Suzanne Steab< suzannesteab@utah.gov>

Horizon 2012 Macroinverterbrate Study

1 message

Kit Pappas< kit@emerytelcom.net> Wed, Jun 19, 2013 at 8:43 AM
To: Suzanne Steab <suzannesteab@utah.gov>

Suzanne, attached, please find the 2012 Macroinverterbrate Study as was required by the Horizon 2012 Annual Report.

Thanks,

Kit

John C. (Kit) Pappas

America West Resources, Hidden Splendor Resources

Manager of Engineering & Environmental Services

3266 South 125 West, Price, Utah 84501

Phone: 435-636-0820 Fax: 435-636-0817

Cell: 435-650-7339

kit@emerytelcom.net

kit@americacoal.com

2 attachments

report transmittal letter to KP - 2012 macro results.pdf
63K

BugLab Report NF Gordon 2012.pdf
201K

JBR Environmental Consultants, Inc.
Corporate Headquarters
8160 S. Highland Dr.
Sandy, Utah 84093
[p] 801.943.4144
[f] 801.942.1852
www.jbrenv.com

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June 18, 2013

Kit Pappas
Hidden Splendor Resources, Inc.
Horizon Mine
3266 South 125 West
Price, UT 84501

RE: North Fork Gordon Creek Macroinvertebrate Sampling – Fall 2012

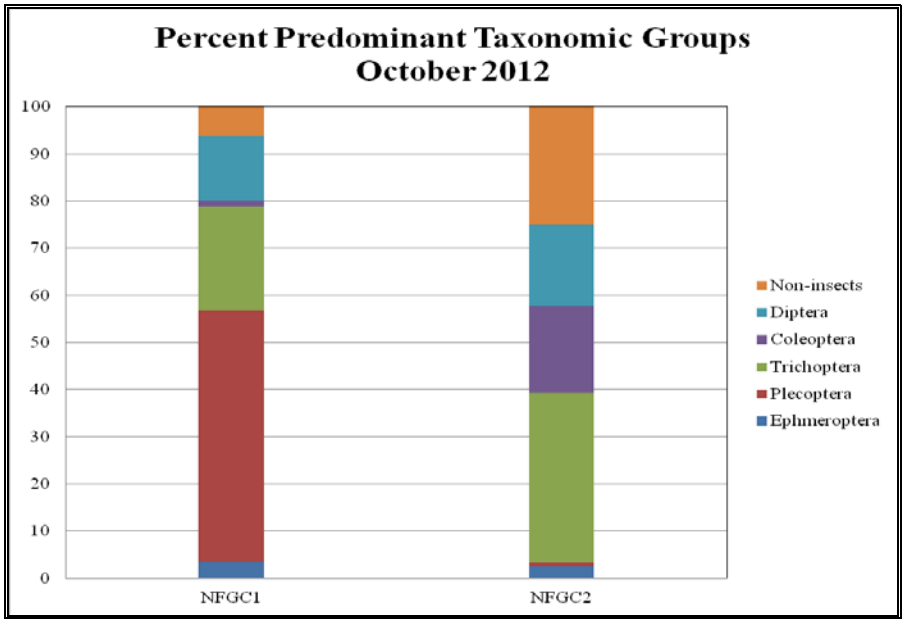
Dear Kit,

This letter transmits and summarizes the laboratory analysis report for the samples that JBR Environmental Consultants, Inc. (JBR) collected upstream and downstream of Hidden Splendor's UPDES discharge point on North Fork Gordon Creek. JBR collected these samples on October 11, 2012 and submitted them to the BLM/USU National Aquatic Monitoring Center in Logan, Utah for taxonomic identification and metric calculation. Since JBR last collected macroinvertebrate samples at Hidden Splendor (October 2008), we have updated our sampling protocol and changed laboratories in order to be more consistent with the State of Utah's macroinvertebrate progam. While this means that direct comparisons between the 2012 results and earlier results are not easily made, data quality is improved and future analysis will be more robust.

Overall, compared to 2008, more taxa (i.e., richness metric) were identified in 2012 than in 2008 and the number of individuals per square meter (i.e., abundance metric) was greater in 2012. Whether this is due to some or all of the above-noted changes cannot be determined. However, the differences in those metrics between the upstream and downstream site were not as great as they had been in 2008. The U.S. Forest Service's Community Tolerance Quotient (CTQd), which should not be affected by the noted changes, indicates a steam in poor condition at both sites; in 2008 the stream was good to fair. The Shannon Weaver Index, which is a measure of diversity, was similar at both sites and also reflected somewhat worse conditions than in 2008.

Comparing each of the calculated 2012 metrics by site, and knowing whether they typically increase or decrease with a perturbation such as poor water quality, stream instability, and the like, provides insight into whether there are differences between the upstream and the downstream North Fork Gordon Creek sites. For many of the metrics there is no or little

difference between the two sites. For a number of metrics, the upstream site (NFGC1) represented better macroinvertebrate habitat conditions. However several metrics were better at the downstream site (NFGC2). The following bar chart that shows the percent abundance associated with each of the major taxonomic groups found at each site indicates that the upstream site is likely in overall better condition. For example, the three taxonomic orders that are generally considered as more sensitive to ecological stressors, and thus likely to be found in higher proportions at sites of good quality, are Ephemeroptera, Plecoptera, and Tricoptera (often abbreviated as EPT taxa). As shown below, that grouping makes up a much greater proportion of the macroinvertebrate population at the upstream site than it does at the downstream site (almost entirely due to the presence of Plecoptera taxa). Conversely, non-insects, which generally increase in proportion as habitat or water quality is perturbed, are relatively greater at the downstream site.



Thank you for the opportunity to provide this service to Hidden Splendor. Please let me know if you have any questions about this information.

Sincerely,

<< sent via email >>

Karla Knoop, Hydrologist

enc

BLM/USU National Aquatic Monitoring Center (NAMC)
Department of Watershed Sciences (WATS) - Utah State University 5210 Old Main Hill Logan, UT 84322-5210
http://www.usu.edu/buglab/

Report prepared by:
Scott Miller: 435.797.2612 / scott.miller@usu.edu
Sarah Judson: 435.797.3310 / sarah.judson@usu.edu

Report Table of Contents

Metadata
- Contact
- Worksheet
- Metrics
- References

Metrics
Species Matrix (Raw)
Species Matrix (Standardized)

Excel Worksheet Name	Worksheet Description
Metrics	Common metrics used to assess freshwater biological integ standardized to operational taxonomic units (OTUs; sensu (Standardized metrics are indicated with an asterisk. NAMC merging finer level identifications to coarser levels. We are apply. A more detailed explanation of each metric, as well **This report was generated with the following settings - OT**
Species Matrix (Raw)	Raw taxonomic and abundance data for sampled sites. Abu number of individuals per sample for qualitative samples. N thus considerable redundancy likely exists in the taxonomic
Species Matrix (Standardized)	Taxonomic and abundance data (Species matrix) for sample Please note that data has not been standardized to a fixed quantitative samples OR is the estimated number per samp

Description of the fields contained in the 'Metrics' worksheet. A more detailed explanation of e

Category	Column Name	Explanation
Collection information	SampleID	NAMC unique tracking number
	Station (NAMC)	NAMC station tracking id

	Station (Customer)	Station abbreviation provided by the customer
	Waterbody	Specific location name
	County	Administrative boundary
	State	Administrative boundary
	Latitude	Y coordinate in decimal degree units
	Longitude	X coordinate in decimal degree units
	Collection Date	Date of sampling event
	Habitat Sampled	Microhabitat or channel unit(s) where sample(s) was taken. Values are restricted to predetermined values as specified in the PDF metadata.
	Collection Method	Method used to collect sample. Values are restricted to predetermined values as specified in the PDF metadata.
	Field Notes	Field notes provided by customer
	Lab Notes	Laboratory processing notes, particularly regarding condition of received samples and QAQC
	Area Sampled	Total area sampled in square meters
Laboratory Processing	Field Split	% sample submitted for processing
	Lab Split	% of sample processed to obtain 600 random individuals (if present)
	Split Count	# of organisms randomly subsampled from [Lab Split] for identification
	Fixed count	# of computationally resampled organisms

	Big Rare Count	# of "big and rare" organisms selected NON-RANDOMLY for identification from the entire submitted sample
Richness (metrics summarizing all unique taxa in a sample)	Richness	# of unique taxa, standardized to OTU
	Abundance	Estimated # number of individuals per unit area (m^2) for quantitative samples OR the estimated number per sample for qualitative samples.
	Shannon's Diversity	Measure of richness and evenness (based on relative abundance of each species); weighted toward rare species
	Simpson's Diversity	Measure of richness and evenness (based on relative abundance of each species); weighted toward common species
	Evenness	Measure of relative abundance indicative of taxa dominance
	# of EPT Taxa	Richness of Ephemeroptera, Plecoptera, and Trichoptera taxa
	EPT Taxa Abundance	Abundance of Ephemeroptera, Plecoptera, and Trichoptera taxa
Dominance Metrics (metrics summarizing all most abundant taxa in a sample)	Dominant Family	Taxonomic family with the highest abundance
	Abundance of Dominant Family	Abundance of dominant family
	Dominant Taxa	Individual taxa with the highest abundance
	Abundance of Dominant Taxa	Abundance of dominant taxa

Tolerance Indices (indices based on the indicator species concept in which taxa are assigned tolerance values)	Hilsenhoff Biotic Index	Abundance-weighted average of family-level pollution tolerances
	# of Intolerant Taxa	# of taxa with an HBI score <= 2
	Intolerant Taxa abundance	Abundance of taxa with an HBI score <= 2
	# of Tolerant Taxa	# of taxa with an HBI score>=8
	Tolerant Taxa abundance	Abundance of taxa with an HBI score >=8
	USFS Community Tolerance Quotient (d)	Dominance weighted community tolerance quotient
Functional Feeding Groups (classification of organisms based on morphological or behavioral adaptations for where and how food is acquired)	# of shredder taxa	# of taxa utilizing living or decomposing vascular plant tissue and CPOM
	Shredder Abundance	Abundance of taxa utilizing vascular plant tissue and CPOM
	# of scraper taxa	# of taxa utilizing periphyton, particularly algae and diatoms
	Scraper abundance	Abundance of taxa utilizing periphyton, particularly algae and diatoms
	# of collector-filterer taxa	# of taxa utilizing FPOM in the water column
	Collector-filterer abundance	Abundance of taxa utilizing FPOM in the water column
	# of collector-gatherer taxa	# of taxa utilizing FPOM from benthic deposits
	Collector-gatherer abundance	Abundance of taxa utilizing FPOM from benthic deposits
	# of predator taxa	# of taxa utilizing living animal tissue
	Predator abundance	Abundance of taxa utilizing living animal tissue
Functional Traits (metrics based on morphological and life history traits)	# of clinger taxa	# of taxa with fixed retreats or other strategies for clinging to rocks

	"# of" Long-lived Taxa	# of taxa with 2 to 3 year life cycles
Compositional Metrics (richness and abundance of various taxonomic groups)	# of Ephemeroptera taxa	
	Ephemeroptera abundance	
	# of Plecoptera taxa	
	Plecoptera abundance	
	# of Trichoptera taxa	
	Trichoptera abundance	
	# of Coleoptera taxa	
	Coleoptera abundance	
	# of Elmidae taxa	
	Elmidae abundance	
	# of Megaloptera taxa	
	Megaloptera abundance	
	# of Diptera taxa	
	Diptera abundance	
	# of Chironomidae taxa	
	Chironomidae abundance	
	# of Crustacea taxa	
	Crustacea abundance	
	# of Oligochaete taxa	
	Oligochaete abundance	
	# of Mollusca taxa	
	Mollusca abundance	
	# of Insect taxa	
	Insect abundance	
	# of non-insect taxa	
	Non-insect abundance	

References

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Vinson, M.R. & Hawkins, C.P., 1996. Effects of sampling area and subsampling procedure on co
Winget, R.N. & Mangum, F.A., 1979. Biotic condition index: integrated biological, physical, and

Report prepared for:

Customer contact:	Dave Kikkert
Customer:	JBR Environmental Consultan
Customer Address :	8160 S. Highland Drive
Customer City, State, Zip:	Sandy UT 84093
Customer Phone:	801-440-9271
Customer Email:	dkikkert@jbrenv.com

;rity, as well as basic field and lab processing information. Note that values for richness ba
Cuffney et al. 2007) and a fixed count (i.e., rarefaction) of 300, but density metrics are bas
OTU standardization uses the method of removing individuals identified to the coarser ta
able to standardize your data to custom OTUs and/or fixed counts if provided, although a
as references, can be obtained by contacting NAMC and will soon be available on our we

'Us: Genus (NAMC Level 2); Fixed Count: 300.

ndance data is the estimated number of individuals per square meter for quantitative sar
Note that the taxonomic data in this worksheet **has not been standardized to operational**
: hierarchy.

ed sites that has been standardized to Operational Taxonomic Units (OTUs) but not stand
count as in the 'Standardized Metrics worksheet'. Also, abundance data is the estimated r
ole for qualitative samples.

each metric can be obtained by contacting NAMC and will soon be available on our websi

Predicted response to increasing perturbation (Barbour et al. 1999)	**Calculation**	**Standardized (OTU and Rarefication)**
NA	NA	NA
NA	NA	NA

NA	NA	NA
NA	NA	NA
NA	NA	NA

NA	NA	NA
Decrease	$[\text{Richness}]_{\text{UniqueTaxa}}$	Y
Increase or decrease	(([Split Count]* (100/[Lab Split])) + [Big_Rare Count]) *(100/[Field Split]) *(1/[Area Sampled])	N
Decrease	$-\sum([\text{Relative Abundance}]_{\text{taxa}} * \ln([\text{Relative Abundance}]_{\text{taxa}})$	Y
Decrease	$1 - [\text{Simpson's Diversity}] = 1 - \sum([\text{Relative Abundance}]_{\text{taxa}})^2$	Y
Decrease	[Shannon's Diversity]/ln([Richness])	Y
Decrease	$[\text{Richness}]_E + [\text{Richness}]_P + [\text{Richness}]_T$	Y
Decrease	$[\text{Abundance}]_E + [\text{Abundance}]_P + [\text{Abundance}]_T$	N
NA	NA	N
Increase	$[\text{Abundance}]_{\text{dominant family}}$	N
NA	NA	N
Increase	$[\text{Abundance}]_{\text{dominant taxa}}$	N

Increase	$\sum([\text{Abundance}]_{taxa} * [\text{Tolerance}]_{taxa}) / [\text{Abundance}]_{Total}$	Y
Decrease	$[\text{Richness}]_{intolerant}$	Y
Decrease	$[\text{Abundance}]_{intolerant}$	N
Increase	$[\text{Richness}]_{tolerant}$	Y
Increase	$[\text{Abundance}]_{tolerant}$	N
Decrease	$\sum([\text{Tolerance Quotient}] * \log([\text{Abundance}]_{taxa})) / \sum \log([\text{Abundance}]_{taxa})$	Y
Decrease	$[\text{Richness}]_{shredder}$	Y
Decrease	$[\text{Abundance}]_{shredder}$	N
Decrease	$[\text{Richness}]_{scraper}$	Y
Decrease	$[\text{Abundance}]_{scraper}$	N
Variable	$[\text{Richness}]_{collector\text{-}filterer}$	Y
Variable	$[\text{Abundance}]_{collector\text{-}filterer}$	N
Variable	$[\text{Richness}]_{collector\text{-}gatherer}$	Y
Variable	$[\text{Abundance}]_{collector\text{-}gatherer}$	N
Decrease	$[\text{Richness}]_{predator}$	Y
Decrease	$[\text{Abundance}]_{predator}$	N
Decrease	$[\text{Richness}]_{clinger}$	Y

Decrease	$[\text{Richness}]_{\text{long-lived}}$	Y
Decrease	$[\text{Richness}]_{\text{Ephemeroptera}}$	Y
Decrease	$[\text{Abundance}]_{\text{Ephemeroptera}}$	N
Decrease	$[\text{Richness}]_{\text{Plecoptera}}$	Y
Decrease	$[\text{Abundance}]_{\text{Plecoptera}}$	N
Decrease	$[\text{Richness}]_{\text{Trichoptera}}$	Y
Decrease	$[\text{Abundance}]_{\text{Trichoptera}}$	N
Variable	$[\text{Richness}]_{\text{Coleoptera}}$	Y
Variable	$[\text{Abundance}]_{\text{Coleoptera}}$	N
Decrease	$[\text{Richness}]_{\text{Elmidae}}$	Y
Decrease	$[\text{Abundance}]_{\text{Elmidae}}$	N
Variable	$[\text{Richness}]_{\text{Megaloptera}}$	Y
Variable	$[\text{Abundance}]_{\text{Megaloptera}}$	N
Variable	$[\text{Richness}]_{\text{Diptera}}$	Y
Variable	$[\text{Abundance}]_{\text{Diptera}}$	N
Increase	$[\text{Richness}]_{\text{Chironomidae}}$	Y
Increase	$[\text{Abundance}]_{\text{Chironomidae}}$	N
Variable	$[\text{Richness}]_{\text{Crustacea}}$	Y
Variable	$[\text{Abundance}]_{\text{Crustacea}}$	N
Increase	$[\text{Richness}]_{\text{Oligochaeta}}$	Y
Increase	$[\text{Abundance}]_{\text{Oligochaeta}}$	N
Variable	$[\text{Richness}]_{\text{Mollusca}}$	Y
Variable	$[\text{Abundance}]_{\text{Mollusca}}$	N
Decrease	$[\text{Richness}]_{\text{Insect}}$	Y
Decrease	$[\text{Abundance}]_{\text{Insect}}$	N
Increase	$[\text{Richness}]_{\text{Non-insect}}$	Y
Increase	$[\text{Abundance}]_{\text{Non-insect}}$	N

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ts - Sandy, UT

ased metrics are
sed on the raw taxa list.
axonomic resolution or
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l taxonomic units (OTUs),

ardized to fixed count.
number per square meter for

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Reference
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Ludwig and Reynolds (1988, equation 8.11, page 93)
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Merritt et. al (2008)
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Karr and Chu (1998), Merritt et al. (2008)

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vice, Intermountain Region, Ogden, UT.

ent/index.cfm.

SampleID	149690	149691
Station (NAMC)	NFGC1	NFGC2
Station (Customer	NFGC1	NFGC2
Waterbody	h Fork Gordon Creek	ork Gordon Creek
County	Carbon	Carbon
State	UT	UT
Latitude	39.68866076	39.68669909
Longitude	-111.0552911	-111.0495985
Collection Date	10/11/2012	10/11/2012
Habitat Sampled	Targeted Riffle	Targeted Riffle
Collection Method	Kick net	Kick net
Field Notes	NULL	NULL
Lab Notes	NULL	NULL
Area sampled (m^	0.28	0.28
Field Split	100	100
Lab Split	100	100
Split Count	292	475

Code	Phylum	Class	Order	Family	SubFamily	Genus	Species		
19	Annelida	Clitellata						32	268
12	Annelida	Clitellata	Arhynchob	Erpobdellidae				0	4
66	Arthropoda	Arachnida	Trombidifo	Sperchonidae				7	0
121	Arthropoda	Insecta	Coleoptera	Elmidae				7	96
135	Arthropoda	Insecta	Coleoptera	Elmidae		Optioservus		7	164
1076	Arthropoda	Insecta	Coleoptera	Elmidae		Optioservu	quadrimaculatus	0	4
149	Arthropoda	Insecta	Coleoptera	Haliplidae				0	7
150	Arthropoda	Insecta	Coleoptera	Haliplidae		Brychius		0	39
908	Arthropoda	Insecta	Diptera	Ceratopog	Ceratopog	Probezzia		14	39
180	Arthropoda	Insecta	Diptera	Chironomidae				0	46
182	Arthropoda	Insecta	Diptera	Chironomi	Chironominae			54	0
184	Arthropoda	Insecta	Diptera	Chironomi	Orthocladiinae			18	89
187	Arthropoda	Insecta	Diptera	Chironomi	Tanypodinae			25	18
200	Arthropoda	Insecta	Diptera	Empididae				7	0
2253	Arthropoda	Insecta	Diptera	Empididae		Neoplasta		0	11
216	Arthropoda	Insecta	Diptera	Psychodidae		Pericoma		11	4

							SampleID	149690	149691
							Station (NAMC)	NFGC1	NFGC2
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							Area sampled (m^	0.28	0.28
							Field Split	100	100
							Lab Split	100	100
							Split Count	292	475
221	Arthropoda	Insecta	Diptera	Simuliidae				4	0
225	Arthropoda	Insecta	Diptera	Stratiomyidae				0	4
706	Arthropoda	Insecta	Diptera	Stratiomyidae		Caloparyphus		0	4
226	Arthropoda	Insecta	Diptera	Stratiomyidae		Euparyphus		0	21
233	Arthropoda	Insecta	Diptera	Tabanidae		Tabanus		0	4
234	Arthropoda	Insecta	Diptera	Tipulidae				0	18
237	Arthropoda	Insecta	Diptera	Tipulidae		Dicranota		7	4
247	Arthropoda	Insecta	Diptera	Tipulidae	Tipulinae	Tipula		4	32
249	Arthropoda	Insecta	Ephemerop	Baetidae				11	0
250	Arthropoda	Insecta	Ephemerop	Baetidae		Baetis		0	39
834	Arthropoda	Insecta	Ephemerop	Baetidae		Diphetor	hageni	14	0
262	Arthropoda	Insecta	Ephemerop	Ephemerellidae				0	4
276	Arthropoda	Insecta	Ephemerop	Heptageniidae				7	0
287	Arthropoda	Insecta	Ephemerop	Leptophlebiidae				4	0
403	Arthropoda	Insecta	Plecoptera					307	0
404	Arthropoda	Insecta	Plecoptera	Capniidae	Capniinae			221	0
455	Arthropoda	Insecta	Plecoptera	Perlodidae				0	4

								SampleID	149690	149691
								Station (NAMC)	NFGC1	NFGC2
								Station (Customer	NFGC1	NFGC2
								Waterbody	h Fork Gordon Creek	ork Gordon Creek
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								Habitat Sampled	Targeted Riffle	Targeted Riffle
								Collection Method	Kick net	Kick net
								Field Notes	NULL	NULL
								Lab Notes	NULL	NULL
								Area sampled (m^	0.28	0.28
								Field Split	100	100
								Lab Split	100	100
								Split Count	292	475
462	Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperlinae	Isoperla			11	11
1194	Arthropoda	Insecta	Plecoptera	Perlodidae	Perlodinae	Diura	knowltoni		11	0
800	Arthropoda	Insecta	Plecoptera	Pteronarcy	Pteronarcy	Pteronarce	badia		7	0
495	Arthropoda	Insecta	Trichoptera	Hydropsychidae					4	64
499	Arthropoda	Insecta	Trichoptera	Hydropsycl	Hydropsycl	Hydropsyche			71	532
528	Arthropoda	Insecta	Trichoptera	Limnephilidae					154	4
542	Arthropoda	Insecta	Trichoptera	Limnephilic	Limnephilir	Hesperophylax			0	11
69	Arthropoda	Malacostra	Amphipoda						0	21
71	Arthropoda	Malacostra	Amphipoda	Gammaridae		Gammarus			4	89
84	Arthropoda	Malacostra	Isopoda	Asellidae					18	0
647	Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidiinae	Pisidium			4	43

*Standardized to OTU and fixed count, see Metadata for details

SampleID	149690	149691
Station (NAMC)	NFGC1	NFGC2
Station (Customer)	NFGC1	NFGC2
Waterbody	North Fork Gordon Creek	North Fork Gordon Creek
County	Carbon	Carbon
State	UT	UT
Latitude	39.68866076	39.68669909
Longitude	-111.0552911	-111.0495985
Collection Date	10/11/2012	10/11/2012
Habitat Sampled	Targeted Riffle	Targeted Riffle
Collection Method	Kick net	Kick net
Field Notes	NULL	NULL
Lab Notes	NULL	NULL
Area sampled (m^2)	0.28	0.28
Field Split	100	100
Lab Split	100	100
Split Count	292	475
Fixed Count	152	300
Big Rare Count	0	0
Richness*	20	18
Abundance	1043	1696
Shannon's Diversity*	2.178936148	2.056109374
Simpson's Diversity*	0.800627396	0.800914158
Evenness*	0.727346755	0.711365024
# of EPT Taxa*	6	4
EPT Taxa Abundance	821	668
Dominant Family	Capniidae	Hydropsychidae
Abundance of Dominant Family	221	596
Dominant Taxa	Plecoptera	Hydropsyche
Abundance of Dominant Taxa	307	532
Hilsenhoff Biotic Index*	2.980263158	3.13
# of Intolerant Taxa*	4	1
Intolerant Taxa abundance	254	18
# of Tolerant Taxa*	2	1
Tolerant Taxa abundance	29	4
USFS Community Tolerance Quotient (d)*	84	95
# of shredder taxa*	3	2
Shredder Abundance	386	71
# of scraper taxa*	2	2
Scraper abundance	25	204
# of collector-filterer taxa*	3	2
Collector-filterer abundance	82	639
# of collector-gatherer taxa*	6	5
Collector-gatherer abundance	171	686
# of predator taxa*	5	7

SampleID	149690	149691
Station (NAMC)	NFGC1	NFGC2
Station (Customer)	NFGC1	NFGC2
Waterbody	North Fork Gordon Creek	North Fork Gordon Creek
County	Carbon	Carbon
State	UT	UT
Latitude	39.68866076	39.68669909
Longitude	-111.0552911	-111.0495985
Collection Date	10/11/2012	10/11/2012
Predator abundance	71	93
# of clinger taxa*	4	4
Long-lived Taxa*	2	2
# of Ephemeroptera taxa*	1	1
Ephemeroptera abundance	36	43
# of Plecoptera taxa*	4	1
Plecoptera abundance	557	14
# of Trichoptera taxa*	1	2
Trichoptera abundance	229	611
# of Coleoptera taxa*	1	2
Coleoptera abundance	14	311
# of Elmidae Taxa*	1	1
Elmidae abundance	7	121
# of Megaloptera taxa*	0	0
Megaloptera abundance	0	0
# of Diptera taxa*	8	9
Diptera abundance	143	293
# of Chironomidae taxa*	3	2
Chironomidae abundance	96	154
# of Crustacea taxa*	0	0
Crustacea abundance	0	0
# of Oligochaete taxa*	0	0
Oligochaete abundance	32	268
# of Mollusca taxa*	1	1
Mollusca abundance	4	43
# of Insect taxa*	15	15
Insect abundance	979	1271
# of Non-insect taxa*	5	3
Non-insect abundance	64	425

							SampleID	149690	149691
							Station (NAMC)	NFGC1	NFGC2
							Station (Customer)	NFGC1	NFGC2
							Waterbody	th Fork Gordon Creek	Fork Gordon Creek
							County	Carbon	Carbon
							State	UT	UT
							Latitude	39.68866076	39.68669909
							Longitude	-111.0552911	-111.0495985
							Collection Date	10/11/2012	10/11/2012
							Habitat Sampled	Targeted Riffle	Targeted Riffle
							Collection Method	Kick net	Kick net
							Field Notes	NULL	NULL
							Lab Notes	NULL	NULL
							Area sampled (m^2)	0.28	0.28
							Field Split	100	100
							Lab Split	100	100
							Split Count	292	475
OTUCode	**Phylum**	**Class**	**Order**	**Family**	**Genus**	**Spe**	**OTUName**		
5	Annelida						Other_Oligochaeta	32	268
1	Annelida	Clitellata	Arhynchobdellida				Erpobdellidae	0	4
7	Arthropoda						Acari	7	0
43	Arthropoda	Insecta	Coleoptera	Elmidae			Optioservus	7	164
51	Arthropoda	Insecta	Coleoptera	Haliplidae			Brychius	0	39
244	Arthropoda	Insecta	Diptera				Simuliidae	4	0
249	Arthropoda	Insecta	Diptera				Tabanidae	0	4
80	Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogoninae	14	39
84	Arthropoda	Insecta	Diptera	Chironomidae			Chironominae	54	0
86	Arthropoda	Insecta	Diptera	Chironomidae			Orthocladiinae	18	89
89	Arthropoda	Insecta	Diptera	Chironomidae			Tanypodinae	25	18
227	Arthropoda	Insecta	Diptera	Empididae			Chelifera_Metachela_Neoplasta	0	11
240	Arthropoda	Insecta	Diptera	Psychodidae			Pericoma_Telmatoscopus	11	4
245	Arthropoda	Insecta	Diptera	Stratiomyidae			Caloparyphus_Euparyphus	0	21
254	Arthropoda	Insecta	Diptera	Tipulidae			Dicranota	7	4
265	Arthropoda	Insecta	Diptera	Tipulidae			Tipula	4	32

					SampleID	149690	149691
					Station (NAMC)	NFGC1	NFGC2
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					Waterbody	th Fork Gordon Creek	Fork Gordon Creek
					County	Carbon	Carbon
					State	UT	UT
					Latitude	39.68866076	39.68669909
					Longitude	-111.0552911	-111.0495985
					Collection Date	10/11/2012	10/11/2012
271	Arthropoda	Insecta	Ephemerop	Baetidae	Baetis	0	39
277	Arthropoda	Insecta	Ephemerop	Baetidae	Diphetor	14	0
358	Arthropoda	Insecta	Plecoptera	Capniidae	Capniidae	221	0
387	Arthropoda	Insecta	Plecoptera	Perlodidae	Diura	11	0
379	Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperla	11	11
391	Arthropoda	Insecta	Plecoptera	Pteronarcyidae	Pteronarcella	7	0
409	Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	71	532
438	Arthropoda	Insecta	Trichoptera	Limnephilidae	Hesperophylax	0	11
488	Arthropoda	Malacostra	Amphipoda	Gammaridae	Gammarus	4	89
493	Arthropoda	Malacostra	Isopoda		Asellidae	18	0
499	Mollusca	Bivalvia	Veneroida		Pisidiidae	4	43