BIG DRY CREEK
ANNUAL WATER QUALITY SUMMARY
FOR 2022

Prepared for the
Big Dry Creek Watershed Association
Board of Directors

Prepared by
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Abbreviations and Acronyms

ac	acute
BDCWA	Big Dry Creek Watershed Association
BMP	best management practice
BMW	Barr Milton Watershed
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System
CDWR	Colorado Division of Water Resources
cfs	cubic feet per second
ch	chronic
cfu	colony forming unit
CWQCC	Colorado Water Quality Control Commission
CWQCD	Colorado Water Quality Control Division
DM	daily maximum
DMR	discharge monitoring report
DO	dissolved oxygen
EDAS	Ecological Data Application System
EPA	U.S. Environmental Protection Agency
HBI	Hilsenhoff Biotic Index
HSW	high scoring water
kg/yr	kilograms per year
MCL	maximum contaminant level
µg/L	micrograms per liter
µS/cm	microsiemens per centimeter
mg/L	milligrams per liter
MG/YR	million gallons per year
mL	milliliter
MMI	multi-metric index
MPN	most probable number
MS4	municipal separate storm sewer system
MWAT	maximum weekly average temperature
NTU	nephelometric turbidity unit
QA/QC	quality assurance/quality control
RPD	relative percent difference
SAP	sampling and analysis plan
SDI	Shannon Diversity Index
TIN	total inorganic nitrogen
TKN	total Kjeldahl nitrogen
TMDL	total maximum daily load
TOC	total organic carbon
TN	total nitrogen

TP	total phosphorus
TSS	total suspended solids
USGS	U.S. Geological Survey
WWTP	wastewater treatment plant

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1. INTRODUCTION AND BACKGROUND

The Big Dry Creek Watershed Association (BDCWA) is a 501(c)(3) non-profit corporation focused on developing a sound scientific understanding of water quality, flow, aquatic life, and habitat conditions in the Big Dry Creek watershed and acting to improve these conditions. To support these objectives, BDCWA implements an instream monitoring program and analyzes results from the program on an annual basis. The monitoring program is described in the *Cooperative Sampling and Analysis Plan for the Mainstem of Big Dry Creek* (SAP), which was reviewed and updated in 2018 and can be obtained from the BDCWA website (www.bigdrycreek.org). The monitoring program is conducted by the City and County of Broomfield, City of Westminster, City of Northglenn, and the City of Thornton (Cities). The program includes water quality, flow, and biological monitoring. On an annual basis, data collected under this program are reviewed by the BDCWA Board and uploaded into a master database and then analyzed for compliance with stream standards, for water quality trends, and with regard to other priorities or areas of interest to BDCWA.

Following a brief introduction to the monitoring program and an overview of field conditions during 2022, this report summarizes findings from the 2022 monitoring program, focusing on these primary topics:

- Annual data summary and comparison to stream standards
- Targeted discussion regarding these key water quality constituents:
  - *Escherichia coli* (*E. coli*)
  - Selected metals (selenium, iron, manganese, arsenic)
  - Chloride and sulfate
  - Nutrients
- Biological monitoring
- Annual flow conditions
- Quality assurance/quality control (QA/QC)
- Recommendations and conclusions

A map of the watershed and sampling locations is provided in Appendix A, and statistical data summaries supporting these discussions are provided in Appendix B.

2. Overview of Monitoring Activities and Field Conditions During 2022

During 2022, BDCWA members worked together to collect water quality and flow data along the main stem of Big Dry Creek (Figure 1), consistent with the long-term BDCWA monitoring program, as described in the SAP (BDCWA 2018) and in Table 1. The Cities and BDCWA also helped to fund operation of the U.S. Geological Survey (USGS) gauging station at Westminster behind Front Range Community College.

A conceptual-level understanding of the hydrologic regime for Big Dry Creek is important due to its significant effect on pollutant loading and instream concentrations. For general context, Figure 36 (later in this report) provides a conceptual summary of the key discharges and diversions along the creek, along with the USGS gauging station locations.

Figure 1. Big Dry Creek Watershed Location Map

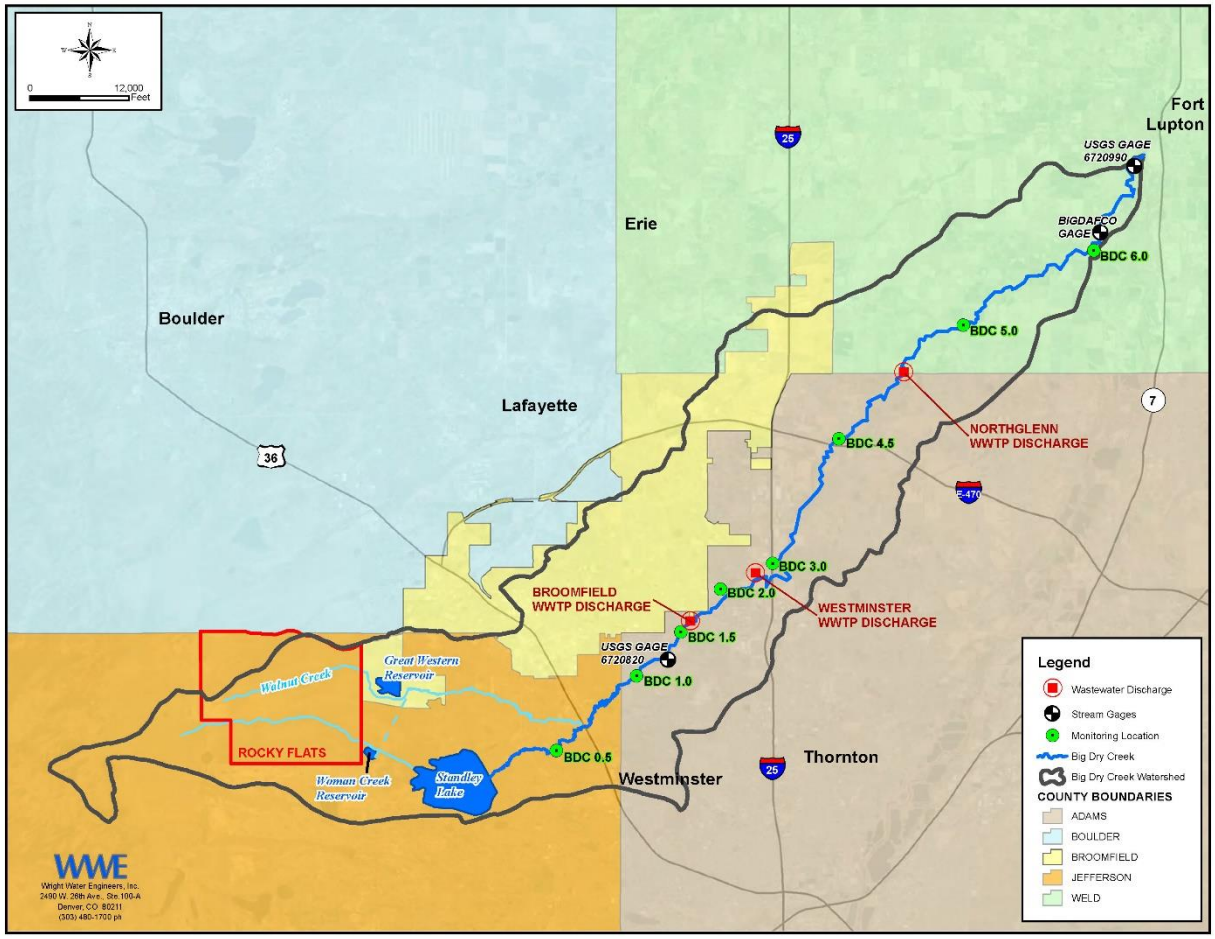


Table 1. Description of Instream Monitoring Locations in 2022

Site	Location/Selection Criteria	Constituents
bdc0.5	Big Dry Creek at Old Wadsworth Ave. Represents background conditions upstream of the WWTP outfalls, and urbanization impacts.	Water Quality, Habitat, Macroinvertebrates, Fish, Flow
bdc1.0	Big Dry Creek at 112th Ave. Represents conditions downstream of the confluence with Walnut Creek and Rocky Flats discharge.	Water Quality, Habitat, Macroinvertebrates, Fish, Flow
bdc1.5	Big Dry Creek at 120th Ave. Represents conditions immediately upstream of the Broomfield WWTP outfall.	Water Quality, Flow
120th & BDC	Big Dry Creek at 120th Avenue. Same approximate location as bdc1.5.	Mercury
bdc1.5C	Big Dry Creek downstream of 120th Ave. upstream of the Broomfield WWTP. Serves as reference site representing habitat conditions prior to the Broomfield WWTP outfall.	Habitat, Macroinvertebrates, Fish
bdc2.0	Big Dry Creek at 128th Ave. Represents conditions downstream of the Broomfield WWTP and upstream of the Westminster WWTP outfall.	Water Quality, Habitat, Macroinvertebrates, Fish, Flow
bdc3.0	Big Dry Creek at I-25 Represents conditions downstream of the Westminster WWTP outfall, but upstream of Northglenn.	Water Quality, Habitat, Macroinvertebrates, Fish, Flow
bdc4.5	Big Dry Creek downstream of York St. Represents urban development impacts, agricultural impacts, and background conditions for the Northglenn WWTP. (Replaces bdc4.0; site moved downstream April 2011 for safety reasons.)	Water Quality
bdc5.0	Big Dry Creek at Weld County Rd. 4. Represents conditions downstream of the Northglenn WWTP and agricultural influences.	Water Quality, Habitat, Macroinvertebrates, Fish
bdc6.0	**Big Dry Creek at Weld County Rd. 23 near the confluence with the S. Platte.** **Represents conditions just prior to the confluence with the South Platte River (end of Segment 15).**	Water Quality

During 2022, city staff collected and analyzed water quality samples for a variety of constituents, resulting in over 3,000 records being added into the BDCWA water quality database. Most metals, boron, and cyanide were monitored on a quarterly basis, with the exception of total recoverable iron and dissolved selenium, which are monitored monthly. Iron is monitored monthly because of elevated iron concentrations in the lower watershed. The selenium monitoring frequency has been increased to monthly to support potential future longevity plan requirements for site-specific standards. Mercury is monitored quarterly at only one location at 120th Avenue due to the high cost of mercury analysis at sufficiently low detection limits. All other constituents are monitored on a monthly basis. The Big Dry Creek monitoring program is an ambient-based program. The program does not target wet-weather events, but typically includes one or more sampling events associated with precipitation that happens to fall on or prior to the designated sampling date.

Table 2 summarizes field conditions during each sampling event during 2022, as recorded at various locations in the watershed. Standley Lake releases and instream flow on the sample date are provided in cubic feet per second (cfs). Based on information shown in Table 2, Standley Lake releases occurred from June 13 through September 7, 2022. As was the case for 2021, this release pattern continues to differ from historical release patterns, which have typically begun earlier in the spring. Some of the January, February, April, November, and December samples at upstream locations were affected by icy conditions, affecting more months than usual. This resulted in a smaller winter condition sample population for the stream as a whole and the upper watershed in particular. Site bdc3.0 at I-25 was inaccessible due to construction during January and February. Most of the sampling events during 2022 represent dry weather conditions, with the exceptions of the March sampling that occurred during a snowfall event, a significant rainfall event in the days prior to the June sampling, and then a mild rain event preceded the August sampling event by several days. Water quality responses to the March and June events are evident in several data sets such as total recoverable iron, *E. coli* and total phosphorus as discussed later in this report.

Table 2. Summary of Field Conditions during 2022 Sampling Events

Date	Precip. (inches)[1,3]	Release (cfs)[1]	Flow (cfs)[2]		Update Comments
	Standley Lake	Standley Lake	USGS Westminster	USGS Ft. Lupton	
13-Jan-22	0.00	0.0	3.0	23.9	No Standley releases this month. bdc0.5 & 1.0 frozen. bdc3.0 inaccessible due to construction.
10-Feb-22	0.00	0.0	3.8	27.3	No Standley releases this month. bdc0.5 & 1.0 frozen. bdc3.0 inaccessible due to construction.
17-Mar-22	~0.7 (snow-rain event)	0.0	41.4	70.9	No Standley releases this month. 1.75" of snow and 0.15" of precip as rain at Standley. 2.5" of precip as snow & 0.7" of precip as rain at Northglenn.
14-Apr-22	0.00	0.0	1.4	51.7	No Standley releases this month. bdc0.5 frozen.
12-May-22	0.00	0.0	10.8	33.7	No Standley releases this month.
02-Jun-22	~1.2 (prior)	0.0	14.8	137	No Standley releases on sample date. 1.15" of precip on 6/1 at Standley Lake. 1.20" of precip on 6/1 at Northglenn. 0.25" of precip on 6/1 at Fort Lupton.
14-Jul-22	0.00	8.6	9.1	14.4	Standley releasing at 8.58 cfs on sample date. Standley released 6.35 cfs 7/10 to 7/12, 8.58 cfs 7/13 to 7/15, and 2.24 7/16 to 7/18.
11-Aug-22	0.00	0.0	4.4	37.9	No Standley releases on sample date. 8/8/2023 had 0.8" of precip at Northglenn.
15-Sep-22	0.00	0.0	2.4	60.5	No Standley releases on sample date.
20-Oct-22	0.00	0.0	0.7	16.6	No Standley releases this month.
17-Nov-22	0.00 (follows snow)	0.0	0.8	37.0	No Standley releases this month. bdc0.5 & 1.0 frozen. ~3" of snow on 11/15 at Standley Lake and Northglenn.
08-Dec-22	0.00	0.0	0.8	35.5	No Standley releases this month. bdc0.5 & 1.0 frozen.

[1] Standley Lake precipitation and release data recorded at Standley Lake Dam by dam tender.

[2] USGS flow data were obtained from USGS NWIS website for USGS 06720820 Big Dry Creek at Westminster and USGS 06720990 Big Dry Creek at Mouth near Fort Lupton.

[3] Precipitation at Northglenn (Colorado Climate Center - Data (colostate.edu) also reviewed to represent a central location in watershed.

3. APPLICABLE STREAM STANDARDS, DATA SUMMARY, AND STANDARDS ASSESSMENT

In 2020, the Colorado Water Quality Control Commission (CWQCC) adopted major changes to stream standards for Segment 1 of Big Dry Creek. These changes applied more stringent designated uses including an upgrade of the stream from Aquatic Life 2 to Aquatic Life 1, upgrade from Potential Recreation to Existing Recreation, and addition of a Water Supply use. Agricultural use standards continue to apply. Big Dry Creek is also identified as a "Use Protected" stream, which means that it is not subject to antidegradation review.[1]

Table 3 identifies the currently applicable Regulation 38 stream standards for Segment 1 of Big Dry Creek. Attainment of stream standards is evaluated based on comparison of specific statistical values to chronic stream standards and determining whether acute standards are exceeded in any samples. For most constituents, the relevant statistic for comparison to the chronic standard is the 85th percentile value. Exceptions include use of the 50th percentile value for metals with standards in the total recoverable form, the geometric mean[2] for *E. coli*, and the 15th percentile value for dissolved oxygen (DO) and the lower acceptable range for pH. For total phosphorus and total nitrogen, annual medians with an allowable exceedance of no more than once every three years are used as "interim values" until final stream standards are adopted. For nitrate, the maximum value is used, with no more than one exceedance every three years. More complex evaluation approaches are required for *E. coli*, selenium, ammonia, and temperature, as described later in this report. (*Note that from a regulatory perspective, five years of data would be used in such a comparison to standards*.)

As part of the 2020 Regulation 38 Rulemaking Hearing, the CWQCC adopted Segment 1 stream standards for chloride, sulfate, dissolved iron, and dissolved manganese that are based on "secondary" drinking water standards developed pursuant to the federal Safe Drinking Water Act. These secondary standards are not health based, but rather are based upon "welfare" impacts such as taste, odor and discoloration of laundry or fixtures. Stream standards for these parameters can either be based on the "table value standards" in Regulation 31, or they can be based on "existing conditions" as of January 1, 2000, with the exception of chloride. Assessment procedures for these constituents are discussed in more detail later in this report.

The time periods evaluated in this report vary, depending on the nature of the water quality and/or regulatory issue. For constituents with current or historic water quality concerns, five to ten years of data may be included in the discussion, whereas for most other constituents, new data collected during 2022 are the primary focus.

[1] For more information on Use Protected and Reviewable designations related to antidegradation requirements in Regulation 31, see 5 CCR 1002-31 Section 31.8 Antidegradation.

[2] The geometric mean is calculated as the nth root of the product of n values. The geometric mean is used for regulatory purposes because it dampens the impact of extremely high or low values, relative to the arithmetic mean.

Table 3. Regulation 38 Stream Standards for Big Dry Creek Adopted in 2020

1. Mainstem of Big Dry Creek, including all tributaries and wetlands, from the outlet of Standley Lake to the confluence with the South Platte River. Walnut Creek, including tributaries and wetlands, from the outlet of Great Western Reservoir to the confluence with Big Dry Creek.

COSPBD01	Classifications
Designation	Agriculture
UP	Aq Life Warm 1
	Water Supply
	Recreation E

Qualifiers:

Fish Ingestion Standards Do Not Apply

Other:

*chlorophyll a (mg/m^2)(chronic) = applies only above the facilities listed at 38.5(4).
*Phosphorus(chronic) = applies only above the facilities listed at 38.5(4).
*Selenium(acute) = 19.1 ug/L from 11/1 - 3/31
TVS from 4/1 - 10/31.
Refer to Section 38.6(4)(d).
*Selenium(chronic) = 15 ug/L from 11/1 - 3/31
7.4 ug/L from 4/1 - 10/31.
Refer to Section 38.6(4)(d).
*Uranium(acute) = See 38.5(3) for details.
*Uranium(chronic) = See 38.5(3) for details.

Physical and Biological	DM	MWAT
Temperature °C	WS-I	WS-I
	acute	**chronic**
D.O. (mg/L)	---	5.0
pH	6.5 - 9.0	---
chlorophyll a (mg/m^2)	---	150*
E. Coli (per 100 mL)	---	126
Inorganic (mg/L)		
	acute	**chronic**
Ammonia	TVS	TVS
Boron	---	0.75
Chloride	---	250
Chlorine	0.019	0.011
Cyanide	0.005	---
Nitrate	10	---
Nitrite	---	4.5
Phosphorus	---	0.17*
Sulfate	---	WS
Sulfide	---	0.002

Metals (ug/L)	acute	chronic
Arsenic	340	---
Arsenic(T)	---	0.02-10 [A]
Beryllium(T)	---	100
Cadmium	TVS	TVS
Cadmium(T)	5.0	---
Chromium III	---	TVS
Chromium III(T)	50	---
Chromium VI	TVS	TVS
Copper	TVS	TVS
Iron	---	WS
Iron(T)	---	1000
Lead	TVS	TVS
Lead(T)	50	---
Manganese	TVS	TVS/WS
Mercury(T)	---	0.01
Molybdenum(T)	---	150
Nickel	TVS	TVS
Nickel(T)	---	100
Selenium	varies*	---
Selenium	---	varies*
Silver	TVS	TVS
Uranium	varies*	varies*
Zinc	TVS	TVS

To calculate hardness-based stream standards, a hardness value of 361 milligrams per liter (mg/L) was used, consistent with the value used by the Colorado Water Quality Control Division (CWQCD) in 2019 wastewater discharge permits for Broomfield, Westminster, and Northglenn. The mean hardness value for the stream as a whole during 2022 was 367 mg/L. Hardness values have a significant effect on certain metals standards. For example, a hardness value of 250 mg/L results in a chronic zinc standard of 271 micrograms per liter (µg/L), whereas a hardness value of 350 mg/L results in a chronic zinc standard of 362 µg/L (i.e., the higher the hardness value, the less stringent the water quality standard is for certain metals). For purposes of the 303(d) List (which identifies impaired stream segments), the CWQCD uses the mean hardness value associated with the five-year assessment period for assessment of chronic table value standards for metals. Alternatively, a detailed assessment may also be conducted calculating the chronic table value standard for each pair of hardness and concentration data. The acute table value standards for metals are calculated for each paired hardness/concentration and attainment is determined for each data pair (CWQCD 2019).

In addition to the stream standards and classifications for Big Dry Creek, it is also important to be aware of the 303(d) Listing Methodology, which provides additional information on how impairment decisions are made and how streams can be delisted from being impaired on the 303(d) List. This methodology is updated every two years, with several notable changes to the *E. coli* listing methodology included in the 2024 303(d) Listing Methodology (Division 2022).

4. Overview of Water Quality Data

Table 4 provides a summary of the numbers of instream water quality samples collected and key summary statistics for each constituent analyzed during 2022 and identifies whether the stream attained the standard for each constituent with an applicable stream standard.

A complete summary of individual sampling event results during 2022 for each monitoring station is provided in Appendix B. Quality control (QC) samples, collected in accordance with the Big Dry Creek SAP (BDCWA 2018), are provided in Appendix C.

Discharge monitoring report (DMR) data from municipal wastewater treatment plant (WWTP) discharges to Big Dry Creek during 2022 are provided in Appendix D. The DMR samples were collected in accordance with Colorado Department of Public Health and Environment (CDPHE) Colorado Discharge Permit System (CDPS) permit requirements and are provided as a courtesy from the City and County of Broomfield, the City of Westminster, and the City of Northglenn to provide supplemental information on the quality of discharges to Big Dry Creek at the time of instream sample collection. Broomfield, Westminster, and Northglenn are permitted to discharge to Big Dry Creek, and all three did so during 2022.

Appendix E provides instream iron monitoring results at two sites on lower Big Dry Creek that are monitored by Metro Wastewater Reclamation District (Metro Wastewater) biweekly and provided as a courtesy to BDCWA.

Table 4. Statistical Summary for 2022 Big Dry Creek Data and Comparison to Standards

Analyte	Nbr	Min	Max	Mean	15th	Median	85th	Standard	Standard Exceeded?
General									
ALKALINITY (mg/L)	86	64	302	168	130	162	199	N/A	N/A
BORON, T (mg/L)	30	0.06	0.33	0.20	0.11	0.20	0.29	0.75	No
CHLORIDE, D (mg/L)	87	52	840	248	135	183	411	250	No
CHLOROPHYLL-a, corrected (ug/L)	86	ND	21	4	1	2	7	N/A	N/A
CHLOROPHYLL-a, uncorrected (ug/L)	86	1	32	7	2	5	10	N/A	N/A
CONDUCTIVITY (uS/cm)	87	428	3399	1626	1149	1528	2305	N/A	N/A
DO (mg/L)	87	4	20	9	6	9	13	5 (min)	No
pH (SU)	87	7.2	8.2	7.7	7.5	7.7	8.0	6.5-9.0	No
E. coli (MPN/100 mL)	86	15	2420	**421**	61	192	921	126	**Yes**
CALCIUM, Total (mg/L)	87	36	181	97	73	95	119	N/A	N/A
MAGNESIUM, D (mg/L)	87	8	60	30	21	30	40	N/A	N/A
HARDNESS (mg/L)	87	123	699	367	261	358	462	N/A	N/A
POTASSIUM, D (mg/L)	87	3	12	8	4	9	10	N/A	N/A
SODIUM, D (mg/L)	87	29	549	195	119	167	284	N/A	N/A
SULFATE (mg/L)	87	54	522	277	179	284	**368**	250 (WS)	**Yes***
TDS (mg/L)	87	232	2160	1007	698	940	1391	N/A	N/A
TEMPERATURE (°C)	87	2	24	12	5	11	20	WS-1 Stds.	Not Assessed
TOC (mg/L)	87	2	9	7	6	7	8	N/A	N/A
TSS (mg/L)	87	0.00	356	44	6	18	65	N/A	N/A
TURBIDITY (NTU)	87	1	133	23	5	12	37	N/A	N/A
CYANIDE, Total (mg/L)	21	ND	ND	ND	ND	ND	ND	0.005	No
Nutrients									
NITROGEN, TOTAL (mg/L)	87	0.39	16.23	5.36	1.34	**5.46**	8.82	2.01	**Yes (future std.)**
NO3+NO2 (mg/L)	87	0.14	**14.29**	4.46	0.57	4.59	7.96	10	**Yes**
NO2 (mg/L)	79	ND	0.45	0.08	0.01	0.04	0.16	4.5	No
PHOSPHORUS, TOTAL (mg/L)	87	0.04	0.93	0.23	0.09	**0.18**	0.35	0.17	**Yes (future std.)**
PHOSPHORUS, ORTHO AS P (mg/L)	87	ND	0.51	0.08	0.01	0.05	0.16	N/A	N/A
AMMONIA, Total (mg/L)	87	ND	0.55	0.09	ND	0.05	0.20	Varies	No
Metals									
ARSENIC, Trec (ug/L)	30	0.45	2.89	1.40	0.70	1.22	2.45	0.02-10	No (for hyphenated)
CADMIUM, D (ug/L)	30	ND	0.11	0.01	ND	ND	0.04	1.1 / 8.4	No
CADMIUM, T (ug/L)	30	ND	0.30	0.08	ND	0.06	0.19	5 (ac)	No
CHROMIUM, D (ug/L)	30	ND	0.65	0.18	ND	0.16	0.32	Cr-III: 212 / 1,630 Cr-VI: 11 / 16	No
CHROMIUM, T (ug/L)	30	0.33	10.40	3.15	0.53	1.60	7.11	Cr-III: 50 (ac)	No
COPPER, D (ug/L)	30	1.95	9.06	4.12	2.16	3.26	7.33	27 / 45	No
IRON, D (ug/L)	30	8.49	114.30	32.33	14.41	28.70	46.96	300	No
IRON, Trec (mg/L)	87	ND	8.65	1.34	0.23	0.67	2.00	1	No
LEAD, D (ug/L)	30	ND	0.89	0.33	0.16	0.28	0.50	9.8 / 253	No
LEAD, T (ug/L)	30	0.24	8.73	2.97	0.47	1.67	6.98	50	No
MANGANESE, D (ug/L)	30	13	255	81	31	61	**147**	50 (WS)	**Yes***
MERCURY, Trec (µg/L)	3	0.0011	0.0028	0.0019	0.0013	0.0018	0.0025	0.01	No
NICKEL, D (ug/L)	30	0.96	37.70	3.37	1.73	2.07	2.69	154 / 1,387	No
NICKEL, T (ug/L)	30	1.51	9.37	4.16	2.36	3.19	7.59	100	No
SELENIUM, D (ug/L)	79	ND	8.86	3.89	2.29	3.74	5.42	Site-specific	No
SILVER, D (ug/L)	30	ND	ND	ND	ND	ND	ND	2.9 / 18	No
ZINC, D (ug/L)	30	ND	41.80	11.62	2.13	7.16	24.31	389 / 514	No

Notes: Geometric mean provided for *E. coli* instead of arithmetic mean. Table Value Standards (TVS) calculated based on a hardness of 361 mg/L. N/A = no standard; #/# = acute/chronic; ND = Non-detect. WS-1 indicates warm water tier 1 temperature standard, but was not evaluated. * = can also be assessed based on "existing conditions" as of January 1, 2000. *See discussion later in text related to "existing condition" considerations.

Segment 1 (the main stem) of Big Dry Creek is listed on the 2024 303(d) List for Colorado for non-attainment of stream standards for *E. coli* for the entire segment (Category 4a Impaired with an Approved TMDL) and for total recoverable iron for the portion of the stream below Weld County Road 8 (CWQCC 2023). The iron impairment in the lower watershed is based on data collected by Metro Wastewater. A brief synopsis of these two regulatory issues based on 303(d) listings as of 2023 includes:

- *E. coli*: Big Dry Creek did not meet the *E. coli* standard during 2022. A Total Maximum Daily Load (TMDL) for *E. coli* in Big Dry Creek segment COSPBD01 was approved by the U.S. Environmental Protection Agency (EPA) in September 2016. This TMDL was based on a Potential Recreational Contact standard of 205 colony forming units per 100 milliliters (cfu/100 mL). As a result of the 2020 standards change to Big Dry Creek Segment 1, this standard is now 126 cfu/100 mL. Special studies to identify sources of *E. coli* in the watershed are on-going for the stream reach between Standley Lake and I-25.

- Iron: Although BDCWA's long-term water quality data set shows attainment of the total recoverable iron standard, the portion of Big Dry Creek below Weld County 8 was originally identified as impaired on the 2016 303(d) List based on data submitted to the CWQCD by Metro Wastewater. The Metro Wastewater data set is also discussed in this report and summarized in Appendix E. Based on the last five years of total recoverable iron data, the stream currently attains the stream standard.

The 2020 changes to the applicable stream standards for Big Dry Creek result in additional anticipated impairment listings in the future, driven primarily by the addition of Water Supply standards based on identification of alluvial wells used for drinking water in the lower watershed. These impairments are discussed later in the report but potentially include chloride, sulfate, dissolved manganese, and nitrate, depending on the assessment time period and methodology.

Other future impairment concerns include total nitrogen and total phosphorus, which are constituents included in the CWQCC's 10-Year Water Quality Road Map (https://cdphe.colorado.gov/water-quality-10-year-roadmap). Currently, interim values for total nitrogen and total phosphorus are exceeded for the portion of the stream segment beginning below the WWTP discharges. Total phosphorus concentrations below the WWTPs are decreasing and are approaching the standard for the stream as a whole. A final decision by the CWQCC on application of these instream standards is expected in 2027.

More detailed discussion of constituents of interest to Big Dry Creek is provided in the remainder of this report. See Appendix B for tabular summaries for 2022 water quality data.

5. *E. coli*

In 2020, the recreational use classification and associated stream standards for *E. coli* changed from a potential primary contact recreation use classification to existing primary contact recreation use, based on the potential for waterplay by children and lack of fencing to preclude access. This change decreased the stream standard for *E. coli* from 205 cfu/100 mL to 126/100 mL. Neither standard is attained for the stream and a TMDL was completed in 2016 for *E. coli* based on the 205 cfu/100 mL standard. This section summarizes the data analysis for *E. coli* and provides a brief summary of the 2016 *E. coli* TMDL.

E. coli Data Summary

BDCWA has 23 years of *E. coli* data collected on a monthly basis at eight instream locations, as well as DMR data from the WWTPs (Tables 5 through 7 and Figures 2 through 5). Standards assessment methods for *E. coli* have changed several times over the years with regard to the duration (timeframe) during which standards are assessed. The 2024 303(d) Listing Methodology included the most recent changes to the *E. coli* assessment method. This method is now based on calculation of geometric mean values for fixed two-month periods for future 303(d) listing and delisting decisions. To remove a segment from the 303(d) List, the geometric mean for at least one two-month period that includes at least five samples from the most recent two years of available data in the period of record must demonstrate attainment (CWQCD 2022). Because the BDCWA sampling program is based on a monthly program, only two samples per assessment period are available. For this reason, BDCWA also applies a seasonal approach for data analysis in this report, dividing the analysis into a recreation season (May-October) and a non-recreation season (November-April). This approach provides six samples for calculation of a geometric mean for each season at most sites other than bdc0.5 and bdc1.0 in the winter. The CWQCD also used these seasons in the 2016 *E. coli* TMDL. If sampling results begin to approach attainment of the stream standard, then more frequent sampling by BDCWA may be warranted to demonstrate attainment of the stream standard.

Prior to discussion of findings related to *E. coli*, the following tables and figures are presented:

- Table 5 summarizes *E. coli* data by monitoring location on an annual basis for the entire period of record. (Note: most probable number per 100 milliliter [MPN/100 mL] units are associated with the IDEXX Colilert analysis method, but can be compared directly against the stream standard expressed as cfu/100 mL.) Values shaded in pink exceed the previous standard of 205 cfu/100 mL and values shaded in yellow are “new” exceedances due to the change in standard to 126 cfu/100 mL. Although annual geometric means are not used by the CWQCD to assess attainment, the tabular summary is still useful for general information regarding trends over time and identifying locations where *E. coli* is persistently elevated.

- Tables 6 and 7 summarize data for the last five years and 2022 only, respectively. Table 6 is useful for evaluating seasonally elevated *E. coli*.

- Figure 2 shows seasonal geometric mean bar charts of *E. coli* from 2018-2022 from upstream to downstream. Figure 3 shows 2022 *E. coli* boxplots from upstream to downstream, and Figure 4 shows the sample results from upstream to downstream for all sampling events, with concentrations following storm events highlighted. Figure 5 provides a matrix of seasonal *E. coli* boxplots from 2018-2022.

Table 5. Annual Geometric Mean Summary of Big Dry Creek *E. coli* Data (MPN/100 mL)

Year	bdc0.5	bdc1.0	bdc1.5	Broom. WWTP[2]	bdc2.0	West. WWTP[2]	bdc3.0 (I-25)	bdc4.5	North. WWTP[2]	bdc5.0	bdc6.0
2000	212	151	389	--	574	--	294	500	--	212	323
2001	477	118	332	215	649	68	387	634	--	442	510
2002	858	230	363	364	934	16	536	441	--	451	572
2003 [3]	191	210	293	27	615	24	382	225	--	249	339
2004	279	181	217	18	346	28	205	187	--	156	377
2005	152	122	281	26	328	35	204	113	--	182	301
2006	76	241	316	20	309	48	214	163	--	179	333
2007	196	177	257	14	324	66	230	231	--	198	364
2008	266	197	267	10	461	6	439	376	--	290	380
2009 [4]	61	78	147	5	207	14	251	137	--	149	197
2010	111	191	193	12	483	16	376	280	--	235	368
2011	64	228	323	6	622	8	518	537	--	380	730
2012	267	397	260	7	555	8	544	497	--	390	545
2013	239	214	292	3	398	10	424	342	--	272	505
2014	119	269	254	5	323	9	371	410	--	287	1085
2015	257	251	230	4	311	9	528	415	18	266	490
2016	207	254	221	5	312	18	358	315	10	300	536
2017	178	194	217	5	327	19	444	392	5	349	371
2018	81	89	194	3	277	15	352	273	5	314	300
2019	163	117	157	2	192	25	490	204	2	275	350
2020	220	121	106	2	138	15	389	174	2	211	256
2021	98	50	113	2	85	10	405	96	9	126	273
2022	263	254	83	2	201	9	537	158	5	205	228

1. Pink-shaded cells exceed the pre-2020 205 cfu/100 mL stream standard. Yellow-shaded cells exceed the more stringent 2020 stream standard of 126 cfu/100 mL but not the less stringent previous standard of 205 cfu/100 mL.
2. Broom. = Broomfield; West. = Westminster; Northglenn historically excluded due to infrequent discharge to Big Dry Creek. During 2015-2022, Northglenn discharged to Big Dry Creek more frequently.
3. For consistency between sampling years, the 2003 weekly samples were converted to monthly geometric means prior to calculating the annual geometric mean for 2003.
4. The 2009-2022 Broomfield, Westminster and Northglenn geometric means are based on DMR values. Prior samples were based on synoptic monitoring program grab samples.

Table 6. Seasonal Summary of Instream Big Dry Creek *E. coli* Data for 2018-2022

	Geometric Mean *E. coli* (MPN/100 mL)	
	Recreation Season	Non-recreation Season
Station	May-Oct	Nov-Apr
bdc0.5	214	65
bdc1.0	214	29
bdc1.5	230	59
bdc2.0	261	112
bdc3.0	382	458
bdc4.5	167	179
bdc5.0	336	149
bdc6.0	588	123

Note: Shaded cells exceed the stream standard of 126 cfu/100 mL.

Table 7. 2022 *E. coli* Data (MPN/100 mL)

Station ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Geomean
bdc0.5	ice	ice	1046	ice	179	980	687	249	110	25	ice	ice	263
bdc1.0	ice	ice	2420	17	225	1046	816	124	107	166	ice	ice	254
bdc1.5	144	61	204	16	15	1120	345	248	79	39	55	16	83
bdc2.0	172	517	866	34	157	921	276	206	167	152	178	44	201
bdc3.0	727	308	613	166	308	866	517	770	727	488	921	727	537
bdc4.5	156	345	1733	86	19	980	69	140	99	79	204	108	158
bdc5.0	79	365	1553	61	77	1414	276	222	231	197	109	61	205
bdc6.0	72	130	1046	82	124	1414	613	2420	225	134	64	49	228
Geomean All Sites	192		240		315		338		137		106		214

Note: Yellow shaded cells are between 126 MPN/100 mL and 205 MPN/mL. Pink shaded cells exceed the prior stream standard of 205 MPN/100 mL (as well as the current standard of 126 MPN/100 mL). Values reported as 2420 MPN/100 mL exceed the upper quantitation limit of the test.

Figure 2. Big Dry Creek *E. coli* Geometric Mean Values (2018-2022)

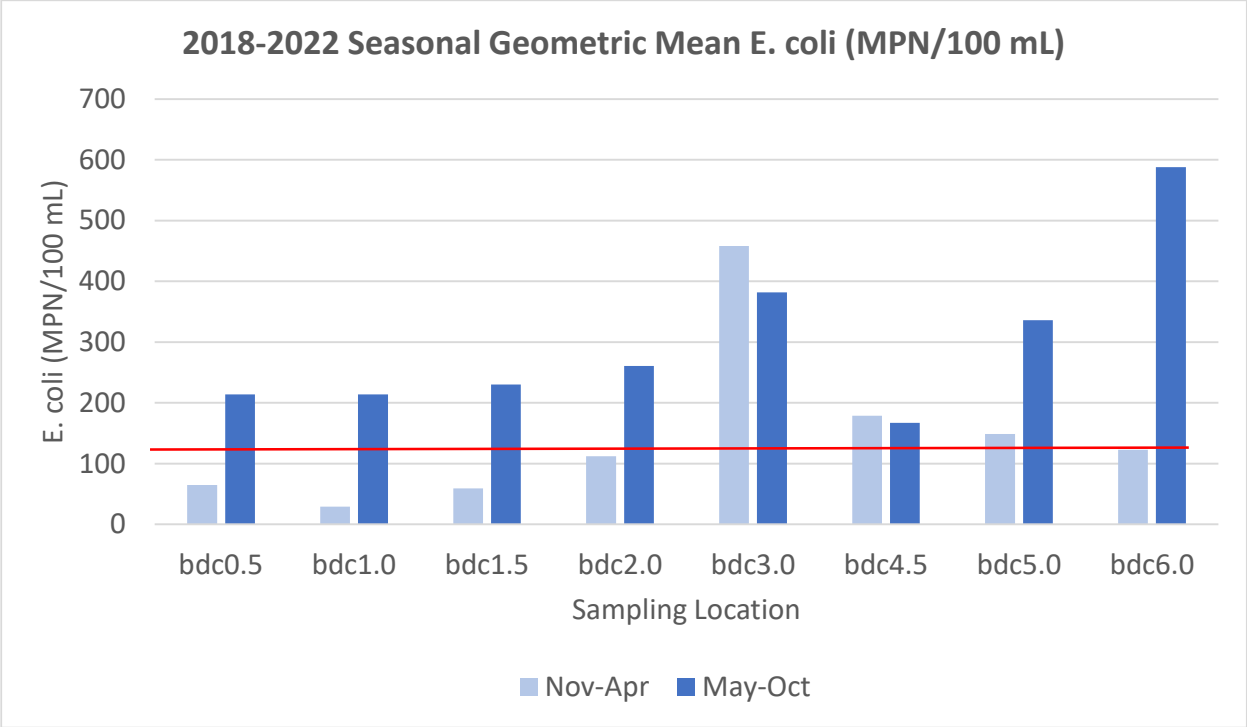


Figure 3. Big Dry Creek *E. coli* (2022)

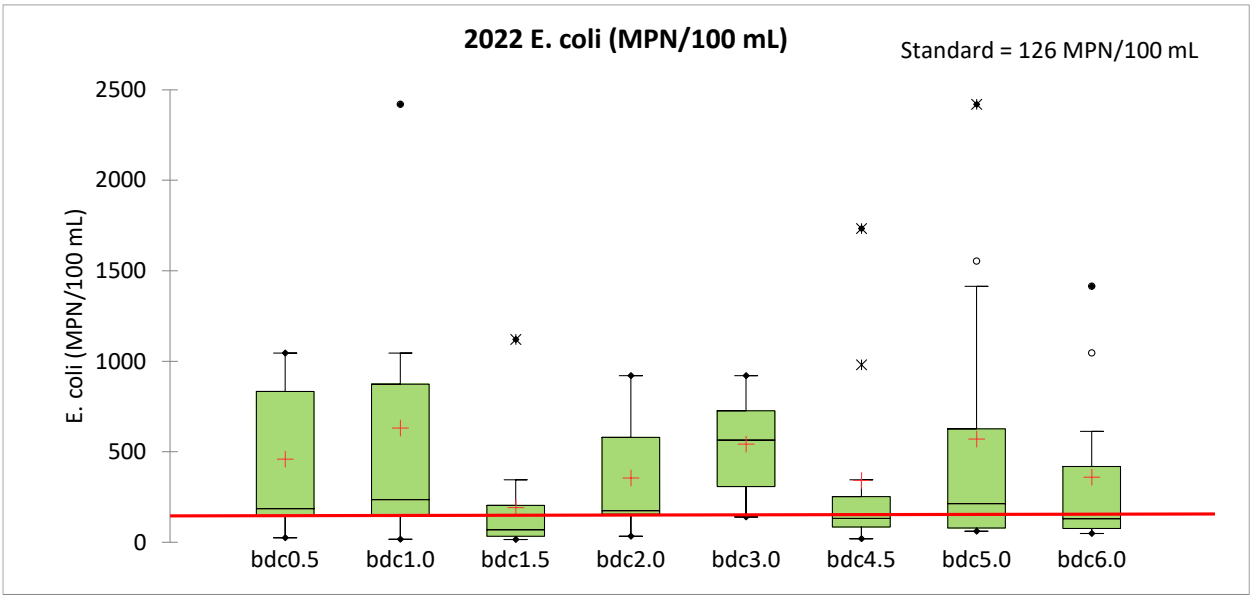
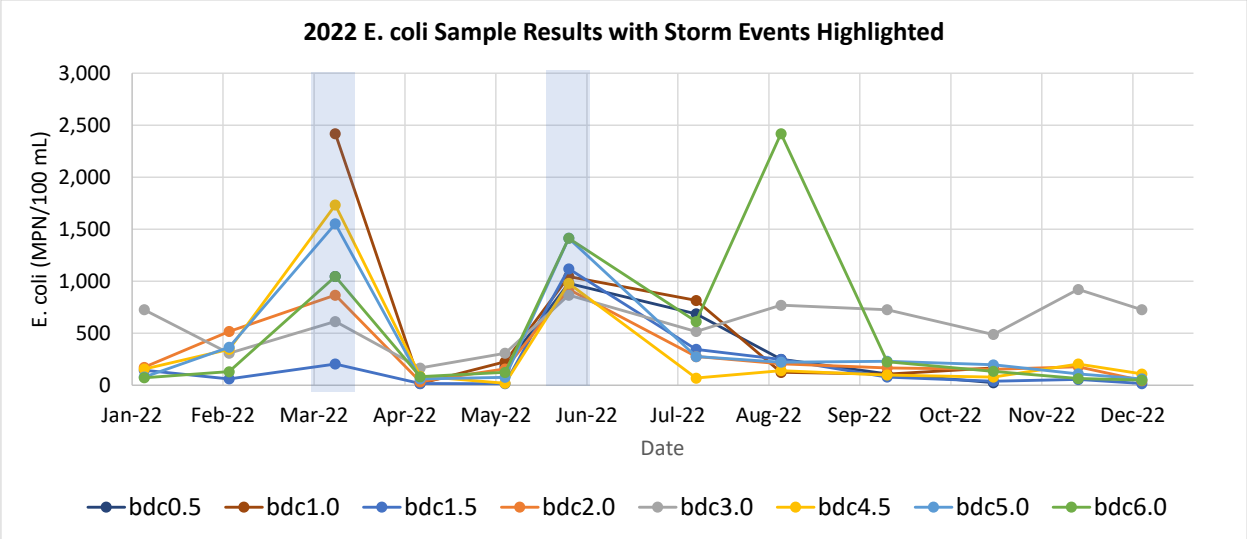


Figure 4. Big Dry Creek Monthly *E. coli* 2022 for all Sites with Storm Events Highlighted



Based on review of the *E. coli* data, the following observations are noteworthy:

- Table 5 indicates the *E. coli* concentrations in 2019 through 2022 were generally on the lower end of the range of geometric means that have been observed since about 2010 at most monitoring locations. A notable exception is bdc3.0, which had the highest annual geometric mean *E. coli* observed since 2012.

- The historic data in Table 5 show significant reductions in the Broomfield WWTP's effluent concentrations following plant upgrades and expansion in the 2001-2004 time period. Significant reductions in Westminster's WWTP effluent concentrations are also apparent beginning in 2008, following plant upgrades including ultraviolet (UV) treatment and other operational changes. Based on review of geometric mean concentrations from 2003-2022, *E. coli* concentrations are consistently well below the stream standard in samples from the Broomfield, Westminster and Northglenn WWTP discharges.

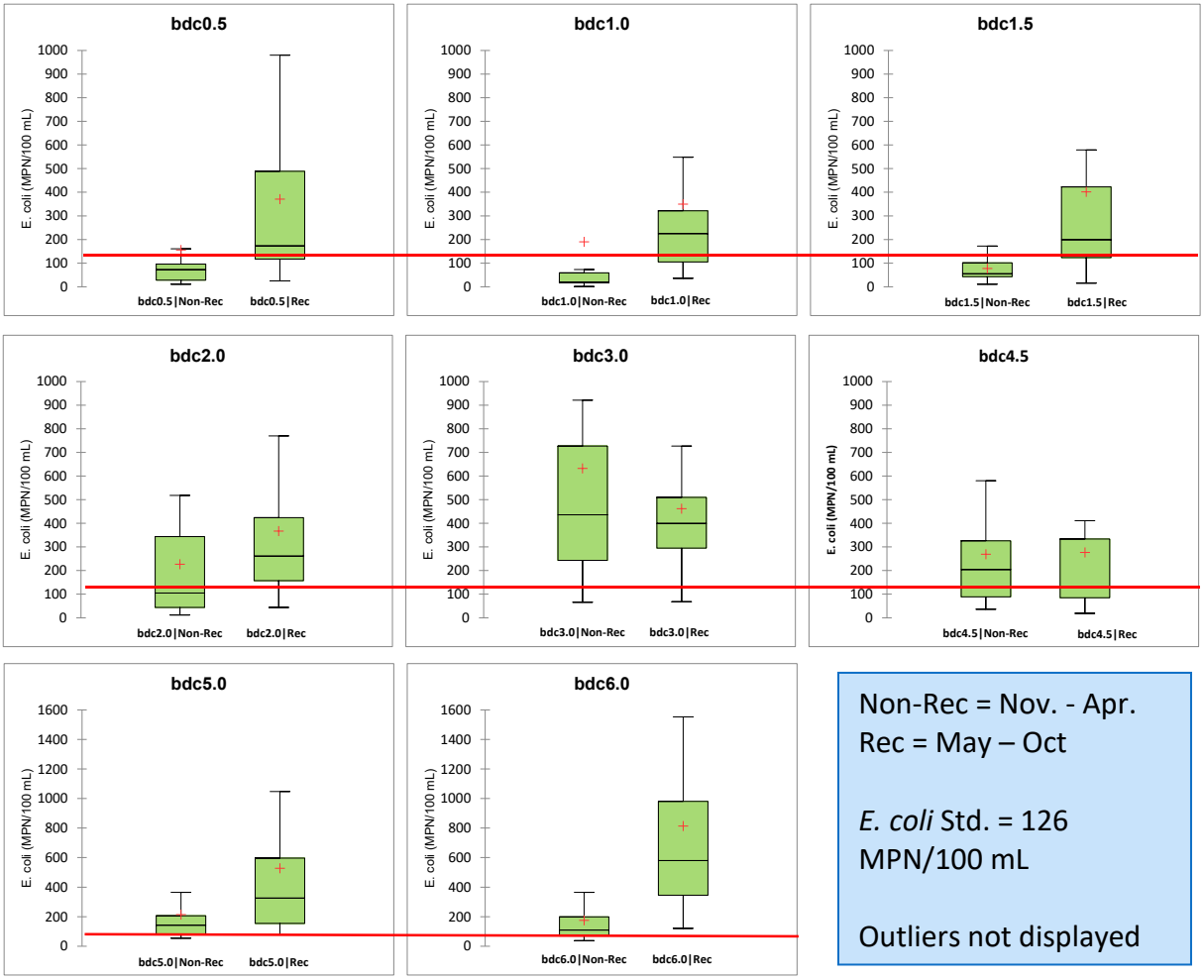
- The 2022 data set (Table 7) does not meet stream standards during the recreation season at any location. For 2018-2022 (Table 6), the highest *E. coli* concentrations for most stations were experienced during the May-October recreation season, which is the typical pattern for the stream. The seasonal pattern at bdc3.0 is unusual relative to other stream locations, showing higher winter concentrations. Site bdc4.5 at York Street had comparable values year-round, albeit at concentrations lower than those at bdc3.0.

- Boxplots of upstream to downstream monitoring locations for 2022 (Figure 3) show the highest ranges of *E. coli* concentrations occurred at bdc3.0 (I-25) and bdc6.0. At bdc3.0, birds are suspected as a possible source warranting further field documentation at the

time of sampling if birds are present. During 2022, ducks and swallow nests were present during several sampling events. Based on field observations and Google Earth aerial photos, cattle are present in and along the stream above bdc6.0 and are hypothesized to contribute to elevated *E. coli* in this portion of the stream. Cattle access to the stream is still present in 2022 aerial imagery.

- Figure 5 provides a boxplot matrix of seasonal *E. coli* by monitoring location for the past five years, with recreation season (May-October) having higher *E. coli* at most sites. However, the seasonal pattern is weaker at locations bdc2.0 to bdc4.5 through the more urbanized portion of the watershed. In 2022, seasonal differences were not present at bdc3.0 (elevated year-round). Special studies are underway to identify sources of *E. coli* in the watershed between Standley Lake and I-25. Section 14 of this report provides additional trend analysis for multiple pollutants in this report, including *E. coli*.

Figure 5. Seasonal *E. coli* Matrix (2018-2022)



E. coli TMDL Summary

As part of the TMDL for Big Dry Creek, the CWQCD developed load duration curves for three portions of Big Dry Creek. The segment was divided into three distinct reaches to account for changes in land use, influences from instream flow (diversions, reservoir releases, WWTP contributions, etc.), and location of permitted point sources. The three reaches correspond to Standley Lake to bdc1.5 (bdc0.5 to bdc1.5), from bdc1.5 to 152nd Avenue (bdc2.0 and bdc3.0), and 152nd Avenue to the Weld County Line (bdc4.0/4.5 to bdc6.0). These curves are based on data from 2003 through 2014 and are shown in Figures 6 through 8. These figures illustrate that recreation season (May-October) stream loads generally exceed the allowable stream load for *E. coli* during all flow regimes. The TMDL has assigned load reductions needed for each of these three portions of the stream. BDCWA is currently working on source identification and potentially feasible load reductions in the urbanized portion of the watershed. These investigations are prioritizing potential human waste sources. Since development of the TMDL, the stream standard has become more stringent (126 cfu/100 mL vs. 205 cfu/100 mL.)

Figure 6. Load Duration Curve for BDC1.5 and the USGS Gauge at Westminster
(Source: CWQCD 2016)

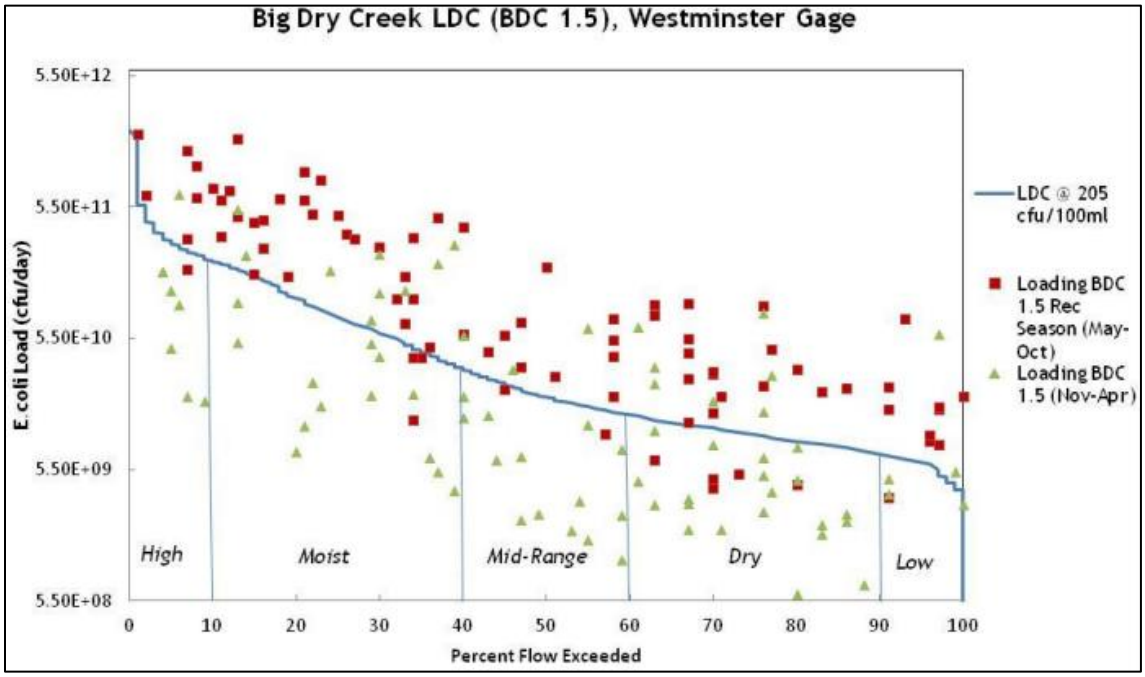


Figure 7. Load Duration Curve for BDC2.0 and the USGS Gauge at Westminster
(Source: CWQCD 2016)

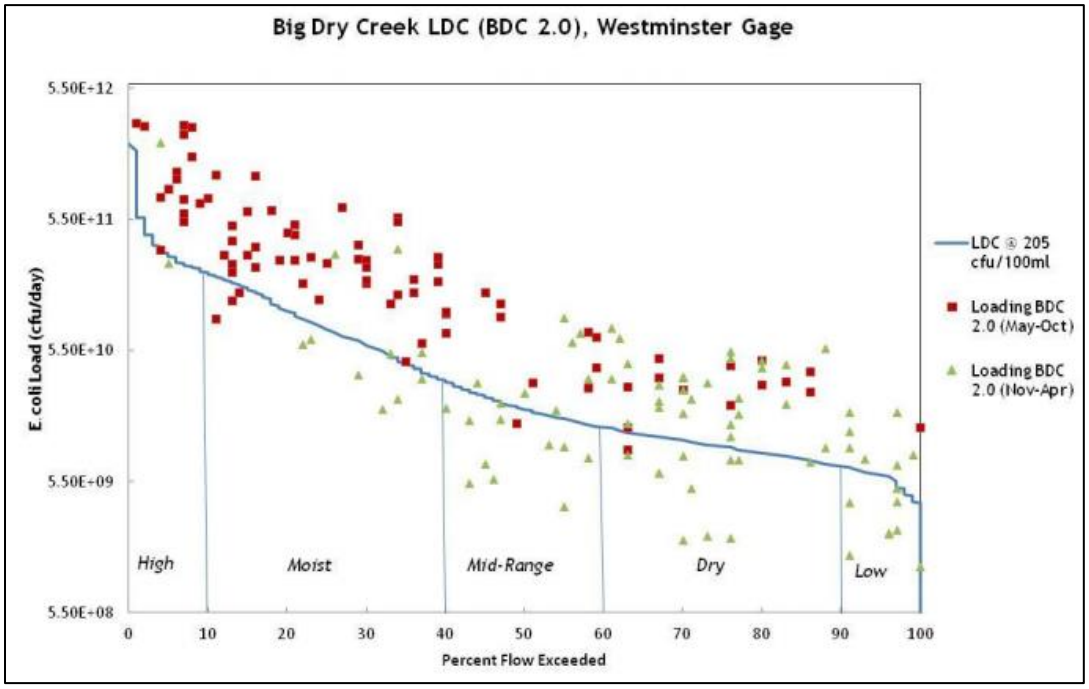
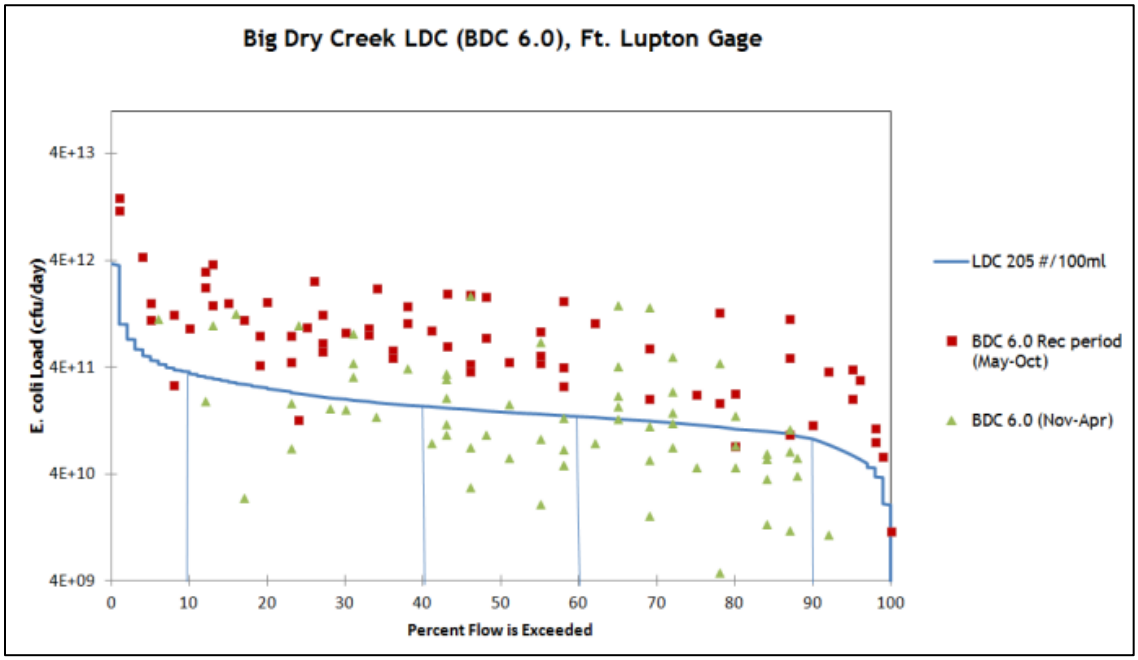


Figure 8. Load Duration Curve for BDC6.0 and the USGS Gauge at Fort Lupton
(Source: CWQCD 2016)



6. METALS

Big Dry Creek attains most metals standards assigned for protection of aquatic life, including arsenic, cadmium, chromium, copper, lead, selenium, silver, zinc, and mercury. Since 2016, a portion of Big Dry Creek below Weld County Road 8 has been identified as impaired on the 303(d) List for total recoverable iron. In the past, selenium was a metal of concern; however, adoption of a site-specific standard for selenium on Big Dry Creek in 2007 and some changes to assessment methodology for ambient-based standards have resulted in attainment of the selenium standard. In 2020, a new Water Supply classification resulted in addition of more metals standards to the stream segment, including more stringent total recoverable arsenic and dissolved manganese standards and new standards for dissolved iron and total cadmium, chromium, lead, and nickel. Of these, dissolved manganese is expected to be a future impairment for Big Dry Creek due to adoption of a Water Supply standard for the stream and is also discussed further.

See Appendix B for tabular statistical summaries for Big Dry Creek samples analyzed for metals, with additional information on selenium, iron, manganese, and arsenic discussed further below.

Selenium

Elevated selenium concentrations in the upper reach of Big Dry Creek are due to naturally occurring selenium in geologic formations. BDCWA conducted special studies in 2006-2007 to support a site-specific standard. Background on this site-specific standard can be obtained in the 2015 Statement of Basis and Purpose in Regulation 38. The site-specific standard includes irrigation and non-irrigation seasonal standards assessed at three specific monitoring locations: bdc1.5, bdc2.0 and bdc4.0/4.5.[3] In 2021, BDCWA increased the sampling frequency for selenium from quarterly to monthly. This change was made due to "longevity plans" for site-specific standards that may include more detailed review of the basis of the underlying standard as part of triennial reviews of stream standards in the future.

Based on the site-specific selenium standards for Big Dry Creek, the 2022 data set and the data set for the most recent five years (2018 through 2022) attain both the non-irrigation season (winter) and irrigation season (summer) standards for Big Dry Creek, as summarized in Table 8. As an additional observation in the context of longevity plans for the standards, the stream still needs a site-specific standard—the underlying chronic standard for selenium of 4.6 µg/L would not be attained, with the 85th percentile for the stream for 2018-2022 at 5.95 ug/L. Additionally, the temporal and spatial pattern present at the time that the site-specific standard was developed is generally maintained with non-irrigation season samples typically having higher

[3] In 2015, the CWQCC adopted a formal change to the site-specific selenium standard assessment locations in Regulation 38 because sampling location bdc4.0 was relocated in 2011 for safety reasons and has been replaced with bdc4.5, although both sites may still be used for standards assessment, if needed.

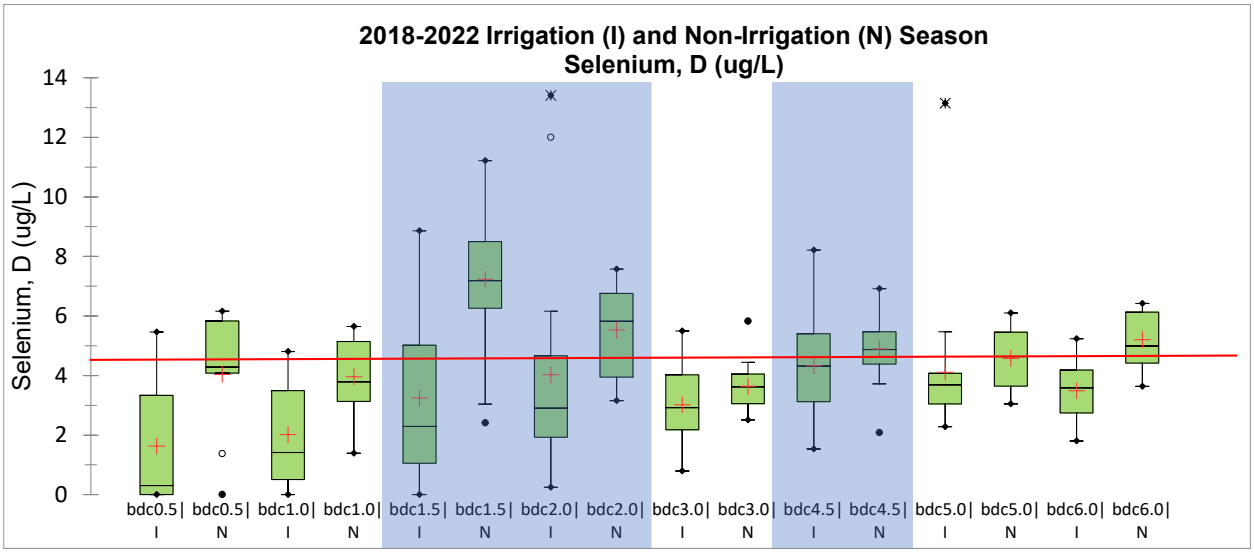
selenium concentrations at all sites and the upstream sites (represented by bdc1.5) having higher selenium concentrations (Figure 1Figure 9). In the event that the site-specific standard is re-evaluated in the future, factors that would need to be taken into account in re-analysis include: 1) changing release patterns for Standley Lake, which may affect assumptions related to irrigation season flows and 2) numerous missing winter samples for bdc0.5 and bdc1.0 due to frozen stream conditions. Given that the site-specific standard is generally representative and conditions have not worsened over time, a re-evaluation of the site-specific standard is not recommended.

Table 8. Big Dry Creek Selenium Data Summary (2018-2022)

Selenium (µg/L)				
	Irrigation Season		Non-irrigation Season	
	2018-2022 (Apr-Oct)	Reg. 38 Standard	2018-2022 (Nov-Mar)	Reg. 38 Standard
bdc1.5, 2.0, 4.5 (85th Percentile)	5.76	7.4 (ch)	7.43	15.0 (ch)
bdc1.5, 2.0, 4.5 (Maximum)	13.40	18.4 (ac)	11.21	19.1 (ac)

Table Notes: ch = chronic; ac = acute. For reference, Reg. 31 Table Value Standards are 4.6 ug/L chronic and 18.4 acute.

Figure 9. Irrigation and Non-Irrigation Season Selenium for All Sites (2018-2022)



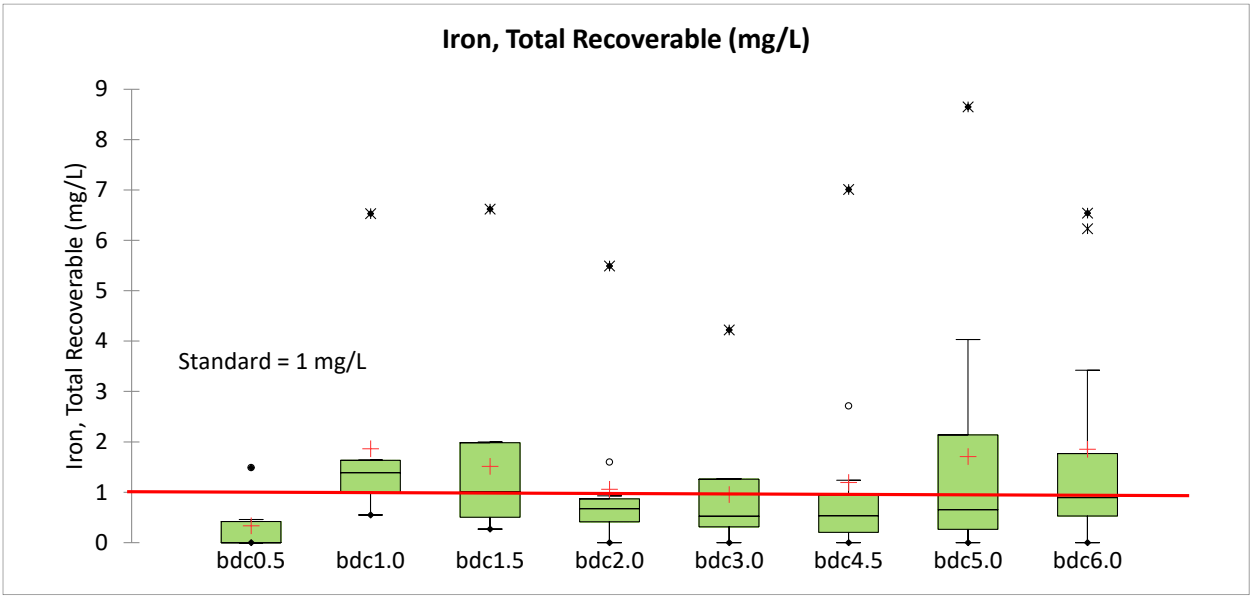
Iron

BDCWA currently monitors total recoverable iron (Figure 10) on a monthly basis, after increasing the sample frequency from quarterly to monthly in May 2018 due to Big Dry Creek being added to the 303(d) List for total recoverable iron based on monitoring conducted by Metro Wastewater. Metro Wastewater conducts sampling twice per month at two locations in the lower watershed. Metro Wastewater's upstream-most site, "BDC-8," is located where Big Dry Creek crosses Weld County Road 8 and has been monitored by Metro Wastewater since 2007. This site is located in proximity to BDCWA site bdc6.0. Metro Wastewater's downstream site, "BDC," is located approximately 30-50 yards upstream of the State Engineer's gauge "Big Dry Creek at Mouth" also known as BIGDAFCO (see Figure 33 for general location). Both of these sites were close to the stream standard of 1 mg/L during 2022, with median values of 0.91 mg/L and 1.13 mg/L for BDC-8 and BDC, respectively. For the 2018-2022 timeframe, BDCWA's five-year data set meets the iron standard for the stream as a whole. Additionally, bdc6.0 at Weld County Road 8 shows attainment of the iron standard with a median of 0.55 mg/L during 2018-2022. Metro Wastewater's five-year data set at its two sites suggest attainment with a median value of 0.94 mg/L total recoverable iron. Attainment of the total recoverable iron standard in the lower watershed is expected to vary year-to-year, depending on the timing of sampling events relative to storm events.

The expected source of elevated iron is streambank and soil erosion in the watershed, often in response to storm events (Figure 11). Previous analyses by BDCWA have shown that total iron and total suspended solids (TSS) are highly correlatedFigure 11, with both concentrations tending to be elevated during storm events (WWE 2022). Also see discussion in Section 14 of this report related to runoff-influenced pollutants in the agricultural area.

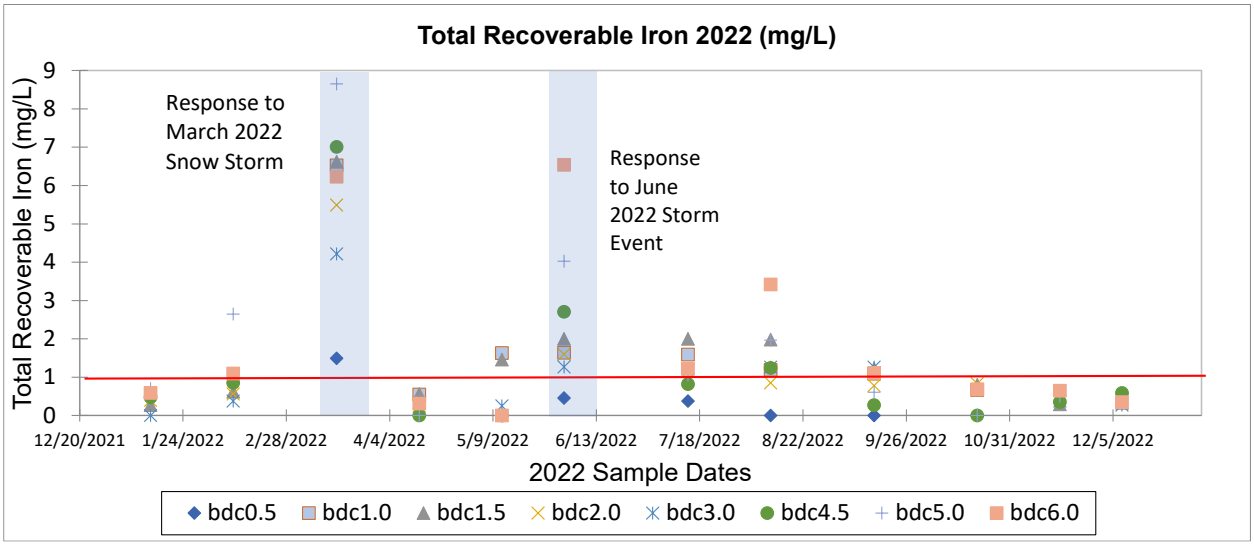
In 2020, a dissolved iron standard of 300 µg/L was added to Big Dry Creek to protect water supply uses. BDCWA began monitoring for dissolved iron in June of 2020. The 85th percentile value of 17.4 µg/L was well below the dissolved iron stream standard in 2021, as well as in 2022 with a value of 46.96 µg/L. Metro Wastewater's dissolved iron monitoring in the lower watershed also shows attainment of the dissolved iron standard. Additionally, review of the CWQCD's existing quality data library for Big Dry Creek shows an existing condition for dissolved iron of 90 µg/L, further indicating that dissolved iron is likely to attain the new stream standard.

Figure 10. BDCWA Monitoring Locations for Total Iron (2022)



Note: Total recoverable iron is assessed as a median (50th percentile), which corresponds to the line in the box portion of the boxplot.

Figure 11. 2022 Iron at All BDC Monitoring Locations with Storm Event Responses Highlighted



Manganese

In the 2020 Regulation 38 Rulemaking Hearing, the CWQCC adopted a dissolved manganese standard to protect Water Supply uses associated with alluvial wells near Big Dry Creek in the lower watershed. Dissolved manganese standards can be applied as either of the less restrictive of the following two options:

1. existing quality as of January 1, 2000; or

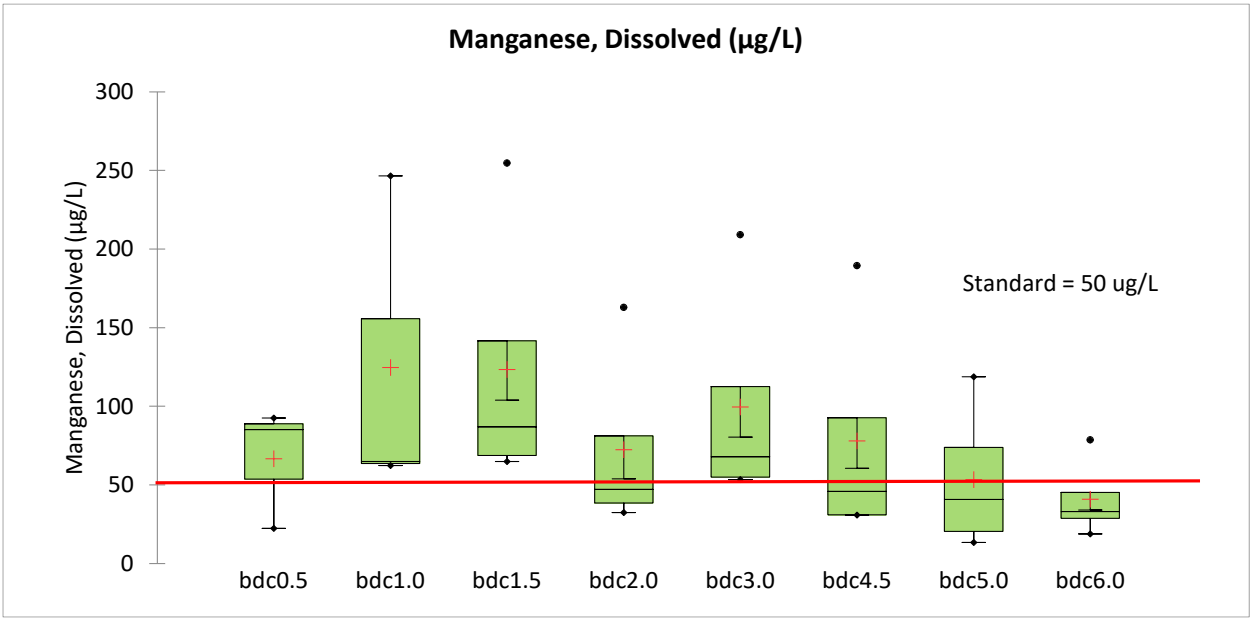
2. a table value criterion of 50 µg/L dissolved manganese.

Based on dissolved manganese in the CWQCD's existing quality library,[4] which does not currently include BDCWA's data set, existing quality for 1995-1999 would be 85 µg/L. Using the entire period of record in the library, the existing quality value would be 78 µg/L. BDCWA's database only includes dissolved manganese for 30 samples in 1999, with an 85th percentile value of 57 µg/L.

The 85th percentile value for dissolved manganese is 147 µg/L for the 2022 Big Dry Creek data set, which exceeds both the underlying standard of 50 µg/L and the existing quality standard as of January 1, 2000. The primary cause of the elevated dissolved manganese is hypothesized to be groundwater inflows in the upper watershed. Review of seasonal patterns shows elevated concentrations in the winter, when Standley Lake is not releasing and the stream is dominated by groundwater above the WWTP discharges. This is also the cause of higher variation in the upper watershed, as illustrated by the large ranges in the boxplots for bdc1.0 and bdc1.5 in Figure 12. (Note: bdc0.5 was missing five samples during the winter of 2022, which may result in less variation at this site in 2022.)

[4] The CWQCD library version of the database was provided as a courtesy from the CWQCD on 6/24/2020.

Figure 12. Big Dry Creek 2022 Dissolved Manganese

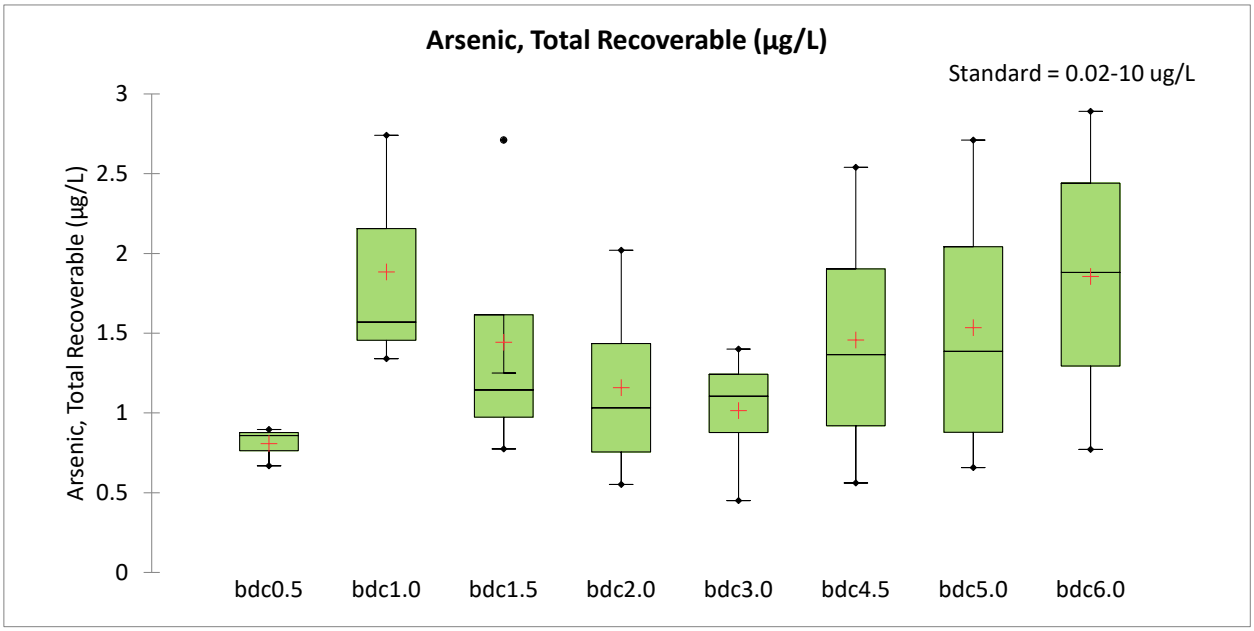


Arsenic

In the 2020 Regulation 38 Rulemaking Hearing, the CWQCC adopted a more stringent total recoverable arsenic standard to protect Water Supply uses associated with alluvial wells near Big Dry Creek. Previously, Big Dry Creek's arsenic standard was much higher at 100 µg/L. The new Water Supply standard is expressed as a hyphenated standard of 0.02-10 µg/L. The first number in the range is a strictly health-based value, based on the CWQCC's established methodology for human health-based standards. The second number in the range (i.e., 10 µg/L) is a maximum contaminant level (MCL), as established under the federal Safe Drinking Water Act, that has been determined to be an upper limit for arsenic in public water supplies, taking treatability and laboratory detection limits into account. Discharge permit effluent limitations are established using the first number in the range as the ambient water quality target, provided that no effluent limitation will require an "end-of-pipe" discharge concentration more restrictive than the second number in the range. Waterbodies are considered in attainment of this standard and not included on the 303(d) List, provided that the existing ambient quality does not exceed the second number in the range (i.e., 10 µg/L).

Big Dry Creek attains the 10 µg/L MCL for total recoverable arsenic and exceeds the 0.02 µg/L underlying health-based value. Thus, the segment would be considered to attain the hyphenated arsenic standard. In the 2020 Regulation 38 Rulemaking Hearing, the CWQCC considered adoption of a more stringent Water + Fish standard of 0.02 µg/L (without the hyphenated 10 µg/L value). Because there was no evidence of fish ingestion for Big Dry Creek meeting the criterion of "fish normally consumed on a recurring basis," the Water + Fish standard was not adopted.

Figure 13. Big Dry Creek 2022 Total Recoverable Arsenic



7. WATER SUPPLY STANDARDS FOR INORGANIC POLLUTANTS (SULFATE AND CHLORIDE)

In the 2020 Regulation 38 Rulemaking Hearing, the CWQCC adopted sulfate and chloride standards to protect Water Supply uses associated with alluvial wells near Big Dry Creek.

Sulfate

The sulfate standard can be applied as either of the less restrictive of the following two options

1. existing quality as of January 1, 2000; or
2. sulfate at 250 mg/L.

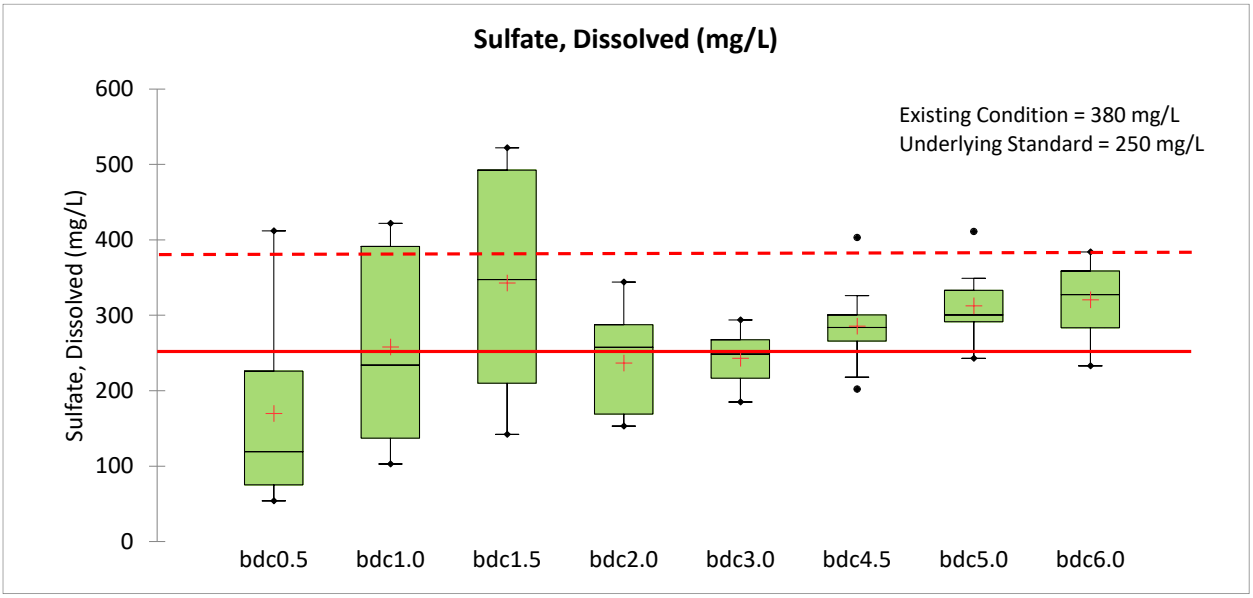
Based on sulfate data in the BDCWA database from 1995-1999, the existing quality standard for sulfate would be 380 mg/L. Based on sulfate in the CWQCD's existing quality library,[5] which does not currently include BDCWA's data set, existing quality for 1995-1999 would be 308 mg/L. Using the entire period of record in the library, existing quality would be 383 mg/L. Based on review of sulfate data, Big Dry Creek would not be expected to attain the sulfate standard.

[5] The CWQCD library is in the process of being updated and the most current working version of the database was provided as a courtesy from the CWQCD on 6/24/2020.

For sulfate (Figure 14), the 85th percentile value for the overall stream segment is 368 mg/L for 2022, which is less than BDCWA's existing condition calculation of 380 mg/L.[6] However, the 85th percentile value for the past five years of samples on Big Dry Creek exceeds both standards. The primary cause of this standards exceedance is seasonally elevated sulfate in the upper portion of the watershed above the WWTP discharges. During time periods when Standley Lake is not releasing flows to the stream, the stream flows are dominated by groundwater, which is high in sulfate (as well as other parameters like chloride, total dissolved solids, selenium, and manganese). Other sources in the lower watershed could potentially include ammonium sulfate fertilizer.

A potential solution to this standards issue would be to apply the existing condition provision on a sampling location-specific basis. For example, the 85th percentile value for bdc1.5 for 1995-1999 was 555 µg/L. If recent monitoring data for bdc1.5 are compared to historic water quality data as of the January 1, 2000 for bdc1.5, then the standard would be attained. Although this location-specific comparison technique is not currently expressly included in the 303(d) Listing Methodology, there is precedent for this approach (CWQCD 2020). Additionally, historic data may not be representative of hydrologic conditions in the upper watershed in the future because releases from Standley Lake to the stream are expected to decrease as a result of changes in water rights administration.

Figure 14. Big Dry Creek 2022 Sulfate



[6] The 2022 results may be lower due to the large number of missing winter samples I the upper watershed.

Chloride

The chloride standard added to Big Dry Creek in the 2020 Regulation 38 Rulemaking Hearing is 250 mg/L. For chloride, an existing condition provision is not provided in Regulation 31, so the 250 mg/L standard applies. Big Dry Creek's 2022 85th percentile value for chloride is 411 mg/L, which exceeds the stream standard. The 5-year 85th percentile value for the stream is 274 mg/L, which exceeds the stream standard. Review of annual 85th percentile values from 1997 through 2022 (Figure 16) suggest that chloride concentrations may be increasing over time, with three out of five of the annual 85th percentile values exceeding the stream standard during the past five years. More in-depth review of the chloride data may be warranted given that Big Dry Creek could potentially cycle on-and-off the 303(d) list for chloride, depending on the data set. A few observations regarding potential sources and trends include:

- Further review of the chloride data set during May through October (summer from 2018-2022) showed that chloride sample results exceeded 250 mg/L relatively infrequently (Figure 17). Conversely, most of the elevated values occurred during the winter and non-irrigation months of November through April. The concentrations of chloride were generally highest above the WWTPs (upper sites: bdc0.5, bdc1.0, bdc1.5) during the winter months.

- Consistent with previous analysis (WWE 2022), winter chloride concentrations are generally higher, with the most elevated concentrations present in the upper watershed (Figure 17). Additionally, elevated chloride during the winter months is expected to be exacerbated by a groundwater-dominated flow regime above the WWTP discharges in the winter when Standley Lake is not releasing, similar to sulfate, selenium and manganese. Road deicing may contribute to elevated winter chloride concentrations; additional analysis could be conducted to compare winter instream concentrations during snow and non-snow influenced sampling events.

Figure 15. Big Dry Creek 2022 Chloride

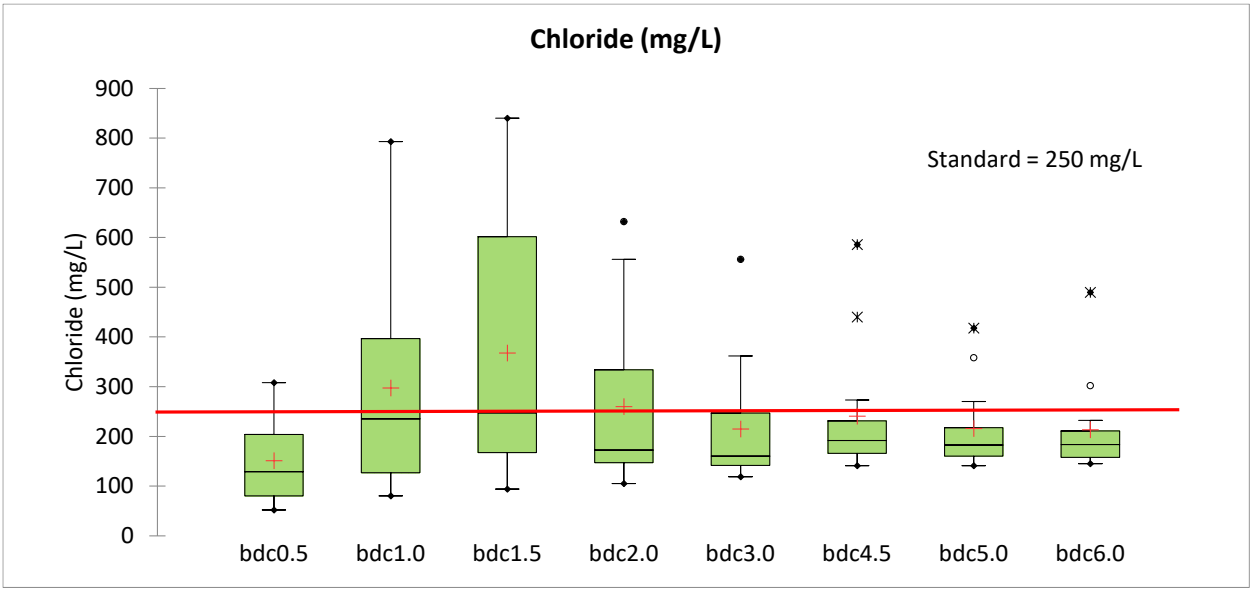


Figure 16. Big Dry Creek Chloride Annual 85th Percentile Values

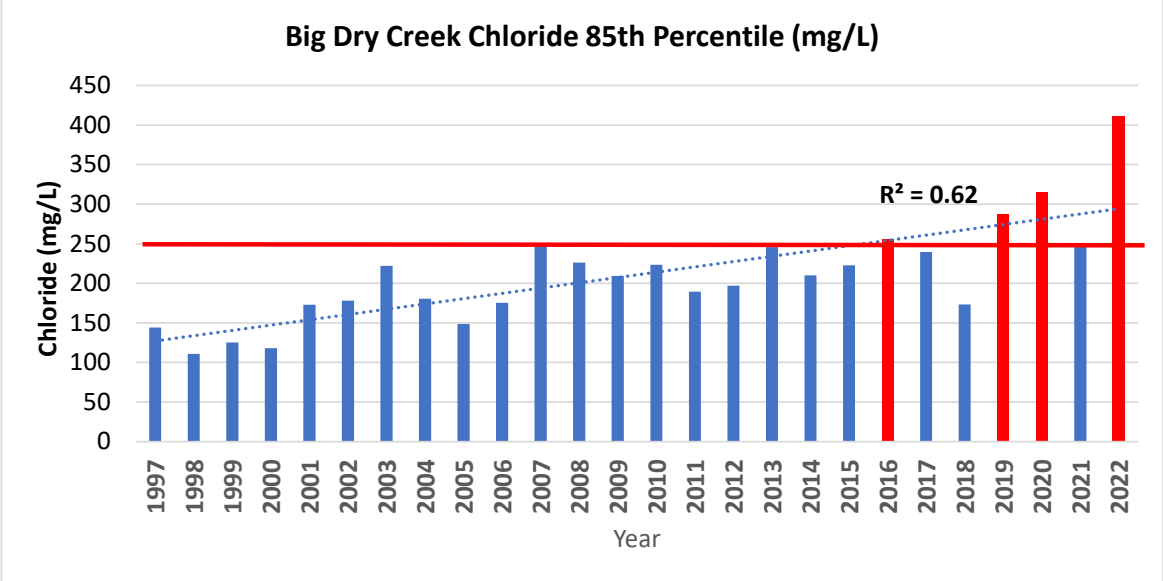
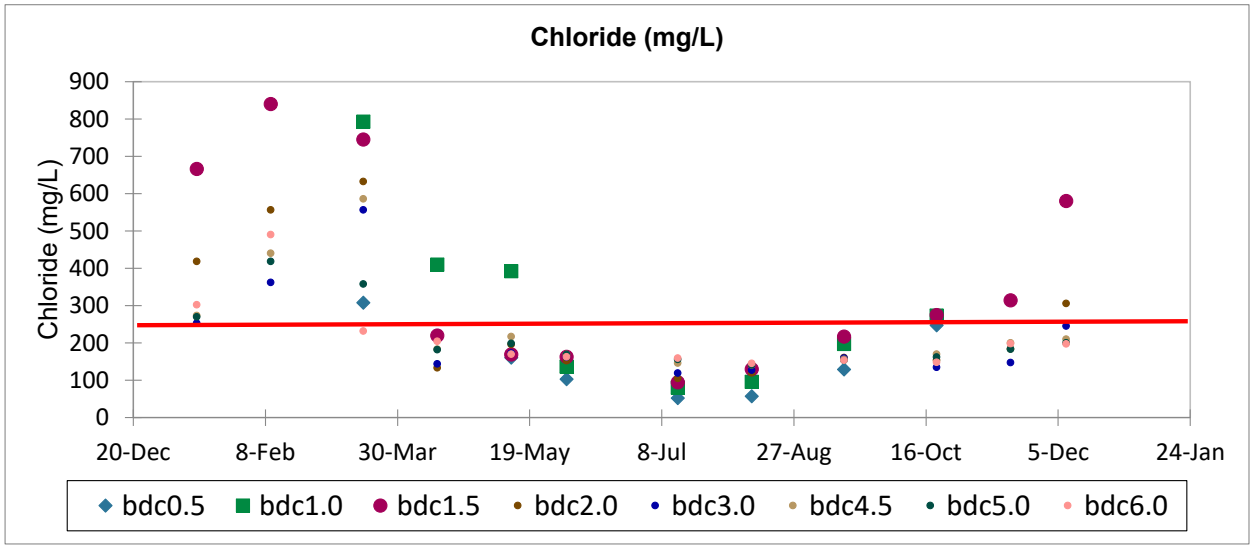


Figure 17. Big Dry Creek Chloride Seasonal Trend (2022)



Note: For this figure, upper sites including bdc0.5, 1.0 & 1.5 are shown by larger markers. Note that bdc0.5 and bdc1.0 are missing multiple winter samples.

8. NUTRIENTS

Currently applicable nutrient standards for the main stem of Big Dry Creek include ammonia, nitrate, and nitrite. In 2012, the CWQCC adopted new interim nutrient criteria for total phosphorus and total nitrogen, which are expected to become effective for the main stem of Big Dry Creek in 2027 (CWQCC 2012, 2017). Additionally, Big Dry Creek has been assigned a phosphorus Load Allocation in a downstream TMDL for Barr Lake and Milton Reservoir and has been assigned a phosphorus load reduction.

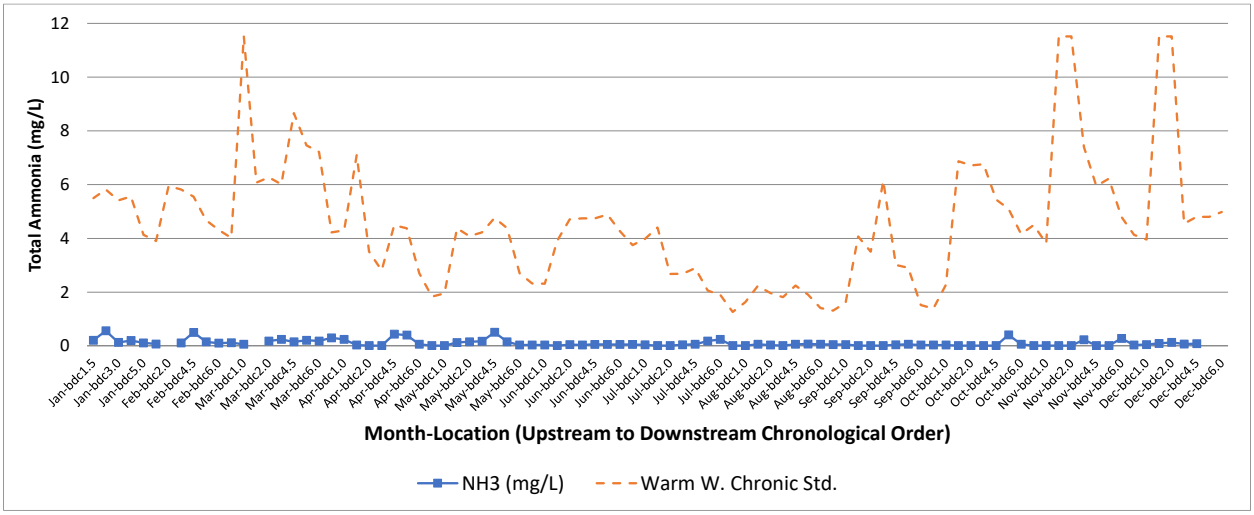
A discussion of ammonia, nitrate and nitrite results, total nitrogen, and total phosphorus data for Big Dry Creek are provided below.

Ammonia

After a five-year transition period from an unionized ammonia standard to a total ammonia standard, a total ammonia standard became effective on Big Dry Creek on January 1, 2012. In 2013, EPA published a revision to the aquatic life criteria for ammonia. Although these criteria have not yet been adopted in Colorado, these criteria can be accessed at EPA's website: http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/ammonia/index.cfm.
As part of Colorado's 10-year Water Quality Road Map, ammonia standards will be revisited in 2027.

Total ammonia concentrations for Big Dry Creek are plotted in Figure 18, along with the chronic standards, which are calculated using a formula based on pH and temperature. During 2022, the stream attained both chronic and acute total ammonia standards. Acute standards are higher than chronic standards and are not shown in Figure 18 since all results were below chronic standards.

Figure 18. Comparison of Big Dry Creek 2022 Ammonia Data to Chronic Ammonia Standards

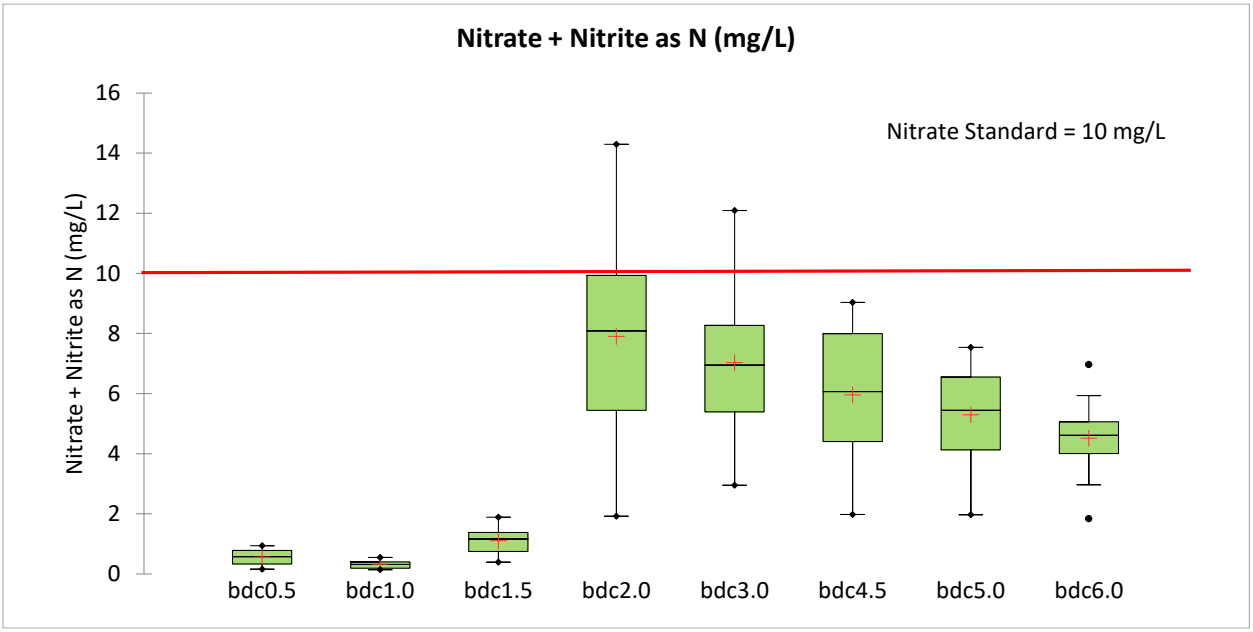


Nitrate and Nitrite

The CWQCC adopted a nitrate standard of 10 mg/L for Big Dry Creek in 2020 for the protection of Water Supply uses, which is a more stringent standard than the previously applicable 100 mg/L for agricultural uses. Big Dry Creek monitors for nitrate+nitrite instead of nitrate; however, the nitrite component is very small. For this reason, nitrate+nitrite results are compared against the 10 mg/L nitrate standard in this report. As shown in Figure 19, Big Dry Creek's instream nitrate+nitrite concentrations are below 10 mg/L at most sampling locations; however, bdc2.0 and bdc3.0 (below the Broomfield and Westminster WWTPs, respectively) have a few nitrate+nitrite results above 10 mg/L, resulting in exceedance of the stream standard. The stream standard is assessed based on the maximum daily value and allows only one exceedance of the 10 mg/L every three years. An increase in instream nitrate concentrations occurs below the WWTP discharges, but gradually decreases in the agricultural area, consistent with the trend for total nitrogen.

Nitrite concentrations at all locations on Big Dry Creek are well below the 4.5 mg/L stream standard, with an 85th percentile value of 0.16 mg/L for 2022.

Figure 19. Big Dry Creek 2022 Nitrate + Nitrite



Colorado's Phased Nutrient Criteria for Nitrogen and Phosphorus

Nationally, statewide, and locally, control of nutrient loading to streams is a significant regulatory topic. In June 2012, the CWQCC adopted Regulation 85 (Nutrient Management Control) and updated the nutrient portion of Regulation 31 (Colorado Basic Standards). Although many requirements under these regulations originally had a 10-year delay until May 31, 2022, some requirements became effective in 2013. For example, monitoring requirements for municipal WWTPs, a data gap evaluation process for the municipal separate storm sewer (MS4) discharge permit holders, and other requirements became effective in 2013. Additionally, municipal wastewater dischargers to Big Dry Creek now have compliance plans to attain new discharge permit limits for total phosphorus and total inorganic nitrogen (TIN) in accordance with Regulation 85. Compliance plans allow time to implement upgrades to meet the limits.

As a result of requirements under Regulation 85, BDCWA has developed an instream nutrient monitoring plan, which was implemented in March 2013. Additionally, MS4s in the Big Dry Creek watershed participated in a joint nutrient data gap analysis for stormwater runoff characterization in conjunction with the Colorado Stormwater Council and Urban Drainage and Flood Control District (WWE et al. 2013). This "data gap analysis" was submitted to and accepted by the CWQCD in fulfillment of the Regulation 85 requirement for MS4s pertaining to characterizing nutrients in urban runoff.

Under Regulation 31, interim nutrient "values" were developed that may be applicable to Big Dry Creek in the future.[7] These interim values include:

- Median annual total phosphorus concentration of 0.17 mg/L, and
- Median annual total nitrogen concentration of 2.01 mg/L.

Both interim values have a once every five years allowable exceedance frequency. Additionally, streams with recreational uses have a not-to-exceed 150 milligrams per square meter (mg/m^2) chlorophyll-*a* interim value for attached algae. At the June 2015 Regulation 38 Rulemaking Hearing, it was determined that the total phosphorus and chlorophyll-a standards would not apply to the mainstem of Big Dry Creek downstream of Standley Lake until a later date, because the lake is filled by ditches that withdraw water downstream of multiple permitted domestic wastewater treatment facilities. The chlorophyll-*a* standard became applicable to Big Dry Creek as part of the 2022 nutrient rulemaking hearing. Total phosphorus and total nitrogen standards will not apply prior to the 2027 nutrient rulemaking hearing.

At the October 2017 CWQCC Rulemaking Hearing related to nutrients, the CWQCD presented its 10-year water quality roadmap for pollutants including total nitrogen, total phosphorus, cadmium, ammonia, selenium, arsenic and temperature. As a result of this hearing, phased adoption of instream total nitrogen and total phosphorus standards was extended from 2022 to 2027. As part of this decision, a new CWQCC policy, Policy 17-1 Voluntary Incentive Program for Early Nutrient Reductions, was adopted. The Roadmap and Incentives Policy were a result of extensive stakeholder meetings and dialogue through the Water Quality Forum. Among other provisions, the Incentive Program will allow a WWTP to accrue time under a post-2027 compliance schedule through trading or watershed nutrient reductions as part of its nutrient reduction plan. Such opportunities should be further explored as part of the Big Dry Creek Watershed Management Plan update. All three municipal WWTPs discharging to Big Dry Creek are participating in the Voluntary Incentive Program.

The Voluntary Incentive Program is intended to encourage facilities to make voluntary reductions of nutrients, and in exchange the facility will receive an extended compliance schedule as well as certainty about the year in which the facility will need to meet water-quality-based effluent limits. An extended compliance schedule means the facility will be given additional time to comply with effluent limits that would be based on water quality standards or variances adopted in 2027 or nutrient-related wasteload allocations. The most current version of Policy 17-1 is available on CDPHE's website (https://cdphe.colorado.gov/wqcc-policies).

[7] For consistency with terminology used in Regulation 31, the term interim nutrient "value" has been used, as opposed to criterion or standard. These "values" may be adopted as stream standards in the future but have not been adopted as stream standards on the main stem of Big Dry Creek.

Big Dry Creek data for nitrogen and phosphorus are discussed further below. Monitoring for chlorophyll-*a* as attached algae has not been conducted for Big Dry Creek to date.

Total Nitrogen

Total nitrogen is calculated based on total Kjeldahl nitrogen (TKN) plus nitrate/nitrite or through direct analysis of total nitrogen. TKN includes organic nitrogen and ammonia. During 2017, BDCWA changed its analysis methodology for total nitrogen from a calculation-based method to a laboratory analysis method (conductimetric persulfate determination of total nitrogen using Timberline analyzer; 4500-N C). Figure 20 provides box plots of total nitrogen from upstream to downstream during 2022, also showing the interim total nitrogen value in Regulation 31 of 2.01 mg/L. Figure 21 provides a matrix of boxplots illustrating total nitrogen trends from 2014 to 2022 at three representative locations: bdc1.5 above the Broomfield WWTP discharge, bdc3.0 below the Westminster (and Broomfield) discharge, and bdc6.0 in the lower agricultural area.

Municipal WWTPs discharging to Big Dry Creek have compliance plans to achieve total inorganic nitrogen limits. During 2022, annual median TIN values for the WWTPs were 13.6 mg/L for Broomfield, 7.68 mg/L for Westminster, and 6.95 mg/L for Northglenn. All three facilities have a compliance schedule to attain a running annual median of 15 mg/L and maximum of 20 mg/L by July 1, 2024.

Figure 20. Big Dry Creek 2022 Total Nitrogen

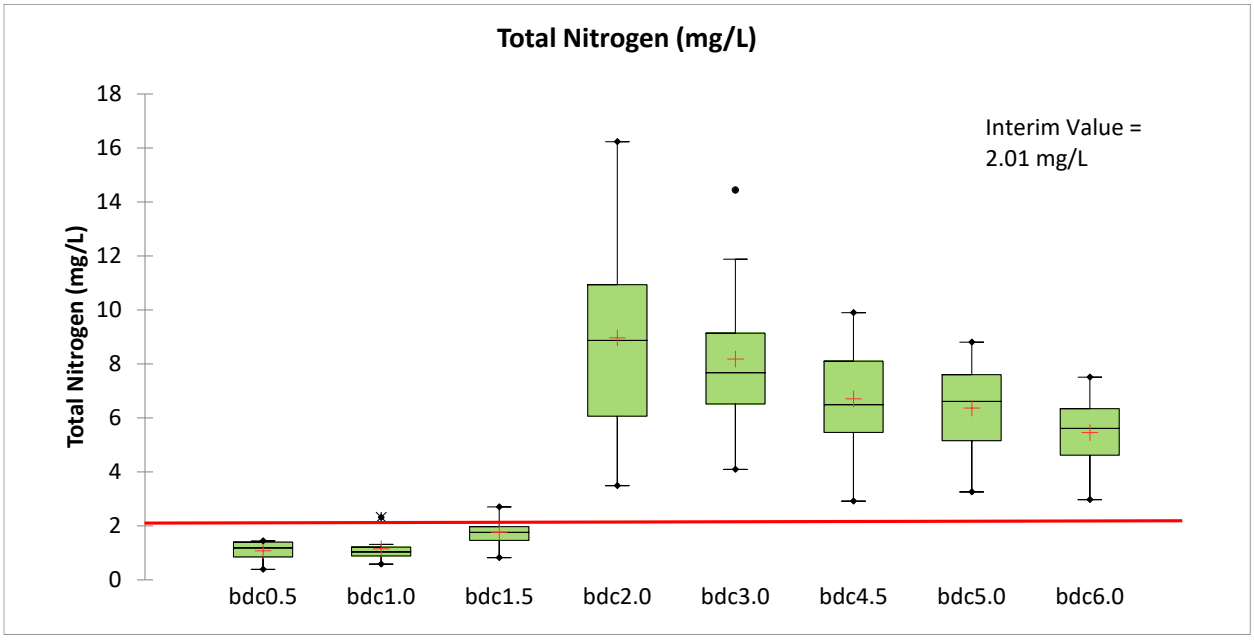
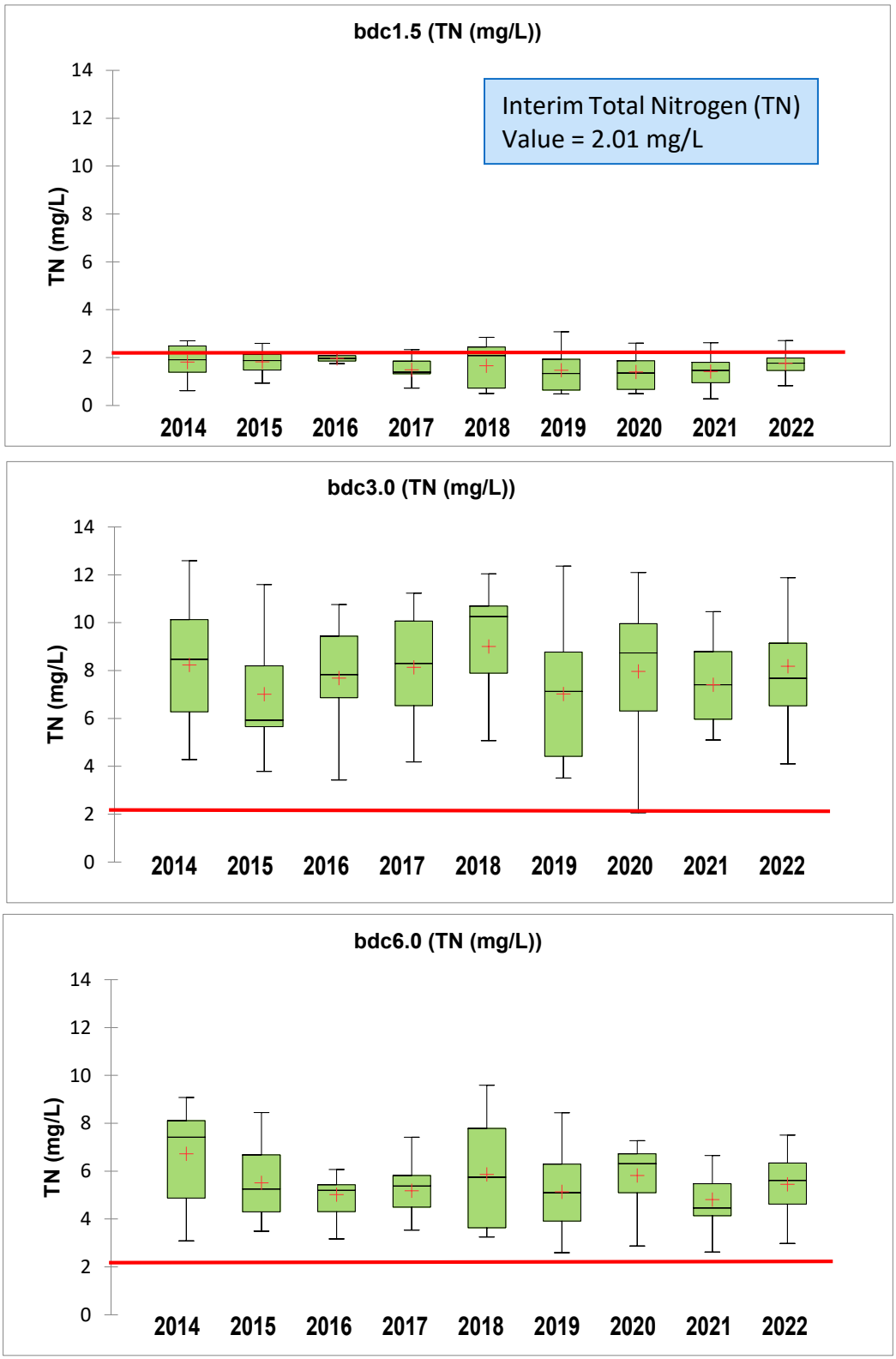


Figure 21. Big Dry Creek Total Nitrogen Trends for Selected Sites (2014-2022)



Key observations from Figure 20 and Figure 21 include:

- At locations upstream of the WWTP discharges to Big Dry Creek (bdc0.5, bdc1.0 and bdc1.5), the 2022 median total nitrogen values ranged from 1.04 to 1.77 mg/L. This indicates that locations upstream of the WWTPs are likely to meet the interim stream value.

- Below the Broomfield WWTP at bdc2.0, a noticeable increase in total nitrogen concentrations is observed. The 2022 median concentration at bdc2.0 was 8.88 mg/L, exceeding the interim total nitrogen value. Below the Westminster WWTP at bdc3.0, the 2022 median total nitrogen concentration was 7.68 mg/L, also exceeding the interim total nitrogen value. Although total nitrogen concentrations decline in the lower watershed, instream total nitrogen is still well above the interim nitrogen value at all locations downstream from the WWTP discharges. Dilution from instream flows and natural losses associated with the nitrogen cycle result in lower total nitrogen concentrations downstream.

- From Figure 21, there are not clear trends over time at individual monitoring locations from 2014 to 2022, with year-to-year variability present at each location; however, the last several years have lower median total nitrogen above the Broomfield WWTP. City of Westminster staff indicate that this decrease may be due to operational changes in the outlet used for Standley Lake releases. The upper release outlet is used from approximately the end of July to after lake turnover and mixing in October (Personal Communication with Kelly Cline, May 2021). Upstream to downstream trends for the period of record are similar to those discussed for 2022. In summary, the interim total nitrogen value would not be attained under current conditions in Big Dry Creek from below the Broomfield WWTP discharge to the South Platte River.

Phosphorus

Phosphorus is of interest to BDCWA in two contexts: 1) Colorado's interim total phosphorus values in the context of Colorado's 10-year Water Quality Road Map, and 2) the downstream Barr-Milton TMDL, as discussed below.

Phosphorus in Relation to Colorado's Interim Total Phosphorus Values

Total phosphorus concentrations in Big Dry Creek are of interest with regard to the interim warm water total phosphorus value (0.17 mg/L) adopted by the CWQCC in June 2012. Based on conditions described in nutrient-related criteria in Regulation 31, these interim values are not expected to be adopted as stream standards for the main stem of Big Dry Creek prior to 2027, as part of Colorado's 10-year Water Quality Roadmap. Nonetheless, it is important to develop an understanding of nutrient conditions in Big Dry Creek with regard to these interim values.

Table 9 and Figure 22 show that Big Dry Creek would have difficulty meeting the phosphorus interim value from below the Westminster WWTP to the South Platte River, with the median phosphorus concentration during 2022 ranging from 0.23 to 0.27 mg/L at locations in this reach. Figures 23a-d provide boxplots of annual total phosphorus concentrations over time at selected monitoring locations upstream of the Broomfield WWTP (bdc1.5), below Broomfield's discharge (bdc2.0), below Westminster's discharge (bdc3.0), and in the agricultural area (bdc6.0). These figures show that locations upstream of the Westminster WWTP can meet the interim total phosphorus value. Significant reductions in total phosphorus are evident beginning in 2010 below Broomfield's discharge. Significant reductions in total phosphorus below Westminster's discharge are evident beginning in 2009. Despite overall phosphorus reductions at both WWTPs (Figure 24 and Figure 25), median annual total phosphorus concentrations instream are still above the interim total phosphorus value from below the Westminster WWTP to the confluence with the South Platte River. Although not shown in a figure due to a shorter period of record for regular discharges to Big Dry Creek, Northglenn's 2022 median total phosphorus discharge from WWTP outfall 007 was 0.26 mg/L. All three WWTPs are now required to attain a running annual median of 1.0 mg/L and a 95th percentile value of 2.5 mg/L effective January 1, 2021, which is being attained.

Figure 22. Big Dry Creek 2022 Total Phosphorus

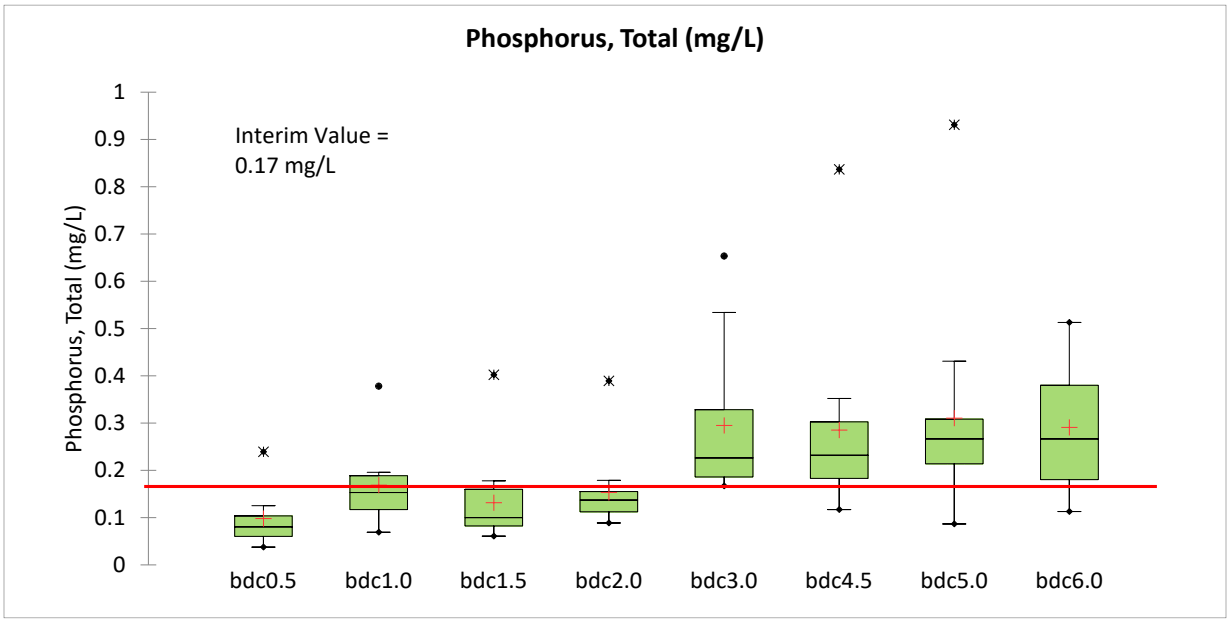
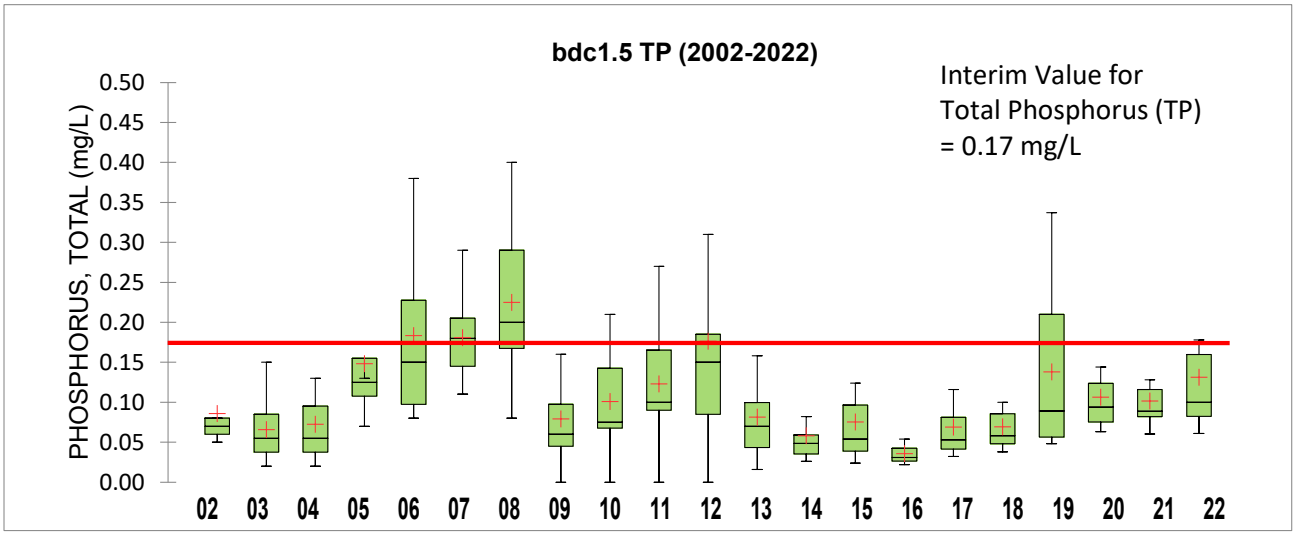


Table 9. Median Annual Total Phosphorus (mg/L) 1999-2022

Year	bdc0.5	bdc1.0	bdc1.5	bdc2.0	bdc3.0	bdc4.0/4.5	bdc5.0	bdc6.0
2000	0.00	0.07	0.04	0.43	1.85	1.60	1.45	1.25
2001	0.00	0.06	0.06	0.47	1.90	1.10	1.20	0.93
2002	0.00	0.06	0.07	1.20	2.25	1.50	1.80	1.60
2003	0.04	0.04	0.05	0.75	2.25	1.55	1.40	1.15
2004	0.04	0.05	0.05	0.23	1.75	1.15	1.10	0.94
2005	0.09	0.12	0.12	1.32	2.54	1.68	1.68	1.40
2006	0.12	0.13	0.15	0.48	2.04	1.38	1.30	1.13
2007	0.12	0.16	0.18	0.85	2.21	1.24	1.29	1.23
2008	0.14	0.23	0.20	0.90	1.73	1.18	1.10	1.22
2009	0.03	0.07	0.06	0.84	0.76	0.57	0.77	0.60
2010	0.06	0.09	0.08	0.13	0.34	0.31	0.33	0.44
2011	0.07	0.10	0.10	0.17	0.55	0.49	0.32	0.49
2012	0.11	0.13	0.15	0.27	0.96	0.85	0.68	0.62
2013	0.04	0.07	0.07	0.27	0.78	0.64	0.52	0.48
2014	0.04	0.04	0.05	0.48	0.52	0.63	0.58	0.53
2015	0.04	0.09	0.05	0.20	0.66	0.50	0.45	0.55
2016	0.04	0.06	0.03	0.21	0.72	0.68	0.56	0.43
2017	0.08	0.06	0.05	0.30	0.99	0.78	0.64	0.55
2018	0.05	0.07	0.06	0.16	0.36	0.46	0.35	0.40
2019	0.15	0.14	0.09	0.24	0.34	0.36	0.32	0.28
2020	0.07	0.11	0.09	0.15	0.31	0.39	0.45	0.43
2021	0.07	0.11	0.10	0.13	0.25	0.23	0.21	0.24
2022	0.08	0.15	0.10	0.14	0.23	0.23	0.27	0.27

Pink-shaded cells exceed the interim value of 0.17 mg/L total phosphorus as an annual median.

Figure 23 (a-d). Total Phosphorus over Time at Selected Big Dry Creek Monitoring Locations



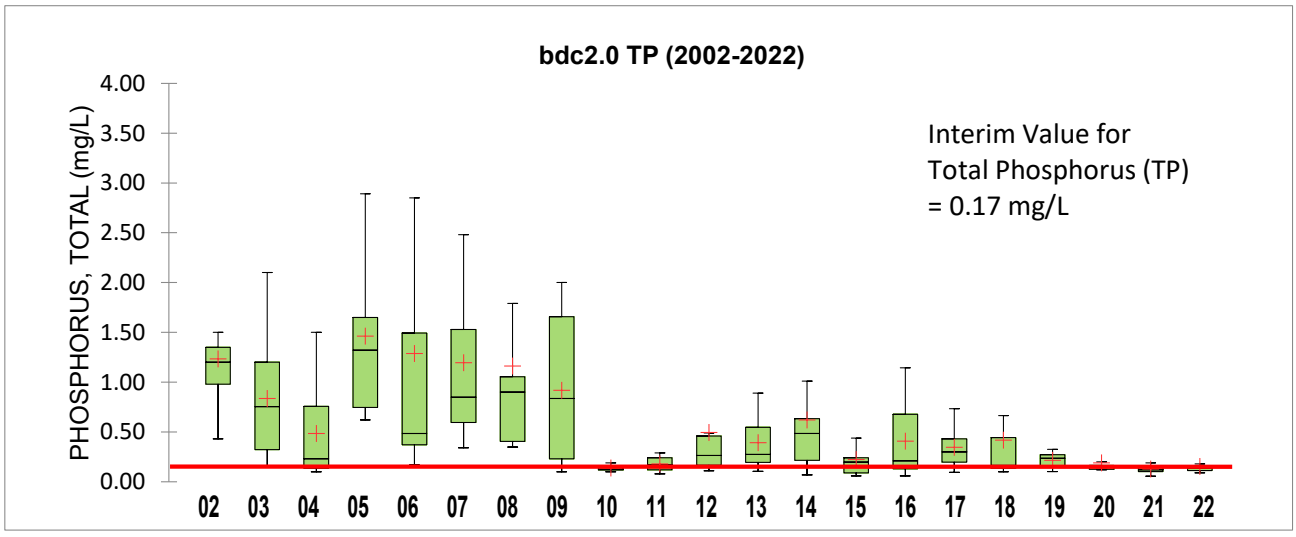
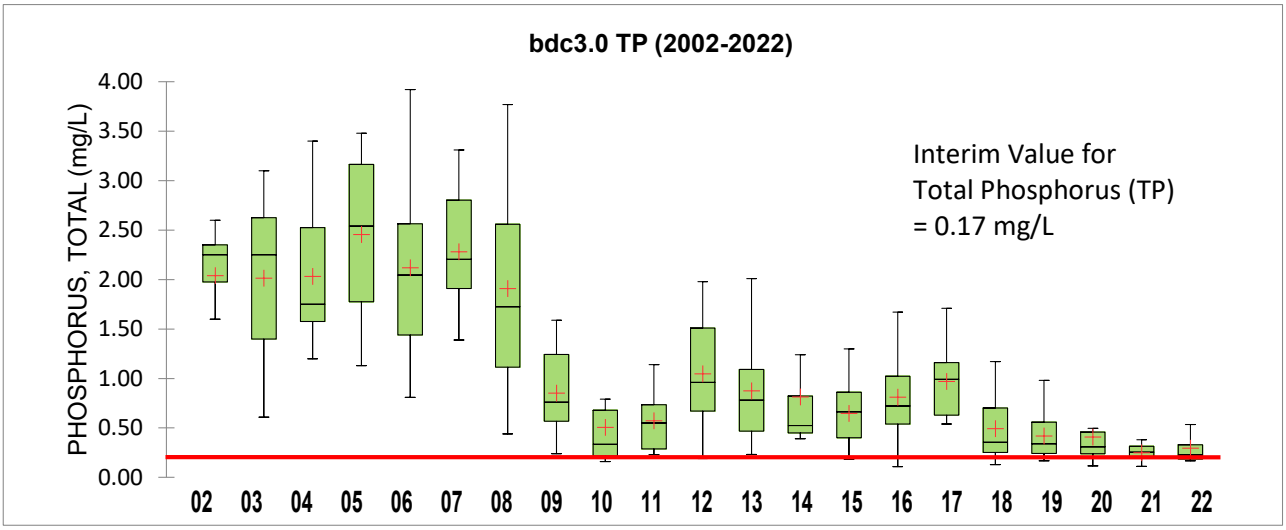


Figure 22 (a-d) (cont). Total Phosphorus over Time at Selected Big Dry Creek Monitoring Locations



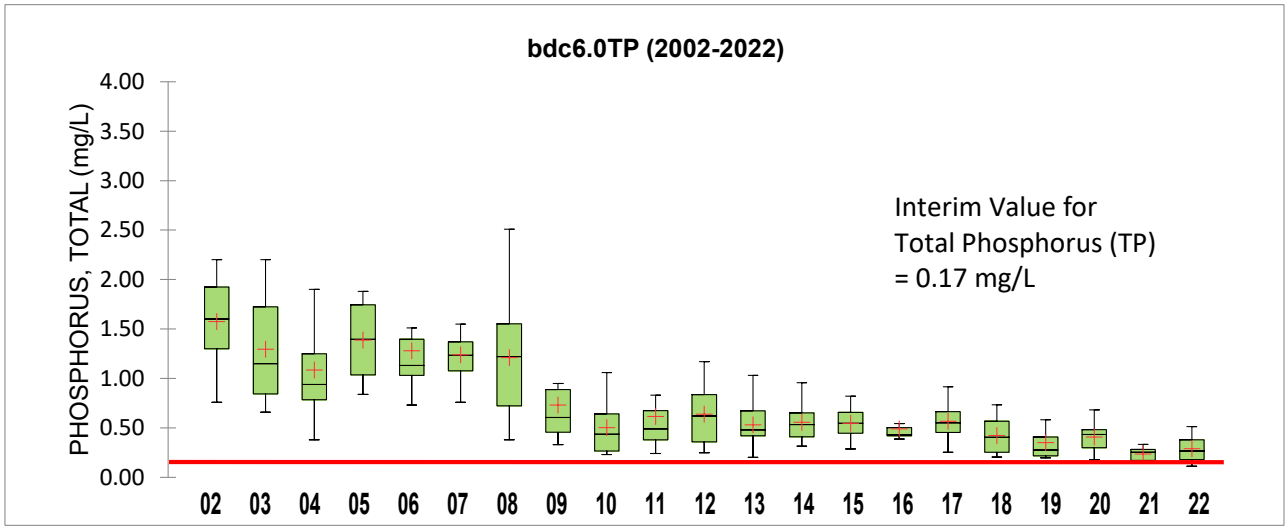


Figure 24. Decreases in Total P Concentrations in Broomfield WWTP Discharge (2002-2022)

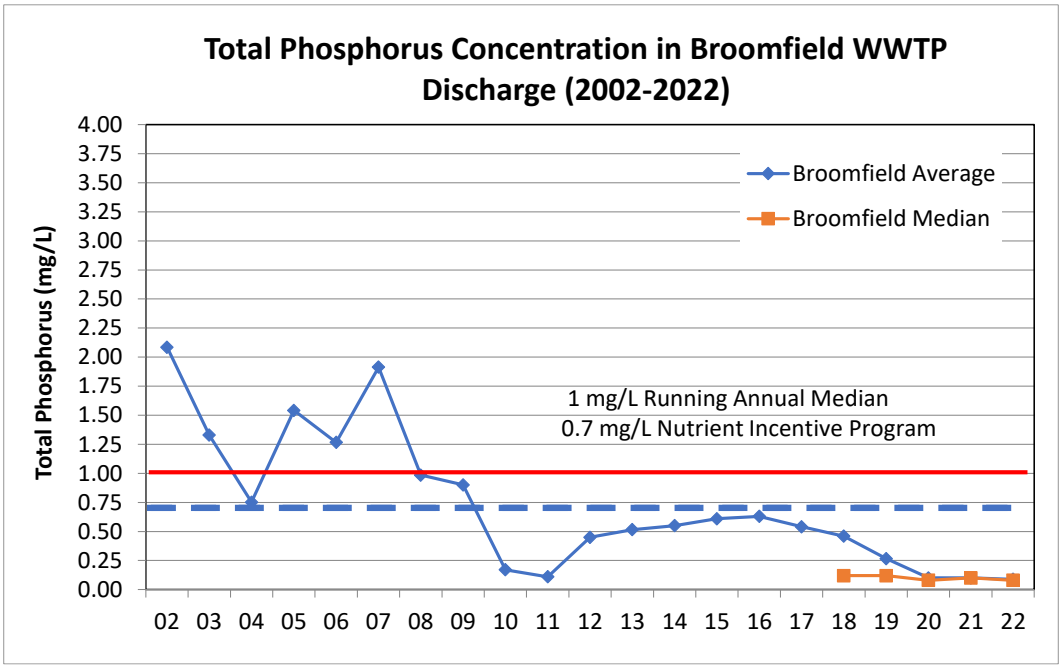


Figure 25. Decreases in Total P Concentrations in Westminster WWTP Discharge (2004-2022)

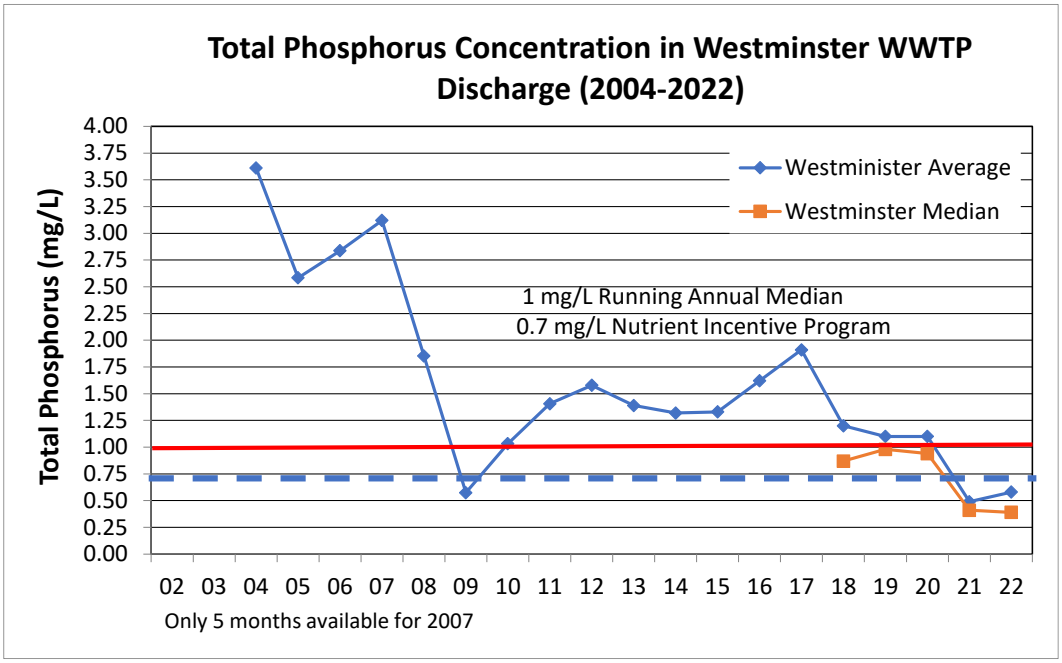


Figure Note: Medians are calculated for the past five years because this statistic forms the basis for accrual of additional compliance schedule time under the Voluntary Nutrient Incentive Program. Both WWTPs attain the 0.7 mg/L total phosphorus target under this program.

Phosphorus in Relation to Barr-Milton TMDL

The Barr-Milton Watershed Association (BMW) is addressing pH exceedances and low dissolved oxygen in the Barr-Milton reservoir system. These pH exceedances and low dissolved oxygen are attributed to excessive algal growth caused by nutrient loading, specifically phosphorus. BMW has established a database for modeling conditions in the reservoirs and has included water quality data from Big Dry Creek, as well as many other tributaries upstream of the Barr-Milton system. BDCWA representatives have participated in various aspects of the BMW effort over the years. In August 2009, AECOM released the final report titled "Watershed and Lake Modeling for a TMDL Evaluation of Barr Lake and Milton Reservoir," which forms the underlying basis for the TMDL.[8] In July 2013, EPA approved the Barr-Milton TMDL for pH and DO, which is focused on controlling phosphorus loads to the reservoirs. In the final TMDL, Big Dry Creek was identified as contributing approximately 5.9 percent of the phosphorus loading to Milton Reservoir. Big Dry Creek has been targeted for a 20 percent total phosphorus load reduction from 2,301 kilograms per year (kg/yr) (baseline year of 2003-2004) down to 1,840 kg/yr (Integral 2011).[9] Because Big Dry Creek is identified as a nonpoint source of loading, "application of best management practices (BMPs) to the greatest extent feasible" is the recommended approach for achieving these reductions. BMW updated their watershed plan in 2017 (BMW 2017).

As a result of the Barr-Milton TMDL process, BDCWA reviewed phosphorus data collected along Big Dry Creek, with primary focus on monitoring station bdc6.0, which is the downstream-most instream monitoring location on Big Dry Creek in the agricultural portion of Weld County. Although instantaneous flow measurements are conducted by BDCWA on a monthly basis, the USGS Fort Lupton gauging station is combined with the bdc6.0 water quality data to estimate loads because the USGS gauge provides a more comprehensive data set. Table 10 and Figure 26 summarize changes in total phosphorus concentrations at bdc6.0 over time, indicating total phosphorus concentration reductions on the order of 78 percent since 2003 and 73 percent since 2004. Total phosphorus load reductions for the overall watershed (based on bdc6.0) over time are also shown in Figure 26. Phosphorus load reductions are also substantial, with some year-to-

[8] In 2019, BMW began updating this model. Since then, BMW has concluded that the SWAT model provides reasonable predictive estimates of the phosphorus loads to the reservoirs; however, the in-reservoir WASP model may need to be recalibrated or another model option selection. BDCWA provided data to the BMW Association to support the model update initiated in 2019. With the floods of 2013 and recent phosphorus treatment at Metro Wastewater, phosphorus concentrations in both Barr and Milton Reservoirs are at about half of the 2003-2004 concentrations. Over the last four years, BMW has also removed over 6,000 carp from Barr Lake; carp disturb bottom sediments and can be a source of phosphorus release. More details are at www.barr-milton.org (Personal Communication with Steve Lundt, May 2021).

[9] This load reduction applies to the portion of the Big Dry Creek load that enters Milton Reservoir, which is a significantly smaller load than occurs at bdc6.0.

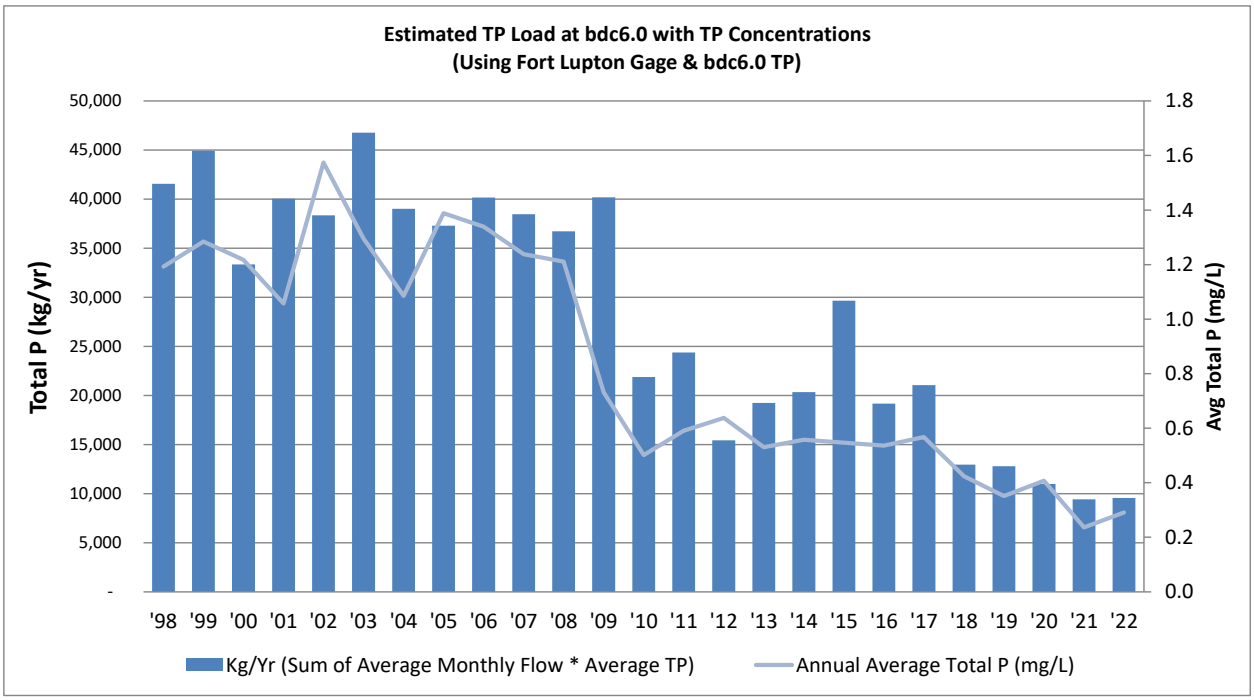
year variation depending on flow volumes. The 2022 phosphorus loads are 78 and 73 percent lower than loads in 2003 and 2004, respectively.

Table 10. Total Phosphorus Concentrations at bdc6.0 (2003-2022)

Year	No. of Samples	Median	Mean	Min.	Max.	25th Percentile	75th Percentile
2003	12	1.15	1.30	0.66	2.20	0.85	1.73
2004	12	0.94	1.08	0.38	2.00	0.78	1.25
2005	12	1.40	1.39	0.84	1.88	1.04	1.75
2006	11	1.13	1.28	0.73	2.65	1.03	1.39
2007	12	1.23	1.24	0.76	1.97	1.08	1.37
2008	12	1.22	1.21	0.38	2.51	0.72	1.55
2009	12	0.60	0.73	0.33	2.10	0.46	0.89
2010	12	0.44	0.50	0.23	1.06	0.27	0.64
2011	11	0.49	0.62	0.24	1.83	0.38	0.68
2012	12	0.62	0.64	0.25	1.17	0.36	0.84
2013	12	0.48	0.53	0.2	1.03	0.42	0.67
2014	12	0.53	0.56	0.32	0.96	0.41	0.65
2015	12	0.55	0.55	0.29	0.82	0.45	0.66
2016	10	0.43	0.49	0.39	0.86	0.42	0.5
2017	12	0.55	0.57	0.25	0.92	0.45	0.66
2018	12	0.40	0.42	0.21	0.73	0.25	0.57
2019	12	0.28	0.35	0.20	0.80	0.22	0.41
2020	12	0.43	0.41	0.18	0.68	0.30	0.48
2021	12	0.25	0.24	0.14	0.33	0.17	0.28
2022	12	0.27	0.29	0.11	0.51	0.18	0.38
Percent Reduction in P (mg/L) (2003 - 2022)		**77%**	**78%**				
Percent Reduction in P (mg/L) (2004 - 2022)		**72%**	**73%**				

Note: For 2016 data, May and December total phosphorus results were not available for use in these calculations.

Figure 26. Decreases in Total P Loads at bdc6.0 Plotted with Total P Concentration Data



Note: 2013 load estimate uncertain due to missing flow data following September Flood. The 2016 load estimate is uncertain due to missing phosphorus results for May and December 2016. Estimated phosphorus concentrations were substituted for those months for purposes of an annual load estimate.

Several additional observations related to the volume component of phosphorus load reductions include:

- In addition to phosphorus concentration reductions at the Broomfield and Westminster WWTPs, both cities have implemented significant reclaimed water programs, which help to manage nutrient loading to Big Dry Creek. Factors such as population growth and demand for reclaimed water affect volumes discharged. The current and future effects of reclaimed water programs have not been fully evaluated for purposes of this report but are important considerations should more in-depth analysis be conducted related to Big Dry Creek phosphorus loading to the South Platte River.

- Historically, Northglenn has discharged infrequently to Big Dry Creek; however, during 2015 through 2022, Northglenn discharged to Big Dry Creek much more frequently. These discharges represent a new source of phosphorus loads to Big Dry Creek relative to the 2003-2004 baseline conditions used in the Barr Milton TMDL.

- As illustrated in Figure 36 (later in this report), the hydrology of Big Dry Creek is highly managed and complex. Future evaluation of measures to reduce phosphorus loading

from Big Dry Creek must consider these complexities. Other hydrology-related considerations include:

- It is important to be aware that bdc6.0 is located upstream from the USGS gauge. Instantaneous flow measurements at bdc6.0 and the average daily flow measurements at the USGS Fort Lupton gauge vary substantially. On average, flows at the USGS gauge are approximately 20 percent higher than measured flows at bdc6.0; however, there is large variation in the magnitude of the difference between individual pairs of flow measurements.

- It is important that the water quality sample location used for modeling Big Dry Creek phosphorus contributions to the South Platte River be located upstream of the Lupton Bottoms Ditch discharge to Big Dry Creek. Sampling location bdc6.0 is upstream of Lupton Bottoms Ditch, but Metro Wastewater Reclamation District also collects water quality samples below Lupton Bottoms ditch, which may be influenced by South Platte water discharged from the Lupton Bottoms Ditch to Big Dry Creek.

9. TEMPERATURE

The currently applicable classification for temperature standards on Big Dry Creek is Warm Stream Tier I (WS-I), due to the presence of the Johnny darter in some locations in the upper portion of the stream. Attainment of standards is assessed based on comparison of the maximum weekly average temperature (MWAT) and daily maximum (DM) temperature to seasonal temperature standards established for March-November and December-February. Values above these standards are allowed under these conditions:

- The DM may exceed the acute temperature standard once every three years. The DM means the highest two-hour average water temperature recorded during a given 24-hour period.

- The MWAT may exceed the chronic standard once every three years (1E3). The MWAT is calculated as the largest mathematical mean of multiple, equally spaced, daily temperatures over a seven-day consecutive period, with a minimum of three data points spaced equally through the day.

- Values measured during conditions “warming event” excursion criteria in Regulation 31 and the 2024 303(d) Listing Methodology are not considered exceedances.

The CWQCD determines whether temperature limits are to be included in permits in accordance with the Basic Standards 31.14(14) “Integration into Discharge Permits.” Currently, the municipal WWTP dischargers to Big Dry Creek are required to “report only” under terms of the 2019 permits, but temperature limits are anticipated in the next permit renewals. Additional instream

monitoring data have been collected at several instream locations in support of this effort using HOBO data loggers recording temperature measurements at 15-minute intervals. For a more robust evaluation of temperatures on Big Dry Creek in the vicinities of the WWTP discharges, 15-minute incremental temperature data collected as part of CDPS DMRs for each WWTP should be obtained and reviewed but is beyond the scope of this report.

10. MACROINVERTEBRATE DATA AND MMI ANALYSIS[10]

BDCWA conducts a biennial macroinvertebrate monitoring program during the month of October in even years. This section provides a summary of multi-metric index (MMI) results for macroinvertebrate data collected in the fall of 2012, 2014, 2016, 2018, 2020, and 2022 for the aquatic monitoring program on Big Dry Creek. Analysis in this section was provided by Aquatics Associates, Inc., with more detailed information for fish, macroinvertebrates, and habitat available in biennial reports completed by Aquatics Associates (2014, 2019a, 2019b, 2021), along with a forthcoming report addressing sampling conducted during 2022.

Background on Aquatic Life Use Attainment Policy 10-1

The CWQCC adopted Policy 10-1 on October 12, 2010 (CWQCC 2010), which provides for the evaluation of the biotic integrity of streams through use of a multi-metric index (MMI) calibrated for the State of Colorado (Jessup 2010). Policy 10-1 was updated on August 7, 2017 (CWQCC 2017) and included a recalibration of the MMI (Jessup and Stribling 2017). This recalibration resulted in a different algorithm used in the CWQCD's Ecological Data Application System (EDAS) to calculate the MMI, as well as different attainment and impairment thresholds for determining attainment and impairment.

EDAS (Version 4.0 CO) was used to calculate MMI and other metrics for the Big Dry Creek analysis summarized below. Application of this method requires the collection and analysis of benthic macroinvertebrate samples according to Policy 10-1 protocols (CWQCC 2017). Use-attainment thresholds have been established for three separate stream biotypes which include Transition (Biotype 1), Mountain (Biotype 2), and Plains & Xeric (Biotype 3). The Big Dry Creek study sites are all designated as Biotype 3 per EDAS. The thresholds for Biotype 3 streams are MMI >42 for use attainment and MMI <29 for impairment. Class 1 streams (Cold or Warm) with MMI scores falling in between the attainment and impairment thresholds require additional analysis using two auxiliary metrics: the Hilsenhoff Biotic Index (HBI) and the Shannon Diversity Index (SDI). Also, MMI scores >51 for Biotype 3 streams indicate a high scoring water (HSW) and any drop in HSW scores of 22 points or more for samples collected 12 or more months apart within a 5-year span of time may indicate impairment. Failure to meet use attainment thresholds for streams in

[10] This section was also included in the 2021 Big Dry Creek Annual Water Quality Report (WWE 2022) but is repeated for ease of reference since biological monitoring is conducted every two years.

their particular biotype may result in the affected segment(s) being listed as provisionally impaired for aquatic life on the 303(d) List. For differing MMI scores on the same representative segment taken in different calendar years, the most recent MMI score is used in the impairment listing decision. The representative nature of all aquatic life data is to be considered before listing decisions are made. Clear and convincing evidence is required to show impairment (CWQCC 2018).

Big Dry Creek MMI Results

Results of the MMI analyses for the macroinvertebrate samples collected at the six BDC sites in the fall of 2012, 2014, 2016, 2018, 2020, and 2022 are presented in Table 11 and Figure 27. The changes to EDAS in 2018 and the new Warm Water 1 stream classification required re-evaluation of historic data presented in previous annual reports; therefore, previous tabulations of these data sets will show different results. As described above, the main difference in evaluation methodology for Class 1 and Class 2 streams is that MMI values between the attainment (MMI > 42) and impairment (MMI < 29) thresholds require evaluation of two auxiliary metrics (the HBI and SDI). If either the SDI is >7.6 or the HBI is < 2.4 for values in the "grey zone", then the stream is considered impaired for aquatic life under Policy 10-1.

All samples for the six years met or were better than the impairment threshold (MMI score of 29) with the exception of bdc5.0 in 2016. No consistent upward or downward trends were noted. For sites with "grey zone" MMI scores, the auxiliary HBI and SDI thresholds were attained for all six sampling years.

During 2016, the MMI at bdc5.0 was the lowest on record; however, field observations did not identify unusual conditions that would be contributing to these scores. Preliminary review of the raw data suggested that the score may be due in part to relatively high numbers of aquatic worms (Personal Communication with Tami Schneck, 2017).

Based on the MMI results for the six sampling sites for the six most recent years analyzed, the aquatic macroinvertebrate community in Big Dry Creek is generally healthy and meets MMI use-attainment criteria for Aquatic Life Class 1 warm water streams. Additionally, the long-term data set demonstrates the significant year-to-year variability that can occur at individual sites. Although the last six sampling events show attainment (other than 2016), a retrospective analysis of the effects of a regulatory upgrade of the stream from Aquatic Life Warm 2 to Aquatic Life Warm 1 indicates an increase in frequency of impairment determinations using Policy 10-1 from 4 percent to 19 percent for the longer monitoring record.

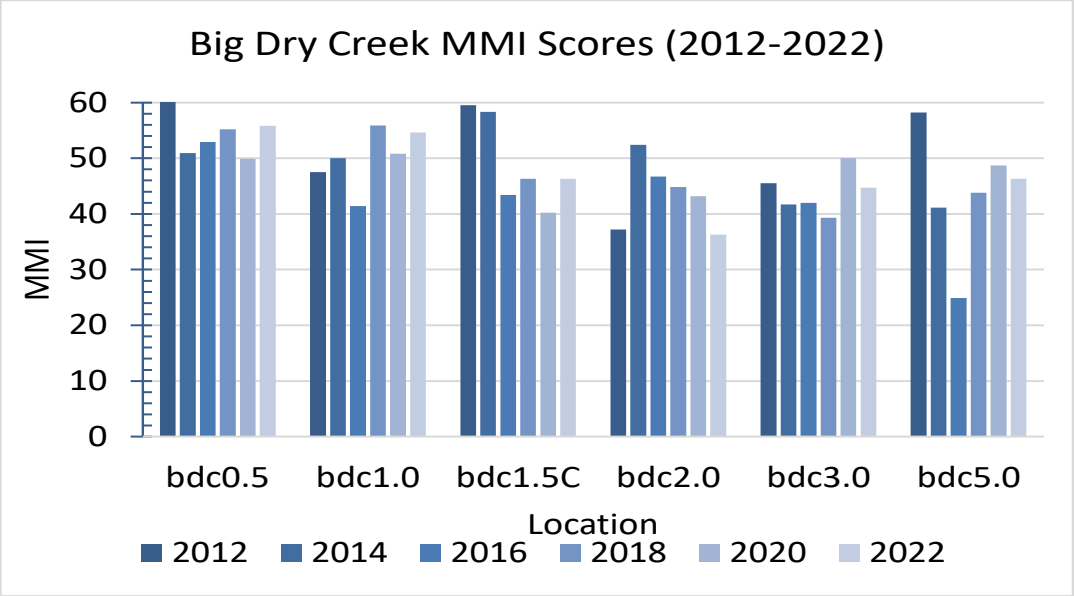
More detailed analysis of the 2022 monitoring will be provided in a written report by Aquatics Associates later in 2024.

Table 11. Fall MMI Scores for Big Dry Creek Sites (2012-2022)
(Source: Aquatics Associates 2022)

MMI Scores						
Site	**2012**	**2014**	**2016**	**2018**	**2020**	**2022**
0.5	**60.2**	50.9	**52.9**	**55.2**	49.9	**55.8**
1.0	47.5	50.0	41.4	**55.9**	50.8	**54.6**
1.5C	**59.5**	**58.3**	43.4	46.3	40.2	46.3
2.0	37.2	**52.4**	46.7	44.8	43.2	36.3
3.0	45.5	41.7	42.0	39.3	50.0	44.7
5.0	**58.2**	41.1	24.9	43.8	48.7	46.3
Shannon Diversity Index (SDI) Scores						
Site	**2012**	**2014**	**2016**	**2018**	**2020**	**2022**
0.5	4.23	3.60	3.63	3.63	3.28	3.30
1.0	3.64	3.78	4.00	4.13	3.97	3.66
1.5C	3.00	3.83	3.75	3.41	3.34	2.44
2.0	2.75	3.73	3.73	3.69	3.63	3.54
3.0	3.44	4.06	3.20	3.73	3.44	3.30
5.0	3.78	3.25	2.25	3.58	3.11	2.53
Hilsenhoff Biotic Index (HBI) Scores						
Site	**2012**	**2014**	**2016**	**2018**	**2020**	**2022**
0.5	6.44	6.15	6.62	6.45	5.79	6.26
1.0	6.66	6.31	6.17	6.45	6.18	6.14
1.5C	6.61	6.92	6.74	7.27	6.68	6.66
2.0	7.02	6.43	6.87	7.10	6.37	6.27
3.0	8.01	7.29	7.90	7.11	6.95	6.21
5.0	6.40	5.65	7.77	6.56	6.38	5.48

Notes: Pink-shaded MMIs are below the impairment threshold. Yellow-shaded cells are between attainment and impairment thresholds and require evaluation of auxiliary metrics for assessment. Bold MMI scores indicate High Scoring Water (MMI >51 for Biotype 3). MMI Impairment threshold for Warm Water Class 1 streams is <29. SDI scores >7.6 and HBI scores <2.4 are thresholds for evaluation of auxiliary metrics for "grey zone" MMI scores.

Figure 27. Biennial Big Dry Creek MMI Scores (2012-2022)



11. FLOW CONDITIONS

The hydrology of Big Dry Creek is discussed below in terms of: 1) annual stream flows relative to period of record, 2) WWTP discharges, and 3) seasonal variation related to release and diversion patterns.

Stream Flows

Stream gauges are managed by several entities in the watershed. A discussion of USGS gauges and a Colorado Division of Water Resources (CDWR) gauge are discussed further below.

USGS Stream Flow Measurements for 2022

USGS mean daily discharge data for the Westminster and Fort Lupton gauges are shown in Figures 28 and 29. Figures 30 and 31 identify peak stream flows for the period of record at both gauges. Figure 32 shows the average annual stream flows at both gauges.

During 2022, average daily flows at the Westminster gauge ranged from 0.7 cfs to 117 cfs with an average of 7.1 cfs. Average daily flows for the Fort Lupton gauge data ranged from 8.6 cfs to 227 cfs with an average of 35.7 cfs. Peak flows at both gauges were within historic ranges (Figures 30 and 31). Flows in 2022 were within the range of historic average flow conditions, but average annual flows at Westminster were the lowest since 2002, with a particularly dry fall.

Figure 28. Mean Daily Discharge at USGS Gauge Big Dry Creek at Westminster, CO

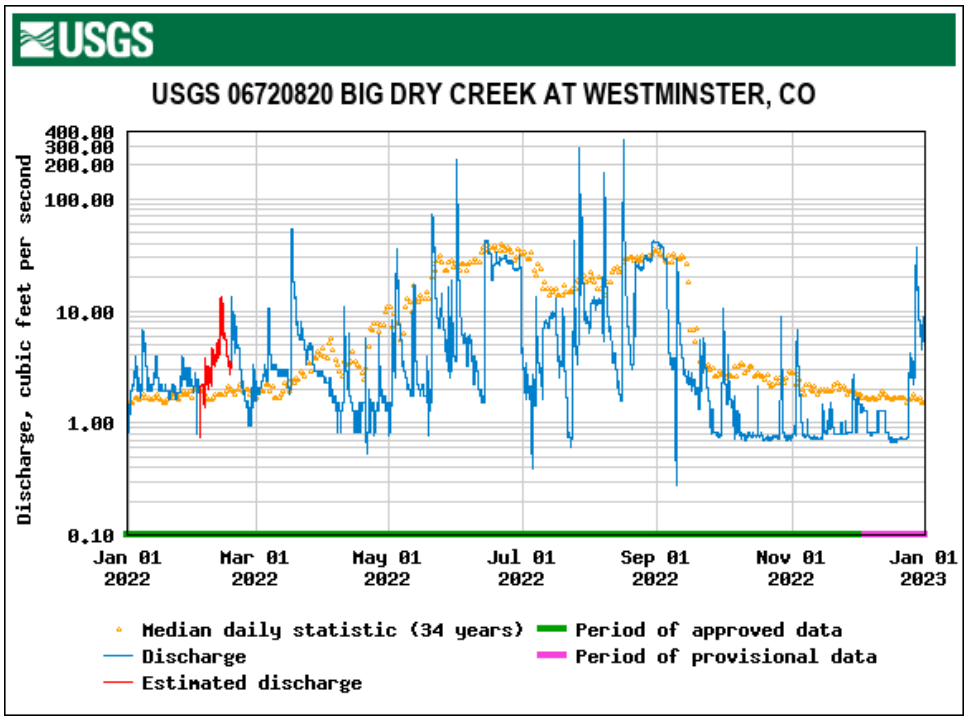


Figure 29. Mean Daily Discharge at USGS Gauge Big Dry Creek at Fort Lupton, CO

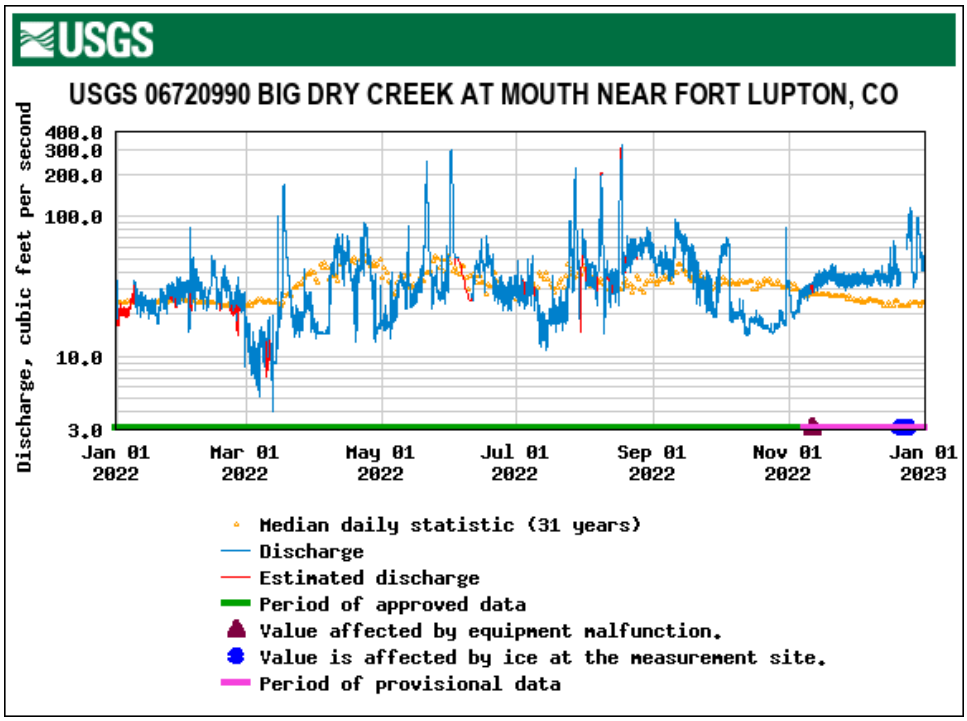


Figure 30. Annual Peak Streamflow at USGS Gauge Big Dry Creek at Westminster

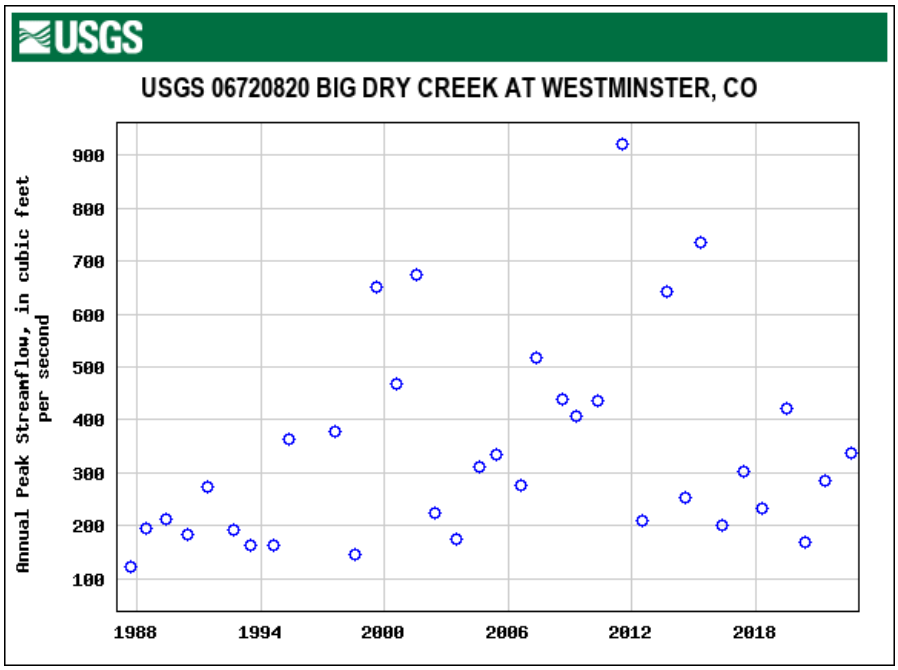


Figure 31. Annual Peak Streamflow at USGS Gauge Big Dry Creek at Fort Lupton

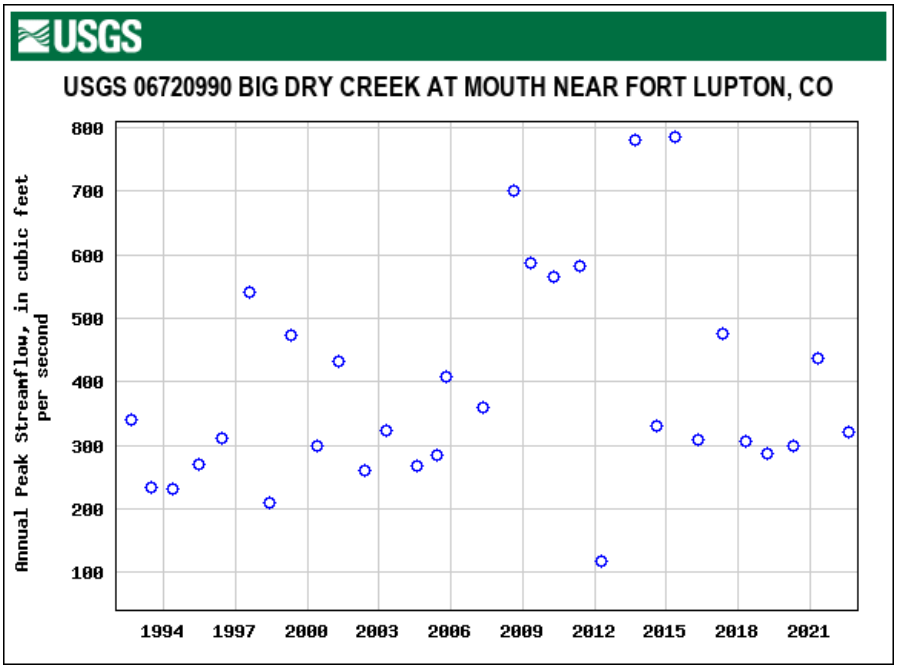
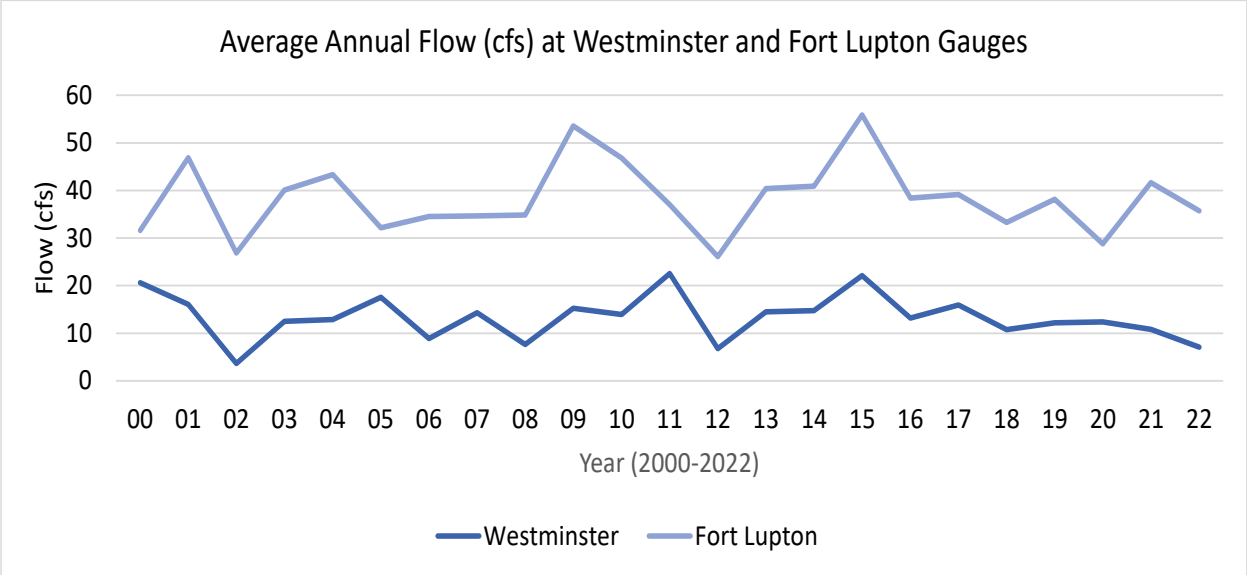


Figure 32. Average Annual Stream Flows Measured at USGS Gauges



Colorado Division of Water Resources Stream Flow Measurements for 2022

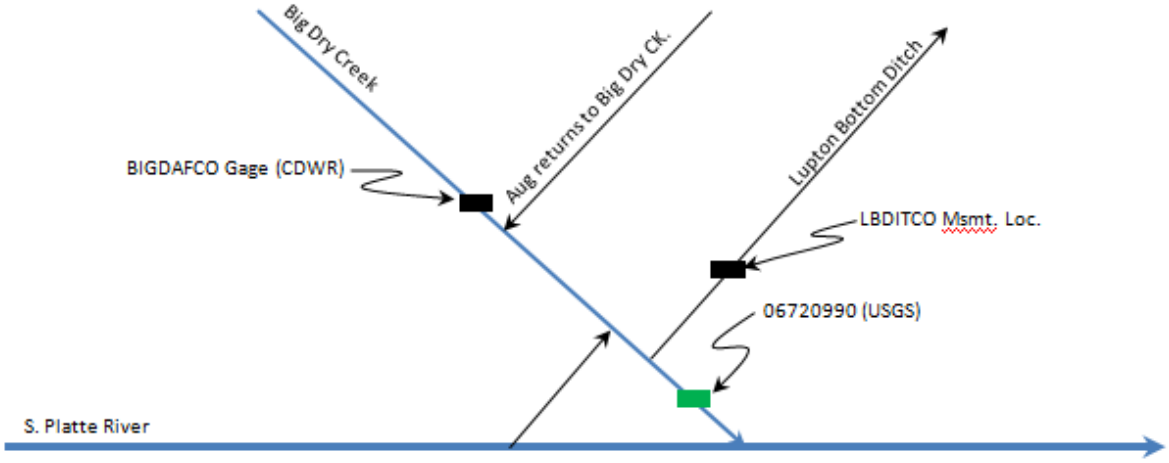
Although BDCWA has historically used the two USGS stream gauges on Big Dry Creek for purposes of analysis in this annual report, other gauge data are or have been available for various locations on Big Dry Creek. These locations include four relatively new (<10 years old) gauges installed by Northern Water; however, these gauges have had a series of issues over the years and are no longer expected to be a source of flow data for Big Dry Creek. A flood alert gauge was installed by Mile High Flood District near I-25 and Thorn Creek golf course, but it was not calibrated to measure baseflow conditions and was removed due to construction activities. A new flood alert gauge maybe installed near the pedestrian bridge crossing just west of I-25, with a request by Westminster to calibrate the new gauge to include lower flow conditions in addition to its primary function for flood alerts.

Another gauge operated by CDWR is named Big Dry Creek Near Ft. Lupton, CO (BIGDAFCO). BIGDAFCO is located approximately 3.8 stream miles upstream of the USGS's 06720990 Big Dry Creek at Fort Lupton stream gauge.[11] Between the two gauges, several notable hydrologic influences occur (Figure 33), including augmentation returns to Big Dry Creek, a diversion off of the South Platte River to Big Dry Creek and a diversion from Big Dry Creek to the Lupton Bottoms Ditch. Additionally, there are irrigation tailwaters accruing to the system in the intervening reach due to irrigation practices as well as percolation return flows from irrigation. The Lupton Bottoms Ditch has a diversion structure on the South Platte River that diverts water to Big Dry Creek. The diversion is situated in such a way that it can receive water from both Big Dry Creek and the South

[11] Metro Wastewater's instream monitoring location "BDC" is located 30-50 yards upstream of BIGDAFCO.

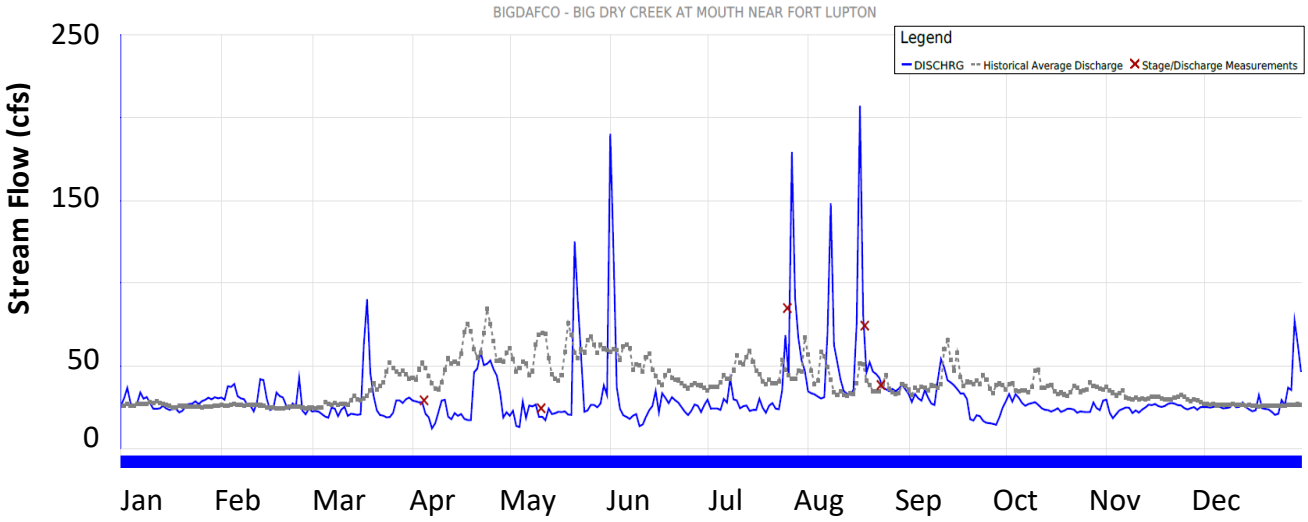
Platte River. Below this confluence point, another diversion structure diverts water from Big Dry Creek into their ditch system. Regardless of the irrigation waters returning to the system between the two gauges, the interactions among the Lupton Bottoms Ditch, the South Platte River and Big Dry Creek cause significant and regular differences in flows measured by CDWR (Figure 33) and the USGS.[12] (Personal Communication with Russel Stroud, CDWR).

Figure 33. Relationship between BIGDAFCO and USGS 06720990
(Source: Russell Stroud, CDWR)



[12]CDWR recently relocated the BIGDAFCO stream gauge slightly downstream from its historic location. This relocation was done to address several issues including aging infrastructure, damage incurred to the gauge by the 2013 flood event and frequent and regular backwater conditions due to debris as a result of farming and ranching practices in the immediate vicinity of the old gauge location.

Figure 34. Colorado Division of Water Resources Gauge Measurements for BIGDAFCO 2022



Wastewater Treatment Plant Discharges

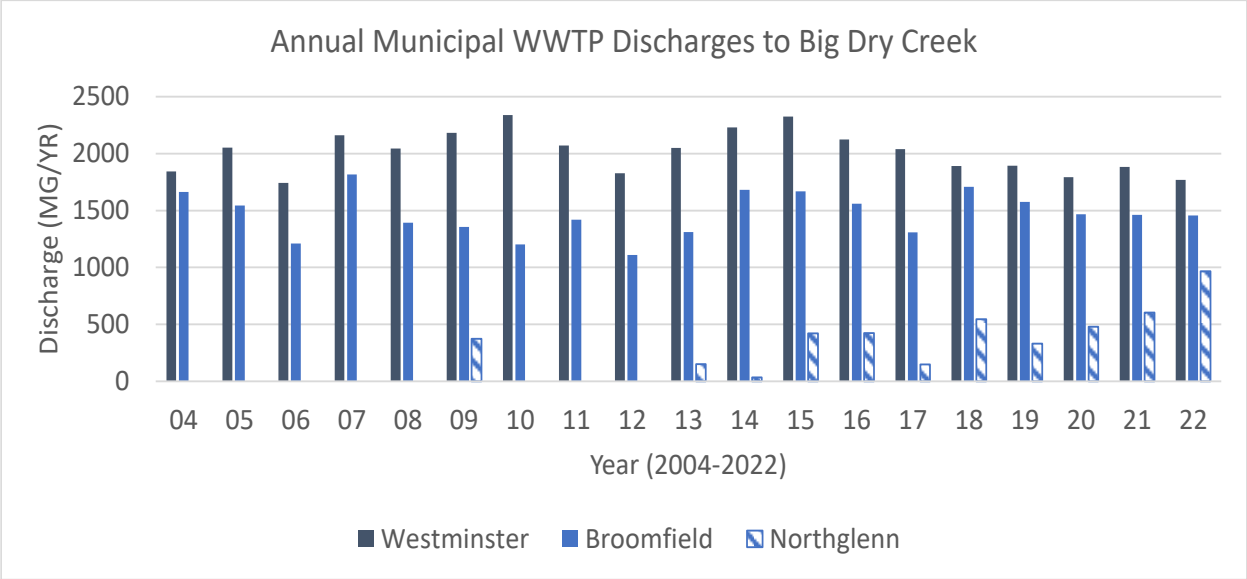
Table 12 and Figure 35 summarize total annual WWTP discharges to Big Dry Creek over time for the Westminster, Broomfield and Northglenn WWTPs since 2004. Through implementation of reclaimed water programs, both Broomfield and Westminster have been working to limit or reduce discharges from their WWTPs to Big Dry Creek, as water rights allow. The volume of wastewater discharged is a critically important component in determining nutrient loading to the stream. For purposes of the Barr-Milton TMDL load reduction objectives, the year 2004 is the baseline year for measuring progress relative to the TMDL. Thus, volume changes relative to 2004 can affect overall nutrient loading relative to the TMDL.

Table 12. Annual WWTP Discharges to Big Dry Creek

	Westminster WWTP (MG/YR)	Broomfield WWTP (MG/YR)	Northglenn WWTP (MG/YR)
2004	1843	1663	NR
2005	2051	1545	NR
2006	1742	1211	NR
2007	2161	1817	NR
2008	2043	1392	NR
2009	2183	1355	374
2010	2337	1201	0
2011	2070	1418	0
2012	1827	1109	0
2013	2050	1310	151
2014	2229	1681	34
2015	2326	1668	420
2016	2123	1559	423
2017	2039	1309	147
2018	1891	1709	546
2019	1894	1576	331
2020	1792	1467	480
2021	1882	1462	604
2022	1770	1457	967

NR = not reported for purposes of report; historically, Northglenn rarely discharged to Big Dry Creek.

Figure 35. Annual WWTP Discharges to Big Dry Creek



Seasonal Flow Regime

In 2011, an evaluation of Standley Lake discharges, irrigation diversions and WWTP discharges was completed for the 2005-2009 time period (WWE 2011). This evaluation was updated in 2018 as part of the ongoing BDCWA watershed plan update, with flows included through 2017. Figure 36 summarizes the primary hydrologic influences on Big Dry Creek, based on analysis of five years of data for 2013-2017. This analysis was not updated for purposes of this report, but will be updated periodically to support trend evaluation in the watershed. Additionally, previous analysis of flow conditions (WWE 2022) has shown the sources of flows in the creek vary seasonally. Key observations include:

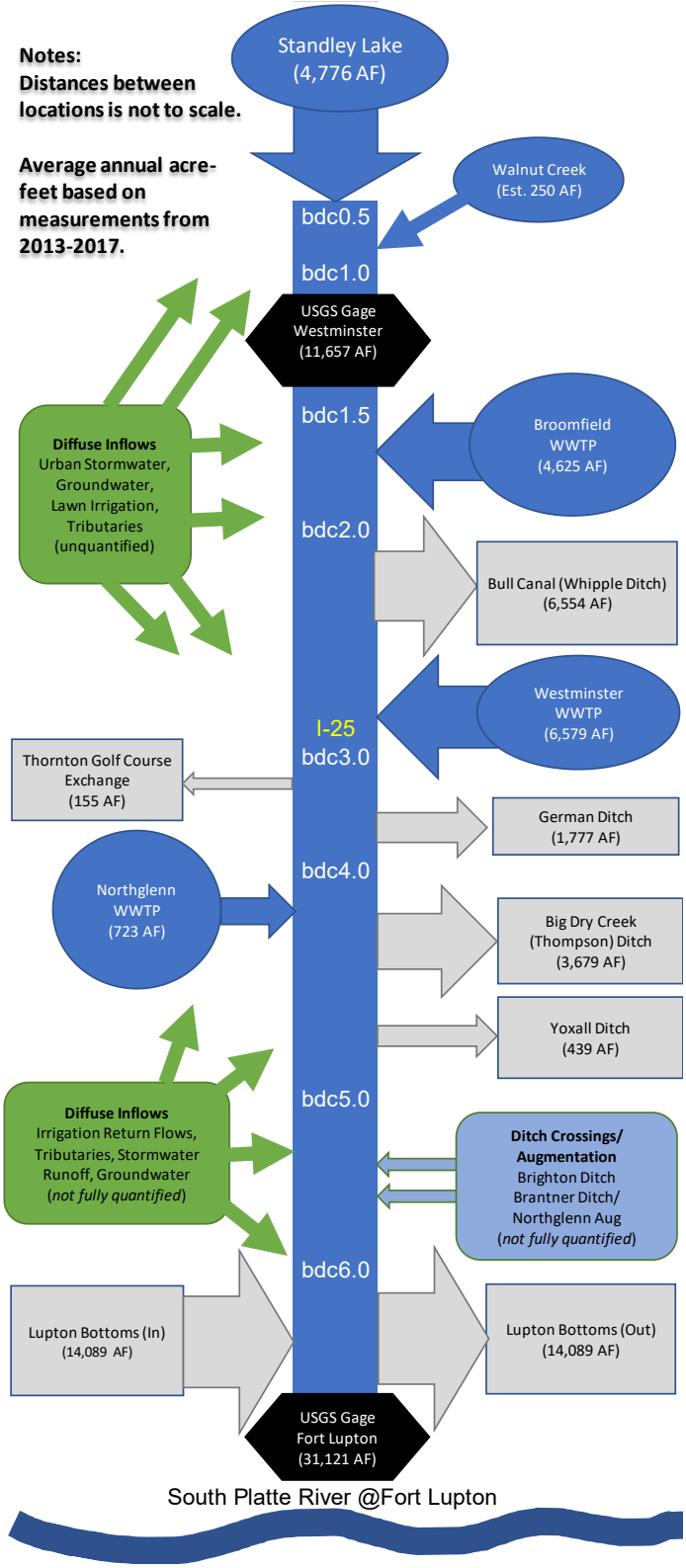
- Significant seasonal variation in release patterns from Standley Lake is present in accordance with releases for irrigation purposes. During June through September, Standley Lake releases comprise 50 to 75 percent of the flows measured at the USGS Westminster gauge. During April, May and October the percent of instream flow from Standley releases is on the order of 5 to 10 percent of the flows at the Westminster gauge.

- With regard to relative percentages of WWTP discharges, during the winter months of December through March, WWTP flows comprise roughly 50 percent or more of the flows present at bdc6.0. During the summer and fall months, WWTP flows are on the order of 25 to 40 percent of the flows at bdc6.0.

Variations in dominant sources of water in the creek during different seasons affect water quality conditions in the creek. For example, in the absence of Standley Lake releases, selenium, chloride,

dissolved manganese, sulfate, total dissolved solids and other groundwater-related parameters may be elevated in the upper watershed. With regard to nutrient loading, it is important to recognize that winter months are dominated by wastewater contributions and relatively low flow conditions. Summer months have higher flows with lower relative contributions from wastewater.

Figure 36. Hydrologic Influences Affecting the Main Stem of Big Dry Creek



12. QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

During 2022, quality assurance/quality control (QA/QC) samples were collected using the guidelines set forth in the Big Dry Creek SAP (BDCWA 2018). Under this program, field blanks and duplicates are collected and analyzed in accordance with Table 13.

Table 13. Field Quality Control Program in Sampling and Analysis Plan

Month	QC Test	Site
March	Field blanks, full set	bdc6.0
	Field duplicates and blanks for nutrients	bdc2.0
June	Field duplicates for Selenium, Dis. and Iron, Trec	bdc1.5
	Field duplicate for *E. coli*	bdc2.0
	Field duplicates for nutrients @bdc2.0	bdc2.0
September	Field duplicates, full set	bdc5.0
	Field blanks and duplicates for nutrients @ bdc2.0	bdc2.0
December	Field duplicates for Selenium, Dis. and Iron, Trec	bdc1.5
	Field duplicate for *E. coli*	bdc2.0
	Field duplicates for nutrients	bdc2.0

Appendix C summarizes analysis of field blank and field duplicate samples for 2022. The QC program was followed in 2022. Analysis of relative percent differences (RPD) for the sample duplicates and review of field blanks show acceptable accuracy for most constituents. Selected observations include:

- Most field blanks had non-detect concentrations of analytes, with a few values near detection limits. Several metals, notably lead, were elevated in the March 11, 2022 field blank. The March 11, 2021 field blanks showed several analytes detected above detection limits.

- Two pairs of field duplicates for total phosphorus at bdc2.0 had relatively high RPDs at 33% and 47%.

- Several elevated RPD results for metals were present in the September 15, 2022 sample pairs including dissolved copper (67%), dissolved iron (33%), and dissolved nickel (74%).

13. DATA GAPS IN CURRENT MONITORING PROGRAM

In June 2020, BDCWA began sampling for additional sample fractions for several metals with new stream standards adopted. Total chromium-III is not currently included in the sampling program; however, given historical data on Big Dry Creek that indicates total chromium is typically below stream standards, total chromium was added in June 2021, as opposed to total chromium-III.

Other constituents with stream standards not analyzed under the monitoring program include sulfide, beryllium, uranium and molybdenum. Additionally, chlorophyll-a as attached periphyton is not currently part of the monitoring program. (Chlorophyll measurements in the water column are, however, part of the monitoring program.) At this time, the BDCWA Board has chosen not to add these constituents to the program. Chlorophyll-a standards for streams were adopted in November 2022 as part of Colorado's 10-year Water Quality Roadmap.

14. INTEGRATED TREND ANALYSIS AND SOURCE CHARACTERIZATION[13]

Given the increased focus on monitoring requirements in municipal separate storm sewer system (MS4) discharge permit renewals, an analysis of 10 years of instream monitoring data from 2011 through 2020 was completed in the 2021 Big Dry Creek Annual Report for pollutants of interest to better characterize portions of the watershed with elevated pollutant concentrations and to identify conditions under which the pollutants are elevated. WWE recommends that this analysis be updated approximately every two years. Due to a relatively large number of missing winter samples during 2022 and a general lack of storm events in 2021, update of this analysis is being deferred until 2024. For purposes of this targeted analysis, pollutants of interest include:

- *E. coli*, which has a TMDL;
- total phosphorus, which is high priority due to the Barr-Milton TMDL and Regulation 85;
- total nitrogen and nitrate due to Regulation 85 and nitrate standards exceedances;
- secondary drinking water parameters exceeding the new stream standard (chloride, sulfate, manganese); and
- selenium, which has a site-specific standard.

The targeted analysis was limited to three monitoring locations representing different conditions:

- bdc1.5 represents conditions above the WWTPs with hydrology controlled by Standley Lake;
- bdc3.0 represents conditions below the dominant WWTPs discharging to the creek; and
- bdc6.0, which represents agricultural conditions in Weld County.

The analysis included these components:

[13] This section was also included in the 2020 and 2021 Big Dry Creek Annual Water Quality Report but is repeated for ease of reference, even though it was not updated for this report.

- Spearman correlation analysis (Table 14) to identify potential relationships for further exploration (i.e., pollutants and flow conditions that tend to trend together, either positively or inversely). In Table 14, statistically significant correlations are shown in bold. Shading is added to highlight stronger correlations (e.g., positive correlations >0.5 and inverse correlations < -0.5), with positive correlations shaded in pink and inverse correlations shaded in green.

- For the upper watershed monitoring location of bdc1.5, categorizing sampling events as during Standley Lake releases (or not) for the purpose of characterizing conditions where groundwater is the dominant inflow to baseflow conditions. Results are shown in boxplots in Figure 37.

- Retrieval of storm event data for the past 10 years for purposes of identifying streamflow as influenced by wet or dry weather conditions. A sampling event was categorized as wet weather if 0.1 inch or more precipitation occurred on the day preceding the sampling event or on the date of the sampling event. The National Oceanic and Atmospheric Administration Northglenn gauge was used for convenience and simplicity (but other precipitation gauges could also be used for a more refined analysis in the future.) On average, May is the wettest month with 2.9 inches of precipitation. Results are shown in boxplots in Figures 37 through 39.

- Seasonal boxplots were also prepared; however, seasonal trends are similar to, and interrelated with, the wet vs. dry and Standley release vs. non-Standley release data and are not reproduced in the report.

Table 14. Spearman Correlation Matrix Big Dry Creek 2011-2020

Correlation matrix (Spearman) / Group bdc1.5:

Variables	E_ coli (MPN/100 mL)	IRON, Trec (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	NO3+NO2 (mg/L)	SELENIUM, D (mg/L)	CHLORIDE, D (mg/L)	MANGANESE, D (mg/L)	SULFATE, D (mg/L)	TEMPERATURE (°C)	Westminster (cfs)	Fort Lupton (cfs)
E_ coli (MPN/100 mL)	1.00	0.29	0.50	0.29	-0.19	-0.34	-0.39	-0.47	-0.51	-0.45	0.43	0.52	0.34
IRON, Trec (mg/L)	0.29	1.00	0.82	0.54	-0.52	-0.62	-0.68	-0.53	-0.36	-0.64	0.52	0.62	0.36
TSS (mg/L)	0.50	0.82	1.00	0.55	-0.44	-0.65	-0.73	-0.68	-0.59	-0.70	0.62	0.70	0.29
TP (mg/L)	0.29	0.54	0.55	1.00	-0.41	-0.49	-0.36	-0.34	-0.05	-0.45	0.41	0.40	0.28
TN (mg/L)	-0.19	-0.52	-0.44	-0.41	1.00	0.93	0.91	0.66	0.68	0.84	-0.63	-0.71	-0.17
NO3+NO2 (mg/L)	-0.34	-0.62	-0.65	-0.49	0.93	1.00	0.95	0.72	0.66	0.92	-0.72	-0.82	-0.24
SELENIUM, D (mg/L)	-0.39	-0.68	-0.73	-0.36	0.91	0.95	1.00	0.75	0.72	0.94	-0.70	-0.89	-0.33
CHLORIDE, D (mg/L)	-0.47	-0.53	-0.68	-0.34	0.66	0.72	0.75	1.00	0.80	0.84	-0.78	-0.70	-0.23
MANGANESE, D (mg/L)	-0.51	-0.36	-0.59	-0.05	0.68	0.66	0.72	0.80	1.00	0.74	-0.55	-0.73	-0.27
SULFATE, D (mg/L)	-0.45	-0.64	-0.70	-0.45	0.84	0.92	0.94	0.84	0.74	1.00	-0.74	-0.89	-0.32
TEMPERATURE (°C)	0.43	0.52	0.62	0.41	-0.63	-0.72	-0.70	-0.78	-0.55	-0.74	1.00	0.63	0.27
Westminster (cfs)	0.52	0.62	0.70	0.40	-0.71	-0.82	-0.89	-0.70	-0.73	-0.89	0.63	1.00	0.44
Fort Lupton (cfs)	0.34	0.36	0.29	0.28	-0.17	-0.24	-0.33	-0.23	-0.27	-0.32	0.27	0.44	1.00

Values in bold are different from 0 with a significance level alpha=0.05

Correlation matrix (Spearman) / Group bdc3.0:

Variables	E_ coli (MPN/100 mL)	IRON, Trec (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	NO3+NO2 (mg/L)	SELENIUM, D (mg/L)	CHLORIDE, D (mg/L)	MANGANESE, D (mg/L)	SULFATE, D (mg/L)	TEMPERATURE (°C)	Westminster (cfs)	Fort Lupton (cfs)
E_ coli (MPN/100 mL)	1.00	0.33	0.45	-0.16	-0.13	-0.18	-0.03	-0.34	-0.41	-0.17	0.18	0.15	0.08
IRON, Trec (mg/L)	0.33	1.00	0.78	-0.38	-0.54	-0.60	-0.46	-0.58	-0.49	-0.61	0.61	0.73	0.49
TSS (mg/L)	0.45	0.78	1.00	-0.28	-0.37	-0.43	-0.18	-0.39	-0.50	-0.37	0.44	0.59	0.41
TP (mg/L)	-0.16	-0.38	-0.28	1.00	0.37	0.38	0.38	0.30	0.34	0.32	-0.19	-0.35	-0.07
TN (mg/L)	-0.13	-0.54	-0.37	0.37	1.00	0.98	0.50	0.34	0.56	0.47	-0.28	-0.76	-0.22
NO3+NO2 (mg/L)	-0.18	-0.60	-0.43	0.38	0.98	1.00	0.37	0.34	0.51	0.40	-0.30	-0.75	-0.27
SELENIUM, D (mg/L)	-0.03	-0.46	-0.18	0.38	0.50	0.37	1.00	0.38	0.52	0.84	-0.09	-0.32	-0.12
CHLORIDE, D (mg/L)	-0.34	-0.58	-0.39	0.30	0.34	0.34	0.38	1.00	0.73	0.60	-0.64	-0.45	-0.07
MANGANESE, D (mg/L)	-0.41	-0.49	-0.50	0.34	0.56	0.51	0.52	0.73	1.00	0.64	-0.57	-0.61	-0.35
SULFATE, D (mg/L)	-0.17	-0.61	-0.37	0.32	0.47	0.40	0.84	0.60	0.64	1.00	-0.27	-0.52	-0.13
TEMPERATURE (°C)	0.18	0.61	0.44	-0.19	-0.28	-0.30	-0.09	-0.64	-0.57	-0.27	1.00	0.48	0.20
Westminster (cfs)	0.15	0.73	0.59	-0.35	-0.76	-0.75	-0.32	-0.45	-0.61	-0.52	0.48	1.00	0.39
Fort Lupton (cfs)	0.08	0.49	0.41	-0.07	-0.22	-0.27	-0.12	-0.07	-0.35	-0.13	0.20	0.39	1.00

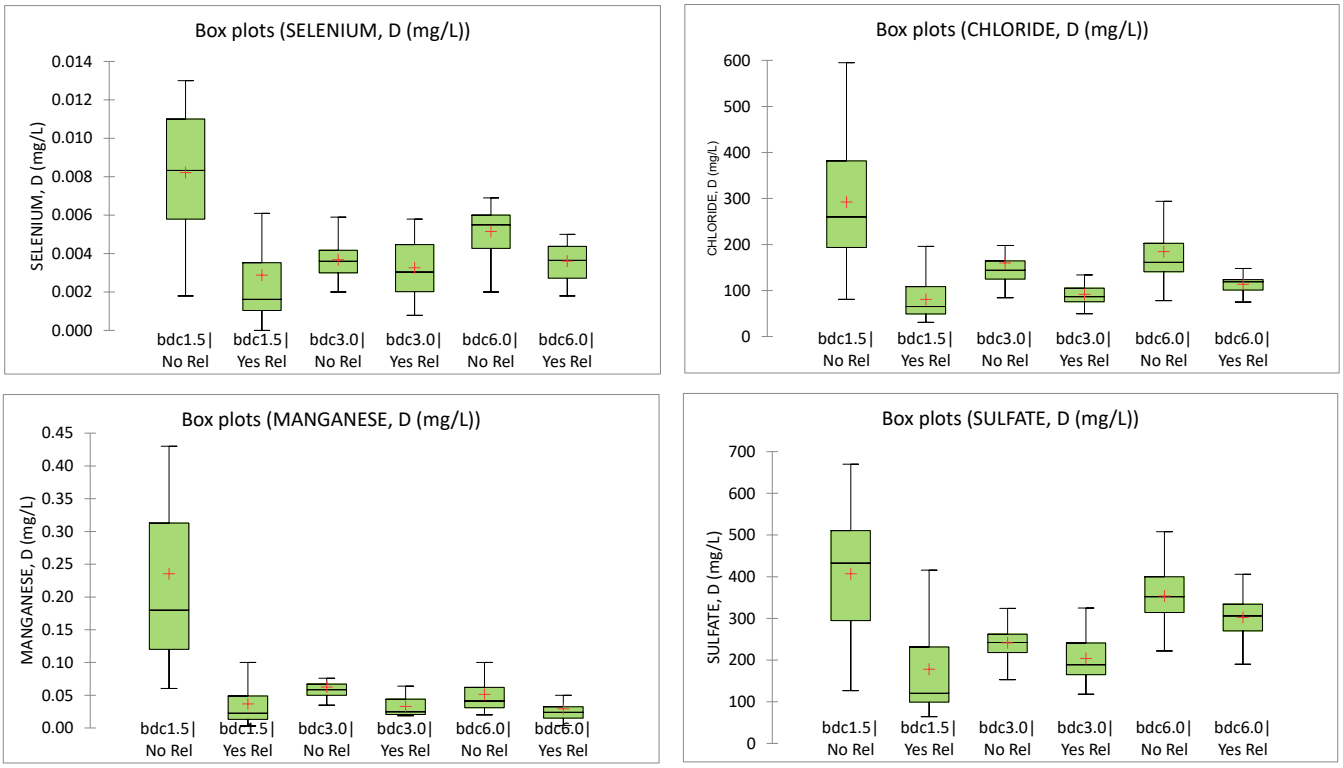
Values in bold are different from 0 with a significance level alpha=0.05

Correlation matrix (Spearman) / Group bdc6.0:

Variables	E_ coli (MPN/100 mL)	IRON, Trec (mg/L)	TSS (mg/L)	TP (mg/L)	TN (mg/L)	NO3+NO2 (mg/L)	SELENIUM, D (mg/L)	CHLORIDE, D (mg/L)	MANGANESE, D (mg/L)	SULFATE, D (mg/L)	TEMPERATURE (°C)	West-minster (cfs)	Fort Lupton (cfs)
E_ coli (MPN/100 mL)	1.00	0.57	0.52	0.24	-0.28	-0.51	-0.54	-0.50	-0.41	-0.51	0.57	0.55	0.41
IRON, Trec (mg/L)	0.57	1.00	0.85	0.40	-0.19	-0.31	-0.48	-0.48	-0.65	-0.63	0.39	0.51	0.65
TSS (mg/L)	0.52	0.85	1.00	0.56	-0.17	-0.33	-0.46	-0.36	-0.64	-0.56	0.31	0.51	0.51
TP (mg/L)	0.24	0.40	0.56	1.00	0.03	-0.10	-0.32	-0.09	-0.35	-0.31	0.07	0.23	0.27
TN (mg/L)	-0.28	-0.19	-0.17	0.03	1.00	0.93	0.64	0.42	0.26	0.36	-0.56	-0.66	-0.18
NO3+NO2 (mg/L)	-0.51	-0.31	-0.33	-0.10	0.93	1.00	0.66	0.47	0.36	0.43	-0.64	-0.66	-0.23
SELENIUM, D (mg/L)	-0.54	-0.48	-0.46	-0.32	0.64	0.66	1.00	0.60	0.46	0.84	-0.66	-0.67	-0.28
CHLORIDE, D (mg/L)	-0.50	-0.48	-0.36	-0.09	0.42	0.47	0.60	1.00	0.51	0.57	-0.67	-0.51	-0.24
MANGANESE, D (mg/L)	-0.41	-0.65	-0.64	-0.35	0.26	0.36	0.46	0.51	1.00	0.47	-0.52	-0.31	-0.49
SULFATE, D (mg/L)	-0.51	-0.63	-0.56	-0.31	0.36	0.43	0.84	0.57	0.47	1.00	-0.45	-0.57	-0.35
TEMPERATURE (°C)	0.57	0.39	0.31	0.07	-0.56	-0.64	-0.66	-0.67	-0.52	-0.45	1.00	0.66	0.19
Westminster (cfs)	0.55	0.51	0.51	0.23	-0.66	-0.66	-0.67	-0.51	-0.31	-0.57	0.66	1.00	0.41
Fort Lupton (cfs)	0.41	0.65	0.51	0.27	-0.18	-0.23	-0.28	-0.24	-0.49	-0.35	0.19	0.41	1.00

Values in bold are different from 0 with a significance level alpha=0.05

Figure 37. Upstream to Downstream Paired Boxplots for Selected Pollutant Concentrations by Location With and Without Standley Lake Releases (2011-2020)



Boxplot Notes:

Yes Rel = Standley Releasing

No Rel = Standley Not Releasing

Figure 38. Upstream to Downstream Paired Boxplots of Selected Pollutants Influenced by Stormwater/Runoff Conditions (2011-2020) during Wet vs. Dry Conditions

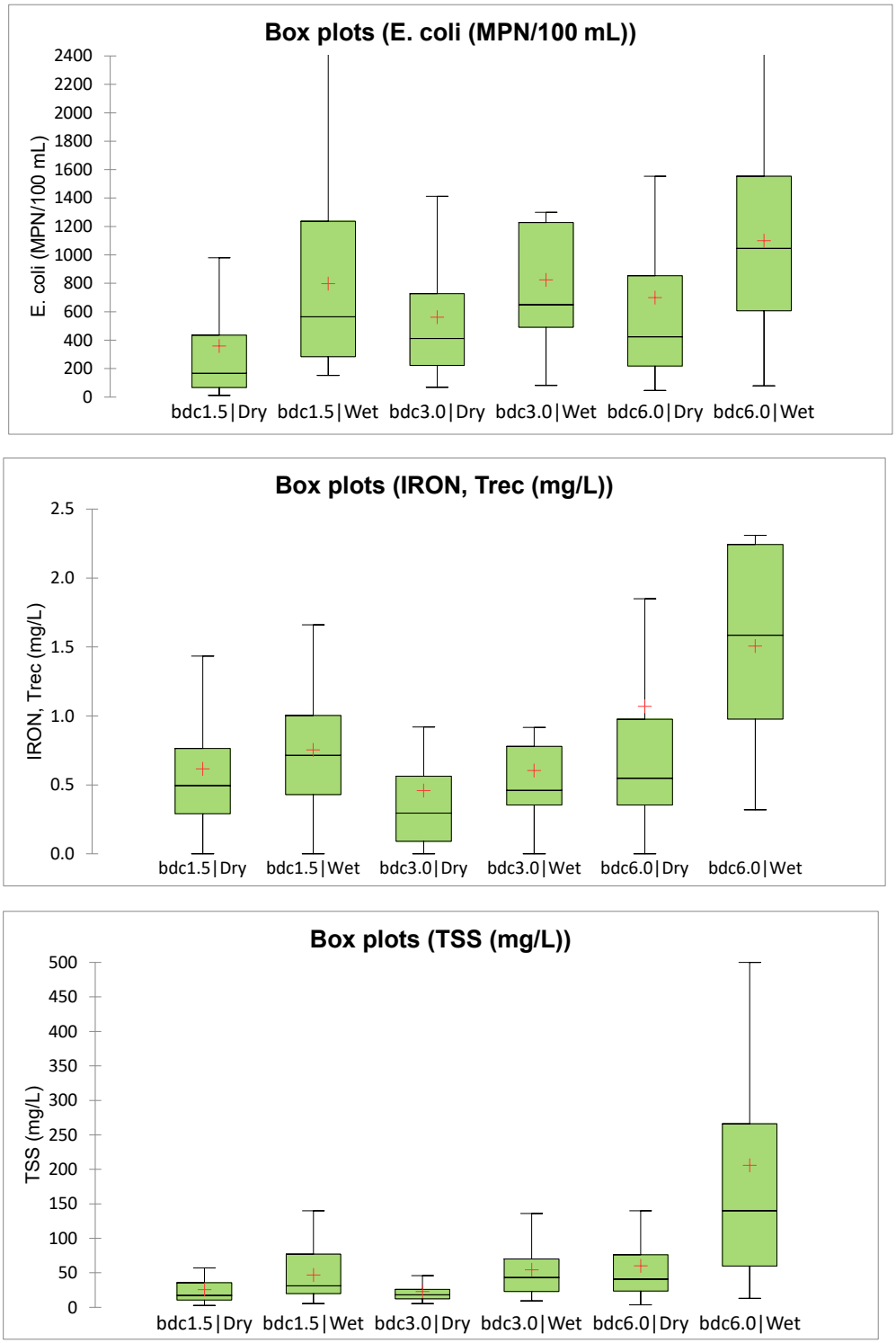
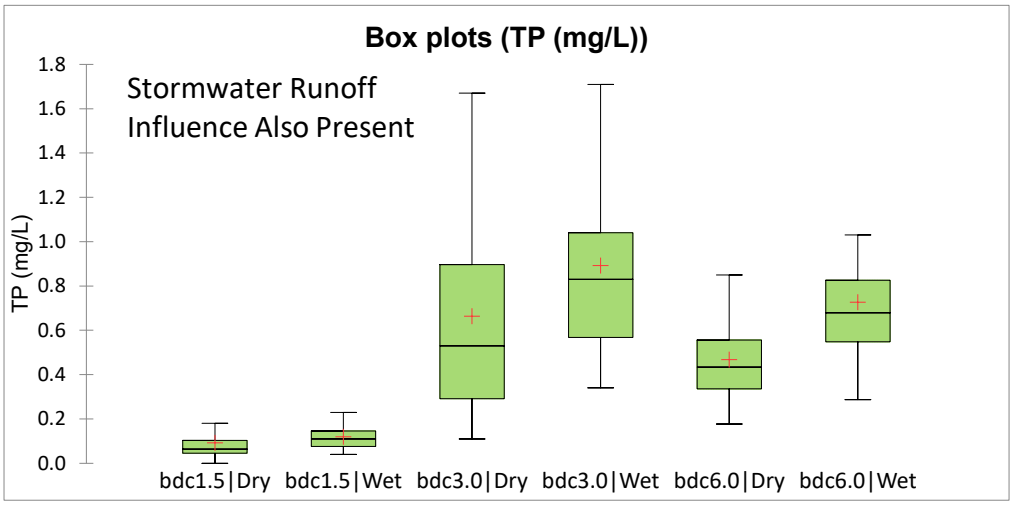
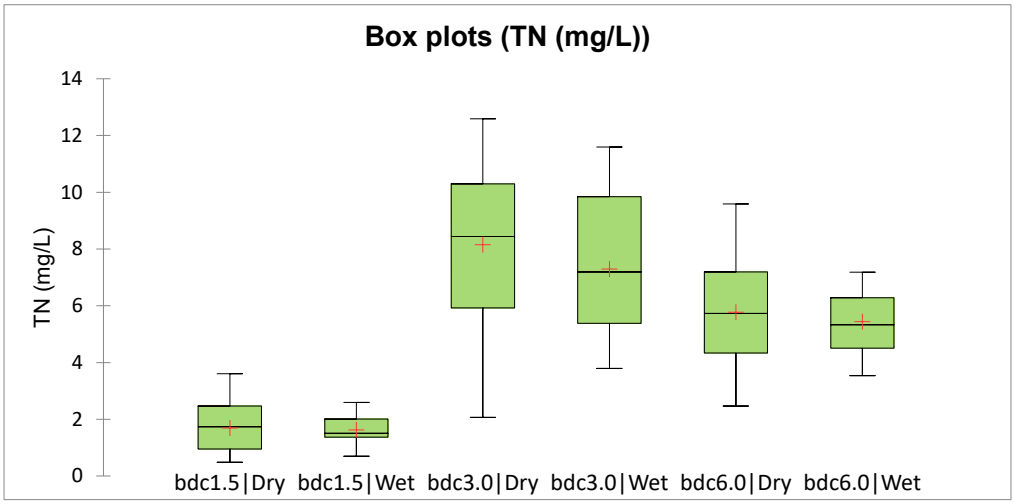


Figure 39. Upstream to Downstream Paired Boxplots of Selected Pollutants Influenced by Wastewater Discharges (2011-2020) during Wet vs. Dry Conditions





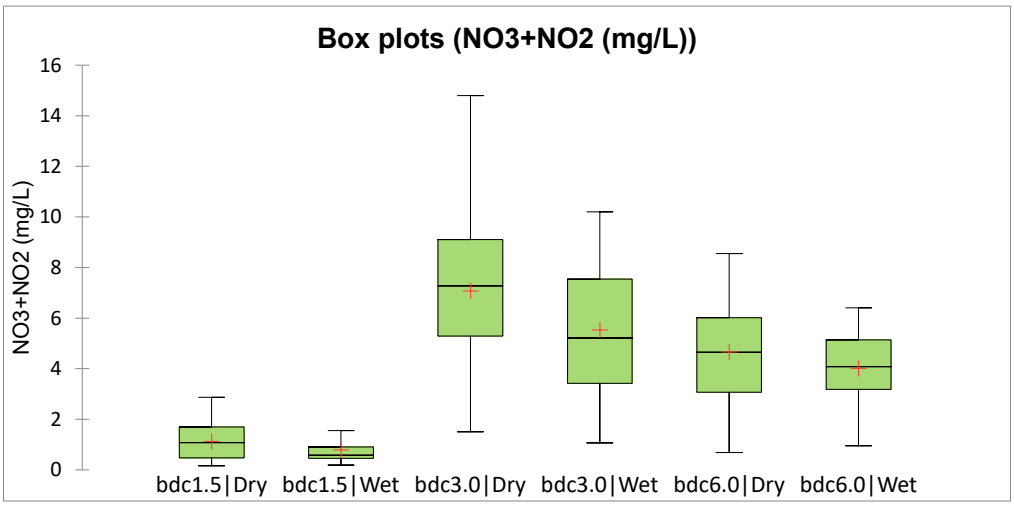


Figure 40. Upstream to Downstream Paired Boxplots of Selected Pollutants Not Influenced by Stormwater (2011-2020) under Wet vs. Dry Conditions

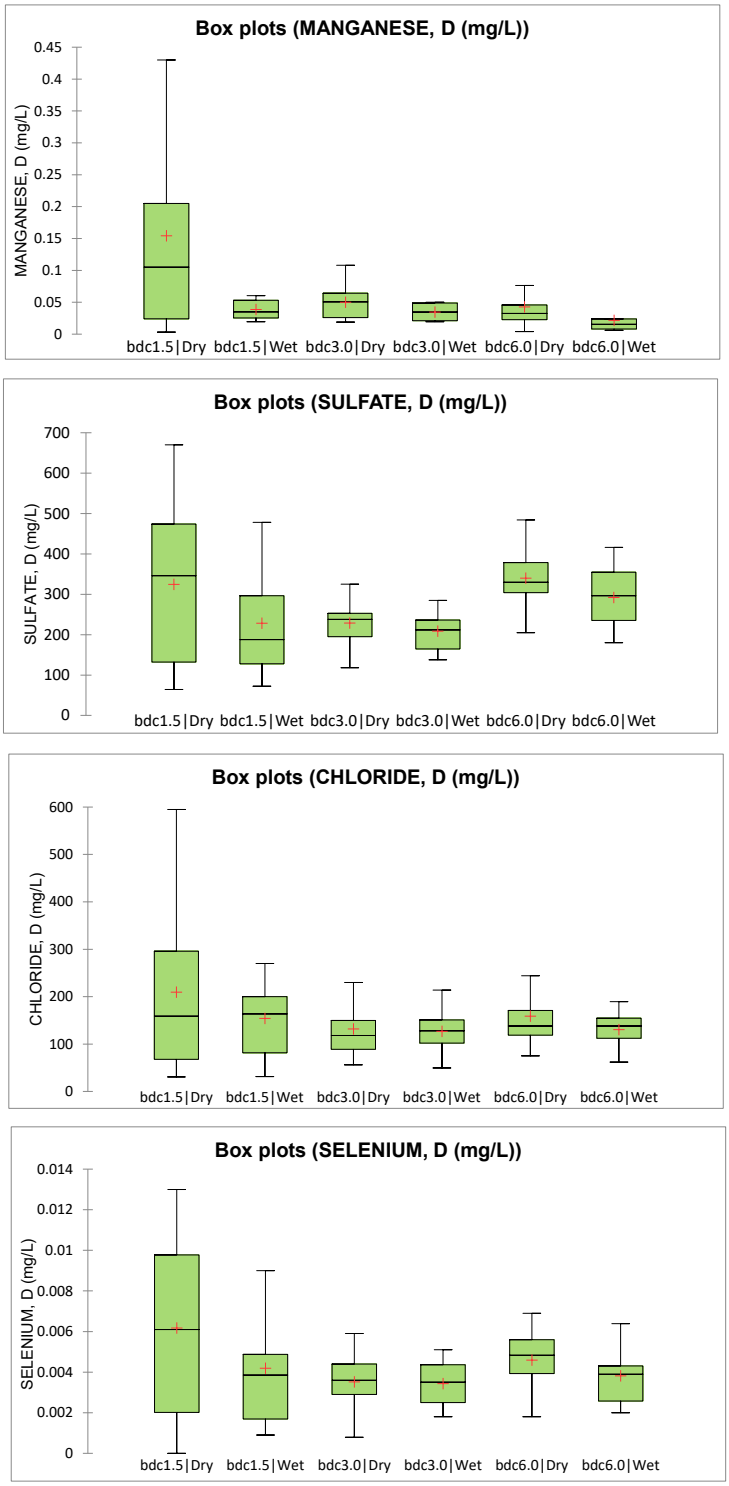


Table 15 provides a summary of a relative comparison of wet weather sample results to dry weather sample results for selected pollutants to simplify observations in Figures 37 through 40. Table 16 provides a summary of anticipated sources and control strategies that should be further considered by BDCWA as part of watershed planning and future Regulation 38 rulemakings based in part on this analysis. Key findings from the analysis for pollutants of interest include:

1. ***E. coli*:** *E. coli* is elevated throughout the watershed under both dry and wet flow conditions. *E. coli* concentrations are higher during wet weather influenced sampling events throughout the watershed. Nonetheless, because *E. coli* is also elevated under dry weather conditions, it is recommended that BDCWA continue to focus on identifying persistent dry weather sources of *E. coli*.

2. **Nitrogen:** Elevated nitrogen in the watershed is limited to the portion of the stream between the Broomfield WWTP and the confluence with the South Platte River. The dominant influence on the nitrogen conditions at this time is the wastewater facilities.

3. **Phosphorus:** Elevated total phosphorus above the interim limit of 0.17 mg/L in the watershed is limited to the portion of the stream between the Broomfield WWTP and the confluence with the South Platte River. Wet weather influenced events have higher phosphorus concentrations throughout the watershed; however, the wet weather influenced events above the WWTP discharges still attain the interim limit of 0.17 mg/L.

4. **Total Recoverable Iron:** Total recoverable iron is elevated under wet weather-influenced conditions throughout the watershed; however, the only portion of the watershed exceeding the total recoverable iron standard under any condition is the lower watershed in the agricultural area.

5. **Secondary Drinking Water Parameters:** Chloride, manganese and sulfate are elevated in the upper watershed above the WWTP discharges during dry weather, low-flow conditions when Standley Lake is not releasing. Groundwater-dominated flow conditions lead to these elevated values, similar to selenium, which has a site-specific standard due to natural or irreversible human-induced conditions. Stormwater runoff BMPs are not expected to be effective in addressing these pollutants.

Table 15. Relative Comparison of Wet vs. Dry Weather Sample Results

Watershed Portion	Bacteria	Iron	Nutrients		Secondary Drinking Water Params.			Se**
	E. coli	Iron	TP	TN & NO3	Mn	Cl	SO4	Se**
Upper (bdc1.5)	Higher	Higher*	Higher*	Lower*	Lower	Lower/ Neutral	Lower	Lower*
WWTP-Urban (bdc3.0)	Higher	Higher*	Higher	Lower	Lower*	Neutral*	Lower*	Lower*
Agricultural (bdd6.0)	Higher	Higher	Higher	Lower	Lower*	Neutral*	Lower*	Lower*

TP = total phosphorus; TN = total nitrogen; NO3 = nitrate; Mn = manganese; Cl = chloride; SO4 = sulfate; Se = selenium
Comparison is wet weather relative to dry weather. *Meets stream standard. **Site-specific standard in place.

Table 16. Summary of Water Quality Issues, Sources and Potential Solutions

Watershed Portion	Pollutants of Interest	Observations for Sources and Trends	Treatment/BMPs/Solutions to Explore
Between Standley Lake Dam and Broomfield WWTP	Chloride, Manganese, Sulfate & Selenium	Groundwater.	Expected to be groundwater-related during low-flow conditions. Site-specific standard similar to selenium standard.
	E. coli	*E. coli* elevated under all conditions, with summer and storm-influenced concentrations notably higher.	Continue dry weather source investigations and source controls. Continue to implement MS4 permanent stormwater control measures, with preference toward Green Infrastructure practices providing volume reduction.
	Nutrients	Nutrients in this reach meet the stream standards. Phosphorus increases during runoff events, but not at levels exceeding standards.	Continue to implement MS4 nutrient-related programs and permanent stormwater control measures.
Broomfield WWTP to South Platte	Total Nitrogen & Nitrate	WWTP discharges.	WWTPs dominant source of nutrients; continued WWTP upgrades. Total phosphorus also increases under runoff conditions: stormwater BMPs & bank stabilization. Support agricultural BMPs for nutrients in lower watershed.
	Total Phosphorus	WWTP discharges; Stormwater Runoff.	
	E. coli	*E. coli* elevated under all conditions, with summer and storm-influenced concentrations notably higher.	Continue dry weather source investigations and source controls. Continue to implement MS4 permanent stormwater control measures, with preference toward Green Infrastructure practices providing volume reduction. Explore private property owner interest in agricultural BMPs where cattle are adjacent to stream.
Downstream of WCR 8*	Total Recoverable Iron	Storm events that mobilize sediment and associated iron.	Runoff-related agricultural and/or channel stabilization BMPs.

*Pollutants identified from Broomfield WWTP to South Platte are also applicable below Weld County Rd. 8.

15. CONCLUSIONS AND RECOMMENDATIONS

1. Water quality in Big Dry Creek attained many, but not all, applicable stream standards as of 2022. For known water quality issues with standards in place prior to 2021, *E. coli* concentrations remain elevated above the stream standard throughout the stream; however, total recoverable iron is now meeting the stream standard. For new stream standards assigned by the WQCC in 2020 related to addition of a Water Supply classification, Big Dry Creek exceeds the dissolved manganese, nitrate and chloride standards and may potentially exceed sulfate standards, depending on the time period used for assessment and the assessment methodology (e.g., individual site vs. entire stream). These pollutants could become future impairment listings for Big Dry Creek. With the exception of nitrate, the new potential impairments are related to secondary drinking water standards (e.g., taste, odor, staining) rather than human health concerns.

2. *E. coli* concentrations are elevated at multiple instream locations. *E. coli* concentrations in the WWTP discharges are very low and do not exceed stream standards. Efforts are underway to identify sources of *E. coli* upstream of I-25. The current monitoring program is useful for identifying elevated stream reaches and trends over time but is not sufficient for identifying and mitigating sources of *E. coli.* For this reason, BDCWA and partnering cities have conducted a microbial source identification study on the creek and dry weather outfall sampling. Locations with the most elevated *E. coli* occur at I-25 (bdc3.0) and in an agricultural area with cattle in Weld County (bdc6.0).

3. Although total recoverable iron samples collected and analyzed by BDCWA show attainment of the total recoverable iron standard at all monitoring locations, additional data collected by Metro Wastewater in the lower watershed in recent years has shown elevated iron concentrations. For this reason, Big Dry Creek below Weld County Road 8 is listed as impaired on the 2024 303(d) List. Elevated iron concentrations are expected to be due to stream bank and soil erosion in the lower watershed. For the last five-year period, total recoverable iron attains the stream standard; however, this attainment status is expected to vary year-to-year depending on the extent to which water quality samples coincide with storm events sufficient to generate erosion.

4. Sources of sulfate, chloride and dissolved manganese in the watershed include groundwater inflows in the upper watershed, as evidenced by seasonal patterns in the data set. Other sources of sulfate may also be present in the lower watershed, but at levels below the stream standard. These constituents are secondary drinking water parameters, not related to human health risk. All of these constituents are expected to have exceedances of the stream standards potentially resulting in impairment listing on future 303(d) lists. For chloride, the most recent 5-year period does not meet the stream standard; additionally, a trend of increasing chloride concentrations over time is suggested by the data. Further exploration of

existing quality conditions as of January 1, 2000, and a targeted spatial assessment approach (individual sites or reaches) may provide regulatory relief for sulfate.

5. For the most recent five-year analysis period (2018-2022), Big Dry Creek attained its site-specific selenium standard. In 2016, the stream was removed from the 303(d) List of impaired waters. From a longevity plan perspective related to the site-specific standard, a site-specific standard for selenium is still needed in order for the stream to attain selenium standards.

6. Big Dry Creek exceeds the recently assigned nitrate standard of 10 mg/L for five sampling events below the Broomfield and/or Westminster WWTPs. Compliance plans in the 2019 WWTP discharge permits are expected to address this issue in the next several years.

7. Big Dry Creek does not attain the interim warm water instream nitrogen "interim value" below municipal WWTP discharges (from the Broomfield WWTP to the South Platte River). As of 2022, the reach of stream between the Broomfield and Westminster WWTP meets the total phosphorus interim value but is elevated throughout the remainder of the downstream area. Although the nutrient interim values are not expected to be adopted as stream standards on the main stem of Big Dry Creek prior to December 31, 2027, addressing nutrient sources to Big Dry Creek continues to be an area of focus for BDCWA. More stringent CDPS permit limits with compliance schedules have been included in the 2019 permit renewal for the WWTPs. Under CWQCC Policy 17-1, a Voluntary Incentive Program for Early Nutrient Reductions was established. The Incentive Program allows enrolled WWTPs to accrue time under a post-2027 compliance schedule through trading or watershed nutrient reductions as part of its nutrient reduction plan. All three of the municipal WWTP dischargers are enrolled in this program.

8. Phosphorus concentrations and loads to Big Dry Creek have decreased significantly over time as a result of treatment plant upgrades at the Broomfield and Westminster WWTPs, along with reuse programs that continue to be implemented at these WWTPs. Phosphorus concentrations at bd6.0 in the lower watershed have decreased by 78 percent since 2003. Despite these substantial improvements, the stream does not yet meet the interim total phosphorus criteria from below the Westminster WWTP to the confluence with the South Platte River.

9. Aquatic life monitoring is conducted in even years for Big Dry Creek, so the most recent monitoring results are for 2022. Big Dry Creek does not show impairment of aquatic life uses in 2022, based on calculation of MMI scores in accordance with CWQCC's Aquatic Life Use Attainment Policy 10-1, EDAS Version 4. Scores were calculated at six biological monitoring locations for fall monitoring conducted during 2012, 2014, 2016, 2018, 2020 and 2022. MMI scores vary substantially, both temporally and spatially.

10. Stream flows were average during 2022 at the Fort Lupton gauge, but lower than average at the Westminster gauge. Stream flow is a significant factor influencing instream water quality and pollutant loads. WWTP discharges from Northglenn were higher than historic discharges.

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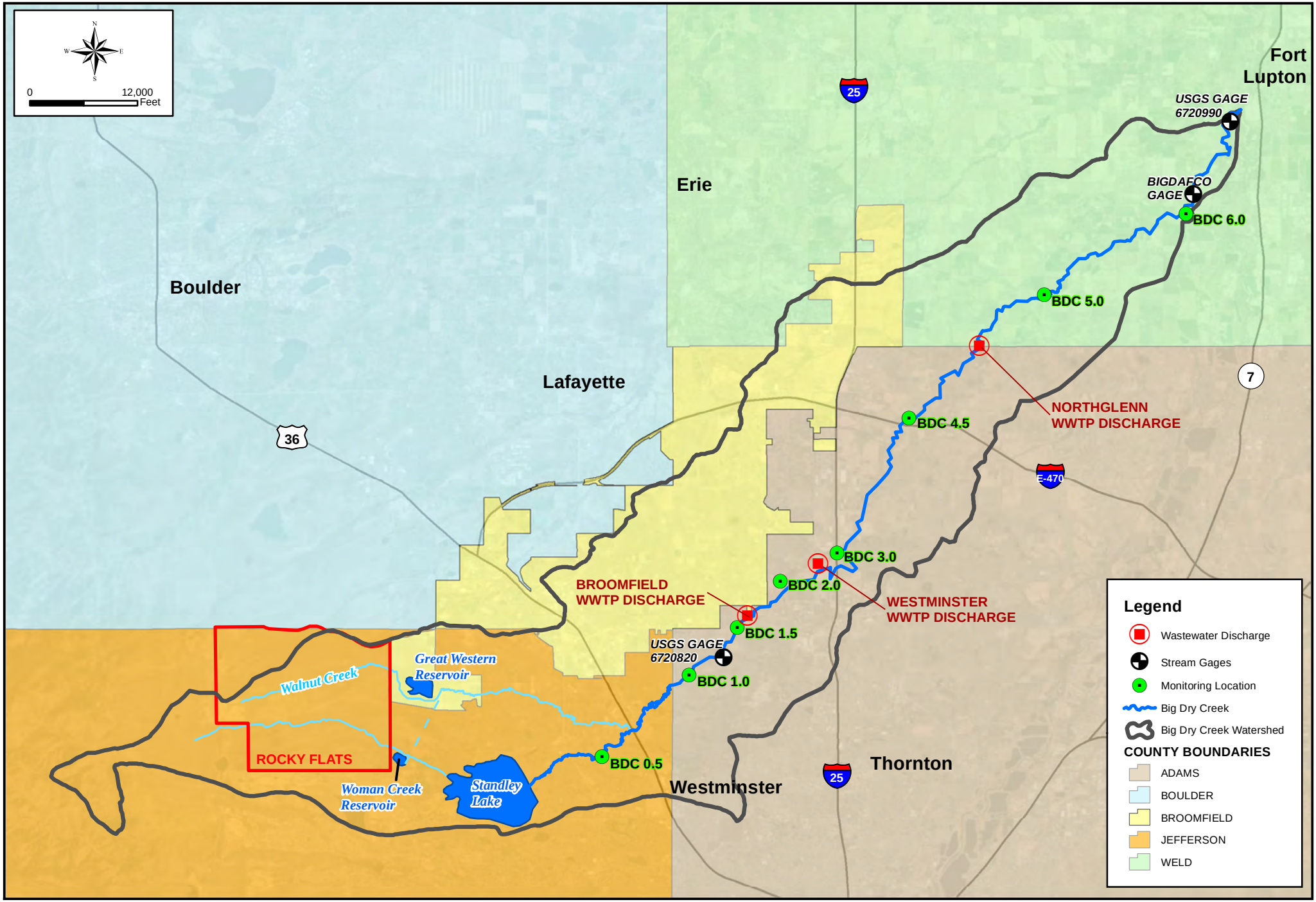
Appendix A. Supplemental Figures



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BIG DRY CREEK WATERSHED - KEY FEATURES AND MONITORING LOCATIONS

BIG DRY CREEK WATERSHED ASSOCIATION

PROJECT NO. 971-179.101

FIGURE 1

Appendix B. Big Dry Creek 2022 Instream Sampling Results

Appendix B. General Monthly Water Quality Parameters and Total Recoverable Iron

Monitoring Location ID	Activity Start Date	ALKALINITY (mg/L)	CALCIUM, Total (mg/L)	CHLORIDE, D (mg/L)	CHLOROPHYLL-a, corr_ (ug/L)	CHLOROPHYLL-a, uncor_ (ug/L)	CONDUCTIVITY (µS/cm)	DO (mg/L)	E_ coli (MPN/100 mL)	HARDNESS (mg/L)	MAGNESIUM, D (mg/L)	pH (SU)	POTASSIUM, D (mg/L)
bdc1.5	1/13/2022	275	178	666	1.6	3.7	3270	11.48	144	676	56.30	7.75	5.79
bdc2.0	1/13/2022	198	125	418	2.3	4.3	2321	12.07	172	475	39.50	7.70	7.98
bdc3.0	1/13/2022	147	107	253	1.8	3.4	1547	11.57	727	386	28.90	7.63	11.20
bdc4.5	1/13/2022	158	106	273	2.3	4.3	1727	12.79	156	400	32.80	7.74	10.60
bdc5.0	1/13/2022	170	108	270	2.4	5.1	1759	13.71	79	415	35.40	7.97	10.40
bdc6.0	1/13/2022	201	121	302	8.1	11.6	1977	15.36	72	465	39.60	8.01	9.14
bdc1.5	2/10/2022	234	140	840	3.1	5.2	3399	10.30	61	535	45.10	7.68	4.97
bdc2.0	2/10/2022	188	107	556	3.1	4.7	2331	8.82	517	416	36.20	7.70	7.49
bdc3.0	2/10/2022	154	96	362	2.4	4.0	1876	9.05	308	361	29.10	7.66	10.20
bdc4.5	2/10/2022	168	109	440	1.6	3.5	2129	10.33	345	414	34.50	7.88	9.83
bdc5.0	2/10/2022	188	108	418	1.9	4.3	2154	10.52	365	420	36.60	7.94	9.69
bdc6.0	2/10/2022	196	116	490	4.6	6.6	2394	11.50	130	461	41.60	7.99	9.02
bdc0.5	3/17/2022	64	36	308	3.1	6.7	1171	9.02	1046	123	7.78	7.66	3.44
bdc1.0	3/17/2022	128	80	793	20.8	32.1	2947	11.48	2420	233	7.92	7.63	3.51
bdc1.5	3/17/2022	204	88	745	19.8	30.0	2875	13.04	204	333	27.50	7.67	5.58
bdc2.0	3/17/2022	160	76	632	15.2	24.6	2516	12.08	866	296	25.80	7.22	6.57
bdc3.0	3/17/2022	160	94	556	14.4	22.5	2407	12.81	613	356	29.60	7.44	7.71
bdc4.5	3/17/2022	108	68	586	7.4	13.3	2345	12.99	1733	262	22.60	7.48	8.03
bdc5.0	3/17/2022	128	81	358	7.4	16.7	1828	20.15	1553	306	25.20	7.54	9.27
bdc6.0	3/17/2022	184	113	232	3.6	7.0	1679	14.88	1046	435	37.00	7.52	10.60
bdc1.0	4/14/2022	212	119	410	2.8	3.9	2313	13.97	17	462	40.00	7.72	4.39
bdc1.5	4/14/2022	202	103	220	2.4	3.4	1757	14.10	16	396	33.80	7.90	3.20
bdc2.0	4/14/2022	108	60	133	1.3	2.7	1115	12.24	34	232	20.20	7.47	11.00
bdc3.0	4/14/2022	106	67	144	2.5	4.3	1153	12.10	166	253	20.70	7.50	11.80
bdc4.5	4/14/2022	142	86	183	1.8	3.9	1473	13.28	86	334	28.80	7.93	11.20
bdc5.0	4/14/2022	160	90	182	ND	3.1	1541	13.29	61	358	32.00	8.19	10.20
bdc6.0	4/14/2022	162	100	204	3.3	4.6	1669	13.13	82	391	34.60	8.15	9.72
bdc0.5	5/12/2022	190	91	161	3.0	5.3	1417	9.05	179	357	31.50	7.50	4.02
bdc1.0	5/12/2022	220	133	392	11.2	16.2	2295	8.77	225	514	44.10	7.54	5.31
bdc1.5	5/12/2022	170	99	169	6.5	9.3	1460	9.06	15	368	29.50	7.54	3.53
bdc2.0	5/12/2022	154	89	196	1.4	2.1	1530	8.92	157	345	29.90	7.35	9.80
bdc3.0	5/12/2022	142	95	173	1.2	2.2	1485	9.11	308	358	29.50	7.32	11.90
bdc4.5	5/12/2022	192	126	217	ND	1.1	1853	12.63	19	485	41.40	7.86	9.91
bdc5.0	5/12/2022	194	128	199	ND	1.5	1849	13.65	77	495	42.60	7.95	10.30
bdc6.0	5/12/2022		117	170	1.7	3.1	1665	13.03	124	445	37.10	7.95	10.30
bdc0.5	6/2/2022	130	67	103	1.6	3.3	849	6.04	980	234	16.20	7.62	4.92
bdc1.0	6/2/2022	132	64	137	6.2	9.0	979	6.06	1046	232	17.20	7.41	4.67
bdc1.5	6/2/2022	138	74	163	7.0	10.3	1114	5.52	1120	264	19.20	7.40	4.77
bdc2.0	6/2/2022	134	71	152			1078	5.69	921	257	19.20	7.40	6.33
bdc3.0	6/2/2022	136	73	162	7.5	11.5	1192	6.20	866	276	22.80	7.34	7.67
bdc4.5	6/2/2022	146	79	169	5.7	9.1	1261	5.34	980	296	24.10	7.46	6.23
bdc5.0	6/2/2022	148	76	169	7.4	10.7	1288	5.26	1414	293	25.20	7.58	6.84
bdc6.0	6/2/2022	140	80	163	9.6	15.3	1263	6.18	1414	301	24.30	7.53	6.92
bdc0.5	7/14/2022	68	43	52	2.9	5.1	428	7.95	687	145	9.06	7.36	2.57
bdc1.0	7/14/2022	100	55	81	3.3	7.5	623	7.57	816	192	13.10	7.66	3.06
bdc1.5	7/14/2022	130	64	94	5.2	9.8	796	6.47	345	233	17.50	7.63	3.20
bdc2.0	7/14/2022	102	65	105	2.3	4.7	904	6.18	276	240	19.00	7.49	6.80
bdc3.0	7/14/2022	124	76	119	2.0	4.7	1078	6.65	517	287	23.50	7.65	7.96

Appendix B. General Monthly Water Quality Parameters and Total Recoverable Iron

Monitoring Location ID	Activity Start Date	ALKALINITY (mg/L)	CALCIUM, Total (mg/L)	CHLORIDE, D (mg/L)	CHLOROPHYLL-a, corr_ (ug/L)	CHLOROPHYLL-a, uncor_ (ug/L)	CONDUCTIVITY (µS/cm)	DO (mg/L)	E_ coli (MPN/100 mL)	HARDNESS (mg/L)	MAGNESIUM, D (mg/L)	pH (SU)	POTASSIUM, D (mg/L)
bdc4.5	7/14/2022	148	91	146	1.1	2.3	1277	7.93	69	346	28.80	7.82	9.26
bdc5.0	7/14/2022	168	102	156	3.5	5.6	1427	8.01	276	393	33.60	8.09	9.37
bdc6.0	7/14/2022	178	104	159	4.7	7.7	1430	8.46	613	393	32.40	7.94	10.10
bdc0.5	8/11/2022	108	52	58	ND	2.4	595	5.85	186.5	179	12.10	7.82	3.06
bdc1.0	8/11/2022	130	68	96	11.2	13.8	843	5.54	248	236	16.30	7.82	3.67
bdc1.5	8/11/2022	172	94	130	15.4	17.4	1156	6.11	206	331	23.50	7.94	3.80
bdc2.0	8/11/2022	130	76	120	5.7	7.2	1071	6.68	770	276	21.10	7.74	8.42
bdc3.0	8/11/2022	152	84	127	4.1	6.1	1204	5.95	140	314	25.40	7.87	7.85
bdc4.5	8/11/2022	170	91	141	ND	2.2	1330	7.10	222	345	28.60	8.05	7.55
bdc5.0	8/11/2022	148	90	141	1.7	2.9	1324	7.02	2420	340	27.80	8.06	9.03
bdc6.0	8/11/2022	160	95	145	2.6	4.7	1329	6.74		353	27.90	7.95	8.74
bdc0.5	9/15/2022	190	84	129	1.3	2.7	1170	7.57	110	312	25.10	7.57	4.19
bdc1.0	9/15/2022	188	106	197	7.5	10.2	1509	7.52	107	390	30.40	7.60	4.90
bdc1.5	9/15/2022	238	126	217	7.1	9.3	1784	7.66	79	469	37.40	7.65	4.41
bdc2.0	9/15/2022	162	93	161	2.8	5.5	1408	7.89	167	350	28.80	7.65	8.82
bdc3.0	9/15/2022	170	93	159	1.5	3.9	1458	8.04	727	355	29.80	7.70	8.96
bdc4.5	9/15/2022	168	96	156	ND	2.5	1456	11.87	99	362	29.80	8.14	9.84
bdc5.0	9/15/2022	158	94	154	2.4	4.4	1377	9.50	231	347	27.30	8.16	10.30
bdc6.0	9/15/2022	182	101	154	4.2	7.5	1434	9.22	225	372	29.10	7.87	9.60
bdc0.5	10/20/2022	260	139	247	ND	1.1	2030	9.41	25	536	45.90	7.53	4.22
bdc1.0	10/20/2022	242	148	273	2.7	4.6	2071	8.74	166	553	44.60	7.51	4.49
bdc1.5	10/20/2022	302	162	275	2.2	3.6	2304	8.05	39	624	53.40	7.46	3.89
bdc2.0	10/20/2022	150	89	154	ND	3.8	1352	7.54	152	337	27.70	7.41	10.00
bdc3.0	10/20/2022	136	84	135	1.0	4.3	1257	7.42	488	308	23.80	7.36	11.30
bdc4.5	10/20/2022	178	116	170	1.0	2.4	1567	9.71	79	431	34.40	7.78	9.76
bdc5.0	10/20/2022	176	114	162	ND	1.8	1543	8.31	197	425	34.10	7.64	9.92
bdc6.0	10/20/2022	188	100	148	3.6	6.0	1346	9.93	134	360	26.90	7.76	10.90
bdc1.5	11/17/2022	292	157	314	ND	1.6	2358	11.03	55	616	54.30	7.45	4.18
bdc2.0	11/17/2022	170	92	184	ND	1.7	1528	10.32	178	361	31.80	7.68	8.65
bdc3.0	11/17/2022	144	83	147	1.3	2.0	1338	11.46	921	312	25.60	7.59	10.90
bdc4.5	11/17/2022	172	100	200	1.1	2.6	1573	14.10	204	383	32.30	7.86	10.20
bdc5.0	11/17/2022	174	90	183	1.9	4.3	1476	15.32	109	354	31.20	7.97	10.60
bdc6.0	11/17/2022	188	106	198	2.0	4.5	1628	14.77	64	410	35.20	8.00	9.77
bdc1.5	12/8/2022	300	181	580	4.8	6.7	3175	5.50	16	699	60.10	7.90	4.46
bdc2.0	12/8/2022	180	111	306	1.4	3.1	1959	5.46	44	422	35.10	7.86	8.17
bdc3.0	12/8/2022	156	102	245	1.1	2.7	1674	5.96	727	376	29.50	7.86	10.50
bdc4.5	12/8/2022	145	109	210	ND	2.1	1530	4.56	108	395	29.80	7.83	10.80
bdc5.0	12/8/2022	161	107	200	1.6	3.4	1550	4.34	61	394	30.80	7.92	10.40
bdc6.0	12/8/2022	178	102	197	4.4	6.6	1574	4.17	49	387	32.20	7.87	9.44
Count		86	87	87	86	86	87	87	86	87	87	87	87
Min		64	36	52	ND	1.1	428	4.17	15.0	123	7.78	7.22	2.57
Max		302	181	840	20.8	32.1	3399	20.15	2420.0	699	60.10	8.19	11.90
Mean		168	97	248	3.9	6.6	1626	9.45	421.1	367	30.10	7.71	7.75
15th		130	73	135	1.0	2.4	1149	6.03	61.0	261	20.65	7.46	4.19
Median		162	95	183	2.4	4.6	1528	9.02	191.8	358	29.50	7.68	8.65
85th		199	119	411	7.4	10.4	2305	13.05	921.0	462	39.51	7.95	10.41

Appendix B. General Monthly Water Quality Parameters and Total Recoverable Iron

Monitoring Location ID	Activity Start Date	SODIUM, D (mg/L)	SULFATE, D (mg/L)	TDS (mg/L)	TEMPERATURE (°C)	TOC (mg/L)	TSS (mg/L)	TURBIDITY (NTU)	IRON, Trec (mg/L)	SELENIUM, D (µg/L)
bdc1.5	1/13/2022	484	494	2130	2.17	4.69	7.6	7.4	0.27	7.31
bdc2.0	1/13/2022	332	344	1420	4.80	5.69	14.8	9.2	0.40	6.46
bdc3.0	1/13/2022	210	262	971	9.28	7.58	10.4	5.7	ND	4.31
bdc4.5	1/13/2022	228	296	1080	6.61	7.04	16.8	9.9	0.48	5.47
bdc5.0	1/13/2022	229	331	1100	4.95	6.78	20.4	13.9	0.70	5.45
bdc6.0	1/13/2022	256	356	1240	4.43	6.87	28.8	15.3	0.59	6.16
bdc1.5	2/10/2022	549	388	2160	3.41	5.75	15.2	11.3	0.62	5.42
bdc2.0	2/10/2022	382	298	1590	5.13	5.49	15.6	8.6	0.56	5.82
bdc3.0	2/10/2022	262	261	1170	8.40	7.27	12.5	6.6	0.38	3.78
bdc4.5	2/10/2022	304	314	1370	6.88	6.96	21.6	13.8	0.85	5.31
bdc5.0	2/10/2022	305	340	1400	5.87	6.63	74.4	40.3	2.65	5.25
bdc6.0	2/10/2022	345	380	1550	5.84	8.46	33.6	15.5	1.10	6.13
bdc0.5	3/17/2022	175	54.1	637	4.11	8.94	20.0	36.1	1.49	ND
bdc1.0	3/17/2022	181	180	1620	3.88	8.77	230.0	133.0	6.53	3.08
bdc1.5	3/17/2022	437	204	1630	3.54	7.73	204.0	82.9	6.62	3.04
bdc2.0	3/17/2022	374	170	1410	4.48	8.07	184.0	101.0	5.49	3.68
bdc3.0	3/17/2022	342	266	1390	6.23	8.30	170.0	77.1	4.22	2.52
bdc4.5	3/17/2022	353	202	1310	4.77	8.88	244.0	118.0	7.01	2.08
bdc5.0	3/17/2022	247	274	1070	5.80	9.47	356.0	132.0	8.65	3.05
bdc6.0	3/17/2022	195	384	1090	5.05	7.64	101.0	61.5	6.23	4.52
bdc1.0	4/14/2022	294	422	1430	4.85	8.74	12.8	11.5	0.55	3.89
bdc1.5	4/14/2022	202	330	1090	4.43	5.69	12.6	10.6	0.56	5.31
bdc2.0	4/14/2022	116	166	679	6.98	7.77	6.6	3.6	0.25	1.82
bdc3.0	4/14/2022	119	185	710	9.67	8.55	12.2	5.3	0.33	2.28
bdc4.5	4/14/2022	159	266	938	7.81	8.02	3.8	2.3	ND	3.44
bdc5.0	4/14/2022	167	298	994	6.96	7.70	4.6	2.7	ND	4.02
bdc6.0	4/14/2022	182	334	1050	6.88	7.29	10.6	5.2	0.31	4.53
bdc0.5	5/12/2022	156	252	821	13.46	5.65	5.6	3.9	ND	
bdc1.0	5/12/2022	283	384	1330	15.02	9.20	64.4	28.6	1.63	
bdc1.5	5/12/2022	161	290	831	13.99	4.92	47.2	24.5	1.46	
bdc2.0	5/12/2022	171	262	888	15.02	8.26	6.2	3.1	ND	
bdc3.0	5/12/2022	158	290	858	16.62	8.60	10.6	3.3	0.25	
bdc4.5	5/12/2022	204	403	1140	15.96	7.94	2.4	2.6	ND	
bdc5.0	5/12/2022	205	411	1150	16.44	7.76	2.4	1.8	ND	
bdc6.0	5/12/2022	177	367	964	16.47	7.15	7.0	4.5	ND	
bdc0.5	6/2/2022	90.9	119	519	10.90	7.87	7.0	11.6	0.46	2.85
bdc1.0	6/2/2022	114	134	606	11.77	8.44	51.2	34.0	1.64	1.96
bdc1.5	6/2/2022	136	163	681	12.12	8.46	64.8	41.2	2.00	2.29
bdc2.0	6/2/2022	128	160	685	13.44	8.43	56.0	32.0	1.60	1.97
bdc3.0	6/2/2022	143	197	736	14.74	8.71	48.8	25.6	1.27	2.46
bdc4.5	6/2/2022	153	218	786	15.43	9.01	98.4	49.1	2.71	2.29
bdc5.0	6/2/2022	156	243	805	15.76	9.21	166.0	70.8	4.03	2.53
bdc6.0	6/2/2022	152	233	792	15.57	8.82	266.0	108.0	6.54	2.91
bdc0.5	7/14/2022	29.3	64.5	232	16.13	2.20	10.4	7.2	0.38	ND
bdc1.0	7/14/2022	53.4	103	355	19.76	3.26	49.4	27.5	1.59	1.24
bdc1.5	7/14/2022	75.8	142	488	20.20	3.49	61.6	30.8	2.00	2.25
bdc2.0	7/14/2022	90.8	153	550	21.10	5.24	20.0	16.2	0.93	2.97
bdc3.0	7/14/2022	115	204	743	24.01	6.02	36.0	19.5	1.17	3.22

Appendix B. General Monthly Water Quality Parameters and Total Recoverable Iron

Monitoring Location ID	Activity Start Date	SODIUM, D (mg/L)	SULFATE, D (mg/L)	TDS (mg/L)	TEMPERATURE (°C)	TOC (mg/L)	TSS (mg/L)	TURBIDITY (NTU)	IRON, Trec (mg/L)	SELENIUM, D (µg/L)
bdc4.5	7/14/2022	140	266	832	22.22	7.13	20.8	13.7	0.82	3.86
bdc5.0	7/14/2022	164	324	940	22.74	7.20	30.0	17.3	1.06	3.97
bdc6.0	7/14/2022	158	310	940	22.19	7.24	45.2	20.1	1.22	3.64
bdc0.5	8/11/2022	47	86	331	19.70	3.66	2.4	4.4	ND	1.95
bdc1.0	8/11/2022	79.9	138	537	21.70	5.66	30.0	21.8	1.19	3.31
bdc1.5	8/11/2022	119	212	743	20.50	6.01	56.8	33.1	1.98	3.37
bdc2.0	8/11/2022	109	186	655	21.10	7.02	26.4	16.4	0.85	2.74
bdc3.0	8/11/2022	128	236	768	21.20	7.33	36.8	19.3	1.26	3.95
bdc4.5	8/11/2022	143	276	861	22.00	7.13	33.2	18.5	1.24	5.26
bdc5.0	8/11/2022	140	284	873	22.90	7.55	65.6	22.7	1.97	3.01
bdc6.0	8/11/2022	138	279	861	22.20	7.24	125.0	54.6	3.42	2.77
bdc0.5	9/15/2022	116	200	699	14.66	4.33	ND	1.5	ND	3.50
bdc1.0	9/15/2022	155	288	929	16.52	7.51	30.0	18.1	1.09	3.43
bdc1.5	9/15/2022	193	365	1110	15.39	6.96	28.0	20.9	1.22	7.54
bdc2.0	9/15/2022	145	266	851	18.09	6.94	20.4	12.0	0.78	5.43
bdc3.0	9/15/2022	154	294	905	17.81	7.09	40.8	21.2	1.26	4.77
bdc4.5	9/15/2022	152	292	896	18.68	6.88	3.4	4.7	0.27	4.63
bdc5.0	9/15/2022	142	297	844	19.56	7.32	16.0	11.4	0.61	3.08
bdc6.0	9/15/2022	148	285	878	18.44	6.51	34.0	17.5	1.11	2.40
bdc0.5	10/20/2022	225	412	1260	7.09	5.09	ND	1.8	ND	4.69
bdc1.0	10/20/2022	235	413	1330	7.72	6.94	12.0	12.0	0.67	4.44
bdc1.5	10/20/2022	269	522	1520	8.29	5.99	14.8	13.8	0.80	8.86
bdc2.0	10/20/2022	146	253	827	12.26	6.25	20.4	13.3	0.83	4.12
bdc3.0	10/20/2022	133	221	782	13.84	7.61	25.2	12.5	0.67	4.10
bdc4.5	10/20/2022	172	326	1010	10.79	7.12	3.6	3.5	ND	5.24
bdc5.0	10/20/2022	167	349	990	12.01	7.10	5.6	4.7	ND	3.81
bdc6.0	10/20/2022	143	264	833	12.52	6.45	17.6	12.4	0.69	2.27
bdc1.5	11/17/2022	271	492	1560	2.15	6.70	3.2	5.3	0.29	6.62
bdc2.0	11/17/2022	172	284	961	6.08	6.84	12.0	9.8	0.57	3.95
bdc3.0	11/17/2022	143	228	802	7.74	7.11	13.2	6.8	0.38	3.30
bdc4.5	11/17/2022	182	289	984	6.10	7.19	9.2	7.4	0.35	4.59
bdc5.0	11/17/2022	166	303	941	4.71	7.04	12.0	9.7	0.50	3.94
bdc6.0	11/17/2022	183	334	1030	4.50	6.83	15.6	10.8	0.65	4.42
bdc1.5	12/8/2022	426	512	2100	3.48	5.72	5.8	6.6	0.33	7.95
bdc2.0	12/8/2022	234	298	1160	5.72	6.21	9.6	7.4	0.42	4.94
bdc3.0	12/8/2022	191	272	981	6.55	7.18	10.0	4.8	0.27	3.74
bdc4.5	12/8/2022	176	279	933	7.01	6.83	7.6	5.3	0.59	3.72
bdc5.0	12/8/2022	175	294	964	5.45	6.88	9.8	7.0	0.35	3.34
bdc6.0	12/8/2022	173	321	972	4.83	6.51	9.4	6.3	0.35	3.64
Count		87	87	87	87	87	87	87	87	79
Min		29	54	232	2.15	2.20	0.0	1.5	ND	ND
Max		549	522	2160	24.01	9.47	356.0	133.0	8.65	8.86
Mean		195	277	1007	11.65	7.01	43.5	22.9	1.34	3.89
15th		119	179	698	4.80	5.69	6.2	4.6	0.23	2.29
Median		167	284	940	10.90	7.12	17.6	12.4	0.67	3.74
85th		284	368	1391	19.80	8.46	64.9	36.5	2.00	5.42

Appendix B. Nutrients

Monitoring Location ID	Activity Start Date	AMMONIA, Total (mg/L)	NITROGEN, TOTAL (mg/L)	NO2 (mg/L)	NO3+NO2 (mg/L)	PHOSPHORUS, ORTHO AS P (mg/L)	PHOSPHORUS, TOTAL (mg/L)
bdc1.5	1/13/2022	0.20	2.71	0.03	1.89	0.01	0.06
bdc2.0	1/13/2022	0.55	8.13	0.17	6.59	0.02	0.09
bdc3.0	1/13/2022	0.12	7.92	0.16	6.68	0.06	0.19
bdc4.5	1/13/2022	0.19	7.63	0.28	6.58	0.07	0.18
bdc5.0	1/13/2022	0.10	6.72	0.08	5.42	0.08	0.18
bdc6.0	1/13/2022	0.06	5.76	0.05	4.97	0.09	0.20
bdc1.5	2/10/2022	0.10	1.92	0.02	1.36	0.01	0.10
bdc2.0	2/10/2022	0.49	6.08	0.17	5.09	0.02	0.14
bdc3.0	2/10/2022	0.14	6.59	0.27	5.09	0.05	0.19
bdc4.5	2/10/2022	0.09	5.71	0.30	4.67	0.07	0.21
bdc5.0	2/10/2022	0.11	5.37	0.15	4.06	0.07	0.28
bdc6.0	2/10/2022	0.05	4.39	0.05	3.69	0.10	0.18
bdc0.5	3/17/2022	0.17	1.37	0.03	0.57	0.07	0.24
bdc1.0	3/17/2022	0.23	2.32	0.03	0.55	0.02	0.38
bdc1.5	3/17/2022	0.14	1.84	0.02	0.39	0.02	0.40
bdc2.0	3/17/2022	0.20	3.49	0.04	1.92	0.03	0.39
bdc3.0	3/17/2022	0.17	4.70	0.05	3.02	0.04	0.53
bdc4.5	3/17/2022	0.29	4.72	0.07	3.06	0.12	0.84
bdc5.0	3/17/2022	0.23	6.51	0.11	4.63	0.12	0.93
bdc6.0	3/17/2022	0.02	6.30	0.03	4.63	0.12	0.50
bdc1.0	4/14/2022	ND	0.85	ND	0.18	ND	0.07
bdc1.5	4/14/2022	ND	1.51	0.01	1.11	ND	0.07
bdc2.0	4/14/2022	0.43	16.23	0.45	14.29	0.02	0.11
bdc3.0	4/14/2022	0.39	14.44	0.35	12.09	0.05	0.18
bdc4.5	4/14/2022	0.05	6.89	0.20	8.55	0.03	0.12
bdc5.0	4/14/2022	ND	8.81	0.07	7.54	0.02	0.09
bdc6.0	4/14/2022	ND	6.47	0.08	5.33	0.03	0.11
bdc0.5	5/12/2022	0.11	1.09	0.03	0.40	0.01	0.06
bdc1.0	5/12/2022	0.14	1.18	0.01	0.14	ND	0.15
bdc1.5	5/12/2022	0.16	1.33	0.03	0.80	0.01	0.09
bdc2.0	5/12/2022	0.50	9.84	0.20	8.40	0.03	0.11
bdc3.0	5/12/2022	0.14	6.33	0.09	5.50	0.51	0.65
bdc4.5	5/12/2022	0.02	4.39	0.08	3.61	0.21	0.29
bdc5.0	5/12/2022	0.03	4.53	0.13	3.81	0.17	0.26
bdc6.0	5/12/2022	0.02	3.63	0.06	2.97	0.19	0.25
bdc0.5	6/2/2022	ND	1.45	0.02	0.83	0.04	0.13
bdc1.0	6/2/2022	0.04	1.32	0.02	0.53	0.03	0.19
bdc1.5	6/2/2022	0.02	1.57	0.02	0.60	0.03	0.18
bdc2.0	6/2/2022	0.05	3.62	0.03	2.67	0.04	0.17
bdc3.0	6/2/2022	0.04	4.10	0.03	2.95	0.15	0.31
bdc4.5	6/2/2022	0.04	2.92	0.03	1.98	0.09	0.28
bdc5.0	6/2/2022	0.04	3.26	0.03	1.97	0.12	0.43
bdc6.0	6/2/2022	0.03	2.98	0.03	1.84	0.12	0.51
bdc0.5	7/14/2022	ND	0.39	ND	0.16	ND	0.08
bdc1.0	7/14/2022	ND	0.59	ND	0.19	0.01	0.16
bdc1.5	7/14/2022	0.03	0.83	ND	0.45	ND	0.16
bdc2.0	7/14/2022	0.05	6.04	0.05	5.56	0.02	0.10
bdc3.0	7/14/2022	0.17	7.18	0.10	6.88	0.11	0.24
bdc4.5	7/14/2022	0.23	6.09	0.16	5.55	0.22	0.33
bdc5.0	7/14/2022	ND	4.50	0.05	4.15	0.15	0.29

Appendix B. Nutrients

Monitoring Location ID	Activity Start Date	AMMONIA, Total (mg/L)	NITROGEN, TOTAL (mg/L)	NO2 (mg/L)	NO3+NO2 (mg/L)	PHOSPHORUS, ORTHO AS P (mg/L)	PHOSPHORUS, TOTAL (mg/L)
bdc6.0	7/14/2022	ND	4.70	0.06	4.11	0.16	0.30
bdc0.5	8/11/2022	0.05	0.63	ND	0.27	0.02	0.08
bdc1.0	8/11/2022	0.02	0.91	ND	0.28	ND	0.13
bdc1.5	8/11/2022	ND	1.34	ND	0.80	0.01	0.16
bdc2.0	8/11/2022	0.05	8.45	0.04	7.77	0.02	0.12
bdc3.0	8/11/2022	0.06	7.43	0.05	7.01	0.04	0.17
bdc4.5	8/11/2022	0.05	6.04	0.03	5.31	0.07	0.23
bdc5.0	8/11/2022	0.04	5.99	0.04	5.47	0.17	0.35
bdc6.0	8/11/2022	0.04	5.46	0.03	4.59	0.21	0.46
bdc0.5	9/15/2022	ND	1.19	0.02	0.74	ND	0.04
bdc1.0	9/15/2022	ND	1.10	ND	0.36	ND	0.20
bdc1.5	9/15/2022	ND	1.96	0.01	1.21	ND	0.10
bdc2.0	9/15/2022	0.03	9.30	0.02	8.59	0.02	0.18
bdc3.0	9/15/2022	0.05	8.79	0.03	7.94	0.18	0.32
bdc4.5	9/15/2022	0.02	7.81	0.03	6.95	0.26	0.35
bdc5.0	9/15/2022	0.02	7.56	0.05	6.01	0.13	0.22
bdc6.0	9/15/2022	0.02	5.99	0.04	4.90	0.16	0.28
bdc0.5	10/20/2022	ND	1.44		0.94	ND	0.06
bdc1.0	10/20/2022	ND	0.98		0.35	ND	0.09
bdc1.5	10/20/2022	ND	2.04		1.45	ND	0.09
bdc2.0	10/20/2022	ND	14.41		13.70	0.04	0.14
bdc3.0	10/20/2022	0.40	11.88		10.42	0.17	0.37
bdc4.5	10/20/2022	0.05	9.90		9.03	0.18	0.24
bdc5.0	10/20/2022	ND	7.73		6.51	0.13	0.27
bdc6.0	10/20/2022	ND	5.32		4.25	0.21	0.35
bdc1.5	11/17/2022	ND	1.69	ND	1.29	ND	0.11
bdc2.0	11/17/2022	ND	11.18	0.02	10.50	0.04	0.14
bdc3.0	11/17/2022	0.22	9.95	0.03	8.67	0.09	0.21
bdc4.5	11/17/2022	ND	9.00	0.05	7.90	0.09	0.18
bdc5.0	11/17/2022	ND	7.81	0.11	7.26	0.10	0.21
bdc6.0	11/17/2022	0.27	7.51	0.33	6.96	0.09	0.18
bdc1.5	12/8/2022	0.02	2.40	0.02	1.88	0.01	0.06
bdc2.0	12/8/2022	0.04	10.86	0.03	9.74	0.04	0.15
bdc3.0	12/8/2022	0.08	8.87	0.05	8.13	0.08	0.18
bdc4.5	12/8/2022	0.12	9.33	0.11	8.28	0.10	0.18
bdc5.0	12/8/2022	0.06	7.53	0.15	6.65	0.11	0.22
bdc6.0	12/8/2022	0.07	6.94	0.41	5.93	0.08	0.16
Count		87	87	79	87	87	87
Min		ND	0.39	ND	0.14	ND	0.04
Max		0.55	16.23	0.45	14.29	0.51	0.93
Mean		0.09	5.36	0.08	4.46	0.08	0.23
15th		ND	1.34	0.01	0.57	0.01	0.09
Median		0.05	5.46	0.04	4.59	0.05	0.18
85th		0.20	8.82	0.16	7.96	0.16	0.35

Appendix B. Metals

Monitoring Location ID	Activity Start Date	ARSENIC, Trec (µg/L)	BORON, Total (mg/L)	CADMIUM, D (µg/L)	CADMIUM, T (µg/L)	CHROMIUM, D (µg/L)	CHROMIUM, T (µg/L)	COPPER, D (µg/L)	CYANIDE, Total (µg/L)	IRON, D (ug/L)	LEAD, D (µg/L)	LEAD, T (µg/L)	MANGANESE, D (µg/L)	NICKEL, D (µg/L)	NICKEL, T (µg/L)	SILVER, D (µg/L)	ZINC, D (µg/L)
bdc0.5	3/17/2022	0.86	0.06	ND	ND	0.65	2.75	3.30	ND	114.30	0.54	1.78	85.20	0.96	2.31	ND	8.13
bdc1.0	3/17/2022	2.74	0.09	ND	0.21	0.39	8.38	2.34	ND	46.70	0.89	7.19	246.60	1.57	7.75	ND	12.30
bdc1.5	3/17/2022	2.71	0.10	ND	0.19	0.42	8.20	3.22	ND	38.00	0.26	6.59	254.70	1.72	7.48	ND	6.33
bdc2.0	3/17/2022	2.02	0.12	ND	0.16	0.28	6.81	3.51	ND	34.10	0.21	5.82	162.90	1.76	6.58	ND	5.58
bdc3.0	3/17/2022	1.40	0.16	0.06	0.13	0.30	5.40	4.25	ND	25.90	0.32	5.23	209.20	1.95	5.57	ND	11.50
bdc4.5	3/17/2022	2.54	0.14	0.06	0.20	0.46	8.94	4.70	ND	39.60	0.34	7.81	189.50	1.93	7.95	ND	17.60
bdc5.0	3/17/2022	2.71	0.17	0.06	0.20	0.33	10.40	4.29	ND	30.00	0.31	8.19	118.70	1.95	9.37	ND	21.90
bdc6.0	3/17/2022	2.29	0.27	0.11	0.30	0.13	7.14	4.58	ND	16.90	0.43	8.73	78.60	2.77	7.83	ND	41.80
bdc0.5	6/2/2022	0.90	0.08	ND	ND	0.13	0.66	2.82	ND	56.90	0.48	0.79	92.60	1.70	2.09	ND	2.44
bdc1.0	6/2/2022	1.57	0.10	ND	0.07	0.18	2.18	2.04	ND	55.10	0.22	2.45	64.90	1.95	3.28	ND	1.70
bdc1.5	6/2/2022	1.04	0.13	ND	0.07	0.15	2.50	2.15	ND	50.20	0.22	3.39	69.90	1.93	3.68	ND	1.97
bdc2.0	6/2/2022	1.24	0.15	ND	0.06	0.24	2.03	2.20	ND	44.00	0.22	2.18	53.90	1.98	3.22	ND	3.30
bdc3.0	6/2/2022	1.19	0.20	ND	0.05	0.18	1.62	2.17	ND	33.70	0.16	1.56	53.30	1.82	2.86	ND	9.95
bdc4.5	6/2/2022	1.69	0.19	ND	0.07	0.16	3.34	2.23	ND	38.40	0.20	3.13	60.50	2.14	4.27	ND	3.46
bdc5.0	6/2/2022	1.82	0.20	ND	0.12	0.14	4.52	2.76		39.70	0.22	4.75	58.80	2.26	5.48	ND	6.12
bdc6.0	6/2/2022	2.89	0.14	ND	0.21	0.14	7.06	2.13	ND	47.10	0.25	7.92	34.10	2.46	7.65	ND	4.47
bdc0.5	9/15/2022	0.67	0.14	ND	ND	ND	0.33	2.32		14.60	0.45	0.24	22.30	1.38	1.51	ND	ND
bdc1.0	9/15/2022	1.34	0.17	ND	0.05	ND	1.33	1.95		14.30	0.49	1.39	62.40	2.11	2.98	ND	ND
bdc1.5	9/15/2022	1.25	0.25	ND	ND	ND	1.57	2.41		40.60	0.49	1.36	64.90	37.70	3.16	ND	ND
bdc2.0	9/15/2022	0.82	0.26	ND	ND	ND	1.02	6.59		15.20	0.48	0.87	32.50	2.28	2.91	ND	2.85
bdc3.0	9/15/2022	1.02	0.28	ND	0.05	ND	1.47	7.24		13.10	0.49	1.49	80.40	2.38	3.31	ND	5.13
bdc4.5	9/15/2022	1.04	0.30	ND	ND	ND	0.55	2.35		8.49	0.51	0.45	31.10	2.40	2.68	ND	7.93
bdc5.0	9/15/2022	0.95	0.33	ND	ND	ND	0.81	7.52		10.70	0.56	0.87	13.40	5.14	2.81	ND	12.40
bdc6.0	9/15/2022	1.47	0.32	0.09	0.13	ND	1.48	2.06		9.36	0.58	1.97	18.90	2.87	3.84	ND	6.38
bdc1.5	12/8/2022	0.78	0.28	ND	ND	0.11	0.36	5.70	ND	15.30	ND	0.52	103.90	2.72	2.47	ND	8.69
bdc2.0	12/8/2022	0.55	0.23	ND	ND	0.12	0.54	7.75	ND	27.40	ND	0.38	40.40	2.36	2.57	ND	16.50
bdc3.0	12/8/2022	0.45	0.26	ND	ND	0.28	1.55	7.54	ND	26.30	0.14	0.35	55.50	1.89	1.99	ND	36.50
bdc4.5	12/8/2022	0.56	0.27	ND	ND	0.22	0.44	7.38	ND	22.30	0.15	0.36	30.80	2.03	2.08	ND	34.00
bdc5.0	12/8/2022	0.66	0.29	ND	ND	0.19	0.52	9.06	ND	23.20	0.18	0.51	22.80	2.23	2.44	ND	34.10
bdc6.0	12/8/2022	0.77	0.31	ND	0.13	0.19	0.52	4.91	ND	18.40	0.16	0.69	32.10	2.64	2.78	ND	25.60
Count		30	30	30	30	30	30	30	21	30	30	30	30	30	30	30	30
Min		0.45	0.06	ND	ND	ND	0.33	1.95	ND	8.49	ND	0.24	13.40	0.96	1.51	ND	ND
Max		2.89	0.33	0.11	0.30	0.65	10.40	9.06	ND	114.30	0.89	8.73	254.70	37.70	9.37	ND	41.80
Mean		1.40	0.20	0.01	0.08	0.18	3.15	4.12	ND	32.33	0.33	2.97	81.49	3.37	4.16	ND	11.62
15th		0.70	0.11	ND	ND	ND	0.53	2.16	ND	14.41	0.16	0.47	30.91	1.73	2.36	ND	2.13
Median		1.22	0.20	ND	0.06	0.16	1.60	3.26	ND	28.70	0.28	1.67	61.45	2.07	3.19	ND	7.16
85th		2.45	0.29	0.04	0.19	0.32	7.11	7.33	ND	46.96	0.50	6.98	147.43	2.69	7.59	ND	24.31

Appendix B. Mercury Data

Monitoring Location ID	Activity Start Date	MERCURY, Trec (µg/L)
bdc1.5	2/4/2022	0.0011
bdc1.5	5/19/2022	0.0018
bdc1.5	12/6/2022	0.0028
Count		3
Min		0.0011
Max		0.0028
Mean		0.0019
15th		0.0013
Median		0.0018
85th		0.0025

Appendix C. Big Dry Creek 2022 Quality Control (QC) Samples

Sample Location	Activity Start Date	Characteristic Name	SampleFraction	Units	Field Duplicate	Routine Sample	Relative Percent Difference	Comments
bdc1.5	6/2/2022	Iron	Total Rec.	mg/L	1.97	2.00	2%	
bdc1.5	6/2/2022	Selenium	Dissolved	ug/L	2.45	2.29	7%	
bdc1.5	12/8/2022	Selenium	Dissolved	ug/L	6.37	7.95	22%	1 ug/L MDL
bdc2.0	3/17/2022	Ammonia	Total	mg/L	0.21	0.20	5%	
bdc2.0	3/17/2022	Nitrogen	Total	mg/L	3.74	3.49	7%	
bdc2.0	3/17/2022	NO3+NO2		mg/L	1.98	1.92	3%	
bdc2.0	3/17/2022	Phosphorus	Total	mg/L	0.46	0.39	16%	
bdc2.0	6/2/2022	Ammonia	Total	mg/L	0.03	0.05	50%	Results between MRL (0.05) and MDL (0.02)
bdc2.0	6/2/2022	E. coli		mg/L	816	921	12%	
bdc2.0	6/2/2022	Nitrogen	Total	mg/L	3.58	3.62	1%	
bdc2.0	6/2/2022	NO3+NO2		mg/L	2.66	2.67	0%	
bdc2.0	6/2/2022	Phosphorus	Total	mg/L	0.15	0.17	9%	
bdc2.0	9/15/2022	Ammonia	Total	mg/L	0.03	0.03	0%	
bdc2.0	9/15/2022	Nitrogen	Total	mg/L	9.19	9.30	1%	
bdc2.0	9/15/2022	NO3+NO2		mg/L	8.95	8.59	4%	
bdc2.0	9/15/2022	Phosphorus	Total	mg/L	0.13	0.18	33%	0.01 mg/L MDL
bdc2.0	12/8/2022	Ammonia	Total	mg/L	0.04	0.04	0%	
bdc2.0	12/8/2022	E. coli		mg/L	46	44	4%	
bdc2.0	12/8/2022	Nitrogen	Total	mg/L	10.68	10.86	2%	
bdc2.0	12/8/2022	NO3+NO2		mg/L	9.85	9.74	1%	
bdc2.0	12/8/2022	Phosphorus	Total	mg/L	0.09	0.15	47%	0.01 mg/L MDL
bdc5.0	3/17/2022	Chlorophyll-a		mg/L	13.70	16.70	20%	
bdc5.0	3/17/2022	Chlorophyll-a, corrected		mg/L	7.60	7.40	3%	
bdc5.0	9/15/2022	Alkalinity, Total	Total	mg/L	162	158	3%	
bdc5.0	9/15/2022	Ammonia	Total	mg/L	0.02	0.02	0%	
bdc5.0	9/15/2022	Arsenic	Total Rec.	mg/L	0.96	0.95	1%	
bdc5.0	9/15/2022	Boron	Total	mg/L	0.31	0.33	6%	
bdc5.0	9/15/2022	Cadmium	Dissolved	mg/L	0.00	0.00	NA	
bdc5.0	9/15/2022	Cadmium	Total	mg/L	0.00	0.00	NA	
bdc5.0	9/15/2022	CALCIUM	Total	mg/L	98.00	94.00	4%	
bdc5.0	9/15/2022	TOC	Total	mg/L	7.24	7.32	1%	
bdc5.0	9/15/2022	CHLORIDE	Dissolved	mg/L	150.00	154.00	3%	
bdc5.0	9/15/2022	Chlorophyll-a		mg/L	4.60	4.40	4%	
bdc5.0	9/15/2022	Chlorophyll-a, corrected		mg/L	2.70	2.40	12%	
bdc5.0	9/15/2022	Chromium	Dissolved	mg/L	0.09	0.00	NA	0.09 ug/L detection limit
bdc5.0	9/15/2022	Chromium	Total	mg/L	0.84	0.81	5%	
bdc5.0	9/15/2022	Copper	Dissolved	mg/L	3.75	7.52	67%	0.1 ug/L MDL
bdc5.0	9/15/2022	HARDNESS, CA,MG		mg/L	357.13	347.14	3%	
bdc5.0	9/15/2022	Iron	Dissolved	ug/L	7.63	10.70	33%	0.3 ug/L MDL
bdc5.0	9/15/2022	Iron	Total Rec.	mg/L	0.64	0.61	5%	
bdc5.0	9/15/2022	Lead	Dissolved	ug/L	0.55	0.56	0%	
bdc5.0	9/15/2022	Lead	Total	ug/L	0.94	0.87	8%	
bdc5.0	9/15/2022	MAGNESIUM	Dissolved	mg/L	27.30	27.30	0%	
bdc5.0	9/15/2022	Manganese	Dissolved	ug/L	13.40	13.40	0%	
bdc5.0	9/15/2022	Nickel	Dissolved	ug/L	2.35	5.14	74%	0.1 ug/L MDL
bdc5.0	9/15/2022	Nickel	Total	ug/L	2.89	2.81	3%	
bdc5.0	9/15/2022	Nitrogen	Total	mg/L	7.49	7.56	1%	
bdc5.0	9/15/2022	NO2	Dissolved	mg/L	0.05	0.05	0%	
bdc5.0	9/15/2022	NO3+NO2		mg/L	6.05	6.01	1%	
bdc5.0	9/15/2022	Phosphorus	Total	mg/L	0.25	0.22	12%	
bdc5.0	9/15/2022	Phosphorus, Ortho as P	Dissolved	mg/L	0.14	0.13	6%	
bdc5.0	9/15/2022	POTASSIUM	Dissolved	mg/L	10.20	10.30	1%	
bdc5.0	9/15/2022	Selenium	Dissolved	ug/L	3.80	3.08	21%	1 ug/L MDL
bdc5.0	9/15/2022	Silver	Dissolved	ug/L	0.00	0.00	NA	
bdc5.0	9/15/2022	SODIUM	Dissolved	mg/L	141.00	142.00	1%	
bdc5.0	9/15/2022	TDS		mg/L	853.00	844.00	1%	
bdc5.0	9/15/2022	SULFATE	Dissolved	mg/L	287.00	297.00	3%	
bdc5.0	9/15/2022	TSS	Total	mg/L	16.40	16.00	2%	
bdc5.0	9/15/2022	TURBIDITY	Total	mg/L	14.10	11.40	21%	
bdc5.0	9/15/2022	Zinc	Dissolved	ug/L	12.60	12.40	2%	

Appendix C. Big Dry Creek 2022 QC Samples
Field Blanks

Monitoring Location ID	Activity Start Date	Characteristic Name	Method Species	SampleFraction	Use Result Value	Result Unit	Flag	Result Analytical Method ID	Result Analytical Method Context	Analysis Start Date	Minimum Level / Lower Reporting Level (ML/LRL)	Method Detection Limit (MDL)	Result Detection Limit Unit	Laboratory
bdc6.0 FB	3/17/2022	Alkalinity, Total		Total	2	mg/L							mg/L	City of Northglenn
bdc2.0 FB	3/17/2022	Ammonia	as N	Total	0.02	mg/L	U	Timberline-NH3	Timberline	3/17/2022	0.05	0.02	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	Ammonia	as N	Total	0.02	mg/L	U	Timberline-NH3	Timberline	3/17/2022	0.05	0.02	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	Arsenic		Total Recoverable	0.07	ug/L	U	200.8	USEPA	7/18/2022	0.10	0.07	ug/L	Broomfield
bdc6.0 FB	3/17/2022	Boron		Total	0.01	mg/L	U	200.7	USEPA	3/22/2022	0.01	0.01	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	Cadmium		Dissolved	0.05	ug/L	U	200.8	USEPA	5/2/2022	0.10	0.05	ug/L	Broomfield
bdc6.0 FB	3/17/2022	Cadmium		Total	0.05	ug/L	U	200.8	USEPA	7/18/2022	0.10	0.05	ug/L	Broomfield
bdc6.0 FB	3/17/2022	CALCIUM		TOTAL	1	mg/L	U				1.00	1.00	mg/L	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	CARBON, TOTAL ORGANIC		TOTAL	0.30	mg/L					0.25	0.25	mg/L	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	CHLORIDE		DISSOLVED	0.5	mg/L	U				0.50	0.50	mg/L	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	Chlorophyll-a		NS	1	ug/L	U						ug/L	City of Northglenn
bdc6.0 FB	3/17/2022	Chlorophyll-a, corrected		NS	1	ug/L	U						ug/L	City of Northglenn
bdc6.0 FB	3/17/2022	Chromium		Dissolved	0.09	ug/L	U	200.8	USEPA	5/2/2022	0.10	0.09	ug/L	Broomfield
bdc6.0 FB	3/17/2022	Chromium		Total	0.17	ug/L		200.8	USEPA	7/18/2022	0.10	0.09	ug/L	Broomfield
bdc6.0 FB	3/17/2022	Conductivity		NS	5	uS/cm							uS/cm	City of Northglenn
bdc6.0 FB	3/17/2022	Copper		Dissolved	0.29	ug/L		200.8	USEPA	5/2/2022	0.10	0.10	ug/L	Broomfield
bdc6.0 FB	3/17/2022	Cyanide, Total		Total	0.005	ug/L	U						ug/L	City of Northglenn
bdc6.0 FB	3/17/2022	E. coli		NS	1	MPN/100 mL	U					1.00	MPN/100 mL	City of Thornton
bdc6.0 FB	3/17/2022	Iron		Dissolved	10.30	ug/L		200.8	USEPA	5/2/2022	1.00	0.30	ug/L	Broomfield
bdc6.0 FB	3/17/2022	IRON		TOTAL RECOVERABLE	0.25	mg/L	U				0.25	0.05	mg/L	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	Lead		Dissolved	0.46	ug/L		200.8	USEPA	5/2/2022	0.10	0.10	ug/L	Broomfield
bdc6.0 FB	3/17/2022	Lead		Total	0.15	ug/L		200.8	USEPA	7/18/2022	0.10	0.10	ug/L	Broomfield
bdc6.0 FB	3/17/2022	MAGNESIUM		DISSOLVED	1	mg/L	U				1.00	1.00	mg/L	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	Manganese		Dissolved	0.1	ug/L	U	200.8	USEPA	5/2/2022	0.10	0.10	ug/L	Broomfield
bdc6.0 FB	3/17/2022	Nickel		Dissolved	0.1	ug/L	U	200.8	USEPA	5/2/2022	0.10	0.10	ug/L	Broomfield
bdc6.0 FB	3/17/2022	Nickel		Total	0.1	ug/L	U	200.8	USEPA	7/18/2022	0.10	0.10	ug/L	Broomfield
bdc2.0 FB	3/17/2022	Nitrogen	as N	Total	0.03	mg/L	U	Timberline-TN	Timberline	3/18/2022	0.10	0.02	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	Nitrogen	as N	Total	0.03	mg/L	U	Timberline-TN	Timberline	3/18/2022	0.10	0.02	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	NITROGEN, NITRITE (NO2)		DISSOLVED	0.01	mg/L	U				0.01	0.01	mg/L	Broomfield Env. Lab
bdc2.0 FB	3/17/2022	NO3+NO2	as N	NS	0.02	mg/L	U	Timberline-NO5	Timberline	3/17/2022	0.05	0.02	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	NO3+NO2	as N	NS	0.08	mg/L		Timberline-NO5	Timberline	3/17/2022	0.05	0.02	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	Oxygen, Dissolved		NS	9.07	mg/L							mg/L	City of Northglenn
bdc6.0 FB	3/17/2022	pH		NS	8	SU							SU	City of Northglenn
bdc2.0 FB	3/17/2022	Phosphorus	as P	Total	0.07	mg/L		10-115-01-1-E	Lachat	3/18/2022	0.01	0.01	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	Phosphorus	as P	Total	0.05	mg/L		10-115-01-1-E	Lachat	3/18/2022	0.01	0.01	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	PHOSPHORUS, ORTHOPHOSPHATE AS P		DISSOLVED	0.01	mg/L	U				0.01	0.01	mg/L	Broomfield Env. Lab

Appendix C. Big Dry Creek 2022 QC Samples
Field Blanks

Monitoring Location ID	Activity Start Date	Characteristic Name	Method Species	SampleFraction	Use Result Value	Result Unit	Flag	Result Analytical Method ID	Result Analytical Method Context	Analysis Start Date	Minimum Level / Lower Reporting Level (ML/LRL)	Method Detection Limit (MDL)	Result Detection Limit Unit	Laboratory
bdc6.0 FB	3/17/2022	POTASSIUM		DISSOLVED	0.5	mg/L	U				0.50	0.50	mg/L	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	Selenium		Dissolved	1	ug/L	U	200.8	USEPA	5/2/2022	1.00	1.00	ug/L	Broomfield
bdc6.0 FB	3/17/2022	Silver		Dissolved	0.05	ug/L	U	200.8	USEPA	5/2/2022	0.05	0.05	ug/L	Broomfield
bdc6.0 FB	3/17/2022	SODIUM		DISSOLVED	1	mg/L	U				1.00	1.00	mg/L	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	SOLIDS, DISSOLVED		FILTERABLE	10.00	mg/L					10.00	1.00	mg/L	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	SULFATE		DISSOLVED	1	mg/L	U				1.00	1.00	mg/L	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	Temperature		NS	9.73	C							C	City of Northglenn
bdc6.0 FB	3/17/2022	TSS		Total	2	mg/L	U	2540-D	SM	3/18/2022	2.00	2.00	mg/L	City of Westminster
bdc6.0 FB	3/17/2022	TURBIDITY		TOTAL	0.19	NTU					0.10	0.10	NTU	Broomfield Env. Lab
bdc6.0 FB	3/17/2022	Zinc		Dissolved	1.69	ug/L		200.8	USEPA	5/2/2022	1.00	1.00	ug/L	Broomfield
bdc2.0 FB	9/15/2022	Ammonia	as N	Total	0.02	mg/L	U	Timberline-NH3	Timberline	9/18/2022	0.05	0.02	mg/L	City of Westminster
bdc2.0 FB	9/15/2022	Nitrogen	as N	Total	0.03	mg/L	U	Timberline-TN	Timberline	9/16/2022	0.10	0.02	mg/L	City of Westminster
bdc2.0 FB	9/15/2022	NO3+NO2	as N	NS	0.02	mg/L	U	Timberline-NO5	Timberline	9/18/2022	0.05	0.02	mg/L	City of Westminster
bdc2.0 FB	9/15/2022	Phosphorus	as P	Total	0.02	mg/L		10-115-01-1-E	Lachat	9/30/2022	0.01	0.01	mg/L	City of Westminster

Appendix D. 2022 WWTP Discharge Samples for Broomfield, Westminster and Northglenn Collected for CDPS Discharge Monitoring Reports

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster

City of Westminster - Big Dry Creek Wastewater Treatment Facility - 2022

Date	E004 Eff Flow MG	E004 Eff Alk mg/L	E004 Eff BOD < mg/L	E004 Eff TSS < mg/L	E004 Eff BOD < pounds	E004 Eff TSS < pounds	E004 Eff E. coli #/100ml	E004 Eff NH3 mg/L < Timberline	E004 Eff NO2+NO3 mg/L Lachat	E004 Eff TIN mg/L Timberline (ATP)	E004 Eff TIN calculated $NH3_{Timberline}$ +$NO5_{Lachat}$	E004 Eff TN (Timberline) mg/L
12/26/2021	5.87							0.39	6.50	6.71	6.89	
12/27/2021	5.76			7.4				0.15	5.88	5.92	6.03	
12/28/2021	5.62		7.02					0.14	5.39	5.65	5.53	
12/29/2021	5.56						4.1	0.15	6.33	6.60	6.48	
12/30/2021	5.78							0.16	6.56	6.86	6.72	
12/31/2021	5.70											
1/1/2022	5.63											
1/2/2022	6.07							1.08	7.85	8.87	8.93	
1/3/2022	5.99			10.6			20.1	0.75	6.47	7.54	7.22	
1/4/2022	5.94		9.10					0.30	6.51	6.84	6.81	
1/5/2022	5.64		10.80					0.16	6.69	6.87	6.85	
1/6/2022	5.54							0.29	7.13	7.38	7.42	
1/7/2022	6.00											
1/8/2022	6.13											
1/9/2022	6.13							0.80	6.00	6.79	6.80	
1/10/2022	5.83							0.29	5.73	6.09	6.02	
1/11/2022	5.76		10.50					0.12	5.61	5.92	5.73	
1/12/2022	5.91		9.48					0.16	6.18	6.48	6.34	
1/13/2022	5.95			9.4			8.6	0.17	6.56	6.74	6.73	9.05
1/14/2022	5.73											
1/15/2022	6.05											
1/16/2022	6.21			9.4				0.62	6.06	6.50	6.68	
1/17/2022	6.20						2.0	0.40	5.68	6.05	6.08	
1/18/2022	5.80		5.97					0.12	5.26	5.52	5.38	
1/19/2022	5.28		4.41					0.11	6.11	6.41	6.22	
1/20/2022	5.60							0.12	6.55	6.73	6.67	
1/21/2022	5.55											
1/22/2022	5.93											
1/23/2022	6.28							0.61	5.78	6.66	6.39	
1/24/2022	5.90			5.8				0.20	5.28	5.77	5.48	
1/25/2022	5.60		5.08					0.09	5.45	5.78	5.54	
1/26/2022	5.68		4.94				21.3	0.12	5.90	6.36	6.02	
1/27/2022	5.62							0.11	6.12	6.57	6.23	
1/28/2022	5.80											
1/29/2022	6.16											
1/30/2022	6.38							0.86	5.53	6.65	6.39	
1/31/2022	6.04			6.6			6.3	0.33	5.27	5.96	5.60	
2/1/2022	5.59		5.21					0.12	5.80	6.10	5.92	
2/2/2022	5.71		5.42					0.42	6.40	6.88	6.82	
2/3/2022	5.63							0.33	6.50	6.97	6.83	
2/4/2022	5.62											
2/5/2022	6.18											

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff Flow MG	E004 Eff Alk mg/L	E004 Eff BOD < mg/L	E004 Eff TSS < mg/L	E004 Eff BOD < pounds	E004 Eff TSS < pounds	E004 Eff E. coli #/100ml	E004 Eff NH3 mg/L < Timberline	E004 Eff NO2+NO3 mg/L Lachat	E004 Eff TIN mg/L Timberline (ATP)	E004 Eff TIN calculated $NH3_{Timberline}$ +$NO5_{Lachat}$	E004 Eff TN (Timberline) mg/L
2/6/2022	6.29							0.64	5.11	6.01	5.75	
2/7/2022	6.06							0.20	4.79	5.20	4.99	
2/8/2022	6.09		6.53					0.09	5.10	5.29	5.19	
2/9/2022	6.06		5.14					0.10	5.39	5.68	5.49	
2/10/2022	6.11			7.0			6.3	0.10	5.70	5.96	5.80	6.96
2/11/2022	5.87											
2/12/2022	6.20											
2/13/2022	6.65			9.6				0.85	5.65	6.71	6.50	
2/14/2022	6.21						6.3	0.25	5.26	5.77	5.51	
2/15/2022	6.03		6.68					0.06	5.07	5.39	5.13	
2/16/2022	5.79		6.43					0.07	5.60	5.96	5.67	
2/17/2022	5.97							0.19	5.69	6.15	5.88	
2/18/2022	6.11											
2/19/2022	6.42											
2/20/2022	6.61		5.10					0.48	5.13	5.92	5.61	
2/21/2022	6.34			4.2				0.25	5.04	5.57	5.29	
2/22/2022	5.88		4.06					0.11	5.36	5.79	5.47	
2/23/2022	5.88							0.14	5.88	6.09	6.02	
2/24/2022	5.89							0.17	6.02	6.22	6.19	
2/25/2022	5.82						25.3					
2/26/2022	6.17											
2/27/2022	6.67							0.76	5.44	6.31	6.20	
2/28/2022	6.27			6.6				0.26	5.14	5.37	5.40	
3/1/2022	6.27		3.66				21.6	0.11	5.39	5.58	5.50	
3/2/2022	6.43		4.15					0.15	5.93	5.91	6.08	
3/3/2022	6.38							0.13	6.09	6.27	6.22	
3/4/2022	6.28											
3/5/2022	6.17											
3/6/2022	6.40							0.61	6.47	7.14	7.08	
3/7/2022	6.02							0.19	6.22	6.32	6.41	
3/8/2022	5.96		4.22	5.0			26.5	J 0.04	6.49	6.60	6.53	
3/9/2022	5.91		5.09					0.11	7.40	7.48	7.51	
3/10/2022	5.82							0.13	7.93	8.09	8.06	
3/11/2022	6.04											
3/12/2022	6.68											
3/13/2022	6.92							0.37	7.04	7.28	7.41	
3/14/2022	6.49							0.08	6.47	6.67	6.55	
3/15/2022	6.46		4.84					J 0.03	7.14	6.87	7.17	
3/16/2022	6.44		3.89					0.06	7.64	7.66	7.70	
3/17/2022	6.78			5.5			8.6	0.20	7.86	7.81	8.06	10.02
3/18/2022	6.68											
3/19/2022	6.93											
3/20/2022	7.03			6.3				0.40	6.70	7.18	7.10	
3/21/2022	6.44							0.14	6.49	6.60	6.63	
3/22/2022	6.23		4.75					0.07	6.97	6.97	7.04	

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff Flow MG	E004 Eff Alk mg/L	E004 Eff BOD < mg/L	E004 Eff TSS < mg/L	E004 Eff BOD < pounds	E004 Eff TSS < pounds	E004 Eff E. coli #/100ml	E004 Eff NH3 mg/L < Timberline	E004 Eff NO2+NO3 mg/L Lachat	E004 Eff TIN mg/L Timberline (ATP)	E004 Eff TIN calculated $NH3_{Timberline}$ +$NO5_{Lachat}$	E004 Eff TN (Timberline) mg/L
3/23/2022	6.46		5.38					0.10	7.43	7.57	7.53	
3/24/2022	6.40						5.2	0.08	7.63	7.70	7.71	
3/25/2022	6.48											
3/26/2022	6.69											
3/27/2022	6.94							0.55	7.34	7.86	7.89	
3/28/2022	6.73			6.6				0.21	6.98	7.29	7.19	
3/29/2022	6.48		5.55					0.10	7.31	7.39	7.41	
3/30/2022	6.30		4.28				13.4	0.14	8.55	8.99	8.69	
3/31/2022	6.35							0.15	8.87	9.48	9.02	
4/1/2022	6.32											
4/2/2022	6.44											
4/3/2022	6.77							0.66	6.95	8.04	7.61	
4/4/2022	6.38			6.0				0.25	6.61	7.25	6.86	
4/5/2022	6.33		3.63					0.10	6.78	7.23	6.88	
4/6/2022	6.15		3.76				16.0	0.16	7.76	8.56	7.92	
4/7/2022	6.19							0.19	8.39	8.79	8.58	
4/8/2022	6.21											
4/9/2022	6.55											
4/10/2022	6.84		4.58					1.07	7.78	9.05	8.85	
4/11/2022	6.41							0.66	7.54	8.44	8.20	
4/12/2022	6.57		2.99					0.51	7.94	8.78	8.45	
4/13/2022	6.14							0.49	8.84	9.20	9.33	
4/14/2022	6.18			5.8			5.2	0.57	9.63	10.68	10.20	12.16
4/15/2022	6.31											
4/16/2022	6.54											
4/17/2022	6.71			6.2				0.86	6.90	8.26	7.76	
4/18/2022	6.34							0.45	6.59	7.41	7.04	
4/19/2022	6.34		6.17				9.8	0.18	6.88	6.89	7.06	
4/20/2022	6.33		4.09					0.17	7.45	7.45	7.62	
4/21/2022	6.26							0.18	7.90	8.01	8.08	
4/22/2022	6.36											
4/23/2022	6.76											
4/24/2022	6.72							0.51	7.37	7.88	7.88	
4/25/2022	5.82			8.4				0.20	6.98	6.99	7.18	
4/26/2022	6.96							0.08	6.87	6.76	6.95	
4/27/2022	6.43		4.45				6.2	0.06	7.08	7.02	7.14	
4/28/2022	4.96		3.63					0.07	7.22	6.77	7.29	
4/29/2022	7.26											
4/30/2022	5.69											
5/1/2022	7.28							0.45	6.69	7.49	7.14	
5/2/2022	5.65			4.8				0.16	6.53	7.02	6.69	
5/3/2022	4.59							0.07	6.97	7.28	7.04	
5/4/2022	4.88		3.80					0.09	7.31	7.51	7.40	
5/5/2022	5.15		3.36				13.2	0.08	7.26	7.57	7.34	
5/6/2022	5.04											

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Date	E004 Eff Flow MG	E004 Eff Alk mg/L	E004 Eff BOD < mg/L	E004 Eff TSS < mg/L	E004 Eff BOD < pounds	E004 Eff TSS < pounds	E004 Eff E. coli #/100ml	E004 Eff NH3 mg/L < Timberline	E004 Eff NO2+NO3 mg/L Lachat	E004 Eff TIN mg/L Timberline (ATP)	E004 Eff TIN calculated $NH3_{Timberline}$ +$NO5_{Lachat}$	E004 Eff TN (Timberline) mg/L
5/7/2022	5.03											
5/8/2022	5.24							0.40	6.05	6.65	6.45	
5/9/2022	4.53							0.15	5.96	6.15	6.11	
5/10/2022	3.65							0.14	6.21	6.56	6.35	
5/11/2022	3.36		3.91					0.11	6.85	6.97	6.96	
5/12/2022	3.54		4.06	5.6			9.7	0.12	6.82	6.86	6.94	7.90
5/13/2022	3.59											
5/14/2022	3.41											
5/15/2022	3.48			3.8				0.35	6.27	6.52	6.62	
5/16/2022	3.46							0.12	5.97	6.15	6.09	
5/17/2022	3.19							0.06	6.31	6.33	6.37	
5/18/2022	3.47		2.37				7.4	0.07	6.64	6.76	6.71	
5/19/2022	3.90		2.14					0.08	6.74	6.69	6.82	
5/20/2022	5.11											
5/21/2022	6.33											
5/22/2022	6.15							0.28	5.90	6.03	6.18	
5/23/2022	4.64			4.0				0.06	5.57	5.71	5.63	
5/24/2022	5.09							0.06	5.76	5.64	5.82	
5/25/2022	3.79		3.39					0.07	6.63	6.72	6.70	
5/26/2022	4.26		3.22				6.3	0.05	6.46	6.86	6.51	
5/27/2022	3.15											
5/28/2022	3.19											
5/29/2022	4.24		3.83					0.24	7.11	7.49	7.35	
5/30/2022	3.32							0.42	6.68	7.37	7.10	
5/31/2022	4.02							0.10	6.40	6.66	6.50	
6/1/2022	5.82		3.62					0.05	6.48	6.57	6.53	
6/2/2022	5.19			4.2			3.1	0.06	7.04	7.31	7.10	8.11
6/3/2022	4.84											
6/4/2022	4.19											
6/5/2022	5.12			3.2				0.17	6.03	6.36	6.20	
6/6/2022	5.76						3.1	1.34	5.59	7.03	6.93	
6/7/2022	4.48							0.89	5.96	7.01	6.85	
6/8/2022	3.18		3.63					0.67	6.76	7.34	7.43	
6/9/2022	3.61		3.65					0.78	6.55	7.11	7.33	
6/10/2022	3.62											
6/11/2022	3.18											
6/12/2022	4.19							1.12	6.22	7.10	7.34	
6/13/2022	3.12							0.82	6.14	6.90	6.96	
6/14/2022	3.70			6.0				0.54	6.15	6.66	6.69	
6/15/2022	3.03		4.55					0.72	6.40	7.11	7.12	
6/16/2022	3.74		4.57				9.5	0.66	7.01	7.97	7.67	
6/17/2022	3.27											
6/18/2022	2.20											
6/19/2022	2.79							0.82	7.27	8.42	8.09	
6/20/2022	3.64			5.2				0.24	7.42	7.84	7.66	

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6/21/2022	3.61		4.73					0.33	5.46	6.32	5.79	
6/22/2022	2.16		5.31				9.7	0.53	7.20	8.21	7.73	
6/23/2022	2.18							0.51	7.32	7.94	7.83	
6/24/2022	1.85											
6/25/2022	2.12											
6/26/2022	2.75							1.15	6.60	7.71	7.75	
6/27/2022	2.10			7.2				0.49	6.23	6.61	6.72	
6/28/2022	1.62							0.48	6.61	7.35	7.09	
6/29/2022	2.47		6.20					0.71	7.26	7.83	7.97	
6/30/2022	2.17		6.11				3.1	0.74	7.29	8.12	8.03	
7/1/2022	1.46											
7/2/2022	1.87											
7/3/2022	2.93							0.82	6.85	8.15	7.67	
7/4/2022	2.28			9.6				1.44	6.16	7.53	7.60	
7/5/2022	2.45							0.95	6.56	7.89	7.51	
7/6/2022	1.72		7.03				7.4	1.05	6.19	7.11	7.24	
7/7/2022	1.89		6.76					1.15	7.08	8.28	8.23	
7/8/2022	1.48											
7/9/2022	1.28											
7/10/2022	2.33							2.02	7.63	9.72	9.65	
7/11/2022	2.13							1.66	7.72	9.15	9.38	
7/12/2022	2.53							1.32	8.18	9.37	9.50	
7/13/2022	1.47		7.23					1.94	7.88	9.24	9.82	
7/14/2022	1.45		6.62	10.4			9.7	1.64	8.17	9.10	9.81	11.83
7/15/2022	1.14											
7/16/2022	0.64											
7/17/2022	1.69			13.0				2.11	7.54	9.51	9.65	
7/18/2022	0.94							1.32	7.71	8.69	9.03	
7/19/2022	1.29							0.87	8.12	8.92	8.99	
7/20/2022	1.82		8.67				7.4	1.28	8.05	9.22	9.33	
7/21/2022	1.51		7.20					1.33	7.92	9.13	9.25	
7/22/2022	1.20											
7/23/2022	1.07											
7/24/2022	1.95							1.92	6.36	8.25	8.28	
7/25/2022	2.67			10.0				1.98	6.29	7.96	8.27	
7/26/2022	2.78		7.52				9.5	1.44	6.53	8.22	7.97	
7/27/2022	3.53		6.88					1.40	7.19	9.04	8.59	
7/28/2022	4.46							1.19	7.41	9.00	8.60	
7/29/2022	3.86											
7/30/2022	3.66											
7/31/2022	4.05							0.84	6.57	7.49	7.41	
8/1/2022	2.51			8.0				0.65	6.58	7.34	7.23	
8/2/2022	2.37							0.54	6.60	7.71	7.14	
8/3/2022	2.56		5.51					0.47	7.41	8.47	7.88	
8/4/2022	2.22		5.31				9.0	0.48	7.35	8.09	7.83	

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8/5/2022	2.67											
8/6/2022	2.83											
8/7/2022	3.34							1.08	6.81	8.25	7.89	
8/8/2022	4.22							0.87	6.63	7.73	7.50	
8/9/2022	4.49							0.41	7.00	8.16	7.41	
8/10/2022	2.65		5.49					0.33	7.19	8.22	7.52	
8/11/2022	2.86		4.66	4.8			3.1	0.30	7.37	8.12	7.67	9.21
8/12/2022	2.54											
8/13/2022	2.45											
8/14/2022	3.84			5.4				1.01	7.93	9.69	8.94	
8/15/2022	5.21							0.11	7.36	8.61	7.47	
8/16/2022	5.22		4.57					1.35	7.36	8.63	8.71	
8/17/2022	5.29						7.4	0.42	7.46	8.43	7.88	
8/18/2022	4.68		3.86					0.56	7.72	8.81	8.28	
8/19/2022	4.29											
8/20/2022	4.09											
8/21/2022	4.54							0.55	7.56	8.55	8.11	
8/22/2022	3.72			6.0				0.29	7.21	8.08	7.50	
8/23/2022	3.05							0.16	7.66	8.05	7.82	
8/24/2022	2.48		3.90				17.1	0.18	8.38	8.87	8.56	
8/25/2022	3.05		4.35					0.20	8.32	8.60	8.52	
8/26/2022	3.14											
8/27/2022	2.55											
8/28/2022	3.44							0.36	7.53	7.86	7.89	
8/29/2022	4.63			5.6				0.22	7.08	7.21	7.30	
8/30/2022	6.00						7.4	0.25	7.25	7.66	7.50	
8/31/2022	6.31		4.99					0.19	8.71	9.30	8.90	
9/1/2022	1.31		5.70					0.11	8.02	8.36	8.13	
9/2/2022	2.22											
9/3/2022	2.34											
9/4/2022	2.87							0.07	6.74	7.15	6.81	
9/5/2022	3.37			4.2				0.08	6.50	6.93	6.58	
9/6/2022	2.92		3.84				14.8	0.09	6.14	6.33	6.23	
9/7/2022	2.64		2.62					0.08	7.16	7.64	7.24	
9/8/2022	2.72							0.08	7.28	7.59	7.36	
9/9/2022	3.01											
9/10/2022	3.70											
9/11/2022	4.27		4.05					0.06	7.15	7.81	7.21	
9/12/2022	3.18							0.08	6.35	6.61	6.43	
9/13/2022	3.20		3.09					0.06	6.83	7.10	6.89	
9/14/2022	3.13							0.08	7.24	7.59	7.32	
9/15/2022	2.50			2.4			4.1	0.09	7.70	7.65	7.79	9.47
9/16/2022	3.12											
9/17/2022	2.84											
9/18/2022	3.48			3.6				0.11	8.03	8.08	8.14	

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9/19/2022	3.48						15.8	0.05	6.95	6.82	7.00	
9/20/2022	3.04							0.06	7.81	7.80	7.87	
9/21/2022	3.79		6.03					0.06	7.32	8.15	7.38	
9/22/2022	4.91		5.69					0.06	8.48	8.67	8.54	
9/23/2022	4.14											
9/24/2022	3.75											
9/25/2022	3.73							0.65	8.32	8.83	8.97	
9/26/2022	3.50			7.3				0.22	7.29	7.49	7.51	
9/27/2022	3.01						9.8	0.32	8.22	8.51	8.54	
9/28/2022	3.40		5.74					0.31	8.40	8.72	8.71	
9/29/2022	3.77		5.71					0.37	8.79	9.21	9.16	
9/30/2022	2.94											
10/1/2022	3.56											
10/2/2022	5.07											
10/3/2022	5.12			8.6				0.99	7.31	8.43	8.30	
10/4/2022	4.56							0.75	7.93	8.85	8.68	
10/5/2022	4.13		5.11					0.68	8.99	9.75	9.67	
10/6/2022	4.27		5.29				20.9	0.64	9.73	10.22	10.37	
10/7/2022	3.74							0.74	9.62	10.16	10.36	
10/8/2022	4.72											
10/9/2022	5.55							1.67	8.00	9.74	9.67	
10/10/2022	4.90			11.0			34.1	1.49	7.52	8.90	9.01	
10/11/2022	4.11		7.90					0.97	7.88	9.00	8.85	
10/12/2022	4.15							1.20	8.62	9.92	9.82	
10/13/2022	4.56		6.62					1.26	9.03	10.39	10.29	
10/14/2022	4.58											
10/15/2022	4.20											
10/16/2022	5.26		11.2					2.04	6.95	9.29	8.99	
10/17/2022	4.37	103.0						1.55	6.84	8.44	8.39	
10/18/2022	4.53							0.97	7.43	8.40	8.40	
10/19/2022	4.75		7.14					1.08	7.73	8.86	8.81	
10/20/2022	4.76			10.2			13.5	0.97	7.59	8.33	8.56	10.29
10/21/2022	4.70											
10/22/2022	5.53											
10/23/2022	6.02			11.0				1.76	7.20	8.51	8.96	
10/24/2022	5.15							1.19	7.26	8.33	8.45	
10/25/2022	4.02		6.66				17.3	0.43	7.58	7.79	8.01	
10/26/2022	5.01											
10/27/2022	5.48	103.0	4.54					0.44	7.72	8.28	8.16	
10/28/2022	5.45							0.64	8.52	9.24	9.16	
10/29/2022	6.03											
10/30/2022	5.97	99.9						0.83	7.00	8.16	7.83	
10/31/2022	5.60			5.6				0.33	6.45	7.02	6.78	
11/1/2022	5.79						18.9	0.19	7.16	7.45	7.35	
11/2/2022	6.02		3.65					0.32	7.86	8.38	8.18	

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11/3/2022	5.82							0.15	8.54	8.53	8.69	
11/4/2022	5.77											
11/5/2022	6.13											
11/6/2022	6.47	99.4						0.78	8.13	9.15	8.91	
11/7/2022	5.87			5.6				0.32	7.67	7.66	7.99	
11/8/2022	5.48						4.1	0.09	7.96	8.13	8.05	
11/9/2022	5.12		3.54					0.08	8.82	8.98	8.90	
11/10/2022	5.61		3.26					0.08	9.64	9.92	9.72	
11/11/2022	5.27											
11/12/2022	5.85											
11/13/2022	6.35							0.55	8.61	9.29	9.16	
11/14/2022	5.97	94.4						0.15	7.57	7.89	7.72	
11/15/2022	5.57							J 0.02	8.01	8.22	8.03	
11/16/2022	5.69		3.60					J 0.04	8.91	8.90	8.95	
11/17/2022	5.55		3.60	3.8			5.2	0.10	9.49	10.38	9.59	10.88
11/18/2022	5.56											
11/19/2022	6.02											
11/20/2022	6.17	92.2		5.8				0.72	8.51	9.90	9.23	
11/21/2022	5.99		4.00					0.29	7.89	8.51	8.18	
11/22/2022	5.84		3.88				3.1	0.16	8.13	8.82	8.29	
11/23/2022	6.02							0.13	7.67	8.24	7.80	
11/24/2022	5.97							0.59	6.44	9.24	7.03	
11/25/2022	5.72											
11/26/2022	6.03											
11/27/2022	6.45	95.9						0.62	6.61	7.61	7.23	
11/28/2022	5.99							0.20	6.36	6.76	6.56	
11/29/2022	5.64		4.93	4.4				0.11	6.86	7.54	6.97	
11/30/2022	5.65		3.69				14.5	0.14	7.82	8.60	7.96	
12/1/2022	6.03							0.17	8.82	9.47	8.99	
12/2/2022	6.01											
12/3/2022	6.05											
12/4/2022	6.45	91.9						1.01	8.51	9.73	9.52	
12/5/2022	6.23							0.65	7.97	8.74	8.62	
12/6/2022	5.92		3.48					0.21	8.53	8.86	8.74	
12/7/2022	5.98		3.54					0.23	9.21	9.54	9.44	
12/8/2022	6.61			5.4			13.5	0.29	9.30	9.62	9.59	10.66
12/9/2022	6.93											
12/10/2022	6.27											
12/11/2022	6.36			5.4				1.42	8.28	9.67	9.70	
12/12/2022	6.06	95.4						0.74	7.90	9.02	8.64	
12/13/2022	5.70		4.93					0.31	8.60	8.72	8.91	
12/14/2022	5.78		4.26				19.7	0.29	9.07	10.13	9.36	
12/15/2022	5.68							0.35	9.02	9.21	9.37	
12/16/2022	5.70											
12/17/2022	5.89											

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff Flow MG	E004 Eff Alk mg/L	E004 Eff BOD < mg/L	E004 Eff TSS < mg/L	E004 Eff BOD < pounds	E004 Eff TSS < pounds	E004 Eff E. coli #/100ml	E004 Eff NH3 mg/L < Timberline	E004 Eff NO2+NO3 mg/L Lachat	E004 Eff TIN mg/L Timberline (ATP)	E004 Eff TIN calculated $NH3_{Timberline}$ +$NO5_{Lachat}$	E004 Eff TN (Timberline) mg/L
12/18/2022	6.04	97.6						1.29	7.52	8.85	8.81	
12/19/2022	5.88			4.8				0.81	7.25	7.95	8.06	
12/20/2022	5.70						12.0	0.48	7.28	7.73	7.76	
12/21/2022	5.84		5.37					0.55	7.73	8.47	8.28	
12/22/2022	6.18		6.21					0.81	7.75	8.65	8.56	
12/23/2022	6.11											
12/24/2022	6.33											
12/25/2022	6.07							1.23	6.11	7.52	7.34	
12/26/2022	6.38	97.9						1.55	6.20	7.76	7.75	
12/27/2022	6.32		7.70					1.31	6.13	7.16	7.44	
12/28/2022	6.36		6.42	7.0			15.6	0.88	6.29	7.24	7.17	
12/29/2022	6.06							1.15	6.67	8.08	7.82	
12/30/2022	5.98											
12/31/2022	6.34											

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff T-P (Lachat) mg/L	BDC Eff sulfide < mg/L	BDC Eff sodium mg/L	BDC Eff chloride mg/L	BDC Eff TDS mg/L	BDC Eff Salinity mg/L	BDC Eff calcium mg/L	BDC Eff magnesium mg/L	BDC Eff potassium mg/L	BDC Eff bromide mg/L	BDC Eff fluoride mg/L	BDC Eff sulfate mg/L	E004 Eff Nonylphenol < ug/L
12/26/2021													
12/27/2021	0.32												
12/28/2021		0.013											
12/29/2021													
12/30/2021													
12/31/2021													
1/1/2022													
1/2/2022		0.011											
1/3/2022	0.38												
1/4/2022												137.97	
1/5/2022													< 5.1
1/6/2022													
1/7/2022													
1/8/2022													
1/9/2022		0.010											
1/10/2022					443	503							
1/11/2022												142.76	
1/12/2022													
1/13/2022	0.40												
1/14/2022													
1/15/2022													
1/16/2022	0.43	0.018											
1/17/2022													
1/18/2022													
1/19/2022													
1/20/2022													
1/21/2022													
1/22/2022													
1/23/2022		0.006											
1/24/2022													
1/25/2022	0.31												
1/26/2022													
1/27/2022													
1/28/2022													
1/29/2022													
1/30/2022		0.006											
1/31/2022	0.33												
2/1/2022													
2/2/2022													
2/3/2022													
2/4/2022													
2/5/2022													

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff T-P (Lachat) mg/L	BDC Eff sulfide < mg/L	BDC Eff sodium mg/L	BDC Eff chloride mg/L	BDC Eff TDS mg/L	BDC Eff Salinity mg/L	BDC Eff calcium mg/L	BDC Eff magnesium mg/L	BDC Eff potassium mg/L	BDC Eff bromide mg/L	BDC Eff fluoride mg/L	BDC Eff sulfate mg/L	E004 Eff Nonylphenol < ug/L
2/6/2022		0.006											
2/7/2022					442	522							
2/8/2022												143.21	
2/9/2022													< 5.0
2/10/2022	0.37												
2/11/2022													
2/12/2022													
2/13/2022	0.41	0.009											
2/14/2022													
2/15/2022												152.90	
2/16/2022													
2/17/2022													
2/18/2022													
2/19/2022													
2/20/2022		0.007											
2/21/2022													
2/22/2022	0.33											152.92	
2/23/2022													< 5.1
2/24/2022													
2/25/2022													
2/26/2022													
2/27/2022													
2/28/2022	0.34	< 0.005											
3/1/2022												140.15	
3/2/2022													< 4.8
3/3/2022													
3/4/2022													
3/5/2022													
3/6/2022		< 0.005											
3/7/2022													
3/8/2022	0.28											158.00	
3/9/2022													
3/10/2022													
3/11/2022													
3/12/2022													
3/13/2022		0.006			481	532							
3/14/2022													
3/15/2022													
3/16/2022													
3/17/2022	0.28												
3/18/2022													
3/19/2022													
3/20/2022	0.33	0.010											
3/21/2022													
3/22/2022													

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2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff T-P (Lachat) mg/L	BDC Eff sulfide < mg/L	BDC Eff sodium mg/L	BDC Eff chloride mg/L	BDC Eff TDS mg/L	BDC Eff Salinity mg/L	BDC Eff calcium mg/L	BDC Eff magnesium mg/L	BDC Eff potassium mg/L	BDC Eff bromide mg/L	BDC Eff fluoride mg/L	BDC Eff sulfate mg/L	E004 Eff Nonylphenol < ug/L
3/23/2022													
3/24/2022													
3/25/2022													
3/26/2022													
3/27/2022		0.007											
3/28/2022	0.23												
3/29/2022													
3/30/2022													
3/31/2022													
4/1/2022													
4/2/2022													
4/3/2022		0.005											
4/4/2022													
4/5/2022	0.33												
4/6/2022													
4/7/2022													
4/8/2022													
4/9/2022													
4/10/2022		0.006											
4/11/2022													
4/12/2022					502	521						167.54	
4/13/2022													< 5.1
4/14/2022	0.42												
4/15/2022													
4/16/2022													
4/17/2022	0.39												
4/18/2022													
4/19/2022		0.008										150.38	
4/20/2022													
4/21/2022													
4/22/2022													
4/23/2022													
4/24/2022		0.011											
4/25/2022	0.45												
4/26/2022													
4/27/2022													
4/28/2022													
4/29/2022													
4/30/2022													
5/1/2022		0.011											
5/2/2022													
5/3/2022	0.47											147.71	
5/4/2022													< 4.9
5/5/2022													
5/6/2022													

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2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff T-P (Lachat) mg/L	BDC Eff sulfide < mg/L	BDC Eff sodium mg/L	BDC Eff chloride mg/L	BDC Eff TDS mg/L	BDC Eff Salinity mg/L	BDC Eff calcium mg/L	BDC Eff magnesium mg/L	BDC Eff potassium mg/L	BDC Eff bromide mg/L	BDC Eff fluoride mg/L	BDC Eff sulfate mg/L	E004 Eff Nonylphenol < ug/L
5/7/2022													
5/8/2022		0.006											
5/9/2022													
5/10/2022												164.94	
5/11/2022													
5/12/2022	0.86												
5/13/2022													
5/14/2022													
5/15/2022	1.30	< 0.005			494	527							
5/16/2022													
5/17/2022													
5/18/2022													
5/19/2022													
5/20/2022													
5/21/2022													
5/22/2022		0.007											
5/23/2022	0.52												
5/24/2022													
5/25/2022													
5/26/2022													
5/27/2022													
5/28/2022													
5/29/2022		0.013											
5/30/2022													
5/31/2022													
6/1/2022													
6/2/2022	0.89												
6/3/2022													
6/4/2022													
6/5/2022	0.84												
6/6/2022													
6/7/2022												188.10	
6/8/2022													
6/9/2022		0.006											
6/10/2022													
6/11/2022													
6/12/2022		0.009											
6/13/2022	0.32												
6/14/2022					530	555						166.65	
6/15/2022													
6/16/2022													
6/17/2022													
6/18/2022													
6/19/2022		< 0.005											
6/20/2022													

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2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff T-P (Lachat) mg/L	BDC Eff sulfide < mg/L	BDC Eff sodium mg/L	BDC Eff chloride mg/L	BDC Eff TDS mg/L	BDC Eff Salinity mg/L	BDC Eff calcium mg/L	BDC Eff magnesium mg/L	BDC Eff potassium mg/L	BDC Eff bromide mg/L	BDC Eff fluoride mg/L	BDC Eff sulfate mg/L	E004 Eff Nonylphenol < ug/L
6/21/2022	0.32												
6/22/2022													
6/23/2022													
6/24/2022													
6/25/2022													
6/26/2022		0.009											
6/27/2022													
6/28/2022													
6/29/2022	0.42												< 4.8
6/30/2022													
7/1/2022													
7/2/2022													
7/3/2022		0.008											
7/4/2022	0.56												
7/5/2022												156.51	
7/6/2022													
7/7/2022													
7/8/2022													
7/9/2022													
7/10/2022		0.011											
7/11/2022													
7/12/2022					481	510						143.23	
7/13/2022													< 4.9
7/14/2022	1.52												
7/15/2022													
7/16/2022													
7/17/2022	1.27	0.010											
7/18/2022													
7/19/2022													
7/20/2022													
7/21/2022													
7/22/2022													
7/23/2022													
7/24/2022		0.008											
7/25/2022													
7/26/2022	0.45												
7/27/2022													
7/28/2022													
7/29/2022													
7/30/2022													
7/31/2022		0.007											
8/1/2022	0.43												
8/2/2022												154.52	
8/3/2022													< 4.9
8/4/2022													

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2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff T-P (Lachat) mg/L	BDC Eff sulfide < mg/L	BDC Eff sodium mg/L	BDC Eff chloride mg/L	BDC Eff TDS mg/L	BDC Eff Salinity mg/L	BDC Eff calcium mg/L	BDC Eff magnesium mg/L	BDC Eff potassium mg/L	BDC Eff bromide mg/L	BDC Eff fluoride mg/L	BDC Eff sulfate mg/L	E004 Eff Nonylphenol < ug/L
8/5/2022													
8/6/2022													
8/7/2022		0.007											
8/8/2022													
8/9/2022					491	521						155.29	
8/10/2022													
8/11/2022	0.36												
8/12/2022													
8/13/2022													
8/14/2022	0.35	0.006											
8/15/2022													
8/16/2022													
8/17/2022													
8/18/2022													
8/19/2022													
8/20/2022													
8/21/2022		< 0.005											
8/22/2022													
8/23/2022													
8/24/2022	0.33												
8/25/2022													
8/26/2022													
8/27/2022													
8/28/2022		0.007											
8/29/2022													
8/30/2022	0.39												
8/31/2022													
9/1/2022													
9/2/2022													
9/3/2022													
9/4/2022		0.009											
9/5/2022	0.39												
9/6/2022												141.31	
9/7/2022													
9/8/2022													
9/9/2022													
9/10/2022													
9/11/2022		< 0.005											
9/12/2022													
9/13/2022					461	490						147.99	
9/14/2022													< 5.2
9/15/2022	1.58												
9/16/2022													
9/17/2022													
9/18/2022	2.18												

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2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff T-P (Lachat) mg/L	BDC Eff sulfide < mg/L	BDC Eff sodium mg/L	BDC Eff chloride mg/L	BDC Eff TDS mg/L	BDC Eff Salinity mg/L	BDC Eff calcium mg/L	BDC Eff magnesium mg/L	BDC Eff potassium mg/L	BDC Eff bromide mg/L	BDC Eff fluoride mg/L	BDC Eff sulfate mg/L	E004 Eff Nonylphenol < ug/L
9/19/2022													
9/20/2022													
9/21/2022													
9/22/2022		< 0.005											
9/23/2022													
9/24/2022													
9/25/2022		< 0.005											
9/26/2022													
9/27/2022	1.26												
9/28/2022													
9/29/2022													
9/30/2022													
10/1/2022													
10/2/2022													
10/3/2022	1.53	< 0.005											
10/4/2022													
10/5/2022													
10/6/2022													
10/7/2022													
10/8/2022													
10/9/2022		0.005											
10/10/2022													
10/11/2022	1.53				468	481						147.00	
10/12/2022													
10/13/2022													
10/14/2022													
10/15/2022													
10/16/2022		0.006											
10/17/2022													
10/18/2022												134.42	
10/19/2022													< 5.0
10/20/2022	0.66												
10/21/2022													
10/22/2022													
10/23/2022	0.67												
10/24/2022													
10/25/2022													
10/26/2022													
10/27/2022		0.005											
10/28/2022													
10/29/2022													
10/30/2022		0.006											
10/31/2022													
11/1/2022	0.39											140.24	
11/2/2022													< 5.0

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff T-P (Lachat) mg/L	BDC Eff sulfide < mg/L	BDC Eff sodium mg/L	BDC Eff chloride mg/L	BDC Eff TDS mg/L	BDC Eff Salinity mg/L	BDC Eff calcium mg/L	BDC Eff magnesium mg/L	BDC Eff potassium mg/L	BDC Eff bromide mg/L	BDC Eff fluoride mg/L	BDC Eff sulfate mg/L	E004 Eff Nonylphenol < ug/L
11/3/2022													
11/4/2022													
11/5/2022													
11/6/2022		0.006											
11/7/2022	0.37				441	460							
11/8/2022													
11/9/2022												146.04	
11/10/2022													
11/11/2022													
11/12/2022													
11/13/2022		0.007											
11/14/2022													
11/15/2022													
11/16/2022													
11/17/2022	0.29												
11/18/2022													
11/19/2022													
11/20/2022	0.34	< 0.005											
11/21/2022													
11/22/2022													
11/23/2022													
11/24/2022													
11/25/2022													
11/26/2022													
11/27/2022		0.007											
11/28/2022	0.27												
11/29/2022													
11/30/2022													
12/1/2022													
12/2/2022													
12/3/2022													
12/4/2022		0.007											
12/5/2022													
12/6/2022												138.39	
12/7/2022													< 5.0
12/8/2022	0.32												
12/9/2022													
12/10/2022													
12/11/2022	0.36	< 0.005											
12/12/2022													
12/13/2022					441	452						133.45	
12/14/2022													
12/15/2022													
12/16/2022													
12/17/2022													

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster

Date	E004 Eff T-P (Lachat) mg/L	BDC Eff sulfide < mg/L	BDC Eff sodium mg/L	BDC Eff chloride mg/L	BDC Eff TDS mg/L	BDC Eff Salinity mg/L	BDC Eff calcium mg/L	BDC Eff magnesium mg/L	BDC Eff potassium mg/L	BDC Eff bromide mg/L	BDC Eff fluoride mg/L	BDC Eff sulfate mg/L	E004 Eff Nonylphenol < ug/L
12/18/2022		0.005											
12/19/2022													
12/20/2022	0.31												
12/21/2022													
12/22/2022													
12/23/2022													
12/24/2022													
12/25/2022													
12/26/2022	0.36	0.008											
12/27/2022													
12/28/2022													
12/29/2022													
12/30/2022													
12/31/2022													

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster -- Metals

City of Westminster - Big Dry Creek Wastewater Treatment Facility - 2022

	E004	E004	E004	E004	E004	E004	E004	E004	E004	E004	E004	E004	E004	E004	E004	E004
	ARSENIC (TOTAL)	BERYLLIUM **(TR)**	CADMIUM (TOTAL)	CHROMIUM (TOTAL)	COPPER (TOTAL)	IRON **(TR)**	LEAD (TOTAL)	MERCURY (TOTAL)	MOLYBDENUM (TOTAL)	NICKEL (TOTAL)	SELENIUM (TOTAL)	SILVER (TOTAL)	ZINC (TOTAL)	BORON (TOTAL)	CYANIDE (TOTAL)	PHENOLS (TOTAL)
Method Number	200.8	200.8	200.8	200.8	200.8	200.7	200.8	1631c	200.8	200.8	200.8	200.8	200.8	SM4500 B E	SM4500 CN E	420.2
Units	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ng/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(mg/L)	(ug/L)	(ug/L)
Sample Date																
1/4/2022						42										
1/11/2022						44										
2/8/2022						45										
2/15/2022						39										
2/22/2022	< 0.6	< 0.1	< 0.1	< 1.5	4.5	38	0.2		3.0	1.9	1.6	< 0.5	62	0.27		< 15.0
2/23/2022															< 5	
3/1/2022						39										
3/8/2022						34		1.24								
4/12/2022	< 0.6	< 0.1	< 0.1	< 1.5	5.5	40	0.2		2.9	2.2	1.4	< 0.5	63	0.25		< 15.0
4/13/2022								1.82							< 5	
4/19/2022						30										
5/3/2022						33										
5/10/2022						33										
6/7/2022						33										
6/14/2022						39										
7/5/2022						74										
7/12/2022						96										
8/2/2022						83										
8/9/2022						64										
9/6/2022						36										
9/13/2022	< 0.6	< 0.1	< 0.1	< 1.5	4.7	33	< 0.1	0.66	3.5	1.6	0.9	< 0.5	47	0.24		< 15.0
9/14/2022															< 5	
10/11/2022						74										
10/18/2022	< 0.6	< 0.1	< 0.1	< 1.5	6.4	93	0.10	2.06	3.4	2.1	2.0	< 0.5	54	0.26		< 15.0
10/19/2022															< 5	
11/1/2022						47										
11/9/2022						29										
12/6/2022						23										
12/13/2022						26										
Average						46.68										
Maximum	< 0.6	< 0.10	< 0.10	< 1.5	6.4	96	0.20	2.06	3.5	2.2	< 2.0	< 0.50	63	0.27	< 5	< 15
Minimum	< 0.6	< 0.1	< 0.1	< 1.5	4.5	23	0.10	0.66	2.9	1.6	< 0.9	< 0.5	47	0.24	< 5	< 15

NOTE: If some values for a parameter were <(X), (X) was used in calculating the average.

Appendix D
2022 Discharge Monitoring Report (DMR) Summary
Westminster -- Metals

	E004	E004	E004	E004	E004
	COPPER (PD)	IRON (Dissolved)	MANGANESE (PD)	SELENIUM (PD)	CYANIDE (WAD)
Method Number	200.7	200.7	200.8	200.8	SM4500 CN E
Units	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Sample Date					
1/4/2022		25	52.5	1.6	
1/11/2022		27	45.2		
2/8/2022		25	60.0	1.3	
2/15/2022		23	50.6		
2/22/2022	3.8	21	52.5	1.6	
2/23/2022					
3/1/2022		26	61.0	1.6	
3/8/2022		21	52.2		
4/12/2022	4.7	26	86.8	1.3	
4/13/2022					
4/19/2022		23	73.5		
5/3/2022		24	119.7	2.6	
5/10/2022		21	38.1		
6/7/2022		17	105.5	1.8	
6/14/2022		21	63.5		
7/5/2022		18	73.2	1.7	
7/12/2022		30	42.9		
8/2/2022		31	242.3	< 0.8	
8/9/2022		32	236.1		
9/6/2022		19	148.9		
9/13/2022	4.2	19	69.8	0.8	
9/14/2022					
10/11/2022		22	46.5		
10/18/2022	5.3	20	41.5	0.9	
10/19/2022					
11/1/2022		46	31.2	0.9	
11/9/2022		17	39.8		
12/6/2022		14	40.0	0.8	
12/13/2022		15	37.8		
Average			76.4	< 1.36	
Maximum	5.3	46.0	242.3	2.6	0
Minimum	3.8	14.0	31.2	< 0.8	0

NOTE: If some values for a parameter were <(X), (X) was used in calculating the average.

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1/1/2022													1.036
1/2/2022													1.102
1/3/2022			0.07	0.16	12	0.09	12.2	12.29				4.1	1.241
1/4/2022				0.15	11.3		11.5		65.4		<5.000		1.143
1/5/2022	2.20	1.57	0.01	0.18	12	0.68	12.1	12.78					1.634
1/6/2022			0.1	0.22	12.2	0.95	12.4	13.35					1.639
1/7/2022				0.39	13.9		14.3						2.457
1/8/2022													2.503
1/9/2022													2.238
1/10/2022	2.27		0.08	0.27	12.3	0.75	12.6	13.35		34		1	1.658
1/11/2022				0.58	10.8		11.4		65.8				1.816
1/12/2022	2.27	2.18	0.06	0.66	11.7	1.11	12.4	13.51					1.583
1/13/2022			0.07	0.74	12.9	1.25	13.7	14.95					1.819
1/14/2022	0.93			0.64	12.6		13.2						1.538
1/15/2022													1.366
1/16/2022													1.577
1/17/2022			0.07	0.15	11.2	1.98	11.4	13.38				4.1	1.739
1/18/2022				0.6	9.9		10.5		71.6				1.29
1/19/2022	1.93	2.23	0.08	0.34	11.8	3.03	12.1	15.13					1.424
1/20/2022			0.04	0.67	12.7	2.33	13.4	15.73					1.203
1/21/2022				0.42	10.8		11.2						2.092
1/22/2022													2.336
1/23/2022													2.708
1/24/2022			0.08	0.24	11.5	0.72	11.7	12.42				3	2.533
1/25/2022				0.29	10.5		10.8		63.8				2.24
1/26/2022	3.13	3.00	0.04	0.45	12.4	0.22	12.9	13.12					2.233
1/27/2022			0.08	0.8	12.4	0.2	13.2	13.4					2.307
1/28/2022				0.47	13.5		14						2.389
1/29/2022													2.556
1/30/2022													2.531
1/31/2022			0.07	0.54	10.5	1.39	11	12.39				7.5	2.776
2/1/2022				0.54	9.8		10.3		78.2				3.075

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2/2/2022	2.27	3.00	0.07	0.4	10.4	1.66	10.8	12.46					3.002
2/3/2022			0.1	0.96	11.5	1.08	12.5	13.58					3.223
2/4/2022				1.46	12.5		14						3.639
2/5/2022													3.867
2/6/2022													3.915
2/7/2022			0.08	0.56	10.5	1.58	11.1	12.68		29		3.1	3.53
2/8/2022				0.65	9.9		10.5		77.2				2.121
2/9/2022	2.53	3.00	0.08	0.82	11	2.05	11.9	13.95					1.315
2/10/2022			0.06	0.3	11.6	1.05	11.9	12.95					1.552
2/11/2022				0.66	11.8		12.5						1.736
2/12/2022													1.702
2/13/2022													1.856
2/14/2022			0.1	0.31	10.5	1.71	10.8	12.51				2	1.83
2/15/2022				0.19	9.7		9.9		87				1.428
2/16/2022	2.20	4.00	0.07	0.23	9.4	1.75	9.7	11.45					1.408
2/17/2022			0.07	0.32	10.1	0.97	10.4	11.37					1.735
2/18/2022				0.6	12		12.6						1.322
2/19/2022													1.496
2/20/2022													1.392
2/21/2022			0.09	0.17	11.3	1.51	11.5	13.01				1	1.897
2/22/2022				0.33	10.9		11.2		88.2				1.949
2/23/2022	2.73	2.00	0.03	0.97	10.7	2.2	11.7	13.9					1.292
2/24/2022			0.08	1.88	10.6	3.5	12.5	16					1.483
2/25/2022				1.34	11.6		12.9						1.562
2/26/2022													1.587
2/27/2022													1.824
2/28/2022			0.04	1.33	11	3	12.3	15.3				3	1.77
3/1/2022				0.76	10.6		11.4		83.8				2.124
3/2/2022	2.13	1.28	0.08	0.83	10.5	1.96	11.3	13.26					1.901
3/3/2022			0.07	1.42	11.7	2.48	13.1	15.58					1.255
3/4/2022				0.79	14.2		14.9						1.202
3/5/2022													1.015

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3/6/2022													1.711
3/7/2022			0.09	0.6	12.3	1.48	12.9	14.38		26		2.1	2.183
3/8/2022				0.08	12		12.1		80				1.966
3/9/2022	2.00	1.77	0.05	0.095	13.4	1	13.5	14.5					1.426
3/10/2022			0.05	0.09	14.2	0.18	14.3	14.48					1.338
3/11/2022				0.76	14.6		15.4						1.557
3/12/2022													1.712
3/13/2022													1.687
3/14/2022			0.02	0.62	10.9	2	11.5	13.5				1	1.6
3/15/2022				0.5	11		11.5		80.8				3.743
3/16/2022	2.40	2.40	0.03	1.2	11.9	2.62	13.1	15.72					5.418
3/17/2022			0.04	0.35	12.9	2.62	13.2	15.82					5.142
3/18/2022				0.8	12.8		13.6						2.179
3/19/2022													2.012
3/20/2022													1.687
3/21/2022			0.08	0.11	12	0.72	12.1	12.82				1	1.476
3/22/2022				0.07	11.3		11.4		96				1.813
3/23/2022	2.13	2.34	0.1	0.12	12.5	0.68	12.6	13.28					1.443
3/24/2022			0.09	0.46	12.5	0.66	13	13.66					2.699
3/25/2022				0.45	15.7		16.1						1.874
3/26/2022													1.224
3/27/2022													3.185
3/28/2022	1.80	1.82	0.09	0.18	13.1	0.64	13.3	13.94				1	4.155
3/29/2022				0.14	12.6		12.7		81.4				5.471
3/30/2022			0.06	0.16	14.2	<0.09	14.4						5.307
3/31/2022			0.09	0.56	14.2	1.35	14.8	16.15					5.461
4/1/2022				1.06	16.1		17.1						5.472
4/2/2022													4.52
4/3/2022													5.338
4/4/2022	1.65		0.05	0.19	14.1	1.01	14.3	15.31		34		3.1	6.001
4/5/2022				0.31	12.5		12.8		75.6				5.201
4/6/2022	1.53	2.36	0.07	0.12	15.4	0.53	15.5	16.03					5.709

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4/7/2022			0.03	1.2	15.7	2.32	16.9	19.22					5.847
4/8/2022	1.73			1.15	19.1		20.3						5.694
4/9/2022													4.465
4/10/2022													3.29
4/11/2022			0.06	0.15	14.1	1.29	14.2	15.49				2	5.986
4/12/2022				0.12	12.9		13		84.8				4.866
4/13/2022	2.40	4.17	0.07	0.11	14.3	1.13	14.4	15.53					4.129
4/14/2022			0.07	0.5	15.9	1.26	16.4	17.66					4.749
4/15/2022				0.59	20.2		20.8						5.874
4/16/2022													4.671
4/17/2022													5.626
4/18/2022			0.11	0.12	12.6	2.26	12.7	14.96				5.2	3.399
4/19/2022				0.11	12		12.1		84.4				4.225
4/20/2022	2.33	5.80	0.07	0.12	13.5	1.29	13.6	14.89					3.048
4/21/2022			0.1	0.13	13.6	0.97	13.7	14.67					2.383
4/22/2022				0.17	16.1		16.2						3.003
4/23/2022													4.301
4/24/2022													5.681
4/25/2022			0.08	0.11	13.7	1.02	13.8	14.82				6.3	5.831
4/26/2022				0.13	12.6		12.7		82.4				4.514
4/27/2022	2.27	4.91	0.11	0.09	12.8	1.09	12.9	13.99					5.309
4/28/2022			0.08	0.15	13.6	0.44	13.8	14.24					5.446
4/29/2022				0.39	14.8		15.2						5.602
4/30/2022													2.919
5/1/2022													3.574
5/2/2022			0.11	0.72	14.1	2.06	14.8	16.86			<5.000	1	3.974
5/3/2022				1.37	11.6		13		88.8				4.435
5/4/2022	2.20	3.02	0.1	1.94	12.4	2.68	14.4	17.08					5.062
5/5/2022			0.08	1.78	12.2	2.32	14	16.32					6.634
5/6/2022				2.2	12.1		14.3						6.071
5/7/2022													4.374
5/8/2022													6.036

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5/9/2022			0.04	0.55	12.4	2.58	13	15.58				2	5.858
5/10/2022				0.25	11.1		11.3		96.4				4.222
5/11/2022	2.27	4.80	0.09	0.49	11.5	1.25	12	13.25					3.254
5/12/2022			0.08	0.58	12	1.2	12.6	13.8					3.359
5/13/2022				0.42	13.5		13.9						4.324
5/14/2022													5.674
5/15/2022													5.773
5/16/2022			0.08	0.12	14	0.95	14.1	15.05				1	5.786
5/17/2022				0.31	12.1		12.4		83.8				5.731
5/18/2022	2.40	5.42	0.06	0.3	11.4	1.06	11.7	12.76					5.838
5/19/2022			0.06	0.32	12	1.02	12.3	13.32					5.732
5/20/2022				0.19	13.7		13.9						6.462
5/21/2022													7.072
5/22/2022													6.54
5/23/2022			0.08	0.15	10.8	2.3	11	13.3				3.6	6.345
5/24/2022				0.26	10.2		10.5		101				6.148
5/25/2022	1.97	3.02	0.08	0.196	12	1.01	12.2	13.21					6.122
5/26/2022			0.08	0.47	12.7	1.36	13.2	14.56					6.13
5/27/2022				0.69	13.2		13.9						5.984
5/28/2022													5.637
5/29/2022													6.026
5/30/2022			0.08	0.28	13.6	2.44	13.9	16.34		53		1	5.79
5/31/2022				0.11	12.9		13		100				6.625
6/1/2022	2.07	4.32	0.07	0.48	12.5	2.18	13	15.18					7.495
6/2/2022			0.06	0.28	10.6	2.26	10.9	13.16					6.597
6/3/2022				0.18	11.9		12.1						6.408
6/4/2022													6.278
6/5/2022													6.155
6/6/2022			0.06	0.15	12.2	2.22	12.3	14.52				1	6.249
6/7/2022				0.15	11.9		12.1		102				6.184
6/8/2022	1.87	3.39	0.06	0.1	14.7	1.16	14.8	15.96					6.047
6/9/2022			0.06	0.16	13.5	1	13.7	14.7					6.112

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6/10/2022				0.27	17.8		18						6.101
6/11/2022													6.096
6/12/2022													5.832
6/13/2022			0.06	0.13	13.8	1.51	13.9	15.41				3.1	6.23
6/14/2022				0.34	12.9		13.2		83.4				5.866
6/15/2022	2.13	4.30	0.09	0.13	13.4	1.54	13.5	15.04					6.19
6/16/2022			0.08	0.23	13.3	1.65	13.5	15.15					5.906
6/17/2022				0.19	15.6		15.7						5.672
6/18/2022													5.935
6/19/2022													5.882
6/20/2022			0.09	0.09	13.2	1.73	13.3	15.03				1	6.071
6/21/2022				0.3	12.1		12.4		83				5.896
6/22/2022	2.20	3.38	0.05	0.07	12.6	1.44	12.7	14.14					6.121
6/23/2022			0.06	0.17	14.1	1.35	14.3	15.65					6.15
6/24/2022				0.56	12.9		13.5						5.646
6/25/2022													5.665
6/26/2022													5.939
6/27/2022			0.05	0.22	13.5	0.89	13.7	14.59				1	6.208
6/28/2022				0.59	12.9		13.5		72.4				5.693
6/29/2022	2.67	2.67	0.07	0.45	13.5	1.95	13.9	15.85					5.702
6/30/2022			0.06	0.16	13.6	1.89	13.8	15.69					6.454
7/1/2022				0.53	14.7		15.2						6.123
7/2/2022													5.964
7/3/2022													5.731
7/4/2022			0.07	0.11	13.1	0.85	13.2	14.05		36			6.019
7/5/2022				0.07	13.1		13.2		70.4			1	6.302
7/6/2022	2.53	2.82	0.09	0.4	12	5.8	12.4	18.2					5.943
7/7/2022			0.08	0.08	14.8	3.38	14.9	18.28					5.982
7/8/2022				0.29	13.3		13.6						6.049
7/9/2022													5.109
7/10/2022													4.495
7/11/2022	2.00		0.08	0.16	13.7	1.3	13.9	15.2				2	4.619

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7/12/2022				0.16	12.2		12.4		80				4.446
7/13/2022	2.53	3.57	0.06	0.39	14.6	1.63	15	16.63					4.562
7/14/2022			0.06	0.23	14.4	1.4	14.6	16					4.47
7/15/2022	1.35			0.2	14.7		14.9						4.591
7/16/2022													4.751
7/17/2022													4.676
7/18/2022			0.07	0.15	13.5	2.68	13.6	16.28				2.1	4.676
7/19/2022				0.34	13.1		13.4		75				4.79
7/20/2022	1.45	2.00	0.07	0.2	13.9	1.7	14.1	15.8					6.149
7/21/2022			0.08	0.7	14.1	1.91	14.8	16.71					4.788
7/22/2022				0.71	17.5		18.2						4.767
7/23/2022													4.477
7/24/2022													5.529
7/25/2022			0.08	0.48	13.7	1.77	14.2	15.97				2	5.282
7/26/2022				0.41	12.3		12.7		90		<1.000		5.51
7/27/2022	1.80	3.80	0.11	0.26	13.9	1.76	14.2	15.96					6.386
7/28/2022			0.12	0.86	11.4	2.1	12.3	14.4					5.684
7/29/2022				0.18	13.2		13.4						5.064
7/30/2022													5.27
7/31/2022													4.676
8/1/2022			0.11	0.06	12.8	1.3	12.9	14.2				1	4.673
8/2/2022				0.52	12.1		12.6		92.6				5.238
8/3/2022	1.53	4.51	0.09	0.59	14.4	1.66	15	16.66					4.658
8/4/2022			0.09	0.28	13.3	1.19	13.6	14.79					4.683
8/5/2022				0.62	15.8		16.4					6.3	4.465
8/6/2022													4.885
8/7/2022													5.622
8/8/2022			0.09	0.14	12.9	3.54	13	16.54				4.1	5.691
8/9/2022				0.19	11.2		11.4		97.2				5.567
8/10/2022	1.65	3.78	0.08	0.27	13.1	2.64	13.4	16.04					5.081
8/11/2022			0.06	0.16	12.9	2.52	13.1	15.62					4.653
8/12/2022				0.11	14.3		14.4						4.677

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8/13/2022													4.706
8/14/2022													4.874
8/15/2022			0.08	0.1	13.7	0.75	13.8	14.55				3	4.992
8/16/2022				0.06	12.4		12.5		111				8.61
8/17/2022	6.40	2.68	0.07	1.31	10.5	2.66	11.9	14.56					7.183
8/18/2022			0.11	0.11	10.1	0.78	10.2	10.98					6.138
8/19/2022				0.13	14		14.1						6.563
8/20/2022													5.947
8/21/2022													6.24
8/22/2022			0.09	0.09	12.6	2.04	12.7	14.74					6.236
8/23/2022				0.11	11.8		11.9		107			2	6.037
8/24/2022	1.45	2.17	0.06	0.06	13.2	1.17	13.2	14.37					6.115
8/25/2022			0.06	0.09	14	1.4	14.1	15.5					6.519
8/26/2022				0.05	13.4		13.5						6.086
8/27/2022													6.558
8/28/2022													6.315
8/29/2022			0.08	0.13	13.3	1.91	13.4	15.31		31		1	6.546
8/30/2022				0.07	11.6		11.7		106				6.162
8/31/2022	1.73	2.00	0.07	0.07	12.2	2.2	12.3	14.5					6.769
9/1/2022			0.1	0.09	12.7	2.18	12.8	14.98					6.626
9/2/2022				0.1	14.2		14.3						6.071
9/3/2022													4.909
9/4/2022													6.059
9/5/2022			0.08	0.05	14.8	1.51	14.9	16.41				2	6.056
9/6/2022				0.1	13.5		13.6		102				4.935
9/7/2022	1.15	2.09	0.1	0.26	12.6	1.09	12.9	13.99					4.227
9/8/2022			0.1	0.12	15	0.69	15.1	15.79					3.677
9/9/2022				0.09	15.3		15.4						4.137
9/10/2022													4.879
9/11/2022													5.052
9/12/2022			0.09	0.1	13.7	1.6	13.8	15.4		35		2.6	5.218
9/13/2022				0.17	11.3		11.5		110				4.85

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9/14/2022	1.65	0.97	0.04	0.124	14.4	0.6	14.6	15.2					4.219
9/15/2022			0.06	0.1	14.6	0.86	14.7	15.56					4.396
9/16/2022				0.12	15.5		15.6						3.797
9/17/2022													4.308
9/18/2022													3.881
9/19/2022			0.07	0.12	13.8	1.56	13.9	15.46				3	4.464
9/20/2022				0.11	13.4		13.5		91.8				4.082
9/21/2022	1.40	1.33	0.08	0.13	18.1	2.24	18.3	20.54					4.322
9/22/2022			0.08	0.25	15.8	1.65	16.1	17.75					5.649
9/23/2022				0.13	16.4		16.6						5.435
9/24/2022													4.5
9/25/2022													4.614
9/26/2022			0.06	0.09	14.3	1.24	14.4	15.64				2	4.195
9/27/2022				0.16	14		14.2		87.8				4.005
9/28/2022	1.25	0.98	0.08	0.12	16.1	0.81	16.3	17.11					3.882
9/29/2022			0.06	0.46	18.6	0.67	19.1	19.77					4.624
9/30/2022				0.13	20.8		20.9						4.715
10/1/2022													4.588
10/2/2022													3.938
10/3/2022	1.93		0.12	0.11	16	1.72	16.1	17.82		26		3.1	5.543
10/4/2022				0.06	13.2		13.3		88.4				5.009
10/5/2022		1.44	0.08	0.11	16.6	0.91	16.8	17.71					4.184
10/6/2022			0.08	0.15	16.9	0.28	17.1	17.38					4.017
10/7/2022				0.11	17.5		17.6						3.539
10/8/2022													3.964
10/9/2022													4.639
10/10/2022	2.15		0.11	0.1	17.3	1.17	17.4	18.57				2	4.163
10/11/2022				0.07	15.3		15.4		81.8				5.063
10/12/2022		1.35	0.13	0.07	16.4	1.2	16.5	17.7					3.756
10/13/2022			0.13	0.11	15.6	0.89	15.7	16.59					3.616
10/14/2022				0.1	15.8		15.9						4.032
10/15/2022													3.429

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10/16/2022													4.062
10/17/2022	3.33		0.12	0.11	16.9	0.26	17	17.26				3	4.782
10/18/2022				0.012	16.1		16.1		84				3.762
10/19/2022		0.90	0.11	0.08	18.1	0.31	18.2	18.51					3.711
10/20/2022			0.13	0.11	18.4	0.48	18.5	18.98					4.033
10/21/2022				0.1	19.6		19.7						4.098
10/22/2022													3.954
10/23/2022													4.327
10/24/2022	2.67		0.14	0.22	15.1	1.69	15.3	16.99				2	4.373
10/25/2022				0.1	14.8		14.9		74.6				4.552
10/26/2022		2.13	0.14	0.07	18.4	0.63	18.4	19.03					4.239
10/27/2022			0.14	0.13	17.4	0.92	17.5	18.42					5.286
10/28/2022				0.16	16.4		16.6						5.481
10/29/2022													4.782
10/30/2022													5.229
10/31/2022			0.14	0.12	13.9	0.85	14	14.85				4.1	5.33
11/1/2022				0.07	13.2		13.3		69.2		<1.000		3.059
11/2/2022	1.87	1.13	0.14	0.09	16.6	1.15	16.7	17.85				5.2	1.675
11/3/2022			0.13	0.11	15.5	1.02	15.6	16.62					1.4
11/4/2022				0.14	18.2		18.4						1.363
11/5/2022													1.317
11/6/2022													2.31
11/7/2022	2.69		0.12	0.16	16.3	0.33	16.5	16.83		23		5.2	2.564
11/8/2022				0.1	14.2		14.3		74.4				2.392
11/9/2022		1.22	0.16	0.08	15.7	0.82	15.8	16.62					2.022
11/10/2022			0.16	0.08	16.7	1.16	16.8	17.96					1.708
11/11/2022				0.12	16.3		16.4						1.888
11/12/2022													1.84
11/13/2022													2.799
11/14/2022	2.47		0.14	0.2	14.1	1.35	14.3	15.65				4.1	2.676
11/15/2022				0.15	13.6		13.7		67				2.303
11/16/2022	2.53	0.94	0.16	0.1	14.7	0.81	14.8	15.61					2.244

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11/17/2022			0.13	0.09	15.5	0.46	15.6	16.06					2.177
11/18/2022	2.33			0.1	15.5		15.6						1.826
11/19/2022													2.563
11/20/2022													3.185
11/21/2022	4.80		0.11	0.14	13.9	0.83	14	14.83				3.1	2.904
11/22/2022				0.1	12.6		12.7		63.8				2.863
11/23/2022		1.41	0.13	0.09	15	0.87	15	15.87					2.676
11/24/2022			0.16	0.12	14	1.22	14.1	15.32					1.884
11/25/2022				0.11	12.8		12.9						1.423
11/26/2022													1.43
11/27/2022													1.889
11/28/2022	3.33		0.12	0.1	14	1.26	14.1	15.36				3.1	1.612
11/29/2022				0.09	14.2		14.3		66.2				1.608
11/30/2022	2.57	1.37	0.12	0.088	15.2	0.9	15.3	16.2					1.726
12/1/2022			0.16	0.08	15.7	1.11	15.8	16.91					1.562
12/2/2022				0.11	15.6		15.7						1.718
12/3/2022													1.749
12/4/2022													1.62
12/5/2022	2.53		0.12	0.14	15.1	0.9	15.2	16.1				3.1	1.794
12/6/2022				0.06	13.3		13.4		66.2				1.437
12/7/2022		0.38	0.15	0.07	15.5	0.75	15.6	16.35					1.333
12/8/2022			0.14	0.22	16.7	0.85	16.9	17.75					1.289
12/9/2022				0.12	15.1		15.2						2.513
12/10/2022													1.855
12/11/2022													1.631
12/12/2022	1.96		0.14	0.12	14.5	1.24	14.6	15.84		25		1	1.69
12/13/2022				0.11	11.6		11.7		58.4				2.065
12/14/2022		3.00	0.17	0.08	14.4	1.26	14.5	15.76					1.568
12/15/2022			0.15	0.11	14.7	0.78	14.8	15.58					0.825
12/16/2022				0.09	15		15.1						1.043
12/17/2022													1.391
12/18/2022													1.655

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12/19/2022	2.05		0.15	0.08	14.7	0.85	14.8	15.65				2	1.598
12/20/2022				0.09	13.2		13.3		66.6				1.575
12/21/2022		1.29	0.1	0.11	13.4	1.38	13.5	14.88					1.079
12/22/2022			0.12	0.1	10.1	1.03	10.2	11.23					1.06
12/23/2022				0.25	14		14.2						2.671
12/24/2022													5.375
12/25/2022													6.115
12/26/2022	3.00		0.12	0.14	10.3	1.37	10.4	11.77				2	6.124
12/27/2022				0.1	10.8		10.9		58.6				5.831
12/28/2022		1.47	0.14	0.06	10.7	0.58	10.8	11.38					5.893
12/29/2022			0.13	0.045	11.3	0.52	11.3	11.82					6.354
12/30/2022				0.041	14.3		14.3						5.989
12/31/2022													6.048
Avg		2.56	0.09	0.32	13.51	1.42	13.83	15.21	82.64	32.00	<3	2.64	3.99
Max		5.8	0.17	2.2	20.8	5.8	20.9	20.54	111	53	0	7.5	8.61
Min		0.38	0.01	0.012	9.4	0.09	9.7	10.98	58.4	23	0	1	0.825
GMean												2.22	

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Northglenn

	Total Influent	PI	PI	PI		PI	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC
	Flow	**BOD**	**BOD**	**TSS**	**BOD:TSS**	**pH**	**Flow**	**BOD**	**TSS**	**pH**	**E. coli**	**E. coli**	**Ammonia**	**NO2**	**NO3**	**TIN**	**WAD - CN**
	MGD	**mg/L**	**pound/day**	**mg/L**	**Ratio**	**SU**	MGD	mg/L	mg/L	SU	MPN/100 mL	MPN/100 mL	mg/L as N	mg/L as N	mg/L as N	mg/L as N	ug/l
		Composite		Composite	Calculated	Grab		Composite	Composite	Grab	Grab	Grab	Comp. 3xWeek	Comp. 3xWeek	Comp. 3xWeek	Comp. 3xWeek	Grab
		Weekly		3 X Week	0.82-1.43	No Limit		Weekly	3 X Week	Daily	Weekly	Weekly	Method TMA-001	Method TMA-001	Method TMA-001	Method TMA-001	2x Monthly
Sunday, December 26, 2021	2.81			236.60		6.99	2.58		8	6.65			1.49	0.384	4.47	6.344	
27-Dec	2.78	264	6127	280.00	0.94	7.02	2.58	7	10.2	6.78	45.5	45.5	2.74	0.394	4.99	8.124	
28-Dec	2.72			206.70		7.11	2.41		10	6.73			1.73	0.360	4.64	6.730	
29-Dec	2.75					6.93	2.58			6.66							
30-Dec	2.66					6.94	2.58			6.72							
31-Dec	2.75					7.23	2.58			6.74							
1-Jan	2.65					7.00	2.58			6.78							
Sunday, January 2, 2022	2.90			176.67		6.85	2.58			6.75	167.4	167.4					
3-Jan	2.87			236.67		6.85	2.58		8	6.60	218.7	218.7	4.71	0.495	3.96	9.165	
4-Jan	2.81	344	8068	216.67	1.59	7.07	2.65		7.6	6.69	770.1	770.1	3.33	0.522	3.80	7.652	
5-Jan	2.70					6.90	0.91	22	10.2	6.92			1.79	0.445	3.86	6.095	<5.00
6-Jan	2.65					7.25	0.78			7.47	8.4	8.4					
7-Jan	2.82					7.14	0.60			7.31	7.2	7.2					
8-Jan	2.89					7.15	0.65			7.24	5.1	5.1					
Sunday, January 9, 2022	2.95			246.67		6.96	0.66		8.4	6.81			1.34	0.479	4.24	6.059	
10-Jan	2.84			233.33		6.78	0.65		8.2	6.69	1.00	1	1.37	0.512	4.15	6.032	
11-Jan	2.82					6.86	0.65			6.65							
12-Jan	2.76					7.21	0.68			7.02							
13-Jan	2.71	279	6294	293.33	0.95	7.29	0.65	3	8.8	6.93			0.49	0.374	4.82	5.684	
14-Jan	2.76					7.26	0.70			6.87							<5.00
15-Jan	2.85					7.26	0.65			7.29							
Sunday, January 16, 2022	2.89					7.21	0.71		10	6.95			0.52	0.435	4.34	5.295	
17-Jan	2.91			246.67		7.15	0.67		12.2	6.95			0.71	0.423	3.86	4.993	
18-Jan	2.75			266.67		7.17	0.69	7	8.8	6.99	7.3	7.3	0.26	0.336	3.35	3.946	
19-Jan	2.61	237	5151	280.00	0.85	7.21	0.71			6.99							
20-Jan	2.68					7.28	2.47			7.12							
21-Jan	2.66					7.23	2.58			7.05							
22-Jan	2.82					7.25	2.58			7.06							
Sunday, January 23, 2022	2.95			290.00		7.08	2.58		11	6.91			0.58	0.478	5.24	6.298	
24-Jan	2.85			263.33		7.19	2.58	6	10.4	6.94	8.6	8.6	0.32	0.424	3.99	4.734	
25-Jan	2.72	183	4147	346.67	0.53	7.21	2.58		10.8	6.90			0.30	0.415	3.37	4.085	
26-Jan	2.72					7.20	2.58			6.86							
27-Jan	2.67					7.19	2.58			6.85							
28-Jan	2.72					7.23	2.58			6.83							
29-Jan	2.84					7.22	2.58			6.87							
Sunday, January 30, 2022	3.01			240.00		7.14	2.58		6.6	6.85	13.4	13.4	0.960	0.676	4.61	6.246	
31-Jan	2.83			240.00		7.16	2.58		7.8	6.88	5.2	5.2	1.33	0.817	4.12	6.267	
1-Feb	2.66	283	6281	292.00	0.97	7.37	2.58	6	7.4	6.88			0.57	0.674	4.14	5.384	<5
2-Feb	2.78					7.68	1.33			6.95							
3-Feb	2.77					7.31	0.71			6.96							
4-Feb	2.72					7.18	0.65			6.82							
5-Feb	2.99					7.30	0.71			6.90							
Sunday, February 6, 2022	3.07			213.30		7.89	0.72		10.2	6.97			0.85	0.59	3.91	5.349	
7-Feb	2.90			233.30		7.13	0.65		9.4	6.85	8.4	8.4	0.33	0.488	3.31	4.128	
8-Feb	2.80					7.30	0.65			6.98	7.4	7.4					
9-Feb	2.79					7.19	0.65			7.02							
10-Feb	2.71	224	5059	210.00	1.07	7.28	0.66	9	11	6.97			0.68	0.486	2.42	3.586	<5
11-Feb	2.71					7.24	0.65			7.04							
12-Feb	2.93					7.25	2.58			7.08							
Sunday, February 13, 2022	3.03			140.00		7.16	2.58		10.8	7.04			0.38	0.911	4.72	6.011	
14-Feb	2.87			280.00		7.27	2.58		8.6	7.04			0.65	0.942	3.64	5.232	
15-Feb	2.78	202	4682	252.00	0.8	7.17	2.58	4	12.6	6.91	52.90	52.9	0.18	0.680	3.31	4.170	
16-Feb	2.70					7.13	2.58			6.93							
17-Feb	2.86					7.10	2.58			6.85							
18-Feb	2.87					7.23	2.58			6.83							
19-Feb	3.02					7.20	2.58			6.83							
Sunday, February 20, 2022	2.97					7.09	2.58			6.88							
21-Feb	2.95			253.30		7.17	2.58		9.2	6.90			0.57	0.924	3.13	4.624	
22-Feb	2.84			256.70		7.23	2.58		10.2	6.88	14.6	14.6	0.29	0.812	3.21	4.312	
23-Feb	2.79	229	5319	312.00	0.73	7.21	2.58	6	9.2	6.95			0.33	0.793	3.49	4.613	
24-Feb	2.95					7.22	2.58			6.85							
25-Feb	2.87					7.25	2.58			6.94							
26-Feb	2.98					7.13	2.58			6.85							
Sunday, February 27, 2022	3.12			223.30		7.25	2.58		13.2	6.83			0.95	0.706	4.18	5.836	
28-Feb	3.00			156.70		7.07	2.58		11.6	6.81	28.5	28.5	1.04	0.760	3.92	5.720	
1-Mar	2.88	272	6542	280.00	0.97	7.47	1.77	9	10.8	6.87			0.37	0.559	3.86	4.789	<5
2-Mar	2.83					7.13	1.77			6.74							
3-Mar	2.94					7.14	1.77			6.75							
4-Mar	2.80					7.22	1.77			7.08							
5-Mar	2.88					7.24	1.77			7.18							
Sunday, March 6, 2022	3.04			210.00		7.10	1.77		12.8	6.89			0.70	0.38	5.27	6.353	
7-Mar	2.93			320.00		7.21	1.77		11.4	6.87			0.34	0.312	4.95	5.602	
8-Mar	2.93	219	5350	256.70	0.85	7.18	1.77	7	14.6	6.88	6.3	6.3	0.28	0.292	4.90	5.472	
9-Mar	2.84					7.23	1.77			6.88	3.1	3.1					
10-Mar	2.87					7.23	1.77			6.86							
11-Mar	2.91					7.20	1.77			6.83							

	Total Influent **Flow** **MGD**	PI **BOD** **mg/L** Composite Weekly	PI **BOD** **pound/day**	PI **TSS** **mg/L** Composite 3 X Week	**BOD:TSS** **Ratio** Calculated 0.82-1.43	PI **pH** **SU** Grab No Limit	007 BDC **Flow** MGD	007 BDC **BOD** mg/L Composite Weekly	007 BDC **TSS** mg/L Composite 3 X Week	007 BDC **pH** SU Grab Daily	007 BDC **E. coli** MPN/100 mL Grab Weekly	007 BDC **E. coli** MPN/100 mL Grab Weekly	007 BDC **Ammonia** mg/L as N Comp. 3xWeek Method TMA-001	007 BDC **NO2** mg/L as N Comp. 3xWeek Method TMA-001	007 BDC **NO3** mg/L as N Comp. 3xWeek Method TMA-001	007 BDC **TIN** mg/L as N Comp. 3xWeek Method TMA-001	007 BDC **WAD - CN** ug/l Grab 2x Monthly
12-Mar	2.97					7.16	1.77			6.81							
Sunday, March 13, 2022	2.97					7.16	1.77	8	13.6	6.87			0.90	0.317	5.76	6.977	
14-Mar	2.86	302	7213	296.70	1.02	7.15	1.77		13.2	6.88	4.10	4.1	0.33	0.273	5.68	6.283	
15-Mar	2.80			233.30		7.20	1.77			6.78							
16-Mar	2.80					7.15	1.77		34.2	6.83			0.34	0.210	6.57	7.120	
17-Mar	3.10			316.70		7.16	1.77			6.94			0.27				
18-Mar	2.99					7.21	1.77			6.84							
19-Mar	3.08					7.17	1.77			6.85							
Sunday, March 20, 2022	3.12			300.00		7.17	1.77	7	12.4	6.85			0.74	0.276	6.17	7.186	<5
21-Mar	2.89	260	6267	223.30	1.16	7.15	1.77		9.6	6.85	4.1	4.1	0.26	0.203	5.73	6.193	
22-Mar	2.88			256.70		7.21	1.77		11	6.88			0.27	0.219	7.44	7.929	
23-Mar	2.92					7.15	1.77			6.79							
24-Mar	2.81					7.15	1.77			6.82							
25-Mar	2.81					7.21	1.77			6.86							
26-Mar	2.88					7.18	1.77			6.81							
Sunday, March 27, 2022	2.97					7.08	1.77			6.76							
28-Mar	2.92					7.16	1.77		17.6	6.85			0.81	0.299	6.25	7.359	
29-Mar	2.96			263.30		7.77											
30-Mar	2.83			206.70		7.24	1.77	10	13.6	6.95			0.17	0.182	4.10	4.452	
31-Mar	2.88	355	8527	313.30	1.13	7.18	1.35		17.6	6.93	7.4	7.4	0.12	0.141	3.07	3.331	
1-Apr	2.81					7.16	1.68			6.89							
2-Apr	2.88					7.20	1.68		13.6	6.81							
Sunday, April 3, 2022	3.06			243.30		7.07	1.68		14.2	6.78			0.52	0.24	5.81	6.574	
4-Apr	2.96			296.70		7.10	1.68		12.6	6.83	5.2	5.2	0.42	0.262	5.62	6.302	
5-Apr	2.87	153	3663	233.30	0.66	7.23	1.68	12	18.4	6.77	3	3	0.41	0.214	5.76	6.384	
6-Apr	2.85					7.18	1.68			6.75							<5
7-Apr	2.82					7.16	1.68			6.77							
8-Apr	2.85					7.90	1.68			6.74							
9-Apr	2.91					7.21	1.68			6.72							
Sunday, April 10, 2022	3.17			216.70		7.25	1.68	11	19.6	6.81			1.18	0.244	6.08	7.504	
11-Apr	2.94	171	4193	270.00	0.63	7.15	1.68		20.8	6.94	4.10	4.1	0.60	0.252	5.39	6.242	
12-Apr	2.82					7.29	1.68			7.08							
13-Apr	2.87					7.14	2.49			6.94							
14-Apr	2.82			393.30		7.14	2.19		17	6.94			0.52	0.229	5.27	6.019	
15-Apr	2.82					7.20	2.19			6.97							
16-Apr	2.91					7.19	2.19			7.01							
Sunday, April 17, 2022	3.01			243.30		7.25	2.19	10	15	6.92			0.45	0.240	3.79	4.480	
18-Apr	2.90	173	4186	253.30	0.68	7.06	2.19		11	6.91	9.6	9.6	0.48	0.243	3.59	4.313	<5
19-Apr	3.04			236.70		7.15	2.19		12.6	6.94			0.49	0.249	3.84	4.579	
20-Apr	2.87					7.21	2.19			7.02							
21-Apr	2.85					7.24	3.03			6.94							
22-Apr	2.93					7.14	1.35			6.93							
23-Apr	3.04					7.13	2.18			6.97							
Sunday, April 24, 2022	3.06			326.70		7.15	2.19		12	6.84			0.90	0.304	6.95	8.154	
25-Apr	2.96			270.00		7.13	2.19		11	6.81	4.1	4.1	0.71	0.319	6.07	7.099	
26-Apr	3.01	173	4340	276.70	0.63	7.06	2.26	4	8	6.79			0.34	0.262	6.15	6.752	
27-Apr	2.85					7.52	2.26			7.03							
28-Apr	2.93					7.24	2.26			6.97							
29-Apr	2.86					7.14	2.26			6.77							
30-Apr	2.95					7.20	2.26			6.99							
Sunday, May 1, 2022	2.99			286.67		7.18	2.26		11.4	6.94			0.21	0.275	6.05	6.535	
2-May	2.94	268	6578	260.00	1.03	7.10	2.26	8	12.4	6.89	6.3	6.3	0.46	0.364	5.97	6.794	<5
3-May	2.83			250.00		7.49	2.26		12.4	6.90	248.1	248.1	0.28	0.328	5.55	6.158	
4-May	2.94					7.21	2.26			6.88							
5-May	2.98					7.23	2.26			6.91							
6-May	2.85					7.28	1.61			6.97							
7-May	2.99					7.23	1.61			6.98							
Sunday, May 8, 2022	3.10			176.67		7.28	1.61	6	8	7.06			0.12	0.25	6.68	7.047	
9-May	3.03	290	7321	273.33	1.06	7.39	1.61		9.8	7.11	4.1	4.1	0.10	0.242	5.90	6.242	
10-May	2.90					7.50	1.61			7.15							
11-May	2.92					7.39	2.65			7.01							
12-May	3.01			293.33		7.61	3.00		6	7.06			0.11	0.180	7.40	7.690	
13-May	2.83					7.27	3.21			7.05							
14-May	2.98					7.37	2.20			7.23							
Sunday, May 15, 2022	3.08			213.33		7.40	1.94		6.6	7.21			0.24	0.246	6.46	6.946	
16-May	2.98	244	6054	306.67	0.8	7.41	1.94	0	6.4	7.09	2.00	2	0.13	0.203	7.99	8.323	<5
17-May	2.87			280.00		7.25	3.24		7.2	7.88			0.11	0.163	6.66	6.933	
18-May	2.90					7.20	3.26			7.08							
19-May	2.92					7.17	0.69			7.01							
20-May	2.98					7.12	2.59			6.95							
21-May	3.43					7.37	3.89			7.10							
Sunday, May 22, 2022	3.36			246.67		7.25	3.82		5.4	7.11			0.16	0.275	8.32	8.755	
23-May	3.12			243.33		7.37	2.91		7	7.17	2	2	0.13	0.289	7.43	7.849	
24-May	3.13	204	5330	233.33	0.87	7.20	2.91			7.06							
25-May	3.07					7.31	0.69	3	5.6	6.88			0.12	0.218	7.01	7.348	
26-May	3.06					7.25	0.00										

	Total Influent Flow MGD	PI BOD mg/L Composite Weekly	PI BOD pound/day	PI TSS mg/L Composite 3 X Week	BOD:TSS Ratio Calculated 0.82-1.43	PI pH SU Grab No Limit	007 BDC Flow MGD	007 BDC BOD mg/L Composite Weekly	007 BDC TSS mg/L Composite 3 X Week	007 BDC pH SU Grab Daily	007 BDC E. coli MPN/100 mL Grab Weekly	007 BDC E. coli MPN/100 mL Grab Weekly	007 BDC Ammonia mg/L as N Comp. 3xWeek Method TMA-001	007 BDC NO2 mg/L as N Comp. 3xWeek Method TMA-001	007 BDC NO3 mg/L as N Comp. 3xWeek Method TMA-001	007 BDC TIN mg/L as N Comp. 3xWeek Method TMA-001	007 BDC WAD - CN ug/l Grab 2x Monthly
27-May	3.07					7.31	2.91			6.97							
28-May	3.10					7.17	3.54			6.93							
Sunday, May 29, 2022	3.07					7.19	2.91			6.91							
30-May	3.28			253.33		7.19	2.91		4.2	6.93			0.18	0.337	7.18	7.697	
31-May	3.31	213		243.33	0.88	7.15	2.90	5	6	6.97	1	1	0.30	0.472	7.14	7.912	
1-Jun	3.678					7.57	2.899			7.04							
2-Jun	3.306			220.00		7.41	2.900		5.4	7.06			0.12	0.238	5.50	5.858	
3-Jun	3.169					7.36	2.900			7.05							
4-Jun	3.388					7.52	2.900			7.12							
Sunday, June 5, 2022	3.389			166.70		7.44	2.899		4.8	7.09			0.15	0.293	7.19	7.633	
6-Jun	3.292	202	5546	243.30	0.83	7.39	2.900	4	5.6	7.12	1	1	0.20	0.376	7.06	7.636	<5
7-Jun	3.198			233.30		7.45	2.899		4.6	7.08	1	1	0.16	0.355	6.62	7.135	
8-Jun	3.149					7.48	2.899			7.20							
9-Jun	3.073					7.49	2.899			7.22							
10-Jun	3.153					7.40	2.900			7.15							
11-Jun	3.194					7.39	2.899			7.09							
Sunday, June 12, 2022	3.351			236.70		7.37	2.900		6	7.10			0.16	0.230	5.16	5.550	
13-Jun	3.155			263.30		7.40	2.899		6.2	7.10	1	1	0.72	0.472	3.82	5.012	
14-Jun	3.119	244	6347	253.30	0.96	7.76	2.899	5	5.2	7.39			0.19	0.323	5.27	5.783	<5
15-Jun	2.997					7.63	2.899			6.99							
16-Jun	0.922					7.73	1.082			7.19							
17-Jun	3.299					7.21	2.866			7.02							
18-Jun	3.055					7.34	2.899			7.17							
################	3.161					7.27	2.899			7.08							
20-Jun	3.083			243.30		7.35	2.899		8	7.07			0.14	0.346	8.32	8.806	
21-Jun	3.054			270.00		7.28	2.900		7.2	7.07	2	2	0.12	0.378	6.98	7.478	
22-Jun	2.990	232	5785	280.00	0.83	7.27	2.899	9	8.2	7.10			0.13	0.337	6.46	6.927	
23-Jun	3.004					7.22	1.344			6.96							
24-Jun	2.974					7.25	1.299			7.06							
25-Jun	2.894					7.21	1.299			7.10							
Sunday, June 26, 2022	3.024			270.00		7.23	1.300		8.4	7.10			0.14	0.284	8.41	8.834	
27-Jun	2.913	230	5588	266.70	0.86	7.23	3.278	5	11.4	7.07	2	2	0.17	0.366	7.78	8.316	
28-Jun	3.015			303.30		7.27	2.824		10	7.12			0.16	0.498	7.71	8.368	
29-Jun	2.994					7.22	3.414			7.20							
30-Jun	2.916					7.12	2.856			7.09							
1-Jul	3.037					7.35	3.511			7.24							
2-Jul	2.947					7.22	3.388			7.29							
Sunday, July 3, 2022	3.070					7.26	3.482			7.06							
4-Jul	3.029			276.70		7.16	3.462		6	7.01			0.15	0.277	7.38	7.807	
5-Jul	3.070			253.30		7.35	3.475		6.8	7.12			0.13	0.389	7.52	8.039	
6-Jul	2.989	257	6407	306.70	0.84	7.23	3.472	9	7	7.25			0.11	0.297	7.49	7.897	<5.0
7-Jul	2.995					7.30	2.909			7.20	1	1					
8-Jul	2.955					7.21	2.909			7.06							
9-Jul	2.883					7.29	2.909			7.08							
Sunday, July 10, 2022	3.067			273.30		7.17	2.910		5.6	7.10			0.00	0.354	7.79	8.144	
11-Jul	2.853	284	6758	310.00	0.92	7.21	2.909	9	5.6	7.00	0	1	0.12	0.362	8.00	8.482	
12-Jul	2.897					7.25	2.909			7.09							
13-Jul	2.832					7.20	2.909			7.12							
14-Jul	2.796			333.30		7.25	1.929		6	7.06			0.15	0.275	7.90	8.325	
15-Jul	2.834					7.13	1.929			7.04							
16-Jul	2.840					7.18	1.930			7.03							
Sunday, July 17, 2022	2.986			306.70		7.28	1.929		7	7.08			0.15	0.401	7.90	8.451	
18-Jul	2.911			316.70		7.22	1.929		7.6	7.03	0	1	0.11	0.297	7.28	7.687	
19-Jul	2.855			306.70		7.22	3.184			7.11							
20-Jul	2.859	284	6772			7.30	3.276	6	8.8	7.13			0.12	0.341	7.38	7.841	<5.0
21-Jul	2.798					7.48	3.168			7.12							
22-Jul	2.827					7.20	3.158			7.21							
23-Jul	2.911					7.21	3.305			7.09							
Sunday, July 24, 2022	3.037			352.00		7.18	3.496		6.8	6.98	0	1	0.15	0.334	7.00	7.484	
25-Jul	2.916	275	6688	392.00	0.7	7.11	3.295	6	5.8	7.00	3.1	3.1	0.19	0.596	6.12	6.906	
26-Jul	2.973			344.00		7.44	3.378		7.2	7.08			0.13	0.382	4.68	5.192	
27-Jul	3.071					7.28	3.534			7.07							
28-Jul	2.957					7.21	3.411			7.19							
29-Jul	2.831					7.25	3.262			7.19							
30-Jul	2.977					7.27	3.399			7.17							
Sunday, July 31, 2022	2.985			272.00		7.27	3.41		7.4	6.88			0.00	0.299	5.53	5.829	
1-Aug	2.957	260	6412	276.00	0.94	7.16	3.347	5	5.4	7.01	2	2	0.00	0.230	5.54	5.770	<5
2-Aug	2.897			280.00		7.27	3.313		6.4	7.03			0.00	0.270	5.05	5.320	
3-Aug	2.833					7.24	3.227			7.04							
4-Aug	2.860					7.39	3.231			7.18							
5-Aug	2.868					7.27	3.400			7.27							
6-Aug	2.933					7.01	3.643			7.19							
Sunday, August 7, 2022	3.291			316.00		7.28	4.020		5	7.39			0.51	0.922	9.89	11.322	
8-Aug	3.257	293	7959	516.00	0.57	7.23	3.906	7	8.6	7.21	0	1	0.77	1.208	8.30	10.278	
9-Aug	3.065					7.20	3.664			7.12	0	1					
10-Aug	3.043					7.34	3.569			7.08							

	Total Influent Flow MGD	PI BOD mg/L Composite Weekly	PI BOD pound/day	PI TSS mg/L Composite 3 X Week	BOD:TSS Ratio Calculated 0.82-1.43	PI pH SU Grab No Limit	007 BDC Flow MGD	007 BDC BOD mg/L Composite Weekly	007 BDC TSS mg/L Composite 3 X Week	007 BDC pH SU Grab Daily	007 BDC E. coli MPN/100 mL Grab Weekly	007 BDC E. coli MPN/100 mL Grab Weekly	007 BDC Ammonia mg/L as N Comp. 3xWeek Method TMA-001	007 BDC NO2 mg/L as N Comp. 3xWeek Method TMA-001	007 BDC NO3 mg/L as N Comp. 3xWeek Method TMA-001	007 BDC TIN mg/L as N Comp. 3xWeek Method TMA-001	007 BDC WAD - CN ug/l Grab 2x Monthly
11-Aug	3.103			273.33		7.38	3.615		4.6	7.09			0.20	0.210	7.77	8.180	
12-Aug	3.093					7.21	3.714			7.10							
13-Aug	3.074					7.19	3.755			6.98							
Sunday, August 14, 2022	3.186			290.00		7.16	3.825		10.4	6.98			0.24	0.234	8.93	9.404	
15-Aug	3.100					7.14	3.735		6.6	7.03	1	1	0.23	0.360	9.06	9.650	
16-Aug	3.348			300.00		7.14	4.071		6	7.02			0.15	0.299	8.69	9.139	
17-Aug	3.139	215	5629	240.00	0.9	7.28	3.724	6		7.04							<5
18-Aug	3.042					7.21	3.490			7.03							
19-Aug	3.013					7.27	3.600			7.05							
20-Aug	3.119					7.29	3.792			7.16							
##################	3.242			323.30		7.39	3.951		4.8	7.09			0.00	0.305	8.15	8.455	
22-Aug	3.138	275	7197	296.70	0.93	7.26	3.492	10	7.6	7.04	7.5	7.5	0.17	0.451	7.14	7.761	
23-Aug	3.137					7.25	3.674		6.6	7.11			0.14	0.292	6.83	7.262	
24-Aug	2.936			366.70		7.28	3.390			7.03							
25-Aug	3.081					7.35	3.529			7.14							
26-Aug	2.924					7.29	3.294			7.06							
27-Aug	3.092					7.29	3.433			7.12							
Sunday, August 28, 2022	3.212			336.70		7.33	3.565		3.8	7.16			0.19	0.247	6.55	6.987	
29-Aug	3.219	224	6014	313.30	0.71	7.39	3.596	5	4	7.15	1	1	0.18	0.308	6.08	6.568	
30-Aug	2.941					7.18	3.218		5.4	7.05			0.19	0.267	5.26	5.717	
1-Sep	2.923					7.19	3.246			7.05							
2-Sep	2.867					7.15	3.308			6.99							<5
3-Sep	2.881					7.13	3.338			6.89							
Sunday, September 4, 2022	2.891					7.13	3.338			6.91							
5-Sep	3.044			336.70		7.13	3.496		3.8	6.95	0	1	0.17	0.286	7.16	7.616	
6-Sep	2.897			286.70		7.16	3.248		3.4	7.04	3	3	0.14	0.334	6.99	7.464	
7-Sep	3.121	264	6872	350.00	0.75	7.21	3.568	3	3.4	7.00			0.12	0.214	6.51	6.844	
8-Sep	2.832					7.42	1.918			7.05							
9-Sep	2.783					7.26	4.511			7.08							
10-Sep	3.029					7.22	3.518			7.12							
Sunday, September 11, 2022	3.142					7.21	3.581			7.04							
12-Sep	2.937			316.00		7.21	3.294		3.8	7.00			0.12	0.323	6.29	6.733	
13-Sep	2.884	213	5123	260.00	0.82	7.18	3.279	4	3.6	7.01	1.00	1	0.17	0.210	5.78	6.160	<5
14-Sep	2.813					7.20	3.228			7.11							
15-Sep	2.886			316.70		7.29	3.280		4.2	7.18			0.12	0.213	7.09	7.423	
16-Sep	2.824					7.32	3.287			7.14							
17-Sep	2.956					7.39	3.436			7.27							
##################	3.063			280.00		7.19	3.606		3.6	6.98			0.13	0.221	8.86	9.211	
19-Sep	2.972	343	8502	320.00	1.07	7.30	3.307	9	3.8	7.01	2	2	0.13	0.393	9.58	10.103	
20-Sep	2.836			313.30		7.56	3.174		3.6	7.13			0.16	0.518	9.01	9.688	
21-Sep	2.850					7.22	3.344			6.90							
22-Sep	2.941					7.22	3.467			7.10							
23-Sep	2.820					7.11	3.267			7.09							
24-Sep	2.825					7.53	3.260			7.03							
Sunday, September 25, 2022	3.008			276.70		7.11	3.286		3.4	7.01			0.14	0.301	8.85	9.291	
26-Sep	2.874			293.30		7.34	3.188		3.6	7.02	2	2	0.12	0.248	6.00	6.368	
27-Sep	2.842	266	6305	253.30	1.05	7.31	3.221	5	2.8	7.25			0.10	0.191	5.13	5.421	
28-Sep	2.725					7.07	3.066			6.99							
29-Sep	2.727					7.09	3.069			7.04							
30-Sep	2.765					7.19	3.275			6.89							
1-Oct	2.900					7.19	3.429			6.93							
Sunday, October 2, 2022	2.943					7.07	3.428			6.89							
3-Oct	2.941			290.00		7.06	3.443		4.4	7.01			0.25	0.689	9.13	10.069	
4-Oct	2.846			233.30		7.03	3.329		4	6.94			0.13	0.347	9.60	10.077	
5-Oct	2.860	206	4914	286.70	0.72	7.06	3.326	3	4.6	6.86	6.3	6.3	0.13	0.272	10.00	10.402	<5
6-Oct	2.766					7.06	3.081			6.84	9.5	9.5					
7-Oct	2.740					7.10	3.257			6.96							
8-Oct	2.968					7.08	3.404			7.00							
Sunday, October 9, 2022	3.039			296.70		7.08	3.495		6.6	6.86			0.15	0.472	12.00	12.622	
10-Oct	2.891			250.00		7.07	3.349		7.4	6.98	8.4	8.4	0.33	0.723	9.73	10.783	
11-Oct	2.780	258	5982	246.70	1.05	7.15	3.430	4	7.4	6.97			0.14	0.384	10.10	10.624	
12-Oct	2.749					7.20	3.078			7.07							
13-Oct	2.779					7.21	3.058			7.14							
14-Oct	2.732					7.46	3.022			7.26							
15-Oct	2.844					7.35	3.151			7.10							
##################	2.968			310.00		7.28	3.234		8.4	7.14			0.11	0.221	8.86	9.191	
17-Oct	2.788			293.30		7.19	3.039	9	7.6	7.14	3.1	3.1	0.17	0.393	9.58	10.143	
18-Oct	2.717					7.28	2.985			7.07							
19-Oct	2.764					7.13	3.067			7.11							
20-Oct	2.740	292	6673	343.30	0.85	7.43	3.051	2	6	7.28			0.13	0.360	6.36	6.850	
21-Oct	2.669					7.36	2.976			7.13			1.07	0.334	5.75	7.154	
22-Oct	2.841					7.33	3.138			7.30							
Sunday, October 23, 2022	2.991			196.70		7.15	3.287		6	7.12			0.26	0.690	6.20	7.150	
24-Oct	2.836	223	5274	303.30	0.74	7.33	3.117	3	9.4	7.06	2	2	0.54	0.826	5.57	6.936	<5
25-Oct	2.746			260.00		7.19	3.016		6.2	7.02			0.23	0.530	5.30	6.060	
26-Oct	2.728					7.25	2.982			6.99							

	Total Influent	PI	PI	PI		PI	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC	007 BDC
	Flow	**BOD**	**BOD**	**TSS**	**BOD:TSS**	**pH**	**Flow**	**BOD**	**TSS**	**pH**	**E. coli**	**E. coli**	**Ammonia**	**NO2**	**NO3**	**TIN**	**WAD - CN**
	MGD	**mg/L**	**pound/day**	**mg/L**	**Ratio**	**SU**	MGD	mg/L	mg/L	SU	MPN/100 mL	MPN/100 mL	mg/L as N	mg/L as N	mg/L as N	mg/L as N	ug/l
		Composite		Composite	Calculated	Grab		Composite	Composite	Grab	Grab	Grab	Comp. 3xWeek	Comp. 3xWeek	Comp. 3xWeek	Comp. 3xWeek	Grab
		Weekly		3 X Week	0.82-1.43	No Limit		Weekly	3 X Week	Daily	Weekly	Weekly	Method TMA-001	Method TMA-001	Method TMA-001	Method TMA-001	2x Monthly
27-Oct	2.813					7.21	3.096			7.03							
28-Oct	2.652					7.25	2.959			6.96							
29-Oct	2.811					7.19	3.153			6.92							
################	2.975			193.30		7.15	3.267		5.6	6.97			0.83	0.944	5.05	6.824	
31-Oct	2.698			253.30		7.42	3.036		5.8	6.98			1.58	1.210	4.27	7.060	
1-Nov	2.757	337	7749	353.30	0.95	7.38	3.136	5	4.6	7.16	3.1	3.1	0.41	0.883	4.15	5.443	<5
2-Nov	2.801					7.13	3.184			6.87	1	1					
3-Nov	2.852					7.05	3.268			6.98							
4-Nov	2.870					7.06	3.261			7.34							
5-Nov	2.946					7.07	3.378			6.84							
Sunday, November 6, 2022	3.095			213.30		7.48	3.572		6.2	6.99			1.38	1.170	6.70	9.250	
7-Nov	2.791	310	7216	253.30	1.22	7.10	3.239	4	5.4	6.86			1.89	1.330	5.54	8.760	
8-Nov	2.757			266.70		7.13	3.214		4.8	6.96	1	1	0.47	1.030	5.54	7.040	
9-Nov	2.725					7.58	3.140			6.77							
10-Nov	2.681					7.22	3.122			6.81							
11-Nov	2.725					7.46	3.111			7.30							
12-Nov	2.826					7.16	3.249			6.84							
Sunday, November 13, 2022	2.927			270.00		7.10	3.380		5.6	6.82			0.87	1.590	5.55	8.010	
14-Nov	2.772	300	6936	253.30	1.18	7.08	3.206	5	6.4	7.26	159.7	159.7	1.85	1.720	5.07	8.640	<5
15-Nov	2.715					7.17	3.155			6.89			1.81	1.920	5.05	8.780	
16-Nov	2.726					7.26	3.167			6.90							
17-Nov	2.763			290.00		7.61	3.209		6.6	6.92							
18-Nov	2.767					7.47	3.168			6.87							
19-Nov	2.933					7.28	3.542			6.92							
################	2.980			350.00		7.09	3.411		6.8	7.16			2.32	1.770	3.83	7.920	
21-Nov	2.802	253	5912	286.70	0.88	7.21	3.241	5	7.6	6.89	184.7	184.7	2.54	1.910	2.93	7.380	
22-Nov	2.805			243.30		7.33	3.237		7	6.89			0.92	1.910	2.75	5.580	
23-Nov	2.826					7.37	3.177			6.97							
24-Nov	2.863					7.34	3.234			6.92							
25-Nov	2.702					7.89	3.040			7.96							
26-Nov	2.817					7.33	3.192			7.18							
Sunday, November 27, 2022	2.984			233.30		7.55	3.346		8.4	7.05			2.55	2.320	2.00	6.870	
28-Nov	2.779			286.70		7.30	3.174		9	7.10	5.1	5.1	2.61	2.300	1.95	6.860	
29-Nov	2.787					7.29	3.124		6.8	7.11			0.77	2.510	1.91	5.190	
30-Nov	2.808	308	7213	416.70	0.74	7.64	3.132	10		7.57							
1-Dec	2.819					7.15	3.220			6.91							
2-Dec	2.750					7.54	3.119			6.97							
3-Dec	2.797					7.17	3.107			7.00							
4-Dec	3.009					7.15	3.307			6.94							
5-Dec	2.848					7.04	3.179		8	6.90			0.70	1.940	0.799	3.439	
6-Dec	2.719			170.00		7.26	3.054		9.2	7.00	17.1	17.1	0.71	2.330	1.170	4.210	
7-Dec	2.817	273	6414	313.30	0.87	7.68	3.165	9		7.29	18.5	18.5					<5
8-Dec	2.812			230.00		7.31	3.157		7.6	6.93			1.62	2.460	1.570	5.650	
9-Dec	2.563					7.24	3.050			6.94							
10-Dec	2.821					7.27	3.151			6.84							
11-Dec	2.951			270.00		7.22	3.280		7.8	6.78			2.30	2.600	1.990	6.890	
12-Dec	2.771	266	6147	266.70	1	7.24	3.133	8	8.6	7.34	24.6	24.6	5.81	1.910	1.100	8.820	
13-Dec	2.704			253.30		7.47	3.065		9.2	7.40			9.62	1.800	0.716	12.136	
14-Dec	2.745					7.58	3.112			7.07							
15-Dec	2.663					7.25	3.053			7.06			1.70	2.460	1.440	5.600	<5
16-Dec	2.708					7.16	3.098			6.94							
17-Dec	2.854					7.28	3.113			7.08							
18-Dec	2.856			270.00		7.59	3.182		8.6	7.22			2.84	2.660	1.460	6.960	
19-Dec	2.752	343	7872	266.70	1.29	7.46	3.170	7	7.6	7.21	1	1	3.65	2.340	1.200	7.190	
20-Dec	2.749					6.33	3.160		8.2	6.91			3.11	2.140	1.180	6.430	
21-Dec	2.721			240.00		7.28	3.069			7.06							
22-Dec	2.968						3.157			7.28							
23-Dec	2.912					7.27	3.128			6.80							
24-Dec	2.995					7.22	3.375			7.14							
25-Dec	2.797					7.30	3.190			7.05							
26-Dec	2.993					7.13	3.361			7.04							
27-Dec	2.956					7.15	3.363			7.57							
28-Dec	2.865	263	6284	243.30	1.08	7.19	3.326	7	9.8	7.33			6.49	0.632	1.820	8.942	
29-Dec	2.904			513.30		7.38	3.303		9.2	7.40	9.7	9.7	6.91	0.636	2.800	10.346	
30-Dec	2.925			270.00		7.14	3.300		9.2	7.25			7.69	0.495	3.600	11.785	
31-Dec	3.129					7.10	3.470			6.97							

	007 BDC **Boron (T)** mg/l Composite 2x Monthly	007 BDC **Fe (Dis)** ug/l Composite 2x Monthly	007 BDC **Fe (TR)** ug/l Composite 2x Monthly	007 BDC **Mn (Dis)** ug/l Composite 2x Monthly	007 BDC **Sulfide as H2S** mg/l Composite 2x Monthly	007 BDC **Sulfate** mg/l Composite 2x Monthly	007 BDC **Chloride** mg/l Composite 2x Monthly	007 BDC **Nonylphenol** ug/l Grab Monthly	007 BDC **Total Phosphorus** mg/l Composite Monthly	BOD **Removal** % to BDC	TSS **Removal** % to BDC
Sunday, December 26, 2021											96.62
27-Dec										97.35	96.36
28-Dec											95.16
29-Dec											
30-Dec											
31-Dec											
1-Jan											
Sunday, January 2, 2022											
3-Jan											96.62
4-Jan											96.49
5-Jan	0.33	60	78	119.3	<0.1	183.61	147.61	<4.7			
6-Jan											
7-Jan											
8-Jan											
Sunday, January 9, 2022											96.59
10-Jan											96.49
11-Jan											
12-Jan											
13-Jan	0.38	38	57	141.1	<0.1	175.65	114.94		0.237	98.92	97.00
14-Jan											
15-Jan											
Sunday, January 16, 2022											
17-Jan											95.05
18-Jan											96.70
19-Jan											
20-Jan											
21-Jan											
22-Jan											
Sunday, January 23, 2022											96.21
24-Jan											96.05
25-Jan											96.88
26-Jan											
27-Jan											
28-Jan											
29-Jan											
Sunday, January 30, 2022											97.25
31-Jan											96.75
1-Feb	0.35	43	74	153.8	<0.1	196.09	133.19			97.88	97.47
2-Feb											
3-Feb											
4-Feb											
5-Feb											
Sunday, February 6, 2022											95.22
7-Feb											95.97
8-Feb											
9-Feb											
10-Feb	0.3	48	79	146.3	<0.1	234.03	151.02		0.162	95.98	94.76
11-Feb											
12-Feb											
Sunday, February 13, 2022											92.29
14-Feb											96.93
15-Feb								<5.3		98.02	95.00
16-Feb											
17-Feb											
18-Feb											
19-Feb											
Sunday, February 20, 2022											
21-Feb											96.37
22-Feb											96.03
23-Feb										97.38	97.05
24-Feb											
25-Feb											
26-Feb											
Sunday, February 27, 2022											94.09
28-Feb											92.60
1-Mar	0.32	56	70	146.7	<0.1	199.32	139.79			96.69	96.14
2-Mar											
3-Mar											
4-Mar											
5-Mar											
Sunday, March 6, 2022											93.90
7-Mar											96.44
8-Mar										96.80	94.31
9-Mar								<5.2			
10-Mar											
11-Mar											

	007 BDC **Boron (T)** mg/l Composite 2x Monthly	007 BDC **Fe (Dis)** ug/l Composite 2x Monthly	007 BDC **Fe (TR)** ug/l Composite 2x Monthly	007 BDC **Mn (Dis)** ug/l Composite 2x Monthly	007 BDC **Sulfide as H2S** mg/l Composite 2x Monthly	007 BDC **Sulfate** mg/l Composite 2x Monthly	007 BDC **Chloride** mg/l Composite 2x Monthly	007 BDC **Nonylphenol** ug/l Grab Monthly	007 BDC **Total Phosphorus** mg/l Composite Monthly	BOD **Removal** % to BDC	TSS **Removal** % to BDC
12-Mar											
Sunday, March 13, 2022											
14-Mar											95.55
15-Mar											
16-Mar											
17-Mar									0.316		
18-Mar											
19-Mar											
Sunday, March 20, 2022	0.35	32	59	75.2	<0.1	251.8	137.2				95.87
21-Mar											95.70
22-Mar											95.71
23-Mar											
24-Mar											
25-Mar											
26-Mar											
Sunday, March 27, 2022											
28-Mar											
29-Mar											
30-Mar											93.42
31-Mar											94.38
1-Apr											
2-Apr											
Sunday, April 3, 2022											94.16
4-Apr											95.75
5-Apr	0.31	54	104	50.2	<0.1	241.42	124.9			92.16	92.11
6-Apr											
7-Apr											
8-Apr											
9-Apr											
Sunday, April 10, 2022											90.96
11-Apr											92.30
12-Apr											
13-Apr											
14-Apr									0.448		95.68
15-Apr											
16-Apr											
Sunday, April 17, 2022	0.33	48	92	161.2	<0.1	232.88	130.07				93.83
18-Apr											95.66
19-Apr								<5.3			94.68
20-Apr											
21-Apr											
22-Apr											
23-Apr											
Sunday, April 24, 2022											96.33
25-Apr											95.93
26-Apr										97.69	97.11
27-Apr											
28-Apr											
29-Apr											
30-Apr											
Sunday, May 1, 2022											96.02
2-May	0.36	44	87	264.4	<0.1	216.44	124.16			97.01	95.23
3-May											95.04
4-May											
5-May											
6-May											
7-May											
Sunday, May 8, 2022											95.47
9-May											96.41
10-May											
11-May											
12-May									0.202		97.95
13-May											
14-May											
Sunday, May 15, 2022											96.91
16-May	0.33	19	30	264.3	<0.1	240.24	133.13				97.91
17-May								<5.1			97.43
18-May											
19-May											
20-May											
21-May											
Sunday, May 22, 2022											97.81
23-May											97.12
24-May											
25-May											
26-May											

	007 BDC **Boron (T)** mg/l Composite 2x Monthly	007 BDC **Fe (Dis)** ug/l Composite 2x Monthly	007 BDC **Fe (TR)** ug/l Composite 2x Monthly	007 BDC **Mn (Dis)** ug/l Composite 2x Monthly	007 BDC **Sulfide as H2S** mg/l Composite 2x Monthly	007 BDC **Sulfate** mg/l Composite 2x Monthly	007 BDC **Chloride** mg/l Composite 2x Monthly	007 BDC **Nonylphenol** ug/l Grab Monthly	007 BDC **Total Phosphorus** mg/l Composite Monthly	BOD **Removal** % to BDC	TSS **Removal** % to BDC
27-May											
28-May											
Sunday, May 29, 2022											98.34
30-May											97.53
31-May										97.65	
1-Jun											97.55
2-Jun									0.239		
3-Jun											
4-Jun											
Sunday, June 5, 2022											97.12
6-Jun	0.4	20	30	172.5	<0.1	294.34	137.15			98.02	97.70
7-Jun											98.03
8-Jun											
9-Jun											
10-Jun											
11-Jun											
Sunday, June 12, 2022											97.47
13-Jun											97.65
14-Jun	0.38	20	31	310.4	<0.1	251.97	122.74			97.95	97.95
15-Jun											
16-Jun											
17-Jun											
18-Jun											
##################											96.71
20-Jun											97.33
21-Jun											97.07
22-Jun								<5		96.12	
23-Jun											
24-Jun											
25-Jun											
Sunday, June 26, 2022											96.89
27-Jun										97.83	95.73
28-Jun											96.70
29-Jun											
30-Jun											
1-Jul											
2-Jul											
Sunday, July 3, 2022											97.83
4-Jul											97.32
5-Jul											97.72
6-Jul	0.31	17	37	371	<0.1	218.28	133.63			96.50	
7-Jul											
8-Jul											
9-Jul											
Sunday, July 10, 2022											97.95
11-Jul										96.83	98.19
12-Jul											
13-Jul											
14-Jul									0.212		98.20
15-Jul											
16-Jul											
Sunday, July 17, 2022											97.72
18-Jul											97.60
19-Jul											
20-Jul	0.3	24	42	341.5	<0.1	197.41	116.57	<4.9		97.89	
21-Jul											
22-Jul											
23-Jul											
Sunday, July 24, 2022											98.07
25-Jul										97.82	98.52
26-Jul											97.91
27-Jul											
28-Jul											
29-Jul											
30-Jul											
Sunday, July 31, 2022											97.28
1-Aug	0.41	16	27	220.7	<0.1	219.36	120.91			98.08	98.04
2-Aug											97.71
3-Aug											
4-Aug											
5-Aug											
6-Aug											
Sunday, August 7, 2022											98.42
8-Aug										97.61	98.33
9-Aug											
10-Aug											

	007 BDC **Boron (T)** mg/l Composite 2x Monthly	007 BDC **Fe (Dis)** ug/l Composite 2x Monthly	007 BDC **Fe (TR)** ug/l Composite 2x Monthly	007 BDC **Mn (Dis)** ug/l Composite 2x Monthly	007 BDC **Sulfide as H2S** mg/l Composite 2x Monthly	007 BDC **Sulfate** mg/l Composite 2x Monthly	007 BDC **Chloride** mg/l Composite 2x Monthly	007 BDC **Nonylphenol** ug/l Grab Monthly	007 BDC **Total Phosphorus** mg/l Composite Monthly	BOD **Removal** % to BDC	TSS **Removal** % to BDC
11-Aug									0.887		98.32
12-Aug											
13-Aug											
Sunday, August 14, 2022											96.41
15-Aug											
16-Aug											98.00
17-Aug	0.3	10	30	94.6	<0.1	194.56	107.32	<4.7		97.21	
18-Aug											
19-Aug											
20-Aug											
##################											98.52
22-Aug										96.36	97.44
23-Aug											
24-Aug											
25-Aug											
26-Aug											
27-Aug											
Sunday, August 28, 2022											98.87
29-Aug										97.77	98.72
30-Aug											
1-Sep											
2-Sep	0.29	<5	11	68	<0.1	206.14	117.69				
3-Sep											
Sunday, September 4, 2022											
5-Sep											98.87
6-Sep											98.81
7-Sep										98.86	99.03
8-Sep											
9-Sep											
10-Sep											
Sunday, September 11, 2022											
12-Sep											98.80
13-Sep	0.37	12	20	96.5	<0.1	202.65	113.39	<4.7		98.12	98.62
14-Sep											
15-Sep									0.365		98.67
16-Sep											
17-Sep											
##################											98.71
19-Sep										97.38	98.81
20-Sep											98.85
21-Sep											
22-Sep											
23-Sep											
24-Sep											
Sunday, September 25, 2022											98.77
26-Sep											98.77
27-Sep										98.12	98.89
28-Sep											
29-Sep											
30-Sep											
1-Oct											
Sunday, October 2, 2022											
3-Oct											98.48
4-Oct											98.29
5-Oct	0.36	18	40	40	<0.1	206.63	119.94			98.54	98.40
6-Oct											
7-Oct											
8-Oct											
Sunday, October 9, 2022											97.78
10-Oct											97.04
11-Oct										98.45	97.00
12-Oct											
13-Oct								<4.7			
14-Oct											
15-Oct											
##################											97.29
17-Oct											97.41
18-Oct											
19-Oct											
20-Oct									0.258	99.32	98.25
21-Oct											
22-Oct											
Sunday, October 23, 2022											96.95
24-Oct	0.33	23	46	209.6	<0.1	205.38	110.32			98.65	96.90
25-Oct											97.62
26-Oct											

	007 BDC **Boron (T)** mg/l Composite 2x Monthly	007 BDC **Fe (Dis)** ug/l Composite 2x Monthly	007 BDC **Fe (TR)** ug/l Composite 2x Monthly	007 BDC **Mn (Dis)** ug/l Composite 2x Monthly	007 BDC **Sulfide as H2S** mg/l Composite 2x Monthly	007 BDC **Sulfate** mg/l Composite 2x Monthly	007 BDC **Chloride** mg/l Composite 2x Monthly	007 BDC **Nonylphenol** ug/l Grab Monthly	007 BDC **Total Phosphorus** mg/l Composite Monthly	BOD **Removal** % to BDC	TSS **Removal** % to BDC
27-Oct											
28-Oct											
29-Oct											
################											97.10
31-Oct											97.71
1-Nov	0.39	45	70	189	<0.1	188.1	105.1			98.52	98.70
2-Nov											
3-Nov											
4-Nov											
5-Nov											
Sunday, November 6, 2022											97.09
7-Nov										98.71	97.87
8-Nov											98.20
9-Nov											
10-Nov											
11-Nov											
12-Nov											
Sunday, November 13, 2022											97.93
14-Nov	0.37	290	570	106.6	<0.1	201.15	110.07			98.33	97.47
15-Nov											
16-Nov								<4.7			
17-Nov									0.299		97.72
18-Nov											
19-Nov											
################											98.06
21-Nov										98.02	97.35
22-Nov											97.12
23-Nov											
24-Nov											
25-Nov											
26-Nov											
Sunday, November 27, 2022											96.40
28-Nov											96.86
29-Nov											
30-Nov										96.75	
1-Dec											
2-Dec											
3-Dec											
4-Dec											
5-Dec											
6-Dec											94.59
7-Dec	0.34	61	79	108	<0.1	193.22	103.25			96.70	
8-Dec									0.253		96.70
9-Dec											
10-Dec											
11-Dec											97.11
12-Dec										96.99	96.78
13-Dec											96.37
14-Dec											
15-Dec	0.35	62	82	109.7	<0.1	197.68	105.45	<4.7			
16-Dec											
17-Dec											
18-Dec											96.81
19-Dec										97.96	97.15
20-Dec											
21-Dec											
22-Dec											
23-Dec											
24-Dec											
25-Dec											
26-Dec											
27-Dec											
28-Dec										97.34	95.97
29-Dec											98.21
30-Dec											96.59
31-Dec											

Appendix D
2022 WWTP releases into Big Dry Creek
Northglenn

Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)
1/1/22	3.99	2/1/22	3.99	3/1/22	2.74	4/1/22	2.60	5/1/22	3.50	6/1/22	4.49
1/2/22	3.99	2/2/22	2.06	3/2/22	2.74	4/2/22	2.60	5/2/22	3.50	6/2/22	4.49
1/3/22	4.00	2/3/22	1.10	3/3/22	2.74	4/3/22	2.60	5/3/22	3.50	6/3/22	4.49
1/4/22	4.09	2/4/22	1.01	3/4/22	2.74	4/4/22	2.60	5/4/22	3.50	6/4/22	4.49
1/5/22	1.41	2/5/22	1.09	3/5/22	2.74	4/5/22	2.60	5/5/22	3.50	6/5/22	4.49
1/6/22	1.20	2/6/22	1.11	3/6/22	2.74	4/6/22	2.60	5/6/22	2.49	6/6/22	4.49
1/7/22	0.93	2/7/22	1.01	3/7/22	2.74	4/7/22	2.60	5/7/22	2.49	6/7/22	4.49
1/8/22	1.01	2/8/22	1.00	3/8/22	2.74	4/8/22	2.60	5/8/22	2.49	6/8/22	4.49
1/9/22	1.02	2/9/22	1.00	3/9/22	2.74	4/9/22	2.60	5/9/22	2.49	6/9/22	4.49
1/10/22	1.01	2/10/22	1.01	3/10/22	2.74	4/10/22	2.60	5/10/22	2.49	6/10/22	4.49
1/11/22	1.01	2/11/22	1.01	3/11/22	2.74	4/11/22	2.60	5/11/22	4.10	6/11/22	4.49
1/12/22	1.05	2/12/22	3.99	3/12/22	2.74	4/12/22	2.60	5/12/22	4.65	6/12/22	4.49
1/13/22	1.01	2/13/22	3.99	3/13/22	2.74	4/13/22	3.85	5/13/22	4.96	6/13/22	4.49
1/14/22	1.08	2/14/22	3.99	3/14/22	2.74	4/14/22	3.39	5/14/22	3.40	6/14/22	4.49
1/15/22	1.01	2/15/22	3.99	3/15/22	2.74	4/15/22	3.39	5/15/22	3.00	6/15/22	4.49
1/16/22	1.09	2/16/22	3.99	3/16/22	2.74	4/16/22	3.39	5/16/22	3.01	6/16/22	1.67
1/17/22	1.04	2/17/22	3.99	3/17/22	2.74	4/17/22	3.39	5/17/22	5.02	6/17/22	4.43
1/18/22	1.07	2/18/22	3.99	3/18/22	2.74	4/18/22	3.39	5/18/22	5.04	6/18/22	4.49
1/19/22	1.10	2/19/22	3.99	3/19/22	2.74	4/19/22	3.39	5/19/22	1.07	6/19/22	4.49
1/20/22	3.82	2/20/22	3.99	3/20/22	2.74	4/20/22	3.39	5/20/22	4.01	6/20/22	4.49
1/21/22	3.99	2/21/22	3.99	3/21/22	2.74	4/21/22	4.69	5/21/22	6.02	6/21/22	4.49
1/22/22	3.99	2/22/22	3.99	3/22/22	2.74	4/22/22	2.08	5/22/22	5.91	6/22/22	4.49
1/23/22	3.99	2/23/22	3.99	3/23/22	2.74	4/23/22	3.37	5/23/22	4.50	6/23/22	2.08
1/24/22	3.99	2/24/22	3.99	3/24/22	2.74	4/24/22	3.39	5/24/22	4.50	6/24/22	2.01
1/25/22	3.99	2/25/22	3.99	3/25/22	2.74	4/25/22	3.39	5/25/22	1.06	6/25/22	2.01
1/26/22	3.99	2/26/22	3.99	3/26/22	2.74	4/26/22	3.50	5/26/22	0.00	6/26/22	2.01
1/27/22	3.99	2/27/22	3.99	3/27/22	2.74	4/27/22	3.50	5/27/22	4.50	6/27/22	5.07
1/28/22	3.99	2/28/22	3.99	3/28/22	2.74	4/28/22	3.50	5/28/22	5.48	6/28/22	4.37
1/29/22	3.99			3/29/22	0.00	4/29/22	3.50	5/29/22	4.50	6/29/22	5.28
1/30/22	3.99			3/30/22	2.74	4/30/22	3.50	5/30/22	4.50	6/30/22	4.42
1/31/22	3.99			3/31/22	2.09			5/31/22	4.49		
Monthly TOTAL	79.80		83.24		81.48		93.14		113.65		123.08

Appendix D
2022 WWTP releases into Big Dry Creek
Northglenn

Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)	Date	Discharge To Big Dry Creek 007 (CFS)
7/1/22	5.43	8/1/22	5.18	9/1/22	5.02	10/1/22	5.31	11/1/22	4.85	12/1/22	4.98
7/2/22	5.24	8/2/22	5.13	9/2/22	5.12	10/2/22	5.30	11/2/22	4.93	12/2/22	4.83
7/3/22	5.39	8/3/22	4.99	9/3/22	5.16	10/3/22	5.33	11/3/22	5.06	12/3/22	4.81
7/4/22	5.36	8/4/22	5.00	9/4/22	5.16	10/4/22	5.15	11/4/22	5.05	12/4/22	5.12
7/5/22	5.38	8/5/22	5.26	9/5/22	5.41	10/5/22	5.15	11/5/22	5.23	12/5/22	4.92
7/6/22	5.37	8/6/22	5.64	9/6/22	5.03	10/6/22	4.77	11/6/22	5.53	12/6/22	4.73
7/7/22	4.50	8/7/22	6.22	9/7/22	5.52	10/7/22	5.04	11/7/22	5.01	12/7/22	4.90
7/8/22	4.50	8/8/22	6.04	9/8/22	2.97	10/8/22	5.27	11/8/22	4.97	12/8/22	4.88
7/9/22	4.50	8/9/22	5.67	9/9/22	6.98	10/9/22	5.41	11/9/22	4.86	12/9/22	4.72
7/10/22	4.50	8/10/22	5.52	9/10/22	5.44	10/10/22	5.18	11/10/22	4.83	12/10/22	4.88
7/11/22	4.50	8/11/22	5.59	9/11/22	5.54	10/11/22	5.31	11/11/22	4.81	12/11/22	5.07
7/12/22	4.50	8/12/22	5.75	9/12/22	5.10	10/12/22	4.76	11/12/22	5.03	12/12/22	4.85
7/13/22	4.50	8/13/22	5.81	9/13/22	5.07	10/13/22	4.73	11/13/22	5.23	12/13/22	4.74
7/14/22	2.98	8/14/22	5.92	9/14/22	4.99	10/14/22	4.68	11/14/22	4.96	12/14/22	4.81
7/15/22	2.98	8/15/22	5.78	9/15/22	5.07	10/15/22	4.88	11/15/22	4.88	12/15/22	4.72
7/16/22	2.99	8/16/22	6.30	9/16/22	5.09	10/16/22	5.00	11/16/22	4.90	12/16/22	4.79
7/17/22	2.98	8/17/22	5.76	9/17/22	5.32	10/17/22	4.70	11/17/22	4.96	12/17/22	4.82
7/18/22	2.98	8/18/22	5.40	9/18/22	5.58	10/18/22	4.62	11/18/22	4.90	12/18/22	4.92
7/19/22	4.93	8/19/22	5.57	9/19/22	5.12	10/19/22	4.75	11/19/22	5.48	12/19/22	4.90
7/20/22	5.07	8/20/22	5.87	9/20/22	4.91	10/20/22	4.72	11/20/22	5.28	12/20/22	4.89
7/21/22	4.90	8/21/22	6.11	9/21/22	5.17	10/21/22	4.60	11/21/22	5.01	12/21/22	4.75
7/22/22	4.89	8/22/22	5.40	9/22/22	5.36	10/22/22	4.86	11/22/22	5.01	12/22/22	4.88
7/23/22	5.11	8/23/22	5.68	9/23/22	5.05	10/23/22	5.09	11/23/22	4.92	12/23/22	4.84
7/24/22	5.41	8/24/22	5.25	9/24/22	5.04	10/24/22	4.82	11/24/22	5.00	12/24/22	5.22
7/25/22	5.10	8/25/22	5.46	9/25/22	5.08	10/25/22	4.67	11/25/22	4.70	12/25/22	4.94
7/26/22	5.23	8/26/22	5.10	9/26/22	4.93	10/26/22	4.61	11/26/22	4.94	12/26/22	5.20
7/27/22	5.47	8/27/22	5.31	9/27/22	4.98	10/27/22	4.79	11/27/22	5.18	12/27/22	5.20
7/28/22	5.28	8/28/22	5.52	9/28/22	4.74	10/28/22	4.58	11/28/22	4.91	12/28/22	5.15
7/29/22	5.05	8/29/22	5.56	9/29/22	4.75	10/29/22	4.88	11/29/22	4.83	12/29/22	5.11
7/30/22	5.26	8/30/22	4.98	9/30/22	5.07	10/30/22	5.05	11/30/22	4.85	12/30/22	5.11
7/31/22	5.28	8/31/22	5.07			10/31/22	4.70			12/31/22	5.37
Monthly TOTAL	145.56		171.83		153.80		152.68		150.09		153.05

Appendix E. Metro Wastewater 2022 Sampling on Lower Big Dry Creek

Appendix E. Metro Wastewater 2022 Iron Sampling on Lower Big Dry Creek

Site ID	Site Description	Activity ID	Date	Time	Characteristic	Result	Unit
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF48303	1/5/2022	11:26	Iron	0.7	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF51452	2/9/2022	10:01	Iron	0.82	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF52849	2/16/2022	10:46	Iron	1.07	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF55353	3/16/2022	10:30	Iron	1.26	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF57296	4/6/2022	10:38	Iron	1.19	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF60092	5/4/2022	10:12	Iron	0.92	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF62886	6/1/2022	11:03	Iron	10.9	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF64298	6/15/2022	11:21	Iron	1.27	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF66369	7/6/2022	10:55	Iron	1.06	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF67631	7/20/2022	10:41	Iron	1.75	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF69128	8/3/2022	10:08	Iron	2.52	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF70862	8/17/2022	10:44	Iron	8.66	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF73029	9/7/2022	10:16	Iron	1.48	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF74702	9/21/2022	10:37	Iron	1.86	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF76323	10/5/2022	10:42	Iron	0.84	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF79612	11/2/2022	11:09	Iron	0.75	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF81192	11/16/2022	10:52	Iron	0.68	mg/L
BDC	Big Dry Creek at Lupton Bottoms Ditch	AF83201	12/7/2022	11:16	Iron	0.34	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF48304	1/5/2022	11:42	Iron	0.72	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF49979	1/19/2022	12:10	Iron	0.63	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF51453	2/9/2022	10:18	Iron	0.97	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF52850	2/16/2022	10:59	Iron	1.72	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF53976	3/2/2022	12:50	Iron	0.96	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF55354	3/16/2022	10:46	Iron	0.47	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF57297	4/6/2022	10:59	Iron	0.91	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF58719	4/20/2022	11:02	Iron	2.32	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF60093	5/4/2022	10:29	Iron	0.38	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF61506	5/18/2022	11:51	Iron	0.8	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF62887	6/1/2022	11:22	Iron	15.8	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF64299	6/15/2022	10:57	Iron	1.29	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF66370	7/6/2022	11:16	Iron	0.96	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF67632	7/20/2022	11:05	Iron	1.47	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF69129	8/3/2022	10:25	Iron	3.35	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF70863	8/17/2022	11:07	Iron	10.7	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF73030	9/7/2022	10:38	Iron	0.62	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF74703	9/21/2022	10:53	Iron	0.64	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF76324	10/5/2022	11:12	Iron	0.67	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF78162	10/19/2022	12:47	Iron	0.29	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF79613	11/2/2022	11:24	Iron	3.1	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF81193	11/16/2022	11:10	Iron	0.57	mg/L
BDC-8	Big Dry Creek at Weld County Road 8	AF83202	12/7/2022	11:35	Iron	0.32	mg/L
					Median BDC	1.13	
					Median BDC-8	0.91	