COLD/WARM SEASONS Nov 1-Mar		31 Stream Std. WAT (9°C) Nov 1-	31 2-Hr Avg. Temp.	Nov 1-Mar 31Stream Std. DM (13°C)	Apr 1-Oct 31Stream Std. WAT (19.3°C)	Apr 1-Oct 312-HR Avg. Temp.	Apr 1-Oct 31 Stream DM
Min	-0.2	-0.2	0.0	-0.2	-0.2	2.9	-0.2	-0.2
Max	7.9	20.7	4.7	7.9	7.9	18.4	20.7	20.7
Avg	1.7	12.2	1.9	1.7	2.9	12.4	12.2	13.9
Std. Dev.	2.1	5.0	1.7	2.1	2.6	4.5	5.0	4.9
Measurements	2279	10221	6	569	47	30	2554	213
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 19.3°C WAT						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Datalogger ID: MORR11 GPS Coordinates: 39.6522 □N, 105.1731 □W; Monitoring site in Bear Creek near USGS gage in Bear Creek Park.]

Segment 3

Table 43 Segment 3 Summary (Site 25)

Segment 3 Sampling/Monitoring Summary 2019						
Monthly Parameter Results	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.57	0.4	9.68	37.7	61	6
Max	8.55	12.3	13.58	86.1	149	14
Avg	7.98	7.15	11.30	64.17	108.50	9.17
Std. Dev.	0.34	3.70	1.51	14.84	31.94	3.13
Measurements	6	6	6	6	6	6

Segment 3 Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/ WARM SEASON		Nov 1- Mar 31 Stream Std. WAT (9C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (17.0°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct31 Stream DM (21.2°C)
Min	0.0	3.5	3.2	0.1	2.9	8.3	3.5	9.6
Max	14.0	18.6	8.1	13.9	13.9	13.7	18.4	18.4
Avg	5.6	11.4	5.6	5.6	8.9	11.5	11.4	14.6
Std. Dev.	3.2	2.9	1.5	3.2	2.8	1.8	2.9	2.2
Measurements	2372	5787	7	593	49	17	1446	121
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					1			
% Compliance DM					99%			
# 19.3°C WAT						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Datalogger ID: ALKMEL GPS Coordinates: 39.6322°N, 105.4558°W; Sampling/ monitoring site in Vance Creek.]

Segment 5

Table 44 Segment 5 Summary

Segment 5 Sampling/Monitoring Summary 2019						
Monthly Parameter Results	pH, SU	T°C emp	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.24	2.4	8.65	152.1	87	18
Max	8.46	22.2	13.32	810.9	1420	153
Avg	7.85	10.22	10.62	571.30	589.61	65.28
Std. Dev.	0.31	4.13	1.47	256.20	343.64	46.16
Measurement	18	18	18	18	18	18

Segment 5 Data logger Temperature Summary 2018								
All Temperatures in °C	30-Min Temp. COLD/ WARM SEASON		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HRAvg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min		-0.1				1.9	-0.1	1.5
Max		19.8				15.7	19.5	19.5
Avg		9.9				10.0	9.9	12.5
Std. Dev.		4.8				4.3	4.8	4.5
Measurements		9431				28	2357	196
# 17°C WAT exceeded						0		
% Compliance WAT						100%		
# 21.2°C DM exceeded								
% Compliance DM								0
# 9°C WAT exceeded								100%

Table 45 Upper Troublesome Creek (site 64)

6 Monthly Sampling/Monitoring Events May 1- October 31, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.3	3.9	8.87	772	229	29
Max	8.46	22.2	12.55	810.9	838	66
Avg	7.88	10.93	10.31	787.98	525.50	47.83
Std. Dev.	0.40	5.66	1.43	14.73	203.13	16.46
Measurements	6	6	6	6	6	6

Table 46 Lower Troublesome Creek (Site 32)

6 Monthly Sampling/Monitoring Events May 1- October 31, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.7	5.9	8.7	652.8	324	26
Max	8.1	12.5	12.3	739.0	1420	153
Avg	7.9	10.9	10.4	711.0	868.67	115.33
Std. Dev.	0.15	2.36	1.45	32.81	374.34	44.18
Measurements	6	6	6	6	6	6

Table 47 Cub Creek Mouth (Site 26)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019								
Monthly Parameter Results	pH, SU		Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L	
Min	7.2		2.4	9.6	152.1	87.0	18.0	
Max	8.3		11.4	13.3	272.3	691.0	70.0	
Avg	7.8		8.8	11.1	215.0	374.7	32.7	
Std. Dev.	0.32		3.25	1.40	46.61	211.42	17.16	
Measurements	6		6	6	6	6	6	
Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min		-0.1				1.9	-0.1	1.5
Max		19.8				15.7	19.5	19.5
Avg		9.9				10.0	9.9	12.5
Std. Dev.		4.8				4.3	4.8	4.5
Measurements		9431				28	2357	196
# 18.2°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0

Turkey Creek Stream Segments (Segment 6a South Turkey Creek)

Table 48 Segment 6a Summary

Segment 6a Sampling/Monitoring Summary 2019								
Monthly Parameter Results	pH, SU		Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L	
Min	7.50		0.80	6.85	782.00	246	2	
Max	8.72		16.40	18.66	2145	900	135	
Avg	8.06		10.02	10.97	1521.75	601.71	32.95	
Std. Dev.	0.34		5.55	2.56	405.68	170.62	34.39	
Measurements	21		21	21	20	21	21	
Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min	-0.1	-0.1	-0.1	-0.1	-0.1	4.4	-0.1	1.4
Max	7.8	23.2	5.2	7.8	7.8	18.2	22.9	22.9

Avg	1.2	12.2	1.2	1.2	1.8	12.3	12.2	14.6
Std. Dev.	1.9	4.68	1.7	1.9	2.4	4.14	4.68	4.52
Measurements	6290	18764	17	1572	130	55	4690	390
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 18.2°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								100%

Table 49 South Turkey Creek in Bear Creek Lake Park (Site 16a)

15 Monthly Sampling/Monitoring Events January 1-December 31, 2019						
Monthly Parameter	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.5	0.8	8.7	782	404.0	2.0
Max	8.7	16.4	13.4	2145	900.0	135.0
Avg	8.2	8.8	11.1	1546.53	666.0	30.5
Std. Dev.	0.29	5.69	1.60	432.25	150.07	36.03
Measurements	15	15	15	15	15	15

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min	-0.1	-0.1	1.9	-0.1	1.6	4.4	-0.1	1.4
Max	7.8	21.1	5.2	7.8	7.8	18.2	21.0	21.0
Avg	3.3	12.2	3.4	3.3	4.7	12.2	12.2	14.3
Std. Dev.	1.7	4.8	1.1	1.7	1.6	4.4	4.8	4.6
Measurements	2278	10146	6	569	47	30	2536	211
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 18.2°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Datalogger ID: TURK2 GPS Coordinates: 39.6394□N, 105.161□W; Sampling/ monitoring site in Turkey Creek, inside Bear Creek Lake Park, at the maintenance shop site.]

Table 50 Aspen Park Metropolitan District, South Turkey Creek (Site 18)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.5	5.2	6.85	1002	246	16
Max	7.94	16.1	18.66	1927	524	103
Avg	7.7	13.0	10.7	1447.4	441.0	39.2
Std. Dev.	0.16	3.81	4.07	300.68	97.12	28.98
Measurements	6	6	6	5	6	6

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min	-0.14	0.8	-0.08	-0.14	-0.12	5.9	0.9	3.5
Max	1.21	23.2	0.34	1.11	1.11	17.2	22.9	22.9
Avg	0.04	12.3	0.05	0.04	0.12	12.5	12.3	15.0
Std. Dev.	0.16	4.56	0.12	0.16	0.25	3.85	4.55	4.36
Measurements	4012	8618	11	1003	83	25	2154	179
# 9°C WAT exceeded			0					

% Compliance WAT	100%					
# 13°C DM exceeded		0				
% Compliance DM		100%				
# 18.2°C WAT exceeded				0		
% Compliance WAT				100%		
# 23.8°C DM exceeded						0
% Compliance DM						100%

[Monitoring station/Datalogger ID: APMD1 GPS Coordinates: 39.5461°N, 105.2708°W; Sampling/ monitoring site in South Turkey Creek downstream of the APMD WWTP.]

Segment 6b (North Turkey Creek)

Table 51 Conifer Metropolitan District, North Turkey Creek (Site19)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.66	3.2	8.52	223.2	191	12
Max	8.09	12.5	12.89	750	558	21
Avg	7.9	9.8	10.3	479.98	344.6	14.4
Std. Dev.	0.15	3.31	1.79	189.82	122.75	3.38
Measurements	6	6	6	6	5	5

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min	-0.1	0.0	0.0	-0.1	0.0	4.5	0.0	1.0
Max	10.5	18.8	5.5	10.3	10.3	14.4	18.8	18.8
Avg	1.3	11.2	0.9	1.3	2.1	11.4	11.2	13.7
Std. Dev.	2.4	3.5	1.7	2.4	3.4	2.5	3.4	3.0
Measurements	7178	6554	19	1794	149	19	1638	137
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 18.2°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

Segment 1c: Bear Creek Reservoir Temperature Summary 2019

Table 52 Segment 1c Data logger Summary

Segment 1c Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min		-0.2				2.9	-0.2	-0.2
Max		20.7				18.4	20.7	20.7
Avg		12.2				12.4	12.2	13.9
Std. Dev.		5.0				4.5	5.0	4.9
Measurements						30	2554	213
# 18.2°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

Table 53 Bear Creek Reservoir Profile Station (Site 40T 0.5)

Segment 1c Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min		1.9				3.3	2.1	3.1
Max		24.0				22.4	23.5	23.5
Avg		13.7				13.7	13.7	14.3
Std. Dev.		6.5				6.5	6.5	6.6
Measurements		12816				38	3204	267
# 18.2°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
# 9°C WAT exceeded								100%

Bear Creek Reservoir Profile Station (Site 40T 1.0)

Table 54 Bear Creek Reservoir Profile Station (Site 40T 1.0)

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min		2.5				3.4	2.6	3.0
Max		23.3				22.4	23.1	23.1
Avg		13.6				13.7	13.6	14.1
Std. Dev.		6.5				6.4	6.5	6.5
Measurements		12816				38	3204	267
# 18.2°C WAT						0		
% Compliance WAT						100%		
# 23.8°C DM								0
% Compliance DM								100%

Table 55 Bear Creek Reservoir Profile Station (Site 40T 1.5)

Segment 1c Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min		2.6				3.4	2.7	3.0
Max		23.0				22.3	22.9	22.9
Avg		13.5				13.6	13.5	13.9
Std. Dev.		6.4				6.4	6.4	6.5
Measurements		12816				38	3204	267
# 18.2°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
# 9°C WAT exceeded								100%

Table 56 Bear Creek Reservoir Profile Station (Site 40T 2.0)

Segment 1c Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min		2.7				3.4	2.8	3.0
Max		22.9				22.3	22.9	22.9

Avg		13.5				13.5	13.5	13.8
Std. Dev.		6.4				6.4	6.4	6.5
Measurements		12816				38	3204	267
# 18.2°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
# 9°C WAT exceeded								100%

Segment 2

Table 57 Summary (sites 45 and 90)

Segment 2 Sampling/Monitoring Summary 2019						
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.55	2.2	6.27	234.2	371	9
Max	8.66	23.7	13.39	970	1542	111
Avg	8.16	14.01	9.89	560.08	725.63	40.43
Std. Dev.	0.25	7.46	1.91	254.51	316.34	21.87
Measurements	30	30	30	30	30	30

Data logger Temperature Summary 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min	0.3	0.2	3.3	0.3	2.4	4.8	0.3	1.6
Max	5.7	42.0	3.6	5.6	5.6	22.6	38.5	38.5
Avg	3.3	14.6	3.4	3.3	4.2	14.8	14.6	16.5
Std. Dev.	0.9	5.9	0.1	0.9	0.7	5.5	5.9	6.1
Measurements	1681	23324	4	420	34	68	5829	486
# 9C WAT exceeded			0					
% Compliance WAT			100%					
# 13C DM exceeded					0			
% Compliance DM					100%			
# 18.2C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8C DM exceeded								2
% Compliance DM								99%

Table 58 Site 90 West of Wadsworth bridge

15 Monthly Sampling/Monitoring Events January 1-December 31, 2019						
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L
Min	7.6	2.2	7.9	283.7	477.0	9.0
Max	8.4	23.7	13.4	970.0	1,542.0	111.0
Avg	8.1	13.9	10.4	624.6	807.3	46.0
Std. Dev.	0.20	7.80	1.84	255.35	321.72	27.72
Measurements	15	15	15	15	15	15

Data logger Temperature Data 2019								
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min	0.3	0.2	3.3	0.3	2.4	4.8	0.3	1.6
Max	5.7	29.1	3.6	5.6	5.6	22.1	26.1	26.1
Avg	3.2	14.3	3.5	3.2	4.4	14.6	14.3	16.8
Std. Dev.	1.2	5.9	0.1	1.2	0.8	5.4	5.9	6.1
Measurements	841	11663	2	210	17	34	2915	243
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			

# 18.2°C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
# 9°C WAT exceeded							100%

Table 59 Site 45 Below Trace Weir at spillway of Bear Creek Reservoir

15 Monthly Sampling/Monitoring Events January 1-December 31, 2019							
Monthly Parameter Results	pH, SU	Temp, °C	DO, mg/L	Sp. Cd., us/cm	Total nitrogen, ug/L	Total phosphorus ug/L	
Min	8	4	6	234	371	13	
Max	9	24	12	893	1350	55	
Avg	8.2	14.1	9.4	495.5	644.0	34.9	
Std. Dev.	0.25	7.10	1.85	236.67	288.63	11.24	
Measurements	15	15	15	15	15	15	
Data logger Temperature Data 2019							
All Temperatures in °C	30-Min Temp. COLD/WARM SEASONS		Nov 1-Mar 31 Stream Std. WAT (9°C)	Nov 1-Mar 31 2-Hr Avg. Temp.	Nov 1-Mar 31 Stream Std. DM (13°C)	Apr 1-Oct 31 Stream Std. WAT (18.2°C)	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min	2.3	1.9	3.3	2.4	3.5	5.3	2.1	3.5
Max	4.8	42.0	3.5	4.6	4.6	22.6	38.5	38.5
Avg	3.3	14.8	3.4	3.3	4.0	15.0	14.8	16.2
Std. Dev.	0.4	5.9	0.1	0.4	0.3	5.5	5.9	6.2
Measurements	840	11661	2	210	17	34	2914	243
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 18.2°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								2
% Compliance DM								99%

USGS Stream Flow Data Tables

During the Program, stream flows for Bear Creek were tracked using three gaging stations. The stations are the USGS station above Evergreen Lake (Segment 1a), the DWR/U.S. Army COE station above Morrison (Segment 1e) and the USGS station within Bear Creek Lake Park (Segment 1b). Weekly downloads of flow graphs were printed to document flows. Downloads were obtained at www.waterdata.usgs.gov. The available historic record for the gage above Evergreen Lake is 25 years. The available historic record for the gage above Morrison is 90 years (1899-2006— however, permanent reliable data was recorded from 1919). The available historic record for the USGS gage in Bear Creek Lake Park is 25 years. NOTE: Operation of this gage was discontinued on September 30, 2009. For the 2009 Program period, historical Minimum, Maximum and Average were calculated. A Deviation from Historic averages was also calculated; however, when both the Minimum and Maximum values for Deviation from Historic were negative, these values are interchanged to reflect the desired interpretation.

Table 60 2019 May Bear Creek Evergreen vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) May 2019	Historic Daily Mean Flow (cfs) 25 Years for May	Deviation from Historic Flow (cfs)
1	23.7	41	-17.3
2	20.9	41	-20.1
3	20.4	43	-22.6
4	20.3	43	-22.7
5	20.6	55	-34.4
6	22.9	78	-55.1
7	26.2	95	-68.8
8	26.1	96	-69.9
9	24	98	-74
10	23.9	100	-76.1

11	25.1	93	-67.9
12	25.7	95	-69.3
13	30.3	104	-73.7
14	35.4	99	-63.6
15	39.7	97	-57.3
16	42.2	92	-49.8
17	41.9	96	-54.1
18	36.7	88	-51.3
19	32.7	83	-50.3
20	33	86	-53
21	31.7	77	-45.3
22	30.7	70	-39.3
23	32.2	65	-32.8
24	32.9	58	-25.1
25	42	61	-19
26	47.3	87	-39.7
27	57.2	75	-17.8
28	58.4	72	-13.6
29	55.1	62	-6.9
30	51.5	63	-11.5
31	54.7	67	-12.3
MIN	**20.3**	**41**	**-76.1**
MAX	**58.4**	**104**	**-6.9**
AVG	**34.37**	**76.77**	**-42.41**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W

Table 61 2019 June Bear Creek Evergreen vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) June 2019	Historic Daily Mean Flow (cfs) 25 Years for June	Deviation from Historic Flow (cfs)
1	59.9	81	-21.1
2	65.5	73	-7.5
3	67	66	1
4	60.6	68	-7.4
5	64.2	58	6.2
6	76.4	54	22.4
7	77.9	51	26.9
8	80.2	48	32.2
9	85	45	40
10	76.5	44	32.5
11	70.9	43	27.9
12	70.3	42	28.3
13	73.4	41	32.4
14	81.5	38	43.5
15	81.8	35	46.8
16	86.5	35	51.5
17	90.4	34	56.4
18	95.5	36	59.5
19	88	37	51
20	85.9	50	35.9
21	87.5	65	22.5
22	106	70	36
23	103	50	53
24	86	42	44
25	81.6	38	43.6
26	77.2	35	42.2
27	74.9	33	41.9
28	73.5	31	42.5
29	77.8	30	47.8

30	87.9	28	59.9
MIN	**59.9**	**28**	**-21.1**
MAX	**106**	**81**	**59.9**
AVG	**79.76**	**46.70**	**33.06**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W

Table 62 2019 July Bear Creek Evergreen vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) July 2019	Historic Daily Mean Flow (cfs) 25 Years for July	Deviation from Historic Flow (cfs)
1	91.7	27	64.7
2	92.9	26	66.9
3	88	29	59
4	82.6	27	55.6
5	82.6	25	57.6
6	85.2	25	60.2
7	80	24	56
8	77.7	23	54.7
9	73	23	50
10	65.9	22	43.9
11	63.2	24	39.2
12	62.1	28	34.1
13	62.1	28	34.1
14	65.9	31	34.9
15	68.2	30	38.2
16	66.4	34	32.4
17	58.8	31	27.8
18	55.7	28	27.7
19	52.5	36	16.5
20	53.1	46	7.1
21	59.6	37	22.6
22	55	33	22
23	56.2	37	19.2
24	52.6	47	5.6
25	55	22	33
26	65.3	19	46.3
27	57	18	39
28	55.2	19	36.2
29	48.8	18	30.8
30	47.4	18	29.4
31	47.7	17	30.7
MIN	**47.4**	**17**	**5.6**
MAX	**92.9**	**47**	**66.9**
AVG	**65.40**	**27.48**	**37.92**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W

Table 63 2019 August Bear Creek Evergreen vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) August 2019	Historic Daily Mean Flow (cfs) 25 Years for August	Deviation from Historic Flow (cfs)
1	48.4	25	23.4
2	50.3	32	18.3
3	50.8	28	22.8
4	44.1	24	20.1
5	52.5	21	31.5
6	45.3	19	26.3
7	42.2	17	25.2
8	46.8	17	29.8
9	51.5	17	34.5

10	41.3	17	24.3
11	46.9	20	26.9
12	41.4	21	20.4
13	36.7	30	6.7
14	34.9	27	7.9
15	33.9	22	11.9
16	32.5	19	13.5
17	30.9	18	12.9
18	30.3	17	13.3
19	29.5	19	10.5
20	28.8	23	5.8
21	29.2	19	10.2
22	37.5	19	18.5
23	30.4	17	13.4
24	27.6	17	10.6
25	26.2	17	9.2
26	25.5	16	9.5
27	25.4	15	10.4
28	24.5	16	8.5
29	23	18	5
30	23	16	7
31	22.5	19	3.5
MIN	**22.5**	**15**	**3.5**
MAX	**52.5**	**32**	**34.5**
AVG	**35.93**	**20.06**	**15.86**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W

Table 64 2019 September Bear Creek Evergreen vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) September 2019	Historic Daily Mean Flow (cfs) 25 Years for September	Deviation from Historic Flow (cfs)
1	21.4	24	-2.6
2	20.6	25	-4.4
3	19.8	22	-2.2
4	20	19	1
5	20.8	17	3.8
6	20.1	17	3.1
7	21.7	16	5.7
8	22.1	16	6.1
9	27.3	16	11.3
10	21.5	16	5.5
11	19.5	16	3.5
12	18.2	17	1.2
13	17.8	17	0.8
14	17.4	17	0.4
15	16.5	16	0.5
16	16.4	16	0.4
17	16.5	17	-0.5
18	16	15	1
19	16.4	15	1.4
20	15.6	17	-1.4
21	15.1	20	-4.9
22	14.9	19	-4.1
23	14.9	18	-3.1
24	14.7	17	-2.3
25	14.3	16	-1.7
26	14.2	15	-0.8
27	13.9	16	-2.1

28	14.1	15	-0.9
29	14.1	15	-0.9
30	13.3	14	-0.7
MIN	**13.3**	**14**	**-4.9**
MAX	**27.3**	**25**	**11.3**
AVG	**17.64**	**17.20**	**0.44**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W

Table 65 2019 May Bear Creek Morrison vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) May 2019	Historic Daily Mean Flow (cfs) 25Years for May	Deviation from Historic Flow (cfs)
1	31.6	56.2	-24.6
2	26.9	58.9	-32
3	25.5	60.5	-35
4	24.9	58.2	-33.3
5	24.5		24.5
6	24.8	77.3	-52.5
7	28.7	89.3	-60.6
8	35.1	90.8	-55.7
9	35.8	97.1	-61.3
10	28.5	110	-81.5
11	38.1	96	-57.9
12	36.2	95.4	-59.2
13	39.9	99.5	-59.6
14	46.1	100	-53.9
15	50.4	95.2	-44.8
16	53.1	89.9	-36.8
17	53.8	91.4	-37.6
18	47.6	83.3	-35.7
19	42.5	78.1	-35.6
20	42.8	79.8	-37
21	47.5	74.4	-26.9
22	43.2	70	-26.8
23	48.7	70	-21.3
24	43.7	65.4	-21.7
25	54.6	66.5	-11.9
26	56.9	86.7	-29.8
27	63.8	81.3	-17.5
28	68.2	75	-6.8
29	65.8	69.4	-3.6
30	60.4	66.5	-6.1
31	60.2	67.4	-7.2
MIN	**24.5**	**58.2**	**-81.5**
MAX	**68.2**	**110**	**24.5**
AVG	**43.54**	**79.98**	**-33.86**

USGS 06710500 GPS Coordinates: 39.6530°N, 105.1950°W

Table 66 2019 June Bear Creek Morrison vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) June 2019	Historic Daily Mean Flow (cfs) 25 Years for June	Deviation from Historic Flow (cfs)
1	62.6	78.1	-15.5
2	66.3	72.6	-6.3
3	72	67.20	4.8
4	66.2	66.2	0
5	68	60.4	7.6
6	80.5	55.9	24.6
7	78	53.6	24.4
8	79.3	50.8	28.5

9	83.9	48	35.9
10	79.5	47.4	32.1
11	71.3	45.5	25.8
12	69.8	44.3	25.5
13	70.5	42.4	28.1
14	77.4	39	38.4
15	77.5	35.8	41.7
16	85.6	33.8	51.8
17	88	32.9	55.1
18	99.9	33.6	66.3
19	90.5	36.6	53.9
20	88.6	44	44.6
21	89.4	60	29.4
22	110	68.9	41.1
23	113	54.3	58.7
24	93.3	46.1	47.2
25	85.7	41.6	44.1
26	80.6	37	43.6
27	76	32	44
28	73.2	30	43.2
29	75	28	47
30	82.5	27.2	55.3
MIN	**62.6**	**27.2**	**-15-.5**
MAX	**113**	**78.1**	**66.3**
AVG	**81.14**	**47.11**	**34.03**

USGS 06710500 GPS Coordinates: 39.6530°N, 105.1950°W

Table 67 2019 July Bear Creek Morrison vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) July 2019	Historic Daily Mean Flow (cfs) 25 Years for July	Deviation from Historic Flow (cfs)
1	91.7	24.3	67.4
2	91.3	24.3	67
3	86.2	25.7	60.5
4	78.9	26.1	52.8
5	79.1	23.4	55.7
6	85.2	23.1	62.1
7	78.4	21.7	56.7
8	74.5	22.1	52.4
9	71.6	21.2	50.4
10	65.8	19.9	45.9
11	63.9	18.2	45.7
12	61.5	20.4	41.1
13	59.6	21.5	38.1
14	66	23	43
15	69.3	25.3	44
16	67		67
17	59.7		59.7
18	54.6	20	34.6
19	51	18.4	32.6
20	51.9	19.4	32.5
21	61.8	21.6	40.2
22	58.1	18.3	39.8
23	55.3	15.4	39.9
24	51.2	17	34.2
25	53.9	31.2	22.7
26	63.1	18.7	44.4
27	55.6	16.9	38.7
28	57.1	15.7	41.4

29	47.4	16.7	30.7
30	45.9	16.2	29.7
31	45.2	16	29.2
MIN	**45.2**	**15.4**	**-2.6**
MAX	**91.7**	**31.2**	**46.2**
AVG	**64.57**	**20.75**	**13.31**

USGS 06710500 GPS Coordinates: 39.6530°N, 105.1950°W

Table 68 2019 August Bear Creek Morrison vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) August 2019	Historic Daily Mean Flow (cfs) 25 Years for August	Deviation from Historic Flow (cfs)
1	47.4	18.8	28.6
2	55.8	37	18.8
3	50	29.8	20.2
4	46	26.9	19.1
5	50.9	22.3	28.6
6	45.2	20.1	25.1
7	41.1	16.3	24.8
8	40.4	15	25.4
9	61.4	15.2	46.2
10	41.9	16.2	25.7
11	44.3	18.8	25.5
12	41.7	23.5	18.2
13	34.6	31.4	3.2
14	30.7	33.3	-2.6
15	29	25.3	3.7
16	27.9	21.2	6.7
17	26.7	18.9	7.8
18	26.2	16.7	9.5
19	25	17.5	7.5
20	24.1	25.1	-1
21	24.4	22.8	1.6
22	31.8	20.4	11.4
23	27.1	17.5	9.6
24	24.2	14.9	9.3
25	22.5	14.6	7.9
26	21	14.1	6.9
27	21.1	13.2	7.9
28	20.8	13.6	7.2
29	19.3	16.6	2.7
30	20.1	15.9	4.2
31	19.2	16.3	2.9
MIN	**19.2**	**13.2**	**-10**
MAX	**61.4**	**37**	**9.1**
AVG	**33.61**	**20.30**	**-2.79**

USGS 06710500 GPS Coordinates: 39.6530°N, 105.1950°W

Table 69 2019 September Bear Creek Morrison vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) September 2019	Historic Daily Mean Flow (cfs) 25 Years for September	Deviation from Historic Flow (cfs)
1	17.9	27.7	-9.8
2	16.2	25.5	-9.3
3	15.8	24.5	-8.7
4	16	19.5	-3.5
5	16	16.8	-0.8
6	20.3	15.9	4.4

7	21.6	16.6	5
8	20.6	17.1	3.5
9	25.5	16.4	9.1
10	21.3	16.8	4.5
11	17.5	16.4	1.1
12	16.4	16.5	-0.1
13	15.2	17	-1.8
14	15.1	16.9	-1.8
15	14.2	17.1	-2.9
16	14.4	16.2	-1.8
17	13.9	17.1	-3.2
18	14	16.3	-2.3
19	13.6	15.9	-2.3
20	13.5	16.3	-2.8
21	12.9	19.1	-6.2
22	13.2	23.2	-10
23	12.5	20.3	-7.8
24	12.3	18.2	-5.9
25	10.7	17.2	-6.5
26	11.4	17.1	-5.7
27	11.2	16.9	-5.7
28	11.1	16.7	-5.6
29	12	15.1	-3.1
30	10.5	14.1	-3.6
MIN	**10.5**	**14.1**	**-10**
MAX	**25.5**	**27.7**	**9.1**
AVG	**15.23**	**18.01**	**-2.79**

USGS 06710500 GPS Coordinates: 39.6530°N, 105.1950°W

Weather Data

Local weather data was documented at the Evergreen Metropolitan District's WWTP. The plant has been operating the National Weather Service reporting station since EMD assumed operations of the plant in 1974. Online historical records, however, are available from 1961 through 2019. Historical weather data obtained from the National Oceanographic and Atmospheric Administration/National Weather Service, High Plains Climate Center.

Maximum and minimum air temperature values along with precipitation measurements recorded each morning. Daily readings entered an NWS software program. Local weather statistics are summarized, comparing 2019 monthly maximum, minimum and mean air temperatures and monthly precipitation to 58-year (1961-2019) historical data.

Table 70 Weather Data May-September 2019 Summary

Monthly Weather Data	May 2019	June 2019	July 2019	August 2019	September 2019
Air Temp Low Max (□F)	33	52	71	70	68
Air Temp High Max (□F)	75	89	92	89	91
Air Temp High Avg (□F)	56.81	72.67	82.58	81.81	78.07
Total Precip (in.)	2.79	2.33	2.04	2.68	0.69
Days of Precip.	13	12	13	11	4

Table 71 2019 Weather Data vs. Historical Weather Data (57 years 1961-2019)

	Avg. Daily Max (□F)	Avg Daily Min (□F)	Avg. Monthly (□F)	Precip. (in.)
May 2019	56.81	32.29	44.55	2.79
May Hist	65.2	33.9	49.6	2.57
% Deviation	87%	95%	90%	109%
June 2019	72.67	41.70	57.18	2.33
June Hist	75.3	41.1	58.2	2.14

% Deviation	97%	101%	98%	109%
July 2019	82.58	48.74	65.66	2.04
July Hist	81.6	46.8	64.2	2.23
% Deviation	101%	104%	102%	91%
August 2019	81.81	48.10	64.95	2.68
August Hist	79.3	45.3	62.4	2.31
% Deviation	103%	106%	104%	116%
Sept. 2019	78.07	42.03	60.05	0.69
Sept. Hist	72.1	37.1	56.57	1.47
% Deviation	108%	1113%	106%	47%

Stream Flow vs. Local Weather

Stream flows, as measured at the USGS gage above Evergreen Lake, were compared to local weather observations obtained from the NWS reporting station located at the EMD WWTP. The following tables illustrate the relationship between high air temperatures and measured precipitation, and their effect on stream flows measured above Evergreen Lake.

Table 72 2019 May Bear Creek Evergreen vs. Weather Data

Date	May 2019 Daily Mean Flow (cfs)	May 2019 Daily Air Max Temp (□F)	May 2019 Precip. (in.)
1	23.7	40	0.15
2	20.9	47	0.02
3	20.4	54	
4	20.3	63	
5	20.6	67	
6	22.9	70	
7	26.2	62	0.01
8	26.1	53	0.4
9	24	40	0.71
10	23.9	33	0.04
11	25.1	48	0.01
12	25.7	60	
13	30.3	66	
14	35.4	74	
15	39.7	73	
16	42.2	75	
17	41.9	74	
18	36.7	67	
19	32.7	58	
20	33	47	0.12
21	31.7	37	0.6
22	30.7	36	0.04
23	32.2	38	0.33
24	32.9	52	
25	42	64	
26	47.3	66	
27	57.2	64	
28	58.4	64	0.13
29	55.1	53	0.23
30	51.5	52	
31	54.7	64	
MIN	**20.3**	**33**	**0.01**
MAX	**58.4**	**75**	**0.71**
AVG	**34.37**	**56.81**	**0.21**
TOTAL			**2.79**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W Daily Mean flows were obtained from the USGS gaging station above Evergreen Lake. Weather data obtained from the NWS reporting station located at the EMD WWTP.

Table 73 **2019 June Bear Creek Evergreen vs. Weather Data**

Date	June 2019 Daily Mean Flow (cfs)	June 2019 Daily Max Air Temp (□F)	June 2019 Precip (in.)
1	59.9	69	
2	65.5	69	0.02
3	67	76	
4	60.6	77	0.01
5	64.2	72	0.05
6	76.4	70	0.4
7	77.9	75	
8	80.2	79	
9	85	77	0.04
10	76.5	52	
11	70.9	74	
12	70.3	74	
13	73.4	67	
14	81.5	78	
15	81.8	78	
16	86.5	69	0.04
17	90.4	73	0.19
18	95.5	65	0.16
19	88	65	0.44
20	85.9	75	
21	87.5	75	
22	106	63	0.7
23	103	57	0.27
24	86	59	
25	81.6	74	
26	77.2	76	0.01
27	74.9	81	
28	73.5	87	
29	77.8	89	
30	87.9	85	0.01
MIN	**59.9**	**52**	**0.01**
MAX	**106.0**	**89**	**0.7**
AVG	**79.76**	**72.67**	**0.19**
TOTAL			**2.33**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W Daily Mean flows were obtained from the USGS gaging station above Evergreen Lake. Weather data obtained from the NWS reporting station located at the EMD WWTP.

Table 74 **2019 July Bear Creek Evergreen vs. Weather Data**

Date	July 2019 Daily Mean Flow (cfs)	July 2019 Daily Max Air Temp (□F)	July 2019 Precip (in.)
1	91.7	85	0.05
2	92.9	80	0.12
3	88	77	0.01
4	82.6	84	
5	82.6	76	
6	85.2	71	0.62
7	80	74	0.04
8	77.7	80	
9	73	78	0.03
10	65.9	83	
11	63.2	79	
12	62.1	88	
13	62.1	87	

14	65.9	89	0.07
15	68.2	84	0.02
16	66.4	86	
17	58.8	85	
18	55.7	89	
19	52.5	92	
20	53.1	91	
21	59.6	84	0.42
22	55	78	0.32
23	56.2	74	
24	52.6	81	
25	55	88	
26	65.3	78	0.22
27	57	85	
28	55.2	81	0.07
29	48.8	84	
30	47.4	84	0.05
31	47.7	85	
MIN	**47.4**	**71**	**0.01**
MAX	**92.9**	**92**	**0.62**
AVG	**65.40**	**82.58**	**0.16**
TOTAL			**2.04**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W Daily Mean flows were obtained from the USGS gaging station above Evergreen Lake. Weather data obtained from the NWS reporting station located at the EMD WWTP.

- Data Missing Not Recorded

Table 75 2019 August Bear Creek Evergreen vs. Weather Data

Date	August 2019 Daily Mean Flow (CFS)	August 2019 Daily Max Air Temp (ºF)	August 2019 Precip (in.)
1	48.4	84	0.17
2	50.3	78	0.4
3	50.8	78	0.11
4	44.1	85	
5	52.5	85	0.81
6	45.3	83	0.01
7	42.2	86	
8	46.8	80	
9	51.5	76	0.59
10	41.3	88	
11	46.9	77	0.16
12	41.4	77	0.02
13	36.7	81	
14	34.9	83	
15	33.9	85	
16	32.5	87	
17	30.9	82	
18	30.3	82	
19	29.5	85	
20	28.8	87	
21	29.2	89	
22	37.5	76	0.26
23	30.4	83	0.03
24	27.6	82	
25	26.2	77	
26	25.5	89	
27	25.4	71	

28	24.5	70	
29	23	86	
30	23	82	
31	22.5	82	0.12
MIN	**22.5**	**70**	**0.01**
MAX	**52.5**	**89**	**0.81**
AVG	**35.93**	**81.81**	**0.24**
TOTAL			**2.68**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W Daily Mean flows were obtained from the USGS gaging station above Evergreen Lake. Weather data obtained from the NWS reporting station located at the EMD WWTP.

Table 76 2019 September Bear Creek Evergreen vs. Weather Data

Date	September 2019 Daily Mean Flow (cfs)	September 2019 Daily Max Air Temp (ºF)	September 2019 Precip (in.)
1	21.4	83	
2	20.6	88	
3	19.8	91	
4	20	78	
5	20.8	88	
6	20.1	86	
7	21.7	79	0.26
8	22.1	81	
9	27.3	68	0.38
10	21.5	76	0.01
11	19.5	79	
12	18.2	74	
13	17.8	70	
14	17.4	73	
15	16.5	82	
16	16.4	82	
17	16.5	79	
18	16	81	
19	16.4	74	
20	15.6	78	
21	15.1	79	
22	14.9	72	0.04
23	14.9	70	
24	14.7	74	
25	14.3	79	
26	14.2	76	
27	13.9	82	
28	14.1	71	
29	14.1	69	
30	13.3	80	
MIN	**8.91**	**68**	**0.01**
MAX	**19.4**	**91**	**0.38**
AVG	**14.45**	**78.07**	**0.17**
TOTAL			**0.69**

USGS 06710385 GPS Coordinates: 39.6228°N, 105.3361°W Daily Mean flows were obtained from the USGS gaging station above Evergreen Lake. Weather data obtained from the NWS reporting station located at the EMD WWTP.