Final Report

Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments for 2020

Prepared by:
David Stagliano
Montana Biological Survey/Stag Benthics

Prepared for:

JACOBS

Boise, Idaho

Submitted to
U.S. Environmental Protection Agency
Region 8

March 2021

Executive Summary

The upper Clark Fork River (CFR) Basin in western Montana contains three contiguous Superfund Sites over 140 miles that have been undergoing various remediation activities for decades. Since 1986, annual benthic macroinvertebrate-based (BMI) monitoring has been consistently performed at 13 CFR stream reaches with prior, ongoing or future remedial actions (McGuire Consulting 1986-2017; MBS/Stag Benthics 2017-Present). Monitoring extended from Silver Bow Creek (SBC) sites upstream of the Warm Springs Ponds, downstream through the upper CFR, bracketing the former Milltown Dam site to below the CFR-Bitterroot River confluence. In addition to providing a current assessment of biological conditions, these sampling events extend the long-term data set for evaluating water quality trends and the effectiveness of these remedial activities.

These BMI assessment methods were developed specifically for the CFR basin (McGuire 1993). Ten measures of BMI community structure and composition are integrated into a single index of biological integrity. Results are represented on a scale of 0 to 100 percent, with values greater than 90 percent indicating a minimally impaired stream environment. Additionally, subsets of the BMI metrics provide estimates of the relative probable cause and severity of impacts from metals and/or nutrient stressors.

The 2020 BMI assessments documented above average biointegrity scores at 10 of the 13 sites, with notable improvements in SBC and upper CFR scores (**Figure ES-1**). The overall biointegrity average of 89.8 percent across all sites is the 3rd highest ever reported for this study. Although, environmental conditions are still causing slight impairments in the biological integrity of SBC and the CFR in the Deer Lodge Valley. Biological integrity in 2020 was non-impaired at seven sites and slightly impaired at six sites (**Figure ES-2**). Biological assessment scores ranged from 97 percent at Mill-Willow Bypass (Station 05) and CFR at Gemback Road (Station 8.0) to 77 percent at SBC below Warm Springs (Station 4.5) (**Figure ES-1**). Both SBC sites (Stations 2.5 and 4.5) were rated as slightly impaired in 2020. Slight biological impairment from nutrients was evident at one CFR station near Deer Lodge (09), but this site has improved markedly since 2017. The lower Blackfoot River (Station 14) was ranked slightly impaired again in 2020, likely due to nutrients.

During 2020, environmental conditions in SBC at Opportunity (Station 2.5) continued improving after experiencing large declines in integrity scores in 2018. Likewise, SBC below the Warm Springs Ponds (Station 4.5) remained slightly impaired, but BMI integrity scores have improved since 2017.

Environmental stressors (nutrients and low-stream flows) have decreased across the four CFR sites in the Deer Lodge Valley based on the 2018 to 2020 BMI assessments, likely due to above-average stream flows. Nutrient pollution exhibits more of an effect as the upper CFR becomes eutrophic during low-flow conditions. During 2017, the significant effects of nutrient enrichment were documented throughout the Deer Lodge Valley (five sites), while in 2018 only three CFR sites (Stations 8.5, 09 & 10), in 2019, 8.5 and 09, and in 2020 only site 09 reported slight nutrient impairments.

Long-term monitoring data shows biological integrity throughout the CFR Basin has improved since 1992 with the highest previous assessment scores occurring in 2009 and 2019 (**Figure ES-2**). Floodplain restoration and contaminant removal from upper SBC has resulted in improved water quality and biological integrity at the Opportunity site. Biological monitoring shows accelerated recovery over the past 3 years as remediation near this site was completed. Biological integrity in SBC improved to slightly impaired over the past 2 years after ranking moderately impaired in 2018.

Improved biological integrity at sites near Warm Springs, and farther downstream, coincided with

a series of remedial actions to control metals in the upper basin and the implementation of a basin-wide, nutrient-reduction program during the 1990s. Metals pollution has diminished throughout the basin, and significant biological impacts have been detected in the CFR on only a few dates during the past 15 years; particularly following flood events in 1997, 2011 and 2018, although slight metals impacts continue to be evident each year in upper SBC (Station 4.5). Residual metals effects appear to be continually limiting the recolonization and proliferation of the mayfly family Heptageniidae across the CFR basin.

Based on monitoring results from 2001 through 2020 (**Figure ES-1**), biological integrity scores usually indicate moderate impairment in upper SBC (Station 2.5), slight to moderate impairment in lower SBC (Station 4.5), and slightly impaired BMI communities along the CFR in the Deer Lodge Valley from Sager Lane to Kohrs Bend (Stations 8.5, 09 and 10). Biointegrity scores are typically non-impaired in the CFR below Warm Springs Creek (Station 07), from Gold Creek to below Missoula (Stations 11, 13, 15.5, and 20), in the lower Blackfoot River (Station 14), and at the Mill-Willow Bypass (Station 5). The Blackfoot River biointegrity has been ranked slightly impaired from 2016 through 2020. Assessment scores peaked in 2009, when all eight CFR stations were classified as non-impaired.

While the extent and severity of impacts has declined, environmental stresses continue to impact SBC and portions of the CFR. Upper SBC remains impaired by both metals and nutrients. Although the Warm Springs Ponds continue to effectively sequester metals, recent assessments of lower SBC (Station 4.5) indicate seasonal effluent toxicity consistent with episodic pulses of ammonia and/or arsenic. Lower SBC was classified as moderately impaired for most of the past decade but ranks slightly impaired over the past 3 years.

Nutrient impacts are routinely documented at the CFR stations in the Deer Lodge Valley, and nutrient scores were the lowest ever reported in 2017; these have significantly improved in 2019 and 2020 with the flushing flows of 2018. Based on BMI biointegrity metrics in 2020, CFR Stations 07, 8.5, and 09 have all increased by an average of 22 percent over 2017 scores. This reach is particularly susceptible to drought-related metric stressors, as seen in 2017, and remains at risk from increased metals loading from un-remediated floodplain slickens deposits during high-flow events (Fall 2019).

Long-term monitoring has identified more temporal and spatial impacts. Cumulative drought-related stresses were evident from 2002 through 2007 and possibly from 2014 to 2017. Probable metals impacts were indicated at several upper CFR stations following the floods in 1997, 2011 and 2018. Floods have had dramatic effects on water quality, stream habitat, and the biota of the CFR. In 2011, significant biological impairment from metals was documented at 10 of the 12 monitoring sites from SBC and in the CFR downstream to Gold Creek.

Metals impacts in the CFR were more widespread and severe following the floods in 1997 than in 2011, and lessor, but persisting, effects were detected after the high flows of 2018. In September of 2019, a series of rain events in the upper basin briefly doubled flows of SBC and CFR and slicken area run-off during this time was causally linked to a CFR fish kill that occurred from Galen to Perkins Lanes. The CRF Site 08 at Gemback Rd. was established in 2020 to monitor this river section, but surprisingly, reported one of the highest biointegrity scores (97 percent) of all CFR sites with no indications of metal toxicity.

Decades of biomonitoring has shown that biological integrity across most sites in the CFR Basin is trending upward, and the number of sites reporting moderate to severe degradation is decreasing, though there have been slight deviations from this trend in the Deer Lodge area over the last 4 years. During water years with periods of normal to below normal annual discharge for the CFR, nutrient impacts are becoming more of a contributing stressor than metals to the integrity of the BMI communities. Of the 34-year period of record, 2020 was only the 3rd year to report no sites ranked moderately or severely impaired (**Figure ES-2**).

Figure ES-1. Biointegrity at 13 Sites in the Clark Fork River Basin from August 2001 to 2019 (Mean and Standard Deviation) and August 2020. Sites arranged upstream to downstream.

Note: *See Table 1 for station names, locations, and periods of record.*

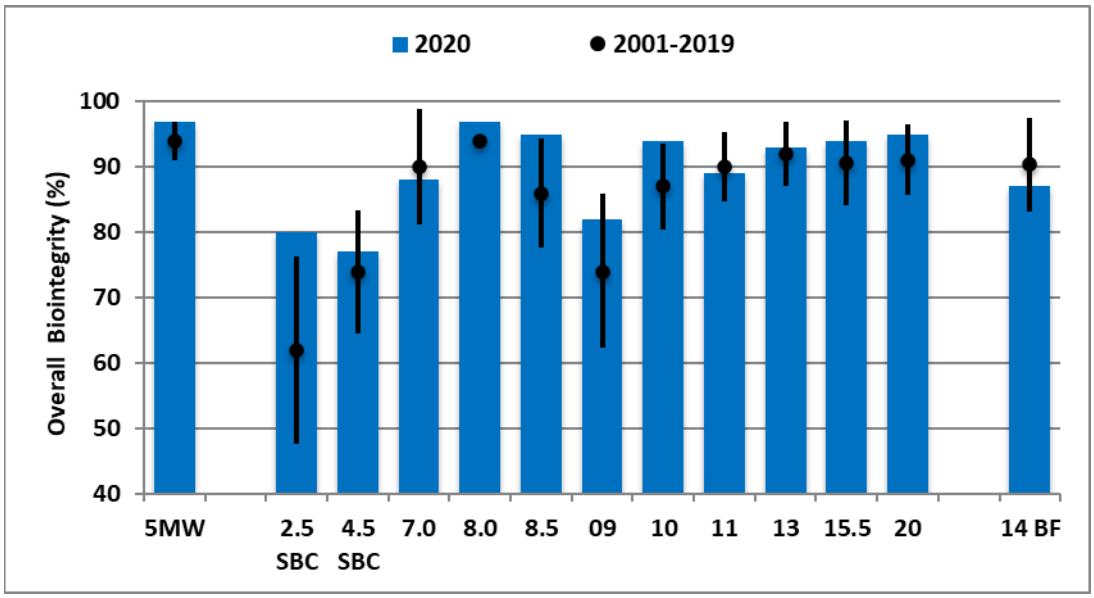
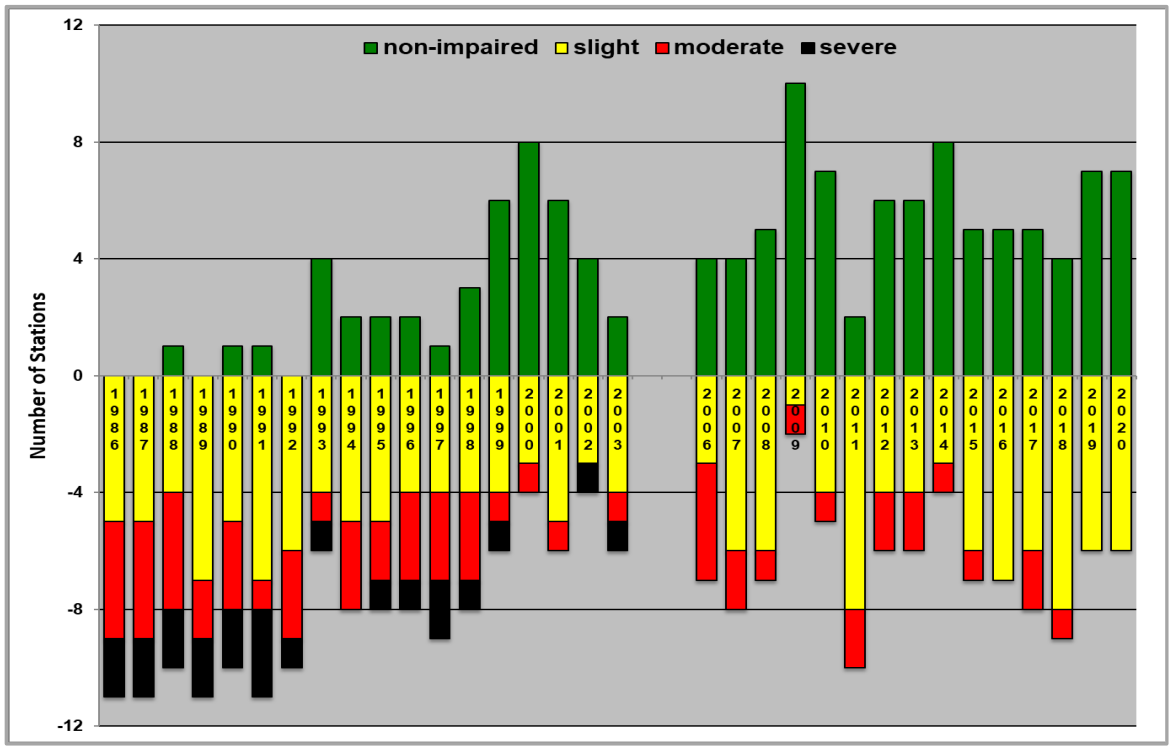


Figure ES-2. Biointegrity ranks reported at 13 Stations in the CFR basin from August 1986 to 2020.



Contents

Appendices

Tables

Figures

Acronyms and Abbreviations

BMI	Benthic macroinvertebrates
BI	Biotic Index
CH2M	CH2M HILL, Inc.
CFR	Clark Fork River
EPA	U.S. Environmental Protection Agency
EPT	Ephemeroptera, Plecoptera, and Trichoptera
EPTC	Ephemeroptera, Plecoptera, Trichoptera and Chironomidae
FAS	Fishing Access Site
MBS	Montana Biological Survey
MWB	Mill-Willow Bypass
MTI	metals tolerance index
OU	operable unit
RA	relative abundance
SBC	Silver Bow Creek
USGS	U.S. Geological Survey
WWTP	wastewater treatment plant

SECTION 1

Introduction

The upper Clark Fork River (CFR) Basin in western Montana contains four contiguous Superfund operable units (OUs) that have been undergoing various remediation activities to mitigate some of the most severe metal inputs for decades (Lipton et al., 1995; Pioneer Technical Services 2002; RESPEC, 2017) (**Figure 1**). The State of Montana initiated a biological monitoring program for the Clark Fork River Basin in 1984. The benthic macroinvertebrate (BMI) component evolved into an annual assessment of environmental conditions at 25 locations in approximately 300 miles of the drainage and included 10 years of data from CFR tributaries. The program was discontinued in 2004. In 2006, the U.S. Environmental Protection Agency (EPA) resurrected the program in its current form. CH2M HILL, Inc., now Jacobs, contracted with Montana Biological Survey/Stag Benthics to continue annual macroinvertebrate-based biological monitoring in the upper CFR Basin in 2017; McGuire Consulting had conducted the sampling program since 1986 (McGuire, 2017). The 2020 monitoring was conducted at 13 sites from Silver Bow Creek (SBC) at Opportunity, MT to the Clark Fork River downstream of Missoula at the Kona Bridge FAS (**Figure 2, Table 1**).

In addition to the BMI assemblage, all aspects of aquatic environmental quality have been monitored in the CFR basin since the Superfund listings in 1989 (RESPEC, 2017). Caddisfly, *Hydropsyche*, tissue metal concentrations have been evaluated since 1986-1990 and 1993 to present. Between 1993 and 2006, Copper (Cu) concentrations in sediment, water, and *Hydropsyche* tissues declined by more than 50% at the Silver Bow station (SBC 4.5), but CFR sites up to 190 km downstream show increases in Cu tissue concentrations during years of high discharge (Hornberger et al. 2009). Toxicity exceedances from metals persist in some areas of the watershed and are exacerbated during high discharge years, but nutrient pollution has become the primary stressor across the upper Clark Fork River Basin (RESPEC, 2017). Total phosphorous and total nitrogen levels have been steady in the upper Clark Fork River for the last two decades, while soluble reactive phosphorus concentrations in the upper Clark Fork River have been on the rise since 1998 (Hydrosolutions, 2014). Increases in available nutrients, in conjunction with higher water temperatures and lower stream flows during some years, are having compounding effects on the productivity and the integrity of biological communities. Therefore, it is essential to continue BMI monitoring as a measure of biological health while the CFR transitions from metals toxicity impairment to nutrient enrichment.

In early September of 2019, multiple rain events increased stream flows in SBC and the upper CFR (almost doubling baseflow) likely causing a metals toxicity-related fish kill downstream of Warm Springs from Galen to Perkins Lane (N. Cook, MFWP personal communication, 2019). Rainwater draining across slickens was implicated as the cause for this fish kill. Slickens are fluvial deposits of mine tailings that, because of their phytotoxicity, create areas of bare ground in the floodplain along SBC and the upper CFR. The low pH, heavy metal laden deposits are readily transported by runoff from precipitation and snowmelt and date back to an early 20th-century flood that washed waste from upstream mining/smelting sources down river all the way to Missoula. Therefore, in 2020, a new monitoring station was established, site 8.0, located downstream of Galen in order to evaluate possible macroinvertebrate effects; this new station is approximately 7 river miles upstream of the current long-term monitoring site 8.5 at Sager Lane (**Figures 2 and 3**).

In addition to providing current assessments of ecological condition, this analysis incorporates and extends a long-term data set used to evaluate biological trends and the effectiveness of remedial actions. The macroinvertebrate monitoring period of record on the Clark Fork River is the longest continuous data set of any river in Montana. A list of annual Clark Fork River biomonitoring reports is included in Appendix D.

SECTION 2

Study Area

The upper Clark Fork River Basin in western Montana contains three contiguous Superfund Sites beginning in Butte, Montana, and ending at Milltown Dam (**Figure 1**). These sites encompass more than 140 miles of stream, including all of Silver Bow Creek, the Clark Fork River from Warm Springs Ponds to the confluence of the Blackfoot River, and the Milltown Reservoir Site. For this study, the designated stream reaches of the CFR will be referred to as the Upper Reach (A), Middle Reach (B), and Lower Reach (C). Current monitoring efforts (**Figure 2**) are concentrated in stream reaches with known water quality issues and ongoing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedial activities. Past biological monitoring has included macroinvertebrate data from 25 mainstem locations and 10 tributary sites in the Clark Fork River Basin (Table 1). In 2020, macroinvertebrate samples were collected from 13 locations, site 8.0 was sampled in lieu of site 22. The change was requested by Montana State Fisheries Biologists, and targets a location downstream of recent remedial actions (**Figure 3**), and keeps the field sample numbers consistent with the allocated budget.

- Warm Springs Ponds and Mill-Willow Bypass (SBC/Butte NPL)
  - Silver Bow Creek at Opportunity (SBC Station 2.5)
  - Silver Bow Creek below the Pond 2 discharge (SBC Station 4.5)
  - Mill-Willow Bypass above Pond 2 discharge (MW Station 5)
- Upper Clark Fork River (Reach A)
  - Clark Fork below Warm Springs Creek (CFR Station 7)
  - Clark Fork at Gemback Road (CFR Station 8.0)
  - Clark Fork at Sager Lane (CFR Station 8.5)
  - Clark Fork at Deer Lodge (CFR Station 9)
  - Clark Fork above the Little Blackfoot River (CFR Station 10)
- Middle Clark Fork River (Reach B)
  - Clark Fork at Gold Creek Bridge (CFR Station 11)
- Milltown Dam Area (Reach C)
  - Clark Fork at Turah FAS (CFR Station 13)
  - Blackfoot River at U.S. Geological Survey (USGS) gage above Bonner (BF Station 14)
  - Clark Fork River above Missoula at ShaRon FAS (CFR Station 15.5)
  - Clark Fork River below Missoula (CFR Station 20)

Table 1. Clark Fork Basin biomonitoring stations.

Station	Site Name	Period of Record		Latitude	Longitude
SF-1	Blacktail Creek above Grove Gulch	1993 - 2001			
00	Silver Bow Creek above Butte WWTP	1987 - 2001			
01	Silver Bow Creek at Rocker	1986 - 2001			
02	Silver Bow Creek near Ramsay	1986 - 1992			
02.5	**Silver Bow Creek at Opportunity***	1993 - 2003	2006 - **2020**	46.10712	-112.8051
03	Silver Bow Creek above Warm Springs Ponds	1986 - 1992			
04	Warm Springs Pond #2 discharge	1986 - 1991			
04.5	**Silver Bow Creek below Warm Springs Ponds**	1993 - 2004	2006 - **2020**	46.18104	-112.7793
05	**Mill-Willow Creeks Bypass**	1986 - 2001	2006 - **2020**	46.17205	-112.7854
06	Warm Springs Creek near mouth	1986 - 2001			
07	**Clark Fork River below Warm Springs Creek**	1986 - 2004	2006 - **2020**	46.18791	-112.7688
08	**Clark Fork River near Galen/Gembach Rd.**	1986 - 2001	**2020**	46.26557	-112.7445
08.5	**Clark Fork River at Sager Lane**	1990 - 2001	2006 - **2020**	46.31753	-112.7360
09	**Clark Fork River at Deer Lodge**	1986 - 2004	2006 - **2020**	46.40087	-112.7427
10	**Clark Fork River at Kohrs Bend FAS**	1986 - 2003	2007 - **2020**	46.49750	-112.7385
10.2	Little Blackfoot River near mouth	1993 - 2001			
11	**Clark Fork River at Gold Creek Bridge**	1986 - 2001	2006 - **2020**	46.59044	-112.9309
11.5	Flint Creek at New Chicago	1993 - 2001			
11.7	Clark Fork River at Bearmouth	1993 - 2001			
12	Clark Fork River at Bonita	1986 - 2003			
12.5	Rock Creek near Clinton	1993 - 2001			
13	**Clark Fork River at Turah**	1986 - 2003	2006 - **2020**	46.82121	-113.8051
14	**Blackfoot River above Bonner**	1986 - 2001	2006 - **2020**	46.89542	-113.7669
15	Clark Fork River below Milltown Dam	1986 - 1988			
15.5	**Clark Fork River at ShaRon FA**	1989 - 2003	2006 - **2020**	46.88275	-113.9318
16	Clark Fork River above Missoula WWTP	1986 - 1988			
18	Clark Fork River at Shuffield's	1986 - 2003			
19	Bitterroot River near mouth	1986 - 2003			
20	Clark Fork River at Harper Bridge	1986 - 2003			
20.1	**Clark Fork River at Kona Rd FAS**		2006 - **2020**	46.90394	-114.1498
22	Clark Fork River at Huson	1986 - 2003	2017 - 2019	47.02316	-114.3363
23	Clark Fork River near Alberton	1986 - 1992			
24	Clark Fork River at Superior	1986 - 2001			
25	Clark Fork River above Flathead River	1986 - 2001			
26	Flathead River near mouth	1986 - 1988			
27	Clark Fork River above Thompson Falls Reservoir	1987 - 2001			

* *sites in bold were sampled in 2020*

Figure 1. Map of Clark Fork River Basin

Note: *Superfund areas are depicted with arrows and shaded.*

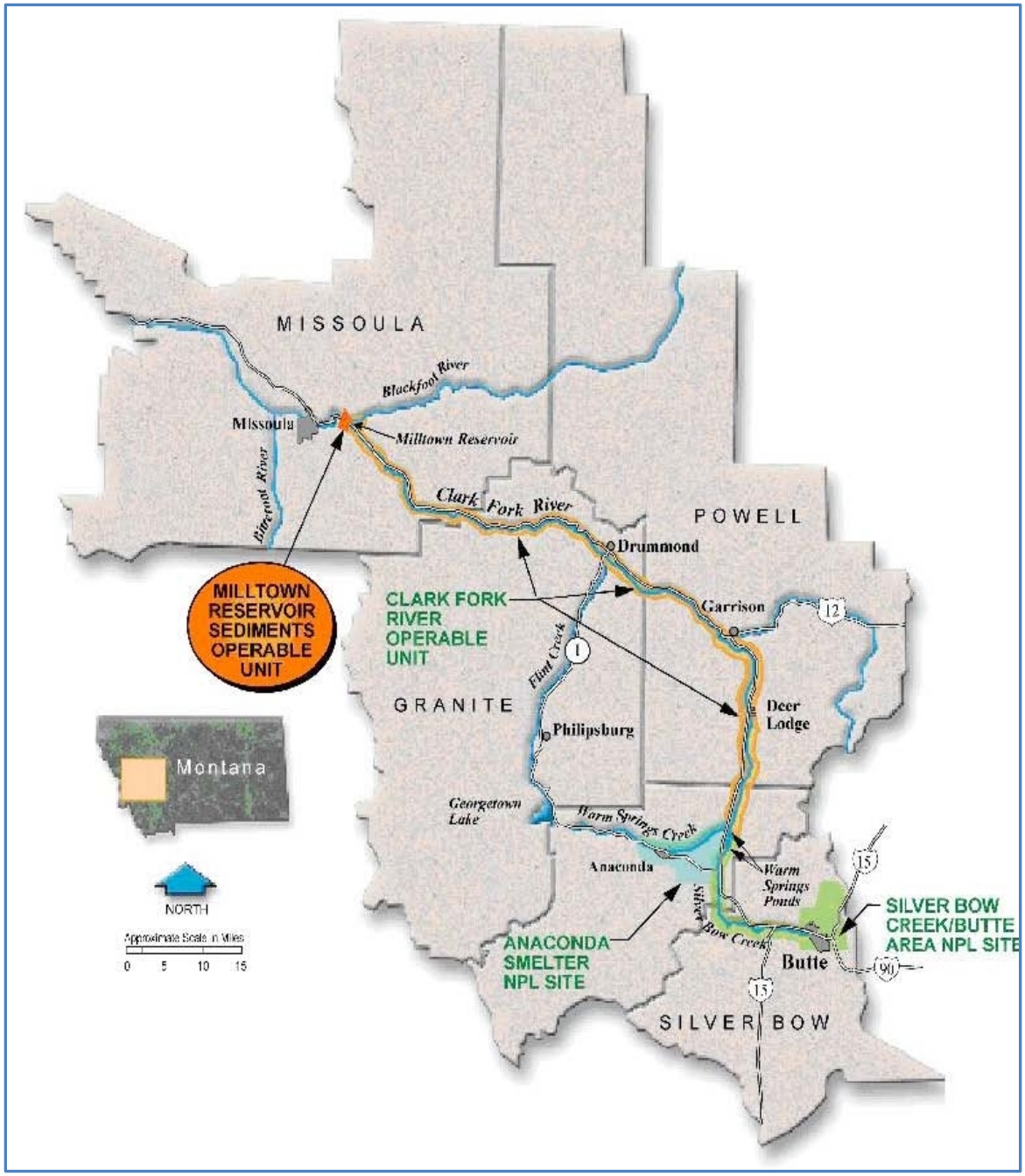


Figure 2. Clark Fork River Biomonitoring: 2020 Monitoring Locations

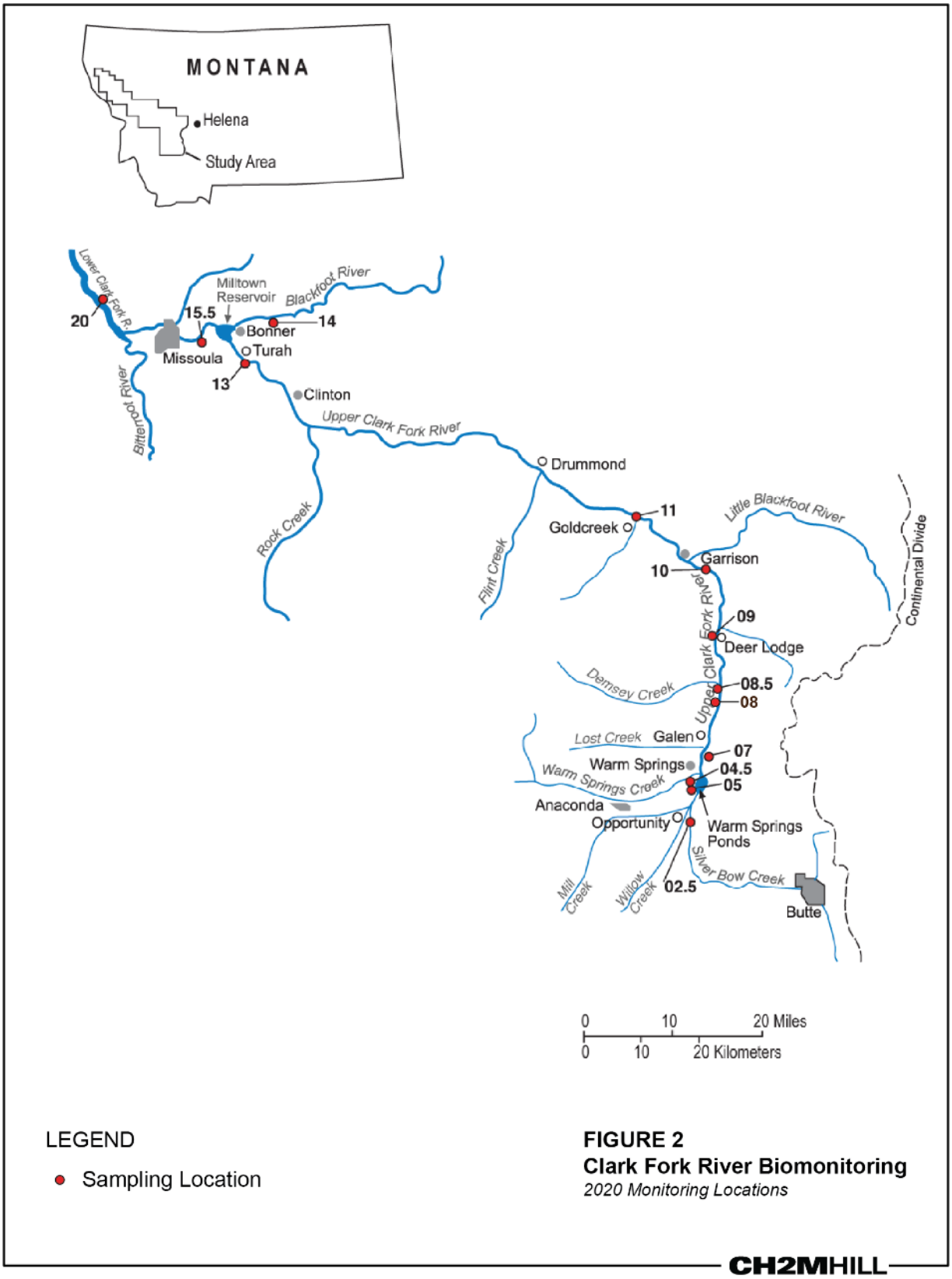


Figure 3. Clark Fork River New 2020 Biomonitoring Site 8.0 downstream of Galen Rd.

SECTION 3

Methods

3.1 Field Work

Benthic macroinvertebrates were collected at the 13 sites during the second week of August in 2020. Sampling methods are described in the Montana Department of Environmental Quality *Field Procedures Manual* (1996) and have been consistent since 1986. Benthic macroinvertebrates were collected with modified Hess samplers (0.1-square-meter-diameter, 1,000-micron mesh netting). Four replicate samples were obtained from the least embedded, most heterogeneous cobble riffle substrates available at each site.

3.2 Laboratory Analysis

Laboratory processing used the same methods reported in previous years (McGuire 2017). Samples were rinsed on a U.S. Standard #30 sieve to remove the preservative. A known portion of the sample (e.g., 25%) was spread evenly in a white pan divided into 10 equal areas by a grid. All macroinvertebrates were counted as they were removed from each randomly selected grid. This process was repeated until the entire sample was processed. If most of the sample had already been processed by the grid method (i.e., 9 of 10 grids), a complete sort was conducted. For samples containing more than 1,000 macroinvertebrates (i.e., 50% of the sample grids contained 1000 organisms), the remainder of the sample was spread on the tray and selected taxa not identified in the original portion were removed and added to the initial portion. Organisms were identified using a dissecting microscope (10-40x magnification) to the lowest level practical, usually genus or species, and enumerated. If taxa (Chironomidae, Baetidae) needed further magnification for identification to genus or species, whole or partial wet slide mounts were assembled and viewed with a compound microscope (100-1,000x power). Subsample macroinvertebrate counts were corrected by the appropriate factor to provide estimated density per Hess sample.

3.3 Data Analysis

This macroinvertebrate analysis was specifically designed to evaluate water quality in the Clark Fork River Basin by incorporating 10 metrics into a single index of biological integrity (**Table 2**) (McGuire, 1993). These metrics exhibit predicable responses to environmental stress and are suitable for the broad range of habitats within the study area. Each metric measures a different aspect of community composition, structure, or function. Because biological communities integrate the effects of all environmental stresses, this analysis provides a reliable evaluation of cumulative impacts from metals, nutrients, and streamflow alteration.

To evaluate stream health, each metric is assigned a score from 0 to 6 based on its comparability to a reference value. Scores for all metrics are totaled and the sum, expressed as a percentage of the maximum possible score, is used as an estimate of biological integrity. The resulting summary score provides a reliable and easily understandable estimate of ecological health.

Table 2a. Metrics and Criteria Used to Determine Biological Integrity in the Clark Fork River Basin

Metric	Scoring Criteria						
	6	5	4	3	2	1	0
General							
Taxa richness	> 39	39 to 35	34 to 30	29 to 25	24 to 20	19 to 15	< 15
Shannon diversity	> 3.3	3.3 to 3.0	2.9 to 2.6	2.5 to 2.2	2.1 to 1.8	1.7 to 1.4	< 1.4
EPT/EPTC	> 0.54	0.54 to 0.45	0.44 to 0.35	0.34 to 0.25	0.24 to 0.15	0.14 to 0.05	< 0.05
Hydropsychinae/ Trichoptera	< 0.85	0.85 to 0.87	0.88 to 0.90	0.91 to 0.93	0.94 to 0.96	0.97 to 0.99	1.00
Baetidae/ Ephemeroptera	< 0.85	0.85 to 0.87	0.88 to 0.90	0.91 to 0.93	0.94 to 0.96	0.97 to 0.99	1.00
Organic Pollution Subset							
Density	550 to 1,999	2,000 to 2,599	2,6,00 to 3,199	3,200 to 3,799	3,800 to 4,399	4,400 to 4,999	> 5,000
Biotic index	< 4.0	4.0 to 4.5	4.6 to 5.1	5.2 to 5.7	5.8 to 6.3	6.4 to 6.9	> 6.9
% Filterer	< 51	51 to 55	56 to 60	61 to 65	66 to 70	71 to 75	> 75
Metals Pollution Subset							
Density	> 549	549 to 450	449 to 350	349 to 250	249 to 150	149 to 50	< 50
EPT richness	> 21	21 to 18	17 to 14	13 to 10	9 to 6	5 to 2	< 2
Metals Tolerance Index	< 4.0	4.0 to 4.9	5.0 to 5.9	6.0 to 6.9	7.0 to 7.9	8.0 to 8.9	> 8.9

Notes: All values are per 0.1-m^2 Hess sample. Each metric was scored from 0 (severe impact) to 6 (no impact).
Biointegrity was estimated as the sum of metric scores divided by the maximum possible score.
< = less than. EPT = Ephemeroptera, Plecoptera, and Trichoptera

Table 2b. Numerical Criteria for the Assessment of Biologically Significant Environmental Degradation

Classification	Biointegrity (%)	Metric Subsets Indicating Metals or Organic Pollution (%)
Non-impaired	> 90	> 80
Slightly impaired	70 to 90	60 to 80
Moderately impaired	50 to 70	40 to 60
Severely impaired	< 50	< 40

Metric scoring criteria reflect the range of values in the Clark Fork River Basin from 1986 through 1990. Data from the first 3 years (1986 to 1988) of the Clark Fork River Basin study and 2 years of data (1988 and 1989) from the Blackfoot River were used to establish metric scoring criteria. For each metric, statistically significant differences among stations were identified by one-way analysis of variance (McGuire, 1987, 1989a, 1989b, 1990a, 1990b; Ingman and Kerr, 1989; and unpublished data). Scoring criteria endpoints were defined by statistically distinct groups of stations with the highest and lowest scores.

Non-impaired endpoints were based on stations with the best metric scores and were generally established as the mean minus one standard deviation. On the lower end of the scale, endpoints were generally based on average values of the most severely impaired station(s).

Scoring criteria for some metrics were adjusted to improve the reliability of the assessment. The inclusion of SBC data resulted in wide scoring ranges for most metrics; consequently, some statistical differences in metric values were not reflected in the scoring criteria. The lower end of the scoring criteria for taxa richness was truncated to provide better discrimination of slight impacts in the CFR at the expense of detecting slight improvements in SBC. Scoring criteria for percent filterers, Baetidae to Ephemeroptera, Hydropsychinae to Trichoptera, and EPT (Ephemeroptera, Plecoptera, and Trichoptera) to Chironomidae (C) metrics were relaxed to dampen longitudinal biases of these metrics.

In general, biological integrity in the Clark Fork River Basin can be categorized as non-impaired (90 to 100 percent), slightly impaired (70 to 90 percent), moderately impaired (50 to 70 percent), or severely impaired (less than 50 percent). These impairment classifications were less rigorous than statistical differences in the 1986 through 1988 Clark Fork River Basin data. Except for borderline values, scores in different narrative categories are considered significantly different from one another.

Macroinvertebrate assemblages exhibit predictable responses to different types of environmental stress. Consequently, the sensitivity of individual metrics varies with the type of pollution. Some parameters are useful as estimators of metals pollution, while others are more sensitive to organic or nutrient enrichment, excessive sediment deposition, or partial dewatering. Both metals and nutrient pollution are known to degrade water quality and impact aquatic life in the Clark Fork River Basin (Ingman et al., 1990; McGuire, 1990a). Therefore, subsets of metrics considered sensitive to these forms of pollution were used to estimate the relative severity of each pollutant (see **Table 2**).

Impacts attributable to metals and organic and/or nutrient pollutants were estimated by the sum of scores for metrics in each subset, expressed as a percentage of the maximum possible score (usually 18). A specific type of pollution was indicated when the score of one set of metrics was substantially lower. To facilitate interpretation, impacts attributable to these pollutants were categorized as slight (60 to 80 percent), moderate (40 to 60 percent), or severe (less than 40 percent). The more conservative classification scheme for these metric subsets reflects the limitations of an assessment based on only three metrics. Metrics comprising the organic and/or nutrient subset were community density, biotic index, and the percent relative abundance of filter-feeding macroinvertebrates. The subset used to estimate metals pollution consisted of community density, EPT richness, and metals tolerance index.

Impairment classifications accurately reflect statistical differences in the 1986 through 1988 Clark Fork River Basin data. Except for borderline values, scores in different narrative categories were considered significantly different from one another. These assessments must be interpreted cautiously. Metrics are not direct measurements of toxicity or nutrient concentration. While they may be strongly correlated with a stressor (ISSI, 1999), each metric is also influenced to a greater or lesser degree by other environmental factors. Metrics and the rationale for their use are described in the following text.

3.3.1 Macroinvertebrate Density

Total macroinvertebrate density is an important metric of community structure and, when carefully interpreted, can be a useful indicator of several different environmental conditions. Unusually high or low macroinvertebrate densities are indicative of environmental perturbation. Macroinvertebrate density tends to increase in response to organic and/or nutrient enrichment, and the magnitude of the increase reflects the degree of the pollution. Conversely, toxins, severe habitat degradation, or extensive scouring may reduce macroinvertebrate standing crops.

Low macroinvertebrate densities were used as an index of metals pollution in the upper Clark Fork River Basin. Specifically, this metric was included to document toxic impacts and provide a measure of biological improvement in SBC. Historically, macroinvertebrates were absent from, or present at extremely low densities in SBC and the Mill-Willow Bypass (Spindler, 1959; Multitech and OEA Research, 1986; McGuire, 1990b). Increased macroinvertebrate abundance at these sites can be considered a clear indication of reduced toxicity. This metric typically provides little information regarding toxic impacts in the remainder of the study area.

High macroinvertebrate standing crops were included as a metric to assess nutrient and organic loading in the Clark Fork River. Densities greater than 2,000 per sample (0.1 square meter) were attributed to organic pollution and/or enhanced primary production caused by nutrient enrichment. Given that the threshold value is 2,000 organisms per sample, it is not considered a sensitive measure of organic loading in more oligotrophic tributaries. Because toxic conditions can preclude high macroinvertebrate densities (McGuire, 1990b), this metric was not used to evaluate organic and/or nutrient pollution when samples contained fewer than 550. Densities between 550 and 2,000 organisms per sample received maximum scores for both metrics.

3.3.2 Taxa Richness

Taxa richness, or the number of macroinvertebrate taxa per Hess sample, was probably the single best measure of environmental condition in the CFR drainage. It is a reliable measure of biological integrity because the loss of the most sensitive species due to any stress affects the index. The range for scoring this metric was 14 to 40 taxa per sample. This truncated scoring range maximizes the sensitivity of this metric to small reductions in taxa richness.

3.3.3 Shannon Diversity

Shannon diversity has long been used as an index of environmental condition (Weber, 1973) and is a reliable measure of combined environmental stress in the Clark Fork drainage. This index has two components and is influenced by taxa richness and the distribution of individuals among taxa (evenness). Reference stations had an average Shannon diversity value of 3.7 with a standard deviation of 0.4. Diversity values greater than 3.3 were considered non-impaired.

3.3.4 EPT to Chironomidae Ratio (EPT/EPTC)

This metric, originally developed by the EPA (Plafkin et al., 1989), is based on relative abundance of indicator groups. Most EPT are considered sensitive to environmental stresses while Chironomidae, as a group, are more tolerant. In the form (E+P+T) divided by (E+P+T+C), this metric ranges from 0 to 1.

An even distribution of individuals among the four groups reflects good biotic condition, while a disproportionate number of chironomids indicates environmental stress. For the Clark Fork River analysis, values less than 0.55 indicate impairment. Using this scale, the EPT/EPTC metric reliably identifies severe biological impairment but does not consistently separate slight, moderate, and non-impaired sites. In some cases, large populations of relatively tolerant EPT taxa (for example, Baetidae, *Tricorythodes*, or hydropsychids) result in high EPT/EPTC values. The percentage Baetidae of Ephemeroptera and percentage Hydropsychinae of Trichoptera metrics are included to identify slight to moderate impairment missed by the EPT/EPTC metric.

3.3.5 Percent Baetidae of Ephemeroptera

Members of the family Baetidae are among the most pollution-tolerant mayflies (Hubbard and Peters, 1978). Slight to moderate environmental stress is indicated when baetids comprise most of the mayfly fauna. This metric ranges from 0 to 1, with high values (greater than 0.85) indicating biological impairment. This metric received a default value of 1 when no mayflies were collected.

3.3.6 Percent Hydropsychinae of Trichoptera

The subfamily Hydropsychinae is, in general, more tolerant of pollution than most other caddisflies (Harris and Lawrence, 1978). Environmental stress is indicated when most of the caddisflies in a sample are *Hydropsyche* and *Cheumatopsyche*. This metric is analogous to the Baetidae/Ephemeroptera metric and ranges from 0 to 1, with high values (greater than 0.85) indicating biological impairment. When no caddisflies were collected, this metric received a default value of 1.

3.3.7 Biotic Index

The biotic index is based on the "indicator organism" approach to water quality assessment and was developed to measure organic pollution but can also be used as a surrogate for sediment impairment (MDEQ 2012). The index is calculated:

$$\sum (\%RA_i * t_i)$$

where:

$\%RA_i$ = percent relative abundance of each taxon and

t_i = tolerance value of the taxon

This index consists of a scale from 0 to 10, with higher values (usually >5.0) indicating more polluted conditions. Tolerance values used in this study (see Appendix A) were taken from Hilsenhoff (1987), McGuire (1992) and MDEQ (2012).

3.3.8 Percent Relative Abundance of Filter Feeders

The relative abundance of functional feeding groups can provide useful insights into energy transfer, food resources, and organic loading in aquatic ecosystems. Filter feeding insects typically comprise a major component of the summer macroinvertebrate fauna in Montana rivers. Relative abundance greater than 50 percent indicates high seston (suspended organics) concentrations that are usually associated with organic and/or nutrient enrichment, extensive filamentous algae growth, or lake outflows. This metric is used as a measure of organic pollution in the Clark Fork River Basin. Functional classifications were based on Merritt and Cummins (1984).

3.3.9 EPT Richness

This metric summarizes species richness of EPT and was used as an indicator of metals pollution. The majority of mayfly, stonefly, and caddisfly species are extremely sensitive to pollution. With a few exceptions, species in these groups are among the first to be eliminated by metals toxicity (Wiederholm, 1984; Clements, 1991). EPT richness averaged 21 among Blackfoot River reference stations. The scoring criteria reflect the wide range of values found within the study area. While minimizing influences of pollutants other than toxins, the wide range reduces the sensitivity of this metric to subtle changes.

3.3.10 Metal Tolerance Index

This metric quantifies changes in community composition attributable to metals pollution in the Clark Fork River Basin. The format and calculation are based on Hilsenhoff's biotic index, with tolerance values assigned to each taxon based on sensitivity to metals instead of organics. The metal tolerance index (MTI) is calculated:

$$\sum (\%RA_i * t_i)$$

where:

$\%RA_i$ = percent relative abundance of each taxon and

t_i = tolerance value of the taxon

The theoretical scale of the index is 0 to 10, with higher values indicating communities more tolerant of metals pollution. Metal Tolerance Index values for communities dominated by species intolerant of metals are less than 4.0 (Blackfoot River), while values for communities composed of only the most metals-tolerant species approach 10 (Silver Bow Creek). Small, but statistically significant, differences in metric values are not reflected in assessment scores because of the wide criteria range necessitated by the inclusion of Silver Bow Creek data.

Metals tolerance values (see Appendix A) for most taxa were developed from the 1987 and 1988 CFR Basin water quality report (Ingman and Kerr, 1989) and collocated macroinvertebrate data (McGuire, 1987 and 1989a). Ingman and Kerr (1989) quantified metals pollution severity for each station based on the frequency and magnitude of measured copper, zinc, cadmium, and lead concentrations exceeding EPA chronic or acute criteria for the protection of aquatic life. Macroinvertebrate taxa were ranked according to their relative abundance and distributions along this gradient. Abundant taxa (comprising at least 5 percent of the fauna at any station) were assigned a rank corresponding to the station where they attained their maximum relative abundance. Ranks were transformed to a scale of 0 to 10, rounded to the nearest integer, and used as metals tolerance values. Some tolerance values, particularly for infrequently collected taxa, were modified based on interpretation of pertinent literature (Clements, 1991; Clements et al., 1988; Roline, 1988; Wiederholm, 1984; Winner et al., 1980; Yasuno et al., 1985; Lynch et al., 1988; Leland et al., 1989).

3.3.11 Percent Relative Abundance of Heptageniidae

The relative abundance of the mayfly family Heptageniidae has been shown to be a good measure of a community's sensitivity to heavy metal impacts (Winner et al. 1980, Clements 1991, Clements et al. 1988, Nelson and Roline 1993), since they are considered the most sensitive mayfly to metals toxicity. Therefore, we have presented this mayfly family as a separate bioassessment metric in the utility of presence/absence or abundance at a site rather than as an index to rank impairment. Blackfoot River Reference site (Station 14) values for the RA of Heptageniidae averaged above 2.0 percent when this site ranked non-impaired, and less than 1.9 percent when ranked slightly impaired. Therefore, a RA value of ≥ 2.0 percent should indicate a benthic community that is not subjected to significant metal impacts.

SECTION 4

Results and Discussion

A checklist of macroinvertebrate taxa identified from the Clark Fork River Basin since 1986 and tolerance values for 209 taxa and those taxa present in 2020 is provided in Appendix A. The 2020 data (identifications, organism counts, metric values, and summary statistics) are presented in Appendix B. For each station, mean metric values, metric scores, and biological integrity scores were calculated for all 34 years (Appendix C).

4.1 Stream Discharge

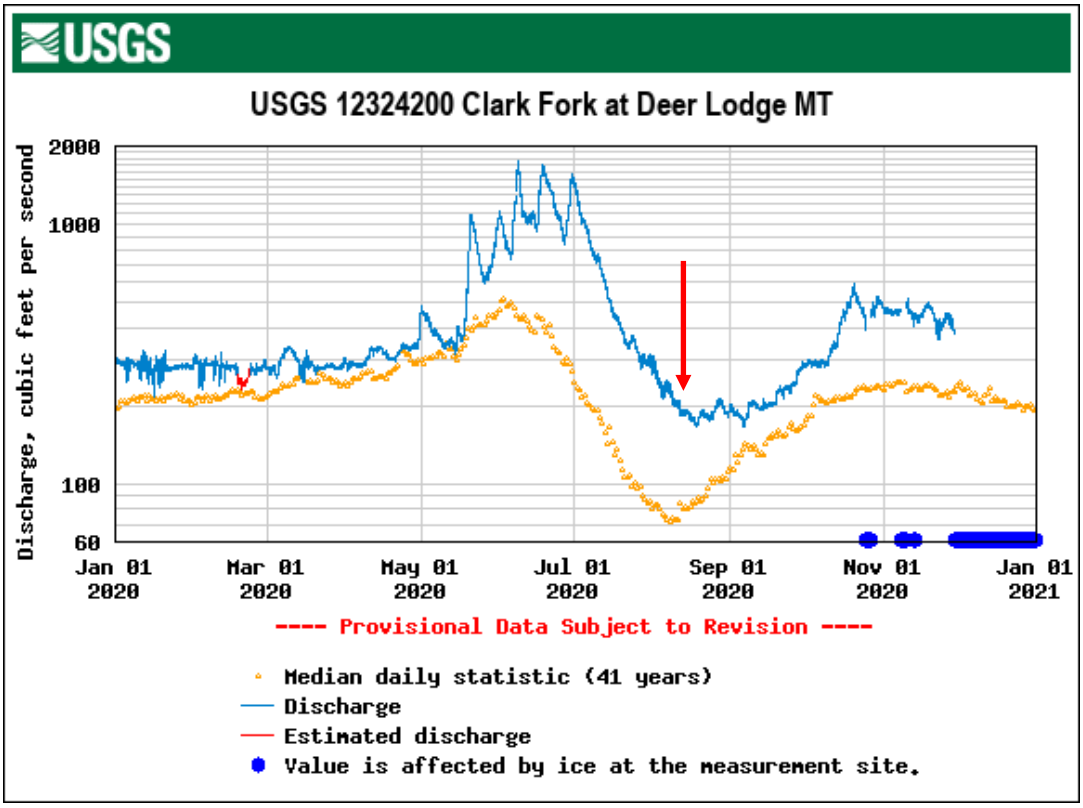
In 2020, the Clark Fork watershed experienced another above average water year with some of the highest average August discharge, annual and peak flows recorded since 2011 (**Table 3**). Low elevation runoff occurred early in 2020, with a strong pulse in late-April to early-May, stream flows then declined slightly with a second pulse in late-May and sustained flows with a peak flow pulse at the upstream Missoula gauge on May 21st to above 20,000 cfs; 3 maximum flow pulses occurred at the Deer Lodge USGS Station into late-June (**Figure 4**). This above average water year is following one in 2019, and two years after the record flow year in 2018; whose effects on some stream channel morphologies and riffle positions are still noticeable in 2020.

BMI sampling was completed during the second full week of August (Aug. 10-17th) when stream flows had almost reached baseflow values at Deer Lodge, but a large thunderstorm bumped flows up on August 12th and postponed sampling 72 hours to allow flows to stabilize at the lower CFR sites (August 15th and 17th) (**Figure 4**). The last three years of sampling within the same historical August time frame have occurred at much higher flows than more 'typical' summer baseflow (**Figure 4**).

Stream flow has a fundamental, but episodic, influence on stream ecosystems. Four major floods have affected the Clark Fork River Basin in the past 30 years. Flood events during 1986, 1997, 2011 and 2018 bracketed multi-year droughts in the late 1980s and at the turn of the century (2000 through 2007). We can also consider the period of 2012-2017 as low discharge years for the CFR, since some aspect of recorded streamflow was below the 30-year average (**Table 3**).

Figure 4. Clark Fork River at Deer Lodge (top) and above Missoula (bottom), Montana – Discharge during the 2020 Water Year

Note: Red arrow indicates period of sampling.



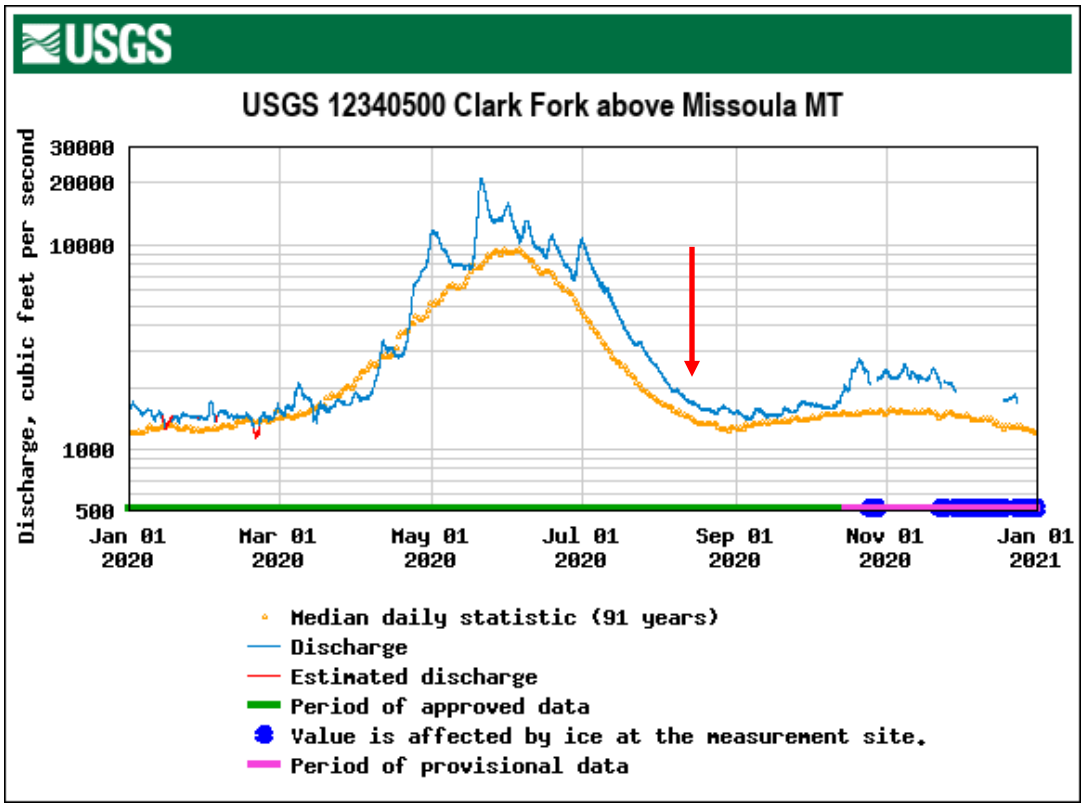


Table 3. Mean August, Annual, and Peak Discharge at Selected USGS Gaging Stations in the Clark Fork River Basin. USGS = U.S. Geological Survey

	Silver Bow Creek at Opportunity USGS No. 12323600			Clark Fork River at Deer Lodge USGS No. 12324200			Clark Fork River above Missoula USGS No. 12340500		
	August	Annual	Peak	August	Annual	Peak	August	Annual	Peak
1986				56	273	2090	1123	2927	13600
1987				89	197	463	964	1692	7270
1988	16			**28**	155	409	627	1544	6460
1989	30	50	654	82	184	1430	1601	2689	15300
1990	38	44	373	84	183	507	1509	2870	13000
1991	20	51	257	30	185	1020	1236	2666	14500
1992	20	34	228	40	**131**	367	789	1614	6150
1993	**70**	54	194	312	248	613	2369	2417	13000
1994	25	47	209	36	207	462	861	2078	10600
1995	44	83	479	107	274	1240	1525	2577	13400
1996	**32**	**80**	**1,300**	95	**327**	**1,400**	**1732**	**4,381**	**18,500**
1997	**59**	**99**	**648**	**337**	**465**	**2,020**	**2394**	**4,700**	**27,000**
1998	36	61	435	117	309	1200	1879	3085	12900
1999	27	51	269	93	252	819	1585	3015	16300
2000	15	31	79	35	156	263	767	1996	6770
2001	15	30	88	42	151	310	1111	1785	6990
2002	19	32	144	92	161	461	1423	2424	12300
2003	16	39	517	59	211	1060	1039	2552	15900
2004	16	27	139	48	145	286	1100	2039	7290
2005	20	37	211	90	197	848	1028	2265	9400
2006	15	47	254	46	195	654	938	2485	12900
2007	17	44	205	67	209	1130	979	2443	9320
2008	20	53	331	90	256	1020	1531	3045	17,500
2009	37	64	304	192	323	1,180	1,983	3,560	17,500
2010	42	67	497	182	309	1,540	1701	2429	10,200
2011	44	97	772	256	450	1,970	2,600	5,099	28,500
2012	**19**	**51**	**159**	**87**	275	840	1,394	3,365	18,500
2013	**14**	**36**	**146**	**66**	**182**	**381**	**1,007**	**2,343**	**13,000**
2014	**35**	**58**	**290**	**199**	**270**	**1,190**	**1,767**	**3,406**	**17,300**
2015	**19**	**51**	**249**	**69**	**237**	**647**	**951**	**2,449**	**7,050**
2016	**15**	**48**	**176**	**83**	**219**	**514**	**885**	**2,146**	**8,010**
2017	**15**	**58**	**301**	**72**	**248**	**1,710**	**1,180**	**3,276**	**15,900**
2018	**44**	**114**	**411**	**181**	**462**	**2,260**	**1,940**	**5,229**	**32,200**
2019	**32**	**62**	**320**	**167**	**410**	**1,310**	**1,450**	**3,654**	**16,500**
2020	**42**	**66**	**301**	**205**	**424**	**1,770**	**1,749**	**3,630**	**20,900**
Mean	**28**	**55**	**343**	**110**	**254**	**1,011**	**1,392**	**2,854**	**14,055**

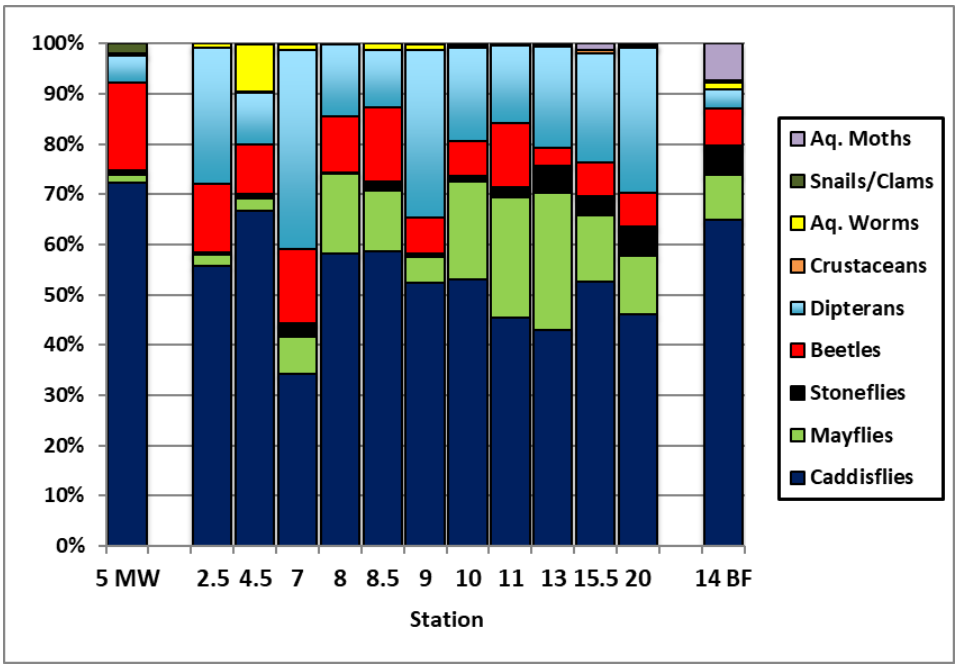
Notes: *All values are in cubic feet per second. Values in bolded red are below the 30-year average during the last 8 years.*

4.2 Macroinvertebrate Densities and Community Characterization

The 52 samples collected from 13 sites in 2020 contained nearly 65,150 macroinvertebrates representing 140 taxa; this is approximately 34 percent more individuals than collected in 2019 (48,600 total) and 60 percent more than in 2018 (26,190 individuals). Insects (Class: Insecta) accounted for 101 of those taxa and 97 percent of the collected invertebrate organisms (**Appendix A**). Caddisflies were the most abundant insect group at 12 of the 13 sites (**Figure 5**), attaining maximum densities in the Mill-Willow Bypass (>72 percent), SBC Station 4.5 (66 percent) and the Blackfoot River Station 14 (65 percent) (**Figure 5**). The relative abundance of caddisflies >50 percent of the community was observed at SBC 2.5, CFR sites 08, 8.5, 09, 10 and 15.5 (**Figure 5**).

Dipterans were also abundant throughout the study area and were numerically dominant at CFR station 07 (largely midges and blackflies) (**Figure 5**). Mayflies were most abundant downstream from the Deer Lodge Valley (Stations 10 & 11) and Turah FAS (13) averaging about 24 percent of the community, but mayflies were less abundant than caddisflies at all CFR and SBC sites. Stoneflies were widespread, but low in abundance and accounted for <1 to 5 percent of the fauna, achieving highest relative abundance (6 percent) at the Blackfoot River (station 14) (**Figure 5**). Riffle beetles (Elmidae) comprised a relatively high abundance (17 percent) of the assemblage at the Mill-Willow ByPass (05) and the CFR at Warm Springs (07) and Sager Lane (08.5) at ~15 percent (**Figure 5**). Flatworms comprised 9.2 percent of the benthic fauna at SBC Station 4.5 and ~1 percent at CFR below Warm Springs (Station 07) but were relatively rare elsewhere (**Figure 5**). Likewise, crustaceans (mainly Amphipoda) were reported only at SBC Station 4.5 and CFR Station 07 at low percentages (<1 percent) (**Figure 5**). Aquatic Moths (*Petrophila*) are increasing their abundance at the Blackfoot River (7.4 percent, Station 14) and the CFR at ShaRon (1.2%, Station 15.5).

Figure 5. Relative Abundance (Percent) of Major Macroinvertebrate Groups at 13 Sites in the Clark Fork River Basin, August 2020.



Metric values characterizing community structure, composition, or function are presented for each station in the Deer Lodge Valley (**Table 4**) and from Gold Creek to downstream of Missoula (**Table 5**). Metric values for 2020 are compared to means and ranges from 2001 through 2019.

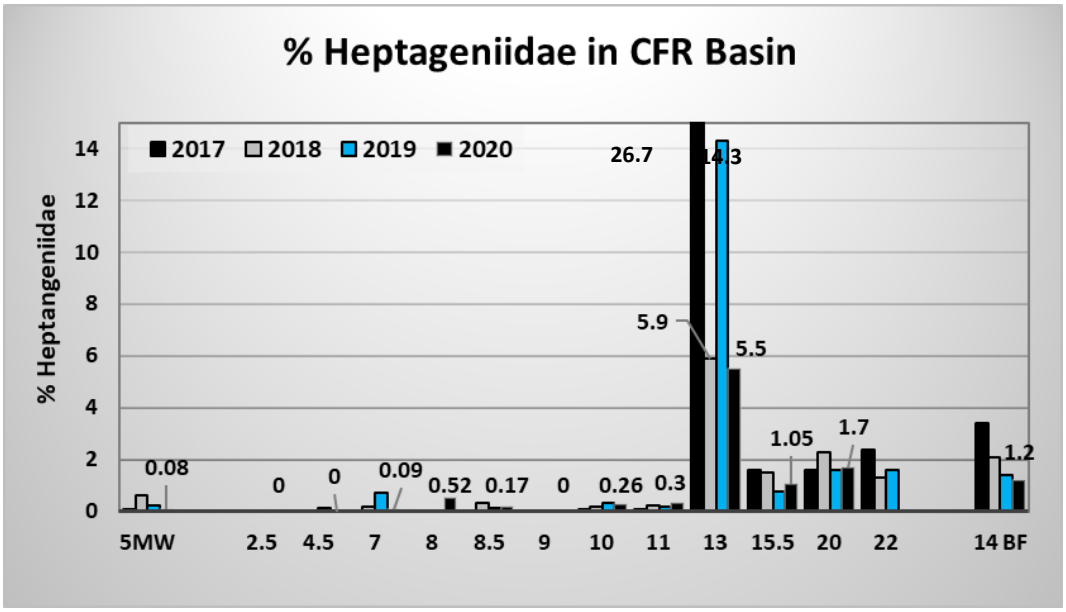
BMI densities were below average at 10 of 13 sites throughout the Clark Fork River Basin in 2020 (1,210 ind. per 0.1m^2) compared to the long-term average (1,278 ind. per 0.1m^2) (**Table 4 & 5**). Mean density estimates for individual stations ranged from approximately 244 to 3,413 macroinvertebrates per Hess sample. Densities were highest across the Deer Lodge Valley (Stations 07 and 09) and at SBC below Warm Springs (4.5) (**Table 4**) and lowest at the CFR at Turah (Station 13) and in the Blackfoot River (Station 14) (**Table 5**).

Diversity and richness metrics were at or above average at most sites in 2020. Diversity, total taxa, and EPT richness have increased at most CFR sites downstream from Gold Creek to Kona Road; Stations 10, 13, 15.5, and 20 reported the highest EPT richness values for the study (**Table 5**). Most upstream CFR sites had also increased values for these metrics in 2020 compared to 2019 (**Table 4**). The highest richness and diversity values among upstream sites were for the Mill-Willow Bypass (Station 5) and the Clark Fork River below Warm Springs Creek (Station 7). The number of taxa, EPT species, and diversity continued to increase in Silver Bow Creek below Warm Springs (Station 4.5).

Relative Abundance (Percent) of Heptageniidae

Heptageniidae (typical genera, *Rhithrogena, Epeorus* and *Ecdyonurus*) were virtually absent from SBC sites 2.5 and 4.5 (<0.1 percent) and the upper CFR sites through the Deer Lodge Valley (stations 7.0-10) (<0.6 percent) (**Figure 6**). CFR sites downstream of the Rock Creek confluence (starting at Turah Station 13) increase the relative abundance of Heptageniidae to levels similar to or exceeding the Blackfoot River reference site (Station 14) (**Figure 6**). Steady declines of the numbers of this mayfly family are being documented at the Blackfoot River reference reach (Station 14) from 2016 to 2020.

Figure 6. Relative Abundance (Percent) of the mayfly family, Heptageniidae at 13 Sites in the CFR Basin 2017-2020. *Data labels are for 2020 values, except for Site 13 where 2017-2020 are labeled.*



Compositional and functional BMI metrics indicate varying degrees of environmental stress within the monitoring area. Values for the ordinal composition metric (EPT/EPTC) ranged from 0.54 to 0.96 (**Tables 4 and 5**). All sites received maximum assessment scores for this metric in 2020.

The Caddisfly compositional metric (Hydropsychinae/Trichoptera) values ranged from 0.34 (CFR Station 10) to 0.90 (Station 09) and indicated stress at just site 09 (**Table 4**). The mayfly composition metric (Baetidae/Ephemeroptera) ranged from 0.17 at the CFR at Kona Br. (Station 20) to 0.97 in Silver Bow Creek (Station 4.5); the 2 SBC sites were the only sites where the metric indicated environmental stress. The percentage of filterers ranged from 22 percent (Station 11) to 61 percent at the Blackfoot River (Station 14). Higher percentages of filter-feeders (>50 percent) supported evidence of nutrient enrichment at four sites (Stations 2.5, 4.5, 14, and 15.5), down from seven sites reporting these levels in 2019 (**Tables 4 and 5**).

Metal Tolerance Index (MTI) Scores

In 2020, three of the 13 sites reported the lowest Metal Tolerance Index (MTI) scores of the 34-year study, one was the Mill-Willow Bypass (Station 5), and the CFR sites 8.0 and 8.5 (**Table 4**) and 4 sites reported MTI scores below the 18-year average (**Tables 4 and 5**). SBC sites 2.5 and 4.5 and CFR sites (7.0, 9.0, 10, 11, 15.5, 20) had MTI values greater than 4.0 in 2020, consistent with slight metals effects. MTI values ranged from 3.1 at Mill-Willow Bypass (Station 5) to 4.7 at the CFR at Kona FAS (Station 20) (**Table 4**). The Blackfoot River (Station 14) reported MTI values >4.0 in 2017, 2018 and 2020, but average MTI scores of 3.6 over the long term (2001-2019) indicate that the BMI community at this site has only been indicating metals stressors at this site for the last 4 years (**Figure 6a**).

Biotic Index Scores

Biotic index values indicated varying degrees of nutrient enrichment across the 13 sites (**Figure 6a**). Values ranged from a record low score of 2.8 (non-impaired) for the Mill-Willow Bypass (Station 05) to 5.3 (moderately impaired) at the CFR at Deer Lodge (Station 09). Four sites in 2020, Mill-Willow Bypass (Station 5), SBC (Station 4.5) and the CFR sites Kohrs Bend (Station 10) and Turah (Station 13) reported the lowest BI scores ever for that site in 34 years (**Tables 4 and 5**). The Blackfoot River (Station 14) had previously averaged <4.0 biotic index values (2001-2018), but this site has been trending upward in BI tolerance scores ≥4.0 in all the last 4 years (**Figure 6a**, **Table 5, Appendix C**).

Figure 6a. Mean Biotic Index Tolerance Scores at 13 Sites in the CFR Basin, 2020. Yellow Line = Slightly impaired ranking >4.0, Redline = Moderate impairment >5.0. Error bars are ± SE.

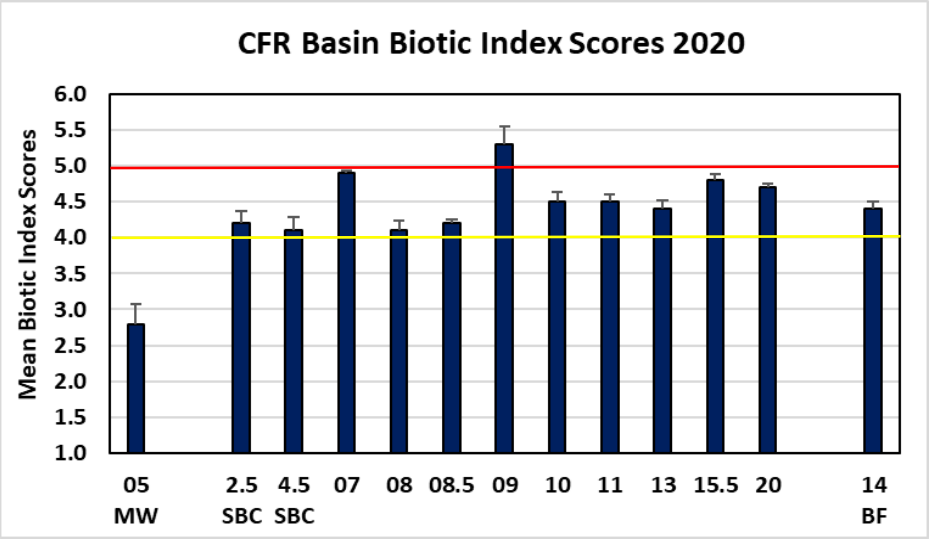


Table 4. Mean Metric Values Characterizing Macroinvertebrate Assemblages at Seven Stations in the Upper Clark Fork River Basin (Deer Lodge Valley) during August 2001 to 2019, and 2020. ***2020 bolded values are outside of the typical range for the site.***

Station:	2.5		4.5		5.0		7.0		8.0 (new)		8.5		9.0	
Metric	2001-2019 (range)	2020	2001-2019 (range)	2020	2001-2019 (range)	2020	2001-2019 (range)	2020	1986-2001 (range)	2020	2001-2019 (range)	2020	2001-2019 (range)	2020
per 0.1 m^2 Hess Density	840 (240-1741)	460	2252 (1101-4128)	3413	1107 (582-3124)	843	1923 (1150-4799)	3316	1568 (840-2624)	853	1675 (301-2670)	658	2522 (693-5257)	2653
Taxa richness	21 (12-30)	27	32 (23-44)	35	39 (32-46)	33	44 (35-55)	40	32 (22-42)	36	36 (24-41)	38	36 (27-44)	36
EPT richness	8.6 (4-15)	13	12 (7-19)	17	18 (14-21)	19	22 (17-31)	24	16 (10-20)	**22**	19 (14-24)	24	18 (12-23)	20
Shan. Diversity	2.5 (1.8-3.4)	3.4	3.1 (2.5-3.7)	**3.8**	3.7 (3.3-4.1)	3.3	3.7 (2.3-4.4)	4.0	3.2 (2.6-3.9)	**4.1**	3.3 (2.4-4.0)	**4.0**	3.0 (1.8-3.9)	3.3
EPT/EPTC	0.80 (.59-.90)	0.77	0.84 (.50-.98)	0.87	0.80 (.54-.94)	0.94	0.80 (.58-.98)	**0.54**	0.85 (.76-.99)	0.86	0.88 (.81-.99)	0.93	0.86 (0.71-.93)	**0.66**
Baetidae/ Ephemeroptera	0.9 (0.75-1.00)	0.95	0.86 (.57-1.00)	0.97	0.61 (.27-.89)	0.39	0.66 (.41-.96)	0.46	0.66 (.20-.97)	0.32	0.66 (.22-.96)	0.52	0.77 (.26-.99)	0.42
Hydropsychinae/ Trichoptera	0.66 (0.1-1.0)	0.56	0.89 (.71-.97)	**0.61**	0.42 (.18-.83)	0.19	0.71 (.23-.98)	0.58	0.79 (.60-.98)	**0.46**	0.78 (.55-.93)	**0.51**	0.88 (.41-.98)	0.90
% Filterer	69 (29-84)	52	49 (23-81)	58	41 (11-57)	39	40 (15-71)	30	44 (18-61)	31	48 (32-72)	**30**	64 (31-81)	49
Biotic Index	4.2 (3.0-5.3)	4.2	5.1 (4.6-5.7)	**4.4**	4.0 (2.6-4.9)	2.8	4.6 (3.7-5.3)	4.9	4.8 (4.6-5.1)	**4.1**	4.5 (3.7-4.9)	4.2	5.0 (4.5-5.3)	5.3
Metals Index	5.3 (3.9-7.0)	4.7	4.8 (4.2-5.5)	4.3	4.2 (3.1-4.8)	3.1	4.7 (4.3-5.5)	5.4	4.7 (4.1-5.4)	**3.9**	4.6 (4.2-5.0)	**4.1**	4.9 (4.4-5.3)	**5.9**

Stations 2.5 and 4.5 on Silver Bow Creek, Station 5 on Mill-Willow Bypass, stations 07, 08, 8.5, 09 on the upper Clark Fork.

Table 5. Mean Metric Values Characterizing Macroinvertebrate Assemblages at Six stations in the Clark Fork River Basin near Missoula during August 2001 to 2019 and 2020. ***2020 bolded values are outside of the typical range for the site.***

Station:	10		11		13		14		15.5		20	
Metric	**2001-2019** (range)	**2020**	**2001-2019** (range)	**2020**	**2001-2019** (range)	**2020**	**2001-2019** (range)	**2020**	**2001-2019** (range)	**2020**	**2001-2019** (range)	**2020**
per 0.1 m^2 Hess Density	1533 (519-2296)	1014	1256 (388-2357)	827	842 (119-2458)	373	460 (232-727)	244	859 (223-2145)	847	857 (459-1558)	646
Taxa richness	35 (23-43)	37	40 (31-44)	39	41 (29-49)	46	37 (33-43)	**31**	42 (26-54)	50	41 (32-48)	**52**
EPT richness	19 (12-22)	**24**	21 (16-23)	22	24 (18-29)	**31**	21 (19-24)	24	23 (18-29)	**31**	23 (19-26)	**30**
Shan. Diversity	3.3 (2.7-3.9)	4.2	3.9 (3.5-4.2)	4.2	4.0 (2.9-4.6)	4.4	3.7 (2.8-4.1)	3.8	4.0 (3.3-4.3)	3.9	3.7 (3.3-4.4)	**4.6**
EPT/EPTC	0.80 (.61-.88)	0.85	0.78 (.54-.90)	0.67	0.81 (.64-.95)	0.92	0.76 (.32-.98)	0.96	0.80 (.31-.95)	0.94	0.80 (.48-.88)	0.69
Baetidae/ Ephemeroptera	0.59 (.30-.87)	0.82	0.63 (.09-.91)	0.83	0.40 (.29-.55)	**0.64**	0.38 (.16-.51)	0.42	0.44 (.25-.64)	0.45	0.40 (.08-.73)	0.17
Hydropsychinae/ Trichoptera	0.65 (.32-.90)	0.34	0.67 (.21-.95)	0.38	0.71 (.45-.97)	0.78	0.80 (.61-.88)	0.86	0.78 (.41-.93)	0.85	0.80 (.61-.93)	0.82
% Filterer	50 (21-75)	39	39 (19-55)	22	37 (12-63)	43	45 (20-74)	61	49 (11-68)	51	52 (20-74)	42
Biotic Index	4.8 (4.1-5.4)	4.5	4.6 (4.2-5.1)	4.5	4.2 (3.4-4.7)	4.4	4.0 (3.4-4.1)	**4.4**	4.4 (3.8-5.1)	4.7	4.6 (4.1-5.0)	4.7
Metals Index	4.7 (3.8-5.5)	4.7	4.7 (4.2-5.6)	4.3	4.2 (3.5-5.1)	4.3	3.6 (2.2-4.1)	4.1	4.2 (3.7-4.6)	4.1	4.2 (3.0-4.9)	4.7

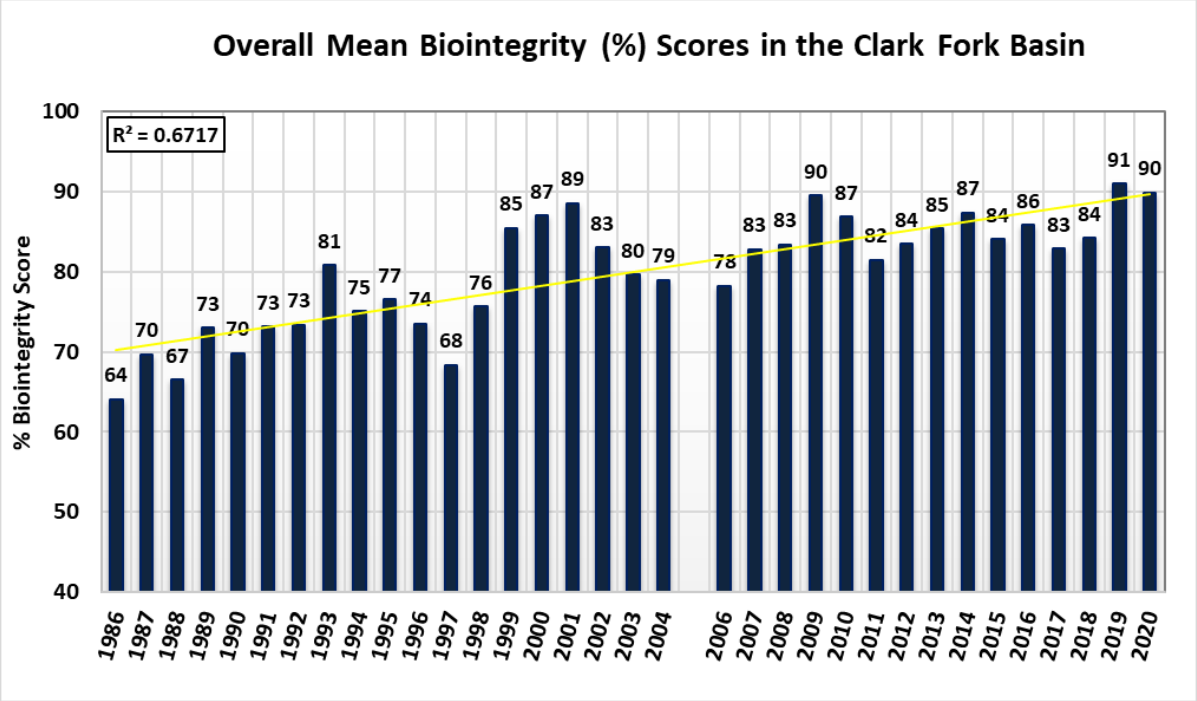
Stations 10, 11, 13, 15.5 and 20 on the Clark Fork River. Station 14 on the Blackfoot River.

4.3 2020 Bioassessments

The overall effect of water quality on BMI was estimated from the composite score of 10 metrics known to have predictable effects on these assemblages (**Table 2**). For this discussion, bioassessment scores are categorized as non-impaired (90 to 100 percent), slightly impaired (70 to 89 percent), moderately impaired (50 to 69 percent), or severely impaired (less than 50 percent).

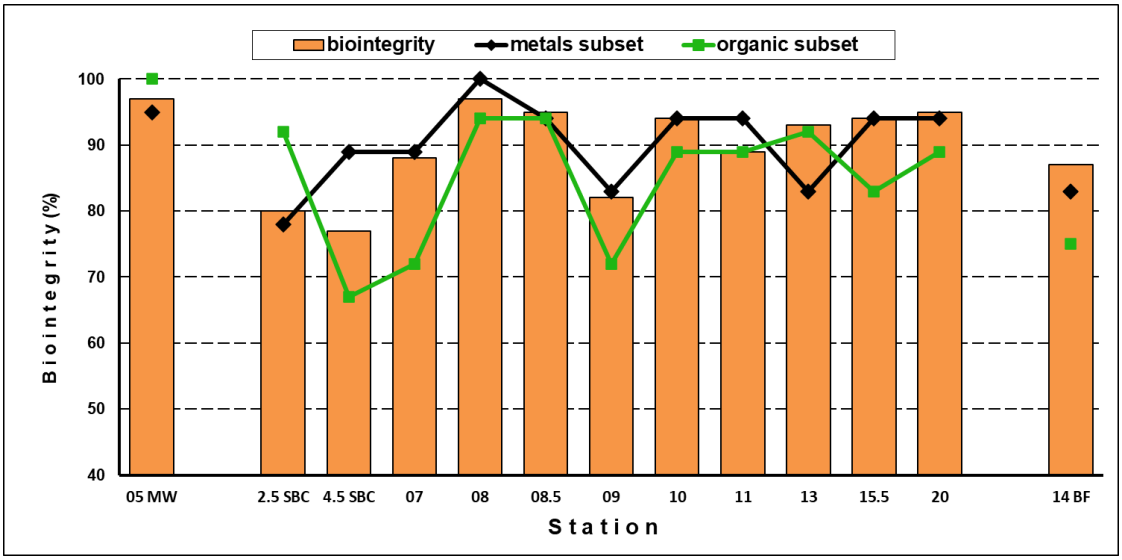
The 2020 BMI assessments documented above average biointegrity scores at 10 of the 13 sites, especially noted at the SBC sites and in the upper Clark Fork River (**Figure ES-1**). The overall biointegrity average of 89.8 percent across all sites in 2020 is the 3rd highest ever reported for 34 years of the study (**Figure 7**). Bioassessment scores in 2020 ranged from 77 to 97 percent (**Table 6**).

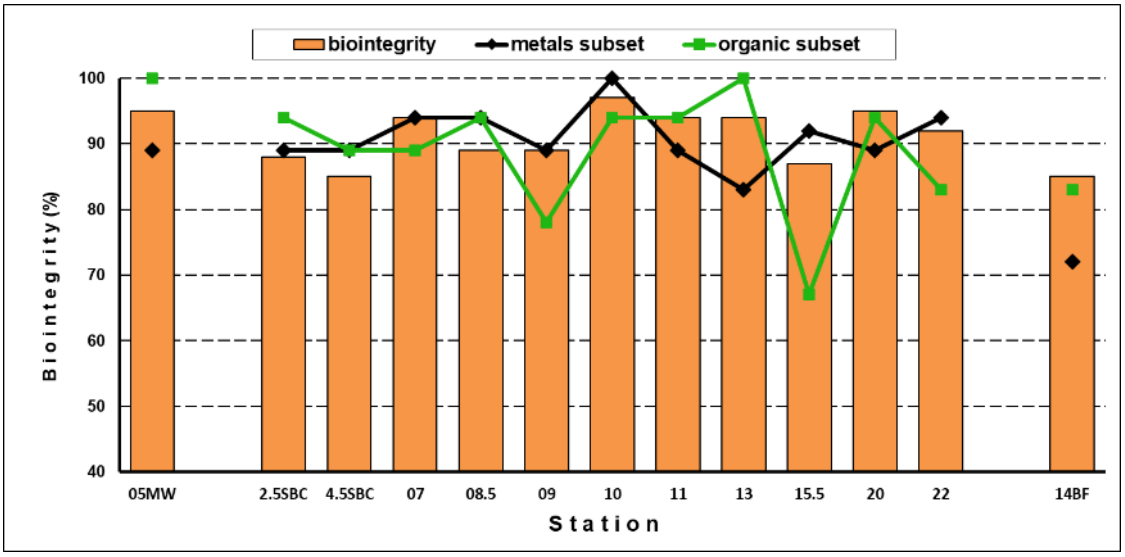
Figure 7. Mean (%) Biointegrity Scores for 13 sites in the Clark Fork River Basin sampled between 1986 to 2020. Trendline and R^2 of the line on the graph in yellow.



During 2020, biological integrity based on BMI was ranked non-impaired at seven sites, slightly impaired at six sites, and moderately impaired at zero sites (**Figure 8**). The Mill-Willow Bypass (Station 5) and all CFR sites, except Stations 07, 09 and 11 ranked non-impaired. SBC Stations 2.5 and 4.5 and the Blackfoot River (Station 14) ranked slightly impaired (**Figure 8, Table 6**). Deer Lodge Valley CFR sites (Stations 08, 8.5 and 10) improved substantially between 2017 and 2020. Overall, 2020 BMI assessment results reflect a similar trend compared to 2019 biointegrity results that reported seven sites non-impaired and six sites slightly impaired (**Figure 8**).

Figure 8. Biointegrity Scores for 13 Sites in the Clark Fork River Basin Sampled in August 2020 (top), 2019 (middle) and 2018 (bottom).





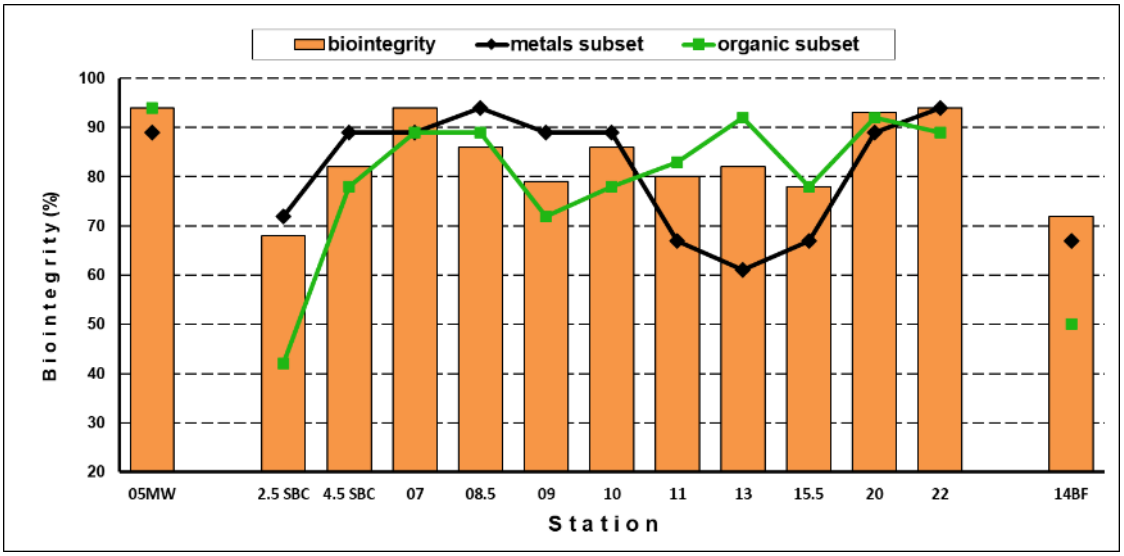


Table 6. Macroinvertebrate community biointegrity estimates in the Clark Fork River Basin sampled in August 2020.

Biointegrity (% of max score)			
Station	**Overall**	**Metals Subset**	**Organic Subset**
Silver Bow Creek			
2.5	80 *	78 *	92
4.5	77 *	89	67 **
Mill-Willow Bypass			
05	97	95	100
Clark Fork River			
07	88 *	89	72 *
08	97	100	94
8.5	95	94	94
09	82 *	83	72 *
10	94	94	89
11	89 *	94	89
13	93	83	92
15.5	94	94	83
20	95	94	89
Blackfoot River			
14	85 *	83	75 *

Classification: slightly impaired *, moderately impaired **, severely impaired ***.

4.3.1 Nutrient and Organic Pollution

Diagnosis of nutrient-related impacts are based on metrics known to be sensitive to organic pollution, high seston concentrations and extensive algae/plant growth. Scores of less than 80 percent are considered indicative of significant nutrient and/or organic pollution and scores less than 40 percent are severely impaired (**Table 2**).

The 2020 nutrient metric subset scores ranged from 67 percent to 100 percent (**Figure 8, Table 6**). Biological impairment characteristics of nutrient/organic pollution were evident at one site in the Deer Lodge Valley (Station 09), the CFR at Warm Springs (07) and at the Blackfoot River reference site (Station 14) (**Table 6**). Moderate nutrient impairment was indicated at the SBC site at Warm Springs (Station 4.5) in 2020 (**Figure 8**).

4.3.2 Metals Pollution

Diagnosis of metals-related impacts to the BMI community is based on three metrics shown to be sensitive to metals toxicity. Scores of less than 80 percent are considered indicative of significant metals impacts (**Table 2**). The relative abundance of the mayfly family Heptageniidae was also presented as a measure of a community's sensitivity to heavy metal impacts (**Figure 5**)

During the 2020 sampling, significant metal-related stressors were only exhibited in the BMI community at Silver Bow Creek (Station 2.5) (**Table 6**). Metal toxicity stressors were only detected at the Blackfoot River site (Stations 14) in 2019, but no community metal issues were reported at this site in 2020 (**Figure 8**).

4.4 Longitudinal and Temporal Patterns

Biological integrity has continually improved throughout the CFR Basin since 1986 (**Figures 9 and 10**). For all stations combined, mean annual biointegrity has ranged from 64 percent in 1986 to 90 percent in 2020 **(Table 7, Figure 9**). Short-term negative impacts from floods were evident during 1986, 1997, and to a lesser extent, 2011 and 2018. However, biological integrity recovered quickly from these events. The drought at the beginning of this century (2000 through 2007) and below average flows from 2014-2017 had a widespread, but generally slight, negative impact on biological integrity.

Long-term data show dynamic longitudinal and temporal trends (**Figure 9**). At the start of this study, biological integrity was severely impaired in Silver Bow Creek, moderately impaired in the Mill-Willow Bypass and in the CFR through the Deer Lodge Valley, and slightly impaired from the confluence of the Little Blackfoot River to below Missoula. Biological integrity improved significantly at stations near Warm Springs Creek (Stations 4.5, 5.0, and 7.0) soon after completion of remedial actions in 1993. Consistent improvement was not observed at most downstream stations until about 2000 and coincided with implementation of several Voluntary Nutrient Reduction Program projects (Tri-State Water Quality Council, 2009) and instream flow augmentation from Silver Lake. Assessments during the past decade indicate more stable conditions, with no significant changes in overall biological integrity at most CFR monitoring sites.

Environmental conditions continue to improve in SBC. Remediation of the SBC floodplain has resulted in significantly improved biological integrity at the Opportunity site (Station 2.5). This site was characterized as severely impaired during the 20th century but has improved to moderately impaired from 2006 through 2014; it has been ranked slightly impaired 2015 and 2016, unimpaired in 2017, moderately impaired in 2018 and back to slightly impaired in 2019.

In contrast, increased environmental stress was indicated during the past decade in SBC below the Warm Springs Ponds (Station 4.5) (**Figure 9**). Biological integrity was slightly impaired at this site at the turn of the century but has declined to moderately impaired from 2007 through 2013. Biological integrity is classified as slightly impaired during the 2014 to 2020 period (**Figure 9**).

Figure 9. Mean Biointegrity Scores at 13 Stations in the CFR Basin during Five Time Periods since 1986.

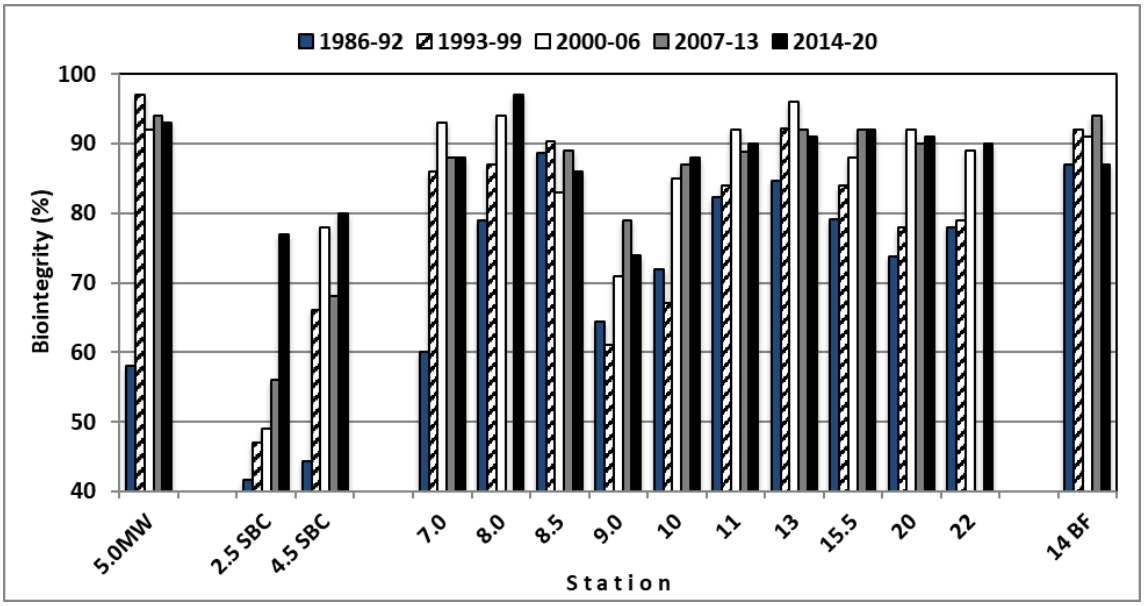
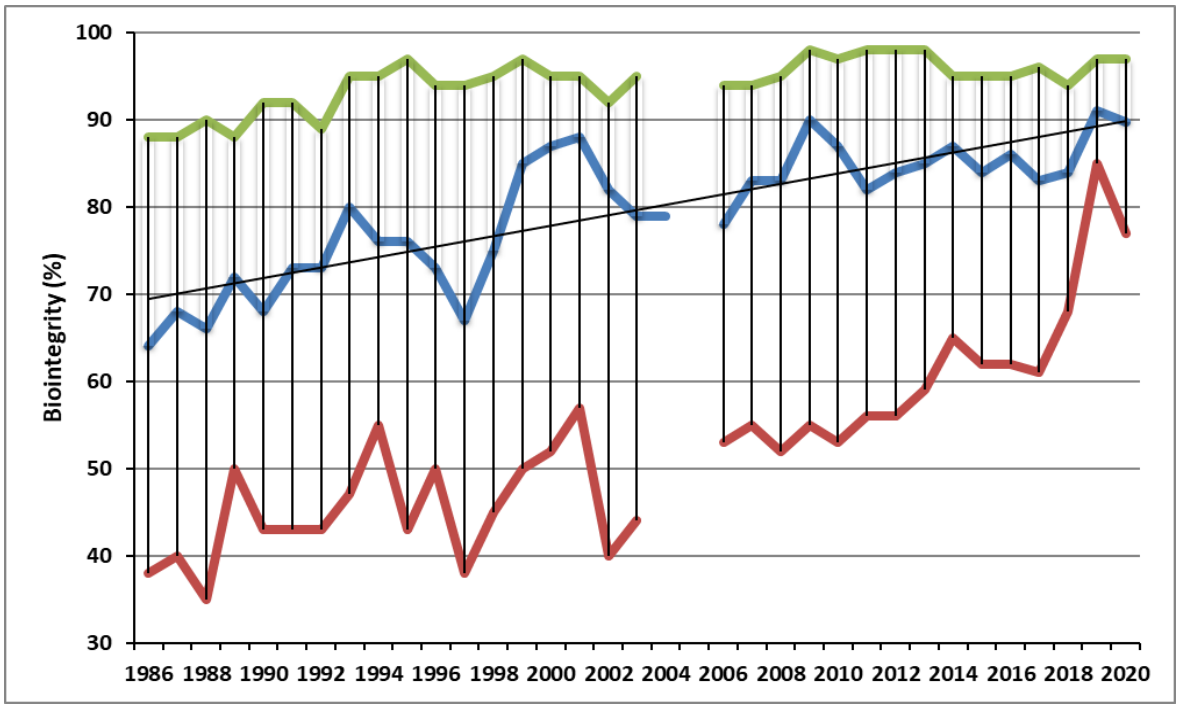


Figure 10. Mean Annual Biointegrity Scores (Blue Line) with Max, Min and Trendline (Black) for the Clark Fork River Basin sites from 1986-2020.



Over the past 3 years, biological integrity has been characterized as slightly impaired in Silver Bow Creek (Stations 2.5 and 4.5), slightly to moderately impaired in the CFR through the Deer Lodge Valley (Stations 8.5, 9.0 and 10), and generally non-impaired from the junction of the Little Blackfoot River to below Missoula (Stations 11, 13, 15.5, 20 and 22). Surprisingly, the Blackfoot River's (Station 14) biological integrity has been characterized as slightly impaired in each of the past 6 years.

4.4.1 Metals Pollution

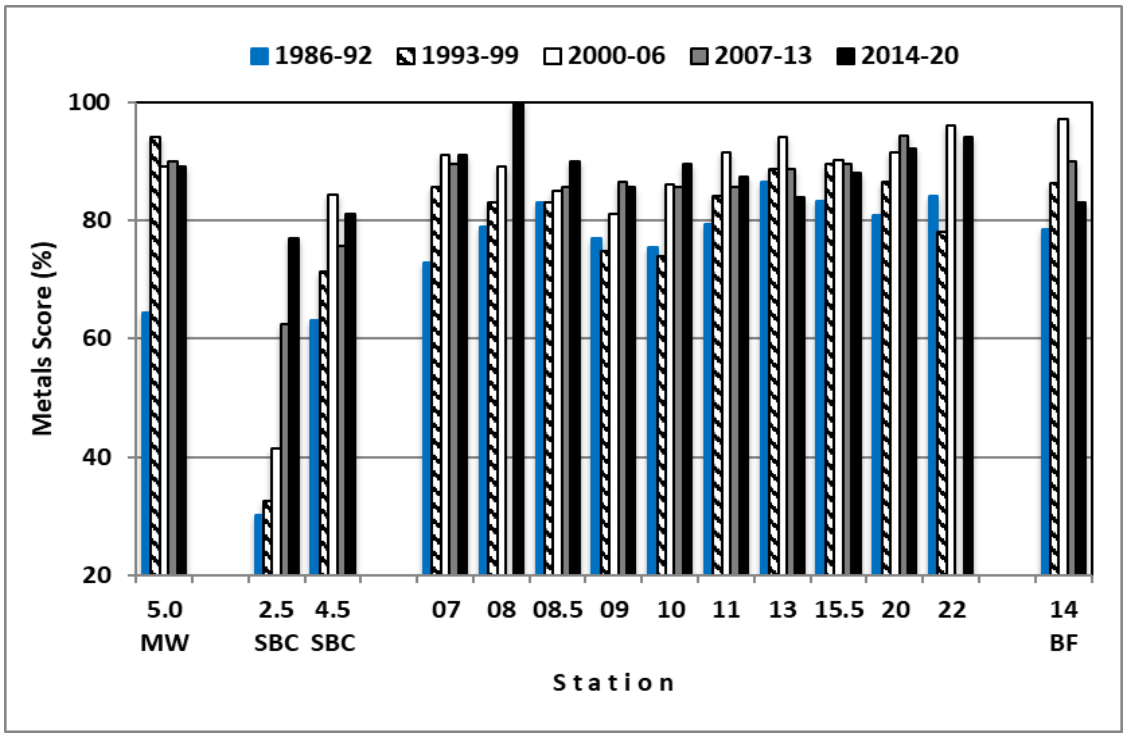
Diagnosis of metals-related impacts is based on BMI metrics considered most sensitive to toxicants. Scores of less than 80 percent are considered indicative of significant metals pollution (**Table 2**).

Metals pollution was historically widespread and has caused significant biological impairment in the upper Clark Fork River Basin when this monitoring program was initiated (**Figure 11**). Biologically significant impacts were routinely detected in Silver Bow Creek, the Mill-Willow Bypass, and the CFR throughout the Deer Lodge Valley. Metals pollution was occasionally indicated as far downstream as Missoula, especially after the Milltown Dam removal in 2008 (**Table 8**). The extent and frequency of metals impacts have declined throughout the monitoring area since 1993.

Metals pollution is still routinely detected in Silver Bow Creek. However, the severity of these impacts has significantly diminished since 2002 (**Table 8**). Impacts from metals were classified as slight at Opportunity (Station 2.5) during 10 of the past 11 years and registered unimpaired in 2017 for the first time since 1986 (**Table 8**). Below the Warm Springs Ponds, moderate to slight metals impacts were detected in Silver Bow Creek (Station 4.5) on all dates prior to 2000. Significant metals pollution was not indicated at this site from 2000 through 2003. However, during the past decade, slight impacts consistent with metals were indicated on all dates, including 2017. Recent assessments may be registering toxicity because of ammonia and high pH instead of metals.

In the CFR, recent metals impacts have been infrequent and associated with elevated metal loads during floods. Widespread but generally slight biological impairment consistent with metals pollution was observed in the CFR following the floods in 1997, 2011 and 2018. Metals-related impacts were more severe and widespread in 1997 than in 2011. During periods of more normal flow, slight metals pollution was detected in the Deer Lodge Valley (Stations 8.5, 09, and 10). However, the frequency of metals impacts in this reach has declined over the past 20 years (**Table 8**). Since 2007, impacts consistent with metals pollution were detected in the CFR only in 2011 and at one site in 2017.

Figure 11. Mean Scores for Metals-Sensitive Metrics at 13 Stations in the CFR Basin during Five Time Periods since 1986.



4.4.2 Nutrient Pollution

Diagnosis of nutrient-related impacts is based on macroinvertebrate metrics known to be sensitive to organic pollution, high seston concentrations, algae and extensive plant growth. Scores of less than 80 percent are considered indicative of significant nutrient and/or organic pollution (**Table 2**).

Nutrient pollution continues to be a significant stressor in portions of the Clark Fork River Basin, especially at sites in the Deer Lodge Valley (**Figure 12**). When monitoring began, slight to moderate impacts were evident at all monitoring sites (**Figure 12**), except the Blackfoot River (Station 14). Moreover, the nutrient pollution metrics increased significantly in Silver Bow Creek at Opportunity (Station 2.5) as metals toxicity abated. This site, characterized as moderately impaired by nutrients on most dates since 2004, had the highest nutrient concentrations in the monitoring area (PBS&J, 2009). However, nutrient impacts were not indicated at this site during 2017.

The Warm Springs Ponds act as a net nutrient sink, sequestering nutrients for most of the year. However, organic and nutrient impacts are routinely detected below the ponds (Station 4.5). Nutrient-related impacts have been classified as slightly impacted for the past 4 years (**Figure 12**).

Impacts attributable to nutrients have declined over the past 30 years at most Clark Fork River stations except near Deer Lodge (Stations 8.5, 09 and 10), where moderate impacts consistent with nutrient pollution continue to be detected. However, slight to significant nutrient-related impacts to the BMI were detected at CFR sites in the Deer Lodge Valley during 2014-2017 (**Figure 12**, **Table 9**).

Figure 12. Mean Scores for Nutrient-sensitive Metrics at 13 Stations in the CFR during Five Time Periods since 1986.

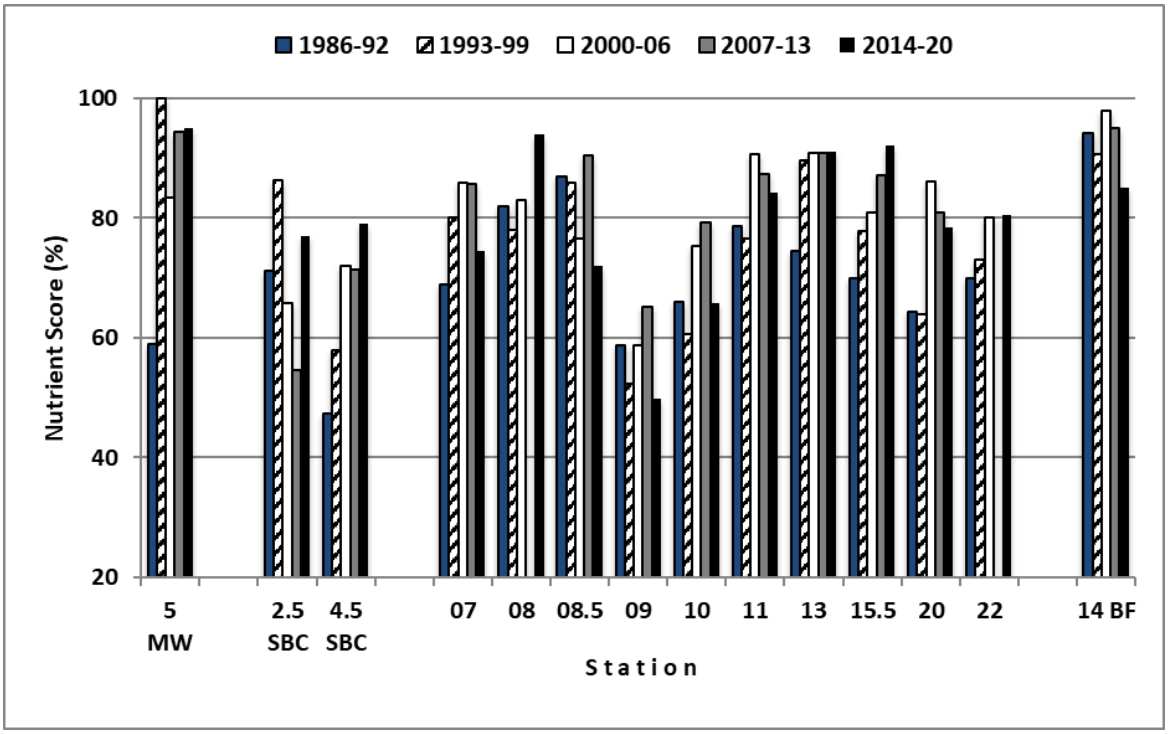


Table 7. Mean Annual Macroinvertebrate Biointegrity (%) at 13 Clark Fork River Basin Monitoring Stations during August 1986 – 2020

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Mean	S.D.
Silver Bow Creek																																					
02.5	38	40	35	50	43	43	43	47	55	43	50	38	45	50	52	57	40	44		53	55	52	55	53	56	59	59	65	74	73	91	68	88	80	54	14
04.5	45	44	44	47	41	45		71	70	59	62	58	61	83	88	88	74	86	71	59	73	74	76	70	67	53	65	77	71	82	76	82	85	77	67	14
Mill-Willow Bypass																																				
05	58	61	67	61		43								97	94	91				92	89	94	95	95	95	91	97	92	91	92	94	94	95	97	85	16
Clark Fork River																																				
07	59	64	53	59	55	65	65	83	82	88	77	94	86	94	92	94	92	95	94	92	65	89	92	97	98	91	82	94	92	85	71	94	94	88	83	14
08	71	62	71		85	88	89						85	88	89	94																		97	84	11
08.5					89	88	89						91	89	91	88			83	68	91	92	95	86	83	88	89	95	88	82	64	88	89	95	87	8
09	52	65	62	73	61	83	55	86	53	58	55	55	55	68	79	86	82	53	68	55	85	74	94	82	74	70	73	74	62	70	61	79	89	82	70	12
10	52	68	71	80	79	86	68	87	59	74	65	48	59	77	82	86	89	82			82	91	91	92	77	82	92	88	77	80	86	86	97	94	79	12
11	86	80	85	88	63	89	85	94	94	86	78	62	86	88	95	95				86	91	83	92	92	80	92	92	94	91	95	90	80	94	89	87	8
13	88	80	76	88	86	92	83	95	89	94	94	82	91	98	94	97	97	97		94	94	95	93	97	88	88	86	93	88	95	91	82	94	93	91	6
15.5	76	88	86	77	68	79	80	90	82	83	85	71	82	95	91	88	91	89		83	88	85	98	93	83	98	98	92	97	97	94	82	92	94	87	8
20	71	77	61	79	73	79	76	61	79	82	76	83	76	92	95	95	92	89		89	83	82	98	89	89	97	94	95	83	91	86	93	95	95	85	10
22	62	86	68	89	88	71	74	85	68	79	75	78	82	88		95	91	82													86	94	92		82	9
Blackfoot River																																				
14	82	83	90	85	92	88	89	90	95	97	92	83	95	92	92	91				90	98	90	95	97	88	93	98	90	95	88	88	72	85	87	90	6
mean	65	69	67	73	71	74	75	81	75	77	74	68	76	86	87	89	83	80	79	78	83	83	**90**	87	82	84	85	87	84	86	83	84	**91.5**	**89.8**	80	7

Table 8. Mean Annual Macroinvertebrate Biointegrity (%) as Measured by Metrics* Sensitive to Metals Pollution at Clark Fork River Basin Stations – August 1986 – 2020

Station	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Mean	S.D.
Silver Bow Creek																																					
02.5	22	17	44	28	22	28	50	33	56	22	44	22	28	22	44	33	33	56		67	67	61	67	50	61	67	67	61	78	78	83	72	89	78	50	20
04.5	61	61	61	67	67	61		72	72	61	72	72	72	78	89	83	83	89	78	72	67	83	78	78	78	72	67	72	72	78	78	89	89	89	75	8
Mill-Willow Bypass																																				
05	61	72	67	72		50								94	89	89				89	83	89	89	94	89	89	94	83	89	89	89	89	89	95	84	12
Clark Fork River																																				
07	72	72	78	72	72	72	72	83	83	78	83	89	94	89	89	94	89	94	89	83	83	89	89	94	94	89	89	89	94	94	89	89	94	89	86	8
08	78	72	72		78	83	83						83	83	89	89																		100	83	83
08.5					83	83	83						83	83	89	83			83	78	89	89	94	89	67	83	89	89	89	89	83	94	94	94	86	6
09	78	78	72	83	72	83	72	78	72	72	78	67	78	78	83	78	83	83	78	72	89	83	89	83	83	89	89	83	89	89	78	89	89	83	81	6
10	72	78	72	67	78	83	78	78	78	78	83	44	78	78	89	89	83	83			83	89	89	89	72	89	89	89	83	83	89	89	100	94	82	9
11	83	78	78	89	67	83	78	89	94	83	83	67	89	83	94	89				83	94	83	89	83	72	89	89	89	89	94	94	67	89	94	85	8
13	78	89	94	83	78	89	94	94	89	89	94	61	94	100	94	94	94	94		94	89	89	83	94	78	94	94	89	94	94	83	61	83	83	88	9
15.5	83	92	92	72	78	83	83	83	89	94	94	83	94	89	94	89	89	89		94	94	72	100	83	78	100	100	83	94	94	89	67	92	94	88	8
20	83	83	78	78	78	83	83	89	83	89	89	78	94	83	94	89	89	94		89	94	89	100	94	89	94	100	94	94	94	89	89	89	94	89	6
22	83	89	83	89	78	83	83	83	83	83	78	56	83	78		94	94	100	94												94	94	94		86	10
Blackfoot River																																				
14	61	83	83	67	83	72	100	83	94	94	83	78	94	78	100	94				78	100	78	89	100	83	89	100	83	94	89	83	67	72	83	85	11
Mean	70	74	75	72	72	74	80	79	81	77	80	65	82	80	87	85	82	87	84	82	86	83	88	86	79	87	**89**	84	88	**89**	86	81	**89**	**90**	82	6

Table 9. Mean Annual Macroinvertebrate Biointegrity (%) as Measured by Metrics* Sensitive to Nutrient/Organic Pollution at Clark Fork River Basin Stations – August 1986 – 2020.

Station	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Mean	S.D.
Silver Bow Creek																																				
02.5	83	83	33	100	83	75	42	92	61	92	75	92	92	100	67	83	67	56		56	56	50	67	42	50	61	56	67	67	83	94	42	94	92	71	19
04.5	50	56	44	39	39	56		83	72	56	50	33	33	78	72	72	72	83	61	72	83	83	83	83	56	33	78	78	78	78	83	78	89	67	66	18
Mill-Willow Bypass																																				
05	58	61	78	56		42								100	89	78				83	83	94	100	100	100	89	94	94	94	89	94	94	100	100	86	16
Clark Fork River																																				
07	72	72	50	78	56	72	83	83	83	83	67	89	67	89	83	83	83	89	89	89	61	89	89	94	100	83	83	89	83	72	39	89	89	72	79	13
08	78	72	72		83	89	89						72	83	78	89																		94	82	8
08.5					89	89	83						89	83	78	83			78	67	89	89	94	89	100	89	83	94	72	72	33	89	94	94	83	14
09	56	67	50	61	44	83	50	89	50	50	39	50	44	44	61	78	83	22	50	56	67	56	89	72	78	50	44	56	44	44	33	72	78	72	58	17
10	39	61	56	83	67	89	67	83	50	67	50	58	56	61	67	78	89	67			67	83	89	94	67	72	83	78	50	56	67	78	94	89	70	14
11	89	72	92	89	42	89	78	94	89	83	67	42	78	83	89	94				89	89	83	89	92	83	94	83	94	83	89	72	83	94	89	83	13
13	89	67	44	89	83	83	67	92	89	89	83	92	89	94	83	94	94	94		89	89	92	100	94	100	78	83	92	78	94	99	92	100	92	87	11
15.5	72	75	81	58	42	78	83	100	78	67	72	61	67	100	89	83	78	83		72	78	83	94	100	67	94	94	92	94	94	89	92	67	83	81	14
20	67	67	39	78	67	72	61	33	67	67	61	67	61	92	89	94	92	78		78	67	67	94	83	78	94	83	89	61	78	72	92	94	89	74	15
22	61	78	50	88	92	61	61	78	33	67	67	100	75	92		89	89	61													72	89	83		74	17
Blackfoot River																																				
14	100	83	83	100	100	100	94	92	92	100	92	67	92	100	94	100				100	100	92	100	94	83	100	94	92	100	100	94	50	83	75	92	11
Mean	70	70	59	77	68	77	72	84	69	75	66	68	70	86	80	86	83	70	70	77	77	80	**91**	86	80	78	80	85	75	79	72	80	**89**	**85**	77	7

* metric subset: biotic index, % filterers and community density.

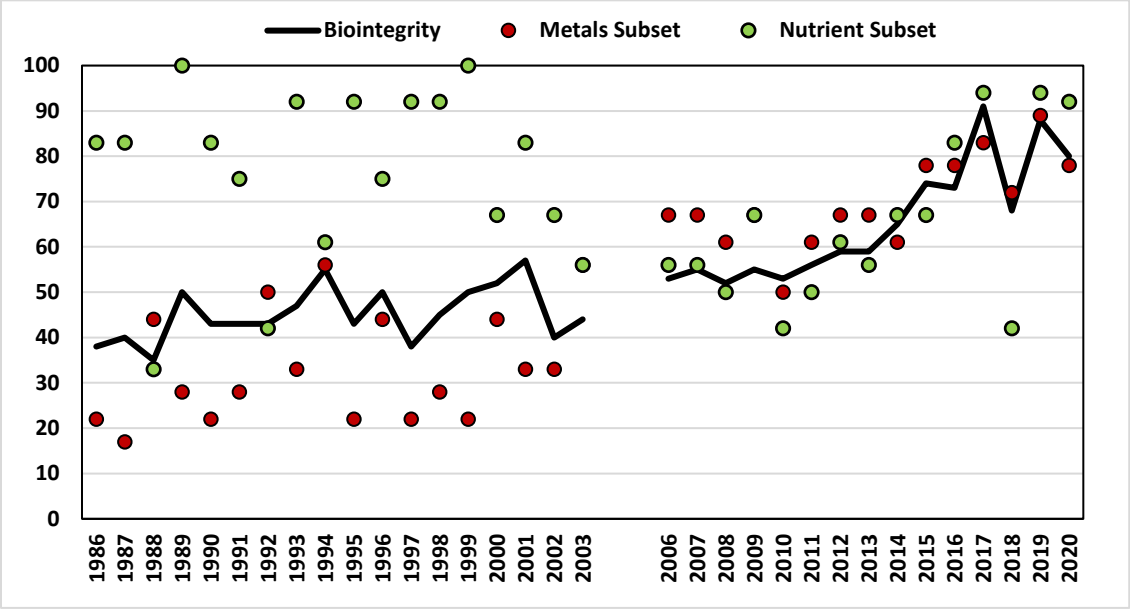
4.5 Site-specific Assessments

4.5.1 Silver Bow Creek at Opportunity (Station 2.5)

In 2020, Silver Bow Creek at Opportunity was classified as slightly impaired (80 percent) but has substantially improved from being ranked moderately impaired (68 percent) in 2018. Metals impairment was indicated as a community stressor in 2020, but mats of aquatic vegetation have increased since 2018 reflecting some nutrient loading (**Photo 1**).

The 2020 assessment documents significantly increased integrity compared to 2018 when both metals and nutrients appear to be stressors (**Figure 13**). Silver Bow Creek was grossly polluted from metals during the 20th century (**Figure 13**). Remediation of the Silver Bow Creek floodplain began in 1999 and was ongoing for about 15 years. The monitoring site near Opportunity was typically classified as severely impaired for the first 20 years of monitoring and moderately impaired from 2006 through 2014. Slight biological impairment was indicated in 2015 and 2016.

Figure 13. Macroinvertebrate Community Biointegrity in Silver Bow Creek near Opportunity (Station 2.5), 1986 to 2020.



Metrics indicating improved biological integrity included higher community density, total taxa and EPT richness, and declining biotic and metals tolerance indices (**Appendix C-1**). Community composition has shifted from predominately chironomids to a preponderance of filter feeders. Filtering caddisflies *Brachycentrus* and *Hydropsyche* have dominated the macroinvertebrate assemblage for the past few years, but in 2018, after large flushing flows, the community was dominated by blackfly larvae (filtering Dipterans). Improvements in biological integrity and reduced metals pollution (**Tables 7** and **8, Figure 13**) have been evident for a decade. However, as metals toxicity diminished in the early 2000s, the benthic community has exhibited more characteristics of nutrient and organic pollution. The 2018 assessment indicated significant nutrient and metals pollution (**Figure 13**). Additional treatment at the Butte WWTP may further improve water quality and biological integrity in Silver Bow Creek.

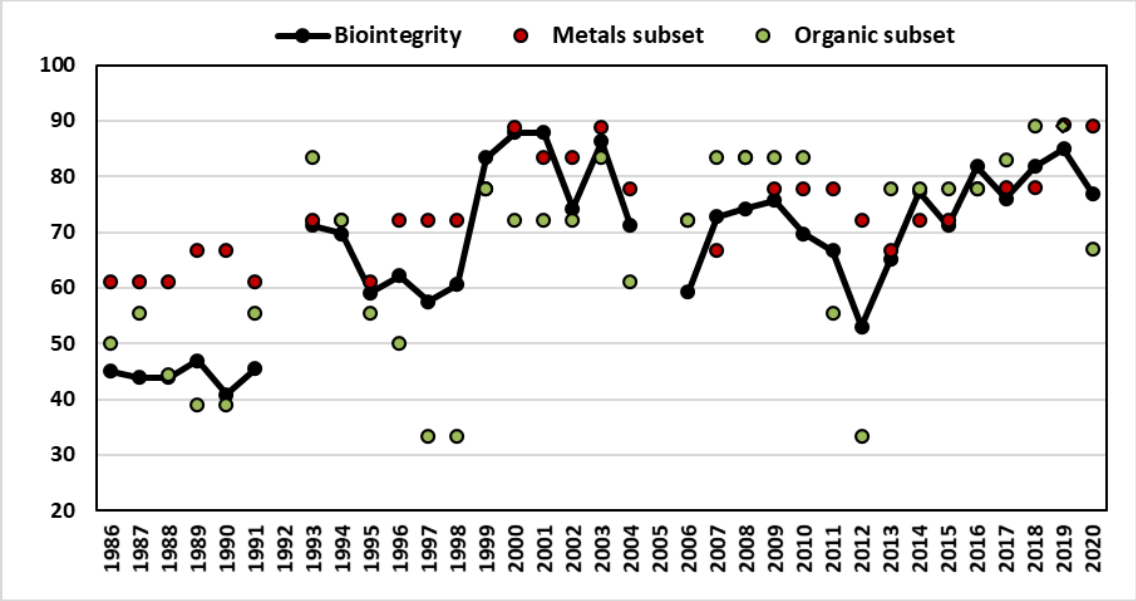
Photo 1. Silver Bow Creek near Opportunity Station 2.5 in 2020 (top) with more aquatic vegetation and filamentous algae mats than in 2019 (bottom).

4.5.2 Silver Bow Creek below the Warm Springs Ponds (Station 4.5)

Silver Bow Creek Below Warm Springs Ponds was classified as slightly impaired (77 percent) in 2020; nutrients were indicated as a probable stressor (67 percent); although, the biotic index is still low (4.4) indicating slight organic enrichment (**Figure 14, Appendix C**).

Biological integrity increased significantly following remedial work on the Warm Springs Ponds and bypass channel in the early through mid-1990s. The outflow of the Warm Springs Ponds was severely impaired by nutrients and metals on each date sampled prior to 1993 (**Figure 14**). Biological integrity was moderately impaired from 1993 through 1998, but only slightly impaired from 1999 through 2003. During the later period, assessment scores averaged 84 percent, with nutrient and organic loading from the pond outflow identified as the principal limiting factor. However, environmental stresses have increased since 2004 and the biointegrity score declined to a 20-year low in 2012. Biointegrity was moderately impaired from 2010 through 2013, but it has been classified as slightly impaired since 2014. Nutrient pollution was strongly indicated as a stressor to macroinvertebrate communities in 2011 and 2012, but it has been less evident in the last 7 years until 2020.

Figure 14. Macroinvertebrate Biointegrity in Silver Bow Creek Below Warm Springs Ponds (Station 4.5), 1986 to 2020

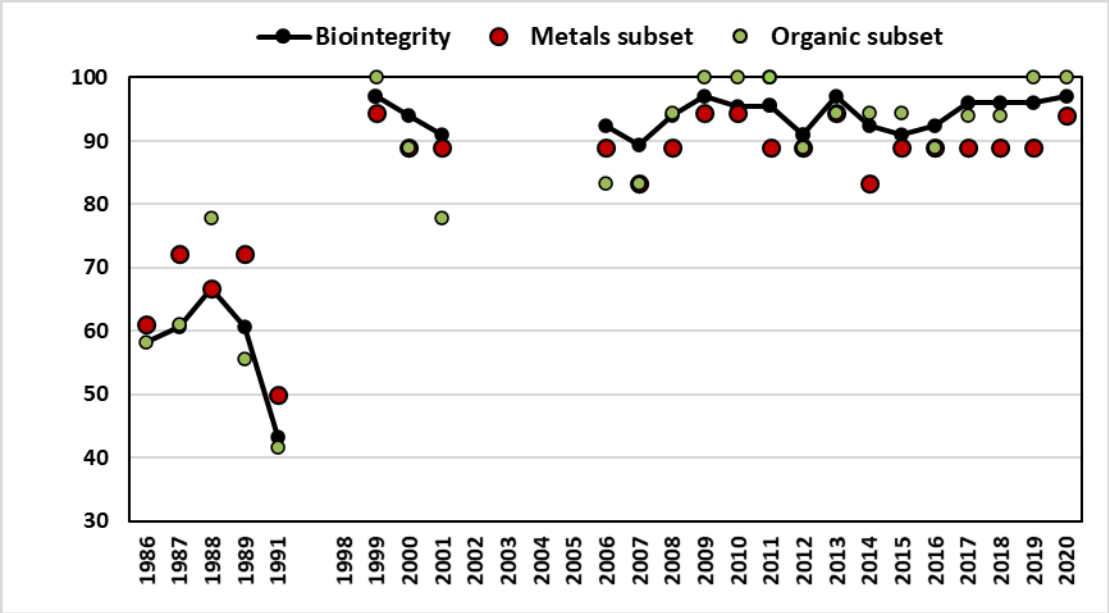


The decline in biological integrity at this site prior to 1999, and since the turn of the century, may be attributed to increased eutrophication of the Warm Springs Ponds and episodic declines in effluent water quality, especially after years of above average flows (2011 and 2012). As the Warm Springs Ponds age, there are multiple interacting factors contributing to recent changes in the effluent water quality of the ponds (Chatham 2011). Extensive growth of aquatic vegetation within the ponds drives high summer pH values and seasonal nutrient cycles (CDM 2005). During the winter, the water column stratifies and plant decomposition results in anoxic sediments and hypolimnetic water enriched with ammonia, phosphorus, and arsenic. Impacts were most likely the result of pulses of oxygen-poor and ammonia- and/or arsenic-rich water leaving the ponds during spring turnover.

4.5.3 Mill-Willow Bypass (Station 05)

The Mill-Willow Bypass has supported a healthy, non-impaired macroinvertebrate community since contaminant removal and channel reconstruction occurred in the early 1990s; the 2020 bioassessment score of 97 percent has continued this non-impaired trend (**Figure 15**). The Mill-Willow Bypass was moderately impaired from 1986 through 1991, but it has been classified as non-impaired on each date sampled since 1999 (**Figure 15**). Recent assessments suggest that the Mill-Willow Bypass remains free of biologically significant metals contamination.

Figure 15. Macroinvertebrate Community Biointegrity in the Mill-Willow Bypass (Station 5), 1986 to 2020.



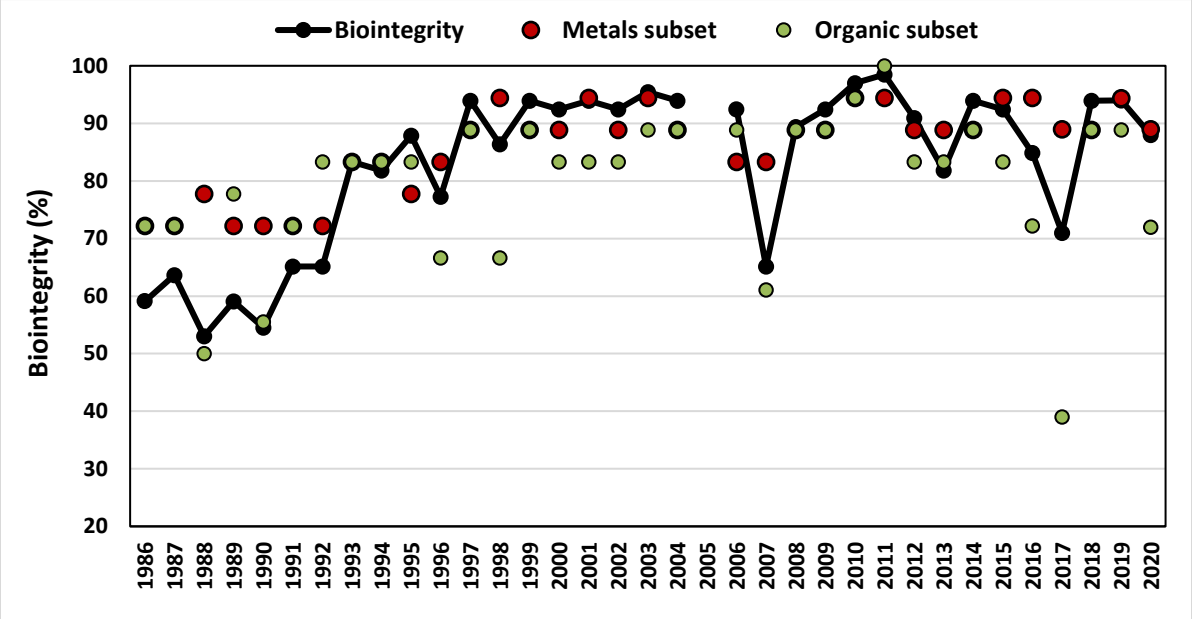
4.5.4 Clark Fork River below Warm Springs Creek (Station 07)

The CFR below Warms Springs Creek was ranked slightly impaired (88 percent) in 2020; this has slightly declined from non-impaired ranks (94 percent) in 2018 and 2019 but is a significant rebound from 71 percent in 2017 (**Figure 16**). Nutrients were indicated as the probable stressor in 2020 (72 percent) with a BI score of 4.9, but the MTI was also moderately elevated (5.4) after a 4.1 score in 2019; the lowest score of all years sampled (**Table 4, Figure 16**). Neither nutrients nor metals were listed as stressors in 2019 or 2018 (both at 89 and 94 percent) (**Figure 16**). Overall BMI diversity metrics and EPT taxa richness have increased markedly from 2018 to 2020 from the low scores of 2017. Despite the high flushing flows of 2018, BMI densities at this site remained very abundant in 2018 (avg. ~19,500 ind. per m^2), then decreased to ~6,000 ind. per m^2 in 2019 and have become extremely abundant in 2020 (avg. 33,150 ind. per m^2) (**Table 4, Appendix B**). This 70 percent reduction in 2019 BMI densities may be causally linked to August high flow events the week before sampling occurred, but other sites in the vicinity did not experience similar decreases.

This station showed the greatest improvement in biological condition following the Warm Springs Ponds and bypass restoration in the early 1990s. From 1986 through 1992, this site was moderately impaired and had the lowest mean biointegrity (60 percent) in the CFR. Biological integrity was slightly impaired (mean 83 percent) from 1993 through 1996 and has been largely non-impaired (mean 91 percent) since 1999 (**Figure 16**). However, biological integrity was moderately impaired

(65 percent) in 2007 and slightly impaired during 2013 and 2016. Impacts during 2007 appeared consistent with an episode of poor water quality (pH and arsenic exceedances) discharged from the Warm Springs Ponds. The 2013 slightly impaired assessment reflected impacts from concurrent remediation activities in this reach. Nutrient impacts had been causing the biointegrity to decline on a decreasing trajectory since 2014, with the lowest value ever recorded in 2017 (score 39) (**Figure 16**). Significant metals pollution has not been indicated at this site since 1995.

Figure 16. Macroinvertebrate Community Biointegrity in the CFR below Warm Springs Creek (Station 07), 1986 to 2020.



4.5.5 Clark Fork River at Gemback Road (Station 08)

The Clark Fork River at the new Gemback Road site (see Photo 2) was ranked non-impaired in 2020 with the highest assessment score of all CRF sites (97 percent) (**Figure 17**). This is the first year this site has been sampled since 2001 when the BMI community was ranked 94 percent with no stressors evident (**Figure 17**). Stressors in the late-1990's were consistent with slight nutrient pollution while earlier in the late-1980's and 1990's both metal and nutrient stressors (**Figure 17**). The 2020 BMI metrics at this site do not reflect any metals toxicity, although a "significant" fish kill was reported in the Fall of 2019 approximately 7 miles upstream near Galen Lane (Cook 2019).

This stream reach (old site 08 near Galen Lane) has been monitored on 11 occasions since 1986; the mean bioassessment score during this time is 84 percent (**Table 7**). In the late-1980's and 1990, both metals and nutrients appeared to be significant stressors at this site, while in the late-1990's and 2000 only nutrients were probable impairments (**Figure 17**). Relative abundance of Heptageniidae (typical taxa, *Rhithrogena and Heptagenia*) at this site are still averaging less than 1.0 percent per sample (**Figure 6**), indicating some possible residual benthic metals stress.

Figure 17. Macroinvertebrate Community Biointegrity in the CFR below Galen (Old Station 08), 1986 to 2001 and Gemback Rd. 2020.

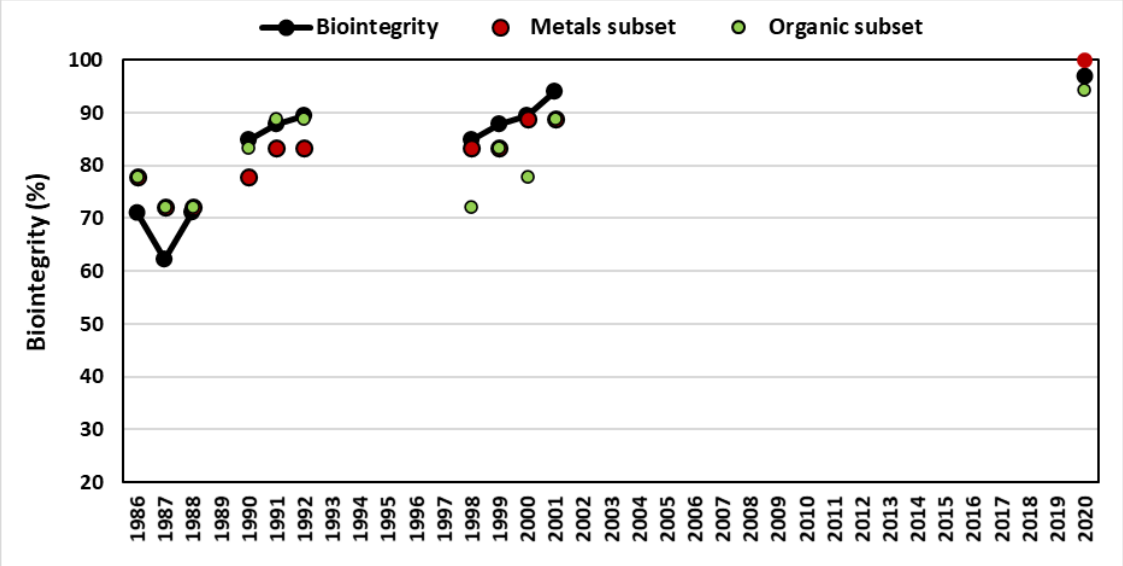


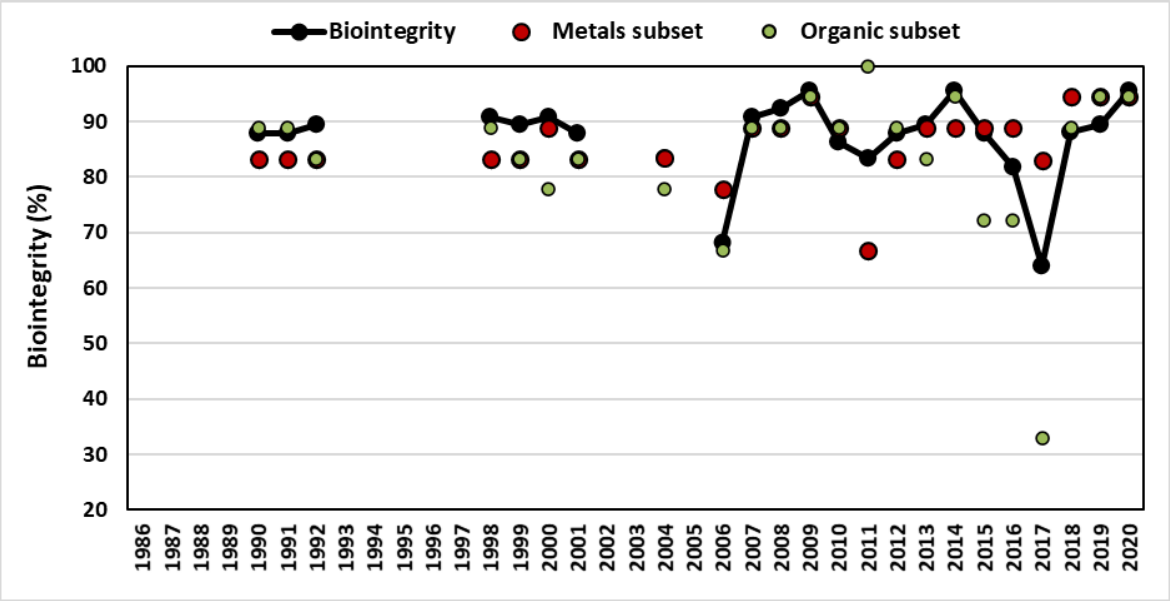
Photo 2. CFR at Gemback Rd. New Station 08 riffle in 2020 (left) and looking upstream of the bridge into the remediation area (right).

4.5.6 Clark Fork River at Sager Lane (Station 8.5)

The Clark Fork River at Sager Lane was significantly impaired from nutrient stressors during 2017 but has rebounded to slightly impaired in 2018 and 2019 and was ranked non-impaired in 2020 (95 percent) with no probable stressors (**Figure 18**). Prior stressors at this site were consistent with slight nutrient pollution in 2018 (88 percent) and significant nutrient stress in 2017 (32 percent) (**Figure 18**). Due to the high spring flows in 2018 and 2019, benthic cobbles have been thoroughly flushed of sediments and we observed a lower biomass of filamentous algae. The 2020 BMI metrics did not reflect any metals toxicity, although a "significant" fish kill was reported shortly after we sampled in 2019 approximately 15 miles upstream near Galen Lane (Cook 2019).

This stream reach has been monitored on 23 occasions since 1990; annually since 2006; the mean bioassessment score during this time is 87 percent (**Table 7**). Habitat in this reach varies annually because of local bank erosion, mobile substrates, and diversion structures. The sampling site was moved downstream from the bridge in 2012 because of channel instability at the upstream site. The site was also moved in 2006 because the original riffle was backwatered by an irrigation structure. Sediment load and dewatering contribute to impacts at this site and downstream sites. The Clark Fork River at Sager Lane was severely dewatered during August 2016.

Figure 18. Macroinvertebrate Community Biointegrity in the CFR at Sager Lane (Station 8.5), 1990 to 2020.



4.5.7 Clark Fork River at Deer Lodge (Station 09)

In 2020, the biointegrity of the BMI community at this site was ranked slightly impaired (82 percent) and has decreased from 89 percent in 2019 with nutrients as the probable stressor (**Figure 19**). The CFR at Station 09 had the lowest biointegrity score among all monitored sites in 2017; biological integrity was classified as moderately impaired (56 percent). Environmental stress on the macroinvertebrate community resulted from extensive nutrients (33 percent) and probable metals pollution (78 percent) (**Figure 19**).

The Clark Fork River in Deer Lodge typically has the lowest biointegrity (mean 68 percent) among all the CFR sites and has been classified as impaired in all but one annual assessment (**Table 7, Figure 19**). Moderate biological impairment was indicated on 17 dates, most recently in 2017. Slight biological

impairment was indicated for 13 years. This site was rated as unimpaired in 2009, but biological integrity has declined over the past 8 years.

Nutrient and/or organic pollution is implicated as the primary stressor at the Deer Lodge site. Total soluble reactive phosphorous and total nitrogen have been increasing for the last decade (Hydrosolutions, 2014). For the period of record, mean values of diagnostic metrics indicated moderate nutrient pollution (58 percent). Significant environmental stress from nutrient enrichment has been indicated for 30 years, and in 2017, reached the highest impairment levels since 2003 (**Table 9, Figure 19**). Extensive growth of the filamentous algae *Cladophora* are common at this site, especially during low-flow years (see Stagliano 2019); high stream flows of 2018 have scoured this site clean of algae but by 2020, the 'filamentous green covering' is beginning to return (**Photo 3**). Metals pollution was indicated as a stressor on 15 sampling occasions, but only once since 2006 (**Figure 19, Table 8**).

Figure 19. Macroinvertebrate Community Biointegrity in the Clark Fork River at Deer Lodge (Station 09), 1986 to 2020.

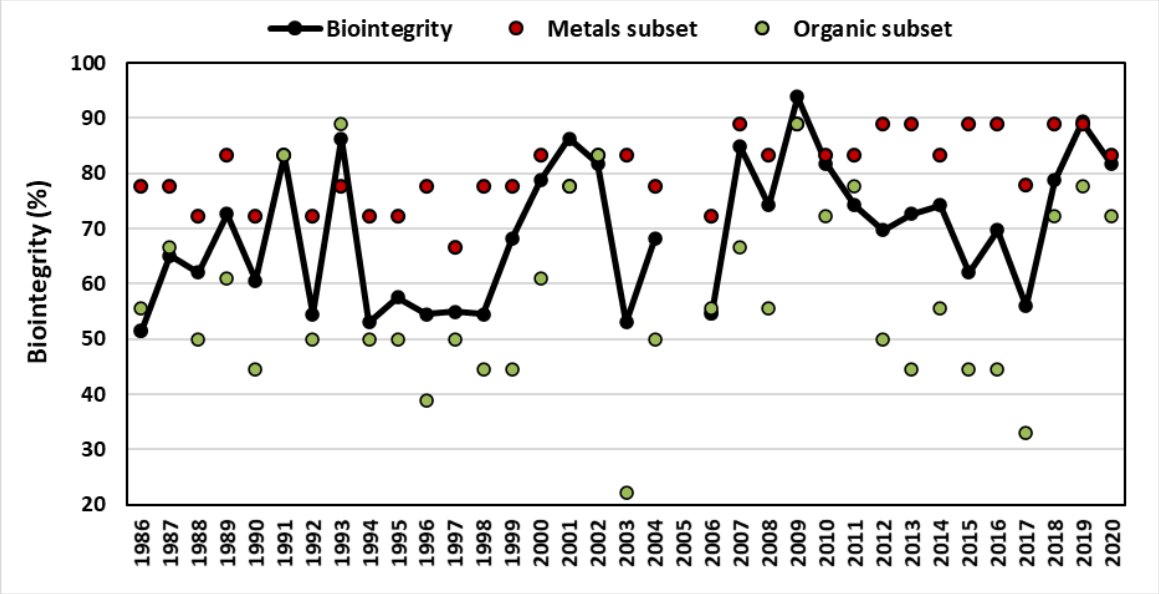


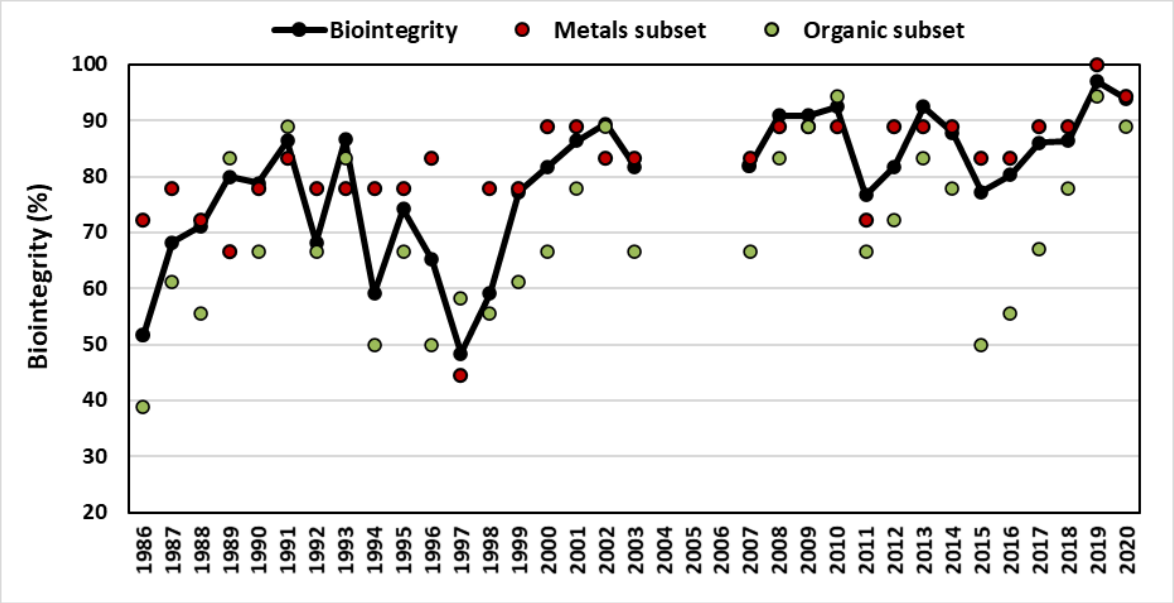
Photo 3. CFR at Deer Lodge in 2020 showing increasing filamentous algae.

4.5.8 Clark Fork River above Kohrs Bend Fishing Access (Station 10)

The Clark Fork River at Kohrs Bend FAS was classified as non-impaired in 2020 with the 4th highest biological integrity score (94 percent) reported across all sites in the study (**Figure 20**).

Annual biological integrity estimates have varied widely in the lower Deer Lodge Valley, but generally the biological conditions have been gradually trending upwards (**Figure 20**). Significant impairment was evident on many monitoring dates prior to 1999 but has not been exhibited since then. From 1986 through 1998, biointegrity averaged 69 percent, and diagnostic metrics indicated nutrient (63 percent) and metals (74 percent) impacts. Since 1986, nutrient pollution has been evident on 20 of 32 dates (60% of the time) and was classified as moderate or severe on seven occasions. Metals-related impacts were indicated on 12 dates between 1986 and 1999. The 1997 assessment score (48 percent) and metals impairment score (44 percent) were the lowest recorded among CFR monitoring stations. Slight metals impacts were indicated following high flows in 2011, but not again in 2018 (**Figure 20**).

Figure 20. Macroinvertebrate Community Biointegrity in the CFR above Kohrs Bend FAS (Station 10), 1986 to 2020.

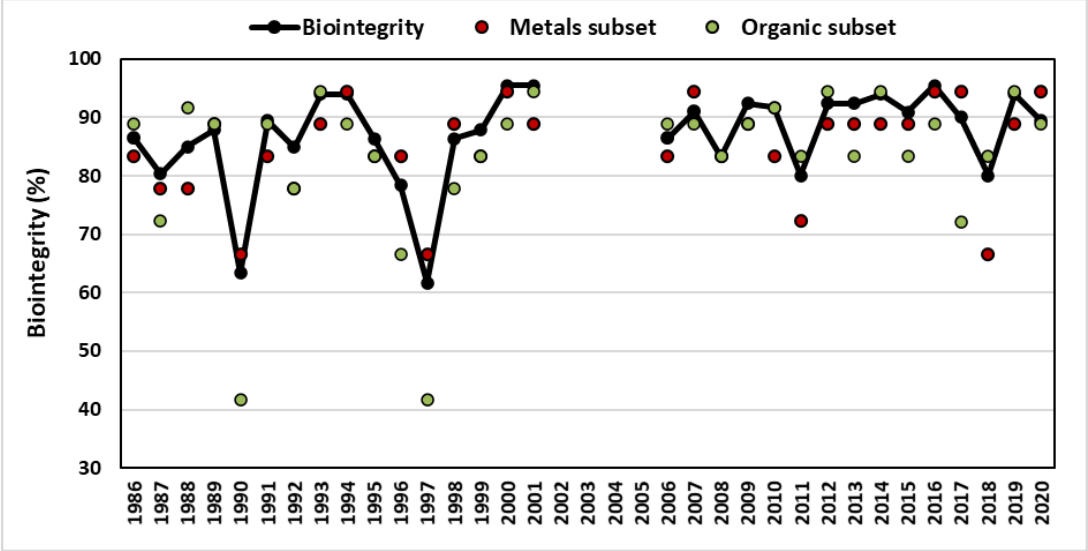


4.5.9 Clark Fork River at Gold Creek Bridge (Station 11)

The CFR below Gold Creek was ranked slightly impaired (89 percent) in 2020 (**Figure 21**). Nutrients were the probable stressor impairing the biointegrity of this site in 2020; metals impacts were the previously reported stressor in 2018 and in 2011 (**Figure 21**).

During the past 34 years, this site was classified as impaired in 18 of the 34 annual assessments. Impacts were generally slight, although moderate impairment was indicated during 1990 and 1997. Large fluctuations in biointegrity have moderated in the last decade and the site has been mostly scored as unimpaired (Figure 20). Nutrient pollution was evident in 2017 and six-times during monitoring between 1986 and 1998 (see **Table 8**). Metals impairment was more common prior to 2000, but only twice in the past 20 years (**Figure 21**). Significant metal impacts were indicated following springs with above average run-off in 1990, 1997, 2011 and again in 2018.

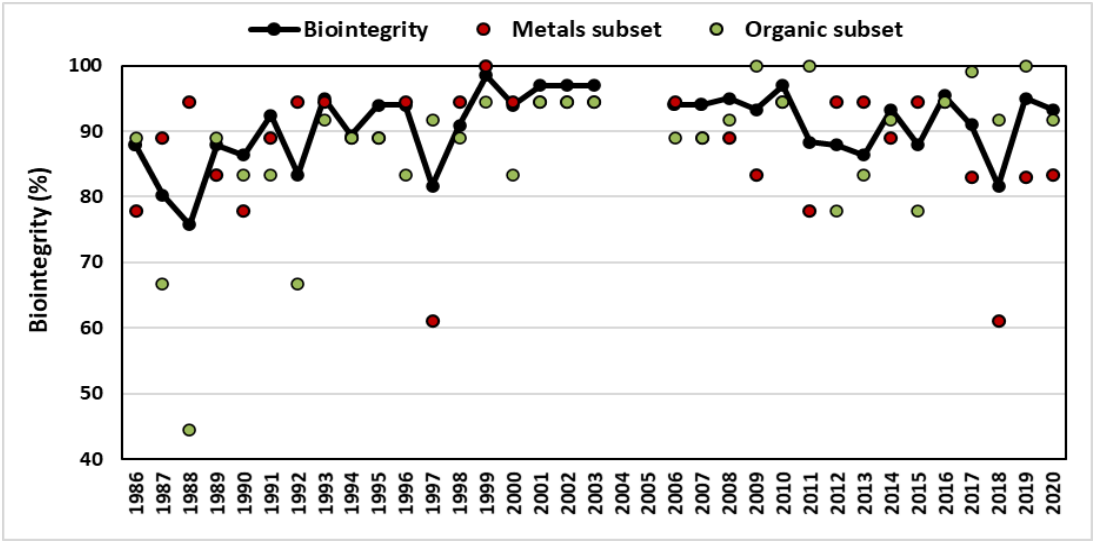
Figure 21. Macroinvertebrate Community Biointegrity in the CFR at Gold Creek Bridge (Station 11), 1986 to 2020.



4.5.10 Clark Fork River at Turah Fishing Access (Station 13)

The CFR at Turah Fishing Access site was classified as non-impaired in 2020 (93 percent) and 2019 (95 percent), improving from a slightly impaired rank (82 percent) in 2018 with metal toxicity being the probable environmental stressor (**Figure 22**). MTI scores reported in 2019 (3.2) were the lowest of the 2001-2020 period (**Table 5**). This site frequently has the highest biological integrity in the CFR and based on long-term mean biointegrity (91 percent), is the only CFR station classified as non-impaired (**Table 7**). On six occasions from 1986 through 1992, the CFR at Turah was classified as slightly impaired (**Figure 22**). Metals impairment has been probable during years with the highest peak flows and suspended sediment loads. Metals impairment was indicated in 1986, 1990, 1997, 2011, and again in 2018 (**Figure 22**). Nutrient-related impacts were indicated on five dates, but only twice (2012 and 2015) in the past two decades.

Figure 22. Macroinvertebrate Community Biointegrity in the Clark Fork River at Turah (Station 13), 1986 to 2020.

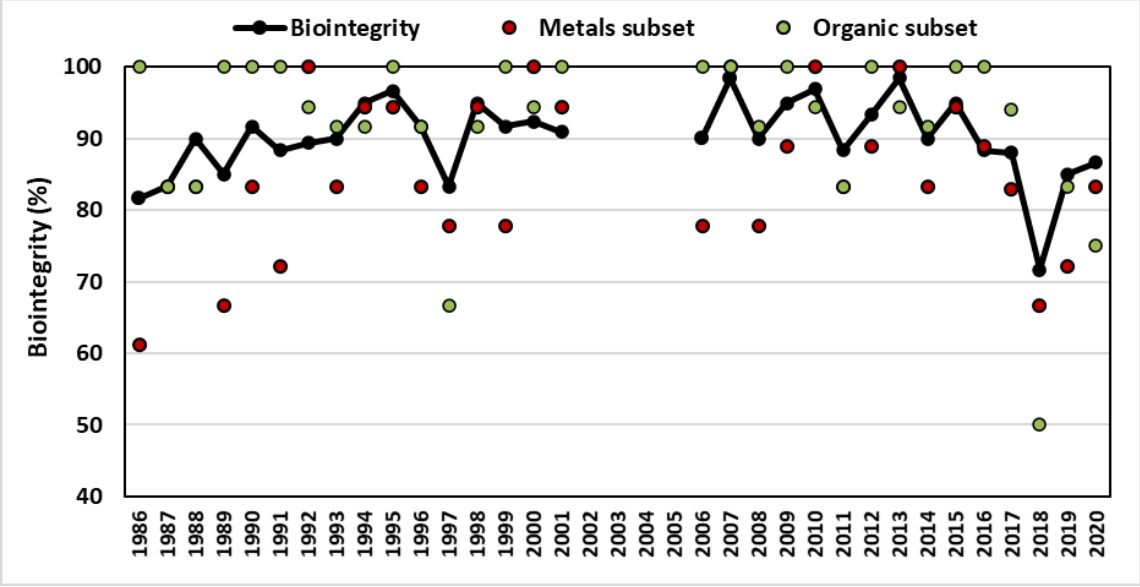


4.5.11 Blackfoot River near USGS Gauge (Station 14)

The most recent BMI assessment in 2020 indicated slight biological impairment (87 percent) from probable nutrient stressors (75 percent); this is a switch from the last 2 years reporting significant metals pollution (**Table 6, Figure 7, Figure 23**). A low taxa richness, high biotic index score (4.4), the dominance of Hydropsychid caddisflies/filterers, and a paucity of mayflies are community metrics indicating probable nutrient impairment contributing to low biointegrity in 2020 (**Table 5**). The macroinvertebrate assemblage in the lower Blackfoot River is characterized by high diversity, but relatively low density (**Table 5**). The BMI community is considerably different from those observed in other Clark Fork River sites.

Biointegrity scores in 2018 (72 percent) represented the lowest in the 34-year history of monitoring this 'reference' site and it continues a declining trend which began in 2016 (**Figure 23**). Biological integrity estimates averaged 91 percent over the initial 29 years of monitoring (**Table 7**), but only 83 percent for the last 5 years (**Figure 10**). Based on long-term mean scores for diagnostic metrics, neither nutrients (93 percent), nor metals (86 percent) pollution is consistently indicated for the lower Blackfoot River. However, metals impairment was indicated in 2018 and 2019, and in seven other monitoring years; correspondingly, overall biological impairment was exhibited by the BMI on five of those eight dates (**Figure 23**). Declining numbers of the mayfly family, Heptageniidae over the last 5 years is also indicative of possible metal stresses (**Figure 6**). Elevated water temperatures, fine sediment accumulation during low discharge, and bed scour during high-flow events are the most probable non-metal stressors to the aquatic community in this reach.

Figure 23. Macroinvertebrate Community Biointegrity in the Blackfoot River near Mouth (Station 14), 1986 to 2020.



4.5.12 Clark Fork River at ShaRon FAS above Missoula (Station 15.5)

The monitoring site at the ShaRon FAS in East Missoula was ranked non-impaired in 2020 with 94 percent biointegrity score (**Figure 24**). This site was ranked slightly impaired in 2019 (87 percent) due to nutrient stresses (67 percent), increasing from lower biointegrity scores during 2018 (78 percent), likely a result of metals impairment (67 percent) (**Figure 7, Figure 24**).

This site is the nearest monitoring station below the former Milltown Dam site (**Photo 4**). Following dam breeching in March 2008, an estimated 370,000 tons of sediment were transported from the reservoir through this reach. Benthic habitat was altered by scour and sand deposition. Nevertheless, the 2008 macroinvertebrate assessment indicated only minor impacts from dam breeching (McGuire, 2009). Large volumes of sediment were transported through this reach for several years after the removal of Milltown Dam. Since 2015, riffle cobbles have been less embedded and supported more diverse BMI, periphyton and moss than during the previous years; 2020 reported one of the highest ever total taxa richness (50 taxa) and the highest EPT taxa richness value (31 taxa) ever reported (**Table 5**). Relative abundance of Heptageniidae (typical taxa, *Epeorus albertae*, *Rhithrogena* and *Heptagenia*) at this site are still averaging less than 2.0 percent per sample (**Figure 6**), indicating some possible residual metal stressors.

Monitoring has been conducted at this site on 30 occasions since 1989. The CFR above Missoula was classified as non-impaired on 13 dates and slightly impaired on 17 occasions (**Figure 24**). Nutrient pollution was the most frequently detected environmental stress and was evident on 13 occasions. Slight metal impacts were indicated on four dates; these biological impairments detected in 2008 and 2018 was probably caused by sediment scour rather than metals toxicity. During the past 9 years (except 2018 and 2019), this site has had the highest biointegrity of the CFR study sites (**Figure 24**).

Figure 24. Macroinvertebrate Community Biointegrity in the CFR at ShaRon FAS (Station 15.5), 1989 to 2020

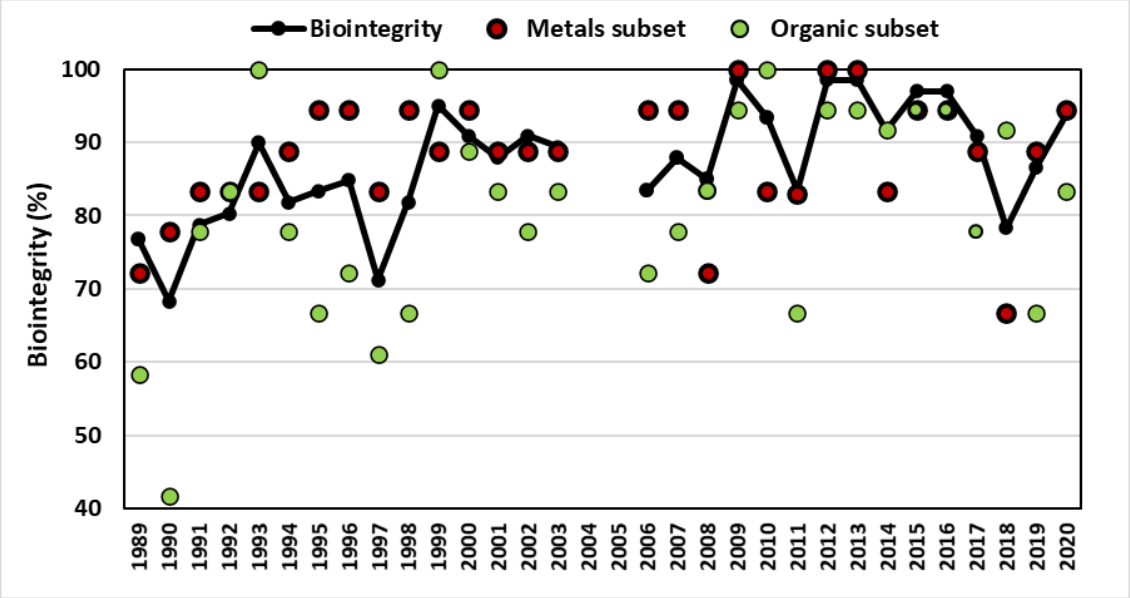


Photo 4. CFR at ShaRon FAS Station 15.5 cobble riffle looking upstream in 2020 (left) and 2019 (right).

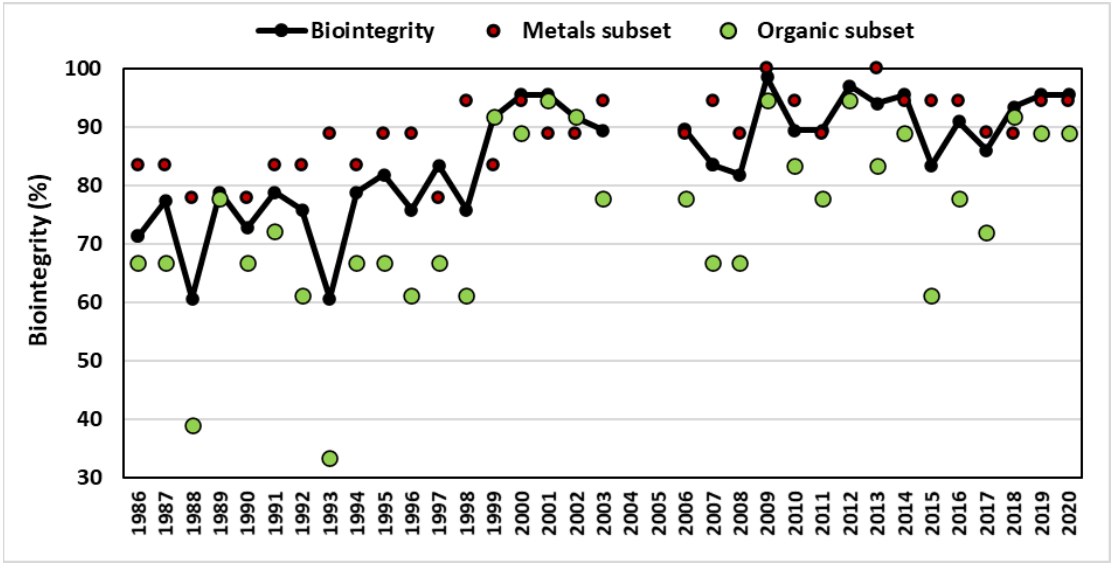
4.5.13 Clark Fork River below Missoula at Kona Bridge (Station 20)

The Kona Bridge FAS was classified as non-impaired (95 percent) again in 2020, as in 2019; no evidence of either nutrient or metals impairment was reflected in the BMI community (**Figure 25**).

This station is located downstream of Missoula and the confluence of the Bitterroot River (**Figure 2**). The CFR is considerably larger in this reach and both the physical environment and water quality are quite different from upstream reaches. In 2006, the monitoring station was moved upstream approximately 2 miles, from Harper's Bridge to the Kona Road Fishing Access. The results for the Kona Road site (2006-2020) are similar to Harper's Bridge from 1999 through 2003 (Appendix C-12).

The CFR below Missoula was impaired by nutrients on all dates from 1986 through 1998 (**Figure 25**). During this period, biointegrity averaged 75 percent, while the mean nutrient/organic and metals subset scores were 62 and 84 percent, respectively. Biological integrity improved to non-impaired in 1999 and has remained relatively high during subsequent monitoring (avg. 91 percent) (**Figure 25**). During the last decade, biological integrity averaged 90 percent and the nutrient/organic subset score averaged 80 percent. Significant nutrient impairment has been indicated at this site for 7 of the past 15 years (**Figure 25**).

Figure 25. Macroinvertebrate Community Biointegrity in the CFR below Missoula (Station 20), 1986 to 2020



SECTION 5

Conclusions

5.1 2020 Assessments

1. In 2020, the overall biointegrity average across all 13 sites was 90 percent; this is the 3rd highest ever reported for 34 years of the study. The 2020 BMI assessments documented above average biointegrity scores at 10 of the 13 sites, with notable improvements in SBC and upper CFR scores During 2020, biological integrity ranked seven monitoring sites as non-impaired, six sites slightly impaired, and zero were moderately impaired. Assessment scores ranged from 77 to 97 percent.
2. Record high spring flows in 2018, followed by above average discharge in 2019 and 2020, have played a significant role in mobilizing cobbles causing a reduction in filamentous algae, flushing silts from gravels, reshaping riffles and reducing invertebrate densities at many of the main stem CFR sites; thus, the composition of many BMI assemblages has been restructured reducing the numbers of many silt-tolerant taxa, such as worms and midges.
3. The most recent macroinvertebrate-based assessments have indicated continued nutrient stress at some CFR sites in the Deer Lodge Valley (Stations 07 and 09), and in SBC below Warm Springs (Station 4.5); 4 of 5 CFR stations from Kohrs Bend to Kona Bridge downstream of Missoula, except for Gold Creek (11), ranked non-impaired.
4. Environmental conditions in the upper Silver Bow watershed are improving with above average biological integrity in 2020 but are still being plagued with slightly impaired BMI communities with metal-related stressors at Opportunity (Station 2.5) and nutrient stressors below Warm Springs (Station 4.5). Two years ago, the biological integrity at 2.5 scored non-impaired (91 percent) for the first time since monitoring began. Metrics considered responsive to metals pollution continued to show improvement at this site, while nutrients are now the causal stressor to the BMI communities.
5. All four CFR sites in the Deer Lodge Valley vastly improved their biointegrity scores from 2018 to 2020, compared to 2017; these scores were, on average, 21 percentage points higher than 2017 scores (avg. 71 percent). Surprisingly, the 2020 BMI metrics at CFR sites 08 or 8.5 did not reflect any metals stressors, despite a “significant” fish kill being reported in the Fall of 2019 near Galen Lane, approximately 7 and 15 river miles upstream, respectively.
6. The assessment metrics indicate that nutrient pollution is still the causal environmental stressor at sites ranked impaired in the Deer Lodge Valley (sites 07 and 09). Even though above average stream flows during 2020 and 2019 have greatly reduced environmental stress caused by low flows and nutrients, they are still having a negative effect on the aquatic communities.
7. Biological integrity was non-impaired and above average at 6 of 9 Clark Fork River stations (Stations 08, 8.5, 10, 13, 15.5 and 20). The CFR at Gold Creek (Station 11) which usually has non-impaired biointegrity scores was ranked slightly impaired.
8. Significant metals pollution was not evident at any Clark Fork River monitoring station during 2020; this is a reduction from three metals impaired sites in 2018. Metal impacts were indicated as the probable stressor at the Blackfoot River (Station 14) in both 2018 and 2019.

5.2 Long-term Monitoring

1. Biological integrity has improved in upper SBC over the past decade. Biological communities experienced accelerated recovery during the past 4 years as remediation of the SBC floodplain was completed. Metals pollution has diminished significantly, and BMI have become more abundant and diverse. However, nutrient-related impacts have now become more evident in recent assessments as metals toxicity subside. Continued improvement may be dependent on further reductions in nutrient loads. Additional water treatment at the Butte WWTP may further improve water quality and biological integrity in SBC.
2. The Warm Springs Ponds continue to sequester metals and protect lower Silver Bow Creek from recontamination. During the 1990s, biological integrity in SBC below the Warm Springs Ponds improved from severely to slightly impaired. However, mean biological integrity declined at this site from 2004 through 2013. BMI assessments have indicated moderate impairment because of increased eutrophication of the Warm Springs Ponds. These impacts were probably the result of seasonal pulses of high pH and ammonia- and/or arsenic-rich water leaving the ponds. The magnitude and duration of these impacts varies from year to year and are likely influenced by the degree of water column mixing and flow rates.
3. Biological integrity improved in the Clark Fork River Basin below the Warm Springs Ponds during the 1990s. Improvement coincided with the completion of a series of remedial actions to control metals in the upper basin and implementation of a basin-wide voluntary nutrient reduction program.
4. The Clark Fork River below the former Milltown Dam site has fully recovered from short-term negative impacts associated with sediment transport and scour. The CFR at ShaRon FAS (Station 15.5) has reported the highest biointegrity scores in the monitoring program during the last decade (avg. 92 percent); although, 2018 and 2019 scored slightly impaired.
5. Portions of the Clark Fork River remain susceptible to metals impacts during high-flow years, likely from “slickens”. Significant impacts characteristic of metals pollution were evident following floods in 1997, 2011 and 2018. Probable impairment by metals loading was evident at four sites in 1997 (Deer Lodge to Turah), four sites in 2011 (Sager Lane to Gold Creek) and 3 sites in 2018 (Gold Creek to East Missoula). Surprisingly, the 2020 BMI metrics at CFR sites 08 or 8.5 did not reflect any metals toxicity, although a “significant” fish kill was reported in the Fall of 2019 near Galen Lane, approximately 7 and 15 miles upstream, respectively.
6. Metals pollution has been significantly reduced in the CFR over the past 25 years and is no longer the overarching environmental factor limiting BMI communities. Although, residual metals effects appear to be limiting the recolonization and proliferation of the mayfly family Heptageniidae across the upper CFR basin. Metals-related impacts have not been evident in the CFR BMI between the high flow years of 2011 and 2018 and were detected at only two Clark Fork River sites from 2000 through 2010.
7. Excessive nutrients remain a significant and widespread pollutant in the upper CFR Basin. Biological impacts related to nutrients were routinely detected in SBC and most of the upper CFR. Eutrophic conditions were most evident during periods of low streamflow.
8. Floods and droughts profoundly affect aquatic communities in the CFR, often by exacerbating existing anthropogenic stressors. Drought-related, low-flow and warm-water stresses contributed to a slight, but widespread, decline in assessment scores from 2002 through 2007 and 2015 to 2017. Streambed scour, gravel redistribution, sediment flushing, and metals mobilization has influenced the BMI assessments in 1997, 2011 and 2018 when stream discharge was highest.

SECTION 6

Literature Cited

CDM. 2005. *Five-Year Review. Second Five-Year Review Report for Silver Bow Creek/Butte Area Superfund Site*. Silver Bow and Deer Lodge Co., Montana. Prepared for U.S. Environmental Protection Agency, Region 8. Helena, Montana.

Chatham, J.R. 2011. *Chemical Cycling and Nutrient Loading at Warm Springs Ponds (MT)*. Atlantic Richfield Company. Butte, Montana.

Clements, W. H. 1991. Community Responses of Stream Organisms to Heavy Metals: A Review of Observational and Experimental Approaches. *Metal Ecotoxicology: Concepts and Applications*. Lewis Publishers.

Clements, W. H., D. S. Cherry, and J. Cairns. 1988. Impact of Heavy Metals on Insect Communities in Streams: A Comparison of Observational and Experimental Results. *Can. J. Aquat. Sci*. 45:2017-2025.

Cook, N. September 2019. Montana Public Radio Report: https://www.ypradio.org/post/biologists-suspect-mine-waste-clark-fork-fish-kill#stream/0

Dodds, W.K., V.H. Smith, B. Zander. 1997. Developing nutrient targets to control benthic chlorophyll levels in streams: A case study of the Clark Fork River, Water Research, Volume 31 (7); 1738-1750.

Harris, T.L. and T.M. Lawrence. 1978. *Environmental Requirements and Pollution Tolerance of Trichoptera*. EPA-600/4-78-061. U.S. Environmental Protection Agency.

Hilsenhoff, W. L. 1987. "An Improved Biotic Index of Organic Stream Pollution." *Great Lakes Entomologist*. 20:31-39.

Hornberger, M.I., Luoma S.N., Johnson M.L., and M. Holyoak. 2009. Influence of remediation in a mine-impacted river: metal trends over large spatial and temporal scales. Ecol. Applic. 19(6): 1522-1535

Hubbard, M.D. and W.L. Peters. 1978. *Environmental Requirements and Pollution Tolerance of Ephemeroptera*. EPA-600/4-78-061. U.S. Environmental Protection Agency.

HydroSolutions. 2014. Clark Fork River Water Quality Trends Report 1998–2012. Helena, MT. Prepared for Montana Department of Environmental Quality, Helena, MT and Avista Corporation, Spokane, WA.

Ingman, G. L. and M. A. Kerr. 1989. *Water Quality in the Clark Fork River Basin, Montana: State Fiscal Years 1988-1989*. Montana Department of Health and Environmental Sciences, Water Quality Bureau.

Ingman, G. L., M. A. Kerr and D.L. McGuire. 1990. *Water Quality Investigations in the Blackfoot River Drainage, Montana*. Montana Dept. of Health and Environmental Sciences, Water Quality Bureau.

ISSI Consulting Group. 1999. *Clark Fork River Ecological Risk Assessment*. Public review draft prepared for U.S. Environmental Protection Agency, Region 8. Denver, Colorado.

Leland, H. V., S. V. Fend, T. L. Dudley, and J. L. Carter. 1989. "Effects of Copper on Species Composition of Benthic Insects in a Sierra Nevada, California, Stream." *Freshwater Biol*. 21:361-365.

Lipton, J., Bergman, H., Chapman, D., Hillman, T., Kerr, M., Moore, J. and Woodward, D. 1995. Aquatic Resources Injury Assessment Report, Upper Clark Fork River Basin. Prepared by RCG/Hagler Bailly, Inc. for the State of Montana, Natural Resource Damage Litigation Program.

Lynch, T. R., C. J. Popp, and G. Z. Jacobi. 1988. "Aquatic Insects as Environmental Monitors of Trace Metal Contamination: Red River, New Mexico." *Water Air Soil Pollution*. 42: 19-31.

McGuire D. L. 2017. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments in 2016.* Technical report prepared for CH2M HILL, Inc. Boise, Idaho.

McGuire, D. L. 1993. *Clark Fork River Macroinvertebrate Community Bio-integrity, 1986 through 1992*. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

McGuire, D. L. 1992. *Montana Reference Streams Project: 1991 Aquatic Macroinvertebrate Surveys*. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

McGuire, D. L. 1990a. "Aquatic Macroinvertebrate Surveys in the Clark Fork River, 1986 to 1988." *Clark Fork River Symposium Proceedings*. Mont. Acad. Sci. Missoula Montana.

McGuire, D. L. 1990b. *Aquatic Macroinvertebrate Survey of the Blackfoot River, Montana: August 1988 and 1989*. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

McGuire, D. L. 1989a. *Clark Fork River Aquatic Macroinvertebrate Survey, August 1987*. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

McGuire, D. L. 1989b. *Clark Fork River Aquatic Macroinvertebrate Survey, August 1988*. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

McGuire, D. L. 1987. *Clark Fork River Macroinvertebrate Study, 1986*. Technical report prepared for the Montana Governor's Office and Montana Water Quality Bureau.

Merritt, R. W. and K.W. Cummins. 1984. *An Introduction to the Aquatic Insects of North America*. 2nd Ed. Kendall/Hunt Publishing Co. Dubuque, Iowa.

Montana Dept. of Environmental Quality. 1996. *Field Procedure Manual: Collection, Analysis and Reporting of Water Quality Samples*. Water Quality Division.

MultiTech and OEA Research. 1986. *Silver Bow Creek Remedial Investigation, Appendix E - Macroinvertebrate Investigation*. Montana Dept. of Health and Environmental Sciences.

Nelson, S.M. and Roline, R.A. 1993. Selection of the mayfly *Rhithrogena hageni* as an indicator of metal pollution in the Upper Arkansas River. Journal of Freshwater Ecology 8(2):111-119.

Pioneer Technical Services. 2002. Clark Fork River Operable unit, public review draft feasibility study report. Milltown Reservoir sediments NPL Site, prepared for ARCO Environmental Remediation, L.L.C. (AERL). Pioneer Technical Services, Butte, Montana, USA.

PBS&J. 2009. *Water Quality Status and Trends in the Clark Fork-Pend Oreille Watershed Time Trends Analysis for the 1984-2007 Period.* Prepared for Tri-State Water Quality Council. Sandpoint, Idaho.

Plafkin, J. L., M. T. Barbour, K. D. Porter, S. K. Gross, and R. M. Hughes. 1989. *Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish*. U.S. EPA/444/4-89-001.

RESPEC. 2017. Monitoring Report for 2016 Clark Fork River Operable Unit. Prepared for the Montana Department of Environmental Quality | Remediation Division.

Rolin, R. A. 1988. "The Effects of Heavy Metal Pollution of the Upper Arkansas River on the Distribution of Aquatic Macroinvertebrates." *Hydrobiologia.* 160:3-8.

Spindler, J. C. 1959. *An Extensive Chemical, Physical, Bacteriological, and Biological Survey - Columbia River Drainage in Montana*. Water Pollution Control Report No. 59-1, Montana State Board of Health.

Suplee, Michael W., Vicki Watson, Mark E. Teply, and Heather McKee. 2009. How Green Is Too Green? Public Opinion of What Constitutes Undesirable Algae Levels in Streams. Journal of the American Water Resources Association. 45(1): 123-140.

Tri-State Water Quality Council. 2009. *The Clark Fork Voluntary Nutrient Reduction Program. Final Report.* Tri-State Water Quality Council. Sandpoint, Idaho.

Weber, C. I. (ed). 1973. *Biological Field and Laboratory Methods for Measuring the Quality of Surface Waters and Effluents*. U.S. Environmental Protection Agency. Cincinnati, Ohio. (670/4-73-001).

Wiederholm, T. 1984. "Responses of Aquatic Insects to Environmental Pollution." *The Ecology of Aquatic Insects*. Praeger Publ. New York.

Winner, R. W., M. W. Boessel, and M. P. Farrel. 1980. "Insect Community Structure as an Index of Heavy-Metal Pollution in Lotic Ecosystems." *Can. J. Fish. Aq. Sci*. 37:647-55.

Yasuno, M., S. Hataeyama, and Y. Sugaya. 1985. "Characteristic Distribution of Chironomids in Rivers Polluted with Heavy Metals." *Verh. Int. Ver. Limnol*. 22:2371-2377.

Appendix A
Taxonomic Checklist and Tolerance Values

Appendix A. Aquatic macroinvertebrates collected from the Clark Fork River Basin during August, 1986-2020 and tolerance values used to calculate biotic and metals tolerance indices.

Class	Order	Family	Genus	species		Biotic index		Metals Tolerance	Present in 2020
INSECTA									
	Coleoptera								
		Dytiscidae				7			
			Agabetes sp.						
			Agabinus sp.						
			Agabus sp.						
			Stictotarsus sp. (Deronectes)						
			Hydroporus sp.						
			Hydrovatus sp.						
			Hygrotus sp.						
			Illybius sp.						
			Oreodytes spp.						**x**
		Elmidae							
				Cleptelmis ornata		4		4	**x**
				Dubiraphia sp.		6		4	
				Heterlimnius corpulentus		3		3	
				Lara avara		1		1	
				Microcylloepus cf. pusillis		5		4	**x**
				Narpus concolor		2		1	
				Optioservus spp.		5		5	**x**
				Ordobrevia nubifera		5		3	**X (15.5, 20)**
				Stenelmis sp.		5		3	
				Zaitzevia parvula		4		3	**x**
		Haliplidae				5		7	**x**
			Brychius sp.						
			Haliplus sp.						
			Peltodytes sp.						
		Hydrophilidae				7			
	Plecoptera								
		Capniidae				1		0	
		Chloroperlidae							
			(Chloroperlinae)			1		2	**x**
			Kathroperla perdita			1		2	
			Sweltsa sp.			0		2	**x**
		Nemouridae							
			Amphinemura sp.			2		1	
			Zapada cinctipes			3		3	**x (07)**
			Zapada oregenensis gp.			2		2	
			Malenka sp.			1		1	**x (07)**
		Perlidae							
			Calineuria californica			2		3	**x**
			Claassenia sabulosa			3		3	**x**
			Doroneuria theodora			1		3	**X (BF14)**
			Hesperoperla pacifica			1		3	**x**

Appendix A. continued.

	Order	Family	Genus	species		Biotic index		Metals tolerance	Present in 2020
	Plecoptera (continued)								
		Perlodidae							
				Cultus sp.		2		2	
				Isoperla fulva		2		3	**x**
				Isoperla quinquepunctata		2		2	
				Isogenoides sp.		3		2	**x**
				Megarcys sp.		1		1	
				Skwala sp.		3		3	**x**
		Pteronarcidae							
				Pteronarcella badia		3		4	**x**
				Pteronarcys californica		2		1	**x**
		Taeniopterygidae				2		1	
	Diptera								
		Chironomidae							
			Tanypodinae						
				Ablabesmyia sp.		8		3	
				Macropelopia sp.		6		5	
				Nilotanypus sp.		6		3	
				Thienemannimyia gp.		5		3	**x**
				Pentaneura sp.		6		2	**x**
				Procladius sp.		9		5	
				Radotanypus sp. [Alotanypus,		6		8	
			Diamesinae						
				Diamesa sp.		5		9	**x**
				Pagastia sp.		1		9	**x**
				Potthastia gaedii gp.		2		5	**x**
				P. longimanus gp.		2		5	
				Sympotthastia sp.		2		4	
			Prodiamesinae						
				Monodiamesa sp.		7		5	
				Odontomesa sp.		4		5	
				Prodiamesa sp.		3		3	
			Orthocladinae						
				Brillia sp.		4		4	
				Cardiocladius spp.		5		9	**x**
				Corynoneura sp.		7		4	**x**
				Cricotopus spp.		7		10	**x**
				C. (Nostococladius) sp.		6		5	**x**
				Eukiefferiella spp.		8		9	**x**
				E. (devonica) gp.		8		7	
				Heleniella sp.					
				Hydrobaenus sp.		8			
				Lopescladius sp.		2			
				Nanocladius sp.		3		4	
				Orthocladius spp.		6		5	**x**
				Parametriocnemus sp.		5		4	**x**
				Paraphaenocladius sp.		4		4	**x**
				Parakiefferiella		8		4	**x**
				Rheocricotopus sp.		4		5	**x**
				Symbiocladius sp.		4		1	

Appendix A. continued.

class	Order	Family	Genus	species	Biotic index	Metals tolerance	Present in 2020
	Diptera (continued)						
				Synorthocladius sp.	2	1	
				Thienemanniella sp.	6	4	
				Tvetenia sp.	5	4	**x**
			Chironominae				
			Chironomini				
				Chironomus sp.	10	7	
				Cryptochironomus sp.	8	5	**x**
				Demicryptochironomus sp.	8	4	
				Dicrotendipes sp.	8	5	**x**
				Endochironomus sp.	10	6	
				Glyptotendipes sp.	10	4	
				Harnishia sp.			
				Microtendipes sp	6	4	**x**
				Parachironomus sp.	10	4	
				Paracladopelma sp.	7	4	
				Phaenopsectra sp	7	4	**x**
				Polypedilum spp.	6	4	**x**
				Pseudochironomus sp.	5	4	
				Robackia sp.	7	4	
				Stenochironomus sp.	5	4	
				Stictochironomus sp.	5	4	
				Xenochironomus sp.	4	0	
			Tanytarsini				
				Cladotanytarsus sp.	7	3	
				Krenopsectra sp.	4	1	
				Micropsectra spp.	4	1	**x**
				Paratanytarsus sp.	6	3	
				Stempellina sp.	2	0	
				Stempellinella sp.	2	0	**x**
				Sublettia sp.	2	0	**x**
				Rheotanytarsus sp.	6	1	**x**
				Tanytarsus sp.	6	3	**x**
		Tipulidae					
				Antocha sp.	3	4	**x**
				Dicranota sp.	3	2	**x**
				Hesperoconpa sp.	1	1	
				Hexatoma sp.	2	2	**x**
				Limnonia (?) sp.	3	2	
				Limnephila sp.	3	3	
				Ormosia (?) sp.	6	3	
				Tipula sp.	4	3	**x**
				Rhabdomastix sp.	1	1	
		Athericidae					
				Atherix pachypus	4	4	**x**
		Simuliidae					
				Simulium (Eusimulium) spp.	5	5	**x**
				Simulium vittatum complex (P	7	7	**x**
				Simulium spp.	6	6	**x**

Appendix A. continued.

class	order	family	genus	species		Biotic index		Metals tolerance	Present in 2020
	Diptera (cont.)								
		Empididae							
				Chelifera sp.		5		4	**x**
				Clinocera sp.		5		4	
				Hemerodromia sp.		6		4	**x**
		Tanyteridae							
				Protanyderus sp.		5		1	**x (CFR13)**
		Muscidae							
				Limnophora sp.		6		7	**x**
		Ceratopogonidae							
				Certatopogoninae		6		4	**x**
		Dolichopodidae				4		4	
		Tabanidae				6		3	
		Stratiomyidae							
				Euparyphus sp.		7		4	
		Psychodidae							
				Pericoma sp.		4		4	
		Dixidae							
				Dixa sp.		4			
	Hemiptera								
		Corixidae						5	
				Cenocorixa sp.					
				Hesperocorixa laevigata					
				Sigara sp.					
		Saldidae							
				Salda sp.					
	Lepidoptera								
		Pyralidae							
				Petrophila sp.		5		3	**x**
		Notoridae							
	Megaloptera								
		Sialidae							
				Sialis sp.		4		4	
	Odonata								
		Gomphidae							
				Ophiogomphus sp.		5		4	**x**
		Ceonagrionidae							
				Ischnura sp.		8		4	
				Enallagma sp.		7		3	
	Ephemeroptera								
		Baetidae							
				Acentrella spp.		4		4	**x**
				A. insignificans		4		4	**x**
				A. turbida		4		3	**x**
				Baetis bicaudatus		2		4	
				Baetis tricaudatus		4		5	**x**
				Callibaetis sp.		9		1	
				Centroptilum sp.		2		1	
				Diphetor hageni		5		1	**x**
				Isweon sp.		5			**x**
				Pladitus punctiventris		6		3	**x**

Appendix A. continued.

	order	family	genus	species		Biotic index		Metals tolerance	Present in 2020
	Ephemeroptera (cont)								
		Ephemerellidae							
				Attenella margarita		3		1	**x**
				Caudatella heterocaudata		0		0	
				C. hystrix		0		0	
				Drunella coloradensis		0		0	**x**
				D. doddsi		1		0	**x**
				D. grandis		2		1	**x**
				Ephemerella excrutians (inerm		4		3	**x**
				Serratella tibialis		2		1	**x**
				Timpanoga hecuba		2		1	**x (CFR20)**
		Heptageniidae							
				Cinygmula sp.		0		0	**x**
				Epeorus spp.		2		0	
				E. albertae		2		0	**x**
				E. grandis		0		0	
				E. longimanus		1		0	
				Heptagenia soltari		3		1	**x**
				Ecdyonurus criddlei [Nixe, Hep		4		1	**x**
				Rhithrogena spp.		0		2	**x**
				Maccaffertium [Stenonema ter		4		1	
		Leptophlebiidae							
				Paraleptophlebia spp.		1		1	**x**
				P. bicornuta		2		1	**x**
				P. debilis		1		1	**x**
		Ameletidae							
				Ameletus sp.		0		1	
		Caenidae							
				Caenis sp.		7		3	
		Leptohyphidae							
				Asioplax edmundsi		4		3	**x**
				Tricorythodes minutus		4		4	**x**
	Trichoptera								
		Brachycentridae							
				Amiocentrus aspilus		3		1	**x**
				Brachycentrus americanus		1		4	**x (07)**
				Brachycentrus occidentalis		2		3	**x**
				Micrasema bactro		1		2	**x**
		Glossosomatidae							
				Agapetus sp.		0		2	**x (MW05)**
				Glossosoma sp.		0		2	**x**
				Protoptila sp.		1		2	**x (20)**
		Helicopsycidae							
				Helicopsyche borealis		3		3	**x**
		Hydropsychidae							
				Arctopsyche grandis		2		3	**x**
				Cheumatopsyche spp.		5		5	**x**
				Hydropsyche spp.		5		5	**x**
				H. (H.) occidentalis		5		5	**x**
				H. (Ceratopsyche) spp.		5		5	**x**

Appendix A. continued.

class	order	family	genus	species	Biotic index		Metals tolerance	Present in 2020
	Trichoptera (continued)							
				H.(C.) cockerelli	4		4	**x**
				H. (C.) nr. morosa	6		5	**x**
				H. (C.) sp1. [Silver Bow, oslari	3		6	**x**
				H. (C.) oslari	3		6	
				H. (C.) slossonae	4		6	**x**
		Hydroptildae						
				Agraylea spp.				**x**
				Hydroptila spp.	6		4	**x**
				Leucotrichia pictipes	2		1	
				Neotrichia sp.	2		2	
				Ochrotrichia sp.	4		3	**x**
				Oxyethira sp.	3		2	**x**
				Zumatrichia notosa	3		1	
		Lepidostomatidae						
				Lepidostoma sp.	1		1	**x**
		Leptoceridae						
				Ceraclea spp.	3		1	**x**
				Oecetis avara gr.	8		3	**x**
				Nectopsyche sp.	6		3	**x**
				Trianodes sp.	6		1	
		Limnephilidae						
				Dicosmoecus gilvipes	2		1	**x**
				Ecclisomyia sp.	4		2	
				Onocosmoecus unicolor	3		2	**x (10)**
				Neophylax sp.	3		2	
				Psychoglypha sp.	0		2	
		Philopotamidae						
				Wormaldia sp.	0		1	**x**
		Phryageneaidae						
				Phryagenea sp.	4			
		Polycentropididae						
				Neureclipsis sp.	6		1	
				Polycentropus sp.	6		1	
		Psychomyiidae						
				Psychomyia flavida	2		1	**x**
		Rhyacophilidae						
				Rhyacophila angelita gp.	0		1	**x**
				R. coloradensis gp.	0		1	**x**
				R. brunnea gp.	2		1	**x**
ANNELIDA								
	Oligochaeta							
		Branchiobdellidae						
		Enchytraeidae			4		1	**x**
		Lumbricidae			4		1	**x**
		Lumbriculidae			4		1	**x**
		Naididae			8		5	**x**
		Tubificidae			10		6	**x**

Appendix A. concluded.

class	order	family	genus	species	Biotic index		Metals tolerance	Present in 2020
	Hirudinea							
		Erpobdellidae			8		4	
		Glossophoniidae			9		4	
			Glossiphonia complanata		9		4	
			Helobdella stagnalis		10		4	**x**
CRUSTACEA								
	Amphipoda							
		Gammaridae						
			Gammarus sp.		4		1	
		Talitridae						
			Hyalella azteca		8		3	**x**
	Isopoda							
		Asellidae						
			Caecidotea sp. [Asellus]		8		5	**x**
	Decapoda							
		Astacidae						
			Pacifasticus sp.		6		3	
		Cambaridae						
			Orconectes sp.		6		3	
MOLLUSCA								
	Gastropoda							
		Ancyclidae						
			Ferrissia rivularis		6		1	**x**
		Lymnaeidae						
			Fossaria spp.		6		3	**x**
			Stagnicola sp.		6		3	**x**
			Fisherola nutalli		3		1	
			Radix auricularia		8		1	
		Physidae						
			Aplexa elongata		8		3	**x (MW05)**
			Physella sp.		8		4	**x**
		Planorbidae						
			Gyraulus sp.		8		3	**x**
			Helisoma sp.		6		3	
		Valvatidae						
			Valvata humeralis		3		1	
	Pelecypoda							
		Sphaeriidae			8		3	
			Sphaerium sp.		8		3	
			Pisidium sp.		8		3	**x**
TURBELLARIA					5		5	**x**
NEMATODA					5		5	**x**
NEMATOMORPHA					0		0	
PORIFERA					5		5	
ACARI								
CNIDARIA			Hydra sp.		8		3	
synonyms used in previous reports are [bracketed].							**total 2020**	**134**

Appendix B
2020 Clark Fork River Basin Macroinvertebrate Data

CRF MACROINVERTEBRATE DATA

CLARK FORK RIVER #2.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								13%	47	
Optioservus spp.	57	50	50	60	0		217	12.1%	43.4	24.7
Zaitzevia sp.	5	5	7	3	0		20	1.1%	4.0	2.6
Cleptelmis ornata	0	0	0	0	0		0	0.0%	0.0	0.0
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA								27%	97	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gr.	0	2	2	2	0		6	0.3%	1.2	1.1
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	4	16	2	5	0		27	1.5%	5.4	6.2
Potthastia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	2	3	6	17	0		28	1.6%	5.6	6.7
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	4	0	4	0	0		8	0.4%	1.6	2.2
Cricotopus nostococladius	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	3	4	5	3	0		15	0.8%	3.0	1.9
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	0	1	0	0	0		1	0.1%	0.2	0.4
Paracladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Parametriocnemus sp.	0	1	0	0	0		1	0.1%	0.2	0.4
Paraphaenocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	2	0	0	2	0		4	0.2%	0.8	1.1
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	0	3	0	0	0		3	0.2%	0.6	1.3
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #2.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	0	0	0	0	0		0	0.0%	0.0	0.0
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	0	0	0		0	0.0%	0.0	0.0
Polypedilum spp.	51	40	72	38	0		201	11.2%	40.2	26.2
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	1	0	0	2	0		3	0.2%	0.6	0.9
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Micropsectra spp.	2	1	0	2	0		5	0.3%	1.0	1.0
Antocha sp.	1	4	2	1	0		8	0.4%	1.6	1.5
Dicranota sp.	0	0	2	0	0		2	0.1%	0.4	0.9
Hexatoma sp.	0	0	1	3	0		4	0.2%	0.8	1.3
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	2	0	1	1	0		4	0.2%	0.8	0.8
Simulium spp.	13	57	64	33	0		167	9.3%	33.4	27.5
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								2%	8	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella turbida	0	0	0	0	0		0	0.0%	0.0	0.0
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	9	7	14	10	0		40	2.2%	8.0	5.1
Baetis intercalaris	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #2.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	0	0	0	0	0		0	0.0%	0.0	0.0
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	0	0	0	0	0		0	0.0%	0.0	0.0
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	0	0	0	0	0		0	0.0%	0.0	0.0
Serratella tibialis	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemerella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus longimanus	0	0	0	0	0		0	0.0%	0.0	0.0
Heptagenia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucrocuta sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ecdyonurus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhithrogena sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Macaffertium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	1	0	0	1	0		2	0.1%	0.4	0.5
							2			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
ODONATA								0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	1	0	0	0		1	0.1%	0.2	0.4
PLECOPTERA								0%	1	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	0	0	0	0	0		0	0.0%	0.0	0.0
Hesperoperla pacifica	0	0	0	0	0		0	0.0%	0.0	0.0
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #2.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Skwala sp.	2	1	1	0	0		4	0.2%	0.8	0.8
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcella badia	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcys californica	0	0	0	0	0		0	0.0%	0.0	0.0
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							2			
TRICHOPTERA								56%	202	
Arctopsyche grandis	0	0	0	0	0		0	0.0%	0.0	0.0
Cheumatopsyche spp.	5	4	4	5	0		18	1.0%	3.6	2.1
Hydropsyche occidentalis	3	4	0	9	0		16	0.9%	3.2	3.7
Hydropsyche slossonae	0	0	1	1	0		2	0.1%	0.4	0.5
Hydropsyche bronta	0	3	2	1	0		6	0.3%	1.2	1.3
Hydropsyche C. cockerelli	0	9	0	3	0		12	0.7%	2.4	3.9
Hydropsyche morosa gr.	75	159	115	160	0		509	28.4%	101.8	66.9
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Onocosmoecus unicolor	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydroptila spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Lepidostoma sp.	13	47	4	24	0		88	4.9%	17.6	18.8
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	0	1	5	1	0		7	0.4%	1.4	2.1
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus aspilus	20	41	12	11	0		84	4.7%	16.8	15.3
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	57	72	49	33	0		211	11.8%	42.2	27.5
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gr.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	8	4	1	5	0		18	1.0%	3.6	3.2
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	5	4	4	25	0		38	2.1%	7.6	9.9
							12			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #2.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA								0.6%	2	
Lumbricidae	0	0	0	0	0		0	0.0%	0.0	0.0
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	3	1	6	0	0		10	0.6%	2.0	2.5
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
CRUSTACEA								0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
MOLLUSCA								0%	0	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Fossaria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	0	0	0	0	0		0	0.0%	0.0	0.0
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	1	0	2	0	0		3	0.2%	0.6	0.9
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0
*(+) present in these samples but not in subsamples							40			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #4.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								10%	44	
Optioservus spp.	38	29	44	29	0		140	6.3%	28.0	16.9
Zaitzevia sp.	22	25	22	6	0		75	3.4%	15.0	11.2
Cleptelmis ornata	1	2	0	1	0		4	0.2%	0.8	0.8
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA								10%	46	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	0	1	0	0	0		1	0.0%	0.2	0.4
Potthastia sp.	0	1	1	1	0		3	0.1%	0.6	0.5
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	8	1	1	2	0		12	0.5%	2.4	3.2
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	12	34	21	12	0		79	3.5%	15.8	12.6
Cricotopus nostococladius	3	12	0	1	0		16	0.7%	3.2	5.1
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	3	8	5	4	0		20	0.9%	4.0	2.9
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	0	1	0	0	0		1	0.0%	0.2	0.4
Parakiefferiella	2	4	1	1	0		8	0.4%	1.6	1.5
Parametriocnemus sp.	3	3	9	2	0		17	0.8%	3.4	3.4
Paraphaenocladius sp.	1	1	1	0	0		3	0.1%	0.6	0.5
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	2	0	0	0	0		2	0.1%	0.4	0.9
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	2	8	9	12	0		31	1.4%	6.2	5.0
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #4.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	0	0	0	0	0		0	0.0%	0.0	0.0
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	0	0	0		0	0.0%	0.0	0.0
Polypedilum spp.	12	7	8	2	0		29	1.3%	5.8	4.8
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	0	0	0	1	0		1	0.0%	0.2	0.4
Micropsectra spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Antocha sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	0	0	1	0	0		1	0.0%	0.2	0.4
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Simulium spp.	1	3	1	1	0		6	0.3%	1.2	1.1
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								3%	11	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella turbida	0	2	0	1	0		3	0.1%	0.6	0.9
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	12	19	7	14	0		52	2.3%	10.4	7.2
Baetis intercalris	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #4.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	0	0	0	0	0		0	0.0%	0.0	0.0
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	0	0	0	0	0		0	0.0%	0.0	0.0
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	0	1	0	1	0		2	0.1%	0.4	0.5
Serratella tibialis	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemerella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus longimanus	0	0	0	0	0		0	0.0%	0.0	0.0
Heptagenia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucrocuta sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ecdyonurus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhithrogena sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Macaffertium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	0	0	0	0	0		0	0.0%	0.0	0.0
							3			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	1	0	0	0	0		1	0.04%	0.2	0.4
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
ODONATA								0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
PLECOPTERA								1%	4	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	0	0	0	0	0		0	0.0%	0.0	0.0
Hesperoperla pacifica	0	1	1	0	0		2	0.1%	0.4	0.5
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #4.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Skwala sp.	0	1	1	0	0		2	0.1%	0.4	0.5
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcella badia	4	4	5	2	0		15	0.7%	3.0	2.0
Pteronarcys californica	0	0	0	0	0		0	0.0%	0.0	0.0
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							4			
TRICHOPTERA								66%	296	
Arctopsyche grandis	0	0	0	0	0		0	0.0%	0.0	0.0
Cheumatopsyche spp.	28	12	27	24	0		91	4.1%	18.2	12.0
Hydropsyche occidentalis	25	30	85	32	0		172	7.7%	34.4	31.1
Hydropsyche sp.	48	27	60	40	0		175	7.8%	35.0	23.0
Hydropsyche morosa gr.	77	91	123	99	0		390	17.5%	78.0	46.7
Hydropsyche C. cockerelli	15	30	13	12	0		70	3.1%	14.0	10.7
Hydropsyche nr bronta	1	1	1	1	0		4	0.2%	0.8	0.4
Dicosmoecus sp.	0	0	1	1	0		2	0.1%	0.4	0.5
Onocosmoecus unicolor	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	0	1	0	0	0		1	0.0%	0.2	0.4
Hydroptila spp.	1	1	0	0	0		2	0.1%	0.4	0.5
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Lepidostoma sp.	53	35	29	36	0		153	6.9%	30.6	19.3
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	1	1	1	1	0		4	0.2%	0.8	0.4
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus sp.	5	4	1	2	0		12	0.5%	2.4	2.1
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	97	102	20	172	0		391	17.5%	78.2	69.3
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	1	1	1	2	0		5	0.2%	1.0	0.7
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	1	0	4	2	0		7	0.3%	1.4	1.7
							15			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #4.5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA								0.2%	1	
Lumbricidae	0	0	2	0	0		2	0.1%	0.4	0.9
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	2	0	1	0	0		3	0.1%	0.6	0.9
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
CRUSTACEA								0.2%	1	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	1	0	0	0	0		1	0.0%	0.2	0.4
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	1	2	0	0		3	0.1%	0.6	0.9
MOLLUSCA								0.1%	1	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	1	0	0	0	0		1	0.0%	0.2	0.4
Fossaria sp.	1	0	0	0	0		1	0.0%	0.2	0.4
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	0	0	1	0		1	0.0%	0.2	0.4
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	21	67	66	51	0		205	9.2%	41.0	29.5
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	5	0	3	0	0		8	0.4%	1.6	2.3
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

Mill-Willow ByPass #5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								15%	100	
Optioservus spp.	91	51	48	106	0		295.8	8.8%	59.2	41.5
Zaitzevia sp.	90	25	24	55	0		194.2	5.8%	38.8	34.7
Cleptelmis ornata	2	4	0	5	0		11.2	0.3%	2.2	2.2
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius corpulentus	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA	0	0	0	0				4%	29	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	1	0	0	0	0		1.2	0.0%	0.2	0.5
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	0	3	0	2	0		5.4	0.2%	1.1	1.5
Potthastia sp.	5	4	0	0	0		8.8	0.3%	1.8	2.4
Odontamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	0	2	10	5	0		15.9	0.5%	3.2	4.1
Cricotopus nostococladius	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	5	1	0	7	0		13	0.4%	2.6	3.2
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Parametriocnemus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraphaenocladius sp.	4	0	0	0	0		3.6	0.1%	0.7	1.6
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	16	6	0	10	0		31.2	0.9%	6.2	6.6
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

Mill-Willow ByPass #5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	0	0	0	0	0		0	0.0%	0.0	0.0
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	0	2	0		2.4	0.1%	0.5	1.1
Polypedilum spp.	6	15	6	12	0		39	1.2%	7.8	5.8
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Micropsectra spp.	0	1	0	2	0		3.4	0.1%	0.7	1.1
Antocha sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	6	1	0	0	0		7	0.2%	1.4	2.6
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Simulium spp.	0	2	4	7	0		13.2	0.4%	2.6	3.0
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	1	0	0	0	0		1.2	0.0%	0.2	0.5
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
EPHEMEROPTERA	0	0	0	0				2%	12	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella turbida	0	0	0	0	0		0	0.0%	0.0	0.0
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	0	4	0	2	0		6.4	0.2%	1.3	1.8
Baetis intercalris	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	0	0	0	2	0		2.4	0.1%	0.5	1.1
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

Mill-Willow ByPass #5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	0	1	6	0	0		7	0.2%	1.4	2.6
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	0	0	4	2	0		6.4	0.2%	1.3	1.8
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	2	0	0	2	0		4.8	0.1%	1.0	1.3
Serratella tibialis	0	0	0	2	0		2.4	0.1%	0.5	1.1
Ephemerella sp.	1	0	2	19	0		22.4	0.7%	4.5	8.3
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus longimanus	0	0	0	0	0		0	0.0%	0.0	0.0
Heptagenia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucrocuta sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ecdyonurus sp.	0	0	2	0	0		2	0.06%	0.4	0.9
Rhithrogena sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Macaffertium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	2	0	0	2	0		4.8	0.1%	1.0	1.3
	0	0	0	0			9			
HEMIPTERA	0	0	0	0				0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
LEPIDOPTERA	0	0	0	0						
Petrophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
ODONATA	0	0	0	0				0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
PLECOPTERA	0	0	0	0				1%	5	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	2	1	0	0	0		3.4	0.1%	0.7	1.1
Hesperoperla pacifica	2	0	0	0	0		2.4	0.1%	0.5	1.1
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

Mill-Willow ByPass #5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Skwala sp.	1	1	4	2	0		8.6	0.3%	1.7	1.5
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcella badia	2	2	4	2	0		10.8	0.3%	2.2	1.4
Pteronarcys californica	0	0	0	0	0		0	0.0%	0.0	0.0
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0			4			
TRICHOPTERA	0	0	0	0				76%	510	
Arctopsyche grandis	0	0	0	0	0		0	0.0%	0.0	0.0
Cheumatopsyche spp.	5	1	2	0	0		7.8	0.2%	1.6	2.0
Hydropsyche occidentalis	30	10	4	5	0		48.8	1.4%	9.8	11.9
Hydropsyche morosa	46	79	8	48	0		180.6	5.4%	36.1	32.3
Hydropsyche spp.	0	16	2	5	0		22.8	0.7%	4.6	6.7
Hydropsyche C. cockerelli	17	11	0	0	0		27.8	0.8%	5.6	7.9
Hydropsyche nr bronta	0	0	0	0	0		0	0.0%	0.0	0.0
Dicosmoecus gilvipes	1	0	2	0	0		3.2	0.1%	0.6	0.9
Onocosmoecus unicolor	0	0	2	0	0		2	0.1%	0.4	0.9
Neophylax splendans	1	0	0	5	0		6	0.2%	1.2	2.1
Agraylea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydroptila spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	0	0	0	2	0		2.4	0.1%	0.5	1.1
Lepidostoma sp.	48	19	308	226	0		600.6	17.8%	120.1	138.1
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	0	2	2	5	0		8.8	0.3%	1.8	2.0
Oecetis sp.	4	0	4	7	0		14.8	0.4%	3.0	3.0
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus aspilus	1	1	2	2	0		6.6	0.2%	1.3	0.9
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	80	48	342	590	0		1060.8	31.5%	212.2	249.6
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	23	7	70	46	0		145.4	4.3%	29.1	28.8
Agapetus montanus	0	0	4	0	0		4	0.1%	0.8	1.8
Glossosoma sp.	91	89	172	58	0		409.8	12.2%	82.0	62.4
							17			

CRF M A C R O I N V E R T E B R A T E D A T A

Mill-Willow ByPass #5 August 12, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA	0	0	0	0				0.00	2	
Lumbricidae	0	0	0	0	0		0	0.0%	0.0	0.0
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	1	0	4	2	0		7.6	0.2%	1.5	1.7
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
CRUSTACEA	0	0	0	0				0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
MOLLUSCA	0	0	0	0				2%	13	
Physella sp.	1	1	0	5	0		7	0.2%	1.4	2.0
Aplexa	0	0	6	0	0		6	0.2%	1.2	2.7
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	12	0	0		12	0.4%	2.4	5.4
Fossaria sp.	0	0	20	0	0		20	0.6%	4.0	8.9
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	1	14	5	0		19.8	0.6%	4.0	6.0
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	5	7	0	2	0		14.2	0.4%	2.8	3.1
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	0	1	0	2	0		3.4	0.1%	0.7	1.1
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 7.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA								15%	64	
Optioservus spp.	66	59	73	41	0		239	11.2%	47.8	29.3
Zaitzevia sp.	13	7	22	11	0		53	2.5%	10.6	8.1
Cleptelmis ornata	11	4	10	3	0		28	1.3%	5.6	4.7
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA	0	0	0	0	0			40%	169	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	5	3	5	5	0		18	0.8%	3.6	2.2
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	1	0	0	2	0		3	0.1%	0.6	0.9
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	5	11	6	7	0		29	1.4%	5.8	4.0
Potthastia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	103	100	133	147	0		483	22.7%	96.6	57.6
Cricotopus nostococladius	8	3	3	4	0		18	0.8%	3.6	2.9
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	6	1	4	0	0		11	0.5%	2.2	2.7
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Parametriocnemus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraphaenocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	21	14	23	24	0		82	3.9%	16.4	10.0
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 7.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	0	0	0	0	0		0	0.0%	0.0	0.0
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	1	0	1	0	0		2	0.1%	0.4	0.5
Polypedilum spp.	48	31	19	39	0		137	6.4%	27.4	18.7
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	0	0	1	0	0		1	0.0%	0.2	0.4
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Micropsectra spp.	4	0	1	1	0		6	0.3%	1.2	1.6
Antocha sp.	0	1	3	1	0		5	0.2%	1.0	1.2
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	0	1	0	2	0		3	0.1%	0.6	0.9
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	1	0	0	1	0		2	0.1%	0.4	0.5
Simulium spp.	0	0	35	7	0		42	2.0%	8.4	15.2
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	1	0	0	0	0		1	0.0%	0.2	0.4
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								8%	32	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella turbida	0	0	0	0	0		0	0.0%	0.0	0.0
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	17	20	16	10	0		63	3.0%	12.6	7.9
Isweon	0	0	3	0	0		3	0.1%	0.6	1.3
Plauditus sp.	1	3	1	2	0		7	0.3%	1.4	1.1
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 7.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Diphetor hageni	0	0	0	0	0		0	0.0%	0.0	0.0
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	3	1	3	1	0		8	0.4%	1.6	1.3
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	8	2	6	2	0		18	0.8%	3.5	3.4
Serratella	1	0	1	1	0		3	0.1%	0.6	0.5
Ephemerella sp.	0	3	0	0	0		3	0.1%	0.6	1.3
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	0	0	0	0		0	0.00%	0.0	0.0
Epeorus longimanus	0	0	0	0	0		0	0.00%	0.0	0.0
Heptagenia sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Leucrocuta sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Ecdyonurus sp.	0	0	0	1	0		1	0.05%	0.2	0.4
Rhithrogena sp.	0	1	0	0	0		1	0.0%	0.2	0.4
Macaffertium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	1	0	0	0	0		1	0.0%	0.2	0.4
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	13	10	7	23	0		53	2.5%	10.6	8.4
							11			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
ODONATA	0	0	0	0				0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
PLECOPTERA								3%	11	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	0	0	0	0	0		0	0.0%	0.0	0.0
Hesperoperla pacifica	3	6	3	2	0		14	0.7%	2.8	2.2
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 7.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	3	0		3	0.1%	0.6	1.3
Zapada cinctipes	0	0	1	0	0		1	0.0%	0.2	0.4
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Skwala sp.	0	1	1	0	0		2	0.1%	0.4	0.5
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcella badia	8	4	16	6	0		34	1.6%	6.8	5.9
Pteronarcys californica	0	0	0	0	0		0	0.0%	0.0	0.0
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							5			
TRICHOPTERA								34%	144	
Arctopsyche grandis	0	0	1	0	0		1	0.0%	0.2	0.4
Cheumatopsyche spp.	2	1	2	3	0		8	0.4%	1.6	1.1
Hydropsyche occidentalis	27	40	33	10	0		110	5.2%	22.0	16.6
Hydropsyche morosa gr.	18	11	15	21	0		65	3.1%	13.0	8.2
Hydropsyche	65	75	29	62	0		231	10.9%	46.2	31.1
Hydropsyche C. cockerelli	2	1	1	0	0		4	0.2%	0.8	0.8
Hydropsyche nr bronta	1	1	1	1	0		4	0.2%	0.8	0.4
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Onocosmoecus unicolor	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax rickeri	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	0	0	2	0	0		2	0.1%	0.4	0.9
Hydroptila spp.	5	3	5	5	0		18	0.8%	3.6	2.2
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	1	0	0	0	0		1	0.0%	0.2	0.4
Lepidostoma sp.	13	17	12	3	0		45	2.1%	9.0	7.2
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	3	2	5	0	0		10	0.5%	2.0	2.1
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus aspilus	3	3	12	9	0		27	1.3%	5.4	4.9
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	43	30	53	44	0		170	8.0%	34.0	20.7
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gr.	3	2	2	2	0		9	0.4%	1.8	1.1
Rhyacophila coloradensis gr.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	4	6	5	1	0		16	0.8%	3.2	2.6
Agapetus	0	0	1	0	0		1	0.0%	0.2	0.4
Glossosoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
							17			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 7.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
ANNELIDA								0%	0	
Lumbricidae	0	0	0	0	0		0	0.0%	0.0	0.0
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	0	0	0	0	0		0	0.0%	0.0	0.0
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
CRUSTACEA	0	0	0	0				0.1%	1	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	1	2	0	0	0		3	0.1%	0.5	0.7
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
MOLLUSCA	0	0	0	0				0.2%	1	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Fossaria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	1	0	1	2	0		4	0.2%	0.8	0.8
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER										
Turbellaria	10	1	7	3	0		21	0.99%	4.2	4.2
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								11%	51	
Optioservus spp.	52	53	54	56	0		215	9.6%	43.0	24.1
Zaitzevia sp.	8	6	14	9	0		37	1.7%	7.4	5.1
Cleptelmis ornata	1	1	1	0	0		3	0.1%	0.6	0.5
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA								14%	64	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	1	2	1	2	0		6	0.3%	1.2	0.8
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	0	0	0	0	0		0	0.0%	0.0	0.0
Potthastia sp.	2	0	2	1	0		5	0.2%	1.0	1.0
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	0	1	0	0	0		1	0.0%	0.2	0.4
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	8	4	0	4	0		16	0.7%	3.2	3.3
Cricotopus nostococladius	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	0	0	3	1	0		4	0.2%	0.8	1.3
Paracladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Parametriocnemus sp.	0	0	1	0	0		1	0.0%	0.2	0.4
Paraphaenocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	2	0	8	1	0		11	0.5%	2.2	3.3
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	0	0	0	0	0		0	0.0%	0.0	0.0
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	0	0	0		0	0.0%	0.0	0.0
Polypedilum spp.	43	65	57	55	0		220	9.9%	44.0	25.8
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Micropsectra spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Antocha sp.	0	0	1	1	0		2	0.1%	0.4	0.5
Dicranota sp.	4	1	0	0	0		5	0.2%	1.0	1.7
Hexatoma sp.	3	4	2	6	0		15	0.7%	3.0	2.2
Tipula sp.	0	1	3	0	0		4	0.2%	0.8	1.3
Ormosia sp.	0	1	0	0	0		1	0.0%	0.2	0.4
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	7	0	1	4	0		12	0.5%	2.4	3.0
Simulium spp.	4	7	2	1	0		14	0.6%	2.8	2.8
Chelifera sp.	0	0	1	0	0		1	0.0%	0.2	0.4
Hemerodromia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								16%	71	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella turbida	1	0	9	0	0		10	0.4%	2.0	3.9
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	31	21	25	18	0		95	4.3%	19.0	11.7
Isweon	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	2	1	1	4	0		8	0.4%	1.6	1.5
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	0	0	0	0	0		0	0.0%	0.0	0.0
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	4	10	14	13	0		41	1.8%	8.2	6.0
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	0	0	1	0	0		1	0.0%	0.2	0.4
Serratella tibialis	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemerella sp.	6	0	11	11	0		28	1.3%	5.6	5.5
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	0	0	0	0		0	0.00%	0.0	0.0
Epeorus longimanus	0	0	0	0	0		0	0.00%	0.0	0.0
Heptagenia sp.	0	0	3	0	0		3	0.13%	0.6	1.3
Leucrocuta sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Ecdyonurus sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Rhithrogena sp.	2	6	1	0	0		9	0.40%	1.8	2.5
Macaffertium sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	70	23	35	34	0		162	7.3%	32.4	25.3
							9			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
ODONATA								0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	1	0		1	0.0%	0.2	0.4
PLECOPTERA								0%	1	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	0	0	0	0	0		0	0.0%	0.0	0.0
Hesperoperla pacifica	0	0	0	0	0		0	0.0%	0.0	0.0
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Skwala sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	1	1	0	0	0		2	0.1%	0.4	0.5
Pteronarcella badia	1	0	0	1	0		2	0.1%	0.4	0.5
Pteronarcys californica	0	0	0	0	0		0	0.0%	0.0	0.0
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							3			
TRICHOPTERA								58%	258	
Arctopsyche grandis	0	0	0	0	0		0	0.0%	0.0	0.0
Cheumatopsyche spp.	4	6	3	1	0		14	0.6%	2.8	2.4
Hydropsyche occidentalis	48	50	94	70	0		262	11.7%	52.4	34.7
Hydropsyche sp1	22	16	28	5	0		71	3.2%	14.2	11.6
Hydropsyche morosa gr.	46	32	83	59	0		220	9.9%	44.0	30.9
Hydropsyche C. cockerelli	3	19	5	1	0		28	1.3%	5.6	7.7
Hydropsyche nr bronta	1	1	2	1	0		5	0.2%	1.0	0.7
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Onocosmoecus unicolor	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	8	16	3	3	0		30	1.3%	6.0	6.3
Hydroptila spp.	29	7	21	7	0		64	2.9%	12.8	11.8
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Lepidostoma sp.	32	17	70	36	0		155	6.9%	31.0	26.0
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	2	3	3	0	0		8	0.4%	1.6	1.5
Oecetis sp.	12	19	7	7	0		45	2.0%	9.0	7.0
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus sp.	90	35	70	37	0		232	10.4%	46.4	34.7
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	12	19	29	17	0		77	3.4%	15.4	10.6
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	12	12	10	34	0		68	3.0%	13.6	12.4
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	3	10	0	0	0		13	0.6%	2.6	4.3
							15			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA								0%	0	
Lumbricidae	0	0	0	0	0		0	0.0%	0.0	0.0
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	0	0	0	0	0		0	0.0%	0.0	0.0
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
CRUSTACEA								0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
MOLLUSCA								0.04%	0	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Fossaria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	1	0	0	0	0		1	0.0%	0.2	0.4
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	2	0	1	0	0		3	0.1%	0.6	0.9
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	1	0	0	0	0		1	0.0%	0.2	0.4
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.5 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								16%	68	
Optioservus spp.	55	82	68	78	0		283	13.0%	56.6	33.3
Zaitzevia sp.	27	8	6	14	0		55	2.5%	11.0	10.2
Cleptelmis ornata	0	0	0	0	0		0	0.0%	0.0	0.0
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	1	0	0		1	0.0%	0.2	0.4
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA								13%	55	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	0	0	0	0	0		0	0.0%	0.0	0.0
Potthastia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	1	0	0	0	0		1	0.0%	0.2	0.4
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	7	20	19	22	0		68	3.1%	13.6	9.6
Cricotopus nostococladius	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	2	0	0	0	0		2	0.1%	0.4	0.9
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladius sp.	0	0	0	3	0		3	0.1%	0.6	1.3
Parametriocnemus sp.	2	2	0	0	0		4	0.2%	0.8	1.1
Paraphaenocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	0	0	1	0		1	0.0%	0.2	0.4
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	6	2	3	2	0		13	0.6%	2.6	2.2
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.5 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	0	1	0	2	0		3	0.1%	0.6	0.9
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	1	0	1	0		2	0.1%	0.4	0.5
Polypedilum spp.	7	7	1	5	0		20	0.9%	4.0	3.3
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	1	0	0	0	0		1	0.0%	0.2	0.4
Micropsectra spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Antocha sp.	1	2	1	1	0		5	0.2%	1.0	0.7
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	6	3	5	8	0		22	1.0%	4.4	3.0
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	1	59	27	38	0		125	5.7%	25.0	25.1
Simulium spp.	1	0	0	0	0		1	0.0%	0.2	0.4
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	1	0	1	0		2	0.1%	0.4	0.5
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								16%	69	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	1	3	3	4	0		11	0.5%	2.2	1.6
Acentrella turbida	6	8	4	10	0		28	1.3%	5.6	3.8
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	86	11	14	27	0		138	6.3%	27.6	34.0
Isweon	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.5 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	0	1	0	2	0		3	0.1%	0.6	0.9
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	1	20	19	49	0		89	4.1%	17.8	19.9
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	0	0	0	0	0		0	0.0%	0.0	0.0
Serratella tibialis	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemerella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	0	0	0	0		0	0.00%	0.0	0.0
Epeorus longimanus	0	0	0	0	0		0	0.00%	0.0	0.0
Heptagenia sp.	0	0	0	1	0		1	0.05%	0.2	0.4
Leucrocuta sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Ecdyonurus sp.	0	0	0	1	0		1	0.05%	0.2	0.4
Rhithrogena sp.	1	0	0	1	0		2	0.09%	0.4	0.5
Macaffertium sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	7	10	10	47	0		74	3.4%	14.8	18.5
							9			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	1	0	0	0	0		1	0.0%	0.2	0.4
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
ODONATA								0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
PLECOPTERA								2%	10	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	2	0	3	3	0		8	0.4%	1.6	1.5
Hesperoperla pacifica	0	0	0	0	0		0	0.0%	0.0	0.0
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.5 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	1	1	0	1	0		3	0.1%	0.6	0.5
Skwala sp.	6	10	8	14	0		38	1.7%	7.6	5.2
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcella badia	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcys californica	0	0	0	0	0		0	0.0%	0.0	0.0
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							4			
TRICHOPTERA								52%	229	
Arctopsyche grandis	0	0	0	0	0		0	0.0%	0.0	0.0
Cheumatopsyche spp.	1	8	4	5	0		18	0.8%	3.6	3.2
Hydropsyche occidentalis	17	24	19	4	0		64	2.9%	12.8	10.3
Hydropsyche sp1	14	13	11	10	0		48	2.2%	9.6	5.6
Hydropsyche morosa gr.	118	85	101	51	0		355	16.3%	71.0	46.8
Hydropsyche C. cockerelli	10	15	31	21	0		77	3.5%	15.4	11.6
Hydropsyche nr bronta	3	5	5	2	0		15	0.7%	3.0	2.1
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Onocosmoecus unicolor	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	52	31	8	1	0		92	4.2%	18.4	22.6
Hydroptila spp.	3	5	1	1	0		10	0.5%	2.0	2.0
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Lepidostoma sp.	2	10	30	37	0		79	3.6%	15.8	16.8
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	1	0	2	3	0		6	0.3%	1.2	1.3
Oecetis sp.	0	5	16	7	0		28	1.3%	5.6	6.6
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus sp.	117	85	48	7	0		257	11.8%	51.4	50.1
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	2	3	7	6	0		18	0.8%	3.6	2.9
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	1	10	39	9	0		59	2.7%	11.8	15.9
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	5	5	4	4	0		18	0.8%	3.6	2.1
							15			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 8.5 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA								0.2%	1	
Lumbricidae	0	0	0	0	0		0	0.0%	0.0	0.0
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	1	2	1	1	0		5	0.2%	1.0	0.7
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
CRUSTACEA								0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
MOLLUSCA								0%	0	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Fossaria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	1	2	5	2	0		10	0.5%	2.0	1.9
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	0	4	2	6	0		12	0.6%	2.4	2.6
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 9.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								7%	31	
Optioservus spp.	16	19	34	33	0		102	4.7%	20.4	14.0
Zaitzevia sp.	12	5	20	14	0		51	2.4%	10.2	7.8
Cleptelmis ornata	0	0	0	0	0		0	0.0%	0.0	0.0
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA	0	0	0	0				33%	143	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	0	1	0	1	0		2	0.1%	0.4	0.5
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	1	0	0		1	0.0%	0.2	0.4
Pagastia sp	0	0	1	1	0		2	0.1%	0.4	0.5
Potthastia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	5	3	2	2	0		12	0.6%	2.4	1.8
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	250	235	36	77	0		598	27.7%	119.6	115.6
Cricotopus nostococladius	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	4	6	2	1	0		13	0.6%	2.6	2.4
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Parakiefferiella	2	1	1	1	0		5	0.2%	1.0	0.7
Parametriocnemus sp.	2	0	1	3	0		6	0.3%	1.2	1.3
Paraphaenocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	3	5	2	6	0		16	0.7%	3.2	2.4
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 9.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	0	0	0	0	0		0	0.0%	0.0	0.0
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	1	0	0		1	0.0%	0.2	0.4
Polypedilum spp.	10	3	0	4	0		17	0.8%	3.4	4.1
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	2	0	0	1	0		3	0.1%	0.6	0.9
Micropsectra spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Antocha sp.	0	0	0	1	0		1	0.0%	0.2	0.4
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	1	1	0	1	0		3	0.1%	0.6	0.5
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	1	0	0	0	0		1	0.0%	0.2	0.4
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	1	0	0	2	0		3	0.1%	0.6	0.9
Simulium spp.	6	20	4	3	0		33	1.5%	6.6	7.8
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
EPHEMEROPTERA	0	0	0	0				5%	22	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella turbida	1	0	0	0	0		1	0.0%	0.2	0.4
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	5	3	17	16	0		41	1.9%	8.2	7.8
Baetis intercalris	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	1	3	1	0	0		5	0.2%	1.0	1.2
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 9.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	1	0	0	0	0		1	0.0%	0.2	0.4
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	8	5	15	7	0		35	1.6%	7.0	5.4
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	0	0	0	0	0		0	0.0%	0.0	0.0
Serratella tibialis	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemerella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	0	0	0	0		0	0.00%	0.0	0.0
Epeorus longimanus	0	0	0	0	0		0	0.00%	0.0	0.0
Heptagenia sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Leucrocuta sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Ecdyonurus sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Rhithrogena sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Macaffertium sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	10	3	2	14	0		29	1.3%	5.8	5.9
	0	0	0	0			6			
HEMIPTERA	0	0	0	0				0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
LEPIDOPTERA	0	0	0	0						
Petrophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
ODONATA	0	0	0	0				0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	1	0		1	0.0%	0.2	0.4
	0	0	0	0						
PLECOPTERA	0	0	0	0				1%	3	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	0	1	0	0	0		1	0.0%	0.2	0.4
Hesperoperla pacifica	0	0	0	0	0		0	0.0%	0.0	0.0
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 9.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	1	0	2	0	0		3	0.1%	0.6	0.9
Skwala sp.	1	1	1	0	0		3	0.1%	0.6	0.5
Isoperla fulva	1	2	3	1	0		7	0.3%	1.4	1.1
Isoperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcella badia	0	0	1	1	0		2	0.1%	0.4	0.5
Pteronarcys californica	0	0	0	0	0		0	0.0%	0.0	0.0
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0			6			
TRICHOPTERA	0	0	0	0				52%	226	
Arctopsyche grandis	0	0	0	1	0		1	0.0%	0.2	0.4
Cheumatopsyche spp.	13	9	28	30	0		80	3.7%	16.0	12.8
Hydropsyche occidentalis	18	31	75	50	0		174	8.1%	34.8	29.0
Hydropsyche sp1	31	21	16	17	0		85	3.9%	17.0	11.2
Hydropsyche morosa gr.	93	132	171	160	0		556	25.8%	111.2	69.1
Hydropsyche C. cockerelli	9	15	35	38	0		97	4.5%	19.4	16.5
Hydropsyche nr bronta	3	5	1	7	0		16	0.7%	3.2	2.9
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Onocosmoecus unicolor	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	0	1	0	0	0		1	0.0%	0.2	0.4
Hydroptila spp.	0	1	0	0	0		1	0.0%	0.2	0.4
Stactobiella sp.	0	1	0	0	0		1	0.0%	0.2	0.4
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Lepidostoma sp.	3	1	6	8	0		18	0.8%	3.6	3.4
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	1	0	0	1	0		2	0.1%	0.4	0.5
Oecetis sp.	1	2	2	0	0		5	0.2%	1.0	1.0
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus aspilus	4	10	1	9	0		24	1.1%	4.8	4.5
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	3	2	1	2	0		8	0.4%	1.6	1.1
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	0	1	43	1	0		45	2.1%	9.0	19.0
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	3	6	6	0	0		15	0.7%	3.0	3.0
	0	0	0	0			17			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 9.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA	0	0	0	0				1.0%	4	
Lumbricidae	1	0	0	0	0		1	0.0%	0.2	0.4
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	1	1	19	0	0		21	1.0%	4.2	8.3
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
CRUSTACEA	0	0	0	0				0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
MOLLUSCA	0	0	0	0				0.1%	1	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Fossaria sp.	0	0	0	1	0		1	0.0%	0.2	0.4
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	0	2	0	0		2	0.1%	0.4	0.9
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
OTHER	0	0	0	0	0					
Turbellaria	1	0	0	0	0		1	0.05%	0.2	0.4
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	1	3	1	0	0		5	0.2%	1.0	1.2
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 10.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								5%	43	
Optioservus spp.	44	18	28	53	0		143	3.5%	28.6	21.0
Zaitzevia sp.	14	14	15	29	0		71	1.8%	14.3	10.2
Cleptelmis ornata	0	0	0	0	0		0	0.0%	0.0	0.0
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA								18%	142	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	7	0	0	0	0		7	0.2%	1.4	3.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	0	0	0	0	0		0	0.0%	0.0	0.0
Potthastia sp.	0	2	0	0	0		2	0.0%	0.4	0.9
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	3	6	1	5	0		15	0.4%	3.0	2.5
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	180	26	76	120	0		402	9.9%	80.4	72.4
Cricotopus nostococladius	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	7	2	5	2	0		16	0.4%	3.2	2.7
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Parametriocnemus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratrichocladius sp.	3	2	3	7	0		16	0.4%	3.1	2.6
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	24	7	4	46	0		80	2.0%	16.1	18.8
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 10.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	0	0	0	0	0		0	0.0%	0.0	0.0
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	0	0	0		0	0.0%	0.0	0.0
Polypedilum spp.	48	6	10	14	0		78	1.9%	15.6	18.7
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Micropsectra spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Antocha sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	20	2	6	5	0		33	0.8%	6.6	8.0
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	10	0	0	0	0		10	0.3%	2.0	4.6
Atherix sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Simulium spp.	31	7	10	5	0		52	1.3%	10.5	11.8
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								18%	148	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	7	4	10	5	0		26	0.6%	5.1	3.7
Acentrella turbida	24	18	46	17	0		105	2.6%	20.9	16.6
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	99	25	46	60	0		230	5.7%	45.9	37.1
Baetis intercalris	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	3	0	1	5	0		9	0.2%	1.8	2.2
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 10.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	0	0	1	0	0		1	0.0%	0.2	0.4
Isweon	3	1	1	0	0		5	0.1%	1.1	1.4
Attenella margarita	44	0	19	53	0		116	2.9%	23.2	24.6
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	0	0	0	0	0		0	0.0%	0.0	0.0
Serratella tibialis	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemerella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Timpanoga hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	0	0	0	0		0	0.00%	0.0	0.0
Epeorus longimanus	0	0	0	0	0		0	0.00%	0.0	0.0
Heptagenia sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Leucrocuta sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Ecdyonurus sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Rhithrogena sp.	14	2	4	0	0		20	0.48%	3.9	5.7
Macaffertium sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	184	5	14	29	0		231	5.7%	46.3	77.5
							9			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
ODONATA	0	0	0	0				0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
PLECOPTERA	0	0	0	0				1%	9	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	3	1	6	2	0		13	0.3%	2.6	2.3
Hesperoperla pacifica	0	0	0	0	0		0	0.0%	0.0	0.0
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 10.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	7	2	1	10	0		19	0.5%	3.9	4.1
Skwala sp.	10	0	0	2	0		13	0.3%	2.5	4.4
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcella badia	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcys californica	0	0	0	0	0		0	0.0%	0.0	0.0
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							3			
TRICHOPTERA								57%	464	
Arctopsyche grandis	14	2	0	5	0		20	0.5%	4.1	5.7
Cheumatopsyche spp.	143	7	8	122	0		280	6.9%	56.0	70.3
Hydropsyche occidentalis	197	35	15	146	0		394	9.7%	78.7	87.7
Hydropsyche morosa gr.	58	25	12	55	0		150	3.7%	30.0	25.8
Hydropsyche spp.	459	35	44	271	0		809	20.0%	161.8	197.8
Hydropsyche C. cockerelli	24	6	5	46	0		80	2.0%	16.1	18.8
Hydropsyche nr bronta	0	1	2	2	0		5	0.1%	1.1	1.1
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Onocosmoecus unicolor	0	0	1	0	0		1	0.0%	0.2	0.4
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	0	0	0	3	0		3	0.1%	0.6	1.4
Hydroptila spp.	20	0	4	2	0		27	0.7%	5.4	8.6
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	0	0	1	0	0		1	0.0%	0.2	0.4
Lepidostoma sp.	37	2	27	84	0		150	3.7%	30.1	34.1
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	7	1	2	2	0		12	0.3%	2.4	2.6
Oecetis sp.	17	0	15	38	0		70	1.7%	14.1	15.8
Trianodes sp.	0	1	0	0	0		1	0.0%	0.2	0.4
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus sp.	7	6	3	5	0		21	0.5%	4.1	2.7
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	0	2	1	0	0		3	0.1%	0.6	0.9
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	71	1	67	94	0		233	5.7%	46.6	43.3
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	10	23	10	14	0		58	1.4%	11.5	8.3
	0	0	0	0			19			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER # 10.0 August 15, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA	0	0	0	0				0%	0	
Lumbricidae	0	0	0	0	0		0	0.0%	0.0	0.0
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	0	0	0	0	0		0	0.0%	0.0	0.0
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
CRUSTACEA	0	0	0	0				0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0						
MOLLUSCA	0	0	0	0				0.3%	3	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	2	0		2	0.1%	0.5	1.1
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	7	0	0	2	0		9	0.2%	1.8	3.0
Fossaria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	2	0	0	0		2	0.0%	0.4	0.9
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	0	0	0	0	0		0	0.00%	0.0	0.0
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	0	3	5	0	0		8	0.2%	1.6	2.3
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #11 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								12%	84	
Optioservus spp.	28	56	22	28	0		134	3.9%	26.8	20.0
Zaitzevia sp.	63	72	48	104	0		286	8.4%	57.3	38.0
Cleptelmis ornata	0	0	0	0	0		0	0.0%	0.0	0.0
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA								16%	109	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	0	0	2	0	0		2	0.1%	0.4	0.9
Potthastia sp.	1	2	2	1	0		7	0.2%	1.3	0.8
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	3	10	8	24	0		45	1.3%	8.9	9.3
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	49	32	140	4	0		225	6.6%	45.0	56.8
Cricotopus nostococladius	1	0	0	0	0		1	0.0%	0.3	0.6
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	12	12	14	12	0		50	1.5%	10.0	5.7
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	1	0	4	0	0		5	0.2%	1.1	1.7
Parakiefferiella	1	0	4	0	0		5	0.2%	1.1	1.7
Parametriocnemus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratrichocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	8	8	2	1	0		19	0.6%	3.9	3.8
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #11 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	1	0	2	0	0		3	0.1%	0.7	0.9
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	0	0	0		0	0.0%	0.0	0.0
Polypedilum spp.	5	12	10	3	0		30	0.9%	6.0	5.0
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stempellina	1	0	0	0	0		1	0.0%	0.3	0.6
Tanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Micropsectra spp.	0	0	0	3	0		3	0.1%	0.5	1.2
Antocha sp.	0	0	2	0	0		2	0.1%	0.4	0.9
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	4	6	2	3	0		15	0.4%	2.9	2.2
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	0	0	0	3	0		3	0.1%	0.5	1.2
Simulium spp.	11	68	34	17	0		130	3.8%	26.0	26.5
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								24%	163	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	13	6	6	7	0		32	0.9%	6.4	4.7
Acentrella turbida	61	20	68	16	0		165	4.8%	33.0	29.9
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	108	198	124	118	0		548	16.0%	109.6	70.9
Baetis intercalris	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #11 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	1	2	10	1	0		15	0.4%	2.9	4.0
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	3	6	8	7	0		23	0.7%	4.7	3.3
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	0	0	0	0	0		0	0.0%	0.0	0.0
Serratella tibialis	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemerella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	0	0	0	0		0	0.00%	0.0	0.0
Epeorus longimanus	0	0	0	0	0		0	0.00%	0.0	0.0
Heptagenia sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Leucrocuta sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Ecdyonurus sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Rhithrogena sp.	4	2	0	3	0		9	0.25%	1.7	1.7
Macaffertium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	4	0	20	0	0		24	0.7%	4.8	8.7
							7			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	0	2	0	0	0		2	0.06%	0.4	0.9
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
ODONATA								0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
PLECOPTERA								2%	14	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	4	8	4	1	0		17	0.5%	3.5	3.1
Hesperoperla pacifica	0	0	0	0	0		0	0.0%	0.0	0.0
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #11 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	4	12	20	11	0		47	1.4%	9.3	7.7
Skwala sp.	0	2	0	0	0		2	0.1%	0.4	0.9
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	2	0	0	0		2	0.1%	0.4	0.9
Pteronarcella badia	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcys californica	0	0	0	0	0		0	0.0%	0.0	0.0
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							5			
TRICHOPTERA								46%	312	
Arctopsyche grandis	9	12	18	5	0		45	1.3%	8.9	6.8
Cheumatopsyche spp.	27	80	38	35	0		179	5.2%	35.8	28.8
Hydropsyche occidentalis	82	144	110	110	0		447	13.1%	89.4	54.5
Hydropsyche spp.	56	70	80	32	0		238	6.9%	47.6	32.1
Hydropsyche morosa gr.	57	112	94	49	0		312	9.1%	62.5	43.5
Hydropsyche C. cockerelli	23	42	46	49	0		160	4.7%	32.0	20.6
Hydropsyche nr bronta	3	2	4	1	0		10	0.3%	2.0	1.5
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Onocosmoecus unicolor	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	1	0	0	0	0		1	0.0%	0.3	0.6
Hydroptila spp.	1	0	10	0	0		11	0.3%	2.3	4.4
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Lepidostoma sp.	7	28	20	16	0		71	2.1%	14.1	11.0
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	0	0	0	4	0		4	0.1%	0.8	1.8
Oecetis sp.	0	0	2	1	0		3	0.1%	0.7	0.9
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus sp.	3	8	6	1	0		18	0.5%	3.6	3.3
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	0	4	2	5	0		11	0.3%	2.3	2.4
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	3	2	0	0	0		5	0.1%	0.9	1.3
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	11	10	6	19	0		45	1.3%	9.1	6.8
							16			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #11 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA								0%	0	
Lumbricidae	0	0	0	0	0		0	0.0%	0.0	0.0
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	0	0	0	0	0		0	0.0%	0.0	0.0
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
CRUSTACEA								0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
MOLLUSCA								0%	0	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Fossaria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	0	0	0	0	0		0	0.0%	0.0	0.0
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	0	2	4	4	0		10	0.3%	2.0	2.0
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #13 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								3%	10	
Optioservus spp.	6	10	5	4	0		25	1.7%	5.0	3.6
Zaitzevia sp.	3	4	5	14	0		26	1.7%	5.2	5.3
Cleptelmis ornata	0	0	0	0	0		0	0.0%	0.0	0.0
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA								22%	64	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	1	0	0	0	0		1	0.1%	0.2	0.4
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	1	0	0	0	0		1	0.1%	0.2	0.4
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	0	0	0	0	0		0	0.0%	0.0	0.0
Potthastia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	1	0	2	9	0		12	0.8%	2.4	3.8
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	21	35	17	65	0		138	9.2%	27.6	24.3
Cricotopus nostococladius	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	4	10	4	11	0		29	1.9%	5.8	4.6
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	3	10	3	6	0		22	1.5%	4.4	3.8
Parakiefferiella	0	0	0	1	0		1	0.1%	0.2	0.4
Parametriocnemus sp.	0	0	1	0	0		1	0.1%	0.2	0.4
Paraphaenocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	1	0	0	0		1	0.1%	0.2	0.4
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	0	6	4	4	0		14	0.9%	2.8	2.7
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #13 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	1	0	0	0		1	0.1%	0.2	0.4
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	0	0	0	0	0		0	0.0%	0.0	0.0
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	0	0	0		0	0.0%	0.0	0.0
Polypedilum spp.	2	2	1	5	0		10	0.7%	2.0	1.9
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	0	0	2	2	0		4	0.3%	0.8	1.1
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	0	1	5	5	0		11	0.7%	2.2	2.6
Micropsectra spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Antocha sp.	0	0	1	1	0		2	0.1%	0.4	0.5
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	0	1	1	1	0		3	0.2%	0.6	0.5
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	1	10	4	9	0		24	1.6%	4.8	4.5
Simulium spp.	2	5	5	33	0		45	3.0%	9.0	13.6
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Protanydarus	1	0	0	0	0		1	0.1%	0.2	0.4
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								26%	78	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	7	16	10	14	0		47	3.1%	9.4	6.3
Acentrella turbida	34	26	23	55	0		138	9.2%	27.6	19.9
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	9	19	0	19	0		47	3.1%	9.4	9.5
Isweon	6	5	2	2	0		15	1.0%	3.0	2.4
Plauditus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #13 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	2	1	0	5	0		8	0.5%	1.6	2.1
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	8	3	7	5	0		23	1.5%	4.6	3.2
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	1	2	1	1	0		5	0.3%	1.0	0.7
Serratella tibialis	4	14	11	18	0		47	3.1%	9.4	7.3
Ephemerella sp.	0	0	0	1	0		1	0.1%	0.2	0.4
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	0	3	0	0	0		3	0.2%	0.6	1.3
Epeorus longimanus	0	0	0	0	0		0	0.0%	0.0	0.0
Cinygmula	2	2	0	1	0		5	0.3%	1.0	1.0
Leucrocuta sp.	0	1	0	1	0		2	0.1%	0.4	0.5
Ecdyonurus sp.	0	3	6	0	0		9	0.6%	1.8	2.7
Rhithrogena sp.	6	8	12	5	0		31	2.1%	6.2	4.4
Macaffertium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	1	2	1	0	0		4	0.3%	0.8	0.8
Tricorythodes sp	1	1	0	1	0		3	0.2%	0.6	0.5
							16			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	0	0	0	1	0		1	0.1%	0.2	0.4
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
ODONATA								0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
PLECOPTERA								5%	16	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	0	1	0	4	0		5	0.3%	1.0	1.7
Hesperoperla pacifica	1	2	2	1	0		6	0.4%	1.2	0.8
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #13 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	5	12	12	17	0		46	3.1%	9.2	6.7
Skwala sp.	1	5	1	3	0		10	0.7%	2.0	2.0
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcella badia	0	3	3	4	0		10	0.7%	2.0	1.9
Pteronarcys californica	1	1	0	0	0		2	0.1%	0.4	0.5
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	1	1	0	0	0		2	0.1%	0.4	0.5
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							8			
TRICHOPTERA								43%	129	
Arctopsyche grandis	11	29	18	15	0		73	4.9%	14.6	10.5
Cheumatopsyche spp.	8	13	12	8	0		41	2.7%	8.2	5.1
Hydropsyche occidentalis	49	158	50	88	0		345	23.1%	69.0	58.7
Hydropsyche morosa gr.	8	9	4	12	0		33	2.2%	6.6	4.7
Hydropsyche spp.	2	5	2	5	0		14	0.9%	2.8	2.2
Hydropsyche C. cockerelli	5	20	18	25	0		68	4.6%	13.6	10.6
Hydropsyche nr bronta	2	3	1	1	0		7	0.5%	1.4	1.1
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Onocosmoecus unicolor	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	1	1	0	10	0		12	0.8%	2.4	4.3
Hydroptila spp.	1	1	1	3	0		6	0.4%	1.2	1.1
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	1	0	0	2	0		3	0.2%	0.6	0.9
Lepidostoma sp.	0	2	4	1	0		7	0.5%	1.4	1.7
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	1	1	5	1	0		8	0.5%	1.6	1.9
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	3	1	4	0		8	0.5%	1.6	1.8
Psychomyia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amiocentrus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	2	10	2	0	0		14	0.9%	2.8	4.1
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	0	0	0	0	0		0	0.0%	0.0	0.0
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	1	0	3	1	0		5	0.3%	1.0	1.2
							15			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER #13 August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA								0%	0	
Lumbricidae	0	0	0	0	0		0	0.0%	0.0	0.0
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	0	0	0	0	0		0	0.0%	0.0	0.0
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
CRUSTACEA								0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
MOLLUSCA								0%	0	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Fossaria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	0	1	0	1	0		2	0.13%	0.4	0.5
Dugesia sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.00%	0.0	0.0
Nematoda	1	2	2	0	0		5	0.33%	1.0	1.0
Hydracarina	0	0	0	0	0		0	0.00%	0.0	0.0
Porifera	0	0	0	0	0		0	0.00%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

BLACKFOOT RIVER #14 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA								7.3%	21	
Optioservus spp.	30	9	13	12	0		64	4.5%	12.8	10.9
Zaitzevia sp.	14	10	5	7	0		36	2.5%	7.2	5.3
Cleptelmis ornata	2	1	0	1	0		4	0.3%	0.8	0.8
Microcylloepus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agabus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA								3.8%	11	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	0	0	1	0	0		1	0.1%	0.2	0.4
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	0	0	0	0	0		0	0.0%	0.0	0.0
Potthastia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	0	0	4	3	0		7	0.5%	1.4	1.9
Cricotopus nostococladius	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	3	0	0	5	0		8	0.6%	1.6	2.3
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	0	4	0	0	0		4	0.3%	0.8	1.8
Parakiefferiella	2	0	1	0	0		3	0.2%	0.6	0.9
Parametriocnemus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraphaenocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	1	0	0	0	0		1	0.1%	0.2	0.4
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	0	0	3	0	0		3	0.2%	0.6	1.3
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

BLACKFOOT RIVER #14 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	1	1	2	1	0		5	0.4%	1.0	0.7
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	0	0	0		0	0.0%	0.0	0.0
Polypedilum spp.	2	1	1	2	0		6	0.4%	1.2	0.8
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	1	0	2	0	0		3	0.2%	0.6	0.9
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stempellina	0	0	0	1	0		1	0.1%	0.2	0.4
Micropsectra spp.	3	1	0	0	0		4	0.3%	0.8	1.3
Antocha sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	2	0	0	0	0		2	0.1%	0.4	0.9
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix	2	1	1	0	0		4	0.3%	0.8	0.8
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Protoplasa fitchii	0	0	0	0	0		0	0.0%	0.0	0.0
Simulium spp.	0	1	0	0	0		1	0.1%	0.2	0.4
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	1	0	0	0	0		1	0.1%	0.2	0.4
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pericoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								9.1%	26	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	0	1	0	3	0		4	0.3%	0.8	1.3
Acentrella turbida	1	0	0	1	0		2	0.1%	0.4	0.5
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	10	7	5	16	0		38	2.7%	7.6	5.9
Isweon	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

BLACKFOOT RIVER #14 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Diphetor hageni	1	0	5	7	0		13	0.9%	2.6	3.2
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	1	0	1	0	0		2	0.1%	0.4	0.5
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	2	4	6	5	0		17	1.2%	3.4	2.4
Serratella tibialis	0	0	0	2	0		2	0.1%	0.4	0.9
Ephemerella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	12	4	3	13	0		32	2.26%	6.4	5.8
Epeorus longimanus	0	0	0	0	0		0	0.00%	0.0	0.0
Heptagenia sp.	0	2	4	3	0		9	0.64%	1.8	1.8
Cinygmula	0	0	0	0	0		0	0.00%	0.0	0.0
Ecdyonurus sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Rhithrogena sp.	3	3	2	2	0		10	0.71%	2.0	1.2
Macaffertium sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	0	0	0	0	0		0	0.0%	0.0	0.0
Tricorythodes sp	0	0	0	0	0		0	0.0%	0.0	0.0
							10			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	31	19	25	30	0		105	7.4%	21.0	12.7
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
ODONATA								0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
PLECOPTERA								6.1%	17	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	0	0	0	1	0		1	0.1%	0.2	0.4
Claassenia sabulosa	0	1	0	2	0		3	0.2%	0.6	0.9
Hesperoperla pacifica	6	8	1	9	0		24	1.7%	4.8	4.1
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

BLACKFOOT RIVER #14 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Skwala sp.	4	1	2	2	0		9	0.6%	1.8	1.5
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	0	2	2	0		4	0.3%	0.8	1.1
Pteronarcella badia	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcys californica	23	7	3	13	0		46	3.3%	9.2	9.1
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							7			
TRICHOPTERA								64.9%	184	
Arctopsyche grandis	2	2	2	8	0		14	1.0%	2.8	3.0
Cheumatopsyche spp.	41	29	32	43	0		145	10.2%	29.0	17.2
Hydropsyche occidentalis	39	23	26	27	0		115	8.1%	23.0	14.2
Hydropsyche sp1	34	43	33	29	0		139	9.8%	27.8	16.4
Hydropsyche morosa gr.	95	102	59	101	0		357	25.2%	71.4	43.6
Hydropsyche C. cockerelli	3	5	1	14	0		23	1.6%	4.6	5.6
Hydropsyche nr bronta	1	0	2	1	0		4	0.3%	0.8	0.8
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnephilus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydroptila spp.	0	2	3	0	0		5	0.4%	1.0	1.4
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Lepidostoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceraclea sp.	1	2	0	0	0		3	0.2%	0.6	0.9
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	2	0	0	0	0		2	0.1%	0.4	0.9
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psychomyia sp.	3	2	6	17	0		28	2.0%	5.6	6.7
Micrasema	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	17	37	1	11	0		66	4.7%	13.2	15.1
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila angelita gr.	1	2	5	1	0		9	0.6%	1.8	1.9
Rhyacophila coloradensis gr.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	0	0	0	0	0		0	0.0%	0.0	0.0
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	5	1	1	1	0		8	0.6%	1.6	1.9
							14			

CRF M A C R O I N V E R T E B R A T E D A T A

BLACKFOOT RIVER #14 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
ANNELIDA								1.3%	4	
Lumbricidae	0	0	13	5	0		18	1.3%	3.6	5.7
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	0	0	0	0	0		0	0.0%	0.0	0.0
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
CRUSTACEA								0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
MOLLUSCA								0%	0	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Fossaria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	0	0	0	0	0		0	0.0%	0.0	0.0
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER 15.5 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								7%	46	
Optioservus spp.	8	48	27	39	0		122	3.6%	24.4	20.2
Zaitzevia sp.	19	32	20	31	0		102	3.0%	20.4	12.8
Cleptelmis ornata	1	0	0	0	0		1	0.0%	0.2	0.5
Microcylloepus sp.	0	0	0	2	0		2	0.1%	0.3	0.8
Heterlimnius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Dubiraphia minima	0	0	0	0	0		0	0.0%	0.0	0.0
Narpus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ordobrevia	0	2	1	0	0		3	0.1%	0.7	0.9
Deronectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrovatus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Illybius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oreodytes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhantus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brychius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Haliplus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydrophilidae	0	0	0	0	0		0	0.0%	0.0	0.0
DIPTERA								22%	151	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	0	2	0	0	0		2	0.1%	0.4	0.9
Macropelopia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Procladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nilotanypus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Diamesa spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pagastia sp	0	0	0	2	0		1.7	0.1%	0.3	0.8
Potthastia sp.	0	0	0	2	0		1.7	0.1%	0.3	0.8
Monodiamesa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Brillia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cardiocladius spp.	12	6	12	7	0		36.77	1.1%	7.4	5.0
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	22	54	40	128	0		243	7.2%	48.6	48.5
Cricotopus nostococladius	10	0	9	5	0		24.01	0.7%	4.8	4.7
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	5	30	11	37	0		82.84	2.5%	16.6	16.3
Lopescladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nanocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Orthocladius spp.	1	4	4	3	0		12.59	0.4%	2.5	1.8
Paracladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Parametriocnemus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraphaenocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stilocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Synorthocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	4	2	1	2	0		8.63	0.3%	1.7	1.3
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER 15.5 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Dicrotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Endochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glyptotendipes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Microtendipes sp	2	16	3	10	0		31.26	0.9%	6.3	6.7
Parachironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paracladopelma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Phaenopsectra sp	0	0	0	0	0		0	0.0%	0.0	0.0
Polypedilum spp.	5	14	4	2	0		24.49	0.7%	4.9	5.4
Pseudochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Robackia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stictochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Xenochironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cladotanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paratanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheotanytarsus sp.	4	8	1	9	0		21.43	0.6%	4.3	3.8
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Micropsectra spp.	2	12	4	3	0		21.79	0.6%	4.4	4.5
Antocha sp.	1	2	4	2	0		8.89	0.3%	1.8	1.5
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnophila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ceratopogoninae	0	0	0	0	0		0	0.0%	0.0	0.0
Tabanidae	0	0	0	0	0		0	0.0%	0.0	0.0
Muscidae	0	0	0	0	0		0	0.0%	0.0	0.0
Atherix sp.	0	2	0	2	0		4	0.1%	0.7	1.0
Simulium spp.	24	52	64	88	0		228	6.8%	45.6	34.5
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	0	0	2	0		2	0.1%	0.3	0.8
Clinocera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chaoborus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Protoplasa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Deuterophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stratiomyiidae	0	0	0	0	0		0	0.0%	0.0	0.0
EPHEMEROPTERA								13%	89	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella insignificans	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella turbida	10	20	3	17	0		49	1.5%	9.9	8.7
Acerpenna pygmacus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis bicaudatus	0	0	0	0	0		0	0.0%	0.0	0.0
Baetis tricaudatus	48	88	37	31	0		204	6.0%	40.8	31.9
Isweon	0	0	3	0	0		3	0.1%	0.5	1.2
Plauditus sp.	0	0	0	2	0		2	0.1%	0.3	0.8
Callibaetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Camelobaetidius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Centroptilum bifurcatum	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER 15.5 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	4	0	0	3	0		7	0.2%	1.4	1.9
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	4	6	5	2	0		17	0.5%	3.3	2.5
Caudatella heterocaudata	0	2	0	0	0		2	0.1%	0.4	0.9
Drunella coloradensis	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella doddsi	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella grandis (spinifera)	8	14	1	10	0		34	1.0%	6.8	6.0
Serratella tibialis	4	4	0	0	0		8	0.2%	1.5	2.1
Ephemerella sp.	0	2	1	2	0		5	0.1%	1.0	0.9
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	1	4	7	5	0		17	0.5%	3.4	2.7
Epeorus longimanus	0	0	0	0	0		0	0.0%	0.0	0.0
Heptagenia sp.	1	2	0	2	0		5	0.1%	1.0	0.9
Leucrocuta sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ecdyonurus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhithrogena sp.	12	8	3	10	0		33	1.0%	6.6	5.1
Macaffertium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Choroterpes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Traverella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia bicornuta	0	0	0	0	0		0	0.0%	0.0	0.0
Paraleptophlebia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isonychia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephoron sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemera simulans	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycerus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	2	2	0	3	0		8	0.2%	1.6	1.5
Tricorythodes sp	16	16	17	5	0		54	1.6%	10.8	7.8
							15			
HEMIPTERA								0%	0	
Sigara sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gerris sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhagovelia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
LEPIDOPTERA										
Petrophila sp.	11	8	3	17	0		38.5	1.1%	7.7	6.7
Synclita sp.	0	0	0	0	0		0	0.0%	0.0	0.0
ODONATA								0%	0	
Argia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Enallagma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ischnura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ophiogomphus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
PLECOPTERA								4%	26	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Calineuria california	0	0	1	0	0		1	0.0%	0.3	0.6
Claassenia sabulosa	2	0	1	2	0		5	0.2%	1.1	1.1
Hesperoperla pacifica	5	10	4	5	0		24	0.7%	4.8	3.6
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER 15.5 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Zapada cinctipes	0	0	1	0	0		1	0.0%	0.3	0.6
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	0	4	0	3	0		7	0.2%	1.5	2.0
Skwala sp.	0	6	0	3	0		9	0.3%	1.9	2.7
Isoperla fulva	0	4	1	0	0		5	0.2%	1.1	1.7
Isoperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Pteronarcella badia	6	8	1	2	0		17	0.5%	3.4	3.4
Pteronarcys californica	16	16	12	14	0		57	1.7%	11.4	6.6
Sweltsa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Suwallia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Kathroperla sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							10			
TRICHOPTERA								52%	350	
Arctopsyche grandis	7	8	7	2	0		24	0.7%	4.7	3.6
Cheumatopsyche spp.	126	216	174	163	0		679	20.2%	135.9	82.5
Hydropsyche occidentalis	31	22	23	14	0		89	2.7%	17.9	11.8
Hydropsyche morosa gr.	78	122	88	82	0		369	11.0%	73.9	44.8
Hydropsyche spp.	42	50	53	20	0		166	4.9%	33.1	22.5
Hydropsyche C. cockerelli	26	18	11	7	0		62	1.8%	12.4	10.2
Hydropsyche nr bronta	4	4	8	3	0		19	0.6%	3.8	2.8
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Limnephilus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	2	20	0	5	0		28	0.8%	5.5	8.4
Hydroptila spp.	28	48	28	54	0		158	4.7%	31.6	21.3
Ithytrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Leucotrichia pictipes	0	0	0	0	0		0	0.0%	0.0	0.0
Neotrichia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ochrotrichia sp.	1	0	0	0	0		1	0.0%	0.2	0.5
Lepidostoma sp.	0	18	7	20	0		45	1.3%	9.0	9.7
Ceraclea sp.	0	2	1	9	0		12	0.4%	2.4	3.5
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	0	10	9	12	0		31	0.9%	6.2	5.8
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	2	1	0	0		3	0.1%	0.7	0.9
Psychomyia sp.	7	6	5	10	0		29	0.9%	5.7	3.7
Micrasema	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	1	4	0	20	0		26	0.8%	5.1	8.7
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gp.	1	0	0	0	0		1	0.0%	0.2	0.5
Helicopsyche borealis	0	6	0	2	0		8	0.2%	1.5	2.6
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	0	0	0	0	0		0	0.0%	0.0	0.0
							18			

CRF M A C R O I N V E R T E B R A T E D A T A

CLARK FORK RIVER 15.5 --August 17, 2020

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
ANNELIDA								0.6%	4	
Lumbricidae	0	0	0	0	0		0	0.0%	0.0	0.0
Lumbriculidae	2	2	11	0	0		15	0.4%	3.0	4.4
Encytraeidae	0	0	0	0	0		0	0.0%	0.0	0.0
Naididae	0	0	0	0	0		0	0.0%	0.0	0.0
Tubificidae	1	2	1	0	0		5	0.1%	0.9	0.9
Erpobdellidae	0	0	0	0	0		0	0.0%	0.0	0.0
Glossophonia complanata	0	0	0	0	0		0	0.0%	0.0	0.0
Helobdella stagnalis	0	0	0	0	0		0	0.0%	0.0	0.0
CRUSTACEA								0%	0	
Orconectes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ostracoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hyalella azteca	0	0	0	0	0		0	0.0%	0.0	0.0
Gammarus spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Caecidotea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
MOLLUSCA								0.1%	1	
Physella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Gyraulus sp.	0	0	0	1	0		1	0.0%	0.2	0.4
Fossaria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Stagnicola sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Valvata	0	0	0	0	0		0	0.0%	0.0	0.0
Potamopyrgus antipodarum	0	0	0	0	0		0	0.0%	0.0	0.0
Margaritifera falcata	0	0	0	0	0		0	0.0%	0.0	0.0
Pisidium sp.	0	2	0	0	0		2	0.1%	0.4	0.9
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER										
Turbellaria	0	0	0	0	0		0	0.0%	0.0	0.0
Dugesia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Polycelis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydra sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Bryozoa	0	0	0	0	0		0	0.0%	0.0	0.0
Nematoda	0	0	0	0	0		0	0.0%	0.0	0.0
Hydracarina	0	0	0	0	0		0	0.0%	0.0	0.0
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

*(+) present in these samples but not in subsamples

Appendix C
Metric Values and Bioassessment Scores for Clark Fork River Basin Monitoring Stations, 1986 to 2020

C-1. Mean metric values and bioassessment scores for Silver Bow Creek near Opportunity: Station 02.5* - August 1986-2020 (four Hess samples per year).

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Mean	SD	2001 - 2020 Mean	2001 - 2020 Max	2001 - 2020 MIN	1986-2000 Mean	1986-2000 Max	1986-2000 MIN
Metric values																																									
Taxa richness	9	11	14	11	8	11	16	13	14	10	19	5	10	10	13	15	12	18	16	21	17	15	16	16	19	25	22	26	24	30	26	28	27	**17**		21	30.0	12	12	19	5
Shannon diversity	2.1	2.3	2.1	2.6	2.2	2.3	2.9	1.7	2.3	2.2	2.4	1.2	2.0	2.4	2.4	2.0	1.8	2.0	1.9	1.9	2.7	2.4	2.7	2.3	2.3	2.4	2.7	2.3	2.8	3.4	2.3	3.4	3.4	**2.4**		2.5	3.4	1.8	2.2	2.9	1.2
EPT/EPTC	0.63	0.27	0.74	0.44	0.52	0.51	0.75	0.11	0.65	0.18	0.66	0.21	0.26	0.46	0.56	0.59	0.71	0.68	0.81	0.87	0.87	0.84	0.80	0.63	0.86	0.72	0.79	0.90	0.86	0.82	0.73	0.65	0.77	**0.6**		0.8	0.9	0.6	0.46	0.75	0.11
Hydropsychinae/Trichoptera	0.98	0.87	0.98	0.86	0.89	0.89	0.98	0.93	0.16	0.66	0.99	0.49	0.34	0.53	0.24	0.91	0.96	1.00	0.98	0.95	0.94	0.96	0.42	0.70	0.66	0.87	0.33	0.57	0.23	0.4	0.11	0.31	0.56	**0.7**		0.66	1.0	0.1	0.72	0.99	0.16
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.75	1.00	1.00	0.92	0.95	0.99	1.00	0.99	0.99	1.00	1.00	0.96	0.85	0.97	0.78	0.82	0.90	0.95	**1.0**		0.94	1.0	0.8	0.98	1.00	0.75
Biotic index	4.0	4.9	5.4	3.8	4.3	4.7	4.6	4.3	4.1	4.5	3.6	4.3	4.3	3.2	3.5	3.0	3.2	5.3	5.1	5.0	3.9	4.3	4.5	5.3	4.3	5.2	3.9	3.9	3.2	3.5	4.6	4.0	4.2	**4.2**		4.2	5.3	3.0	4.2	5.4	3.2
% Filterer	53	21	73	39	51	51	71	12	77	18	62	21	25	45	67	59	70	74	82	84	79	74	76	78	79	71	69	83	63	51	71	24	52	**58**		69	84.0	24	46	77	12
Density	82	120	378	189	147	220	396	399	640	157	321	176	158	115	431	341	240	1650	893	1423	543	896	262	707	798	1608	510	1741	757	1128	485	669	460	**577**		840	1741.0	240	262	640	82
EPT richness	3	3	5	5	3	4	7	4	5	3	8	3	4	3	4	5	4	5	7	9	8	6	7	7	8	8	9	11	11	15	12	13	13	**6.6**		8.6	15.0	4.0	4	8	3
Metals Tolerance index	7.0	8.0	6.7	7.5	7.4	7.5	6.0	8.6	6.2	8.3	6.8	8.1	7.8	7.1	6.5	7.0	6.7	6.4	5.8	5.5	5.8	5.0	5.5	6.6	5.2	5.8	5.0	4.3	4.0	4.02	4.8	3.9	4.7	**6.2**		5.3	7.0	3.9	7.3	8.6	6.0
Metric scores																																									
Taxa richness	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	1	1	2	1	1	1	1	1	3	2	3	2	4	3	3	3	**1.1**		1.8	4.0	0.0	0	1	0
Shannon diversity	2	3	2	4	3	3	4	1	3	3	3	0	2	3	3	2	2	2	2	2	4	3	4	3	3	3	4	3	4	6	3	6	6	**3.1**		3.4	6.0	2.0	3	4	0
EPT/EPTC	6	3	6	4	5	5	6	1	6	2	6	2	3	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**5.3**		6.0	6.0	6.0	4	6	1
Hydropsychinae/Trichoptera	1	5	1	5	4	4	1	3	6	6	1	6	6	6	6	3	2	0	1	2	2	2	6	6	6	5	6	6	6	6	6	6	6	**4.2**		4.3	6.0	0.0	4	6	1
Baetidae/Ephemeroptera	0	0	0	0	0	0	0	6	0	0	2	0	0	0	0	6	0	0	3	2	1	0	1	1	0	0	2	5	1	6	5	4	2	**1.4**		2.2	6.0	0.0	1	6	0
Biotic index	5	4	3	6	5	4	4	5	5	5	6	5	5	6	6	6	6	3	4	4	6	5	5	3	5	3	6	6	6	6	4	5	5	**4.9**		4.9	6.0	3.0	5	6	3
% Filterer	5	6	1	6	5	5	1	6	0	6	3	6	6	6	2	4	2	1	0	0	0	1	0	0	0	1	2	0	3	6	1	6	6	**2.9**		1.8	6.0	0.0	4	6	0
Density (high)	*	*	*	*	*	*	*	*	6	*	*	*	*	*	*	*	*	6	6	6	*	6	*	6	*	6	6	6	*	6	6	5	*	6	*	**5.9**		5.9	6.0	5.0	6	6	6
Density (low)	1	1	4	2	1	2	4	4	6	2	3	2	2	1	4	3	2	6	6	6	5	6	3	6	6	6	5	6	6	6	5	6	5	**4.0**		5.2	6.0	2.0	3	6	1
EPT richness	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	4	3	4	4	**1.8**		2.3	4.0	1.0	1	2	1
Metals Tolerance index	2	1	3	2	2	2	3	1	3	1	3	1	2	2	3	2	3	3	4	4	4	4	4	3	4	4	4	5	5	5	5	6	5	**3.2**		4.1	6.0	2.0	2	3	1
Total	23	24	21	30	26	26	26	28	36	26	30	23	27	30	31	34	24	29	35	36	31	36	32	37	39	39	39	49	48	60	41	58	48	**33**		38.1	60.0	24.0	27	36	21
Organic subset	10	10	4	12	10	9	5	11	11	11	9	11	11	12	8	10	8	10	10	10	6	12	5	9	11	10	8	12	15	17	5	17	11	**10**		9.9	17.0	5.0	10	12	4
Metals subset	4	3	8	5	4	5	9	6	10	4	8	4	5	4	8	6	6	10	12	12	11	12	9	11	12	12	11	14	14	15	13	16	14	**8**		11.3	15.0	6.0	6	10	3
Bioassessment																																									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 #	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Mean		Mean	Max	MIN	Mean	Max	MIN
Biointegrity	38%	40%	35%	50%	43%	43%	43%	47%	55%	43%	50%	38%	45%	50%	52%	57%	40%	44%	53%	55%	52%	55%	53%	56%	59%	59%	65%	74%	73%	91%	68%	88%	80%	**54%**	14.2%	62%	91%	40%	45%	55%	35%
Metals subset	22%	17%	44%	28%	22%	28%	50%	33%	56%	22%	44%	22%	28%	22%	44%	33%	33%	56%	67%	67%	61%	67%	50%	61%	67%	67%	61%	78%	78%	83%	72%	89%	78%	**50%**	14.1%	63%	83%	33%	32%	56%	17%
Organic subset	83%	83%	33%	100%	83%	75%	42%	92%	61%	92%	75%	92%	92%	100%	67%	83%	67%	56%	56%	56%	50%	67%	42%	50%	61%	56%	67%	67%	83%	94%	42%	94%	92%	**71%**	14.9%	62%	94%	42%	78%	100%	33%

1986- 1992 data from Station 03.

* not calculated if density is < 550

0.68 0.68
0.72 0.72
0.42 0.42

Appendix D
List of Clark Fork River Basin Macroinvertebrate Biomonitoring Reports

APPENDIX D

List of Clark Fork River Basin Biomonitoring Reports

Stagliano D. M. 2020. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments for 2019.* Technical report prepared for JACOBS. Boise, Idaho

Stagliano D. M. 2019. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments for 2018.* Technical report prepared for JACOBS. Boise, Idaho

Stagliano D. M. 2018. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments for 2017.* Technical report prepared for CH2M/JACOBS. Boise, Idaho

McGuire D. L. 2017. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments for 2016.* Technical report prepared for CH2M. Boise, Idaho.

McGuire D. L. 2016. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments for 2015.* Technical report prepared for CH2M. Boise, Idaho.

McGuire D. L. 2015. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments for 2014.* Technical report prepared for CH2M. Boise, Idaho.

McGuire D. L. 2014. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments in 2013.* Technical report prepared for CH2M. Boise, Idaho.

McGuire D. L. 2013a. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments in 2012.* Technical report prepared for CH2M. Boise, Idaho.

McGuire D. L. 2013b. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments in 2011.* Technical report prepared for CH2M. Boise, Idaho.

McGuire D. L. 2011. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments in 2010.* Technical report prepared for CH2M. Boise, Idaho.

McGuire D. L. 2010. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments in 2009.* Technical report prepared for CH2M. Boise, Idaho.

McGuire D. L. 2009. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments in 2008.* Technical report prepared for CH2M. Boise, Idaho.

McGuire D. L. 2008. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments in 2004 and 2007.* Technical report prepared for EPA, Region 8. Helena, Montana.

McGuire, D. L. 2007. *Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments, 2006.* Technical report prepared for EPA, Region 8. Helena, Montana.

McGuire, D. L. 2004. *Clark Fork River Macroinvertebrate Community Bio-integrity, 2003 Assessments*. Technical report prepared for the Montana Department of Environmental Quality/ Planning, Prevention and Assistance Division.

McGuire, D. L. 2003. *Clark Fork River Macroinvertebrate Community Bio-integrity, 2002 Assessments*. Technical report prepared for the Montana Department of Environmental Quality/ Planning, Prevention and Assistance Division.

McGuire, D. L. 2002. *Clark Fork River Macroinvertebrate Community Bio-integrity, 2001 Assessments*. Technical report prepared for the Montana Department of Environmental Quality/ Planning, Prevention and Assistance Division.

McGuire, D. L. 2001. *Clark Fork River Macroinvertebrate Community Bio-integrity, 2000 Assessments*. Technical report prepared for the Montana Department of Environmental Quality/ Planning, Prevention and Assistance Division.

McGuire, D. L. 2000. *Clark Fork River Macroinvertebrate Community Bio-integrity, 1999 Assessments*. Technical report prepared for the Montana Department of Environmental Quality/ Planning, Prevention and Assistance Division.

McGuire, D. L. 1999. *Clark Fork River Macroinvertebrate Community Bio-integrity, 1997 and 1998 Assessments*. Technical report prepared for the Montana Department of Environmental Quality/ Planning, Prevention and Assistance Division.

McGuire, D. L. 1998. *Clark Fork River Macroinvertebrate Community Bio-integrity, 1996 Assessment*. Technical report prepared for the Montana Department of Environmental Quality/ Planning, Prevention and Assistance Division.

McGuire, D. L. 1997. *Clark Fork River Macroinvertebrate Community Bio-integrity, 1995 Assessment*. Technical report prepared for the Montana Department of Environmental Quality/ Planning, Prevention and Assistance Division.

McGuire, D. L. and G.L. Ingman 1996. *Clark Fork River Macroinvertebrate Community Bio-integrity, 1994 Assessment*. Technical report prepared for the Montana Department of Environmental Quality.

McGuire, D. L. 1995. *Clark Fork River Macroinvertebrate Community Bio-integrity, 1993 Assessment*. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Division.

McGuire, D. L. 1993. *Clark Fork River Macroinvertebrate Community Bio-integrity, 1986 through 1992*. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

lngman G. L. 1992. A rationale and alternatives for controlling nutrients and eutrophication problems in the Clark Fork river basin. State of Montana, Department of Health and Environmental Sciences. Section 525 of 1987 Clean Water Act amendments.

McGuire, D. L. 1989a. *Clark Fork River Aquatic Macroinvertebrate Survey, August 1987*. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

McGuire, D. L. 1989b. *Clark Fork River Aquatic Macroinvertebrate Survey, August 1988*. Technical report prepared for the Montana Department of Health and Environmental Sciences/Water Quality Bureau.

McGuire, D. L. 1987. *Clark Fork River Macroinvertebrate Study, 1986*. Technical report prepared for the Montana Governor's Office and Montana Water Quality Bureau.

Hornig, C.E. and S. Hornig. 1985. *Macroinvertebrate Communities of the Clark Fork River, 1984-85.* IN. G.L. Ingman (ed.). Champion International Frenchtown Mill Discharge Permit, Vol. II. Montana Department of Health and Environmental Sciences. MT-0000035.