Report

Clark Fork River Biomonitoring: Macroinvertebrate Community Assessments for 2019

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Executive Summary

The upper Clark Fork River (CFR) Basin in western Montana contains four contiguous Superfund operable units that have been undergoing various remediation activities for decades. Since 1986, annual benthic macroinvertebrate-based (BMI) monitoring has been performed at 13 CFR stream reaches with ongoing or future remedial actions (McGuire Consulting 1986-2017; Montana Biological Survey/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 current assessments of ecological conditions, these sampling events extend the long-term data set for evaluating water quality trends and the effectiveness of remedial activities.

These BMI assessment methods, developed specifically for the CFR basin, compare each station to a fixed reference condition (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 nutrient stressors.

The 2019 BMI assessments documented above average biointegrity scores at 11 of the 13 sites, with notable improvement in the Silver Bow Creek watershed and upper CFR (Figure ES-1). The overall biointegrity average of 91 percent across all sites is the highest ever reported for this study. Although, environmental conditions still appear to be causing slight impairments in the biological integrity of SBC and the CFR in the Deer Lodge Valley. Biological integrity in 2019 was non-impaired at seven monitoring sites and slightly impaired at six sites (Figure ES-2). Biological assessment scores ranged from 97 percent at CFR at Kohrs Bend (Station 10) to 85 percent at SBC below Warm Springs (Station 4.5) and the Blackfoot River site (Station 14) (Figure ES-1). Both SBC sites (stations 2.5 and 4.5) were rated as slightly impaired. Slight biological impairment from nutrients was evident at two CFR stations near Deer Lodge (8.5 and 9.0) and near Missoula (Station 15.5), but the former sites have improved markedly since 2017. The lower Blackfoot River (Station 14) was ranked slightly impaired again in 2019, likely due to metal related stressors.

During 2019, environmental conditions in SBC at Opportunity (Station 2.5) improved after experiencing declines in integrity scores in 2018. Likewise, SBC below the Warm Springs Ponds (Station 4.5) remained slightly impaired but BMI integrity improved over 2017 scores. Environmental stressors (nutrients and low-stream flows) decreased across the three CFR sites in the Deer Lodge Valley based on the 2018 and 2019 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. Significant impacts characteristic of nutrient enrichment were documented throughout the Deer Lodge Valley (five sites) during 2017, while only three CFR sites (Stations 8.5, 9.0 and 10 in 2018; 8.5 and 9.0 in 2019) reported slight nutrient impairments in the last two years

Long-term monitoring data shows biological integrity throughout the CFR Basin has improved since 1992 with the highest assessment scores previously occurring in 2009 (Figure ES-2). Most recently, floodplain restoration and contaminant removal from upper Silver Bow Creek have 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 Silver Bow Creek improved to slightly impaired over the past 2 years.

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 voluntary nutrient-reduction program during the 1990s. Impacts attributable to nutrients have declined at all stations except in SBC. 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). Significant metals pollution has not been indicated in the CFR since 2011. Assessment scores peaked in 2009, when all eight CFR stations were classified as non-impaired. Except for the SBC sites and the Blackfoot River, biological integrity in the CFR Basin has, on average, been only slightly impaired during this last decade.

Based on monitoring results from 2001 through 2019 (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). Surprisingly, the Blackfoot River biointegrity has been slightly impaired from 2016 through 2019.

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 it has been slightly impaired over the past 3 years. This uptick in bio-assessment scores may be the result of reduced liming and lower pH in the Warm Springs Ponds.

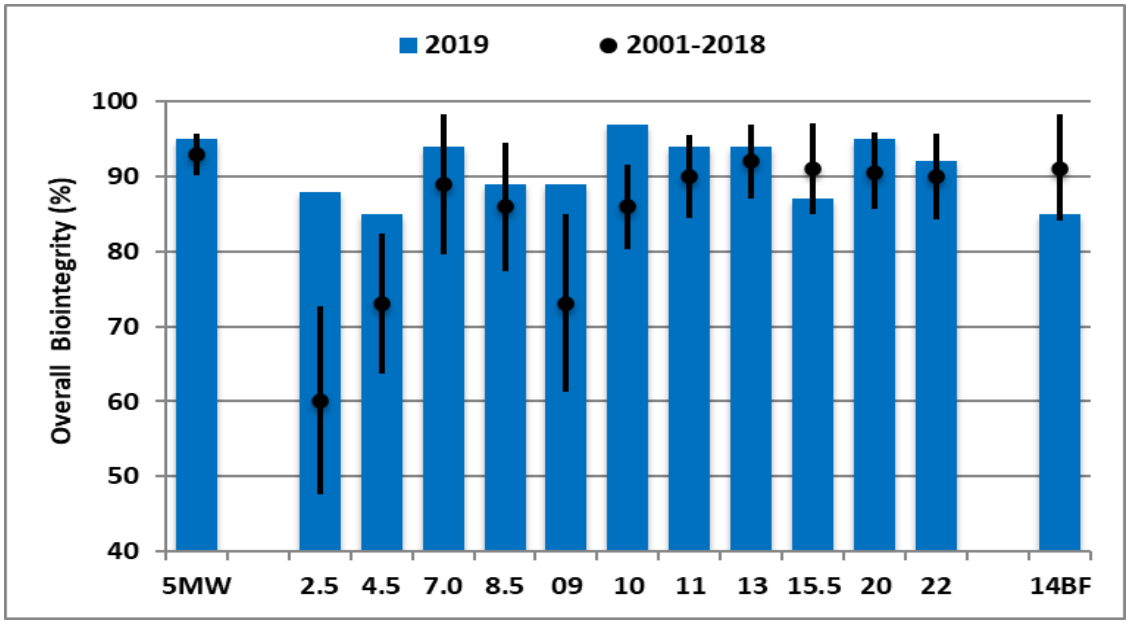
Nutrient impacts are routinely documented at the CFR stations in the Deer Lodge Valley, and nutrient scores were the lowest ever reported in 2017; these have significantly improved in 2019 with the flushing flows of 2018. Based on BMI biointegrity metrics in 2019, CFR Stations 07, 8.5, and 09 have all increased by an average of 22 percent from 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 unremediated floodplain slickens deposits during high-flow events.

Long-term monitoring has identified more ephemeral 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 was documented at 10 of the 12 monitoring sites. Impacts from metals were indicated in SBC and in the CFR from Sager Lane 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 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.

Decades of biomonitoring has shown that biological community 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

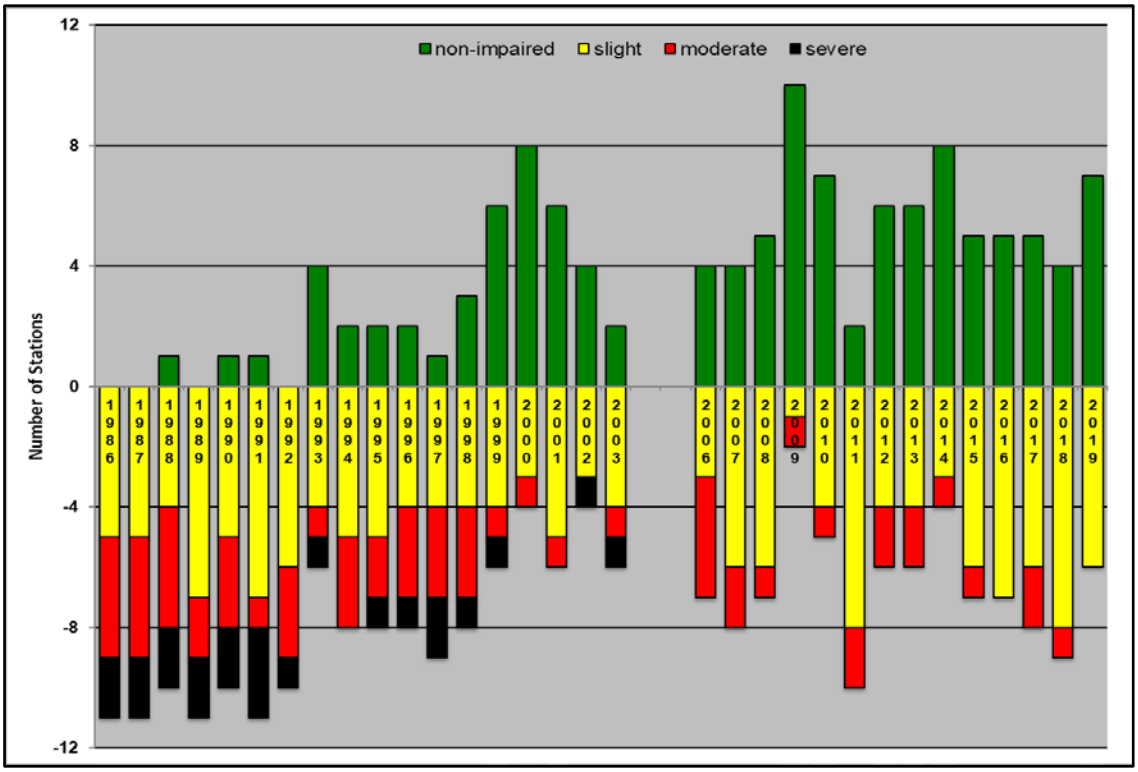
becoming more of a contributing stressor than metals to the integrity of the BMI communities. Of the 33-year period of record, 2019 was only the second year to report no sites ranked moderately or severely impaired (Figure ES-2).

Figure ES-1. Biointegrity at 13 Sites in the Clark Fork River Basin from August 2001 to 2018 (Mean and Standard Deviation) and August 2019. 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 2019



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Acronyms and Abbreviations

BMI	Benthic macroinvertebrates
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
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). 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 2019 monitoring was conducted at 13 sites from Silver Bow Creek at Opportunity, MT to approximately 20 miles downstream of Missoula at the Clark Fork River near Huson, MT.

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, 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 persists 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 large rain events increased stream flows in Silver Bow Creek and the upper CFR (almost doubling baseflow [**Figure 3**]) likely causing a metals toxicity-related fish kill downstream of Warm Springs from Galen to Perkins Lane (Cook 2019). Rainwater draining across slickens was causally blamed for this fish-kill. Slickens are areas of bare ground in the upper Clark Fork watershed devoid of life due to flood deposited heavy metal contamination dating back to an early 20th-century flood that washed waste from upstream mining/smelting sources down river all the way to Missoula.

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 four contiguous Superfund OUs beginning in Butte, Montana, and ending at the site of 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 former 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 2019, macroinvertebrate samples were collected from 13 locations:

- 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 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)
  - Clark Fork River at Huson (CFR Station 22)

Table 1. Clark Fork Basin Biomonitoring Stations

Station	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 Ramsey	1986 – 1992			
02.5	**Silver Bow Creek at Opportunity**	1993 – 2003	**2006 – 2019**	**46.10712**	**-112.80506**
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 Pond**	1993 – 2004	**2006 – 2019**	**46.18104**	**-112.77932**
05	**Mill-Willow Creeks Bypass**	1986 – 2001	**2006 – 2019**	**46.17205**	**-112.78543**
06	Warm Springs Creek near mouth	1986 – 2001			
07	**Clark Form River below Warm Springs Creek**	1986 – 2004	**2006 – 2019**	**46.18791**	**-112.76877**
08	Clark Fork River near Dempsey	1986 – 2001			
08.5	**Clark Fork River at Sager Lane**	1990 – 2001	**2006 – 2019**	**46.31753**	**-112.73604**
09	**Clark Fork River at Deer Lodge**	1986 – 2004	**2006 – 2019**	**46.40087**	**-112.74273**
10	**Clark Fork River at Kohrs Bend FA**	1986 – 2003	**2007 – 2019**	**46.49750**	**-112.73848**
10.2	Little Blackfoot River near mouth	1993 – 2001			
11	**Clark Fork River and Gold Creek Bridge**	1986 – 2001	**2006 – 2019**	**46.59044**	**-112.93091**
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 – 2019**	**46.82121**	**-113.80509**
14	**Blackfoot River above Bonner**	1986 – 2001	**2006 – 2019**	**46.89542**	**-113.76690**
15	Clark Fork River below Milltown Dam	1968 – 1988			
15.5	**Clark Fork River at ShaRon FA**	1989 – 2003	**2006 – 2019**	**46.88275**	**-113.93184**
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 FA**		**2006 – 2019**	**46.90394**	**-114.14978**
22	**Clark Fork River at Huson**	1986 – 2003	**2017 – 2019**	**47.02316**	**-114.33625**
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 samples in 2019.

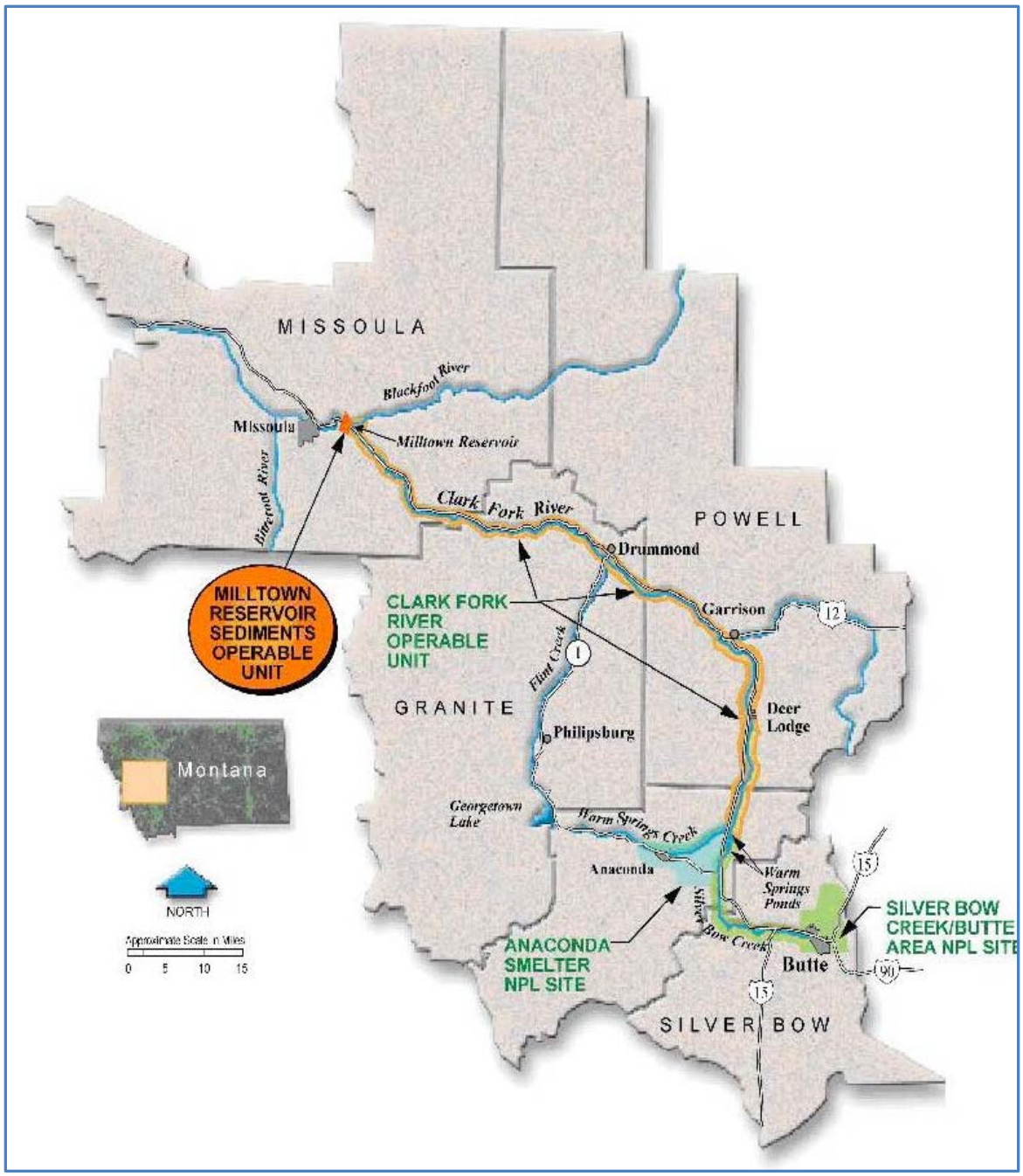
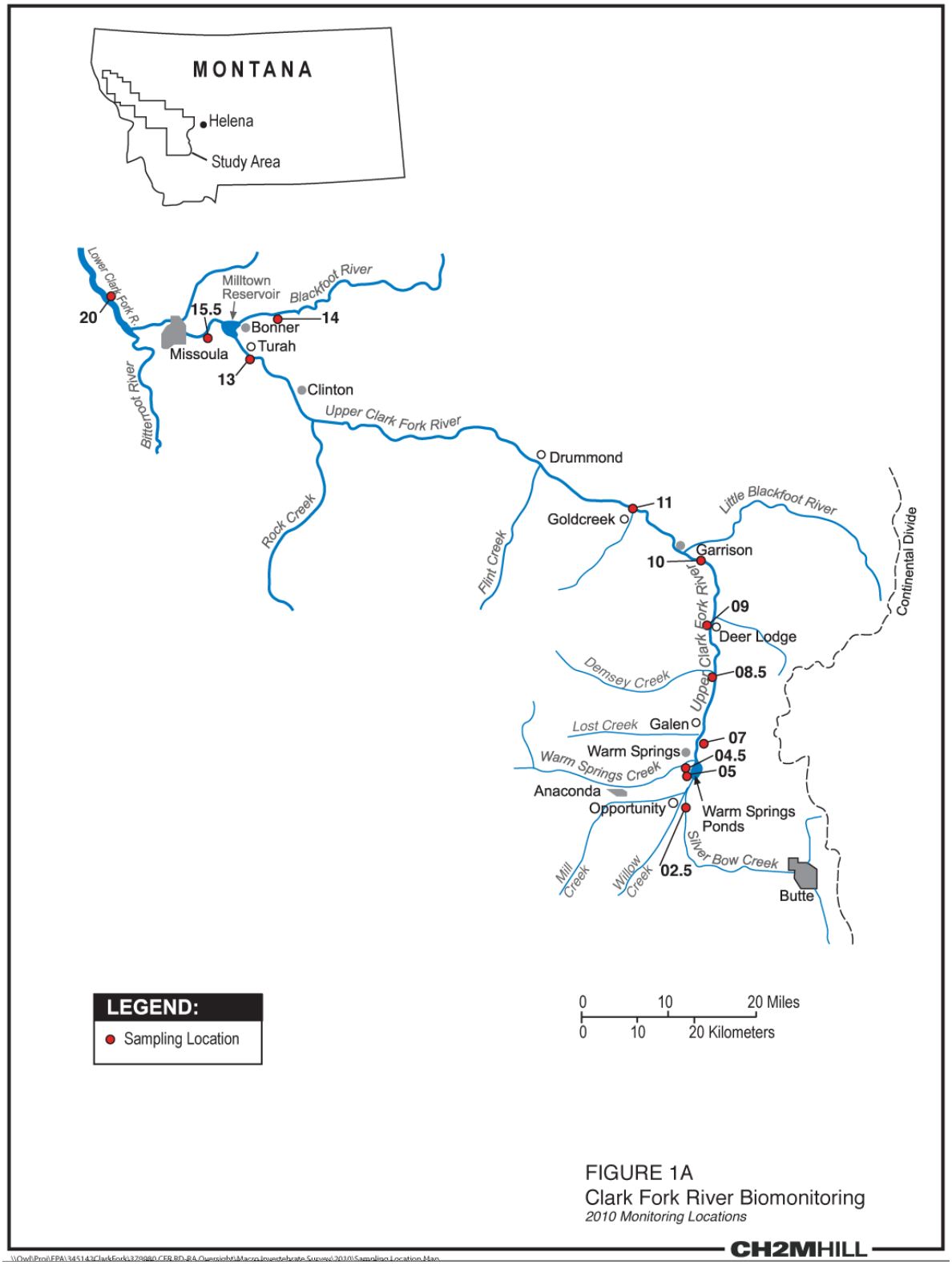


Figure 1. Map of Clark Fork River Basin
Note: Superfund areas are depicted with arrows and shaded.

Figure 2. Clark Fork River Biomonitoring: 2019 Monitoring Locations



Note: Station 22 Clark Fork River at Huson is approximately 20 miles downstream from Station 20, which is off the map.

SECTION 3

Methods

3.1 Field Work

Benthic macroinvertebrates were collected at 13 sites during the second week of August in 2019. 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 Silver Bow Creek 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 Clark Fork River at the expense of detecting slight improvements in Silver Bow Creek. 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 feature 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 Silver Bow Creek. Historically, macroinvertebrates were absent from, or present at extremely low densities in Silver Bow Creek 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 Clark Fork River 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) and McGuire (1992).

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 to metals. 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 impaired.

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 2019 is provided in Appendix A. The 2019 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 33 years (Appendix C).

4.1 Stream Discharge

In 2019, the Clark Fork watershed experienced an above average water year with some of the highest average August, annual flows and peak discharges, save for 2018, recorded since 2011 (**Table 3**). Runoff occurred early, with a strong pulse in early-April, then stream flows declined slightly with a second pulse in late-May and sustained flows into late-June (**Figure 3**). This above average water year followed the record flow year in 2018 and its effects were still noticeable in 2019.

BMI sampling was completed during the second full week of August (Aug. 12-14th) when streamflow had already reached its lowest value at Deer Lodge, but after large thunderstorms bumped flows up on August 8-9th on SBC and CFR at Deer Lodge (**Figure 3**).

Streamflow 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 basin, since some aspect of recorded streamflow was below the 30-year average (**Table 3**).

Figure 3. Clark Fork River at Deer Lodge (top) and above Missoula (bottom), Montana – Discharge during the 2019 Water Year

Note: Red arrow indicates period of sampling.

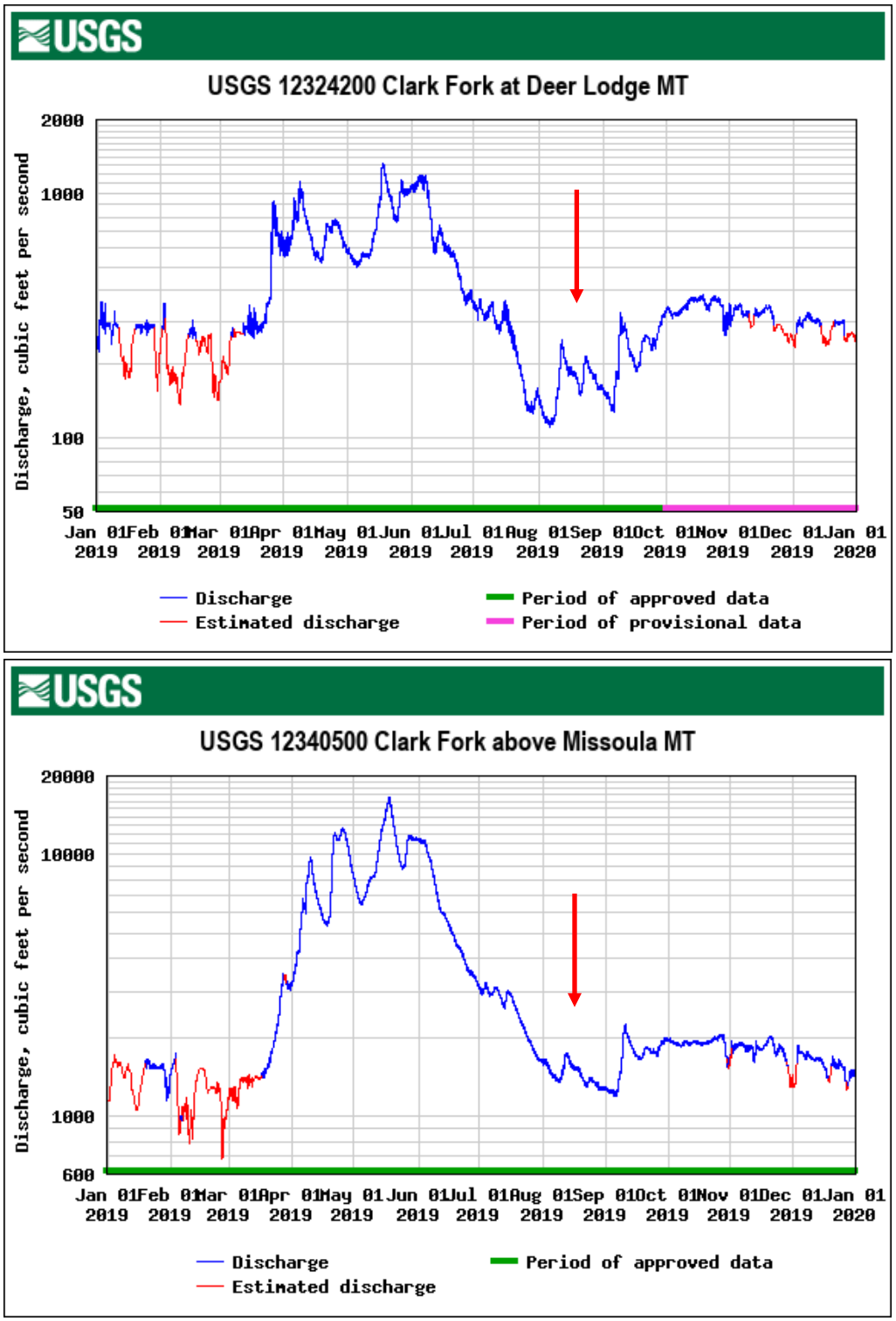


Table 3. Mean August, Annual, and Peak Discharge at Selected USGS Gaging Stations in the Clark Fork River Basin

	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**	**1190**	**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**
Mean	**28**	**55**	**343**	**107**	**249**	**989**	**1,379**	**2,806**	**13,773**

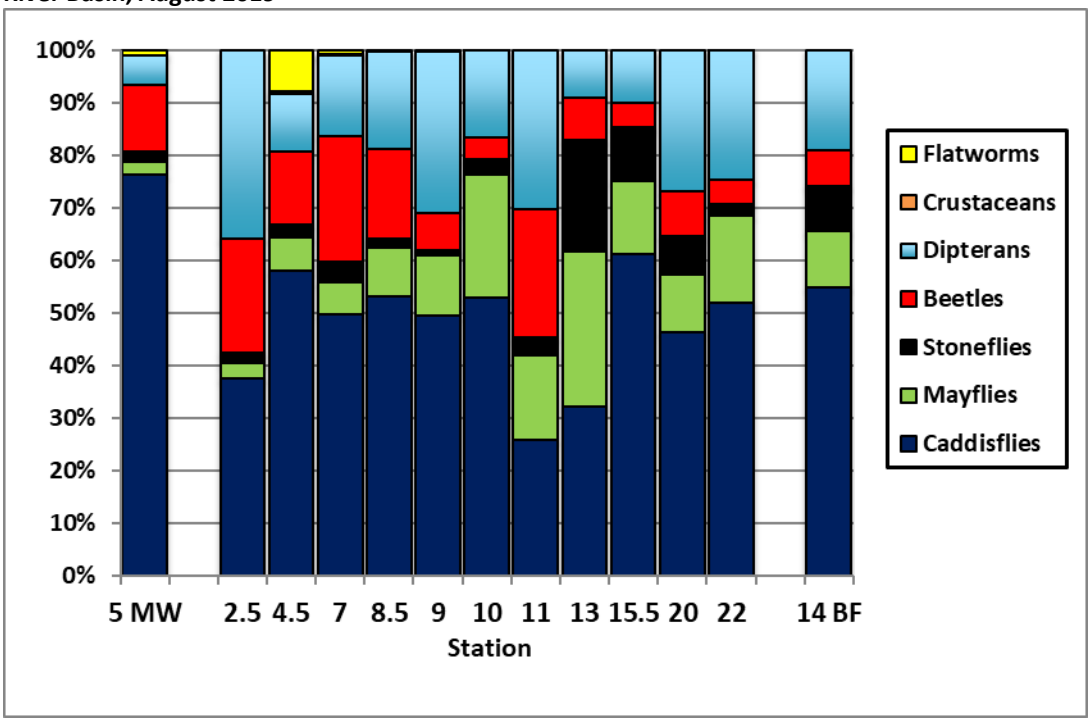
Notes: All values are in cubic feet per second. Values in bolded red are below the 30-year average during the last 7 years.
USGS = U.S. Geological Survey

4.2 Macroinvertebrate Densities and Community Characterization

The 52 samples collected from 13 sites in 2019 contained nearly 48,600 macroinvertebrates representing 115 taxa; this is approximately 26 percent more individuals than collected in 2018. Insects (Class: Insecta) accounted for 100 of those taxa and 98.8 percent of the collected invertebrate organisms (**Appendix A**). Caddisflies were the most abundant insect group at 11 of the 13 sites (**Figure 4**), attaining maximum densities in the Mill-Willow By-pass (>75 percent), SBC Station 4.5 (57 percent) and CFR at ShaRon Station 15.5 (61 percent) (**Figure 4**). The relative abundance of caddisflies >50 percent was also observed at the CFR at Huson (Station 22) and the Blackfoot River (Station 14) (**Figure 4**).

Dipterans were also abundant throughout the study area and were numerically dominant at SBC 2.5 and CFR stations 09 and 11 (largely midges and blackflies) (**Figure 4**). Mayflies were most abundant and co-dominant with caddisflies at the Turah FAS (Station 13), but mayflies were less common than caddisflies at all other 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 (21 percent) at CFR at Turah FAS (13) (**Figure 4**). Riffle beetles (Elmidae) comprised a relatively high abundance (24 percent) of the assemblage at the CFR at Warm Springs (07) and at Gold Creek (11). Flatworms comprised ~1 percent of the benthic fauna in Mill-Willow By-Pass (site 5) and CFR below Warm Springs (Station 7), but were relatively rare elsewhere, except for 7.7 percent at the SBC Station 4.5 (**Figure 4**). Likewise, crustaceans (mainly Amphipoda) were reported only at SBC Station 4.5 and CFR station 07 at low percentages (<1 percent) (**Figure 4**).

Figure 4. Relative Abundance (Percent) of Major Macroinvertebrate Groups at 13 Sites in the Clark Fork River Basin, August 2019



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 2019 are compared to means and ranges from 2001 through 2018.

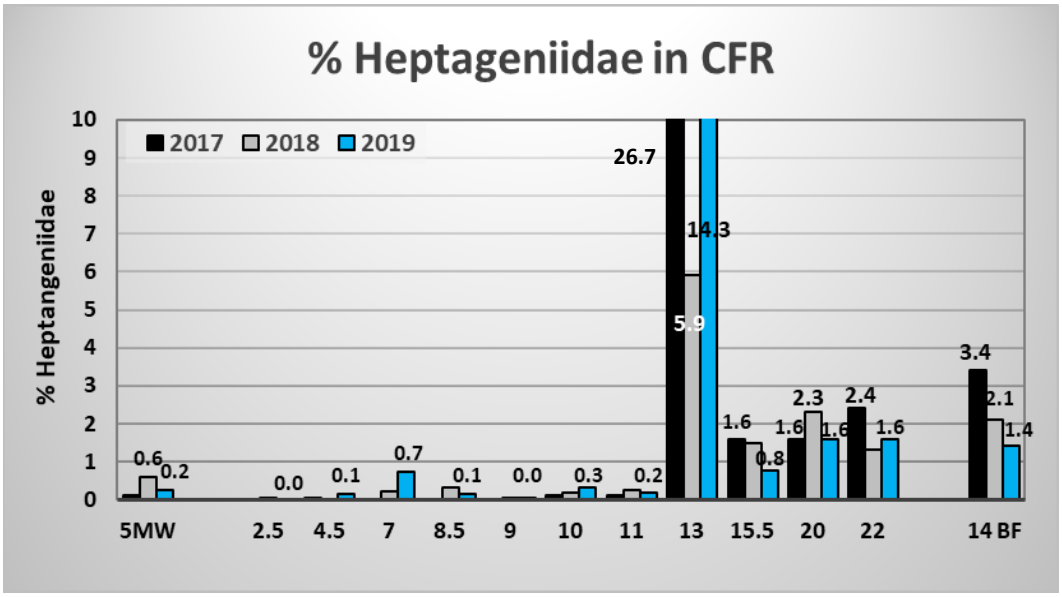
BMI densities were below average at 11 of 13 sites throughout the Clark Fork River Basin in 2019 (933 ind. per 0.1m^2) compared to the long-term average (1,340 ind. per 0.1m^2) (**Table 4**). Mean density estimates for individual stations ranged from approximately 244 to 2,500 macroinvertebrates per Hess sample. Densities were highest across the Deer Lodge Valley (Stations 7.0, 8.5, 9, 10 and 11) (**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 2019. Diversity, total taxa, and EPT richness have increased at the CFR downstream from Gold Creek to Kona Road (Stations 11, 13, 15.5, and 20), especially since 2018 (**Table 5**). Most upstream CFR sites had increased values for these metrics in 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 (typically *Rhithrogena* 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 8.5-10) (<0.3 percent) (**Figure 5**). CFR sites downstream of the Rock Creek confluence (starting at Turah station 13) increase RA of Heptageniidae to levels similar to or exceeding the Blackfoot River reference site (Station 14) (**Figure 5**). Steady declines of the numbers of this mayfly family have been documented at the Blackfoot River reference reach (station 14) from 2017 to 2019.

Figure 5. Relative Abundance (Percent) of the mayfly family, Heptageniidae at 13 Sites in the CFR Basin 2017-2019.



Compositional and functional BMI metrics indicated varying degrees of environmental stress within the monitoring area. Values for the ordinal composition metric (EPT/EPTC) ranged from 0.65 to 0.95 (**Tables 4 and 5**). All sites received maximum assessment scores for this metric in 2019.

The Caddisfly compositional metric (Hydropsychinae/Trichoptera) values ranged from 0.24 (CFR Station 5.0) to 0.87 (Station 22.0) and indicated stress at two sites (Stations 15.5 and 22). The mayfly composition metric (Baetidae/Ephemeroptera) ranged from 0.22 at the Clark Fork River at Turah (Station 13) to 0.90 in Silver Bow Creek (Station 2.5); this was the only site where the metric indicated environmental stress. The percentage of filterers ranged from 21 percent (Station 10) to 64 percent

(Station 15.5). Higher percentages of filterer-feeders (>50 percent) supported evidence of nutrient enrichment at four sites (Stations 4.5, 14, 15.5 and 22), down from seven sites reporting these levels in 2018 (**Tables 4 and 5**).

Metal Tolerance Index (MTI) scores

In 2019, five of the 13 sites reported the lowest Metal Tolerance Index (MTI) scores of the 33-year study, one was Silver Bow Creek at Opportunity (Station 2.5), and 10 sites reported MTI scores below the 18-year average (**Tables 4 and 5**). SBC 4.5 and CFR sites (7.0, 8.5, 9.0, 11, 15.5, 20 and 22) had MTI values greater than 4.0 in 2019, consistent with slight metals effects. MTI values ranged from 3.1 at Mill-Willow By-pass (Station 5) to 4.7 at the CFR at Kona FAS (Station 20) (**Table 4**). The Blackfoot River (Station 14) had MTI values <4.0 in 2019 and over the long term (2001-2018), but the BMI community at this site has been indicating metals stressors at this site the last 2 years (**Figure 7**).

Biotic Index Scores

Biotic index values indicated varying degrees of nutrient pollution at the 13 sites. Values ranged from a record low 2.6 (non-impaired) for the Mill-Willow Bypass (Station 05) to 4.9 (moderately impaired) at the Clark Fork River at Deer Lodge (Station 09). Four sites in 2019, 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 33 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 BMI tolerance ≥4.0 over the last 3 years (**Table 5, Appendix C**).

Table 4. Mean Metric Values Characterizing Macroinvertebrate Assemblages at Seven Stations in the Upper Clark Fork River Basin (Deer Lodge Valley) during August 2000 to 2018, and 2019. 2019 bolded values are outside of the typical range for the site.

Station:	2.5		4.5		5.0		7.0		8.5		9.0		10	
Metric	2001-2018 (range)	2019	2001-2018 (range)	2019	2001-2018 (range)	2019	2001-2018 (range)	2019	2001-2018 (range)	2019	2001-2018 (range)	2019	2001-2018 (range)	2019
per 0.1 m^2 Hess Density	874 (240-1741)	669	2300 (1101-4128)	1437	1097 (582-3124)	1254	2002 (1150-4799)	**568**	1765 (301-2670)	1031	2516 (889-5257)	2623	1542 (519-2296)	1372
Taxa richness	20 (12-30)	28	32 (23-44)	36	39 (35-46)	**32**	44 (35-50)	37	36 (24-43)	37	36 (27-44)	36	35 (23-43)	37
EPT richness	8 (4-15)	13	12 (7-19)	17	18 (14-22)	16	21 (17-26)	24	19 (14-24)	22	18 (12-23)	20	19 (12-21)	22
Shan. Diversity	2.0 (1.8-3.4)	3.4	3.1 (2.5-3.7)	**4.0**	3.7 (3.4-4.1)	**3.3**	3.6 (2.3-4.3)	4.0	3.2 (2.6-3.9)	**4.0**	3.0 (1.8-3.7)	**4.0**	3.3 (2.7-3.9)	3.9
EPT/EPTC	0.78 (.59-.90)	0.65	0.84 (.50-.98)	0.87	0.78 (.54-.91)	**0.94**	0.88 (.81-.99)	0.86	0.88 (.81-.99)	0.85	0.87 (.76-.93)	0.71	0.80 (.61-.88)	0.85
Baetidae/ Ephemeroptera	0.9 (.75-1.00)	0.90	0.86 (.57-1.00)	0.76	0.65 (.27-.89)	0.36	0.65 (.43-.96)	0.80	0.63 (.22-.96)	0.9	0.77 (.26-.99)	0.72	0.59 (.30-.87)	0.82
Hydropsychinae/ Trichoptera	0.70 (.1-1.0)	0.31	0.89 (.71-.97)	0.76	0.45 (.18-.83)	0.24	0.78 (.23-.98)	0.78	0.77 (.55-.93)	0.9	0.87 (.41-.98)	0.71	0.65 (.32-.90)	0.34
% Filterer	73 (51-84)	**24**	49 (23-81)	52	41 (11-57)	41	41 (15-71)	34	48 (32-70)	49	65 (31-81)	47	52 (28-75)	**21**
Biotic Index	4.3 (3.0-5.3)	4.0	5.1 (4.6-5.7)	**4.4**	4.2 (3.3-4.9)	**2.6**	4.5 (3.7-5.3)	4.4	4.5 (3.7-4.9)	4.4	5.0 (4.5-5.3)	4.9	4.9 (4.3-5.3)	**4.1**
Metals Index	5.0 (4.0-7.0)	**3.9**	4.8 (4.3-5.5)	4.4	4.3 (3.3-4.8)	**3.1**	4.8 (4.3-5.5)	**4.1**	4.6 (4.2-5.0)	4.4	4.9 (4.4-5.3)	4.5	4.7 (4.2-5.5)	**3.8**

Stations 2.5 and 4.5 on Silver Bow Creek, station 5 on Mill-Willow Bypass, stations 7, 8.5, 9, 10 on the upper Clark Fork.

Table 5. Mean Metric Values Characterizing Macroinvertebrate Assemblages at Five stations in the Clark Fork River Basin near Missoula during August 2001 to 2018 and 2019. 2019 bolded values are outside of the typical range for the site.

Station:	11		13		14		15.5		20		22	
Metric	2001-2018 (range)	2019	2001-2018 (range)	2019	2001-2018 (range)	2019	2001-2018 (range)	2019	2001-2018 (range)	2019	2001-2018 (range)	2019
per 0.1 m^2 Hess Density	1320 (388-2357)	752	877 (119-2458)	281	460 (232-727)	244	882 (223-2145)	**498**	857 (459-1558)	**801**	935 (308-1484)	605
Taxa richness	40 (31-44)	39	41 (29-49)	40	37 (33-43)	**31**	41 (32-54)	39	41 (32-48)	45	40 (39-44)	48
EPT richness	21 (16-23)	21	24 (21-28)	**29**	21 (19-24)	21	23 (18-29)	25	23 (19-26)	26	22 (19-23)	27
Shan. Diversity	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)	4.4	3.5 (3.3-4.1)	4.2
EPT/EPTC	0.78 (.54-.90)	0.67	0.81 (.64-.95)	0.92	0.75 (.32-.98)	0.88	0.80 (.31-.95)	0.94	0.78 (.48-.88)	0.71	0.76 (.62-.85)	0.76
Baetidae/ Ephemeroptera	0.63 (.09-.91)	0.83	0.41 (.29-.55)	**0.22**	0.38 (.16-.51)	0.32	0.44 (.25-.64)	0.45	0.43 (.08-.73)	0.15	0.38 (.05 -.63)	0.55
Hydropsychinae/ Trichoptera	0.67 (.21-.95)	0.38	0.72 (.45-.97)	0.57	0.80 (.61-.88)	0.84	0.78 (.41-.93)	0.85	0.83 (.61-.93)	0.5	0.81 (.70 -.92)	0.87
% Filterer	39 (19-55)	22	37 (12-63)	29	44 (20-74)	54	48 (11-68)	64	54 (20-74)	34	53 (27-73)	52
Biotic Index	4.6 (4.2-5.1)	4.5	4.2 (3.4-4.7)	**3.3**	3.9 (3.4-4.1)	4.0	4.4 (3.8-5.1)	4.2	4.6 (4.1-5.0)	4.7	4.7 (4.4-5.0)	4.7
Metals Index	4.7 (4.2-5.6)	4.3	4.2 (3.5-5.1)	**3.2**	3.6 (2.2-4.1)	3.8	4.2 (3.7-4.6)	4.1	4.1 (3.0-4.9)	4.7	4.1 (3.7-4.5)	4.5

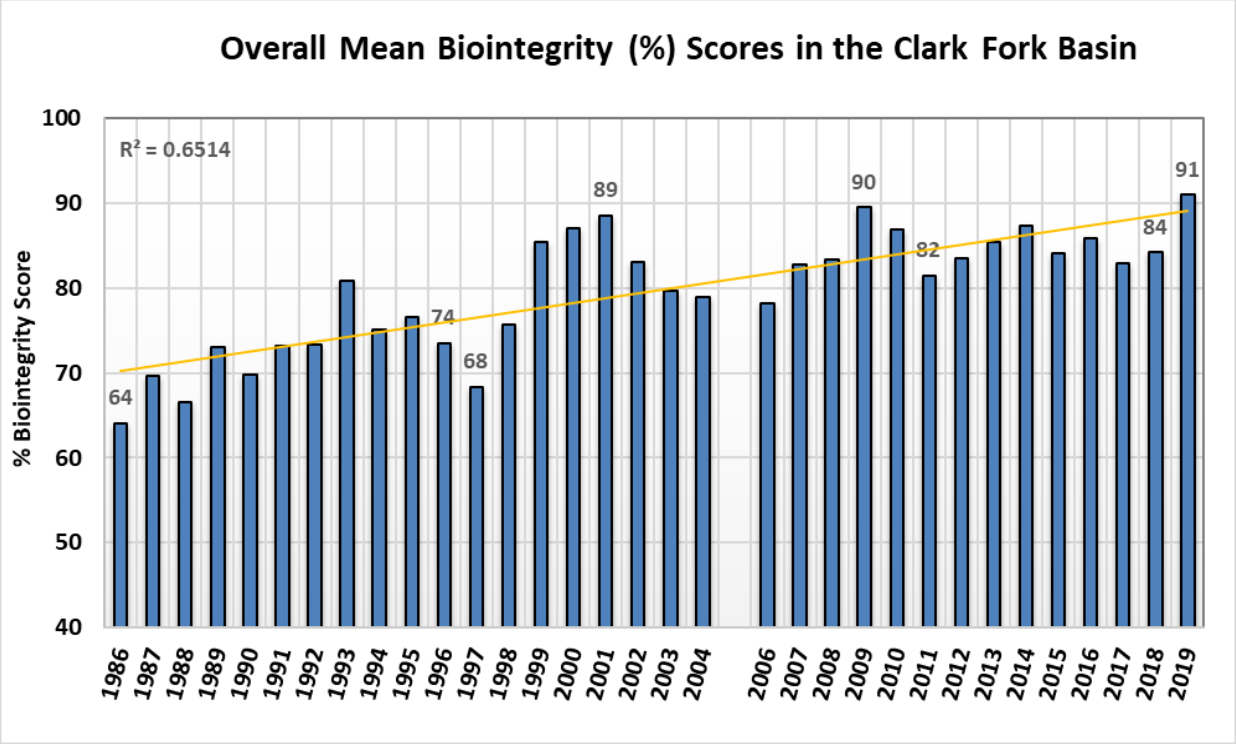
Stations 11, 13, 15.5, 20 and 22 on the Clark Fork River. Station 14 on the Blackfoot River.

4.3 2019 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 2019 BMI assessments documented above average biointegrity scores at 11 of the 13 sites, especially at the SBC sites and in the upper Clark Fork River (**Figure ES-1**). The overall biointegrity average of 91 percent across all sites is the highest ever reported for 33 years of this study (**Figure 6**). Bioassessment scores ranged from 85 to 97 percent (**Table 6**).

Figure 6. Mean (%) Biointegrity Scores for 13 sites in the Clark Fork River Basin sampled between 1986 to 2019. Trendline and R^2 of the line on the graph in yellow.



During 2019, biological integrity based on BMI was ranked non-impaired at seven sites, slightly impaired at six sites, and moderately impaired at zero sites (**Figure 7**). The Mill-Willow Bypass (Station 5) and all CFR sites, except Stations 8.5, 9.0 and 15.5, ranked non-impaired. Silver Bow Creek Stations 2.5 and 4.5, CFR sites (8.5, 9.0 and 15.5) and the Blackfoot River Site (Station 14) ranked slightly impaired (**Figure 6, Table 6**). Deer Lodge Valley CFR sites (Stations 8.5, 9.0 and 10) improved substantially between 2017 and 2019. Overall, 2019 BMI assessment results reflect a significant improvement compared to 2018 biointegrity results that reported nine sites impaired, one moderately (**Figure 7**).

Figure 7. Biointegrity Scores for 13 Sites in the Clark Fork River Basin Sampled in 2019 (top) and August 2018 (bottom).

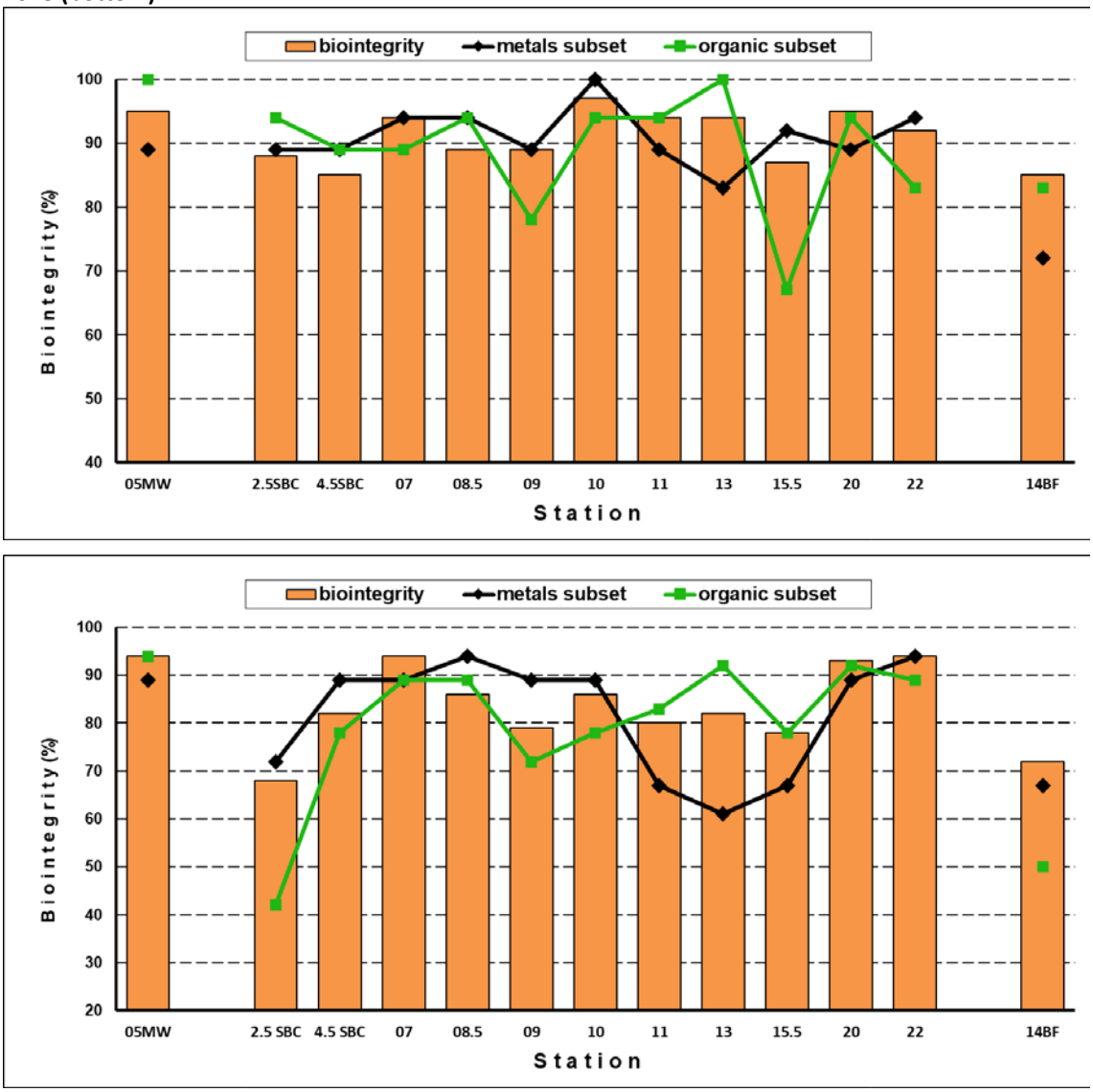


Table 6. Macroinvertebrate community biointegrity estimates in the Clark Fork River Basin sampled in August 2019.

	Biointegrity (% of max score)		
Station	Overall	Metals Subset	Organic Subset
Silver Bow Creek			
2.5	88 *	89	94
4.5	85 *	89	89
Mill-Willow Bypass			
05	95	89	100
Clark Fork River			
07	94	94	89
8.5	89 *	94	94
09	89 *	89	78 *
10	97	100	94
11	94	89	94
13	94	83	100
15.5	87 *	92	67 **
20	95	89	94
22	92	94	83
Blackfoot River			
14	85 *	72 *	83

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 2019 nutrient metric subset scores ranged from 67 percent to 100 percent (**Figure 7, Table 6**). Biological impairment characteristics of nutrient/organic pollution were evident at one site in the Deer Lodge Valley (Station 9.0) and at East Missoula (Station 15.5) (**Table 6**). Moderate nutrient impairment was indicated at the Blackfoot River reference site (Station 14) and at the SBC site at Opportunity (Station 2.5) in 2018, but these stressors appeared to be ameliorated in 2019 (**Figure 7**).

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 2019 sampling, significant metal-related stressors were only exhibited in the BMI community at the Blackfoot River reference site (**Table 6**). Metals stressors were detected at the CFR sites downstream of Gold Creek (Stations 11, 13 and 15.5) and at Silver Bow Creek (Station 2.5) in 2018, but no community metals issues were reported at these sites in 2019 (**Figure 7**).

4.4 Longitudinal and Temporal Patterns

Biological integrity has improved throughout the CFR Basin since 1986 (**Figures 8 and 9**). For all stations combined, mean annual biointegrity has ranged from 64 percent in 1986 to 91 percent in 2019 **(Table 7, Figure 8**). 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 7). 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 Clark Fork River 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 Clark Fork River monitoring sites.

Environmental conditions continue to improve in Silver Bow Creek. Remediation of the Silver Bow Creek 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 Silver Bow Creek below the Warm Springs Ponds (Station 4.5) (**Figure 8**). Biological integrity was slightly impaired at this site at the turn of the century but has declined to moderately impaired from 2006 through 2013. Biological integrity was classified as slightly impaired during 2014 and 2019.

Figure 8. Mean Biointegrity Scores at 13 Stations in the Clark Fork River Basin during Five Time Periods since 1986.

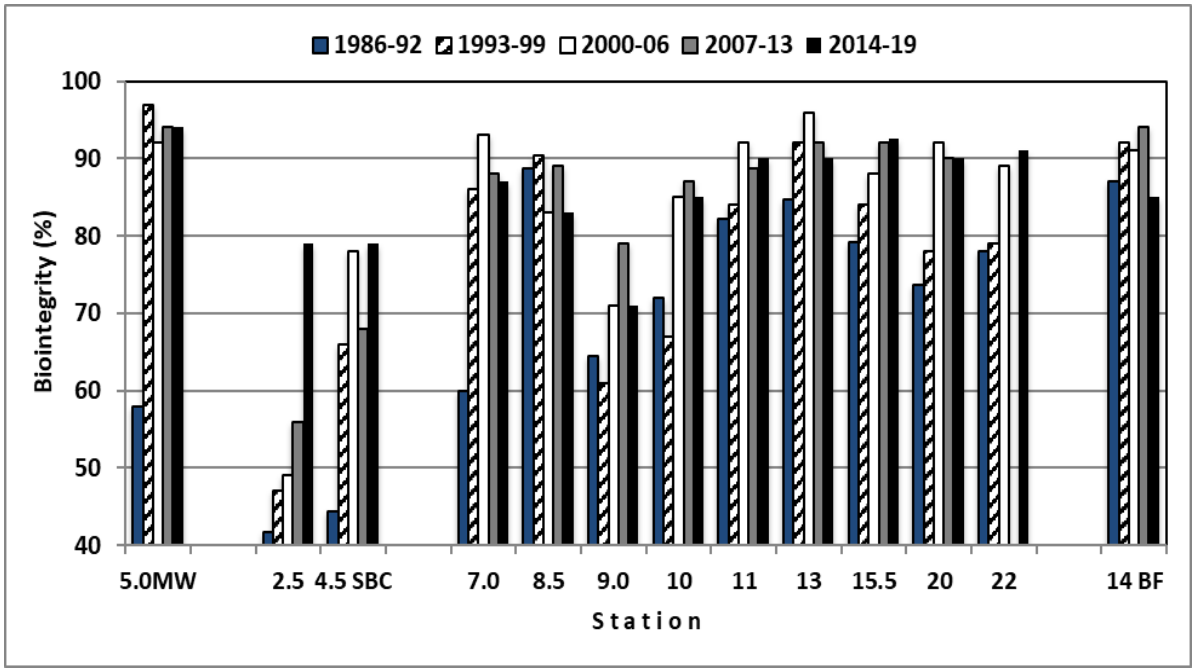
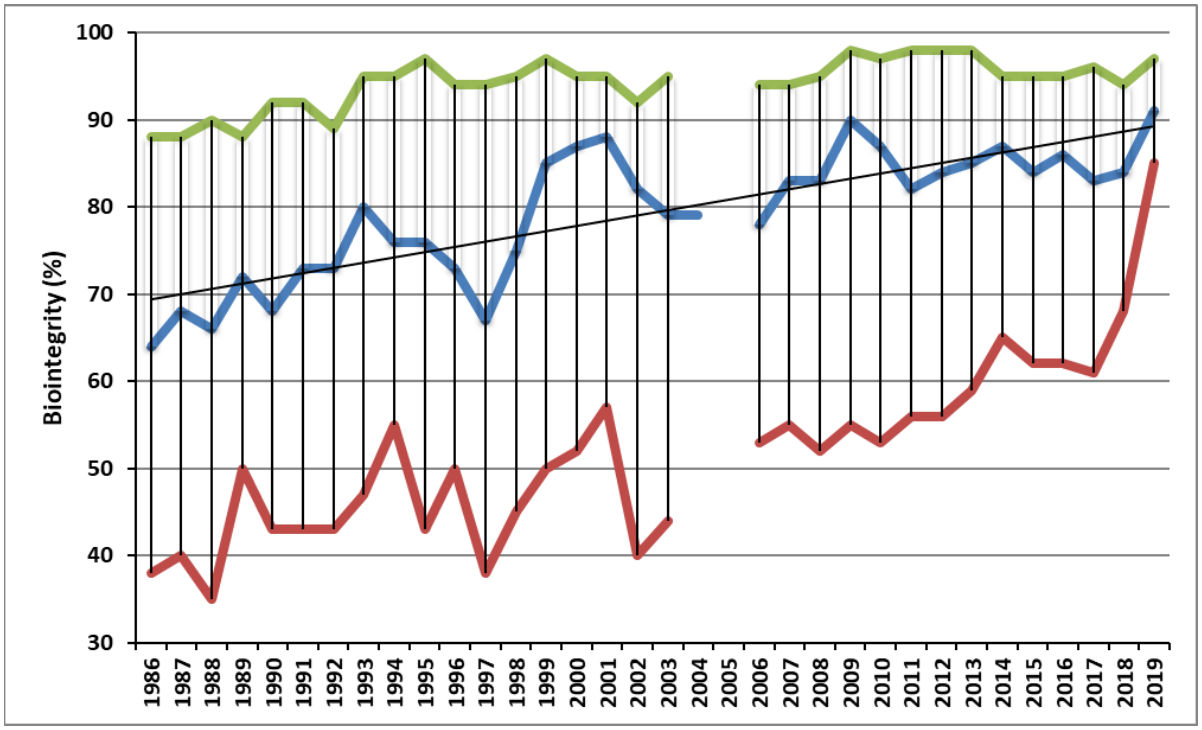


Figure 9. Mean Annual Biointegrity Scores (Blue Line) with Max, Min and Trendline for the Clark Fork River Basin sites since 1986.



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, and 9.0), 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 (Station 14) biological integrity has been characterized as slightly impaired in each of the past 3 years.

4.4.1 Metals Pollution

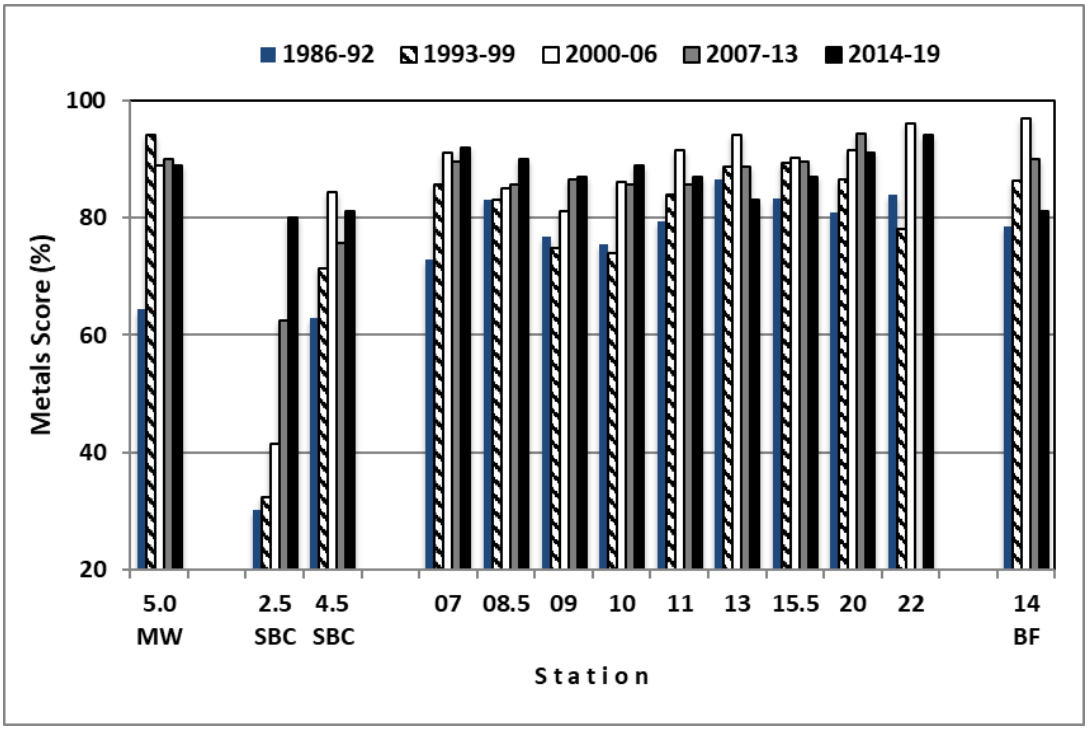
Diagnosis of metals-related impacts is based on BMI metrics considered most sensitive to toxicants. Scores of less than 80 percent are considered indicative of significant metals pollution (**Table 2**).

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 10**). 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 metals loads during floods. Widespread but generally slight biological impairment consistent with metals pollution was ed in the signaled 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 10. Mean Scores for Metals-Sensitive Metrics at 13 Stations in the CFR Basin during Five Time Periods since 1986



4.4.2 Nutrient Pollution

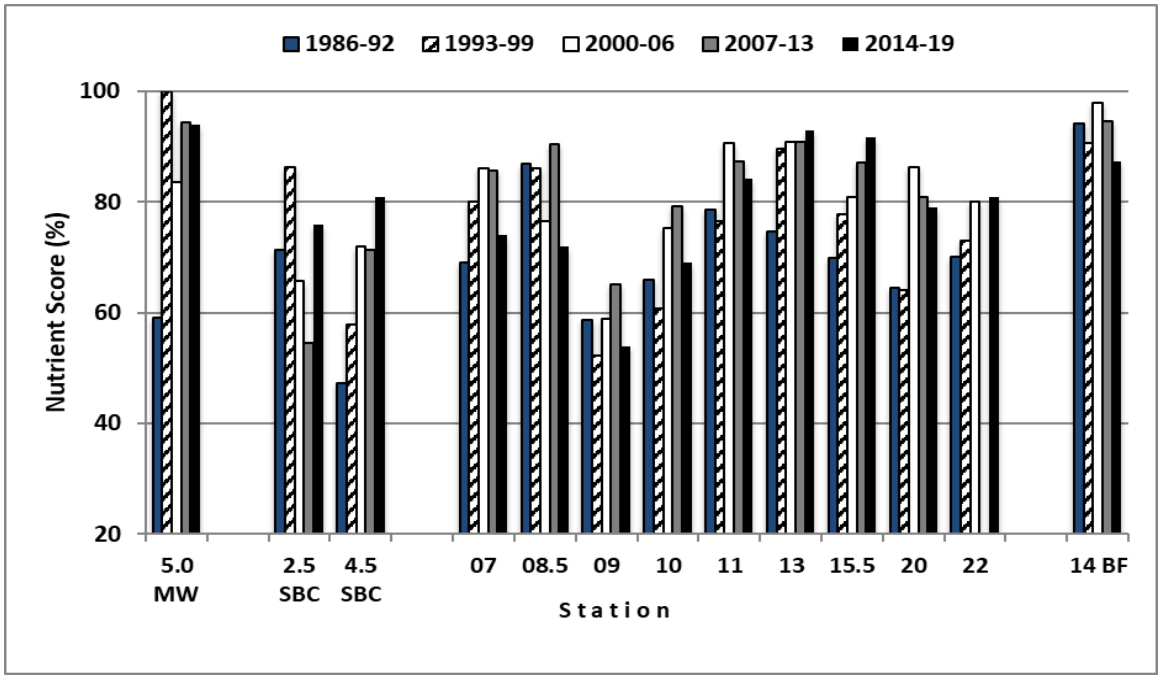
Diagnosis of nutrient-related impacts is based on macroinvertebrate metrics known to be sensitive to organic pollution, high seston concentrations, algae and extensive plant growth. Scores of less than 80 percent are considered indicative of significant nutrient and/or organic pollution (Table 2).

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 10). When monitoring began, slight to moderate impacts were evident at all monitoring sites (Figure 10), 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 10).

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 11**, **Table 9**).

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



4.5 Site-specific Assessments

4.5.1 Silver Bow Creek at Opportunity (Station 2.5)

In 2019, Silver Bow Creek at Opportunity was classified as slightly impaired (88 percent) but has substantially improved from a moderately impaired assessment rank (68 percent) in 2018. Neither metals nor organic pollution were evident as stressors in 2019.

The 2018 assessment documents significantly decreased integrity compared to 2017, both metals and organics appear to be stressors (Figure 12). Silver Bow Creek was grossly polluted from metals during the 20th century (Figure 12). 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.

Metrics indicating improved biological integrity included higher community density, 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, the community was dominated by blackfly larvae (filtering Dipterans).

Table 7. Mean Annual Macroinvertebrate Biointegrity (%) at 13 Clark Fork River Basin Monitoring Stations during August 1986 – 2019

	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	Mean	S.D.	Min.	Max.
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	54	14	35	91
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	67	14	41	88
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	85	16	43	97
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	83	14	53	98
08.5					89	88	89						91	89	91	88			83	68	91	92	95	86	83	88	89	95	88	82	64	88	89	87	7	64	95
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	69	12	52	94
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	78	12	48	97
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	87	8	62	95
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	91	6	76	98
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	87	8	68	98
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	84	10	61	98
22	62	86	68	89	88	71	74	85	68	79	75	78	82	88		95	91	82													86	94	92	82	9	62	95
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	90	6	72	98
mean	64	70	67	73	70	73	73	81	75	77	74	68	76	85	87	89	83	80	79	78	83	83	**90**	87	82	84	85	87	84	86	83	84	**91.5**	80	7	64	91

Table 8. Mean Annual Macroinvertebrate Biointegrity (%) as Measured by Metrics* Sensitive to Metals Pollution at Clark Fork River Basin Stations – August 1986 – 2019

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	Mean	S.D.	Min.	Max.
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	49	21	17	89
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	74	9	61	89
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	84	12	50	94
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	86	8	72	94
08.5					83	83	83						83	83	89	83			83	78	89	89	94	89	67	83	89	89	89	89	83	94	94	86	6	67	94
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	81	6	67	89
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	81	10	44	100
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	84	8	67	94
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	88	9	61	100
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	88	8	67	100
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	89	6	78	100
22	83	89	83	89	78	83	83	83	83	83	78	56	83	78		94	94	100	94												94	94	94	86	9	56	100
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	85	11	61	100
Mean	70	74	75	72	71	73	80	79	81	77	80	65	82	79	87	84	82	87	84	82	86	83	88	86	79	87	**89**	84	88	**89**	86	81	**89**	81	6	65	89

* metric subset: metals tolerance index, EPT richness and community density.

Table 9. Mean Annual Macroinvertebrate Biointegrity (%) as Measured by Metrics* Sensitive to Nutrient/Organic Pollution at Clark Fork River Basin Stations – August 1986 – 2019

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	Mean	S.D.	Min.	Max.
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	71	19	33	100
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	66	18	33	89
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	85	17	42	100
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	79	13	39	100
08.5					89	89	83						89	83	78	83			78	67	89	89	94	89	100	89	83	94	72	72	33	89	94	83	14	33	100
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	58	17	22	89
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	70	14	39	94
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	83	13	42	94
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	87	11	44	100
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	81	14	42	100
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	74	15	33	94
22	61	78	50	88	92	61	61	78	33	67	67	100	75	92		89	89	61													72	89	83				
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	92	11	50	100
Mean	70	70	58	77	67	76	70	84	69	75	66	68	70	86	80	85	83	70	70	77	77	80	**91**	86	80	78	80	85	75	79	72	80	**89**	76	7	58	91

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

Improved biological integrity and reduced metals pollution (Tables 7 and 8, Figure 10) 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 most recent assessment indicated significant nutrient pollution. Additional treatment at the Butte WWTP may further improve water quality and biological integrity in Silver Bow Creek.

Figure 12. Macroinvertebrate Community Biointegrity in Silver Bow Creek near Opportunity (Station 2.5), 1986 to 2019.

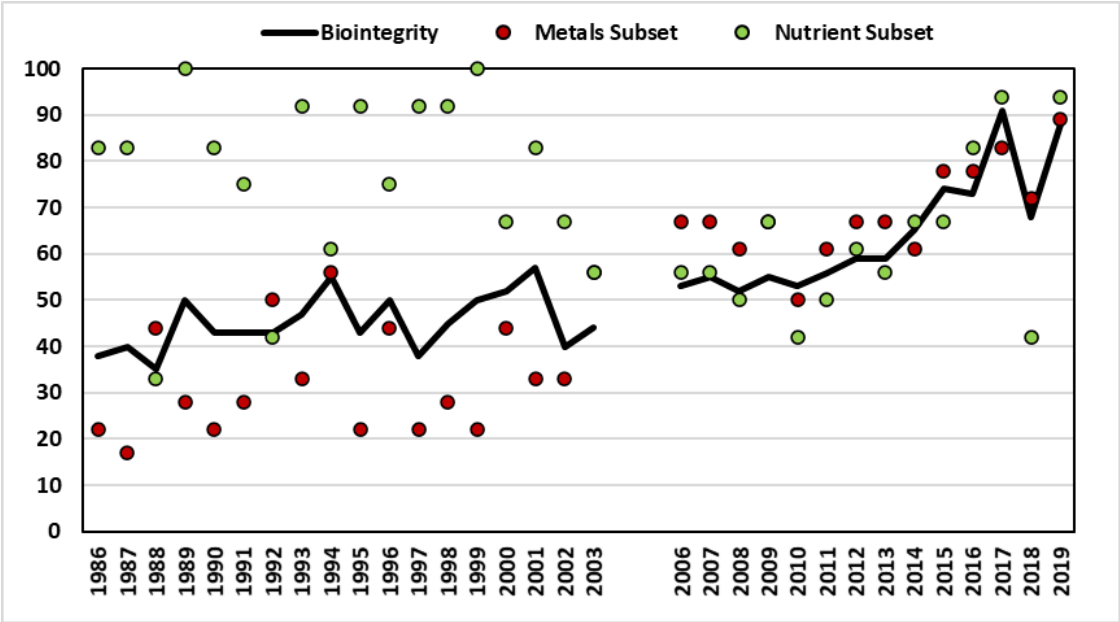


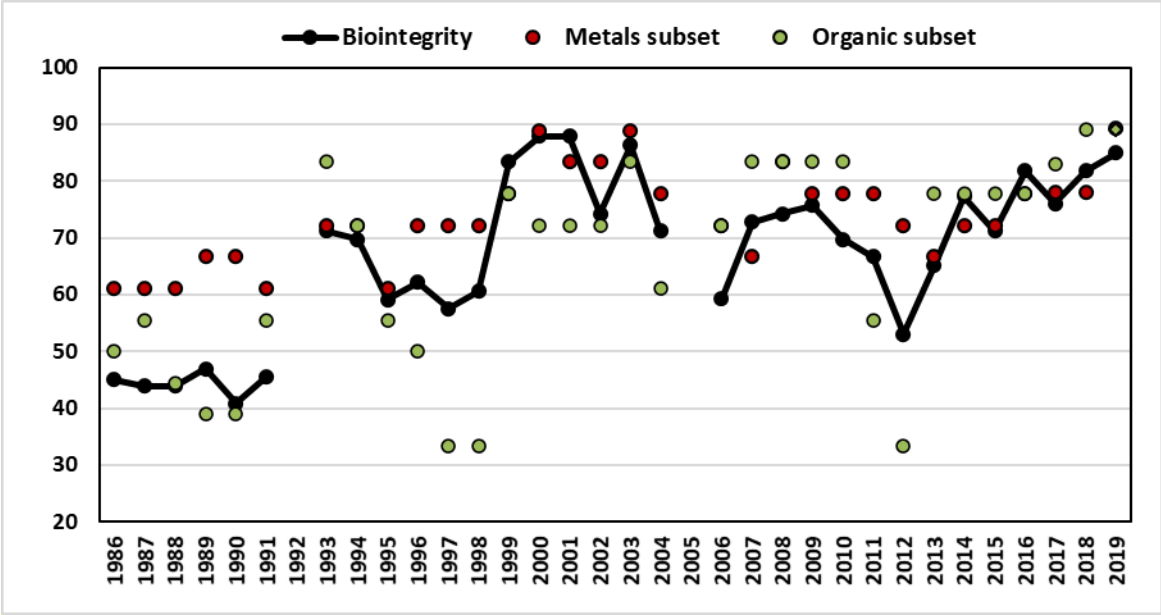
Photo 1. Silver Bow Creek near Opportunity Station 2.5 in 2019 (top) and in 2017 with large filamentous algae mats (bottom).

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

Silver Bow Creek below the Warm Springs Ponds was classified as slightly impaired (85 percent) in 2019; neither nutrients or metals were indicated as probable stressors (both at 89 percent); although, the biotic index is still fairly high (4.4) indicating slight organic enrichment (Figure 13, 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 13). 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 and/or organic pollution was strongly indicated as a stressor to macroinvertebrate communities in 2011 and 2012, but it has been less evident in the last 6 years.

Figure 13. Macroinvertebrate Biointegrity in Silver Bow Creek below Warm Springs Ponds (Station 4.5), 1986 to 2019



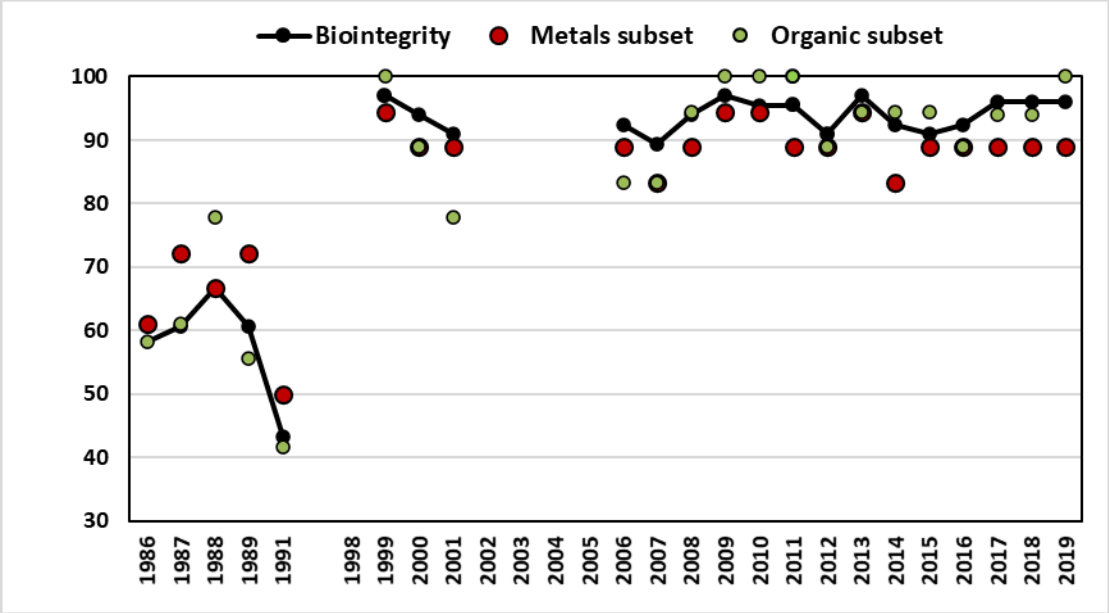
The decline in biological integrity at this site prior to 1999, and since the turn of the century may be attributed to increased eutrophication of the Warm Springs Ponds and episodic declines in effluent water quality, especially after years of above average flows (2011 and 2012). As the Warm Springs 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 5)

The Mill-Willow Bypass has supported a healthy, non-impaired macroinvertebrate community since contaminant removal and channel reconstruction occurred in the early 1990s. The 2019

bioassessment score was 95 percent. 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 14). Recent assessments suggest that the Mill-Willow Bypass remains free of biologically significant metals contamination.

Figure 14. Macroinvertebrate Community Biointegrity in the Mill-Willow Bypass (Station 5), 1986 to 2019

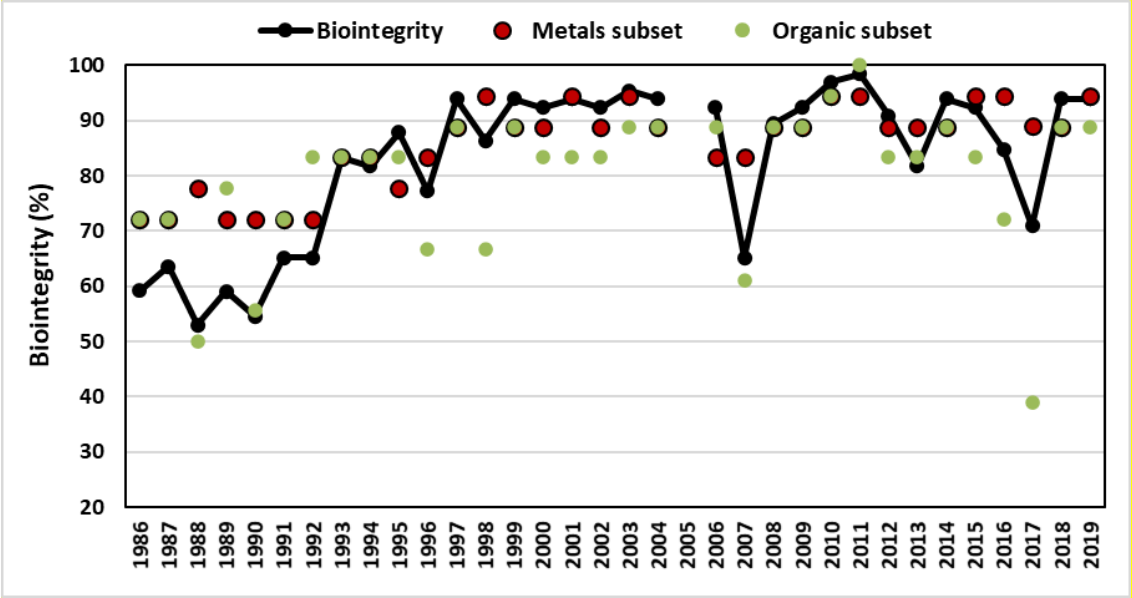


4.5.4 Clark Fork River below Warm Springs Creek (Station 7)

The CFR below Warms Springs Creek was ranked slightly impaired (71 percent) in 2017 but rebounded to non-impaired (94 percent) in 2018 and 2019 (**Figure 15**). Nutrient pollution was ranked as severely impaired (39 percent) in 2017, but neither nutrients nor metals were listed as stressors in 2019 or 2018 (both at 89 percent) (**Figure 15**). Overall BMI diversity metrics and EPT taxa richness have increased markedly in 2019 and this site reported the lowest MTI of all years sampled (4.1) (Table 4). Despite the high flushing flows of 2018, BMI densities at this site were still extremely abundant in 2018 (avg. ~19,500 ind. per m^2) but decreased to ~6,000 ind. per m^2 in 2019 (Table 4, Appendix B). This 75 percent reduction in BMI density 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 15). 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 at this site in 2017 (score 39) (Figure 15). Significant metals pollution has not been indicated at this site since 1995.

Figure 15. Macroinvertebrate Community Biointegrity in the CFR below Warm Springs Creek (Station 07), 1986 to 2019

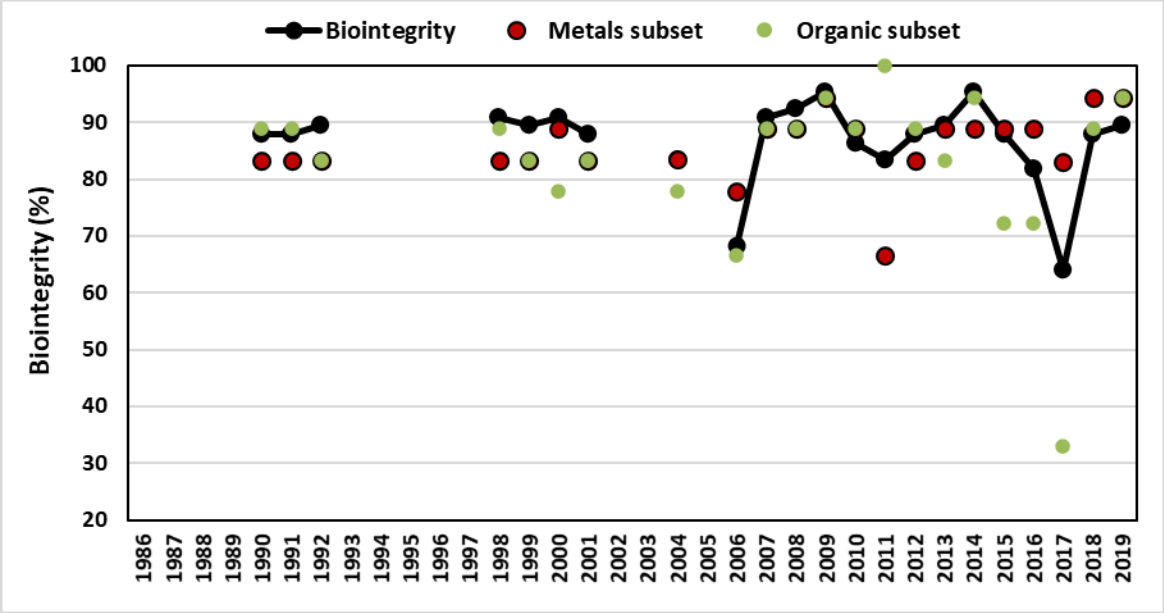


4.5.5 Clark Fork River at Sager Lane (Station 8.5)

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 (**Figure 16**). Biological integrity in 2019 was estimated at 89 percent. Stressors were consistent with slight nutrient pollution (88 percent) (**Figure 16**). Due to the high spring flows in 2018 and 2019, benthic cobbles have been thoroughly flushed of sediments and we observed an incredibly low biomass of filamentous algae. The 2019 BMI metrics at this site do not reflect any metals toxicity, although a "significant" fish kill was reported shortly after we sampled approximately 7 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 16. Macroinvertebrate Community Biointegrity in the CFR at Sager Lane (Station 8.5), 1990 to 2019



4.5.6 Clark Fork River at Deer Lodge (Station 09)

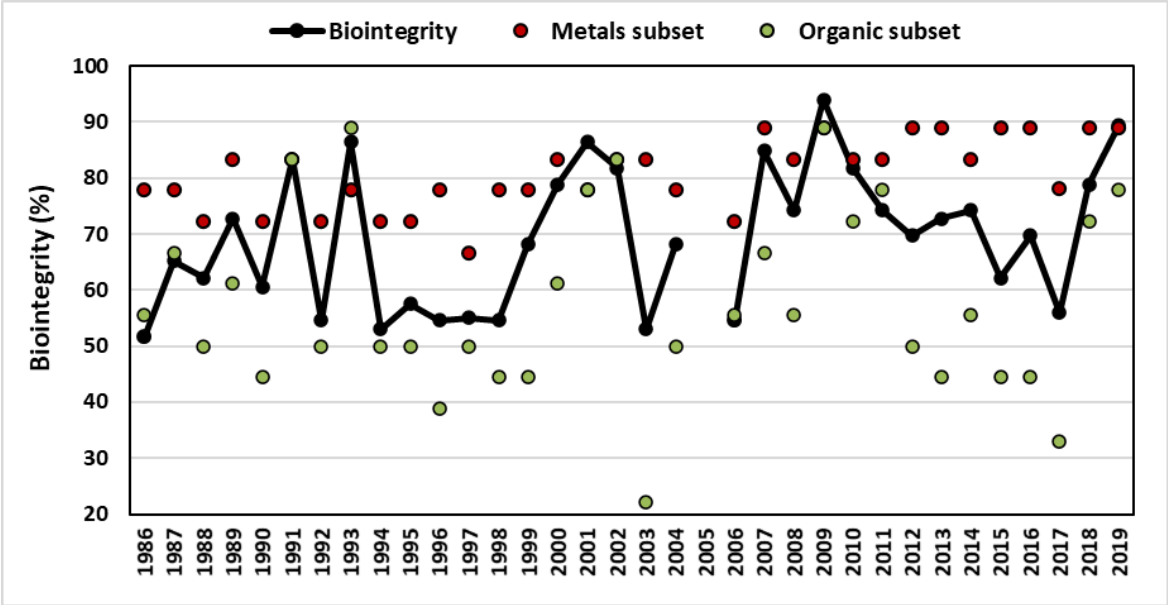
In 2019, the biointegrity of the BMI community at CFR site 09 improved to 89 percent from slightly impaired (79 percent) in 2018 with nutrients as the probable stressor (**Figure 17**).

The CFR at Station 09 had the lowest biointegrity score among all sites in the monitoring program in 2017; biological integrity was classified as moderately impaired (56 percent). Environmental stress on the macroinvertebrate community resulted from extensive nutrients (33 percent score) and probable metals pollution (78 percent) (**Figure 17**).

The Clark Fork River in Deer Lodge typically has the lowest biointegrity (mean 68 percent) among the CFR sites and has been classified as impaired in all but one annual assessment (**Table 7, Figure 17**). 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 Deer Lodge. 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 27 years, and in 2017, reached the highest impairment levels since 2003 (**Table 9, Figure 16**). Extensive growths of the filamentous algae *Cladophora* are common at this site, especially during low-flow years (Photo 1); high stream flows of 2018 have cleared this site of algae (see Stagliano 2019). Metals pollution was indicated as a stressor on 15 sampling occasions, but only once since 2006 (**Figure 17, Table 8**).

Figure 17. Macroinvertebrate Community Biointegrity in the Clark Fork River at Deer Lodge (Station 09), 1986 to 2019



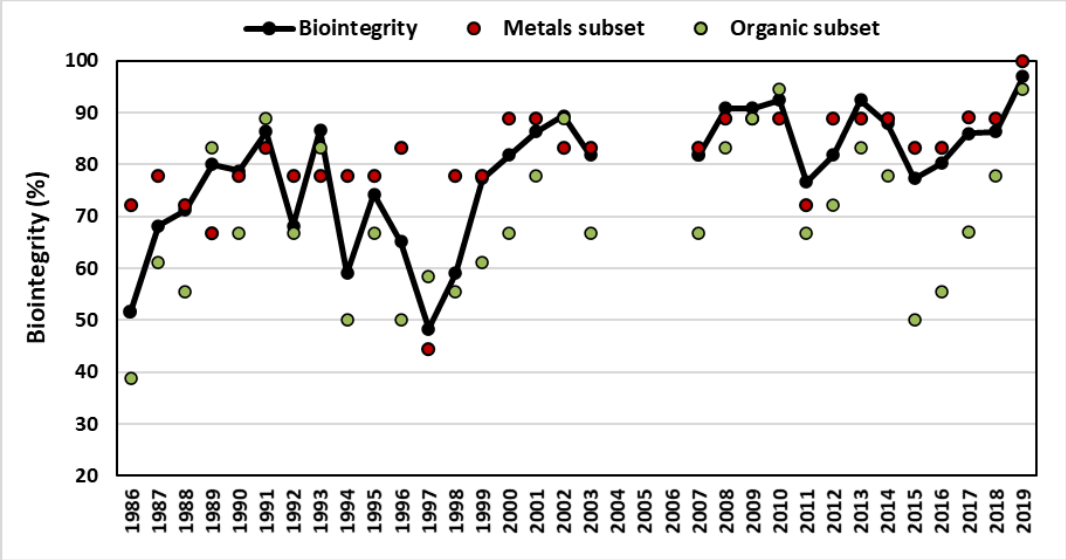
4.5.7 Clark Fork River above Kohrs Bend Fishing Access (Station 10)

The Clark Fork River at Kohrs Bend FAS was classified as non-impaired in 2019 with the highest biological integrity score (97 percent) reported of all sites in the study (Figure 18).

Annual biological integrity estimates have varied widely in the lower Deer Lodge Valley (Figure 18). Nevertheless, biological integrity has gradually improved. Significant impairment was evident on many monitoring dates prior to 2000 but has not been indicated 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 dates 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 in 2011, but not again in 2018.

Photo 2. CFR Station 10 cobble with Helicopschye caddisflies and a relic pearlshell mussel shell in 2018.

Figure 18. Macroinvertebrate Community Biointegrity in the CFR above Kohrs Bend FAS (Station 10), 1986 to 2019.

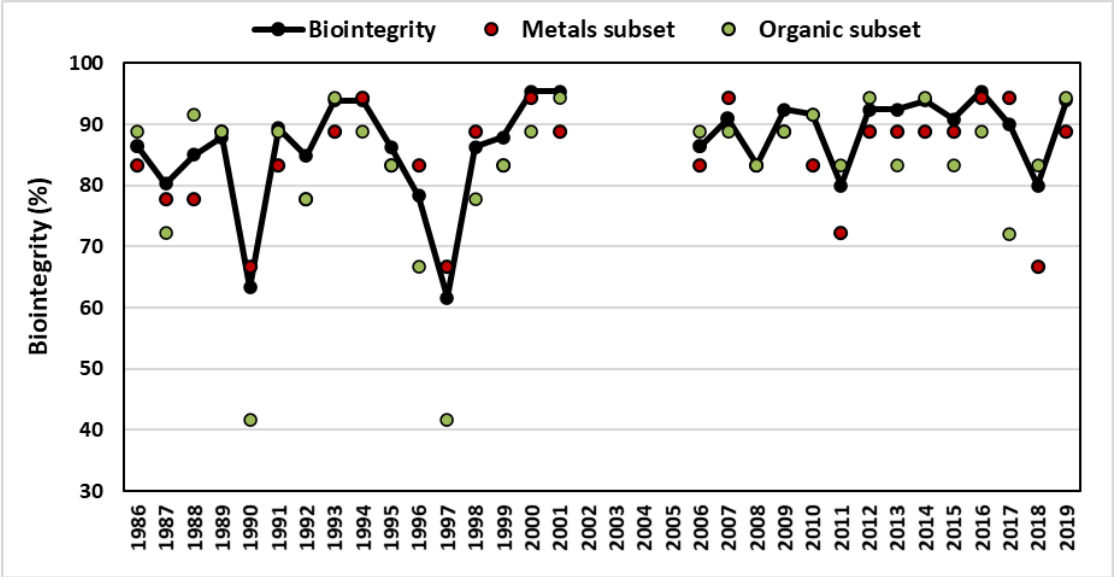


4.5.8 Clark Fork River at Gold Creek Bridge (Station 11)

The CFR below Gold Creek was ranked non-impaired (94 percent) during 2019 which has improved from the 80 percent impaired score in 2018 (**Figure 19**). Metals were the probable stressor impairing the biointegrity of this site in 2018, previously reported metals impacts were in 2011 (Figure 19).

During the past 30 years, this site was classified as impaired in 15 of the 28 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 19). 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 on one occasion in the past 20 years (Figure 19). Significant metal impacts were indicated following springs with above average run-off in 1990, 1997, 2011 and again in 2018.

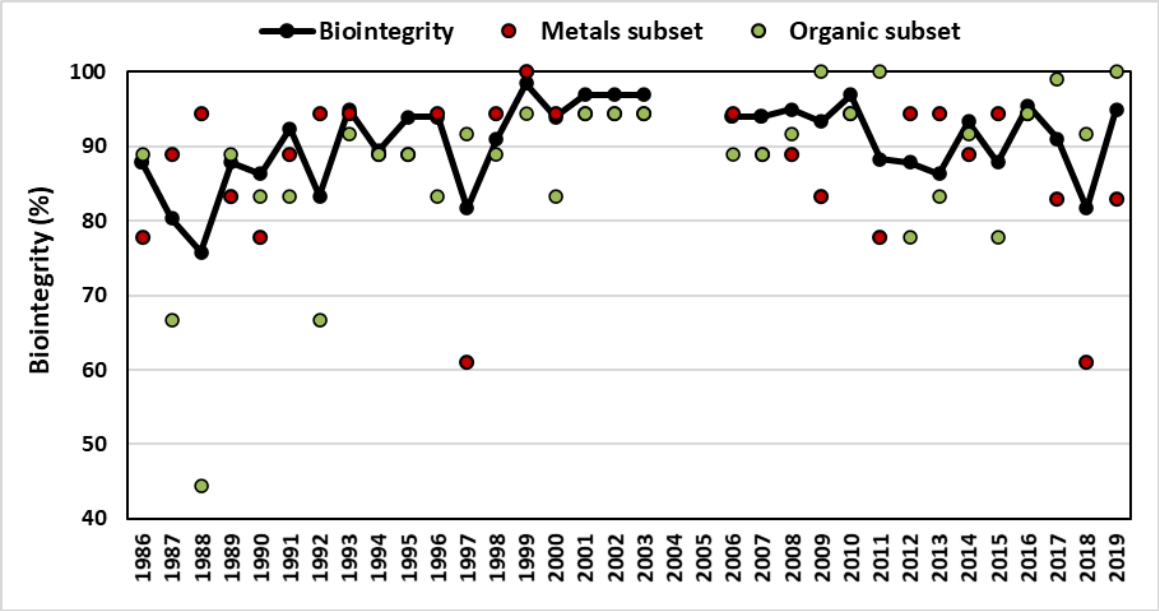
Figure 19. Macroinvertebrate Community Biointegrity in the CFR at Gold Creek Bridge (Station 11), 1986 to 2019



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

The Turah Fishing Access site was classified as non-impaired in 2019 (92 percent) up from slightly impaired (82 percent) during 2018 with metal toxicity being the probable environmental stressor (**Figure 20**). MTI scores reported in 2019 (3.2) were the lowest of the 2001-2018 time 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 20**). 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 20**). Nutrient-related impacts were indicated on five dates but only twice (2012 and 2015) in the past two decades.

Figure 20. Macroinvertebrate Community Biointegrity in the Clark Fork River at Turah (Station 13), 1986 to 2019

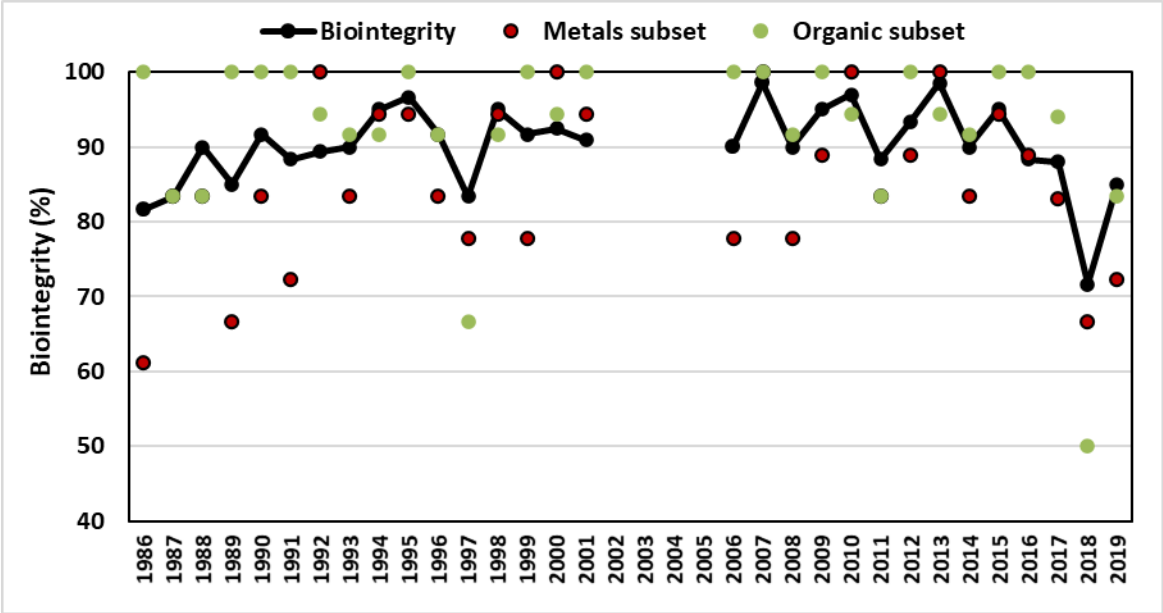


4.5.10 Blackfoot River near USGS Gauge (Station 14)

The most recent BMI assessment in 2019 indicated slight biological impairment (85 percent) from probable metals stressors (72 percent); this site was the only site in the CFR basin reporting significant metals pollution in 2019 (**Table 6, Figure 7, Figure 21**). 2018 represented the lowest biointegrity score in the history of monitoring this reference site and continues a declining trend since 2016 (**Figure 21**). A high biotic index score (4.5), the dominance of Hydropsychid caddisflies, percent filterers, and a paucity of mayflies are community metrics contributed to probable nutrient impairment causing this low biointegrity in 2018 (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.

Biological integrity estimates averaged 90 percent over 27 years of monitoring (Table 7), but only 85 percent for the last 5 years (Figure 10). Based on mean scores for diagnostic metrics, neither nutrients (93 percent) nor metals (86 percent) pollution were 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 BMI on five of those eight dates (**Figure 21**). Elevated water temperatures, fine sediment accumulation during droughts, and bed scour during high-flow events are the most probable non-metal stressors to the aquatic community in this river reach.

Figure 21. Macroinvertebrate Community Biointegrity in the Blackfoot River near Mouth (Station 14), 1986 to 2019



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

The monitoring site at the ShaRon FAS in East Missoula was ranked slightly impaired in 2019 with 87 percent biointegrity score and a moderate nutrient impairment (67 percent) (**Figure 22**). This site was ranked slightly impaired (78 percent) during 2018, likely a result of metals impairment which scored 67 (**Figure 7, Figure 22**).

This site is the nearest monitoring station below the former Milltown Dam site (Photo 3). 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. Consequently, habitat conditions became more variable from year to year. Since 2015, riffle cobbles have appeared less embedded and have supported more periphyton and moss than during the previous years.

Monitoring has been conducted at this site on 27 occasions since 1989. The Clark Fork River above Missoula was classified as non-impaired on 11 dates and slightly impaired on 17 occasions (Figure 22). 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 8 years (except 2018 and 2019), this site has had the highest biointegrity in the study area (Figure 22).

Figure 22. Macroinvertebrate Community Biointegrity in the CFR at ShaRon FAS (Station 15.5), 1989 to 2019

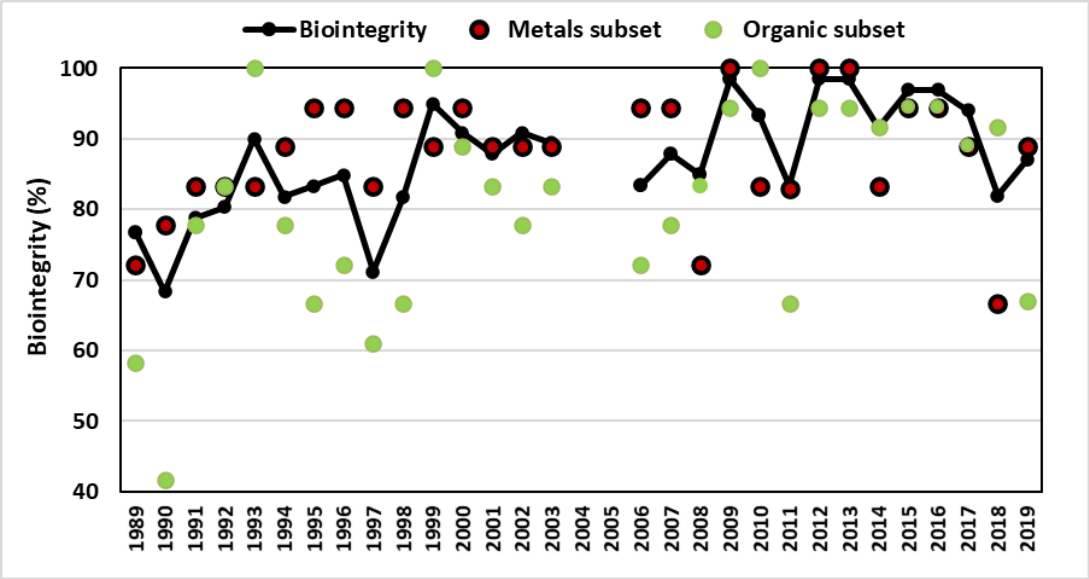


Photo 3. Clark Fork River at ShaRon FAS Station 15.5 cobble riffle looking upstream in 2019.

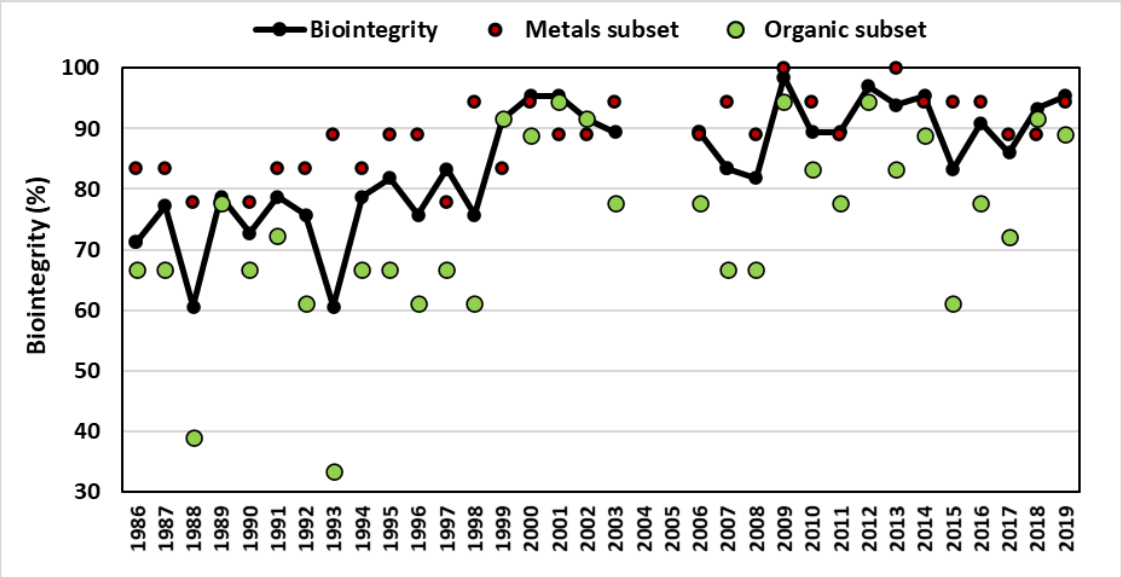
4.5.12 Clark Fork River below Missoula at Kona Bridge (Station 20)

The Kona Road FAS was classified as non-impaired (95 percent) during 2019; no evidence of either nutrient or metals impairment was reflected in the BMI community (**Figure 23**).

This station is located downstream from Missoula and the confluence of the Bitterroot River. The river 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 (2006-2018) are similar to those at 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 23**). 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 23**). During the last decade, biological integrity averaged 90 percent and the nutrient/organic subset score averaged 80 percent. Slight nutrient impairment has been indicated at this site for 7 of the past 14 years (**Figure 23**).

Figure 23. Macroinvertebrate Community Biointegrity in the CFR below Missoula (Station 20), 1986 to 2019



4.5.13 Clark Fork River at Huson (Station 22)

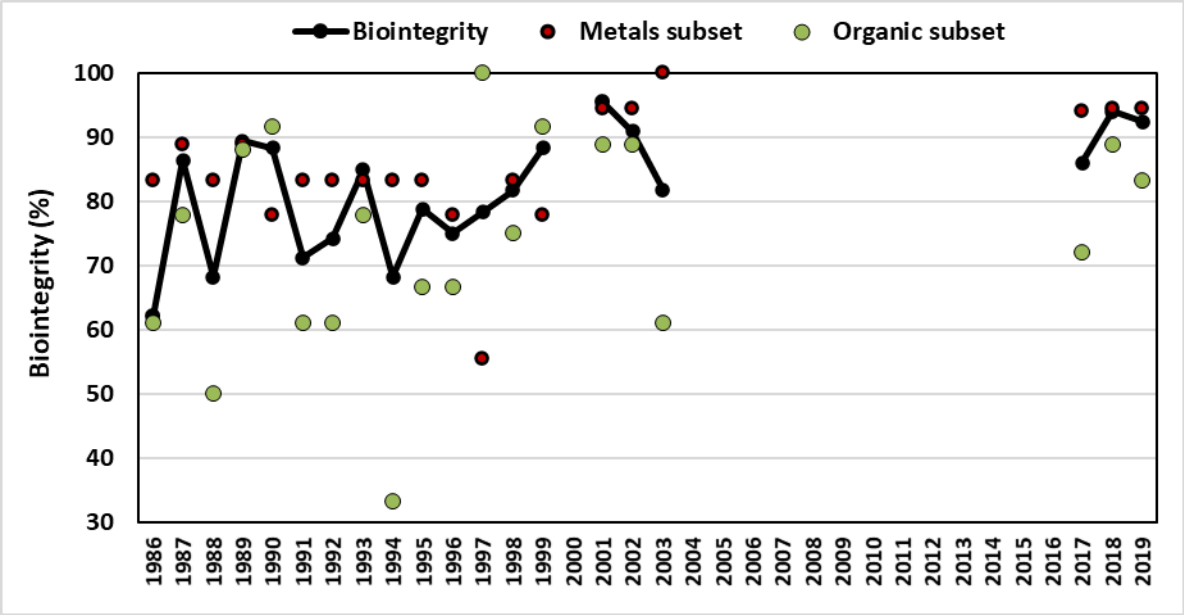
The biointegrity of the Clark Fork River at Huson was classified as non-impaired (92 percent) in 2019; this is an improvement from a slightly impaired score in 2017 (86 percent) which was likely a result of nutrient impairment and low base flows during the "flash drought" (**Figure 24**).

This station is located downstream from the Huson exit off I-90 approximately 20 miles downstream from Station 20. This site was sampled in 2017 after not being sampled since 2003. Bioassessment results for the Huson Site are similar to those reported 14 years ago (**Table 7, Figure 24**).

The Clark Fork River at Huson was impaired by nutrients on all dates from 1986 through 1998, except for two. During this period, biointegrity averaged 75 percent, while the mean nutrient/organic and metals subset scores were 62 and 84 percent, respectively (Tables 8 and 9). Biological integrity improved to non-impaired in 2001 and 2002 and has dipped to slightly impaired during subsequent

monitoring (Figure 24). Nutrient impairment has been indicated for two of the six sampling events in the past 18 years.

Figure 24. Macroinvertebrate Community Biointegrity in the Clark Fork River at Huson (Station 22), 1986 to 2019



SECTION 5

Conclusions

5.1 2019 Assessments

1. In 2019, the overall biointegrity average across all sites was 91 percent; this is the highest ever reported for 33 years of the study. During 2019, biological integrity ranked seven monitoring sites as non-impaired, six sites slightly impaired, and zero moderately impaired. Assessment scores ranged from 85 to 97 percent.
2. Record high spring flows in 2018, and above average 2019 discharge, have played a particularly important role by 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 have been restructured reducing the numbers of many silt-tolerant taxa.
3. The most recent macroinvertebrate-based assessments indicated above average biological integrity in Silver Bow Creek, continued stress from nutrients at CFR sites in the Deer Lodge Valley, and metal-related stressors in the lower Blackfoot River; all six CFR stations from Kohrs Bend to Huson 20 miles downstream of Missoula, except for ShaRon FAS (15.5), ranked non-impaired.
4. Environmental conditions in the upper Silver Bow watershed are improving but are still being mirrored with a slightly impaired BMI community. Two years ago, the biological integrity at Opportunity (Station 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. Biological integrity also improved at Silver Bow Creek below the Warm Springs Ponds (Station 4.5). The 2019 bioassessment score (85 percent) was the highest reported for this site since 2003; this site was characterized as slightly impaired in 2017 and 2018 as well.
6. The Mill-Willow Bypass (station 05) BMI community continues to be classified as non-impaired (scoring 95 percent in 2019), since attaining this status in 1999.
7. All four sites on the Clark Fork River in the Deer Lodge Valley vastly improved their biointegrity scores in 2018 and 2019. CFR Stations 07 and 10 ranked non-impaired with a scores of 94 and 97 percent, respectively, while stations 8.5 and 09 were slightly impaired with reported overall scores of 89 percent each; these scores were, on average, 21 percentage points higher than 2017 scores (avg. 71 percent).
8. The assessment metrics indicate that nutrient pollution is still the causal environmental stressor at sites ranked impaired in the Deer Lodge Valley. Even though above average stream flows during 2018 and 2019 have greatly reduced environmental stress caused by low flows and nutrients, they are still having a negative effect on the aquatic communities.
9. Biological integrity was non-impaired and above average at 6 of 9 Clark Fork River stations (Stations 07, 10, 11, 13, 20 and 22). The Clark Fork River at ShaRon FAS (Station 15.5) which usually has the highest biointegrity scores among all CFR monitoring sites was ranked slightly impaired.
10. Significant metals pollution was not evident at any Clark Fork River monitoring station during 2019; 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 Silver Bow Creek over the past decade. Biological monitoring showed accelerated recovery during the past 3 years as remediation of the Silver Bow floodplain was completed. Metals pollution has diminished significantly, and BMI have become more abundant and diverse. However, nutrient-related impacts have been more evident 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 Silver Bow Creek. The most recent assessment indicated than nutrient pollution may be more of a contributing stress than metals.
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. Biological integrity has improved since liming rates were reduced, but it remains slightly impaired.
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).
6. Metals pollution has been significantly reduced in the Clark Fork River over the past 25 years and is no longer the overarching environmental factor limiting BMI communities. 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 were routinely detected in Silver Bow Creek and most of the upper Clark Fork River. Eutrophic conditions were most evident during periods of low streamflow.
8. Floods and droughts profoundly affect aquatic communities in the Clark Fork River 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

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Appendix A
Taxonomic Checklist and Tolerance Values

Appendix A. Aquatic macroinvertebrates collected from the Clark Fork River Basin during August, 1986-2019 and tolerance values used to calculate biotic and metals tolerance indices.

Class	Order	Family	Genus	species		Biotic index		Metals Tolerance	Present in 2019
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 sp.			2		1	
			Optioservus spp.			5		5	**x**
			Ordobrevia nubifera			5		3	**x (site 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	
			Kathroperla perdita			1		2	
			Sweltsa sp.			0		2	**x**
		Nemouridae							
			Amphinemura sp.			2		1	
			Zapada cinctipes			3		3	**x**
			Zapada oregenensis gp.			2		2	
			Malenka sp.			1		1	
		Perlidae							
			Calineuria californica			2		3	**x**
			Claassenia sabulosa			3		3	**x**
			Doroneuria sp.			1		3	**x (BF14)**
			Hesperoperla pacifica			1		3	**x**

Appendix A. continued.

	Order	Family	Genus	species		Biotic index		Metals tolerance	Present in 2019
	Plecoptera (continued)								
		Perlodidae							
				Cultus sp.		2		2	
				Isoperla fulva		2		3	
				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	**x**
				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**
				Rheocricotopus sp.		4		5	
				Symbiocladius sp.		4		1	

Appendix A. continued.

class	Order	Family	Genus	species		Biotic index		Metals tolerance	Present in 2019
	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	
				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	
				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 2019
	Diptera (cont.)								
		Empididae							
			Chelifera sp.			5		4	**x**
			Clinocera sp.			5		4	
			Hemerodromia sp.			6		4	**x**
		Tanyteridae							
			Protanyderus sp.			5		1	**x**
		Muscidae							
			Limnophora sp.			6		7	
		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 2019
	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	
		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 [Tricorythodes edmundsi]					
				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	
		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 2019
	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	
				Zumatrichia notosa	3		1	
		Lepidostomatidae						
				Lepidostoma sp.	1		1	**x**
		Leptoceridae						
				Ceraclea spp.	3		1	
				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 (09, 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	
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 2019
	Hirudinea							
		Erpobdellidae			8		4	
		Glossophoniidae			9		4	
			Glossiphonia complanata		9		4	
			Helobdella stagnalis		10		4	**x**
CRUSTACEA								
	Amphipoda							
		Gammaridae						
			Gammarus sp.		4		1	**x**
		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	
			Fisherola nutalli		3		1	
			Radix auricularia		8		1	
		Physidae						
			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 2019**	**115**

Appendix B
2019 Clark Fork River Basin Macroinvertebrate Data

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon	sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA									20%	72	
Optioservus spp.		55	90	59	139	0		343	19.1%	68.6	51.0
Zaitzevia parvula		1	4	1	4	0		10	0.6%	2.0	1.9
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.		1	0	1	3	0		5	0.3%	1.0	1.2
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									38%	136	
unassociated midge pupa		0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gr.		1	0	1	3	0		5	0.3%	1.0	1.2
Macropelopia sp.		0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.		2	0	0	1	0		3	0.2%	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		3	6	0	17	0		26	1.4%	5.2	7.0
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.		4	3	0	1	0		8	0.4%	1.6	1.8
Corynoneura sp		0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.		0	3	0	1	0		4	0.2%	0.8	1.3
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.		6	14	1	15	0		36	2.0%	7.2	7.0
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Orthocladius spp.	0	0	0	1	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	0	0	11	0		11	0.6%	2.2	4.9
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.	10	12	0	37	0		59	3.3%	11.8	15.1
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
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	0	0		1	0.1%	0.2	0.4
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	1	0		1	0.1%	0.2	0.4
Polypedilum spp.	154	46	11	100	0		311	17.3%	62.2	64.4
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.	2	0	0	0	0		2	0.1%	0.4	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.	0	1	0	4	0		5	0.3%	1.0	1.7
Antocha sp.	0	2	0	3	0		5	0.3%	1.0	1.4
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	0	3	1	6	0		10	0.6%	2.0	2.5
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Atherix sp.	0	1	0	0	0		1	0.1%	0.2	0.4
Simulium spp.	90	36	25	38	0		189	10.5%	37.8	32.9
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%	9	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	2	1	1	3	0		7	0.4%	1.4	1.1
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	13	7	5	9	0		34	1.9%	6.8	4.8
Baetis intercalris	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	0	0	0	2	0		2	0.1%	0.4	0.9
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
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	1	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)	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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	0.1%	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	0	0	0	1	0		1	0.1%	0.2	0.4
							6			
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.	1	0	1	0	0		2	0.1%	0.4	0.5
PLECOPTERA								2%	6	
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
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Skwala sp.	6	10	5	6	0		27	1.5%	5.4	3.6
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	0	0	1	0		1	0.1%	0.2	0.4
Pteronarcella badia	3	0	1	0	0		4	0.2%	0.8	1.3
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								37%	134	
Arctopsyche grandis	0	0	0	0	0		0	0.0%	0.0	0.0
Cheumatopsyche spp.	2	1	0	4	0		7	0.4%	1.4	1.7
Hydropsyche occidentalis	11	8	0	18	0		37	2.1%	7.4	7.7
Hydropsyche slossonae	0	1	0	0	0		1	0.1%	0.2	0.4
Ceratopsyche spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydropsyche C. cockerelli	3	6	0	6	0		15	0.8%	3.0	3.0
Hydropsyche morosa gr.	25	64	12	56	0		157	8.7%	31.4	27.7
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.	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.	40	47	42	55	0		184	10.2%	36.8	21.4
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	0	1	2	0		3	0.2%	0.6	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.	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	4	5	3	7	0		19	1.1%	3.8	2.6
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Rhyacophila coloradensis gr	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	1	7	0	5	0		13	0.7%	2.6	3.2
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	20	151	19	43	0		233	13.0%	46.6	60.3
							10			
ANNELIDA								0%	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	0	4	1	0	0		5	0.3%	1.0	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
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	1	1	0	0		2	0.1%	0.4	0.5
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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							47			
ID's by D. Stagliano										
SUBSAMPLE count	462	536	195	603	0		1796		449	179
TAXA RICHNESS	27	29	22	33	0		218		28	5
EPT RICHNESS	13	13	10	15	0		94		13	2
SHAN. DIVERSITY (log2)	3.17	3.41	3.09	3.73	0		3.63		3.35	0
BIOTIC INDEX	4.67	3.26	3.61	4.27	0		4.00		3.95	1
% EPT	28%	58%	46%	36%	0		42%		42%	13%
% Chironomidae	39%	16%	7%	32%	0		26%		23%	15%
EPT/EPTC	42%	78%	87%	53%			219%		65%	21%
TEMPERATURE METRICS										
Warm water					taxa		77	Percent	11%	
Cold water					taxa		41	Percent	4%	
Cool water - eurithermal					taxa		79	Percent	85%	
temp estimate - C					max T		21	opt T	18	
SEDIMENT METRICS										
Sediment tolerant taxa	3	3	3	4	0		7		3	0.50
% Sediment tolerant	1%	1%	2%	0%	0%		1%		1%	1%
Sediment intolerant taxa	2	2	2	0	0		2		2	1.00
% Sediment intolerant	13%	37%	31%	0%	0%		23%		20%	17%
fines estimate (%< 0.06mm	8	7	9	0	0		8		6	4.06
sand estimate (%<2mm)	27	23	24	0	0		25		19	12.49
Baetidae/Ephemeroptera	0.94	0.89	0.86	0.93	0.00		0.91		0.90	0.04
Hydropsychinae/Trichoptera	0.39	0.28	0.16	0.43	0.00		0.32		0.31	0.12
% R.A. DOMINANT	33%	28%	30%	23%	0%		19%		29%	4%
Shannon-Weaver Index (log	2.20	2.37	2.14	2.59	0.00		2.59		2.32	0.20
METALS TOLERANCE	4.18	3.60	3.63	4.25	0.00		3.97		3.91	0.35
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	3%	2%	4%	2%	#DIV/0!		3%		3%	1%
PLECOPTERA	2%	2%	3%	1%	#DIV/0!		2%		2%	1%
TRICHOPTERA	23%	54%	39%	33%	#DIV/0!		37%		37%	13%
COLEOPTERA	12%	18%	31%	24%	#DIV/0!		20%		21%	8%
DIPTERA	59%	24%	20%	40%	#DIV/0!		38%		36%	18%
NONINSECT	0%	1%	2%	0%	#DIV/0!		1%		0.8%	1%

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	5%	30%	10%	8%	0%		14%		13%	11%
SHREDDERS	9%	9%	22%	9%	0%		10%		12%	6%
FILTER FEEDERS	30%	23%	21%	21%	0%		24%		24%	4%
COLLECTOR-GATHERER	53%	36%	41%	58%	0%		48%		47%	10%
PREDATORS	3%	3%	6%	4%	0%		4%		4%	1%
% of sample used:	100%	100%	100%	100%	100%					
Ind. per m2	4620	5826	1950	14357					6688	5363
estimated total organisms	462	583	195	1436	0				669	536
total Potamopyrgus	0	0	0	0	0				0	0
HABITAT										
total PTCA	0	0	0	0	0				0	0
% blackflies	19%	7%	13%	6%						
% Heptageniidae	0.00%	0.00%	0.00%	0.00%	0.0%				0.00%	0.00%

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon	sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA									15%	167	
Optioservus spp.		200	93	57	284	0		634	11.0%	126.8	114.2
Zaitzevia parvula		67	33	7	84	0		190	3.3%	38.1	36.7
Cleptelmis ornata		6	3	0	0	0		10	0.2%	1.9	2.8
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
		0	0	0	0						
DIPTERA		0	0	0	0				11%	126	
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		6	9	7	8	0		30	0.5%	5.9	3.5
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.		24	0	0	8	0		32	0.6%	6.4	10.5
Corynoneura sp		0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.		9	16	19	36	0		80	1.4%	15.9	13.3
Cricotopus nostococladius		3	10	10	8	0		32	0.6%	6.3	4.6
		0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.		33	3	9	8	0		53	0.9%	10.7	13.1
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	2	5	8	0		15	0.3%	3.0	3.5
Paraphaenocladius sp.	3	0	3	0	0		6	0.1%	1.3	1.8
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.	27	17	7	80	0		131	2.3%	26.3	31.8
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	3	0	2	0	0		5	0.1%	1.0	1.4
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	28	0		28	0.5%	5.6	12.5
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	3	0	2	0	0		5	0.1%	1.0	1.4
Polypedilum spp.	12	12	53	64	0		142	2.5%	28.3	28.4
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.	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	4	0		4	0.1%	0.8	1.8
Micropsectra spp.	0	0	3	0	0		3	0.1%	0.7	1.5
Antocha sp.	0	5	5	4	0		14	0.2%	2.9	2.7
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	6	0	0	0	0		6	0.1%	1.2	2.7
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Atherix sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Simulium spp.	36	0	7	0	0		43	0.8%	8.7	15.8
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%	62	
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	67	26	83	40	0		215	3.7%	43.1	32.8
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
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	3	0	0		3	0.1%	0.7	1.5
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)	0	0	2	4	0		6	0.1%	1.1	1.8
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	5	0	0		5	0.1%	1.0	2.3
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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.	3	0	19	8	0		30	0.5%	6.0	8.0
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	16	36	0		52	0.9%	10.3	15.9
							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.	3	3	12	28	0		47	0.8%	9.3	11.4
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				2%	27	
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
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Skwala sp.	21	9	22	24	0		76	1.3%	15.2	10.5
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	21	9	9	20	0		58	1.0%	11.7	8.9
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
	0	0	0	0			3			
TRICHOPTERA	0	0	0	0				58%	664	
Arctopsyche grandis	0	0	0	0	0		0	0.0%	0.0	0.0
Cheumatopsyche spp.	312	114	169	328	0		923	16.1%	184.6	138.0
Hydropsyche occidentalis	21	19	9	24	0		73	1.3%	14.6	10.0
Hydropsyche sp.	188	81	60	280	0		609	10.6%	121.9	111.4
Hydropsyche morosa gr.	185	178	83	276	0		721	12.5%	144.2	105.7
Hydropsyche C. cockerelli	82	12	19	76	0		189	3.3%	37.8	38.2
Hydropsyche nr bronta	3	2	2	4	0		10	0.2%	2.1	1.5
Dicosmoecus sp.	0	0	2	4	0		6	0.1%	1.1	1.8
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	7	12	0		19	0.3%	3.8	5.5
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.	24	41	72	96	0		234	4.1%	46.8	38.1
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.	9	3	2	16	0		30	0.5%	6.1	6.5
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.	0	3	0	4	0		7	0.1%	1.5	2.0
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	24	116	47	280	0		466	8.1%	93.3	112.9
Polycentropus sp.	0	0	2	0	0		2	0.0%	0.3	0.8
Rhyacophila brunnea 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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Rhyacophila coloradensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	15	0	2	4	0		21	0.4%	4.2	6.4
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	0	3	0	4	0		7	0.1%	1.5	2.0
							15			
ANNELIDA								0%	3	
Lumbricidae	0	3	0	8	0		11	0.2%	2.3	3.5
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	2	0	0	0		2	0.0%	0.3	0.8
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				0.3%	4	
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	3	0	3	4	0		10	0.2%	2.1	1.9
Gammarus spp.	0	0	5	0	0		5	0.1%	1.0	2.3
Caecidotea sp.	0	0	3	0	0		3	0.1%	0.7	1.5
	0	0	0	0						
MOLLUSCA	0	0	0	0				0%	2	
Physella sp.	0	0	3	0	0		3	0.1%	0.7	1.5
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.	3	0	0	0	0		3	0.1%	0.6	1.4
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	0	0	4	0		4	0.1%	0.8	1.8
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	176	78	62	112	0		427	7.4%	85.5	64.8
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

CRF MACROINVERTEBRATE DATA

CLARK FORK RIVER #4.5 August 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	5	0	0		5	0.1%	1.0	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

ID's by D. Stagliano

SUBSAMPLE count	1600	905	924	2320	0		5749		1437	671
TAXA RICHNESS	33	29	43	38	0		218		36	6
EPT RICHNESS	14	14	21	20	0		94		17	4
SHAN. DIVERSITY (log2)	3.82	3.76	4.29	4.00	0		4		3.97	0
BIOTIC INDEX	4.66	4.23	4.30	4.34	0		4		4.38	0
% EPT	61%	68%	68%	66%	0		1		66%	3%
% Chironomidae	8%	8%	13%	11%	0		0		10%	3%
EPT/EPTC	89%	90%	84%	86%			3		87%	3%
TEMPERATURE METRICS										
Warm water					taxa		77	Percent	30%	
Cold water					taxa		41	Percent	2%	
Cool water - eurithermal					taxa		79	Percent	68%	
temp estimate - C					max T		22	opt T	19	
SEDIMENT METRICS										
Sediment tolerant taxa	5	2	8	6	0		12		5	2.50
% Sediment tolerant	20%	13%	22%	0%	0%		0		14%	10%
Sediment intolerant taxa	1	2	2	0	0		3		1	0.96
% Sediment intolerant	2%	5%	8%	0%	0%		0		4%	4%
fines estimate (%< 0.06mm)	10	9	10	0	0		10		7	4.98
sand estimate (%<2mm)	29	28	29	0	0		29		21	14.25
Baetidae/Ephemeroptera	0.96	1.00	0.65	0.45	#DIV/0!		1		0.76	0.26
Hydropsychinae/Trichoptera	0.92	0.71	0.72	0.70	#DIV/0!		1		0.76	0.10
% R.A. DOMINANT	20%	20%	18%	14%	#DIV/0!		0		18%	3%
Shannon-Weaver Index (loge)	#######	#######	#######	#######	0.00		3		#######	#######
METALS TOLERANCE	4.69	4.38	4.20	4.34	#DIV/0!		4		4.40	0.21
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	4%	3%	14%	4%	#DIV/0!		0		6%	5%
PLECOPTERA	3%	2%	3%	2%	#DIV/0!		0		2%	1%
TRICHOPTERA	54%	63%	51%	61%	#DIV/0!		1		57%	6%
COLEOPTERA	17%	14%	7%	16%	#DIV/0!		0		14%	5%
DIPTERA	10%	8%	14%	11%	#DIV/0!		0		11%	3%
NONINSECT	11%	9%	9%	6%	#DIV/0!		0		8.7%	2%

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	1%	1%	3%	2%	#DIV/0!		0		2%	1%
SHREDDERS	3%	7%	10%	5%	#DIV/0!		0		6%	3%
FILTER FEEDERS	53%	58%	43%	55%	#DIV/0!		1		52%	6%
COLLECTOR-GATHERER	27%	25%	33%	31%	#DIV/0!		0		29%	3%
PREDATORS	15%	10%	10%	7%	#DIV/0!		0		11%	3%
% of sample used:	100%	100%	100%	100%	100%					
Ind. per m2	16000	9052	9241	23200					14373	6713
estimated total organisms	1600	905	924	2320	0				1437	671
total Potamopyrgus	0	0	0	0	0				0	0
total PTCA	0	0	0	0	0				0	0
% blackflies	2%	0%	1%	0%						
% Heptageniidae	0.00%	0.00%	0.32%	0.00%	0.00%				0.08%	0.16%

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA								13%	130	
Optioservus spp.	189	68	89	84	0		429.3	8.6%	85.9	67.7
Zaitzevia parvula	69	21	46	60	0		195.6	3.9%	39.1	28.4
Cleptelmis ornata	12	5	5	2	0		23.3	0.5%	4.7	4.5
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				6%	57	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	3	0	0	0	0		3	0.1%	0.6	1.3
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	24	5	14	10	0		52.9	1.1%	10.6	9.3
Potthastia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
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	5	2	0		8.3	0.2%	1.7	2.0
Cricotopus nostococladius	9	9	10	2	0		29.6	0.6%	5.9	4.6
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	9	2	10	4	0		24.1	0.5%	4.8	4.3
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	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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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.	57	18	12	18	0		105	2.1%	21.0	21.4
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
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	3	5	0	0	0		7.5	0.1%	1.5	2.1
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.	9	3	7	8	0		27.2	0.5%	5.4	3.8
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.	3	0	2	0	0		5.4	0.1%	1.1	1.5
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	2	0	8	0		9.5	0.2%	1.9	3.5
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.	0	0	0	0	0		0	0.0%	0.0	0.0
Simulium spp.	0	9	5	0	0		13.8	0.3%	2.8	4.1
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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				3%	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	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	30	3	5	10	0		47.8	1.0%	9.6	12.0
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
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	6	14	0	2	0		21.5	0.4%	4.3	5.7
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)	3	0	2	0	0		5.4	0.1%	1.1	1.5
Serratella tibialis	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemerella sp.	0	8	0	0	0		7.5	0.1%	1.5	3.4
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.	6	0	10	2	0		17.6	0.35%	3.5	4.2
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.	21	2	0	0	0		22.5	0.4%	4.5	9.2
Isonychia 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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	8	0	2	0		9.5	0.2%	1.9	3.2
	0	0	0	0			7			
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				2%	20	
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	6	0	5	0	0		10.8	0.2%	2.2	3.0
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
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.	24	8	10	8	0		49.1	1.0%	9.8	8.7
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	21	11	7	0	0		38.7	0.8%	7.7	8.7
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0			3			
TRICHOPTERA	0	0	0	0				75%	753	
Arctopsyche grandis	0	0	0	0	0		0	0.0%	0.0	0.0
Cheumatopsyche spp.	63	20	19	20	0		121.7	2.4%	24.3	23.2
Hydropsyche occidentalis	45	18	5	10	0		77.8	1.6%	15.6	17.8
Hydropsyche morosa	285	105	127	118	0		635.2	12.7%	127.0	102.1
Ceratopsyche spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydropsyche C. cockerelli	39	15	5	26	0		84.8	1.7%	17.0	15.9
Hydropsyche nr bronta	0	0	0	0	0		0	0.0%	0.0	0.0
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	5	0	0	0		4.5	0.1%	0.9	2.0
Lepidostoma sp.	315	114	178	14	0		620.6	12.4%	124.1	129.4
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.	6	5	0	2	0		12.5	0.2%	2.5	2.7
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	0	7	0	0		10.2	0.2%	2.0	3.2
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	327	320	276	134	0		1056.5	21.1%	211.3	141.3
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	18	35	24	6	0		82.5	1.6%	16.5	13.8
Agapetus montanus	0	2	0	0	0		1.5	0.0%	0.3	0.7
Glossosoma sp.	207	41	391	420	0		1058.7	21.1%	211.7	193.5
							12			
ANNELIDA	0	0	0	0				0%	2	
Lumbricidae	0	2	2	0	0		3.9	0.1%	0.8	1.1
Lumbriculidae	0	0	0	0	0		0	0.0%	0.0	0.0
Encytraeidae	3	0	2	0	0		5.4	0.1%	1.1	1.5
Naididae	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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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				1%	5	
Physella sp.	3	2	2	0	0		6.9	0.1%	1.4	1.4
Physa sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ferrissia sp.	3	0	2	0	0		5.4	0.1%	1.1	1.5
Gyraulus sp.	6	2	2	0	0		9.9	0.2%	2.0	2.5
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	2	0		3.5	0.1%	0.7	1.0
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	33	0	10	2	0		44.6	0.9%	8.9	14.0
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	2	0		2	0.0%	0.4	0.9
Hydracarina	0	0	2	0	0		2.4	0.0%	0.5	1.1
Porifera	0	0	0	0	0		0	0.0%	0.0	0.0

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

ID's by D. Stagliano

SUBSAMPLE count	1860	879	1298	978	0	5015.4	1254	442
TAXA RICHNESS	34	34	33	27	0	218	32	3
EPT RICHNESS	18	18	15	14	0	94	16	2
SHAN. DIVERSITY (log2)	3.70	3.40	3.21	2.92	0	3.56	3.31	0
BIOTIC INDEX	3.00	2.95	2.16	2.21	0	2.62	2.58	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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
% EPT	77%	83%	82%	79%	0		80%		80%	3%
% Chironomidae	6%	5%	5%	4%	0		5%		5%	1%
EPT/EPTC	92%	95%	95%	95%			121%		94%	1%
TEMPERATURE METRICS										
Warm water					taxa		77	Percent	18%	
Cold water					taxa		41	Percent	2%	
Cool water - eurithermal					taxa		79	Percent	80%	
temp estimate - C					max T		21	opt T	17	
SEDIMENT METRICS										
Sediment tolerant taxa	4	5	4	3	0		6		4	0.82
% Sediment tolerant	4%	4%	2%	0%	0%		3%		2%	2%
Sediment intolerant taxa	3	2	3	0	0		3		2	1.41
% Sediment intolerant	28%	18%	44%	0%	0%		34%		22%	18%
fines estimate (%< 0.06mm)	8	7	7	0	0		7		5	3.54
sand estimate (%<2mm)	#VALUE!	#VALUE!	#VALUE!	0	0		23		#VALUE!	#VALUE!
Baetidae/Ephemeroptera	0.45	0.09	0.29	0.63	#DIV/0!		0.36		0.36	0.23
Hydropsychinae/Trichoptera	0.33	0.23	0.15	0.23	#DIV/0!		0.24		0.24	0.07
% R.A. DOMINANT	18%	36%	30%	43%	#DIV/0!		21%		32%	11%
Shannon-Weaver Index (loge	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!		2.50		#VALUE!	#VALUE!
METALS TOLERANCE	3.32	3.32	2.72	2.88	#DIV/0!		3.08		3.06	0.31
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	4%	4%	1%	2%	#DIV/0!		3%		3%	1%
PLECOPTERA	3%	2%	2%	1%	#DIV/0!		2%		2%	1%
TRICHOPTERA	70%	77%	79%	77%	#DIV/0!		75%		76%	4%
COLEOPTERA	15%	11%	11%	15%	#DIV/0!		13%		13%	2%
DIPTERA	6%	6%	5%	5%	#DIV/0!		6%		6%	1%
NONINSECT	3%	1%	2%	1%	#DIV/0!		2%		1.4%	1%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	13%	9%	33%	44%	#DIV/0!		24%		25%	16%
SHREDDERS	19%	15%	15%	2%	#DIV/0!		14%		13%	7%
FILTER FEEDERS	41%	55%	34%	32%	#DIV/0!		40%		40%	11%
COLLECTOR-GATHERER	24%	19%	16%	21%	#DIV/0!		20%		20%	3%
PREDATORS	4%	2%	2%	2%	#DIV/0!		3%		2%	1%
% of sample used:	100%	100%	100%	100%	100%					
Ind. per m2	18600	8790	12984	9780					12539	4420
estimated total organisms	1860	879	1298	978	0				1254	442
total Potamopyrgus	0	0	0	0	0				0	0
total PTCA	0	0	0	0	0				0	0
% blackflies	0%	1%	0%	0%						
% Heptageniidae	0.3%	0.0%	0.5%	0.1%	0.0%				0.24%	0.23%

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 August 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA								23%	104	
Optioservus spp.	64	113	88	84	0		349	15.3%	69.7	42.6
Zaitzevia parvula	21	57	30	65	0		173	7.6%	34.5	26.5
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	0			17%	76	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	0	0	0	3	0		3	0.1%	0.6	1.3
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	2	6	10	23	0		41	1.8%	8.1	8.9
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	0	0	0		0	0.0%	0.0	0.0
Cricotopus nostococladius	2	0	2	6	0		10	0.4%	2.0	2.4
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	0	9	8	12	0		29	1.3%	5.8	5.5
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

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 August 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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.	2	59	21	39	0		121	5.3%	24.1	24.9
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
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.	5	45	25	24	0		99	4.4%	19.8	18.0
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
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.	4	3	3	3	0		13	0.6%	2.6	1.5
Dicranota sp.	0	0	0	2	0		2	0.1%	0.3	0.7
Hexatoma sp.	5	0	3	5	0		13	0.6%	2.5	2.4
Tipula sp.	2	0	1	3	0		6	0.3%	1.2	1.3
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.	2	9	10	20	0		41	1.8%	8.1	7.7
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

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 August 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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								6%	25	
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	26	21	33	0		97	4.2%	19.3	12.3
Isweon	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	1	0	1	0	0		2	0.1%	0.4	0.5
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
Diphetor hageni	1	0	1	0	0		2	0.1%	0.4	0.5
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	2	0	2	2	0		6	0.2%	1.1	1.0
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)	1	0	2	2	0		5	0.2%	0.9	0.9
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	1	2	1	0	0		4	0.15%	0.7	0.7
Epeorus longimanus	0	2	0	0	0		2	0.07%	0.3	0.7
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	2	2	0	0		4	0.2%	0.7	1.0
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.	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

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 August 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	2	2	2	0		5	0.2%	1.0	0.9
							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.	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								4%	18	
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	1	0	0		3	0.1%	0.6	0.9
Hesperoperla pacifica	2	6	4	8	0		20	0.9%	3.9	3.0
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
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	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.	3	11	6	15	0		35	1.5%	6.9	6.0
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	4	8	6	11	0		28	1.2%	5.6	3.9
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

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 August 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
							5			
TRICHOPTERA								50%	228	
Arctopsyche grandis	2	3	2	3	0		10	0.4%	2.0	1.2
Cheumatopsyche spp.	5	15	12	15	0		47	2.1%	9.4	6.7
Hydropsyche occidentalis	5	54	38	77	0		174	7.6%	34.7	32.5
Hydropsyche morosa gr.	60	119	58	117	0		354	15.6%	70.7	49.3
Ceratopsyche spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydropsyche C. cockerelli	8	45	18	9	0		80	3.5%	16.0	17.4
Hydropsyche nr bronta	2	2	3	3	0		10	0.4%	1.9	1.2
Dicosmoecus sp.	0	3	0	0	0		3	0.1%	0.6	1.3
Onocosmoecus unicolor	0	0	0	0	0		0	0.0%	0.0	0.0
Neophylax rickeri	0	2	1	2	0		4	0.2%	0.8	0.8
Agraylea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydroptila spp.	2	0	2	2	0		6	0.2%	1.1	1.0
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.	8	15	12	23	0		58	2.5%	11.5	8.3
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.	0	0	0	2	0		2	0.1%	0.3	0.7
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
Micrasema sp.	0	5	3	5	0		12	0.5%	2.4	2.3
Brachycentrus americanus	1	5	4	15	0		25	1.1%	4.9	6.0
Brachycentrus occidentalis	2	15	8	24	0		49	2.2%	9.8	9.9
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila brunnea gr.	0	5	2	2	0		8	0.4%	1.6	1.9
Rhyacophila coloradensis gr	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	2	14	16	8	0		39	1.7%	7.8	7.0
Agapetus	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	47	93	56	65	0		261	11.5%	52.1	33.8
							17			
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

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 August 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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								0.1%	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
MOLLUSCA								0%	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.	0	0	0	3	0		3	0.1%	0.6	1.3
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER										
Turbellaria	1	2	3	12	0		18	0.8%	3.5	4.9
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	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

ID's by D. Stagliano

SAMPLE count	291	750	489	743	0	2273	568	230
TAXA RICHNESS	36	33	40	39	0	218	37	4
EPT RICHNESS	23	23	27	24	0	94	24	2
SHAN. DIVERSITY (log2)	3.71	3.93	4.22	4.26	0	4	4.03	0.25
BIOTIC INDEX	3.65	3.89	3.84	3.84	0	4	3.81	0.13

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 August 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
% EPT	62%	60%	58%	59%	0		1		60%	2%
% Chironomidae	4%	16%	14%	14%	0		0		12%	6%
EPT/EPTC	94%	79%	81%	81%			1		84%	7%
TEMPERATURE METRICS										
Warm water					taxa		77	Percent	21%	
Cold water					taxa		41	Percent	6%	
Cool water - eurithermal					taxa		79	Percent	74%	
temp estimate - C					max T		22	opt T	18	
SEDIMENT METRICS										
Sediment tolerant taxa	5	3	5	5	0		7		4.50	1.15
% Sediment tolerant	4%	2%	4%	0%	0%		0		2%	1%
Sediment intolerant taxa	6	9	9	0	0		11		6.00	1.73
% Sediment intolerant	21%	17%	17%	0%	0%		0		14%	2%
fines estimate (%< 0.06mm	8	8	8	0	0		8		5.95	0.24
sand estimate (%<2mm)	#VALUE!	#VALUE!	#VALUE!	0	0		24		#VALUE!	#VALUE!
Baetidae/Ephemeroptera	0.79	0.81	0.72	0.88	#DIV/0!		1		0.80	0.05
Hydropsychinae/Trichoptera	0.56	0.60	0.55	0.60	#DIV/0!		1		0.58	0.03
% R.A. DOMINANT	22%	16%	18%	16%	#DIV/0!		0		18%	3%
Shannon-Weaver Index (log	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!		3		#VALUE!	#VALUE!
METALS TOLERANCE	3.92	4.07	4.15	4.29	#DIV/0!		4		4.11	0.12
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	8%	4%	7%	5%	#DIV/0!		0		6%	2%
PLECOPTERA	4%	3%	3%	5%	#DIV/0!		0		4%	0%
TRICHOPTERA	49%	52%	48%	49%	#DIV/0!		1		50%	2%
COLEOPTERA	29%	23%	24%	20%	#DIV/0!		0		24%	3%
DIPTERA	9%	17%	17%	19%	#DIV/0!		0		15%	5%
NONINSECT	1%	0%	1%	2%	#DIV/0!		0		0.9%	0%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	18%	15%	16%	10%	#DIV/0!		0		15%	2%
SHREDDERS	5%	3%	4%	6%	#DIV/0!		0		5%	1%
FILTER FEEDERS	30%	36%	31%	38%	#DIV/0!		0		34%	3%
COLLECTOR-GATHERER	42%	43%	44%	39%	#DIV/0!		0		42%	1%
PREDATORS	4%	3%	4%	6%	#DIV/0!		0		4%	1%
% of sample used:	100%	100%	100%	100%	100%					
Ind. per m2	2910	7500	4890	7425					5681	2210
estimated total organisms	291	750	489	743	0				568	221
total Potamopyrgus	0	0	0	0	0				0	0
total PTCA	0	0	0	0	0				0	0
% blackflies	1%	1%	2%	3%						
% Heptageniidae	0.3%	1.5%	1.0%	0.0%	0.0%				0.73%	0.69%

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA								16%	138	
Optioservus spp.	67	221	181	123	0		592	14.2%	118.4	88.3
Zaitzevia parvula	3	61	24	3	0		90	2.2%	18.0	25.7
Cleptelmis ornata	1	3	0	0	0		4	0.1%	0.8	1.3
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	2	0	0		2	0.1%	0.5	1.1
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
	0	0	0	0						
DIPTERA	0	0	0	0				18%	147	
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	12	5	3	0		20	0.5%	3.9	5.0
Potthastia sp.	0	0	2	0	0		2	0.1%	0.5	1.1
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	0	0	0	0		2	0.0%	0.4	0.9
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	11	24	17	5	0		57	1.4%	11.4	9.5
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	12	2	1	0		16	0.4%	3.2	5.1
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Parametriocnemus sp.	0	48	12	3	0		63	1.5%	12.6	20.6
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.	6	58	64	27	0		155	3.7%	30.9	29.2
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
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	0	7	0		8	0.2%	1.5	2.9
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	1	0		1	0.0%	0.3	0.6
Polypedilum spp.	6	79	74	17	0		176	4.2%	35.2	38.1
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.	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.	10	27	12	21	0		71	1.7%	14.1	10.6
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	5	12	7	13	0		38	0.9%	7.5	5.4
Tipula sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Ormosia sp.	1	0	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.	37	27	19	21	0		105	2.5%	20.9	13.6
Simulium spp.	1	6	7	5	0		20	0.5%	3.9	3.2
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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								10%	84	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	1	0	0	0	0		1	0.0%	0.2	0.4
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	34	115	76	93	0		319	7.6%	63.7	46.4
Isweon	1	0	0	3	0		4	0.1%	0.7	1.2
Plauditus sp.	1	0	2	9	0		13	0.3%	2.5	3.9
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
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	12	12	9	0		37	0.9%	7.5	5.3
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.	1	0	0	0	0		1	0.02%	0.2	0.4
Rhithrogena sp.	0	0	0	1	0		1	0.03%	0.3	0.6
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	3	5	28	0		43	1.0%	8.6	11.2
	0	0	0	0			8			
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
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	1	0		1	0.0%	0.3	0.6
	0	0	0	0						
PLECOPTERA	0	0	0	0				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	2	6	10	0	0		18	0.4%	3.5	4.2
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
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	3	0	0	0		3	0.1%	0.6	1.4
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.	1	33	12	3	0		49	1.2%	9.8	14.0
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	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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Chloroperlinae	0	0	0	0	0		0	0.0%	0.0	0.0
	0	0	0	0			5			
TRICHOPTERA	0	0	0	0				54%	450	
Arctopsyche grandis	1	3	2	0	0		6	0.2%	1.3	1.4
Cheumatopsyche spp.	3	85	76	13	0		177	4.2%	35.5	41.5
Hydropsyche occidentalis	14	79	52	44	0		189	4.5%	37.8	31.3
Hydropsyche sp1	37	327	305	81	0		750	18.0%	150.1	154.4
Hydropsyche morosa gr.	53	212	138	93	0		497	11.9%	99.3	81.0
Hydropsyche C. cockerelli	29	64	40	24	0		157	3.8%	31.4	23.3
Hydropsyche nr bronta	1	3	5	1	0		10	0.2%	2.0	1.9
Dicosmoecus sp.	1	0	0	0	0		1	0.0%	0.2	0.4
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	3	5	1	0		10	0.2%	2.0	1.9
Hydroptila spp.	1	15	0	4	0		20	0.5%	4.0	6.4
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	15	7	27	0		56	1.3%	11.2	10.2
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	0	0	0	3	0		3	0.1%	0.5	1.2
Oecetis sp.	0	0	7	3	0		10	0.2%	2.0	3.1
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 sp.	1	3	5	1	0		10	0.2%	2.0	1.9
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	13	9	5	11	0		38	0.9%	7.5	5.2
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 g	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	2	18	10	9	0		39	0.9%	7.8	7.2
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	6	88	152	32	0		278	6.7%	55.7	64.3
	0	0	0	0			17			
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

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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%	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	2	0	0		2	0.1%	0.5	1.1
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 antipodarun	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
	0	0	0	0						
OTHER	0	0	0	0	0					
Turbellaria	4	3	2	1	0		11	0.3%	2.1	1.5
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	1	0	2	0	0		3	0.1%	0.7	1.0
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

ID's by D. Stagliano

SUBSAMPLE count	379	1691	1362	748	0	4180	1045	683
TAXA RICHNESS	40	34	37	38	0	218	37.3	3
EPT RICHNESS	24	20	20	22	0	94	21.5	2
SHAN. DIVERSITY (log2)	4.05	4.01	3.85	4.13	0	4.1	4.01	0.10
BIOTIC INDEX	4.46	4.47	4.28	4.30	0	4.4	4.38	0.11

CRF MACROINVERTEBRATE DATA

CLARK FORK RIVER #8.5 August 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
% EPT	59%	65%	68%	66%	0		0.7		64%	5%
% Chironomidae	7%	14%	13%	9%	0		0.1		11%	4%
EPT/EPTC	90%	82%	84%	89%			2.6		86%	3%
TEMPERATURE METRICS										
Warm water					taxa		77	Percent	29%	
Cold water					taxa		41	Percent	3%	
Cool water - eurithermal					taxa		79	Percent	69%	
temp estimate - C					max T		21	opt T	18	
SEDIMENT METRICS										
Sediment tolerant taxa	3	3	3	5	0		6		3.50	0.00
% Sediment tolerant	3%	6%	6%	0%	0%		0		4%	2%
Sediment intolerant taxa	5	4	4	0	0		6		3.25	0.58
% Sediment intolerant	4%	6%	12%	0%	0%		0		6%	4%
fines estimate (%< 0.06m	7	8	8	0	0		7		5.77	0.32
sand estimate (%<2mm)	25	26	26	0	0		25		19.36	0.66
Baetidae/Ephemeroptera	0.76	0.88	0.83	0.73	#DIV/0!		1		0.80	0.06
Hydropsychinae/Trichopter	0.81	0.83	0.76	0.74	#DIV/0!		1		0.78	0.04
% R.A. DOMINANT	18%	19%	22%	16%	#DIV/0!		0		0.19	2%
Shannon-Weaver Index (lo	2.81	2.78	2.67	2.86	0.00		3		2.78	0.07
METALS TOLERANCE	4.58	4.55	4.32	4.34	#DIV/0!		4		4.45	0.14
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	13%	8%	7%	19%	#DIV/0!		0		9%	3%
PLECOPTERA	1%	3%	2%	0%	#DIV/0!		0		2%	1%
TRICHOPTERA	45%	55%	59%	47%	#DIV/0!		1		53%	7%
COLEOPTERA	19%	17%	15%	17%	#DIV/0!		0		17%	2%
DIPTERA	21%	18%	16%	17%	#DIV/0!		0		18%	2%
NONINSECT	1%	0%	1%	0%	#DIV/0!		0		0.7%	1%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	3%	7%	12%	6%	#DIV/0!		0		7%	5%
SHREDDERS	2%	1%	1%	4%	#DIV/0!		0		1%	1%
FILTER FEEDERS	40%	47%	46%	37%	#DIV/0!		0		44%	4%
COLLECTOR-GATHERER	41%	40%	37%	48%	#DIV/0!		0		39%	2%
PREDATORS	14%	5%	5%	6%	#DIV/0!		0		8%	5%
% of sample used:	100%	100%	100%	100%	100%					
Ind. per m2	3790	16909	13619	7480					10450	6826
estimated total organisms	379	1691	1362	748	0				1045	591
total Potamopyrgus	0	0	0	0	0				0	0
total PTCA	0	0	0	0	0				0	0
% blackflies	0%	0%	1%	1%						
% Heptageniidae	0.3%	0.0%	0.0%	0.4%	0.0%				0.15%	0.18%
Shannon diversity	4.011									

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 13, 2019

0.1 m2 Hess samples - full pick samples

Taxon	sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
EPT/EPTC		0.861									

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA								7%	145	
Optioservus spp.	162	86	172	202	0		622	5.9%	124.4	81.5
Zaitzevia parvula	18	38	12	19	0		88	0.8%	17.5	13.9
Cleptelmis ornata	0	0	0	0	0		0	0.0%	0.0	0.0
Microcylloepus sp.	0	14	0	0	0		14	0.1%	2.9	6.4
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				31%	649	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	0	0	0	5	2		7	0.1%	1.4	2.1
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	12	0	8	5	0		25	0.2%	5.0	5.2
Potthastia sp.	0	5	0	0	0		5	0.0%	1.0	2.1
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	0	0	5	0		17	0.2%	3.4	5.3
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	48	10	28	67	0		153	1.5%	30.6	27.5
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.	6	10	8	5	0		28	0.3%	5.7	3.7
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.	6	5	24	5	0		40	0.4%	7.9	9.3
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

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Tvetenia sp.	114	197	132	168	0		611	5.8%	122.2	75.4
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
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	6	14	0	29	0		49	0.5%	9.8	12.1
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.	510	533	196	490	0		1728	16.5%	345.7	237.0
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.	6	5	4	14	0		29	0.3%	5.8	5.3
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.	18	0	8	14	0		40	0.4%	8.1	8.2
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	18	38	8	14	0		79	0.8%	15.8	14.4
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	18	0	0	0	0		18	0.2%	3.6	8.0
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	5	4	0	0		9	0.1%	1.8	2.4
Simulium spp.	180	77	60	91	0		408	3.9%	81.6	65.0
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								11%	239	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	6	0	0	0	0		6	0.1%	1.2	2.7
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	270	86	228	144	0		728	6.9%	145.7	108.4

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Baetis intercalris	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	18	5	44	43	0		110	1.0%	22.0	20.8
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
Diphetor hageni	0	0	8	5	0		13	0.1%	2.6	3.7
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	36	10	20	19	0		85	0.8%	17.0	13.4
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	5	0	0	0		5	0.0%	1.0	2.1
Serratella tibialis	0	0	0	0	0		0	0.0%	0.0	0.0
Ephemerella sp.	0	0	0	5	0		5	0.0%	1.0	2.1
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	5	0		5	0.05%	1.0	2.1
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	72	14	68	86	0		241	2.3%	48.2	38.4
							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	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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.	
	0	0	0	0							
PLECOPTERA	0	0	0	0				1%	22		
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	12	10	0	0	0		22	0.2%	4.3	6.0	
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	
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.	54	0	8	5	0		67	0.6%	13.4	23.0	
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0	
Isoperla sp.	0	10	0	10	0		19	0.2%	3.8	5.3	
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	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	0	0	0	0				49%	1027		
Arctopsyche grandis	0	0	0	0	0		0	0.0%	0.0	0.0	
Cheumatopsyche spp.	366	211	124	254	0		956	9.1%	191.1	137.9	
Hydropsyche occidentalis	60	120	116	134	0		430	4.1%	86.1	55.8	
Hydropsyche sp1	312	302	240	288	0		1142	10.9%	228.5	130.7	
Hydropsyche morosa gr.	510	451	320	317	0		1598	15.2%	319.6	197.3	
Hydropsyche C. cockerelli	42	19	96	19	0		176	1.7%	35.3	37.1	
Hydropsyche nr bronta	0	0	0	0	0		0	0.0%	0.0	0.0	
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0	
Onocosmoecus unicolor	0	0	4	0	0		4	0.0%	0.8	1.8	
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.	72	29	24	19	0		144	1.4%	28.8	26.5	
Stactobiella sp.	54	67	20	14	0		156	1.5%	31.1	28.3	
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.	12	29	40	24	0		105	1.0%	21.0	15.4	
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0	
Nectopsyche sp.	0	0	4	14	0		18	0.2%	3.7	6.2	
Oecetis sp.	24	19	60	34	0		137	1.3%	27.4	22.0	
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.	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	

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Brachycentrus occidentalis	36	10	44	82	0		171	1.6%	34.2	32.1
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	12	14	4	14	0		45	0.4%	9.0	6.6
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	6	14	28	5	0		53	0.5%	10.6	11.0
				0			14			
ANNELIDA	0	0	0	0				0%	7	
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	12	24	0		36	0.3%	7.2	10.7
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				0%	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.	0	0	4	0	0		4	0.0%	0.8	1.8
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	0	14	4	10	0		28	0.27%	5.6	6.3
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	14	0	0	0		14	0.1%	2.9	6.4
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 MACROINVERTEBRATE DATA

CLARK FORK RIVER #9.0 August 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.	
ID's by D. Stagliano											
SUBSAMPLE count	3108	2491	2184	2707	2		10492		2623	388	194.17
TAXA RICHNESS	34	35	36	39	1		218		36	2	1.08
EPT RICHNESS	19	19	20	22	0		94		20	1	0.71
SHAN. DIVERSITY (log2)	3.91	3.76	4.18	4.08	0		4.09		3.98	0	0.09
BIOTIC INDEX	4.93	4.98	4.81	5.03	0		4.94		4.94	0	0.05
% EPT	64%	57%	69%	57%	0		61%		62%	6%	3%
% Chironomidae	23%	31%	18%	29%	0		26%		25%	6%	3%
EPT/EPTC	73%	65%	79%	66%			13		71%	7%	3%
TEMPERATURE METRICS											
Warm water					taxa		77	Percent	27%		
Cold water					taxa		41	Percent	1%		
Cool water - eurithermal					taxa		79	Percent	72%		
temp estimate - C					max T		22	opt T	20		
SEDIMENT METRICS											
Sediment tolerant taxa	4	4	6	5	0		6		5	1	0.48
% Sediment tolerant	18%	13%	12%	15%	0%		0		14%	3%	1%
Sediment intolerant taxa	2	3	2	3	0		4		3	1	0.29
% Sediment intolerant	1%	2%	3%	1%	0%		0		2%	1%	1%
fines estimate (%< 0.06mm)	9	9	8	0	0		10		7	4	2.19
sand estimate (%<2mm)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0		28		#VALUE!	#VALUE!	#VALUE!
Baetidae/Ephemeroptera	0.73	0.76	0.76	0.63	#DIV/0!		1		0.72	0.06	0.03
Hydropsychinae/Trichoptera	0.86	0.86	0.80	0.83	#DIV/0!		1		0.84	0.03	0.01
% R.A. DOMINANT	16%	21%	15%	18%	100%		0		18%	3%	1%
Shannon-Weaver Index (loge	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.00		3		#VALUE!	#VALUE!	#VALUE!
METALS TOLERANCE	4.58	4.40	4.46	4.52	3.00		4		4.49	0.08	0.04
ORDINAL RELATIVE ABUNDANCE (%)											
EPHEMEROPTERA	13%	5%	17%	11%	0%		0		11%	5%	3%
PLECOPTERA	2%	1%	0%	1%	0%		0		1%	1%	0%
TRICHOPTERA	48%	52%	51%	45%	0%		0		49%	3%	2%
COLEOPTERA	6%	6%	8%	8%	0%		0		7%	2%	1%
DIPTERA	31%	36%	22%	34%	100%		0		31%	6%	3%
NONINSECT	0%	1%	1%	1%	0%		0		0.8%	1%	0%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)											
SCRAPERS/GRAZERS	5%	5%	3%	2%	0%		0		4%	1%	1%
SHREDDERS	0%	1%	2%	1%	0%		0		1%	1%	0%
FILTER FEEDERS	49%	48%	46%	44%	0%		0		47%	2%	1%
COLLECTOR-GATHERER	42%	41%	44%	49%	0%		0		44%	4%	2%
PREDATORS	4%	4%	4%	3%	100%		0		4%	1%	0%
% of sample used:	100%	100%	100%	100%	100%						
Ind. per m2	31080	24912	21840	27072					26226	3883	1942
estimated total organisms	3108	2491	2184	2707	2				2623	388	194
total Potamopyrgus	0	0	0	0	0				0	0	0
total PTCA	0	0	0	0	0				0	0	0
% blackflies	6%	3%	3%	3%							
% Heptageniidae	0.0%	0.0%	0.0%	0.2%	0.0%				0.04%	0.08%	0.04%

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 August 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon	sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA									5%	50	
Optioservus spp.		84	64	24	8	0		180	3.3%	36.0	36.5
Zaitzevia parvula		15	40	9	5	0		69	1.3%	13.8	15.6
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									18%	203	
unassociated midge pupa		0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.		3	0	2	0	0		5	0.1%	0.9	1.4
Macropelopia sp.		0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.		0	0	2	3	0		4	0.1%	0.9	1.2
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	2	0	0		2	0.0%	0.3	0.8
Corynoneura sp		0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.		18	64	26	23	0		130	2.4%	26.0	23.4
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.		3	4	2	4	0		13	0.2%	2.5	1.7
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.		3	4	3	4	0		14	0.3%	2.9	1.7
Paratrichocladius sp.		0	4	3	0	0		7	0.1%	1.5	2.0
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

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 August 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Tvetenia sp.	33	64	9	5	0		111	2.0%	22.2	26.6
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
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	8	3	0	0		11	0.2%	2.3	3.5
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.	75	320	82	31	0		507	9.2%	101.4	126.7
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	1	0		1	0.0%	0.3	0.6
Micropsectra spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Antocha sp.	3	0	3	0	0		6	0.1%	1.3	1.8
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	21	32	10	7	0		70	1.3%	14.0	12.6
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	3	0	0	0	0		3	0.1%	0.6	1.3
Atherix sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Simulium spp.	30	84	9	5	0		128	2.3%	25.6	34.6
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
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								21%	232	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	0	0	5	1	0		6	0.1%	1.3	2.2
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	219	308	167	185	0		878	16.0%	175.7	112.3

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 August 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Baetis intercalris	0	0	0	0	0		0	0.0%	0.0	0.0
Plauditus sp.	21	20	15	13	0		70	1.3%	13.9	8.4
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
Diphetor hageni	0	4	2	0	0		6	0.1%	1.1	1.8
Isweon	0	0	3	0	0		3	0.1%	0.7	1.5
Attenella margarita	36	8	34	9	0		87	1.6%	17.5	16.4
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
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	2	0	0		2	0.03%	0.3	0.8
Rhithrogena sp.	6	8	3	3	0		20	0.37%	4.0	3.1
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	12	20	31	24	0		87	1.6%	17.3	11.8
							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	2	0	0		2	0.0%	0.3	0.8

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 August 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
PLECOPTERA	0	0	0	0				3%	32	
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
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.	36	16	0	15	0		67	1.2%	13.3	14.8
Skwala sp.	24	36	14	19	0		92	1.7%	18.4	13.3
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								53%	577	
Arctopsyche grandis	0	16	0	0	0		16	0.3%	3.2	7.2
Cheumatopsyche spp.	144	244	41	9	0		438	8.0%	87.6	104.4
Hydropsyche occidentalis	42	76	39	7	0		164	3.0%	32.8	30.6
Hydropsyche morosa gr.	33	76	34	3	0		146	2.7%	29.1	30.8
Hydropsyche spp.	60	160	77	20	0		316	5.8%	63.3	62.1
Hydropsyche C. cockerelli	6	24	9	1	0		40	0.7%	8.0	9.6
Hydropsyche nr bronta	0	0	0	0	0		0	0.0%	0.0	0.0
Dicosmoecus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Onocosmoecus unicolor	0	0	3	0	0		3	0.1%	0.7	1.5
Neophylax sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Agraylea sp.	0	0	0	1	0		1	0.0%	0.3	0.6
Hydroptila spp.	18	12	12	5	0		47	0.9%	9.4	6.9
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.	6	0	0	0	0		6	0.1%	1.2	2.7
Lepidostoma sp.	192	68	56	142	0		458	8.4%	91.7	75.6
Ceraclea sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Nectopsyche sp.	18	12	10	4	0		44	0.8%	8.8	7.0
Oecetis sp.	36	48	32	33	0		150	2.7%	29.9	17.9
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.	6	4	0	0	0		10	0.2%	2.0	2.8
Brachycentrus americanus	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 August 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Brachycentrus occidentalis	24	20	17	3	0		64	1.2%	12.7	10.7
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	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	423	188	160	157	0		928	16.9%	185.5	151.9
Protoptila sp.	9	0	0	0	0		9	0.2%	1.8	4.0
Glossosoma sp.	21	12	10	3	0		46	0.8%	9.2	8.3
	0	0	0	0			18			
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	
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	2	1	0		3	0.1%	0.6	0.8
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.	3	4	3	3	0		13	0.2%	2.6	1.5
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	0	0	0	2	0		2	0.04%	0.4	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	0	0	0	1	0		1	0.0%	0.3	0.6
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 MACROINVERTEBRATE DATA

CLARK FORK RIVER #10 August 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
ID's by D. Stagliano										
SUBSAMPLE count	1686	2072	969	760.1	0		5487.1		1372	560
TAXA RICHNESS	35	34	41	36	0		218		37	4
EPT RICHNESS	22	22	23	21	0		94		22	1
SHAN. DIVERSITY (log2)	3.93	4.09	4.21	3.55	0		4.14		3.94	0.14
BIOTIC INDEX	3.75	4.60	4.22	3.66	0		4.14		4.06	0.43
% EPT	83%	67%	80%	86%	0		77%		79%	9%
% Chironomidae	8%	23%	14%	9%	0		15%		13%	7%
EPT/EPTC	91%	75%	85%	90%			373%		85%	8%
TEMPERATURE METRICS										
Warm water					taxa		77	Percent	37%	
Cold water					taxa		41	Percent	1%	
Cool water - eurithermal					taxa		79	Percent	62%	
temp estimate - C					max T		23	opt T	20	
SEDIMENT METRICS										
Sediment tolerant taxa	4	4	8	7	0		9		5.75	2.31
% Sediment tolerant	10%	14%	10%	0%	0%		11%		8%	2%
Sediment intolerant taxa	3	4	3	0	0		5		2.50	0.58
% Sediment intolerant	13%	5%	7%	0%	0%		10%		6%	4%
fines estimate (%< 0.06mm	9	9	8	0	0		9		6.41	0.64
sand estimate (%<2mm)	#VALUE!	#VALUE!	#VALUE!	0	0		28		#VALUE!	#VALUE!
Baetidae/Ephemeroptera	0.82	0.90	0.73	0.85	#DIV/0!		0.83		0.82	0.08
Hydropsychinae/Trichoptera	0.27	0.60	0.40	0.10	#DIV/0!		0.38		0.34	0.17
% R.A. DOMINANT	25%	15%	17%	24%	#DIV/0!		17%		21%	5%
Shannon-Weaver Index (log	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!		2.92		#VALUE!	#VALUE!
METALS TOLERANCE	3.59	4.31	3.96	3.51	#DIV/0!		3.92		3.84	0.36
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	17%	18%	27%	31%	#DIV/0!		21%		23%	5%
PLECOPTERA	4%	3%	1%	4%	#DIV/0!		3%		3%	1%
TRICHOPTERA	62%	46%	52%	51%	#DIV/0!		53%		53%	8%
COLEOPTERA	6%	5%	3%	2%	#DIV/0!		5%		4%	1%
DIPTERA	11%	28%	16%	11%	#DIV/0!		18%		17%	9%
NONINSECT	0%	0%	1%	1%	#DIV/0!		0%		0.5%	0%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	28%	11%	19%	22%	#DIV/0!		19%		20%	9%
SHREDDERS	12%	4%	7%	19%	#DIV/0!		9%		11%	4%
FILTER FEEDERS	20%	34%	24%	7%	#DIV/0!		24%		21%	7%
COLLECTOR-GATHERER	32%	45%	43%	41%	#DIV/0!		40%		40%	7%
PREDATORS	7%	6%	6%	10%	#DIV/0!		7%		8%	1%
% of sample used:	100%	100%	100%	100%	100%					
ENTIRE SAMPLE	16860	20720	9690	7601					13718	5597
estimated total organisms	1686	2072	969	760	0				1372	560
total PTCA	0	0	0	0	0				0	0
% blackflies	2%	4%	1%	1%						
% Heptageniidae	0.4%	0.5%	0.3%	0.2%	0.0%				0.32%	0.13%

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon	sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA									23%	140	
Optioservus spp.		145	140	111	80	0		475	15.8%	95.1	59.1
Zaitzevia parvula		69	64	45	47	0		224	7.4%	44.8	27.2
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
		0	0	0	0						
DIPTERA		0	0	0	0				31%	184	
unassociated midge pupa		0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.		1	2	1	0	0		4	0.1%	0.9	0.9
Macropelopia sp.		0	0	0	0	0		0	0.0%	0.0	0.0
Pentaneura sp.		4	6	3	1	0		14	0.5%	2.8	2.3
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	2	1	0	0		3	0.1%	0.6	0.9
Potthastia sp.		1	0	0	0	0		1	0.0%	0.2	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.		5	6	3	5	0		19	0.6%	3.9	2.4
Corynoneura sp		1	0	0	0	0		1	0.0%	0.2	0.5
Cricotopus spp.		8	12	11	15	0		46	1.5%	9.2	5.6
Cricotopus nostococladius		4	6	2	0	0		12	0.4%	2.4	2.5
		0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.		20	26	4	12	0		63	2.1%	12.6	10.8
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

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	4	0	0	0		4	0.1%	0.8	1.8
Paratrichocladius sp.	1	0	5	1	0		8	0.3%	1.6	2.2
Psectrocladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rheocricotopus sp.	0	0	0	1	0		1	0.0%	0.3	0.6
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	24	1	9	0		43	1.4%	8.6	9.6
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	0	0	0	1	0		1	0.0%	0.3	0.6
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	8	20	14	7	0		49	1.6%	9.8	7.6
Parachironomus sp.	0	0	0	1	0		1	0.0%	0.3	0.6
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.	93	112	71	116	0		391	13.0%	78.3	47.3
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	3	0		3	0.1%	0.5	1.2
Stempellina	1	0	0	0	0		1	0.0%	0.2	0.5
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.	8	30	13	5	0		57	1.9%	11.4	11.4
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	4	6	9	13	0		32	1.1%	6.3	5.1
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

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Atherix sp.	0	0	0	3	0		3	0.1%	0.5	1.2
Simulium spp.	23	82	13	41	0		159	5.3%	31.9	31.8
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				17%	104	
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	2	0	2	1	0		6	0.2%	1.2	1.2
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	226	50	99	0		423	14.1%	84.6	86.4
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
Diphetor hageni	2	10	9	3	0		24	0.8%	4.8	4.3
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	1	2	8	3	0		13	0.4%	2.7	2.9
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.	1	0	1	0	0		2	0.1%	0.5	0.6
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	2	0	0		2	0.07%	0.4	1.0
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.	1	0	0	1	0		3	0.08%	0.5	0.7

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	12	14	15	5	0		47	1.6%	9.3	6.5
	0	0	0	0			8			
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	1	0	0		1	0.0%	0.2	0.5
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				3%	20	
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	6	0	1	0		10	0.3%	1.9	2.5
Hesperoperla pacifica	0	0	0	7	0		7	0.2%	1.3	3.0
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amphinemura sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Malenka sp.	0	0	0	1	0		1	0.0%	0.3	0.6
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	1	0	0		2	0.1%	0.5	0.6

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Skwala sp.	8	26	25	17	0		77	2.6%	15.4	11.1
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	1	0	0	1	0		3	0.1%	0.5	0.7
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
							7			
TRICHOPTERA								25%	151	
Arctopsyche grandis	17	28	10	23	0		77	2.6%	15.5	11.0
Cheumatopsyche spp.	8	8	18	28	0		63	2.1%	12.6	10.8
Hydropsyche occidentalis	18	20	14	21	0		74	2.4%	14.7	8.7
Hydropsyche spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydropsyche morosa gr.	18	32	14	25	0		90	3.0%	17.9	12.1
Hydropsyche C. cockerelli	13	16	13	13	0		56	1.9%	11.1	6.3
Hydropsyche nr bronta	0	0	0	0	0		0	0.0%	0.0	0.0
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.	19	36	18	27	0		100	3.3%	20.1	13.3
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.	0	0	0	0	0		0	0.0%	0.0	0.0
Lepidostoma sp.	24	30	20	29	0		103	3.4%	20.6	12.3
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.	5	2	3	4	0		14	0.5%	2.8	1.9
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.	0	2	2	0	0		4	0.1%	0.8	1.1
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	14	40	33	55	0		142	4.7%	28.3	21.5
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

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Rhyacophila coloradensis gp	0	0	1	0	0		1	0.0%	0.2	0.5
Helicopsyche borealis	1	2	3	0	0		6	0.2%	1.3	1.4
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	0	4	15	7	0		26	0.9%	5.2	6.3
	0	0	0	0			13			
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%	2	
Physella sp.	1	6	1	0	0		8	0.3%	1.7	2.5
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	1	1	0		2	0.1%	0.5	0.7
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	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

CRF MACROINVERTEBRATE DATA

CLARK FORK RIVER #11 August 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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

ID's by D. Stagliano

SUBSAMPLE count	627	1052	589	739	0	3006		752	257
TAXA RICHNESS	40	35	41	41	0	218		39	3
EPT RICHNESS	21	18	22	21	0	94		21	2
SHAN. DIVERSITY (log2)	4.03	4.06	4.35	4.25	0	4.26		4.17	0.17
BIOTIC INDEX	4.71	4.50	4.32	4.40	0	4.48		4.48	0.20
% EPT	35%	48%	47%	50%	0	0.46		45%	7%
% Chironomidae	25%	21%	20%	24%	0	0.22		22%	3%
EPT/EPTC	58%	70%	70%	68%		3.33		67%	6%
TEMPERATURE METRICS									
Warm water					taxa	77	Percent	9%	
Cold water					taxa	41	Percent	5%	
Cool water - eurithermal					taxa	79	Percent	85%	
temp estimate - C					max T	22	opt T	18	
SEDIMENT METRICS									
Sediment tolerant taxa	5	5	6	6	0	7		5.50	0.58
% Sediment tolerant	7%	7%	10%	0%	0%	0		6%	2%
Sediment intolerant taxa	3	3	4	0	0	6		2.50	0.58
% Sediment intolerant	7%	6%	8%	0%	0%	0		5%	1%
fines estimate (%< 0.06mm	9	8	9	0	0	9		6.62	0.57
sand estimate (%<2mm)	26	25	26	0	0	26		19.33	0.27
Baetidae/Ephemeroptera	0.77	0.94	0.70	0.92	#DIV/0!	1		0.83	0.12
Hydropsychinae/Trichoptera	0.42	0.35	0.36	0.38	#DIV/0!	0		0.38	0.04
% R.A. DOMINANT	23%	21%	19%	16%	#DIV/0!	0		20%	2%
Shannon-Weaver Index (loge	2.79	2.82	3.01	2.95	0.00	3		2.89	0.12
METALS TOLERANCE	4.49	4.45	4.14	4.24	#DIV/0!	4		4.33	0.19
ORDINAL RELATIVE ABUNDANCE (%)									
EPHEMEROPTERA	11%	24%	15%	15%	#DIV/0!	0		16%	7%
PLECOPTERA	2%	3%	4%	4%	#DIV/0!	0		3%	1%
TRICHOPTERA	22%	21%	28%	31%	#DIV/0!	0		26%	4%
COLEOPTERA	34%	19%	26%	17%	#DIV/0!	0		24%	7%
DIPTERA	31%	32%	26%	32%	#DIV/0!	0		30%	3%
NONINSECT	0%	1%	0%	0%	#DIV/0!	0		0.3%	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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	4%	5%	7%	5%	#DIV/0!		0		5%	2%
SHREDDERS	5%	3%	4%	4%	#DIV/0!		0		4%	1%
FILTER FEEDERS	18%	21%	20%	29%	#DIV/0!		0		22%	2%
COLLECTOR-GATHERER	69%	65%	62%	55%	#DIV/0!		1		63%	4%
PREDATORS	5%	5%	8%	7%	#DIV/0!		0		6%	2%
% of sample used:	100%	100%	100%	100%	100%					
Ind. per m2	6265	10520	5891	7387					7516	2101
estimated total organisms	627	1052	589	739	0				752	210
total Potamopyrgus	0	0	0	0	0				0	0
total PTCA	0	0	0	0	0				0	0
% blackflies	4%	8%	2%	6%	0					
% Heptageniidae	0.2%	0.0%	0.3%	0.2%	0.0%				0.19%	0.1%

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon	sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA									8%	18	
Optioservus spp.		10	5	6	14	0		35	3.1%	7.0	5.3
Zaitzevia parvula		9	13	17	17	0		56	5.0%	11.2	7.1
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									9%	21	
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.		1	0	1	1	0		3	0.3%	0.6	0.5
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.		4	1	0	5	0		10	0.9%	2.0	2.3
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	1	0	1	0		2	0.2%	0.4	0.5
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

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	2	4	0		12	1.1%	2.4	1.7
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
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	4	0	0		4	0.4%	0.8	1.8
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	1	0		1	0.1%	0.2	0.4
Polypedilum spp.	5	1	5	5	0		16	1.4%	3.2	2.5
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.	3	0	1	1	0		5	0.4%	1.0	1.2
Sublettia sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tanytarsus sp.	5	4	6	10	0		25	2.2%	5.0	3.6
Micropsectra spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Antocha sp.	1	0	1	0	0		2	0.2%	0.4	0.5
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	1	3	6	2	0		12	1.1%	2.4	2.3
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.	0	1	1	5	0		7	0.6%	1.4	2.1
Simulium spp.	0	2	0	2	0		4	0.4%	0.8	1.1
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	0	0	1	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

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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								30%	67	
Ameletus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Acentrella sp.	1	3	8	2	0		14	1.2%	2.8	3.1
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	4	7	3	45	0		59	5.3%	11.8	18.7
Isweon	0	1	0	0	0		1	0.1%	0.2	0.4
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
Diphetor hageni	1	2	4	3	0		10	0.9%	2.0	1.6
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	8	5	12	15	0		40	3.6%	8.0	5.9
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)	3	0	5	4	0		12	1.1%	2.4	2.3
Serratella tibialis	10	12	6	6	0		34	3.0%	6.8	4.6
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	0.3%	0.6	1.3
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.	6	1	5	7	0		19	1.7%	3.8	3.1
Rhithrogena sp.	23	34	35	31	0		123	11.0%	24.6	14.5
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	1	1	3	1	0		6	0.5%	1.2	1.1
Paraleptophlebia sp.	1	0	0	1	0		2	0.2%	0.4	0.5
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

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Caenis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Asioplax edmundsi	1	0	3	3	0		7	0.6%	1.4	1.5
Tricorythodes sp	1	0	0	4	0		5	0.4%	1.0	1.7
							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.	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	0	0		0	0.0%	0.0	0.0
PLECOPTERA								21%	47	
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	0	3	2	0		9	0.8%	1.8	1.8
Hesperoperla pacifica	1	0	0	3	0		4	0.4%	0.8	1.3
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
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.	8	3	4	7	0		22	2.0%	4.4	3.2
Skwala sp.	57	27	53	40	0		177	15.8%	35.4	23.0
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	1	0	0	0		1	0.1%	0.2	0.4
Pteronarcella badia	1	0	1	6	0		8	0.7%	1.6	2.5
Pteronarcys californica	1	5	1	2	0		9	0.8%	1.8	1.9
Sweltsa sp.	0	1	0	1	0		2	0.2%	0.4	0.5
Suwallia sp.	0	3	0	1	0		4	0.4%	0.8	1.3
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
							9			
TRICHOPTERA								32%	71	
Arctopsyche grandis	26	21	19	16	0		82	7.3%	16.4	9.9

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Cheumatopsyche spp.	12	5	12	8	0		37	3.3%	7.4	5.1
Hydropsyche occidentalis	13	31	12	22	0		78	7.0%	15.6	11.6
Hydropsyche morosa gr.	10	21	15	14	0		60	5.3%	12.0	7.8
Ceratopsyche spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydropsyche C. cockerelli	4	12	3	7	0		26	2.3%	5.2	4.5
Hydropsyche nr bronta	1	0	0	1	0		2	0.2%	0.4	0.5
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.	0	0	2	4	0		6	0.5%	1.2	1.8
Hydroptila spp.	4	2	4	1	0		11	1.0%	2.2	1.8
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.	2	1	5	5	0		13	1.2%	2.6	2.3
Ceraclea sp.	0	0	0	1	0		1	0.1%	0.2	0.4
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	1	0	0	0	0		1	0.1%	0.2	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.	1	0	1	0	0		2	0.2%	0.4	0.5
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	1	4	10	13	0		28	2.5%	5.6	5.7
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	0.1%	0.2	0.4
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.	2	3	1	0	0		6	0.5%	1.2	1.3
							15			
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

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	1	0		1	0.1%	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	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

ID's by D. Stagliano

SUBSAMPLE count	253	242	280	347	0		1122		281	20
TAXA RICHNESS	41	35	37	47	0		218		40	3
EPT RICHNESS	31	25	26	32	0		94		29	3
SHAN. DIVERSITY (log2)	4.32	4.23	4.39	4.67	0		4.58		4.40	0.08
BIOTIC INDEX	3.29	3.14	3.17	3.52	0		3.30		3.28	0.08
% EPT	83%	86%	82%	80%	0		83%		83%	2%
% Chironomidae	9%	4%	7%	8%	0		7%		7%	3%
EPT/EPTC	91%	96%	92%	91%			37%		92%	2%
TEMPERATURE METRICS										
Warm water					taxa		77	Percent	16%	
Cold water					taxa		41	Percent	20%	

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 14, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Cool water - eurithermal					taxa		79	Percent	64%	
temp estimate - C					max T		21	opt T	17	
SEDIMENT METRICS										
Sediment tolerant taxa	6	3	5	8	0		8		5.50	1.53
% Sediment tolerant	9%	5%	9%	0%	0%		8%		6%	3%
Sediment intolerant taxa	9	9	8	0	0		13		6.50	0.58
% Sediment intolerant	27%	34%	26%	0%	0%		27%		22%	4%
fines estimate (%< 0.06mm	8	7	7	0	0		6		5.35	0.54
sand estimate (%<2mm)	22	21	22	0	0		21		16.32	0.35
Baetidae/Ephemeroptera	0.10	0.19	0.18	0.41	#DIV/0!		0.25		0.22	0.05
Hydropsychinae/Trichoptera	0.51	0.69	0.50	0.57	#DIV/0!		0.57		0.57	0.11
% R.A. DOMINANT	23%	14%	19%	13%	#DIV/0!		16%		17%	4%
Shannon-Weaver Index (loge	3.00	2.93	3.04	3.24	0.00		3.37		3.05	0.06
METALS TOLERANCE	3.07	3.24	3.00	3.49	#DIV/0!		3.22		3.20	0.13
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	24%	29%	30%	35%	#DIV/0!		30%		29%	3%
PLECOPTERA	28%	17%	22%	18%	#DIV/0!		21%		21%	6%
TRICHOPTERA	31%	41%	30%	27%	#DIV/0!		32%		32%	6%
COLEOPTERA	8%	7%	8%	9%	#DIV/0!		8%		8%	0%
DIPTERA	9%	6%	10%	11%	#DIV/0!		9%		9%	2%
NONINSECT	0%	0%	0%	0%	#DIV/0!		0%		0.1%	0%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	15%	18%	18%	12%	#DIV/0!		16%		16%	2%
SHREDDERS	2%	2%	3%	4%	#DIV/0!		3%		3%	1%
FILTER FEEDERS	28%	40%	26%	24%	#DIV/0!		29%		29%	8%
COLLECTOR-GATHERER	26%	24%	30%	41%	#DIV/0!		31%		30%	3%
PREDATORS	29%	16%	24%	18%	#DIV/0!		22%		22%	7%
% of sample used:	100%	100%	100%	100%	100%					
Ind. per m2	2530	2420	2800	3470					2805	471
estimated total organisms	253	242	280	347	0				281	47
total Potamopyrgus	0	0	0	0	0				0	0
total PTCA	1	5	1	2	0				2	2
% blackflies	0%	1%	0%	1%						
% Heptageniidae	11.5%	15.0%	15.8%	15.0%	0.0%				14.33%	1.9%

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 15, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
COLEOPTERA								7%	13	
Optioservus spp.	8	9	7	12	0		36	3.7%	7.2	4.4
Zaitzevia parvula	5	15	2	7	0		29	3.0%	5.8	5.8
Cleptelmis ornata	0	0	0	1	0		1	0.1%	0.2	0.4
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								19%	37	
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	1	0	0		2	0.2%	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.	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.	3	1	0	0	0		4	0.4%	0.8	1.3
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.	1	5	2	2	0		10	1.0%	2.0	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	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

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 15, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	0	1	0		3	0.3%	0.6	0.9
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
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	3	3	0		6	0.6%	1.2	1.6
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.	0	2	0	1	0		3	0.3%	0.6	0.9
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	0	0		2	0.2%	0.4	0.9
Sublettia sp.	1	0	1	0	0		2	0.2%	0.4	0.5
Stempellina	0	0	0	1	0		1	0.1%	0.2	0.4
Micropsectra spp.	40	1	17	6	0		64	6.6%	12.8	16.6
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.	4	0	0	0	0		4	0.4%	0.8	1.8
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
Protoplasa fitchii	0	0	0	0	0		0	0.0%	0.0	0.0
Simulium spp.	0	82	0	0	0		82	8.4%	16.4	36.7
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

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 15, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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								10%	20	
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	10	10	3	7	0		30	3.1%	6.0	4.4
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
Diphetor hageni	0	0	2	0	0		2	0.2%	0.4	0.9
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	0	0	2	0	0		2	0.2%	0.4	0.9
Caudatella heterocaudata	0	0	0	0	0		0	0.0%	0.0	0.0
Drunella coloradensis	1	0	0	0	0		1	0.1%	0.2	0.4
Drunella doddsi	1	0	0	0	0		1	0.1%	0.2	0.4
Drunella grandis (spinifera)	4	8	5	12	0		29	3.0%	5.8	4.5
Serratella tibialis	0	1	0	0	0		1	0.1%	0.2	0.4
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	5	10	2	5	0		22	2.26%	4.4	3.8
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
Cinygmula	1	0	0	0	0		1	0.10%	0.2	0.4
Ecdyonurus sp.	0	0	0	0	0		0	0.00%	0.0	0.0
Rhithrogena sp.	1	3	5	2	0		11	1.13%	2.2	1.9
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

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 15, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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	1	0	0		1	0.1%	0.2	0.4
							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.	6	2	13	3	0		24	2.5%	4.8	5.1
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								8%	16	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Doroneuria sp.	1	2	2	1	0		6	0.6%	1.2	0.8
Claassenia sabulosa	3	3	0	0	0		6	0.6%	1.2	1.6
Hesperoperla pacifica	0	3	1	0	0		4	0.4%	0.8	1.3
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
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	1	0		1	0.1%	0.2	0.4
Skwala sp.	3	2	16	6	0		27	2.8%	5.4	6.3
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	6	8	4	12	0		30	3.1%	6.0	4.5
Sweltsa sp.	1	1	2	1	0		5	0.5%	1.0	0.7
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
							8			
TRICHOPTERA								53%	103	
Arctopsyche grandis	13	5	0	3	0		21	2.2%	4.2	5.4

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 15, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Cheumatopsyche spp.	10	23	31	34	0		98	10.1%	19.6	14.4
Hydropsyche occidentalis	19	17	4	12	0		52	5.3%	10.4	8.2
Hydropsyche sp1	0	0	0	0	0		0	0.0%	0.0	0.0
Hydropsyche morosa gr.	45	38	61	69	0		213	21.9%	42.6	26.8
Hydropsyche C. cockerelli	18	11	14	19	0		62	6.4%	12.4	7.6
Hydropsyche nr bronta	0	0	0	2	0		2	0.2%	0.4	0.9
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	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	2	0	1	0		3	0.3%	0.6	0.9
Lepidostoma sp.	0	2	3	0	0		5	0.5%	1.0	1.4
Ceraclea sp.	0	1	1	0	0		2	0.2%	0.4	0.5
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	1	0	0	1	0		2	0.2%	0.4	0.5
Psychomyia sp.	0	2	0	0	0		2	0.2%	0.4	0.9
Micrasema	0	1	0	0	0		1	0.1%	0.2	0.4
Brachycentrus americanus	0	0	0	0	0		0	0.0%	0.0	0.0
Brachycentrus occidentalis	0	0	0	0	0		0	0.0%	0.0	0.0
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila angelita gr.	2	4	5	3	0		14	1.4%	2.8	1.9
Rhyacophila coloradensis g	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	0	0	0	2	0		2	0.2%	0.4	0.9
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	2	3	2	27	0		34	3.5%	6.8	11.3
							15			
ANNELIDA								1%	2	
Lumbricidae	0	3	1	3	0		7	0.7%	1.4	1.5
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	1	0		1	0.1%	0.2	0.4
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

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 15, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
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

ID's by D. McGuire

SUBSAMPLE count	217	281	215	261	0		974		244	38
TAXA RICHNESS	29	33	30	32	0		218		31	2
EPT RICHNESS	20	23	20	20	0		94		21	2
SHAN. DIVERSITY (log2)	3.87	3.85	3.78	3.85	0		4.22		3.84	0.05
BIOTIC INDEX	3.99	4.22	4.13	3.82	0		4.04		4.04	0.12
% EPT	68%	57%	77%	84%	0		72%		72%	10%
% Chironomidae	22%	4%	12%	5%	0		10%		11%	9%
EPT/EPTC	76%	94%	86%	94%			44%		88%	9%
TEMPERATURE METRICS										
Warm water					taxa		77	Percent	14%	
Cold water					taxa		41	Percent	17%	

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 15, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	present*	SUM	%RA	MEAN	S. D.
Cool water - eurithermal					taxa		79	Percent	69%	
temp estimate - C					max T		22	opt T	19	
SEDIMENT METRICS										
Sediment tolerant taxa	1	1	2	3	0		4		1.75	0.58
% Sediment tolerant	5%	8%	15%	0%	0%		10%		7%	5%
Sediment intolerant taxa	11	12	10	0	0		14		8.25	1.00
% Sediment intolerant	17%	18%	14%	0%	0%		19%		12%	2%
fines estimate (%< 0.06mr	7	8	8	0	0		9		5.80	0.88
sand estimate (%<2mm)	24	26	26	0	0		29		19.02	1.30
Baetidae/Ephemeroptera	0.43	0.31	0.25	0.27	#DIV/0!		0.32		0.32	0.09
Hydropsychinae/Trichoptera	0.84	0.82	0.91	0.79	#DIV/0!		0.83		0.84	0.05
% R.A. DOMINANT	21%	29%	28%	26%	#DIV/0!		22%		26%	5%
Shannon-Weaver Index (log	2.68	2.67	2.62	2.67	0.00		3.12		2.66	0.03
METALS TOLERANCE	3.37	4.25	3.77	3.74	#DIV/0!		3.81		3.78	0.44
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	11%	11%	9%	10%	#DIV/0!		10%		10%	1%
PLECOPTERA	6%	7%	12%	8%	#DIV/0!		8%		8%	3%
TRICHOPTERA	51%	39%	56%	66%	#DIV/0!		53%		53%	9%
COLEOPTERA	6%	9%	4%	8%	#DIV/0!		7%		7%	2%
DIPTERA	24%	33%	12%	5%	#DIV/0!		19%		18%	10%
NONINSECT	0%	1%	0%	2%	#DIV/0!		1%		0.8%	1%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	10%	9%	13%	20%	#DIV/0!		13%		13%	2%
SHREDDERS	3%	4%	3%	5%	#DIV/0!		4%		4%	0%
FILTER FEEDERS	49%	63%	52%	54%	#DIV/0!		55%		54%	7%
COLLECTOR-GATHERER	32%	19%	20%	18%	#DIV/0!		22%		22%	7%
PREDATORS	6%	5%	12%	5%	#DIV/0!		7%		7%	4%
% of sample used:	100%	100%	100%	100%	100%					
Ind. per m2	2170	2810	2150	2610					2435	328
estimated total organisms	217	281	215	261	0				244	33
total Potamopyrgus	0	0	0	0	0				0	0
total PTCA	6	8	4	12	0				6	2
% blackflies	0%	29%	0%	0%						
% Heptageniidae	0.9%	1.4%	2.3%	0.9%	0.0%				1.38%	0.7%

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 125, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								5%	18	
Optioservus spp.	5	21	18	7	0		51	2.7%	10.2	8.9
Zaitzevia sp.	4	10	12	11	0		37	2.0%	7.4	5.2
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
Ordobrevia	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%	38	
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	1	0	0		1	0.1%	0.2	0.4
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.	3	0	3	0	0		6	0.3%	1.2	1.6
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	0	0	2	2	0		4	0.2%	0.8	1.1
Cricotopus nostococladius	3	2	1	0	0		6	0.3%	1.2	1.3
	0	0	0	0	0		0	0.0%	0.0	0.0
Eukiefferiella spp.	1	1	7	1	0		10	0.5%	2.0	2.8
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	0	3	2	0		8	0.4%	1.6	1.5
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.	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	1	6	0	0		10	0.5%	2.0	2.5
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 125, 2019

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	3	1	3	3	0		10	0.5%	2.0	1.4
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.	4	2	3	4	0		13	0.7%	2.6	1.7
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.	3	1	0	3	0		7	0.4%	1.4	1.5
Sublettia sp.	1	0	0	1	0		2	0.1%	0.4	0.5
Tanytarsus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Micropsectra spp.	6	0	1	14	0		21	1.1%	4.2	6.0
Antocha sp.	2	0	0	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.	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.	1	1	0	0	0		2	0.1%	0.4	0.5
Simulium spp.	6	51	21	7	0		85	4.5%	17.0	20.5
Chelifera sp.	1	0	0	0	0		1	0.1%	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
Protoplasa sp.	0	1	0	0	0		1	0.1%	0.2	0.4
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								14%	54	
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	4	0	13	1	0		18	1.0%	3.6	5.5
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	29	66	7	0		111	5.9%	22.2	26.8
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 15.5 --August 125, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Diphetor hageni	2	0	3	2	0		7	0.4%	1.4	1.3
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)	6	9	27	1	0		43	2.3%	8.6	10.9
Serratella tibialis	10	9	24	24	0		67	3.6%	13.4	10.4
Ephemerella sp.	0	0	1	0	0		1	0.1%	0.2	0.4
Timpango hecuba	0	0	0	0	0		0	0.0%	0.0	0.0
Epeorus albertae	2	1	2	1	0		6	0.3%	1.2	0.8
Epeorus longimanus	0	0	0	0	0		0	0.0%	0.0	0.0
Heptagenia sp.	0	0	0	2	0		2	0.1%	0.4	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.	5	1	2	5	0		13	0.7%	2.6	2.3
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	1	0	0	0		1	0.1%	0.2	0.4
							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.	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								10%	39	
Acroneuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Calineuria sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Claassenia sabulosa	9	2	5	8	0		24	1.3%	4.8	3.8
Hesperoperla pacifica	8	10	13	7	0		38	2.0%	7.6	4.8
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 15.5 --August 125, 2019

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	5	1	1	0		7	0.4%	1.4	2.1
Skwala sp.	11	10	24	9	0		54	2.9%	10.8	8.6
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	10	33	1	0		46	2.4%	9.2	13.9
Pteronarcys californica	9	6	6	6	0		27	1.4%	5.4	3.3
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								60%	227	
Arctopsyche grandis	40	17	24	21	0		102	5.4%	20.4	14.4
Cheumatopsyche spp.	133	98	103	141	0		475	25.2%	95.0	56.3
Hydropsyche occidentalis	30	25	35	30	0		120	6.4%	24.0	13.9
Hydropsyche morosa gr.	66	100	39	109	0		314	16.7%	62.8	44.8
Hydropsyche spp.	3	1	2	0	0		6	0.3%	1.2	1.3
Hydropsyche C. cockerelli	19	11	4	15	0		49	2.6%	9.8	7.8
Hydropsyche nr bronta	3	1	0	1	0		5	0.3%	1.0	1.2
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	0	1	0	0		1	0.1%	0.2	0.4
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.	1	0	0	0	0		1	0.1%	0.2	0.4
Lepidostoma sp.	4	5	4	5	0		18	1.0%	3.6	2.1
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	2	5	0	0		8	0.4%	1.6	2.1
Trianodes sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Wormaldia sp.	0	1	0	0	0		1	0.1%	0.2	0.4
Psychomyia sp.	2	3	6	2	0		13	0.7%	2.6	2.2
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	3	7	5	1	0		16	0.9%	3.2	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	0	2	0	1	0		3	0.2%	0.6	0.9
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	3	0	1	0	0		4	0.2%	0.8	1.3
							16			
ANNELIDA								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 125, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Lumbricidae	1	0	0	0	0		1	0.1%	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	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.	1	0	0	0	0		1	0.1%	0.2	0.4
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

ID's by D. Stagliano

SUBSAMPLE count	436	460	530	456	0	1882		471	49
TAXA RICHNESS	43	38	39	35	0	218		39	3
EPT RICHNESS	25	25	26	24	0	94		25	1
SHAN. DIVERSITY (log2)	3.91	3.80	4.23	3.48	0	4.05		3.85	0.23
BIOTIC INDEX	4.14	4.30	3.98	4.31	0	4.17		4.18	0.16
% EPT	88%	80%	85%	88%	0	85%		85%	4.4%
% Chironomidae	7%	2%	6%	7%	0	5%		5%	3%
EPT/EPTC	93%	98%	94%	93%		46%		94%	2%
TEMPERATURE METRICS									
Warm water					taxa	77	Percent	46%	

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 125, 2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Cold water					taxa		41	Percent	9%	
Cool water - eurithermal					taxa		79	Percent	45%	
temp estimate - C					max T		21	opt T	19	
SEDIMENT METRICS										
Sediment tolerant taxa	2	3	2	1	0		5		2.00	0.58
% Sediment tolerant	31%	22%	20%	0%	0%		25%		18%	6%
Sediment intolerant taxa	9	8	9	0	0		9		6.50	0.58
% Sediment intolerant	20%	13%	19%	0%	0%		17%		13%	4%
fines estimate (%< 0.06mm)	10	10	10	0	0		8		7.49	0.38
sand estimate (%<2mm)	######	######	######	0	0		26		#######	#####
Baetidae/Ephemeroptera	0.39	0.58	0.59	0.23	#DIV/0!		0.51		0.45	0.11
Hydropsychinae/Trichoptera	0.82	0.86	0.80	0.91	#DIV/0!		0.85		0.85	0.03
% R.A. DOMINANT	31%	22%	19%	31%	#DIV/0!		25%		0.26	6%
Shannon-Weaver Index (loge)	######	######	######	######	######		2.92		#######	#####
METALS TOLERANCE	3.97	4.35	4.11	4.15	#DIV/0!		4.15		4.14	0.19
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	9%	11%	26%	9%	#DIV/0!		14%		14%	9%
PLECOPTERA	9%	9%	15%	7%	#DIV/0!		10%		10%	4%
TRICHOPTERA	71%	59%	43%	71%	#DIV/0!		60%		61%	14%
COLEOPTERA	2%	7%	6%	4%	#DIV/0!		5%		5%	2%
DIPTERA	9%	13%	10%	8%	#DIV/0!		10%		10%	2%
NONINSECT	0%	0%	0%	0%	#DIV/0!		0%		0.1%	0%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	4%	3%	6%	2%	#DIV/0!		4%		4%	2%
SHREDDERS	4%	5%	8%	3%	#DIV/0!		5%		5%	2%
FILTER FEEDERS	70%	68%	44%	72%	#DIV/0!		63%		64%	15%
COLLECTOR-GATHERER	14%	17%	32%	18%	#DIV/0!		21%		20%	10%
PREDATORS	8%	7%	10%	5%	#DIV/0!		7%		7%	1%
% of sample used:	100%	100%	83%	100%	100%					
ENTIRE SAMPLE	4360	4600	6386	4560					4976	945
estimated total organisms	436	460	639	456	0				498	95
total Potamopyrgus	0	0	0	0	0				0	0
% Non-insect taxa	0%	0%	0%						0%	0%
total PTCA	9	6	7	6	0				6	2
% blackflies	1%	11%	4%							
% Heptageniidae	1.1%	0.2%	0.5%	1.1%	0.0%				0.75%	0.5%

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 #20 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								8%	36	
Optioservus spp.	37	22	41	37	0		137	6.4%	27.4	16.9
Zaitzevia sp.	16	5	4	16	0		41	1.9%	8.2	7.4
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
Ordobrevia nubifera	0	0	0	1	0		1	0.0%	0.2	0.4
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%	114	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	4	3	4	4	0		15	0.7%	3.0	1.7
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	14	13	11	40	0		78	3.7%	15.6	14.7
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	1	0		1	0.0%	0.2	0.4
Cricotopus spp.	52	48	36	34	0		170	8.0%	34.0	20.5
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.	8	7	4	3	0		22	1.0%	4.4	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.	12	8	10	9	0		39	1.8%	7.8	4.6
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
Parakiefferiella sp.	1	2	0	1	0		4	0.2%	0.8	0.8
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.	11	9	12	5	0		37	1.7%	7.4	4.9
Chironomus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Cryptochironomus sp.	1	2	0	0	0		3	0.1%	0.6	0.9
Dicrotendipes 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 #20 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
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	20	12	13	7	0		52	2.4%	10.4	7.4
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	1	2	4	0		8	0.4%	1.6	1.5
Polypedilum spp.	11	18	13	26	0		68	3.2%	13.6	9.6
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.	2	7	4	4	0		17	0.8%	3.4	2.6
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.	19	10	1	13	0		43	2.0%	8.6	8.1
Atherix	1	0	0	0	0		1	0.0%	0.2	0.4
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	2	1	1	1	0		5	0.2%	1.0	0.7
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
Protoplasa fitchii	0	0	0	0	0		0	0.0%	0.0	0.0
Simulium spp.	3	0	0	1	0		4	0.2%	0.8	1.3
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	0	0	1	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								11%	47	
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	1	2	2	0		6	0.3%	1.2	0.8
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	6	4	0	8	0		18	0.8%	3.6	3.6
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
Diphetor hageni	0	9	3	0	0		12	0.6%	2.4	3.9
Fallceon quilleri	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 #20 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Attenella margarita	5	13	5	5	0		28	1.3%	5.6	4.7
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)	7	3	2	0	0		12	0.6%	2.4	2.9
Serratella tibialis	1	10	5	12	0		28	1.3%	5.6	5.3
Ephemerella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Timpango hecuba	0	0	0	1	0		1	0.0%	0.2	0.4
Epeorus albertae	0	0	5	0	0		5	0.2%	1.0	2.2
Epeorus longimanus	0	0	0	0	0		0	0.0%	0.0	0.0
Nixe	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.	4	6	2	2	0		14	0.7%	2.8	2.3
Rhithrogena sp.	2	6	2	7	0		17	0.8%	3.4	3.0
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	7	2	2	4	0		15	0.7%	3.0	2.6
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	3	7	6	4	0		20	0.9%	4.0	2.7
Tricorythodes sp	1	13	20	24	0		58	2.7%	11.6	10.9
							13			
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.	2	2	4	2	0		10	0.5%	2.0	1.4
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								7%	30	
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	5	1	0	0		6	0.3%	1.2	2.2
Hesperoperla pacifica	3	8	9	4	0		24	1.1%	4.8	3.7
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
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

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 #20 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
Zapada oregenensis gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Isogenoides sp.	0	3	9	5	0		17	0.8%	3.4	3.8
Skwala sp.	9	23	18	47	0		97	4.6%	19.4	17.8
Isoperla fulva	0	0	0	0	0		0	0.0%	0.0	0.0
Isoperla sp.	0	1	0	0	0		1	0.0%	0.2	0.4
Pteronarcella badia	2	1	0	2	0		5	0.2%	1.0	1.0
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
							7			
TRICHOPTERA								46%	196	
Arctopsyche grandis	16	5	4	7	0		32	1.5%	6.4	5.9
Cheumatopsyche spp.	114	122	115	54	0		405	19.0%	81.0	53.0
Hydropsyche occidentalis	79	32	55	36	0		202	9.5%	40.4	29.3
Hydropsyche bronta	0	0	3	0	0		3	0.1%	0.6	1.3
Ceratopsyche spp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hydropsyche C. cockerelli	9	16	19	9	0		53	2.5%	10.6	7.4
Hydropsyche morosa gr.	36	27	26	46	0		135	6.3%	27.0	17.1
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.	13	3	2	1	0		19	0.9%	3.8	5.3
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.	0	0	0	0	0		0	0.0%	0.0	0.0
Lepidostoma sp.	1	0	4	1	0		6	0.3%	1.2	1.6
Ceraclea sp.	3	0	0	0	0		3	0.1%	0.6	1.3
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	11	28	29	8	0		76	3.6%	15.2	12.8
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.	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	9	2	0	7	0		18	0.8%	3.6	4.2
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila angelita gr.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gr.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	2	6	11	1	0		20	0.9%	4.0	4.5
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	3	1	2	1	0		7	0.3%	1.4	1.1
							13			
ANNELIDA								0%	1	
Lumbricidae	0	0	0	5	0		5	0.2%	1.0	2.2
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

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 #20 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
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.	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	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	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										
ID's by D. Stagliano										
SUBSAMPLE count	567	527	522	512	0		2128		532	25
TAXA RICHNESS	47	44	42	45	0		218		45	3
EPT RICHNESS	25	27	26	25	0		94		26	1
SHAN. DIVERSITY (log2)	4.33	4.46	4.33	4.57	0		4.57		4.42	0.08
BIOTIC INDEX	4.82	4.81	4.81	4.29	0		4.69		4.68	0.00
% EPT	61%	68%	69%	58%	0		64%		64%	4%
% Chironomidae	28%	27%	21%	29%	0		26%		26%	4%
EPT/EPTC	69%	72%	77%	66%			256%		71%	4%
TEMPERATURE METRICS										
Warm water					taxa		77	Percent	37%	
Cold water					taxa		41	Percent	9%	
Cool water - eurithermal					taxa		79	Percent	54%	
temp estimate - C					max T		23	opt T	20	
SEDIMENT METRICS										
Sediment tolerant taxa	7	6	6	6	0		9		6.25	0.58

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 #20 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
% Sediment tolerant	24%	28%	28%	0%	0%		24%		20%	3%
Sediment intolerant taxa	7	6	8	0	0		8		5.25	1.00
% Sediment intolerant	6%	6%	6%	0%	0%		6%		5%	0%
fines estimate (%< 0.06mm)	11	11	11	0	0		11		8.36	0.29
sand estimate (%<2mm)	29	30	30	0	0		30		22.25	0.65
Baetidae/Ephemeroptera	0.19	0.19	0.09	0.14	#DIV/0!		0.15		0.15	0.06
Hydropsychinae/Trichoptera	0.80	0.81	0.81	0.85	#DIV/0!		0.82		0.82	0.01
% R.A. DOMINANT	20%	23%	22%	11%	#DIV/0!		19%		19%	2%
Shannon-Weaver Index (loge)	3.00	3.09	3.00	3.17	0.00		3.26		3.06	0.05
METALS TOLERANCE	4.82	4.57	4.59	4.74	#DIV/0!		4.68		4.68	0.14
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	7%	14%	10%	13%	#DIV/0!		11%		11%	4%
PLECOPTERA	2%	8%	7%	11%	#DIV/0!		7%		7%	3%
TRICHOPTERA	52%	46%	52%	33%	#DIV/0!		46%		46%	3%
COLEOPTERA	9%	5%	9%	11%	#DIV/0!		8%		8%	2%
DIPTERA	29%	27%	21%	30%	#DIV/0!		27%		27%	4%
NONINSECT	0%	0%	0%	1%	#DIV/0!		0%		0.3%	0%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	6%	5%	6%	3%	#DIV/0!		5%		5%	0%
SHREDDERS	1%	0%	1%	1%	#DIV/0!		1%		1%	0%
FILTER FEEDERS	47%	40%	43%	32%	#DIV/0!		41%		41%	4%
COLLECTOR-GATHERER	41%	41%	36%	51%	#DIV/0!		42%		42%	2%
PREDATORS	6%	14%	14%	13%	#DIV/0!		12%		12%	5%
% of sample used:	75%	50%	83%	67%	100%					
ENTIRE SAMPLE	7560	10540	6289	7642					8008	1798
estimated total organisms	756	1054	629	764	0				801	180
total Potamopyrgus	0	0	0	0	0				0	0
% Non-insect taxa	0%	0%	0%	1%					0%	0%
total PTCA	0	0	0	0	0				0	0
% blackflies	1%	0%	0%	0%						
% Heptageniidae	1.1%	2.1%	1.6%	1.6%	0.0%				1.6%	0.4%

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 #22 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
COLEOPTERA								5%	22	
Optioservus spp.	25	13	17	22	0		77	3.2%	15.4	9.8
Zaitzevia sp.	10	11	8	4	0		33	1.4%	6.6	4.6
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.	1	0	0	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								25%	119	
unassociated midge pupa	0	0	0	0	0		0	0.0%	0.0	0.0
Thienemannimyia gp.	4	3	2	1	0		10	0.4%	2.0	1.6
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	5	1	6	0		16	0.7%	3.2	2.6
Potthastia sp.	2	1	3	1	0		7	0.3%	1.4	1.1
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.	7	12	0	0	0		19	0.8%	3.8	5.5
Corynoneura sp	0	0	0	0	0		0	0.0%	0.0	0.0
Cricotopus spp.	45	51	27	38	0		161	6.7%	32.2	20.1
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.	9	6	0	0	0		15	0.6%	3.0	4.2
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.	3	6	3	2	0		14	0.6%	2.8	2.2
Paracladius sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Parametriocnemus sp.	3	1	2	2	0		8	0.3%	1.6	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	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.	4	0	0	0	0		4	0.2%	0.8	1.8
Thienemanniella sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Tvetenia sp.	15	22	11	9	0		57	2.4%	11.4	8.1
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 #22 8/15/2019

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	2	3	5	0		11	0.5%	2.2	1.9
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	3	1	2	1	0		7	0.3%	1.4	1.1
Polypedilum spp.	14	21	18	27	0		80	3.3%	16.0	10.1
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.	29	39	12	30	0		110	4.5%	22.0	15.7
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.	6	4	9	3	0		22	0.9%	4.4	3.4
Atherix	1	1	0	1	0		3	0.1%	0.6	0.5
Dicranota sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hexatoma sp.	1	1	2	1	0		5	0.2%	1.0	0.7
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
Protoplasa fitchii	1	0	0	1	0		2	0.1%	0.4	0.5
Simulium spp.	14	7	13	8	0		42	1.7%	8.4	5.6
Chelifera sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Hemerodromia sp.	1	0	1	0	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								17%	80	
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	4	5	12	7	0		28	1.2%	5.6	4.4
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	33	54	23	32	0		142	5.9%	28.4	19.5
Isweon	12	10	17	8	0		47	1.9%	9.4	6.2
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

CLARK FORK RIVER #22 8/15/2019

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	3	0	0		6	0.2%	1.2	1.3
Fallceon quilleri	0	0	0	0	0		0	0.0%	0.0	0.0
Attenella margarita	1	2	4	1	0		8	0.3%	1.6	1.5
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)	0	4	1	4	0		9	0.4%	1.8	2.0
Serratella tibialis	26	18	12	21	0		77	3.2%	15.4	10.0
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	1	3	2	1	0		7	0.29%	1.4	1.1
Epeorus longimanus	0	0	0	0	0		0	0.00%	0.0	0.0
Nixe	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.	2	4	7	6	0		19	0.78%	3.8	2.9
Rhithrogena sp.	2	5	4	2	0		13	0.54%	2.6	1.9
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	4	0	2	0	0		6	0.2%	1.2	1.8
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	0	2	1	0		4	0.2%	0.8	0.8
Tricorythodes sp	6	13	9	8	0		36	1.5%	7.2	4.8
							13			
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	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	1	1	4	0		8	0.3%	1.6	1.5
Hesperoperla pacifica	1	3	0	3	0		7	0.3%	1.4	1.5
Capnia gp.	0	0	0	0	0		0	0.0%	0.0	0.0
Amphinemura 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 #22 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
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.	2	0	2	1	0		5	0.2%	1.0	1.0
Skwala sp.	3	4	2	7	0		16	0.7%	3.2	2.6
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	5	7	1	0		15	0.6%	3.0	2.9
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								52%	251	
Arctopsyche grandis	2	1	3	4	0		10	0.4%	2.0	1.6
Cheumatopsyche spp.	75	112	90	101	0		378	15.6%	75.6	44.4
Hydropsyche occidentalis	144	159	126	97	0		526	21.7%	105.2	63.2
Hydropsyche sp1	0	1	0	0	0		1	0.0%	0.2	0.4
Ceratopsyche spp.	3	6	0	0	0		9	0.4%	1.8	2.7
Hydropsyche C. cockerelli	11	15	7	12	0		45	1.9%	9.0	5.8
Hydropsyche morosa gr.	31	40	30	25	0		126	5.2%	25.2	15.1
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.	5	4	7	3	0		19	0.8%	3.8	2.6
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	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.	0	0	1	0	0		1	0.0%	0.2	0.4
Nectopsyche sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Oecetis sp.	6	11	4	5	0		26	1.1%	5.2	4.0
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.	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	0	5	0	0	0		5	0.2%	1.0	2.2
Polycentropus sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila angelita gr.	0	0	0	0	0		0	0.0%	0.0	0.0
Rhyacophila coloradensis gr.	0	0	0	0	0		0	0.0%	0.0	0.0
Helicopsyche borealis	4	1	3	2	0		10	0.4%	2.0	1.6
Protoptila sp.	0	0	0	0	0		0	0.0%	0.0	0.0
Glossosoma sp.	18	26	33	20	0		97	4.0%	19.4	12.3
							13			
ANNELIDA								0%	1	
Lumbricidae	1	1	0	2	0		4	0.2%	0.8	0.8

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 #22 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
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	1	1	0	0		2	0.1%	0.4	0.5
Sphaerium sp.	0	0	0	0	0		0	0.0%	0.0	0.0
OTHER	0	0	0	0	0					
Turbellaria	1	1	0	1	0		3	0.12%	0.6	0.5
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	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

ID's by D. Stagliano

SUBSAMPLE count	608	723	549	541	0	2421		605	88
TAXA RICHNESS	52	49	45	45	0	218		48	4
EPT RICHNESS	27	27	27	25	0	94		27	0
SHAN. DIVERSITY (log2)	4.32	4.21	4.24	4.21	0	4.31		4.25	0.06
BIOTIC INDEX	4.75	4.73	4.51	4.65	0	4.67		4.66	0.13
% EPT	66%	71%	75%	70%	0	71%		71%	5%
% Chironomidae	25%	24%	17%	23%	0	22%		22%	4%
EPT/EPTC	73%	75%	82%	75%		250%		76%	4%
TEMPERATURE METRICS									
Warm water					taxa	77	Percent	29%	
Cold water					taxa	41	Percent	4%	
Cool water - eurithermal					taxa	79	Percent	67%	

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 #22 8/15/2019

0.1 m2 Hess samples - full pick samples

Taxon sample #:	1	2	3	4	5	resen	SUM	%RA	MEAN	S. D.
temp estimate - C					max T		22	opt T	19	
SEDIMENT METRICS										
Sediment tolerant taxa	6	5	7	5	0		7		5.75	1.00
% Sediment tolerant	15%	18%	20%	0%	0%		19%		13%	3%
Sediment intolerant taxa	6	7	6	0	0		7		4.75	0.58
% Sediment intolerant	8%	8%	10%	0%	0%		9%		7%	1%
fines estimate (%< 0.06mm)	9	9	10	0	0		10		7.00	0.27
sand estimate (%<2mm)	28	28	29	0	0		30		21.22	0.29
Baetidae/Ephemeroptera	0.54	0.59	0.56	0.52	#DIV/0!		0.55		0.55	0.02
Hydropsychinae/Trichoptera	0.88	0.87	0.83	0.87	#DIV/0!		0.87		0.87	0.03
% R.A. DOMINANT	24%	22%	23%	19%	#DIV/0!		22%		22%	1%
Shannon-Weaver Index (loge)	3.00	2.92	2.94	2.92	0.00		3.07		2.94	0.04
METALS TOLERANCE	4.64	4.64	4.30	4.43	#DIV/0!		4.52		4.50	0.20
ORDINAL RELATIVE ABUNDANCE (%)										
EPHEMEROPTERA	15%	16%	18%	17%	#DIV/0!		17%		17%	1%
PLECOPTERA	2%	2%	2%	3%	#DIV/0!		2%		2%	0%
TRICHOPTERA	49%	53%	55%	50%	#DIV/0!		52%		52%	3%
COLEOPTERA	6%	3%	5%	5%	#DIV/0!		5%		5%	1%
DIPTERA	27%	25%	20%	25%	#DIV/0!		25%		24%	4%
NONINSECT	0%	0%	0%	1%	#DIV/0!		0%		0.4%	0%
FUNCTIONAL FEEDING GROUP RELATIVE ABUNDANCE (%)										
SCRAPERS/GRAZERS	5%	7%	10%	7%	#DIV/0!		7%		7%	3%
SHREDDERS	0%	1%	1%	0%	#DIV/0!		1%		1%	0%
FILTER FEEDERS	51%	53%	51%	51%	#DIV/0!		52%		52%	1%
COLLECTOR-GATHERER	39%	34%	34%	37%	#DIV/0!		36%		36%	2%
PREDATORS	5%	5%	3%	4%	#DIV/0!		4%		4%	1%
% of sample used:	100%	100%	100%	100%	100%					
Ind. per m2	6080	7230	5490	5410					6052.50	884.89
estimated total organisms	608	723	549	541	0				605	88
total Potamopyrgus	0	0	0	0	0				0	0
% Heptageniidae	0.8%	2.0%	2.1%	1.5%	0.0%				1.6%	0.6%

Appendix C
Metric Values and Bioassessment Scores for Clark Fork River Basin Monitoring Stations, 1986 to 2019

C-1. Mean metric values and bioassessment scores for Silver Bow Creek near Opportunity: Station 02.5* - August 1986-2019 (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	Mean	SD	2001 - 2018 Mean	2001 - 2018 Max	2001 - 2018 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	**16**		20	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	**2.3**		2	3.4	2	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	0.817	0.73	0.652	**0.63**		0.78	0.90	0.59	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	0.109	0.312	**0.69**		0.7	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	0.784	0.82	0.90	**0.96**		0.9	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**		4.3	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	**59**		73	84.0	51	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	484.8	668.8	**581**		874	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	**6.4**		8	15.0	4	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	**6.3**		5	7.0	4	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	**1**		1.7	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	**3**		3.1	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	**5**		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	**4**		4.1	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	**1**		2.1	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	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	**3**		1.3	6.0	0.0	4	6	0
Density (high)	*	*	*	*	*	*	*	*	6	*	*	*	*	*	*	*	*	6	6	6	*	6	*	6	6	6	*	6	5	*	6	6	**6**		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	**4**		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	**2**		2.1	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	**3**		3.9	5.0	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	**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	**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	**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	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%	**52%**	12.4%	60%	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%	**47%**	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%	**71%**	14.9%	62%	94%	42%	78%	100%	33%

1986- 1992 data from Station 03.

* not calculated if density is < 550

C-2. Mean metric values and bioassessment scores for Silver Bow Creek below Warm Springs Ponds: Station 04.5* - August, 1986-2019 (4 samples per year).

	1986	1987	1988	1989	1990	1991	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	Mean	SD	2001 - 2018 Mean	2001 - 2018 Max	2001 - 2018 MIN	1986-2000 Mean	1986-2000 Max	1986-2000 MIN
Metric values																																									
Taxa richness	16	16	18	16	13	16	29	30	27	30	33	35	36	42	42	37	44	37	23	25	30	31	27	29	33	29	34	31	34	28	36	36	**29**		32	44	23	25	42	13
Shannon diversity	2.4	1.6	2.5	2.7	2.1	1.9	3.0	3.2	2.9	2.5	2.0	2.4	3.6	3.6	3.4	3.3	3.7	2.9	2.5	2.9	3.1	3.0	3.0	2.7	2.5	2.9	3.3	3.3	3.1	2.9	3.6	4.0	**2.9**		3.06	3.67	2.48	2.6	3.6	1.6
EPT/EPTC	0.96	0.98	0.97	0.92	0.99	1.00	0.93	0.88	0.74	0.88	0.87	0.93	0.70	0.70	0.85	0.88	0.77	0.90	0.94	0.50	0.88	0.71	0.88	0.98	0.92	0.89	0.89	0.76	0.89	0.86	0.85	0.87	**0.86**		0.84	0.98	0.50	0.89	1.00	0.70
Hydropsychinae/Trichoptera	1.00	1.00	1.00	0.97	1.00	1.00	0.87	0.85	0.90	0.94	0.98	0.98	0.88	0.87	0.71	0.97	0.95	0.97	0.96	0.78	0.91	0.96	0.93	0.83	0.97	0.97	0.91	0.89	0.86	0.88	0.76	0.76	**0.91**		0.89	0.97	0.71	0.95	1.00	0.85
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.90	0.80	0.26	0.23	0.52	0.65	0.90	0.58	0.82	1.00	0.91	0.98	0.89	1.00	0.97	0.95	0.93	0.57	0.97	0.66	0.90	0.98	0.76	**0.85**		0.86	1.00	0.57	0.84	1.00	0.23
Biotic index	6.3	5.1	5.8	5.9	5.0	5.1	5.5	4.8	5.4	5.1	5.2	5.2	5.5	5.4	5.4	5.3	5.0	5.3	5.2	5.7	5.0	5.4	4.9	4.6	5.0	5.1	5.1	5.4	5.5	4.7	4.6	4.4	**5.2**		5.14	5.65	4.60	5.4	6.3	4.8
% Filterer	66	94	75	79	93	90	32	51	58	75	79	80	27	44	29	52	50	53	57	23	51	42	52	81	77	40	57	38	43	34	62	52	**57**		49	81	23	67	94	27
Density	2558	1648	2563	2574	3223	1952	940	3018	3609	3090	3517	3345	2065	2983	3083	2536	2252	3650	1539	1136	1805	1959	1793	1997	4128	3169	1923	2592	2049	2396	1101	1437	**2426**		2300	4128	1101	2649	3609	940
EPT richness	4	5	4	6	6	5	8	12	8	13	13	13	12	19	15	14	18	13	7	7	14	12	11	13	12	9	12	12	14	11	19	17	**11.1**		12	19	7	9	19	4
Metals Tolerance index	5.1	5.4	5.1	5.8	5.4	5.8	4.6	5.4	6.1	5.2	5.3	5.1	4.6	4.5	4.3	4.7	4.6	4.7	4.8	5.5	4.7	4.6	4.9	4.7	5.1	5.0	5.0	5.1	5.1	4.2	4.9	4.4	**5.0**		4.8	5.5	4.2	5.2	6.1	4.5
Metric scores																																								
Taxa richness	1	1	1	1	0	1	3	4	3	4	4	5	5	6	6	5	6	5	2	3	4	4	3	3	4	3	4	4	4	3	5	5	**3**		4	6	2	3	6	0
Shannon diversity	3	1	3	4	2	2	5	5	4	3	2	3	6	6	6	5	6	4	3	4	5	5	5	4	3	4	5	5	5	4	6	6	**4**		5	6	3	4	6	1
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	**6**		6	6	5	6	6	6
Hydropsychinae/Trichoptera	0	0	0	1	0	0	5	5	4	2	1	1	4	5	6	1	2	1	2	6	3	2	3	6	1	1	3	4	5	4	6	6	**3**		3	6	1	2	5	0
Baetidae/Ephemeroptera	0	0	0	0	0	0	0	0	1	4	6	6	6	6	6	4	6	6	0	3	1	4	0	1	2	3	6	1	6	4	1	1	**3**		3	6	0	2	6	0
Biotic index	2	4	2	2	4	4	3	4	3	4	3	3	3	3	3	3	4	3	3	3	4	3	4	5	4	4	4	3	3	5	5	5	**3**		4	5	3	3	4	2
% Filterer	2	0	1	0	0	0	6	5	4	1	0	0	6	6	6	5	6	5	4	6	5	6	5	0	0	6	4	6	6	4	3	5	**3**		5	6	0	2	6	0
Density (high)	5	6	5	5	3	6	6	4	3	4	3	3	5	4	4	5	5	3	6	6	6	6	6	6	2	4	6	5	5	6	6	6	**5**		5	6	2	4	6	3
Density (low)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**		6	6	6	6	6	6
EPT richness	1	1	1	2	2	1	2	3	2	3	3	3	3	5	4	4	5	3	2	2	4	3	3	3	3	2	3	3	4	3	5	5	**3**		3	5	2	2	5	1
Metals Tolerance index	4	4	4	4	4	4	5	4	3	4	4	4	5	5	5	5	5	5	5	4	5	5	5	5	4	4	4	4	4	5	5	5	**4**		5	5	4	4	5	3
Total	30	29	29	31	27	30	47	46	39	41	38	40	55	58	58	49	57	47	39	48	49	50	46	45	35	43	51	47	54	50	54	56	**44**		48	58	35	39	58	27
Organic subset	9	10	8	7	7	10	15	13	10	9	6	6	14	13	13	13	15	11	13	15	15	15	15	11	6	14	14	14	14	15	14	16	**12**		13	15	6	10	15	6
Metals subset	11	11	11	12	12	11	13	13	11	13	13	13	14	16	15	15	16	14	13	12	15	14	14	14	13	12	13	13	14	14	16	16	**13**		14	16	12	12	16	11
Bioassessment																																								
	1986	1987	1988	1989	1990	1991	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	**Mean**		Mean					
Biointegrity	45%	44%	44%	47%	41%	45%	71%	70%	59%	62%	58%	61%	83%	88%	88%	74%	86%	71%	59%	73%	74%	76%	70%	68%	53%	65%	77%	71%	82%	76%	82%	85%	**66%**	9.0%	73%	88%	53%	58%	88%	41%
Organic subset	50%	56%	44%	39%	39%	56%	83%	72%	56%	50%	33%	33%	78%	72%	72%	72%	83%	61%	72%	83%	83%	83%	83%	61%	33%	78%	78%	78%	78%	83%	78%	89%	**65%**		74%	83%	33%	54%	83%	33%
Metals subset	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%	**73%**		77%	89%	67%	69%	89%	61%

*** 1986-91 data from station 04.**

C.3. Mean metric values and bioassessment scores for the Mill-Willow Bypass

Station 05 - August, 1986-1991; 1999-2001; and 2006-2019 (4 samples per year).

	1986	1987	1988	1989	1991	1999	2000	2001	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean
Metric values																							
Taxa richness	25	21	22	23	17	37	42	46	42	35	38	39	39	35	41	46	39	39	38	42	35	32	**35**
Shannon diversity	3.2	2.9	3.0	2.9	2.4	3.4	3.6	3.4	3.8	3.5	3.8	4.0	3.6	3.6	4.1	4.0	3.7	4.0	3.4	3.9	3.3	3.3	**3.5**
EPT/EPTC	0.86	0.97	0.91	0.86	0.80	0.82	0.70	0.85	0.91	0.90	0.85	0.83	0.54	0.64	0.67	0.73	0.74	0.75	0.79	0.82	0.86	0.94	**0.8**
Hydropsychinae/Trichoptera	0.96	0.88	0.85	0.92	0.98	0.20	0.19	0.38	0.83	0.74	0.69	0.37	0.18	0.19	0.66	0.57	0.30	0.49	0.35	0.44	0.18	0.24	**0.5**
Baetidae/Ephemeroptera	0.98	1.00	1.00	0.96	0.97	0.33	0.61	0.27	0.56	0.82	0.63	0.31	0.36	0.76	0.89	0.70	0.72	0.89	0.69	0.78	0.70	0.36	**0.7**
Biotic index	4.6	4.7	4.3	5.2	5.6	3.8	4.8	4.8	4.9	4.5	4.4	3.3	3.8	3.3	4.6	4.5	4.2	4.2	4.4	4.0	3.5	2.6	**4.3**
% Filterer	63	74	63	72	67	13	11	27	52	57	37	43	22	35	43	26	50	43	53	38	54	41	**45**
Density	357	822	869	1376	408	762	1397	3124	1750	752	822	593	923	679	1410	1083	934	825	904	972.1	581.5	1254	**1027**
EPT richness	11	10	8	10	7	22	20	21	18	14	18	19	19	15	20	20	17	19	18	20	18	16	**16**
Metals Tolerance index	5.2	5.1	5.3	5.6	6.8	4.1	4.1	4.6	4.7	4.8	4.5	3.5	3.7	3.3	4.7	4.5	4.5	4.5	4.7	4.4	4.1	3.1	**4.5**
Metric scores																							
Taxa richness	3	2	2	2	1	5	6	6	6	5	5	5	5	5	6	6	5	5	5	6	5	5	**5**
Shannon diversity	5	4	5	4	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	**6**
Hydropsychinae/Trichoptera	2	4	5	3	1	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**5**
Baetidae/Ephemeroptera	1	0	0	2	1	6	6	6	6	6	6	6	6	6	4	6	6	4	6	6	6	6	**5**
Biotic index	4	4	5	3	3	6	4	4	4	5	5	6	6	6	4	5	5	5	5	6	6	6	**5**
% Filterer	3	1	3	1	2	6	6	6	5	4	6	6	6	6	6	6	6	6	5	5	5	6	**5**
Density (high)	*	6	6	6	*	6	6	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**
Density (low)	4	6	6	6	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**
EPT richness	3	3	2	3	2	6	5	5	5	4	5	5	5	4	5	6	4	5	5	5	5	4	**4**
Metals Tolerance index	4	4	4	4	3	5	5	5	5	5	5	6	6	6	5	5	5	5	5	5	5	6	**5**
Total	35	40	44	40	26	64	62	60	61	59	62	64	63	63	60	64	61	60	61	63	62	63	**56**
Organic subset	7	11	14	10	5	18	16	14	15	15	17	18	18	18	16	17	17	17	16	17	17	18	**15**
Metals subset	11	13	12	13	9	17	16	16	16	15	16	17	17	16	16	17	15	16	16	16	16	16	**15**
Bioassessment																							
	1986	1987	1988	1989	1991	1999	2000	2001	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean
Biointegrity	58%	61%	67%	61%	43%	97%	94%	91%	92%	89%	94%	97%	95%	95%	91%	97%	92%	91%	92%	95%	94%	95%	**86%**
Metals subset	61%	72%	67%	72%	50%	94%	89%	89%	89%	83%	89%	94%	94%	89%	89%	94%	83%	89%	89%	89%	89%	89%	**84%**
Organic subset	58%	61%	78%	56%	42%	100%	89%	78%	83%	83%	94%	100%	100%	100%	89%	94%	94%	94%	89%	94%	94%	100%	**85%**

*** 1999-2010 data from reconstructed channel.**

C-4. Mean metric values and bioassessment scores for Clark Fork River below Warm Springs Creek: Station 07 - August, 1986-2019 (4 Hess samples per year).

	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	Mean
Metric values																																		
Taxa richness	25	24	25	23	22	24	25	36	37	35	43	44	47	48	47	50	44	45	42	41	35	42	48	46	42	50	40	50	49	45	38	55	37	**39**
Shannon diversity	2.9	2.7	1.5	2.5	2.3	2.4	2.6	3.6	3.2	3.6	2.9	4.0	3.0	4.2	3.7	3.7	3.8	3.7	3.4	3.9	2.3	3.5	3.9	4.1	3.9	3.8	3.3	4.3	3.5	3.5	2.8	4.4	4.0	**3.3**
EPT/EPTC	0.97	0.95	0.98	0.93	0.91	0.94	0.94	0.61	0.85	0.64	0.83	0.60	0.86	0.63	0.61	0.73	0.82	0.87	0.82	0.77	0.98	0.87	0.73	0.81	0.79	0.78	0.76	0.66	0.78	0.87	0.90	0.58	0.84	**0.81**
Hydropsychinae/Trichoptera	1.00	0.90	0.96	0.98	0.99	0.99	0.96	0.95	0.89	0.72	0.95	0.74	0.87	0.55	0.79	0.30	0.46	0.84	0.61	0.79	0.98	0.92	0.87	0.57	0.56	0.86	0.92	0.23	0.87	0.94	0.93	0.59	0.58	**0.79**
Baetidae/Ephemeroptera	1.00	1.00	1.00	1.00	0.99	0.86	1.00	0.46	0.90	0.80	0.84	0.26	0.45	0.15	0.65	0.44	0.50	0.70	0.71	0.77	0.96	0.82	0.69	0.49	0.72	0.50	0.93	0.43	0.65	0.41	0.76	0.64	0.80	**0.71**
Biotic index	4.7	4.7	4.1	4.7	5.0	4.8	4.9	5.2	4.5	5.0	4.9	4.6	4.6	4.6	4.8	5.0	5.3	4.6	4.9	4.9	4.8	4.5	4.4	4.2	3.7	4.4	4.8	4.7	4.7	4.7	4.8	4.6	3.8	**4.7**
% Filterer	65	64	81	58	75	62	54	25	41	27	57	27	62	16	30	30	15	40	20	39	71	53	40	38	44	45	46	22	46	56	67	20	34	**44.5**
Density	847	959	2874	1151	2402	1397	1353	852	2894	2152	2783	940	2439	1493	2269	2135	1218	1355	1306	1374	1912	1939	2425	1150	1161	2900	2461	1334	2239	2385	4799	1945	568.1	**1861**
EPT richness	10	10	11	10	11	11	12	15	15	16	20	22	22	21	21	22	19	22	20	21	17	20	24	26	22	23	18	20	22	22	21	31	24	**18.8**
Metals Tolerance index	5.0	5.0	4.9	5.0	5.2	5.3	5.0	4.6	4.6	5.6	5.1	5.4	4.8	4.9	4.6	4.5	4.3	4.4	4.6	5.1	4.8	4.7	5.0	4.6	4.6	5.0	4.9	4.7	4.8	4.9	4.9	5.5	4.1	**4.9**
Metric scores																																		
Taxa richness	3	2	3	2	2	2	3	5	5	5	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	5	6	5	**5**
Shannon diversity	4	4	1	3	3	3	4	6	5	6	4	6	5	6	6	6	6	6	6	6	3	6	6	6	6	6	5	6	6	6	4	6	6	**5**
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**
Hydropsychinae/Trichoptera	0	4	2	1	1	1	2	2	4	6	2	6	5	6	6	6	6	6	6	6	1	3	5	6	6	5	3	6	5	2	3	6	6	**4**
Baetidae/Ephemeroptera	0	0	0	0	1	5	0	6	4	6	6	6	6	6	6	6	6	6	6	6	2	6	6	6	6	6	3	6	6	6	6	6	6	**5**
Biotic index	4	4	5	4	4	4	4	3	5	4	4	4	4	4	4	4	3	4	4	4	4	5	5	5	6	5	4	4	4	4	1	4	4	**4**
% Filterer	3	3	0	4	1	3	5	6	6	6	4	6	3	6	6	6	6	6	6	6	1	5	6	6	6	6	6	6	6	4	4	6	6	**5**
Density (high)	6	6	4	6	5	6	6	6	4	5	4	6	5	6	5	5	6	6	6	6	6	6	5	6	6	4	5	6	5	5	2	6	6	**5**
Density (low)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**
EPT richness	3	3	3	3	3	3	3	4	4	4	5	6	6	5	5	6	5	6	5	5	4	5	6	6	6	6	5	5	6	6	5	6	6	**5**
Metals Tolerance index	4	4	5	4	4	4	4	5	5	4	4	4	5	5	5	5	5	5	5	4	5	5	4	5	5	4	5	5	5	5	5	4	5	**5**
Total	39	42	35	39	36	43	43	55	54	58	51	62	57	62	61	62	61	63	62	61	43	59	61	64	65	60	54	62	61	56	47	62	62	**55**
Organic subset	13	13	9	14	10	13	15	15	15	15	12	16	12	16	15	15	15	16	16	16	11	16	16	17	18	15	15	16	15	13	7	16	16	**14**
Metals subset	13	13	14	13	13	13	13	15	15	14	15	16	17	16	16	17	16	17	16	15	15	16	16	17	17	16	16	16	17	17	16	16	17	**15**
Bioassessment																																		
	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	Mean
Biointegrity	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%	**83%**
Metals subset	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%	**86%**
Organic subset	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%	**79%**

C-5. Mean metric values and bioassessment scores for Clark Fork River at Sager Lane:
Station 08.5 - August, 1990-1992; 1998-2001; 2004: 2006 - 2019 (4 Hess samples per year).

	1990	1991	1992	1998	1999	2000	2001	2004	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean	SD	2001 - 2018 Mean	2001 - 2018 Max	2001 - 2018 MIN	1986-2000 Mean	1986-2000 Max	1986-2000 MIN
Metric values																														
Taxa richness	26	28	35	36	38	43	39	34	31	38	36	41	39	24	39	39	40	41	31	30	37	37	**35**		36	41	24	34	43	26
Shannon diversity	3.6	3.6	3.5	3.5	3.7	3.5	3.7	2.8	2.6	3.3	3.5	3.9	3.1	3.4	3.3	3.0	3.8	3.1	2.7	2.4	3.5	4.0	**3.3**		3.2	3.9	2.4	3.6	3.7	3.5
EPT/EPTC	0.74	0.80	0.70	0.84	0.70	0.92	0.83	0.90	0.88	0.89	0.84	0.84	0.83	0.94	0.81	0.90	0.86	0.91	0.99	0.97	0.85	0.86	**0.85**		0.88	0.99	0.81	0.79	0.92	0.70
Hydropsychinae/Trichoptera	0.78	0.60	0.35	0.72	0.73	0.65	0.85	0.72	0.93	0.55	0.69	0.86	0.91	0.61	0.86	0.74	0.73	0.66	0.85	0.85	0.90	0.78	**0.73**		0.78	0.93	0.55	0.67	0.85	0.35
Baetidae/Ephemeroptera	0.56	0.43	0.34	0.84	0.17	0.74	0.48	0.65	0.96	0.72	0.22	0.49	0.22	0.83	0.62	0.77	0.54	0.72	0.72	0.90	0.90	0.80	**0.60**		0.65	0.96	0.22	0.51	0.84	0.17
Biotic index	4.8	4.6	5.2	4.9	5.0	5.0	4.8	4.6	4.9	4.6	4.6	4.3	4.7	3.7	4.4	4.7	4.2	4.6	4.5	4.6	4.8	4.4	**4.6**		4.52	4.92	3.65	4.9	5.2	4.6
% Filterer	22	18	9	44	32	45	49	55	69	36	34	35	33	38	54	43	32	53	70	72	49	44	**42**		48	72	32	31	49	9
Density	1282	840	1155	1372	2380	2956	2019	2244	1569	1350	1002	651	1701	301	1498	2349	955	2670	1630	4777	1031	1045	**1735**		1716	4777	301	1715	2956	840
EPT richness	14	15	17	19	16	21	19	17	15	20	20	24	21	14	21	18	21	21	18	17	23	22	**18**		19	24	14	17	21	14
Metals Tolerance index	4.9	4.7	4.8	5.0	4.7	4.6	5.0	4.8	5.0	4.4	4.7	4.4	4.5	4.2	5.0	4.5	4.2	4.6	4.6	4.6	4.8	4.4	**4.7**		4.6	5.0	4.2	4.8	5.0	4.6
Metric scores																														
Taxa richness	3	3	5	5	5	6	5	4	4	5	5	6	5	2	5	5	6	6	4	3	5	5	**5**		5	6	2	5	6	3
Shannon diversity	6	6	6	6	6	6	6	4	4	5	6	6	5	6	5	5	6	5	4	3	6	6	**5**		5	6	3	6	6	6
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**		6	6	6	6	6	6
Hydropsychinae/Trichoptera	6	6	6	6	6	6	5	6	3	6	6	5	3	6	5	6	6	6	5	5	4	4	**5**		5	6	3	6	6	5
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6	2	6	6	6	6	6	6	6	6	6	6	4	4	4	**6**		5	6	2	6	6	6
Biotic index	4	4	3	4	4	4	4	4	4	4	4	5	4	6	4	4	5	4	5	4	4	5	**4**		4	6	4	4	4	3
% Filterer	6	6	6	6	6	6	6	5	2	6	6	6	6	6	5	6	6	5	2	4	6	6	**5**		5	6	2	6	6	6
Density (high)	6	6	6	6	5	4	5	5	6	6	6	6	6	*	6	5	6	4	6	1	6	6	**6**		5	6	1	5	6	4
Density (low)	6	6	6	6	6	6	6	6	6	6	6	6	6	3	6	6	6	6	6	6	6	6	**6**		6	6	3	6	6	6
EPT richness	4	4	4	5	4	5	5	4	4	5	5	6	5	4	5	5	5	5	5	4	6	6	**5**		5	6	4	4	5	4
Metals Tolerance index	5	5	5	4	5	5	4	5	4	5	5	5	5	5	4	5	5	5	5	5	5	5	**5**		5	5	4	5	5	4
																										0	0			
Total	58	58	59	60	59	60	58	55	45	60	61	63	57	50	57	59	63	58	54	45	58	59	**58**		56	63	45	59	60	58
Organic subset	16	16	15	16	15	14	15	14	12	16	16	17	16	12	15	15	17	13	13	9	16	17	**15**		14	17	9	15	16	14
Metals subset	15	15	15	15	15	16	15	15	14	16	16	17	16	12	15	16	16	16	16	15	17	17	**15**		15	17	12	15	16	15
Bioassessment																														
	1990	1991	1992	1998	1999	2000	2001	2004	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	**Mean**		77%					
Biointegrity	88%	88%	89%	91%	89%	91%	88%	83%	68%	91%	92%	95%	86%	83%	86%	89%	95%	88%	82%	68%	88%	89%	**87%**	8.2%	86%	95%	68%	89%	91%	88%
Metals subset	83%	83%	83%	83%	83%	89%	83%	83%	78%	89%	89%	94%	89%	67%	83%	89%	89%	89%	89%	83%	94%	94%	**85%**		86%	94%	67%	84%	89%	83%
Organic subset	89%	89%	83%	89%	83%	78%	83%	78%	67%	89%	89%	94%	89%	100%	83%	83%	94%	72%	72%	50%	89%	94%	**84%**		82%	100%	50%	85%	89%	78%

C-6. Mean metric values and bioassessment scores for Clark Fork River at Deer Lodge: Station 09 - August, 1986-2019 (4 Hess samples per year).

	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	Mean
Metric values																																		
Taxa richness	24	28	26	32	26	28	28	29	26	26	31	27	30	36	40	38	34	36	35	27	39	36	44	36	28	37	40	37	36	38	30	37	36	**32**
Shannon diversity	1.7	2.3	2.3	2.3	2.1	2.9	2.3	3.9	2.2	2.7	2.4	2.4	1.9	2.8	3.3	3.7	3.7	2.2	2.9	1.8	3.2	2.8	3.7	3.1	3.1	2.5	2.8	3.2	2.5	2.9	2.5	3.5	4.0	**2.7**
EPT/EPTC	0.98	0.94	0.77	0.87	0.94	0.91	0.94	0.81	0.95	0.71	0.89	0.87	0.91	0.75	0.83	0.82	0.89	0.89	0.90	0.91	0.87	0.81	0.76	0.88	0.88	0.93	0.87	0.80	0.93	0.92	0.87	0.90	0.71	**0.87**
Hydropsychinae/Trichoptera	1.00	0.95	0.99	0.93	0.96	0.70	0.99	0.73	0.99	0.96	0.98	0.98	0.99	0.96	0.92	0.69	0.41	0.97	0.90	0.98	0.82	0.93	0.80	0.89	0.92	0.97	0.96	0.96	0.97	0.97	0.97	0.91	0.84	**0.91**
Baetidae/Ephemeroptera	0.99	0.93	0.63	0.42	0.78	0.71	0.98	0.68	1.00	0.97	0.99	0.96	0.99	0.69	0.72	0.26	0.96	0.99	0.71	0.98	0.79	0.71	0.57	0.51	0.91	0.82	0.82	0.67	0.95	0.80	0.79	0.91	0.72	**0.80**
Biotic index	4.8	4.9	4.6	5.0	5.0	4.8	5.0	4.9	4.8	5.5	5.1	4.9	5.1	5.4	4.9	4.8	4.9	5.1	4.8	5.0	4.8	5.2	5.1	5.3	4.5	4.6	5.1	5.2	4.8	4.9	5.2	4.8	4.9	**5.0**
% Filterer	77	69	66	67	77	52	78	42	76	71	76	69	81	61	55	48	31	80	66	81	57	69	40	57	62	79	64	70	77	79	72	64	47	**66**
Density	1410	1555	3745	2150	3183	909	2283	569	2288	2135	3308	459	2825	3918	3856	2724	2266	5257	2532	1889	1041	2565	1381	1902	889	2031	4874	2027	2869	3160	4666	693	2623	**2473**
EPT richness	10	14	11	15	13	15	12	13	11	12	16	13	15	15	19	16	16	18	16	12	20	20	23	19	14	18	19	19	20	21	15	21	20	**16**
Metals Tolerance index	4.9	5.1	5.5	4.9	5.0	4.7	5.3	4.8	5.1	5.8	5.3	5.2	5.4	5.4	5.0	5.1	4.4	5.2	5.1	5.1	4.7	5.3	5.1	5.0	4.7	4.8	4.9	5.3	4.8	4.9	5.0	4.9	4.5	**5.0**
Metric scores																																		
Taxa richness	2	3	3	4	3	3	3	3	3	3	4	3	4	5	6	5	4	5	5	3	5	5	6	5	3	5	6	5	5	5	4	5	5	**4**
Shannon diversity	1	3	3	3	2	4	3	6	3	4	3	3	2	4	5	6	6	3	4	2	5	4	6	5	5	3	4	5	3	4	3	6	6	**4**
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**
Hydropsychinae/Trichoptera	0	2	1	3	2	6	1	6	1	2	1	1	1	2	3	6	6	1	1	1	6	3	6	4	3	1	2	2	1	1	1	3	6	**3**
Baetidae/Ephemeroptera	1	3	6	6	6	6	1	6	0	1	1	2	1	6	6	6	2	1	6	1	6	6	6	6	3	6	6	6	2	6	6	3	6	**4**
Biotic index	4	4	4	4	4	4	4	4	4	3	4	4	4	3	4	4	4	4	4	4	4	3	4	3	5	4	4	3	4	4	1	4	4	**4**
% Filterer	0	2	2	2	0	5	0	6	0	1	0	2	0	3	5	6	6	0	0	0	2	2	6	4	3	0	3	2	0	0	1	3	6	**2**
Density (high)	6	6	3	5	4	6	5	6	5	5	3	*	4	2	2	4	5	0	5	6	6	5	6	6	6	5	1	5	4	4	1	6	4	**4**
Density (low)	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**
EPT richness	3	4	3	4	3	4	3	3	3	3	4	3	4	4	5	4	4	5	4	3	5	5	6	5	4	5	5	5	5	5	4	5	5	**4**
Metals Tolerance index	5	4	4	5	4	5	4	5	4	4	4	4	4	4	4	4	5	4	4	4	5	4	4	4	5	5	5	4	5	5	4	5	5	**4**
Total	34	43	41	48	40	55	36	57	35	38	36	33	36	45	52	57	54	35	45	36	56	49	62	54	49	46	48	49	41	46	37	52	59	**45**
Organic subset	10	12	9	11	8	15	9	16	9	9	7	6	8	8	11	14	15	4	9	10	12	10	16	13	14	9	8	10	8	8	3	13	14	**10**
Metals subset	14	14	13	15	13	15	13	14	13	13	14	12	14	14	15	14	15	15	14	13	16	15	16	15	15	16	16	15	16	16	14	16	16	**14**
Bioassessment																																		
	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	**Mean**
Biointegrity	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%	56%	79%	89%	**69%**
Metals subset	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%	**80%**
Organic subset	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%	17%	72%	78%	**57%**

	SD	2001 - 2018 Mean	Max	MIN	1986-2000 Mean	Max	MIN
		36	44	27	29	40	24
		2.95	3.73	1.84	2.5	3.9	1.7
		0.87	0.93	0.76	0.87	0.98	0.71
		0.88	0.98	0.41	0.94	1.00	0.70
		0.77	0.99	0.26	0.83	1.00	0.42
		4.95	5.29	4.51	5.0	5.5	4.6
		64.47	81.00	31.00	68	81	42
		2515.64	#####	693.00	2306	3918	459
		17.85	23.00	12.00	14	19	10
		4.94	5.28	4.40	5.2	5.8	4.7
		5	6	3	3	6	2
		4	6	2	3	6	1
		6	6	6	6	6	6
		3	6	1	2	6	0
		5	6	1	3	6	0
		4	5	3	4	4	3
		2	6	0	2	6	0
		4	6	0	4	6	2
		6	6	6	6	6	5
		5	6	3	4	5	3
		4	5	4	4	5	4
		48	62	35	42	57	33
		10	16	4	10	16	6
		15	16	13	14	15	12
		########					
		Mean					
	11.6%	73%	94%	53%	64%	86%	52%
		84%	89%	72%	76%	83%	67%
		58%	89%	17%	56%	89%	39%

	21	33	13
		0.8	0.8
		0.9	0.9
		0.7	0.7

C-7. Mean metric values and bioassessment scores for Clark Fork River above Kohr's Bend F.A.: Station 10 - August, 1986-2003 and 2007 -2019 (four Hess samples per year).

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean	SD	2001- 2018 Mean	2001- 2018 Max	2001- 2018 MIN	1986-2000 Mean	1986-2000 Max	1986-2000 MIN
Metric values																																								
Taxa richness	23	26	28	20	25	26	30	30	27	34	32	18	30	33	39	35	34	33	37	37	30	31	23	38	43	33	37	41	37	30	37	31		34.5	42.8	23.0	28	39	18
Shannon diversity	2.1	2.4	2.4	3.4	3.0	3.3	2.9	4.0	2.8	3.1	2.9	2.6	2.4	3.2	3.4	3.4	3.9	3.1	3.1	3.5	3.6	3.7	3.2	3.2	3.4	3.5	2.7	2.8	3.5	3.0	3.94	3.14		3.31	3.86	2.71	2.9	4.0	2.1
EPT/EPTC	0.92	0.91	0.62	0.83	0.77	0.91	0.92	0.81	0.91	0.65	0.91	0.83	0.92	0.83	0.80	0.82	0.76	0.87	0.74	0.61	0.75	0.82	0.87	0.88	0.87	0.80	0.82	0.69	0.84	0.82	0.85	0.82		0.80	0.88	0.61	0.84	0.92	0.62
Hydropsychinae/Trichoptera	0.99	0.94	0.81	0.53	0.73	0.44	0.95	0.60	0.93	0.94	0.93	0.92	0.94	0.87	0.93	0.90	0.60	0.66	0.73	0.71	0.83	0.79	0.80	0.89	0.57	0.44	0.78	0.44	0.35	0.32	0.34	0.73		0.65	0.90	0.32	0.83	0.99	0.44
Baetidae/Ephemeroptera	0.93	0.81	0.79	0.51	0.72	0.10	0.92	0.48	1.00	0.37	0.96	1.00	1.00	0.51	0.31	0.32	0.30	0.75	0.85	0.55	0.39	0.50	0.82	0.87	0.73	0.38	0.65	0.71	0.33	0.67	0.82	0.65		0.59	0.87	0.30	0.69	1.00	0.10
Biotic index	5.2	4.9	5.4	5.0	5.7	4.9	4.9	4.9	4.8	5.4	4.9	4.8	5.0	5.2	5.0	5.0	5.0	5.0	5.3	5.2	4.8	4.5	4.3	4.6	4.8	4.8	5.4	5.4	4.5	4.5	4.1	4.94		4.88	5.43	4.31	5.1	5.7	4.8
% Filterer	78	73	73	32	65	26	66	28	76	55	77	65	80	63	64	54	36	67	64	37	36	39	62	65	28	56	75	74	33	52	21	55		51.9	75.0	28.0	61	80	26
Density	3131	974	1688	448	1889	1615	1116	528	2388	3006	2045	195	1537	2580	2041	2077	788	797	1323	1389	1473	689	519	1502	2228	880	2296	1944	4654	599	1372	1604		1543.9	4654.1	519.0	1679	3131	195
EPT richness	11	14	12	11	14	15	15	15	16	16	20	9	15	16	19	18	17	20	19	20	19	19	12	21	21	18	20	21	18	17	22	17		18.6	21.0	12.3	14	20	9
Metals Tolerance index	5.3	5.1	5.4	4.9	5.5	4.7	5.2	4.8	5.0	5.5	5.1	5.2	5.2	5.2	4.8	4.7	4.6	5.1	5.2	4.7	4.7	4.6	4.6	4.6	4.2	4.8	5.5	5.4	4.1	4.5	3.8	4.9		4.7	5.5	4.1	5.1	5.5	4.7
Metric scores																																							
Taxa richness	2	3	3	2	3	3	4	4	3	4	4	1	4	4	5	5	4	4	5	5	4	4	2	5	6	4	5	6	5	4	5	4		4.5	6.0	2.0	3	5	1
Shannon diversity	2	3	3	6	5	5	4	6	4	5	4	4	3	5	6	6	6	5	5	6	6	6	5	5	6	6	4	4	6	5	6	5		5.4	6.0	4.0	4	6	2
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		6.0	6.0	6.0	6	6	6
Hydropsychinae/Trichoptera	1	2	6	6	6	6	2	6	3	2	3	3	2	5	3	4	6	6	6	6	6	6	6	4	6	6	6	6	6	6	6	5		5.7	6.0	4.0	4	6	1
Baetidae/Ephemeroptera	3	6	6	6	6	6	3	6	0	6	2	0	0	6	6	6	6	6	5	6	6	6	6	5	6	6	6	6	6	6	6	5		5.9	6.0	5.0	4	6	0
Biotic index	3	4	3	4	3	4	4	4	4	3	4	4	4	3	4	4	4	4	3	3	4	5	5	4	4	4	3	3	1	4	5	4		3.7	5.0	1.0	4	4	3
% Filterer	0	1	1	6	3	6	2	6	0	5	0	3	0	3	3	5	6	2	3	6	6	6	3	3	6	4	1	1	5	4	6	3		4.1	6.0	1.0	3	6	0
Density (high)	4	6	6	*	6	6	6	*	5	4	5	*	6	5	5	5	6	6	6	6	6	6	*	6	5	6	5	6	6	6	6	6		5.8	6.0	5.0	5	6	4
Density (low)	6	6	6	4	6	6	6	5	6	6	6	2	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6		5.9	6.0	5.0	6	6	2
EPT richness	3	4	3	3	4	4	4	4	4	4	5	2	4	4	5	5	4	5	5	5	5	5	3	5	5	5	5	5	5	5	6	4		4.8	5.0	3.0	4	5	2
Metals Tolerance index	4	4	4	5	4	5	4	5	4	4	4	4	4	4	5	5	5	4	4	5	5	5	5	5	5	5	4	4	5	5	6	5		4.7	5.0	4.0	4	5	4
Total	34	45	47	48	52	57	45	52	39	49	43	29	39	51	54	57	59	54	54	60	60	61	46	54	61	58	51	53	57	57	64	52		56.1	61.0	46.0	46	57	29
Organic subset	7	11	10	10	12	16	12	10	9	12	9	7	10	11	12	14	16	12	12	15	16	17	8	13	15	14	9	10	12	14	17	13		13.1	17.0	8.0	11	16	7
Metals subset	13	14	13	12	14	15	14	14	14	14	15	8	14	14	16	16	15	15	15	16	16	16	13	16	16	16	15	15	16	16	18	15		15.5	16.0	13.0	14	16	8
Bioassessment																																		80.2%					
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean		Mean					
Biointegrity	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%	78%	5.3%	86%	92%	77%	70%	87%	48%
Metals subset	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%	80%		86%	89%	72%	76%	89%	44%
Organic subset	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%	69%		74%	94%	50%	64%	89%	39%

* not calculated if density is < 550

0.86 0.86
0.89 0.89
0.78 0.78

C-8. Mean metric values and bioassessment scores for Clark Fork River at Gold Creek Bridge:
Station 11 - August, 1986-2001; 2006 - 2019 (4 Hess samples per year).

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean	SD	2000 - 2018 Mean	2000 - 2018 Max	2000 - 2018 MIN	1986-2000 Mean	1986-2000 Max	1986-2000 MIN
Metric values																																						
Taxa richness	29	30	35	32	25	34	37	39	39	37	32	24	37	35	44	44	39	39	36	42	38	31	42	44	37	43	47	39	28	39	**37**		39	47	28	34	44	24
Shannon diversity	3.3	2.9	3.8	2.9	3.2	3.6	3.4	4.3	3.6	3.6	3.5	3.0	3.4	3.1	4.2	3.5	3.7	3.8	3.6	4.1	4.2	3.8	3.9	3.8	4.2	3.5	4.1	4.2	3.6	4.2	**3.7**		3.9	4.2	3.5	3.4	4.3	2.9
EPT/EPTC	0.87	0.83	0.80	0.93	0.93	0.86	0.63	0.79	0.75	0.73	0.86	0.92	0.86	0.79	0.73	0.90	0.69	0.86	0.77	0.54	0.79	0.82	0.75	0.75	0.72	0.80	0.80	0.84	0.95	0.67	**0.8**		0.78	0.95	0.54	0.82	0.93	0.63
Hydropsychinae/Trichoptera	0.76	0.79	0.93	0.23	0.90	0.56	0.54	0.58	0.83	0.90	0.82	0.86	0.87	0.71	0.75	0.59	0.88	0.73	0.95	0.47	0.69	0.68	0.74	0.64	0.21	0.87	0.51	0.73	0.68	0.38	**0.7**		0.67	0.95	0.21	0.74	0.93	0.23
Baetidae/Ephemeroptera	0.51	0.49	0.40	0.20	0.92	0.18	0.24	0.37	0.84	0.60	0.95	0.96	0.87	0.40	0.61	0.09	0.87	0.88	0.75	0.60	0.64	0.91	0.89	0.38	0.24	0.79	0.21	0.80	0.78	0.83	**0.6**		0.63	0.91	0.09	0.57	0.96	0.18
Biotic index	4.8	5.1	4.2	4.9	5.2	5.0	5.9	4.8	4.5	5.0	4.4	4.3	4.8	5.1	4.7	4.5	4.9	4.6	5.0	5.1	4.2	4.2	4.4	5.0	4.4	5.0	4.6	4.6	4.3	4.5	**4.7**		4.6	5.1	4.2	4.9	5.9	4.2
% Filterer	42	63	41	23	68	34	47	31	54	53	62	76	56	51	35	19	44	30	55	25	29	51	45	24	31	52	33	46	58	22	**43.3**		39	58	19	49	76	23
Density	838	1073	396	965	457	1446	1781	558	1265	906	509	398	909	1390	1426	1267	1273	789	1220	718	496	388	1529	2357	596	1430	1965	4145	307	751.6	**1118**		1320	4145	307	954	1781	396
EPT richness	15	17	18	18	13	19	17	21	24	19	19	13	20	18	22	21	20	22	19	22	20	16	21	21	20	23	24	22	17	21	**19.3**		20.5	24.3	15.8	18	24	13
Metals Tolerance index	4.8	5.3	4.4	4.6	5.5	5.1	5.5	4.6	4.5	5.0	4.5	4.6	4.9	5.0	4.3	4.2	5.0	4.8	5.1	5.6	4.2	4.6	4.7	4.2	4.5	5.2	4.3	4.7	4.2	4.3	**4.7**		4.7	5.6	4.2	4.8	5.5	4.3
Metric scores																																						
Taxa richness	3	4	5	4	3	4	4	5	5	5	4	2	5	5	6	6	5	5	5	6	5	4	6	6	5	6	6	5	3	5	**5**		5	6	3	4	6	2
Shannon diversity	5	4	6	4	5	6	6	6	6	6	6	5	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**		6	6	6	5	6	4
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	5	6	**6**		6	6	5	6	6	6
Hydropsychinae/Trichoptera	6	6	3	6	4	6	6	6	6	4	6	5	5	6	6	6	4	6	2	6	6	6	6	6	6	5	6	6	6	6	**5**		6	6	2	5	6	3
Baetidae/Ephemeroptera	6	6	6	6	3	6	6	6	6	6	2	2	5	6	6	6	5	4	6	6	6	3	4	6	6	6	6	6	6	6	**5**		5	6	3	5	6	2
Biotic index	4	4	5	4	3	4	2	5	5	4	5	5	4	4	4	5	4	4	4	4	5	5	5	4	5	4	4	2	5	5	**4**		4	5	2	4	5	2
% Filterer	6	3	6	6	2	6	6	6	5	5	3	0	4	5	6	6	6	6	5	6	6	5	6	6	6	5	6	5	5	6	**5**		6	6	5	5	6	0
Density (high)	6	6	*	6	*	6	6	6	6	6	*	*	6	6	6	6	6	6	6	6	*	*	6	5	6	6	6	6	*	6	**6**		6	6	5	6	6	6
Density (low)	6	6	4	6	5	6	6	6	6	6	5	4	6	6	6	6	6	6	6	6	5	4	6	6	6	6	6	6	3	6	**6**		6	6	3	6	6	4
EPT richness	4	4	5	5	3	5	4	5	6	5	5	3	5	5	6	5	5	6	5	6	5	4	5	5	5	6	6	6	4	5	**5**		5	6	4	5	6	3
Metals Tolerance index	5	4	5	5	4	4	4	5	5	4	5	5	5	4	5	5	4	5	4	4	5	5	5	5	5	4	5	5	5	5	**5**		5	5	4	5	5	4
Total	57	53	51	58	38	59	56	62	62	57	47	37	57	58	63	63	57	60	55	61	55	48	61	61	62	60	63	59	48	62	**56**		58	63	48	54	63	37
Organic subset	16	13	11	16	5	16	14	17	16	15	8	5	14	15	16	17	16	16	15	16	11	10	17	15	17	15	16	13	10	17	**14**		15	17	10	13	17	5
Metals subset	15	14	14	16	12	15	14	16	17	15	15	12	16	15	17	16	15	17	15	16	15	13	16	16	16	16	17	17	12	16	**15**		16	17	12	15	17	12
Bioassessment																																	84.4%					
	1986	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Mean**		**Mean**	**Max**	**MIN**			
Biointegrity	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%	89%	80%	94%	**87%**	5.2%	90%	95%	80%	84%	95%	62%
Metals subset	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%	**84%**		86%	94%	67%	83%	94%	67%
Organic subset	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%	**83%**		87%	94%	72%	78%	94%	42%

* not calculated if density is < 550

C-9. Mean metric values and bioassessment scores for Clark Fork River at Turah: Station 13 - August, 1986-2019 (4 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	Mean
Metric values																																	
Taxa richness	34	35	42	31	31	50	49	46	38	44	40	26	37	42	41	45	41	45	39	49	40	35	49	29	39	48	39	46	45	31	29	40	**40**
Shannon diversity	3.7	3.3	3.1	3.7	3.6	4.1	3.5	4.4	3.5	4.0	3.9	3.5	3.5	4.2	3.7	4.6	4.3	4.4	4.1	4.0	4.4	4.2	4.3	3.6	2.9	3.8	3.9	3.6	4.1	3.7	4.2	4.4	**3.9**
EPT/EPTC	0.63	0.81	0.80	0.77	0.61	0.63	0.72	0.76	0.73	0.68	0.80	0.92	0.89	0.66	0.79	0.71	0.70	0.73	0.67	0.64	0.80	0.82	0.80	0.95	0.88	0.79	0.93	0.87	0.84	0.96	0.85	0.92	**0.8**
Hydropsychinae/Trichoptera	0.81	0.92	0.96	0.85	0.54	0.75	0.93	0.85	0.89	0.70	0.81	0.80	0.88	0.59	0.84	0.45	0.77	0.82	0.66	0.84	0.67	0.45	0.63	0.62	0.78	0.97	0.56	0.93	0.85	0.80	0.77	0.57	**0.8**
Baetidae/Ephemeroptera	0.40	0.68	0.83	0.48	0.22	0.40	0.87	0.34	0.59	0.53	0.55	0.50	0.51	0.22	0.25	0.29	0.43	0.43	0.30	0.55	0.42	0.40	0.33	0.29	0.43	0.45	0.46	0.52	0.55	0.23	0.50	0.22	**0.4**
Biotic index	4.8	4.7	4.4	4.7	5.1	5.0	4.8	4.0	4.3	4.9	4.3	3.8	4.2	4.2	4.2	4.5	4.5	4.5	4.6	4.7	4.1	3.9	4.3	3.4	4.2	4.6	4.1	4.6	4.5	3.0	4.1	3.3	**4.3**
% Filterer	44	68	65	50	27	34	56	22	51	44	57	54	54	25	57	29	39	43	38	35	23	12	23	28	63	47	36	60	45	38	37	29	**42**
Density	1539	1708	5636	1725	2145	2164	2757	483	1078	1941	1354	226	674	1111	1454	1128	879	584	616	1150	453	296	737	291	1744	2458	517	1528	1112	415.3	119	280.5	**1259**
EPT richness	17	19	23	17	16	26	26	26	20	25	23	17	22	25	22	26	24	26	24	28	24	22	28	21	24	25	23	24	27	21	18	29	**23**
Metals Tolerance index	5.0	4.8	4.8	4.6	5.3	5.1	4.7	3.5	4.2	5.2	4.2	4.0	4.3	3.9	4.2	4.1	4.4	4.2	4.8	5.1	4.3	3.7	4.2	3.5	4.3	4.4	4.0	4.5	4.6	3.7	3.9	3.2	**4.3**
Metric scores																																	
Taxa richness	4	5	6	4	4	6	6	6	5	6	6	3	5	6	6	6	6	6	5	6	6	5	6	3	5	6	5	6	6	3	3	6	**5**
Shannon diversity	6	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	6	6	6	6	6	6	6	**6**
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**
Hydropsychinae/Trichoptera	6	3	2	5	6	6	3	5	4	6	6	6	4	6	6	6	6	6	6	6	6	6	6	6	6	1	6	3	5	6	6	6	**5**
Baetidae/Ephemeroptera	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**
Biotic index	4	4	5	4	4	4	4	5	5	4	5	6	5	5	5	5	5	5	4	4	5	6	5	6	5	4	5	4	5	6	5	6	**5**
% Filterer	6	2	3	6	6	6	4	6	5	6	4	5	5	6	4	6	6	6	6	6	6	6	6	6	3	5	6	4	6	6	6	6	**5**
Density (high)	6	6	0	6	5	5	4	*	6	6	6	*	6	6	6	6	6	6	6	6	*	*	6	*	6	6	*	6	6	*	*	*	**6**
Density (low)	6	6	6	6	6	6	6	5	6	6	6	2	6	6	6	6	6	6	6	6	5	3	6	3	6	6	5	6	6	4	1	3	**5**
EPT richness	4	5	6	4	4	6	6	6	5	6	6	4	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	5	4	6	**6**
Metals Tolerance index	4	5	5	5	4	4	5	6	5	4	5	5	5	6	5	5	5	5	5	4	5	6	5	6	5	5	5	5	5	6	6	6	**5**
Total	58	53	50	58	57	61	55	57	59	62	62	49	60	65	62	64	64	64	62	62	57	56	64	53	58	57	56	58	63	54	49	57	**58**
Organic subset	16	12	8	16	15	15	12	11	16	16	15	11	16	17	15	17	17	17	16	16	11	12	17	12	14	15	11	14	17	12	11	12	**14**
Metals subset	14	16	17	15	14	16	17	17	16	16	17	11	17	18	17	17	17	17	17	16	16	15	17	14	17	17	16	17	17	15	11	15	**16**
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	Mean
Biointegrity	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%	90%	82%	95%	**91%**
Metals subset	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%	**88%**
Organic subset	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%	100%	92%	100%	**87%**

	SD	2000 - 2018 Mean	Max	MIN	1986-2000 Mean	Max	MIN
		41	49	29	39	50	26
		4.0	4.6	2.9	3.7	4.4	3.1
		0.81	0.96	0.64	0.75	0.92	0.61
		0.72	0.97	0.45	0.81	0.96	0.54
		0.41	0.55	0.23	0.49	0.87	0.22
		4.22	4.72	2.96	4.5	5.1	3.8
		37	63	12	47	68	22
		877	2458	119	1733	5636	226
		24	28	18	21	26	16
		4.2	5.1	3.5	4.5	5.3	3.5
		5	6	3	5	6	3
		6	6	4	6	6	5
		6	6	6	6	6	6
		5	6	1	5	6	2
		6	6	6	6	6	5
		5	6	4	5	6	4
		6	6	3	5	6	2
		6	6	6	5	6	0
		5	6	1	6	6	2
		6	6	4	5	6	4
		5	6	4	5	6	4
		59	64	49	58	65	49
		14	17	11	14	17	8
		16	17	11	16	18	11
		87.6%					
		Mean	Max	MIN			
	4.6%	92%	97%	82%	89%	98%	76%
		89%	94%	61%	88%	100%	61%
		91%	100%	78%	82%	94%	44%

* not calculated if <550

	82%	82%
	61%	61%
	92%	92%

C-10. Mean metric values and bioassessment scores for Blackfoot River at USGS:
Station 14 - August, 1986-2001; 2006-2019 (4 Hess samples per year).

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean	SD	2001 - 2018 Mean	2001 - 2018 Max	2001 - 2018 MIN	1986-2000 Mean	1986-2000 Max	1986-2000 MIN
Metric values																																						
Taxa richness	21	31	36	28	31	30	41	37	39	42	35	32	36	35	41	40	33	38	38	37	37	33	34	43	38	37	34	34	27	31	**35**		36	43	27	34	42	21
Shannon diversity	4.0	3.3	4.0	4.0	4.1	4.1	2.8	3.9	4.0	3.6	3.9	3.6	3.9	4.2	3.0	2.8	3.9	3.5	4.1	3.9	3.5	3.5	3.9	4.1	4.0	3.4	3.2	4.0	3.4	3.8	**3.7**		3.7	4.1	2.8	3.8	4.2	2.8
EPT/EPTC	0.76	0.37	0.59	0.77	0.88	0.88	0.20	0.50	0.68	0.54	0.91	0.95	0.79	0.68	0.34	0.32	0.84	0.63	0.74	0.69	0.73	0.98	0.93	0.79	0.79	0.64	0.63	0.85	0.96	0.88	**0.69**		0.75	0.98	0.32	0.66	0.95	0.20
Hydropsychinae/Trichoptera	0.62	0.84	0.73	0.79	0.74	0.65	0.77	0.64	0.78	0.64	0.74	0.80	0.75	0.46	0.57	0.61	0.69	0.79	0.81	0.65	0.84	0.79	0.77	0.79	0.85	0.87	0.88	0.89	0.91	0.84	**0.74**		0.80	0.91	0.61	0.70	0.84	0.46
Baetidae/Ephemeroptera	0.49	0.49	0.71	0.37	0.28	0.47	0.50	0.41	0.44	0.35	0.75	0.67	0.32	0.29	0.22	0.29	0.43	0.29	0.51	0.47	0.32	0.36	0.41	0.34	0.48	0.16	0.16	0.49	0.64	0.32	**0.41**		0.38	0.64	0.16	0.45	0.75	0.22
Biotic index	3.4	4.8	4.8	3.7	3.5	3.6	4.4	4.1	4.0	3.7	3.7	3.9	3.5	3.5	4.0	3.8	3.7	3.9	4.1	3.7	3.7	4.0	3.4	4.0	4.1	3.9	3.9	4.5	4.5	4.0	**3.9**		3.94	4.54	3.42	3.9	4.8	3.4
% Filterer	19	17	32	42	45	30	7	19	37	26	55	66	51	30	16	20	48	38	34	33	51	55	43	40	46	42	47	47	74	54	**37**		44	74	20	33	66	7
Density	65	414	382	192	408	170	975	284	511	535	426	291	531	268	721	727	270	641	323	469	587	542	432	595	340	490	485	313	232	243.5	**442**		460	727	232	412	975	65
EPT richness	14	18	20	17	20	20	23	22	22	24	21	19	24	21	24	21	19	22	21	21	23	20	22	24	22	23	21	21	19	21	**21**		21	24	19	20	24	14
Metals Tolerance index	3.0	2.9	3.8	3.4	3.6	3.7	2.9	3.7	3.7	2.6	3.8	3.9	3.4	3.1	2.5	2.2	3.7	3.3	3.6	3.4	3.3	4.1	3.5	3.6	3.6	3.0	3.2	4.9	4.4	3.8	**3.4**		3.6	4.9	2.2	3.3	3.9	2.5
Metric scores																																						
Taxa richness	2	4	5	3	4	4	6	5	5	6	5	4	5	5	6	6	4	5	5	5	5	4	4	6	5	5	4	4	3	4	**5**		5	6	3	5	6	2
Shannon diversity	6	5	6	6	6	6	4	6	6	6	6	6	6	6	5	4	6	6	6	6	6	6	6	6	6	6	5	6	6	6	**6**		6	6	4	6	6	4
EPT/EPTC	6	4	6	6	6	6	2	5	6	5	6	6	6	6	3	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**		6	6	3	5	6	2
Hydropsychinae/Trichoptera	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	4	4	4	6	**6**		5	6	4	6	6	6
Baetidae/Ephemeroptera	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**		6	6	6	6	6	6
Biotic index	6	4	4	6	6	6	5	5	5	6	6	6	6	6	5	6	6	6	5	6	6	5	6	5	5	6	6	5	5	5	**6**		6	6	5	5	6	4
% Filterer	6	6	6	6	6	6	6	6	6	6	5	2	5	6	6	6	6	6	6	6	5	5	6	6	6	6	6	5	1	5	**6**		5	6	1	6	6	2
Density (high)	*	*	*	*	*	*	6	*	*	*	*	*	*	*	6	6	*	6	*	*	6	*	*	6	*	*	*	*	*	*	**6**		6	6	6	6	6	6
Density (low)	1	4	4	2	4	2	6	3	5	5	4	3	5	3	6	6	3	6	3	5	6	5	4	6	3	5	5	4	2	2	**4**		5	6	2	4	6	1
EPT richness	4	5	5	4	5	5	6	6	6	6	5	5	6	5	6	5	5	6	5	5	6	5	6	6	6	6	5	6	5	5	**5**		6	6	5	5	6	4
Metals Tolerance index	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	5	5	6	**6**		6	6	5	6	6	6
Total	49	50	54	51	55	53	59	54	57	58	55	50	57	55	61	60	54	65	54	57	64	53	56	65	54	57	53	51	43	51	**56**		56	65	43	55	61	49
Organic subset	12	10	10	12	12	12	17	11	11	12	11	8	11	12	17	18	12	18	11	12	17	10	12	17	11	12	12	10	6	10	**13**		13	18	6	12	17	8
Metals subset	11	15	15	12	15	13	18	15	17	17	15	14	17	14	18	17	14	18	14	16	18	15	16	18	15	17	16	15	12	13	**16**		16	18	12	15	18	11
Bioassessment																																	84.0%					
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	**Mean**		Mean					
Biointegrity	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%	85%	72%	85%	**90%**	6.9%	90.8%	98%	72%	90%	97%	82%
Metals subset	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%	**85%**		87.7%	100%	67%	84%	100%	61%
Organic subset	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%	83%	50%	83%	**92%**		92.1%	100%	50%	93%	100%	67%

* not calculated if density is < 550

0.72 0.72
0.67 0.67
0.5 0.5

C-11. Mean metric values and bioassessment scores for Clark Fork River at ShaRon Fishing Access: Station 15.5 - August, 1989-2003, 2006-2019 (4 Hess samples per year).

	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	Mean	SD	2000 - 2018 Mean	Max	MIN	1986-2000 Mean	Max	MIN
Metric values																																					
Taxa richness	29	25	32	39	36	37	47	38	29	36	36	43	45	40	44	37	44	35	46	36	32	46	46	37	54	47	47	26	39	**39**	6.96	41	54	26	36	47	25
Shannon diversity	3.4	2.8	3.2	3.7	4.0	3.5	3.5	3.6	2.9	3.1	4.2	3.9	4.0	3.5	3.8	3.3	3.7	3.9	4.3	4.0	3.6	4.0	4.2	4.3	4.3	4.3	4.5	3.9	3.9	**3.8**	0.34	3.98	4.48	3.29	3.5	4.2	2.8
EPT/EPTC	0.84	0.91	0.83	0.65	0.85	0.76	0.88	0.92	0.95	0.92	0.84	0.54	0.31	0.87	0.72	0.95	0.84	0.90	0.81	0.91	0.95	0.89	0.78	0.91	0.72	0.73	0.66	0.88	0.94	**0.8**	0.16	0.80	0.95	0.31	0.82	0.95	0.54
Hydropsychinae/Trichoptera	0.86	0.92	0.94	0.89	0.90	0.97	0.95	0.93	0.95	0.91	0.56	0.88	0.41	0.80	0.90	0.93	0.93	0.87	0.75	0.72	0.83	0.82	0.78	0.68	0.79	0.74	0.59	0.92	0.85	**0.8**	0.14	0.78	0.93	0.41	0.89	0.97	0.56
Baetidae/Ephemeroptera	0.71	0.51	0.82	0.96	0.30	0.66	0.40	0.57	0.44	0.65	0.28	0.55	0.25	0.48	0.31	0.41	0.55	0.45	0.55	0.46	0.64	0.37	0.33	0.31	0.46	0.27	0.42	0.73	0.45	**0.5**	0.13	0.44	0.73	0.25	0.57	0.96	0.28
Biotic index	4.3	4.1	4.5	5.0	3.8	4.6	4.3	4.3	4.3	4.3	3.8	4.9	5.1	4.7	4.6	4.2	4.6	4.1	4.0	3.8	4.1	3.9	4.3	4.3	4.4	4.4	4.8	4.4	4.2	**4.3**	0.34	4.4	5.1	3.8	4.4	5.0	3.8
% Filterer	67	79	64	53	48	58	67	66	79	75	49	38	11	56	51	68	57	53	42	49	65	52	50	43	44	46	29	48	64	**54**	13.4	48	68	11	62	79	38
Density	341	468	560	1841	384	1292	2090	795	631	1257	411	1646	2145	1558	1347	798	1011	308	567	472	374	934	848	294	1325	821	1093	223	497.6	**908**	528	882	2145	223	976	2090	341
EPT richness	18	16	16	21	21	20	27	23	17	22	22	22	18	19	21	22	26	20	27	20	20	29	24	22	29	25	26	18	25	**22**	3.7	23	29	18	20	27	16
Metals Tolerance index	4.3	4.0	4.6	5.2	3.4	4.7	4.3	4.3	4.4	4.4	3.8	4.4	4.2	4.5	4.2	4.3	4.6	4.2	3.9	4.1	4.1	3.9	3.7	3.7	4.3	4.2	5.0	4.4	4.1	**4.3**	0.33	4.2	5.0	3.7	4.3	5.2	3.4
Metric scores																																					
Taxa richness	3	3	4	5	5	5	6	5	3	5	5	6	6	6	6	5	6	5	6	5	4	6	6	5	6	6	6	3	5	**5**	0.89	5	6	3	5	6	3
Shannon diversity	6	4	5	6	6	6	6	6	4	5	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**	0.25	6	6	5	6	6	4
EPT/EPTC	6	6	6	6	6	6	6	6	6	6	6	5	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**	0.75	6	6	3	6	6	5
Hydropsychinae/Trichoptera	5	3	2	4	4	1	2	3	2	3	6	4	6	6	4	3	3	5	6	6	6	6	6	6	6	6	6	3	5	**4**	1.24	5	6	3	3	6	1
Baetidae/Ephemeroptera	6	6	6	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**	0	6	6	6	6	6	2
Biotic index	5	5	5	4	6	4	5	5	5	5	6	4	4	4	4	5	4	5	5	6	5	6	5	5	5	5	4	5	5	**5**	0.66	5	6	4	5	6	4
% Filterer	2	0	3	5	6	4	2	2	0	1	6	6	6	4	5	2	4	5	6	6	3	5	6	6	6	6	4	6	3	**4**	1.26	5	6	2	3	6	0
Density (high)	*	*	6	6	*	6	5	6	6	6	*	6	5	6	6	6	6	*	6	*	*	6	6	*	6	6	6	*	*	**6**	0.3	6	6	5	6	6	5
Density (low)	3	5	6	6	4	6	6	6	6	6	4	6	6	6	6	6	6	3	6	5	4	6	6	3	6	6	6	2	5	**5**	1.38	5	6	2	5	6	3
EPT richness	5	4	4	5	5	5	6	6	4	6	6	6	5	5	5	6	6	5	6	5	5	6	6	6	6	6	6	5	6	**5**	0.51	6	6	5	5	6	4
Metals Tolerance index	5	5	5	4	6	5	5	5	5	5	6	5	5	5	5	5	5	5	6	5	5	6	6	6	5	5	4	5	5	**5**	0.54	5	6	4	5	6	4
Total	46	41	52	53	54	54	55	56	47	54	57	60	58	60	59	55	58	51	65	56	50	65	65	55	64	64	60	47	52	**58**	5.67	58	65	47	52	60	41
Organic subset	7	5	14	15	12	14	12	13	11	12	12	16	15	14	15	13	14	10	17	12	8	17	17	11	17	17	14	11	8	**15**	2.85	14	17	8	12	16	5
Metals subset	13	14	15	15	15	16	17	17	15	17	16	17	16	16	16	17	17	13	18	15	14	18	18	15	17	17	16	12	16	**16**	1.77	16	18	12	16	17	13
Bioassessment																																84.5%					
	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	Mean		Mean	Max	MIN			
Biointegrity	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%	91%	78%	87%	**87%**	6.2%	91%	98%	78%	82%	95%	68%
Organic subset	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%	78%	92%	67%	**81%**	###	86%	100%	67%	75%	100%	42%
Metals subset	72%	78%	83%	83%	83%	89%	94%	94%	83%	94%	89%	94%	89%	89%	89%	94%	94%	72%	100%	83%	83%	100%	100%	83%	94%	94%	89%	67%	89%	**89%**	8.2%	89%	100%	67%	87%	94%	72%

* not calculated if density is < 550

0.83 0.83
0.67 0.67
0.92 0.92

C-12. Mean metric values and bioassessment scores for Clark Fork River below Missoula: Station 20 - August, Harper's Bridge: 1986-2003 and Kona FAS. 2006-2019 (4 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	Mean	ST DE\	2000 - 2018 Mean	2000 - 2018 Max	2000 - 2018 MIN	1986-2000 Mean	1986-2000 Max	1986-2000 MIN
Metric values																																									
Taxa richness	28	33	31	29	28	32	39	31	31	41	33	31	36	37	44	41	32	37	42	39	36	46	44	37	43	48	46	40	47	37	39	44.5	**37**	4.537	41	48	32	34	44	28
Shannon diversity	2.9	3.2	2.5	3.5	3.1	3.3	3.2	1.4	3.2	3.1	2.9	3.6	2.4	4.2	4.0	3.8	3.6	3.4	3.9	3.3	3.4	4.4	3.7	3.7	4.1	3.9	4.0	3.4	3.9	3.6	3.8	4.4	**3.4**	0.333	3.7	4.4	3.3	3.1	4.2	1.4
EPT/EPTC	0.92	0.76	0.84	0.59	0.74	0.78	0.53	0.81	0.77	0.78	0.90	0.91	0.86	0.72	0.58	0.76	0.84	0.48	0.81	0.88	0.78	0.74	0.70	0.88	0.84	0.55	0.80	0.85	0.87	0.92	0.71	0.71	**0.77**	0.123	0.78	0.92	0.48	0.77	0.92	0.53
Hydropsychinae/Trichoptera	0.95	0.92	0.98	0.93	0.96	0.93	0.93	0.98	0.90	0.91	0.93	0.80	0.94	0.55	0.81	0.78	0.81	0.61	0.86	0.89	0.93	0.74	0.92	0.81	0.78	0.87	0.79	0.93	0.87	0.87	0.50	0.82	**0.86**	0.09	0.81	0.93	0.50	0.89	0.98	0.55
Baetidae/Ephemeroptera	0.86	0.84	0.85	0.66	0.72	0.62	0.83	0.75	0.68	0.43	0.77	0.40	0.39	0.28	0.19	0.08	0.08	0.19	0.73	0.66	0.61	0.51	0.47	0.41	0.40	0.28	0.58	0.38	0.39	0.37	0.68	0.15	**0.51**	0.21	0.43	0.73	0.08	0.62	0.86	0.19
Biotic index	4.7	4.9	4.5	5.4	5.2	4.7	5.4	4.9	4.7	4.9	4.6	4.0	4.8	4.5	4.9	4.5	4.3	4.8	4.6	4.7	4.9	4.3	5.0	4.4	4.1	5.0	4.6	4.8	4.4	4.6	5.1	4.7	**4.7**	0.283	4.61	5.07	4.10	4.8	5.4	4.0
% Filterer	68	68	74	52	64	61	47	90	67	63	71	62	74	42	34	20	42	58	57	68	67	43	54	62	48	53	43	74	62	66	34	41	**58**	14.2	53	74	20	62	90	34
Density	810	1519	4786	1391	1362	795	4369	4259	1658	2436	882	255	1594	364	999	836	517	726	849	769	876	756	1503	625	683	1558	911	1433	768	459	441	801	**1358**	343.6	857	1558	441	1832	4786	255
EPT richness	16	15	16	15	15	16	19	18	16	20	18	20	22	21	22	20	19	20	21	23	20	24	24	21	25	26	23	24	26	23	23	26	**20**	2.399	23	26	19	18	22	15
Metals Tolerance index	4.7	4.8	5.1	5.5	5.1	4.7	5.7	4.9	4.4	4.8	4.7	3.9	4.8	3.3	4.4	4.0	3.9	3.0	4.6	4.4	4.9	3.8	4.9	4.1	4.0	3.9	4.2	4.3	4.1	4.4	3.7	4.7	**4.4**	0.499	4.13	4.93	3.01	4.7	5.7	3.3
																																		####						
Metric scores																																		####						
Taxa richness	3	4	4	3	3	4	5	4	4	6	4	4	5	5	6	6	4	5	6	5	5	6	6	5	6	6	6	6	6	5	5	6	**5**	0.66	6	6	4	4	6	3
Shannon diversity	4	5	3	6	5	5	5	1	5	5	4	6	3	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	**5**	0.277	6	6	5	5	6	1
EPT/EPTC	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**	0.277	6	6	5	6	6	5
Hydropsychinae/Trichoptera	2	3	1	3	2	3	3	1	4	3	3	6	2	6	6	6	6	6	5	4	3	6	3	6	6	5	6	3	5	5	6	6	**4**	1.291	5	6	3	3	6	1
Baetidae/Ephemeroptera	5	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**	0	6	6	6	6	6	5
Biotic index	4	4	5	3	3	4	3	4	4	4	4	5	4	5	4	5	5	4	4	4	4	5	4	5	5	4	4	4	5	4	5	4	**4**	0.506	4	5	4	4	5	3
% Filterer	2	2	1	5	3	3	6	0	2	3	1	3	1	6	6	6	6	4	4	2	2	6	5	3	6	5	6	1	3	3	6	6	**4**	1.797	4	6	1	3	6	0
Density (high)	6	6	1	6	6	6	2	2	6	5	6	*	6	*	6	6	*	6	6	6	6	6	6	6	6	6	6	6	6	*	*	6	**5**	0	6	6	6	5	6	1
Density (low)	6	6	6	6	6	6	6	6	6	6	6	3	6	4	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	5	4	6	**6**	0.277	6	6	4	6	6	3
EPT richness	4	4	4	4	4	4	5	5	4	5	5	5	6	5	6	5	5	5	5	6	5	6	6	5	6	6	6	6	6	6	6	6	**5**	0.519	6	6	5	5	6	4
Metals Tolerance index	5	5	4	4	4	5	4	5	5	5	5	6	5	6	5	5	6	6	5	5	5	6	5	5	5	6	5	5	5	5	6	5	**5**	0.48	5	6	5	5	6	4
																																		####						
Total	47	51	40	52	48	52	50	40	52	54	50	50	50	55	63	63	55	59	59	55	54	65	59	59	64	62	63	55	60	51	56	63	**55**	3.798	59	65	51	50	63	40
Organic subset	12	12	7	14	12	13	11	6	12	12	11	8	11	11	16	17	11	14	14	12	12	17	15	14	17	15	16	11	14	7	11	16	**12**	2.204	14	17	7	11	16	6
Metals subset	15	15	14	14	14	15	15	16	15	16	16	14	17	15	17	16	16	17	16	17	16	18	17	16	17	18	17	17	17	16	16	17	**16**	0.725	17	18	16	15	17	14
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	**Mean**	4.576	Mean					
Biointegrity	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%	85%	93%	95%	**84%**	5.1%	90.5%	98%	82%	77%	95%	61%
Organic subset	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%	58%	92%	89%	**73%**	####	80%	94%	58%	66%	92%	33%
Metals subset	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%	94%	**89%**	3.9%	93%	100%	89%	84%	94%	78%

* not caclulated if density is < 550

C-13. Mean metric values and bioassessment scores for Clark Fork River at Huson: Station 22 - August: 1986-2003. 2017-2019 (4 Hess samples per year).

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2001	2002	2003	2017	2018	2019	2001-2019 Mean	2001-2019 ST DEV	2001- 2018 Mean	2001- 2018 Max	2001- 2018 MIN	1986-2000 Mean	1986-2000 Max	1986-2000 MIN
Metric values																												
Taxa richness	28	42	33	32	30	33	40	32	29	30.5	27.3	20	33	33	44	39	39	38	39	48	**34**	3.9	40	44	38	32	42	20
Shannon diversity	2.5	3.4	2.8	3.9	3.7	2.7	3.3	3.0	2.5	2.9	3.4	3.0	3.1	4.0	4.1	3.5	3.3	3.4	3.4	4.2	**3.31**	0.41	3.5	4.1	3.3	3.2	4.0	2.5
EPT/EPTC	0.94	0.79	0.82	0.63	0.70	0.83	0.50	0.73	0.70	0.68	0.82	0.96	0.85	0.79	0.70	0.85	0.62	0.86	0.77	0.76	**0.77**	0.09	0.76	0.86	0.62	0.8	1.0	0.5
Hydropsychinae/Trichoptera	0.99	0.93	0.97	0.86	0.79	0.99	0.94	0.66	0.81	0.86	0.95	0.52	0.90	0.34	0.77	0.88	0.92	0.88	0.58	0.87	**0.82**	0.13	0.81	0.92	0.58	0.8	1.0	0.3
Baetidae/Ephemeroptera	0.94	0.40	0.81	0.45	0.29	0.78	0.87	0.47	0.59	0.47	0.70	0.68	0.53	0.19	0.15	0.05	0.63	0.43	0.63	0.55	**0.53**	0.25	0.38	0.63	0.05	0.6	0.9	0.2
Biotic index	4.8	4.9	4.6	4.9	4.3	4.8	5.3	4.6	4.6	4.7	4.8	3.2	4.6	4.5	4.7	4.5	5.0	4.4	5.1	4.7	**4.65**	0.26	4.74	5.06	4.38	4.6	5.3	3.2
% Filterer	75	60	71	43	40	71	57	57	77	70	58	42	55	23	27	55	73	70	40	52	**56**	17.5	53	73	27	57	77	23
Density	1396	1452	2680	819	516	882	2902	806	4296	1205	476	141	507	308	1054	633	1484	768	737	605.3	**1183**	336.0	935	1484	633	1313	4296	141
EPT richness	16	21	17	18	17	17	20	15	15	15	16	12	18	19	22	22	23	22	22	27	**19**	1.8	22	23	22	17	21	12
Metals Tolerance index	4.9	4.9	4.9	4.5	4.0	4.9	5.0	4.3	4.5	4.7	4.7	3.8	4.5	3.2	4.2	4.2	3.7	4.1	4.5	4.5	**4.4**	0.30	4.1	4.5	3.7	4.5	5.0	3.2
Metric scores																												
Taxa richness	3	6	4	4	4	4	6	4	3	4	3	2	4	4	6	5	5	5	5	6	**4**	0.5	5	6	5	4	6	2
Shannon diversity	3	6	4	6	6	4	5	5	3	4	6	5	5	6	6	6	5	6	6	6	**5**	0.4	6	6	5	5	6	3
EPT/EPTC	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**	0.0	6	6	6	6	6	5
Hydropsychinae/Trichoptera	1	3	1	5	6	1	2	6	6	5	2	6	4	6	6	4	3	5	6	5	**4**	1.2	5	6	3	4	6	1
Baetidae/Ephemeroptera	2	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	**6**	0.0	6	6	6	6	6	2
Biotic index	4	4	4	4	5	4	3	4	4	4	4	6	4	5	4	5	4	5	4	4	**4**	0.5	4	5	4	4	6	3
% Filterer	1	4	1	6	6	1	4	4	0	2	4	6	5	6	6	5	1	2	6	5	**4**	2.1	4	6	1	4	6	0
Density (high)	6	6	4	6	*	6	4	6	2	6	*	*	*	*	6	6	6	6	6	6	**5**	0.0	6	6	6	5	6	2
Density (low)	6	6	6	6	5	6	6	6	6	6	5	1	5	3	6	6	6	6	6	6	**5**	0.0	6	6	6	5	6	1
EPT richness	4	5	4	5	4	4	5	4	4	4	4	3	5	5	6	6	6	6	6	6	**5**	0.0	6	6	6	4	5	3
Metals Tolerance index	5	5	5	5	5	5	4	5	5	5	5	6	5	6	5	5	6	5	5	5	**5**	0.4	5	6	5	5	6	4
Total	41	57	45	59	53	47	49	56	45	52	45	47	49	53	63	60	54	58	62	61	**52**	3.3	59	63	54	50	59	41
Organic subset	11	14	9	16	11	11	11	14	6	12	8	12	9	11	16	16	11	13	16	15	**12**	2.1	14	16	11	11	16	6
Metals subset	15	16	15	16	14	15	15	15	15	15	14	10	15	14	17	17	18	17	17	17	**15**	0.4	17	18	17	15	16	10
Bioassessment																							84.6%					
																					Mean		Mean					
Biointegrity	62%	86%	68%	89%	88%	71%	74%	85%	68%	79%	75%	78%	82%	88%	95%	91%	82%	88%	94%	92%	**81%**	5.4%	90%	95%	82%	78%	89%	62%
Metals subset	83%	89%	83%	89%	78%	83%	83%	83%	83%	83%	78%	56%	83%	78%	94%	94%	100%	94%	94%	94%	**84%**	2.5%	96%	100%	94%	81%	89%	56%
Organic subset	61%	78%	50%	89%	92%	61%	61%	78%	33%	67%	67%	100%	75%	92%	89%	89%	61%	72%	89%	83%	**73%**	12.8%	80%	89%	61%	72%	100%	33%

* not caclulated if density is < 550

Appendix D
List of Clark Fork River Basin Macroinvertebrate Biomonitoring Reports

APPENDIX D

List of Clark Fork River Basin Biomonitoring Reports

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.

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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.

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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.

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