BCWA DR2015 - *BCWA Data Report*

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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 PGO15** ***Water Monitoring Program and Sample Analyses Plan Version 2015.02, BCWA February 18, 2015, 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 PGO15** ***Water Monitoring Program and Sample Analyses Plan Version 2015.02, BCWA February 18, 2015, 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 PGO15** ***Water Monitoring Program and Sample Analyses Plan Version 2015.02, BCWA February 18, 2015, 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 memorandum designed to summarize the site-specific studies and data results for any given year (Table 1).

Table 1	2015 Technical Memorandum of the Association
TM2015.01	BCR EGL Sediment Study
TM2015.02	UBCW Summary
TM2015.03	Kerr Swede Summary 2015/ Completion
TM2015.04	Coyote Gulch Summary
TM2015.05	BCR 2015 Summary Statistics & Graphs
TM2015.06	MBCW 2015 Nutrient Summary
TM2015.07	2015 P1 Summary
TM2015.08	Barr Milton TMDL Summary
TM2015.09	EGL Summary
TM2015.10	BCR Phytoplankton Summary
TM2015.11	Fishery Survey Results
TM2015.12	Macroinvertebrates

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 PGO15

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 (Association, February 18, 2015; *BCWA PGO15 Surface Water Monitoring Program and Sample Analyses Plan Version 2015.02*).

The *BCWA PGO15 Bear Creek 2015 Sample Plan Version 2015.02* 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*.

The 2015 data results are contained in the MSD*2015 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*2015 BCWA Annual Report WQCC (BCWA,* June 2016*)*, which also posted with previous Association annual reports.

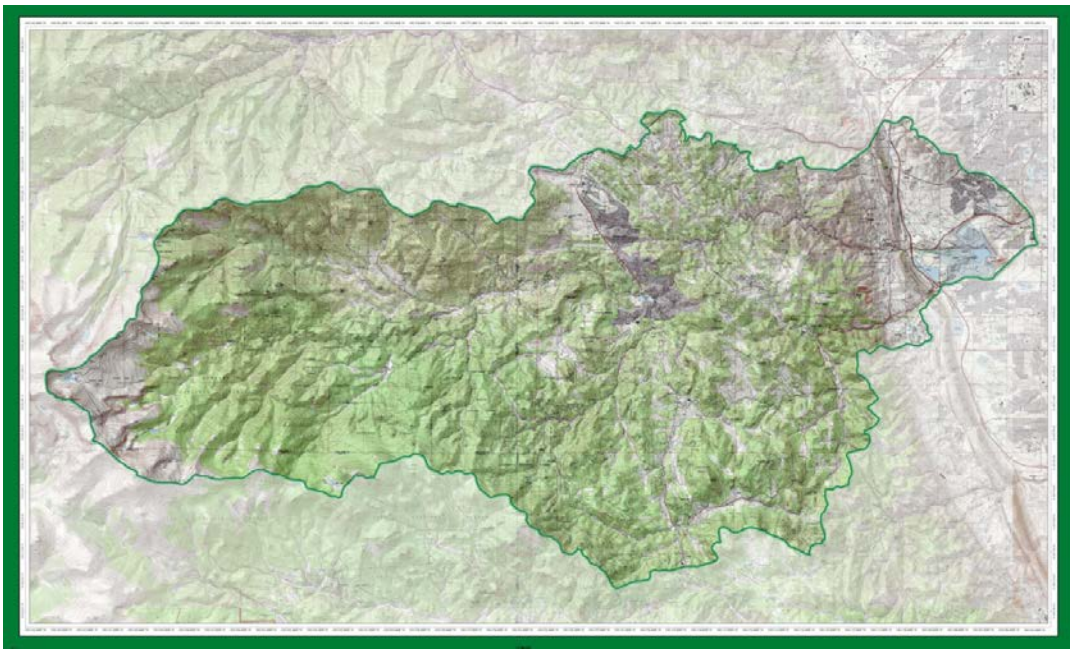

Figure 1 Bear Creek Watershed

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.

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 dataloggers, wastewater treatment plant effluent process control and permit monitoring data (from five larger treatment plants), weather statistics and stream flows comprise raw data. All data are stored on an office computer. The majority of the data resides in and analyses occurred in Excel spreadsheet format. Data is nightly 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 electronically forwarded from EMD staff to the Manager for data summary and analyses. RNC Consulting LLC maintains all monitoring data for all Association monitoring programs. Data is kept on a computer with daily 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, 2014 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*2015 P1-P4 Master Spreadsheet (February 2016)* that includes data analyses and raw data for Bear Creek Reservoir and watershed nutrient collection program. The Association transmits this data report to the Water Quality Control Division Staff (Association website www.bearcreekwatershed.org).

All of 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 only available 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 outdoor classroom. The Association supplies water quality and environmental materials for these various educational uses.

Spreadsheets in Master Data Series Updated 2015

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
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

Fact Sheets in Watershed Plan Updated 2014

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

Policies in Watershed Plan Updated 2015

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

Map Series in Watershed Plan Updated 2015

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 2015 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 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*2015 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 2016 after approval from the Association Board (Bear Creek Association March 2016). 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

Reservoir Growing Season July to September	
Reservoir Monitoring Parameters	Reservoir
Chlorophyll (Site 40)	
Average Growing Season Chlorophyll-a [ug/l (-1m)]	20.9
Average Annual Chlorophyll-a [ug/l (-1m)]	13.2
Peak Chlorophyll-a [ug/l]	45.7
Phosphorus	
Average Annual Total Phosphorus [ug/l]: Water Column	56
Average Annual Total Phosphorus [ug/l] -1m	42
Average Annual Total Phosphorus [ug/l] -10m	69
Growing Season Total Phosphorus [ug/l]: Water Column	88
Growing Season Total Phosphorus [ug/l]: -1m	60
Growing Season Total Phosphorus [ug/l]: -10m	116
Peak Annual Total Phosphorus [ug/l] Water Column	191
Average Annual Ortho Phosphorus ug/l] Water Column	13
Growing Season Average Ortho Phosphorus [ug/l] Water Column	14
Peak Annual Ortho Phosphorus [ug/l] Water Column	47.0
Nitrogen	
Average Annual Nitrate-Nitrogen [ug/l] Water Column	352
Growing Season Average Nitrate-Nitrogen [ug/l] Water Column	148
Peak Annual Nitrate-Nitrogen [ug/l] Water Column	965
Average Annual Total Nitrogen [ug/l]: Water Column	927
Average Total Nitrogen [ug/l]: -1m	926
Average Total Nitrogen [ug/l]: -10m	929
Growing Season Total Nitrogen [ug/l]: Water Column	799
Growing Season Total Nitrogen [ug/l]: -1m	828
Growing Season Total Nitrogen [ug/l]: -10m	770
Clarity (All Profiles)	
Average Annual Secchi Depth (meters)	1.17
Growing Season Average Secchi Depth (meters)	1.04
Total Suspended Sediments	
Annual Average Total Suspended Sediments [mg/l]	12.5
Growing Season Average Total Suspended Sediments [mg/l]	20.6
Peak Total Suspended Sediments [mg/l]	81
Dissolved Oxygen (site 40 Profile)	
Annual Average at -1/2m - 2m [mg/l]	10.12
Annual Minimum at -1/2m - 2m [mg/l]	5.41
Seasonal Average at -1/2 - 2m [mg/l]	8.13
Seasonal Minimum at -1/2 - 2m [mg/l]	5.41
pH	
Annual Average at -1/2m - 2m [mg/l]	8.22
Annual Maximum at -1/2m - 2m [mg/l]	8.64
Seasonal Average at -1/2 - 2m [mg/l]	8.18
Seasonal Maximum at -1/2 - 2m [mg/l]	8.97
Specific Conductance	
Annual Average at -1/2m - 2m [uS/cm]	418
Annual Minimum at -1/2m - 2m [us/cm]	635
Seasonal Average at -1/2 - 2m [us/cm]	343
Seasonal Minimum at -1/2 - 2m [us/cm]	440
Phytoplankton Species @ Site 40 July- September	
Anabaena planctonica	Bluegreens
Aphanizomenon flos-aquae	
Kephyrion sp.	Chrysophyte
Cryptomonas erosa	Cryptophyte

Rhodomonas minuta	
Asterionella formosa	Diatom
Melosira ambigua	
Melosira granulata	
Melosira granulata angustissima	
Stephanodiscus niagarae	
Trachelomonas charkowensis	Euglenoid
Trachelomonas hispida	
Trachelomonas robusta	
Trachelomonas scabra	
Trachelomonas volvocina	
Chlamydomonas sp.	Green
Oocystis pusilla	
Peak Phytoplankton Peak Biovolume (um3/mL) =	
Cryptomonas erosa	3,745,806
Anabaena planctonica	2,019,887
Trachelomonas volvocina	1,808,798
Loading - Annual Pound Estimates	
Total Nitrogen -Total Load In to BCR	166,700
Total Nitrogen -Total Load From BCR	159,080
Total Nitrogen -Total Deposition into BCR	-5,410
Total Phosphorus -Total Load In to BCR	29,186
Total Phosphorus -Total Load From BCR	14,516
Total Phosphorus -Total Deposition into BCR	18,867
TSS -Total Load In to BCR	16,025,800
TSS -Total Load From BCR	6,734,600
TSS -Total Deposition into BCR	14,355,700

IV. P3-Summary Bear Creek Watershed 2015 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 is 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 dataloggers that were in stream segments since January 1, 2015 were replaced with other loggers that had already been returned from the manufacture after being recalibrated and recertified in early February 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 removed and data downloaded after September 30, 2015, depending on stream segment criteria. Stream and lake sampling and monitoring data, including pH, Temperature, Dissolved Oxygen, Specific Conductance, Ammonia, Nitrate + Nitrite, Total Nitrogen, and Total Phosphorous were collected from May through October, at 39 sites, with selected other P1 sites being analyzed for Total Dissolved Phosphorus, and Total Suspended Solids. Stream and lake temperature data loggers were used at 28 sites, and temperature data was collected at 23 of these 28 sites including the Evergreen Lake profile station, and the Bear Creek Reservoir profile station, excluding the five WWTPs. Five of the 28 sites loggers were lost or malfunctioned causing a loss of data.

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 4A, in the Mount Vernon Drainage, segment 1b in the main stem below the Harriman diversion, segment 2, segment 3, and segment 1c (Bear Creek Reservoir). Segment 1a

(Sites 58, 2a, 3a), Segment 1e (Sites 5, 8a, 13a), Segment 5(Sites 64), Segment 6a (Site 18), and Segment 16b (Site 19) comprise the Cold-season locations for temperature data loggers. It is worth mentioning that many of these sites only recorded data during the shoulder season the month before the warm season began. The program began in January 1 of 2015 and ended December 31 of 2015. The data presented in this report reflects the temperature measurements collected from January 1 through December 31, 2015. (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-one sites in Bear Creek Segments 1a, 1c, 1d, 1e, 2, 5, 6a, 6b, (including four total at the Evergreen Lake profile station, and 4 total at the Bear Creek Reservoir profile station), and two 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 2015 Warm-season program for temperature data collection began on April 1, May 1, and June 1, and concluded on September 30, October 31, and November 30, 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. 202,954 individual temperature data points were obtained from the twenty-one 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 671 weekly averages calculated for the program period. 50,731 two-hour blocks were averaged and 4,225 Daily Maximum values were calculated. 87,481 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, a data summary consists of number of measurements and calculations, including Weekly Average and Daily Average temperatures.

Table 3 Bear Creek Watershed 2015 Temperature Compliance by Segment

	Cold-Season		Warm Season	
Segment 3	**9.0°C WAT**	**13°C DM**	**17°C WAT**	**21.2°C DM**
# Exceedances	N/A	N/A	N/A	N/A
% Compliance	N/A	N/A	N/A	N/A
Segment 1a	**9.0°C WAT**	**13°C DM**	**17°C WAT**	**21.2°C DM**
# Exceedances	3		0	0
% Compliance	92%	100%	100%	100%
Segment 1d	**9.0°C WAT**	**13°C DM**	**18.2°C WAT**	**23.8°C DM**
# Exceedances	N/A	N/A	0	0
% Compliance	N/A	N/A	100%	100%
Segment 1e	**9.0°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 1b	**9.0°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances	N/A	N/A	N/A	N/A
% Compliance	N/A	N/A	N/A	N/A
Segment 5	**9.0°C WAT**	**13°C DM**	**18.2°C WAT**	**23.8°C DM**
# Exceedances	0	0	0	0
% Compliance	100%	100%	100%	100%
Segment 6a	**9.0°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	**9.0°C WAT**	**13°C DM**	**17°C WAT**	**21.2°C DM**
# Exceedances	1	3	0	0
% Compliance	92%	97%	100%	100%
Segment 2	**13.7°C WAT**	**14.3°C DM**	**27.5°C WAT**	**28.6°C DM**
# Exceedances	N/A	N/A	0	0
% Compliance	N/A	N/A	100%	100%
Segment 1c	**9.0°C WAT**	**13°C DM**	**24.0°C WAT**	**26.0°C DM**
# Exceedances	N/A	N/A	0	0
% Compliance	N/A	N/A	100%	100%

N/A-Indicates no logger data obtained.

Table 4 Number of Temperature Measurements

2015 Total Number of Measurements (Off- and Growing Seasons)				
	# 30-min.	# Calculated	# 2-Hr. Avg DM	# Calculated WAT Temps.
Segment 1a	25611	87	6402	534
Segment 1d	40412	148	10100	840
Segment 1e	46503	152	11625	970
Segment 1b	N/A	N/A	N/A	N/A
Segment 1c	43864	128	10964	912
Segment 2	10368	44	2592	216
Segment 4a	N/A	N/A	N/A	N/A
Segment 5	14835	49	3708	309
Segment 6a	23375	67	5843	487
Segment 6b	11111	32	2777	231
Watershed totals	202,954	671	50,731	4225

N/A-Indicates no logger data obtained.

Segment 8 (Site 36) and Segment 7 (Sites 37 and 38)

No temperature loggers were placed in either of these segments in 2015.

Segment 3 (Site 25)

Temperature logger malfunctioned at this site rendering all data retrieved as non-reportable.

Segment 1a (Sites 58, 2a, 3a)

- 92% of the recorded temperature values complied with the 9°C Weekly Average Temperature (WAT) standard Oct 1 through May 31.
- 100% of the recorded temperature values complied with the 13°C Daily Maximum (DM) Temperature standard for Oct 1 through May 31.
- 100% of the recorded temperature values complied with the 17.0°C Weekly Average Temperature (WAT) standard June 1 through September 30.
- 100% of the recorded temperature values complied with the 21.2°C Daily Maximum (DM) temperature standard for June 1 through September 30.

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

- 100% of the recorded temperature values complied with the 18.2°C Weekly Average Temperature (WAT) standards for CLL designation.
- 100% of the recorded temperature values complied with the 23.8°C Daily Maximum (DM) Temperature standards for CLL designation.

Segment 1e (Sites 5, 8a, 9, 13a, and 14a)

All temperatures complied 100% with the temperature standards set for this segment.

Segment 1b (Sites15a)

Logger for site 15a was lost due to extreme high flows. No data recorded in 2015.

Segment 4a (Site 34)

Logger for site 34 was lost due to extreme high flows. No data was recorded in 2015.

Segment 5 (35 and 64)

All temperature complied 100% with the standards set for this segment.

Segment 6a (Sites 18)

All temperatures complied 100% with the standards set for this segment.

Segment 6b (Site 19)

- 92% of the temperatures complied with the cold season MWAT standard.
- 97% of the temperatures complied with the cold season DM standard.
- All other temperatures complied 100% with all standards set for this segment.

Segment 2(Site 45)

All temperatures complied 100% with the temperature standards set for this segment.

Segment 1c (Site 40 Profile)

- There were no cold season temperatures recorded.
- Warm season WAT and DM complied 100% of the time with the temperature standards.

Wastewater treatment plant effluents

Morrison WWTP, Evergreen Metro District, and West Jefferson County Metro District are the only treatment plants with a temperature requirement, all five wastewater treatment plant, datalogger measurements have been analyzed and summarized below using the representative segment standard that the wastewater treatment facility discharges into.

Table 5 WWTP Number of Temperature Measurements 2015

	# 30-min. measurements	# Calculated WAT	# Daily Max
EMD WWTP (1e)	17496	65	365
WJCMD WWTP (5)	17494	59	365
KSWD WWTP (1e)	17496	60	365
GWSD WWTP (5)	17498	60	365
Morrison WWTP (1b)	17497	60	365
Totals (Jan 1-Dec. 31)	87481	304	1825

Table 6 WWTP Logger Summary 2015

	Cold-season		Growing Season	
Segment 1e	**9°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances	14	17	0	0
% Compliance	67%	94%	100%	100%
Segment 1b	**9°C WAT**	**13°C DM**	**19.3°C WAT**	**23.8°C DM**
# Exceedances	43	60	19	9
% Compliance	0%	80%	50%	96%
Segment 5	**9°C WAT**	**13°C DM**	**18.2°C**	**23.8°C**
# Exceedances	34	53	7	0
% Compliance	0%	80%	88%	100%

Water Quality Compliance

Water quality compliance was determined by sampling and monitoring selected sites during the Growing season timeframe. Dissolved Oxygen, pH, Ammonia, Nitrate, Nitrite, and Total phosphorus measurements were compared to water quality standards and anticipated standards to determine compliance.

Table 7 Bear Creek Watershed 2015 Water Quality Compliance by Segment

	Stream Std.	Stream Std.	Stream Std.	Proposed Standard	Proposed Standard
	pH (6.5-9 SU)	DO (6.0 mg/L 2-	NH3-N ug/L	Total Nitrogen (1250	Total Phosphorous
Segment 8					
# Exceedances	24	24	4	4	4
# Measurements	2	5*	0	0	0
% Compliance	92%	79%	100%	100%	100%
Segment 7					
# Exceedances	0	0	0	0	0
# Measurements	4	4	4	4	4
% Compliance	100%	100%	100%	100%	100%
Segment 3					
# Exceedances	0	0	0	0	0
# Measurements	10	10	6	10	10
% Compliance	100%	100%	100%	100%	100%
Segment 1a					
# Exceedances	0	0	0	0	0
# Measurements	18	18	18	18	18
% Compliance	100%	100%	100%	100%	100%
Segment 1d					
# Exceedances	0	0	0	0	0
# Measurements	60	60	12	12	12
% Compliance	100%	100%	100%	100%	100%
Segment 1e					

# Exceedances	0	0	0	0	1
# Measurements	36	36	36	36	36
% Compliance	100%	100%	100%	100%	97%
Segment 1b					
# Exceedances	0	0	0	0	1
# Measurements	15	15	15	15	15
% Compliance	100%	100%	100%	100%	93%
Segment 5					
# Exceedances	1	0	0	12	7
# Measurements	76	76	60	76	76
% Compliance	99%	100%	100%	84%	91%
Segment 6a					
# Exceedances	0	0	0	2	3
# Measurements	21	21	21	21	21
% Compliance	100%	100%	100%	90%	86%
Segment 6b					
# Exceedances	0	0	0	0	0
# Measurements	6	6	6	6	6
% Compliance	100%	100%	100%	100%	100%
Segment 4a					
# Exceedances	0	0	0	4	0
# Measurements	6	6	6	6	6
% Compliance	100%	100%	100%	33%	100%
Segment 2					
# Exceedances	0	2	0	1	0
# Measurements	15	15	15	15	15
% Compliance	100%	87%	100%	93%	100%

**signifies exceedance in a special study sampling location. Not part of the historic sampling sites*

Segment 8 (Site 36)

92% of measured pH values complied with the adopted water quality standards, 79 % of dissolved oxygen (due to special study location) complied with water quality standards, and all other parameters measured complied 100% with the water quality standards and all proposed water quality standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS).

Segment 7 (Sites 37)

100% of the measured values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). 100% of Total Phosphorous complied with the 110ug/L proposed standard as well as Total Nitrogen proposed standards of 1250 ug/L.

Segment 3 (Site 25)

100% of the measured pH and DO values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). Total Phosphorous complied 100% with the anticipated standard of 110ug/L as did Total Nitrogen with a proposed standard of 1250 ug/L.

Segment 1a (Sites58, 2a and 3a)

100% of the measured pH and DO values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). Total Phosphorous complied 100% with the anticipated standard of 110ug/L as did Total Nitrogen with a proposed standard of 1250 ug/L.

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

100% of the measured pH and DO values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). Total Phosphorous complied 100% with the anticipated standard of 110ug/L as did Total Nitrogen with a proposed standard of 1250 ug/L.

Segment 1e (Sites 5, 8a, 9, 12, 13a and 14a)

100% of the measured pH and DO values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). Total Phosphorous complied 97% with the anticipated standard of 110ug/L and Total Nitrogen complied 100% with a proposed standard of 1250 ug/L.

Segment 1b (Sites 15a)
100% of the measured pH and DO values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). Total Phosphorous complied 93% with the anticipated standard of 110ug/L. Total Nitrogen complied 100% with a proposed standard of 1250 ug/L.

Segment 5 (Site 35, 50 and 64)
99% of the measured pH and 100% of measured DO values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). Total Phosphorous complied 91% with the anticipated standard of 110ug/L. Total Nitrogen complied 84% with proposed water quality standard of 1250 ug/L.

Segment 6a (Site16 and 18)
100% of the measured pH and DO values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). Total Phosphorous complied 86% with the anticipated standard of 110ug/L. Total Nitrogen complied 90% with a proposed standard of 1250 ug/L.

Segment 6b (Site 19)
100% of all parameters measured complied with all water quality standards and all proposed water quality standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS).

Segment 4a (site 34)
100% of the measured pH and DO values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). Total Phosphorous complied 100% with the anticipated standard of 110ug/L. Total Nitrogen complied 33% with a proposed standard of 1250 ug/L.

Segment 2 (site 45)
100% of the measured pH and 87% of the DO values complied with the adopted water quality stream standards. Results for Ammonia-N are expected to comply with adopted water quality stream standards (TVS). Total Phosphorous complied 100% with the anticipated standard of 110ug/L. Total Nitrogen complied 93% with a proposed standard of 1250 ug/L.

Summary

Temperature Compliance

Segments 1a, 1b, 1c, 1d, 1e, 2, 3, 5, and Turkey Creek Segments 6a and 6b showed little impairment during both the Cold- and Warm Seasons. Comparisons with adopted temperature standards resulted in 99% compliance for the WAT and 99% compliance for the DM calculated for the calendar year throughout the Watershed, utilizing the 85th%-tile qualifier. Comparisons with adopted temperature standards for the Warm season resulted in 100% compliance for the calculated WAT and 100% compliance for the calculated DM. A comparison with the adopted temperature standards for the cold season resulted in 94% compliance for the calculated WAT and 99% compliance for the calculated DM, at the monitored locations of the Watershed, utilizing the 85th%-tile qualifier. A comprehensive temperature data collection effort spanning January through December, summarized in 202,954 30-minute measurements at 21 in-stream/lake Sites throughout the Watershed, excluding the WWTP facilities, provided the data for analyses.

The evaluation of the entirety of temperature datalogger measurements recorded during the calendar year at 21 sites in the Watershed from Mt. Evans Wilderness to just below Bear Creek Lake in Morrison and Turkey Creek do not indicate that a problem exists, either man-induced or natural, when compared to water quality standards. Compliance exceedance issues did not occur during the warm season in any segment for either the MWAT or the Daily Maximum calculations and only occurred in segments 1a and 6b during the cold season measurements during what would be considered the "shoulder season".

Wastewater plant discharges into Bear Creek did not cause temperature impairment. A comprehensive temperature data collection effort from January through December, summarized in 87,48130 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. Although only three of the five WWTPs that discharge into Segments 1e, 1b, and 5 have temperature discharge requirements, the resulted 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 was performed at 49 sites within the watershed at varying intervals throughout the season. 291 measurements of pH and 272 measurements of DO were performed at these Sites. 99% compliance for pH and 97% compliance for Dissolved Oxygen were achieved. 211 samples were analyzed for Total Ammonia. Sampling results show 100% compliance with Total Ammonia TVS. There are no stream standards for Total Phosphorous; however, 243 samples were analyzed for Total Phosphorous and ran against the proposed standard of

110ug/L, this resulted in 93% of the samples being in compliance of the proposed standard. There are no stream standards set for Total Nitrogen, however 239 samples were run against the proposed standard of 1250 ug/L resulting in a 91% compliance rating.

Wastewater plant discharges into Bear Creek result in no evidence of water quality impairment. 100% of the wastewater plant effluent pH and 100% of effluent Ammonia values met permit limits, while 100% Total Phosphorous met permit effluent limits as well. Five of the five wastewater treatment plants met discharge limits stated in their Colorado Discharge Pollutant Elimination System (CDPES) permit for pH, Total Phosphorous and Total Ammonia during 2015. There were no permit violations reported for any of the parameters from 5 wastewater treatment plants in 2015. 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 significantly higher from May through September in 2015. Bear Creek stream flows tracked during May through September, on daily average at the gage above Evergreen Lake, were significantly higher than the historic daily average in May through September. The stream gage above Morrison followed the Evergreen gage values. The stream flows remained significantly higher above monthly historic averages. A surprising factor in the 2015 program was the lack of snow pack to aid in the runoff and the wetter than average summer in terms of inches of rainfall throughout the summer.

Weather and climate in the May through September timeframe were approximately average to below average as compared to historic averages. Measurably more precipitation was noticed verses historic averages in May through July. The Average Monthly Mean temperatures were approximately equal to historical data for May through September. The Average Monthly Maximum temperatures were approximately equal to historical averages for May through September. However, the Average Daily Minimum temperatures were slightly higher or equal to historical averages in all months. The Average Monthly temperatures were unremarkable.

Wastewater Treatment Facility 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. Datalogger temperature measurements of plant effluent were obtained at the identical frequency of the in-stream dataloggers (30-minute intervals) during a study period of January 1 through December 31, 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 and GWSD and 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 7 Evergreen Metropolitan District (Site 20)

EMD WWTP Effluent Summary 2015									
2015 Process Control and Permit Sampling and Monitoring									
Parameter	pH, SU	Temp, °C	D. O.,	NH3-N,	NO3-N,	NO2-N,	TIN, ug/L	Total P,	Flow,
Min	6.37	6.80	3.34	38	2940	8	3037	50	0.30
Max	7.06	19.1	7.70	6200	11600	205	12559	620	2.18
Avg	6.67	13.07	4.28	904.52	6294.23	45.98	7518.53	246.23	0.60
Std. Dev.	0.10	3.96	0.65	1399.29	2003.43	44.79	2301.09	134.17	0.34
Measurements	260	249	249	52	52	52	47	53	365
Exceedances	0			0				0	

Effluent Datalogger Temperature Summary: Cold Season/Warm Season 2015						
All Temperatures in °C	30-Min Temp.		Daily Avg. Temp.		Weekly Avg. Temp.	
Min	7.57	8.9	7.66	9.2	7.81	9.6
Max	15.63	19.7	15.48	19.0	15.07	19.0
Avg	9.79	15.1	9.79	15.1	9.82	15.4
Std. Dev.	1.93	3.5	1.93	3.5	1.93	3.3
Measurements	7224	10272	151	214	21	44

[Datalogger ID: EMD5 GPS Coordinates: 39.6376°N, 105.3150°W; Sampling/monitoring site is the EMD WWTP effluent. The datalogger 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 8 West Jefferson County Metropolitan District (Site 21)

WJCMD WWTP Effluent Summary 2015									
2015 Process Control and Permit Sampling and Monitoring									
Parameter	pH, SU	Temp, °C	D. O.,	Total NH3-	NO3-N,	NO2-N,	TIN, ug/L	Total P,	Flow,
Min	6.40	9.30	2.17	81	473	24	1599	10	0.26
Max	6.97	18	4.70	12300	13300	336	14689	1100	1.30
Avg	6.67	13.00	3.09	2745.10	2050.75	110.54	4906.38	183.96	0.59
Std. Dev.	0.09	2.84	0.34	2805.98	1881.34	52.08	3396.28	144.96	0.17
Measurements	266	245	245	52	52	52	52	53	365
Exceedances	0		0	0				0	

Effluent Datalogger Temperature Summary Cold/Warm Seasons 2015						
All Temperatures in °C	30-Min Temp.		Daily Avg. Temp.		Weekly Avg. Temp.	
Min	4.1	9.3	9.0	9.9	9.2	10.3
Max	14.7	17.7	14.7	17.6	14.4	17.4
Avg	10.7	14.4	10.7	14.4	10.7	14.3
Std. Dev.	1.4	2.68	1.4	2.7	1.4	2.6
Measurements	7223	10271	151	214	21	38

[Datalogger ID: WJ6 GPS Coordinates: 39.6621°N, 105.3351°W; Sampling/monitoring site is the WJCMD WWTP effluent. The datalogger was located 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 9 Kittredge Sanitation and Water District (Site 22)

Kittredge WWTP Effluent Summary 2015									
2015 Process Control and Permit Sampling and Monitoring									
Parameter	pH, SU	Temp, °C	D. O.,	Total NH3-	NO3-N,	NO2-N,	TIN, ug/L	Total P,	Flow,
Min	6.63	3.70	0.71	168	718	99	4773	150	0.01
Max	7.71	17.8	19.50	3820	97100	412	98513	650	0.30
Avg	6.86	10.82	3.28	734.62	9469.96	189.39	11144.67	341.43	0.09
Std. Dev.	0.12	4.68	2.36	643.97	12881.50	68.20	14371.23	137.91	0.04
Measurements	244	209	209	52	49	49	39	28	365
Exceedances	0			0	0	0	0	0	

Effluent Datalogger Temperature Summary Cold/Warm Seasons 2015						
All Temperatures in °C	30-Min Temp.		Daily Avg. Temp.		Weekly Avg. Temp.	
Min	3.6	5.4	3.8	6.9	4.0	10.0
Max	12.4	18.3	12.2	18.0	11.8	17.6
Avg	6.1	14.4	6.1	14.4	6.1	14.6
Std. Dev.	2.4	2.46	2.3	2.42	2.3	2.24
Measurements	7225	10271	151	214	22	38

[Datalogger ID: KSWD8 G P S Coordinates: 39.6585°N, 105.2868°W; Sampling/monitoring site is the KSWD WWTP effluent. The datalogger was located near the flow-measuring flume, just upstream of the outfall. Effluent flows from the datalogger 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 10 Genesee Water and Sanitation District (Site 23)

GWSD WWTP Effluent Summary 2015									
2015 Process Control and Permit Sampling and Monitoring									
Parameter	pH, SU	Temp, ⍰C	D. O.,	NH3-N,	NO3-N,	NO2-N,	TIN, ug/L	Total	Flow,
Min	6.60	9.00	6.35	39	4670	1	5677	90	0.18
Max	7.90	20.7	8.79	580	11040	602	11174.5	678	0.88
Avg	7.03	14.40	7.77	175.56	8460.00	41.90	8677.46	271.87	0.29
Std. Dev.	7.02	13.60	7.87	165	8340	16.5	8567	264	0.24
Measurements	365	365	365	52	52	52	52	52	365
Exceedances	0			0	0	0	0	0	

Effluent Datalogger Temperature Summary COLD/WARM Seasons 2015						
All Temperatures in ⍰C	30-Min Temp.		Daily Avg. Temp.		Weekly Avg. Temp.	
Min	9.7	10.2	9.8	10.3	10.0	10.7
Max	16.4	19.2	16.3	18.9	15.9	18.6
Avg	11.9	15.4	11.9	15.4	11.9	15.2

Std. Dev.	1.7	3.0	1.7	3.0	1.7	2.9
Measurements	7226	10272	151	214	22	38

[Datalogger ID: GWSD9A GPS Coordinates: 39.6732°N, 105.2712°W; Sampling/monitoring site is the GWSD WWTP effluent. The datalogger was located in a wet well, just upstream of the outfall at the plant. Effluent flows from the datalogger 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.-**8,000**, Feb.-**8,100**, Mar.- **8,000**, Apr.-**6,000**, May-**6,000** June-**5,600** July-**5,000** Aug.-**4,800** Sept.-**5,100**; Oct.-**5,500**; Nov.-**6,000**; Dec.-**7,100**; pH **6.5-9.0**

Table 11 Town of Morrison (Site 24)

Town of Morrison WWTP Effluent Summary 2015									
2015 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	1.32	6.40	0.58	80	190	10	4100	53	0.02
Max	7.61	23.9	11.74	4580	190	10	4100	450	0.90
Avg	7.19	14.97	6.13	1456.60	190	10	4100	288.30	0.09
Std. Dev.	7.25	14.60	5.99	675	190	10	4100	285	0.08
Measurements	356	358	189	10	1	1	1	10	357
Exceedances	1								

Effluent Datalogger Temperature Summary COLD/WARM Seasons 2015						
All Temperatures in ⍰C	30-Min Temp.		Daily Avg. Temp.		Weekly Avg. Temp.	
Min	-0.5	11.5	6.2	12.6	7.2	13.4
Max	17.3	25.7	15.6	23.0	14.9	22.4
Avg	10.4	18.4	10.4	18.4	10.4	18.5
Std. Dev.	2.2	3.3	2.0	3.2	2.0	3.0
Measurements	7225	10272	151	214	22	38

[Datalogger ID: MORR12 GPS Coordinates: 39.6541°N, 105.1796°W; Sampling/monitoring site is the GWSD WWTP effluent. The datalogger was located in a wet well, just upstream of the outfall at the plant. Effluent flows from the datalogger 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.-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

Bear Creek Stream Segments

Sampling and monitoring was 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 omitted.

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. Total phosphorous is evaluated against the proposed listing of 110 ug/L, and Total Nitrogen is analyzed against the proposed listing of 1250 ug/L. 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.

Segments 7 and 8 (Mt Evans Wilderness)

Table 12 Summit Lake Site 36 (In Summit Lake near outlet) Segment 8

4 Monthly Sampling/Monitoring Events J u n e 1-Sept 30, 2015									
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2- N, ug/L	TIN, ug/L	TP, ug/L	TN, ug/L
Min	8.26	1.7	8.1	0.013	20	121	160	2	304
Max	9.04	5.30	11.32	0.02	44	152	173	15	326
Avg	8.83	4.03	10.14	0.02	30.75	137.75	168.50	7.50	313.75
Std. Dev.	0.33	1.40	1.23	0.00	10.89	13.10	5.12	5.32	8.50
Measurements	4	4	4	4	4	4	4	4	4

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

Table 13 Summit Lake Site 37 (outfall of Summit lake) Segment 7

4 Monthly Sampling/Monitoring Events J u n e 1-Sept 30, 2015									
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TIN, ug/L	TP, ug/L	TN, ug/L
Min	7.43	3.2	8.63	0.015	5	130	172	2	305
Max	8.24	5.20	12.57	0.02	42	189	205	13	436
Avg	7.98	4.48	10.61	0.02	26.25	159.75	186.00	7.50	350.00
Std. Dev.	0.32	0.77	1.51	0.00	16.22	26.02	12.19	5.02	51.98
Measurements	4	4	4	4	4	4	4	4	4

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

Table 14 Summit Lake Site 63 (Summit Lake Pollution Plume fens) Segment 7

4 Monthly Sampling/Monitoring Events June 1-Sept 30, 2015									
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TIN, ug/L	TP, ug/L	TN, ug/L
Min	7.93	4.4	3.73	0.025	8	2	10	71	119
Max	8.67	7.50	7.30	0.04	30	2	32	406	720
Avg	8.41	5.68	5.23	0.03	24.00	2	26	227.75	342.25
Std. Dev.	0.29	1.13	1.36	0.01	9.25	0	9.25	138.72	246.53
Measurements	4	4	4	4	4	4	4	4	4

[Monitoring station GPS Coordinates: Sampling /monitoring site

Table 15 (Site 65) Between 2 large ponds on east side of Summit Lake outfall. Segment 7

4 Monthly Sampling/Monitoring Events June 1-Sept 30, 2015									
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TIN, ug/L	TN, ug/L	TP, ug/L
Min	7.6	3	8.55	0.015	18	118	156	295	2
Max	8.50	5.30	11.67	0.02	46	155	173	343	13
Avg	8.09	4.33	10.28	0.02	30.00	134.00	164	309.50	6.75
Std. Dev.	0.33	0.97	1.16	0.00	11.94	15.98	6.04	19.50	4.87
Measurements	4	4	4	4	4	4	4	4	4

Segment 1a (Above Evergreen Lake)

Table 16 Segment 1a Summary

Segment 1a Sampling/Monitoring Summary 2015									
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2- N,	TIN, ug/L	TN, ug/L	TP, ug/L
Min	7.76	1.1	8.99	0.03	5	38	48	124	2
Max	8.64	11.2	16.53	0.92	30	125	133	360	67
Avg	8.29	6.36	12.36	0.16	14.50	66.00	80.50	224.61	28.39
Std. Dev.	0.25	2.90	1.79	0.26	7.31	23.80	24.48	76.51	21.86
Measurements	18	18	18	18	18	18	18	18	18

Segment 1a Datalogger Temperature Summary 2015								
All Temperatures in °C	30-Min Temp. COLD	30-Min Temp. WARM	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	3.2	0.8	0.0	0.0	5.8	3.3	6.6
Max	13.0	15.8	10.4	12.8	12.8	12.7	15.7	15.7
Avg	5.0	9.9	5.1	5.0	6.8	10.2	9.9	11.8
Measurements	13899	11712	38	3474	290	49	2928	244
# 9°C WAT exceeded			3					
% Compliance WAT			92%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 17°C WAT						0		
% Compliance WAT						100%		
# 21.2°C DM								0
% Compliance DM								100%

Table 17 Above Lost & Found, Below Mount Evans Wilderness (Site 58)

5 Monthly Sampling/Monitoring Events M a y 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.96	1.1	10.61	0.03	5	38	145	2
Max	8.64	7.7	13.98	0.487	17	125	360	64
Avg	8.5	4.9	12.4	0.1	10.3	85.7	233.8	22.7
Std. Dev.	0.24	2.45	1.10	0.17	4.46	25.49	68.14	23.08
Measurements	6	6	6	6	6	6	6	6
Datalogger Temperature Data 2015								
All Temperatures in °C	30-Min Temp. COLD	30-Min Temp. WARM	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	0.0	3.2	1.2	0.0	0.1	5.8	3.3	6.6
Max	9.9	13.2	7.2	9.8	9.8	10.6	13.2	13.2
Avg	4.1	9.0	4.0	4.1	5.8	9.2	9.0	10.8
Std. Dev.	2.2	2.0	1.7	2.1	2.0	1.3	2.0	1.5
Measurements	3812	5856	10	953	79	24	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 Singin' River)

Table 18 Golden Willow Rd (Site 2a)

5 Monthly Sampling/Monitoring Events M a y 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.76	2.6	8.99	0.04	6	42	124	2
Max	8.33	10.5	16.53	0.729	27	63	349	58
Avg	8.19	6.82	12.34	0.17	13.67	50.67	208.50	26.17
Std. Dev.	0.20	2.74	2.37	0.25	6.52	7.85	80.03	19.09
Measurements	6	6	6	6	6	6	6	6
Datalogger Temperature Data 2015								
All Temperatures in °C	30-Min Temp. COLD	30-Min Temp. WARM	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	-0.09	5.0	0.75	-0.05	0.06	8.0	5.1	8.6
Max	13.02	15.8	9.57	12.79	12.79	12.7	15.7	15.7
Avg	5.15	10.9	5.15	5.15	7.22	11.1	10.9	12.8
Std. Dev.	2.82	2.0	2.17	2.80	2.86	1.2	2.0	1.5
Measurements	4972	5856	14	1243	104	25	1464	122
# 9°C WAT exceeded			1					
% Compliance WAT			93%					
# 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: 39.634039N-105.40261W; Sampling /monitoring site is at Golden Willow Rd. below Yankee Creek drainage. Estimate 4 miles from gage station above lake.

Table 19 Above Evergreen Lake, at CDOW site (Site 3a)

6 Monthly Sampling/Monitoring Events M a y 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.85	3.1	9.72	0.052	12	41	142	11
Max	8.35	11.2	15.39	0.92	30	99	354	67
Avg.	8.2	7.4	12.3	0.2	19.5	61.7	231.5	36.3
Std. Dev.	0.17	2.86	1.65	0.32	7.41	18.64	78.24	20.89
Measurements	6	6	6	6	6	6	6	6

Datalogger Temperature Data 2015								
All Temperatures in °C	30-Min Temp. COLD	30- MIN Warm	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	0.0	5.7	0.9	0.0	0.0	8.8	5.8	9.5
Max	12.6	16.1	10.4	12.5	12.5	13.6	16.1	16.1
Avg	5.6	11.9	5.8	5.6	7.1	12.1	11.9	13.7
Std. Dev.	2.9	2.0	2.3	2.9	3.0	1.3	2.0	1.5
Measurements	5115	5856	14	1278	107	24	1464	122
# 9°C WAT exceeded			2					
% Compliance WAT			86%					
# 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: 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 comprises 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 dataloggers at the individual site locations were analyzed and compared to state water quality standards.

Segment 1d Summary

Table 20 Segment 1D Summary 2015

Segment 1D Sampling/Monitoring Summary 2015									
Monthly Results	pH, SU	Temp, °C	D. O.,	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TIN, ug/L	TN, ug/L	TP, ug/L
Min	7.65	4.9	4.58	0.055	31	31	77	208	11
Max	8.98	14.9	13.73	0.099	143	79	174	455	36
Avg	8.16	9.62	8.78	0.08	50.58	53.83	104.42	337.17	23.58
Std. Dev.	0.34	3.10	2.25	0.01	29.20	14.69	23.95	75.44	8.38
Measurements	60	60	60	60	12	12	12	12	12

Segment 1D Datalogger Temperature Summary 2015							
All Temperatures in ⍰C	30- MIN WARM	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 (18.2°C	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 Stream DM (23.8°C)
Min	3.2				5.9	3.7	4.4
Max	18.4				16.0	18.2	16.6
Avg	11.6				11.7	11.6	11.6
Std. Dev.	40412				148	10100	840
Measurements							
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM					0		
# 17°C WAT exceeded					100%		
% Compliance WAT							0
# 21.2°C DM exceeded							100%

[Monitoring station/Datalogger ID: EMD4A GPS Coordinates: 39.6314 ⍰N, 105.3231 ⍰W; Sampling /monitoring site in Evergreen Lake near the dam, 0.5m below surface, near the EMD WTP intake.]

Table 21 Evergreen Lake, 0.5 meters below surface, near dam (Site 4a)

6 Monthly Monitoring Events May 1-Oct. 31, 2015				
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm
Min	7.95	5.5	6.69	0.055
Max	8.98	14.9	13.73	0.099
Avg	8.2	10.3	8.6	0.1
Std. Dev.	0.36	3.46	2.58	0.01
Measurements	6	6	6	6

Datalogger Temperature Data 2015							
All Temperatures in °C	30-MIN WARM	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 (18.2°C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 Stream DM (23.8°C)
Min	18.4				16.0	18.2	16.6
Max	11.7				11.8	11.7	11.7
Avg	3.5				3.2	3.5	3.4
Measurements	10103				37	2525	210
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM							
# 18.2°C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							100%

Table 22 Evergreen Lake, 1.0 meters below surface, near dam (Site 4b)

6 Monthly Monitoring Events May 1-Oct. 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.86	5.5	7.29	0.055	35	34	252	11
Max	8.97	13.6	13.37	0.099	58	79	455	31
Avg	8.2	9.9	8.9	0.1	42.3	55.0	351.5	21.8
Std. Dev.	0.37	3.15	2.19	0.01	7.76	14.61	82.87	7.51
Measurements	6	6	6	6	6	6	6	6

Datalogger Temperature Data 2015							
All Temperatures in ⍰C	30-Min Temp. WARM	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)	June 1-Sept 30 Stream Std. WAT (18.2°C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 Stream DM (23.8°C)
Min	3.2				6.0	3.8	4.4
Max	18.1				16.0	17.8	16.4
Avg	11.6				11.7	11.6	11.7
Std. Dev.	3.4				3.1	3.4	3.4
Measurements	10103				37	2525	210
# 9⍰C WAT exceeded							
% Compliance WAT							
# 13⍰C DM exceeded							
% Compliance DM							
# 18.2⍰C WAT					0		
% Compliance WAT					100%		
# 23.8⍰C DM							0
% Compliance DM							100%

[Monitoring station/Datalogger ID: EMD4B 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 23 Evergreen Lake, 1.5 meters below surface, near dam (Site 4c)

6 Monthly Monitoring Events May 1-Oct. 31, 2015				
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm
Min	7.83	5.4	6.73	0.055
Max	8.93	13.6	13.21	0.098
Avg	8.2	9.7	8.8	0.1
Std. Dev.	0.36	3.14	2.20	0.01
Measurements	6	6	6	6

Datalogger Temperature Data 2015							
All Temperatures in °C	30-Min Temp. WARM	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 (18.2°C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 Stream DM (23.8°C)
Min	3.2				5.9	3.7	4.4
Max	17.7				15.8	17.3	16.1
Avg	11.5				11.6	11.5	11.5
Measurements	10103				37	2525	210
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM							
# 18.2°C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							100%

Table 24 Evergreen Lake, 2.0 meters below surface, near dam (Site 4d)

6 Monthly Monitoring Events May 1-Oct. 31, 2015				
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm
Min	7.83	5.4	6.28	0.055
Max	8.88	13.5	13.11	0.098
Avg	8.2	9.7	8.8	0.1
Std. Dev.	0.33	3.09	2.22	0.01
Measurements	6	6	6	6

Datalogger Temperature Data 2015							
All Temperatures in °C	30-Min Temp. WARM	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 (18.2°C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 Stream DM (23.8°C)
Min	3.2				5.9	3.7	4.4
Max	17.7				15.8	17.3	16.1
Avg	11.5				11.6	11.5	11.5
Measurements	10103				37	2525	210
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM							
# 18.2°C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							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 25 Evergreen Lake, 2.5m below surface, near dam (Site 4e)

6 Monthly Monitoring Events May 1-Oct. 31, 2015				
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm
Min	7.81	5.4	6.22	0.055
Max	8.85	13.4	13.16	0.098
Avg	8.2	9.6	8.8	0.1
Std. Dev.	0.32	3.05	2.20	0.01
Measurements	6	6	6	6

[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 26 Evergreen Lake, 3.0m below surface, near dam (Site 4f)

6 Monthly Monitoring Events May 1-Oct. 31, 2015				
Monthly Parameter Results	**pH, SU**	**Temp, °C**	**D. O., mg/L**	**Sp. Cd., mS/cm**
Min	7.79	5.4	6.3	0.055
Max	8.8	13.3	12.26	0.098
Avg	8.2	9.6	8.7	0.1
Std. Dev.	0.31	3.02	1.88	0.01
Measurements	6	6	6	6

[Monitoring station/Datalogger ID: EMD4f G P S 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 27 Evergreen Lake, 3.5m below surface, near dam (Site 4g)

6 Monthly Monitoring Events May 1-Oct. 31, 2015				
Monthly Parameter Results	**pH, SU**	**Temp, °C**	**D. O., mg/L**	**Sp. Cd., mS/cm**
Min	7.78	5.2	6.48	0.055
Max	8.79	13.2	12.75	0.098
Avg	8.1	9.5	8.8	0.1
Std. Dev.	0.31	3.03	2.02	0.01
Measurements	6	6	6	6

Monitoring station/Datalogger ID: EMD4g G P S 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, 4.0m below surface, near dam (Site 4h)

6 Monthly Monitoring Events May 1-Oct. 31, 2015				
Monthly Parameter Results	**pH, SU**	**Temp, °C**	**D. O., mg/L**	**Sp. Cd., mS/cm**
Min	7.76	5.2	6.62	0.055
Max	8.76	13.1	13.16	0.098
Avg	8.1	9.4	8.9	0.1
Std. Dev.	0.31	2.98	2.15	0.01
Measurements	6	6	6	6

Monitoring station/Datalogger ID: EMD4h G P S 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 29 Evergreen Lake, 5.0m below surface, near dam (Site 4i)

6 Monthly Sampling/6 Monitoring Monthly Monitoring Events May 1-Oct. 31, 2015										
Monthly Paramet	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TIN, ug/L	TN ug/L	TP, Ug/L	TDP Ug/L
Min	7.7	5	6.54	0.055	31	31	89	208	12	2
Max	8.74	12.9	13.23	0.099	143	77	174	406	36	8
Avg	8.1	9.3	8.9	0.1	58.8	52.7	111.5	322.8	25.3	4.3
Std. Dev.	0.32	2.97	2.25	0.01	38.85	14.68	29.07	64.07	8.83	2.13
Measurements	6	6	6	6	6	6	6	6	6	6

Monitoring station/Datalogger ID: EMD4i G P S 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 30 Evergreen Lake, 6.0m below surface, near dam (Site 4j)

6 Monthly Monitoring Events May 1-Oct. 31, 2015				
Monthly Parameter Results	**pH, SU**	**Temp, °C**	**D. O., mg/L**	**Sp. Cd., mS/cm**
Min	7.65	4.9	4.58	0.055
Max	8.7	12.7	13.1	0.099
Avg	8.1	9.2	8.5	0.1
Std. Dev.	0.32	2.92	2.63	0.01
Measurements	6	6	6	6

Monitoring station/Datalogger ID: EMD4j G P S 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 (Mainstem below Evergreen Lake and Above Harriman Diversion)

Table 31 Segment 1e Summary

Segment 1e Sampling/Monitoring Summary 2015									
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TIN, ug/L	TN, ug/L	TP, ug/L
Min	7.74	5	8.24	0.024	10	35	54	158	10
Max	8.74	15	15.32	0.264	100	486	496	647	211
Avg	8.15	10.36	11.50	0.14	35.39	207.44	242.83	417.0	46.53
Std. Dev.	0.19	3.52	1.71	0.06	21.40	124.31	120.64	121.9	35.20
Measurements	36	36	36	36	36	36	36	36	36

Segment 1e Datalogger Temperature Summary 2015								
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	Apr 1-Oct 31 Stream Std. WAT	Apr 1-Oct 31 2-HR Avg. Temp.	Apr 1-Oct 31 Stream DM (23.8°C)
Min	0.2	-0.1	2.3	0.2	2.4	5.7	-0.1	5.2
Max	7.9	19.3	5.4	7.8	7.8	16.6	19.3	19.3
Avg	4.0	11.3	4.2	4.0	4.9	11.1	11.3	12.6
Measurements	2105	44398	5	526	45	147	11099	925
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 19.3°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

Table 32 Downtown Evergreen, at CDOW site (Site 5)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2015									
	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2 -N, ug/L	TIN, ug/L	TN Ug/L	TP, ug/L
Min	7.74	5	9.4	0.063	10	35	54	158	10
Max	8.24	14.2	15.32	0.117	39	214	250	442	59
Avg	8.1	9.7	11.8	0.1	29.3	84.7	114.0	272.5	32.5
Std. Dev.	0.17	3.57	1.80	0.02	10.87	59.13	63.95	101.7	19.82
Measurements	6	6	6	6	6	6	6	6	6

Site 5 Datalogger Temperature Summary 2015								
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 (23.8°C)
Min	1.94	3.4	3.16	2.03	3.00	5.8	3.5	5.3
Max	6.69	18.2	5.37	6.60	6.60	15.1	18.0	18.0
Avg	4.13	11.4	4.27	4.13	4.53	10.3	11.4	12.2
Measurements	748	1022	2	187	16	25	2556	213
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 19.3°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

Monitoring station/Datalogger 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 33 Bear Creek Cabins (Site 8a)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2 -N, ug/L	TN ug/L	TP, ug/L
Min	7.74	5.1	9.23	0.069	15	69	258	14
Max	8.15	14.7	11.53	0.131	100	231	622	68
Avg	8.0	10.1	10.9	0.1	57.5	124.3	369.5	40.5
Std. Dev.	0.13	3.66	0.78	0.02	33.96	53.91	120.52	20.22
Measurements	6	6	6	6	6	6	6	6

Site 8a Datalogger Temperature Summary 2015								
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 (23.8°C)
Min	1.43	3.2	5.42	1.51	3.39	5.8	3.5	5.2
Max	7.90	18.3	5.42	7.78	7.78	15.1	18.2	18.2
Avg	4.44	11.4	5.42	4.44	5.85	10.4	11.4	12.6
Std. Dev.	1.50	3.7	0.00	1.49	1.29	3.1	3.7	3.7
Measurements	608	10224	1	152	13	25	2556	213
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 19.3°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

[Monitoring station/Datalogger 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 34 O'Fallon Park (Site 9)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	8.15	5.4	9.41	0.089	20	93	292	18
Max	8.74	15	14.36	0.197	71	288	511	62
Avg	8.4	10.3	11.6	0.1	41.8	190.7	402.7	41.5
Std. Dev.	0.21	3.70	1.50	0.04	15.94	73.53	67.72	17.46
Measurements	6	6	6	6	6	6	6	6

Datalogger Temperature Data 2015							
All Temperatures in °C	30-Min Temp. 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 DM (23.8°C)
Min	1.2				5.9	1.3	3.9
Max	17.7				15.4	17.6	15.9
Avg	10.3				10.6	10.3	10.3
Std. Dev.	3.7				3.2	3.7	3.5
Measurements	6310				25	1577	131
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM							
# 19.3°C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							100%

[Monitoring station/Datalogger ID: OFPDOW G P S Coordinates: 39.6564°N, 105.2917°W; Sampling/ monitoring site north side of the creek above ETU restoration site, at the CDOW fish survey site.]

Table 35 Lair o' the Bear (Site 12)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.98	6.3	8.24	0.101	14	132	374	19
Max	8.37	14.8	14.45	0.246	45	454	567	93
Avg	8.2	10.9	11.5	0.2	31.2	285.3	481.3	50.0
Std. Dev.	0.16	3.08	1.91	0.05	12.64	119.22	81.14	22.44
Measurements	6	6	6	6	6	6	6	6

NO TEMPERATURE DATA IN 2015 LOGGER LOST DUE TO HIGH FLOWS

[Monitoring station/Datalogger ID: LOBDOW G P S Coordinates: 39.6672°N, 105.2687°W; 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 36 Idledale (Shady Lane-Site 13a)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.93	5.6	9.4	0.024	13	138	354	14
Max	8.34	14.8	14.8	0.254	42	464	647	211
Avg	8.1	10.7	11.6	0.2	26.7	286.2	501.3	68.5
Std. Dev.	0.14	3.52	2.13	0.07	12.20	122.08	102.35	66.57
Measurements	6	6	6	6	6	6	6	6

Datalogger Temperature Data 2015								
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 Avg. Temp.	Apr 1-Oct 31 Stream DM (23.8°C)
Min	0.2	-0.1	2.3	0.2	2.4	5.7	-0.1	5.9
Max	7.5	19.0	5.0	7.5	7.5	16.2	18.9	18.9
Avg	3.5	11.5	3.6	3.5	4.5	11.7	11.5	13.0
Std. Dev.	1.9	3.7	1.4	1.9	1.7	3.2	3.7	3.7
Measurements	749	10272	2	187	16	44	2568	214
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 19.3°C WAT exceeded						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

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

Table 37 West End of Morrison (Site 14a)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.88	5.9	9.62	0.107	10	148	367	13
Max	8.28	14.6	14.64	0.264	45	486	581	79
Avg	8.1	10.6	11.5	0.2	25.8	273.5	475.2	46.2
Std. Dev.	0.14	3.42	1.67	0.05	12.68	113.59	68.72	25.26
Measurements	6	6	6	6	6	6	6	6

Datalogger Temperature Data 2015							
All Temperatures in °C	30-Min Temp. 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	Apr 1-Oct 31 Stream DM (23.8°C)
Min	0.72				6.16	0.74	5.64
Max	19.34				16.56	19.31	19.31
Avg	11.92				12.01	11.92	13.56
Std. Dev.	4.08				3.47	4.08	3.99
Measurements	7368				28	1842	154

# 9□C WAT exceeded							
% Compliance WAT							
# 13□C DM exceeded							
% Compliance DM							
# 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.]

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

Table 38 Segment 1b Site 15a

Segment 1b Sampling/Monitoring Summary 2015									
Monthly Parameter Results	pH, SU	Temp, □C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2 -N, ug/L	TIN, ug/L	TN Ug/L	TP, ug/L
Min	7.86	0.30	9.41	0.16	5	233	264	422	2
Max	8.98	14.10	16.12	0.43	75	971	1046	1316	112
Avg	8.46	7.61	12.20	0.31	33.20	557.20	590.40	808.13	43.13
Std. Dev.	0.31	5.07	2.11	0.09	19.87	219.09	221.99	256.73	28.57
Measurements	15	15	15	15	15	15	15	15	15

NO TEMPERATURE DATA, LOGGER LOST DUE TO HIGH FLOWS

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

Segment 3 (Vance Creek)

Table 39 Mt. Evans Wilderness Drainage, Vance Creek (Site 25)

6 Monthly Sampling/Monitoring Events M a y 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	8.1	2.3	11.17	0.058	5	21	98	2
Max	8.74	9.1	15.6	0.099	27	40	364	60
Avg	8.6	6.2	12.8	0.1	15.0	29.2	208.7	26.2
Std. Dev.	0.23	2.41	1.45	0.01	8.66	5.87	97.39	24.31
Measurements	6	6	6	6	6	6	6	6

NO TEMPERATURE DATA LOGGER MALFUNCTIONED RENDERING ALL DATA UNUSABLE

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

Segment 5 Swede, Kerr, Sawmill, Troublesome and Cold Springs

Table 40 Segment 5 Summary

Segment 5 Sampling/Monitoring Summary 2015								
Monthly Results	pH, SU		Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.56		-1.50	5.70	0.05	9	25	218	2
Max	8.51		18.80	16.61	1.26	621	1177	2249	256
Avg	8.06		8.14	11.57	0.83	46.68	445.68	798.00	53.25
Std. Dev.	0.20		5.07	2.19	0.33	88.20	306.99	419.49	46.71
Measurements	76		76	76	76	76	76	76	76
Segment 5 Datalogger Temperature Summary 2015									
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-HR Avg. Temp.	Apr 1-Oct 31 DM (23.8°C)
Min	0.0	0.0	0.8	0.0	0.6		0.8	0.0	0.1
Max	9.5	23.3	5.1	9.3	9.3		17.8	22.9	22.9
Avg	2.4	10.5	2.5	2.4	4.4		11.2	10.5	13.2
Measurements	1902	1293	5	475	39		44	3233	270
# 18.2°C WAT							0		
% Compliance							100%		
# 23.8°C DM									0
% Compliance DM									100%

# 9 C WAT			0				
% Compliance			100%				
# 13 C DM				0			
% Compliance DM				100%			

Table 41 Little Cub Creek above Brook Forest Inn (Site 35)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2015								
Monthly Results	pH	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.84	4.5	9.62	0.054	13	110	219	8
Max	8.41	11.9	14.22	0.767	27	412	499	75
Avg	8.2	8.4	11.8	0.2	18.7	220.3	325.0	33.8
Std. Dev.	0.19	2.86	1.43	0.26	4.75	124.25	98.33	20.86
Measurements	6	6	6	6	6	6	6	6

Datalogger Temperature Data 2015							
All Temperatures in °C	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 (18.2°C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 DM (23.8°C)
Min	0.0				0.8	0.0	0.1
Max	9.9				5.7	9.8	9.8
Avg	3.3				3.3	3.3	4.8
Std. Dev.	1.8				1.4	1.8	1.9
Measurements	2709				8	677	57
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM							
# 18.2°C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							100%

[Monitoring station/Datalogger ID: (ABFI) GPS Coordinates: 39.5795□N, 105.3817□W; Sampling/ monitoring site in Little Cub Creek above Brook Forest Inn WWTP discharge.]

Table 42 Cub Creek Park on Little Cub Creek (site 50)

6 Monthly Sampling/Monitoring Events M a y 1 – October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.73	5.6	8.14	0.106	11	39	218	13
Max	8.25	14.6	14.02	1.098	98	387	629	256
Avg	8.1	10.4	10.8	0.3	35.5	177.2	429.3	85.8
Std. Dev.	0.19	3.32	1.72	0.35	30.04	123.07	140.67	81.30
Measurements	6	6	6	6	6	6	6	6

NO TEMPERATURE DATA DUE TO LOST LOGGER DUE TO HIGH FLOWS

[Monitoring station/Datalogger ID: (CUBCREEK PARK) GPS Coordinates: 39° 36' 50.21"N, 105° 07' 59.46"W; Sampling/ monitoring site in Little Cub Creek Park.]

Table 43 Upper Troublesome Creek (site 64)

6 Monthly Sampling/Monitoring Events M a y 1- October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	8.05	5.6	6	0.508	16	139	547	33
Max	8.51	14.1	13.82	0.761	35	492	700	103
Avg	8.4	10.7	8.9	0.6	26.2	283.3	640.3	57.7
Std. Dev.	0.16	3.30	2.67	0.11	6.72	132.11	48.59	23.74
Measurements	6	6	6	6	6	6	6	6

Datalogger Temperature Data 2015								
All Temperatures in °C	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 (18.2°C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 DM (23.8°C)
Min	0.0	0.1	0.8	0.0	0.6	4.1	0.1	1.9

Max	9.5	23.3	5.1	9.3	9.3	17.8	22.9	22.9
Avg	2.4	12.5	2.5	2.4	4.4	13.0	12.5	15.4
Std. Dev.	1.9	4.4	1.5	1.9	2.2	3.7	4.4	4.1
Measurements	1902	10224	5	475	39	36	2556	213
# 9°C WAT exceeded			0					
% Compliance WAT			100%					
# 13°C DM exceeded					0			
% Compliance DM					100%			
# 18.2°C WAT						0		
% Compliance WAT						100%		
# 23.8°C DM exceeded								0
% Compliance DM								100%

Table 44 Lower Troublesome Creek (Site 32)

6 Monthly Sampling/Monitoring Events M a y 1- October 31, 2015								
Monthly Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TN ug/L	TP, ug/L
Min	7.8	6.9	10.2	0.499	9	434	1017	82
Max	8.05	13.7	13.52	0.726	621	1177	1883	194
Avg	7.9	11.1	11.6	0.6	209.8	825.0	1439.8	125.3
Std. Dev.	0.09	2.71	1.28	0.08	211.59	268.06	343.72	42.96
Measurements	6	6	6	6	6	6	6	6

NO TEMPERATURE DATA DUE TO LOST LOGGER DUE TO HIGH FLOWS

Table 45 Kerr Gulch at Mouth (Site 52)

12 Monthly Sampling/Monitoring Events J a n u a r y 1- December 31, 2015										
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2-N, ug/L	TIN ug/L,	TN Ug/L	TP, ug/L	E. coli
Min	7.76	-0.3	9.4	0.985	13	346	362	553	10	1
Max	8.19	13.3	16.61	1.149	57	1090	1112	1353	107	79
Avg	8.03	6.17	12.59	1.03	27.22	666.67	693.89	893.67	33.25	19
Std. Dev.	0.14	4.91	1.99	0.05	13.26	254.08	255.35	265.83	26.87	23
Measurements	12	12	12	12	9	9	9	12	12	12

Table 46 Kerr Gulch @ Riefenburg Property (Site 53)

12 Monthly Sampling/Monitoring Events January 1- December 31, 2015										
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	Total NH3-N, ug/L	NO3+NO 2-N, ug/L	TIN ug/L,	TN Ug/L	TP, ug/L	E. coli
Min	7.72	-0.7	9.19	0.98	15	88	115	270	6	1
Max	8.21	14.6	15.26	1.095	127	796	811	1099	66	60
Avg	8.06	6.67	12.31	1.02	34.00	420.00	454.00	688.67	22.83	10.33
Std. Dev.	0.16	5.34	1.76	0.03	34.50	246.01	247.59	260.95	15.98	16.31
Measurements	12	12	12	12	9	9	9	12	12	12

Table 47 Kerr Gulch Top End (Site 54)

12 Monthly Sampling/Monitoring Events J a n u a r y 1- December 31, 2015										
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	Total NH3-N, ug/L	NO3+NO2- N, ug/L	TIN ug/L,	TN Ug/L	TP, ug/L	E. coli
Min	7.72	-1.5	8.74	0.845	21	219	240	440	12	1
Max	8.35	13.8	15.6	1.097	45	1130	1161	1400	130	41
Avg	8.08	6.88	11.91	0.99	28.89	527.11	556.00	764.67	51.25	10.67
Std. Dev.	0.19	5.37	2.10	0.06	8.63	279.02	281.86	281.82	31.48	11.87
Measurements	12	12	12	12	9	9	9	12	12	12

Table 48 Swede Gulch (Site 55)

12 Monthly Sampling/Monitoring Events J a n u a r y 1- December 31, 2015										
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	Total NH3-N, ug/L	NO3+NO2- N, ug/L	TIN ug/L,	TN Ug/L	TP, ug/L	E. coli
Min	7.72	-1.5	8.74	0.845	21	219	240	440	12	1
Max	8.35	13.8	15.6	1.097	45	1130	1161	1400	130	41
Avg	8.08	6.88	11.91	0.99	28.89	527.11	556.00	764.67	51.25	11
Std. Dev.	0.19	5.37	2.10	0.06	8.63	279.02	281.86	281.82	31.48	12
Measurements	12	12	12	12	9	9	9	12	12	12

Turkey Creek Stream Segments

(Segment 6a South Turkey Creek)

Table 49 Segment 6a Summary

Segment 6a Sampling/Monitoring Summary 2015									
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	NH3-N, ug/L	NO3+NO2- N, ug/L	TIN, ug/L	TN Ug/L	TP, ug/L
Min	7.53	0.10	8.23	0.23	6	66	14	430	2
Max	8.97	15.90	16.49	2.11	103	1026	1046	1552	277
Avg	8.29	9.30	11.35	1.03	36.24	466.80	480.81	890.52	58.48
Std. Dev.	0.36	5.12	2.18	0.57	25.79	278.76	288.96	261.01	69.62
Measurements	21	21	21	21	21	21	21	21	21

Datalogger Temperature Summary 2015								
All Temperatures in °C	30-Min Temp. COLD/		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	3.2	0.1	1.9	1.7	-0.1	0.2
Max	7.3	23.5	3.2	7.3	7.3	17.2	23.2	23.2
Avg	2.6	11.4	3.2	2.6	4.5	12.2	11.4	14.8
Measurements	45	102	1	114	9	25	2556	213
# 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%

Table 50 South Turkey Creek in Bear Creek Lake Park (Site 16a)

15 Monthly Sampling/Monitoring Events January 1-December 31, 2015									
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	Total NH3-N, ug/L	NO3+NO2- N, ug/L	TIN, ug/L	TN Ug/L	TP, ug/L
Min	7.53	0.10	9.60	0.25	6	379	402	718	2
Max	8.97	14.40	16.49	2.11	103	1026	1046	1552	277
Avg	8.37	8.13	11.86	1.15	34.80	608.40	643.20	980.67	54.33
Std. Dev.	0.40	5.19	2.10	0.58	28.78	192.38	188.01	241.94	77.32
Measurements	15	15	15	15	15	15	15	15	15

NO TEMPERATURE DATA DUE TO LOGGER BEING LOST DUE TO HIGH FLOWS

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

Table 51 Aspen Park Metropolitan District, South Turkey Creek (Site 18)

6 Monthly Sampling/Monitoring Events May 1 – October 31, 2015									
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	Total NH3-N, ug/L	NO3+NO2 -N, ug/L	TIN, ug/L	TN Ug/L	Total P, ug/L
Min	7.95	5.8	8.23	0.225	20	66	103	430	16
Max	8.3	15.9	13.8	1.183	68	307	375	824	144
Avg	8.1	12.3	10.0	0.7	39.8	132.3	172.2	665.2	68.8
Std. Dev.	0.11	3.49	1.79	0.37	15.49	82.41	93	144.9	43.20
Measurements	6	6	6	6	6	6	6	6	6

Datalogger Temperature Data 2015								
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	3.2	0.1	1.9	1.7	-0.1	0.2
Max	7.3	23.5	3.2	7.3	7.3	17.2	23.2	23.2
Avg	2.6	11.4	3.2	2.6	4.5	12.2	11.4	14.8
Std. Dev.	2.0	5.05	0.0	2.0	1.9	4.55	5.03	4.92
Measurements	457	10224	1	114	9	25	2556	213
# 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 52 Conifer Metropolitan District, North Turkey Creek (Site19)

9 Monthly Sampling/Monitoring Events March 1-November 30, 2015									
Monthly Parameter Results	pH, SU	Temp, °C	D. O., mg/L	Sp. Cd., mS/cm	Total NH3-	NO3+NO2-N, ug/L	TIN, ug/L	TN Ug/L	TP, ug/L
Min	7.92	4.7	9.43	0.024	7	75	82	274	4
Max	8.27	13.7	15.1	1.638	31	361	392	673	69
Avg	8.1	10.1	11.1	0.6	19.2	211.0	230.2	445.3	35.7
Std. Dev.	0.14	3.03	1.88	0.51	8.45	84.87	91.80	134.73	22.80
Measurements	6	6	6	6	6	6	6	6	6

Datalogger Temperature Data 2015								
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 DM (21.2°C)
Min	-0.1	6.0	1.7	-0.1	0.0	10.0	6.2	12.0
Max	14.0	19.1	10.3	13.9	13.9	14.5	18.8	18.8
Avg	5.0	12.3	5.1	5.0	7.5	12.4	12.3	15.1
Std. Dev.	3.1	2.4	2.3	3.1	3.1	1.3	2.4	1.5
Measurements	4825	5855	13	1206	100	24	1464	122
# 9°C WAT exceeded			1					
% Compliance WAT			92%					
# 13°C DM exceeded					3			
% Compliance DM					97%			
# 17°C WAT exceeded						0		
% Compliance WAT						100%		
# 21.2°C DM exceeded								0
% Compliance DM								100

V. P1 Segments

Segment 1c: Bear Creek Reservoir Temperature Summary 2015

Table 53 BCR Temperature

Segment 1c Datalogger Temperature Summary 2015							
All Temperatures in □C	30-Min Temp. Cold/ Warm Seasons	Oct 1-May 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 (23.3□C)	Apr 1-Oct 31 2- HR Avg. Temp.	Apr 1-Oct 31 Stream DM (23.8□C)
Min	6.2	**NO COLD SEAON DATA**			8.1	6.9	7.2
Max	23.8				21.5	23.6	23.6
Avg	14.9				15.0	14.9	15.3
Measurements	43864				128	10964	912
# 9□C WAT exceeded							
% Compliance WAT							
# 13□C DM exceeded							
% Compliance DM							
# 23.3□C WAT					0		
% Compliance WAT					100%		
# 23.8□C DM exceeded							0
% Compliance DM							100%

Bear Creek Reservoir Profile Station (Site 40T 0.5) Bear Creek Reservoir Profile Station. Site 40T (2.0), [Monitoring station/Datalogger

ID: 40T (0.5) G P S Coordinates: 39° 39’06.27” N 105°08’30.60” W; Sampling/ monitoring site in Bear Creek Reservoir by dam at profile station.]

Table 54 Bear Creek Reservoir Profile Station (Site 40T 0.5)

Datalogger Temperature Data 2015							
All Temperatures in °C	30- MIN WARM Season	Stream Std. Seasons 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 (23.3°C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 DM (23.8°C)
Min	6.9	NO COLD SEAON DATA			8.3	6.9	7.3
Max	23.8				21.5	23.6	23.6
Avg	15.1				15.3	15.1	15.6
Std. Dev.	4.7				4.6	4.7	4.9
Measurements	10966				32	2741	228
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM							
# 23.3C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							100%

[Monitoring station/Datalogger ID: 40T (0.5) G P S Coordinates: 39° 39’06.27” N 105°08’30.60” W; Sampling/ monitoring site in Bear Creek Reservoir by dam at profile station.]

Table 55 Bear Creek Reservoir Profile Station (Site 40T 1.0)

Datalogger Temperature Data 2015							
All Temperatures in ⍰C	30- MIN WARM Season	Stream Std. Seasons 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 (23.3⍰C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 DM (23.8⍰C)
Min	6.7	**NO COLD SEAON DATA**			8.2	6.9	7.2
Max	23.1				21.0	22.8	22.8
Avg	14.8				15.0	14.9	15.3
Std. Dev.	4.6				4.5	4.6	4.7
Measurements	10966				32	2741	228
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM							
# 23.3C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							100%

[Monitoring station/Datalogger ID: 40T (1.0) G P S Coordinates: 39° 39’06.27” N 105°08’30.60” W; Sampling/ monitoring site in Bear Creek Reservoir by dam at profile station.]

Table 56 Bear Creek Reservoir Profile Station Site 40T (1.5)

Datalogger Temperature Data 2015							
All Temperatures in °C	30- MIN WARM Season	Stream Std. Seasons 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 (23.3°C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 DM (23.8°C)
Min	6.2	**NO COLD SEAON DATA**			8.1	6.9	7.2
Max	22.9				20.6	22.8	22.8
Avg	14.7				14.9	14.7	15.1
Std. Dev.	4.6				4.5	4.6	4.6
Measurements	10966				32	2741	228
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM							
# 23.3C WAT exceeded					0		

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

[Monitoring station/Datalogger ID: 40T (1.5) G P S Coordinates: 39° 39'06.27" N 105°08'30.60" W; Sampling/ monitoring site in Bear Creek Reservoir by dam at profile station.] [Monitoring station/Datalogger ID: 40T (2.0) G P S Coordinates: 39° 39'06.27" N 105°08'30.60" W; Sampling/ monitoring site in Bear Creek Reservoir by dam at profile station.]

Table 57 Bear Creek Reservoir Profile Station Site 40T (2.0)

Datalogger Temperature Data 2015							
All Temperatures in °C	30- MIN WARM Season	Stream Std. SeasonsWAT (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 (23.3°C)	June 1-Sept 30 2-HR Avg. Temp.	June 1-Sept 30 DM (23.8°C)
Min	6.7	**NO COLD SEAON DATA**			8.2	6.9	7.3
Max	22.9				20.2	22.9	22.9
Avg	14.8				14.9	14.8	15.1
Std. Dev.	4.5				4.4	4.5	4.6
Measurements	10966				32	2741	228
# 9°C WAT exceeded							
% Compliance WAT							
# 13°C DM exceeded							
% Compliance DM							
# 23.3C WAT exceeded					0		
% Compliance WAT					100%		
# 23.8°C DM exceeded							0
% Compliance DM							100

[Monitoring station/Datalogger ID: 40T (2.0) G P S Coordinates: 39° 39'06.27" N 105°08'30.60" W; Sampling/ monitoring site in Bear Creek Reservoir by dam at profile station.] [Monitoring station/Datalogger ID: 40T (2.0) G P S Coordinates: 39° 39'06.27" N 105°08'30.60" W; Sampling/ monitoring site in Bear Creek Reservoir by dam at profile station.]

Segment 2 Below BCR

Table 58 Below Bear Creek Reservoir Trace weir in Bear Creek (Site 45)

15 Monthly Sampling/Monitoring Events January 1-December 31, 2015										
Monthly Parameter Results	pH, SU	Temp, C	D.O mg/L	Sp. Cd.,	NH3-N, ug/L	NO3+NO2-N, ug/L	TIN, ug/L	TN Ug/L	Total P, ug/L	ECOLI Colonies
Min	7.76	2.1	3.28	0.218	21	139	14	506	2	1
Max	8.63	19.2	15.49	0.724	403	1118	1046	1746	277	35
Avg	8.09	11.15	10.01	0.43	80.27	405.60	480.81	834.73	58.48	8
Std. Dev.	0.24	6.09	3.24	0.14	90.52	260.38	288.96	303.35	69.62	12
Measurements	15	15	15	15	15	15	15	15	15	15
Datalogger Temperature Data 2015										
All Temperatures in °C	30-Min Temp. Cold/ Warm Seasons					April 1-Nov. 30 Stream Std. WAT (27.5°C)		April 1-Nov.30 2-HR Avg. Temp.		April 1-Nov. 30 DM (28.6°C)
Min	6.7					7.9		6.7		7.3
Max	22.4					20.5		22.1		22.1
Avg	14.9					15.1		14.9		15.5
Std. Dev.	4.4					4.1		4.4		4.6
Measurements	10368					44		2592		216
# 9C WAT exceeded										
% Compliance WAT										
# 13C DM exceeded										
% Compliance DM										
# 27.5C WAT						0				
% Compliance WAT						100%				
# 28.6C DM exceeded										0
% Compliance DM										100%

VI. 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). 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 59 2015 May Bear Creek Evergreen vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) May 2015	Historic Daily Mean Flow (cfs) 25 Years for May 1990	Deviation from Historic Flow (cfs)
1	118	51	67
2	129	52	77
3	128	49	79
4	190	46	144
5	303	51	252
6	303	53	250
7	279	61	218
8	309	68	241
9	413	65	348
10	410	61	349
11	368	67	301
12	335	61	274
13	304	59	245
14	269	63	206
15	247	63	184
16	223	64	159
17	197	56	141
18	210	59	151
19	316	61	255
20	301	60	241
21	309	61	248
22	329	65	264
23	350	70	280
24	337	72	265
25	311	72	239
26	284	69	215
27	259	62	197
28	248	57	191
29	323	82	241
30	230	69	161
31	227	71	156
MIN	118	46	67
MAX	413	82	349
AVG	276	62	214

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

Table 60 2015 June Bear Creek Evergreen vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) May 2015	Historic Daily Mean Flow (cfs) 25 Years for May 1990	Deviation from Historic Flow (cfs)
1	241	64	177
2	249	57	192
3	260	54	206
4	269	59	210
5	313	68	245
6	342	69	273

7	323	68	255
8	297	66	231
9	299	65	234
10	351	63	288
11	378	59	319
12	407	56	351
13	364	51	313
14	389	49	340
15	356	48	308
16	428	46	382
17	381	43	338
18	357	42	315
19	335	41	294
20	305	44	261
21	272	43	229
22	243	42	201
23	224	39	185
24	215	39	176
25	217	38	179
26	192	39	153
27	177	39	138
28	165	36	129
29	155	34	121
30	144	34	110
MIN	144	34	110
MAX	428	69	382
AVG	288	50	238

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

Table 61 2015 July Bear Creek Evergreen vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) July 2015	Historic Daily Mean Flow (cfs) 25 Years for July	Deviation from Historic Flow (cfs)
1	154	32	122
2	164	31	133
3	137	30	107
4	127	36	91
5	133	45	88
6	133	50	83
7	179	54	125
8	201	98	103
9	223	125	98
10	198	74	124
11	172	63	109
12	159	54	105
13	170	49	121
14	171	49	122
15	161	52	109
16	145	50	95
17	132	47	85
18	127	44	83
19	125	44	81
20	124	50	74
21	153	61	92
22	128	61	67
23	110	49	61
24	104	46	58
25	108	46	62
26	97	43	54
27	93	42	51
28	87	42	45
29	78	47	31

30	85	46	39
31	82	44	38
MIN	78	30	31
MAX	223	125	133
AVG	137	52	86

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

Table 62 2015 August Bear Creek Evergreen vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) August 2015	Historic Daily Mean Flow (cfs) 25 Years for August 1990	Deviation from Historic Flow (cfs)
1	80	42	38
2	75	42	33
3	73	45	28
4	69	41	28
5	66	43	23
6	63	41	22
7	60	37	23
8	59	36	23
9	57	37	20
10	61	34	27
11	62	37	25
12	58	40	18
13	56	47	9
14	57	40	17
15	56	66	-10
16	60	82	-22
17	67	72	-5
18	54	77	-23
19	51	80	-29
20	48	65	-17
21	44	59	-15
22	42	70	-28
23	41	78	-37
24	40	67	-27
25	38	61	-23
26	37	57	-20
27	36	54	-18
28	26	50	-24
29	35	49	-14
30	34	48	-14
31	34	47	-13
MIN	26	34	-37
MAX	80	82	38
AVG	53	53	0

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

Table 63 **2015 September Bear Creek Evergreen vs. Historic Bear Creek Flow**

Date	Daily Mean Flow (cfs) September 2015	Historic Daily Mean Flow (cfs) 25 Years for September 1990	tion from Historic Flow (cfs)
1	40	53	-13
2	35	62	-27
3	34	50	-16
4	35	47	-12
5	33	47	-14
6	32	70	-38
7	31	57	-26
8	30	50	-20
9	29	47	-18
10	28	46	-18
11	27	44	-17

12	27	43	-16
13	26	41	-15
14	25	39	-14
15	25	39	-14
16	24	38	-14
17	24	44	-20
18	24	42	-18
19	24	47	-23
20	23	42	-19
21	23	42	-19
22	22	39	-17
23	23	38	-15
24	22	37	-15
25	22	42	-20
26	22	51	-29
27	21	41	-20
28	20	55	-35
29	22	55	-33
30	23	47	-24
MIN	20	37	-38
MAX	40	70	-12
AVG	27	47	-20

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

Table 64 2015 May Bear Creek Morrison vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) May 2015	Historic Daily Mean Flow (cfs) 25Years for May 1990	Deviation from Historic Flow (cfs)
1	234	75.7	158.3
2	250	73.6	176.4
3	235	72.9	162.1
4	303	65.4	237.6
5	601	75.2	525.8
6	643	75	568
7	469	78.8	390.2
8	494	84.4	409.6
9	909	83.6	825.4
10	816	79.7	736.3
11	660	82.7	577.3
12	527	81.8	445.2
13	411	78.2	332.8
14	342	76	266
15	261	83.2	177.8
16	341	85.4	255.6
17	286	81.3	204.7
18	288	80.8	207.2
19	624	75.8	548.2
20	575	75.3	499.7
21	555	75.4	479.6
22	573	78.5	494.5
23	654	83.9	570.1
24	607	85.6	521.4
25	543	84.6	458.4
26	477	81.7	395.3
27	406	81.6	324.4
28	367	75.3	291.7
29	310	89.9	220.1
30	301	100	201
31	279	99.9	179.1
MIN	234	65.4	31

MAX	909	100	825.4
AVG	463	81	371

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

Table 65 2015 June Bear Creek Morrison vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) June 2015	Historic Daily Mean Flow (cfs) 25 Years for June 1990	Deviation from Historic Flow (cfs)
1	285	86.5	198.5
2	282	78.5	203.5
3	285	72.3	212.7
4	292	71.5	220.5
5	373	77.3	295.7
6	458	75.9	382.1
7	419	70.1	348.9
8	364	72.4	291.6
9	343	66.8	276.2
10	418	71.8	346.2
11	522	69.5	452.5
12	656	52.7	603.3
13	545	59.3	485.7
14	570		570
15	473		473
16	565		565
17	493		493
18	454		454
19	406		406
20	360		360
21	327		327
22	287		287
23	241		241
24	227		227
25	228		228
26	205	36.6	168.4
27	190	39	151
28	174	36.2	137.8
29	164		164
30	152		152
MIN	152	36.2	0
MAX	656	86.5	603.3
AVG	359	65	324

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

Table 66 2015 July Bear Creek Morrison vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) July 2015	Historic Daily Mean Flow (cfs) 25 Years for July 1990	Deviation from Historic Flow (cfs)
1	153		153
2	174		174
3	149		149
4	138		138
5	150		150
6	143		143
7	177		177
8	195		195
9	244		244
10	215		215
11	183		183
12	165	62	103
13	177	59.8	117.2
14	177	56.1	120.9
15	161	56.6	104.4
16	152	60.1	91.9

17	139	58.9	80.1
18	130	53.1	76.9
19	130	52.8	77.2
20	133	59.9	73.1
21	154	71.1	82.9
22	145	74.7	70.3
23	124	64.7	59.3
24	115	58.1	56.9
25	120	57.7	62.3
26	107	53	54
27	106	50	56
28	93.1		93.1
29	89.4		89.4
30	91.3	56.2	35.1
31	85.1	53.6	31.5
MIN	85.1	50	31.5
MAX	244	74.7	244
AVG	146	59	112

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

Table 67 2015 August Bear Creek Morrison vs. Historic Bear Creek Flow

Date	Daily Mean Flow (cfs) August 2015	Historic Daily Mean Flow (cfs) 25 Years for August 1990	Deviation from Historic Flow (cfs)
1	89.3	50.3	39
2	79.4	52	27.4
3	82.1		82.1
4	75.8		75.8
5	71.2		71.2
6	67.8	48.9	18.9
7	66.5	45.4	21.1
8	64.1	42.2	21.9
9	64.2		64.2
10	65.2		65.2
11	72.8		72.8
12	69.2		69.2
13	63.2		63.2
14	70.6		70.6
15	61.3		61.3
16	67.9		67.9
17	75		75
18	66.4		66.4
19	59		59
20	57.9		57.9
21	54.3		54.3
22	53		53
23	50.7	80.4	-29.7
24	49.5	73.6	-24.1
25	47.9	67.9	-20
26	45.6	62.4	-16.8
27	44.1	60.9	-16.8
28	43.9	61.2	-17.3
29	38.4	60	-21.6
30	38.1		38.1
31	38.1	55.6	-17.5
MIN	38.1	42.2	-29.7
MAX	89.3	80.4	82.1
AVG	61	59	37

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

Table 68 **2015 September Bear Creek Morrison vs. Historic Bear Creek Flow**

Date	Daily Mean Flow (cfs) September	Historic Daily Mean Flow (cfs) 25 Years	Deviation from Historic
1	41.3	58.9	-17.6
2	40.3	71.4	-31.1
3	38.1	62.6	-24.5
4	38.1	56.4	-18.3
5	37.5	53.2	-15.7
6	36.6	69.4	-32.8
7	35	71.9	-36.9
8	32.2	60.8	-28.6
9	29.8	55.8	-26
10	26.9	52.1	-25.2
11	25	50.6	-25.6
12	25	48.1	-23.1
13	24.7	44.9	-20.2
14	22.7	43.1	-20.4
15	21.5	42.6	-21.1
16	21	41.1	-20.1
17	20.4	45.8	-25.4
18	19.6	96.4	-76.8
19	19.8	51.7	-31.9
20	19.8	48.2	-28.4
21	19.8	43.5	-23.7
22	19.8	42.5	-22.7
23	19.6	2570	-2550.4
24	18.9		18.9
25	19.5		19.5
26	19.2		19.2
27	20		20
28	18.3		18.3
29	19.4		19.4
30	22.6	54.5	-31.9
MIN	18.3	41.1	-2550
MAX	41.3	2570	20
AVG	26	160	-102

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

VII. 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 2006. Historical weather data obtained from the National Oceanographic and Atmospheric Administration/National Weather Service, High Plains

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. Climate Center. Maximum and minimum air temperature values along with precipitation measurements recorded each morning. Daily readings entered into a NWS software program. Local weather statistics are summarized, comparing 2015 monthly maximum, minimum and mean air temperatures and monthly precipitation to 54-year (1961-2015) historical data.

Table 69 Weather Data May-September 2015 Summary

Monthly Weather Data	May	June	July	August	September
Air Temp Low Max (°F)	41	52	56	55	65
Air Temp High Max (°F)	71	89	88	88	84
Air Temp High Avg (°F)	57.06	76.10	78	80	77.33
Total Precip (in.)	6.50	3.18	2.85	1.62	.21
Days of Precip.	25	18	19	9	3

Table 70 2015 Weather Data vs. Historical Weather Data (54 years 1961-2015)

	Avg Daily Max (°F)	Avg Daily Min (°F)	Avg Mon. (°F)	Precip (in.)
May 2015	57.06	34.58	45.82	6.91
May Hist	65.2	33.9	49.6	2.57
% Deviation	88%	102%	92%	269%
June 2015	76.10	45.53	60.82	3.18
June Hist	75.3	41.1	58.2	2.14
% Deviation	101%	111%	105%	149%
July 2015	78	48	63	2.85
July Hist	81.6	46.8	64.2	2.23
% Deviation	96%	103%	98%	128%
August 2015	80	47	64	1.62
August Hist	79.3	45.3	62.4	2.31
% Deviation	101%	104%	103%	70%
Sept. 2015	77.33	45.67	61.5	0.21
Sept. Hist	72.1	37.1	54.6	1.47
% Deviation	107%	123%	113%	14%

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 71 **May Weather Summary**

Date	May 2015 Daily Mean Flow (cfs)	May 2015 Daily Air Max Temp (°F)	May 2015Precip. (in.)
1	118	71	0.01
2	129	63	0.15
3	128	67	
4	190	68	0.45
5	303	51	0.86
6	303	49	0.53
7	279	59	0.07
8	309	52	0.22
9	413	50	0.92
10	410	47	1
11	368	44	
12	335	53	
13	304	67	0.03
14	269	58	0.04
15	247	66	T
16	223	60	T
17	197	57	0.08
18	210	62	0.33
19	316	43	0.85
20	301	41	0.32
21	309	40	0.03
22	329	50	0.1
23	350	53	0.28
24	337	53	0.04
25	311	54	0.02
26	284	58	0.26
27	259	64	0.18
28	248	68	0.06
29	323	70	0.01
30	230	63	0.07
31	227	68	
MIN	118	40	0.01
MAX	413	71	1
AVG	276	57.06	0.28
TOTAL			6.91

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 72 **June Weather Summary**

Date	June 2015 Daily Mean Flow (cfs)	June 2015 Daily Max Air Temp (°F)	June 2015 Precip (in.)
1	241	79	
2	249	77	0.03
3	260	83	
4	269	69	0.08
5	313	76	0.14
6	342	65	0.14
7	323	68	0.13
8	297	70	0.47
9	299	74	
10	351	79	0.16
11	378	70	0.16
12	407	65	0.95
13	364	66	0.17
14	389	77	0.3
15	356	75	
16	428	64	0.08
17	381	80	
18	357	78	0.01
19	335	74	0.11
20	305	87	
21	272	80	
22	243	89	
23	224	73	
24	215	83	0.02
25	217	85	0.18
26	192	82	0.04
27	177	73	
28	165	80	
29	155	82	0.01
30	144	80	
MIN	144	64	0.01
MAX	428	89	0.95
AVG	288	76.10	0.18
TOTAL			3.18

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 **July Weather Summary**

Date	July 2015 Daily Mean Flow (cfs)	July 2015 Daily Max Air Temp (°F)	July 2015 Precip (in.)
1	154	86	0.01
2	164	81	0.15
3	137	77	0.01
4	127	78	
5	133	88	
6	133	82	0.48
7	179	59	0.22
8	201	62	0.18
9	223	63	0.58
10	198	70	0.27
11	172	77	0.23
12	159	79	
13	170	83	
14	171	79	0.22
15	161	78	
16	145	76	0.07
17	132	80	0.00
18	127	82	0.00

19	125	76	0.04
20	124	71	0.05
21	153	75	0.20
22	128	75	0.07
23	110	80	
24	104	85	
25	108	74	0.03
26	97	83	
27	93	83	0.04
28	87	85	
29	78	80	
30	85	79	
31	82	81	
MIN	78	59	0.00
MAX	223	88	0.58
AVG	137	78	0.15
TOTAL			2.85

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 74 **August Weather Summary**

Date	August 2015 Daily Mean Flow (cfs)	August 2015 Daily Max Air Temp (ºF)	August 2015 Precip (in.)
1	80	78	
2	75	85	0.18
3	73	84	0.08
4	69	77	
5	66	84	
6	63	86	
7	60	83	
8	59	83	
9	57	78	T
10	61	82	
11	62	76	0.25
12	58	76	
13	56	82	0.02
14	57	83	0.43
15	56	83	
16	60	88	0.23
17	67	79	0.17
18	54	77	0.20
19	51	69	0.06
20	48	63	
21	44	78	
22	42	86	
23	41	84	
24	40	71	
25	38	85	
26	37	87	
27	36	85	T
28	26	78	
29	35	76	
30	34	82	
31	34	87	
MIN	26	63	0.02
MAX	80	88	0.43
AVG	53	80	0.18
TOTAL			1.62

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 75 September Weather Summary

Date	September 2015 Daily Mean Flow (cfs)	September 2015 Daily Max Air Temp (ºF)	September 2015 Precip (in.)
1	40	76	0.06
2	35	80	
3	34	81	
4	35	75	0.07
5	33	77	
6	32	77	
7	31	78	
8	30	73	
9	29	75	
10	28	82	
11	27	84	
12	27	70	
13	26	65	
14	25	42	
15	25	56	
16	24	46	
17	24	44	
18	24	39	
19	24	34	
20	23	38	
21	23	39	
22	22	44	
23	23	46	
24	22	39	
25	22	39	
26	22	46	
27	21	41	
28	20	43	
29	22	49	0.08
30	23	49	
MIN	20	34	0.06
MAX	40	65	0.08
AVG	27	45.67	0.07
TOTAL			.21

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.