

Southwest Colorado Outstanding Waters
water quality assessment of candidate reaches



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Abbreviations and Acronyms

BMI	Benthic Macroinvertebrate
CDPHE	Colorado Department of Public Health and Environment
CPW	Colorado Parks and Wildlife
DRA	Dolores River Anglers
MMI	Multi-Metric Index (see CDPHE Policy 10-1)
MSI	Mountain Studies Institute
OW	Outstanding Waters
WQ	Water Quality

1. Introduction

In September 2019, a coalition of local, state, and national organizations was formed around a common goal of increasing protections for Colorado’s freshwater ecosystems. This coalition, called Southwest Colorado Outstanding Waters Coalition (SCOWC) comprises the following organizations: American Rivers, American Whitewater, Conservation Colorado, Dolores River Anglers, High Country Conservation Advocates, The Pew Charitable Trusts, San Juan Citizens Alliance, Trout Unlimited & Colorado Trout Unlimited, and Western Resource Advocates. Mountain Studies Institute (MSI), based in the San Juan Mountains of Colorado, is a non-advocacy organization committed to providing the best available science to decision makers and was contracted to provide expertise in water quality and aquatic life to the coalition.

The current focus of the coalition is to evaluate and propose surface water reaches in Colorado’s San Juan and Gunnison Basins for Outstanding Waters (OWs) designations during the state’s triennial review process. The coalition’s objectives include: identify priority waterways in these regions; conduct the necessary water quality sampling and testing; involve appropriate stakeholders and build community support for protection of these waters; and to engage with relevant agencies to craft a precise, compelling proposal for protecting Outstanding Waters in these regions.

Outstanding Waters designations offer the highest level of water quality protection under Colorado state regulations to water bodies of an outstanding state or national resource (CDPHE 2021a). In order for water bodies to receive such a designation, the State of Colorado Water Quality Control Commission requires three main criteria be met:

- 1) The waters constitute an outstanding natural resource, based on the water body being a significant attribute or have exceptional recreational or ecological significance not modified by human activities in a manner that detracts from their value as a natural resource.
- 2) The waters require additional protection than already provided by water quality classifications, standards, and protections from the Colorado Department of Public Health & Environment (CDPHE).
- 3) Existing water quality must be in attainment of water quality standards for twelve parameters as specified by CDPHE Regulation 31 (CDPHE 2021a). We present the twelve required water quality parameters and their associated specified standards in Table 1.

2. Methods

2.1 Monitoring Locations and Frequency of Sampling

Monitoring locations were selected based on input from numerous organizations and agencies who shared their regional expertise and priorities through a series of collaborative meetings (Table 2-3 and in ArcGIS Online Map: <https://arcg.is/1KzD81>). In the monitoring site selection process, we choose sites that are representative of the spatial variability that may occur in the candidate watersheds. In some cases, that necessitated establishing more than one monitoring site in one watershed to capture potential differences in water quality between tributaries.

We plan to sample each location multiple times a year so that data are representative of variable hydrologic conditions including:

1. Feb/March: Pre-runoff winter baseflow
2. May/June: Peak Spring Runoff
3. July: Descending limb of spring runoff
4. Oct: Fall baseflow

When certain candidate streams are seasonally dry (e.g., Potter Creek and Roubideau Creek), we will adjust our sampling dates to ensure that these streams are sampled at numerous times throughout their individual annual hydrographs.

Thus far, our coalition has conducted seven sampling events from 2020-2022. Figures 1-4 provide hydrologic context for when sampling events occurred. In these figures we present a relatively representative hydrograph for each of the four main basins. The discharge timing and magnitude of our smaller stream order candidate reaches likely differed somewhat from these larger stream order hydrographs, so direct comparisons should not be made.

2.2 Field Survey Methodology

Sampling events are coordinated and conducted by staff and volunteers with the American Rivers, American Whitewater, Dolores River Anglers, High Country Conservation Advocates, Mountain Studies Institute, San Juan Citizens Alliance, and Trout Unlimited. Measurements of pH and dissolved oxygen are collected instantaneously in the field using a probe such as a YSI Pro-Plus or equivalent. Discrete water grab samples are appropriately preserved and analyzed for additional parameters in laboratories. For applicable analytes, sample collectors utilize pre-preserved bottles and filter through a 0.45-um membrane syringe filter (EPA 2014). To ensure consistency of methodology and data quality, field blanks and duplicate samples are collected at a frequency of one blank and one duplicate sample for every ten samples (i.e., 10%).

Detailed sampling protocols are outlined in Appendix A.

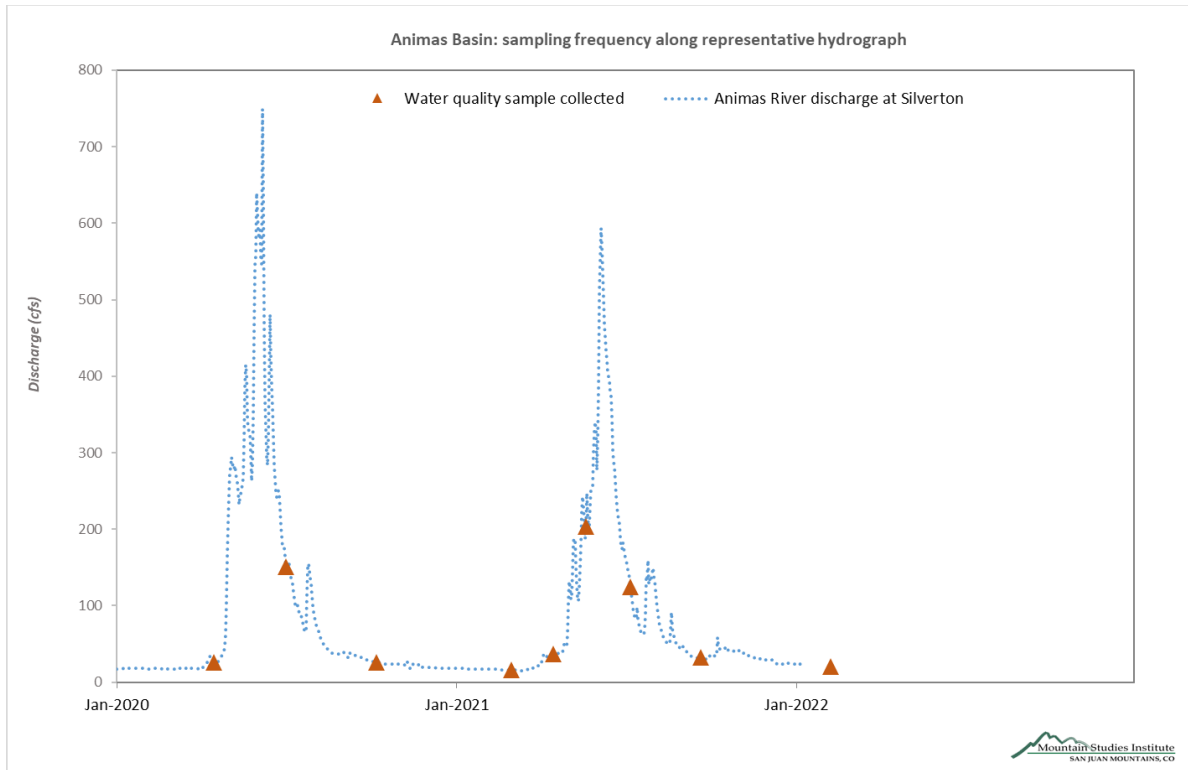


Figure 1: Animas River discharge at Silverton USGS gage from 2020-2022 with corresponding sampling events. For context only; not directly comparable to OW candidate reaches.

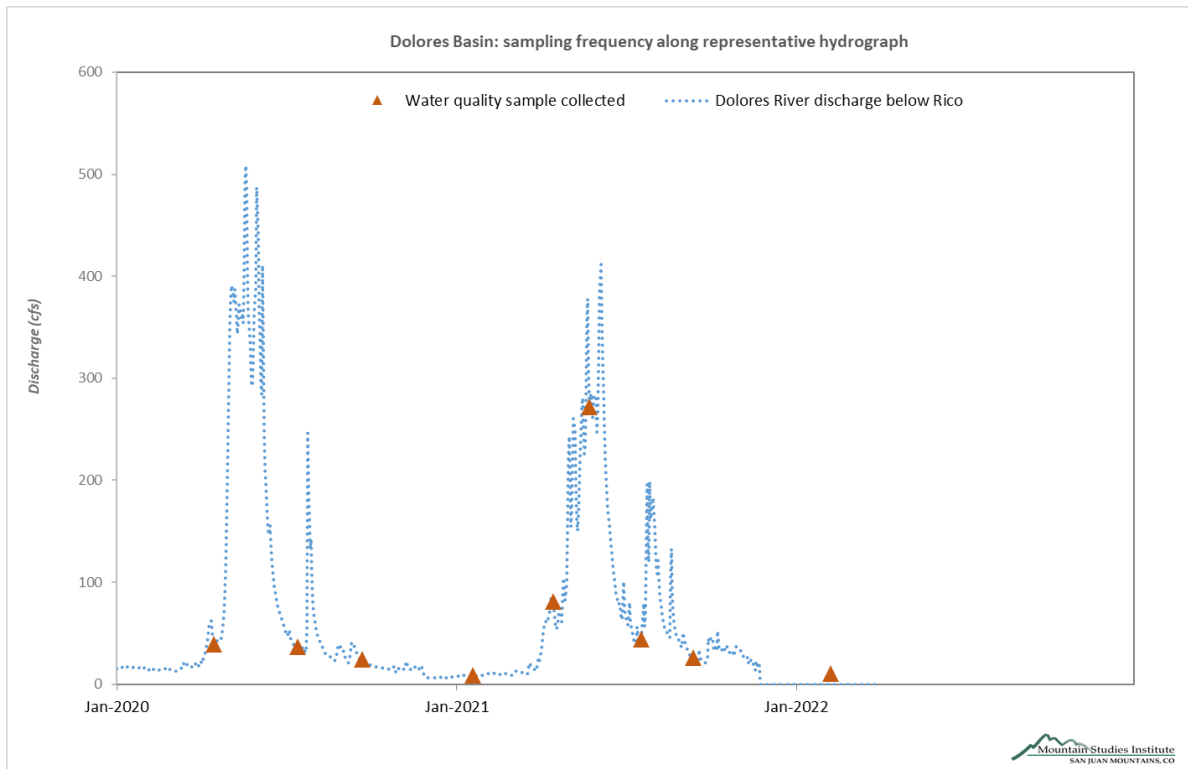


Figure 2: Dolores River discharge at below Rico USGS gage from 2020-2022 with corresponding sampling events. For context only; not directly comparable to OW candidate reaches.

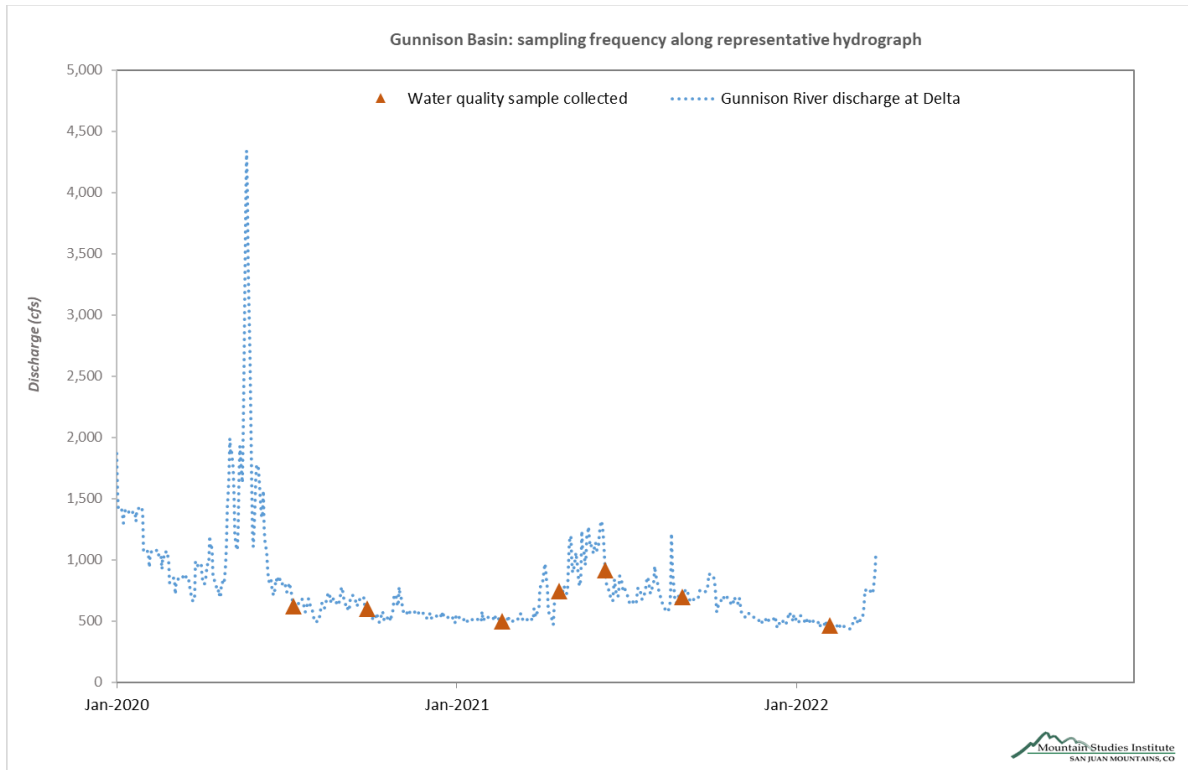


Figure 3: Gunnison River discharge at Delta USGS gage from 2020-2022 with corresponding sampling events. For context only; not directly comparable to OW candidate reaches.

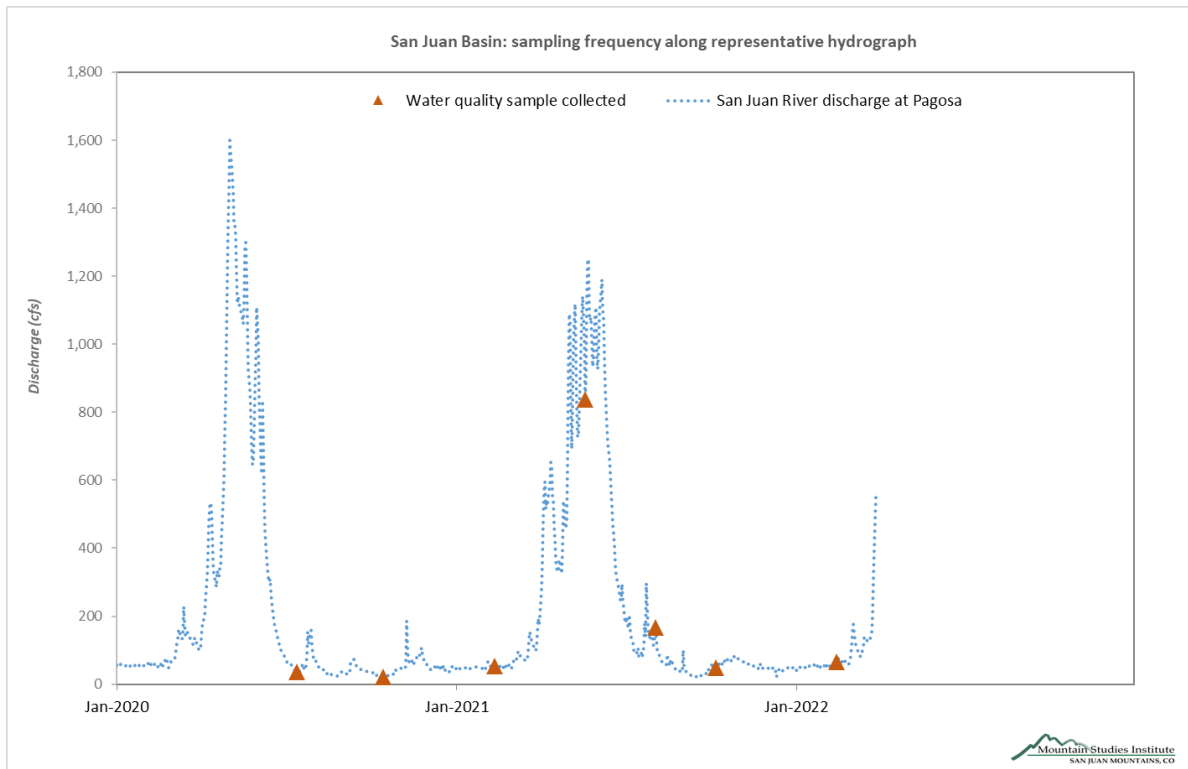


Figure 4: San Juan River discharge at Pagosa Springs USGS gage from 2020-2022 with corresponding sampling events. For context only; not directly comparable to OW candidate reaches.

2.3 Laboratory Methods

Samples are analyzed by Green Analytical Laboratory (Durango), San Juan Basin Public Health Department (Durango), Mesa County Health Department (Grand Junction), and the City of Gunnison Water Lab (Gunnison). The analytical list includes analytes required by CDPHE for Outstanding Waters consideration (Table 1 and 4). Additionally, samples are analyzed for magnesium and calcium in order to calculate hardness. Hardness is a necessary component of water quality standards for several metals.

2.4 Data Analysis

2.4.1 Existing data

MSI obtained existing water quality and benthic macroinvertebrate data for the selected locations from the Environmental Protection Agency's Water Quality Data Portal (also known as WQX), Colorado Data Sharing Network, and other sources. After evaluation of available historical data, it was evident that additional data collection efforts were necessary in order to demonstrate attainment of the twelve required parameters for OW consideration. We did incorporate water quality data from partner organizations for two sites, Soap Creek and Waterfall Creek. Water quality data were generously shared by San Miguel Watershed Coalition for Waterfall Creek and by Curecanti National Recreation Area for Soap Creek.

2.4.2 Water Quality Standards

The CDPHE Water Quality Control Commission (WQCC) establishes water quality standards to protect the use of surface waters for several designated uses such as aquatic life, domestic water supply, agriculture, and recreation. Water quality standards are either fixed numerical values or calculated based on additional water quality parameters such as hardness and pH. Following CDPHE Regulation 31 guidelines, we compared measured concentrations of water quality parameters to CDPHE water quality standards in order to assess whether water quality is sufficient for the protection of aquatic life class 1, recreation class P, and (for nitrate) domestic water supply uses (Table 1) (CDPHE 2021a). We used the average hardness measured at each site to calculate the water quality criteria (or water quality standard) for each site.

To assess whether a surface water segment is in attainment or impairment of a designated use, CDPHE uses assessment statistics, such as data percentiles. Assessment statistics differ by analyte (Table 1). The assessment statistic for ammonia, nitrate, and dissolved metals is the 85th percentile. CDPHE assesses dissolved oxygen using the 15th percentile, *E. coli* using the geometric mean, and pH using the range between the 15th and 85th percentiles (CDPHE 2021a).

2.4.3 Laboratory Detection

When laboratories report analytical results, they also report the numerical limitations of their instruments and analytical methods. For trace metals, it is common for analytical results to be reported as being below a Method Detection Limit (MDL) or a Minimum Level (ML). We followed CDPHE guidelines and replaced results less than the MDL as zero. We retained estimated values (J-flag data) that had results greater than the MDL, but less than the ML (CDPHE 2020a).

2.4.4 Benthic macroinvertebrate data

The structure and composition of benthic macroinvertebrate communities reflect water quality conditions. Although benthic macroinvertebrates are not one of the twelve required parameters for OW consideration, documentation of benthic community condition serve as an additional line of evidence for OW consideration. We collected new benthic macroinvertebrate data for six OW candidates: Boulder Creek, Cascade Creek, Waterfall Creek, Fall Creek, Wolf Creek, and Quartz Creek. We compiled existing benthic macroinvertebrate data for all OW candidates from CDPHE.

3. Results

3.1 Water Quality Conditions and Standards

In Appendix B, we present an assessment of the twelve water quality parameters across sampling events for each site in context to water quality standards. For example, we calculated the 85th percentile of all dissolved cadmium results for Lime Creek and compared that value to the CDPHE chronic aquatic life standard for cadmium (based on average hardness). The tables in Appendix B report descriptive statistics including number of samples assessed and the percent of samples that were detections, estimated (j flag), or non-detections. We also present the water quality criteria, assessment statistic, hazard quotient, and assessment result. The water quality criteria are the CDPHE water quality standards that we compare measured results to. The assessment statistics represent existing quality and are the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters. The hazard quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard quotient values less than 1.0 indicate attainment of the water quality standard and low probability of risk.

3.1.1 pH

Many chemical and biological processes in surface water are dependent on pH. For example, at low pH levels, metals are typically more soluble, more biologically available, and are more toxic to aquatic life. pH is measured in a range from 0 (acidic) to 14 (basic). A pH range of 6.5 to 9.0 is sufficient for the protection of aquatic life (CDPHE 2021a). Measurements of pH at

all sites fell within the target range of 6.5 – 9.0. The 15th to the 85th percentile range of pH for each site met the CDPHE standard.

3.1.1 Dissolved oxygen

Dissolved oxygen (DO) is a measure of how much oxygen is available to aquatic organisms. Some aquatic organisms require abundant DO while other aquatic organisms are adapted to survive with very little DO. Surface water with DO levels below 1.0 mg/l are considered hypoxic and are unable to support life (EPA 2016). DO levels are influenced by numerous factors including temperature, aquatic plant growth, and seasonality. Small, turbulent streams typically have high DO concentrations (Hamid et al. 2020). CDPHE has established that for surface waters classified as Class 1 Cold, DO should be at least 7.0 mg/l during spawning months (Oct-July), and 6.0 mg/l during non-spawning months to be sufficient for the protection of aquatic life (CDPHE 2021a). For surface waters classified as Class 1 Warm, DO of 5.0 mg/l is sufficient for the protection of aquatic life (CDPHE 2021a). The 15th percentile of DO for all sites met the CDPHE standard for aquatic life.

3.1.2 *E. coli* bacteria

Escherichia coli (abbreviated as *E. coli*) is a group of bacteria that have the potential to cause sickness and disease and are usually found in the intestines and feces of warm-blooded animals. Excessive *E. coli* indicates that surface water could potentially harm humans that inadvertently swallow water while recreating or swimming. The *E. coli* geometric mean for each site met the CDPHE standard.

3.1.3 Nutrients

Nutrients are essential for living organisms and exist in different forms that naturally cycle through the atmosphere, terrestrial, and aquatic ecosystems. However, excess concentrations can substantially increase plant growth, affect aquatic habitat, and reach toxic levels to sensitive aquatic species.

Ammonia is a unique form of nitrogen that at high enough concentrations can cause direct toxic effects on aquatic life (EPA 2013). The 85th percentile of ammonia for each site met the CDPHE chronic standard for aquatic life.

Nitrate is another form of nitrogen which at high levels in surface water can impact drinking water sources and become harmful to human and animal health. Due to the short laboratory hold-time of nitrate, we often analyzed for combined nitrate-nitrite instead as it allows for a longer hold-time. CDPHE Regulation 31 states that nitrate-nitrite can be conservatively used in place of nitrate using the same domestic water supply standard of 10 mg/l (CDPHE 2021a). The justification is that if the combined nitrate-nitrite concentration is below 10 mg/l, then nitrate alone also must be below 10 mg/l. The 85th percentile of nitrate for each site met the domestic water supply standard.

3.1.4 Metals

Metals and other trace elements are found in surface water from natural sources such as the weathering of rocks. Typically, metals occur at small concentrations. In disturbed watersheds such as those where recent wildfire has occurred or where there is a legacy of mining, higher levels of metals in surface water can adversely affect aquatic life. In samples from both the San Juan and Gunnison basin, metal concentrations were often lower than detection limits. The 85th percentile for all metals at each site met CDPHE chronic aquatic life standards.

3.2 Benthic macroinvertebrate results

3.2.1 MMI scores

We interpret benthic macroinvertebrate results in the context of CDPHE Multi-Metric Index (MMI) (CDPHE 2020b). MMI scores greater than 45.0 for Biotype 1 streams, and 48.0 for Biotype 2 streams, indicate attainment of aquatic life use. We assessed 31 benthic samples from 15 OW candidate reaches. All 31 benthic samples indicate attainment (Appendix C). Furthermore, MMI scores greater than 56 for Biotype 1 streams, and 62 for Biotype 2 streams, represent “high scoring” benthic communities. Of the 31 benthic samples, 21 had MMI scores that meet the “high scoring” threshold.

3.3 Summary

3.3.1 Exceedances per parameter and site

Water quality results demonstrate that candidate reaches assessed here have good water quality. Concentrations of parameters of concern (e.g., metals, nutrients, bacteria) were low and all twelve water quality parameters required by CDPHE for OW consideration were in attainment of water quality standards.

Appendix B summarizes attainment of the twelve water quality standards required for OW consideration using CDPHE assessment statistics (e.g., 85th percentile of data collected from a location).

4. Discussion

4.1 Specific Considerations

4.1.1 Big Dominguez Creek, Little Dominguez Creek, and Escalante Creek – *E. coli*

Portions of Big Dominguez Creek, Little Dominguez Creek, and Escalante Creek are components of CDPHE segment COGULG06A, which was recently listed on the Monitoring and Evaluation (M&E) list for *E. coli* (CDPHE 2021b). This listing is based on *E. coli* exceedances in samples collected from Big Dominguez Creek during August and September of 2018. To assess whether the 2018 exceedances at Big Dominguez Creek were representative of typical conditions, we collected *E. coli* samples in 2020 and 2021 from Escalante, Big Dominguez, and Little Dominguez during a similar hydrologic period as the

2018 exceedances. Our 2021 *E.coli* sampling regime was intended to meet CDPHE assessment requirements by collecting at least five samples within a 61-day period at intervals of at least eight days apart (CDPHE 2020a). *E.coli* concentrations have been relatively low and largely in attainment of the recreational water quality standard of 126 cfu/100ml, other than samples collected during turbid storm flow conditions on 9/30/21. Geometric means assessed across the entire dataset and separately assessed across 61-day windows demonstrate attainment of the recreational water quality standard for *E.coli*.

4.1.2 Soap Creek – E. coli

Soap Creek is a component of CDPHE segment COGUUG26_E, which includes “*All tributaries, including wetlands which are tributary to the Gunnison River from County Road 32 to the inlet of Blue Mesa Reservoir, Blue Mesa Reservoir, Morrow Point Reservoir, Crystal Reservoir or the segments of the Gunnison River that interconnect those reservoirs, except for (specific listings in Segments 1, 2, 29a, 29b, 30, 31, and 32) and the portions of Blue, Willow and Crystal Creeks.*” This segment is listed on the 303(d) list as being impaired for *E.coli*. However, SCOWC is proposing that Soap Creek be established as a distinct segment rather than being lumped in with other COGUUG26_E tributaries, in which case the geometric mean of recent *E.coli* samples from Soap Creek demonstrate attainment of the recreational water quality standard for *E.coli* (Table 6).

4.1.3 Upper Taylor River – arsenic and macroinvertebrates

Taylor River is CDPHE segment COGUUG04, which has a Monitoring & Evaluation (M&E) water supply use listing for total arsenic. Although arsenic is not one of the twelve water quality parameters required for OW consideration, we analyzed four samples from our Upper Taylor River sampling location for arsenic. Arsenic concentrations from 5/16/21, 6/20/21, 9/22/21, and 2/17/22 were all below detection limits for total arsenic (detection limit of 0.3 ug/l).

COGUUG04 is listed as impaired for benthic macroinvertebrates. Results from four benthic macroinvertebrate samples collected from within the proposed OW reaches of the Upper Taylor River indicate attainment of aquatic life use according to MMI scores (Appendix C).

4.1.4 Waterfall Creek – benthic macroinvertebrates

Segment COGUSM07_A, which includes Waterfall Creek, is listed by CDPHE as impaired for aquatic life use based on benthic macroinvertebrates. This listing is based on benthic samples collected from the Howard Fork and not from Waterfall Creek. The MMI score of a fall 2021 benthic sample from Waterfall Creek was high scoring and indicates attainment of aquatic life use (Appendix C).

4.1.5 Fall Creek, Quartz Creek, and Wolf Creek – benthic macroinvertebrates

Wolf, Fall (COSJSJ05_D), and Quartz (COSJSJ05_E) Creeks have previously been included in CDPHE segments listed on M&E and 303(d) lists for aquatic life impairment based on benthic macroinvertebrates. The latest CDPHE Reg. 93, Colorado's impaired waters and monitoring and evaluation list, categorizes these segments as fully supporting aquatic life use based on benthic macroinvertebrates. MMI results from benthic samples collected from Fall Creek, Quartz Creek and Wolf Creeks in the fall of 2021 are high scoring and indicate attainment (Appendix C).

3. Works Cited

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4. Tables

Table 1. Water quality parameters required for Outstanding Waters consideration

Target Analyte	Fraction Evaluated	Associated use specified by CDPHE	Water quality standard	Assessment statistic
pH	N/A	Aquatic Life Class 1	6.5 - 9.0	15 th – 85 th percentile
Dissolved Oxygen	N/A	Aquatic Life Class 1	6.0 / 7.0 mg/l*	15 th percentile
<i>E. coli</i>	N/A	Recreation Class E**	126 /100ml	Geometric mean
Ammonia	Total	Aquatic Life Class 1 - Chronic	pH and temperature dependent standard	85 th percentile
Nitrate or Nitrate-Nitrite	Total	Domestic Water Supply Use	10 mg/l	85 th percentile
Cadmium	Dissolved	Aquatic Life Class 1 - Chronic	Hardness-based standard*	85 th percentile or exceedances in less than 15% of samples
Copper	Dissolved	Aquatic Life Class 1 - Chronic	Hardness-based standard*	
Lead	Dissolved	Aquatic Life Class 1 - Chronic	Hardness-based standard*	
Manganese	Dissolved	Aquatic Life Class 1 - Chronic	Hardness-based standard*	
Selenium	Dissolved	Aquatic Life Class 1 - Chronic	4.6 ug/l	85 th percentile
Silver	Dissolved	Aquatic Life Class 1 - Chronic	Hardness-based standard*	85 th percentile or exceedances in less than 15% of samples
Zinc	Dissolved	Aquatic Life Class 1 - Chronic	Hardness-based standard*	
Additional parameters				
Water temperature	N/A	N/A	N/A	N/A
Calcium	Dissolved	N/A	N/A	N/A
Magnesium	Dissolved	N/A	N/A	N/A
Arsenic	Total	Domestic Water Supply Use	0.02 ug/l	50 th percentile

Note: * see CDPHE Regulation 31 tables I, II, and III (CDPHE 2021a); **Recreation Class P has an *E.coli* standard of 205/100ml.

Table 2. Sampling locations in the San Juan Basin

Stream Reach	Lat	Long
San Juan Basin		
<i>Animas</i>		
Bear Creek	37.814601	-107.696619
Boulder Creek	37.830749	-107.637910
Cascade Creek – Upper	37.667290	-107.823050
Cascade Creek – Lower	37.598529	-107.776092
Grasshopper Creek	37.578100	-107.776100
Lime Creek at Purgatory Flats	37.632562	-107.790775
<i>Dolores</i>		
Bear Creek	37.574857	-108.187916
Coal Creek	37.760342	-107.999798
East Fork Dolores	37.779186	-107.944373
Priest	37.587578	-108.163686
Slate Creek	37.778770	-107.956500
Snow Spur Creek	37.779540	-107.944564
Stoner Creek - Upper	37.688419	-108.191214
Stoner Creek - Lower	37.589573	-108.321711
West Fork Dolores	37.795545	-108.065590
Wildcat Creek	37.625564	-108.074187
<i>Upper San Juan</i>		
Fall Creek	37.441640	-106.880770
Quartz Creek	37.410480	-106.756850
Wolf Creek	37.442050	-106.886900

Table 3. Sampling locations in the Gunnison Basin

Stream Reach	Lat	Long
Gunnison Basin		
<i>San Miguel</i>		
Tabeguache Creek	38.357849	-108.707358
Waterfall Creek*	37.853600	-107.833530
<i>Upper Gunnison</i>		
Soap Creek**	38.526525	-107.308465
Taylor River	38.857922	-106.569704
<i>Lower Gunnison</i>		
Big Dominguez Creek	38.826719	-108.381629
Escalante Creek	38.670483	-108.324883
Little Dominguez Creek	38.820051	-108.377522
Potter Creek	38.636539	-108.195530
Roubideau Creek	38.73476	-108.161002

* Water quality samples from Waterfall Creek are collected and analyzed by San Miguel Watershed Coalition.

**Water quality samples from Soap Creek are collected and analyzed by Curecanti National Recreation Area.

Table 4. Analytical method for water quality parameters

Target Analyte	Lab	Instrument	Method	Fraction Evaluated
pH	Field probe	YSI Pro-Plus	N/A	N/A
Dissolved Oxygen	Field probe	YSI Pro-Plus	N/A	N/A
<i>E. coli</i>	Green Analytical	N/A	SM092220G	N/A
Ammonia	Green Analytical	N/A	350.1	Total
Nitrate	Green Analytical	N/A	353.2	Total
Cadmium	Green Analytical	ICP-MS	200.8	Dissolved
Copper	Green Analytical	ICP-OES	200.7	Dissolved
Lead	Green Analytical	ICP-MS	200.8	Dissolved
Manganese	Green Analytical	ICP-OES	200.7	Dissolved
Selenium	Green Analytical	ICP-MS	200.8	Dissolved
Silver	Green Analytical	ICP-MS	200.8	Dissolved
Zinc	Green Analytical	ICP-MS	200.8	Dissolved
Calcium	Green Analytical	ICP-OES	200.7	Dissolved
Magnesium	Green Analytical	ICP-OES	200.7	Dissolved

Table 5. *E.coli* results for Big Dominguez Creek, Little Dominguez Creek, and Escalante Creek.

Sampling Event	Date	<i>E.coli</i> per 100ml				
		Big Dominguez	Big Dominguez 2	Little Dominguez	Escalante	All four sites combined as one segment
Summer baseflow 2020	7/9/2020	-	-	-	5.2	-
	8/2/2020	2	-	1		-
Fall baseflow 2020	9/27/2020	39.3	-	33.6	3.1	-
Winter baseflow 2021	2/19/2021	1	1	1	3	-
Spring runoff 2021	4/21/2021	1	1	1	1	-
Summer baseflow 2021	6/10/2021	1	5.1	1	18.9	-
Fall baseflow 2021	8/11/2021	45.7	1	51.2	4.1	-
	8/24/2021	114	1	63.7	13.4	-
	9/1/2021	57.1	1	54.8	5.2	-
	9/20/2021	-	-	167	5.2	-
	9/21/2021	133.4	-	-	-	-
	9/30/2021*	387	272	921	2,420	-
Winter baseflow 2022	3/7/2022	1	1	1	1	
Maximum Geometric Mean across 61-day windows		108.9	4.1	122.4	20.5	36.2
Geometric Mean of all samples		12.5	2.5	12.2	7.3	7.9

Note: *9/30/21 samples collected during turbid storm flow conditions.

Table 6. Recent *E.coli* results for Soap Creek.

<i>Event</i>	<i>Date</i>	<i>E.coli per 100ml</i>
		Soap Cr
Spring runoff 2020	6/5/2020	3
Summer baseflow 2020	7/2/2020	38.8
	7/23/2020	65.7
Fall baseflow 2020	8/12/2020	4.1
Winter baseflow 2021	4/29/2021	1
Spring runoff 2021	5/27/2021	3.1
	6/29/2021	26.2
Summer baseflow 2021	7/21/2021	22.7
	7/29/2021	87.8
<i>Maximum Geometric Mean across 61-day windows</i>		37.4
<i>Geometric Mean of all samples</i>		12.0

Appendix A: Water quality sampling protocol

February 24, 2021
Mountain Studies Institute

Volunteers collecting water quality samples to support Outstanding Waters consideration

We are incredibly grateful to each volunteer willing to contribute time to this effort! Signature below acknowledges that the signee will follow the below protocols while collecting water quality samples to support Outstanding Waters consideration.

General Protocols from San Juan National Forest:

- *All motorized access to and from sampling locations must conform to the Motorized Vehicle Use Maps (MVUM) issued by the Dolores, Columbine and Pagosa Ranger Districts.*
- *This permit does not authorize the installation of instrumentation, stream gauges, temperature sensors or other equipment.*
- *Volunteers shall not disturb any fences or other instrumentation that is in place within the permit area.*
- *The holder shall avoid, minimize or mitigate adverse effects to soil, water quality and riparian resource and shall remove all trash and debris generated by the use of the permit.*

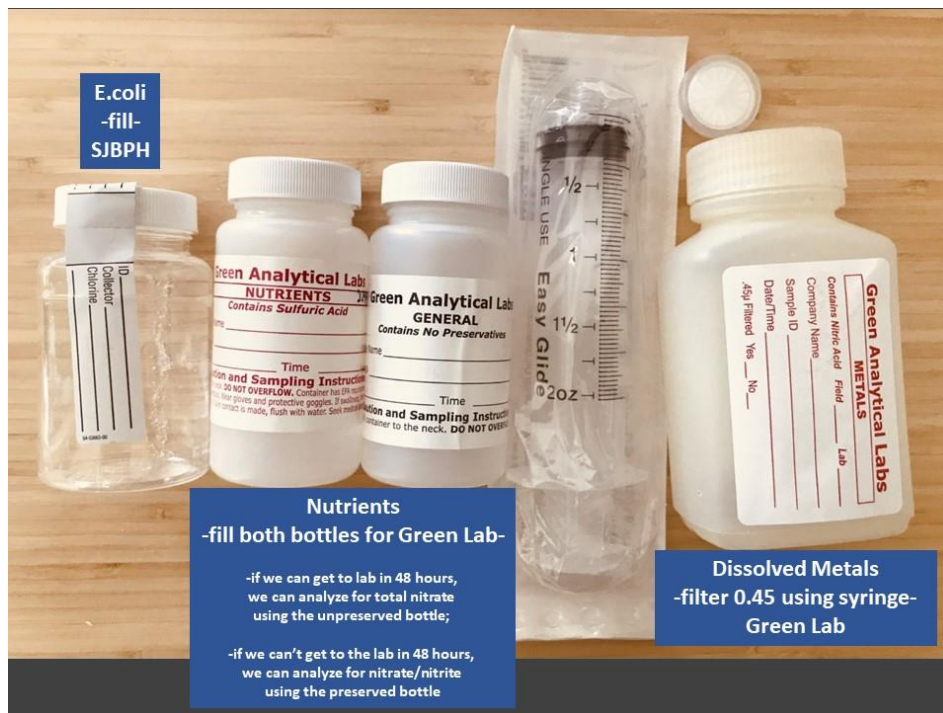
Communication:

- *Please notify Scott Roberts (Director of Water Programs at Mountain Studies Institute) of plans to collect water quality samples (where, who, and when) prior to a sampling event:*
 - scott@mountainstudies.org; 865-382-2993

Field Protocols:

- *pH/Dissolved Oxygen meter*
 - *Ensure sensors are calibrated daily before use.*
 - *Ensure that the measurement location is representative of conditions within the water body or reach. Avoid measurements directly below turbulent sections or in still water unless these conditions represent most of the water body or reach.*
 - *Dip sensors in flowing water and allow readings to stabilize. Record results in a field notebook. At a minimum we need pH and dissolved oxygen.*
- *Photographs and Site Condition*
 - *Please take representative photographs that capture flow conditions (e.g., upstream, downstream, turbid or clear).*

- In field notebook, please note whether any recent precipitation events have occurred.
- Sample Bottles:
 - E. coli: pre-preserved, do not filter
 - Nutrients:
 - fill two bottles
 - pre-preserved; do not filter; for nitrate/nitrite
 - unpreserved; do not filter; for total nitrate
 - If the lab receives the samples within 48 hours, then they will analyze for total nitrate. If not, then they will analyze for nitrate/nitrite.
 - Dissolved Metals: pre-preserved; 0.45 filter; fill at least ½ the bottle with filtered sample
 - Total Metals (not pictured, but identical to Dissolved Metals bottle); do not filter; we will analyze for total arsenic at Taylor River and Escalante.



- Follow sampling protocols at the direction of field leaders including:
 - Wear nitrile gloves while sampling.
 - Use sharpie fine-tip pen to label sample bottles prior to getting them wet. Please use side IDs listed in attached Table 1.

- *Triple rinse syringe with sample water. Use syringe to fill pre-preserved bottles for E. coli and Nutrients, ensuring that you do not overfill and spill the preservative. Acid in bottles will burn skin and damage clothing if spilled.*
- *If a total metals bottle is requested (not typically requested), please also fill a pre-preserved total metals bottle with the syringe. Denote on the sample container that this sample is “unfiltered.”*
- *Fill syringe with sample water (after it has been triple rinsed with sample water). Screw the luer lock disc filter onto the syringe. Condition the filter by running and discarding approximately 10 mL of sample water through the filter prior to filling sample bottle.*
- *After rinsing and conditioning the syringe and filter, fill the dissolved metals bottle with filtered sample. Hold the syringe and filter at an angle when filling to prevent any unfiltered sample water from spilling into the dissolved metals bottle. Denote on the sample container that this sample is “0.45 filtered.”*
- *Keep samples cold and on ice prior to delivery to laboratory.*
- *We will be collecting a field duplicate for every 10 samples we collectively collect. Please see Table 2 and coordinate with Scott Roberts prior to sampling to ensure when/where to collect a duplicate sample. Please label samples with “_30” for a duplicate and “_90” for a blank. For example, “BIG D_30” would be a duplicate for the site “BIG D.”*

Lab Delivery:

- *Please keep samples adequately cold by:*



Place ice packs along the cooler walls. Then place bagged loose ice on the bottom of the cooler.



Place samples (already packaged in ziplock bags) so that they are on top of the bagged loose ice and surrounded by ice packs. If there are glass sample bottles, ensure they will not break during transport by using bubblewrap, cardboard, or other materials.



Place additional bagged loose ice on top of the samples. Adhere strapping tape at least three times around the cooler to prevent it from opening during shipment.

- *E. coli* samples have very short hold time (6-30 hours depending on the lab). Please schedule field collections accordingly.
 - San Juan Basin Public Health (SJBPH) - 281 Sawyer Dr, Durango – 8am-4:30pm
 - *E. coli* samples are only accepted Monday-Thursday
 - Park in upper parking lot. On the west (uphill, away from the Animas) side of the building, there is a sample drop off cabinet where you can leave samples.
 - Please fill out SJBPH Chain of Custody (COC) form. One form for each sample.
 - City of Gunnison Water Lab – 201 W. Virginia Avenue, Gunnison
- Nutrient and Dissolved Metals have a longer hold time (30 days for nutrients, 6 months for metals).
 - Green Analytical Lab - 75 Suttle St, Durango - M-F 8am-5pm
 - Please fill out Green COC. Multiple samples can go on one sheet.
 - Green Analytical only accepts delivery of samples Monday-Friday

Field Parameters and Lab Data:

- Please enter field parameters that were recorded in field notebook into our Outstanding Waters field parameter spreadsheet in our shared folder online.
- Upload any photos (labeled in file name with site and date) to our shared folder online.
- Upload any lab results to our shared folder online.

Signature:

Date:

Table 1. Sampling locations

ID	Stream Reach	Lat	Long
San Juan Basin			
<i>Animas</i>			
Lime	Lime Creek at Purgatory Flats	37.632562	-107.790775
Casc - Up	Cascade Creek above Hwy 550	37.667290	-107.823050
Casc - Low	Cascade Creek above Animas River	37.598529	-107.776092
Boul	Boulder Creek	37.830749	-107.637910
Bear - Animas	Bear Creek	37.814601	-107.696619
Grass	Grasshopper Creek	37.578100	-107.776100
<i>Dolores</i>			
Bear - Dolores	Bear Creek	37.574857	-108.187916
Priest	Priest	37.587578	-108.163686
East Fork	E Fork Dolores at Snow Spur Creek	37.779186	-107.944373
Burro	West Fork Dolores at Burro Bridge	37.795545	-108.065590
Coal	Coal Creek from Wilderness boundary downstream to confluence	37.760342	-107.999798
Slate	Slate Creek from Wilderness boundary downstream to confluence	37.778770	-107.956500
Snow	Snow Spur Creek	37.779540	-107.944564
StonerUp	Stoner Creek - Upper	37.688419	-108.191214
StonerLow	Stoner Creek - Lower	37.589573	-108.321711
Wild	Wildcat Creek	37.625564	-108.074187
<i>Upper San Juan</i>			
Fall	Fall Creek at Wolf Creek campground	37.441640	-106.880770
Wolf	Wolf Creek at Wolf Creek campground	37.442050	-106.886900
Quartz	Quartz Creek at FS 684	37.410480	-106.756850
Gunnison Basin			
<i>San Miguel</i>			
WATF	Waterfall - Ouray	37.853600	-107.833530
TAB	Tabeguache Creek above San Miguel River	38.357849	-108.707358
<i>Upper Gunnison</i>			
UpTay*	Taylor River, Above Taylor Reservoir	38.857922	-106.569704
Soap	Soap Creek, above	38.526525	-107.308465
<i>Lower Gunnison</i>			
BIG D	Big Dominguez Creek above Gunnison River	38.826719	-108.381629
LIL D	Little Dominguez Creek above Big Dominguez Creek	38.820051	-108.377522
ESC*	Escalante Creek at Potholes Recreation Area	38.670483	-108.324883
POTT	Potter Creek above Roubideau Creek	38.636539	-108.195530
ROUB	Roubideau Creek above Gunnison River	38.734760	-108.161002

*collect additional unfiltered total metals bottle (identical to dissolved metal bottle, just unfiltered).

Table 2. Duplicate/Blank schedule					
	# of sites	Winter'21	Spring'21	July'21	Fall'21
Dolores	10	1	1	1	1
Animas	6	1	1	1	
Upper San Juan	3	1	1		1
San Miguel	2	1			
Gunnison	7	1	1	1	1

Note: "1" indicates that a duplicate and blank needs to be collected from one site (chosen at random) within the designated watershed. Please label samples with "_30" for a duplicate and "_90" for a blank. For example, "BIG D_30" would be a duplicate for the site "BIG D."

Appendix B: Assessment of water quality results using CDPHE assessment statistics.

Appendix B summarizes attainment of the twelve water quality standards required for OW consideration using CDPHE assessment statistics.

“WQ Criteria” is the CDPHE water quality standard that we compare measured results to.

“Assessment Statistic” is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Bear Creek - Animas														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	6	1	7	7	7	6	1	7	7	7	7
% Detections	0	14.29	28.57	100	100	42.86	0	71.43	83.33	0	100	0	0	100
% Estimated Values (J flag)	0	0	57.14	0	0	N/A	28.57	14.29	0	100	0	100	0	0
% Non-Detections	100	85.71	14.29	0	0	57.14	71.43	14.29	16.67	0	0	0	100	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0.03	0.96	10.86	9.29	1.43	0.03	3.13	0.19	0.02	7.45-8.1	0.61	0	6.88
WQ Criteria	3.68	0.66	8.12	7.00	6.00	126	2.22	1588	10.00	10.00	6.5-9.0	4.60	0.26	92.41
Hazard Quotient	0.00	0.05	0.12	N/A	N/A	0.01	0.01	0.00	0.02	0.00	N/A	0.13	0.00	0.07
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria.

Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Bear Creek - Dolores														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	5	2	7	7	7	7	1	7	7	7	7
% Detections	0	0	28.57	100	100	57.14	0	100	42.86	0	100	0	0	28.57
% Estimated Values (J flag)	0	0	57.14	0	0	N/A	14.29	0	14.29	100	0	42.86	0	71.43
% Non-Detections	100	100	14.29	0	0	42.86	85.71	0	42.86	0	0	57.14	100	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.61	9.98	9.75	3.45	0.01	3.25	0.17	0.02	8.16-8.6	0.50	0	2.12
WQ Criteria	1.42	0.76	9.54	7.00	6.00	126	2.73	1691	10.00	10.00	6.5-9.0	4.60	0.36	130
Hazard Quotient	0.00	0.00	0.06	N/A	N/A	0.03	0.00	0.00	0.02	0.00	N/A	0.11	0.00	0.02
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Big Dominguez Creek - Site 1														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	3	3	11	7	7	2	5	7	7	7	7
% Detections	14.29	0	85.71	100	100	63.64	14.29	100	50.00	100	100	14.29	0	42.86
% Estimated Values (J flag)	0	14.29	14.29	0	0	N/A	57.14	0	0	0	0	42.86	0	42.86
% Non-Detections	85.71	85.71	0	0	0	36.36	28.57	0	50.00	0	0	42.86	100	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0.01	0.03	1.04	7.71	6.87	12.54	0.29	15.41	0.08	0.58	8.47-8.63	1.04	0	4.31
WQ Criteria	0.97	1.13	15.03	7.00	6.00	126	4.83	2018	10.00	10.00	6.5-9.0	4.60	0.91	210
Hazard Quotient	0.01	0.03	0.07	N/A	N/A	0.10	0.06	0.01	0.01	0.06	N/A	0.23	0.00	0.02
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Big Dominguez Creek - Site 2														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	4	4	4	3	0	8	4	4	2	2	4	4	4	4
% Detections	0	0	100	100	N/A	25.00	0	100	0	0	100	25.00	0	0
% Estimated Values (J flag)	0	0	0	0	N/A	N/A	50.00	0	0	0	0	25.00	25.00	75.00
% Non-Detections	100	100	0	0	N/A	75.00	50.00	0	100	100	0	50.00	75.00	25.00
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.77	7.78	N/A	2.47	0.30	15.87	0	0	8.21-8.5	1.14	0.11	1.31
WQ Criteria	1.68	1.23	16.50	7.00	6.00	126	5.43	2093	10.00	10.00	6.5-9.0	4.60	1.10	232
Hazard Quotient	0.00	0.00	0.05	N/A	N/A	0.02	0.05	0.01	0.00	0.00	N/A	0.25	0.10	0.01
Assessment	Attain	Attain	Attain	Attain	N/A	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

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Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Boulder Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	6	1	7	7	7	6	1	8	7	7	7
% Detections	0	28.57	85.71	100	100	0	0	42.86	100	100	100	0	0	100
% Estimated Values (J flag)	0	57.14	14.29	0	0	N/A	42.86	42.86	0	0	0	28.57	0	0
% Non-Detections	100	14.29	0	0	0	100	57.14	14.29	0	0	0	71.43	100	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0.21	2.03	10.23	9.01	1.00	0.12	0.65	0.30	0.04	6.9-8.16	0.32	0	31.01
WQ Criteria	4.71	0.54	6.48	7.00	6.00	126	1.66	1454	10.00	10.00	6.5-9.0	4.60	0.17	52.41
Hazard Quotient	0.00	0.39	0.31	N/A	N/A	0.01	0.07	0.00	0.03	0.00	N/A	0.07	0.00	0.59
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Cascade Creek (Lower)														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	6	1	7	7	7	6	1	7	7	7	7
% Detections	0	0	14.29	100	100	83.33	0	71.43	100	100	100	0	0	14.29
% Estimated Values (J flag)	14.29	0	71.43	0	0	N/A	14.29	28.57	0	0	0	28.57	0	85.71
% Non-Detections	85.71	100	14.29	0	0	16.67	85.71	0	0	0	0	71.43	100	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0.00	0	0.42	10.70	10.35	3.56	0.00	3.97	0.23	0.97	7.71-8.48	0.30	0	1.99
WQ Criteria	2.27	0.77	9.75	7.00	6.00	126	2.80	1705	10.00	10.00	6.5-9.0	4.60	0.38	133
Hazard Quotient	0.00	0.00	0.04	N/A	N/A	0.03	0.00	0.00	0.02	0.10	N/A	0.07	0.00	0.02
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria.

Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Cascade Creek (Upper)														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	6	1	7	7	7	6	1	7	7	7	7
% Detections	0	0	14.29	100	100	16.67	0	100	100	100	100	0	0	85.71
% Estimated Values (J flag)	14.29	0	57.14	0	0	N/A	28.57	0	0	0	0	28.57	0	14.29
% Non-Detections	85.71	100	28.57	0	0	83.33	71.43	0	0	0	0	71.43	100	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0.00	0	0.57	10.25	8.69	1.27	0.02	37.02	0.13	0.09	7.84-8.27	0.40	0	6.06
WQ Criteria	1.16	0.76	9.51	7.00	6.00	126	2.72	1689	10.00	10.00	6.5-9.0	4.60	0.36	129
Hazard Quotient	0.00	0.00	0.06	N/A	N/A	0.01	0.01	0.02	0.01	0.01	N/A	0.09	0.00	0.05
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria.

Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Coal Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	5	2	9	7	7	7	1	7	7	7	7
% Detections	0	0	28.57	100	100	44.44	0	28.57	28.57	0	100	0	0	28.57
% Estimated Values (J flag)	0	0	42.86	0	0	N/A	28.57	71.43	28.57	0	0	71.43	0	57.14
% Non-Detections	100	100	28.57	0	0	55.56	71.43	0	42.86	100	0	28.57	100	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	1.48	9.36	9.32	4.79	0.30	2.11	0.09	0	8.19-8.61	0.62	0	2.55
WQ Criteria	1.26	0.88	11.31	7.00	6.00	126	3.38	1806	10.00	10.00	6.5-9.0	4.60	0.51	155
Hazard Quotient	0.00	0.00	0.13	N/A	N/A	0.04	0.09	0.00	0.01	0.00	N/A	0.13	0.00	0.02
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

East Fork Dolores														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	5	2	7	7	7	7	1	7	7	7	7
% Detections	14.29	0	14.29	100	100	28.57	0	42.86	85.71	100	100	42.86	0	42.86
% Estimated Values (J flag)	0	0	42.86	0	0	N/A	14.29	57.14	14.29	0	0	57.14	14.29	57.14
% Non-Detections	85.71	100	42.86	0	0	71.43	85.71	0	0	0	0	0	85.71	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0.01	0	0.32	9.90	9.90	1.39	0.02	2.60	0.14	0.08	8.08-8.32	1.20	0.01	3.18
WQ Criteria	1.88	0.87	11.15	7.00	6.00	126	3.32	1797	10.00	10.00	6.5-9.0	4.60	0.50	153
Hazard Quotient	0.01	0.00	0.03	N/A	N/A	0.01	0.01	0.00	0.01	0.01	N/A	0.26	0.02	0.02
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria.

Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Escalante Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	4	2	11	7	7	2	5	7	7	7	7
% Detections	0	0	71.43	100	100	81.82	0	100	0	60.00	100	14.29	0	28.57
% Estimated Values (J flag)	0	0	28.57	0	0	N/A	42.86	0	0	20.00	0	85.71	14.29	57.14
% Non-Detections	100	100	0	0	0	18.18	57.14	0	100	20.00	0	0	85.71	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.93	7.73	7.24	7.33	0.07	6.62	0	0.66	8.35-8.81	1.05	0.01	2.52
WQ Criteria	0.79	1.38	18.89	7.00	6.00	126	6.42	2207	10.00	10.00	6.5-9.0	4.60	1.44	268
Hazard Quotient	0.00	0.00	0.05	N/A	N/A	0.06	0.01	0.00	0.00	0.07	N/A	0.23	0.01	0.01
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria.

Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Fall Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	6	1	7	7	7	6	1	7	7	7	7
% Detections	0	0	71.43	100	100	50.00	0	28.57	50.00	100	100	0	0	14.29
% Estimated Values (J flag)	0	0	28.57	0	0	N/A	42.86	57.14	33.33	0	0	14.29	14.29	85.71
% Non-Detections	100	100	0	0	0	50.00	57.14	14.29	16.67	0	0	85.71	85.71	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.80	9.43	9.70	2.48	0.02	0.67	0.07	0.14	7.24-7.84	0.03	0.01	1.47
WQ Criteria	4.41	0.28	3.02	7.00	6.00	126	0.61	1080	10.00	10.00	6.5-9.0	4.60	0.04	7.75
Hazard Quotient	0.00	0.00	0.26	N/A	N/A	0.02	0.04	0.00	0.01	0.01	N/A	0.01	0.28	0.19
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria.

Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Grasshopper Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	6	1	7	7	7	6	1	6	7	7	7
% Detections	0	0	14.29	100	100	0	0	14.29	100	0	100	0	0	28.57
% Estimated Values (J flag)	0	0	71.43	0	0	N/A	0	71.43	0	100	0	0	0	57.14
% Non-Detections	100	100	14.29	0	0	100	100	14.29	0	0	0	100	100	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.43	10.64	9.45	1.00	0	0.62	0.26	0.02	7.7-8.37	0	0	2.84
WQ Criteria	2.19	0.54	6.52	7.00	6.00	126	1.68	1458	10.00	10.00	6.5-9.0	4.60	0.17	53.34
Hazard Quotient	0.00	0.00	0.07	N/A	N/A	0.01	0.00	0.00	0.03	0.00	N/A	0.00	0.00	0.05
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Little Dominguez Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	3	3	11	7	7	2	5	7	7	7	7
% Detections	0	0	100	100	100	54.55	14.29	100	50.00	60.00	100	14.29	0	42.86
% Estimated Values (J flag)	0	14.29	0	0	0	N/A	42.86	0	0	0	0	28.57	14.29	42.86
% Non-Detections	100	85.71	0	0	0	45.45	42.86	0	50.00	40.00	0	57.14	85.71	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0.03	1.22	7.53	6.51	12.24	0.23	21.40	0.13	0.10	8.55-8.58	0.69	0.02	7.78
WQ Criteria	0.97	1.15	15.26	7.00	6.00	126	4.93	2031	10.00	10.00	6.5-9.0	4.60	0.94	214
Hazard Quotient	0.00	0.03	0.08	N/A	N/A	0.10	0.05	0.01	0.01	0.01	N/A	0.15	0.02	0.04
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Lime Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	6	1	7	7	7	6	1	7	7	7	7
% Detections	0	0	14.29	100	100	28.57	0	57.14	83.33	100	100	0	0	28.57
% Estimated Values (J flag)	0	0	57.14	0	0	N/A	28.57	42.86	16.67	0	0	0	0	71.43
% Non-Detections	100	100	28.57	0	0	71.43	71.43	0	0	0	0	100	100	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.45	10.16	8.57	1.78	0.02	0.74	0.15	0.03	7.95-8.48	0	0	2.51
WQ Criteria	1.67	0.61	7.42	7.00	6.00	126	1.98	1533	10.00	10.00	6.5-9.0	4.60	0.22	73.64
Hazard Quotient	0.00	0.00	0.06	N/A	N/A	0.01	0.01	0.00	0.01	0.00	N/A	0.00	0.00	0.03
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Potter Creek													
Class: Aq Life Warm 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)	<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
Descriptive													
# of samples	4	4	4	3	4	4	4	2	2	4	4	4	4
% Detections	0	0	100	100	50.00	0	100	0	50.00	100	75.00	0	0
% Estimated Values (J flag)	0	0	0	0	N/A	0	0	0	0	0	25.00	0	75.00
% Non-Detections	100	100	0	0	50.00	100	0	100	50.00	0	0	100	25.00
Assessment													
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	2.88	8.42	4.07	0	10.46	0	0.03	8.08-8.13	1.82	0	0.96
WQ Criteria	2.56	2.03	29.28	5.00	126	10.94	2618	10.00	10.00	6.5-9.0	4.60	3.47	428
Hazard Quotient	0.00	0.00	0.10	N/A	0.03	0.00	0.00	0.00	0.00	N/A	0.40	0.00	0.00
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Priest Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	5	2	7	7	7	7	1	7	7	7	7
% Detections	0	0	57.14	100	100	57.14	0	85.71	28.57	0	100	0	0	14.29
% Estimated Values (J flag)	0	0	42.86	0	0	N/A	28.57	14.29	0	0	0	42.86	0	71.43
% Non-Detections	100	100	0	0	0	42.86	71.43	0	71.43	100	0	57.14	100	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.73	9.74	10.00	3.19	0.03	1.85	0.05	0	8.28-8.71	0.40	0	1.92
WQ Criteria	1.12	1.03	13.47	7.00	6.00	126	4.22	1934	10.00	10.00	6.5-9.0	4.60	0.73	187
Hazard Quotient	0.00	0.00	0.05	N/A	N/A	0.03	0.01	0.00	0.00	0.00	N/A	0.09	0.00	0.01
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Quartz Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	5	5	5	4	1	5	5	5	4	1	5	5	5	5
% Detections	0	0	20.00	100	100	40.00	0	100	50.00	100	100	0	0	20.00
% Estimated Values (J flag)	0	0	40.00	0	0	N/A	20.00	0	0	0	0	20.00	20.00	80.00
% Non-Detections	100	100	40.00	0	0	60.00	80.00	0	50.00	0	0	80.00	80.00	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.74	10.24	11.16	1.85	0.02	6.32	0.16	0.12	7.3-8.16	0.12	0.04	2.42
WQ Criteria	3.43	0.44	5.16	7.00	6.00	126	1.24	1330	10.00	10.00	6.5-9.0	4.60	0.11	29.64
Hazard Quotient	0.00	0.00	0.14	N/A	N/A	0.01	0.02	0.00	0.02	0.01	N/A	0.03	0.38	0.08
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Roubideau Creek													
Class: Aq Life Warm 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)	<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
Descriptive													
# of samples	3	3	3	3	3	3	3	2	1	3	3	3	3
% Detections	0	33.33	100	100	66.67	33.33	100	50.00	0	100	100	0	66.67
% Estimated Values (J flag)	0	0	0	0	N/A	66.67	0	50.00	0	0	0	33.33	33.33
% Non-Detections	100	66.67	0	0	33.33	0	0	0	100	0	0	66.67	0
Assessment													
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0.42	3.81	8.24	2.02	1.78	28.34	0.06	0	8.39-8.55	2.54	0.07	5.73
WQ Criteria	1.02	1.36	18.49	5.00	126	6.25	2188	10.00	10.00	6.5-9.0	4.60	1.38	262
Hazard Quotient	0.00	0.31	0.21	N/A	0.02	0.28	0.01	0.01	0.00	N/A	0.55	0.05	0.02
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Slate Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
				Descriptive										
# of samples	7	7	7	5	2	7	7	7	7	1	7	7	7	7
% Detections	0	0	28.57	100	100	57.14	0	14.29	100	100	100	71.43	0	14.29
% Estimated Values (J flag)	14.29	0	42.86	0	0	N/A	28.57	85.71	0	0	0	28.57	0	71.43
% Non-Detections	85.71	100	28.57	0	0	42.86	71.43	0	0	0	0	0	100	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0.00	0	0.73	9.62	9.41	4.28	0.04	0.52	0.15	0.05	8.19-8.51	2.20	0	1.74
WQ Criteria	1.56	0.72	8.92	7.00	6.00	126	2.50	1647	10.00	10.00	6.5-9.0	4.60	0.32	117
Hazard Quotient	0.00	0.00	0.08	N/A	N/A	0.03	0.02	0.00	0.01	0.00	N/A	0.48	0.00	0.01
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Snow Spur Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	5	2	7	7	7	7	1	8	7	7	7
% Detections	0	0	28.57	100	100	42.86	0	100	28.57	0	100	0	0	0
% Estimated Values (J flag)	0	0	57.14	0	0	N/A	57.14	0	0	0	0	71.43	0	85.71
% Non-Detections	100	100	14.29	0	0	57.14	42.86	0	71.43	100	0	28.57	100	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	1.11	9.72	10.05	2.56	0.06	5.45	0.05	0	7.91-8.5	0.51	0	1.52
WQ Criteria	1.58	0.75	9.34	7.00	6.00	126	2.65	1677	10.00	10.00	6.5-9.0	4.60	0.35	127
Hazard Quotient	0.00	0.00	0.12	N/A	N/A	0.02	0.02	0.00	0.00	0.00	N/A	0.11	0.00	0.01
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Soap Creek														
Class: Aq Life Cold 1 Data: 1999-2022 Source: NPS	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	131	96	96	74	34	110	96	12	65	102	125	96	96	96
% Detections	0	0	43.75	100	100	92.73	3.13	91.67	23.08	11.76	100	19.79	0	0
% Estimated Values (J flag)	7.63	5.21	21.88	0	0	N/A	12.50	0	21.54	9.80	0	51.04	4.17	1.04
% Non-Detections	92.37	94.79	34.38	0	0	7.27	84.38	8.33	55.38	78.43	0	29.17	95.83	98.96
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.60	8.20	7.63	6.88	0.02	2.50	0.03	0.01	7.78-8.45	0.11	0	0
WQ Criteria	2.16	0.40	4.60	7.00	6.00	126	1.07	1272	10.00	10.00	6.5-9.0	4.60	0.08	22.21
Hazard Quotient	0.00	0.00	0.13	N/A	N/A	0.05	0.01	0.00	0.00	0.00	N/A	0.02	0.00	0.00
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Stoner Creek (Lower)														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	5	2	9	7	7	7	1	7	7	7	7
% Detections	0	0	14.29	100	100	66.67	0	100	42.86	100	100	0	0	0
% Estimated Values (J flag)	0	0	71.43	0	0	N/A	14.29	0	0	0	0	28.57	0	100
% Non-Detections	100	100	14.29	0	0	33.33	85.71	0	57.14	0	0	71.43	100	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.43	9.42	9.41	17.81	0.01	4.49	0.05	0.15	8.15-8.71	0.30	0	1.31
WQ Criteria	1.35	0.90	11.64	7.00	6.00	126	3.51	1827	10.00	10.00	6.5-9.0	4.60	0.54	160
Hazard Quotient	0.00	0.00	0.04	N/A	N/A	0.14	0.00	0.00	0.01	0.01	N/A	0.07	0.00	0.01
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Tabeguache Creek														
Class: Aq Life Warm 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)	<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)	
Descriptive														
# of samples	7	7	7	7	7	7	7	6	1	7	7	7	7	
% Detections	0	0	57.14	100	71.43	0	100	0	100	100	14.29	0	14.29	
% Estimated Values (J flag)	0	0	28.57	0	N/A	42.86	0	0	0	0	85.71	0	85.71	
% Non-Detections	100	100	14.29	0	28.57	57.14	0	100	0	0	0	100	0	
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	1.01	7.24	5.88	0.07	44.71	0	0.04	8.28-8.49	0.95	0	2.08	
WQ Criteria	1.59	1.48	20.43	5.00	126	7.07	2275	10.00	10.00	6.5-9.0	4.60	1.68	292	
Hazard Quotient	0.00	0.00	0.05	N/A	0.05	0.01	0.02	0.00	0.00	N/A	0.21	0.00	0.01	
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria.

Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Upper Taylor River														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	3	3	7	7	7	1	6	7	7	7	7
% Detections	0	0	0	100	100	42.86	0	100	100	50.00	100	0	0	42.86
% Estimated Values (J flag)	0	0	71.43	0	0	N/A	42.86	0	0	50.00	0	0	14.29	42.86
% Non-Detections	100	100	28.57	0	0	57.14	57.14	0	0	0	0	100	85.71	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.50	8.14	7.19	3.01	0.06	7.23	0.85	0.58	7.44-8.59	0	0.01	5.25
WQ Criteria	2.18	0.48	5.62	7.00	6.00	126	1.38	1375	10.00	10.00	6.5-9.0	4.60	0.13	36.69
Hazard Quotient	0.00	0.00	0.09	N/A	N/A	0.02	0.05	0.01	0.09	0.06	N/A	0.00	0.08	0.14
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Waterfall Creek														
Class: Aq Life Cold 1 Data: 2017-2022 Source: SCOWC and SMWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	15	15	15	1	7	15	15	6	2	19	15	15	15
% Detections	0	13.33	20.00	100	100	28.57	13.33	46.67	83.33	50.00	100	26.67	6.67	66.67
% Estimated Values (J flag)	14.29	13.33	33.33	0	0	N/A	40.00	33.33	16.67	50.00	0	53.33	6.67	26.67
% Non-Detections	85.71	73.33	46.67	0	0	71.43	46.67	20.00	0	0	0	20.00	86.67	6.67
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0.02	0.23	1.71	8.77	9.64	1.30	0.29	130	0.11	0.10	7.23-8.27	0.59	0	18.00
WQ Criteria	4.40	1.32	17.85	7.00	6.00	126	5.99	2159	10.00	10.00	6.5-9.0	4.60	1.28	253
Hazard Quotient	0.00	0.17	0.10	N/A	N/A	0.01	0.05	0.06	0.01	0.01	N/A	0.13	0.00	0.07
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

West Fork Dolores														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	5	2	7	7	7	7	1	7	7	7	7
% Detections	0	0	14.29	100	100	28.57	0	28.57	100	100	100	0	0	42.86
% Estimated Values (J flag)	0	0	71.43	0	0	N/A	14.29	71.43	0	0	0	71.43	0	57.14
% Non-Detections	100	100	14.29	0	0	71.43	85.71	0	0	0	0	28.57	100	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.54	10.40	10.22	1.56	0.01	0.65	0.21	0.11	7.61-8.12	0.80	0	2.44
WQ Criteria	3.02	0.66	8.20	7.00	6.00	126	2.25	1594	10.00	10.00	6.5-9.0	4.60	0.27	94.77
Hazard Quotient	0.00	0.00	0.07	N/A	N/A	0.01	0.00	0.00	0.02	0.01	N/A	0.17	0.00	0.03
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Wildcat Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	5	2	7	7	7	7	1	7	7	7	7
% Detections	0	0	14.29	100	100	42.86	0	85.71	42.86	100	100	0	0	14.29
% Estimated Values (J flag)	0	0	57.14	0	0	N/A	14.29	14.29	0	0	0	28.57	0	71.43
% Non-Detections	100	100	28.57	0	0	57.14	85.71	0	57.14	0	0	71.43	100	14.29
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.51	8.90	9.15	3.46	0.00	5.44	0.14	0.07	8.39-8.6	0.31	0	1.15
WQ Criteria	1.17	0.97	12.61	7.00	6.00	126	3.88	1885	10.00	10.00	6.5-9.0	4.60	0.64	174
Hazard Quotient	0.00	0.00	0.04	N/A	N/A	0.03	0.00	0.00	0.01	0.01	N/A	0.07	0.00	0.01
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Wolf Creek														
Class: Aq Life Cold 1 Data: 2020-2022 Source: SCOWC	Ammonia (mg/l)	Cadmium (µg/l)	Copper (µg/l)	Dissolved oxygen (mg/l)		<i>E.coli</i> (per 100ml)	Lead (µg/l)	Manganese (µg/l)	Nitrate (mg/l)	Nitrate /Nitrite (mg/l)	pH	Selenium (µg/l)	Silver (µg/l)	Zinc (µg/l)
				Spawning season	Non-spawning season									
Descriptive														
# of samples	7	7	7	6	1	7	7	7	6	1	7	7	7	7
% Detections	0	0	14.29	100	100	28.57	0	85.71	50.00	100	100	0	0	14.29
% Estimated Values (J flag)	0	0	57.14	0	0	N/A	28.57	14.29	16.67	0	0	14.29	0	85.71
% Non-Detections	100	100	28.57	0	0	71.43	71.43	0	33.33	0	0	85.71	100	0
Assessment														
WQ Criteria Type	85th percentile	85th percentile	85th percentile	15th percentile	15th percentile	Geometric mean	85th percentile	85th percentile	85th percentile	85th percentile	Range (15th-85th percentile)	85th percentile	85th percentile	85th percentile
Assessment Statistic	0	0	0.53	10.87	10.15	2.00	0.02	1.83	0.14	0.07	7.73-7.98	0.03	0	1.94
WQ Criteria	3.11	0.25	2.74	7.00	6.00	126	0.54	1040	10.00	10.00	6.5-9.0	4.60	0.03	6.09
Hazard Quotient	0.00	0.00	0.19	N/A	N/A	0.02	0.04	0.00	0.01	0.01	N/A	0.01	0.00	0.32
Assessment	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain	Attain

WQ Criteria is the CDPHE water quality standard that we compare measured results to.

Assessment Statistic is the calculated value (e.g., 85th percentile) as specified by CDPHE of measured water quality parameters that we compare to water quality standards.

Hazard Quotient is the ratio of the assessment statistic to the water quality criteria. For metals, bacteria, and nutrients, the assessment statistic must be less than the water quality criteria. For dissolved oxygen, the assessment statistic must be greater than the water quality criteria. Hazard Quotient values less than 1.0 indicate attainment of the water quality standard.

Appendix C: Aquatic Life

Appendix C summarizes fish community composition and Multi-Metric Index (MMI) scores of benthic macroinvertebrate samples collected from candidate reaches.

Candidate waterbody	Fish Species Composition			Aquatic Life - Benthic Macroinvertebrate - Multi-Metric Index (MMI) scores					
	Fish Species Present	Cutthroat Lineage (if present)	Fish data source	Benthic sampling location	Benthic sample collected within candidate portion?	Benthic sample date	Benthic MMI score	Benthic assessment result	Benthic data source
San Juan									
Animas									
Bear - Animas	Cutthroat Trout	Blue	CPW	above confluence with Mineral Creek	Yes	10/12/2016	57.10	Attain	MSI
Boulder	No Data			at 11,365'	Yes	9/24/2020	79.20	Attain; High Scoring	MSI
Cascade	Cutthroat Trout, Brook Trout, Brown Trout, Rainbow Trout	Mixed	CPW	Above confluence with Animas River	Downstream of candidate portion, but representative of conditions	10/15/2015	76.80	Attain; High Scoring	MSI
						10/19/2016	76.40	Attain; High Scoring	MSI
						10/20/2017	78.30	Attain; High Scoring	MSI
						10/19/2018	67.10	Attain; High Scoring	MSI
						10/16/2019	67.80	Attain; High Scoring	MSI
						10/15/2020	85.40	Attain; High Scoring	MSI
Grasshopper	Cutthroat Trout	Blue	CPW	No data					
Lime	Cutthroat Trout, Brook Trout, Brown Trout, Rainbow Trout	Mixed	CPW	below Crater Creek	Yes	8/4/1994	57.70	Attain	CDPHE
Dolores									
Bear - Dolores	Cutthroat Trout, Brook Trout, Brown Trout, Rainbow Trout, Mottled Sculpin	Mixed	CPW	0.5 mi abv confluence w/ Little Bear Creek	Yes	8/6/2003	57.60	Attain	CDPHE
Priest	Cutthroat Trout, Brook Trout, Brown Trout	Green	CPW	No data					
Wildcat	Cutthroat Trout, Mottled Sculpin	Green	CPW	No data					
Stoner	Cutthroat Trout, Brook Trout, Brown Trout, Rainbow Trout, Mottled Sculpin	Undetermined. Likely CRCT	CPW	No data					
East Fork Dolores	Cutthroat Trout, Brooke Trout, Brown Trout, Mottled Sculpin	Mixed	CPW	No data					
Coal	Cutthroat Trout, Brooke Trout, Brown Trout, Mottled Sculpin	Blue	CPW	at FR 535 blw Lizard Head Wilderness	Yes	8/7/2019	74.90	Attain; High Scoring	CDPHE
Slate	Cutthroat Trout	Green	CPW	No data					
Snow Spur	Cutthroat Trout; Brook Trout, Brown Trout, Rainbow Trout, Mottled Sculpin	Green	CPW/DRA	No data					
Upper West Fork Dolores	Cutthroat Trout, Brook Trout, Brown Trout, Rainbow Trout, Mottled Sculpin	Undetermined	CPW/DRA	No data					

Candidate waterbody	Fish Species Composition			Aquatic Life - Benthic Macroinvertebrate - Multi-Metric Index (MMI) scores					
	Fish Species Present	Cutthroat Lineage (if present)	Fish data source	Benthic sampling location	Benthic sample collected within candidate portion?	Benthic sample date	Benthic MMI score	Benthic assessment result	Benthic data source
San Juan									
<i>Upper San Juan</i>									
Fall	Cutthroat Trout	SJCT	CPW	above diversion	Yes	10/7/2021	84.00	Attain; High Scoring	CDPHE
Quartz	Cutthroat Trout	Mixed	CPW	at CR 684 crossing	Yes	8/26/2014	63.00	Attain; High Scoring	CDPHE
			CPW	upstream of SJNF/private boundary	Yes	10/7/2021	85.90	Attain; High Scoring	CDPHE
Wolf	Cutthroat Trout, Brown Trout	SJCT	CPW	above Fall	Yes	10/7/2021	74.70	Attain; High Scoring	CDPHE
Gunnison									
<i>San Miguel</i>									
Tabeguache	Cutthroat Trout, Bluehead Sucker, Flathead minnow, Channel Catfish, Flannelmouth Sucker, Bluehead Sucker, Red Shiner, Green Sunfish, Roundtail Chub, Sand Shiner, Speckled Dace, Mottled Sculpin, Rainbow Trout, Black Bullhead, Brook Stickleback	Colorado River	CPW	near mouth	Yes	9/11/2017	49.30	Attain	CDPHE
Waterfall	<i>No Data</i>		CPW	at 9,965'	Yes	10/3/2021	64.60	Attain; High Scoring	CDPHE
<i>Upper Gunnison</i>									
Soap	Brook Trout, Brown Trout, Rainbow Trout, Speckled Dace, Longnose Sucker, White Sucker	N/A	CPW	above Blue Mesa Reservoir	Yes	8/3/2004	75.50	Attain; High Scoring	CDPHE
			CPW	at Soap Creek Campground	Yes	7/30/2008	87.10	Attain; High Scoring	CDPHE
Upper Taylor	Brown Trout, White Sucker, Northern Pike, Cutthroat Trout (Italian Creek)	Colorado River	CPW	downstream Dinner Bell Campground	Yes	8/1/2012	49.10	Attain	CDPHE
				above Pine Creek	Yes	9/7/1995	68.60	Attain; High Scoring	CDPHE
				Italian Creek	Yes	9/7/1995	60.00	Attain	CDPHE
				below confluence with Bowman Creek	Yes	8/4/2001	54.40	Attain	CDPHE

Candidate waterbody	Fish Species Composition			Aquatic Life - Benthic Macroinvertebrate - Multi-Metric Index (MMI) scores					
	Fish Species Present	Cutthroat Lineage (if present)	Fish data source	Benthic sampling location	Benthic sample collected within candidate portion?	Benthic sample date	Benthic MMI score	Benthic assessment result	Benthic data source
Gunnison									
<i>Lower Gunnison</i>									
Escalante	Rainbow Trout, Bluehead Sucker, Brown Trout, Flannelmouth Sucker, Roundtail Chub, Speckled Dace, Fathead Minnow, Channel Catfish, Green Sunfish, Longnose Sucker, White Sucker, Redside Shiner	Colorado River	CPW	Middle Fork Escalante - above confluence with East Fork	Yes	7/18/2007	52.70	Attain	CDPHE
			CPW	North Fork Escalante - above mouth	Yes	7/18/2007	63.80	Attain; High Scoring	CDPHE
			CPW	North Fork Escalante - above mouth	Yes	7/8/2014	43.60	Attain	CDPHE
			CPW	at Escalante SWA	Downstream of candidate portion, but representative of conditions	8/22/1996	77.50	Attain; High Scoring	CDPHE
			CPW	at Escalante SWA	Downstream of candidate portion, but representative of conditions	9/28/2004	55.00	Attain; High Scoring	CDPHE
			CPW	at Escalante SWA	Downstream of candidate portion, but representative of conditions	7/18/2007	74.30	Attain; High Scoring	CDPHE
			CPW	at Escalante SWA	Downstream of candidate portion, but representative of conditions	7/7/2014	72.70	Attain; High Scoring	CDPHE
Potter	Bluehead Sucker, Brook Trout, Brown Trout, Flathead Minnow, Flannelmouth Sucker, Bluehead Sucker, Green Sunfish, Rainbow Trout, Red Shiner, Roundtail Chub, Sand Shiner, Speckled Dace, White Sucker.	N/A	CPW	at mouth	Yes	7/17/2007	53.20	Attain	CDPHE
Roubideau	Brook Trout, Longnose Sucker, Speckled Dace, Bluehead Sucker, Brown Trout, Cutthroat Trout, Fathead Minnow, Flannelmouth Sucker, Green Sunfish, Longnose Sucker, Rainbow Trout, Red Shiner, Redside Shiner, Roundtail Chub, Speckled Dace, White Sucker, Bluehead Sucker, Sand Shiner, Colorado Pikeminnow, Common Carp, Largemouth Bass, Black Bullhead, Mottled Sculpin, Redside Shiner	N/A	CPW	<i>No data</i>					
Little Dominguez	Rainbow Trout	N/A	CPW	<i>No data</i>					
Big Dominguez	Bluehead Sucker, Common Carp, Flathead Minnow, Flannelmouth Sucker, Gizzard Shad, Green Sunfish, Largemouth Bass, Longnose Sucker, Red Shiner, Redside Shiner, Roundtail Chub, Sand Shiner, Speckled Dace, White Sucker	N/A	CPW	<i>No data</i>					

Note: CRCT = Colorado River Cutthroat Trout; SJCT = San Juan Cutthroat Trout

Appendix D: Data - Water Quality and Benthic Macroinvertebrate – Excel file attachment
