#530

Aquatic Invertebrate Report for samples collected from the Six Rivers National Forest, 2006

Report prepared for:
United States Forest Service
Six Rivers National Forest
Lower Trinity Road
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Eureka, California 95501

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30 August 2006

Sampling Locations

Table 1. Sampling site locations within Siskiyou County, California.

Station ID	Location	Latitude	Longitude	Elevation (meters)
SIXRIVERS1 – 12N29	Unnamed trib to Irving Creek	41.472	123.42	1097
SIXRIVERS3 – 12N08	Irving Creek	41.47	123.431	853

Methods

Field sampling

Samples were collected on 11 and 12 July 2006 (Table 2). Aquatic invertebrates were collected qualitatively from all available habitats with a kick net with a 500 micron mesh net.

Laboratory methods

The general procedures followed for processing invertebrate samples were similar to those recommended by the United States Geological Survey (Cuffney et al. 1993) and are described in greater detail and rationalized in Vinson and Hawkins (1996). Methods for individual samples are presented in Table 2. Samples were processed in their entirety, i.e., all invertebrates present in each

sample were removed and identified. During the sorting process the organisms were separated into Orders. When the sorting of the sub-samples was completed, the entire sample was spread throughout a large white enamel pan and searched for 10 minutes to remove any taxa that might not have been picked up during the initial sample sorting process. The objective of this "big/rare" search was to provide a more complete taxa list by finding rarer taxa that may have been excluded during the sub-sampling process. These rarer bugs were placed into a separate vial and tracked separately from the bugs removed during the sub-sampling process. The numbers of invertebrates collected and identified in each sample are presented in Table 2. All identified invertebrates removed from each sample were composited into a single museum-grade glass screw-top vial with a polypropylene lid and polypropylene liner. Internal sample labels were written in pencil on waterproof paper. Information on each label includes the sampling location, sampling date and laboratory processing information. The outside of each vial is labeled with a unique catalog number. Vials were filled with 70% ethanol. All samples were retained in our collection. The data are presented as the number of individuals per sample.

Table 2. Field comments and laboratory processing information.

Sample ID	Station ID	Sampling date	% of sample processed	Number of individuals identified	Field Comments
127375	SIXRIVERS3	7/11/2006	100	371	above/after
127376	SIXRIVERS3	7/11/2006	100	403	below/after
127377	SIXRIVERS1	7/12/2006	100	151	below/after
127378	SIXRIVERS1	7/12/2006	100	270	above/after
127379	SIXRIVERS3	7/12/2006	100	484	below/after
127380	SIXRIVERS3	7/12/2006	100	260	above/after

Data summarization

A number of metrics or ecological summaries were provided for each sampling station. These metrics were calculated as follows:

Taxa richness - Richness is a component and estimate of community structure and stream health based on the number of distinct taxa. Taxa richness normally decreases with decreasing water quality. In some situations organic enrichment can cause an increase in the number of pollution tolerant taxa. Taxa richness was calculated for operational taxonomic units (OTUs) and the number of unique genera or families. The values for operational taxonomic units may be

overestimates of the true taxa richness at a site if individuals were the same taxon as those identified to lower taxonomic levels or they may be underestimates of the true taxa richness if multiple taxa were present within a larger taxonomic grouping but were not identified. All individuals within all samples were generally identified similarly, so that comparisons in operational taxonomic richness among samples within this dataset are appropriate, but comparisons to other data sets may not. Comparisons to other datasets should be made at the genera or family level.

Abundance - The abundance, density, or number of aquatic macroinvertebrates per unit area is an indicator of habitat availability and fish food abundance. Abundance may be reduced or increased depending on the type of impact or pollutant. Increased organic enrichment typically causes large increases in abundance of pollution tolerant taxa. High flows, increases in fine sediment, or the presence of toxic substances normally cause a decrease in invertebrate abundance. Invertebrate abundance is presented as the number of individuals per square meter for quantitative samples and the number of individuals collected for qualitative samples.

EPT - A summary of the taxa richness and abundance among the insect Orders Ephemeroptera, Plecoptera, and Trichoptera (EPT). These orders are commonly considered sensitive to pollution.

Number of families - All families are separated and counted. The number of families normally decreases with decreasing water quality.

Percent taxon or family dominance – An assemblage dominated by a single taxon or several taxa from the same family suggests environmental stress.

Shannon Diversity Index - Ecological diversity is a measure of community structure defined by the relationship between the number of distinct taxa and their relative abundances. The Shannon diversity index was calculated for each sampling location for which there were a sufficient number of individuals and taxa collected to perform the calculations. The calculations were made following Ludwig and Reynolds (1988, equation 8.9, page 92).

Evenness - Evenness is a measure of the distribution of taxa within a community. The evenness index used in this report was calculated following Ludwig and Reynolds (1988, equation 8.15, page 94). Value ranges from 0-1 and approach zero as a single taxa becomes more dominant.

Biotic indices - Biotic indices use the indicator taxa concept. Taxa are assigned water quality tolerance values based on their specific tolerances to pollution. Scores are typically weighted by taxa relative abundance. In the United States the most commonly used biotic index is the Hilsenhoff Biotic

ndex (Hilsenhoff 1987, Hilsenhoff 1988). The Hilsenhoff Biotic Index (HBI) summarizes the overall pollution tolerances of the taxa collected. This index has been used to detect nutrient enrichment, high sediment loads, low dissolved oxygen, and thermal impacts. It is best at detecting organic pollution. Families were assigned an index value from 0- taxa normally found only in high quality unpolluted water, to 10- taxa found only in severely polluted waters. Family level values were taken from Hilsenhoff (1987, 1988) and a family level HBI was calculated for each sampling location for which there were a sufficient number of individuals and taxa collected to perform the calculations. Sampling locations with HBI values of 0-2 are considered clean, 2-4 slightly enriched, 4-7 enriched, and 7-10 polluted. Rather than using mean HBI values for a sample, taxon HBI values can also be used to determine the number of pollution intolerant and tolerant taxa occurring at a site. In this report taxa with HBI values of 0-2 were considered intolerant clean water taxa and taxa with HBI values of 9-10 were considered pollution tolerant taxa. The number of tolerant and intolerant taxa and the abundances of tolerant and intolerant taxa were calculated for each sampling location.

USFS Community tolerant quotient - This index has been widely used by the USFS and BLM throughout the western United States. Taxa are assigned a tolerant quotient (TQ) from 2-taxa found only in high quality unpolluted water, to 108 - taxa found in severely polluted waters. TQ values were developed by Winget and Mangum (1979). The dominance weighted community tolerance quotient (CTQd) was calculated. Values can vary from about 20 to 100, in general the lower the value the better the water quality.

Functional feeding group measures – A common classification scheme for aquatic macroinvertebrates is to categorize them by feeding acquisition mechanisms. Categories are based on food particle size and food location, e.g., suspended in the water column, deposited in sediments, leaf litter, or live prey. This classification system reflects the major source of the resource, either within the stream itself or from riparian or upland areas and the primary location, either erosional or depositional habitats. The number of taxa and individuals of the following feeding groups were calculated for each sampling location.

Shredders - Shredders use both living vascular hydrophytes and decomposing vascular plant tissue - coarse particulate organic matter (CPOM). Shredders are sensitive to changes in riparian vegetation. Shredders can be good indicators of toxicants that adhere to organic matter.

Scrapers - Scrapers feed on periphyton - attached algae and associated material. Scraper populations increase with increasing abundance of diatoms and can decrease as filamentous algae,

mosses, and vascular plants increase. Scrapers decrease in relative abundance in response to sedimentation and organic pollution.

Collector-filterers - Collector-filterers feed on suspended fine particulate organic matter (FPOM). Collector-gatherers are sensitive to toxicants in the water column and deposited in sediments.

Collector-gatherers - Collector-gatherers feed on deposited fine particulate organic matter. Collector-gatherers are sensitive to deposited toxicants.

Predators - Predators feed on living animal tissue.

Unknown feeding group - This category includes taxa that are highly variable, parasites, and those that for which the primary feeding mode is currently unknown.

Clinger taxa - The number of clinger taxa have been found by Karr and Chu (1998) to respond negatively to human disturbance. Clinger taxa were determined using information in Merritt and Cummins (1996). These taxa typically cling to the tops of rocks and are thought to be reduced by sedimentation or abundant algal growths

Long-live taxa – The number of long-lived taxa was calculated the number of taxa collected that typically have 2-3 year life cycles. Disturbances and water quality and habitat impairment typically reduces the number of long-lived taxa Karr and Chu (1998). Life-cycle length determinations were based on information in Merritt and Cummins (1996) and Dr. Mark Vinson's knowledge of the invertebrate fauna of Utah.

Results

Abundance data and taxa richness are reported as the estimated number of individuals per square meter for quantitative samples and the number per sample for qualitative samples. NC = Not calculated. * = unable to calculate. EPT = totals for the insect orders, Ephemeroptera, Plecoptera, Trichoptera. QL = qualitative sample.

Station ID	Sampling date	Sample ID	Total taxa richness	Total abundance	Number of families	Dominant family	% contribution dominant family
SIXRIVERS3	7/11/2006	127375	371	299	29	Heptageniidae	26.42
SIXRIVERS3	7/11/2006	127376	403	348	29	Leptophlebiidae	19.85
SIXRIVERS1	7/12/2006	127377	151	133	19	Heptageniidae	31.79
SIXRIVERS1	7/12/2006	127378	270	237	25	Leptophlebiidae	22.22
SIXRIVERS3	7/12/2006	127379	484	438	28	Leptophlebiidae	14.67
SIXRIVERS3	7/12/2006	127380	260	243	20	Heptageniidae	28.08
Mean			323	283	25		22.18

Diversity indices

Station ID	Sampling date	Sample ID	Total taxa richness	EPT taxa richness	Shannon diversity index	Simpson diversity index	Evenness
SIXRIVERS3	7/11/2006	127375	55	38	3.192	0.078	0.509
SIXRIVERS3	7/11/2006	127376	56	38	3.231	0.074	0.515
SIXRIVERS1	7/12/2006	127377	32	25	2.803	0.108	0.535
SIXRIVERS1	7/12/2006	127378	48	35	3.170	0.069	0.593
SIXRIVERS3	7/12/2006	127379	57	36	3.300	0.055	0.655
SIXRIVERS3	7/12/2006	127380	43	33	3.018	0.0800	0.594
Mean			48.5	34.2	3.119	0.077	0.567

Biotic Indices

			Hilsenhoff Biotic Index		USFS Community Tolerance Quotient			
Station ID	Sampling date	Sample ID	Index	Indication	CTQp	CTQd	BCI	Indication
SIXRIVERS3	7/11/2006	127375	2.70	Slight organic enrichment	50	44	114	Excellent
SIXRIVERS3	7/11/2006	127376	2.21	Slight organic enrichment	50	44	114	Excellent
SIXRIVERS1	7/12/2006	127377	2.69	Slight organic enrichment	50	39	128	Excellent
SIXRIVERS1	7/12/2006	127378	2.33	Slight organic enrichment	50	41	122	Excellent
SIXRIVERS3	7/12/2006	127379	1.90	Little organic enrichment	50	36	139	Excellent
SIXRIVERS3	7/12/2006	127380	2.51	Slight organic enrichment	50	31	161	Excellent
Mean			2.39		50	39	128	Excellent

Taxa richness and relative abundance values with respect to tolerance or intolerance to pollution were based on the Hilsenhoff Biotic Index (HBI). Intolerant taxa are those taxa given a HBI score of 0, 1, or 2. Tolerant taxa are those taxa given a HBI score of 8, 9, or 10. Data are presented as the estimated number per sample.

			Intolerant taxa				Tolerant taxa			
Station ID	Sampling date	Sample ID	Richness		Abundance		Richness		Abundance	
SIXRIVERS3	7/11/2006	127375	24	(44)	138	(37)	1	(2)	15	(4)
SIXRIVERS3	7/11/2006	127376	26	(46)	205	(51)	1	(2)	10	(2)
SIXRIVERS1	7/12/2006	127377	17	(53)	47	(31)	0	0	0	0
SIXRIVERS1	7/12/2006	127378	24	(50)	131	(49)	0	0	0	0
SIXRIVERS3	7/12/2006	127379	23	(40)	271	(56)	0	0	0	0
SIXRIVERS3	7/12/2006	127380	23	(53)	117	(45)	0	0	0	0
Mean			23	(48)	152	(45)	0	(1)	4	(1)

Functional feeding groups

Taxa richness for each feeding group. The percent of the total is shown in parenthesis.

Station ID	Sampling date	Sample ID	Shredders		Scrapers		Collector-filterers		Collector-gatherers		Predators		Unknown	
SIXRIVERS3	7/11/2006	127375	10	(18)	7	(13)	2	(4)	13	(24)	16	(29)	6	(11)
SIXRIVERS3	7/11/2006	127376	9	(16)	7	(13)	3	(5)	12	(21)	20	(36)	5	(9)
SIXRIVERS1	7/12/2006	127377	4	(13)	4	(13)	3	(9)	6	(19)	10	(31)	4	(13)
SIXRIVERS1	7/12/2006	127378	10	(21)	5	(10)	3	(6)	7	(15)	16	(33)	6	(13)
SIXRIVERS3	7/12/2006	127379	9	(16)	6	(11)	4	(7)	13	(23)	18	(32)	6	(11)
SIXRIVERS3	7/12/2006	127380	9	(21)	4	(9)	3	(7)	11	(26)	10	(23)	5	(12)
Mean			9	(18)	6	(11)	3	(6)	10	(21)	15	(31)	5	(11)

Invertebrate abundance for each feeding group. The percent of the total is shown in parenthesis.

Station ID	Sampling date	Sample ID	Shredders		Scrapers		Collector-filterers		Collector-gatherers		Predators		Unknown	
SIXRIVERS3	7/11/2006	127375	69	(19)	107	(29)	21	(6)	72	(19)	60	(16)	41	(11)
SIXRIVERS3	7/11/2006	127376	92	(23)	75	(19)	16	(4)	120	(30)	67	(17)	33	(8)
SIXRIVERS1	7/12/2006	127377	16	(11)	50	(33)	25	(17)	23	(15)	17	(11)	19	(13)
SIXRIVERS1	7/12/2006	127378	43	(16)	51	(19)	30	(11)	75	(28)	40	(15)	28	(10)
SIXRIVERS3	7/12/2006	127379	106	(22)	64	(13)	49	(10)	144	(30)	82	(17)	35	(7)
SIXRIVERS3	7/12/2006	127380	24	(9)	70	(27)	38	(15)	69	(27)	36	(14)	22	(8)
Mean			58	(18)	70	(22)	30	(9)	84	(26)	50	(16)	30	(9)

The 10 metrics thought to be most responsive to human (induced disturbance (Karr and Chu 1998).

Station ID	Sampling date	Sample ID	Total taxa	Ephemeroptera taxa	Plecoptera taxa	Trichoptera taxa	Long-lived taxa	Intolerant taxa	% tolerant individuals	Clinger taxa	% contribution dominant taxon	% predators
SIXRIVERS3	7/11/2006	127375	55	12	16	10	14	24	4	23	21.8	16.2
SIXRIVERS3	7/11/2006	127376	56	12	13	13	15	26	2.5	31	19.9	16.6
SIXRIVERS1	7/12/2006	127377	32	9	9	7	8	17	0	17	29.1	11.3
SIXRIVERS1	7/12/2006	127378	48	11	13	11	13	24	0	24	16.3	14.8
SIXRIVERS3	7/12/2006	127379	57	11	12	13	13	23	0	26	14.7	16.9
SIXRIVERS3	7/12/2006	127380	43	12	13	8	10	23	0	21	21.2	13.8
Mean			49	11	13	10	12	23	1.3	24	19.3	15.6

List of taxa collected in 6 samples. Samples were collected between 11 July 2006 and 12 July 2006. Count is the total number of individuals identified and retained.

Taxon	Count
Arthropoda	
Arachnida	
Trombidiformes	4
Insecta	
Coleoptera	
Amphizoidae	
Amphizoa lecontei	1
Dytiscidae	2
Agabus	8
Oreodytes	7
Elmidae	
Cheryl barr undescribed	5
Cleptelmis addenda	40
Heterlimnius	10
Lara	15
Narpus	2
Narpus concolor	13
Optioservus quadrimaculatus	6
Hydrophilidae	
Ametor	9
Diptera	
Ceratopogonidae	
Probezzia	1
Chironomidae	
Chironominae	5
Orthocladiinae	7
Tanypodinae	1
Dixidae	
Dixa	4
Empididae	
Oreogeton	6
Pelecorhynchidae	
Glutops	2
Simuliidae	
Prosimulium	20
Simulium	4
Tipulidae	1
Dicranota	11
Hexatoma	9
Ephemeroptera	
Ameletidae	
Ameletus	20
Baetidae	

Taxonomic list, continued.

Taxon	Count
Baetis	52
Diphetor hageni	14
Ephemerellidae	
Caudatella	1
Caudatella edmundsi	4
Caudatella heterocaudata	2
Drunella	1
Drunella coloradensis/flavilinea	32
Drunella pelosa	1
Drunella spinifera	25
Serratella	41
Heptageniidae	1
Cinygma	35
Cinygmula	3
Epeorus	26
Ironodes	304
Rhithrogena	4
Leptophlebiidae	32
Paraleptophlebia	274
Megaloptera	
Corydalidae	1
Orohermes crepusculus	17
Sialidae	
Sialis	1
Odonata	
Coenagrionidae	25
Plecoptera	
Chloroperlidae	12
Kathroperla	9
Sweltsa	68
Leuctridae	57
Moselia infuscata	43
Nemouridae	
Malenka	50
Nemoura	3
Visoka cataractae	22
Zapada	19
Zapada columbiana	1
Peltoperlidae	
Sierraperla cora	20
Soliperla	2
Yoraperla	143
Perlidae	8
Doroneuria baumanni	46

Taxonomic list, continued.

Taxon	Count
Perlodidae	35
Isoperla	1
Pteronarcyidae	
Pteronarcys	1
Pteronarcys princeps	13
Trichoptera	
Apataniidae	
Pedomoecus sierra	3
Brachycentridae	
Micrasema	9
Hydropsychidae	10
Parapsyche almota	17
Parapsyche elsis	82
Lepidostomatidae	
Lepidostoma	3
Limnephilidae	
Ecclisocosmoecus scylla	11
Philopotamidae	8
Dolophilodes	46
Wormaldia	16
Rhyacophilidae	
Rhyacophila	14
Rhyacophila angelita group	1
Rhyacophila betteni group	18
Rhyacophila brunnea/vemna groups	11
Rhyacophila ecosa group	1
Rhyacophila grandis group	3
Rhyacophila hyalinata group	7
Rhyacophila vofixa group	3
Uenoidae	
Neophylax	3
Neophylax occidentis	4
Neothremma	3
Platyhelminthes	
Turbellaria	4
89 Taxa	1939 individuals

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Taxa Lists for Individual Samples 2006

Taxonomic list and abundances of aquatic invertebrates collected 11 July 2006 at station SIXRIVERS3, above/after, Irving Creek, Siskiyou County, California. The sample was collected from multiple habitats using a Kick net. The total area sampled was unspecified. The sample identification number is 127375. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 371 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. Notes - identification to genus or species was not supported because: I - immature organisms, D - damaged organisms, M - poor slide mount, G - gender, U - indistinct characters or distribution, R - retained in our reference collection.

Order	Family	Subfamily/Genus/species	Life Stage	Abundance	Notes
Phylum: Arthropoda					
Class: Arachnida					
Trombidiformes			adult	1	
Class: Insecta					
Coleoptera	Dytiscidae		larvae	1	I
Coleoptera	Elmidae	Cleptelmis addenda	adult	19	
Coleoptera	Elmidae	Heterlimnius	larvae	6	
Coleoptera	Elmidae	Lara	larvae	7	
Coleoptera	Elmidae	Narpus	larvae	1	
Diptera	Chironomidae	Chironominae	larvae	2	
Diptera	Chironomidae	Orthocladiinae	larvae	1	
Diptera	Chironomidae	Tanypodinae	larvae	1	
Diptera	Dixidae	Dixa	larvae	1	
Diptera	Pelecorhynchidae	Glutops	larvae	2	
Diptera	Simuliidae	Prosimulium	larvae	4	
Diptera	Tipulidae	Hexatoma	larvae	2	
Ephemeroptera	Ameletidae	Ameletus	larvae	6	
Ephemeroptera	Baetidae	Baetis	larvae	2	
Ephemeroptera	Baetidae	Diphetor hageni	larvae	3	
Ephemeroptera	Ephemerellidae	Caudatella edmundsi	larvae	3	CHR(3)
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	larvae	3	
Ephemeroptera	Ephemerellidae	Drunella spinifera	larvae	1	
Ephemeroptera	Ephemerellidae	Serratella	larvae	7	I
Ephemeroptera	Heptageniidae	Cinygma	larvae	12	
Ephemeroptera	Heptageniidae	Epeorus	larvae	4	
Ephemeroptera	Heptageniidae	Ironodes	larvae	81	
Ephemeroptera	Heptageniidae	Rhithrogena	larvae	1	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	larvae	41	
Megaloptera	Corydalidae	Orohermes crepusculus	larvae	7	
Megaloptera	Sialidae	Sialis	larvae	1	
Odonata	Coenagrionidae		larvae	15	I
Plecoptera	Chloroperlidae		larvae	2	I
Plecoptera	Chloroperlidae	Kathroperla	larvae	2	
Plecoptera	Chloroperlidae	Sweltsa	larvae	9	
Plecoptera	Leuctridae		larvae	3	I
Plecoptera	Leuctridae	Moselia infuscata	larvae	2	
Plecoptera	Nemouridae	Malenka	larvae	8	
Plecoptera	Nemouridae	Nemoura	larvae	1	
Plecoptera	Nemouridae	Visoka cataractae	larvae	6	
Plecoptera	Nemouridae	Zapada	larvae	6	U
Plecoptera	Peltoperlidae	Sierraperla cora	larvae	5	
Plecoptera	Peltoperlidae	Soliperla	larvae	1	
Plecoptera	Peltoperlidae	Yoraperla	larvae	32	
Plecoptera	Perlidae		larvae	2	I
Plecoptera	Perlidae	Doroneuria baumanni	larvae	6	
Plecoptera	Perlodidae		larvae	8	I
Plecoptera	Pteronarcyidae	Pteronarcys princeps	larvae	5	
Trichoptera	Apataniidae	Pedomoecus sierra	larvae	1	
Trichoptera	Brachycentridae	Micrasema	larvae	2	
Trichoptera	Hydropsychidae	Parapsyche almota	larvae	17	
Trichoptera	Limnephilidae	Ecclisocosmoecus scylla	larvae	2	
Trichoptera	Philopotamidae	Wormaldia	larvae	4	
Trichoptera	Rhyacophilidae	Rhyacophila	larvae	3	I
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	larvae	2	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	larvae	3	
Trichoptera	Uenoidae	Neophylax occidentis	larvae	1	
Trichoptera	Uenoidae	Neothremma	larvae	2	
Phylum: Platyhelminthes					
Class: Turbellaria			adult	1	
Total: 55 taxa				371 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 11 July 2006 at station SIXRIVERS3, below/after, Irving Creek, Siskiyou County, California. The sample was collected from multiple habitats using a Kick net. The total area sampled was unspecified. The sample identification number is 127376. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 403 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. Notes - identification to genus or species was not supported because: I - immature organisms, D - damaged organisms, M - poor slide mount, G - gender, U - indistinct characters or distribution, R - retained in our reference collection.

Order	Family	Subfamily/Genus/species	Life Stage	Abundance	Notes
Phylum: Arthropoda					
Class: Arachnida					
Trombidiformes			adult	2	
Class: Insecta					
Coleoptera	Dytiscidae	Agabus	adult	2	
Coleoptera	Dytiscidae	Oreodytes	adult	2	
Coleoptera	Elmidae	Cleptelmis addenda	adult	12	
Coleoptera	Elmidae	Lara	larvae	2	
Coleoptera	Elmidae	Narpus concolor	adult	3	
Coleoptera	Elmidae	Optioservus quadrimaculatus	adult	6	
Coleoptera	Hydrophilidae	Ametor	adult	2	
Diptera	Chironomidae	Orthocladiinae	larvae	3	
Diptera	Dixidae	Dixa	larvae	2	
Diptera	Empididae	Oreogeton	larvae	1	
Diptera	Simuliidae	Prosimulium	larvae	2	
Diptera	Simuliidae	Simulium	larvae	2	
Diptera	Tipulidae	Dicranota	larvae	1	
Diptera	Tipulidae	Hexatoma	larvae	1	
Ephemeroptera	Ameletidae	Ameletus	larvae	2	
Ephemeroptera	Baetidae	Baetis	larvae	11	
Ephemeroptera	Baetidae	Diphetor hageni	larvae	3	
Ephemeroptera	Ephemerellidae	Caudatella edmundsi	larvae	1	
Ephemeroptera	Ephemerellidae	Caudatella heterocaudata	larvae	2	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	larvae	7	
Ephemeroptera	Ephemerellidae	Drunella spinifera	larvae	9	CHR(3)
Ephemeroptera	Ephemerellidae	Serratella	larvae	10	I
Ephemeroptera	Heptageniidae	Cinygma	larvae	11	
Ephemeroptera	Heptageniidae	Epeorus	larvae	3	
Ephemeroptera	Heptageniidae	Ironodes	larvae	49	CHR(3)
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	larvae	80	
Megaloptera	Corydalidae		larvae	1	I
Odonata	Coenagrionidae		larvae	10	I
Plecoptera	Chloroperlidae		larvae	5	I
Plecoptera	Chloroperlidae	Sweltsa	larvae	8	
Plecoptera	Leuctridae		larvae	7	I
Plecoptera	Leuctridae	Moselia infuscata	larvae	7	
Plecoptera	Nemouridae	Visoka cataractae	larvae	12	
Plecoptera	Nemouridae	Zapada	larvae	9	I
Plecoptera	Peltoperlidae	Sierraperla cora	larvae	1	
Plecoptera	Peltoperlidae	Yoraperla	larvae	44	
Plecoptera	Perlidae		larvae	4	I
Plecoptera	Perlidae	Doroneuria baumanni	larvae	10	
Plecoptera	Perlodidae		larvae	6	I
Plecoptera	Perlodidae	Isoperla	larvae	1	
Plecoptera	Pteronarcyidae	Pteronarcys princeps	larvae	8	
Trichoptera	Apataniidae	Pedomoecus sierra	larvae	2	
Trichoptera	Brachycentridae	Micrasema	larvae	2	
Trichoptera	Hydropsychidae		larvae	5	I
Trichoptera	Hydropsychidae	Parapsyche elsis	larvae	9	
Trichoptera	Limnephilidae	Ecclisocosmoecus scylla	larvae	3	
Trichoptera	Philopotamidae	Dolophilodes	larvae	2	
Trichoptera	Rhyacophilidae	Rhyacophila	larvae	5	I
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	larvae	1	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	larvae	2	
Trichoptera	Rhyacophilidae	Rhyacophila grandis group	larvae	1	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata group	larvae	4	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 127376.

Order	Family	Subfamily/Genus/species	Life Stage	Abundance	Notes
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	larvae	1	
Trichoptera	Uenoidae	Neothremma	larvae	1	
Phylum: Platyhelminthes					
Class: Turbellaria			adult	1	
Total: 56 taxa				403 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 12 July 2006 at station SIXRIVERS1, below/after, Unnamed trib to Irving Creek, Siskiyou County, California. The sample was collected from multiple habitats using a Kick net. The total area sampled was unspecified. The sample identification number is 127377. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 151 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. Notes - identification to genus or species was not supported because: I - immature organisms, D - damaged organisms, M - poor slide mount, G - gender, U - indistinct characters or distribution, R - retained in our reference collection.

Order	Family	Subfamily/Genus/species	Life Stage	Abundance	Notes
Phylum: Arthropoda					
Class: Insecta					
Coleoptera	Amphizoidae	Amphizoa lecontei	adult	1	
Coleoptera	Elmidae	Lara	larvae	2	
Coleoptera	Elmidae	Narpus concolor	adult	3	
Coleoptera	Hydrophilidae	Ametor	adult	4	
Diptera	Simuliidae	Prosimulium	larvae	6	
Diptera	Tipulidae	Hexatoma	larvae	1	
Ephemeroptera	Ameletidae	Ameletus	larvae	2	
Ephemeroptera	Baetidae	Baetis	larvae	1	
Ephemeroptera	Ephemerellidae	Drunella spinifera	larvae	4	
Ephemeroptera	Ephemerellidae	Serratella	larvae	2	I
Ephemeroptera	Heptageniidae		larvae	1	I
Ephemeroptera	Heptageniidae	Cinygmula	larvae	3	
Ephemeroptera	Heptageniidae	Ironodes	larvae	44	
Ephemeroptera	Leptophlebiidae		larvae	5	I
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	larvae	8	
Megaloptera	Corydalidae	Orohermes crepusculus	larvae	1	
Plecoptera	Chloroperlidae		larvae	1	I
Plecoptera	Chloroperlidae	Kathroperla	larvae	1	
Plecoptera	Chloroperlidae	Sweltsa	larvae	1	
Plecoptera	Nemouridae	Malenka	larvae	8	
Plecoptera	Nemouridae	Zapada	larvae	1	U
Plecoptera	Peltoperlidae	Sierraperla cora	larvae	3	
Plecoptera	Peltoperlidae	Yoraperla	larvae	8	
Plecoptera	Peltoperlidae	Yoraperla	larvae	2	
Plecoptera	Perlidae	Doroneuria baumanni	larvae	4	
Plecoptera	Perlodidae		larvae	3	I
Trichoptera	Hydropsychidae	Parapsyche elsis	larvae	13	
Trichoptera	Philopotamidae		larvae	8	
Trichoptera	Philopotamidae	Wormaldia	larvae	4	
Trichoptera	Rhyacophilidae	Rhyacophila	larvae	1	I
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	larvae	3	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	larvae	1	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	larvae	1	
Total: 32 taxa				151	individuals

Taxonomic list and abundances of aquatic invertebrates collected 12 July 2006 at station SIXRIVERS1, above/after, Unnamed trib to Irving Creek, Siskiyou County, California. The sample was collected from multiple habitats using a Kick net. The total area sampled was unspecified. The sample identification number is 127378. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 270 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. Notes - identification to genus or species was not supported because: I - immature organisms, D - damaged organisms, M - poor slide mount, G - gender, U - indistinct characters or distribution, R - retained in our reference collection.

Order	Family	Subfamily/Genus/species	Life Stage	Abundance	Notes
Phylum: Arthropoda					
Class: Insecta					
Coleoptera	Dytiscidae	Agabus	adult	2	
Coleoptera	Dytiscidae	Oreodytes	adult	4	
Coleoptera	Elmidae	Cleptelmis addenda	adult	9	
Coleoptera	Elmidae	Heterlimnius	larvae	2	
Coleoptera	Elmidae	Lara	larvae	2	
Coleoptera	Elmidae	Narpus concolor	adult	2	
Coleoptera	Hydrophilidae	Ametor	adult	1	
Diptera	Empididae	Oreogeton	larvae	2	
Diptera	Simuliidae	Prosimulium	larvae	4	
Diptera	Tipulidae		larvae	1	I
Diptera	Tipulidae	Dicranota	larvae	2	
Diptera	Tipulidae	Hexatoma	larvae	1	
Ephemeroptera	Ameletidae	Ameletus	larvae	2	
Ephemeroptera	Baetidae	Baetis	larvae	5	
Ephemeroptera	Baetidae	Diphetor hageni	larvae	2	
Ephemeroptera	Ephemerellidae	Drunella	larvae	1	I
Ephemeroptera	Ephemerellidae	Drunella spinifera	larvae	1	
Ephemeroptera	Ephemerellidae	Serratella	larvae	3	I
Ephemeroptera	Heptageniidae	Cinygma	larvae	1	
Ephemeroptera	Heptageniidae	Epeorus	larvae	1	
Ephemeroptera	Heptageniidae	Ironodes	larvae	44	
Ephemeroptera	Leptophlebiidae		larvae	18	D
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	larvae	42	
Megaloptera	Corydalidae	Orohermes crepusculus	larvae	1	
Plecoptera	Chloroperlidae		larvae	3	
Plecoptera	Chloroperlidae	Sweltsa	larvae	7	
Plecoptera	Leuctridae		larvae	6	I
Plecoptera	Leuctridae	Moselia infuscata	larvae	8	
Plecoptera	Nemouridae	Malenka	larvae	9	
Plecoptera	Nemouridae	Visoka cataractae	larvae	2	
Plecoptera	Nemouridae	Zapada	larvae	3	U
Plecoptera	Peltoperlidae	Sierraperla cora	larvae	5	
Plecoptera	Peltoperlidae	Yoraperla	larvae	13	
Plecoptera	Perlidae		larvae	2	I
Plecoptera	Perlidae	Doroneuria baumanni	larvae	5	
Plecoptera	Perlodidae		larvae	8	I
Plecoptera	Pteronarcyidae	Pteronarcys	larvae	1	I
Trichoptera	Brachycentridae	Micrasema	larvae	2	
Trichoptera	Hydropsychidae	Parapsyche elsis	larvae	20	
Trichoptera	Limnephilidae	Ecclisocosmoecus scylla	larvae	3	
Trichoptera	Philopotamidae	Dolophilodes	larvae	9	
Trichoptera	Philopotamidae	Wormaldia	larvae	1	
Trichoptera	Rhyacophilidae	Rhyacophila	larvae	1	I
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	larvae	2	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	larvae	2	
Trichoptera	Rhyacophilidae	Rhyacophila ecosa group	larvae	1	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	larvae	1	
Trichoptera	Uenoidae	Neophylax occidentis	larvae	3	
Total: 48 taxa				270 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 12 July 2006 at station SIXRIVERS3, below/after, Irving Creek, Siskiyou County, California. The sample was collected from multiple habitats using a Kick net. The total area sampled was unspecified. The sample identification number is 127379. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 484 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. Notes - identification to genus or species was not supported because: I - immature organisms, D - damaged organisms, M - poor slide mount, G - gender, U - indistinct characters or distribution, R - retained in our reference collection.

Order	Family	Subfamily/Genus/species	Life Stage	Abundance	Notes
Phylum: Arthropoda					
Class: Arachnida					
Trombidiformes			adult	1	
Class: Insecta					
Coleoptera	Dytiscidae		larvae	1	I
Coleoptera	Dytiscidae	Agabus	adult	3	
Coleoptera	Dytiscidae	Oreodytes	adult	1	
Coleoptera	Elmidae	Cheryl Barr Undescribed	adult	4	
Coleoptera	Elmidae	Heterlimnius	larvae	1	
Coleoptera	Elmidae	Lara	larvae	1	
Coleoptera	Elmidae	Narpus	larvae	1	
Coleoptera	Elmidae	Narpus concolor	adult	4	
Coleoptera	Hydrophilidae	Ametor	adult	2	
Diptera	Ceratopogonidae	Probezzia	larvae	1	
Diptera	Chironomidae	Chironominae	larvae	2	
Diptera	Chironomidae	Orthocladiinae	larvae	3	
Diptera	Dixidae	Dixa	larvae	1	
Diptera	Empididae	Oreogeton	larvae	2	
Diptera	Simuliidae	Prosimulium	larvae	1	
Diptera	Simuliidae	Simulium	larvae	2	
Diptera	Tipulidae	Dicranota	larvae	8	
Diptera	Tipulidae	Hexatoma	larvae	4	
Ephemeroptera	Ameletidae	Ameletus	larvae	8	
Ephemeroptera	Baetidae	Baetis	larvae	27	
Ephemeroptera	Baetidae	Diphetor hageni	larvae	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	larvae	16	
Ephemeroptera	Ephemerellidae	Drunella spinifera	larvae	7	
Ephemeroptera	Ephemerellidae	Serratella	larvae	18	
Ephemeroptera	Heptageniidae	Cinygma	larvae	3	
Ephemeroptera	Heptageniidae	Epeorus	larvae	8	
Ephemeroptera	Heptageniidae	Ironodes	larvae	31	
Ephemeroptera	Heptageniidae	Rhithrogena	larvae	3	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	larvae	71	
Megaloptera	Corydalidae	Orohermes crepusculus	larvae	2	
Plecoptera	Chloroperlidae		larvae	1	I
Plecoptera	Chloroperlidae	Kathroperla	larvae	3	
Plecoptera	Chloroperlidae	Sweltsa	larvae	32	
Plecoptera	Leuctridae		larvae	39	I
Plecoptera	Leuctridae	Moselia infuscata	larvae	21	
Plecoptera	Nemouridae	Malenka	larvae	17	
Plecoptera	Nemouridae	Nemoura	larvae	1	
Plecoptera	Nemouridae	Visoka cataractae	larvae	1	
Plecoptera	Peltoperlidae	Sierraperla cora	larvae	1	
Plecoptera	Peltoperlidae	Yoraperla	larvae	37	
Plecoptera	Perlidae	Doroneuria baumanni	larvae	10	
Plecoptera	Perlodidae		larvae	4	I
Trichoptera	Brachycentridae	Micrasema	larvae	2	
Trichoptera	Hydropsychidae		larvae	5	I
Trichoptera	Hydropsychidae	Parapsyche elsis	larvae	25	
Trichoptera	Lepidostomatidae	Lepidostoma	larvae	3	
Trichoptera	Limnephilidae	Ecclisocosmoecus scylla	larvae	3	
Trichoptera	Philopotamidae	Dolophilodes	larvae	13	
Trichoptera	Philopotamidae	Wormaldia	larvae	6	
Trichoptera	Rhyacophilidae	Rhyacophila	larvae	4	I
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	larvae	6	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	larvae	3	
Trichoptera	Rhyacophilidae	Rhyacophila grandis group	larvae	1	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata group	larvae	1	
Trichoptera	Uenoidae	Neophylax	larvae	3	I
Phylum: Platyhelminthes					
Class: Turbellaria			adult	1	
Total: 57 taxa				484 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 12 July 2006 at station SIXRIVERS3, above/after, Irving Creek, Siskiyou County, California. The sample was collected from multiple habitats using a Kick net. The total area sampled was unspecified. The sample identification number is 127380. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 260 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. Notes - identification to genus or species was not supported because: I - immature organisms, D - damaged organisms, M - poor slide mount, G - gender, U - indistinct characters or distribution, R - retained in our reference collection.

Order	Family	Subfamily/Genus/species	Life Stage	Abundance	Notes
Phylum: Arthropoda					
Class: Insecta					
Coleoptera	Dytiscidae	Agabus	adult	1	
Coleoptera	Elmidae	Cheryl Barr Undescribed	adult	1	
Coleoptera	Elmidae	Heterlimnius	larvae	1	
Coleoptera	Elmidae	Lara	larvae	1	
Coleoptera	Elmidae	Narpus concolor	adult	1	
Diptera	Chironomidae	Chironominae	larvae	1	
Diptera	Empididae	Oreogeton	larvae	1	
Diptera	Simuliidae	Prosimulium	larvae	3	
Ephemeroptera	Baetidae	Baetis	larvae	6	
Ephemeroptera	Baetidae	Diphetor hageni	larvae	2	
Ephemeroptera	Ephemerellidae	Caudatella	larvae	1	I
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	larvae	6	
Ephemeroptera	Ephemerellidae	Drunella pelosa	larvae	1	
Ephemeroptera	Ephemerellidae	Drunella spinifera	larvae	3	
Ephemeroptera	Ephemerellidae	Serratella	larvae	1	I
Ephemeroptera	Heptageniidae	Cinygma	larvae	8	
Ephemeroptera	Heptageniidae	Epeorus	larvae	10	
Ephemeroptera	Heptageniidae	Ironodes	larvae	55	
Ephemeroptera	Leptophlebiidae		larvae	9	I
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	larvae	32	
Megaloptera	Corydalidae	Orohermes crepusculus	larvae	6	
Plecoptera	Chloroperlidae	Kathroperla	larvae	3	
Plecoptera	Chloroperlidae	Sweltsa	larvae	11	
Plecoptera	Leuctridae		larvae	2	I
Plecoptera	Leuctridae	Moselia infuscata	larvae	5	
Plecoptera	Nemouridae	Malenka	larvae	8	
Plecoptera	Nemouridae	Nemoura	larvae	1	
Plecoptera	Nemouridae	Visoka cataractae	larvae	1	
Plecoptera	Nemouridae	Zapada columbiana	larvae	1	
Plecoptera	Peltoperlidae	Sierraperla cora	larvae	5	
Plecoptera	Peltoperlidae	Soliperla	larvae	1	
Plecoptera	Peltoperlidae	Yoraperla	larvae	7	
Plecoptera	Perlidae	Doroneuria baumanni	larvae	11	
Plecoptera	Perlodidae		larvae	6	I
Trichoptera	Brachycentridae	Micrasema	larvae	1	
Trichoptera	Hydropsychidae	Parapsyche elsis	larvae	15	
Trichoptera	Philopotamidae	Dolophilodes	larvae	22	
Trichoptera	Philopotamidae	Wormaldia	larvae	1	
Trichoptera	Rhyacophilidae	Rhyacophila angelita group	larvae	1	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	larvae	4	
Trichoptera	Rhyacophilidae	Rhyacophila grandis group	larvae	1	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata group	larvae	2	
Phylum: Platyhelminthes					
Class: Turbellaria			adult	1	
Total: 43 taxa				260	individuals