APPENDIX D

Analysis of the Effects of Rotenone on Aquatic Invertebrates

APPENDIX D ERRATA SHEET

This technical report was prepared for the Humboldt-Toiyabe National Forest. This errata sheet only addresses the technical corrections to the report as a result of the public comments, the agency review process, and conversions with report authors.

Technical corrections to the *An Analysis of the Effects of Rotenone on Aquatic Invertebrate Assemblages in the Silver King Creek Basin, California*, include:

Correction of text in Appendix 12, pages 109-191, which incorrectly states that "Abundance data are presented as the estimated number of individuals per square meter". Corrected text is "Abundance data are presented as the estimated number of individuals per 0.279 square meters". Please note, to estimate the number of individuals per square meter, multiply abundance figures for taxa by 3.58.

AN ANALYSIS OF THE EFFECTS OF ROTENONE ON AQUATIC INVERTEBRATE ASSEMBLAGES IN THE SILVER KING CREEK BASIN, CALIFORNIA

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SUMMARY

Piscicides, namely rotenone and antimycin, have been used for more than 70 years to manage fish populations by eradicating undesirable fish species. Piscicides are intended to eradicate fish, but they are also toxic to other aquatic biota, such as aquatic invertebrates and amphibians. The impact on aquatic invertebrates is a concern because of their intrinsic values, their role in aquatic ecosystem processes and their importance as a food source for fish. The objectives of this report were to review literature on the impacts of rotenone on invertebrate assemblages, evaluate a large data set of historically collected and more recently collected aquatic invertebrate samples from the Silver King Creek Basin, Alpine County, California, and provide recommendations for sampling aquatic invertebrates prior to and after a proposed rotenone treatment in the Silver King Creek Basin that would allow for a robust assessment of the effects of this treatment on aquatic invertebrate assemblages.

Literature Review

In a review of the effects of rotenone treatments on stream invertebrates we found that overall, there have been too few published studies (ca. < 25 published studies since the 1930s) and of there was too little comparability among studies with respect to rotenone treatments and aquatic invertebrate data collection efforts to allow for any sweeping statements on the overall effects of rotenone on aquatic invertebrate assemblages in streams. Variation among treatment effects appeared related to differences in rotenone concentrations and treatment durations, physical and chemical characteristics among water bodies and the intensity of pre- and post-treatment sampling. In particular, the lack of collection of a sufficient amount of data on aquatic invertebrate assemblages prior to treatment prevents us from understanding the true effects of rotenone treatments on invertebrate assemblages. For streams, no studies have done an adequate job of describing pre-treatment assemblages. The studies we reviewed generally reported changes in the entire invertebrate assemblage, such as total taxa richness or abundance. With the exception of a few studies there has been little

reporting on the impacts of piscicides on individual invertebrate taxon or the recovery rates of individual taxon, especially rare species.

Rotenone treatments appear to act on aquatic invertebrate assemblages like a severe pulse physical disturbance. Scientific reviews of the recovery of aquatic invertebrate assemblages following pulse disturbances have suggested that impacts and recovery times appear most influenced by: 1) persistence of the impact, including the degree of change in system productivity, habitat integrity, and persistence of the stressor; 2) the relative magnitude and timing of natural disturbance regimes, 3) life history characteristics of the organisms, including generation time and propensity to disperse; 4) time of year the disturbance occurs in relation to organism life history development; 5) presence of refugia; and 6) distance to a recolonization source. These results suggest that rotenone impacts may be greatest in streams with lower frequencies of disturbance or predictable discharge patterns. Recovery will also likely be longer in streams where long reaches are treated. Increasing the distance to colonization sources will reduce the ability of species to colonize the treated reach. Treatment effects will have greater impacts if they occur during critical life stages or if they occur in the fall when lower winter drift rates and lack of winter reproduction will delay recovery until the following spring, particularly if the site will be dependent on downstream drift of larvae for recolonization.

Aquatic invertebrates have a wide range of sensitivity to rotenone with 96 hr LC50 values ranging from 0.002 to 100 ppm. A review of published laboratory toxicity tests showed the following general results: 1) there has been little rotenone toxicity work done on stream dwelling aquatic invertebrates, 2) there is a wide range of sensitivity both within and among taxonomic divisions, 3) benthic invertebrates appear less sensitive than planktonic invertebrates, 4) smaller invertebrates appear more sensitive than larger invertebrates, 5) aquatic invertebrates that use gills to extract aqueous oxygen appear more sensitive than invertebrates that acquire aqueous oxygen cutaneously, or through lamellae or spiracles, make use of respiratory pigments, or that can breathe atmospheric oxygen, 6) mortality was typically near 100% for rotenone

formulation concentrations > 1 to 1.5 ppm for lotic invertebrates and > 3 ppm for many lentic or aquatic adult insect taxa (e.g., Heteroptera, Coleoptera) depending on the exposure time.

In relation to potential impacts of rotenone treatments in Silver King Creek, the available literature on rotenone impacts and disturbance ecology of aquatic invertebrates suggests that rotenone impacts to invertebrates would be initially high as rotenone effects appear to be greatest in mountain streams characterized by snowmelt dominated hydrologic regimes, cold water, and high oxygen levels, as these streams are characteristically dominated by small gilled invertebrates, namely Ephemeroptera, Plecoptera, and Trichoptera, that are not adapted to low-flow (late summer/fall/winter) disturbances. The results of three longer-term more intensively sampled studies in mountain streams suggest that common taxa will quickly recolonize treated areas and rarer taxa may be eradicated for a number of years or potentially forever. The ability of taxa to recolonize treated areas appears to be a function of treatment mortality levels, overall population sizes within the treated basin, upstream and local habitat conditions, and the dispersal abilities of individual taxon, so leaving upstream areas untreated would enhance recolonization.

Observed impacts of rotenone at Silver King Creek

The effects of previous rotenone treatments on aquatic invertebrate assemblages in the Silver King Creek Basin have been evaluated by the U.S. Forest Service and the California Department of Fish and Game. These past analyses, the analyses presented here, and future assessments of the effects on rotenone on aquatic biota in the Silver King Creek Basin are all hampered by the long history of rotenone treatments in the basin and the lack of data on aquatic invertebrate assemblages prior to the use of rotenone. Rotenone treatments first occurred in the basin in 1964. The earliest data available on aquatic invertebrate assemblages appears to be from 1984. No data on the aquatic invertebrates present before rotenone treatments are available to definitively measure changes that occurred following rotenone treatments in the basin in 1964, 1976, 1977, 1987, 1988, 1991, 1992, and 1993. Aquatic invertebrate samples were

collected in the basin at six locations in 1984, 1987, 1991, 1992, 1993, 1994, 1995, and 1996, as well as several other locations during some of these years. All of these samples were processed by the USFS Aquatic Ecosystem Laboratory, Provo, Utah. Between 2003 and 2006 aquatic invertebrate samples were collected at 14 new sampling locations within the basin. These samples were all processed by the BLM National Aquatic Monitoring Center located at Utah State University. For all years the samples were collected similarly. Laboratory methods were generally similar, but the comparability between the two laboratories could not be quantified as none of the historic samples were available for comparison.

For each of the two aquatic invertebrate assemblage data sets, historic (1984 to 1996) and recent (2003 to 2006), we evaluated the following topics:

1. Differences in total genera richness, genera richness within dominant insect orders, and total assemblage abundance between sites that had been treated with rotenone and untreated sites.
2. Annual variation in total genera richness, genera richness within dominant insect orders, and total assemblage abundance.
3. Variation in total genera richness, genera richness within dominant insect orders, and total assemblage abundance among sampling locations.
4. Rarity of aquatic invertebrate genera within and among years.
5. Comparisons between historic and recent data.

For the historically collected data we found:

1. There were few measureable differences in mean aquatic invertebrate assemblage measures between sites that were treated with rotenone and two sites that were not treated. The only statistically significant difference between treatment and control sites was in the abundance of Coleoptera collected. Mean Coleoptera abundance was twice as high in control as compared to treatment sites. Two genera were collected at untreated sites that were not collected at treated sites; *Ephron* (Ephemeroptera: Polymatarcyidae) and *Dolophilodes* (Trichoptera: Philopotamidae). Twenty-seven genera were collected at treated

sites that were not collected at untreated sites; however, the sampling effort was much greater at treated sites as about four times as many individuals were collected at treated sites as compared to untreated sites. These results were similar to that found by Trumbo et al. (2000) in their more thorough analyses of these data. The large discrepancy among the number of samples and invertebrates collected in treated and untreated reaches made interpretations between the two data sets difficult.

2. Several mean aquatic invertebrate assemblage measures varied significantly among years, but no values were consistently higher or lower for any particular year, though the majority of values were higher for samples collected in the 1990s than they were for samples collected in the 1980s.
3. There were few measureable differences in mean aquatic invertebrate assemblage measures among sampling locations. Variation in all measures was high. Samples collected in Four Mile Canyon Creek, which was never treated with rotenone, were no less variable than those collected in rotenone treated reaches of Silver King Creek and in rotenone treated tributaries.
4. Rarity of individual taxa in treated and untreated sites appeared similar and based on relative abundances and occurrences in individual years and sites most taxa can be considered uncommon or rare.

For the recently collected data we found:

1. There were few measureable differences in mean aquatic invertebrate assemblage measures between sites that were treated with rotenone and the two sites that were not treated for samples collected 10 years after the last rotenone treatment in 1993. The only statistically significant difference between treatment and control sites was the mean number of Coleoptera genera and the mean abundance of Coleoptera collected. Coleoptera, primarily Elmidae, were taxonomically richer and more abundant at treatment sites. Five genera were not collected at treated sites that were collected at untreated sites; *Clinocera* (Diptera: Empididae), *Oreogeton* (Diptera: Empididae), *Pedicia* (Diptera: Tipulidae), *Moselia* (Plecoptea: Leuctridae), and *Kogotus* (Plecoptera:

Pelodidae). Forty-three genera were collected at treated sites that were not collected at untreated sites; however, the sampling effort was much greater at treated sites as nearly eight times as many individuals were collected at treated sites as compared to untreated sites. There was a strong relationship between all measures of biodiversity and organism abundance. The more samples or individuals that are collected greater increases the likelihood of capturing additional taxa. There were no differences in the mean number of taxa or genera collected at treated as compared to untreated sites.

2. Several mean aquatic invertebrate assemblage measures (6 of 15 measures) varied significantly among years. Many values were highest in 2004 and minimum values occurred in all years for different measures.
3. Four of the 15 measures varied significantly among sampling sites. All measures that were significantly different were highest in tributary streams. No measures were highest at untreated sites.
4. The majority of taxa collected between 2003 and 2006 could be considered uncommon or rare. The mean number of rare taxa collected each year was similar among years and averaged about 50% of the total taxa richness.
5. Specific comparisons between historic and recent samples to assess the long-term effects of rotenone on aquatic invertebrate assemblages in Silver King Creek were not possible because samples were not collected from the same locations during the two study periods and methodological differences between the two laboratories could not be quantified. In general terms, we did not detect a strong impact of rotenone on aquatic invertebrate assemblages in Silver King Creek based on sampling conducted since 1984. The biodiversity of aquatic invertebrate assemblages was consistently higher in recent as compared to historic samples. Recent samples had on average 9% percent more families, 30% more genera, 3% more Ephemeroptera genera, 53% more Plecoptera taxa, 42% more Trichoptera genera, 165% more Coleoptera genera, and 25% more Diptera genera than historic samples. The difference in mean total invertebrate abundance between the two sample sets was 2% greater in recent samples. The abundance of Ephemeroptera , Plecoptera, and Trichoptera (EPT) was 56%

higher in recent samples. Elmidae (Coleoptera) abundances were 21% higher in historic samples and Elmidae genera was 165% higher in recent samples. The cause of consistently higher richness in recent as compared to historic samples is not clear. The two most likely causes are improving biological conditions since the 1990s and differences in laboratory procedures between the two data sets. Evidence for improving biological conditions includes the elimination of rotenone treatments since 1993 and the elimination of livestock grazing in the Silver King Creek basin since 1996. None of the aquatic invertebrate samples remain from the historic samples, so differences due to differences in laboratory procedures, such as the number of organisms identified and taxonomic resolution cannot be evaluated.

Future study plan recommendations

A study design to detect impacts of planned rotenone treatments can take many forms depending on the level of impact that you want to detect. While the overall question may simply be, “what is the effect of rotenone on aquatic invertebrate assemblages?”, the specifics of this question need to be addressed to understand the intensity of sampling required to measure the proposed impact. Will “before-after” comparisons be done with assemblage level measures only, such as total abundance, total taxa, or genera richness, or will comparisons in community composition and species or genera occurrences be evaluated as well? The specifics on where, when, how, how often, and for how long samples will be collected is dependent on knowing to the degree to which species or genera level data will be evaluated. The degree to which these data can be evaluated is also dependent on how much sampling will occur before the treatment to provide an accurate or reasonable level of information on the occurrences of taxa in the treatment area. These decisions should be made prior to conducting future sampling.

The current aquatic invertebrate sampling program in the Silver King Creek Basin can be improved by sampling a stream similar to Silver King Creek with respect to major environmental influences on aquatic invertebrate assemblages, as no pre-rotenone data on aquatic invertebrate assemblages exists for Silver King Creek. The program should

also take advantage of recent predictive models that have been developed to estimate the site specific probability of collecting invertebrate taxa in Sierra Nevada streams based on a set of geographical based predictor variables.

The current sampling stations in the basin should be spread out to provide greater coverage within the basin. Consideration should be given to restoring long-term sampling sites that were historically sampled on Fly Valley Creek, Four Mile Creek, Bull Canyon Creek, and at the Silver King Creek historic sites located upstream from the sites presently sampled (Sites S5:725, S6738, S7:775, and S8:813). An equal number of control and treatment sites should be sampled for an equal period of time before and after treatment. A problem with evaluating much of the data collected to date is that vastly more samples and individuals were collected at treatment sites as compared to control sites. Taxa occurrences are highly dependent on the number of samples and individuals collected. At present, the sampling methods, annual or seasonal timing of sampling, and the duration of sampling cannot be adequately evaluated until the study design objectives are more explicitly stated.

INTRODUCTION

Piscicides, namely rotenone and antimycin, have been used for more than 70 years to manage fish populations by eradicating undesirable fish species (McClay 2000). While piscicides are intended to eradicate fish, they are also toxic to other aquatic biota, such as aquatic macroinvertebrates and amphibians. The impact on aquatic macroinvertebrates is a concern because of their intrinsic values, their role in aquatic ecosystem processes and their importance as a food source for fish. The impact to macroinvertebrate assemblages has become such a contentious issue that recent fish restoration projects using piscicides have received court ordered injunctions until issues surrounding impacts to macroinvertebrate assemblages could be addressed. The objectives of this report were to review the impacts of rotenone on invertebrate assemblages, evaluate a large data set of historically collected and more recently collected aquatic invertebrate samples from the Silver King Creek Basin, Alpine County, California, and provide recommendations for sampling aquatic invertebrates prior to and after a proposed rotenone treatment in the Silver King Creek Basin that would allow for a robust assessment of the effects of this treatment on aquatic invertebrate assemblages.

The two most commonly used piscicides are antimycin and rotenone. Antimycin is a fungicide produced by actinomycetes. Antimycin inhibits oxygen metabolism by disrupting electron transport. Antimycin is a widely used piscicide. Fish cannot detect antimycin and the effects on fish are not reversible. Most fishes are killed by concentrations of 20 ug/L or less. The effects of antimycin on aquatic invertebrates were recently reviewed by Cerreto (2004). He concluded that there was substantial variation in the effects of antimycin on aquatic invertebrate assemblages. Overall, there was little standardization in the way effects on aquatic invertebrate assemblages were measured, with respect to the amount of pre- and post-treatment data collected and the number and location of samples collected.

Rotenone is a naturally occurring compound found in many plants within the family Leguminosae. It kills fish and other aquatic organisms by inhibiting respiration at the cellular level (Horgan et al. 1968). Concentrations of 0.1 to 0.5 ppm of 5% rotenone (1 ppm rotenone formulation or 50 ppb rotenone formulation) have been most often used in lakes and rivers. In this report, unless otherwise specified rotenone formulation concentrations were presented as ppm of 5% rotenone formulation. Where possible, in data tables rotenone concentration formulations were also standardized to ppm of rotenone, e.g., 5 mg/L of 5% rotenone solution = 0.25 ppm active rotenone.

LITERATURE REVIEW

In spite of its widespread use, little specific information is known on the effects of rotenone on non-target organisms, particularly in rivers. Older literature on the effects of rotenone is pretty evenly split between studies that generally reported that rotenone treatments did not significantly affect invertebrates, usually referred to as fish food organisms (M'Goinigle and Smith 1938, Leonard 1939, Smith 1940, Brown and Ball 1943, Ball and Hayne 1952, Pintler and Johnson 1958, Zilliox and Pfeiffer 1960, Prevost 1960, and Cook and Moore 1969) and studies that found rotenone to be highly toxic to aquatic invertebrates (Davidson 1930, Ginsburg 1933, Scheuring and Heuschman 1935, Felton 1940, Cutkomp 1943, Zischkale 1952, Rudd and Genelly 1956, Lindgren 1960, Das and McIntosh 1961, Wollitz 1962, and Binns 1967). The cause of these different findings is not entirely clear, but often appears to be related to the study objective. Studies that sought to measure the effects on aquatic invertebrates in terms of fish food availability (invertebrate assemblage abundances or biomass) generally found quick recovery in these measures, whereas studies that sought to look at rotenone effects on individual invertebrate species generally found greater effects. More recent literature (Koksvik and Aagaard 1984, Rach et al. 1988, Dudgeon 1990, Reinertsen et al. 1990, Beal and Anderson 1993, Mangum and Madrigal 1999, and Melaas et al. 2001) have generally reported immediate eradication of invertebrates, quick recovery of abundances of common taxa, and longer-term recovery times for rarer

taxa. The effects of differences in habitat types, such as high elevation mountain streams versus low elevation rivers have not been evaluated.

Laboratory Studies

Aquatic invertebrates have a wide range of sensitivity to rotenone with 96 hr LC50 values ranging from 0.002 to 100 ppm (Pesticide Management Education Program 2007). A review of published laboratory toxicity tests (Appendix 1) showed several general results: 1) there has been little rotenone toxicity work done on stream dwelling aquatic invertebrates, 2) there is a wide range of sensitivity both within and among taxonomic divisions (Figure 1, Appendix 1), 3) benthic invertebrates appear less sensitive than planktonic invertebrates, 4) smaller invertebrates appear more sensitive than larger invertebrates, 5) aquatic invertebrates that use gills to extract aqueous oxygen appear more sensitive than invertebrates that acquire aqueous oxygen cutaneously, through lamellae or spiracles, use respiratory pigments, or that can breathe atmospheric oxygen, 6) mortality was typically near 100% for rotenone formulation concentrations >1 to 1.5 ppm for stream invertebrates and for formulation concentrations >3 ppm for lentic invertebrates depending on the exposure time. The maximum solubility of rotenone in water is 0.20 mg/L, so concentrations > 4 mg/L of 5% rotenone formulation are likely not to increase soluble rotenone concentrations or reflect increasing sensitivity to rotenone (Finlayson, personal communication June 2007).

The following results are pertinent to Silver King Creek and other mountain cold water streams. Lethal doses for Chironomidae (Diptera) have varied from about 0.3 to 1 ppm (Zischkale 1952, Lindgren 1960). Hamilton (1941) found that lethal concentrations were 2 ppm for leeches (Annelida: Hirudinea) and 10 ppm for Amphipoda. Ruck (1966) reported 100% mortality for unspecified dragonflies (Odonata: Anisoptera) at 5.3 ppm, for Isopoda at 1.5 ppm, for Amphipoda at 2.5 ppm, and for crayfish (Decapoda) at 3.0 ppm rotenone. Based on laboratory toxicity tests, Engstom-Heg et al. (1978) reported that few immature aquatic insects could survive a 48 hour exposure to 3 ppm rotenone. Chandler and Marking (1982) reported lower sensitivity than many other studies for the invertebrates they evaluated. LC50 values for 24 hour exposures were 3.6 ppm for

Gyrinus (Coleoptera: Gyrinidae), 3.4 ppm for *Notonecta* (Coleoptera: Notonectidae), and 4.7 ppm for *Macromia* (Odonata: Macromiidae, Chandler and Marking 1982). These three genera are all relatively large and two of them breathe atmospheric air. Aquatic insects that breathe atmospheric air appear to have higher resistance to rotenone than aqueous air breathers (Engstom-Heg et al. 1978).

Data on rotenone toxicity for invertebrates known to occur in Silver King Creek was available for several taxa. *Tipula* (Diptera: Tipulidae) were unaffected by 1 ppm rotenone over 96 hours (Leonard 1939). Lindgren (1960) reported *Hydropsyche* (Trichoptera: Hydropsychidae) suffered 30% mortality at 1 ppm rotenone over 24 hours and Chandler and Marking (1982) reported LC50s of 10.7, 8.0, 3.6, and 0.6 ppm rotenone for 1, 3, 6, and 96 hour trials. Engstom-Heg et al. (1978) evaluated the toxicity of rotenone to several taxa that occur in Silver King Creek. Taxa with low tolerance of rotenone included *Baetis* (Ephemeroptera: Baetidae), Perlidae (Plecoptera), Perlodidae (Plecoptera), *Rhyacophila* (Trichoptera), *Psychomyia* (Trichoptera: Psychomyiidae), and Simuliidae (Diptera). Taxa with intermediate tolerance to rotenone included *Ephemerella* (Ephemeroptera: Ephemerellidae), Heptageniidae (Ephemeroptera), Chloroperlidae (Plecoptera), Philopotamidae (Trichoptera), Limnephilidae (Trichoptera), Antocha, and Chironomidae (Diptera). Taxa with high tolerance to rotenone included *Paraleptophlebia* (Ephemeroptera: Leptophlebiidae) Elmidae (Coleoptera), *Pteronarcys* (Plecoptera), Corydalidae (Megaloptera), *Glossosoma* (Trichoptera: Glossosomatidae), *Hydropsyche* (Trichoptera), *Cheumatopsyche* (Trichoptera), and Odontoceridae (Trichoptera). Tolerances were described in terms of rotenone exposure in ppm hours. Low tolerance was in the range of 1 to 6 ppm hours, intermediate tolerance was in the range of 6 to 16 ppm hours, and high tolerance was in the range of 16 to 24 ppm hours.

The results of laboratory studies published to date appear most useful for accessing the general rather than the specific toxicity of rotenone to invertebrates. As compared to field evaluations, laboratory studies may stress invertebrates and the natural dilution of rotenone in the environment is minimized. Also, in many of the earlier laboratory studies, rotenone formulation concentrations were not confirmed (i.e., not measured)

and the exposure duration often was much longer than that used in field applications (B. Finlayson, personal communication June 2007).

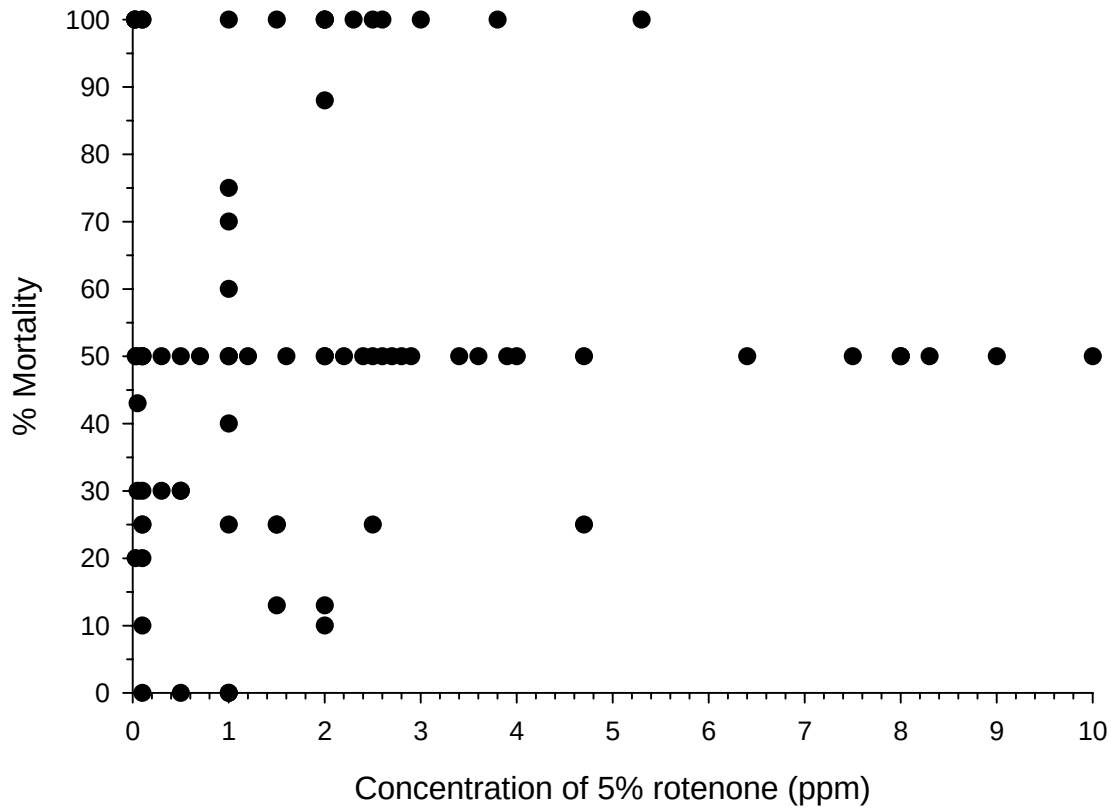

Figure 1. Toxicity of rotenone to aquatic invertebrates based on several laboratory studies. Data are provided in Appendix 1.

Field Studies

A total of 20 published field studies were evaluated as to the effects of rotenone treatments on aquatic invertebrate assemblages (Tables 1 and 2). Eleven studies were conducted in lentic systems (lakes, reservoirs, ponds, and wetlands, Table 1) and nine studies were conducted in lotic systems (rivers and streams, Table 2). The concentration of rotenone and the duration of the rotenone treatment varied widely among studies. Low level concentrations were 0.25 to 1 ppm and higher level concentrations were 3 to 5 ppm. Not all studies provided information on the concentration of rotenone used.

Lentic Studies

The effects of rotenone on invertebrates in lentic habitats have been studied since the 1940s (Table 1). Overall, the impact of rotenone on lentic invertebrates appeared to be highly variable. This variation is related to differences in the toxicity of rotenone among water bodies in response to light, oxygen, alkali, temperature, and turbidity of the water (Almquist 1959), e.g., toxicity is higher in low pH waters (Oberg 1956, cited in Almquist 1959). Some of the variation in reported effects may also be due to the intensity of pre- and post-treatment sampling. Sampling intensity varied from a single pre-treatment sample to more than a year of pre-treatment sampling. Post-treatment sampling varied from a single post-treatment sampling to up to 4 years of post-treatment sampling. Reported impacts were generally less for studies that conducted less sampling.

Short-term Impacts

More studies reported the effects on zooplankton assemblages than the effects on benthic organisms. Most studies reported that zooplankton assemblages were reduced in both number and diversity, with more studies reporting on changes in organism abundance than changes in species composition. Brown and Ball (1943) reported that 0.5 ppm killed the majority of zooplankton. Dragonflies (Odonota), leeches (Annelida: Hirudinea) and *Charoborus* (Diptera: Chaobrdiae) were affected less, but were still seriously affected. Cushing and Olive (1957) reported that 1 ppm of rotenone killed the majority of Chironomidae. Almquist (1959) concluded that most zooplankton and epiphytic and benthic organisms were killed by 0.5 to 0.6 ppm rotenone. Kiser et al. (1963) found that a 0.5 ppm treatment killed all zooplankton within 2 days. Anderson (1970) reported that 0.75 ppm rotenone reduced crustacean zooplankton densities to < 5% of pretreatment levels within 24 hours and no crustaceans were present 1 month after the treatment. In a study of benthic organisms, Koksvik and Aagaard (1984) found that 0.5 ppm rotenone caused only a negligible difference in total benthic invertebrate biomass between pre- and post-treatment samples, but the effects on Chironomidae (Diptera) species were considerable. Reinertsen et al. (1990) found similar zooplankton biomass after a 0.5 ppm rotenone treatment to that measured before the treatment, but

abundances of individual species were significantly different after the treatment. Beal and Anderson (1993) found that no viable zooplankton were found in a small pond 48 hours following a treatment with 0.06 ppm of 2.5% rotenone. Melaas et al. (2001) reported on the effects of a 3 ppm rotenone treatment on wetland zooplankton and benthic invertebrates. The greatest short- and long-term declines were observed in zooplankton abundance. Effects on benthic invertebrates were less. Only abundances of Chaoborus and Hirudinoidea were significantly lower than pre-treatement levels after 3 weeks and no benthic taxa abundances were significantly different after 1 year.

Assemblage Recovery

Recovery of zooplankton assemblages following rotenone treatments was most often reported in terms of organism abundance. The rate of recovery to pre-treatment population sizes ranged from 1 month to 3 years. Brown and Ball (1943) found that Copepoda recovered to pre-treatment levels within a month and Cladocerans recovered within 5 weeks. Kiser et al. (1963) reported that all 42 species collected before a treatment that killed all zooplankton were present within 5 months. Anderson (1970) found that crustacean zooplankton were absent from two Alberta Lakes for 6 months following rotenone treatment, whereas rotifers never completely disappeared. All but one crustacean species returned to pre-treatment population numbers within about 3 years. Beal and Anderson (1993) reported that recovery began with Copepoda within a month of treatment, Cladocera within about 6 months and full recovery to pre-treatment levels occurred within 8 months. Melaas et al. (2001) reported complete recovery of a prairie wetland zooplankton and benthic invertebrate assemblages within 1 year of treatment.

Table 1. Field studies on the effects of rotenone on lentic invertebrates.

Location	Study Year	Rotenone Concentration	Pre-treatment Sampling	Post-treatment Sampling	Observed Change in Aquatic Invertebrate Assemblages	Citation
Third Sister Lake, MI	1943	0.5 ppm		Bimonthly		Brown & Ball 1943
Reservoir 4 & Smith Lake, CO	1954	1 mg/L 5% rotenone solution = 0.5 ppm	4 Ekman dredge samples, 2 weeks prior	Biweekly Ekman dredge samples for 1 yr	Few negative effects to Chironomidae	Cushing & Olive 1957
Salbo & Holm Lakes, Sweden	1958 1956	0.5 – 0.6 mg/L 5% rotenone solution = 0.25 – 0.3 ppm	Immediately prior	Immediately after	Most zooplankton & benthic fauna were killed	Almquist 1959
Fern Lake, WA	1960	0.5 mg/L 5% rotenone solution = 0.25 ppm	Biweekly for 2 yrs prior	Frequently for 6 months after	Complete zooplankton assemblage kill 2 days after; all 42 species found before treatment found within 5 months	Kiser et al. 1963
Patricia & Celestine Lakes, Alberta, Canada	1966	0.75 mg/L 5% rotenone solution = 0.4 ppm	1 sample 2 months prior	3 yrs after	Near complete recovery in 3 yrs	Anderson 1970
Lake Haugatjern, Norway	1980	0.5 mg/L 5% rotenone solution = 0.25 ppm	7 samples 1 yr prior	3 yrs & 4 yrs after	Small effect on zooplankton species composition & biomass	Reinertsen et al. 1990
Lake Haugatjern, Norway	1980	0.5 mg/L 5% rotenone solution = 0.25 ppm	Monthly, 6 months prior	Seasonal, 2 yrs	Little change overall in benthic assemblages, except to Chironomidae fauna, *Chironomus* in particular	Koksvik & Aagaard 1984
Lake Christina, MN	1987	3 mg/L 5% rotenone solution = 0.15 ppm	Seasonal 2 yrs prior	Seasonal 3 yrs	Large change in zooplankton assemblages attributed to change in fish assemblage	Hason & Butler 1994
Golf Course Ponds, IL	1991	0.6 mg/L 2.5% rotenone solution = 0.15 ppm	15 min. prior	6 months	Full recovery in 6-8 months	Beal & Anderson 1993
Unnamed Pond, MN	1998	3 mg/L 5% rotenone solution = 0.15 ppm	2 samples 6 months Prior	1 yr	Large short-term effect on zooplankton, no effect after 1 yr	Melaas et al. 2001
Lake Davis, CA	2006	Estimated to be 2 mg/L 5% rotenone solution = 0.1 ppm	3 months & 18 days prior	1 week, 9 months & 22 months after	Zooplankton abundance decreased 57% after & was 58% & 61% lower after 1 & 2 yrs. Taxa richness not affected	CA Fish & Game 2006

Lotic studies

The impacts of piscicides on aquatic invertebrates in rivers have been studied since the 1960s. The majority of these studies have been of short duration with little or no pre-treatment sampling and a year or less of post-treatment sampling (Binns 1967, Cook and Moore 1969, Koksvik and Aagaard 1984, Dudgeon 1990, Mangum and Madrigal 1999, Whelan 2002). Among the river studies we evaluated, three studies collected no pre-treatment data, four studies collected samples just prior to the treatment, and one study collected data a year before treatment. Post-treatment sampling was similarly variable with few studies collecting samples for more than a year following treatment. Exceptions to this were Mangum and Madrigal (1999), Whelan (2002) and Darby et al. (2004). Mangum and Madrigal (1999), Whelan (2002), and Darby et al. (2004) collected several years of post-rotenone data and Darby et al. collected samples a year prior to treatment.

Short-term Impacts

The immediate and short-term response of aquatic invertebrates to typical rotenone treatments in streams has been the rapid eradication of many if not all members of the assemblage (Binns 1967, Cook and Moore 1969, Engstrom-Heg et al. 1978). Binns (1967) reported that in the Green River, Wyoming, aquatic invertebrate populations were nearly completely eliminated following rotenone treatement. Mangum and Madrigal's (1999) study of the Strawberry River in north eastern Utah, reported at four stations, after two rotenone treatments, of 3 ppm for 48 hours, Ephemeroptera richness was reduced by 67-100%, Plecoptera richness by 67-100%, and Trichoptera richness by 61-100%. In Great Basin National Park, Ephemeroptera, Plecoptera, and Trichoptera (EPT) abundances were reduced by 99% of pre-treatment levels one month following treatment. Total assemblage taxa richness declined from a pre-treatment average of 46.8 taxa to 3.8 and 2.3 taxa, 1 day and 1 week following rotenone treatment. Average EPT group taxa numbers declined from 27 taxa to 0.25 taxa, 1 day and 1 week following rotenone treatment. Average EPT group taxa numbers declined from 26 taxa to 0.3 taxa at one-day post-treatment and 0 taxa by one-week. Taxa most

resistant to rotenone were from the Coleoptera, Diptera and Amphipoda orders. Specimens from these orders were collected at all three time periods: one-day, one-week and one-month post-treatment. One-month following treatment, total assemblage taxa richness had increased to 14.8 taxa (31% of pre-treatment values) and EPT taxa richness had increased to 3.8 taxa (14% of pre-treatment values).

Assemblage Recovery

The time needed for aquatic invertebrate assemblages to recover following rotenone treatment across studies have varied from a few months to 3 years or more depending on the measure of recovery and study length. Overall aquatic invertebrate assemblage abundances generally return to pre-treatment levels quicker than measures of biodiversity or community composition. Assemblage abundances typically return to pre-application levels within a few months to a year (Binns 1967, Cook and Moore 1969, Beal and Anderson 1993, Mangum and Madrigal 1999, Melaas et al. 2001, Whelan 2002). Mangum and Madgrial (1999) found that the total abundance of invertebrates returned to pre-application levels in 1 to 36 months across their sampling sites. In Great Basin National Park, total abundance recovered to an average of 1,167 individuals m^{-2} (-34% of pre-treatment average) after 2 years. EPT group abundance recovery was slower being only 362.5 individuals m^{-2} (-57% of pre-treatment average) after 2 years. Only one sample site had total abundances that exceeded pre-treatment levels over the 3 year sampling period.

The recovery times for biodiversity and community composition measures have been longer and have exceeded 2 years in some studies (Binns 1967, Whelan 2002) and more than 5 years for individual species (Mangum and Madrigal 1999). Unfortunately, longer-term (2 or more years of post-treatment sampling) studies of aquatic invertebrate assemblage recovery following rotenone treatments are limited to four studies; Binn's (1967) study of the Green River, Wyoming, Mangum and Madgrial's (1999) study of the Strawberry River, Utah, Whelan's (2002) study of Manning Creek, Utah, and Darby et al. (2004) study of Snake Creek in Great Basin National Park.

Binns (1967) reported that 2 years after treatment the patterns of dominant invertebrate groups were still different from pre-treatment assemblages. Two genera, Pentagenia (Ephemeroptera: Ephemeridae) and Hexagenia (Ephemeroptera: Ephemeridae) did not reappear 2 years after treatment.

In the Strawberry River, Utah, Mangum and Madrigal (1999) found that 46% of the taxa were found 1 year after two rotenone treatments. Five years after the treatments, 79% of the pre-treatment taxa were collected. Of the 19 taxa that were not collected 5 years after the rotenone treatments, 47% were Trichoptera, 21% were Ephemeroptera, 16% were Plecoptera, 11% were Coleoptera, and 5% were Megaloptera. The number of taxa missing after 5 years at four sampling sites varied from 6 taxa at Station 1, 8 taxa at Station 2, 5 taxa at Station 3, and 4 taxa at Station 4. Seven years following the treatments, 8 additional pre-treatment taxa (2 Ephemeroptera: *Cinygmula, Drunella grandis*, 5 Trichoptera: *Rhyacophila acropedes*, *Micrasema, Ochrotrichia, Glossosoma, Oligophlebodes*, and 1 Coleoptera, Hydaticus) were collected, leaving 11 pre-treatment collected taxa (8%) missing 7 years after treatment (Mangum, personal communication to Jim Harvey, USFS Fisheries Biologist, Humboldt-Toyiabe National Forest, March 2007).

In Manning Creek, Utah, Whelan (2002) reported that about 50% of the taxa were found both pre-and post treatment, 21% (11 taxa) were collected only pre-treatment, and 30% were found only post-treatment. The most impacted orders of aquatic insects were Trichoptera, with about 10% of the taxa missing after 3 years.

In Snake Creek, Great Basin National Park, EPT abundances never returned to pre-treatment levels after 3 years (Darby et al. 2004). Overall taxa numbers recovered to an average of 42 taxa by the second year which was 91% of the average pre-treatment richness. The number of EPT taxa recovered to an average of 20 taxa by the second year which was 77% of the mean pre-treatment richness. After three years, 96% of the pre-treatment taxa were present. The 2 taxa that were not collected were *Baetis* (Ephemeroptera: Baetidae) and *Antocha* (Diptera: Tipulidae).

Table 2. Field studies on the effects of rotenone on lotic invertebrates.

Location	Study Year	Rotenone Concentration	Pre-treatment Sampling	Post-treatment Sampling	Observed Change in Aquatic Invertebrate Assemblages	Citation
Robinson Creek, CA	1963	5% rotenone active, unknown concentration	None, treated/ untreated comparison	8 months	10-50% reduction in abundance	Cook & Moore 1969
Green River, UT	1963	2.5 - 9.4 mg/L 5% rotenone solution = 0.125 – 0.5 ppm	2 weeks prior	2 yrs after	Immediate reduction in abundance of nearly all species. Hydrosychidae (Trichoptera) recovered after 2 yrs, Pentagenia & Hexagenia (Ephemeroptera) were extirpated	Binns 1967
Strawberry River, UT	1990	3 mg/L 5% rotenone solution = 0.15 ppm 48 hr	1 week prior	Annually 5 yrs	54% decrease in taxa richness after 1 yr, 21% decrease in taxa richness after 5 yrs	Mangum & Madrigal 1999
Steams, Papua, New Guinea	1990	Unknown	Immediately prior	Immediately after & then up to 2 hours	Significant declines in Dixidae & Hydropsychidae, no change in Leptophlebiide or in total abundance	Dudgeon 1990
Silver King Creek, CA	1964-1996	Treatments were done in 1964, 1976, 1977, 1991, & 1993. Treatments ranged from high doses of unknown concentrations and durations to lower doses of 0.025 ppm for 4 - 6 hours in 1991 & 1993 (see Table 3)	None	Multiple times 1984 to 2006	Slight reduction in total, Ephemeroptera, Plecoptera, and Trichoptera taxa richness and change in percent dominant taxa	Trumbo et al. 2000, Finlayson and Somer personal communication June 2007
Manning Creek, UT	1995	0.5 - 1.5 mg/L 5% rotenone solution = 0.25-0.75 ppm for 12-18 hours	1 month prior	1 yr & 3 yrs	13% decrease in taxa richness after 3 yrs	Whelan 2002
River Ogna, Norway	2001	Unknown	Just prior	2 months	Rapid recolonization of common taxa, a few taxa disappeared	Kjaerstad & Arnekleiv 2003
Strawberry Creek, Great Basin NP	2000	5 mg/L 5% rotenone solution = 0.25 ppm for 1 hour & 2 mg/L 5% rotenone	1 yr & 1 day prior	1 month, 9 months, 10 months, 11 months, 1 yr, 2 yrs & 3 yrs	Abundance & taxa richness did not return to pre-treatment levels after 3 yrs, 5 taxa	Darby et al. 2004

		solution = 0.1 ppm for 7 hours			not found after 1 yr, 2 taxa not found after 3 yrs	
Virgin River, UT	2001 to 2005	11 treatments between 1988 & 2005, unknown concentrations prior to 2004. In 2004 & 2005, 3 ppm rotenone for 3-8 hours.	None	1 yr	little to no change following 2004 & 2005 treatments, study complicated by lack of pre-data & >20 yrs of rotenone treatment	Vinson & Dinger 2006

Conclusion

Overall, there have been too few published studies and of these studies there is little comparability with respect to rotenone treatments and aquatic invertebrate data collection efforts to allow for any sweeping statements on the overall effects of rotenone on aquatic invertebrate assemblages in streams. Variation among treatment effects are likely related to differences among water bodies in response to light, oxygen, pH, temperature, and turbidity of the water (Almquist 1959). Much of the variation in reported effects also appears due to the intensity of pre- and post-treatment sampling. In particular, the lack of collection of a sufficient amount of data on aquatic invertebrate assemblages prior to treatment prevents us from understanding the true effects of rotenone treatments on invertebrate assemblages. The same is not as true for lakes where the number of studies is greater and the design of many of the studies has been more rigorous than it has been for stream studies. For streams, no studies have done an adequate job of describing pre-treatment assemblages. In general, once the immediate effects and recovery of assemblage abundances are documented, funding is generally unavailable to continue long-term studies of these systems (Niemi et al. 1990).

Based on toxicity tests and field observations, smaller invertebrates that use gills to acquire aqueous oxygen appear more sensitive than larger invertebrates that acquire aqueous oxygen cutaneously, through lamellae or spiracles, use respiratory pigments, or that can breathe atmospheric oxygen. This suggests that rotenone impacts to invertebrates will be greatest in mountain streams characterized by cold water and high

oxygen levels, as these streams are characteristically dominated by small gilled invertebrates, namely Ephemeroptera, Plecoptera, and Trichoptera.

The studies we reviewed generally reported changes in the entire invertebrate assemblage, such as total taxa richness or abundance. With the exception of a few studies there has been little reporting on the impacts of piscicides on individual invertebrate taxon or the recovery rates of individual taxon, especially rare species. The results of the three longer-term more intensively sampled studies suggest that while some taxa can quickly recolonize treated areas, other taxa may be eradicated for a number of years or potentially forever. The ability of taxa to recolonize treated areas is likely a function of their overall population sizes within the basin, upstream and local habitat conditions, and the dispersal abilities of individual taxon.

Rotenone as a disturbance

Natural physical disturbances in stream environments include floods, droughts, and fire. Biological disturbances can include nuisance invasive species, such as New Zealand mud snails (*Potamopyrgus antipodarum*) or the introduction of sport fishes, like rainbow trout (*Oncorhynchus mykiss*). Biological disturbances can be sustained pressures on the environment, whereas physical disturbances are relatively discrete events that remove organisms and create conditions for recolonization. In this way, rotenone appears to act like a physical disturbance and probably most like a high intense streamflow event.

The immediate impact of higher than normal streamflows is a drastic reduction in community diversity and abundance (Lepori and Hjerdt 2006). Estimates on the loss of invertebrate diversity and abundance ranged from to 2 to 10% of pre-flood conditions (e.g., Fisher et al. 1982, Giller et al. 1991, Cobb et al. 1992). Recovery by aquatic invertebrates following floods has generally been reported to occur within weeks to months to years following the flood event (Niemi et al. 1990, Mackay 1992). This variation in recovery time appears highly dependent on the flood regime and habitat

complexity (Lepori and Hjerdt 2006). Slower recovery occurs following unpredictable floods, i.e., floods that occur during the wrong time of year (Giller et al. 1991), which suggests that invertebrates have adapted to the flood regimes they are typically subject to (Resh et al. 1988). Recovery of assemblages is also slower following floods with greater magnitude (Scrimgeour et al. 1988), which suggests that the effectiveness of small scale refugia decreases with increasing flood magnitude and the sources of colonization become further apart.

The effects of rotenone on stream invertebrates appear similar to a large unpredictable flood. Rotenone is typically applied during low flow periods. In Silver King Creek in 1991 to 1993 it was applied in August and September – an unnatural time for a large disturbance in this region, where high flow events are typically caused by snowmelt in late spring and early summer. The impact of rotenone on aquatic invertebrates is typically extensive with respect to the extent of the disturbance. Historical rotenone treatments in Silver King Creek appeared to treat 5 or more miles of stream during each treatment, which would likely make it more difficult for invertebrates to reach treated areas. There are intermittent tributaries and fishless headwater tributary streams along much of Silver King Creek that may supply invertebrates into the treatment area. The degree to which these invertebrates will provide colonization reserves for Silver King Creek should be evaluated.

The rate of recovery after floods is also determined by intrinsic biological characteristics of the invertebrates themselves. Invertebrates adapted to living in unpredictable stream environments, e.g., desert streams, have different behavioral and physiological traits than invertebrates adapted to more predictable streams (Townsend and Hildrew 1994), which allows them to better deal with unpredictable disturbances. Aquatic invertebrate adaptations to frequently or unpredictably disturbed environments include rapid growth and development, lack of diapause or resting stages, small size, flexible life histories, high adult mobility and longevity, and the near year-around presence of adults available for post-flood oviposition (Gray 1981, Fisher et al. 1982, Lake et al. 1986, Williams and Feltmate 1992, Townsend et al. 1997a, 1997b).

In a review of 150 case studies of aquatic ecosystem recovery from disturbance, (15 of which were in response to rotenone treatments), Niemi et al. (1990) found that most recovery times were less than 3 years. Recovery of macroinvertebrate assemblages to 85% of pre-disturbance densities after pulse disturbances (including rotenone) occurred in less than 18 months. Recovery times were slightly quicker for low order (1 to 3) streams than they were for larger rivers (4th to 5th order). They summarized that rates of recovery of aquatic invertebrate assemblages were influenced most by: 1) persistence of the impact, including changes in system productivity, habitat integrity, and persistence of the stressor; 2) life history of the organism, including generation time, and propensity to disperse; 3) time of year the disturbance occurs; 4) presence of refugia; and 5) distance to the recolonization source. They found that assemblage densities recovered much quicker than individual taxon. Times of recovery for common insect orders following pulse disturbances that did not affect physical habitat characteristics (mostly rotenone and DDT) were Diptera < Ephemeroptera < Trichoptera < Plecoptera. Coleoptera was not represented in enough studies, but they felt that Coleoptera likely recovered more slowly than Trichoptera and Plecoptera. Assemblage recovery times were about 60% after 2 years for Trichoptera and Plecoptera, 70% for Ephemeroptera after 1 year, and near 80% for Diptera after 1 year. They speculated that recovery time was primarily related to generation time, propensity to drift, and distance from colonization source. Downstream drift from unimpacted upstream areas was the critical factor in determining the recovery times for stream ecosystems following pulse disturbances that do not impact the physical characteristics of the habitat.

These results suggest that rotenone impacts may be greatest in streams with lower frequency of disturbance or predictable discharge patterns. Recovery will also likely be longer in streams where long reaches are treated. Increasing the distance to colonization sources will reduce the ability of species to colonize the treated reach. Disturbance events will have greater impacts if they occur during critical life stages or if they occur in the fall when lower winter drift rates and lack of winter reproduction will

delay recovery until the following spring, particularly if the site will be dependent on downstream drift of larvae for recolonization.

SILVER KING CREEK

Overview

The Silver King Creek basin is located on the eastern slope of the Sierra Nevada Range, in Alpine County, California. It is a major tributary to the East Fork of the Carson River, which drains into the Lahontan Basin. It is home to Paiute cutthroat trout (*Oncorhynchus clarki seleniris*). The Paiute cutthroat trout is listed as threatened under the Endangered Species Act of 1973. One of the Paiute cutthroat trout recovery plan's criteria is to remove all nonnative salmonids from Silver King Creek and its tributaries downstream of Llewellyn Falls to fish barriers in Silver King Canyon. The use of the piscicide rotenone has been historically used in Silver King Creek to remove nonnative fishes and it has been proposed for future use. The purpose of this report was to evaluate the effects of previous rotenone treatments on aquatic invertebrate assemblages in the Silver King Creek Basin. This analysis and future assessments of the effects on rotenone on aquatic biota in the Silver King Creek Basin are hampered by the long history of rotenone treatments in the basin, the lack of data on aquatic invertebrate assemblages prior to the use of rotenone, and prior land use practices, such as logging and sheep and cattle grazing, that have substantially improved over the last 20 or more years. The oldest data available on aquatic invertebrate assemblages in this analysis was from 1984. Thus we lack necessary pre-treatment samples to definitively measure changes that occurred following rotenone treatments in the basin in 1964, 1976, and 1977. There were also significant differences between the two sets of aquatic invertebrate samples that were collected between 1984 and 1996 (hereafter referred to as historic) and 2003 and 2006 (hereafter referred to as recent) that limited our ability to quantify changes in invertebrate assemblages back to 1984.

Study Area

Silver King Creek is a tributary to the East Fork Carson River, which drains into the Lahontan Basin. The entire Silver King Creek basin occurs within the Humboldt-Toiyabe National Forest in Alpine County, California. The creek originates at 2,926 meters (9,600 feet) elevation and flows north through three distinct valleys for

approximately 22.5 kilometers (14 miles) where it meets the East Fork Carson River (Figure 2). Between the headwaters and the confluence with the East Fork Carson River, eight tributaries, three above and five below Llewellyn Falls, join Silver King Creek. Llewellyn Falls is located at the head of Lower Fish Valley (2,438 meters, 8,000 feet elevation) about 16.2 kilometers (10 miles) above the confluence with the East Fork Carson River. Habitat characteristics were described by Ryan and Nicola (1976). From its source, Silver King Creek flows swiftly for 3.2 kilometers (2.0 miles) before beginning a gradual descent to Upper Fish Valley in an area of washed-out beaver ponds just above the mouth of Fly Valley Creek. For 2.4 kilometers (1.5 miles), through Upper Fish Valley, Silver King Creek is a typical meandering meadow creek, averaging 3.7 meters (12 feet) wide and 0.3 meter (1 foot) deep in the summer. From the southeast, Four Mile Canyon Creek enters 2.0 kilometers (1.2 miles) above Llewellyn Falls. Bull Canyon Creek joins Silver King Creek from the west 0.8 kilometer (0.5 miles) above Llewellyn Falls. At the lower end of Upper Fish Valley, the stream gradient increases through a sparsely forested section before reaching Llewellyn Falls. The vertical drop of Llewellyn Falls is approximately 6.1 meters (20 feet). Within the 2.8-kilometer (1.7-miles) length of Lower Fish Valley, two small tributaries enter the mainstem from the west: Tamarack Lake Creek, located 1.2 kilometers (0.7 miles) below Llewellyn Falls, and a short, unnamed tributary downstream another 1.2 kilometers (0.7 miles). Silver King next flows through Long Valley, which is only 1.5 kilometers (0.9 miles) long and is the shortest of the three valleys. No tributaries enter Silver King Creek in Long Valley. Between Lower Fish Valley and Long Valley the gradient increases. Tamarack Creek enters Silver King Creek from the west 0.6 kilometer (0.4 miles) below Long Valley, and Coyote Valley Creek enters from the east 1 kilometer (0.6 miles) farther downstream. Approximately 2.8 kilometers (1.7 miles) below the mouth of Coyote Valley Creek, Silver King Creek descends through Silver King Canyon and emerges from the canyon in the vicinity of Snodgrass Creek. Upstream from Snodgrass Creek, in the canyon, a series of falls present a fish barrier to nonnative trout and nonsalmonid native fish species that occur downstream. No tributary of significance enters Silver King Creek from Snodgrass Creek downstream for 5.4 kilometers (3.4 miles) until its confluence with the East Fork Carson River.

All of the sampling locations on Silver King Creek were located in stream reaches classified as “C” channels following Rosgen (1996). "C" stream types are typically located in narrow to wide valleys, have a well developed but slightly entrenched floodplain, are relatively sinuous with a channel slope of 2% or less and a bedform morphology indicative of a riffle/pool configuration. The "C" stream type exhibits a sequencing of steeps (riffles) and flats (pools), that are linked to the meander geometry of the river where the riffle/pool sequence or spacing is on the average one-half a meander wavelength or approximately 5-7 bankfull channel widths. The average gradient of Silver King Creek is 4.1 percent, which is less than any of its tributaries. However, the portion of Silver King Creek between Fly Valley and Corral Valley Creeks has an average gradient of 1.6 percent. Stream bottom substrates in Silver King Creek riffles, where aquatic invertebrate collections were made, consist primarily of gravels and cobbles (Table 3) and appear to have changed little between samples collected in 1984 and 1990.

Table 3. Stream bottom sediment particle sizes presented as the percent of each sample > 6.35 mm (medium gravel) for samples collected in 1984 and 1990. Positive % difference values indicate a coarsening of the substrate, whereas negative values indicate more fine (< 6.35 mm) sediment accumulation.

		% >6.35 mm		
Location	Station	1984	1990	% Difference Between 1984 and 1990
Silver King Creek	S2:640	64.3	60.3	-6.6
Silver King Creek	S3:641	61.8	53.4	-15.7
Silver King Creek	S4:700	57.0	61.5	7.3
Silver King Creek	S5:725	57.3	59.0	2.9
Silver King Creek	S6:738	59.3	68.6	13.6
Silver King Creek	S7:775	64.8	57.6	-12.5
Silver King Creek	S8:813	60.0	64.2	6.5
Bull Canyon Creek	S1:040	62.9	61.0	-3.1
Fly Valley Creek	S1:500	62.9	67.9	7.4
Four Mile Creek	S1:250	69.6	72.4	3.9
Coyote Valley Creek	S2:467	32.2	41.0	21.5
Coyote Valley Creek	S3:500	44.5	52.1	14.6
Corral Valley Creek	S1:571	51.8	51.0	-1.6
Corral Valley Creek	S2:574	45.7	46.9	2.6

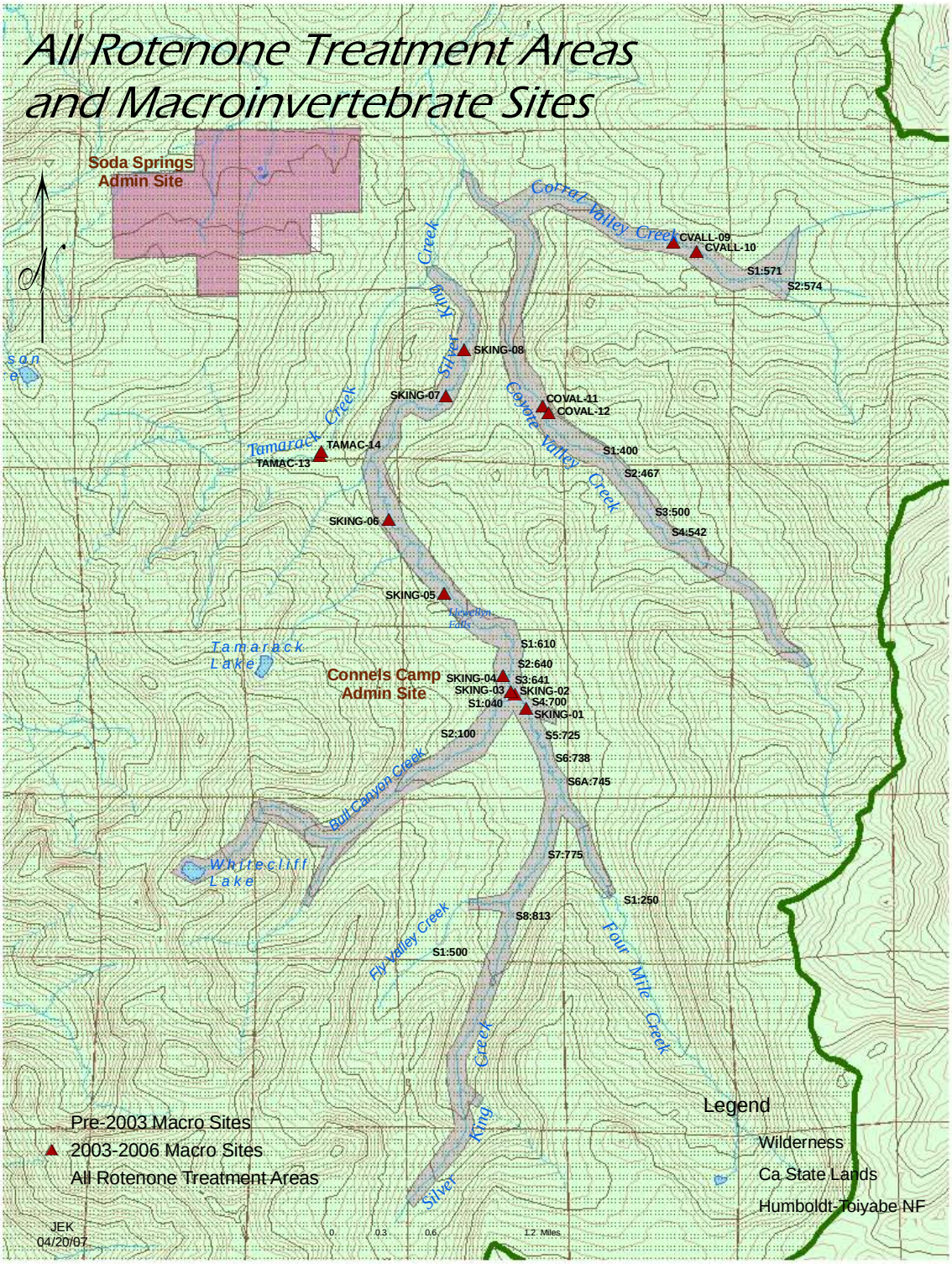

Figure 2. Map of study area.

Aquatic invertebrate samples were collected in several streams that are tributaries of Silver King Creek. These include Corral Valley Creek, Coyote Valley Creek, Four Mile Canyon Creek, and Fly Valley Creek (Figure 2). Except for Fly Valley Creek, these tributaries were all classified as ”C” channels with similar habitat characteristics as Silver King Creek. Fly Valley was classified as a B2/B3 channel. "B" stream types are moderately entrenched, have a cross-section width/depth ratio (greater than 12), display a low channel sinuosity, and exhibit rapids dominated bed morphology. Pool-to-pool spacing is generally four to five bankfull widths, decreasing with an increase in slope gradient. Meander width ratios (belt width/bankfull width) are generally low which reflect low rates of lateral extension. "B" stream types occur primarily on moderately steep to gently sloped terrain, with the predominant landform seen as a narrow and moderately sloping basin.

Rotenone Treatments

Rotenone treatments were conducted in the Silver King Creek Basin between 1964 and 1993 (Table 3). Silver King Creek was treated in 1964, 1976, 1991, 1992, and 1993. Corral Valley Creek was treated with rotenone in 1964 and 1977. Coyote Valley Creek was treated with rotenone in 1964, 1977, 1987, and 1988. Four Mile Canyon Creek and Fly Valley Creek were never treated with rotenone upstream from the aquatic invertebrate sampling locations (USFS and California Fish and Game personnel communication, 9 March 2007). The concentration and duration of rotenone application varied among treatments and among the streams treated (Table 3).

Table 3. Rotenone formula, concentration, and duration for treatments conducted in the Silver King Creek Basin between 1964 and 1993. ppm is parts per million, ppb is parts per billion. Information in the Table for 1991 to 1993 is from Trumbo et al. (2000) and are maximum rotenone formulation concentrations. The notes below the Table[b] are from Finlayson (personal communication June 2007) and are mean rotenone formulation concentrations.

Year	Silver King Creek & Lower Bull Canyon Creek	Corral Valley Creek	Coyote Valley Creek
1964	1 ppm pro-noxfish, 5 hours	1 ppm pro-noxfish, 5 hours	1 ppm pro-noxfish, 5 hours
1976	10 ppb Fintrol, 8 hours, followed by 1 ppm pro-noxfish, 5 hours		
1977		4 ppm unknown formulation, 8 hours followed by 1 ppm unknown formulation 3 hours	4 ppm unknown formulation, 8 hours followed by 1 ppm unknown formulation 3 hours
1987			1 ppm pro-noxfish, 4 hours
1988			0.6 ppm Noxfish, 4 hours
1991	1 ppm Nusyn-noxfish[a] (0.025 mg/L rotenone formulation concentration) 19 and 23 hours a day for 2 consecutive days[b]		
1992	1 ppm Nusyn-noxfish[a], 19 to 23 hours a day for 2 days separated by 1 day[b]		
1993	1 ppm Nusyn-noxfish[a], 24 and 22 hours a day for 2 consecutive days[b]		

[a]Nusyn-Noxfish contains 2.5% rotenone, 5% other rotenoid compounds, 2.5% of the synergist piperonyl butoxide, and 90% not-rotenoid organic compounds. A 1 ppm concentration of Nusyn-noxfish would equal 0.25 ppm rotenone.
[b]Silver King Creek was treated at 0.025 mg/L rotenone for 4 to 6 hours, no more than twice a year in 1991-1993. California Department of Fish and Game monitoring data suggest that the average rotenone concentration was 0.010 mg/L, not 0.020 mg/L, for a period of approximately 8 to 10 hours.

Sample Collection Methods

A list of collections sites and years when samples were collected are presented in Table 4 and 5, respectively. Aquatic invertebrates were collected similarly in all years. Samples were collected using a Surber net (0.09 m^2). Samplers used prior to 2003 most likely had a 280 micron mesh net. The exact mesh is unknown, but most USFS offices were supplied with Surber nets by the USFS Aquatic Ecosystem Laboratory with a 280 micron mesh net. Samplers used since 2003 have a 500 micron mesh net. Samples were collected by disturbing the area within the square sampling frame with hands and scrubbing individual substrate particles within the sampling area and allowing the invertebrates and detritus to wash downstream into the net. Three samples

were collected at different locations within a single riffle. The three samples were kept separate in the field and preserved in 90% ethanol.

Table 4. Aquatic invertebrate sampling locations. Station IDs are those used on the map shown in Figure 1. Station IDs for historic sampling locations were from the original aquatic invertebrate monitoring reports prepared by the USFS Aquatic Ecosystem Laboratory. Additional information on rotenone treatments is shown in Table 3.

Sampling Location	Station ID	Latitude North	Longitude West	Rotenone Treatment or Control Site
Bull Canyon Creek, downstream site, Station 1	S1:040	35.4529	119.6000	Treated
Bull Canyon Creek, 300 feet upstream from fence, Station 2	S2:100	36.4499	119.6029	Control
Corral Valley Creek, downstream from trail	S1:571	34.4894	119.5742	Treated
Corral Valley Creek, upstream from trail	S2:574	34.4883	119.5699	Treated
Corral Valley Creek, Lower Site	CVALL-09	38.4931	119.5822	Treated
Corral Valley Creek, Upper Site	CVALL-10	38.4914	119.5790	Treated
Coyote Creek, downstream from crossing, Station 2	S2:467	35.4724	119.5883	Treated
Coyote Valley Creek, upstream site	S4:452	34.4674	119.5830	Treated
Coyote Creek, upstream from large meadow rock, Station 3	S3:500	35.4691	119.5847	Treated
Coyote Valley Creek, Lower Site	COVAL-11	38.4768	119.6024	Treated
Coyote Valley Creek, Upper Site	COVAL-12	38.4777	119.5956	Treated
Fly Valley Creek, Station 1	S1:500	36.4308	119.6098	Control
Four-mile Canyon Creek, middle meadow, Station 1	S1:250	35.4354	119.5884	Control
Silver King Creek, 300 yards upstream from 4-Mile Creek, Station 7	S7:775	35.4392	119.5968	Treated
Silver King Creek, lower exclosure near Cow Cabin, Station 2	S2:640	35.4559	119.6000	Treated
Silver King Creek, near middle exclosure, Station 3	S3:641	36.4545	119.6003	Treated
Silver King Creek, Station 1	S1:610	35.4576	119.5998	Treated
Silver King Creek, Upper Valley, Site 1	SKING-01	38.4519	119.5981	Treated
Silver King Creek, Upper valley, Site 2	SKING-02	38.4697	119.5878	Treated
Silver King Creek, Upper Valley, Site 3	SKING-03	38.4536	119.5997	Treated
Silver King Creek, Upper Valley, Site 4	SKING-04	38.4547	119.6008	Treated
Silver King Creek, upstream from exclosure, Station 4	S4:700	35.4524	119.5984	Treated
Silver King Creek, upstream from Fly Valley Creek, Station 8	S8:813	36.4339	119.6003	Treated
Silver King Creek, mid meadow upstream from cabin, Station 5	S5:725	35.4495	119.5971	Treated
Silver King Creek, upper meadow upstream from cabin, Station 6	S6:738	35.4476	119.5960	Treated
Silver King Creek, Station 6A	S6A:745	35.4455	119.5946	Treated
Silver King Creek, Long Valley, Site 7	SKING-07	38.4792	119.6069	Treated
Silver King Creek, Long Valley, Site 8	SKING-08	38.4831	119.6047	Treated
Silver King Creek, Lower Valley, Site 5	SKING-05	38.4619	119.6072	Treated
Silver King Creek, Lower Valley, Site 6	SKING-06	38.4686	119.6133	Treated
Tamarack Creek, Lower Site	TAMAC-14	38.4750	119.6208	Control
Tamarack Creek, Upper Site	TAMAC-13	38.4743	119.6207	Control

Table 5. Aquatic invertebrate sample availability.

Sampling Location	Station ID	Samples Obtained	Years Obtained	Years Known to be Missing
Bull Canyon Creek, downstream site, Station 1	S1:040	0	None	unknown
Bull Canyon Creek, 300 feet upstream from fence, Station 2	S2:100	2	1984, 87	none
Corral Valley Creek, downstream from trail	S1:571	2	1984, 87	1977
Corral Valley Creek, upstream from trail	S2:574	0	None	unknown
Corral Valley Creek, Lower Site	CVALL-09	4	2003, 04,05,06	none
Corral Valley Creek, Upper Site	CVALL-10	4	2003, 04,05,06	none
Coyote Valley Creek, upstream site	S1:400	0	None	unknown
Coyote Valley Creek, downstream from crossing, Station 2	S2:467	2	1984, 87	none
Coyote Valley Creek, Lower Site	COVAL-11	4	2003, 04,05,06	none
Coyote Valley Creek, Upper Site	COVAL-12	4	2003, 04,05,06	none
Coyote Valley Creek, upstream from large meadow rock, Station 3	S3:500	2	1984, 87	none
Coyote Valley Creek, upstream site	S4:452	0	None	unknown
Fly Valley Creek, Station 1	S1:500	2	1984, 87	none
Four-mile Canyon Creek, middle meadow, Station 1	S1:250	11	1984,87,91,92,93,94,95,96	1977,78,83,90
Silver King Creek, 300 yds upstream from 4-Mile Creek, Station 7	S7:775	11	1984,87,91,92,93,94,95,96	1990
Silver King Creek, Long Valley, Site 7	SKING-07	4	2003, 04,05,06	None
Silver King Creek, Long Valley, Site 8	SKING-08	4	2003, 04,05,06	None
Silver King Creek, lower exclosure near Cow Cabin, Station 2	S2:640	11	1984,87,91,92,93,94,95,96	1990
Silver King Creek, Lower Valley, Site 5	SKING-05	4	2003, 04,05,06	None
Silver King Creek, Lower Valley, Site 6	SKING-06	4	2003, 04,05,06	None
Silver King Creek, mid meadow upstream from cabin, Station 5	S5:725	2	1984, 87	1990
Silver King Creek, near middle exclosure, Station 3	S3:641	11	1984,87,91,92,93,94,95,96	1977,78,83,90
Silver King Creek, Station 1	S1:610	0	None	Unknown
Silver King Creek, upper meadow upstream from cabin, Station 6	S6:738	11	1984,87,91,92,93,94,95,96	1990
Silver King Creek, Station 6A	S6A:745	0	None	Unknown
Silver King Creek, Upper Valley, Site 1	SKING-01	4	2003, 04,05,06	None
Silver King Creek, Upper valley, Site 2	SKING-02	4	2003, 04,05,06	None
Silver King Creek, Upper Valley, Site 3	SKING-03	4	2003, 04,05,06	None
Silver King Creek, Upper Valley, Site 4	SKING-04	4	2003, 04,05,06	None
Silver King Creek, upstream from exclosure, Station 4	S4:700	2	1984, 87	1977,78,83,90
Silver King Creek, upstream from Fly Valley Creek, Station 8	S8:813	11	1984,87,91,92,93,94,95,96	1990
Tamarack Creek, Lower Site, never treated	TAMAC-14	4	2003, 04,05,06	None
Tamarack Creek, Upper Site, never treated	TAMAC-13	4	2003, 04,05,06	none

Laboratory Methods

Historic samples collected between 1984 and 1996 were processed by the USFS Aquatic Ecosystem Analysis Laboratory in Provo, Utah. Recent samples collected annually between 2003 and 2006 were processed by the National Aquatic Monitoring Center (The BugLab) operated by the U.S. Bureau of Land Management and Utah

State University in Logan, Utah. At the USFS Laboratory in Provo, Utah, samples were sub-sampled using an automated sub-sampler containing eight pans with fine mesh bottoms. The actual mesh size of the subsample is unknown, but was likely 280 microns, which was the mesh provided on Surber samplers used by most USFS offices between 1970 and the 2000. Samples were placed in a 1 L beaker that was attached above the pans. The pans were then rotated on a phonograph turntable as the material in the beaker was flushed out of the beaker with a stream of water delivered to the bottom of the beaker. The invertebrates in the sub-sample pans were then removed under a dissecting microscope at 10-30 power. A total of 250 to 300 organisms were removed from each sample and identified. All organisms removed during the sorting process were then identified using appropriate identification keys. Invertebrates were generally identified to the genus level. Chironomidae were identified to family or sub-family. Non-insects were identified to Phylum, Class, or Order depending on the availability of identification keys. The previous description of the methods used by the USFS Laboratory was from Trumbo et al. (2000). The percentage of each sample processed was unknown.

Recent samples were processed by the BugLab following methods recommended by the United States Geological Survey (Cuffney et al. 1993). These methods are described in greater detail and rationalized in Vinson and Hawkins (1996). All samples were processed in their entirety, i.e., all invertebrates from each sample were removed. All the organisms removed during the sorting process were separated into Orders then identified. Once the data had been entered into a computer and checked, the unsorted portion of the sample (i.e. detritus) was discarded. The identified portion of the sample was placed in 70% ethanol, given a catalog number, and was retained.

Data Processing

Historic Samples

Individual sample data for historic samples processed by the USFS Laboratory were originally entered in a computer program developed by the USFS Aquatic Ecosystem

Analysis Laboratory. Data for each of the three replicate samples collected at each sampling location on each sampling date were entered separately. The data were then summarized and tables were printed that listed the mean number of individuals collected for each taxon among the three replicate samples. The original data sources, (either the taxonomist's original bench sheets or the computerized data for each replicate sample) are no longer available. We were provided with copies of the paper reports that appeared to be prepared annually by the USFS Aquatic Ecosystem Analysis Laboratory. These reports contained a list of taxa and the estimated mean number of individuals per square meter collected among the three replicate samples from each sampling location on each sampling date. These data, the taxon names and mean number of individuals per square meter, were entered into the BugLab's computer data base. The estimated abundances per square meter for each taxon were then converted to counts by multiplying the estimated number of individuals per square meter times the sample area, 0.279 m^2. Rounding errors occurred when these data were converted from densities per square meter to whole number counts. These differences, when the counts were then converted back to densities amounted to no more than 1% of the total abundance for individual samples. The data were converted to counts to improve our ability to make comparisons between historic and more recently collected data. We did not know the percentage of each sample that was processed by the USFS laboratory, so the number of individuals identified in each sample is overestimated for those samples that were not processed in their entirety. The taxonomy for all taxa was updated as required to reflect the most recent taxonomic nomenclature for each taxon. For example, *Ephemerella doddsi, Ephemerella spinifera,* and *Ephemerella hystrix* were changed to *Drunella doddsi, Drunella spinifera,* and *Caudatella hystrix.* We also used experience we gained from processing 210 samples from the Silver King Creek Basin between 2003 and 2006 to clean up some of the taxonomy from samples identified prior to 2003. We believe these somewhat subjective changes – as we did not have the actual specimens identified by the USFS laboratory – were appropriate based on our taxonomic experience and improved the consistency in taxonomy between the two laboratories. Taxa lists with estimated abundances for each taxon for each sample are provided in Appendix 12.

Recent Samples

Data for recent samples processed by the BugLab were from individual Surber samples. These data were entered into the BugLab's computer program. The data from the three Surber samples collected at each site on each sampling date were then composited into a single sample with a sampling area of 0.279 m^2, making them equivalent with respect to sampling area as the samples collected prior to 2003. All recent samples were processed in their entirety, so the number of individuals for each three sample composite was equal to the number of individuals collected at each site. Taxa lists with estimated abundances for each taxon for each sample are provided in Appendix 12.

Data Analysis

Ecological summaries were calculated for each composite sample collected at each site on each sampling date. The sample summaries presented were picked to be representative of the entire aquatic invertebrate assemblage, a major taxonomic group of aquatic invertebrates, or a measure of rarity. Measures of the total assemblage included total taxa richness (OTUs – operational taxonomic units, i.e., individuals were identified to a variety of taxonomic levels), total genera richness, genera richness for the dominant orders of aquatic insects, total sample abundance, presented as the number of individuals per square meter, and the number of taxa (OTUs) with abundances less than 1% of the total assemblage abundance. The Type I experiment wise error rate was managed by setting the critical alpha value to 0.05 for all ANOVAs and by using the Ryan-Einot-Gabriel-Welsch multiple range test (SAS 1988), which controls the Type I error for multiple comparisons. This test was used to determine all significant pair-wise differences between categories. Additional measures of rarity were tabulated and evaluated based on the taxa collected at site or group of sites (Appendices 2 – 10) or computed using EstimateS, version 8.0 (Colwell 2005). We used the Chao 2 estimator (Chao 1987) in EstimateS to estimate overall biodiversity. This estimator was chosen because it was developed for presence/absence data which we feel was most appropriate for our data (Colwell and Coddington 1994). Use of smoothed accumulation curves and estimators requires the assumption that all sampling efforts were similar in duration and area. For the both sets of data, historic and recent, the

sampling and laboratory procedures and most of the laboratory personnel were constant. The Chao 2 estimator predicts the number of taxa by using the observed species collected, plus a correction factor based on taxa rarity as calculated by counting the number of taxa only occurring in one or two samples (singletons and doubletons, Colwell 2005). To reduce variability we limited our analyses and interpretations to the genera level, thus taxon identified to the species level were reduced to genus and taxon identified to family or higher levels were excluded from the data set.

The topics we evaluated in our analyses were:

1. Annual variation in total genera richness, genera richness within dominant insect orders, and total assemblage abundance.
2. Variation in total genera richness, genera richness within dominant insect orders, and total assemblage abundance among sampling locations.
3. Differences in total genera richness, genera richness within dominant insect orders, and total assemblage abundance between sites that had been treated with rotenone and untreated sites.
4. Rarity of aquatic invertebrate genera within and among years.

Results

Historic Samples

Data on a total of 75,974 individuals were extracted from the USFS annual monitoring reports from 13 sampling locations (Table 5, Appendix 2). Samples were collected between 1984 and 1996. Eleven samples were collected at six sites and two samples were collected at the other seven sites in 1984 and 1986. Of the 75,974 individuals for which data were obtained, 44,194 individuals (58%) were identified to genus or species. For all samples collected in all years, a total of 75 genera were identified (Appendix 3).

Treated Versus Untreated Sites

For samples collected between 1984 and 1996, there were few measureable differences in mean aquatic invertebrate assemblage measures between sites that were treated with rotenone and the two sites that were not treated (Table 6). The mean number of individuals collected, total assemblage abundance, total taxa richness, total genera richness, and genera richness within all but one of the major insect orders were all statistically similar between treated and untreated sampling locations. The only statistically significant difference between treatment and control sites was in the abundance of Coleoptera collected. Mean Coleoptera abundance was twice as high in control (433.6±352.7) as compared to treatment sites (206.7±241.9, Table 6). These results contrast Darby et al. (2004) who found Coleoptera (Elmidae) to be one of the more resilient insect groups to rotenone. There was no difference in the mean number of rare taxa collected between treated and untreated sites. Two genera were not collected at treated sites that were collected at untreated sites; *Ephron* (Ephemeroptera: Polymatarcyidae) and *Dolophilodes* (Trichoptera: Philopotamidae). Twenty-seven genera were collected at treated sites that were not collected at untreated sites; however, about four times as many individuals were collected at treated sites as compared to untreated sites. This large discrepancy among the number of samples collected in treated and untreated reaches makes comparison between the two difficult.

Several taxa that Engstom-Heg et al. (1978) found to be sensitive to rotenone were collected at treated sites following treatment (Appendices 3, 4, and 6). These included *Baetis* (Ephemeroptera: Baetidae), Perlidae (Plecoptera), Perlodidae (Plecoptera), *Rhyacophila* (Trichoptera) and Simuliidae (Diptera). Taxa with intermediate tolerance to rotenone that were collected at treatment sites included *Ephemerella* (Ephemeroptera: Ephemerellidae), Heptageniidae (Ephemeroptera), Chloroperlidae (Plecoptera), Limnephilidae (Trichoptera), Antocha, and Chironomidae (Diptera).

Table 6. Mean ± SD and results of ANOVA to evaluate differences in aquatic invertebrate assemblage measures among rotenone treated and control stations for historic samples collected between 1984 and 1996. Sample sizes were 67 for treatment and 13 for control sites.

	Treatment		Control			
Measure	**Mean**	**SD**	**Mean**	**SD**	**F-value**	**Pr > F**
Number of individuals per sample	923.8	474.9	1083.0	471.4	1.23	0.2716
Total abundance	3241.9	1796.5	3838.1	1761.0	0.01	0.9089
Taxa richness	30.0	6.1	30.2	6.3	1.21	0.2755
Genera richness	28.0	5.4	28.3	5.2	0.04	0.8515
Ephemeroptera genera	7.1	2.0	7.4	1.5	0.26	0.6126
Ephemeroptera abundance	1071.3	930.7	938.3	572.6	0.25	0.6213
Plecoptera genera	2.4	1.4	2.7	1.3	0.64	0.4245
Plecoptera abundance	272.3	371.8	254.5	199.1	0.03	0.8673
Trichoptera genera	3.1	1.5	3.6	2.1	1.28	0.2614
Trichoptera abundance	163.7	196.0	159.6	158.8	0.01	0.9430
Coleoptera genera	0.7	0.6	0.6	0.6	0.24	0.6223
Coleoptera abundance	206.7	241.9	433.6	352.7	8.16	0.0055
Diptera genera	3.7	1.6	3.6	2.1	0.00	0.9629
Diptera abundance	1380.4	962.1	1778.0	1089.1	1.78	0.1859
Rare taxa, <1% of total abundance	15.9	4.3	15.5	4.6	0.09	0.7620

Annual Variation

There was considerable annual variation in ecological measures, as mean annual values were statistically different for all measures (Tables 7 and 8) among years. Overall, this was not surprising given that natural climatic differences occurred among these years as well as several rotenone treatments. Values were not consistently higher or lower for any particular year, though the majority of values were higher in the 1990s than they were in the 1980s samples. Samples collected in Four Mile Canyon Creek (Appendix 5), which was never treated with rotenone, were no less variable than those collected in Silver King Creek and rotenone treated tributaries (Appendix 6). The impact of rotenone was not apparent in this analysis and these results are similar to that reported by Trumbo et al. (2000) in their more comprehensive analysis of these data.

Table 7. Mean ± SD of aquatic invertebrate assemblage measures among years for historic samples collected between 1984 and 1996.

	1984		1987		1991		1992		1993		1994		1995		1996	
Measure	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Sample size	13		13		12		12		12		6		6		6	
Number of individuals per sample	993.5	338.1	1504.2	407.3	506.5	282.9	1224.2	272.1	662.3	352.3	1203.0	426.2	445.2	129.2	816.5	155.6
Total abundance	3561.1	1211.8	5391.5	1460.0	1605.1	1188.5	4387.9	975.4	2273.0	1387.0	4312.0	1527.2	1350.0	593.8	2926.7	557.7
Taxa richness	29.2	4.9	26.3	5.2	28.5	6.1	26.3	5.1	32.4	4.9	30.7	3.6	40.0	2.2	35.2	5.1
Genera richness	28.2	4.6	25.5	4.8	26.3	5.7	24.4	4.3	30.5	4.7	28.3	3.5	35.5	2.8	32.3	4.2
Ephemeroptera genera	6.3	1.4	8.1	1.6	7.1	1.8	6.7	1.7	6.3	2.6	7.5	2.0	9.5	0.8	8.0	0.6
Ephemeroptera abundance	1575.3	856.5	1751.6	1112.4	432.6	539.7	1118.5	681.9	519.0	433.0	1098.0	1123.2	469.5	362.1	1080.3	227.4
Plecoptera genera	3.8	1.2	2.5	1.3	2.8	1.8	2.3	0.9	1.7	1.4	1.7	1.0	1.7	0.8	2.3	1.4
Plecoptera abundance	473.1	365.8	511.9	562.9	117.4	205.8	167.7	219.9	112.8	118.1	242.0	243.2	51.8	35.2	369.2	280.3
Trichoptera genera	3.4	1.6	4.0	2.2	3.3	1.2	1.8	1.4	2.2	0.8	3.5	1.0	4.3	0.8	4.7	1.4
Trichoptera abundance	214.2	208.9	332.3	309.9	52.7	59.5	118.2	130.2	97.1	84.0	137.3	75.3	138.2	81.0	179.2	179.4
Coleoptera genera	0.0	0.0	0.0	0.0	1.1	0.3	1.1	0.3	1.1	0.3	1.2	1.0	1.5	0.5	1.2	0.4
Coleoptera abundance	72.9	109.6	270.1	310.8	201.4	238.0	454.8	338.5	286.1	283.9	291.3	357.2	125.2	102.0	204.3	127.3
Diptera genera	1.5	1.2	2.1	0.8	4.0	0.7	4.7	0.9	5.4	1.1	4.7	0.8	4.3	1.2	4.7	0.8
Diptera abundance	1125.8	655.2	2282.0	986.4	712.4	902.7	2335.8	724.3	1112.3	660.3	2121.0	634.5	477.5	171.7	964.8	461.2
Rare taxa, <1% of total abundance	14.8	2.7	13.3	4.0	15.9	3.9	13.6	4.4	15.7	3.0	17.7	2.9	24.3	2.0	18.3	1.8

Table 8. Results of ANOVA to evaluate differences in aquatic invertebrate assemblage measures among years. Significant pairwise differences between categories were determined by the Ryan-Einot-Gabriel-Welsch multiple range test with the critical alpha value set to 0.05. The degrees of freedom for all tests were 7, 72.

			Significantly Different Means	
Measure	**F Value**	**Pr > F**	**Maximum**	**Minimum**
Number of individuals	14.05	<0.0001	1987	1995
Abundance	14.52	<0.0001	1987	1995
Taxa richness	6.91	<0.0001	1995	1992
Genera richness	5.40	<0.0001	1995	1992
Ephemeroptera genera	3.31	0.0042	1995	1993
Ephemeroptera abundance	5.00	0.0001	1987	1991
Plecoptera genera	3.48	0.0029	1984	1994
Plecoptera abundance	3.33	0.0040	1987	1995
Trichoptera genera	4.56	0.0003	1996	1992
Trichoptera abundance	2.98	0.0083	1987	1991
Coleoptera genera	24.93	<0.0001	1995	1987
Coleoptera abundance	2.28	0.0374	1992	1984
Diptera genera	25.14	<0.0001	1993	1984
Diptera abundance	9.74	<0.0001	1992	1995
Rare taxa, <1% of total abundance	7.94	<0.0001	1995	1987

Variation Among Sampling Stations

There were few measureable differences in mean aquatic invertebrate assemblage measures among sampling locations (Table 9 and 10). The mean number of individuals collected, total assemblage abundance, total richness, total genera richness, and genera richness within all but one of the major insect orders were all statistically similar between sites. The only statistically significant difference between treatment and control sites was in the abundance of Coleoptera collected. Coleoptera abundance was highest at site S1:250 an untreated site on Four-mile Canyon Creek and lowest at site S8:813 a rotenone treated site on Silver King Creek. These results are consistent with Darby et al. (2004) who found Coleoptera (Elmidae) to be one of the more resilient insect groups to rotenone.

Table 9. Mean ± SD of aquatic invertebrate assemblage measures among sites located on Silver King Creek. Samples were collected between 1984 and 1996.

	S1:250		S2:640		S3:641		S6:738		S7:775		S8:813	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Sample size	11		11		11		11		11		11	
Number of individuals	1119.0	505.7	795.5	488.1	887.6	357.3	880.1	460.6	899.5	396.9	775.2	557.4
Abundance	3959.2	1896.0	2755.1	1860.9	3161.2	1310.4	3051.8	1796.7	3150.8	1557.5	2649.6	2113.7
Taxa richness	30.8	6.4	31.1	6.6	30.7	5.2	28.5	6.0	29.5	7.8	32.0	6.5
Genera richness	28.7	5.3	29.4	6.2	28.7	4.8	26.4	4.8	27.4	6.8	29.6	5.6
Ephemeroptera genera	7.5	1.6	8.1	1.4	7.5	1.6	7.0	2.7	6.7	1.8	6.6	2.3
Ephemeroptera abundance	981.8	616.4	759.7	664.1	1029.1	656.0	945.5	948.5	867.6	707.1	929.8	1263.3
Plecoptera genera	2.7	1.2	1.8	1.2	2.0	1.3	2.2	1.1	2.4	1.3	2.3	2.0
Plecoptera abundance	230.8	184.7	165.6	216.1	149.5	186.4	255.1	308.4	150.0	154.7	177.7	234.1
Trichoptera genera	3.6	2.3	3.1	1.7	3.5	1.3	2.7	1.7	3.3	1.6	3.0	1.0
Trichoptera abundance	146.3	158.0	133.9	151.6	115.6	166.4	99.3	99.0	142.8	105.7	211.4	253.4
Coleoptera genera	0.8	0.6	1.1	0.7	0.9	0.5	0.7	0.5	1.2	0.8	0.9	0.5
Coleoptera abundance	510.9	326.4	338.8	311.2	356.8	325.7	188.4	168.4	103.5	116.2	65.0	50.2
Diptera genera	4.3	1.8	4.1	1.2	4.0	1.2	4.0	1.5	4.0	1.8	4.4	1.8
Diptera abundance	1806.9	1125.2	1243.1	967.5	1355.5	723.6	1447.2	1043.1	1750.5	1183.5	1136.6	869.9
Rare taxa, <1% of total abundance	16.4	4.5	15.9	5.5	16.2	3.5	15.5	4.0	15.5	5.0	17.8	4.4

Table 10. Results of ANOVA to evaluate differences in aquatic invertebrate assemblage measures among sampling locations. Only sites that were sampled in multiple years, 1984, 1987, 1991, 1992, 1994, 1995, 1996 were included in the analysis. Significant pairwise differences between categories were determined by the Ryan-Einot-Gabriel-Welsch multiple range test with the critical alpha value set to 0.05. The degrees of freedom were 5, 60 for all comparisons.

			Significantly Different Means	
Measure	**F Value**	**Pr > F**	**Maximum**	**Minimum**
Number of individuals	0.76	0.5480		
Abundance	0.74	0.5932		
Taxa richness	0.40	0.8503		
Genera richness	0.55	0.7382		
Ephemeroptera genera	0.91	0.4805		
Ephemeroptera abundance	0.14	0.9824		
Plecoptera genera	0.59	0.7082		
Plecoptera abundance	0.45	0.8115		
Trichoptera genera	0.47	0.7950		
Trichoptera abundance	0.61	0.6935		
Coleoptera genera	0.85	0.5183		
Coleoptera abundance	5.45	0.0003	S1:250	S8:813
Diptera genera	0.11	0.9890		
Diptera abundance	0.81	0.5457		
Rare taxa, <1% of total abundance	0.40	0.8480		

Rarity

Contrary to mean assemblage values which were fairly similar among sites and even treated and untreated sites, rarity of individual taxa was high. Based on relative abundances and occurrences in individual years and site, the majority of taxa collected could be considered uncommon or rare. Three genera, *Pericoma* (Diptera: Psychodidae), *Baetis* (Ephemeroptera: Baetidae), and *Drunella* (Ephemeroptera: Ephemerellidae) accounted for 50% of all genera identified. Fourteen genera (19% of the total genera) accounted for 90% of the total number of genera identified and 42 other genera accounted for only 1% of the total number of individuals identified to genera (Figure 3). Of the 44,194 individuals identified to 75 unique genera, 26 genera (35%) were represented by < 10 individuals, 27 genera (36%) were represented by > 100 individuals, 14 genera were represented by 500 or more individuals (19%), 11

genera were represented by 1000 or more individuals (15%), and two genera were represented by 5,000 or more individuals (3%). The mean number of rare taxa, as measured by the number of taxa whose individual abundances were less than 1% of the total sample abundance, was similar among sampling locations (Table 9) and rotenone treatment and control and sites (Table 5), but did vary significantly among years (Table 7). The highest numbers of rare taxa were collected in 1995 and the fewest in 1987.

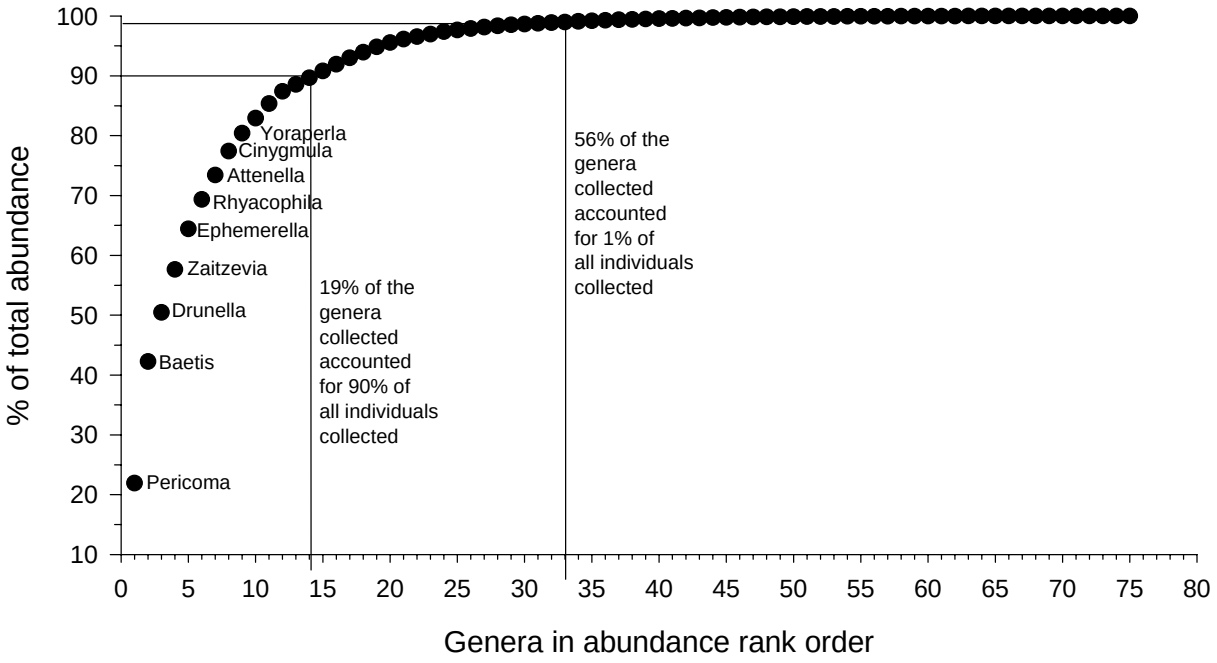

Figure 3. Genera abundance curve for historic data.

The number of genera present in individual years in Silver King Creek was about half of the 65 total genera collected in Silver King Creek over all years (Appendix 4). For example in 1984 and 1987, 30 genera were collected and 35 were missing. In 1991, 37 genera were collected and 28 were missing. In 1992, 35 genera were collected and 30 were missing. In 1993, 39 genera were collected and 26 were missing. In 1994, 37 genera were collected and 28 were missing. In 1995 36 genera were present and 29 were missing. In 1996, 33 genera were present and 32 were missing. The number of genera collected at each site each was generally similar except for site S4:700, where genera richness was about 70% of the total number of genera collected in Silver King

Creek. Of the 65 total genera collected in Silver King Creek, 45 genera were collected at site S7:775, 48 genera were collected at site S6:738, 23 genera were collected at site S4:700, 47 genera were collected at site S3:641, and 49 genera were collected at site S2:640.

At all sites that were sampled in Silver King Creek over 8 years between 1984 and 1996, about an equal number of genera could be considered rare, common, or somewhere in between. Nineteen genera (29%) were found in only 1 year, eight genera (12%), were found in 2 years, four genera (6%) were found in 3 years, three genera (5%) were found in 4 years, two genera (3%) were found in 5 years, 10 genera (15%) were found in 6 years, four genera (6%) were found in 7 years, and 15 genera (23%) were found in all 8 years of sampling (Appendix 6). Fifty-two percent of the genera were found in 4 or fewer years and 47% were found in 5 or more years.

The same general pattern of genera occurrence was seen at the single site sampled in Four Mile Canyon Creek over 8 years between 1984 and 1996 (Appendix 5). Overall, there were fewer total genera collected in Four Mile Creek, but the relative occurrence of genera among years was similar. Nine genera (19%) were found in only 1 year, four genera (9%), were found in 2 years, eight genera (17%) were found in 3 years, three genera (6%) were found in 4 years, seven genera (15%) were found in 5 years, seven genera (15%) were found in 6 years, five genera (11%) were found in 7 years, and four genera (9%) were found in all 8 years of sampling. Fifty-one percent of the genera were found in 4 or fewer years and 49% were found in 5 or more years.

Recent Samples

A total of 54,906 organisms were collected among 14 sampling locations between 2003 and 2006 (Appendix 2). The total number of individuals identified to genus or species was 35,706 (65%, Appendix 8). Total genera richness was 85 across all years. Observed genera accumulation curves had a similar shape each year (Figure 4), but were steeper in some years than others reflecting greater overall diversity in some years. Differences among years for Chao 1 genera estimate curves were slightly different than the observed genera curves. Chao 1 genera richness estimates were much higher in 2006 than in 2005, and both of these years were higher than 2003 and 2004 which had similar end values (Figure 5). These results reflect the large number of genera collected in 2005 and 2006 that only occurred in a few samples or were represented by just a few individuals (Appendix 8).

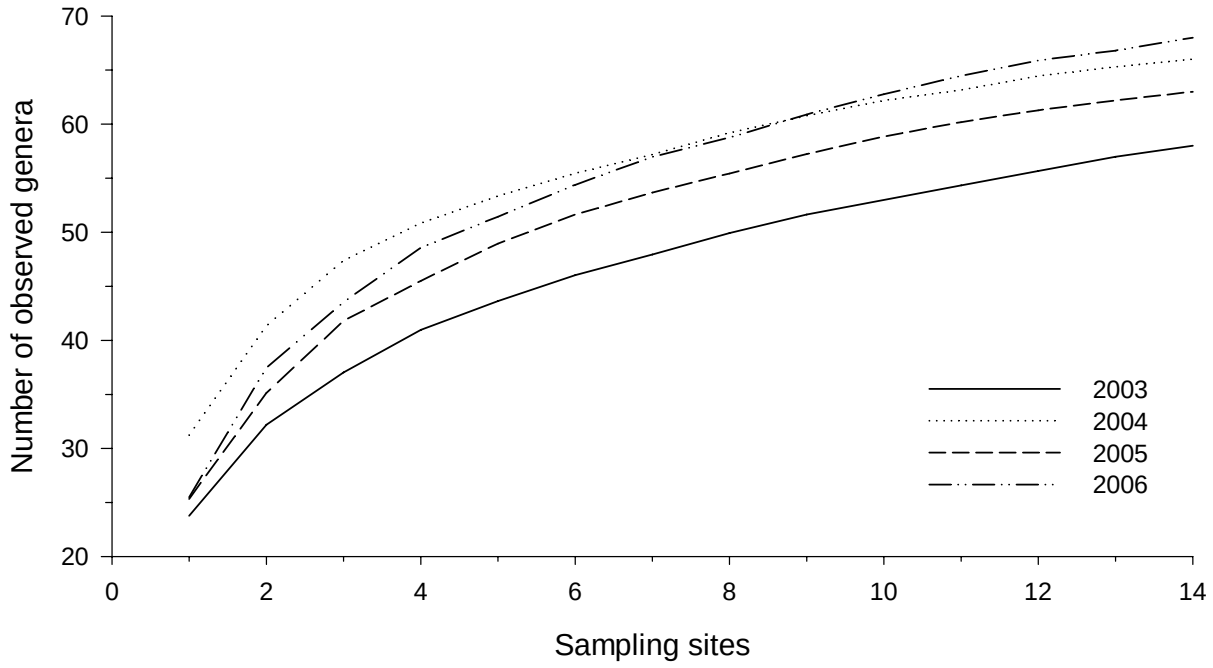

Figure 4. Genera accumulation curves showing the number of observed genera collected each year among all sampling locations for samples collected between 2003 and 2006.

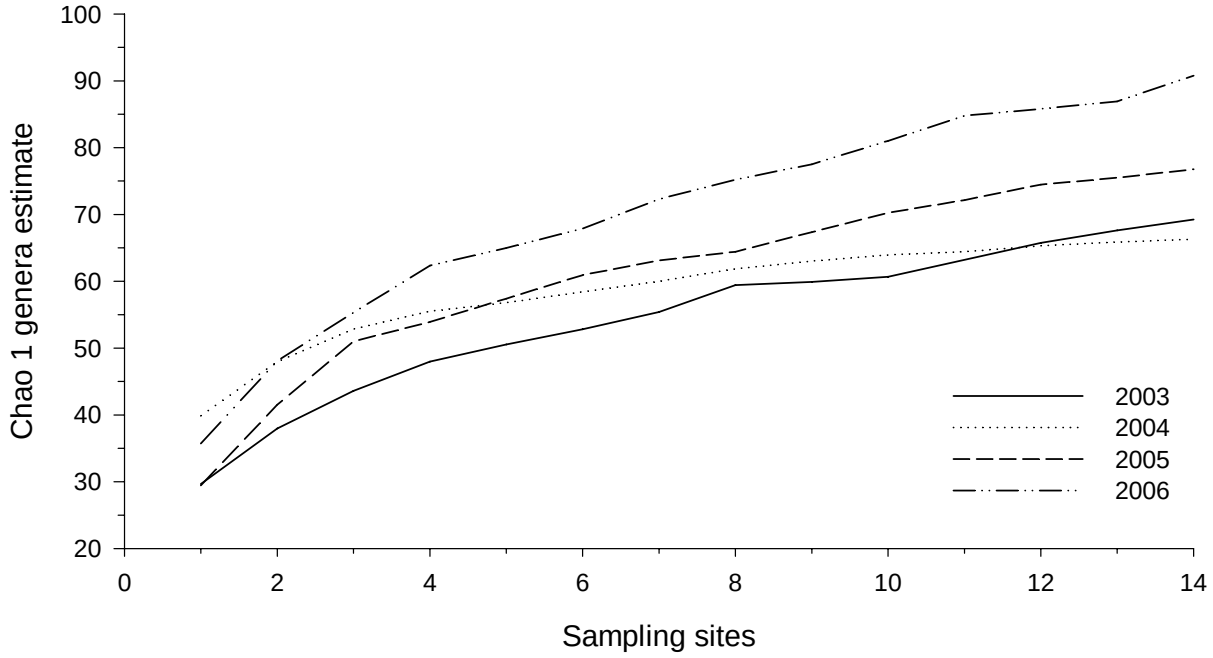

Figure 5. Chao 1 genera richness estimation curves for samples collected among all sampling locations between 2003 and 2006.

Treated Versus Untreated Sites

There were few measureable differences in mean aquatic invertebrate assemblage measures between sites that were treated with rotenone and the two sites that were not treated (Table 11) for samples collected 10 years after the last rotenone treatment in 1993. The mean number of individuals collected, total assemblage abundance, total taxa richness, total genera richness, and genera richness within all but one of the major insect orders were all statistically similar between treated and untreated sampling locations. The only statistically significant difference between treatment and control sites was the number of Coleoptera genera and the abundance of Coleoptera collected. Coleoptera, primarily Elmidae were taxonomically richer and more abundant at treatment sites. This result was opposite to that observed in the historic data set. The reason for this is unknown. Darby et al. (2004) found Coleoptera abundances, primarily Elmidae, recovered quickly following rotenone treatment. There was no difference in the mean number of rare taxa collected between treated and untreated sites. Five genera were not collected at treated sites that were collected at untreated sites;

Clinocera (Diptera: Empididae), *Oreogeton* (Diptera: Empididae), *Pedicia* (Diptera: Tipulidae), *Moselia* (Plecoptea: Leuctridae), and *Kogotus* (Plecoptera: Pelodidae). Forty-three genera were collected at treated sites that were not collected at untreated sites; however, nearly eight times as many individuals were collected at treated sites as compared to untreated sites (Appendix 9).

Table 11. Results of ANOVA to evaluate differences in aquatic invertebrate assemblage measures among rotenone treated and control stations for historic sample collected between 2003 and 2006. Sample sizes were 48 for treatment and 8 for control sites. The degrees of freedom for all tests were 1, 54.

	Treatment		Control			
	Mean	**SD**	**Mean**	**SD**	**F- Value**	**Pr > F**
Number of individuals	1017.0	618.0	759.5	426.3	1.28	0.2634
Abundance	3553.8	2223.3	2625.2	1624.0	1.27	0.2624
Taxa richness	41.3	6.0	39.7	4.8	0.51	0.4787
Genera richness	37.0	5.1	34.7	3.6	1.39	0.2430
Ephemeroptera genera	7.4	1.7	7.1	0.6	0.20	0.6595
Ephemeroptera abundance	1383.1	874.7	913.3	587.5	2.13	0.1503
Plecoptera genera	3.8	1.7	3.8	1.1	0.00	0.9744
Plecoptera abundance	521.2	632.1	858.0	623.0	1.95	0.1679
Trichoptera genera	4.8	1.7	3.8	0.6	2.53	0.1173
Trichoptera abundance	343.0	420.7	107.8	31.0	2.46	0.1227
Coleoptera genera	2.3	1.1	1.1	0.3	8.82	0.0044
Coleoptera abundance	306.0	363.5	24.8	23.4	4.71	0.0344
Diptera genera	4.5	1.3	5.2	1.6	1.76	0.1899
Diptera abundance	819.2	780.5	658.3	557.0	0.31	0.5793
Rare taxa, <1% of total abundance	23.8	5.2	23.7	4.5	0.00	0.9583

Annual Variation

The total number of individuals collected and identified to genera each year varied from 6,280 in 2005 to 13,618 in 2004 (Appendix 10). The total number of genera collected among all years was 85. The total number of genera collected each year at all sites ranged from 59 to 68 and the number of genera not present in a single year ranged from 17 to 26 (Appendix 10). Six of the 15 ecological measures varied significantly among years (Tables 12 and 13). The mean number of individuals per sample, total

sample abundance, Ephemeroptera genera and abundance, Plecoptera genera, and Diptera abundance varied significantly among years. These were all higher in 2004, except Diptera abundance which was highest in 2003. Minimum values for these measures occurred in 2003, 2004, and 2005. The mean number of rare taxa collected each year was similar among years and averaged about 50% of the total taxa richness.

Table 12. Mean ± SD of aquatic invertebrate assemblage measures among years for samples collected between 2003 and 2006.

	2003		2004		2005		2006	
Measure	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Number of individuals	1101.6	569.5	1490.6	675.5	635.2	275.3	693.5	379.8
Total abundance	3860.4	2040.6	5253.9	2358.7	2175.4	1116.5	2394.9	1463.5
Taxa richness	39.1	4.1	42.5	4.6	41.2	5.8	41.7	8.2
Genera richness	36.3	3.3	38.6	4.0	35.9	5.6	35.9	6.5
Ephemeroptera genera	6.2	1.0	8.1	2.2	7.4	1.4	7.8	1.0
Ephemeroptera abundance	1316.9	839.4	2119.5	887.2	771.8	443.2	1055.9	541.6
Plecoptera genera	2.8	1.0	4.7	1.9	4.3	1.1	3.6	1.9
Plecoptera abundance	383.4	354.1	947.7	865.0	495.4	544.5	450.9	575.4
Trichoptera genera	4.9	1.7	4.6	1.8	4.6	1.3	4.8	2.0
Trichoptera abundance	412.4	436.4	398.4	601.6	209.0	144.1	218.0	238.1
Coleoptera genera	2.0	0.9	2.3	1.4	2.0	1.0	2.3	1.2
Coleoptera abundance	260.6	248.3	457.0	527.9	164.4	184.3	181.6	295.7
Diptera genera	5.1	1.4	4.7	1.1	4.4	1.7	4.3	1.4
Diptera abundance	1174.9	912.8	1079.3	953.9	513.9	289.6	416.9	274.1
Rare taxa, <1% of total abundance	22.7	4.0	24.9	4.1	24.4	6.7	23.3	5.6

Table 13. Results of ANOVA to evaluate differences in aquatic invertebrate assemblage measures among years for samples collected between 2003 and 2006. Significant pairwise differences between categories were determined by the Ryan-Einot-Gabriel-Welsch multiple range test with the critical alpha value set to 0.05. The degrees of freedom for all tests were 3, 52.

			Significantly Different Means	
Measure	**F Value**	**Pr > F**	**Maximum**	**Minimum**
Number of individuals pre sample	8.89	<0.0001	2004	2005
Total abundance	8.76	<0.0001	2004	2005
Taxa richness	0.87	0.4619		
Genera richness	0.90	0.4479		
Ephemeroptera genera	4.38	0.0080	2004	2003
Ephemeroptera abundance	9.51	<0.0001	2004	2005
Plecoptera genera	4.09	0.0111	2004	2003
Plecoptera abundance	2.45	0.0736		
Trichoptera genera	0.12	0.9478		
Trichoptera abundance	1.09	0.3596		
Coleoptera genera	0.29	0.8306		
Coleoptera abundance	2.18	0.1013		
Diptera genera	1.01	0.3953		
Diptera abundance	4.39	0.0079	2003	2006
Rare taxa, <1% of total abundance	0.53	0.6622		

Variation Among Sampling Stations

There were few measureable differences in mean aquatic invertebrate assemblage measures between sampling locations (Tables 14, 15, and 16). Four of the 15 measures were significantly different among sites. Plecoptera abundance, Trichoptera genera, and Coleoptera genera and abundance were significantly different among sampling locations. All measures that were significantly different were highest in tributary streams. No measures were highest, suggesting better condition, at untreated sites. The mean number of Coleoptera genera collected was significantly lower at an untreated site on Tamarack Creek (TAMAC-13).

Table 14. Mean ± SD of aquatic invertebrate assemblage measures among sites located on tributary streams. Samples were collected between 2003 and 2006. Sample size was 4 for all sites.

Sample size	COVAL-11		COVAL-12		CVALL-09		CVALL-10		TAMAC-13		TAMAC-14	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Number of individuals	1478.8	375.7	1574.3	605.4	1481.5	990.2	1610.8	732.9	815.8	290.8	703.3	575.5
Abundance	5246.3	1285.9	5522.0	2029.1	5242.5	3488.1	5623.0	2422.9	2906.8	1069.0	2343.8	2190.9
Taxa richness	46.3	6.6	41.3	6.2	45.3	8.1	45.0	2.4	40.0	6.4	39.5	3.9
Genera richness	41.8	3.9	38.5	5.2	39.5	4.5	39.5	1.3	35.3	3.6	34.3	4.2
Ephemeroptera genera	7.8	1.9	6.5	1.7	6.3	1.0	5.5	1.7	7.0	0.8	7.3	0.5
Ephemeroptera abundance	1633.8	773.5	1918.3	705.6	1611.0	1102.4	1310.3	643.3	946.5	371.3	880.3	815.2
Plecoptera genera	5.5	1.0	5.0	2.4	4.5	1.3	5.5	1.7	4.0	1.4	3.8	1.0
Plecoptera abundance	1408.0	844.6	867.8	595.7	816.0	492.3	1454.8	972.8	994.0	655.0	722.0	653.7
Trichoptera genera	5.3	1.5	4.3	0.5	5.5	2.5	7.3	2.1	3.8	0.5	4.0	0.8
Trichoptera abundance	676.0	258.4	420.8	313.5	246.3	151.3	824.5	1030.4	98.3	14.3	117.5	42.4
Coleoptera genera	3.8	1.3	3.8	0.5	2.5	0.6	1.8	0.5	1.0	0.0	1.3	0.5
Coleoptera abundance	334.5	195.8	945.3	571.9	454.8	561.4	519.5	329.9	18.5	13.8	31.3	31.4
Diptera genera	4.8	1.0	4.8	1.3	5.0	0.8	4.0	1.6	6.3	1.7	4.3	1.0
Diptera abundance	637.5	202.7	973.5	750.7	1639.3	1542.7	1216.8	1456.8	767.0	441.1	549.8	705.6
Rare taxa, <1% of total abundance	26.3	5.1	24.5	5.4	26.3	5.6	26.5	5.6	24.0	5.2	23.5	4.7

Table 15. Mean ± SD of aquatic invertebrate assemblage measures among sites located on Silver King Creek. Samples were collected between 2003 and 2006. Sample size was 4 for all sites.

	SKING-01		SKING-02		SKING-03		SKING-04		SKING-05		SKING-06		SKING-07		SKING-08	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Number of individuals	972.5	628.6	1037.5	583.2	855.5	334.3	690.8	488.1	475.0	308.5	770.5	209.8	480.3	197.9	777.0	354.4
Abundance	3475.0	2233.1	3718.8	2089.9	3066.5	1198.0	2331.5	1906.5	1397.8	1310.7	2761.8	752.2	1555.3	909.2	2705.8	1390.2
Taxa Richness	39.5	4.8	41.0	5.4	42.0	3.2	40.0	7.1	42.0	5.4	41.5	4.4	35.0	7.7	37.5	6.6
Genera richness	36.3	3.9	37.0	3.9	37.5	2.6	35.5	6.7	36.8	5.6	36.8	4.6	32.0	8.3	33.0	6.5
Ephemeroptera genera	7.3	1.0	8.5	2.1	8.8	1.3	7.3	1.3	8.3	1.3	8.5	1.9	7.5	1.3	6.8	2.1
Ephemeroptera abundance	1652.3	1300.6	1805.3	1441.1	1561.3	839.7	941.3	699.0	766.5	930.9	929.8	370.6	864.8	555.6	1603.3	778.0
Plecoptera genera	3.3	0.5	3.0	1.8	3.3	1.3	2.3	0.5	3.5	2.1	3.3	1.3	3.5	2.1	3.8	2.4
Plecoptera abundance	211.0	125.5	390.8	531.7	368.3	104.6	115.8	69.5	160.8	183.9	262.0	133.2	71.3	34.1	128.5	104.4
Trichoptera genera	5.0	1.6	4.3	0.5	4.3	1.0	4.0	1.4	6.3	2.2	5.5	1.3	3.0	0.8	4.0	1.4
Trichoptera abundance	193.5	87.1	210.0	77.4	198.8	82.7	98.5	54.5	218.0	146.8	629.8	761.9	111.3	96.1	289.0	211.1
Coleoptera genera	1.8	1.0	2.0	1.6	2.8	1.0	2.0	0.8	1.8	1.0	3.0	0.0	1.3	0.5	1.5	0.6
Coleoptera abundance	410.3	285.2	243.8	256.4	263.8	292.5	248.8	234.4	48.3	8.4	152.3	22.7	13.3	18.6	38.8	27.1
Diptera genera	4.5	1.0	5.3	1.0	5.0	1.2	5.3	1.7	4.0	1.8	3.3	1.0	3.8	2.1	5.0	1.4
Diptera abundance	948.5	687.1	991.0	715.8	610.0	192.0	881.5	925.7	185.5	96.5	710.5	321.7	424.0	222.4	613.0	523.1
Rare taxa, <1% of total abundance	22.3	4.4	23.3	6.2	24.3	4.5	22.8	6.0	22.5	5.8	25.8	4.6	17.8	7.5	24.3	2.8

Table 16. Results of ANOVA to evaluate differences in aquatic invertebrate assemblage measures among sampling locations for recent samples collected between 2003 and 2006. Significant pairwise differences between categories were determined by the Ryan-Einot-Gabriel-Welsch multiple range test with the critical alpha value set to 0.05. The degrees of freedom for all tests were 13, 42.

			Significantly Different Means	
Measure	F Value	Pr > F	Maximum	Minimum
Number of individuals	2.30	0.0208		
Abundance	2.39	0.0167		
Taxa richness	1.08	0.4004		
Genera richness	1.15	0.3466		
Ephemeroptera genera	1.59	0.1260		
Ephemeroptera abundance	0.90	0.5626		
Plecoptera genera	1.42	0.1893		
Plecoptera abundance	3.64	0.0007	CVALL-10	SKING-07
Trichoptera genera	2.43	0.0148	CVALL-10	SKING-07
Trichoptera abundance	1.62	0.1166		
Coleoptera genera	4.71	<0.0001	CVALL-11	TAMAC-13
Coleoptera abundance	3.51	0.0010	COVAL-12	SKING-07
Diptera genera	1.22	0.2990		
Diptera abundance	0.88	0.5770		
Rare taxa, <1% of total abundance	0.72	0.7372		

Rarity

The majority of taxa collected between 2003 and 2006 could be considered uncommon or rare. A total of 85 genera were collected between 2003 and 2006. Of these 85 genera, 47 genera (55%) were collected in all 4 sampling years, 7 genera (8%) were collected in 3 of the years, 16 genera (19%) were collected in 2 of the years, and 15 genera (18%) were collected in only 1 year (Appendix 9). Genera abundance accumulation plots were similar among years (Figure 6) and showed that a few taxa were abundant while most could be considered uncommon or rare. For all samples collected between 2003 and 2006, the individual abundances of 17 common genera (20% of the total number of genera) accounted for 90% of all individuals collected, 21 (25%) other genera accounted for 9% of the total number of individuals collected, and 47 rare genera (45%) accounted for only 1% of all individuals collected (Figure 7). For 53 genera where 10 or more individuals were collected over the 4 years, 46 were found

in all 4 years of collections, 4 were found in 3 years, and two were found in only 2 years, and one was found in a single year. The opposite was generally true for less abundant taxa. For 32 taxa that fewer than 10 individuals were collected over 4 years of sampling, *Lepidostoma* (Trichoptera: Lepidostomatidae) was collected in all 4 years. *Hyalella* (Amphipoda: Hyalellidae), *Moselia* (Plecoptera: Leuctridae), and *Psychoglypha* (Trichoptera: Limnephilidae) were collected in 3 years, 14 other genera were collected in 2 years, and 14 other genera were collected in only a single year (Appendix 9). Three genera, *Baetis* (Ephemeroptera: Baetidae), *Yoraperla* (Plecoptera: Peltoperlidae), and *Drunella* (Ephemeroptera: Ephemerellidae) accounted for about 50% of all genera identified.

Of the 35,706 individuals identified to 85 unique genera (Appendix 10); 32 genera (38%) were represented by < 10 individuals (0.02% relative occurrence), 27 genera (32%) were represented by > 100 individuals (0.2% relative occurrence), 15 genera were represented by 500 individuals (18% relative occurrence), 9 genera were represented by 1000 individuals (11% relative occurrence), and 2 genera were represented by 5,000 individuals (2% relative occurrence). The mean number of rare taxa, as measured by the number of taxa whose individual abundances were less than 1% of the total sample abundance, was similar among sampling locations (Table 15), rotenone treatment and control sites (Table 10), and among years (Table 12).

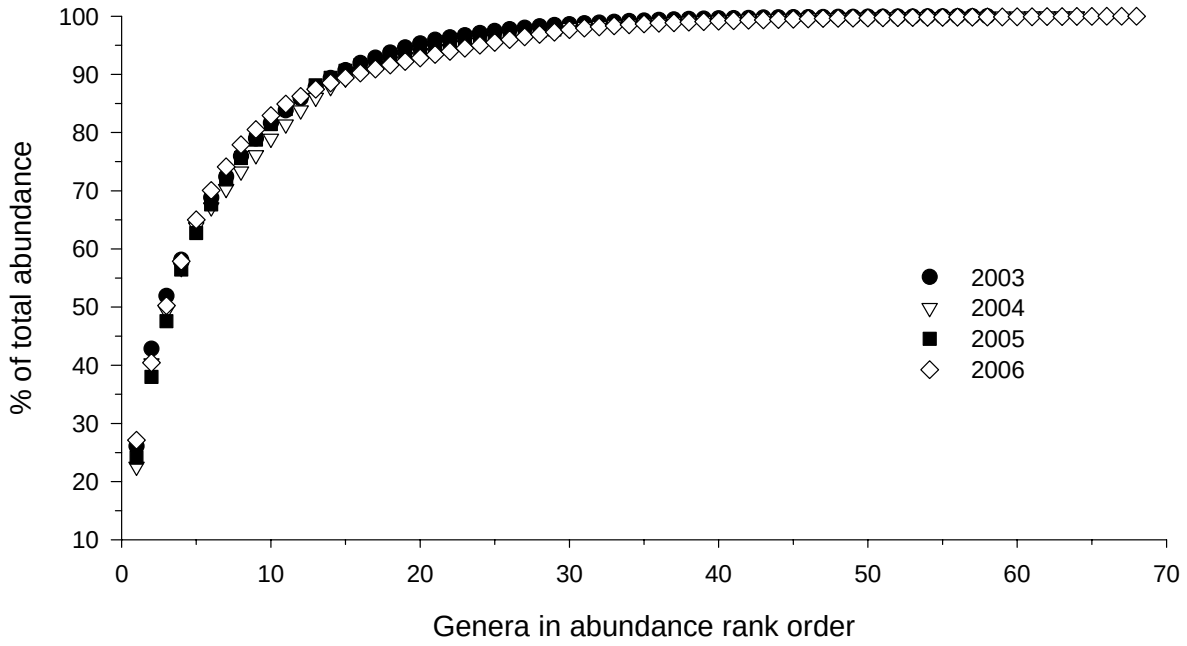

Figure 6. Genera abundance accumulation plots for each year. Data points represent the abundance contribution of individual genera.

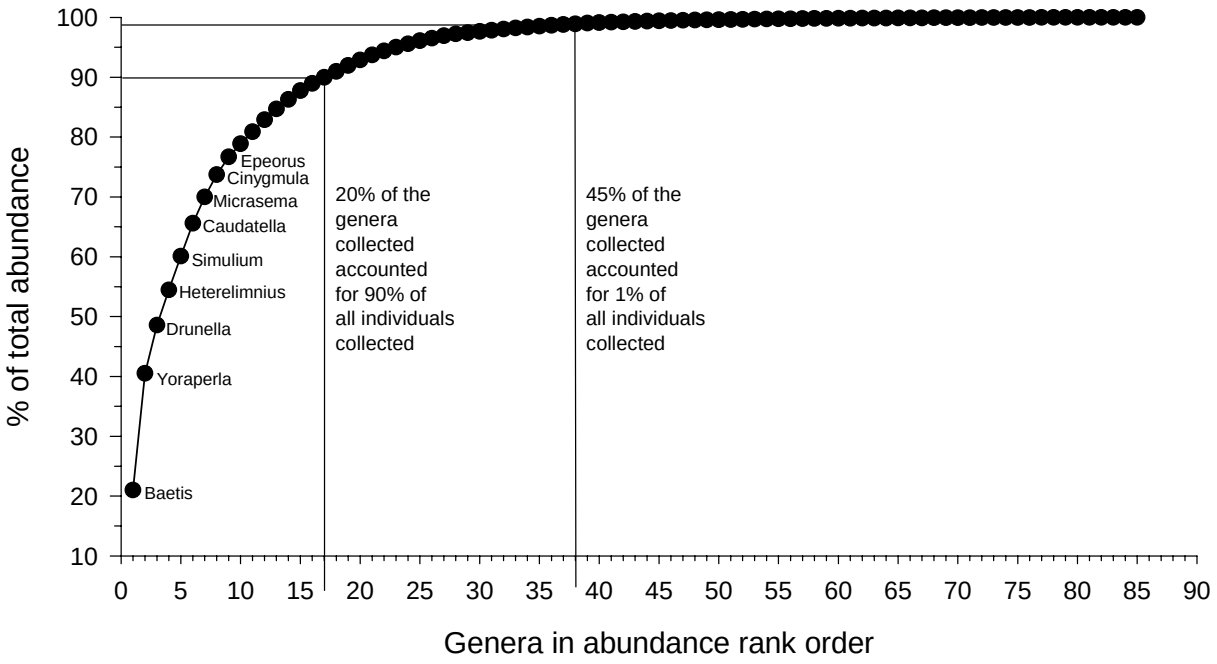

Figure 7. Genera abundance accumulation plot for all samples collected between 2003 and 2006. Symbols represent the abundance contribution of individual genera.

Differences Between Historic and Recent Samples

Pre-analysis of the data was done to evaluate differences between historic and recent samples. Comparisons between data sets collected in different decades can be problematic. Obvious problems can stem from differences in sampling locations, sampling methods, and laboratory techniques. Less obvious problems are often associated with environmental changes that may have occurred along with changes in the primary variable of interest, rotenone in this study.

Sampling intensity and difference in laboratory procedures are known to influence taxa richness estimates (Vinson and Hawkins 1998) and assemblage composition. Taxa richness typically increases with sampling effort as measured by sampling area, the number and type of habitats sampled, and the number of individuals identified (Vinson and Hawkins 1996). There were several commonalities between the two data sets that should reduce biases. The same numbers of samples were collected with the same sampling device in riffle habitats during the same time of year. Two complicating factors were that most of the samples were not collected from the same locations in the basin (Figure 1) and that the samples were identified by two different aquatic macroinvertebrate processing laboratories.

The topics we evaluated in this analysis were:

1. Overall differences in the taxa collected and identified between historic and recent samples.
2. Differences between assemblages collected historically at two untreated sites on Four Mile Canyon Creek and Fly Valley Creek and recent data collected at two untreated sites on Tamarack Creek.
3. Differences between assemblages collected recently at historic treated sites and assemblages collected recently at untreated sites.

Comparisons between the two data sets included evaluating taxa accumulation curves, mean differences in individual samples, and an evaluation of all taxa collected during each study period. To reduce differences due to recent changes in the availability of better taxonomic resources we limited our analyses and interpretations to the genera

level, thus taxon identified to the species level were reduced to genus and taxon identified to family or higher levels were excluded from the data set. We felt that filtering the data this way improved our capacity to make comparisons.

Overall Assemblage Differences

There was no relationship between the number of individuals collected and genera richness for historic samples (includes both treated and untreated sites, Figure 8), whereas there was a significant relationship between the number of individuals collected in each sample and genera richness for recent samples (includes both treated and untreated sites). To reduce this effect, a random subsample of 500 individuals was selected from each sample. Of the 136 samples, only 28 had less than 500 individuals. For these samples, all individuals were included in the analyses. There was no relationship between genera richness and the estimated number of individuals per square meter for this data set. However, genera richness was still consistently higher in recent samples (Figure 9 and 10).

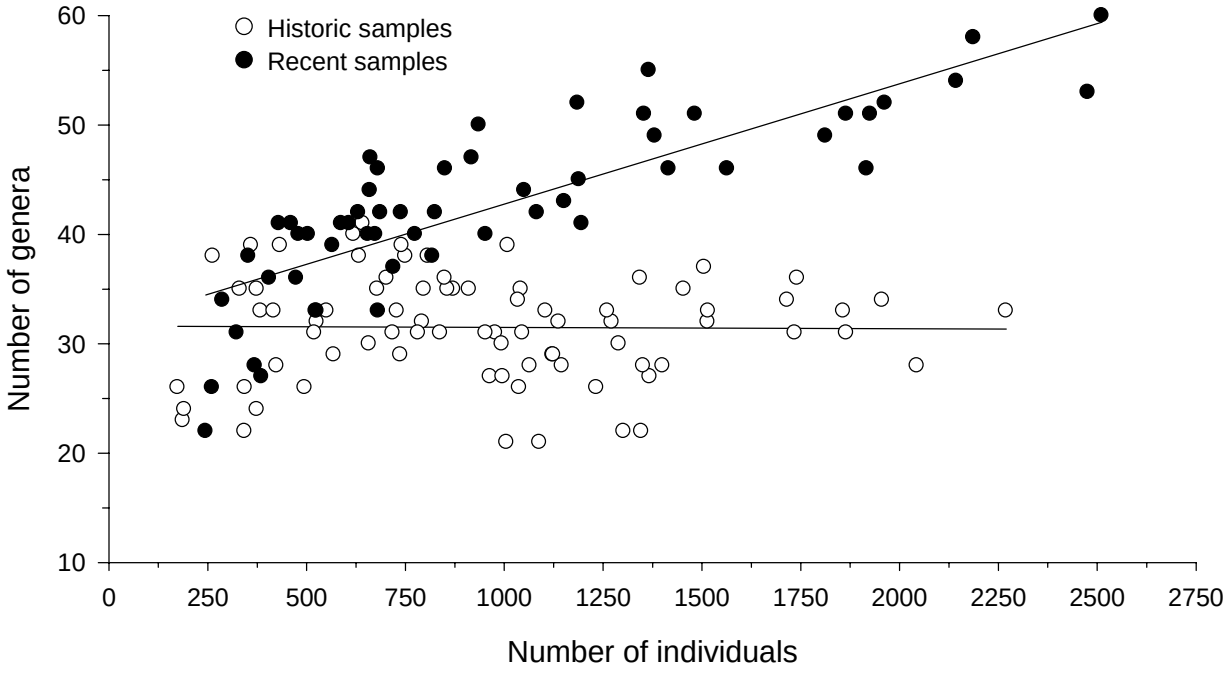

Figure 8. Relationship between genera richness and the number of individuals collected in each sample. r^2 for the post 2003 samples was 0.68.

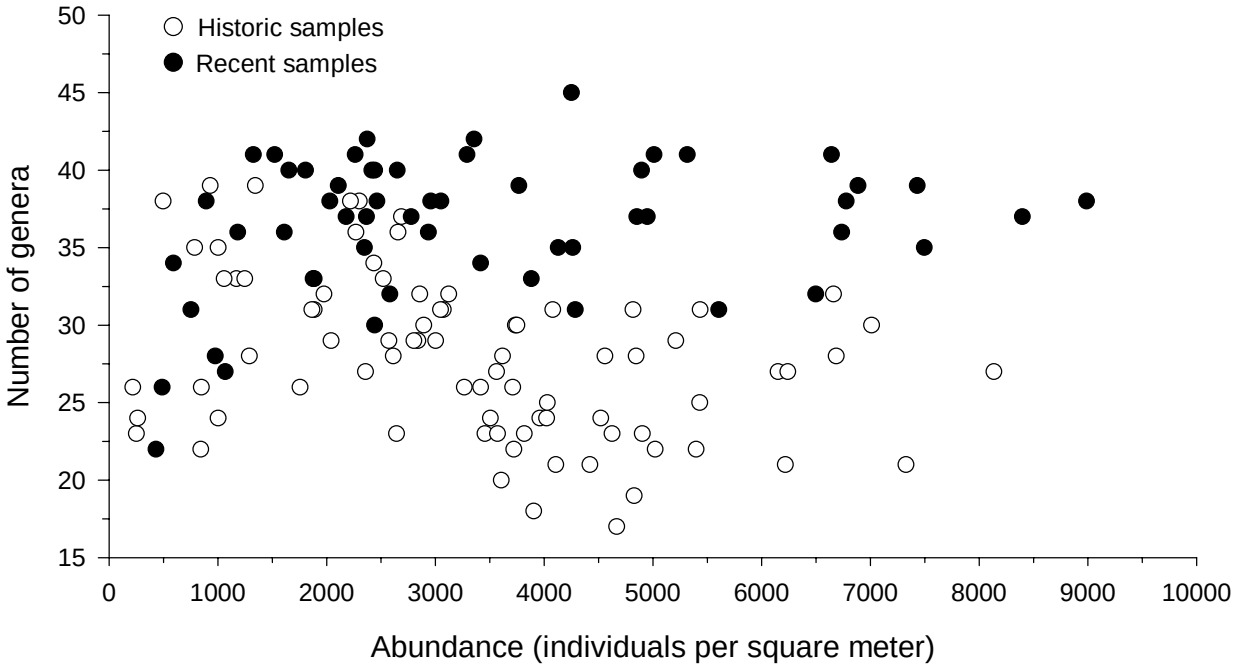

Figure 9. Relationship between genera richness and the number of individuals per square meter. Samples were standardized for 500 randomly selected individuals per sample. Density estimates are based on the number of individuals in the original sample.

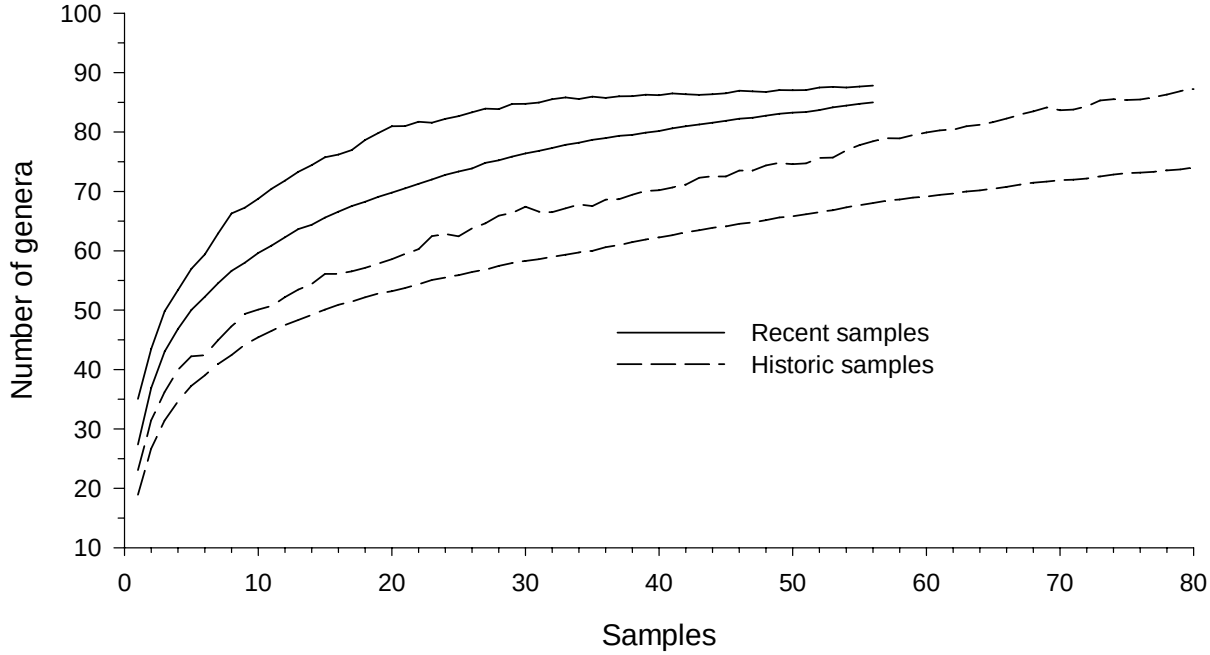

Figure 10. Genera accumulation curves for observed and Chao 1 genera estimates for historic and recent samples. The lower lines for both data sets are the observed number genera and the upper lines are the Chao 1 estimates.

Comparisons of mean per sample values between the two sample sets revealed several significant differences in taxonomic richness between the two data sets (Table 17, Figure 11). Recent samples had on average of 9% percent more families, 30% more genera, 3% more Ephemeroptera genera, 53% more Plecoptera taxa, 42% more Trichoptera genera, 165% more Coleoptera genera, and 25% Diptera genera. Differences were not limited to taxonomic richness measures, as there were differences in total invertebrate abundances and the abundances of some groups as well. The difference in mean total invertebrate abundance between the two sample sets was 2% greater in recent samples. The abundance of EPT was 56% higher in recent samples. An interesting difference between the two sample sets was that Elmidae (Coleoptera) abundances were 21% less in recent samples, but Elmidae genera richness was 165% higher.

Differences in the complete list of genera collected by each sampling period again showed a greater number of genera found in recent samples for nearly all orders and families. There were 49 families and 75 genera identified in the historic samples and 46 families and 83 genera found in the recent samples (Appendix 7). Of the 32 families where genera were identified by both labs, in 10 cases more genera were identified in the recent samples and in 5 cases more genera were identified in the historic samples.

The cause of consistently higher richness in recent as compared to historic samples is not clear. The two most likely causes are improving biological conditions or differences in laboratory procedures between the two data sets. Evidence for improving biological conditions includes the elimination of rotenone treatments since 1993 and the elimination of livestock grazing in the Silver King Creek basin since 1996. None of the aquatic invertebrate samples remain from the historic samples, so differences due to differences in laboratory procedures, such as the number of organisms identified and taxonomic resolution cannot be evaluated.

Table 17. ANOVA results to evaluate differences in aquatic invertebrate assemblage measures between historic and recent samples. Sample sizes were 80 for historic and 56 for recent samples. The degrees of freedom for all tests were 1, 134.

	Historic		Recent			
Assemblage measure	**Mean**	**SD**	**Mean**	**SD**	**F - value**	**Pr > p**
Number of individuals	949.7	475.1	980.2	598.2	0.11	0.7408
Abundance	3338.9	1793.5	3421.2	2160.4	110.68	<0.0001
Taxa richness	30.1	6.2	41.1	5.9	0.06	0.8091
Genera richness	28.1	5.4	36.7	5.0	87.45	<0.0001
Ephemeroptera genera	7.2	1.9	7.4	1.6	0.21	0.6439
Ephemeroptera abundance	1049.7	880.9	1316.0	851.6	3.09	0.0809
Plecoptera genera	2.5	1.4	3.9	1.7	26.45	<0.0001
Plecoptera abundance	269.5	348.6	569.3	636.4	12.45	0.0006
Trichoptera genera	3.2	1.7	4.7	1.7	27.23	<0.0001
Trichoptera abundance	163.1	189.6	309.4	397.9	8.19	0.0049
Coleoptera genera	0.8	0.7	2.1	1.1	80.33	<0.0001
Coleoptera abundance	243.6	273.7	265.9	350.5	0.17	0.6783
Diptera genera	3.7	1.7	4.6	1.4	11.40	0.0010
Diptera abundance	1445.1	987.6	796.3	750.6	17.20	<0.0001
Rare taxa, <1% of total abundance	15.9	4.3	23.8	5.2	95.03	<0.0001

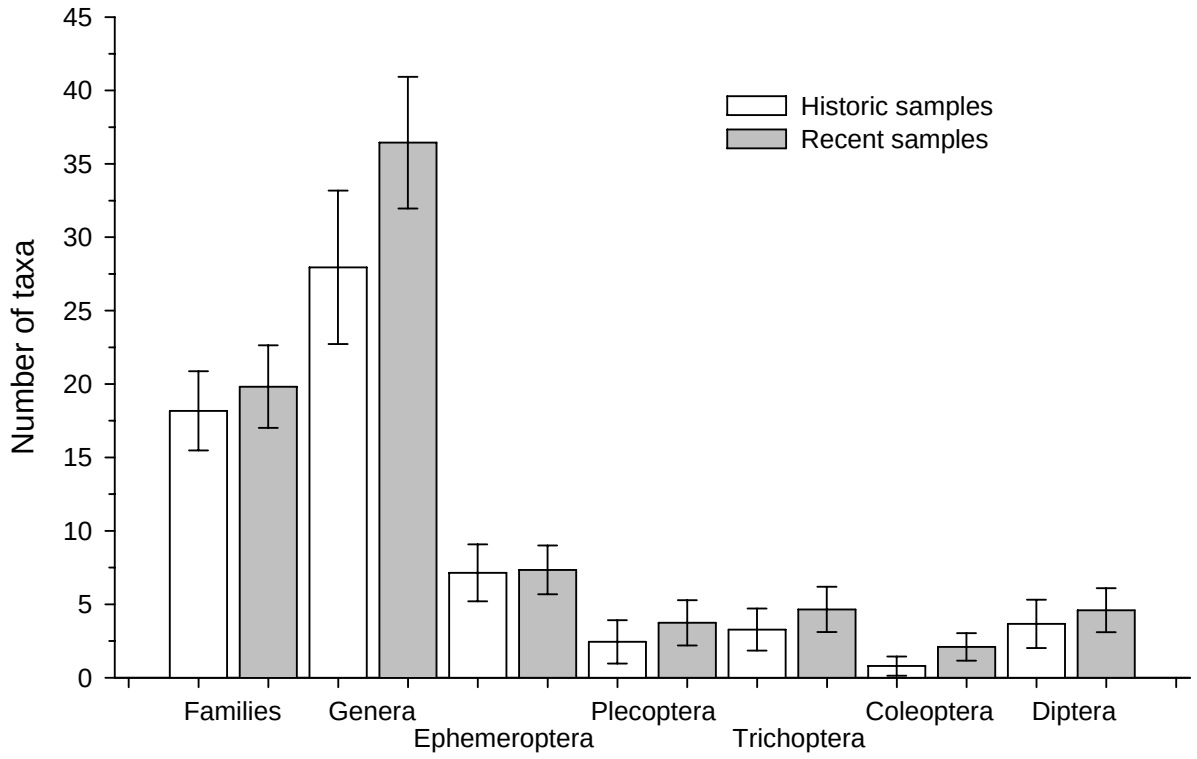

Figure 11. Differences in the number of families, total genera, and genera for individual insect orders between samples collected between 1984 and 1987, and samples collected between 2003 and 2006.

Differences Between Treated and Untreated Sites

To evaluate changes due to the elimination of rotenone, we compared historic data collected on Four Mile Canyon Creek and Fly Valley Creek to recent data collected on Tamarack Creek. None of these streams were treated with rotenone. Similar values between these sites would suggest that the differences observed between historic and recent samples (Table 17 and Figure 11) may be attributed to rotenone, and not field or laboratory methods or other environmental changes, as these streams were never treated with rotenone. Conversely differences between untreated streams suggest that sampling methodology or changes in other environmental factors likely play a role in explaining the observed changes between historic and recent samples (Table 16 and Figure 11). Aquatic invertebrate data were available for Four Mile Canyon Creek from 1984, 1987, 1991, 1992, 1993, 1995, and 1996. Data were available from Fly Valley

Creek from 1984 and 1986. Data were collected annually at two sites on Tamarack Creek between 2003 and 2006.

Comparisons of mean per sample values between the two sample sets revealed similar significant differences in taxonomic richness between the two data sets as we found when comparing the data from all sampling locations (Figure 12). These results suggest that the elimination of rotenone was not the sole cause of the observed differences in aquatic invertebrate assemblages between the two data sets. If all other factors, namely habitat conditions or laboratory procedures, were similar we should not have observed these differences between the historic and recent samples collected at untreated locations. These data suggest that factors in addition to rotenone are responsible for the observed changes. Alternatively, Tamarack Creek may have inherently higher biotic richness than Four Mile Canyon Creek or Fly Valley Creek. We have no way of testing this as recent samples were not collected at Four Mile Canyon Creek or Fly Valley Creek.

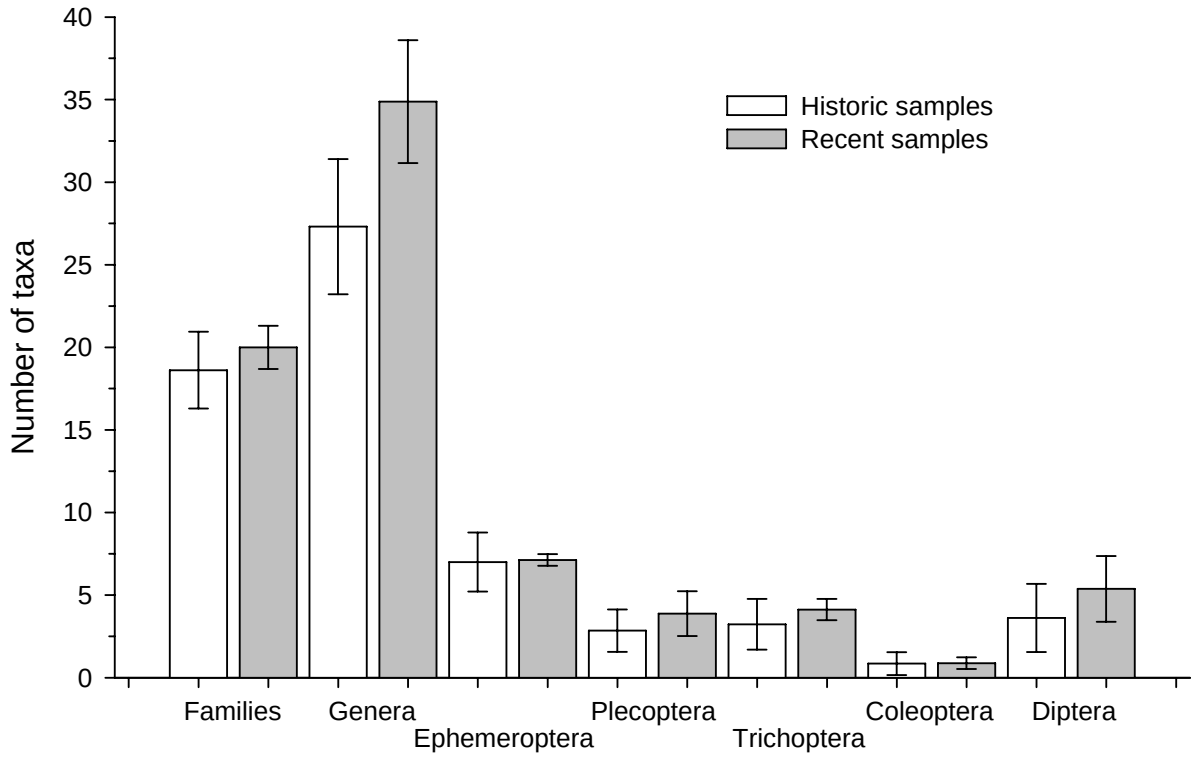

Figure 12. Differences in the number of families, total genera, and genera for individual insect orders between samples collected at the untreated Four Mile Canyon Creek and Fly Valley Creek between 1984 and 1987 and samples collected in the untreated Tamarack Creek between 2003 and 2006.

Differences Between Treated and Untreated Sites in Recent Samples

Differences in aquatic invertebrate assemblages between untreated sites on Tamarack Creek and the treated sites located on Coyote Valley Creek were overall less than that observed between historic and recent samples. The largest observed differences were in total genera richness between Coyote Valley Creek and Tamarack Creek (Figure 13), Corral Valley Creek (Figure 14), and Silver King Creek (Figure 15). These results suggest that if the assemblages present in these streams are comparable; than there have been no lasting effects of rotenone on mean aquatic invertebrate assemblage measures in Coyote Valley Creek.

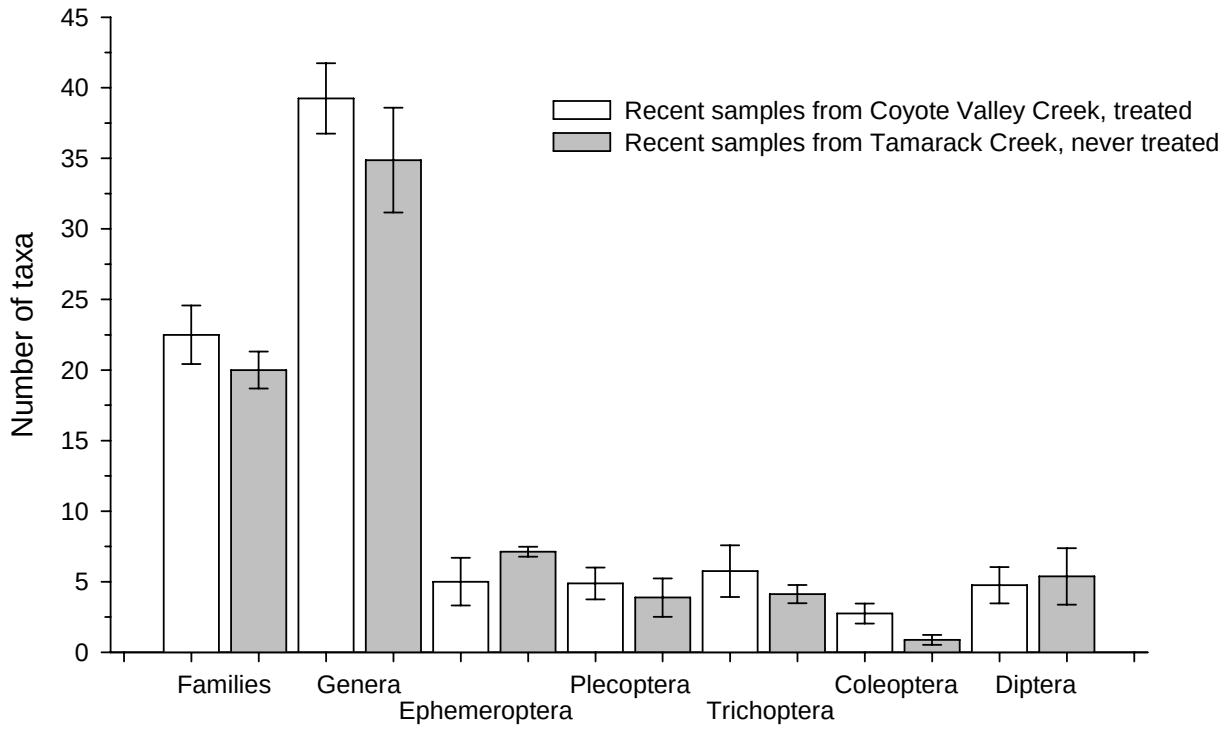

Figure 13. Differences in the number of families, total genera, and genera for individual insect orders between samples collected in Coyote Valley and Tamarack Creek. Samples were collected annually between 2003 and 2006. Coyote Valley was treated with rotenone. Tamarack Creek was never treated.

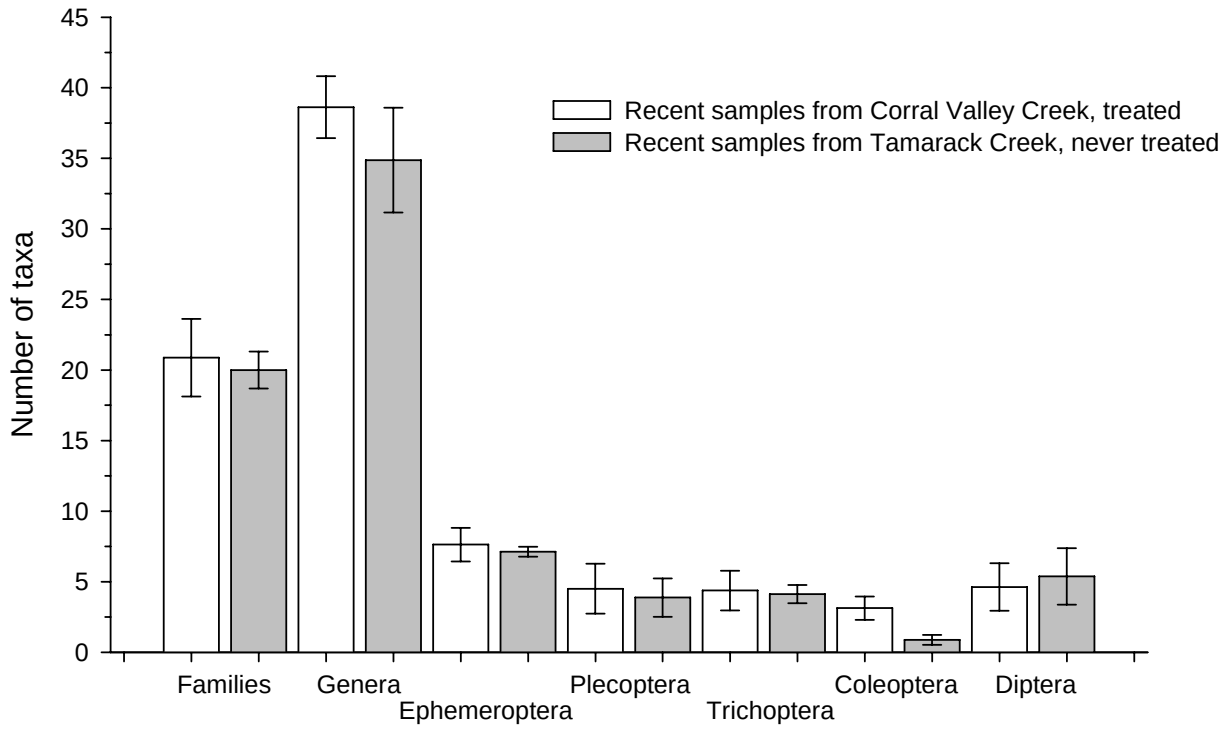

Figure 14 Differences in the number of families, total genera, and genera for individual insect orders between samples collected in Corral Valley and Tamarack Creek. Samples were collected annually between 2003 and 2006. Corral Valley was treated with rotenone. Tamarack Creek was never treated.

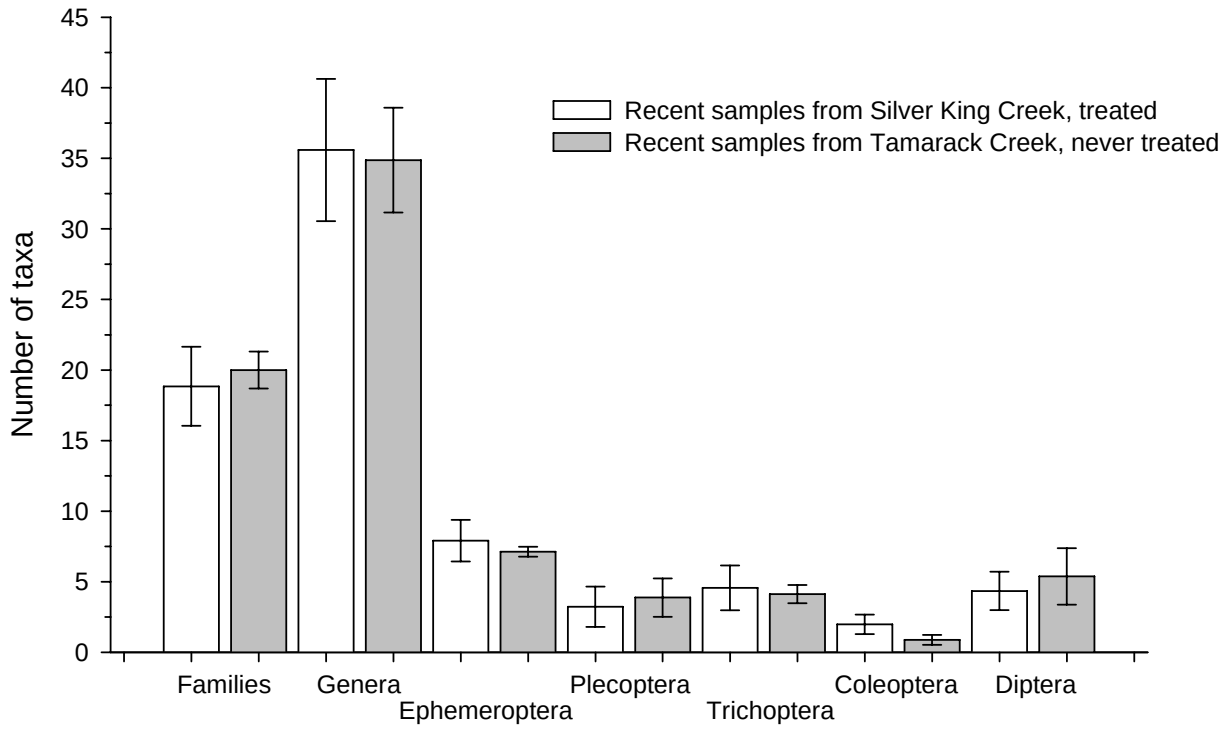

Figure 15. Differences in the number of families, total genera, and genera for individual insect orders between samples collected in Silver King Creek and Tamarack Creek. Samples were collected annually between 2003 and 2006. Silver King Creek was treated with rotenone and Tamarack Creek was untreated.

Conclusions

The cause of consistently higher richness in recent as compared to historic samples is not clear. Potential causes include, 1) the elimination of rotenone treatments since 1993 (Table 3), 2) the elimination of livestock grazing in the Silver King Creek basin since 1996 (Kling, Jason USFS personal communication), 3) differences in aquatic invertebrate sample collection methods, and 4) differences in aquatic invertebrate laboratory procedures and taxonomic resolution. Several problems exist that make it difficult to tease apart the role each of these may play in the observed changes; 1) little information is available on changes in habitat conditions between 1996 when livestock grazing was eliminated and the last samples were collected and processed by the USFS laboratory and 2003 when the samples identified by the BugLab were first collected, 2) none of the exact same sites sampled between 1984 and 1996 were

sampled between 2003 and 2006, 3) only a single control (untreated with rotenone) site, Four Mile Canyon Creek, was sampled more than twice in the early dataset and this stream was not sampled between 2003 and 2006, 4) none of the aquatic invertebrate samples remain from the early samples, so the taxonomic quality of these samples can be evaluated, and 5) none of the raw data exists in terms of the percentage of each sample processed or the individual counts of the number of organisms identified in each sample.

One obvious change was the elimination of rotenone treatments. Rotenone was first used in the basin in 1964 and was used in several other years up until 1993 (Table 2). Ten years of recovery from these rotenone treatments may account for some of these differences. Future sampling in Four Mile Canyon Creek, where rotenone was never applied, would help address this problem. If few differences between historic and present samples were found, this would suggest that the elimination of rotenone may explain the current observed differences between historic and recent samples, as all of the differences can be considered positive or improving. The elimination of livestock grazing has also likely led to improved habitat conditions that have benefited aquatic invertebrate assemblages. Unfortunately, with the data provided, we cannot separate these factors.

These overall results of these comparisons are that despite our best efforts to standardize the data generated by the two laboratories, large differences in aquatic invertebrate assemblage measures and the occurrence of individual taxa remained between the two data sets. These differences prevent us from being able to further evaluate changes between the two sample sets as we cannot separate the effects of rotenone from methodological differences and other environmental changes. We believe these differences and the unanswered questions concerning the historic data made it inappropriate to evaluate changes in taxa occurrences over time using the historic data set.

Based on the data collected between 2003 and 2006, annual and spatial variability in mean aquatic invertebrate assemblage measures were generally low. The coefficient of variation (CV) among years was 36% for aquatic invertebrate abundance and 6% for genera richness, which suggest that differences in these values would likely be detectable following a rotenone treatment. The opposite was true for genera level occurrences where the CV ranged from 12 to 200% and the mean was 101%. This finding, while typical for stream invertebrate studies, has serious consequences for detecting impacts of rotenone on specific genera or species. The low abundances, i.e., rarity, of most genera and species makes it even problematic that they would be collected in the future using the current methods if their populations were less than those collected between 2003 and 2006.

Rarity is broadly defined as something unusual or occurring infrequently. In ecology, there is no current accepted definition of rarity, but measures of rarity most often center on organism abundance, habitat occupancy and range size. Species can be considered rare based on one or more these criteria and they can be rare at different spatial and temporal scales. Abundances among species vary widely; some species are abundant and some or most are not. At local scales, local abundance can vary based on the amount of preferred habitat, while at broad scales, local abundance is generally higher near the center of a species' range (Poff 1997). Following disturbance events, like rotenone treatments, floods or fires, rarity will be related to both organism dispersal rates and community succession that occurs during the colonization phase. Poor dispersers will have slow colonization rates and will thus have lower incidences of occupancy and be difficult to collect. These are basic ecological reasons why species can be rare.

Ecologists have debated the role of rare taxa in detecting and quantifying ecological impairment. This debate has often centered on their role in ecosystems and the ability to accurately assess them. Minimally-disturbed sites often support more rare taxa than disturbed sites. Intentionally removing rare taxa from analyses or effectively removing them by using a small sampling effort may therefore affect the characterization of

richness and assemblage structure more strongly at minimally or least-disturbed sites than impaired sites, therefore introducing bias into assessments (Cao et al. 1998, 2002a, 2002b). In theory, rare taxa are typically associated with restricted distributions and habitat specificity, where as abundant taxa have wider geographic ranges and environmental preferences (Cao et al. 1999). Extinction risk increases with decreasing population size, so rare taxa should have a higher probability of extinction. However, empirical evidence supporting this relationship is scarce, particularly for freshwater ecosystems, and it has also been observed that rare aquatic invertebrate taxa may often increase in abundance in response to disturbance (Hawkins et al. 2000). It is likely that the sensitivity of specific taxa differs with the type and magnitude of disturbances and the colonization source and distance to that source.

For stream invertebrates, rarity is a common phenomenon. Stream environments are very diverse both in terms of habitat complexity and in the number of invertebrate species they support. There have been no complete inventories of invertebrates of any body of freshwater, but several studies to date have documented that local – stream reach level – faunas contain hundreds to thousands of species. A total of 1122 species have been reported from the Danube River, Austria and 1044 species from the Breitenbach, Germany (Strayer 2006). Vinson (unpublished data) has sampled the same location on the Logan River, Utah each month for 7 years. His results are similar to that presented here for Silver King Creek. Namely, there is little variation in the number of species or genera that are collected each month, but the occurrences of individual genera and species is very unpredictable. To date, more than 60 genera have been collected at the site, but the number of individual genera collected each month is only about 40% of the total genera found in the stream reach. On average a new genera is collected about every 2 months (Figure 16) and the genera accumulation curve shows little inclination for flattening out.

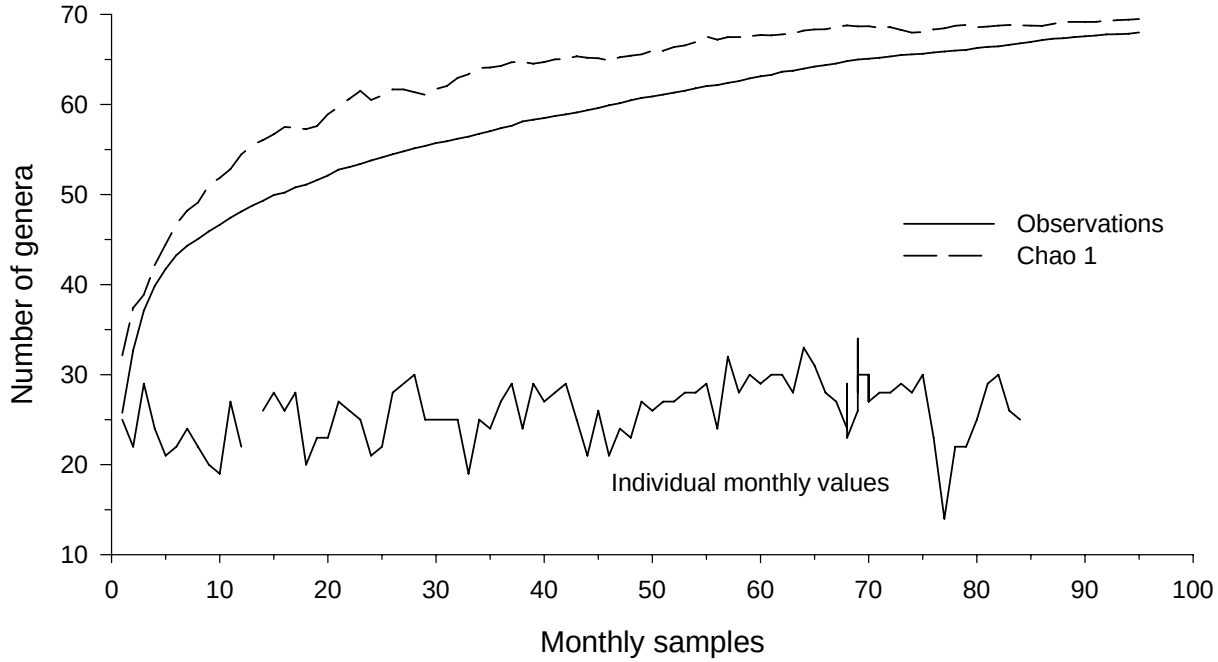

Figure 16. Genera accumulation curves for the Logan River, Cache County, Utah. Lines are individual monthly values and cumulative observations and Chao 1 estimates.

Few species are generally found sharing the same place and the same species are rarely found in similar habitats at similar abundances. These spatial patterns result from either microenvironmental variation in which one habitat is favored over another or from behavioral interactions that may cause individuals to aggregate independently of environmental factors (Resh 1979). These aggregate distributions lead to high variability among samples in terms of both individual abundances and species occurrences. In Needham and Usinger's (1956) classic work to address the problem of precision in sampling stream invertebrates, they concluded that 73 replicate samples were required for a precise estimate of mean total numbers and 194 replicates for mean wet weight. Chutter and Noble (1966) corrected Needham and Usinger's estimate and showed that the problem was even worse than originally thought, if one accepts that 95% CL $\pm$ 5% of the mean is the necessary level of precision. Resh (1979) reanalyzed these data, as well as some of his own, and basically confirmed Needham and Usinger (1956) to say, "We then can conclude from these data that purely quantitative routine sampling in streams to determine weights and numerical data is impractical."

FUTURE SAMPLING CONSIDERATIONS

A study design to detect impacts of rotenone on stream invertebrates can take many forms depending on the level of impact that you want to detect. While the overall question may simply be, “what is the effect of rotenone on aquatic invertebrate assemblages?” The specifics of this question need to be addressed to understand the intensity of sampling required to measure the proposed impact. Will “before-after” comparisons be done with assemblage level measures only, such as total abundance or total taxa or genera richness, or will comparisons in community composition and species or genera occurrences be evaluated as well? The specifics on where, when, how, how often, and for how long samples will be collected is dependent on knowing to the degree to which species or genera level data will be evaluated. The degree to which these data can be evaluated is also dependent on how much sampling will occur before the treatment to provide an accurate or reasonable level of information on the occurrences of taxa in the treatment area.

Where to sample

Presently no information is available on what aquatic invertebrates were present in Silver King Creek prior to the rotenone treatments that began in 1964. Additional effort should be put into locating the missing data for which references are made in USFS monitoring reports. The most valuable data would be pre-1964 before rotenone treatments. To help understand what taxa may have been lost, a stream similar to Silver King Creek with respect to major environmental influences on aquatic invertebrate assemblages, namely latitude, elevation, water chemistry, discharge water temperature regimes, land cover, and livestock grazing history, that has never been treated with rotenone should be sampled. This stream should be sampled with a similar number of sites as Silver King Creek. Sites should be located at similar elevations and positions in the basin as the sites sampled on Silver King Creek.

Consideration should be given to restoring long-term sampling sites that were historically sampled on Fly Valley Creek, Four Mile Creek, Bull Canyon Creek, and at

the historic sites that were sampled in Silver King Creek that are located upstream from the sites presently sampled (Sites S5:725, S6738, S7:775, and S8:813). Sampling these sites would provide additional information on historic assemblages. The issue with these data though is that they are not easily comparable to data presently collected.

The recent sampling locations on Silver King Creek upstream of Llewellyn Falls, on Coyote Valley Creek, Corral Valley Creek, and Tamarack Creek appear to be too close together to provide information on invertebrate assemblages living throughout these streams. These sites should be spread out along each stream. For streams tributary to Silver King Creek, sampling stations should be located at historically sampled locations and at the up and downstream ends of the basins. On Silver King Creek, sampling locations upstream of Llewellyn Falls should be spread out and be placed at or near historic sampling locations.

An equal number of control and treatment sites should be sampled for an equal period of time before and after treatment. A problem with evaluating much of the data collected to date is that there are vastly more treatment sites than control sites. Taxa occurrences are highly dependent on the number of samples and individuals collected.

When to sample

To continue with comparisons of previously collected samples, samples should continue to be collected in late summer, August to September. The majority of past samples collected in the Silver King Creek Basin were collected during these months. In terms of aquatic invertebrate abundance, richness, and organism maturity this is a good time to sample. Collecting samples during other times of the year would likely increase the total number of different taxa collected. These data would be valuable for taxonomic questions related to what genera or species live in the basin. However, these data would not be readily comparable to historic or recently collected data.

How to sample

A Surber sampler has been historically used to collect samples in the Silver King Basin is an adequate sampling device for collecting invertebrates in this type of stream, especially where information on relative densities in desired. The number of samples to be collected and the area sampled for each sample is a difficult question to answer. Recent samples collected between 2003 and 2006 were sampled similar to the way samples were collected historically, 1984 to 1996, (three individual Surber samples per riffle at each site on each sampling date). Individual Surber samples were collected and analyzed separately. Samples collected in the future using this technique would be comparable to previous samples. The problem with this sampling technique is that fewer individuals are collected as compared to more current techniques (Hawkins et al. 2003) used by much of the USFS. Much of the USFS now collects eight Surber samples per sampling site and composites these into a single sample. The use of this technique would allow for the use of RIVPAC analyses (Hawkins et al. 2000, see also Western Center for Monitoring and Assessment of Freshwater Ecosystems 2007) which allows for the prediction of what taxa should occur at a site in the absence of anthropogenic actions and factors in the probability of occurrences for all individual taxa.

A complete census is never done for any environmental assessment. In general, the number of taxa that we collect at a site will increase with increasing sampling effort (e.g., Figure 8 and 16). Collections therefore always contain a subset of the taxa that actually occur at a site. Furthermore, random sampling error ensures that replicate collections will seldom be identical in either the number of individuals or the specific taxa collected. For any single sample, we are more likely to collect an abundant taxon than a rare one. The collection of qualitative samples in addition to quantitative samples would increase the likelihood of collecting taxa with low relative abundances, i.e., rare taxa. Qualitative samples could be collected using a kicknet with a 500 micron mesh net and by hand picking invertebrates from woody debris and large boulders. All major habitat types (e.g., riffles, pools, backwaters, aquatic macrophyte beds) should be sampled and all samples composited to form a single sample from each site for each

sampling date. The occurrence of adult insects in riparian habitats could be sampled as well. Sampling for adult aquatic insects could be as simple as sampling riparian vegetation with terrestrial insect nets at the same time that benthic samples are collected or could be more involved by using ultraviolet and black lights at dusk. A study plan that we are currently using to do a thorough census of the aquatic insects of the Logan River in Cache County, Utah during summer 2007 is presented in Appendix 11).

Sample processing

For historic samples, the percentage of each sample processed is unknown. For recent samples, each sample was processed in its entirety. If future samples are separate Surber samples, these should be processed in their entirety. If multiple Suber samples are collected in each stream reach and composited, these samples will need to be sub-sampled. If a minimum of 500 organisms are removed and the samples are searched for rare taxa following sub-sampling, the probability of collecting rarer taxa will increase. Qualitative samples should be processed in their entirety.

It takes increasing time and money to identify organisms to increasingly higher levels of taxonomic resolution. Many studies conducted in the 1960-70s have shown that variation in assemblage composition along strong, large-scale environmental gradients can be detected with coarser (generally family level) taxonomy, subsets of the assemblage, or abundant taxa only. Other studies which have examined how taxonomic resolution affected the relationships between assemblage structure and stress measures (e.g., heavy metals, pH, nutrients, land use) or environmental variables (e.g., stream width, substrate, and slope) and have demonstrated that species-genus level data yielded stronger correlations between similarity matrices derived from biological and environmental data (Hill et al. 2001, King and Richardson 2002, and Waite et al. 2004). For general ecology and biodiversity conservation studies, Lenat and Resh (2001) discussed the importance of genus-species level resolution, because the biology and environmental requirements of different species in the same family can

differ greatly. Genus-species level data provides more information about the assemblage of interest and their environments than family-level data and is certainly required to detect impacts to individual genera and species. We recommend that taxa be identified to the lowest taxonomic resolution possible based on the organisms collected. For larval insects this is generally genus level, with some species and family level identifications occurring for certain taxa during certain times of the year. The collection of adult insects would greatly facilitate our knowledge of species present in the Silver King Creek Basin, which would assist in the routine identification of larval insects. The practicality of these collections and the more time consuming identifications of adult specimens will obviously need to be weighed with the other objectives of the project.

How to determine sampling adequacy

Information on the adequacy of sampling with respect to how much of the Silver King Creek fauna has been collected prior to treatment can be assessed using rarefaction and species accumulation curves (Colwell and Coddington 1994, Colwell 2005). These techniques provide information on the adequacy of sampling done to date and on the relative number of taxa that may be present but are yet uncollected. These same methods can be used following treatment to evaluate assemblage recovery.

To evaluate where we are in terms of accumulating biodiversity at Silver King Creek we calculated a genus level collection curve for the Silver King Creek data collected between 2003 and 2005 (Figure 17). Compared to the theoretical maximum richness (Chao 1 estimator), about 90% of the genera have been collected to date. The shape of the collector curve can also be evaluated to determine if the rate of increase is starting to level off. In Silver King Creek the slope of the accumulation curve is still fairly steep, suggesting several additional genera will be collected in the future.

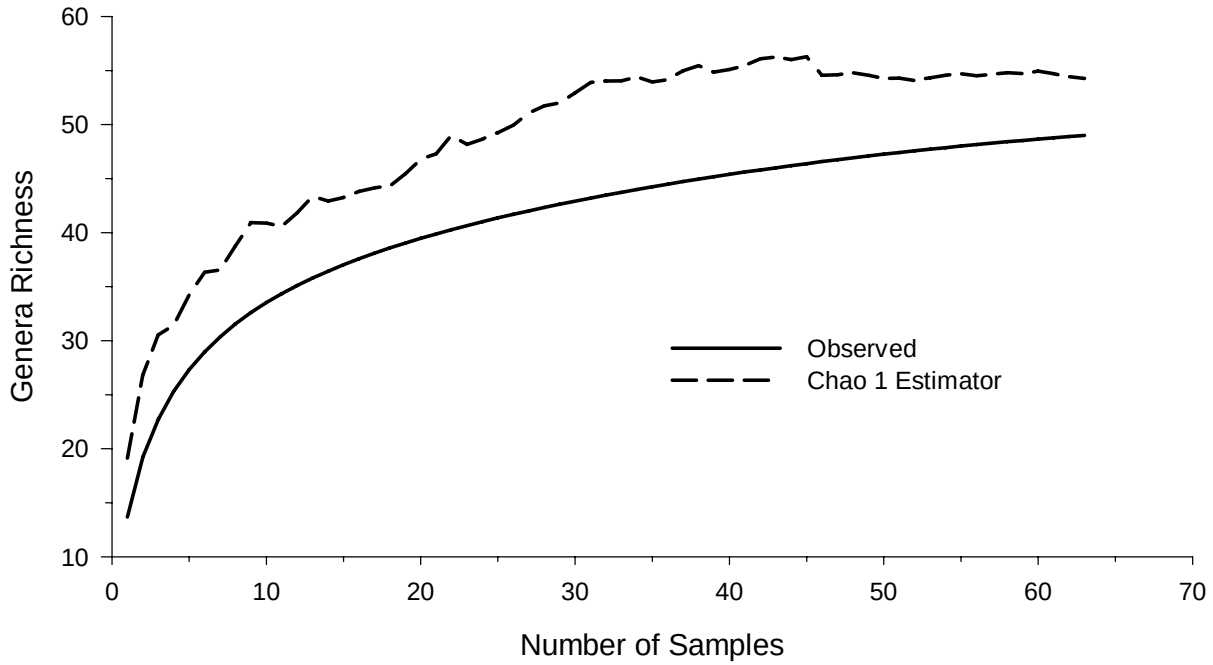

Figure 17 Genera accumulation curve for samples collected betweeen 2003 and 2006 within the Silver King Creek Basin.

For comparison, we also calculated a species accumulation curve for a sampling location we have been sampling monthly for 8 years on the Logan River in Cache County, Utah (Figure 18). After 8 years of sampling the same place each month, we continue to collect new genera. To date, the predicted genera richness for this site is about 10% higher than our observed richness. Conversely, if you look at the number of genera collected each month (the lower line in Figure 18), it varies very little. This means that the number of species at a site fairly constant, but who those individual species are changes considerably from month to month.

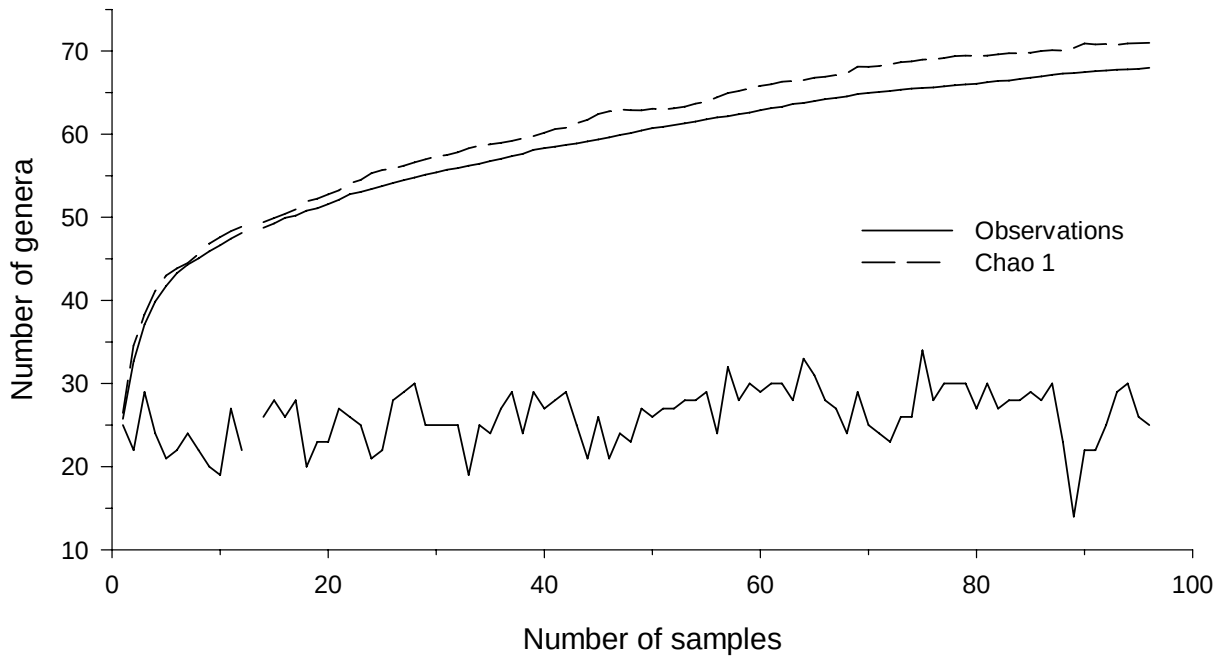

Figure 18 Genera accumulation curve for samples collected between 2000 and 2007 in the Logan River at Wood Camp Campground, Cache County, Utah.

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LIST OF APPENDICES

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Appendix 1. Sensitivity of invertebrates to rotenone in laboratory studies, modified from Lindgren (1960) and Schnick (1974). Rotenone concentration is presented as the concentration of 5% rotenone.

Group & Species	Duration (hrs)	Concentration (ppm)	Mortality (%)	Source
Amphipoda Gammarus pulex	72	0.1	0	Meadows 1973
Amphipoda Gammarus pulex	144	0.5	0	Meadows 1973
Amphipoda Gammarus pulex	144	2.0	10	Meadows 1973
Amphipoda Gammarus pulex	40	1.0	100	Lindgren 1960
Amphipoda Gammaridae	24	1.5	13	Ruck 1966
Amphipoda Gammaridae	24	2.0	88	Ruck 1966
Amphipoda Gammaridae	24	2.5	100	Ruck 1966
Bivalvia: Unionidae Elliptio buckleyi	96	2.9	50	Chandler and Marking 1982
Bivalvia: Unionidae Elliptio complanata	96	2.0	50	Chandler and Marking 1982
Bivalvia: Corbiculidae Corbicula manilensis	96	7.5	50	Chandler and Marking 1982
Coleoptera: Gyrinidae Gyrinus	1	47.5	50	Chandler and Marking 1982
Coleoptera: Gyrinidae Gyrinus	3	8.3	50	Chandler and Marking 1982
Coleoptera: Gyrinidae Gyrinus	6	8.0	50	Chandler and Marking 1982
Coleoptera: Gyrinidae Gyrinus	24	3.6	50	Chandler and Marking 1982
Coleoptera: Gyrinidae Gyrinus	96	0.7	50	Chandler and Marking 1982
Decapoda	24	2.5	50	Ruck 1966
Decapoda	24	3.0	100	Ruck 1966
Diplostraca: Daphnia	3	0.025	100	Hamilton 1941
Diplostraca: Daphnia pulex	1	0.1	50	Chandler and Marking 1982
Diplostraca: Daphnia pulex	3	0.1	50	Chandler and Marking 1982
Diplostraca: Daphnia pulex	6	0.04	50	Chandler and Marking 1982
Diplostraca: Daphnia pulex	24	0.03	50	Chandler and Marking 1982
Diplostraca: Leotodora kindtii	3	0.025	100	Hamilton 1941
Diptera: Ceratopogonidae Palpomyia	23	1.0	40	Lindgren 1960
Diptera: Chironomidae Chironomus plumosus	46	0.3	30	Lindgren 1960
Diptera: Chironomidae Chironomus plumosus	46	1.0	50	Lindgren 1960
Diptera: Chironomidae Chironomus plumosus	48	0.1	25	Zischkale 1952
Diptera: Chironomidae unspecified species	61	0.03	20	Lindgren 1960
Diptera: Culicidae Culex	48	1.5	25	Zischkale 1952
Diptera: Culicidae: Aedes	48	1.0	25	Zischkale 1952
Diptera: Culicidae: Anopheles	48	1.5	25	Zischkale 1952
Diptera: Tipulidae Tipula	96	1.0	0	Leonard 1939
Ephemeroptera: Caenidae Caenis	35	1.0	60	Lindgren 1960
Ephemeroptera: Siphlonuridae Siphlonurus	48	1.2	50	Claffey and Ruck 1967
Ephemeroptera: Siphlonuridae Siphlonurus	48	2.6	100	Claffey and Ruck 1967
Gastropoda: Helisoma	3	33.5	50	Chandler and Marking 1982
Gastropoda: Helisoma	6	33.5	50	Chandler and Marking 1982
Gastropoda: Helisoma	24	30	50	Chandler and Marking 1982
Gastropoda: Helisoma	96	8.0	50	Chandler and Marking 1982
Gastropoda: Lymnaea stagnalis	84	0.5	30	Hamilton 1941
Gastropoda: Lymnaea stagnalis	84	1.0	70	Hamilton 1941
Gastropoda: Physa	96	1.0	0	Leonard 1939
Gastropoda: Physa halei	36	0.1	20	Hamliton 1941
Gastropoda: Physa pomilia	24	6.4	50	Chandler and Marking 1982
Gastropoda: Physa pomilia	96	4.0	50	Chandler and Marking 1982
Hemiptera: Notonectidae Notonecta	1	10.0	50	Chandler and Marking 1982
Hemiptera: Notonectidae Notonecta	3	2.0	50	Chandler and Marking 1982
Hemiptera: Notonectidae Notonecta	6	9.0	50	Chandler and Marking 1982
Hemiptera: Notonectidae Notonecta	24	3.4	50	Chandler and Marking 1982
Hemiptera: Notonectidae Notonecta	96	1.6	50	Chandler and Marking 1982
Hemiptera: Notonectidae Notonecta species	40	0.1	30	Lindgren 1960
Hemiptera: Notonectidae unspecified species	24	0.1	50	Hamilton 1941
Hemiptera: Notonectidae Notonecta species	40	2.0	100	Lindgren 1960
Hirudinea: Unspecified species	50	0.1	100	Hamilton 1941
Hydracarina	96	0.05	43	Hamilton 1941
Hydracarina	65	0.05	30	Hamilton 1941
Isopoda: Asellus aquaticus	144	2.0	100	Meadows 1973
Isopoda: Asellus aquaticus[2]	144	0.1	10	Meadows 1973
Isopoda: Asellus aquaticus[2]	144	0.5	30	Meadows 1973
Isopoda	24	1.0	75	Ruck 1966
Isopoda	24	1.5	100	Ruck 1966
Maxillipoda: Cyclopodidae Cyclops	72	0.1	100	Meadows 1973

Maxillipoda: Diaptomus siciloides	3	0.025	100	Hamilton 1941
Odonata: Anisoptera	24	4.7	25	Ruck 1966
Odonata: Anisoptera	24	5.3	100	Ruck 1966
Odonata: Aeschnidae Anax	48	2.4	50	Claffey and Ruck 1967
Odonata: Aeschnidae Anax	48	3.9	50	Claffey and Ruck 1967
Odonata: Coenagrionidae Agrion = Calopteryx	48	2.7	50	Claffey and Ruck 1967
Odonata: Coenagrionidae Agrion = Calopteryx	48	3.8	100	Claffey and Ruck 1967
Odonata: Macromiidae Macromia	3	275	50	Chandler and Marking 1982
Odonata: Macromiidae Macromia	6	34	50	Chandler and Marking 1982
Odonata: Macromiidae Macromia	24	4.7	50	Chandler and Marking 1982
Odonata: Macromiidae Macromia	96	1.0	50	Chandler and Marking 1982
Odonata: Zygoptera	24	2.5	25	Ruck 1966
Oligochaeta: Stylaria lacustris	14	2.0	13	Lindgren 1960
Ostracoda: Cypridopsis	1	2.8	50	Chandler and Marking 1982
Ostracoda: Cypridopsis	3	2.6	50	Chandler and Marking 1982
Ostracoda: Cypridopsis	6	2.2	50	Chandler and Marking 1982
Ostracoda: Cypridopsis	24	0.5	50	Chandler and Marking 1982
Ostracoda: Cypridopsis	96	0.3	50	Chandler and Marking 1982
Ostracoda: Cypris	7	2.0	100	Lindgren 1960
Ostracoda: Eucypris	48	0.1	25	Zischkale 1952
Trichoptera: Phryganeidae Phryganea	48	2.3	100	Claffey and Ruck 1967

Appendix 2. List of aquatic invertebrate taxa and abundances collected in historic, 1984 to 1996, and recent, 2003 to 2006, samples.

Phylum	Class	Order	Family	Subfamily or genus	Species	Historic	Recent	Total
Annelida	Clitellata	Haplotaxida	Tubificidae			247	0	247
Annelida	Clitellata	Lumbriculida	Lumbriculidae			3	0	3
Annelida	Clitellata Subclass Oligochaeta					112	399	511
Arthropoda	Arachnida	Trombidiformes				2766	1962	4728
Arthropoda	Branchiopoda	Diplostraca	Daphniidae	Daphnia		1	0	1
Arthropoda	Insecta	Coleoptera	Carabidae			3	0	3
Arthropoda	Insecta	Coleoptera	Curculionidae			0	2	2
Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus		1	0	1
Arthropoda	Insecta	Coleoptera	Dytiscidae	Oreodytes		0	3	3
Arthropoda	Insecta	Coleoptera	Dytiscidae	Stictotarsus		0	1	1
Arthropoda	Insecta	Coleoptera	Dytiscidae			3	1	4
Arthropoda	Insecta	Coleoptera	Elmidae	Cleptelmis	addenda	0	567	567
Arthropoda	Insecta	Coleoptera	Elmidae	Heterlimnius	corpulentus	0	177	177
Arthropoda	Insecta	Coleoptera	Elmidae	Heterlimnius	koebelei	0	1	1
Arthropoda	Insecta	Coleoptera	Elmidae	Heterlimnius		0	1855	1855
Arthropoda	Insecta	Coleoptera	Elmidae	Lara		0	5	5
Arthropoda	Insecta	Coleoptera	Elmidae	Narpus	concolor	0	38	38
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	divergens/pecosensis	0	31	31
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	quadrimaculatus	0	230	230
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus		1105	686	1791
Arthropoda	Insecta	Coleoptera	Elmidae	Zaitzevia		3159	0	3159
Arthropoda	Insecta	Coleoptera	Elmidae			2479	547	3026
Arthropoda	Insecta	Coleoptera	Helophoridae	Helophorus		0	4	4
Arthropoda	Insecta	Coleoptera	Hydraenidae	Hydraena		0	6	6
Arthropoda	Insecta	Coleoptera	Hydraenidae	Ochthebius		0	10	10
Arthropoda	Insecta	Coleoptera	Hydrophilidae			1	3	4
Arthropoda	Insecta	Coleoptera				0	1	1
Arthropoda	Insecta	Diptera	Athericidae	Atherix	pachypus	2	67	69
Arthropoda	Insecta	Diptera	Ceratopogonidae	Atrichopogon/Forcipomyia		0	1	1
Arthropoda	Insecta	Diptera	Ceratopogonidae	Bezzia		491	2	493
Arthropoda	Insecta	Diptera	Ceratopogonidae	Forcipomyia		0	2	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Probezzia		0	200	200
Arthropoda	Insecta	Diptera	Ceratopogonidae			162	10	172
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae		0	3083	3083
Arthropoda	Insecta	Diptera	Chironomidae	Orthocladiinae		7847	5288	13135
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae		534	94	628
Arthropoda	Insecta	Diptera	Chironomidae			9604	340	10903
Arthropoda	Insecta	Diptera	Dixidae	Dixa		4	1	5
Arthropoda	Insecta	Diptera	Dixidae			4	0	4
Arthropoda	Insecta	Diptera	Empididae	Chelifera		316	155	471
Arthropoda	Insecta	Diptera	Empididae	Clinocera		0	2	2
Arthropoda	Insecta	Diptera	Empididae	Hemerodromia		7	0	7
Arthropoda	Insecta	Diptera	Empididae	Oreogeton		0	4	4
Arthropoda	Insecta	Diptera	Empididae			211	10	221
Arthropoda	Insecta	Diptera	Ephydridae			2	0	2
Arthropoda	Insecta	Diptera	Pelecorhynchidae	Glutops		193	208	401
Arthropoda	Insecta	Diptera	Psychodidae	Maruina		1	0	1
Arthropoda	Insecta	Diptera	Psychodidae	Pericoma		9689	640	10329

Arthropoda	Insecta	Diptera	Psychodidae			191	0	191
Arthropoda	Insecta	Diptera	Simuliidae	Prosimulium		0	54	54
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	tuberosum complex	0	1	1
Arthropoda	Insecta	Diptera	Simuliidae	Simulium		15	1784	1799
Arthropoda	Insecta	Diptera	Simuliidae			1203	60	1263
Arthropoda	Insecta	Diptera	Stratiomyidae	Nemotelus		2	0	2
Arthropoda	Insecta	Diptera	Stratiomyidae			3	0	3
Arthropoda	Insecta	Diptera	Tipulidae	Antocha	monticola	6	0	6
Arthropoda	Insecta	Diptera	Tipulidae	Antocha		113	94	207
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota		22	18	40
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma		250	48	298
Arthropoda	Insecta	Diptera	Tipulidae	Holorusia		1	0	1
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila		0	3	3
Arthropoda	Insecta	Diptera	Tipulidae	Ormosia		11	0	11
Arthropoda	Insecta	Diptera	Tipulidae	Pedicia		0	1	1
Arthropoda	Insecta	Diptera	Tipulidae	Rhabdomastix		0	12	12
Arthropoda	Insecta	Diptera	Tipulidae	Tipula		3	0	3
Arthropoda	Insecta	Diptera	Tipulidae			1	4	5
Arthropoda	Insecta	Diptera				34	0	34
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus		46	186	232
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis		8980	6629	15609
Arthropoda	Insecta	Ephemeroptera	Baetidae	Diphetor	hageni	0	41	41
Arthropoda	Insecta	Ephemeroptera	Baetidae			0	218	218
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	attenuata group	0	3	3
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	delantala	1430	507	1937
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	margarita	365	0	365
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella		18	1	19
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	heterocaudata	0	8	8
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	hystrix	900	58	958
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella		0	1732	1732
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	coloradensis/flavilinea	82	122	204
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	doddsi	1769	2539	4308
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	grandis/spinifera	1783	1834	3617
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella		0	213	213
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	inermis/dorothea	2997	5	3002
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella	tibialis	91	17	108
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella		0	51	51
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae			31	3126	3157
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula		1757	1175	2932
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus		482	942	1424
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Heptagenia		414	0	414
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Ironodes		0	63	63
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena		500	460	960
Arthropoda	Insecta	Ephemeroptera	Heptageniidae			4	418	422
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	minutus	52	1	53
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae			0	23	23
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia		1082	627	1709
Arthropoda	Insecta	Ephemeroptera	Polymitarcyidae	Ephoron	album	12	0	12
Arthropoda	Insecta	Ephemeroptera				299	2	301
Arthropoda	Insecta	Megaloptera	Corydalidae			0	6	6
Arthropoda	Insecta	Megaloptera	Sialidae	Sialis		1	3	4

Arthropoda	Insecta	Odonata	Coenagrionidae			1	0	1
Arthropoda	Insecta	Plecoptera	Capniidae			185	2	187
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Plumiperla	diversa	5	0	5
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Suwallia		181	52	233
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa		43	294	337
Arthropoda	Insecta	Plecoptera	Chloroperlidae			1679	856	2535
Arthropoda	Insecta	Plecoptera	Leuctridae	Moselia	infuscata	0	5	5
Arthropoda	Insecta	Plecoptera	Leuctridae			169	23	192
Arthropoda	Insecta	Plecoptera	Nemouridae	Malenka		4	263	267
Arthropoda	Insecta	Plecoptera	Nemouridae	Podmosta		1	0	1
Arthropoda	Insecta	Plecoptera	Nemouridae	Visoka	cataractae	1	19	20
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	cinctipes	42	37	79
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	columbiana	0	136	136
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	oregonensis	79	0	79
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	oregonensis group	0	11	11
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada		271	232	503
Arthropoda	Insecta	Plecoptera	Nemouridae			29	81	110
Arthropoda	Insecta	Plecoptera	Peltoperlidae	Yoraperla		1331	6157	7488
Arthropoda	Insecta	Plecoptera	Peltoperlidae			2	107	109
Arthropoda	Insecta	Plecoptera	Perlidae	Calineuria	californica	17	2	19
Arthropoda	Insecta	Plecoptera	Perlidae	Claassenia	sabulosa	0	6	6
Arthropoda	Insecta	Plecoptera	Perlidae	Doroneuria	baumanni	18	132	150
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	hoguei	0	18	18
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	pacifica	15	65	80
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla		22	7	29
Arthropoda	Insecta	Plecoptera	Perlidae			85	159	244
Arthropoda	Insecta	Plecoptera	Perlodidae	Cultus		5	0	5
Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperla		38	0	38
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus	nonus	0	1	1
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus		25	0	25
Arthropoda	Insecta	Plecoptera	Perlodidae	Megarcys		0	2	2
Arthropoda	Insecta	Plecoptera	Perlodidae	Oroperla	barbara	0	11	11
Arthropoda	Insecta	Plecoptera	Perlodidae	Perlinodes	aurea	1	4	5
Arthropoda	Insecta	Plecoptera	Perlodidae	Skwala	americana	20	0	20
Arthropoda	Insecta	Plecoptera	Perlodidae			37	305	342
Arthropoda	Insecta	Plecoptera	Pteronarcyidae	Pteronarcella	regularis	7	17	24
Arthropoda	Insecta	Plecoptera	Pteronarcyidae			0	1	1
Arthropoda	Insecta	Plecoptera	Taeniopterygidae	Taenionema		512	0	512
Arthropoda	Insecta	Plecoptera	Taeniopterygidae			0	2	2
Arthropoda	Insecta	Plecoptera				709	36	745
Arthropoda	Insecta	Trichoptera	Apataniidae	Apatania		2	61	63
Arthropoda	Insecta	Trichoptera	Apataniidae	Pedomoecus	sierra	44	36	80
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	americanus	28	309	337
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus		78	15	93
Arthropoda	Insecta	Trichoptera	Brachycentridae	Micrasema		185	1392	1577
Arthropoda	Insecta	Trichoptera	Brachycentridae			1	0	1
Arthropoda	Insecta	Trichoptera	Calamoceratidae	Heteroplectron	californicum	0	2	2
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Anagapetus		0	20	20
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Glossosoma		495	323	818
Arthropoda	Insecta	Trichoptera	Glossosomatidae			0	547	547
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	californica	0	7	7

Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	grandis	29	12	41
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche		78	36	114
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche		4	0	4
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche		80	2	82
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	almota	0	1	1
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	elsis	1	44	45
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche		29	11	40
Arthropoda	Insecta	Trichoptera	Hydropsychidae			0	140	140
Arthropoda	Insecta	Trichoptera	Hydroptilidae	Leucotrichia		1	0	1
Arthropoda	Insecta	Trichoptera	Hydroptilidae			0	4	4
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma		46	8	54
Arthropoda	Insecta	Trichoptera	Leptoceridae	Oecetis		1	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Chyranda	centralis	1	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Cryptochia		1	2	3
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus		4	10	14
Arthropoda	Insecta	Trichoptera	Limnephilidae	Ecclisomyia		10	0	10
Arthropoda	Insecta	Trichoptera	Limnephilidae	Homophylax		0	1	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Psychoglypha		0	3	3
Arthropoda	Insecta	Trichoptera	Limnephilidae			11	11	22
Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes		2	310	312
Arthropoda	Insecta	Trichoptera	Philopotamidae	Wormaldia		0	2	2
Arthropoda	Insecta	Trichoptera	Philopotamidae			12	50	62
Arthropoda	Insecta	Trichoptera	Polycentropodidae	Polycentropus		4	5	9
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	alberta group	0	1	1
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	angelita group	0	23	23
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	arnaudi	0	34	34
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	betteni group	0	172	172
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	brunnea/vemna groups	295	384	679
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	coloradensis	5	0	5
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	hyalinata	691	0	691
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	sibirica group	0	44	44
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	sibirica group A	0	18	18
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	sibirica group C	0	3	3
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	vagrita	281	3	284
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	verrula group	0	10	10
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	vofixa group	0	176	176
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila		901	439	1340
Arthropoda	Insecta	Trichoptera	Rhyacophilidae			0	16	16
Arthropoda	Insecta	Trichoptera	Uenoidae	Farula		0	1	1
Arthropoda	Insecta	Trichoptera	Uenoidae	Neophylax	splendens	0	2	2
Arthropoda	Insecta	Trichoptera	Uenoidae	Neophylax		0	29	29
Arthropoda	Insecta	Trichoptera	Uenoidae	Neothremma		19	47	66
Arthropoda	Insecta	Trichoptera	Uenoidae	Oligophlebodes		25	13	38
Arthropoda	Insecta	Trichoptera	Uenoidae			0	2	2
Arthropoda	Insecta	Trichoptera				186	185	371
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	Hyalella	azteca	0	9	9
Arthropoda	Maxillopoda, Subclass Copepoda					139	0	139
Arthropoda	Ostracoda					1321	159	1480
Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidium		63	87	150
Mollusca	Gastropoda					0	2	2
Nemata						275	61	336

Nematomorpha			2	0	2
Platyhelminthes	Turbellaria		234	854	1088
		Total individuals collected	75974	54906	130880
		Taxa present, count > 0	132	163	204
		Taxa absent, count =0	72	41	0
		Taxa with count >0 and <10	42	57	70
		Taxa with count >10	90	106	134
		Taxa with count >100	52	54	83
		Taxa with count >500	25	23	40
		Taxa with count >1000	18	13	27

Appendix 3. List of genera and abundances historically collected at treated and untreated sites. Samples were collected in1984, 1987, 1991, 1992, 1993, 1995, and 1996.

Phylum	Class	Order	Family	Genus	Treated sites	Untreated sites	Total
Arthropoda	Branchiopoda	Diplostraca	Daphniidae	Daphnia	1	0	1
Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	1	0	1
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	571	534	1105
Arthropoda	Insecta	Coleoptera	Elmidae	Zaitzevia	2170	989	3159
Arthropoda	Insecta	Diptera	Athericidae	Atherix	2	0	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Bezzia	422	69	491
Arthropoda	Insecta	Diptera	Dixidae	Dixa	1	3	4
Arthropoda	Insecta	Diptera	Empididae	Chelifera	276	40	316
Arthropoda	Insecta	Diptera	Empididae	Hemerodromia	7	0	7
Arthropoda	Insecta	Diptera	Pelecorhynchidae	Glutops	132	61	193
Arthropoda	Insecta	Diptera	Psychodidae	Maruina	1	0	1
Arthropoda	Insecta	Diptera	Psychodidae	Pericoma	7798	1891	9689
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	8	7	15
Arthropoda	Insecta	Diptera	Stratiomyidae	Nemotelus	2	0	2
Arthropoda	Insecta	Diptera	Tipulidae	Antocha	92	27	119
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota	21	1	22
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma	228	22	250
Arthropoda	Insecta	Diptera	Tipulidae	Holorusia	1	0	1
Arthropoda	Insecta	Diptera	Tipulidae	Ormosia	11	0	11
Arthropoda	Insecta	Diptera	Tipulidae	Tipula	2	1	3
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus	40	6	46
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	7367	1613	8980
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	1553	260	1813
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	789	111	900
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	3001	633	3634
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	2615	382	2997
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella	89	2	91
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula	1468	289	1757
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus	416	66	482
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Heptagenia	346	68	414
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena	428	72	500
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	52	0	52
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	983	99	1082
Arthropoda	Insecta	Ephemeroptera	Polymitarcyidae	Ephoron	0	12	12
Arthropoda	Insecta	Megaloptera	Sialidae	Sialis	1	0	1
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Plumiperla	5	0	5
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Suwallia	145	36	181
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa	29	14	43
Arthropoda	Insecta	Plecoptera	Nemouridae	Malenka	4	0	4
Arthropoda	Insecta	Plecoptera	Nemouridae	Podmosta	1	0	1
Arthropoda	Insecta	Plecoptera	Nemouridae	Visoka	1	0	1
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	253	139	392
Arthropoda	Insecta	Plecoptera	Peltoperlidae	Yoraperla	1107	224	1331
Arthropoda	Insecta	Plecoptera	Perlidae	Calineuria	17	0	17
Arthropoda	Insecta	Plecoptera	Perlidae	Doroneuria	11	7	18
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	24	13	37
Arthropoda	Insecta	Plecoptera	Perlodidae	Cultus	5	0	5

Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperla	24	14	38
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus	20	5	25
Arthropoda	Insecta	Plecoptera	Perlodidae	Perlinodes	1	0	1
Arthropoda	Insecta	Plecoptera	Perlodidae	Skwala	19	1	20
Arthropoda	Insecta	Plecoptera	Pteronarcyidae	Pteronarcella	7	0	7
Arthropoda	Insecta	Plecoptera	Taeniopterygidae	Taenionema	448	64	512
Arthropoda	Insecta	Trichoptera	Apataniidae	Apatania	2	0	2
Arthropoda	Insecta	Trichoptera	Apataniidae	Pedomoecus	33	11	44
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	93	13	106
Arthropoda	Insecta	Trichoptera	Brachycentridae	Micrasema	163	22	185
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Glossosoma	400	95	495
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	55	52	107
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche	4	0	4
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	80	0	80
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	24	6	30
Arthropoda	Insecta	Trichoptera	Hydroptilidae	Leucotrichia	1	0	1
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma	27	19	46
Arthropoda	Insecta	Trichoptera	Leptoceridae	Oecetis	1	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Chyranda	1	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Cryptochia	1	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus	3	1	4
Arthropoda	Insecta	Trichoptera	Limnephilidae	Ecclisomyia	4	6	10
Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes	0	2	2
Arthropoda	Insecta	Trichoptera	Polycentropodidae	Polycentropus	4	0	4
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	1832	341	2173
Arthropoda	Insecta	Trichoptera	Uenoidae	Neothremma	6	13	19
Arthropoda	Insecta	Trichoptera	Uenoidae	Oligophlebodes	25	0	25
Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidium	42	21	63
				Total individuals collected	35817	8377	44194
				Genera present, count >0	73	48	75
				Genera absent, count =0	2	27	0
				Genera with count >0 and <10	28	13	26
				Genera with count >=10	45	35	49
				Genera with count >=100	24	12	27
				Genera with count >=500	12	5	14
				Genera with count >=1000	9	2	11
				Genera with count >=5000	2	0	2

Appendix 4. List of genera and abundances collected in Four Mile Canyon Creek and at five sites on Silver King Creek in 1984, 1987, 1991, 1992, 1993, 1995, and 1996. Four Mile Canyon was never treated with rotenone. Silver King Creek was treated with rotenone in 1964, 1976, 1991, 1992, and 1993.

						Silver King Creek					
Phylum	Class	Order	Family	Genus	Four Mile	S7:775	S6:738	S4:700	S3:641	S2:640	Silver King Total
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus	6	4	5	1	5	19	34
Arthropoda	Branchiopoda	Diplostraca	Daphniidae	Daphnia	0	0	0	0	0	1	1
Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	0	0	0	0	0	1	1
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	534	43	159	0	4	308	514
Arthropoda	Insecta	Coleoptera	Elmidae	Zaitzevia	989	185	370	0	721	752	2028
Arthropoda	Insecta	Diptera	Athericidae	Atherix	0	0	0	0	1	1	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Bezzia	69	51	181	0	86	49	367
Arthropoda	Insecta	Diptera	Dixidae	Dixa	3	0	1	0	0	0	1
Arthropoda	Insecta	Diptera	Empididae	Chelifera	40	37	16	0	44	153	250
Arthropoda	Insecta	Diptera	Empididae	Hemerodromia	0	2	1	0	4	0	7
Arthropoda	Insecta	Diptera	Pelecorhynchidae	Glutops	61	36	7	0	2	18	63
Arthropoda	Insecta	Diptera	Psychodidae	Maruina	0	0	1	0	0	0	1
Arthropoda	Insecta	Diptera	Psychodidae	Pericoma	1880	1503	1599	165	1356	1632	6255
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	7	0	0	0	0	0	0
Arthropoda	Insecta	Diptera	Tipulidae	Antocha	27	3	23	3	26	26	81
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota	1	1	0	0	3	0	4
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma	21	72	19	9	42	43	185
Arthropoda	Insecta	Diptera	Tipulidae	Ormosia	0	0	11	0	0	0	11
Arthropoda	Insecta	Diptera	Tipulidae	Tipula	1	0	2	0	0	0	2
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	1339	1084	1194	314	974	709	4275
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	260	218	475	39	198	233	1163
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	92	64	52	50	234	94	494
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	611	642	426	48	471	340	1927
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	369	307	406	173	626	386	1898
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella	2	2	22	0	8	2	34
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula	257	174	174	100	152	236	836
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus	37	91	64	5	74	71	305
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Heptagenia	62	52	169	0	27	70	318
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena	63	32	10	7	23	33	105
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	0	8	0	0	44	0	52
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	98	46	140	20	183	128	517
Arthropoda	Insecta	Ephemeroptera	Polymitarcyidae	Ephoron	12	0	0	0	0	0	0
Arthropoda	Insecta	Megaloptera	Sialidae	Sialis	0	0	0	0	0	1	1
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Plumiperla	0	0	2	0	0	0	2
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Suwallia	36	52	15	0	37	15	119
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa	14	8	0	0	12	5	25
Arthropoda	Insecta	Plecoptera	Nemouridae	Malenka	0	0	0	0	4	0	4
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	70	69	36	1	25	43	174
Arthropoda	Insecta	Plecoptera	Peltoperlidae	Yoraperla	213	32	136	20	103	90	381
Arthropoda	Insecta	Plecoptera	Perlidae	Calineuria	0	1	0	2	2	5	10
Arthropoda	Insecta	Plecoptera	Perlidae	Doroneuria	7	3	2	0	3	1	9
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	8	0	7	0	8	0	15
Arthropoda	Insecta	Plecoptera	Perlodidae	Cultus	0	0	1	1	0	0	2
Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperla	12	1	1	1	3	1	7
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus	5	12	1	0	1	3	17
Arthropoda	Insecta	Plecoptera	Perlodidae	Perlinodes	0	1	0	0	0	0	1

Arthropoda	Insecta	Plecoptera	Perlodidae	Skwala	0	3	1	0	3	2	9
Arthropoda	Insecta	Plecoptera	Taeniopterygidae	Taenionema	60	27	51	17	16	20	131
Arthropoda	Insecta	Trichoptera	Apataniidae	Pedomoecus	11	6	1	0	8	9	24
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	13	11	13	8	23	16	71
Arthropoda	Insecta	Trichoptera	Brachycentridae	Micrasema	18	30	26	3	27	42	128
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Glossosoma	85	49	35	13	26	33	156
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	32	13	5	0	11	3	32
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	0	0	2	0	0	2	4
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	6	10	1	0	4	1	16
Arthropoda	Insecta	Trichoptera	Hydroptilidae	Leucotrichia	0	0	0	0	0	1	1
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma	4	3	1	0	5	5	14
Arthropoda	Insecta	Trichoptera	Leptoceridae	Oecetis	0	0	1	0	0	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Chyranda	0	0	1	0	0	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Cryptochia	0	1	0	0	0	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus	1	0	0	0	0	2	2
Arthropoda	Insecta	Trichoptera	Limnephilidae	Ecclisomyia	6	2	0	0	0	1	3
Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes	2	0	0	0	0	0	0
Arthropoda	Insecta	Trichoptera	Polycentropodidae	Polycentropus	0	0	0	0	0	4	4
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	256	387	252	34	202	225	1100
Arthropoda	Insecta	Trichoptera	Uenoidae	Neothremma	9	0	0	0	4	0	4
Arthropoda	Insecta	Trichoptera	Uenoidae	Oligophlebodes	0	0	0	0	7	2	9
Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidium	21	1	8	0	16	6	31
			Total individuals collected		7730	5379	6126	1034	5858	5843	24240
			Genera present, count >0		47	45	48	23	47	49	65
			Genera absent, count =0		21	23	20	45	21	19	3
			Genera with count >0 and <10		15	17	21	11	19	22	26
			Genera with count >=10		32	28	27	12	28	27	39
			Genera with count >=100		10	8	13	4	11	11	23
			Genera with count >=500		5	3	2	0	4	3	10
			Genera with count >=1000		2	2	2	0	1	1	7
			Genera with count >=5000		0	0	0	0	0	0	1

Appendix 5. List of aquatic invertebrate genera and abundances collected in Four Mile Canyon Creek in 1984, 1987, 1991, 1992, 1993, 1994, 1995, and 1996. Four Mile Canyon Creek was never treated with rotenone.

Phylum	Class	Order	Family	Genus	1984	1987	1991	1992	1993	1994	1995	1996	Total
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus	0	0	0	6	0	0	0	0	6
Arthropoda	Insecta	Diptera	Tipulidae	Antocha	0	11	1	2	7	6	0	0	27
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	2	15	0	0	0	0	0	15	32
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	2	6	60	97	16	78	1	0	260
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	196	241	104	364	184	130	15	105	1339
Arthropoda	Insecta	Diptera	Ceratopogonidae	Bezzia	0	0	8	32	20	4	3	2	69
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	2	0	1	4	5	0	0	1	13
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	49	35	2	0	1	0	0	5	92
Arthropoda	Insecta	Diptera	Empididae	Chelifera	0	0	3	18	9	2	2	6	40
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula	13	21	27	92	65	0	1	38	257
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus	0	0	0	0	0	0	1	0	1
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota	0	0	1	0	0	0	0	0	1
Arthropoda	Insecta	Diptera	Dixidae	Dixa	0	1	0	0	2	0	0	0	3
Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes	0	0	1	0	0	0	0	1	2
Arthropoda	Insecta	Plecoptera	Perlidae	Doroneuria	2	0	0	0	3	0	0	2	7
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	52	43	52	210	118	23	16	97	611
Arthropoda	Insecta	Trichoptera	Limnephilidae	Ecclisomyia	0	4	1	0	1	0	0	0	6
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus	9	7	7	9	3	0	2	0	37
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	0	42	12	250	22	17	16	10	369
Arthropoda	Insecta	Ephemeroptera	Polymitarcyidae	Ephoron	0	0	0	0	0	0	0	12	12
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Glossosoma	9	61	2	0	0	2	1	10	85
Arthropoda	Insecta	Diptera	Pelecorhynchidae	Glutops	0	0	17	0	17	15	1	11	61
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Heptagenia	0	0	8	9	11	22	12	0	62
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	0	8	0	0	0	0	0	0	8
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma	0	0	3	8	5	2	1	2	21
Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperla	0	0	2	7	0	2	1	0	12
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus	1	0	2	0	2	0	0	0	5
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma	2	0	0	0	0	1	0	1	4
Arthropoda	Insecta	Trichoptera	Brachycentridae	Micrasema	9	7	0	0	0	0	0	2	18
Arthropoda	Insecta	Trichoptera	Uenoidae	Neothremma	7	1	0	0	0	0	1	0	9
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	0	0	0	219	303	11	1	0	534
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	18	30	9	15	22	2	1	1	98
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	2	4	0	0	0	0	0	0	6
Arthropoda	Insecta	Trichoptera	Apataniidae	Pedomoecus	0	0	2	2	6	1	0	0	11
Arthropoda	Insecta	Diptera	Psychodidae	Pericoma	0	277	99	373	283	702	9	137	1880
Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidium	0	0	1	2	7	0	1	10	21
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena	18	8	2	31	0	0	2	2	63
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	27	68	19	17	38	15	26	46	256
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella	0	0	0	0	2	0	0	0	2
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	0	0	0	7	0	0	0	0	7
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Suwallia	0	0	0	36	0	0	0	0	36
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa	0	0	10	4	0	0	0	0	14
Arthropoda	Insecta	Plecoptera	Taeniopterygidae	Taenionema	48	0	0	4	0	0	0	8	60
Arthropoda	Insecta	Diptera	Tipulidae	Tipula	0	0	0	0	1	0	0	0	1
Arthropoda	Insecta	Plecoptera	Peltoperlidae	Yoraperla	4	37	37	29	56	15	0	35	213
Arthropoda	Insecta	Coleoptera	Elmidae	Zaitzevia	0	0	338	103	153	236	37	122	989
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	11	27	3	16	0	0	0	13	70

Total individuals collected	483	954	834	1966	1362	1286	151	694	7730
Genera present, count >0	21	22	30	28	28	20	22	26	47
Genera absent, count =0	26	25	17	19	19	27	25	21	0
Genera with count >0 and <10	12	9	19	12	14	9	16	12	15
Genera with count >=10	9	13	11	16	14	11	6	14	32
Genera with count >=100	1	2	2	6	5	3	0	3	10
Genera with count >=500	0	0	0	0	0	1	0	0	5
Genera with count >=1000	0	0	0	0	0	0	0	0	2
Genera with count >=5000	0	0	0	0	0	0	0	0	0

Appendix 6. List of aquatic invertebrate genera and abundances collected among five sites on Silver King Creek in 1984, 1987, 1991, 1992, 1993, 1994, 1995, and 1996. Silver King Creek was treated in 1964, 1976, 1991, 1992, and 1993.

Phylum	Class	Order	Family	Genus	1984	1987	1991	1992	1993	1994	1995	1996	Total
Arthropoda	Branchiopoda	Diplostraca	Daphniidae	Daphnia	0	0	0	0	0	0	1	0	1
Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	0	0	1	0	0	0	0	0	1
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	0	0	0	408	88	7	9	2	514
Arthropoda	Insecta	Coleoptera	Elmidae	Zaitzevia	0	0	414	737	256	366	54	201	2028
Arthropoda	Insecta	Diptera	Athericidae	Atherix	0	0	0	0	2	0	0	0	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Bezzia	0	0	31	101	132	78	14	11	367
Arthropoda	Insecta	Diptera	Dixidae	Dixa	1	0	0	0	0	0	0	0	1
Arthropoda	Insecta	Diptera	Empididae	Chelifera	0	0	23	65	89	55	6	12	250
Arthropoda	Insecta	Diptera	Empididae	Hemerodromia	0	0	0	2	5	0	0	0	7
Arthropoda	Insecta	Diptera	Pelecorhynchidae	Glutops	0	0	7	35	8	7	1	5	63
Arthropoda	Insecta	Diptera	Psychodidae	Maruina	0	0	0	0	1	0	0	0	1
Arthropoda	Insecta	Diptera	Psychodidae	Pericoma	32	1809	418	2113	884	850	5	144	6255
Arthropoda	Insecta	Diptera	Tipulidae	Antocha	1	22	19	15	4	15	2	3	81
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota	2	0	0	0	1	0	0	1	4
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma	15	10	21	43	33	50	5	8	185
Arthropoda	Insecta	Diptera	Tipulidae	Ormosia	0	0	0	0	0	0	11	0	11
Arthropoda	Insecta	Diptera	Tipulidae	Tipula	0	0	2	0	0	0	0	0	2
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus	0	1	8	3	5	13	2	2	34
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	1072	701	617	673	340	74	313	485	4275
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	18	52	112	446	3	494	35	3	1163
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	158	146	14	19	27	6	16	108	494
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	200	188	118	513	228	225	195	260	1927
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	23	593	113	479	294	230	29	137	1898
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella	8	6	6	2	7	0	5	0	34
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula	113	366	59	86	48	17	58	89	836
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus	32	47	26	50	36	3	38	73	305
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Heptagenia	0	9	11	74	9	124	4	87	318
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena	47	40	4	0	6	4	4	0	105
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	0	0	0	2	50	0	0	0	52
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	33	58	107	94	53	159	5	8	517
Arthropoda	Insecta	Megaloptera	Sialidae	Sialis	0	0	1	0	0	0	0	0	1
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Plumiperla	0	0	2	0	0	0	0	0	2
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Suwallia	0	0	0	119	0	0	0	0	119
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa	0	0	21	2	1	1	0	0	25
Arthropoda	Insecta	Plecoptera	Nemouridae	Malenka	0	0	0	0	0	4	0	0	4
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	18	26	34	56	17	3	1	19	174
Arthropoda	Insecta	Plecoptera	Peltoperlidae	Yoraperla	13	51	217	77	5	4	4	10	381
Arthropoda	Insecta	Plecoptera	Perlidae	Calineuria	0	9	1	0	0	0	0	0	10
Arthropoda	Insecta	Plecoptera	Perlidae	Doroneuria	1	1	0	0	5	0	0	2	9
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	11	4	0	0	0	0	0	0	15
Arthropoda	Insecta	Plecoptera	Perlodidae	Cultus	2	0	0	0	0	0	0	0	2
Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperla	0	1	3	0	1	0	2	0	7
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus	0	0	0	7	2	3	1	4	17
Arthropoda	Insecta	Plecoptera	Perlodidae	Perlinodes	0	0	0	0	0	1	0	0	1
Arthropoda	Insecta	Plecoptera	Perlodidae	Skwala	0	0	0	3	0	4	0	2	9
Arthropoda	Insecta	Plecoptera	Taeniopterygidae	Taenionema	130	1	0	0	0	0	0	0	131
Arthropoda	Insecta	Trichoptera	Apataniidae	Pedomoecus	0	0	3	10	1	6	3	1	24

Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	14	42	7	4	0	2	2	0	71
Arthropoda	Insecta	Trichoptera	Brachycentridae	Micrasema	6	64	15	2	3	4	3	31	128
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Glossosoma	36	59	10	11	0	18	10	12	156
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	1	2	0	6	1	7	2	13	32
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	0	0	1	0	2	1	0	0	4
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	11	4	0	0	1	0	0	0	16
Arthropoda	Insecta	Trichoptera	Hydroptilidae	Leucotrichia	0	0	0	0	0	0	1	0	1
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma	1	0	3	3	2	2	0	3	14
Arthropoda	Insecta	Trichoptera	Leptoceridae	Oecetis	0	0	0	0	0	0	1	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Chyranda	0	0	0	0	0	0	0	1	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Cryptochia	0	1	0	0	0	0	0	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus	1	0	0	0	0	0	1	0	2
Arthropoda	Insecta	Trichoptera	Limnephilidae	Ecclisomyia	0	0	1	0	0	2	0	0	3
Arthropoda	Insecta	Trichoptera	Polycentropodidae	Polycentropus	0	4	0	0	0	0	0	0	4
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	98	166	96	170	179	129	117	145	1100
Arthropoda	Insecta	Trichoptera	Uenoidae	Neothremma	4	0	0	0	0	0	0	0	4
Arthropoda	Insecta	Trichoptera	Uenoidae	Oligophlebodes	0	0	0	0	0	3	0	6	9
Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidium	0	0	4	11	2	5	8	1	31
			Total individuals collected		2102	4483	2550	6441	2831	2976	968	1889	24240
			Genera present, count >0		30	30	37	35	39	37	36	33	65
			Genera absent, count =0		35	35	28	30	26	28	29	32	0
			Genera with count >0 and <10		11	12	16	11	23	21	24	16	26
			Genera with count >=10		19	18	21	24	16	16	12	17	39
			Genera with count >=100		5	7	8	10	7	8	3	7	23
			Genera with count >=500		1	3	1	4	1	1	0	0	10
			Genera with count >=1000		1	1	0	1	0	0	0	0	7
			Genera with count >=5000		0	0	0	0	0	0	0	0	1

Appendix 7. List of aquatic invertebrate genera and abundances collected in historic, 1984 to 1996, and recent 2003 to 2006 samples.

Phylum	Class	Order	Family	Genus	Historic	Recent	Total
Arthropoda	Branchiopoda	Diplostraca	Daphniidae	Daphnia	1	0	1
Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	1	0	1
Arthropoda	Insecta	Coleoptera	Dytiscidae	Oreodytes	0	3	3
Arthropoda	Insecta	Coleoptera	Dytiscidae	Stictotarsus	0	1	1
Arthropoda	Insecta	Coleoptera	Elmidae	Cleptelmis	0	567	567
Arthropoda	Insecta	Coleoptera	Elmidae	Heterlimnius	0	2033	2033
Arthropoda	Insecta	Coleoptera	Elmidae	Lara	0	5	5
Arthropoda	Insecta	Coleoptera	Elmidae	Narpus	0	38	38
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	1105	947	2052
Arthropoda	Insecta	Coleoptera	Elmidae	Zaitzevia	3159	0	3159
Arthropoda	Insecta	Coleoptera	Helophoridae	Helophorus	0	4	4
Arthropoda	Insecta	Coleoptera	Hydraenidae	Hydraena	0	6	6
Arthropoda	Insecta	Coleoptera	Hydraenidae	Ochthebius	0	10	10
Arthropoda	Insecta	Diptera	Athericidae	Atherix	2	67	69
Arthropoda	Insecta	Diptera	Ceratopogonidae	Atrichopogon/Forcipomyia	0	1	1
Arthropoda	Insecta	Diptera	Ceratopogonidae	Bezzia	491	2	493
Arthropoda	Insecta	Diptera	Ceratopogonidae	Forcipomyia	0	2	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Probezzia	0	200	200
Arthropoda	Insecta	Diptera	Dixidae	Dixa	4	1	5
Arthropoda	Insecta	Diptera	Empididae	Chelifera	316	155	471
Arthropoda	Insecta	Diptera	Empididae	Clinocera	0	2	2
Arthropoda	Insecta	Diptera	Empididae	Hemerodromia	7	0	7
Arthropoda	Insecta	Diptera	Empididae	Oreogeton	0	4	4
Arthropoda	Insecta	Diptera	Pelecorhynchidae	Glutops	193	208	401
Arthropoda	Insecta	Diptera	Psychodidae	Maruina	1	0	1
Arthropoda	Insecta	Diptera	Psychodidae	Pericoma	9689	640	10329
Arthropoda	Insecta	Diptera	Simuliidae	Prosimulium	0	54	54
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	15	1785	1800
Arthropoda	Insecta	Diptera	Stratiomyidae	Nemotelus	2	0	2
Arthropoda	Insecta	Diptera	Tipulidae	Antocha	119	94	213
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota	22	18	40
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma	250	48	298
Arthropoda	Insecta	Diptera	Tipulidae	Holorusia	1	0	1
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila	0	3	3
Arthropoda	Insecta	Diptera	Tipulidae	Ormosia	11	0	11
Arthropoda	Insecta	Diptera	Tipulidae	Pedicia	0	1	1
Arthropoda	Insecta	Diptera	Tipulidae	Rhabdomastix	0	12	12
Arthropoda	Insecta	Diptera	Tipulidae	Tipula	3	0	3
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus	46	186	232
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	8980	6629	15609
Arthropoda	Insecta	Ephemeroptera	Baetidae	Diphetor	0	41	41
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	1813	511	2324
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	900	1798	2698
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	3634	4708	8342
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	2997	5	3002
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella	91	68	159
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula	1757	1175	2932
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus	482	942	1424

Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Heptagenia	414	0	414
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Ironodes	0	63	63
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena	500	460	960
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	52	1	53
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	1082	627	1709
Arthropoda	Insecta	Ephemeroptera	Polymitarcyidae	Ephoron	12	0	12
Arthropoda	Insecta	Megaloptera	Sialidae	Sialis	1	3	4
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Plumiperla	5	0	5
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Suwallia	181	52	233
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa	43	294	337
Arthropoda	Insecta	Plecoptera	Leuctridae	Moselia	0	5	5
Arthropoda	Insecta	Plecoptera	Nemouridae	Malenka	4	263	267
Arthropoda	Insecta	Plecoptera	Nemouridae	Podmosta	1	0	1
Arthropoda	Insecta	Plecoptera	Nemouridae	Visoka	1	19	20
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	392	416	808
Arthropoda	Insecta	Plecoptera	Peltoperlidae	Yoraperla	1331	6157	7488
Arthropoda	Insecta	Plecoptera	Perlidae	Calineuria	17	2	19
Arthropoda	Insecta	Plecoptera	Perlidae	Claassenia	0	6	6
Arthropoda	Insecta	Plecoptera	Perlidae	Doroneuria	18	132	150
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	37	90	127
Arthropoda	Insecta	Plecoptera	Perlodidae	Cultus	5	0	5
Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperla	38	0	38
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus	25	1	26
Arthropoda	Insecta	Plecoptera	Perlodidae	Megarcys	0	2	2
Arthropoda	Insecta	Plecoptera	Perlodidae	Oroperla	0	11	11
Arthropoda	Insecta	Plecoptera	Perlodidae	Perlinodes	1	4	5
Arthropoda	Insecta	Plecoptera	Perlodidae	Skwala	20	0	20
Arthropoda	Insecta	Plecoptera	Pteronarcyidae	Pteronarcella	7	17	24
Arthropoda	Insecta	Plecoptera	Taeniopterygidae	Taenionema	512	0	512
Arthropoda	Insecta	Trichoptera	Apataniidae	Apatania	2	61	63
Arthropoda	Insecta	Trichoptera	Apataniidae	Pedomoecus	44	36	80
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	106	324	430
Arthropoda	Insecta	Trichoptera	Brachycentridae	Micrasema	185	1392	1577
Arthropoda	Insecta	Trichoptera	Calamoceratidae	Heteroplectron	0	2	2
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Anagapetus	0	20	20
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Glossosoma	495	323	818
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	107	55	162
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche	4	0	4
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	80	2	82
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	30	56	86
Arthropoda	Insecta	Trichoptera	Hydroptilidae	Leucotrichia	1	0	1
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma	46	8	54
Arthropoda	Insecta	Trichoptera	Leptoceridae	Oecetis	1	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Chyranda	1	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Cryptochia	1	2	3
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus	4	10	14
Arthropoda	Insecta	Trichoptera	Limnephilidae	Ecclisomyia	10	0	10
Arthropoda	Insecta	Trichoptera	Limnephilidae	Homophylax	0	1	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Psychoglypha	0	3	3
Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes	2	310	312
Arthropoda	Insecta	Trichoptera	Philopotamidae	Wormaldia	0	2	2

Arthropoda	Insecta	Trichoptera	Polycentropodidae	Polycentropus	4	5	9
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	2173	1307	3480
Arthropoda	Insecta	Trichoptera	Uenoidae	Farula	0	1	1
Arthropoda	Insecta	Trichoptera	Uenoidae	Neophylax	0	31	31
Arthropoda	Insecta	Trichoptera	Uenoidae	Neothremma	19	47	66
Arthropoda	Insecta	Trichoptera	Uenoidae	Oligophlebodes	25	13	38
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	Hyalella	0	9	9
Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidium	63	87	150
				Total individuals collected	44194	35706	79900
				Genera present, count >0	75	85	107
				Genera absent, count =0	32	22	0
				Genera with count >0 and <10	26	32	39
				Genera with count >=10	49	53	68
				Genera with count >=100	27	27	39
				Genera with count >=500	14	15	21
				Genera with count >=1000	11	9	16
				Genera with count >=5000	2	2	4

Appendix 8. List of taxa and the number of individuals collected between 2003 and 2006.

Phylum	Class	Order	Family	Subfamily of genus	species	2003	2004	2005	2006	All Years
Annelida	Clitellata Subclass Oligochaeta					248	85	46	20	399
Arthropoda	Arachnida	Trombidiformes				695	850	250	167	1962
Arthropoda	Insecta	Coleoptera	Curculionidae			2	0	0	0	2
Arthropoda	Insecta	Coleoptera	Dytiscidae	Oreodytes		0	2	1	0	3
Arthropoda	Insecta	Coleoptera	Dytiscidae	Stictotarsus		0	0	0	1	1
Arthropoda	Insecta	Coleoptera	Dytiscidae			0	1	0	0	1
Arthropoda	Insecta	Coleoptera	Elmidae	Cleptelmis	addenda	158	280	70	59	567
Arthropoda	Insecta	Coleoptera	Elmidae	Heterlimnius	corpulentus	27	48	65	37	177
Arthropoda	Insecta	Coleoptera	Elmidae	Heterlimnius	koebelei	0	0	1	0	1
Arthropoda	Insecta	Coleoptera	Elmidae	Heterlimnius		390	829	355	281	1855
Arthropoda	Insecta	Coleoptera	Elmidae	Lara		2	3	0	0	5
Arthropoda	Insecta	Coleoptera	Elmidae	Narpus	concolor	1	20	5	12	38
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	divergens/pecosensis	5	10	3	13	31
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	quadrimaculatus	52	81	25	72	230
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus		65	333	151	137	686
Arthropoda	Insecta	Coleoptera	Elmidae			266	158	56	67	547
Arthropoda	Insecta	Coleoptera	Helophoridae	Helophorus		0	2	2	0	4
Arthropoda	Insecta	Coleoptera	Hydraenidae	Hydraena		0	0	0	6	6
Arthropoda	Insecta	Coleoptera	Hydraenidae	Ochthebius		0	0	8	2	10
Arthropoda	Insecta	Coleoptera	Hydrophilidae			0	1	2	0	3
Arthropoda	Insecta	Coleoptera				0	0	0	1	1
Arthropoda	Insecta	Diptera	Athericidae	Atherix	pachypus	22	26	0	19	67
Arthropoda	Insecta	Diptera	Ceratopogonidae	Atrichopogon/Forcipomyia		0	1	0	0	1
Arthropoda	Insecta	Diptera	Ceratopogonidae	Bezzia		0	0	1	1	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Forcipomyia		0	0	1	1	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Probezzia		62	62	39	37	200
Arthropoda	Insecta	Diptera	Ceratopogonidae			1	1	0	8	10
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae		1081	1264	380	358	3083
Arthropoda	Insecta	Diptera	Chironomidae	Orthocladiinae		1978	1899	843	568	5288
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae		31	36	14	13	94
Arthropoda	Insecta	Diptera	Chironomidae			83	94	98	65	340
Arthropoda	Insecta	Diptera	Dixidae	Dixa		0	0	0	1	1
Arthropoda	Insecta	Diptera	Empididae	Chelifera		49	49	24	33	155
Arthropoda	Insecta	Diptera	Empididae	Clinocera		0	2	0	0	2
Arthropoda	Insecta	Diptera	Empididae	Oreogeton		3	0	0	1	4
Arthropoda	Insecta	Diptera	Empididae			0	3	5	2	10
Arthropoda	Insecta	Diptera	Pelecorhynchidae	Glutops		27	85	54	42	208
Arthropoda	Insecta	Diptera	Psychodidae	Pericoma		218	352	21	49	640
Arthropoda	Insecta	Diptera	Simuliidae	Prosimulium		4	12	10	28	54
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	tuberosum complex	0	0	1	0	1
Arthropoda	Insecta	Diptera	Simuliidae	Simulium		380	372	502	530	1784
Arthropoda	Insecta	Diptera	Simuliidae			17	11	29	3	60
Arthropoda	Insecta	Diptera	Tipulidae	Antocha		25	14	13	42	94
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota		8	2	4	4	18
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma		14	24	4	6	48
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila		0	2	1	0	3
Arthropoda	Insecta	Diptera	Tipulidae	Pedicia		1	0	0	0	1

Arthropoda	Insecta	Diptera	Tipulidae	Rhabdomastix		3	2	4	3	12
Arthropoda	Insecta	Diptera	Tipulidae			1	1	1	1	4
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus		9	130	12	35	186
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis		1872	2091	784	1882	6629
Arthropoda	Insecta	Ephemeroptera	Baetidae	Diphetor	hageni	8	17	5	11	41
Arthropoda	Insecta	Ephemeroptera	Baetidae			10	114	91	3	218
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	attenuata group	0	0	3	0	3
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	delantala	88	92	145	182	507
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella		0	1	0	0	1
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	heterocaudata	0	4	2	2	8
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	hystrix	0	35	23	0	58
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella		0	1058	178	496	1732
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	coloradensis/flavilinea	18	33	37	34	122
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	doddsi	446	873	541	679	2539
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	grandis/spinifera	584	914	128	208	1834
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella		59	1	47	106	213
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	inermis/dorothea	0	2	3	0	5
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella	tibialis	5	10	1	1	17
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella		0	39	12	0	51
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae			1487	1173	281	185	3126
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula		255	293	277	350	1175
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus		255	215	208	264	942
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Ironodes		9	16	5	33	63
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena		97	261	42	60	460
Arthropoda	Insecta	Ephemeroptera	Heptageniidae			33	232	36	117	418
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	minutus	0	0	0	1	1
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae			0	23	0	0	23
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia		112	403	21	91	627
Arthropoda	Insecta	Ephemeroptera				0	0	2	0	2
Arthropoda	Insecta	Megaloptera	Corydalidae			2	1	0	3	6
Arthropoda	Insecta	Megaloptera	Sialidae	Sialis		0	0	1	2	3
Arthropoda	Insecta	Plecoptera	Capniidae			0	1	1	0	2
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Suwallia		2	17	25	8	52
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa		47	124	84	39	294
Arthropoda	Insecta	Plecoptera	Chloroperlidae			133	399	181	143	856
Arthropoda	Insecta	Plecoptera	Leuctridae	Moselia	infuscata	0	2	2	1	5
Arthropoda	Insecta	Plecoptera	Leuctridae			5	7	7	4	23
Arthropoda	Insecta	Plecoptera	Nemouridae	Malenka		20	172	25	46	263
Arthropoda	Insecta	Plecoptera	Nemouridae	Visoka	cataractae	3	3	6	7	19
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	cinctipes	0	37	0	0	37
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	columbiana	10	44	8	74	136
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	oregonensis group	0	0	0	11	11
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada		1	204	6	21	232
Arthropoda	Insecta	Plecoptera	Nemouridae			32	34	5	10	81
Arthropoda	Insecta	Plecoptera	Peltoperlidae	Yoraperla		1205	2663	1363	926	6157
Arthropoda	Insecta	Plecoptera	Peltoperlidae			0	67	40	0	107
Arthropoda	Insecta	Plecoptera	Perlidae	Calineuria	californica	0	2	0	0	2
Arthropoda	Insecta	Plecoptera	Perlidae	Claassenia	sabulosa	5	0	1	0	6
Arthropoda	Insecta	Plecoptera	Perlidae	Doroneuria	baumanni	29	49	25	29	132
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	hoguei	9	0	1	8	18
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	pacifica	5	27	23	10	65

Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla		2	0	0	5	7
Arthropoda	Insecta	Plecoptera	Perlidae			28	60	34	37	159
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus	nonus	0	0	1	0	1
Arthropoda	Insecta	Plecoptera	Perlodidae	Megarcys		1	1	0	0	2
Arthropoda	Insecta	Plecoptera	Perlodidae	Oroperla	barbara	1	7	0	3	11
Arthropoda	Insecta	Plecoptera	Perlodidae	Perlinodes	aurea	0	4	0	0	4
Arthropoda	Insecta	Plecoptera	Perlodidae			61	84	45	115	305
Arthropoda	Insecta	Plecoptera	Pteronarcyidae	Pteronarcella	regularis	4	7	0	6	17
Arthropoda	Insecta	Plecoptera	Pteronarcyidae			0	1	0	0	1
Arthropoda	Insecta	Plecoptera	Taeniopterygidae			2	0	0	0	2
Arthropoda	Insecta	Plecoptera				8	6	8	14	36
Arthropoda	Insecta	Trichoptera	Apataniidae	Apatania		25	9	12	15	61
Arthropoda	Insecta	Trichoptera	Apataniidae	Pedomoecus	sierra	1	7	16	12	36
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	americanus	191	58	32	28	309
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus		12	1	1	1	15
Arthropoda	Insecta	Trichoptera	Brachycentridae	Micrasema		651	331	243	167	1392
Arthropoda	Insecta	Trichoptera	Calamoceratidae	Heteroplectron	californicum	2	0	0	0	2
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Anagapetus		0	14	0	6	20
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Glossosoma		64	78	147	34	323
Arthropoda	Insecta	Trichoptera	Glossosomatidae			218	211	87	31	547
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	californica	0	6	1	0	7
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	grandis	1	9	0	2	12
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche		2	34	0	0	36
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche		0	0	1	1	2
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	almota	0	0	0	1	1
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	elsis	0	34	6	4	44
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche		10	0	0	1	11
Arthropoda	Insecta	Trichoptera	Hydropsychidae			86	41	3	10	140
Arthropoda	Insecta	Trichoptera	Hydroptilidae			1	1	0	2	4
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma		1	2	4	1	8
Arthropoda	Insecta	Trichoptera	Limnephilidae	Cryptochia		1	0	0	1	2
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus		1	4	2	3	10
Arthropoda	Insecta	Trichoptera	Limnephilidae	Homophylax		0	0	0	1	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Psychoglypha		0	1	1	1	3
Arthropoda	Insecta	Trichoptera	Limnephilidae			1	3	2	5	11
Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes		145	80	44	41	310
Arthropoda	Insecta	Trichoptera	Philopotamidae	Wormaldia		1	0	0	1	2
Arthropoda	Insecta	Trichoptera	Philopotamidae			9	1	23	17	50
Arthropoda	Insecta	Trichoptera	Polycentropodidae	Polycentropus		0	0	5	0	5
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	alberta group	0	0	0	1	1
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	angelita group	0	0	18	5	23
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	arnaudi	6	15	1	12	34
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	betteni group	54	68	15	35	172
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	brunnea/vemna groups	142	83	73	86	384
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	sibirica group	44	0	0	0	44
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	sibirica group A	0	1	14	3	18
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	sibirica group C	0	0	0	3	3
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	vagrita	0	0	3	0	3
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	verrula group	0	6	2	2	10
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	vofixa group	0	81	65	30	176
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila		51	151	125	112	439

Arthropoda	Insecta	Trichoptera	Rhyacophilidae			11	5	0	0	16
Arthropoda	Insecta	Trichoptera	Uenoidae	Farula		0	0	1	0	1
Arthropoda	Insecta	Trichoptera	Uenoidae	Neophylax	splendens	0	0	1	1	2
Arthropoda	Insecta	Trichoptera	Uenoidae	Neophylax		12	5	10	2	29
Arthropoda	Insecta	Trichoptera	Uenoidae	Neothremma		17	19	7	4	47
Arthropoda	Insecta	Trichoptera	Uenoidae	Oligophlebodes		0	13	0	0	13
Arthropoda	Insecta	Trichoptera	Uenoidae			2	0	0	0	2
Arthropoda	Insecta	Trichoptera				72	83	19	11	185
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	Hyalella	azteca	1	4	0	4	9
Arthropoda	Ostracoda					13	139	7	0	159
Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidium		22	40	20	5	87
Mollusca	Gastropoda					1	0	0	1	2
Nemata						49	3	9	0	61
Platyhelminthes	Turbellaria					625	167	8	54	854
				Total individuals collected		15426	20878	8893	9709	54906
				Taxa present, count > 0		108	124	118	122	163
				Taxa absent, count = 0		55	39	45	41	0
				Taxa with count >0 and <10		44	46	54	55	57
				Taxa with count >10		64	78	64	67	106
				Taxa with count >100		24	31	19	21	54
				Taxa with count >500		9	10	5	5	23
				Taxa with count >1000		5	6	1	1	13

Appendix 9. List of genera and abundances historically collected at treated and untreated sites. Samples were collected annually between 2003 and 2006.

Phylum	Class	Order	Family	Genus	Treated sites	Untreated sites	Total
Arthropoda	Insecta	Coleoptera	Dytiscidae	Oreodytes	3	0	3
Arthropoda	Insecta	Coleoptera	Dytiscidae	Stictotarsus	1	0	1
Arthropoda	Insecta	Coleoptera	Elmidae	Cleptelmis	567	0	567
Arthropoda	Insecta	Coleoptera	Elmidae	Heterlimnius	1996	37	2033
Arthropoda	Insecta	Coleoptera	Elmidae	Lara	5	0	5
Arthropoda	Insecta	Coleoptera	Elmidae	Narpus	38	0	38
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	945	2	947
Arthropoda	Insecta	Coleoptera	Helophoridae	Helophorus	4	0	4
Arthropoda	Insecta	Coleoptera	Hydraenidae	Hydraena	6	0	6
Arthropoda	Insecta	Coleoptera	Hydraenidae	Ochthebius	10	0	10
Arthropoda	Insecta	Diptera	Athericidae	Atherix	67	0	67
Arthropoda	Insecta	Diptera	Ceratopogonidae	Atrichopogon/Forcipomyia	1	0	1
Arthropoda	Insecta	Diptera	Ceratopogonidae	Bezzia	2	0	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Forcipomyia	2	0	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Probezzia	182	18	200
Arthropoda	Insecta	Diptera	Dixidae	Dixa	1	0	1
Arthropoda	Insecta	Diptera	Empididae	Chelifera	124	31	155
Arthropoda	Insecta	Diptera	Empididae	Clinocera	0	2	2
Arthropoda	Insecta	Diptera	Empididae	Oreogeton	0	4	4
Arthropoda	Insecta	Diptera	Pelecorhynchidae	Glutops	153	55	208
Arthropoda	Insecta	Diptera	Psychodidae	Pericoma	639	1	640
Arthropoda	Insecta	Diptera	Simuliidae	Prosimulium	18	36	54
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	1582	203	1785
Arthropoda	Insecta	Diptera	Tipulidae	Antocha	94	0	94
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota	16	2	18
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma	47	1	48
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila	2	1	3
Arthropoda	Insecta	Diptera	Tipulidae	Pedicia	0	1	1
Arthropoda	Insecta	Diptera	Tipulidae	Rhabdomastix	12	0	12
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus	180	6	186
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	6251	378	6629
Arthropoda	Insecta	Ephemeroptera	Baetidae	Diphetor	36	5	41
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	497	14	511
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	1751	47	1798
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	4334	374	4708
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	5	0	5
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella	68	0	68
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula	758	417	1175
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus	781	161	942
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Ironodes	63	0	63
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena	400	60	460
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	1	0	1
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	598	29	627
Arthropoda	Insecta	Megaloptera	Sialidae	Sialis	3	0	3
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Suwallia	52	0	52
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa	280	14	294
Arthropoda	Insecta	Plecoptera	Leuctridae	Moselia	0	5	5
Arthropoda	Insecta	Plecoptera	Nemouridae	Malenka	261	2	263

Arthropoda	Insecta	Plecoptera	Nemouridae	Visoka	3	16	19
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	302	114	416
Arthropoda	Insecta	Plecoptera	Peltoperlidae	Yoraperla	4312	1845	6157
Arthropoda	Insecta	Plecoptera	Perlidae	Calineuria	2	0	2
Arthropoda	Insecta	Plecoptera	Perlidae	Claassenia	6	0	6
Arthropoda	Insecta	Plecoptera	Perlidae	Doroneuria	122	10	132
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	90	0	90
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus	0	1	1
Arthropoda	Insecta	Plecoptera	Perlodidae	Megarcys	2	0	2
Arthropoda	Insecta	Plecoptera	Perlodidae	Oroperla	11	0	11
Arthropoda	Insecta	Plecoptera	Perlodidae	Perlinodes	4	0	4
Arthropoda	Insecta	Plecoptera	Pteronarcyidae	Pteronarcella	17	0	17
Arthropoda	Insecta	Trichoptera	Apataniidae	Apatania	60	1	61
Arthropoda	Insecta	Trichoptera	Apataniidae	Pedomoecus	16	20	36
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	324	0	324
Arthropoda	Insecta	Trichoptera	Brachycentridae	Micrasema	1384	8	1392
Arthropoda	Insecta	Trichoptera	Calamoceratidae	Heteroplectron	2	0	2
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Anagapetus	20	0	20
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Glossosoma	321	2	323
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	55	0	55
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	2	0	2
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	51	5	56
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma	8	0	8
Arthropoda	Insecta	Trichoptera	Limnephilidae	Cryptochia	1	1	2
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus	9	1	10
Arthropoda	Insecta	Trichoptera	Limnephilidae	Homophylax	1	0	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Psychoglypha	3	0	3
Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes	310	0	310
Arthropoda	Insecta	Trichoptera	Philopotamidae	Wormaldia	2	0	2
Arthropoda	Insecta	Trichoptera	Polycentropodidae	Polycentropus	5	0	5
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	1037	270	1307
Arthropoda	Insecta	Trichoptera	Uenoidae	Farula	1	0	1
Arthropoda	Insecta	Trichoptera	Uenoidae	Neophylax	23	8	31
Arthropoda	Insecta	Trichoptera	Uenoidae	Neothremma	33	14	47
Arthropoda	Insecta	Trichoptera	Uenoidae	Oligophlebodes	13	0	13
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	Hyalella	9	0	9
Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidium	87	0	87
			Total individuals collected		31484	4222	35706
			Genera present, count >0		80	42	85
			Genera absent, count =0		5	43	0
			Genera with count >0 and <10		29	20	32
			Genera with count >=10		51	22	53
			Genera with count >=100		27	8	27
			Genera with count >=500		14	1	15
			Genera with count >=1000		8	1	9
			Genera with count >=5000		1	0	2

Appendix 10. List of genera and number of individuals collected among all sampling locations for each year between 2003 and 2006.

Phylum	Class	Order	Family	Genus	2003	2004	2005	2006	Total	Years present
Mollusca	Bivalvia	Veneroida	Pisidiidae	Pisidium	22	40	20	5	87	4
Arthropoda	Insecta	Coleoptera	Dytiscidae	Oreodytes	0	2	1	0	3	2
Arthropoda	Insecta	Coleoptera	Dytiscidae	Stictotarsus	0	0	0	1	1	1
Arthropoda	Insecta	Coleoptera	Elmidae	Cleptelmis	158	280	70	59	567	4
Arthropoda	Insecta	Coleoptera	Elmidae	Heterlimnius	417	877	421	318	2033	4
Arthropoda	Insecta	Coleoptera	Elmidae	Lara	2	3	0	0	5	2
Arthropoda	Insecta	Coleoptera	Elmidae	Narpus	1	20	5	12	38	4
Arthropoda	Insecta	Coleoptera	Elmidae	Optioservus	122	424	179	222	947	4
Arthropoda	Insecta	Coleoptera	Helophoridae	Helophorus	0	2	2	0	4	2
Arthropoda	Insecta	Coleoptera	Hydraenidae	Hydraena	0	0	0	6	6	1
Arthropoda	Insecta	Coleoptera	Hydraenidae	Ochthebius	0	0	8	2	10	2
Arthropoda	Insecta	Diptera	Athericidae	Atherix	22	26	0	19	67	3
Arthropoda	Insecta	Diptera	Ceratopogonidae	Atrichopogon/Forcipomyia	0	1	0	0	1	1
Arthropoda	Insecta	Diptera	Ceratopogonidae	Bezzia	0	0	1	1	2	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Forcipomyia	0	0	1	1	2	2
Arthropoda	Insecta	Diptera	Ceratopogonidae	Probezzia	62	62	39	37	200	4
Arthropoda	Insecta	Diptera	Dixidae	Dixa	0	0	0	1	1	1
Arthropoda	Insecta	Diptera	Empididae	Chelifera	49	49	24	33	155	4
Arthropoda	Insecta	Diptera	Empididae	Clinocera	0	2	0	0	2	1
Arthropoda	Insecta	Diptera	Empididae	Oreogeton	3	0	0	1	4	2
Arthropoda	Insecta	Diptera	Pelecorhynchidae	Glutops	27	85	54	42	208	4
Arthropoda	Insecta	Diptera	Psychodidae	Pericoma	218	352	21	49	640	4
Arthropoda	Insecta	Diptera	Simuliidae	Prosimulium	4	12	10	28	54	4
Arthropoda	Insecta	Diptera	Simuliidae	Simulium	380	372	503	530	1785	4
Arthropoda	Insecta	Diptera	Tipulidae	Antocha	25	14	13	42	94	4
Arthropoda	Insecta	Diptera	Tipulidae	Dicranota	8	2	4	4	18	4
Arthropoda	Insecta	Diptera	Tipulidae	Hexatoma	14	24	4	6	48	4
Arthropoda	Insecta	Diptera	Tipulidae	Limnophila	0	2	1	0	3	2
Arthropoda	Insecta	Diptera	Tipulidae	Pedicia	1	0	0	0	1	1
Arthropoda	Insecta	Diptera	Tipulidae	Rhabdomastix	3	2	4	3	12	4
Arthropoda	Insecta	Ephemeroptera	Ameletidae	Ameletus	9	130	12	35	186	4
Arthropoda	Insecta	Ephemeroptera	Baetidae	Baetis	1872	2091	784	1882	6629	4
Arthropoda	Insecta	Ephemeroptera	Baetidae	Diphetor	8	17	5	11	41	4
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Attenella	88	93	148	182	511	4
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Caudatella	0	1097	203	498	1798	3
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Drunella	1107	1821	753	1027	4708	4
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Ephemerella	0	2	3	0	5	2
Arthropoda	Insecta	Ephemeroptera	Ephemerellidae	Serratella	5	49	13	1	68	4
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Cinygmula	255	293	277	350	1175	4
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Epeorus	255	215	208	264	942	4
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Ironodes	9	16	5	33	63	4
Arthropoda	Insecta	Ephemeroptera	Heptageniidae	Rhithrogena	97	261	42	60	460	4
Arthropoda	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	0	0	0	1	1	1
Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia	112	403	21	91	627	4
Arthropoda	Insecta	Megaloptera	Sialidae	Sialis	0	0	1	2	3	2
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Suwallia	2	17	25	8	52	4
Arthropoda	Insecta	Plecoptera	Chloroperlidae	Sweltsa	47	124	84	39	294	4
Arthropoda	Insecta	Plecoptera	Leuctridae	Moselia	0	2	2	1	5	3

Arthropoda	Insecta	Plecoptera	Nemouridae	Malenka	20	172	25	46	263	4
Arthropoda	Insecta	Plecoptera	Nemouridae	Visoka	3	3	6	7	19	4
Arthropoda	Insecta	Plecoptera	Nemouridae	Zapada	11	285	14	106	416	4
Arthropoda	Insecta	Plecoptera	Peltoperlidae	Yoraperla	1205	2663	1363	926	6157	4
Arthropoda	Insecta	Plecoptera	Perlidae	Calineuria	0	2	0	0	2	1
Arthropoda	Insecta	Plecoptera	Perlidae	Claassenia	5	0	1	0	6	2
Arthropoda	Insecta	Plecoptera	Perlidae	Doroneuria	29	49	25	29	132	4
Arthropoda	Insecta	Plecoptera	Perlidae	Hesperoperla	16	27	24	23	90	4
Arthropoda	Insecta	Plecoptera	Perlodidae	Kogotus	0	0	1	0	1	1
Arthropoda	Insecta	Plecoptera	Perlodidae	Megarcys	1	1	0	0	2	2
Arthropoda	Insecta	Plecoptera	Perlodidae	Oroperla	1	7	0	3	11	3
Arthropoda	Insecta	Plecoptera	Perlodidae	Perlinodes	0	4	0	0	4	1
Arthropoda	Insecta	Plecoptera	Pteronarcyidae	Pteronarcella	4	7	0	6	17	3
Arthropoda	Insecta	Trichoptera	Apataniidae	Apatania	25	9	12	15	61	4
Arthropoda	Insecta	Trichoptera	Apataniidae	Pedomoecus	1	7	16	12	36	4
Arthropoda	Insecta	Trichoptera	Brachycentridae	Brachycentrus	203	59	33	29	324	4
Arthropoda	Insecta	Trichoptera	Brachycentridae	Micrasema	651	331	243	167	1392	4
Arthropoda	Insecta	Trichoptera	Calamoceratidae	Heteroplectron	2	0	0	0	2	1
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Anagapetus	0	14	0	6	20	2
Arthropoda	Insecta	Trichoptera	Glossosomatidae	Glossosoma	64	78	147	34	323	4
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Arctopsyche	3	49	1	2	55	4
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Hydropsyche	0	0	1	1	2	2
Arthropoda	Insecta	Trichoptera	Hydropsychidae	Parapsyche	10	34	6	6	56	4
Arthropoda	Insecta	Trichoptera	Lepidostomatidae	Lepidostoma	1	2	4	1	8	4
Arthropoda	Insecta	Trichoptera	Limnephilidae	Cryptochia	1	0	0	1	2	2
Arthropoda	Insecta	Trichoptera	Limnephilidae	Dicosmoecus	1	4	2	3	10	4
Arthropoda	Insecta	Trichoptera	Limnephilidae	Homophylax	0	0	0	1	1	1
Arthropoda	Insecta	Trichoptera	Limnephilidae	Psychoglypha	0	1	1	1	3	3
Arthropoda	Insecta	Trichoptera	Philopotamidae	Dolophilodes	145	80	44	41	310	4
Arthropoda	Insecta	Trichoptera	Philopotamidae	Wormaldia	1	0	0	1	2	2
Arthropoda	Insecta	Trichoptera	Polycentropodidae	Polycentropus	0	0	5	0	5	1
Arthropoda	Insecta	Trichoptera	Rhyacophilidae	Rhyacophila	297	405	316	289	1307	4
Arthropoda	Insecta	Trichoptera	Uenoidae	Farula	0	0	1	0	1	1
Arthropoda	Insecta	Trichoptera	Uenoidae	Neophylax	12	5	11	3	31	4
Arthropoda	Insecta	Trichoptera	Uenoidae	Neothremma	17	19	7	4	47	4
Arthropoda	Insecta	Trichoptera	Uenoidae	Oligophlebodes	0	13	0	0	13	1
Arthropoda	Malacostraca	Amphipoda	Hyalellidae	Hyalella	1	4	0	4	9	3
				Total individuals collected	8134	13618	6280	7674	35706	
				Genera present, count >0	59	66	63	68	85	
				Genera absent, count =0	26	19	22	17	0	
				Genera with count >0 and <10	25	23	27	32	32	
				Genera with count >=10	34	43	36	36	53	
				Genera with count >=100	15	19	13	13	27	
				Genera with count >=500	4	5	4	4	15	
				Genera with count >=1000	3	4	1	2	9	
				Genera with count >=5000	0	0	0	0	2	

Appendix 11. Logan River Basin Aquatic Invertebrate Collection Plan for summer 2007

Version: 10 May 2007
Prepared by: Eric Dinger, PhD and Mark Vinson, PhD, The BugLab, Logan, Utah
Purpose: To try and collect as many different taxa as possible from the Logan River Basin. Specimens will be indentified to the lowest level practical and archived for genetic analysis.

Sampling schedule

- Twice weekly, sample a habitat location in the Logan River watershed
  - Personnel: Stephanie Peterson and one additional assistant, occasionally a taxonomist
  - Locations to be determined by Eric , Mark, and others
- Things to remember
  - USE ONLY 95% Ethanol! – standard BugLab juice is only 75% Ethanol

Sampling protocol

1. Upon arrival, record Site Name, Lat/Long with GPS, Date/Time, Site description
   a. Site Description should be in as much detail as possible – e.g. how long it took to walk to site, weather (esp. cloud cover), Moon phase, rise (get from website: www.wunderground.com – Logan, UT forecast or from GPS), vegetation - in as much detail as possible, basic flow estimate (high, low, trickle, etc.), Size of habitat, etc. Take photographs
2. Measure and record water temperature, air temperature, alkalinity, specific conductance, pH.
3. Three separate types of samples:
   a. Aquatic qualitative (min time: 2 hours, or an estimated 500 individuals)
      - Intensively sample all habitats (including "microhabitats" – e.g. aquatic vegetation, filamentous algae, littoral zone, cobbles, boulders, sand/silt, backwaters, water/air interface, etc.) Leave no habitats un-sampled.
      - As you sample, periodically sort out aquatic insects with BioQuip forceps – preserve in medium sized sample vial with 95% Ethanol. Note that some sample processing (i.e., elutriation, washing leaf litter) may speed up the picking portion.
      - Label outside of sample vial with paper tape with site name and date, place paper label inside with site name, date, lat/long, type of sample (aquatic qualitative)
   b. Terrestrial sweep netting (min time: 1 hour)
      - With heavy duty sweep net, vigorously beat all riparian vegetation, sweeping grasses, willows, tree branches, etc.
      - After 5 minutes of sweeping, sweep air rapidly to collate all debris and insects in bottom of net.
      - Expose bottom portion of net, and pull out terrestrial stages with BioQuip forceps, or with aspirator (for midges), place in small vial with 95% Ethanol.
      - Repeat, repeat, repeat.
      - Note, if sampling in bright sun pay particular attention to shaded, near stream vegetation. If cloudy, or during dusk – insects may be in flight more and sweeping higher branches may be more productive.
      - With green, extendable net, sweep above the stream channel (up to 8 ft high) to collect swarming insects (especially mayflies). Avoid using the green delicate net to sweep riparian vegetation (it will rip).
      - Label vials identical to aquatic qualitative (with different sample type, of course)
   c. Light traps
      - As dusk approaches, start setting out light traps

- Over a 150 meter stream reach, pond perimeter, spring area – lay out 12 pairs of lights, each with their own Rubbermaid tray/trap. (one each of blacklight & ultraviolet light, separated by ~1m), place close to stream (a couple can be set off in open areas)
- In bottom of each Rubbermaid tray, pour ~1 cm of 95% Ethanol.
- Make sure Laminated Sheet is underneath each sampling pair.
- Sample Collection: 2 options
    1. Hang out and wait two hours post-dusk to collect
    2. Return next morning to collect
- To collect:
    - Filter all insects in 95% ethanol through fine-mesh aquarium nets
    - Invert net into sample vial, use 95% ethanol to wash out net into vial (all traps can be consolidated into one large sample vial)
- Label vial identical to above vials

Upon return to BugLab, hand off samples to taxonomist, recharge batteries (if using rechargeable batteries), download photographs to computer. Repeat for the remainder of the summer. Tell Eric of any sampling problems.

<u>Equipment list:</u>

Field Pack
Forceps (4 pairs – 2 with leashes)
95% Ethanol (2 liters)
Sample vials (2 small vials, 1 medium, 1 large)
Paper labels
Sharpies
GPS
Alkalinity kit
pH meter
Conductivity meter
2 or 3 sweep nets (1 extendable net (with 4 sections), 1 or 2 heavy duty sweep nets)
1 kicknet
Sorting trays
Headlamps
Field book
Pencils
Blacklights & ultraviolet lights (24 total) with Rubbermaid trays and laminated sheets)
Spare bulbs (2 of each type)
Extra AA Batteries for all powered equipment
Thermometer
Watch
Waders/Gloves as needed
Digital Camera
Aspirator
Aquarium net
Area Maps

Appendix 12. Individual taxa lists and abundances for the samples used in the analyses.

Taxonomic list and abundances of aquatic invertebrates collected 13 August 1984 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128274. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 642 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			93	
Class: Insecta				
Coleoptera	Dytiscidae		4	
Coleoptera	Elmidae		108	
Diptera	Ceratopogonidae		4	
Diptera	Chironomidae		946	
Diptera	Empididae		11	
Diptera	Psychodidae		18	
Diptera	Simuliidae		93	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera			86	
Ephemeroptera	Baetidae	Baetis	39	
Ephemeroptera	Ephemerellidae	Attenella delantala	11	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	93	
Ephemeroptera	Ephemerellidae	Drunella doddsi	100	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	14	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	18	
Ephemeroptera	Heptageniidae	Cinygmula	158	
Ephemeroptera	Heptageniidae	Epeorus	29	
Ephemeroptera	Heptageniidae	Rhithrogena	72	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	39	
Plecoptera			4	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		75	
Plecoptera	Nemouridae	Zapada	18	
Plecoptera	Peltoperlidae	Yoraperla	7	
Plecoptera	Perlidae		4	
Plecoptera	Taeniopterygidae	Taenionema	72	
Trichoptera			11	
Trichoptera	Brachycentridae	Brachycentrus	4	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae	Glossosoma	39	
Trichoptera	Hydropsychidae	Arctopsyche	4	
Trichoptera	Hydropsychidae	Parapsyche	4	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Rhyacophilidae	Rhyacophila	47	
Class: Maxillopoda, subclass copepoda			4	
Class: Ostracoda			14	
Phylum: Nemata			7	
Phylum: Platyhelminthes				
Class: Turbellaria			18	

Total: 42 OTU taxa			2301	individuals

Taxonomic list and abundances of aquatic invertebrates collected 13 August 1984 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128275. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1344 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			118	
Class: Insecta				
Coleoptera	Elmidae		154	
Diptera			7	
Diptera	Ceratopogonidae		14	
Diptera	Chironomidae		1394	
Diptera	Empididae		65	
Diptera	Psychodidae		72	
Diptera	Psychodidae	Pericoma	32	
Diptera	Simuliidae		154	
Diptera	Stratiomyidae		7	
Diptera	Tipulidae	Dicranota	7	
Diptera	Tipulidae	Hexatoma	25	
Ephemeroptera			104	
Ephemeroptera	Baetidae	Baetis	1039	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	437	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	222	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	65	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	65	
Ephemeroptera	Heptageniidae	Cinygmula	79	
Ephemeroptera	Heptageniidae	Epeorus	25	
Ephemeroptera	Heptageniidae	Rhithrogena	65	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	39	
Plecoptera	Chloroperlidae		176	
Plecoptera	Nemouridae	Zapada	25	
Plecoptera	Peltoperlidae	Yoraperla	32	
Plecoptera	Perlidae		7	
Plecoptera	Perlidae	Hesperoperla	14	
Plecoptera	Taeniopterygidae	Taenionema	57	
Trichoptera			14	
Trichoptera	Brachycentridae	Brachycentrus	25	
Trichoptera	Glossosomatidae	Glossosoma	25	
Trichoptera	Hydropsychidae	Parapsyche	14	
Trichoptera	Rhyacophilidae	Rhyacophila	161	
Trichoptera	Uenoidae	Neothremma	14	
Class: Ostracoda			14	
Phylum: Nemata			7	
Phylum: Platyhelminthes				
Class: Turbellaria			32	

Total: 38 OTU taxa			4817	individuals

Taxonomic list and abundances of aquatic invertebrates collected 15 August 1984 at station S4:700, Silver King Creek, upstream from exclosure, Station 4, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128276. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 871 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			104	
Class: Insecta				
Coleoptera	Elmidae		100	
Diptera			7	
Diptera	Ceratopogonidae		14	
Diptera	Chironomidae		903	
Diptera	Empididae		65	
Diptera	Psychodidae		82	
Diptera	Psychodidae	Pericoma	82	
Diptera	Simuliidae		197	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera			82	
Ephemeroptera	Baetidae	Baetis	771	
Ephemeroptera	Ephemerellidae	Attenella delantala	47	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	7	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	39	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	22	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Heptageniidae	Cinygmula	118	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Rhithrogena	22	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	39	
Plecoptera			18	
Plecoptera	Capniidae		7	
Plecoptera	Chloroperlidae		68	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlidae		4	
Plecoptera	Perlodidae	Cultus	4	
Plecoptera	Taeniopterygidae	Taenionema	57	
Trichoptera			97	
Trichoptera	Brachycentridae	Brachycentrus	7	
Trichoptera	Glossosomatidae	Glossosoma	32	
Trichoptera	Rhyacophilidae	Rhyacophila	32	
Class: Ostracoda			14	
Phylum: Nemata			22	
Phylum: Platyhelminthes				
Class: Turbellaria			14	

Total: 37 OTU taxa			3122	individuals

Taxonomic list and abundances of aquatic invertebrates collected 14 August 1984 at station S5:725, Silver King Creek, mid meadow upstream from cabin, Station 5, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128277. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 658 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			4	
Class: Insecta				
Coleoptera	Elmidae		82	
Diptera	Chironomidae		462	
Diptera	Empididae		29	
Diptera	Psychodidae		36	
Diptera	Simuliidae		312	
Diptera	Stratiomyidae		4	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera			29	
Ephemeroptera	Baetidae	Baetis	946	
Ephemeroptera	Ephemerellidae	Attenella delantala	11	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	57	
Ephemeroptera	Ephemerellidae	Drunella doddsi	79	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	11	
Ephemeroptera	Heptageniidae	Epeorus	22	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Plecoptera			4	
Plecoptera	Chloroperlidae		61	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Taeniopterygidae	Taenionema	11	
Trichoptera			4	
Trichoptera	Brachycentridae	Brachycentrus	7	
Trichoptera	Hydropsychidae	Arctopsyche	4	
Trichoptera	Hydropsychidae	Parapsyche	7	
Trichoptera	Lepidostomatidae	Lepidostoma	43	
Trichoptera	Rhyacophilidae	Rhyacophila	90	
Trichoptera	Uenoidae	Neothremma	4	
Phylum: Nemata			18	

Total: 31 OTU taxa			2358	individuals

Taxonomic list and abundances of aquatic invertebrates collected 15 August 1984 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128278. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 782 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			65	
Class: Insecta				
Coleoptera	Elmidae		90	
Diptera	Ceratopogonidae		11	
Diptera	Chironomidae		900	
Diptera	Dixidae	Dixa	4	
Diptera	Empididae		68	
Diptera	Psychodidae		133	
Diptera	Simuliidae		133	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera			22	
Ephemeroptera	Baetidae	Baetis	642	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	29	
Ephemeroptera	Ephemerellidae	Drunella doddsi	29	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	36	
Ephemeroptera	Ephemerellidae	Serratella tibialis	29	
Ephemeroptera	Heptageniidae	Cinygmula	29	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Plecoptera			36	
Plecoptera	Chloroperlidae		168	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlidae	Hesperoperla	25	
Plecoptera	Perlodidae	Cultus	4	
Plecoptera	Taeniopterygidae	Taenionema	183	
Trichoptera			11	
Trichoptera	Brachycentridae	Brachycentrus	14	
Trichoptera	Glossosomatidae	Glossosoma	29	
Trichoptera	Hydropsychidae	Parapsyche	4	
Trichoptera	Rhyacophilidae	Rhyacophila	61	
Class: Ostracoda			4	
Phylum: Nemata			25	

Total: 32 OTU taxa			2803 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 15 August 1984 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128279. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1146 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			97	
Class: Insecta				
Coleoptera	Elmidae		14	
Diptera			4	
Diptera	Ceratopogonidae		47	
Diptera	Chironomidae		1688	
Diptera	Empididae		65	
Diptera	Psychodidae		32	
Diptera	Simuliidae		108	
Ephemeroptera			115	
Ephemeroptera	Baetidae	Baetis	1351	
Ephemeroptera	Ephemerellidae	Drunella doddsi	86	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	82	
Ephemeroptera	Heptageniidae	Cinygmula	22	
Ephemeroptera	Heptageniidae	Epeorus	54	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Plecoptera			68	
Plecoptera	Chloroperlidae		25	
Plecoptera	Leuctridae		7	
Plecoptera	Nemouridae	Zapada	18	
Plecoptera	Perlidae		18	
Plecoptera	Taeniopterygidae	Taenionema	97	
Trichoptera			4	
Trichoptera	Brachycentridae	Micrasema	18	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Hydropsychidae	Parapsyche	18	
Trichoptera	Limnephilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	50	
Class: Maxillopoda, subclass copepoda			4	
Class: Ostracoda			4	

Total: 29 OTU taxa			4108 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 15 August 1984 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128280. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 964 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			186	
Class: Insecta				
Coleoptera	Elmidae		14	
Diptera	Ceratopogonidae		14	
Diptera	Chironomidae		423	
Diptera	Empididae		14	
Diptera	Psychodidae		7	
Diptera	Psychodidae	Pericoma	7	
Diptera	Simuliidae		32	
Ephemeroptera			54	
Ephemeroptera	Baetidae	Baetis	1749	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	29	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	7	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	14	
Ephemeroptera	Heptageniidae	Cinygmula	22	
Ephemeroptera	Heptageniidae	Epeorus	54	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Plecoptera			7	
Plecoptera	Capniidae		22	
Plecoptera	Chloroperlidae		129	
Plecoptera	Leuctridae		22	
Plecoptera	Nemouridae	Zapada	7	
Plecoptera	Perlodidae	Cultus	7	
Plecoptera	Taeniopterygidae	Taenionema	448	
Trichoptera	Glossosomatidae	Glossosoma	25	
Trichoptera	Rhyacophilidae	Rhyacophila	147	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 28 OTU taxa			3455 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 14 August 1984 at station S2:100, Bull Canyon Creek, 300 feet upstream from fence, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128281. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 526 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			39	
Class: Insecta				
Coleoptera	Elmidae		7	
Diptera	Ceratopogonidae		11	
Diptera	Chironomidae		459	
Diptera	Empididae		4	
Diptera	Psychodidae		4	
Diptera	Simuliidae	Simulium	29	
Diptera	Tipulidae	Dicranota	14	
Diptera	Tipulidae	Holorusia	4	
Ephemeroptera			14	
Ephemeroptera	Baetidae	Baetis	366	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	47	
Ephemeroptera	Ephemerellidae	Drunella doddsi	125	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	32	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	18	
Ephemeroptera	Heptageniidae	Cinygmula	115	
Ephemeroptera	Heptageniidae	Epeorus	29	
Ephemeroptera	Heptageniidae	Rhithrogena	11	
Plecoptera			179	
Plecoptera	Capniidae		47	
Plecoptera	Chloroperlidae		4	
Plecoptera	Nemouridae	Visoka cataractae	4	
Plecoptera	Nemouridae	Zapada	14	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlidae	Hesperoperla	4	
Plecoptera	Perlodidae	Isoperla	4	
Plecoptera	Taeniopterygidae	Taenionema	39	
Trichoptera			18	
Trichoptera	Rhyacophilidae	Rhyacophila	115	
Class: Maxillopoda, subclass copepoda			4	
Class: Ostracoda			4	
Phylum: Nemata			118	

Total: 33 OTU taxa			1885 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 16 August 1984 at station S1:500, Fly Valley Creek, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128282. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 792 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			358	
Class: Insecta				
Coleoptera	Elmidae		14	
Diptera			4	
Diptera	Ceratopogonidae		57	
Diptera	Chironomidae		806	
Diptera	Empididae		14	
Diptera	Simuliidae		104	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera			25	
Ephemeroptera	Baetidae	Baetis	452	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	36	
Ephemeroptera	Ephemerellidae	Drunella doddsi	25	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	7	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	18	
Ephemeroptera	Heptageniidae	Cinygmula	22	
Ephemeroptera	Heptageniidae	Epeorus	68	
Ephemeroptera	Heptageniidae	Rhithrogena	29	
Plecoptera			39	
Plecoptera	Capniidae		14	
Plecoptera	Chloroperlidae		61	
Plecoptera	Leuctridae		194	
Plecoptera	Nemouridae	Zapada	129	
Plecoptera	Peltoperlidae	Yoraperla	32	
Plecoptera	Perlidae	Hesperoperla	14	
Plecoptera	Perlodidae	Isoperla	7	
Plecoptera	Taeniopterygidae	Taenionema	14	
Trichoptera			14	
Trichoptera	Glossosomatidae	Glossosoma	14	
Trichoptera	Lepidostomatidae	Lepidostoma	54	
Trichoptera	Rhyacophilidae	Rhyacophila	172	
Trichoptera	Uenoidae	Neothremma	11	
Class: Ostracoda			4	
Phylum: Nemata			22	

Total: 33 OTU taxa			2839 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 17 August 1984 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128283. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1042 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			186	
Class: Insecta				
Coleoptera	Elmidae		351	
Diptera	Ceratopogonidae		36	
Diptera	Chironomidae		588	
Diptera	Empididae		32	
Diptera	Psychodidae		272	
Diptera	Simuliidae		93	
Ephemeroptera			57	
Ephemeroptera	Baetidae	Baetis	703	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	176	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	176	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Heptageniidae	Cinygmula	47	
Ephemeroptera	Heptageniidae	Epeorus	32	
Ephemeroptera	Heptageniidae	Rhithrogena	65	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	65	
Plecoptera			240	
Plecoptera	Capniidae		7	
Plecoptera	Chloroperlidae		22	
Plecoptera	Leuctridae		7	
Plecoptera	Nemouridae	Zapada	39	
Plecoptera	Peltoperlidae	Yoraperla	14	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae	Kogotus	4	
Plecoptera	Taeniopterygidae	Taenionema	172	
Trichoptera			18	
Trichoptera	Brachycentridae	Brachycentrus	7	
Trichoptera	Brachycentridae	Micrasema	32	
Trichoptera	Glossosomatidae	Glossosoma	32	
Trichoptera	Hydropsychidae	Arctopsyche grandis	7	
Trichoptera	Hydropsychidae	Parapsyche	7	
Trichoptera	Lepidostomatidae	Lepidostoma	7	
Trichoptera	Rhyacophilidae	Rhyacophila	97	
Trichoptera	Uenoidae	Neothremma	25	
Class: Ostracoda			93	

Total: 37 OTU taxa			3735 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 18 August 1984 at station S2:467, Coyote Valley Creek, downstream from crossing, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128284. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1368 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			115	
Class: Insecta				
Coleoptera	Elmidae		308	
Diptera			14	
Diptera	Ceratopogonidae		47	
Diptera	Chironomidae		502	
Diptera	Psychodidae		22	
Diptera	Simuliidae		29	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera			72	
Ephemeroptera	Baetidae	Baetis	1713	
Ephemeroptera	Ephemerellidae	Drunella doddsi	32	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	631	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	7	
Ephemeroptera	Heptageniidae	Cinygmula	233	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	18	
Plecoptera			36	
Plecoptera	Capniidae		25	
Plecoptera	Chloroperlidae		760	
Plecoptera	Nemouridae		4	
Plecoptera	Nemouridae	Zapada	7	
Plecoptera	Peltoperlidae	Yoraperla	68	
Plecoptera	Perlidae	Hesperoperla	7	
Plecoptera	Taeniopterygidae	Taenionema	97	
Trichoptera	Brachycentridae	Brachycentrus	7	
Trichoptera	Limnephilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	118	
Phylum: Nemata			7	

Total: 28 OTU taxa			4903 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 18 August 1984 at station S3:500, Coyote Valley Creek, upstream from large meadow rock, Sta. 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128285. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1065 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			72	
Class: Insecta				
Coleoptera	Elmidae		208	
Diptera	Ceratopogonidae		14	
Diptera	Chironomidae		581	
Diptera	Psychodidae		7	
Diptera	Simuliidae		32	
Diptera	Tipulidae	Dicranota	7	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera			68	
Ephemeroptera	Baetidae	Baetis	588	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	133	
Ephemeroptera	Ephemerellidae	Drunella doddsi	36	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	448	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	247	
Ephemeroptera	Heptageniidae	Cinygmula	487	
Ephemeroptera	Heptageniidae	Epeorus	14	
Plecoptera			39	
Plecoptera	Capniidae		39	
Plecoptera	Chloroperlidae		323	
Plecoptera	Nemouridae		14	
Plecoptera	Peltoperlidae	Yoraperla	72	
Plecoptera	Perlidae		7	
Plecoptera	Perlidae	Hesperoperla	14	
Plecoptera	Perlodidae	Kogotus	7	
Plecoptera	Taeniopterygidae	Taenionema	297	
Trichoptera			11	
Trichoptera	Rhyacophilidae	Rhyacophila	22	
Class: Ostracoda			14	
Phylum: Nemata			4	

Total: 29 OTU taxa			3817 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 18 August 1984 at station S5:NOMAP, Coyote Creek, top of upper meadow, Station 5, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128286. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1127 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			11	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			165	
Class: Insecta				
Coleoptera	Dytiscidae		4	
Coleoptera	Elmidae		136	
Diptera	Ceratopogonidae		47	
Diptera	Chironomidae		735	
Diptera	Empididae		14	
Diptera	Psychodidae		158	
Diptera	Simuliidae		470	
Diptera	Tipulidae	Dicranota	7	
Ephemeroptera			72	
Ephemeroptera	Baetidae	Baetis	1240	
Ephemeroptera	Ephemerellidae	Attenella delantala	25	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	29	
Ephemeroptera	Ephemerellidae	Drunella doddsi	68	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Heptageniidae	Cinygmula	25	
Ephemeroptera	Heptageniidae	Epeorus	43	
Ephemeroptera	Heptageniidae	Rhithrogena	47	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	18	
Plecoptera			54	
Plecoptera	Capniidae		129	
Plecoptera	Capniidae		22	
Plecoptera	Chloroperlidae		57	
Plecoptera	Nemouridae	Zapada	14	
Plecoptera	Peltoperlidae	Yoraperla	125	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae	Cultus	4	
Plecoptera	Perlodidae	Skwala americana	25	
Trichoptera			22	
Trichoptera	Brachycentridae	Micrasema	14	
Trichoptera	Glossosomatidae	Glossosoma	14	
Trichoptera	Hydropsychidae	Arctopsyche	22	
Trichoptera	Hydropsychidae	Parapsyche	18	
Trichoptera	Philopotamidae		7	
Trichoptera	Rhyacophilidae	Rhyacophila	115	
Trichoptera	Uenoidae	Neothremma	32	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae		7	
Phylum: Nemata			14	

Total: 39 OTU taxa			4039 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 19 August 1984 at station S1:571, Corral Valley Creek, downstream from trail, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128287. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1716 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			269	
Class: Insecta				
Coleoptera	Elmidae		695	
Diptera	Ceratopogonidae		25	
Diptera	Chironomidae		2186	
Diptera	Empididae		7	
Diptera	Psychodidae	Pericoma	14	
Diptera	Simuliidae		79	
Diptera	Tipulidae	Dicranota	25	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera			312	
Ephemeroptera	Baetidae	Baetis	692	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	176	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	75	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	434	
Ephemeroptera	Ephemerellidae	Serratella tibialis	186	
Ephemeroptera	Heptageniidae	Cinygmula	65	
Ephemeroptera	Heptageniidae	Epeorus	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	32	
Plecoptera	Capniidae		57	
Plecoptera	Chloroperlidae		57	
Plecoptera	Leuctridae		25	
Plecoptera	Nemouridae		7	
Plecoptera	Nemouridae	Zapada	14	
Plecoptera	Peltoperlidae	Yoraperla	14	
Plecoptera	Perlodidae	Cultus	4	
Plecoptera	Perlodidae	Isoperla	22	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	7	
Trichoptera			151	
Trichoptera	Glossosomatidae	Glossosoma	32	
Trichoptera	Hydropsychidae	Arctopsyche	7	
Trichoptera	Rhyacophilidae	Rhyacophila	186	
Class: Maxillopoda, subclass copepoda			39	
Class: Ostracoda			186	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	7	

Total: 36 OTU taxa			6151 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 18 August 1987 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128296. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1865 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			136	
Class: Insecta				
Coleoptera	Elmidae		136	
Coleoptera	Elmidae		330	
Diptera	Ceratopogonidae		14	
Diptera	Chironomidae		1577	
Diptera	Psychodidae	Pericoma	1832	
Diptera	Simuliidae		111	
Diptera	Tipulidae	Antocha	39	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Baetidae	Baetis	584	
Ephemeroptera	Ephemerellidae	Attenella margarita	7	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	118	
Ephemeroptera	Ephemerellidae	Drunella doddsi	104	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	39	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	545	
Ephemeroptera	Ephemerellidae	Serratella tibialis	7	
Ephemeroptera	Heptageniidae	Cinygmula	416	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Heptagenia	32	
Ephemeroptera	Heptageniidae	Rhithrogena	32	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	129	
Plecoptera	Chloroperlidae		65	
Plecoptera	Leuctridae		7	
Plecoptera	Nemouridae	Zapada	32	
Plecoptera	Peltoperlidae	Yoraperla	39	
Plecoptera	Perlidae	Calineuria californica	14	
Trichoptera	Brachycentridae	Brachycentrus	47	
Trichoptera	Brachycentridae	Micrasema	118	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Philopotamidae		14	
Trichoptera	Polycentropodidae	Polycentropus	14	
Trichoptera	Rhyacophilidae	Rhyacophila	97	
Phylum: Nemata			25	

Total: 32 OTU taxa			6685 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 18 August 1987 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128297. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1401 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			265	
Class: Insecta				
Coleoptera	Elmidae		513	
Diptera	Chironomidae		753	
Diptera	Empididae		47	
Diptera	Psychodidae	Pericoma	2011	
Diptera	Simuliidae		25	
Diptera	Tipulidae	Antocha	25	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Baetidae	Baetis	297	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	97	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	47	
Ephemeroptera	Ephemerellidae	Drunella doddsi	97	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	276	
Ephemeroptera	Ephemerellidae	Serratella tibialis	14	
Ephemeroptera	Heptageniidae	Cinygmula	104	
Ephemeroptera	Heptageniidae	Epeorus	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	25	
Plecoptera			7	
Plecoptera	Chloroperlidae		57	
Plecoptera	Nemouridae		14	
Plecoptera	Peltoperlidae	Yoraperla	57	
Plecoptera	Perlidae	Calineuria californica	7	
Plecoptera	Perlidae	Hesperoperla pacifica	14	
Trichoptera	Brachycentridae	Brachycentrus	39	
Trichoptera	Brachycentridae	Micrasema	47	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Rhyacophilidae	Rhyacophila	79	
Class: Ostracoda			32	
Phylum: Nemata			7	

Total: 30 OTU taxa			5022	individuals

Taxonomic list and abundances of aquatic invertebrates collected 18 August 1987 at station S4:700, Silver King Creek, upstream from exclosure, Station 4, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128298. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1046 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			75	
Class: Insecta				
Coleoptera	Elmidae		613	
Diptera	Ceratopogonidae		25	
Diptera	Chironomidae		573	
Diptera	Empididae		11	
Diptera	Psychodidae	Pericoma	509	
Diptera	Simuliidae		14	
Diptera	Tipulidae	Antocha	11	
Diptera	Tipulidae	Hexatoma	22	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	355	
Ephemeroptera	Ephemerellidae	Attenella margarita	93	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	172	
Ephemeroptera	Ephemerellidae	Drunella doddsi	65	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	32	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	620	
Ephemeroptera	Heptageniidae	Cinygmula	240	
Ephemeroptera	Heptageniidae	Epeorus	11	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	32	
Plecoptera	Chloroperlidae		22	
Plecoptera	Peltoperlidae	Yoraperla	68	
Plecoptera	Perlidae	Calineuria californica	7	
Plecoptera	Perlodidae	Isoperla	4	
Plecoptera	Taeniopterygidae	Taenionema	4	
Trichoptera	Brachycentridae	Brachycentrus	22	
Trichoptera	Brachycentridae	Micrasema	11	
Trichoptera	Glossosomatidae	Glossosoma	14	
Trichoptera	Rhyacophilidae	Rhyacophila	90	
Class: Maxillopoda, subclass copepoda			7	
Class: Ostracoda			11	
Phylum: Nemata			11	

Total: 32 OTU taxa			3749 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 18 August 1987 at station S5:725, Silver King Creek, mid meadow upstream from cabin, Station 5, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128299. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1454 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			147	
Class: Insecta				
Coleoptera	Elmidae		351	
Diptera	Ceratopogonidae		25	
Diptera	Chironomidae		1057	
Diptera	Empididae		39	
Diptera	Psychodidae	Pericoma	505	
Diptera	Simuliidae		22	
Diptera	Stratiomyidae	Nemotelus	7	
Ephemeroptera	Baetidae	Baetis	882	
Ephemeroptera	Ephemerellidae	Attenella margarita	97	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	384	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	47	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	39	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	412	
Ephemeroptera	Ephemerellidae	Serratella tibialis	4	
Ephemeroptera	Heptageniidae	Cinygmula	254	
Ephemeroptera	Heptageniidae	Epeorus	11	
Ephemeroptera	Heptageniidae	Rhithrogena	297	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	47	
Plecoptera	Chloroperlidae		147	
Plecoptera	Leuctridae		7	
Plecoptera	Nemouridae	Zapada	7	
Plecoptera	Peltoperlidae	Yoraperla	97	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Calineuria californica	7	
Plecoptera	Perlodidae	Isoperla	4	
Plecoptera	Perlodidae	Skwala americana	7	
Trichoptera	Brachycentridae	Brachycentrus	36	
Trichoptera	Brachycentridae	Micrasema	65	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Hydropsychidae	Parapsyche	22	
Trichoptera	Philopotamidae		29	
Trichoptera	Rhyacophilidae	Rhyacophila	90	
Class: Maxillopoda, subclass copepoda			22	
Class: Ostracoda			4	
Phylum: Nemata			25	

Total: 37 OTU taxa			5211 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 18 August 1987 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128300. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1347 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			208	
Class: Insecta				
Coleoptera	Elmidae		208	
Diptera	Ceratopogonidae		7	
Diptera	Chironomidae		713	
Diptera	Empididae		14	
Diptera	Psychodidae	Pericoma	1466	
Diptera	Simuliidae		47	
Ephemeroptera	Baetidae	Baetis	713	
Ephemeroptera	Ephemerellidae	Attenella margarita	47	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	72	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	104	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	480	
Ephemeroptera	Heptageniidae	Cinygmula	330	
Ephemeroptera	Heptageniidae	Epeorus	65	
Plecoptera			7	
Plecoptera	Chloroperlidae		65	
Plecoptera	Nemouridae	Zapada	7	
Plecoptera	Peltoperlidae	Yoraperla	14	
Plecoptera	Perlidae		7	
Trichoptera	Brachycentridae	Brachycentrus	14	
Trichoptera	Glossosomatidae	Glossosoma	47	
Trichoptera	Rhyacophilidae	Rhyacophila	161	

Total: 24 OTU taxa			4828 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 19 August 1987 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128301. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1105 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			247	
Class: Insecta				
Coleoptera	Elmidae		25	
Diptera	Ceratopogonidae		11	
Diptera	Chironomidae		857	
Diptera	Empididae		22	
Diptera	Psychodidae	Pericoma	667	
Diptera	Simuliidae		65	
Diptera	Tipulidae	Antocha	4	
Ephemeroptera	Baetidae	Baetis	563	
Ephemeroptera	Ephemerellidae	Attenella margarita	39	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	65	
Ephemeroptera	Ephemerellidae	Drunella doddsi	72	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	57	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	204	
Ephemeroptera	Heptageniidae	Cinygmula	222	
Ephemeroptera	Heptageniidae	Epeorus	61	
Ephemeroptera	Heptageniidae	Rhithrogena	108	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	22	
Plecoptera			4	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		133	
Plecoptera	Nemouridae	Zapada	54	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Calineuria californica	4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Trichoptera	Brachycentridae	Brachycentrus	29	
Trichoptera	Brachycentridae	Micrasema	54	
Trichoptera	Glossosomatidae	Glossosoma	136	
Trichoptera	Hydropsychidae	Arctopsyche	7	
Trichoptera	Hydropsychidae	Parapsyche	14	
Trichoptera	Limnephilidae	Cryptochia	4	
Trichoptera	Rhyacophilidae	Rhyacophila	168	
Class: Ostracoda			32	

Total: 34 OTU taxa			3961 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 19 August 1987 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128302. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 2270 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			337	
Class: Insecta				
Coleoptera	Elmidae		47	
Diptera	Chironomidae		1602	
Diptera	Empididae		47	
Diptera	Psychodidae	Pericoma	842	
Diptera	Simuliidae		7	
Diptera	Tipulidae	Antocha	14	
Ephemeroptera	Baetidae	Baetis	1695	
Ephemeroptera	Ephemerellidae	Attenella margarita	168	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	168	
Ephemeroptera	Ephemerellidae	Drunella doddsi	168	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	935	
Ephemeroptera	Ephemerellidae	Serratella tibialis	7	
Ephemeroptera	Heptageniidae	Cinygmula	376	
Ephemeroptera	Heptageniidae	Epeorus	32	
Ephemeroptera	Heptageniidae	Rhithrogena	39	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	32	
Plecoptera			14	
Plecoptera	Chloroperlidae		201	
Plecoptera	Leuctridae		32	
Plecoptera	Nemouridae	Zapada	47	
Plecoptera	Peltoperlidae	Yoraperla	25	
Plecoptera	Perlodidae	Skwala americana	7	
Plecoptera	Taeniopterygidae	Taenionema	79	
Trichoptera			39	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Glossosomatidae	Glossosoma	670	
Trichoptera	Hydropsychidae	Arctopsyche	14	
Trichoptera	Rhyacophilidae	Rhyacophila	233	
Class: Ostracoda			129	
Phylum: Nemata			65	
Phylum: Platyhelminthes				
Class: Turbellaria			47	

Total: 33 OTU taxa			8136 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 18 August 1987 at station S2:100, Bull Canyon Creek, 300 feet upstream from fence, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128303. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1272 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			29	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			186	
Class: Insecta				
Coleoptera	Elmidae		11	
Diptera	Ceratopogonidae		22	
Diptera	Chironomidae		1581	
Diptera	Empididae		39	
Diptera	Psychodidae	Pericoma	516	
Diptera	Simuliidae		111	
Diptera	Tipulidae	Hexatoma	25	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	276	
Ephemeroptera	Ephemerellidae	Attenella margarita	57	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	39	
Ephemeroptera	Ephemerellidae	Drunella doddsi	108	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	29	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	75	
Ephemeroptera	Heptageniidae	Cinygmula	29	
Ephemeroptera	Heptageniidae	Epeorus	39	
Ephemeroptera	Heptageniidae	Rhithrogena	505	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	47	
Plecoptera	Capniidae		14	
Plecoptera	Chloroperlidae		100	
Plecoptera	Leuctridae		25	
Plecoptera	Nemouridae	Zapada	32	
Plecoptera	Perlidae		54	
Plecoptera	Perlidae	Calineuria californica	14	
Plecoptera	Perlodidae	Isoperla	22	
Trichoptera	Glossosomatidae	Glossosoma	93	
Trichoptera	Hydropsychidae	Arctopsyche	29	
Trichoptera	Limnephilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	344	
Class: Ostracoda			72	
Phylum: Nemata			25	

Total: 33 OTU taxa			4559 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 19 August 1987 at station S1:500, Fly Valley Creek, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128304. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 978 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			90	
Class: Insecta				
Diptera	Chironomidae		1720	
Diptera	Empididae		7	
Diptera	Psychodidae	Pericoma	39	
Diptera	Simuliidae		140	
Ephemeroptera	Baetidae	Baetis	530	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	32	
Ephemeroptera	Ephemerellidae	Drunella doddsi	39	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	7	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	29	
Ephemeroptera	Heptageniidae	Cinygmula	93	
Ephemeroptera	Heptageniidae	Epeorus	36	
Ephemeroptera	Heptageniidae	Heptagenia	22	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera			7	
Plecoptera	Capniidae		129	
Plecoptera	Chloroperlidae		43	
Plecoptera	Leuctridae		50	
Plecoptera	Nemouridae	Zapada	118	
Plecoptera	Peltoperlidae	Yoraperla	7	
Plecoptera	Perlidae	Hesperoperla pacifica	4	
Plecoptera	Perlodidae	Skwala americana	4	
Trichoptera	Brachycentridae	Micrasema	14	
Trichoptera	Glossosomatidae	Glossosoma	22	
Trichoptera	Hydropsychidae	Arctopsyche	72	
Trichoptera	Rhyacophilidae	Rhyacophila	133	
Trichoptera	Uenoidae	Neothremma	4	
Class: Ostracoda			7	
Phylum: Nemata			29	
Phylum: Platyhelminthes				
Class: Turbellaria			57	

Total: 32 OTU taxa			3505 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 19 August 1987 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128305. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1515 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			272	
Class: Insecta				
Coleoptera	Elmidae		358	
Diptera	Ceratopogonidae		29	
Diptera	Chironomidae		1065	
Diptera	Dixidae	Dixa	4	
Diptera	Empididae		79	
Diptera	Psychodidae	Pericoma	993	
Diptera	Simuliidae		25	
Diptera	Tipulidae	Antocha	39	
Ephemeroptera	Baetidae	Baetis	864	
Ephemeroptera	Ephemerellidae	Attenella margarita	22	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	125	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	140	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	11	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	151	
Ephemeroptera	Heptageniidae	Cinygmula	75	
Ephemeroptera	Heptageniidae	Epeorus	25	
Ephemeroptera	Heptageniidae	Rhithrogena	29	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	108	
Plecoptera	Capniidae		36	
Plecoptera	Chloroperlidae		4	
Plecoptera	Leuctridae		136	
Plecoptera	Nemouridae	Zapada	97	
Plecoptera	Peltoperlidae	Yoraperla	133	
Plecoptera	Perlidae	Hesperoperla pacifica	29	
Trichoptera	Brachycentridae	Micrasema	25	
Trichoptera	Glossosomatidae	Glossosoma	219	
Trichoptera	Hydropsychidae	Arctopsyche	54	
Trichoptera	Hydropsychidae	Parapsyche	14	
Trichoptera	Limnephilidae	Ecclisomyia	14	
Trichoptera	Rhyacophilidae	Rhyacophila	244	
Trichoptera	Uenoidae	Neothremma	4	
Class: Ostracoda			7	

Total: 34 OTU taxa			5430 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 21 August 1987 at station S1:571, Corral Valley Creek, downstream from trail, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128306. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1956 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			136	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			384	
Class: Insecta				
Coleoptera	Elmidae		1570	
Diptera	Ceratopogonidae		25	
Diptera	Chironomidae		2355	
Diptera	Empididae		47	
Diptera	Psychodidae	Pericoma	47	
Diptera	Simuliidae		65	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	233	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	39	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	65	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	104	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	215	
Ephemeroptera	Heptageniidae	Cinygmula	129	
Ephemeroptera	Heptageniidae	Epeorus	14	
Ephemeroptera	Heptageniidae	Rhithrogena	32	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	416	
Plecoptera	Capniidae		14	
Plecoptera	Chloroperlidae		90	
Plecoptera	Nemouridae	Zapada	32	
Plecoptera	Peltoperlidae	Yoraperla	305	
Plecoptera	Perlodidae	Isoperla	7	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	14	
Trichoptera	Apataniidae	Apatania	7	
Trichoptera	Brachycentridae	Brachycentrus	14	
Trichoptera	Brachycentridae	Micrasema	39	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Hydropsychidae	Arctopsyche	25	
Trichoptera	Hydropsychidae	Cheumatopsyche	14	
Trichoptera	Hydropsychidae	Hydropsyche	272	
Trichoptera	Rhyacophilidae	Rhyacophila	72	
Class: Maxillopoda, subclass copepoda			65	
Class: Ostracoda			129	
Phylum: Platyhelminthes				
Class: Turbellaria			14	

Total: 36 OTU taxa			7011	individuals

Taxonomic list and abundances of aquatic invertebrates collected 20 August 1987 at station S2:467, Coyote Valley Creek, downstream from crossing, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128307. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 2044 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			29	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			118	
Class: Insecta				
Coleoptera	Elmidae		505	
Diptera	Ceratopogonidae		75	
Diptera	Chironomidae		1366	
Diptera	Dixidae		14	
Diptera	Psychodidae	Pericoma	577	
Diptera	Simuliidae		36	
Diptera	Tipulidae	Hexatoma	36	
Ephemeroptera	Baetidae	Baetis	186	
Ephemeroptera	Ephemerellidae	Attenella margarita	778	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	36	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	118	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	39	
Ephemeroptera	Heptageniidae	Cinygmula	118	
Ephemeroptera	Heptageniidae	Epeorus	14	
Ephemeroptera	Heptageniidae	Rhithrogena	244	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	186	
Plecoptera			4	
Plecoptera	Chloroperlidae		1237	
Plecoptera	Nemouridae	Zapada	25	
Plecoptera	Peltoperlidae	Yoraperla	1419	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Hesperoperla pacifica	7	
Plecoptera	Perlodidae	Skwala americana	22	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Rhyacophilidae	Rhyacophila	43	
Class: Ostracoda			61	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	14	

Total: 30 OTU taxa			7326 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 20 August 1987 at station S3:500, Coyote Valley Creek, upstream from large meadow rock, Sta. 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128308. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1302 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			32	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			183	
Class: Insecta				
Coleoptera	Elmidae		753	
Diptera	Ceratopogonidae		39	
Diptera	Chironomidae		1047	
Diptera	Psychodidae	Pericoma	82	
Diptera	Simuliidae		82	
Diptera	Tipulidae	Dicranota	7	
Diptera	Tipulidae	Hexatoma	22	
Ephemeroptera	Baetidae	Baetis	32	
Ephemeroptera	Ephemerellidae	Drunella doddsi	32	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	75	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	4	
Ephemeroptera	Heptageniidae	Cinygmula	262	
Ephemeroptera	Heptageniidae	Rhithrogena	14	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	771	
Plecoptera	Chloroperlidae		530	
Plecoptera	Nemouridae	Zapada	65	
Plecoptera	Peltoperlidae	Yoraperla	538	
Trichoptera			7	
Trichoptera	Rhyacophilidae	Rhyacophila	72	
Class: Ostracoda			4	
Phylum: Nemata			14	

Total: 23 OTU taxa			4667 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 20 August 1987 at station S5:NOMAP, Coyote Creek, top of upper meadow, Station 5, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128309. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1520 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			168	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			330	
Class: Insecta				
Coleoptera	Elmidae		358	
Diptera	Ceratopogonidae		165	
Diptera	Chironomidae		495	
Diptera	Empididae		11	
Diptera	Psychodidae	Pericoma	1315	
Diptera	Simuliidae		183	
Diptera	Tipulidae	Antocha	7	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	65	
Ephemeroptera	Ephemerellidae	Attenella margarita	158	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	72	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	25	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	29	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	36	
Ephemeroptera	Heptageniidae	Cinygmula	47	
Ephemeroptera	Heptageniidae	Epeorus	4	
Ephemeroptera	Heptageniidae	Rhithrogena	65	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	54	
Plecoptera	Capniidae		14	
Plecoptera	Chloroperlidae		287	
Plecoptera	Leuctridae		7	
Plecoptera	Nemouridae		7	
Plecoptera	Nemouridae	Zapada	14	
Plecoptera	Peltoperlidae	Yoraperla	961	
Plecoptera	Perlidae		14	
Plecoptera	Perlidae	Doroneuria baumanni	14	
Plecoptera	Perlidae	Hesperoperla pacifica	25	
Trichoptera	Glossosomatidae	Glossosoma	161	
Trichoptera	Hydropsychidae	Arctopsyche	7	
Trichoptera	Lepidostomatidae	Lepidostoma	7	
Trichoptera	Polycentropodidae	Polycentropus	115	
Trichoptera	Rhyacophilidae	Rhyacophila	104	
Class: Maxillopoda, subclass copepoda			7	
Class: Ostracoda			57	
Phylum: Nemata			32	
Phylum: Platyhelminthes			4	

Total: 40 OTU taxa			5448 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 26 July 1991 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128310. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 424 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			72	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	487	
Diptera	Ceratopogonidae	Bezzia	29	
Diptera	Chironomidae		280	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	25	
Diptera	Simuliidae		143	
Diptera	Tipulidae	Antocha	4	
Ephemeroptera	Baetidae	Baetis	151	
Ephemeroptera	Ephemerellidae	Attenella delantala	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	79	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	29	
Ephemeroptera	Heptageniidae	Cinygmula	36	
Ephemeroptera	Heptageniidae	Epeorus	14	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera	Chloroperlidae		11	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Leuctridae		4	
Plecoptera	Peltoperlidae	Yoraperla	39	
Plecoptera	Perlodidae	Isoperla	7	
Plecoptera	Perlodidae	Kogotus	4	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Limnephilidae		7	
Trichoptera	Limnephilidae	Ecclisomyia	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	22	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	18	
Class: Ostracoda			4	

Total: 30 OTU taxa			1520	individuals

Taxonomic list and abundances of aquatic invertebrates collected 28 August 1991 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128311. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 718 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			11	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			125	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	724	
Diptera			4	
Diptera	Chironomidae		391	
Diptera	Pelecorhynchidae	Glutops	36	
Diptera	Psychodidae	Pericoma	355	
Diptera	Simuliidae		22	
Diptera	Tipulidae	Dicranota	4	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera	Baetidae	Baetis	222	
Ephemeroptera	Ephemerellidae	Attenella delantala	204	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	7	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	97	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	14	
Ephemeroptera	Heptageniidae	Cinygmula	61	
Ephemeroptera	Heptageniidae	Epeorus	11	
Ephemeroptera	Heptageniidae	Heptagenia	29	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	25	
Plecoptera	Chloroperlidae	Sweltsa	29	
Plecoptera	Nemouridae	Zapada	11	
Plecoptera	Peltoperlidae	Yoraperla	93	
Plecoptera	Perlodidae	Kogotus	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Philopotamidae	Dolophilodes	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	14	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	7	
Class: Maxillopoda, subclass copepoda			4	
Class: Ostracoda			25	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	

Total: 34 OTU taxa			2573 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 25 July 1991 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128312. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 404 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			50	
Class: Insecta				
Coleoptera	Carabidae		4	
Coleoptera	Dytiscidae	Laccophilus	4	
Coleoptera	Elmidae	Zaitzevia	186	
Diptera	Ceratopogonidae	Bezzia	4	
Diptera	Chironomidae		222	
Diptera	Empididae	Chelifera	14	
Diptera	Simuliidae		4	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Ameletidae	Ameletus	22	
Ephemeroptera	Baetidae	Baetis	409	
Ephemeroptera	Ephemerellidae	Attenella delantala	57	
Ephemeroptera	Ephemerellidae	Drunella doddsi	11	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	47	
Ephemeroptera	Heptageniidae	Cinygmula	43	
Ephemeroptera	Heptageniidae	Epeorus	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Megaloptera	Sialidae	Sialis	4	
Plecoptera			4	
Plecoptera	Capniidae		7	
Plecoptera	Chloroperlidae		32	
Plecoptera	Chloroperlidae	Sweltsa	14	
Plecoptera	Peltoperlidae	Yoraperla	29	
Plecoptera	Perlidae	Calineuria californica	4	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Hydropsychidae	Hydropsyche	4	
Trichoptera	Limnephilidae	Ecclisomyia	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	29	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	36	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			172	

Total: 35 OTU taxa			1448	individuals

Taxonomic list and abundances of aquatic invertebrates collected 25 July 1991 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128313. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 737 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			104	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	369	
Diptera	Chironomidae		509	
Diptera	Empididae	Chelifera	4	
Diptera	Simuliidae		72	
Diptera	Tipulidae	Antocha	14	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Baetidae	Baetis	699	
Ephemeroptera	Ephemerellidae	Attenella delantala	22	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	143	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	39	
Ephemeroptera	Ephemerellidae	Serratella tibialis	4	
Ephemeroptera	Heptageniidae	Cinygmula	57	
Ephemeroptera	Heptageniidae	Epeorus	14	
Ephemeroptera	Heptageniidae	Heptagenia	14	
Ephemeroptera	Heptageniidae	Rhithrogena	14	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	36	
Plecoptera	Chloroperlidae		36	
Plecoptera	Chloroperlidae	Sweltsa	43	
Plecoptera	Nemouridae		14	
Plecoptera	Nemouridae	Zapada oregonensis	29	
Plecoptera	Peltoperlidae	Yoraperla	244	
Plecoptera	Perlodidae	Isoperla	11	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Brachycentridae	Micrasema	11	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	47	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	25	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	43	

Total: 32 OTU taxa			2642 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 25 July 1991 at station S3:S3A, Silver King Creek, near exclosure, Station 3A, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128314. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 169 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			29	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	133	
Diptera	Ceratopogonidae	Bezzia	4	
Diptera	Chironomidae		133	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Baetidae	Baetis	129	
Ephemeroptera	Ephemerellidae	Attenella delantala	11	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	29	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	22	
Ephemeroptera	Heptageniidae	Cinygmula	11	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Heptagenia	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	11	
Plecoptera	Chloroperlidae		29	
Plecoptera	Nemouridae	Zapada oregonensis	4	
Plecoptera	Peltoperlidae	Yoraperla	22	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	14	

Total: 20 OTU taxa			606 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 26 July 1991 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128315. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 174 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			61	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	25	
Diptera	Ceratopogonidae	Bezzia	11	
Diptera	Chironomidae		168	
Diptera	Empididae		4	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	14	
Diptera	Simuliidae		4	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera	Baetidae	Baetis	29	
Ephemeroptera	Ephemerellidae	Attenella delantala	39	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	7	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	61	
Ephemeroptera	Heptageniidae	Cinygmula	39	
Ephemeroptera	Heptageniidae	Epeorus	36	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera			4	
Plecoptera	Chloroperlidae		22	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae	Zapada oregonensis	11	
Plecoptera	Peltoperlidae	Yoraperla	7	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	29	
Class: Ostracoda			7	

Total: 28 OTU taxa			624 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 26 July 1991 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128316. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 263 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			86	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	47	
Diptera	Ceratopogonidae	Bezzia	22	
Diptera	Chironomidae		254	
Diptera	Empididae		4	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	29	
Diptera	Simuliidae		11	
Diptera	Tipulidae	Antocha	7	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Baetidae	Baetis	129	
Ephemeroptera	Ephemerellidae	Attenella delantala	72	
Ephemeroptera	Ephemerellidae	Drunella doddsi	4	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	11	
Ephemeroptera	Heptageniidae	Cinygmula	25	
Ephemeroptera	Heptageniidae	Epeorus	18	
Ephemeroptera	Heptageniidae	Heptagenia	4	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera			7	
Plecoptera	Chloroperlidae		4	
Plecoptera	Chloroperlidae	Suwallia	4	
Plecoptera	Chloroperlidae	Sweltsa	14	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae	Podmosta	4	
Plecoptera	Peltoperlidae	Yoraperla	11	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Calineuria californica	4	
Plecoptera	Perlodidae	Isoperla	4	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	4	
Trichoptera			4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila coloradensis	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	43	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	47	
Class: Ostracoda			4	
Phylum: Nemata			22	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 41 OTU taxa			943 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 29 August 1991 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128317. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 187 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			50	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	165	
Diptera	Ceratopogonidae	Bezzia	7	
Diptera	Chironomidae		136	
Diptera	Empididae	Chelifera	22	
Diptera	Psychodidae	Pericoma	151	
Diptera	Simuliidae		4	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Baetidae	Baetis	4	
Ephemeroptera	Ephemerellidae	Attenella delantala	39	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	4	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	11	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	4	
Ephemeroptera	Heptageniidae	Heptagenia	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	14	
Plecoptera			4	
Plecoptera	Chloroperlidae		4	
Plecoptera	Peltoperlidae	Yoraperla	4	
Trichoptera			4	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	22	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 24 OTU taxa			670	individuals

Taxonomic list and abundances of aquatic invertebrates collected 29 August 1991 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128318. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 495 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			79	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	341	
Diptera	Ceratopogonidae	Bezzia	25	
Diptera	Chironomidae		588	
Diptera	Empididae	Chelifera	25	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	319	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	14	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	11	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	32	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	93	
Ephemeroptera	Ephemerellidae	Serratella tibialis	7	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	111	
Plecoptera			14	
Plecoptera	Chloroperlidae		4	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Peltoperlidae	Yoraperla	22	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	14	
Class: Maxillopoda, subclass copepoda			7	
Class: Ostracoda			14	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			4	

Total: 28 OTU taxa			1774	individuals

Taxonomic list and abundances of aquatic invertebrates collected 28 August 1991 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128319. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1006 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			315	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	29	
Diptera	Ceratopogonidae	Bezzia	29	
Diptera	Chironomidae		1835	
Diptera	Pelecorhynchidae	Glutops	7	
Diptera	Psychodidae	Pericoma	882	
Diptera	Tipulidae	Hexatoma	29	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Ephemerellidae	Attenella delantala	104	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	25	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	25	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	54	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	79	
Ephemeroptera	Heptageniidae	Cinygmula	7	
Plecoptera			7	
Plecoptera	Chloroperlidae	Sweltsa	14	
Plecoptera	Nemouridae	Zapada cinctipes	7	
Plecoptera	Peltoperlidae	Yoraperla	54	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	32	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	11	
Class: Ostracoda			36	

Total: 24 OTU taxa			3606	individuals

Taxonomic list and abundances of aquatic invertebrates collected 25 July 1991 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128320. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 953 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			183	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	219	
Diptera	Ceratopogonidae	Bezzia	7	
Diptera	Chironomidae		609	
Diptera	Empididae	Chelifera	7	
Diptera	Simuliidae		82	
Diptera	Tipulidae	Antocha	54	
Diptera	Tipulidae	Hexatoma	7	
Diptera	Tipulidae	Tipula	4	
Ephemeroptera	Baetidae	Baetis	1072	
Ephemeroptera	Ephemerellidae	Attenella delantala	43	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	32	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	47	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	68	
Ephemeroptera	Ephemerellidae	Serratella tibialis	11	
Ephemeroptera	Heptageniidae	Cinygmula	65	
Ephemeroptera	Heptageniidae	Epeorus	39	
Ephemeroptera	Heptageniidae	Heptagenia	22	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	165	
Plecoptera	Chloroperlidae		29	
Plecoptera	Chloroperlidae	Plumiperla diversa	7	
Plecoptera	Nemouridae	Zapada	39	
Plecoptera	Nemouridae	Zapada cinctipes	32	
Plecoptera	Peltoperlidae	Yoraperla	405	
Trichoptera	Brachycentridae	Brachycentrus americanus	11	
Trichoptera	Brachycentridae	Micrasema	32	
Trichoptera	Glossosomatidae	Glossosoma	25	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	7	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	32	
Class: Ostracoda			32	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			7	

Total: 35 OTU taxa			3416	individuals

Taxonomic list and abundances of aquatic invertebrates collected 29 August 1991 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128321. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 343 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			61	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			158	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	151	
Diptera	Ceratopogonidae	Bezzia	29	
Diptera	Chironomidae		430	
Diptera	Psychodidae	Pericoma	147	
Diptera	Tipulidae	Tipula	4	
Ephemeroptera	Ephemerellidae		4	
Ephemeroptera	Ephemerellidae	Attenella delantala	93	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	7	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	7	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	14	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	50	
Plecoptera			7	
Plecoptera	Chloroperlidae		4	
Plecoptera	Peltoperlidae	Yoraperla	14	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	11	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	4	
Class: Maxillopoda, subclass copepoda			4	
Class: Ostracoda			14	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			4	

Total: 24 OTU taxa			1229 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 28 August 1991 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128322. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 374 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			22	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			57	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	54	
Diptera	Ceratopogonidae	Bezzia	14	
Diptera	Chironomidae		437	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	14	
Diptera	Psychodidae	Pericoma	509	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Baetidae	Baetis	4	
Ephemeroptera	Ephemerellidae		32	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	14	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera			4	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		7	
Plecoptera	Chloroperlidae	Plumiperla diversa	11	
Trichoptera			4	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	29	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	47	
Phylum: Nemata			11	
Phylum: Platyhelminthes				
Class: Turbellaria			7	

Total: 26 OTU taxa			1341 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 7 August 1992 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128323. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1858 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		254	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			151	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	369	
Diptera	Ceratopogonidae	Bezzia	90	
Diptera	Chironomidae		25	
Diptera	Chironomidae		222	
Diptera	Chironomidae	Orthocladiinae	1104	
Diptera	Empididae	Chelifera	65	
Diptera	Psychodidae	Pericoma	828	
Diptera	Simuliidae	Simulium	25	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Ameletidae	Ameletus	14	
Ephemeroptera	Baetidae	Baetis	971	
Ephemeroptera	Ephemerellidae	Attenella delantala	237	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	129	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	505	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	896	
Ephemeroptera	Heptageniidae	Cinygmula	201	
Ephemeroptera	Heptageniidae	Epeorus	25	
Ephemeroptera	Heptageniidae	Rhithrogena	111	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	47	
Plecoptera			72	
Plecoptera	Chloroperlidae	Suwallia	90	
Plecoptera	Chloroperlidae	Sweltsa	14	
Plecoptera	Nemouridae	Zapada oregonensis	25	
Plecoptera	Perlodidae		25	
Plecoptera	Perlodidae	Isoperla	25	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Brachycentrus americanus	14	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	25	
Class: Maxillopoda, subclass copepoda			11	
Class: Ostracoda			14	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	7	
Phylum: Nemata			39	

Total: 35 OTU taxa			6660	individuals

Taxonomic list and abundances of aquatic invertebrates collected 9 September 1992 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128324. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1290 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		165	
Lumbriculida	Lumbriculidae		4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			82	
Class: Insecta				
Coleoptera	Elmidae	Optioservus	785	
Diptera	Ceratopogonidae	Bezzia	25	
Diptera	Chironomidae		57	
Diptera	Chironomidae		176	
Diptera	Chironomidae	Orthocladiinae	1703	
Diptera	Psychodidae	Pericoma	509	
Diptera	Simuliidae		25	
Diptera	Tipulidae	Antocha	7	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	333	
Ephemeroptera	Ephemerellidae	Attenella delantala	111	
Ephemeroptera	Ephemerellidae	Drunella doddsi	82	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	29	
Ephemeroptera	Heptageniidae	Cinygmula	129	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Heptagenia	32	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera	Chloroperlidae	Suwallia	39	
Plecoptera	Nemouridae	Zapada oregonensis	32	
Plecoptera	Peltoperlidae	Yoraperla	104	
Plecoptera	Perlidae		7	
Plecoptera	Perlodidae		7	
Plecoptera	Taeniopterygidae	Taenionema	14	
Trichoptera			7	
Trichoptera	Limnephilidae		7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	32	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	4	
Class: Ostracoda			79	

Total: 32 OTU taxa			4624	individuals

Taxonomic list and abundances of aquatic invertebrates collected 7 August 1992 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128325. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1352 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			151	
Class: Insecta				
Coleoptera	Elmidae	Optioservus	1082	
Diptera	Ceratopogonidae	Bezzia	14	
Diptera	Chironomidae	Orthocladiinae	1265	
Diptera	Empididae	Chelifera	14	
Diptera	Pelecorhynchidae	Glutops	57	
Diptera	Psychodidae	Pericoma	649	
Diptera	Simuliidae		47	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Baetidae	Baetis	330	
Ephemeroptera	Ephemerellidae	Attenella delantala	104	
Ephemeroptera	Ephemerellidae	Drunella doddsi	194	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	72	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	72	
Ephemeroptera	Heptageniidae	Cinygmula	111	
Ephemeroptera	Heptageniidae	Epeorus	39	
Ephemeroptera	Heptageniidae	Heptagenia	47	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	14	
Plecoptera			7	
Plecoptera	Chloroperlidae	Suwallia	32	
Plecoptera	Leuctridae		7	
Plecoptera	Nemouridae	Zapada oregonensis	90	
Plecoptera	Peltoperlidae	Yoraperla	233	
Trichoptera			14	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	47	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	7	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	32	
Class: Ostracoda			72	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	14	

Total: 31 OTU taxa			4846 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 7 August 1992 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128326. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1261 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		32	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			208	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	609	
Diptera	Ceratopogonidae	Bezzia	65	
Diptera	Chironomidae		7	
Diptera	Chironomidae		358	
Diptera	Chironomidae	Orthocladiinae	609	
Diptera	Empididae	Chelifera	82	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	584	
Diptera	Simuliidae		151	
Diptera	Tipulidae	Antocha	39	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Baetidae	Baetis	584	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	47	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	194	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	369	
Ephemeroptera	Heptageniidae	Epeorus	72	
Ephemeroptera	Heptageniidae	Heptagenia	25	
Ephemeroptera	Leptohyphidae	Tricorythodes minutus	7	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	32	
Plecoptera	Capniidae		14	
Plecoptera	Chloroperlidae	Suwallia	129	
Plecoptera	Nemouridae	Zapada oregonensis	25	
Plecoptera	Perlodidae		39	
Plecoptera	Perlodidae	Skwala americana	4	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Brachycentrus americanus	7	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Hydropsychidae	Arctopsyche grandis	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	57	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	25	
Class: Maxillopoda, subclass copepoda			7	
Class: Ostracoda			79	

Total: 37 OTU taxa			4520	individuals

Taxonomic list and abundances of aquatic invertebrates collected 7 August 1992 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128327. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1138 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			108	
Class: Insecta				
Coleoptera	Carabidae		4	
Coleoptera	Elmidae	Zaitzevia	380	
Diptera	Ceratopogonidae	Bezzia	32	
Diptera	Chironomidae	Orthocladiinae	1366	
Diptera	Chironomidae	Tanypodinae	29	
Diptera	Empididae	Chelifera	22	
Diptera	Psychodidae	Pericoma	254	
Diptera	Simuliidae		7	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	900	
Ephemeroptera	Ephemerellidae	Attenella delantala	143	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	68	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	97	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	183	
Ephemeroptera	Ephemerellidae	Serratella tibialis	7	
Ephemeroptera	Heptageniidae	Cinygmula	57	
Ephemeroptera	Heptageniidae	Epeorus	39	
Ephemeroptera	Heptageniidae	Heptagenia	129	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	39	
Plecoptera	Chloroperlidae		7	
Plecoptera	Chloroperlidae	Suwallia	25	
Plecoptera	Nemouridae	Zapada cinctipes	7	
Plecoptera	Nemouridae	Zapada oregonensis	14	
Plecoptera	Peltoperlidae	Yoraperla	7	
Plecoptera	Perlidae		7	
Plecoptera	Perlodidae	Skwala americana	4	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	7	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	11	
Class: Maxillopoda, subclass copepoda			7	
Class: Ostracoda			75	

Total: 36 OTU taxa			4079 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 6 August 1992 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128328. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1516 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			161	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	201	
Diptera	Ceratopogonidae	Bezzia	14	
Diptera	Chironomidae		14	
Diptera	Chironomidae		43	
Diptera	Chironomidae	Orthocladiinae	2111	
Diptera	Chironomidae	Tanypodinae	39	
Diptera	Empididae	Chelifera	25	
Diptera	Empididae	Hemerodromia	7	
Diptera	Pelecorhynchidae	Glutops	14	
Diptera	Psychodidae	Pericoma	910	
Diptera	Simuliidae		32	
Diptera	Tipulidae	Hexatoma	25	
Ephemeroptera	Baetidae	Baetis	584	
Ephemeroptera	Ephemerellidae		11	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	140	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	351	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	90	
Ephemeroptera	Heptageniidae	Cinygmula	140	
Ephemeroptera	Heptageniidae	Epeorus	25	
Ephemeroptera	Heptageniidae	Heptagenia	61	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	14	
Plecoptera			14	
Plecoptera	Chloroperlidae	Suwallia	161	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Nemouridae		14	
Plecoptera	Nemouridae	Zapada cinctipes	14	
Plecoptera	Nemouridae	Zapada oregonensis	7	
Plecoptera	Perlodidae	Kogotus	25	
Plecoptera	Perlodidae	Skwala americana	4	
Trichoptera	Glossosomatidae	Glossosoma	11	
Trichoptera	Hydropsychidae	Arctopsyche grandis	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	14	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	68	
Class: Ostracoda			57	
Phylum: Nemata			7	

Total: 37 OTU taxa			5434 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 6 August 1992 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128329. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 797 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		18	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			75	
Class: Insecta				
Coleoptera	Elmidae	Optioservus	75	
Diptera	Ceratopogonidae	Bezzia	25	
Diptera	Chironomidae		65	
Diptera	Chironomidae		179	
Diptera	Chironomidae	Orthocladiinae	649	
Diptera	Chironomidae	Tanypodinae	11	
Diptera	Empididae	Chelifera	18	
Diptera	Pelecorhynchidae	Glutops	72	
Diptera	Psychodidae	Pericoma	473	
Diptera	Simuliidae		11	
Diptera	Tipulidae	Antocha	7	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	373	
Ephemeroptera	Ephemerellidae		4	
Ephemeroptera	Ephemerellidae	Attenella delantala	54	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	111	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	68	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	100	
Ephemeroptera	Heptageniidae	Cinygmula	43	
Ephemeroptera	Heptageniidae	Epeorus	22	
Ephemeroptera	Heptageniidae	Heptagenia	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	14	
Plecoptera			14	
Plecoptera	Chloroperlidae	Suwallia	57	
Plecoptera	Nemouridae	Zapada cinctipes	4	
Plecoptera	Perlodidae		4	
Trichoptera			7	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	90	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	29	
Class: Ostracoda			97	
Phylum: Nemata			11	
Phylum: Platyhelminthes				
Class: Turbellaria			29	

Total: 39 OTU taxa			2857 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 September 1992 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128330. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1089 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			93	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	860	
Diptera	Ceratopogonidae	Bezzia	25	
Diptera	Chironomidae		4	
Diptera	Chironomidae	Orthocladiinae	373	
Diptera	Chironomidae	Tanypodinae	36	
Diptera	Empididae	Chelifera	72	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	1563	
Diptera	Simuliidae		4	
Diptera	Tipulidae	Hexatoma	39	
Ephemeroptera	Baetidae	Baetis	7	
Ephemeroptera	Ephemerellidae	Attenella delantala	505	
Ephemeroptera	Ephemerellidae	Drunella doddsi	14	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	61	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	125	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	32	
Plecoptera	Chloroperlidae	Suwallia	22	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	4	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	39	
Class: Maxillopoda, subclass copepoda			4	
Class: Ostracoda			11	

Total: 23 OTU taxa			3903 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 September 1992 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128331. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1122 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			43	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	441	
Diptera	Ceratopogonidae	Bezzia	72	
Diptera	Chironomidae		452	
Diptera	Chironomidae	Orthocladiinae	828	
Diptera	Chironomidae	Tanypodinae	22	
Diptera	Empididae	Chelifera	11	
Diptera	Psychodidae	Pericoma	749	
Diptera	Simuliidae		7	
Diptera	Tipulidae	Antocha	11	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Baetidae	Baetis	4	
Ephemeroptera	Ephemerellidae	Attenella delantala	251	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	43	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	97	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	581	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	143	
Plecoptera	Chloroperlidae	Suwallia	4	
Plecoptera	Leuctridae		4	
Plecoptera	Peltoperlidae	Yoraperla	7	
Trichoptera	Apataniidae	Pedomoecus sierra	11	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Lepidostomatidae	Lepidostoma	11	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	22	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	7	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	4	
Class: Maxillopoda, subclass copepoda			11	
Class: Ostracoda			79	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	25	
Phylum: Nemata			32	

Total: 32 OTU taxa			4022 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 September 1992 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128332. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1038 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			262	
Class: Insecta				
Coleoptera	Elmidae	Optioservus	262	
Diptera	Ceratopogonidae	Bezzia	129	
Diptera	Chironomidae		11	
Diptera	Chironomidae		176	
Diptera	Chironomidae	Orthocladiinae	756	
Diptera	Pelecorhynchidae	Glutops	14	
Diptera	Psychodidae	Pericoma	1287	
Diptera	Simuliidae		7	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	4	
Ephemeroptera	Ephemerellidae	Attenella delantala	444	
Ephemeroptera	Ephemerellidae	Drunella doddsi	43	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	125	
Ephemeroptera	Heptageniidae	Epeorus	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera	Capniidae		7	
Plecoptera	Chloroperlidae	Suwallia	29	
Plecoptera	Nemouridae	Zapada cinctipes	4	
Plecoptera	Nemouridae	Zapada oregonensis	7	
Plecoptera	Peltoperlidae	Yoraperla	25	
Trichoptera			4	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Hydropsychidae	Arctopsyche grandis	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	11	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	4	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	4	
Class: Ostracoda			72	

Total: 30 OTU taxa			3720	individuals

Taxonomic list and abundances of aquatic invertebrates collected 9 September 1992 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128333. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1233 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			430	
Class: Insecta				
Coleoptera	Elmidae	Optioservus	118	
Coleoptera	Elmidae	Zaitzevia	151	
Diptera	Ceratopogonidae	Bezzia	11	
Diptera	Chironomidae		233	
Diptera	Chironomidae	Orthocladiinae	548	
Diptera	Chironomidae	Tanypodinae	39	
Diptera	Empididae		7	
Diptera	Empididae	Chelifera	7	
Diptera	Pelecorhynchidae	Glutops	32	
Diptera	Psychodidae	Pericoma	1577	
Diptera	Tipulidae	Hexatoma	39	
Ephemeroptera	Ephemerellidae	Attenella delantala	143	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	39	
Ephemeroptera	Ephemerellidae	Drunella doddsi	82	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	197	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	297	
Ephemeroptera	Heptageniidae	Heptagenia	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	54	
Plecoptera	Chloroperlidae	Suwallia	25	
Plecoptera	Nemouridae	Zapada oregonensis	32	
Plecoptera	Peltoperlidae	Yoraperla	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	7	
Trichoptera	Glossosomatidae	Glossosoma	14	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	229	
Class: Ostracoda			79	
Phylum: Nemata			14	

Total: 28 OTU taxa			4419 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 September 1992 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128334. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 996 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		22	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			186	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	100	
Diptera	Ceratopogonidae	Bezzia	22	
Diptera	Chironomidae	Orthocladiinae	1204	
Diptera	Chironomidae	Tanypodinae	4	
Diptera	Empididae	Chelifera	7	
Diptera	Pelecorhynchidae	Glutops	32	
Diptera	Psychodidae	Pericoma	749	
Diptera	Simuliidae		11	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Baetidae	Baetis	111	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	100	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	29	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	11	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	394	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	25	
Ephemeroptera	Heptageniidae	Epeorus	11	
Ephemeroptera	Heptageniidae	Heptagenia	29	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera			32	
Plecoptera	Chloroperlidae	Suwallia	32	
Plecoptera	Nemouridae	Zapada oregonensis	11	
Plecoptera	Peltoperlidae	Yoraperla	7	
Trichoptera			7	
Trichoptera	Brachycentridae	Brachycentrus	4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	22	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	158	
Class: Ostracoda			194	
Phylum: Platyhelminthes				
Class: Turbellaria			25	

Total: 30 OTU taxa			3570	individuals

Taxonomic list and abundances of aquatic invertebrates collected 17 September 1993 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128335. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1506 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			111	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Optioservus	1086	
Diptera			7	
Diptera	Ceratopogonidae	Bezzia	29	
Diptera	Chironomidae		25	
Diptera	Chironomidae		25	
Diptera	Chironomidae	Orthocladiinae	1670	
Diptera	Dixidae	Dixa	7	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	32	
Diptera	Psychodidae	Pericoma	606	
Diptera	Simuliidae		47	
Diptera	Tipulidae	Antocha	14	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Baetidae	Baetis	477	
Ephemeroptera	Ephemerellidae	Attenella delantala	57	
Ephemeroptera	Ephemerellidae	Drunella doddsi	276	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	61	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	79	
Ephemeroptera	Ephemerellidae	Serratella tibialis	7	
Ephemeroptera	Heptageniidae	Cinygmula	161	
Ephemeroptera	Heptageniidae	Epeorus	11	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	79	
Plecoptera			36	
Plecoptera	Capniidae		11	
Plecoptera	Chloroperlidae		65	
Plecoptera	Peltoperlidae	Yoraperla	97	
Plecoptera	Perlidae		39	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae	Kogotus	7	
Trichoptera	Apataniidae	Pedomoecus sierra	14	
Trichoptera	Brachycentridae	Brachycentrus americanus	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	61	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	7	
Class: Ostracoda			104	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	25	
Phylum: Platyhelminthes				
Class: Turbellaria			22	

Total: 39 OTU taxa			5398	individuals

Taxonomic list and abundances of aquatic invertebrates collected 26 September 1993 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128336. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 838 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		36	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			61	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	548	
Diptera	Ceratopogonidae	Bezzia	43	
Diptera	Chironomidae		68	
Diptera	Chironomidae		32	
Diptera	Chironomidae	Orthocladiinae	1054	
Diptera	Empididae	Chelifera	22	
Diptera	Pelecorhynchidae	Glutops	29	
Diptera	Psychodidae	Pericoma	409	
Diptera	Simuliidae		4	
Diptera	Tipulidae	Antocha	11	
Diptera	Tipulidae	Hexatoma	14	
Diptera	Tipulidae	Tipula	4	
Ephemeroptera	Baetidae	Baetis	183	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	82	
Ephemeroptera	Heptageniidae	Cinygmula	72	
Ephemeroptera	Heptageniidae	Heptagenia	39	
Plecoptera			14	
Plecoptera	Chloroperlidae		22	
Plecoptera	Peltoperlidae	Yoraperla	104	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		7	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Brachycentrus americanus	11	
Trichoptera	Limnephilidae	Ecclisomyia	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	29	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	39	
Class: Ostracoda			14	
Phylum: Nemata			25	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 33 OTU taxa			3004 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 17 September 1993 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128337. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 679 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		29	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			39	
Class: Insecta				
Coleoptera	Elmidae		104	
Coleoptera	Elmidae	Zaitzevia	183	
Diptera			7	
Diptera	Athericidae	Atherix pachypus	4	
Diptera	Ceratopogonidae	Bezzia	29	
Diptera	Chironomidae		36	
Diptera	Chironomidae	Orthocladiinae	305	
Diptera	Chironomidae	Tanypodinae	29	
Diptera	Empididae	Chelifera	57	
Diptera	Psychodidae	Pericoma	491	
Diptera	Simuliidae		4	
Diptera	Tipulidae	Antocha	7	
Diptera	Tipulidae	Hexatoma	18	
Ephemeroptera	Ameletidae	Ameletus	18	
Ephemeroptera	Baetidae	Baetis	405	
Ephemeroptera	Ephemerellidae		14	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	29	
Ephemeroptera	Ephemerellidae	Drunella doddsi	50	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	65	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	100	
Ephemeroptera	Heptageniidae	Cinygmula	7	
Ephemeroptera	Heptageniidae	Epeorus	61	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	14	
Plecoptera			22	
Plecoptera	Chloroperlidae		57	
Plecoptera	Nemouridae		4	
Plecoptera	Perlidae		4	
Trichoptera			7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	86	
Class: Ostracoda			90	
Phylum: Nemata			11	
Phylum: Platyhelminthes				
Class: Turbellaria			39	

Total: 36 OTU taxa			2434	individuals

Taxonomic list and abundances of aquatic invertebrates collected 26 September 1993 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128338. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 520 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		25	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			61	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Optioservus	7	
Coleoptera	Elmidae	Zaitzevia	315	
Diptera			4	
Diptera	Ceratopogonidae	Bezzia	72	
Diptera	Chironomidae		4	
Diptera	Chironomidae		43	
Diptera	Chironomidae	Orthocladiinae	412	
Diptera	Chironomidae	Tanypodinae	54	
Diptera	Empididae	Chelifera	194	
Diptera	Psychodidae	Pericoma	315	
Diptera	Simuliidae		7	
Diptera	Tipulidae	Hexatoma	22	
Ephemeroptera	Baetidae	Baetis	25	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	14	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	90	
Ephemeroptera	Heptageniidae	Cinygmula	22	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera			11	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		11	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Lepidostomatidae	Lepidostoma	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	25	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	11	
Class: Maxillopoda, subclass copepoda			11	
Class: Ostracoda			32	
Phylum: Nemata			14	

Total: 33 OTU taxa			1864 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 17 September 1993 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128339. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 569 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		36	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			29	
Class: Insecta				
Coleoptera	Elmidae		194	
Coleoptera	Elmidae	Zaitzevia	93	
Diptera	Ceratopogonidae	Bezzia	57	
Diptera	Chironomidae		75	
Diptera	Chironomidae	Orthocladiinae	208	
Diptera	Chironomidae	Tanypodinae	61	
Diptera	Empididae	Chelifera	18	
Diptera	Psychodidae	Pericoma	333	
Diptera	Simuliidae		18	
Diptera	Tipulidae	Hexatoma	25	
Ephemeroptera	Baetidae	Baetis	226	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	61	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	32	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	362	
Ephemeroptera	Heptageniidae	Cinygmula	39	
Ephemeroptera	Heptageniidae	Epeorus	29	
Ephemeroptera	Heptageniidae	Heptagenia	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	39	
Plecoptera			11	
Plecoptera	Chloroperlidae		18	
Plecoptera	Nemouridae	Zapada cinctipes	4	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	22	
Class: Ostracoda			7	
Phylum: Nemata			11	
Phylum: Platyhelminthes				
Class: Turbellaria			7	

Total: 31 OTU taxa			2039 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 26 September 1993 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128340. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 551 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		36	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			68	
Class: Insecta				
Coleoptera	Elmidae		57	
Coleoptera	Elmidae	Zaitzevia	172	
Diptera	Athericidae	Atherix pachypus	4	
Diptera	Ceratopogonidae	Bezzia	39	
Diptera	Chironomidae		22	
Diptera	Chironomidae		47	
Diptera	Chironomidae	Orthocladiinae	513	
Diptera	Chironomidae	Tanypodinae	11	
Diptera	Empididae	Hemerodromia	14	
Diptera	Psychodidae	Pericoma	380	
Diptera	Simuliidae		25	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Baetidae	Baetis	25	
Ephemeroptera	Ephemerellidae	Drunella doddsi	14	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	39	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	143	
Ephemeroptera	Heptageniidae	Cinygmula	11	
Ephemeroptera	Heptageniidae	Epeorus	11	
Ephemeroptera	Leptohyphidae	Tricorythodes minutus	151	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	29	
Plecoptera			22	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		11	
Plecoptera	Nemouridae	Zapada cinctipes	4	
Plecoptera	Peltoperlidae	Yoraperla	4	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	32	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	18	
Class: Maxillopoda, subclass copepoda			4	
Class: Ostracoda			29	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			11	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 35 OTU taxa			1975 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 16 September 1993 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128341. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1035 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		43	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			118	
Class: Insecta				
Coleoptera	Elmidae		39	
Coleoptera	Elmidae	Optioservus	308	
Diptera	Ceratopogonidae	Bezzia	186	
Diptera	Chironomidae		7	
Diptera	Chironomidae	Orthocladiinae	674	
Diptera	Empididae	Chelifera	4	
Diptera	Empididae	Hemerodromia	4	
Diptera	Ephydridae		7	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	1161	
Diptera	Simuliidae		29	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Baetidae	Baetis	287	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	161	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	97	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	7	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	79	
Ephemeroptera	Ephemerellidae	Serratella tibialis	25	
Ephemeroptera	Heptageniidae	Cinygmula	39	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Rhithrogena	14	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	54	
Odonata	Coenagrionidae		4	
Plecoptera			82	
Plecoptera	Chloroperlidae		43	
Plecoptera	Nemouridae	Zapada cinctipes	7	
Plecoptera	Perlidae		11	
Trichoptera			7	
Trichoptera	Hydropsychidae	Hydropsyche	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	32	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	93	
Class: Ostracoda			36	
Phylum: Nemata			14	
Phylum: Platyhelminthes				
Class: Turbellaria			14	

Total: 36 OTU taxa			3710 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 25 September 1993 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128342. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 191 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			79	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	125	
Diptera	Ceratopogonidae	Bezzia	39	
Diptera	Chironomidae		4	
Diptera	Chironomidae	Orthocladiinae	258	
Diptera	Empididae	Chelifera	7	
Diptera	Psychodidae	Maruina	4	
Diptera	Psychodidae	Pericoma	11	
Diptera	Simuliidae		14	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	4	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Plecoptera	Chloroperlidae		14	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlidae		7	
Plecoptera	Perlodidae		4	
Trichoptera			4	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Hydropsychidae	Hydropsyche	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	29	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	39	
Class: Ostracoda			4	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 27 OTU taxa			685 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 16 September 1993 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128343. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 750 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		32	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			82	
Class: Insecta				
Coleoptera	Elmidae		22	
Coleoptera	Elmidae	Zaitzevia	22	
Diptera			25	
Diptera	Ceratopogonidae	Bezzia	29	
Diptera	Chironomidae		47	
Diptera	Chironomidae		140	
Diptera	Chironomidae	Orthocladiinae	448	
Diptera	Empididae		7	
Diptera	Empididae	Chelifera	29	
Diptera	Pelecorhynchidae	Glutops	14	
Diptera	Psychodidae	Pericoma	391	
Diptera	Simuliidae		11	
Diptera	Tipulidae	Dicranota	4	
Diptera	Tipulidae	Hexatoma	25	
Ephemeroptera	Baetidae	Baetis	247	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	25	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	93	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	115	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	265	
Ephemeroptera	Heptageniidae	Cinygmula	39	
Ephemeroptera	Heptageniidae	Epeorus	22	
Ephemeroptera	Heptageniidae	Heptagenia	29	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	32	
Plecoptera			65	
Plecoptera	Chloroperlidae		32	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Nemouridae	Zapada cinctipes	47	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlodidae	Isoperla	4	
Plecoptera	Perlodidae	Kogotus	7	
Trichoptera			7	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Limnephilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	147	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	11	
Class: Ostracoda			136	
Phylum: Nemata			11	
Phylum: Platyhelminthes				
Class: Turbellaria			11	

Total: 41 OTU taxa			2688 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 25 September 1993 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128344. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 331 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			47	
Class: Insecta				
Coleoptera	Elmidae		129	
Coleoptera	Elmidae	Zaitzevia	7	
Diptera	Ceratopogonidae	Bezzia	22	
Diptera	Chironomidae		7	
Diptera	Chironomidae	Orthocladiinae	462	
Diptera	Chironomidae	Tanypodinae	14	
Diptera	Empididae		4	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	11	
Diptera	Psychodidae	Pericoma	86	
Diptera	Simuliidae		36	
Diptera	Tipulidae	Antocha	7	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera			32	
Ephemeroptera	Baetidae	Baetis	4	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	29	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	22	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	14	
Ephemeroptera	Heptageniidae	Cinygmula	14	
Ephemeroptera	Leptohyphidae	Tricorythodes minutus	29	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	14	
Plecoptera			7	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		29	
Plecoptera	Leuctridae		4	
Plecoptera	Peltoperlidae	Yoraperla	7	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Trichoptera			4	
Trichoptera	Hydropsychidae	Arctopsyche grandis	4	
Trichoptera	Hydropsychidae	Parapsyche elsis	4	
Trichoptera	Limnephilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	50	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	43	
Class: Ostracoda			4	
Phylum: Nemata			11	

Total: 36 OTU taxa			1186 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 16 September 1993 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128345. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 633 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			82	
Class: Insecta				
Coleoptera	Elmidae		7	
Coleoptera	Elmidae	Zaitzevia	68	
Diptera			36	
Diptera	Ceratopogonidae	Bezzia	39	
Diptera	Chironomidae		4	
Diptera	Chironomidae		108	
Diptera	Chironomidae	Orthocladiinae	627	
Diptera	Chironomidae	Tanypodinae	11	
Diptera	Empididae	Chelifera	4	
Diptera	Pelecorhynchidae	Glutops	25	
Diptera	Psychodidae	Pericoma	104	
Diptera	Simuliidae		4	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Dicranota	4	
Ephemeroptera	Baetidae	Baetis	258	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	68	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	47	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	82	
Ephemeroptera	Heptageniidae		14	
Ephemeroptera	Heptageniidae	Cinygmula	47	
Ephemeroptera	Heptageniidae	Epeorus	22	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	29	
Plecoptera			4	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		14	
Plecoptera	Nemouridae	Zapada cinctipes	11	
Plecoptera	Perlidae		22	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae		11	
Plecoptera	Taeniopterygidae	Taenionema	4	
Trichoptera			14	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Hydropsychidae	Arctopsyche grandis	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	176	
Class: Ostracoda			122	
Phylum: Nemata			14	
Phylum: Platyhelminthes				
Class: Turbellaria			154	

Total: 41 OTU taxa			2269	individuals

Taxonomic list and abundances of aquatic invertebrates collected 25 September 1993 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128346. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 344 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			39	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	82	
Diptera	Ceratopogonidae	Bezzia	50	
Diptera	Chironomidae		65	
Diptera	Chironomidae	Orthocladiinae	534	
Diptera	Chironomidae	Tanypodinae	36	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	25	
Diptera	Psychodidae	Pericoma	108	
Diptera	Simuliidae		4	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Dicranota	4	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Baetidae	Baetis	7	
Ephemeroptera	Heptageniidae	Cinygmula	4	
Plecoptera	Chloroperlidae		14	
Plecoptera	Nemouridae		4	
Plecoptera	Perlidae		4	
Trichoptera			14	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	115	
Class: Ostracoda			47	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			7	
Phylum: Platyhelminthes				
Class: Turbellaria			29	

Total: 27 OTU taxa			1233	individuals

Taxonomic list and abundances of aquatic invertebrates collected 28 August 1995 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128347. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 374 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			50	
Class: Insecta				
Coleoptera	Elmidae		301	
Coleoptera	Elmidae	Optioservus	4	
Coleoptera	Elmidae	Zaitzevia	133	
Diptera	Ceratopogonidae	Bezzia	11	
Diptera	Chironomidae	Orthocladiinae	337	
Diptera	Chironomidae	Tanypodinae	4	
Diptera	Empididae	Chelifera	7	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	32	
Diptera	Simuliidae		22	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Baetidae	Baetis	54	
Ephemeroptera	Ephemerellidae		4	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	50	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	57	
Ephemeroptera	Heptageniidae	Cinygmula	4	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Heptagenia	43	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera			7	
Plecoptera	Capniidae		11	
Plecoptera	Chloroperlidae		7	
Plecoptera	Perlidae		4	
Plecoptera	Perlodidae		4	
Plecoptera	Perlodidae	Isoperla	4	
Trichoptera			4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	82	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	4	
Trichoptera	Uenoidae	Neothremma	4	
Class: Ostracoda			47	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	

Total: 39 OTU taxa			1340 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 29 August 1995 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128348. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 360 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			22	
Class: Branchiopoda				
Diplostraca	Daphniidae	Daphnia	4	
Class: Insecta				
Coleoptera	Carabidae		4	
Coleoptera	Dytiscidae		4	
Coleoptera	Elmidae		47	
Coleoptera	Elmidae	Zaitzevia	54	
Diptera	Chironomidae	Orthocladiinae	280	
Diptera	Chironomidae	Tanypodinae	18	
Diptera	Empididae	Chelifera	11	
Diptera	Psychodidae	Pericoma	4	
Diptera	Simuliidae		65	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	251	
Ephemeroptera	Ephemerellidae	Attenella	11	
Ephemeroptera	Ephemerellidae	Attenella delantala	39	
Ephemeroptera	Ephemerellidae	Drunella doddsi	79	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	39	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	25	
Ephemeroptera	Heptageniidae	Cinygmula	50	
Ephemeroptera	Heptageniidae	Epeorus	32	
Ephemeroptera	Heptageniidae	Heptagenia	11	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		7	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlodidae		4	
Plecoptera	Perlodidae	Isoperla	4	
Trichoptera			4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Hydroptilidae	Leucotrichia	4	
Trichoptera	Limnephilidae		4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Rhyacophilidae	Rhyacophila	14	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	82	
Class: Maxillopoda, subclass copepoda			11	
Class: Ostracoda			47	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			14	

Total: 43 OTU taxa			1290 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 29 August 1995 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128349. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 433 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		4	
Lumbriculida	Lumbriculidae		7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			11	
Class: Insecta				
Coleoptera	Elmidae		72	
Coleoptera	Elmidae	Optioservus	11	
Coleoptera	Elmidae	Zaitzevia	65	
Coleoptera	Hydrophilidae		4	
Diptera	Ceratopogonidae	Bezzia	4	
Diptera	Chironomidae	Orthocladiinae	530	
Diptera	Chironomidae	Tanypodinae	72	
Diptera	Empididae	Chelifera	4	
Diptera	Psychodidae	Pericoma	4	
Diptera	Simuliidae		50	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	211	
Ephemeroptera	Ephemerellidae	Attenella delantala	32	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	36	
Ephemeroptera	Ephemerellidae	Drunella doddsi	90	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	47	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	14	
Ephemeroptera	Ephemerellidae	Serratella tibialis	4	
Ephemeroptera	Heptageniidae	Cinygmula	50	
Ephemeroptera	Heptageniidae	Epeorus	18	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	11	
Plecoptera	Chloroperlidae		18	
Plecoptera	Nemouridae		4	
Plecoptera	Peltoperlidae	Yoraperla	4	
Trichoptera			7	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae	Glossosoma	29	
Trichoptera	Rhyacophilidae	Rhyacophila	11	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	36	
Class: Maxillopoda, subclass copepoda			11	
Class: Ostracoda			25	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	7	
Phylum: Nemata			22	

Total: 42 OTU taxa			1552 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 29 August 1995 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128350. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 384 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			7	
Class: Insecta				
Coleoptera	Elmidae		50	
Coleoptera	Elmidae	Zaitzevia	43	
Diptera	Ceratopogonidae	Bezzia	22	
Diptera	Chironomidae	Orthocladiinae	513	
Diptera	Chironomidae	Tanypodinae	11	
Diptera	Empididae	Chelifera	4	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	11	
Diptera	Simuliidae		22	
Diptera	Tipulidae	Hexatoma	4	
Diptera	Tipulidae	Ormosia	39	
Ephemeroptera	Baetidae	Baetis	165	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	22	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	61	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	22	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	54	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	11	
Ephemeroptera	Ephemerellidae	Serratella tibialis	7	
Ephemeroptera	Heptageniidae	Cinygmula	22	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Plecoptera	Chloroperlidae		82	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlodidae		4	
Plecoptera	Perlodidae	Isoperla	4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Leptoceridae	Oecetis	4	
Trichoptera	Rhyacophilidae	Rhyacophila	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	11	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	100	
Class: Ostracoda			22	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	18	
Phylum: Nemata			4	

Total: 37 OTU taxa			1376 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 29 August 1995 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128351. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 703 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			82	
Class: Insecta				
Coleoptera	Elmidae		39	
Coleoptera	Elmidae	Optioservus	22	
Coleoptera	Elmidae	Zaitzevia	32	
Diptera	Ceratopogonidae		7	
Diptera	Ceratopogonidae	Bezzia	25	
Diptera	Chironomidae	Orthocladiinae	749	
Diptera	Chironomidae	Tanypodinae	32	
Diptera	Empididae	Chelifera	4	
Diptera	Simuliidae		7	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Baetidae	Baetis	495	
Ephemeroptera	Ephemerellidae	Attenella	39	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	186	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	108	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	54	
Ephemeroptera	Ephemerellidae	Serratella tibialis	7	
Ephemeroptera	Heptageniidae	Cinygmula	86	
Ephemeroptera	Heptageniidae	Epeorus	79	
Ephemeroptera	Heptageniidae	Heptagenia	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera			7	
Plecoptera	Chloroperlidae		29	
Plecoptera	Nemouridae		14	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlidae		11	
Plecoptera	Perlodidae	Kogotus	4	
Trichoptera			7	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae		4	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Hydropsychidae	Arctopsyche grandis	7	
Trichoptera	Rhyacophilidae	Rhyacophila	25	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	25	
Trichoptera	Rhyacophilidae	Rhyacophila coloradensis	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	75	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	18	
Class: Maxillopoda, subclass copepoda			7	
Class: Ostracoda			183	
Phylum: Nemata			4	

Total: 42 OTU taxa			2520 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 29 August 1995 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128352. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 417 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			61	
Class: Insecta				
Coleoptera	Elmidae	Optioservus	108	
Diptera	Ceratopogonidae	Bezzia	4	
Diptera	Chironomidae		240	
Diptera	Chironomidae	Tanypodinae	254	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	14	
Diptera	Simuliidae		43	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	176	
Ephemeroptera	Ephemerellidae		36	
Ephemeroptera	Ephemerellidae	Attenella	14	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	57	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	14	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	7	
Ephemeroptera	Heptageniidae	Cinygmula	18	
Ephemeroptera	Heptageniidae	Epeorus	25	
Ephemeroptera	Heptageniidae	Heptagenia	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	11	
Plecoptera			14	
Plecoptera	Chloroperlidae		18	
Plecoptera	Leuctridae		11	
Plecoptera	Nemouridae		4	
Plecoptera	Peltoperlidae	Yoraperla	39	
Trichoptera			93	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	82	
Trichoptera	Rhyacophilidae	Rhyacophila coloradensis	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	39	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	14	
Trichoptera	Uenoidae	Oligophlebodes	4	
Class: Ostracoda			43	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 39 OTU taxa			1495 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 4 September 1996 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128353. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1009 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			111	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	437	
Diptera	Ceratopogonidae	Bezzia	7	
Diptera	Chironomidae	Orthocladiinae	695	
Diptera	Chironomidae	Tanypodinae	7	
Diptera	Empididae	Chelifera	22	
Diptera	Pelecorhynchidae	Glutops	39	
Diptera	Psychodidae	Pericoma	491	
Diptera	Simuliidae		65	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Baetidae	Baetis	376	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	18	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	323	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	11	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	36	
Ephemeroptera	Heptageniidae	Cinygmula	136	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Ephemeroptera	Polymitarcyidae	Ephoron album	43	
Plecoptera			97	
Plecoptera	Capniidae		61	
Plecoptera	Chloroperlidae		36	
Plecoptera	Leuctridae		7	
Plecoptera	Nemouridae		4	
Plecoptera	Nemouridae	Zapada	47	
Plecoptera	Peltoperlidae	Yoraperla	125	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Taeniopterygidae	Taenionema	29	
Trichoptera			7	
Trichoptera	Brachycentridae	Brachycentrus	4	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Glossosomatidae	Glossosoma	36	
Trichoptera	Hydropsychidae	Arctopsyche	54	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Philopotamidae	Dolophilodes	4	
Trichoptera	Rhyacophilidae	Rhyacophila	14	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	29	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	108	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	14	
Class: Ostracoda			22	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	36	

Total: 44 OTU taxa			3616 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 September 1996 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128354. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 741 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			36	
Class: Insecta				
Coleoptera	Dytiscidae		4	
Coleoptera	Elmidae	Zaitzevia	366	
Diptera	Ceratopogonidae	Bezzia	7	
Diptera	Chironomidae	Orthocladiinae	523	
Diptera	Chironomidae	Tanypodinae	165	
Diptera	Empididae	Chelifera	25	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	54	
Diptera	Simuliidae		47	
Diptera	Tipulidae	Antocha	11	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera	Baetidae	Baetis	444	
Ephemeroptera	Ephemerellidae	Attenella delantala	11	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	75	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	115	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	54	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	172	
Ephemeroptera	Heptageniidae	Cinygmula	39	
Ephemeroptera	Heptageniidae	Epeorus	79	
Ephemeroptera	Heptageniidae	Heptagenia	43	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera			39	
Plecoptera	Chloroperlidae		22	
Plecoptera	Nemouridae	Zapada	7	
Plecoptera	Nemouridae	Zapada cinctipes	4	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae	Kogotus	11	
Plecoptera	Perlodidae	Skwala americana	7	
Trichoptera			11	
Trichoptera	Brachycentridae	Micrasema	25	
Trichoptera	Glossosomatidae	Glossosoma	22	
Trichoptera	Hydropsychidae	Arctopsyche	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	22	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	111	
Class: Maxillopoda, subclass copepoda			14	
Class: Ostracoda			4	
Phylum: Nemata			32	
Phylum: Nematomorpha			7	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 43 OTU taxa			2656 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 September 1996 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128355. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 994 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		25	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			79	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	204	
Diptera	Ceratopogonidae	Bezzia	11	
Diptera	Chironomidae	Orthocladiinae	713	
Diptera	Chironomidae	Tanypodinae	61	
Diptera	Empididae	Chelifera	11	
Diptera	Psychodidae	Pericoma	93	
Diptera	Simuliidae		563	
Diptera	Tipulidae	Dicranota	4	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Baetidae	Baetis	380	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	240	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	158	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	90	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	14	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	290	
Ephemeroptera	Heptageniidae	Cinygmula	201	
Ephemeroptera	Heptageniidae	Epeorus	72	
Ephemeroptera	Heptageniidae	Heptagenia	29	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera			68	
Plecoptera	Chloroperlidae		7	
Trichoptera	Brachycentridae	Micrasema	25	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Hydropsychidae	Arctopsyche grandis	32	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	25	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	47	
Trichoptera	Uenoidae	Oligophlebodes	22	
Class: Maxillopoda, subclass copepoda			4	
Class: Ostracoda			4	
Phylum: Nemata			22	
Phylum: Platyhelminthes				
Class: Turbellaria			39	

Total: 33 OTU taxa			3563 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 4 September 1996 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128356. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 729 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			136	
Class: Insecta				
Coleoptera	Elmidae		11	
Coleoptera	Elmidae	Zaitzevia	79	
Diptera	Ceratopogonidae	Bezzia	11	
Diptera	Chironomidae	Orthocladiinae	201	
Diptera	Chironomidae	Tanypodinae	43	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	219	
Diptera	Simuliidae		287	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Baetidae	Baetis	315	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	25	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	29	
Ephemeroptera	Ephemerellidae	Drunella doddsi	79	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	29	
Ephemeroptera	Heptageniidae	Cinygmula	25	
Ephemeroptera	Heptageniidae	Epeorus	61	
Ephemeroptera	Heptageniidae	Heptagenia	176	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera			487	
Plecoptera	Chloroperlidae		97	
Plecoptera	Leuctridae		4	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlidae		7	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae	Kogotus	4	
Trichoptera	Brachycentridae	Micrasema	39	
Trichoptera	Glossosomatidae	Glossosoma	11	
Trichoptera	Hydropsychidae	Arctopsyche	4	
Trichoptera	Limnephilidae	Chyranda centralis	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila coloradensis	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	158	
Class: Ostracoda			4	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			11	

Total: 37 OTU taxa			2613 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 4 September 1996 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128357. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 807 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			154	
Class: Insecta				
Coleoptera	Elmidae		50	
Coleoptera	Elmidae	Optioservus	7	
Coleoptera	Elmidae	Zaitzevia	72	
Diptera	Ceratopogonidae	Bezzia	11	
Diptera	Chironomidae	Orthocladiinae	219	
Diptera	Chironomidae	Tanypodinae	54	
Diptera	Empididae	Chelifera	7	
Diptera	Pelecorhynchidae	Glutops	11	
Diptera	Psychodidae	Pericoma	151	
Diptera	Simuliidae		165	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	599	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	47	
Ephemeroptera	Ephemerellidae	Drunella doddsi	276	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	75	
Ephemeroptera	Heptageniidae	Cinygmula	54	
Ephemeroptera	Heptageniidae	Epeorus	50	
Ephemeroptera	Heptageniidae	Heptagenia	65	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	11	
Plecoptera			448	
Plecoptera	Chloroperlidae		39	
Plecoptera	Leuctridae		7	
Plecoptera	Nemouridae		4	
Plecoptera	Nemouridae	Zapada	54	
Plecoptera	Nemouridae	Zapada cinctipes	4	
Plecoptera	Peltoperlidae	Yoraperla	32	
Plecoptera	Perlidae		4	
Plecoptera	Perlodidae		4	
Trichoptera			4	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Micrasema	22	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Hydropsychidae	Arctopsyche	4	
Trichoptera	Hydropsychidae	Arctopsyche grandis	4	
Trichoptera	Lepidostomatidae	Lepidostoma	11	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	36	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	100	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	7	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			7	

Total: 43 OTU taxa			2892 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 4 September 1996 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128358. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 619 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			90	
Class: Insecta				
Coleoptera	Elmidae	Zaitzevia	118	
Diptera	Ceratopogonidae		7	
Diptera	Ceratopogonidae	Bezzia	11	
Diptera	Chironomidae	Orthocladiinae	244	
Diptera	Chironomidae	Tanypodinae	57	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	11	
Diptera	Psychodidae	Pericoma	97	
Diptera	Simuliidae		4	
Ephemeroptera	Baetidae	Baetis	613	
Ephemeroptera	Ephemerellidae		7	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	115	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	50	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	25	
Ephemeroptera	Heptageniidae	Cinygmula	39	
Ephemeroptera	Heptageniidae	Epeorus	39	
Ephemeroptera	Heptageniidae	Heptagenia	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	29	
Plecoptera			82	
Plecoptera	Capniidae		54	
Plecoptera	Chloroperlidae		11	
Plecoptera	Leuctridae		14	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Perlidae		4	
Plecoptera	Perlodidae		14	
Plecoptera	Perlodidae	Kogotus	4	
Plecoptera	Taeniopterygidae	Taenionema	161	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Limnephilidae		4	
Trichoptera	Limnephilidae	Ecclisomyia	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	125	
Trichoptera	Uenoidae	Neothremma	4	
Class: Maxillopoda, subclass copepoda			4	
Class: Ostracoda			22	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			25	
Phylum: Platyhelminthes				
Class: Turbellaria			68	

Total: 42 OTU taxa			2219 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 23 September 1994 at station S1:250, Four-mile Canyon Creek, middle meadow, Station 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128359. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1735 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			133	
Class: Insecta				
Coleoptera	Elmidae	Optioservus	39	
Coleoptera	Elmidae	Zaitzevia	846	
Diptera			4	
Diptera	Ceratopogonidae	Bezzia	14	
Diptera	Chironomidae		97	
Diptera	Chironomidae	Orthocladiinae	319	
Diptera	Empididae		7	
Diptera	Empididae	Chelifera	7	
Diptera	Pelecorhynchidae	Glutops	54	
Diptera	Psychodidae	Pericoma	2516	
Diptera	Tipulidae	Antocha monticola	22	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Baetidae	Baetis	466	
Ephemeroptera	Ephemerellidae	Attenella delantala	280	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	43	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	61	
Ephemeroptera	Heptageniidae	Heptagenia	79	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera			7	
Plecoptera	Capniidae		22	
Plecoptera	Chloroperlidae		7	
Plecoptera	Leuctridae		4	
Plecoptera	Peltoperlidae	Yoraperla	54	
Plecoptera	Perlodidae	Isoperla	7	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	43	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	4	
Class: Ostracoda			996	
Phylum: Nemata			14	

Total: 35 OTU taxa			6219	individuals

Taxonomic list and abundances of aquatic invertebrates collected 22 September 1994 at station S2:640, Silver King Creek, lower exclosure near Cow Cabin, Station 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128360. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 911 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			61	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Optioservus	14	
Coleoptera	Elmidae	Zaitzevia	566	
Diptera	Ceratopogonidae	Bezzia	18	
Diptera	Chironomidae	Orthocladiinae	151	
Diptera	Chironomidae	Tanypodinae	204	
Diptera	Empididae	Chelifera	140	
Diptera	Psychodidae	Pericoma	792	
Diptera	Tipulidae	Antocha	29	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Ameletidae	Ameletus	25	
Ephemeroptera	Baetidae	Baetis	43	
Ephemeroptera	Ephemerellidae	Attenella delantala	43	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	32	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	115	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	186	
Ephemeroptera	Heptageniidae	Epeorus	4	
Ephemeroptera	Heptageniidae	Heptagenia	115	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	194	
Plecoptera			4	
Plecoptera	Chloroperlidae		147	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Nemouridae	Zapada cinctipes	4	
Plecoptera	Peltoperlidae	Yoraperla	7	
Plecoptera	Perlidae		22	
Trichoptera	Apataniidae	Pedomoecus sierra	11	
Trichoptera	Glossosomatidae	Glossosoma	47	
Trichoptera	Hydropsychidae	Arctopsyche grandis	4	
Trichoptera	Hydropsychidae	Hydropsyche	4	
Trichoptera	Lepidostomatidae	Lepidostoma	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	14	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	72	
Trichoptera	Uenoidae	Oligophlebodes	7	
Class: Maxillopoda, subclass copepoda			47	
Class: Ostracoda			111	

Total: 37 OTU taxa			3265 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 22 September 1994 at station S3:641, Silver King Creek, near middle exclosure, Station 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128361. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 857 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		18	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			32	
Class: Insecta				
Coleoptera	Elmidae		43	
Coleoptera	Elmidae	Optioservus	4	
Coleoptera	Elmidae	Zaitzevia	290	
Diptera	Ceratopogonidae	Bezzia	36	
Diptera	Chironomidae		781	
Diptera	Chironomidae	Tanypodinae	143	
Diptera	Empididae	Chelifera	4	
Diptera	Psychodidae	Pericoma	355	
Diptera	Tipulidae		4	
Diptera	Tipulidae	Hexatoma	25	
Ephemeroptera	Ameletidae	Ameletus	14	
Ephemeroptera	Baetidae	Baetis	25	
Ephemeroptera	Ephemerellidae	Attenella delantala	391	
Ephemeroptera	Ephemerellidae	Drunella doddsi	4	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	75	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	11	
Ephemeroptera	Heptageniidae	Cinygmula	4	
Ephemeroptera	Heptageniidae	Heptagenia	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	183	
Plecoptera			14	
Plecoptera	Capniidae		7	
Plecoptera	Chloroperlidae		72	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae	Malenka	14	
Plecoptera	Perlodidae	Kogotus	4	
Plecoptera	Perlodidae	Skwala americana	7	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Glossosomatidae	Glossosoma	14	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	25	
Trichoptera	Uenoidae	Oligophlebodes	4	
Class: Maxillopoda, subclass copepoda			183	
Class: Ostracoda			183	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	18	
Phylum: Nemata			43	

Total: 37 OTU taxa			3072 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 23 September 1994 at station S6:738, Silver King Creek, upper meadow upstream from cabin, Sta. 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128362. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1741 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			161	
Class: Insecta				
Coleoptera	Elmidae		32	
Coleoptera	Elmidae	Zaitzevia	330	
Diptera	Ceratopogonidae	Bezzia	194	
Diptera	Chironomidae	Orthocladiinae	1072	
Diptera	Chironomidae	Tanypodinae	72	
Diptera	Empididae	Chelifera	14	
Diptera	Psychodidae	Pericoma	1176	
Diptera	Simuliidae		7	
Diptera	Tipulidae	Antocha	25	
Diptera	Tipulidae	Hexatoma	32	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	183	
Ephemeroptera	Ephemerellidae	Attenella delantala	921	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	176	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	161	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	591	
Ephemeroptera	Heptageniidae	Cinygmula	57	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Heptagenia	280	
Ephemeroptera	Heptageniidae	Rhithrogena	14	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	183	
Plecoptera			32	
Plecoptera	Capniidae		7	
Plecoptera	Chloroperlidae		233	
Plecoptera	Leuctridae		14	
Plecoptera	Nemouridae	Zapada	7	
Plecoptera	Peltoperlidae	Yoraperla	7	
Plecoptera	Perlidae		14	
Trichoptera	Brachycentridae	Brachycentrus americanus	7	
Trichoptera	Brachycentridae	Micrasema	14	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Hydropsychidae	Arctopsyche grandis	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	57	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	39	
Class: Ostracoda			47	
Phylum: Nemata			32	

Total: 39 OTU taxa			6240 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 23 September 1994 at station S7:775, Silver King Creek, 300 yds upstream from 4-Mile Creek, Sta 7, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128363. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1124 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			186	
Class: Insecta				
Coleoptera	Elmidae		65	
Coleoptera	Elmidae	Optioservus	7	
Coleoptera	Elmidae	Zaitzevia	125	
Diptera	Ceratopogonidae	Bezzia	32	
Diptera	Chironomidae	Orthocladiinae	1172	
Diptera	Chironomidae	Tanypodinae	280	
Diptera	Empididae	Chelifera	39	
Diptera	Pelecorhynchidae	Glutops	25	
Diptera	Psychodidae	Pericoma	724	
Diptera	Simuliidae		4	
Diptera	Tipulidae	Hexatoma	108	
Ephemeroptera	Baetidae	Baetis	14	
Ephemeroptera	Ephemerellidae	Attenella delantala	416	
Ephemeroptera	Ephemerellidae	Drunella doddsi	43	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	197	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	36	
Ephemeroptera	Heptageniidae	Heptagenia	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	11	
Plecoptera	Chloroperlidae		54	
Plecoptera	Perlidae		11	
Plecoptera	Perlodidae	Kogotus	7	
Plecoptera	Perlodidae	Perlinodes aurea	4	
Plecoptera	Perlodidae	Skwala americana	7	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Hydropsychidae	Arctopsyche grandis	14	
Trichoptera	Limnephilidae	Ecclisomyia	7	
Trichoptera	Rhyacophilidae	Rhyacophila	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	222	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	7	
Class: Ostracoda			161	
Phylum: Nemata			7	

Total: 33 OTU taxa			4029 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 23 September 1994 at station S8:813, Silver King Creek, upstream from Fly Valley Creek, Station 8, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was 0.279 square meters. The sample identification number is 128364. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 850 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals per square meter. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata				
Haplotaxida	Tubificidae		7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			39	
Class: Insecta				
Coleoptera	Elmidae		47	
Coleoptera	Elmidae	Optioservus	22	
Coleoptera	Elmidae	Zaitzevia	39	
Diptera	Ceratopogonidae	Bezzia	11	
Diptera	Chironomidae	Orthocladiinae	728	
Diptera	Chironomidae	Tanypodinae	43	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	25	
Diptera	Psychodidae	Pericoma	900	
Diptera	Simuliidae		7	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera	Baetidae	Baetis	54	
Ephemeroptera	Ephemerellidae	Attenella delantala	143	
Ephemeroptera	Ephemerellidae	Drunella doddsi	14	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	61	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	204	
Ephemeroptera	Heptageniidae	Heptagenia	14	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	25	
Plecoptera			57	
Plecoptera	Capniidae		22	
Plecoptera	Chloroperlidae		25	
Plecoptera	Peltoperlidae		7	
Plecoptera	Perlidae		4	
Plecoptera	Perlodidae		7	
Trichoptera			25	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Glossosomatidae	Glossosoma	14	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila	32	
Trichoptera	Rhyacophilidae	Rhyacophila hyalinata	18	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	4	
Trichoptera	Uenoidae	Oligophlebodes	54	
Class: Maxillopoda, subclass copepoda			7	
Class: Ostracoda			312	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			36	

Total: 39 OTU taxa			3047	individuals

Taxonomic list and abundances of aquatic invertebrates collected 6 August 2003 at station COVAL-11, Coyote Valley Creek, Lower Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129065. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1416 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			161	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			484	
Class: Insecta				
Coleoptera	Elmidae		47	
Coleoptera	Elmidae	Cleptelmis addenda	154	
Coleoptera	Elmidae	Heterlimnius	7	
Coleoptera	Elmidae	Heterlimnius corpulentus	11	
Coleoptera	Elmidae	Lara	4	
Coleoptera	Elmidae	Optioservus	22	
Coleoptera	Elmidae	Optioservus quadrimaculatus	36	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		25	
Diptera	Chironomidae	Chironominae	183	
Diptera	Chironomidae	Orthocladiinae	606	
Diptera	Chironomidae	Tanypodinae	7	
Diptera	Pelecorhynchidae	Glutops	11	
Diptera	Psychodidae	Pericoma	79	
Diptera	Simuliidae	Simulium	140	
Diptera	Tipulidae	Dicranota	4	
Ephemeroptera	Baetidae	Baetis	663	
Ephemeroptera	Ephemerellidae		950	
Ephemeroptera	Ephemerellidae	Drunella doddsi	22	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	133	
Ephemeroptera	Heptageniidae		29	
Ephemeroptera	Heptageniidae	Cinygmula	22	
Ephemeroptera	Heptageniidae	Epeorus	4	
Ephemeroptera	Heptageniidae	Ironodes	7	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	57	
Megaloptera	Corydalidae		7	
Plecoptera	Chloroperlidae		68	
Plecoptera	Chloroperlidae	Sweltsa	47	
Plecoptera	Nemouridae		79	
Plecoptera	Nemouridae	Malenka	65	
Plecoptera	Peltoperlidae	Yoraperla	222	
Plecoptera	Perlidae		14	
Plecoptera	Perlidae	Hesperoperla pacifica	7	
Plecoptera	Perlodidae		7	
Trichoptera	Brachycentridae	Brachycentrus	43	
Trichoptera	Brachycentridae	Micrasema	75	
Trichoptera	Calamoceratidae	Heteroplectron californicum	7	
Trichoptera	Glossosomatidae		115	
Trichoptera	Hydropsychidae		7	
Trichoptera	Philopotamidae	Dolophilodes	197	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	25	
Trichoptera	Uenoidae	Neophylax	11	
Trichoptera	Uenoidae	Neothremma	4	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			36	
Phylum: Platyhelminthes				
Class: Turbellaria			165	

Total: 49 OTU taxa			5075 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 2 August 2004 at station COVAL-11, Coyote Valley Creek, Lower Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129066. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1965 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			111	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			889	
Class: Insecta				
Coleoptera	Elmidae		18	
Coleoptera	Elmidae	Cleptelmis addenda	161	
Coleoptera	Elmidae	Heterlimnius	36	
Coleoptera	Elmidae	Lara	7	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Elmidae	Optioservus	68	
Coleoptera	Elmidae	Optioservus quadrimaculatus	61	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		14	
Diptera	Chironomidae	Chironominae	22	
Diptera	Chironomidae	Orthocladiinae	226	
Diptera	Chironomidae	Tanypodinae	14	
Diptera	Pelecorhynchidae	Glutops	129	
Diptera	Psychodidae	Pericoma	93	
Diptera	Simuliidae	Simulium	29	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Baetidae	Baetis	330	
Ephemeroptera	Ephemerellidae		251	
Ephemeroptera	Ephemerellidae	Caudatella	419	
Ephemeroptera	Ephemerellidae	Drunella doddsi	54	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	265	
Ephemeroptera	Ephemerellidae	Serratella	72	
Ephemeroptera	Heptageniidae		100	
Ephemeroptera	Heptageniidae	Cinygmula	25	
Ephemeroptera	Heptageniidae	Epeorus	18	
Ephemeroptera	Heptageniidae	Ironodes	14	
Ephemeroptera	Heptageniidae	Rhithrogena	54	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	323	
Plecoptera			4	
Plecoptera	Chloroperlidae		233	
Plecoptera	Chloroperlidae	Suwallia	22	
Plecoptera	Chloroperlidae	Sweltsa	172	
Plecoptera	Nemouridae	Malenka	129	
Plecoptera	Nemouridae	Zapada	480	
Plecoptera	Peltoperlidae	Yoraperla	1545	
Plecoptera	Perlidae		25	
Plecoptera	Perlidae	Doroneuria baumanni	14	
Plecoptera	Perlidae	Hesperoperla pacifica	25	
Plecoptera	Perlodidae		7	
Plecoptera	Perlodidae	Oroperla barbara	4	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	11	
Trichoptera			7	
Trichoptera	Brachycentridae	Micrasema	140	
Trichoptera	Glossosomatidae		79	
Trichoptera	Glossosomatidae	Anagapetus	22	
Trichoptera	Hydropsychidae	Parapsyche elsis	7	
Trichoptera	Philopotamidae	Dolophilodes	129	
Trichoptera	Rhyacophilidae	Rhyacophila	18	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	25	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	29	
Trichoptera	Uenoidae	Neothremma	4	
Class: Ostracoda			79	
Phylum: Platyhelminthes				
Class: Turbellaria			14	

Total: 56 OTU taxa			7043 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2005 at station COVAL-11, Coyote Valley Creek, Lower Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129067. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1051 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			79	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			312	
Class: Insecta				
Coleoptera	Elmidae		11	
Coleoptera	Elmidae	Cleptelmis addenda	79	
Coleoptera	Elmidae	Heterlimnius	14	
Coleoptera	Elmidae	Heterlimnius corpulentus	4	
Coleoptera	Elmidae	Optioservus	50	
Coleoptera	Elmidae	Optioservus divergens/pecosensis	4	
Coleoptera	Elmidae	Optioservus quadrimaculatus	32	
Coleoptera	Hydrophilidae		4	
Diptera	Ceratopogonidae	Probezzia	7	
Diptera	Chironomidae		11	
Diptera	Chironomidae	Chironominae	140	
Diptera	Chironomidae	Orthocladiinae	398	
Diptera	Pelecorhynchidae	Glutops	11	
Diptera	Psychodidae	Pericoma	25	
Diptera	Simuliidae	Simulium	57	
Diptera	Tipulidae	Antocha	7	
Diptera	Tipulidae	Dicranota	4	
Ephemeroptera	Baetidae		39	
Ephemeroptera	Baetidae	Baetis	620	
Ephemeroptera	Baetidae	Diphetor hageni	4	
Ephemeroptera	Ephemerellidae		194	
Ephemeroptera	Ephemerellidae	Caudatella	111	
Ephemeroptera	Ephemerellidae	Drunella	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	158	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	36	
Ephemeroptera	Ephemerellidae	Serratella	22	
Ephemeroptera	Heptageniidae		7	
Ephemeroptera	Heptageniidae	Cinygmula	25	
Ephemeroptera	Heptageniidae	Epeorus	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	29	
Plecoptera	Chloroperlidae		147	
Plecoptera	Chloroperlidae	Sweltsa	18	
Plecoptera	Nemouridae	Malenka	36	
Plecoptera	Nemouridae	Zapada	11	
Plecoptera	Peltoperlidae	Yoraperla	484	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	11	
Plecoptera	Perlidae	Hesperoperla pacifica	39	
Plecoptera	Perlodidae		14	
Trichoptera			11	
Trichoptera	Brachycentridae	Micrasema	211	
Trichoptera	Philopotamidae		29	
Trichoptera	Philopotamidae	Dolophilodes	136	
Trichoptera	Rhyacophilidae	Rhyacophila	7	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	11	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	68	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group a	7	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	4	
Trichoptera	Uenoidae	Neothremma	11	
Class: Ostracoda			4	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 129067.

Order	Family	Subfamily/Genus/species	Life	Abundance	Notes
Phylum: Nemata				7	

Total: 53 OTU taxa				3767 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 10 August 2006 at station COVAL-11, Coyote Valley Creek, Lower Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129068. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1483 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			61	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			211	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Cleptelmis addenda	75	
Coleoptera	Elmidae	Heterlimnius	18	
Coleoptera	Elmidae	Heterlimnius corpulentus	29	
Coleoptera	Elmidae	Narpus concolor	11	
Coleoptera	Elmidae	Optioservus	65	
Coleoptera	Elmidae	Optioservus divergens/pecosensis	14	
Coleoptera	Elmidae	Optioservus quadrimaculatus	36	
Diptera	Ceratopogonidae		4	
Diptera	Chironomidae		4	
Diptera	Chironomidae	Chironominae	154	
Diptera	Chironomidae	Orthocladiinae	355	
Diptera	Pelecorhynchidae	Glutops	25	
Diptera	Psychodidae	Pericoma	47	
Diptera	Simuliidae	Simulium	287	
Diptera	Tipulidae	Dicranota	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	882	
Ephemeroptera	Baetidae	Diphetor hageni	14	
Ephemeroptera	Ephemerellidae		72	
Ephemeroptera	Ephemerellidae	Caudatella	710	
Ephemeroptera	Ephemerellidae	Drunella doddsi	211	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	32	
Ephemeroptera	Heptageniidae		65	
Ephemeroptera	Heptageniidae	Cinygmula	22	
Ephemeroptera	Heptageniidae	Epeorus	229	
Ephemeroptera	Heptageniidae	Ironodes	68	
Ephemeroptera	Heptageniidae	Rhithrogena	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	208	
Megaloptera	Corydalidae		11	
Plecoptera			4	
Plecoptera	Chloroperlidae		68	
Plecoptera	Chloroperlidae	Sweltsa	39	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae		22	
Plecoptera	Nemouridae	Malenka	65	
Plecoptera	Nemouridae	Zapada	50	
Plecoptera	Nemouridae	Zapada columbiana	4	
Plecoptera	Peltoperlidae	Yoraperla	516	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlidae	Hesperoperla	14	
Plecoptera	Perlidae	Hesperoperla hoguei	11	
Plecoptera	Perlidae	Hesperoperla pacifica	14	
Plecoptera	Perlodidae		39	
Trichoptera	Brachycentridae	Micrasema	290	
Trichoptera	Glossosomatidae		54	
Trichoptera	Hydropsychidae		4	
Trichoptera	Hydropsychidae	Hydropsyche	4	
Trichoptera	Hydropsychidae	Parapsyche elsis	4	
Trichoptera	Hydroptilidae		7	
Trichoptera	Limnephilidae	Homophylax	4	
Trichoptera	Philopotamidae		11	
Trichoptera	Philopotamidae	Dolophilodes	25	
Trichoptera	Rhyacophilidae	Rhyacophila	11	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	11	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	79	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 129068.

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 Total:    60  OTU taxa                                                                                             5315 individuals
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Taxonomic list and abundances of aquatic invertebrates collected 6 August 2003 at station COVAL-12, Coyote Valley Creek, Upper Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129069. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1918 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			111	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			599	
Class: Insecta				
Coleoptera	Elmidae		251	
Coleoptera	Elmidae	Cleptelmis addenda	151	
Coleoptera	Elmidae	Heterlimnius	179	
Coleoptera	Elmidae	Optioservus	11	
Diptera	Ceratopogonidae	Probezzia	25	
Diptera	Chironomidae		14	
Diptera	Chironomidae	Chironominae	115	
Diptera	Chironomidae	Orthocladiinae	842	
Diptera	Pelecorhynchidae	Glutops	7	
Diptera	Psychodidae	Pericoma	125	
Diptera	Simuliidae		18	
Diptera	Simuliidae	Simulium	233	
Diptera	Tipulidae	Dicranota	11	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera	Baetidae	Baetis	710	
Ephemeroptera	Baetidae	Diphetor hageni	29	
Ephemeroptera	Ephemerellidae		1487	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	61	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	29	
Ephemeroptera	Heptageniidae		11	
Ephemeroptera	Heptageniidae	Cinygmula	14	
Ephemeroptera	Heptageniidae	Epeorus	22	
Ephemeroptera	Heptageniidae	Ironodes	22	
Ephemeroptera	Heptageniidae	Rhithrogena	11	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	75	
Plecoptera			22	
Plecoptera	Chloroperlidae		100	
Plecoptera	Nemouridae	Malenka	4	
Plecoptera	Peltoperlidae	Yoraperla	538	
Plecoptera	Perlidae		11	
Plecoptera	Perlidae	Hesperoperla	4	
Plecoptera	Perlidae	Hesperoperla hoguei	29	
Plecoptera	Perlidae	Hesperoperla pacifica	4	
Plecoptera	Perlodidae		4	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	14	
Trichoptera			7	
Trichoptera	Brachycentridae	Micrasema	502	
Trichoptera	Glossosomatidae		32	
Trichoptera	Philopotamidae	Dolophilodes	194	
Trichoptera	Rhyacophilidae	Rhyacophila	4	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	79	
Trichoptera	Uenoidae	Neophylax	7	
Trichoptera	Uenoidae	Neothremma	22	
Class: Malacostraca				
Amphipoda	Hyalellidae	Hyalella azteca	4	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	7	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			104	

Total: 51 OTU taxa			6875	individuals

Taxonomic list and abundances of aquatic invertebrates collected 2 August 2004 at station COVAL-12, Coyote Valley Creek, Upper Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129070. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 2188 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			43	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			599	
Class: Insecta				
Coleoptera	Elmidae		122	
Coleoptera	Elmidae	Cleptelmis addenda	326	
Coleoptera	Elmidae	Heterlimnius	168	
Coleoptera	Elmidae	Lara	4	
Coleoptera	Elmidae	Narpus concolor	22	
Coleoptera	Elmidae	Optioservus	391	
Coleoptera	Elmidae	Optioservus quadrimaculatus	25	
Diptera	Ceratopogonidae	Probezzia	14	
Diptera	Chironomidae		11	
Diptera	Chironomidae	Chironominae	25	
Diptera	Chironomidae	Orthocladiinae	613	
Diptera	Empididae	Chelifera	4	
Diptera	Pelecorhynchidae	Glutops	32	
Diptera	Psychodidae	Pericoma	168	
Diptera	Simuliidae	Prosimulium	4	
Diptera	Simuliidae	Simulium	133	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Dicranota	4	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Baetidae		125	
Ephemeroptera	Baetidae	Baetis	559	
Ephemeroptera	Ephemerellidae		1351	
Ephemeroptera	Ephemerellidae	Attenella	4	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	25	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	133	
Ephemeroptera	Heptageniidae		47	
Ephemeroptera	Heptageniidae	Cinygmula	14	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Ironodes	43	
Ephemeroptera	Heptageniidae	Rhithrogena	50	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	122	
Megaloptera	Corydalidae		4	
Plecoptera			7	
Plecoptera	Chloroperlidae		330	
Plecoptera	Chloroperlidae	Suwallia	4	
Plecoptera	Chloroperlidae	Sweltsa	39	
Plecoptera	Nemouridae		22	
Plecoptera	Nemouridae	Malenka	122	
Plecoptera	Nemouridae	Zapada	29	
Plecoptera	Nemouridae	Zapada cinctipes	43	
Plecoptera	Peltoperlidae		29	
Plecoptera	Peltoperlidae	Yoraperla	1204	
Plecoptera	Perlidae		11	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlidae	Hesperoperla pacifica	36	
Plecoptera	Perlodidae		32	
Plecoptera	Perlodidae	Perlinodes aurea	14	
Plecoptera	Pteronarcyidae		4	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	4	
Trichoptera	Brachycentridae	Micrasema	294	
Trichoptera	Glossosomatidae		129	
Trichoptera	Glossosomatidae	Glossosoma	22	
Trichoptera	Limnephilidae		4	
Trichoptera	Philopotamidae	Dolophilodes	68	
Trichoptera	Rhyacophilidae	Rhyacophila	25	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	11	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 129070.

Order	Family	Subfamily/Genus/species	Abundance	Notes
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	72	
Trichoptera	Uenoidae	Neothremma	39	
Class: Malacostraca				
Amphipoda	Hyalellidae	Hyalella azteca	14	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			11	

Total: 64 OTU taxa			7842 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2005 at station COVAL-12, Coyote Valley Creek, Upper Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129071. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 825 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			29	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			93	
Class: Insecta				
Coleoptera	Elmidae		18	
Coleoptera	Elmidae	Cleptelmis addenda	154	
Coleoptera	Elmidae	Heterlimnius	147	
Coleoptera	Elmidae	Heterlimnius corpulentus	97	
Coleoptera	Elmidae	Heterlimnius koebelei	4	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Elmidae	Optioservus	168	
Diptera	Ceratopogonidae	Bezzia	4	
Diptera	Chironomidae	Chironominae	22	
Diptera	Chironomidae	Orthocladiinae	75	
Diptera	Pelecorhynchidae	Glutops	7	
Diptera	Psychodidae	Pericoma	14	
Diptera	Simuliidae	Simulium	108	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera			4	
Ephemeroptera	Baetidae	Baetis	323	
Ephemeroptera	Ephemerellidae		541	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Caudatella	50	
Ephemeroptera	Ephemerellidae	Drunella doddsi	108	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	72	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	29	
Ephemeroptera	Heptageniidae	Ironodes	14	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Megaloptera	Sialidae	Sialis	4	
Plecoptera	Chloroperlidae		86	
Plecoptera	Chloroperlidae	Suwallia	11	
Plecoptera	Chloroperlidae	Sweltsa	190	
Plecoptera	Nemouridae		14	
Plecoptera	Nemouridae	Malenka	4	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Peltoperlidae	Yoraperla	204	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlidae	Hesperoperla pacifica	43	
Plecoptera	Perlodidae		29	
Trichoptera			4	
Trichoptera	Brachycentridae	Micrasema	161	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Philopotamidae		7	
Trichoptera	Philopotamidae	Dolophilodes	7	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	68	

Total: 46 OTU taxa			2957 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 10 August 2006 at station COVAL-12, Coyote Valley Creek, Upper Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129072. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1366 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			29	
Class: Insecta				
Coleoptera	Elmidae		61	
Coleoptera	Elmidae	Cleptelmis addenda	75	
Coleoptera	Elmidae	Heterlimnius	197	
Coleoptera	Elmidae	Heterlimnius corpulentus	43	
Coleoptera	Elmidae	Narpus concolor	25	
Coleoptera	Elmidae	Optioservus	204	
Coleoptera	Elmidae	Optioservus divergens/pecosensis	29	
Coleoptera	Elmidae	Optioservus quadrimaculatus	122	
Coleoptera	Hydraenidae	Hydraena	4	
Diptera	Ceratopogonidae		4	
Diptera	Ceratopogonidae	Bezzia	4	
Diptera	Ceratopogonidae	Probezzia	7	
Diptera	Ceratopogonidae	Forcipomyia	4	
Diptera	Chironomidae		11	
Diptera	Chironomidae	Chironominae	54	
Diptera	Chironomidae	Orthocladiinae	147	
Diptera	Empididae	Chelifera	4	
Diptera	Pelecorhynchidae	Glutops	18	
Diptera	Psychodidae	Pericoma	36	
Diptera	Simuliidae	Prosimulium	7	
Diptera	Simuliidae	Simulium	423	
Diptera	Tipulidae	Dicranota	4	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	18	
Ephemeroptera	Baetidae	Baetis	978	
Ephemeroptera	Baetidae	Diphetor hageni	4	
Ephemeroptera	Ephemerellidae		437	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Caudatella	477	
Ephemeroptera	Ephemerellidae	Drunella doddsi	122	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	79	
Ephemeroptera	Heptageniidae		86	
Ephemeroptera	Heptageniidae	Cinygmula	7	
Ephemeroptera	Heptageniidae	Epeorus	100	
Ephemeroptera	Heptageniidae	Ironodes	50	
Ephemeroptera	Heptageniidae	Rhithrogena	18	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	50	
Plecoptera	Chloroperlidae		233	
Plecoptera	Chloroperlidae	Sweltsa	47	
Plecoptera	Nemouridae		7	
Plecoptera	Nemouridae	Malenka	32	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Peltoperlidae	Yoraperla	269	
Plecoptera	Perlidae		36	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlidae	Hesperoperla	4	
Plecoptera	Perlidae	Hesperoperla hoguei	14	
Plecoptera	Perlidae	Hesperoperla pacifica	11	
Plecoptera	Perlodidae		29	
Plecoptera	Perlodidae	Oroperla barbara	4	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	7	
Trichoptera	Brachycentridae	Micrasema	100	
Trichoptera	Glossosomatidae		7	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Philopotamidae		18	
Trichoptera	Philopotamidae	Dolophilodes	18	
Trichoptera	Philopotamidae	Wormaldia	4	
Trichoptera	Rhyacophilidae	Rhyacophila	18	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	72	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 129072.

Order	Family	Subfamily/Genus/species	Abundance	Notes
Class: Malacostraca				
Amphipoda	Hyalellidae	Hyalella azteca	11	
Phylum: Mollusca				
Class: Gastropoda			4	

Total: 62 OTU taxa			4896 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 6 August 2003 at station CVALL-09, Corral Valley Creek, Lower Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129073. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 2145 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			229	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			437	
Class: Insecta				
Coleoptera	Curculionidae		4	
Coleoptera	Elmidae		168	
Coleoptera	Elmidae	Cleptelmis addenda	168	
Coleoptera	Elmidae	Heterlimnius	39	
Coleoptera	Elmidae	Heterlimnius corpulentus	7	
Coleoptera	Elmidae	Lara	4	
Coleoptera	Elmidae	Optioservus	115	
Coleoptera	Elmidae	Optioservus divergens/pecosensis	18	
Coleoptera	Elmidae	Optioservus quadrimaculatus	22	
Diptera	Ceratopogonidae	Probezzia	32	
Diptera	Chironomidae		36	
Diptera	Chironomidae	Chironominae	401	
Diptera	Chironomidae	Orthocladiinae	1100	
Diptera	Chironomidae	Tanypodinae	18	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	36	
Diptera	Psychodidae	Pericoma	247	
Diptera	Simuliidae	Simulium	115	
Diptera	Tipulidae	Antocha	22	
Diptera	Tipulidae	Dicranota	11	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	642	
Ephemeroptera	Ephemerellidae		634	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Drunella	211	
Ephemeroptera	Ephemerellidae	Drunella doddsi	29	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	763	
Ephemeroptera	Heptageniidae	Cinygmula	68	
Ephemeroptera	Heptageniidae	Epeorus	4	
Ephemeroptera	Heptageniidae	Ironodes	4	
Ephemeroptera	Heptageniidae	Rhithrogena	14	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	47	
Plecoptera	Chloroperlidae		82	
Plecoptera	Chloroperlidae	Sweltsa	25	
Plecoptera	Nemouridae		25	
Plecoptera	Peltoperlidae	Yoraperla	749	
Plecoptera	Perlidae		18	
Plecoptera	Perlidae	Claassenia sabulosa	14	
Plecoptera	Perlidae	Doroneuria baumanni	29	
Plecoptera	Perlidae	Hesperoperla	4	
Plecoptera	Perlidae	Hesperoperla pacifica	7	
Plecoptera	Perlodidae		18	
Trichoptera			29	
Trichoptera	Apataniidae	Apatania	61	
Trichoptera	Brachycentridae	Micrasema	47	
Trichoptera	Glossosomatidae		108	
Trichoptera	Hydropsychidae		29	
Trichoptera	Hydropsychidae	Parapsyche	11	
Trichoptera	Hydroptilidae		4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Philopotamidae	Dolophilodes	7	
Trichoptera	Rhyacophilidae	Rhyacophila	7	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	65	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	61	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group	50	
Trichoptera	Uenoidae		7	
Trichoptera	Uenoidae	Neophylax	7	
Trichoptera	Uenoidae	Neothremma	22	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 129073.

Order	Family	Subfamily/Genus/species	Abundance	Notes
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	11	
Phylum: Nemata			18	
Phylum: Platyhelminthes				
Class: Turbellaria			505	

Total: 63 OTU taxa			7688 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 2 August 2004 at station CVALL-09, Corral Valley Creek, Lower Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129074. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 2512 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			25	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			484	
Class: Insecta				
Coleoptera	Dytiscidae		4	
Coleoptera	Elmidae		136	
Coleoptera	Elmidae	Cleptelmis addenda	459	
Coleoptera	Elmidae	Heterlimnius	22	
Coleoptera	Elmidae	Heterlimnius corpulentus	14	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Elmidae	Optioservus	387	
Coleoptera	Elmidae	Optioservus divergens/pecosensis	7	
Coleoptera	Elmidae	Optioservus quadrimaculatus	50	
Diptera	Ceratopogonidae	Atrichopogon/Forcipomyia	4	
Diptera	Ceratopogonidae	Probezzia	32	
Diptera	Chironomidae		65	
Diptera	Chironomidae	Chironominae	362	
Diptera	Chironomidae	Orthocladiinae	1509	
Diptera	Chironomidae	Tanypodinae	32	
Diptera	Empididae	Chelifera	4	
Diptera	Pelecorhynchidae	Glutops	61	
Diptera	Psychodidae	Pericoma	344	
Diptera	Simuliidae	Simulium	158	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	22	
Ephemeroptera	Baetidae	Baetis	140	
Ephemeroptera	Baetidae	Diphetor hageni	7	
Ephemeroptera	Ephemerellidae		606	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Caudatella	369	
Ephemeroptera	Ephemerellidae	Drunella doddsi	7	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	581	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	18	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	111	
Plecoptera	Chloroperlidae		133	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Nemouridae		82	
Plecoptera	Nemouridae	Malenka	18	
Plecoptera	Nemouridae	Zapada	54	
Plecoptera	Peltoperlidae		39	
Plecoptera	Peltoperlidae	Yoraperla	1731	
Plecoptera	Perlidae		11	
Plecoptera	Perlidae	Calineuria californica	7	
Plecoptera	Perlidae	Doroneuria baumanni	18	
Plecoptera	Perlidae	Hesperoperla pacifica	25	
Plecoptera	Perlodidae		32	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	4	
Trichoptera			14	
Trichoptera	Apataniidae	Apatania	22	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Micrasema	39	
Trichoptera	Glossosomatidae		47	
Trichoptera	Glossosomatidae	Glossosoma	104	
Trichoptera	Hydropsychidae	Parapsyche elsis	22	
Trichoptera	Limnephilidae		4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Limnephilidae	Psychoglypha	4	
Trichoptera	Rhyacophilidae	Rhyacophila	47	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	61	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	18	
Trichoptera	Uenoidae	Neophylax	4	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 129074.

Order	Family	Subfamily/Genus/species	Abundance	Notes
Trichoptera	Uenoidae	Neothremma	11	
Class: Ostracoda			358	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	11	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			32	

Total: 66 OTU taxa			9004	individuals

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2005 at station CVALL-09, Corral Valley Creek, Lower Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129075. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 588 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			118	
Class: Insecta				
Coleoptera	Elmidae		14	
Coleoptera	Elmidae	Cleptelmis addenda	11	
Coleoptera	Elmidae	Heterlimnius	115	
Coleoptera	Elmidae	Heterlimnius corpulentus	18	
Coleoptera	Elmidae	Optioservus	72	
Coleoptera	Elmidae	Optioservus divergens/pecosensis	4	
Coleoptera	Elmidae	Optioservus quadrimaculatus	25	
Diptera	Ceratopogonidae	Probezzia	29	
Diptera	Chironomidae		47	
Diptera	Chironomidae	Chironominae	161	
Diptera	Chironomidae	Orthocladiinae	222	
Diptera	Chironomidae	Tanypodinae	14	
Diptera	Pelecorhynchidae	Glutops	97	
Diptera	Psychodidae	Pericoma	25	
Diptera	Simuliidae	Simulium	50	
Diptera	Tipulidae	Antocha	14	
Ephemeroptera	Ameletidae	Ameletus	29	
Ephemeroptera	Baetidae		262	
Ephemeroptera	Baetidae	Baetis	97	
Ephemeroptera	Ephemerellidae	Attenella delantala	11	
Ephemeroptera	Ephemerellidae	Drunella	108	
Ephemeroptera	Heptageniidae	Cinygmula	22	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		111	
Plecoptera	Chloroperlidae	Sweltsa	11	
Plecoptera	Nemouridae		4	
Plecoptera	Nemouridae	Malenka	7	
Plecoptera	Peltoperlidae	Yoraperla	151	
Plecoptera	Perlidae		25	
Plecoptera	Perlidae	Doroneuria baumanni	11	
Plecoptera	Perlidae	Hesperoperla hoguei	4	
Plecoptera	Perlodidae		11	
Trichoptera			14	
Trichoptera	Apataniidae	Apatania	39	
Trichoptera	Glossosomatidae		11	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Hydropsychidae	Parapsyche elsis	7	
Trichoptera	Limnephilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	39	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	22	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	4	
Trichoptera	Uenoidae	Neophylax	18	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	22	
Phylum: Nemata			14	

Total: 46 OTU taxa			2108 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2006 at station CVALL-09, Corral Valley Creek, Lower Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129076. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 681 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			61	
Class: Insecta				
Coleoptera	Elmidae		11	
Coleoptera	Elmidae	Cleptelmis addenda	32	
Coleoptera	Elmidae	Heterlimnius	79	
Coleoptera	Elmidae	Optioservus	75	
Coleoptera	Elmidae	Optioservus divergens/pecosensis	4	
Coleoptera	Elmidae	Optioservus quadrimaculatus	32	
Diptera	Ceratopogonidae		4	
Diptera	Ceratopogonidae	Probezzia	36	
Diptera	Chironomidae		4	
Diptera	Chironomidae	Chironominae	47	
Diptera	Chironomidae	Orthocladiinae	122	
Diptera	Chironomidae	Tanypodinae	18	
Diptera	Pelecorhynchidae	Glutops	39	
Diptera	Psychodidae	Pericoma	7	
Diptera	Simuliidae	Simulium	14	
Diptera	Tipulidae	Antocha	47	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera	Ameletidae	Ameletus	65	
Ephemeroptera	Baetidae	Baetis	771	
Ephemeroptera	Baetidae	Diphetor hageni	11	
Ephemeroptera	Ephemerellidae		32	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Drunella	68	
Ephemeroptera	Ephemerellidae	Drunella doddsi	32	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	172	
Ephemeroptera	Heptageniidae		14	
Ephemeroptera	Heptageniidae	Cinygmula	93	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera	Chloroperlidae		57	
Plecoptera	Chloroperlidae	Sweltsa	22	
Plecoptera	Nemouridae	Malenka	32	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Nemouridae	Zapada oregonensis group	4	
Plecoptera	Peltoperlidae	Yoraperla	129	
Plecoptera	Perlidae		7	
Plecoptera	Perlidae	Doroneuria baumanni	14	
Plecoptera	Perlidae	Hesperoperla hoguei	4	
Plecoptera	Perlidae	Hesperoperla pacifica	11	
Plecoptera	Perlodidae		29	
Trichoptera			18	
Trichoptera	Apataniidae	Apatania	4	
Trichoptera	Apataniidae	Pedomoecus sierra	11	
Trichoptera	Glossosomatidae	Anagapetus	4	
Trichoptera	Hydropsychidae	Parapsyche almota	4	
Trichoptera	Hydropsychidae	Parapsyche elsis	4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Limnephilidae	Psychoglypha	4	
Trichoptera	Philopotamidae		14	
Trichoptera	Rhyacophilidae	Rhyacophila	32	
Trichoptera	Rhyacophilidae	Rhyacophila alberta group	4	
Trichoptera	Rhyacophilidae	Rhyacophila arnaudi	18	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	32	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	54	
Trichoptera	Uenoidae	Neophylax	4	
Trichoptera	Uenoidae	Neothremma	4	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	7	

Total: 57 OTU taxa			2441 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 6 August 2003 at station CVALL-10, Corral Valley Creek, Upper Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129077. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1927 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			32	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			473	
Class: Insecta				
Coleoptera	Elmidae		201	
Coleoptera	Elmidae	Cleptelmis addenda	39	
Coleoptera	Elmidae	Heterlimnius	39	
Coleoptera	Elmidae	Heterlimnius corpulentus	39	
Coleoptera	Elmidae	Optioservus	47	
Coleoptera	Elmidae	Optioservus quadrimaculatus	129	
Diptera	Ceratopogonidae		4	
Diptera	Ceratopogonidae	Probezzia	65	
Diptera	Chironomidae		86	
Diptera	Chironomidae	Chironominae	563	
Diptera	Chironomidae	Orthocladiinae	1075	
Diptera	Chironomidae	Tanypodinae	32	
Diptera	Pelecorhynchidae	Glutops	7	
Diptera	Psychodidae	Pericoma	226	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Simulium	72	
Diptera	Tipulidae	Antocha	18	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	333	
Ephemeroptera	Ephemerellidae		505	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	47	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	595	
Ephemeroptera	Heptageniidae	Cinygmula	14	
Ephemeroptera	Heptageniidae	Rhithrogena	22	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	158	
Plecoptera	Chloroperlidae		104	
Plecoptera	Chloroperlidae	Sweltsa	18	
Plecoptera	Nemouridae		7	
Plecoptera	Nemouridae	Malenka	4	
Plecoptera	Peltoperlidae	Yoraperla	430	
Plecoptera	Perlidae		22	
Plecoptera	Perlidae	Claassenia sabulosa	4	
Plecoptera	Perlidae	Doroneuria baumanni	47	
Plecoptera	Perlodidae		14	
Trichoptera			197	
Trichoptera	Apataniidae	Apatania	29	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Brachycentridae	Micrasema	43	
Trichoptera	Glossosomatidae		140	
Trichoptera	Glossosomatidae	Glossosoma	11	
Trichoptera	Hydropsychidae		93	
Trichoptera	Hydropsychidae	Parapsyche	22	
Trichoptera	Philopotamidae		4	
Trichoptera	Philopotamidae	Dolophilodes	29	
Trichoptera	Rhyacophilidae	Rhyacophila	4	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	108	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	86	
Trichoptera	Uenoidae	Neophylax	11	
Trichoptera	Uenoidae	Neothremma	4	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	47	
Phylum: Nemata			18	
Phylum: Platyhelminthes				
Class: Turbellaria			570	

Total: 56 OTU taxa			6907	individuals

Taxonomic list and abundances of aquatic invertebrates collected 2 August 2004 at station CVALL-10, Corral Valley Creek, Upper Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129078. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 2479 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			39	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			487	
Class: Insecta				
Coleoptera	Dytiscidae	Oreodytes	7	
Coleoptera	Elmidae		68	
Coleoptera	Elmidae	Cleptelmis addenda	29	
Coleoptera	Elmidae	Heterlimnius	233	
Coleoptera	Elmidae	Heterlimnius corpulentus	14	
Coleoptera	Elmidae	Narpus concolor	11	
Coleoptera	Elmidae	Optioservus	283	
Coleoptera	Elmidae	Optioservus divergens/pecosensis	29	
Coleoptera	Elmidae	Optioservus quadrimaculatus	115	
Diptera	Ceratopogonidae	Probezzia	39	
Diptera	Chironomidae		65	
Diptera	Chironomidae	Chironominae	538	
Diptera	Chironomidae	Orthocladiinae	1634	
Diptera	Empididae	Chelifera	4	
Diptera	Pelecorhynchidae	Glutops	22	
Diptera	Psychodidae	Pericoma	530	
Diptera	Simuliidae	Simulium	197	
Diptera	Tipulidae	Antocha	11	
Diptera	Tipulidae	Hexatoma	11	
Ephemeroptera	Baetidae	Baetis	39	
Ephemeroptera	Baetidae	Diphetor hageni	4	
Ephemeroptera	Ephemerellidae		427	
Ephemeroptera	Ephemerellidae	Caudatella	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	4	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	538	
Ephemeroptera	Heptageniidae		32	
Ephemeroptera	Heptageniidae	Cinygmula	18	
Ephemeroptera	Leptohyphidae		82	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	201	
Plecoptera	Capniidae		4	
Plecoptera	Chloroperlidae		75	
Plecoptera	Chloroperlidae	Sweltsa	65	
Plecoptera	Nemouridae		14	
Plecoptera	Nemouridae	Malenka	100	
Plecoptera	Nemouridae	Zapada	143	
Plecoptera	Nemouridae	Zapada cinctipes	90	
Plecoptera	Peltoperlidae	Yoraperla	1143	
Plecoptera	Perlidae		29	
Plecoptera	Perlidae	Doroneuria baumanni	47	
Plecoptera	Perlidae	Hesperoperla pacifica	7	
Plecoptera	Perlodidae		7	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	7	
Trichoptera			168	
Trichoptera	Apataniidae	Apatania	7	
Trichoptera	Brachycentridae	Micrasema	50	
Trichoptera	Glossosomatidae		448	
Trichoptera	Glossosomatidae	Anagapetus	29	
Trichoptera	Glossosomatidae	Glossosoma	129	
Trichoptera	Hydropsychidae		47	
Trichoptera	Hydropsychidae	Parapsyche elsis	72	
Trichoptera	Philopotamidae	Dolophilodes	36	
Trichoptera	Rhyacophilidae	Rhyacophila	54	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	86	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	61	
Trichoptera	Uenoidae	Neophylax	7	
Trichoptera	Uenoidae	Oligophlebodes	47	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 129078.

Order	Family	Subfamily/Genus/species	Abundance	Notes
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	86	
Phylum: Platyhelminthes				
Class: Turbellaria			108	

Total: 60 OTU taxa			8885 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 10 August 2005 at station CVALL-10, Corral Valley Creek, Upper Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129079. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 851 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			11	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			65	
Class: Insecta				
Coleoptera	Elmidae		39	
Coleoptera	Elmidae	Cleptelmis addenda	7	
Coleoptera	Elmidae	Heterlimnius	229	
Coleoptera	Elmidae	Heterlimnius corpulentus	18	
Coleoptera	Elmidae	Optioservus	240	
Coleoptera	Elmidae	Optioservus quadrimaculatus	32	
Coleoptera	Hydrophilidae		4	
Diptera	Ceratopogonidae	Probezzia	11	
Diptera	Chironomidae		4	
Diptera	Chironomidae	Chironominae	240	
Diptera	Chironomidae	Orthocladiinae	229	
Diptera	Chironomidae	Tanypodinae	18	
Diptera	Empididae	Chelifera	4	
Diptera	Psychodidae	Pericoma	7	
Diptera	Simuliidae	Simulium	93	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Dicranota	7	
Ephemeroptera			4	
Ephemeroptera	Baetidae	Baetis	168	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Drunella	11	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	22	
Ephemeroptera	Ephemerellidae	Drunella doddsi	36	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	65	
Ephemeroptera	Heptageniidae		32	
Ephemeroptera	Heptageniidae	Cinygmula	36	
Ephemeroptera	Heptageniidae	Epeorus	7	
Ephemeroptera	Heptageniidae	Ironodes	4	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera	Chloroperlidae		143	
Plecoptera	Chloroperlidae	Suwallia	32	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Nemouridae	Malenka	18	
Plecoptera	Nemouridae	Zapada	7	
Plecoptera	Peltoperlidae	Yoraperla	860	
Plecoptera	Perlidae		39	
Plecoptera	Perlidae	Doroneuria baumanni	36	
Trichoptera	Apataniidae	Apatania	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Glossosomatidae		11	
Trichoptera	Hydropsychidae	Hydropsyche	4	
Trichoptera	Hydropsychidae	Parapsyche elsis	14	
Trichoptera	Limnephilidae	Psychoglypha	4	
Trichoptera	Philopotamidae		39	
Trichoptera	Philopotamidae	Dolophilodes	4	
Trichoptera	Rhyacophilidae	Rhyacophila	65	
Trichoptera	Rhyacophilidae	Rhyacophila angelita group	25	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	22	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	43	
Trichoptera	Uenoidae	Neophylax	4	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	11	

Total: 54 OTU taxa			3050 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2006 at station CVALL-10, Corral Valley Creek, Upper Site, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129080. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1186 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			125	
Class: Insecta				
Coleoptera	Elmidae		43	
Coleoptera	Elmidae	Cleptelmis addenda	7	
Coleoptera	Elmidae	Heterlimnius	108	
Coleoptera	Elmidae	Heterlimnius corpulentus	14	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Elmidae	Optioservus	115	
Coleoptera	Elmidae	Optioservus quadrimaculatus	50	
Diptera	Ceratopogonidae	Probezzia	57	
Diptera	Chironomidae	Chironominae	147	
Diptera	Chironomidae	Orthocladiinae	97	
Diptera	Chironomidae	Tanypodinae	14	
Diptera	Pelecorhynchidae	Glutops	7	
Diptera	Psychodidae	Pericoma	82	
Diptera	Simuliidae	Simulium	32	
Diptera	Tipulidae	Dicranota	7	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	11	
Ephemeroptera	Baetidae	Baetis	581	
Ephemeroptera	Ephemerellidae		18	
Ephemeroptera	Ephemerellidae	Caudatella	36	
Ephemeroptera	Ephemerellidae	Drunella	143	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	65	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	229	
Ephemeroptera	Heptageniidae		36	
Ephemeroptera	Heptageniidae	Cinygmula	297	
Ephemeroptera	Heptageniidae	Epeorus	43	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	14	
Plecoptera			4	
Plecoptera	Chloroperlidae		54	
Plecoptera	Chloroperlidae	Suwallia	14	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae	Malenka	32	
Plecoptera	Nemouridae	Visoka cataractae	4	
Plecoptera	Nemouridae	Zapada	7	
Plecoptera	Nemouridae	Zapada columbiana	43	
Plecoptera	Nemouridae	Zapada oregonensis group	36	
Plecoptera	Peltoperlidae	Yoraperla	1118	
Plecoptera	Perlidae		7	
Plecoptera	Perlidae	Doroneuria baumanni	25	
Plecoptera	Perlodidae		97	
Plecoptera	Pteronarcyidae	Pteronarcella regularis	14	
Trichoptera	Apataniidae	Apatania	50	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae		14	
Trichoptera	Glossosomatidae	Anagapetus	18	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Hydropsychidae		7	
Trichoptera	Hydropsychidae	Parapsyche elsis	4	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Limnephilidae		7	
Trichoptera	Limnephilidae	Cryptochia	4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Philopotamidae		14	
Trichoptera	Philopotamidae	Dolophilodes	97	
Trichoptera	Rhyacophilidae	Rhyacophila	18	
Trichoptera	Rhyacophilidae	Rhyacophila angelita group	7	
Trichoptera	Rhyacophilidae	Rhyacophila arnaudi	11	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	57	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	61	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 129080.

Order	Family	Subfamily/Genus/species	Abundance	Notes
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	7	

Total: 63 OTU taxa			4251 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 August 2003 at station SKING-01, Silver King Creek, Upper Valley, Site 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129081.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 953 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			29	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			50	
Class: Insecta				
Coleoptera	Elmidae		22	
Coleoptera	Elmidae	Heterlimnius	301	
Diptera	Chironomidae		4	
Diptera	Chironomidae	Chironominae	265	
Diptera	Chironomidae	Orthocladiinae	609	
Diptera	Chironomidae	Tanypodinae	11	
Diptera	Empididae	Chelifera	43	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	32	
Diptera	Simuliidae		11	
Diptera	Simuliidae	Simulium	25	
Diptera	Tipulidae	Antocha	7	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	337	
Ephemeroptera	Ephemerellidae		283	
Ephemeroptera	Ephemerellidae	Attenella delantala	18	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	186	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	122	
Ephemeroptera	Heptageniidae		18	
Ephemeroptera	Heptageniidae	Cinygmula	172	
Ephemeroptera	Heptageniidae	Epeorus	140	
Ephemeroptera	Heptageniidae	Rhithrogena	39	
Plecoptera	Chloroperlidae		32	
Plecoptera	Chloroperlidae	Sweltsa	11	
Plecoptera	Leuctridae		4	
Plecoptera	Peltoperlidae	Yoraperla	122	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Trichoptera			4	
Trichoptera	Brachycentridae	Brachycentrus americanus	7	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae		75	
Trichoptera	Glossosomatidae	Glossosoma	39	
Trichoptera	Rhyacophilidae	Rhyacophila	36	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	32	
Class: Ostracoda			11	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			18	
Phylum: Platyhelminthes				
Class: Turbellaria			258	

Total: 43 OTU taxa			3416 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 4 August 2004 at station SKING-01, Silver King Creek, Upper Valley, Site 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129082.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1867 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			54	
Class: Insecta				
Coleoptera	Elmidae		65	
Coleoptera	Elmidae	Cleptelmis addenda	4	
Coleoptera	Elmidae	Heterlimnius	810	
Coleoptera	Elmidae	Heterlimnius corpulentus	29	
Coleoptera	Elmidae	Narpus concolor	11	
Diptera	Ceratopogonidae	Probezzia	22	
Diptera	Chironomidae		29	
Diptera	Chironomidae	Chironominae	538	
Diptera	Chironomidae	Orthocladiinae	351	
Diptera	Chironomidae	Tanypodinae	22	
Diptera	Empididae	Chelifera	32	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	72	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Simulium	47	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Hexatoma	11	
Diptera	Tipulidae	Limnophila	4	
Ephemeroptera	Ameletidae	Ameletus	32	
Ephemeroptera	Baetidae		39	
Ephemeroptera	Baetidae	Baetis	1287	
Ephemeroptera	Ephemerellidae		262	
Ephemeroptera	Ephemerellidae	Attenella delantala	36	
Ephemeroptera	Ephemerellidae	Caudatella	609	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	330	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	394	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	7	
Ephemeroptera	Heptageniidae		201	
Ephemeroptera	Heptageniidae	Cinygmula	258	
Ephemeroptera	Heptageniidae	Epeorus	43	
Ephemeroptera	Heptageniidae	Rhithrogena	61	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	194	
Plecoptera	Chloroperlidae		82	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae	Malenka	90	
Plecoptera	Nemouridae	Zapada columbiana	22	
Plecoptera	Peltoperlidae	Yoraperla	258	
Plecoptera	Perlidae		25	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		11	
Trichoptera			43	
Trichoptera	Brachycentridae	Brachycentrus americanus	39	
Trichoptera	Brachycentridae	Micrasema	32	
Trichoptera	Glossosomatidae		4	
Trichoptera	Hydropsychidae		11	
Trichoptera	Hydropsychidae	Parapsyche elsis	7	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Philopotamidae	Dolophilodes	29	
Trichoptera	Rhyacophilidae	Rhyacophila	90	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila verrula group	11	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	7	
Phylum: Platyhelminthes				
Class: Turbellaria			25	

Total: 57 OTU taxa			6692 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 10 August 2005 at station SKING-01, Silver King Creek, Upper Valley, Site 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129083.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 504 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			7	
Class: Insecta				
Coleoptera	Elmidae		22	
Coleoptera	Elmidae	Heterlimnius	143	
Coleoptera	Elmidae	Heterlimnius corpulentus	14	
Coleoptera	Elmidae	Narpus concolor	4	
Diptera	Ceratopogonidae	Probezzia	7	
Diptera	Chironomidae		11	
Diptera	Chironomidae	Chironominae	111	
Diptera	Chironomidae	Orthocladiinae	133	
Diptera	Empididae	Chelifera	14	
Diptera	Simuliidae		14	
Diptera	Simuliidae	Simulium	54	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Baetidae		22	
Ephemeroptera	Baetidae	Baetis	226	
Ephemeroptera	Ephemerellidae		18	
Ephemeroptera	Ephemerellidae	Attenella delantala	108	
Ephemeroptera	Ephemerellidae	Caudatella	18	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	211	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	39	
Ephemeroptera	Heptageniidae		11	
Ephemeroptera	Heptageniidae	Cinygmula	108	
Ephemeroptera	Heptageniidae	Epeorus	82	
Ephemeroptera	Heptageniidae	Rhithrogena	18	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera	Chloroperlidae		22	
Plecoptera	Chloroperlidae	Suwallia	7	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae	Malenka	4	
Plecoptera	Peltoperlidae	Yoraperla	50	
Plecoptera	Perlidae		14	
Plecoptera	Perlodidae		4	
Trichoptera	Brachycentridae	Brachycentrus americanus	14	
Trichoptera	Brachycentridae	Micrasema	14	
Trichoptera	Glossosomatidae		65	
Trichoptera	Glossosomatidae	Glossosoma	140	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Philopotamidae	Dolophilodes	4	
Trichoptera	Polycentropodidae	Polycentropus	4	
Trichoptera	Rhyacophilidae	Rhyacophila	36	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	7	

Total: 44 OTU taxa			1806 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 August 2006 at station SKING-01, Silver King Creek, Upper Valley, Site 1, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129084.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 566 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			14	
Class: Insecta				
Coleoptera	Elmidae		39	
Coleoptera	Elmidae	Heterlimnius	165	
Coleoptera	Elmidae	Heterlimnius corpulentus	14	
Coleoptera	Elmidae	Optioservus quadrimaculatus	4	
Coleoptera	Hydraenidae	Ochthebius	4	
Diptera	Ceratopogonidae		4	
Diptera	Chironomidae		14	
Diptera	Chironomidae	Chironominae	204	
Diptera	Chironomidae	Orthocladiinae	90	
Diptera	Chironomidae	Tanypodinae	4	
Diptera	Empididae	Chelifera	18	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Simulium	14	
Diptera	Tipulidae	Antocha	4	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	355	
Ephemeroptera	Ephemerellidae		7	
Ephemeroptera	Ephemerellidae	Attenella delantala	219	
Ephemeroptera	Ephemerellidae	Caudatella	36	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	172	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	50	
Ephemeroptera	Heptageniidae		54	
Ephemeroptera	Heptageniidae	Cinygmula	172	
Ephemeroptera	Heptageniidae	Epeorus	47	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Plecoptera	Chloroperlidae		14	
Plecoptera	Chloroperlidae	Suwallia	11	
Plecoptera	Chloroperlidae	Sweltsa	11	
Plecoptera	Peltoperlidae	Yoraperla	50	
Plecoptera	Perlidae		11	
Plecoptera	Perlodidae		32	
Trichoptera			4	
Trichoptera	Apataniidae	Pedomoecus sierra	11	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Glossosomatidae	Glossosoma	22	
Trichoptera	Limnephilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	57	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	11	
Phylum: Platyhelminthes				
Class: Turbellaria			57	

Total: 43 OTU taxa			2029 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 August 2003 at station SKING-02, Silver King Creek, Upper valley, Site 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129085.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1152 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			29	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			22	
Class: Insecta				
Coleoptera	Elmidae		143	
Coleoptera	Elmidae	Heterlimnius	380	
Coleoptera	Elmidae	Heterlimnius corpulentus	18	
Coleoptera	Elmidae	Narpus concolor	4	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		29	
Diptera	Chironomidae	Chironominae	588	
Diptera	Chironomidae	Orthocladiinae	742	
Diptera	Empididae	Chelifera	18	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	39	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Simulium	25	
Diptera	Tipulidae	Antocha	11	
Diptera	Tipulidae	Hexatoma	14	
Ephemeroptera	Baetidae	Baetis	577	
Ephemeroptera	Ephemerellidae		366	
Ephemeroptera	Ephemerellidae	Attenella delantala	133	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	86	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	36	
Ephemeroptera	Heptageniidae		7	
Ephemeroptera	Heptageniidae	Cinygmula	158	
Ephemeroptera	Heptageniidae	Epeorus	97	
Ephemeroptera	Heptageniidae	Rhithrogena	11	
Plecoptera	Chloroperlidae		7	
Plecoptera	Chloroperlidae	Sweltsa	39	
Plecoptera	Peltoperlidae	Yoraperla	36	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		14	
Trichoptera			7	
Trichoptera	Brachycentridae	Brachycentrus americanus	36	
Trichoptera	Brachycentridae	Micrasema	29	
Trichoptera	Glossosomatidae		104	
Trichoptera	Glossosomatidae	Glossosoma	57	
Trichoptera	Hydropsychidae		22	
Trichoptera	Philopotamidae		7	
Trichoptera	Philopotamidae	Dolophilodes	11	
Trichoptera	Rhyacophilidae	Rhyacophila	18	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	11	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group	14	
Class: Ostracoda			18	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Nemata			14	
Phylum: Platyhelminthes				
Class: Turbellaria			118	

Total: 48 OTU taxa			4129	individuals

Taxonomic list and abundances of aquatic invertebrates collected 4 August 2004 at station SKING-02, Silver King Creek, Upper valley, Site 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129086.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1813 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			29	
Class: Insecta				
Coleoptera	Elmidae		47	
Coleoptera	Elmidae	Heterlimnius	670	
Coleoptera	Elmidae	Heterlimnius corpulentus	36	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Elmidae	Optioservus	4	
Coleoptera	Elmidae	Optioservus quadrimaculatus	4	
Diptera	Ceratopogonidae	Probezzia	11	
Diptera	Chironomidae		22	
Diptera	Chironomidae	Chironominae	1140	
Diptera	Chironomidae	Orthocladiinae	308	
Diptera	Chironomidae	Tanypodinae	25	
Diptera	Empididae	Chelifera	39	
Diptera	Psychodidae	Pericoma	11	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Simulium	122	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	25	
Ephemeroptera	Baetidae	Baetis	1129	
Ephemeroptera	Baetidae	Diphetor hageni	18	
Ephemeroptera	Ephemerellidae		61	
Ephemeroptera	Ephemerellidae	Attenella delantala	82	
Ephemeroptera	Ephemerellidae	Caudatella	337	
Ephemeroptera	Ephemerellidae	Caudatella heterocaudata	7	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	61	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	240	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	297	
Ephemeroptera	Ephemerellidae	Serratella	39	
Ephemeroptera	Ephemerellidae	Serratella tibialis	4	
Ephemeroptera	Heptageniidae		68	
Ephemeroptera	Heptageniidae	Cinygmula	237	
Ephemeroptera	Heptageniidae	Epeorus	93	
Ephemeroptera	Heptageniidae	Rhithrogena	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	208	
Plecoptera	Chloroperlidae		79	
Plecoptera	Chloroperlidae	Sweltsa	111	
Plecoptera	Nemouridae		4	
Plecoptera	Nemouridae	Malenka	75	
Plecoptera	Nemouridae	Zapada columbiana	11	
Plecoptera	Peltoperlidae	Yoraperla	358	
Plecoptera	Perlidae		32	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae		7	
Trichoptera			14	
Trichoptera	Brachycentridae	Brachycentrus americanus	25	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae		4	
Trichoptera	Hydropsychidae		4	
Trichoptera	Hydropsychidae	Arctopsyche	25	
Trichoptera	Hydropsychidae	Arctopsyche californica	11	
Trichoptera	Hydropsychidae	Arctopsyche grandis	7	
Trichoptera	Rhyacophilidae		7	
Trichoptera	Rhyacophilidae	Rhyacophila	25	
Trichoptera	Rhyacophilidae	Rhyacophila arnaudi	25	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila verrula group	4	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	14	
Class: Ostracoda			32	

Continuation of the taxonomic list and abundances of aquatic invertebrates for sample number 129086.

Order	Family	Subfamily/Genus/species	Abundance	Notes
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	11	
Phylum: Platyhelminthes				
Class: Turbellaria			176	

Total: 62 OTU taxa			6498 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 10 August 2005 at station SKING-02, Silver King Creek, Upper valley, Site 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129087.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 662 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			7	
Class: Insecta				
Coleoptera	Elmidae		22	
Coleoptera	Elmidae	Heterlimnius	133	
Coleoptera	Elmidae	Heterlimnius corpulentus	7	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Helophoridae	Helophorus	7	
Coleoptera	Hydraenidae	Ochthebius	4	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		14	
Diptera	Chironomidae	Chironominae	50	
Diptera	Chironomidae	Orthocladiinae	190	
Diptera	Chironomidae	Tanypodinae	4	
Diptera	Empididae	Chelifera	4	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Simulium	136	
Diptera	Tipulidae	Hexatoma	4	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	283	
Ephemeroptera	Ephemerellidae		14	
Ephemeroptera	Ephemerellidae	Attenella delantala	140	
Ephemeroptera	Ephemerellidae	Caudatella	222	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	18	
Ephemeroptera	Ephemerellidae	Drunella doddsi	215	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	54	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	4	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	75	
Ephemeroptera	Heptageniidae	Epeorus	90	
Ephemeroptera	Heptageniidae	Rhithrogena	22	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera			11	
Plecoptera	Chloroperlidae		4	
Plecoptera	Chloroperlidae	Suwallia	4	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Nemouridae	Malenka	11	
Plecoptera	Peltoperlidae		4	
Plecoptera	Peltoperlidae	Yoraperla	75	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Trichoptera	Brachycentridae	Brachycentrus americanus	47	
Trichoptera	Brachycentridae	Micrasema	22	
Trichoptera	Glossosomatidae		93	
Trichoptera	Glossosomatidae	Glossosoma	229	
Trichoptera	Hydropsychidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	29	
Trichoptera	Rhyacophilidae	Rhyacophila angelita group	32	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	14	
Class: Ostracoda			11	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			14	

Total: 53 OTU taxa			2373 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 August 2006 at station SKING-02, Silver King Creek, Upper valley, Site 2, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129088.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 523 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			7	
Class: Insecta				
Coleoptera			4	
Coleoptera	Elmidae		50	
Coleoptera	Elmidae	Heterlimnius	90	
Coleoptera	Elmidae	Heterlimnius corpulentus	4	
Coleoptera	Elmidae	Optioservus quadrimaculatus	4	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		54	
Diptera	Chironomidae	Chironominae	136	
Diptera	Chironomidae	Orthocladiinae	100	
Diptera	Empididae	Chelifera	29	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Prosimulium	11	
Diptera	Simuliidae	Simulium	129	
Ephemeroptera	Baetidae	Baetis	247	
Ephemeroptera	Baetidae	Diphetor hageni	4	
Ephemeroptera	Ephemerellidae		43	
Ephemeroptera	Ephemerellidae	Attenella delantala	122	
Ephemeroptera	Ephemerellidae	Caudatella	65	
Ephemeroptera	Ephemerellidae	Drunella	29	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	315	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	36	
Ephemeroptera	Heptageniidae	Epeorus	18	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Plecoptera	Chloroperlidae		29	
Plecoptera	Nemouridae		4	
Plecoptera	Peltoperlidae	Yoraperla	161	
Trichoptera			4	
Trichoptera	Brachycentridae	Brachycentrus americanus	18	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae		18	
Trichoptera	Glossosomatidae	Glossosoma	25	
Trichoptera	Rhyacophilidae	Rhyacophila	43	
Phylum: Platyhelminthes				
Class: Turbellaria			57	

Total: 36 OTU taxa			1875 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 August 2003 at station SKING-03, Silver King Creek, Upper Valley, Site 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129089.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 674 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			29	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			75	
Class: Insecta				
Coleoptera	Elmidae		61	
Coleoptera	Elmidae	Cleptelmis addenda	4	
Coleoptera	Elmidae	Heterlimnius	97	
Diptera	Chironomidae		22	
Diptera	Chironomidae	Chironominae	186	
Diptera	Chironomidae	Orthocladiinae	312	
Diptera	Chironomidae	Tanypodinae	14	
Diptera	Empididae	Chelifera	25	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	11	
Diptera	Simuliidae	Simulium	18	
Diptera	Tipulidae		4	
Diptera	Tipulidae	Hexatoma	11	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Baetidae	Baetis	136	
Ephemeroptera	Ephemerellidae		208	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	211	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	22	
Ephemeroptera	Heptageniidae		11	
Ephemeroptera	Heptageniidae	Cinygmula	39	
Ephemeroptera	Heptageniidae	Epeorus	43	
Ephemeroptera	Heptageniidae	Rhithrogena	18	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	43	
Plecoptera			4	
Plecoptera	Chloroperlidae	Sweltsa	14	
Plecoptera	Peltoperlidae	Yoraperla	369	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae		11	
Trichoptera			4	
Trichoptera	Brachycentridae	Brachycentrus americanus	50	
Trichoptera	Brachycentridae	Micrasema	50	
Trichoptera	Glossosomatidae		54	
Trichoptera	Glossosomatidae	Glossosoma	68	
Trichoptera	Hydropsychidae		4	
Trichoptera	Philopotamidae	Dolophilodes	4	
Trichoptera	Rhyacophilidae	Rhyacophila	4	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	29	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group	25	
Class: Ostracoda			7	
Phylum: Platyhelminthes				
Class: Turbellaria			104	

Total: 44 OTU taxa			2416 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 4 August 2004 at station SKING-03, Silver King Creek, Upper Valley, Site 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129090.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1354 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			39	
Class: Insecta				
Coleoptera	Elmidae		36	
Coleoptera	Elmidae	Heterlimnius	280	
Coleoptera	Elmidae	Heterlimnius corpulentus	36	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Helophoridae	Helophorus	4	
Coleoptera	Hydrophilidae		4	
Diptera	Ceratopogonidae	Probezzia	11	
Diptera	Chironomidae		29	
Diptera	Chironomidae	Chironominae	258	
Diptera	Chironomidae	Orthocladiinae	122	
Diptera	Chironomidae	Tanypodinae	4	
Diptera	Empididae	Chelifera	11	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Simuliidae	Simulium	158	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Hexatoma	11	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Baetidae		36	
Ephemeroptera	Baetidae	Baetis	817	
Ephemeroptera	Baetidae	Diphetor hageni	7	
Ephemeroptera	Ephemerellidae		100	
Ephemeroptera	Ephemerellidae	Attenella delantala	11	
Ephemeroptera	Ephemerellidae	Caudatella	738	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	753	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	100	
Ephemeroptera	Heptageniidae		43	
Ephemeroptera	Heptageniidae	Cinygmula	72	
Ephemeroptera	Heptageniidae	Epeorus	161	
Ephemeroptera	Heptageniidae	Rhithrogena	68	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	39	
Plecoptera	Chloroperlidae		50	
Plecoptera	Chloroperlidae	Sweltsa	11	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae	Malenka	4	
Plecoptera	Nemouridae	Zapada columbiana	7	
Plecoptera	Peltoperlidae	Yoraperla	398	
Plecoptera	Perlidae		25	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		29	
Trichoptera			25	
Trichoptera	Brachycentridae	Brachycentrus americanus	50	
Trichoptera	Brachycentridae	Micrasema	47	
Trichoptera	Glossosomatidae		25	
Trichoptera	Glossosomatidae	Glossosoma	14	
Trichoptera	Hydropsychidae		4	
Trichoptera	Hydropsychidae	Arctopsyche californica	4	
Trichoptera	Hydropsychidae	Parapsyche elsis	4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Philopotamidae		4	
Trichoptera	Philopotamidae	Dolophilodes	11	
Trichoptera	Rhyacophilidae	Rhyacophila	86	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	22	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	50	

Total: 57 OTU taxa			4853 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 10 August 2005 at station SKING-03, Silver King Creek, Upper Valley, Site 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129091.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 739 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			39	
Class: Insecta				
Coleoptera	Elmidae		14	
Coleoptera	Elmidae	Heterlimnius	147	
Coleoptera	Hydraenidae	Ochthebius	25	
Diptera	Ceratopogonidae	Probezzia	11	
Diptera	Chironomidae		61	
Diptera	Chironomidae	Chironominae	140	
Diptera	Chironomidae	Orthocladiinae	265	
Diptera	Empididae	Chelifera	7	
Diptera	Simuliidae	Prosimulium	4	
Diptera	Simuliidae	Simulium	61	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	204	
Ephemeroptera	Ephemerellidae		118	
Ephemeroptera	Ephemerellidae	Attenella delantala	36	
Ephemeroptera	Ephemerellidae	Caudatella	158	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	333	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	32	
Ephemeroptera	Ephemerellidae	Ephemerella inermis/dorothea	7	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	65	
Ephemeroptera	Heptageniidae	Epeorus	65	
Ephemeroptera	Heptageniidae	Rhithrogena	29	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera	Chloroperlidae		18	
Plecoptera	Chloroperlidae	Sweltsa	11	
Plecoptera	Leuctridae		11	
Plecoptera	Nemouridae	Malenka	11	
Plecoptera	Nemouridae	Visoka cataractae	4	
Plecoptera	Peltoperlidae		4	
Plecoptera	Peltoperlidae	Yoraperla	455	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		14	
Trichoptera			4	
Trichoptera	Brachycentridae	Brachycentrus americanus	11	
Trichoptera	Brachycentridae	Micrasema	75	
Trichoptera	Glossosomatidae		7	
Trichoptera	Glossosomatidae	Glossosoma	29	
Trichoptera	Philopotamidae		7	
Trichoptera	Rhyacophilidae	Rhyacophila	57	
Trichoptera	Rhyacophilidae	Rhyacophila arnaudi	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	14	
Trichoptera	Rhyacophilidae	Rhyacophila vagrita	4	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	39	
Trichoptera	Uenoidae	Neophylax splendens	4	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	11	

Total: 49 OTU taxa			2649 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 August 2006 at station SKING-03, Silver King Creek, Upper Valley, Site 3, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129092.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 655 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			4	
Class: Insecta				
Coleoptera	Dytiscidae	Stictotarsus	4	
Coleoptera	Elmidae		14	
Coleoptera	Elmidae	Heterlimnius	104	
Coleoptera	Hydraenidae	Hydraena	4	
Coleoptera	Hydraenidae	Ochthebius	4	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		22	
Diptera	Chironomidae	Chironominae	179	
Diptera	Chironomidae	Orthocladiinae	72	
Diptera	Chironomidae	Tanypodinae	4	
Diptera	Empididae	Chelifera	54	
Diptera	Pelecorhynchidae	Glutops	7	
Diptera	Psychodidae	Pericoma	4	
Diptera	Simuliidae	Prosimulium	7	
Diptera	Simuliidae	Simulium	32	
Diptera	Tipulidae		4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	344	
Ephemeroptera	Baetidae	Diphetor hageni	4	
Ephemeroptera	Ephemerellidae		7	
Ephemeroptera	Ephemerellidae	Attenella delantala	61	
Ephemeroptera	Ephemerellidae	Caudatella	65	
Ephemeroptera	Ephemerellidae	Drunella	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	720	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	29	
Ephemeroptera	Heptageniidae		43	
Ephemeroptera	Heptageniidae	Cinygmula	54	
Ephemeroptera	Heptageniidae	Epeorus	61	
Ephemeroptera	Heptageniidae	Rhithrogena	79	
Plecoptera	Chloroperlidae		4	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae		4	
Plecoptera	Peltoperlidae	Yoraperla	165	
Plecoptera	Perlidae	Doroneuria baumanni	14	
Plecoptera	Perlodidae		7	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Glossosomatidae	Glossosoma	36	
Trichoptera	Rhyacophilidae	Rhyacophila	39	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	11	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	7	
Phylum: Platyhelminthes				
Class: Turbellaria			39	

Total: 45 OTU taxa			2348 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 August 2003 at station SKING-04, Silver King Creek, Upper Valley, Site 4, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129093.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 660 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			11	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			39	
Class: Insecta				
Coleoptera	Elmidae		22	
Coleoptera	Elmidae	Heterlimnius	147	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		7	
Diptera	Chironomidae	Chironominae	229	
Diptera	Chironomidae	Orthocladiinae	351	
Diptera	Chironomidae	Tanypodinae	11	
Diptera	Empididae	Chelifera	36	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	4	
Diptera	Simuliidae		7	
Diptera	Simuliidae	Simulium	14	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Baetidae		29	
Ephemeroptera	Baetidae	Baetis	290	
Ephemeroptera	Ephemerellidae		179	
Ephemeroptera	Ephemerellidae	Attenella delantala	75	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	211	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	43	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	68	
Ephemeroptera	Heptageniidae	Epeorus	50	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Plecoptera			4	
Plecoptera	Chloroperlidae		7	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Nemouridae	Zapada columbiana	4	
Plecoptera	Peltoperlidae	Yoraperla	122	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		22	
Trichoptera	Brachycentridae	Brachycentrus americanus	18	
Trichoptera	Brachycentridae	Micrasema	29	
Trichoptera	Glossosomatidae		68	
Trichoptera	Glossosomatidae	Glossosoma	39	
Trichoptera	Hydropsychidae		4	
Trichoptera	Hydropsychidae	Parapsyche	4	
Trichoptera	Philopotamidae		4	
Trichoptera	Philopotamidae	Dolophilodes	4	
Trichoptera	Rhyacophilidae	Rhyacophila	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	54	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group	18	
Class: Ostracoda			11	
Phylum: Nemata			25	
Phylum: Platyhelminthes				
Class: Turbellaria			54	

Total: 48 OTU taxa			2366 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 3 August 2004 at station SKING-04, Silver King Creek, Upper Valley, Site 4, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129094.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1381 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			18	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			36	
Class: Insecta				
Coleoptera	Elmidae	Heterlimnius	427	
Coleoptera	Elmidae	Heterlimnius corpulentus	18	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Helophoridae	Helophorus	4	
Diptera	Ceratopogonidae	Probezzia	22	
Diptera	Chironomidae		14	
Diptera	Chironomidae	Chironominae	1004	
Diptera	Chironomidae	Orthocladiinae	459	
Diptera	Chironomidae	Tanypodinae	18	
Diptera	Empididae		4	
Diptera	Empididae	Chelifera	47	
Diptera	Psychodidae	Pericoma	29	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Simulium	18	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Hexatoma	7	
Ephemeroptera	Ameletidae	Ameletus	269	
Ephemeroptera	Baetidae	Baetis	871	
Ephemeroptera	Baetidae	Diphetor hageni	14	
Ephemeroptera	Ephemerellidae		43	
Ephemeroptera	Ephemerellidae	Attenella delantala	90	
Ephemeroptera	Ephemerellidae	Caudatella	86	
Ephemeroptera	Ephemerellidae	Drunella doddsi	258	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	197	
Ephemeroptera	Heptageniidae		32	
Ephemeroptera	Heptageniidae	Cinygmula	93	
Ephemeroptera	Heptageniidae	Epeorus	22	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	122	
Plecoptera	Chloroperlidae		136	
Plecoptera	Chloroperlidae	Suwallia	11	
Plecoptera	Nemouridae	Malenka	36	
Plecoptera	Peltoperlidae	Yoraperla	154	
Plecoptera	Perlidae		7	
Plecoptera	Perlidae	Doroneuria baumanni	18	
Plecoptera	Perlodidae		50	
Trichoptera			11	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Brachycentrus	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae		14	
Trichoptera	Hydropsychidae		22	
Trichoptera	Hydropsychidae	Arctopsyche grandis	4	
Trichoptera	Limnephilidae		4	
Trichoptera	Philopotamidae	Dolophilodes	4	
Trichoptera	Rhyacophilidae	Rhyacophila	47	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	47	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	32	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			104	

Total: 53 OTU taxa			4950 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 10 August 2005 at station SKING-04, Silver King Creek, Upper Valley, Site 4, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129095.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 461 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			11	
Class: Insecta				
Coleoptera	Elmidae	Heterlimnius	122	
Coleoptera	Elmidae	Heterlimnius corpulentus	57	
Coleoptera	Elmidae	Narpus concolor	4	
Diptera	Ceratopogonidae	Probezzia	7	
Diptera	Chironomidae		47	
Diptera	Chironomidae	Chironominae	115	
Diptera	Chironomidae	Orthocladiinae	161	
Diptera	Chironomidae	Tanypodinae	7	
Diptera	Empididae		4	
Diptera	Empididae	Chelifera	22	
Diptera	Simuliidae		18	
Diptera	Simuliidae	Prosimulium	4	
Diptera	Simuliidae	Simulium	22	
Diptera	Tipulidae	Antocha	7	
Diptera	Tipulidae	Hexatoma	4	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Baetidae	Baetis	161	
Ephemeroptera	Ephemerellidae		18	
Ephemeroptera	Ephemerellidae	Attenella delantala	93	
Ephemeroptera	Ephemerellidae	Caudatella	32	
Ephemeroptera	Ephemerellidae	Drunella	22	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	276	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Heptageniidae	Cinygmula	29	
Ephemeroptera	Heptageniidae	Epeorus	18	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Plecoptera			4	
Plecoptera	Chloroperlidae		4	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Leuctridae		4	
Plecoptera	Peltoperlidae	Yoraperla	97	
Plecoptera	Perlidae		11	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Trichoptera			4	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Brachycentrus	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	7	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Glossosomatidae		11	
Trichoptera	Glossosomatidae	Glossosoma	32	
Trichoptera	Rhyacophilidae	Rhyacophila	57	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	43	
Class: Ostracoda			11	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	22	

Total: 48 OTU taxa			1652 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 August 2006 at station SKING-04, Silver King Creek, Upper Valley, Site 4, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129096.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 261 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			4	
Class: Insecta				
Coleoptera	Elmidae	Heterlimnius	68	
Coleoptera	Elmidae	Heterlimnius corpulentus	4	
Coleoptera	Hydraenidae	Hydraena	4	
Diptera	Chironomidae		11	
Diptera	Chironomidae	Chironominae	79	
Diptera	Chironomidae	Orthocladiinae	36	
Diptera	Dixidae	Dixa	4	
Diptera	Empididae		4	
Diptera	Simuliidae	Prosimulium	14	
Diptera	Simuliidae	Simulium	36	
Ephemeroptera	Baetidae	Baetis	151	
Ephemeroptera	Ephemerellidae	Attenella delantala	104	
Ephemeroptera	Ephemerellidae	Caudatella	4	
Ephemeroptera	Ephemerellidae	Drunella	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	140	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Heptageniidae	Cinygmula	32	
Ephemeroptera	Heptageniidae	Epeorus	29	
Ephemeroptera	Heptageniidae	Rhithrogena	18	
Plecoptera	Chloroperlidae		4	
Plecoptera	Leuctridae		4	
Plecoptera	Peltoperlidae	Yoraperla	32	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		7	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Brachycentrus americanus	29	
Trichoptera	Glossosomatidae	Glossosoma	11	
Trichoptera	Rhyacophilidae	Rhyacophila	36	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group a	4	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	47	

Total: 31 OTU taxa			935 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 August 2003 at station SKING-05, Silver King Creek, Lower Valley, Site 5, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129097.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 353 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			36	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			18	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Heterlimnius	68	
Coleoptera	Elmidae	Optioservus	4	
Diptera	Ceratopogonidae	Probezzia	32	
Diptera	Chironomidae	Chironominae	29	
Diptera	Chironomidae	Orthocladiinae	100	
Diptera	Pelecorhynchidae	Glutops	4	
Diptera	Psychodidae	Pericoma	4	
Diptera	Simuliidae	Simulium	4	
Diptera	Tipulidae	Antocha	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	194	
Ephemeroptera	Ephemerellidae		7	
Ephemeroptera	Ephemerellidae	Attenella delantala	36	
Ephemeroptera	Ephemerellidae	Drunella doddsi	43	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	39	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	50	
Ephemeroptera	Heptageniidae	Epeorus	22	
Ephemeroptera	Heptageniidae	Rhithrogena	11	
Plecoptera	Chloroperlidae		4	
Plecoptera	Peltoperlidae	Yoraperla	104	
Plecoptera	Perlidae		4	
Plecoptera	Perlodidae		11	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Brachycentrus americanus	287	
Trichoptera	Brachycentridae	Micrasema	36	
Trichoptera	Glossosomatidae		29	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Hydropsychidae		7	
Trichoptera	Hydropsychidae	Arctopsyche grandis	4	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Philopotamidae	Dolophilodes	7	
Trichoptera	Philopotamidae	Wormaldia	4	
Trichoptera	Rhyacophilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	11	
Phylum: Platyhelminthes				
Class: Turbellaria			25	

Total: 40 OTU taxa			1265 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 3 August 2004 at station SKING-05, Silver King Creek, Lower Valley, Site 5, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129098.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 936 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			50	
Class: Insecta				
Coleoptera	Elmidae		39	
Coleoptera	Elmidae	Cleptelmis addenda	4	
Coleoptera	Elmidae	Heterlimnius	165	
Coleoptera	Elmidae	Heterlimnius corpulentus	14	
Coleoptera	Elmidae	Narpus concolor	7	
Coleoptera	Elmidae	Optioservus	7	
Coleoptera	Elmidae	Optioservus quadrimaculatus	18	
Diptera	Athericidae	Atherix pachypus	11	
Diptera	Ceratopogonidae	Probezzia	43	
Diptera	Chironomidae		4	
Diptera	Chironomidae	Chironominae	7	
Diptera	Chironomidae	Orthocladiinae	237	
Diptera	Chironomidae	Tanypodinae	7	
Diptera	Psychodidae	Pericoma	4	
Diptera	Simuliidae	Simulium	32	
Diptera	Tipulidae	Hexatoma	7	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Ameletidae	Ameletus	115	
Ephemeroptera	Baetidae		133	
Ephemeroptera	Baetidae	Baetis	717	
Ephemeroptera	Ephemerellidae		36	
Ephemeroptera	Ephemerellidae	Attenella delantala	54	
Ephemeroptera	Ephemerellidae	Caudatella	186	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	244	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	312	
Ephemeroptera	Ephemerellidae	Serratella	7	
Ephemeroptera	Heptageniidae		100	
Ephemeroptera	Heptageniidae	Cinygmula	75	
Ephemeroptera	Heptageniidae	Epeorus	25	
Ephemeroptera	Heptageniidae	Rhithrogena	151	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera	Chloroperlidae		36	
Plecoptera	Chloroperlidae	Suwallia	22	
Plecoptera	Chloroperlidae	Sweltsa	14	
Plecoptera	Nemouridae	Malenka	14	
Plecoptera	Peltoperlidae		4	
Plecoptera	Peltoperlidae	Yoraperla	108	
Plecoptera	Perlidae		18	
Plecoptera	Perlidae	Doroneuria baumanni	11	
Plecoptera	Perlodidae		25	
Plecoptera	Perlodidae	Oroperla barbara	11	
Trichoptera	Brachycentridae	Brachycentrus americanus	47	
Trichoptera	Brachycentridae	Micrasema	86	
Trichoptera	Glossosomatidae		4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Hydropsychidae		18	
Trichoptera	Hydropsychidae	Arctopsyche	39	
Trichoptera	Hydropsychidae	Arctopsyche californica	7	
Trichoptera	Hydropsychidae	Arctopsyche grandis	11	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Philopotamidae	Dolophilodes	7	
Trichoptera	Rhyacophilidae		7	
Trichoptera	Rhyacophilidae	Rhyacophila	7	
Trichoptera	Rhyacophilidae	Rhyacophila arnaudi	22	
Trichoptera	Rhyacophilidae	Rhyacophila verrula group	4	
Class: Ostracoda			4	

Total: 58 OTU taxa			3355 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 August 2005 at station SKING-05, Silver King Creek, Lower Valley, Site 5, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129099.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 287 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			4	
Class: Insecta				
Coleoptera	Elmidae	Heterlimnius	82	
Coleoptera	Elmidae	Heterlimnius corpulentus	14	
Diptera	Ceratopogonidae	Probezzia	11	
Diptera	Chironomidae		11	
Diptera	Chironomidae	Chironominae	18	
Diptera	Chironomidae	Orthocladiinae	204	
Diptera	Chironomidae	Tanypodinae	7	
Diptera	Simuliidae	Simulium	18	
Ephemeroptera	Baetidae	Baetis	32	
Ephemeroptera	Ephemerellidae		4	
Ephemeroptera	Ephemerellidae	Attenella delantala	72	
Ephemeroptera	Ephemerellidae	Caudatella	11	
Ephemeroptera	Ephemerellidae	Drunella	18	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	90	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Ephemerellidae	Serratella	7	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	14	
Ephemeroptera	Heptageniidae	Epeorus	36	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Plecoptera			4	
Plecoptera	Chloroperlidae		22	
Plecoptera	Chloroperlidae	Suwallia	7	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Peltoperlidae	Yoraperla	54	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae		4	
Trichoptera	Brachycentridae	Brachycentrus americanus	14	
Trichoptera	Brachycentridae	Micrasema	29	
Trichoptera	Glossosomatidae		47	
Trichoptera	Glossosomatidae	Glossosoma	47	
Trichoptera	Hydropsychidae		7	
Trichoptera	Philopotamidae	Dolophilodes	7	
Trichoptera	Rhyacophilidae	Rhyacophila	47	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	11	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	22	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	7	

Total: 40 OTU taxa			1029 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2006 at station SKING-05, Silver King Creek, Lower Valley, Site 5, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129100.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 324 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			14	
Class: Insecta				
Coleoptera	Elmidae		7	
Coleoptera	Elmidae	Heterlimnius	36	
Coleoptera	Elmidae	Heterlimnius corpulentus	14	
Diptera	Athericidae	Atherix pachypus	4	
Diptera	Ceratopogonidae		7	
Diptera	Ceratopogonidae	Probezzia	11	
Diptera	Chironomidae		7	
Diptera	Chironomidae	Chironominae	25	
Diptera	Chironomidae	Orthocladiinae	111	
Diptera	Chironomidae	Tanypodinae	4	
Diptera	Simuliidae	Simulium	39	
Ephemeroptera	Baetidae	Baetis	301	
Ephemeroptera	Baetidae	Diphetor hageni	4	
Ephemeroptera	Ephemerellidae		7	
Ephemeroptera	Ephemerellidae	Attenella delantala	47	
Ephemeroptera	Ephemerellidae	Caudatella	7	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	18	
Ephemeroptera	Ephemerellidae	Drunella doddsi	183	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	7	
Ephemeroptera	Heptageniidae		14	
Ephemeroptera	Heptageniidae	Cinygmula	54	
Ephemeroptera	Heptageniidae	Epeorus	32	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Plecoptera	Chloroperlidae	Suwallia	4	
Plecoptera	Peltoperlidae	Yoraperla	72	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		14	
Trichoptera	Brachycentridae	Brachycentrus americanus	22	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Philopotamidae	Dolophilodes	7	
Trichoptera	Rhyacophilidae	Rhyacophila	36	
Trichoptera	Rhyacophilidae	Rhyacophila angelita group	4	
Trichoptera	Rhyacophilidae	Rhyacophila arnaudi	7	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group c	11	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	7	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	

Total: 38 OTU taxa			1161 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 August 2003 at station SKING-06, Silver King Creek, Lower Valley, Site 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129101.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1083 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			18	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			65	
Class: Insecta				
Coleoptera	Elmidae		11	
Coleoptera	Elmidae	Cleptelmis addenda	39	
Coleoptera	Elmidae	Heterlimnius	97	
Coleoptera	Elmidae	Heterlimnius corpulentus	18	
Coleoptera	Elmidae	Optioservus	11	
Diptera	Ceratopogonidae	Probezzia	7	
Diptera	Chironomidae		11	
Diptera	Chironomidae	Chironominae	577	
Diptera	Chironomidae	Orthocladiinae	366	
Diptera	Empididae	Chelifera	11	
Diptera	Psychodidae	Pericoma	7	
Diptera	Simuliidae	Simulium	82	
Diptera	Tipulidae	Antocha	11	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	548	
Ephemeroptera	Ephemerellidae		158	
Ephemeroptera	Ephemerellidae	Attenella delantala	18	
Ephemeroptera	Ephemerellidae	Drunella doddsi	158	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	90	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	39	
Ephemeroptera	Heptageniidae	Epeorus	61	
Ephemeroptera	Heptageniidae	Rhithrogena	18	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera	Chloroperlidae		14	
Plecoptera	Peltoperlidae	Yoraperla	254	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae		14	
Trichoptera	Brachycentridae	Brachycentrus americanus	280	
Trichoptera	Brachycentridae	Micrasema	509	
Trichoptera	Glossosomatidae		36	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Hydropsychidae		129	
Trichoptera	Hydropsychidae	Arctopsyche	7	
Trichoptera	Philopotamidae		4	
Trichoptera	Philopotamidae	Dolophilodes	32	
Trichoptera	Rhyacophilidae	Rhyacophila	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	57	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group	18	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Class: Gastropoda			4	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			68	

Total: 46 OTU taxa			3882 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 2 August 2004 at station SKING-06, Silver King Creek, Lower Valley, Site 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129102.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 687 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			43	
Class: Insecta				
Coleoptera	Elmidae		7	
Coleoptera	Elmidae	Cleptelmis addenda	7	
Coleoptera	Elmidae	Heterlimnius	97	
Coleoptera	Elmidae	Heterlimnius corpulentus	7	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Elmidae	Optioservus	7	
Diptera	Chironomidae	Chironominae	165	
Diptera	Chironomidae	Orthocladiinae	179	
Diptera	Empididae	Chelifera	7	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Prosimulium	11	
Diptera	Simuliidae	Simulium	93	
Diptera	Tipulidae	Dicranota	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	452	
Ephemeroptera	Baetidae	Diphetor hageni	4	
Ephemeroptera	Ephemerellidae		61	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Caudatella	179	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	61	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	29	
Ephemeroptera	Ephemerellidae	Drunella doddsi	176	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	104	
Ephemeroptera	Ephemerellidae	Serratella tibialis	7	
Ephemeroptera	Heptageniidae		43	
Ephemeroptera	Heptageniidae	Cinygmula	54	
Ephemeroptera	Heptageniidae	Epeorus	36	
Ephemeroptera	Heptageniidae	Rhithrogena	72	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	22	
Plecoptera	Chloroperlidae		57	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Nemouridae	Malenka	7	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Nemouridae	Zapada columbiana	14	
Plecoptera	Peltoperlidae	Yoraperla	25	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae		22	
Trichoptera	Brachycentridae	Brachycentrus americanus	39	
Trichoptera	Brachycentridae	Micrasema	161	
Trichoptera	Hydropsychidae		29	
Trichoptera	Hydropsychidae	Arctopsyche	57	
Trichoptera	Hydropsychidae	Arctopsyche grandis	4	
Trichoptera	Philopotamidae	Dolophilodes	4	
Trichoptera	Rhyacophilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	22	
Trichoptera	Rhyacophilidae	Rhyacophila arnaudi	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	43	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 51 OTU taxa			2462 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 August 2005 at station SKING-06, Silver King Creek, Lower Valley, Site 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129103.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 631 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			11	
Class: Insecta				
Coleoptera	Elmidae		39	
Coleoptera	Elmidae	Heterlimnius	111	
Coleoptera	Elmidae	Heterlimnius corpulentus	4	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Elmidae	Optioservus	7	
Coleoptera	Elmidae	Optioservus divergens/pecosensis	4	
Diptera	Ceratopogonidae	Probezzia	11	
Diptera	Chironomidae		22	
Diptera	Chironomidae	Chironominae	194	
Diptera	Chironomidae	Orthocladiinae	254	
Diptera	Simuliidae		7	
Diptera	Simuliidae	Simulium	409	
Diptera	Tipulidae	Antocha	4	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Baetidae		4	
Ephemeroptera	Baetidae	Baetis	18	
Ephemeroptera	Ephemerellidae		14	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Caudatella	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	29	
Ephemeroptera	Ephemerellidae	Drunella doddsi	240	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	79	
Ephemeroptera	Ephemerellidae	Serratella	11	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	7	
Ephemeroptera	Heptageniidae	Epeorus	61	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera			7	
Plecoptera	Chloroperlidae		18	
Plecoptera	Chloroperlidae	Suwallia	7	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Leuctridae		4	
Plecoptera	Peltoperlidae	Yoraperla	219	
Trichoptera			22	
Trichoptera	Brachycentridae	Brachycentrus americanus	18	
Trichoptera	Brachycentridae	Micrasema	240	
Trichoptera	Glossosomatidae		32	
Trichoptera	Glossosomatidae	Glossosoma	22	
Trichoptera	Lepidostomatidae	Lepidostoma	11	
Trichoptera	Polycentropodidae	Polycentropus	14	
Trichoptera	Rhyacophilidae	Rhyacophila	4	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	36	
Trichoptera	Uenoidae	Farula	4	
Phylum: Nemata			4	

Total: 48 OTU taxa			2262 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2006 at station SKING-06, Silver King Creek, Lower Valley, Site 6, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129104.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 681 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			22	
Class: Insecta				
Coleoptera	Elmidae	Cleptelmis addenda	7	
Coleoptera	Elmidae	Heterlimnius	104	
Coleoptera	Elmidae	Heterlimnius corpulentus	7	
Coleoptera	Elmidae	Narpus concolor	4	
Coleoptera	Hydraenidae	Hydraena	7	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		25	
Diptera	Chironomidae	Chironominae	54	
Diptera	Chironomidae	Orthocladiinae	384	
Diptera	Simuliidae	Simulium	548	
Diptera	Tipulidae	Antocha	14	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Baetidae	Baetis	380	
Ephemeroptera	Ephemerellidae		7	
Ephemeroptera	Ephemerellidae	Attenella delantala	32	
Ephemeroptera	Ephemerellidae	Caudatella	204	
Ephemeroptera	Ephemerellidae	Drunella	39	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	136	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	25	
Ephemeroptera	Heptageniidae	Cinygmula	7	
Ephemeroptera	Heptageniidae	Epeorus	50	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Megaloptera	Sialidae	Sialis	4	
Plecoptera			4	
Plecoptera	Chloroperlidae		11	
Plecoptera	Nemouridae	Zapada	7	
Plecoptera	Peltoperlidae	Yoraperla	90	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		36	
Trichoptera	Brachycentridae	Brachycentrus americanus	25	
Trichoptera	Brachycentridae	Micrasema	111	
Trichoptera	Glossosomatidae	Glossosoma	11	
Trichoptera	Hydropsychidae	Arctopsyche grandis	7	
Trichoptera	Philopotamidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	18	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	18	

Total: 39 OTU taxa			2441 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 August 2003 at station SKING-07, Silver King Creek, Long Valley, Site 7, Alpine County, California . The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129105. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 720 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			50	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			43	
Class: Insecta				
Coleoptera	Curculionidae		4	
Coleoptera	Elmidae	Heterlimnius	14	
Coleoptera	Elmidae	Optioservus	7	
Diptera	Athericidae	Atherix pachypus	25	
Diptera	Ceratopogonidae	Probezzia	11	
Diptera	Chironomidae		7	
Diptera	Chironomidae	Chironominae	265	
Diptera	Chironomidae	Orthocladiinae	186	
Diptera	Simuliidae		7	
Diptera	Simuliidae	Simulium	29	
Diptera	Tipulidae	Antocha	4	
Ephemeroptera	Baetidae	Baetis	814	
Ephemeroptera	Ephemerellidae		97	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	215	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	68	
Ephemeroptera	Ephemerellidae	Serratella tibialis	7	
Ephemeroptera	Heptageniidae		18	
Ephemeroptera	Heptageniidae	Cinygmula	4	
Ephemeroptera	Heptageniidae	Epeorus	262	
Ephemeroptera	Heptageniidae	Rhithrogena	104	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera	Chloroperlidae		29	
Plecoptera	Chloroperlidae	Suwallia	7	
Plecoptera	Nemouridae		4	
Plecoptera	Peltoperlidae	Yoraperla	29	
Plecoptera	Perlodidae		4	
Plecoptera	Perlodidae	Oroperla barbara	4	
Trichoptera	Brachycentridae	Micrasema	118	
Trichoptera	Glossosomatidae		18	
Trichoptera	Hydropsychidae		11	
Trichoptera	Philopotamidae		14	
Trichoptera	Philopotamidae	Dolophilodes	29	
Trichoptera	Rhyacophilidae	Rhyacophila	7	
Phylum: Nemata			11	
Phylum: Platyhelminthes				
Class: Turbellaria			36	

Total: 39 OTU taxa			2581 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 2 August 2004 at station SKING-07, Silver King Creek, Long Valley, Site 7, Alpine County, California . The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129106. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 430 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			50	
Class: Insecta				
Coleoptera	Elmidae	Optioservus	7	
Diptera	Athericidae	Atherix pachypus	32	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		7	
Diptera	Chironomidae	Chironominae	140	
Diptera	Chironomidae	Orthocladiinae	75	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Simulium	7	
Diptera	Tipulidae		4	
Diptera	Tipulidae	Antocha	11	
Diptera	Tipulidae	Hexatoma	4	
Diptera	Tipulidae	Limnophila	4	
Ephemeroptera	Baetidae		36	
Ephemeroptera	Baetidae	Baetis	265	
Ephemeroptera	Ephemerellidae		36	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Caudatella	215	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	18	
Ephemeroptera	Ephemerellidae	Drunella doddsi	151	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	29	
Ephemeroptera	Ephemerellidae	Serratella	4	
Ephemeroptera	Heptageniidae		54	
Ephemeroptera	Heptageniidae	Cinygmula	4	
Ephemeroptera	Heptageniidae	Epeorus	93	
Ephemeroptera	Heptageniidae	Rhithrogena	100	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	18	
Plecoptera	Chloroperlidae		36	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Nemouridae	Malenka	4	
Plecoptera	Nemouridae	Visoka cataractae	4	
Plecoptera	Peltoperlidae	Yoraperla	4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae		4	
Plecoptera	Perlodidae	Megarcys	4	
Trichoptera			4	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Micrasema	50	
Trichoptera	Hydropsychidae		14	
Trichoptera	Hydropsychidae	Arctopsyche grandis	4	
Trichoptera	Rhyacophilidae	Rhyacophila	11	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group a	4	
Phylum: Platyhelminthes				
Class: Turbellaria			11	

Total: 44 OTU taxa			1541 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 August 2005 at station SKING-07, Silver King Creek, Long Valley, Site 7, Alpine County, California . The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129107. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 245 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			14	
Class: Insecta				
Coleoptera	Dytiscidae	Oreodytes	4	
Diptera	Chironomidae	Chironominae	25	
Diptera	Chironomidae	Orthocladiinae	18	
Diptera	Simuliidae	Simulium	419	
Ephemeroptera	Baetidae	Baetis	54	
Ephemeroptera	Ephemerellidae		11	
Ephemeroptera	Ephemerellidae	Attenella attenuata group	11	
Ephemeroptera	Ephemerellidae	Attenella delantala	29	
Ephemeroptera	Ephemerellidae	Caudatella	18	
Ephemeroptera	Ephemerellidae	Caudatella heterocaudata	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	4	
Ephemeroptera	Ephemerellidae	Drunella doddsi	61	
Ephemeroptera	Heptageniidae		7	
Ephemeroptera	Heptageniidae	Epeorus	43	
Ephemeroptera	Heptageniidae	Rhithrogena	7	
Plecoptera	Chloroperlidae		22	
Plecoptera	Chloroperlidae	Suwallia	14	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Peltoperlidae	Yoraperla	25	
Plecoptera	Perlidae	Claassenia sabulosa	4	
Trichoptera	Brachycentridae	Micrasema	47	
Trichoptera	Glossosomatidae		11	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Rhyacophilidae	Rhyacophila	11	
Trichoptera	Rhyacophilidae	Rhyacophila angelita group	7	

Total: 26 OTU taxa			878 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2006 at station SKING-07, Silver King Creek, Long Valley, Site 7, Alpine County, California . The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129108. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 526 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			22	
Class: Insecta				
Coleoptera	Elmidae	Cleptelmis addenda	7	
Coleoptera	Hydraenidae	Hydraena	4	
Diptera	Athericidae	Atherix pachypus	57	
Diptera	Chironomidae		43	
Diptera	Chironomidae	Chironominae	32	
Diptera	Chironomidae	Orthocladiinae	237	
Diptera	Chironomidae	Tanypodinae	4	
Diptera	Simuliidae	Prosimulium	4	
Diptera	Simuliidae	Simulium	283	
Diptera	Tipulidae	Antocha	22	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	566	
Ephemeroptera	Ephemerellidae		18	
Ephemeroptera	Ephemerellidae	Attenella delantala	32	
Ephemeroptera	Ephemerellidae	Caudatella	57	
Ephemeroptera	Ephemerellidae	Caudatella heterocaudata	7	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	29	
Ephemeroptera	Ephemerellidae	Drunella doddsi	161	
Ephemeroptera	Ephemerellidae	Serratella tibialis	4	
Ephemeroptera	Heptageniidae		11	
Ephemeroptera	Heptageniidae	Cinygmula	4	
Ephemeroptera	Heptageniidae	Epeorus	68	
Ephemeroptera	Leptohyphidae	Tricorythodes minutus	4	
Plecoptera	Chloroperlidae		7	
Plecoptera	Peltoperlidae	Yoraperla	82	
Plecoptera	Perlodidae		25	
Plecoptera	Perlodidae	Oroperla barbara	4	
Trichoptera			7	
Trichoptera	Brachycentridae	Micrasema	32	
Trichoptera	Glossosomatidae		4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Hydropsychidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	4	
Trichoptera	Rhyacophilidae	Rhyacophila angelita group	7	
Trichoptera	Rhyacophilidae	Rhyacophila arnaudi	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Phylum: Platyhelminthes				
Class: Turbellaria			18	

Total: 38 OTU taxa			1885 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 5 August 2003 at station SKING-08, Silver King Creek, Long Valley, Site 8, Alpine County, California . The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129109. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1196 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			50	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			18	
Class: Insecta				
Coleoptera	Elmidae		22	
Coleoptera	Elmidae	Cleptelmis addenda	11	
Coleoptera	Elmidae	Heterlimnius	18	
Coleoptera	Elmidae	Heterlimnius corpulentus	4	
Coleoptera	Elmidae	Optioservus	14	
Diptera	Athericidae	Atherix pachypus	54	
Diptera	Ceratopogonidae	Probezzia	25	
Diptera	Chironomidae		7	
Diptera	Chironomidae	Chironominae	262	
Diptera	Chironomidae	Orthocladiinae	409	
Diptera	Psychodidae	Pericoma	7	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Simulium	262	
Diptera	Tipulidae	Antocha	14	
Diptera	Tipulidae	Hexatoma	4	
Diptera	Tipulidae	Rhabdomastix	4	
Ephemeroptera	Baetidae		4	
Ephemeroptera	Baetidae	Baetis	1240	
Ephemeroptera	Ephemerellidae		333	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	190	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	72	
Ephemeroptera	Ephemerellidae	Serratella tibialis	11	
Ephemeroptera	Heptageniidae		11	
Ephemeroptera	Heptageniidae	Cinygmula	4	
Ephemeroptera	Heptageniidae	Epeorus	122	
Ephemeroptera	Heptageniidae	Rhithrogena	57	
Plecoptera	Chloroperlidae		7	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Peltoperlidae	Yoraperla	43	
Plecoptera	Perlidae		11	
Plecoptera	Perlodidae	Megarcys	4	
Trichoptera			4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Brachycentridae	Micrasema	885	
Trichoptera	Glossosomatidae		4	
Trichoptera	Hydropsychidae		4	
Trichoptera	Philopotamidae	Dolophilodes	7	
Trichoptera	Rhyacophilidae	Rhyacophila arnaudi	22	
Phylum: Nemata			11	
Phylum: Platyhelminthes				
Class: Turbellaria			32	

Total: 44 OTU taxa			4287 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 2 August 2004 at station SKING-08, Silver King Creek, Long Valley, Site 8, Alpine County, California . The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129110. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 918 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			36	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			29	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Cleptelmis addenda	14	
Coleoptera	Elmidae	Heterlimnius	7	
Coleoptera	Elmidae	Heterlimnius corpulentus	4	
Coleoptera	Elmidae	Optioservus	36	
Coleoptera	Elmidae	Optioservus quadrimaculatus	18	
Diptera	Athericidae	Atherix pachypus	50	
Diptera	Ceratopogonidae		4	
Diptera	Ceratopogonidae	Probezzia	18	
Diptera	Chironomidae		7	
Diptera	Chironomidae	Chironominae	161	
Diptera	Chironomidae	Orthocladiinae	158	
Diptera	Psychodidae	Pericoma	11	
Diptera	Simuliidae	Simulium	57	
Diptera	Tipulidae	Antocha	11	
Ephemeroptera	Baetidae		25	
Ephemeroptera	Baetidae	Baetis	391	
Ephemeroptera	Baetidae	Diphetor hageni	4	
Ephemeroptera	Ephemerellidae		186	
Ephemeroptera	Ephemerellidae	Caudatella	477	
Ephemeroptera	Ephemerellidae	Caudatella heterocaudata	7	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	18	
Ephemeroptera	Ephemerellidae	Drunella doddsi	380	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	65	
Ephemeroptera	Ephemerellidae	Serratella	18	
Ephemeroptera	Ephemerellidae	Serratella tibialis	25	
Ephemeroptera	Heptageniidae		79	
Ephemeroptera	Heptageniidae	Epeorus	172	
Ephemeroptera	Heptageniidae	Rhithrogena	244	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	50	
Plecoptera	Chloroperlidae		25	
Plecoptera	Chloroperlidae	Suwallia	4	
Plecoptera	Chloroperlidae	Sweltsa	14	
Plecoptera	Nemouridae	Malenka	11	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Peltoperlidae	Yoraperla	50	
Plecoptera	Perlidae		14	
Plecoptera	Perlidae	Doroneuria baumanni	11	
Plecoptera	Perlodidae		7	
Plecoptera	Perlodidae	Oroperla barbara	11	
Trichoptera			4	
Trichoptera	Brachycentridae	Brachycentrus americanus	4	
Trichoptera	Brachycentridae	Micrasema	265	
Trichoptera	Glossosomatidae		4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Hydropsychidae	Arctopsyche grandis	4	
Trichoptera	Lepidostomatidae	Lepidostoma	4	
Trichoptera	Rhyacophilidae	Rhyacophila	4	
Class: Ostracoda			4	
Phylum: Mollusca				
Class: Bivalvia				
Veneroida	Pisidiidae	Pisidium	4	
Phylum: Platyhelminthes				
Class: Turbellaria			79	

Total: 53 OTU taxa			3290 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 9 August 2005 at station SKING-08, Silver King Creek, Long Valley, Site 8, Alpine County, California . The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129111. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 386 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			4	
Class: Insecta				
Coleoptera	Elmidae		7	
Coleoptera	Elmidae	Optioservus	4	
Diptera	Ceratopogonidae	Probezzia	7	
Diptera	Ceratopogonidae	Forcipomyia	4	
Diptera	Chironomidae		7	
Diptera	Chironomidae	Chironominae	11	
Diptera	Chironomidae	Orthocladiinae	158	
Diptera	Simuliidae	Simulium	294	
Diptera	Simuliidae	Simulium tuberosum complex	4	
Diptera	Tipulidae		4	
Diptera	Tipulidae	Antocha	7	
Ephemeroptera	Baetidae	Baetis	294	
Ephemeroptera	Ephemerellidae		4	
Ephemeroptera	Ephemerellidae	Attenella delantala	4	
Ephemeroptera	Ephemerellidae	Caudatella	14	
Ephemeroptera	Ephemerellidae	Caudatella heterocaudata	4	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	79	
Ephemeroptera	Ephemerellidae	Drunella	7	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	154	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	7	
Ephemeroptera	Ephemerellidae	Serratella	4	
Ephemeroptera	Ephemerellidae	Serratella tibialis	4	
Ephemeroptera	Heptageniidae	Epeorus	143	
Ephemeroptera	Heptageniidae	Rhithrogena	14	
Plecoptera	Chloroperlidae		14	
Plecoptera	Chloroperlidae	Suwallia	7	
Plecoptera	Peltoperlidae	Yoraperla	11	
Trichoptera			7	
Trichoptera	Brachycentridae	Micrasema	57	
Trichoptera	Glossosomatidae		25	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Hydropsychidae	Arctopsyche californica	4	

Total: 34 OTU taxa			1384	individuals

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2006 at station SKING-08, Silver King Creek, Long Valley, Site 8, Alpine County, California . The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129112. The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 608 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			39	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Cleptelmis addenda	7	
Coleoptera	Elmidae	Heterlimnius	7	
Coleoptera	Elmidae	Optioservus	32	
Coleoptera	Elmidae	Optioservus quadrimaculatus	11	
Diptera	Athericidae	Atherix pachypus	7	
Diptera	Chironomidae		4	
Diptera	Chironomidae	Chironominae	90	
Diptera	Chironomidae	Orthocladiinae	165	
Diptera	Simuliidae	Simulium	39	
Diptera	Tipulidae	Antocha	65	
Diptera	Tipulidae	Rhabdomastix	7	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae		11	
Ephemeroptera	Baetidae	Baetis	889	
Ephemeroptera	Ephemerellidae		14	
Ephemeroptera	Ephemerellidae	Attenella delantala	25	
Ephemeroptera	Ephemerellidae	Caudatella	118	
Ephemeroptera	Ephemerellidae	Drunella	86	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	32	
Ephemeroptera	Ephemerellidae	Drunella doddsi	100	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	4	
Ephemeroptera	Heptageniidae		36	
Ephemeroptera	Heptageniidae	Cinygmula	11	
Ephemeroptera	Heptageniidae	Epeorus	79	
Ephemeroptera	Heptageniidae	Rhithrogena	22	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Megaloptera	Sialidae	Sialis	4	
Plecoptera	Chloroperlidae		29	
Plecoptera	Nemouridae	Malenka	4	
Plecoptera	Peltoperlidae	Yoraperla	90	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	11	
Plecoptera	Perlodidae		7	
Plecoptera	Perlodidae	Oroperla barbara	4	
Trichoptera			7	
Trichoptera	Brachycentridae	Brachycentrus	4	
Trichoptera	Brachycentridae	Micrasema	43	
Trichoptera	Glossosomatidae		14	
Trichoptera	Glossosomatidae	Glossosoma	7	
Trichoptera	Hydropsychidae		22	
Trichoptera	Rhyacophilidae	Rhyacophila	14	
Class: Malacostraca				
Amphipoda	Hyalellidae	Hyalella azteca	4	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 45 OTU taxa			2179 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 7 August 2003 at station TAMAC-13, Tamarack Creek, Upper Site, never treated, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129113.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 819 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			50	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			100	
Class: Insecta				
Coleoptera	Elmidae	Optioservus	4	
Diptera	Ceratopogonidae	Probezzia	14	
Diptera	Chironomidae		25	
Diptera	Chironomidae	Chironominae	97	
Diptera	Chironomidae	Orthocladiinae	244	
Diptera	Chironomidae	Tanypodinae	7	
Diptera	Empididae	Chelifera	25	
Diptera	Empididae	Oreogeton	11	
Diptera	Pelecorhynchidae	Glutops	7	
Diptera	Simuliidae		7	
Diptera	Simuliidae	Prosimulium	14	
Diptera	Simuliidae	Simulium	308	
Diptera	Tipulidae	Dicranota	4	
Diptera	Tipulidae	Pedicia	4	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	136	
Ephemeroptera	Ephemerellidae		118	
Ephemeroptera	Ephemerellidae	Drunella doddsi	39	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	43	
Ephemeroptera	Heptageniidae	Cinygmula	97	
Ephemeroptera	Heptageniidae	Epeorus	11	
Ephemeroptera	Heptageniidae	Rhithrogena	4	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera	Chloroperlidae		7	
Plecoptera	Nemouridae	Visoka cataractae	7	
Plecoptera	Nemouridae	Zapada columbiana	32	
Plecoptera	Peltoperlidae	Yoraperla	1100	
Plecoptera	Perlodidae		65	
Plecoptera	Taeniopterygidae		7	
Trichoptera			7	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Limnephilidae	Cryptochia	4	
Trichoptera	Rhyacophilidae		11	
Trichoptera	Rhyacophilidae	Rhyacophila	47	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	43	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group	32	
Trichoptera	Uenoidae	Neothremma	7	
Phylum: Nemata			18	
Phylum: Platyhelminthes				
Class: Turbellaria			161	

Total: 41 OTU taxa			2935	individuals

Taxonomic list and abundances of aquatic invertebrates collected 4 August 2004 at station TAMAC-13, Tamarack Creek, Upper Site, never treated, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129114.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 775 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			4	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			86	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Heterlimnius	18	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		36	
Diptera	Chironomidae	Chironominae	82	
Diptera	Chironomidae	Orthocladiinae	104	
Diptera	Empididae		4	
Diptera	Empididae	Chelifera	4	
Diptera	Pelecorhynchidae	Glutops	11	
Diptera	Simuliidae	Simulium	168	
Ephemeroptera	Baetidae	Baetis	194	
Ephemeroptera	Baetidae	Diphetor hageni	4	
Ephemeroptera	Ephemerellidae		154	
Ephemeroptera	Ephemerellidae	Attenella delantala	22	
Ephemeroptera	Ephemerellidae	Caudatella	136	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	312	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	111	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	75	
Ephemeroptera	Heptageniidae	Epeorus	47	
Ephemeroptera	Heptageniidae	Rhithrogena	65	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4	
Plecoptera			11	
Plecoptera	Chloroperlidae		7	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Leuctridae		11	
Plecoptera	Nemouridae	Malenka	7	
Plecoptera	Nemouridae	Zapada	14	
Plecoptera	Nemouridae	Zapada columbiana	11	
Plecoptera	Peltoperlidae	Yoraperla	835	
Plecoptera	Perlidae		4	
Plecoptera	Perlidae	Doroneuria baumanni	4	
Plecoptera	Perlodidae		32	
Trichoptera	Apataniidae	Pedomoecus sierra	4	
Trichoptera	Brachycentridae	Micrasema	11	
Trichoptera	Hydropsychidae	Parapsyche elsis	4	
Trichoptera	Hydroptilidae		4	
Trichoptera	Rhyacophilidae	Rhyacophila	47	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	39	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila verrula group	4	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	43	
Trichoptera	Uenoidae	Neophylax	4	
Trichoptera	Uenoidae	Neothremma	7	

Total: 47 OTU taxa			2778 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2005 at station TAMAC-13, Tamarack Creek, Upper Site, never treated, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129115.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1189 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			14	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			197	
Class: Insecta				
Coleoptera	Elmidae		14	
Coleoptera	Elmidae	Heterlimnius	14	
Diptera	Ceratopogonidae	Probezzia	32	
Diptera	Chironomidae		93	
Diptera	Chironomidae	Chironominae	97	
Diptera	Chironomidae	Orthocladiinae	627	
Diptera	Empididae		14	
Diptera	Empididae	Chelifera	29	
Diptera	Pelecorhynchidae	Glutops	50	
Diptera	Psychodidae	Pericoma	4	
Diptera	Simuliidae		57	
Diptera	Simuliidae	Prosimulium	25	
Diptera	Simuliidae	Simulium	65	
Diptera	Tipulidae	Dicranota	4	
Diptera	Tipulidae	Limnophila	4	
Ephemeroptera	Baetidae	Baetis	194	
Ephemeroptera	Baetidae	Diphetor hageni	14	
Ephemeroptera	Ephemerellidae		68	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	43	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	18	
Ephemeroptera	Heptageniidae		25	
Ephemeroptera	Heptageniidae	Cinygmula	308	
Ephemeroptera	Heptageniidae	Epeorus	79	
Ephemeroptera	Heptageniidae	Rhithrogena	25	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	18	
Plecoptera			4	
Plecoptera	Chloroperlidae		32	
Plecoptera	Chloroperlidae	Sweltsa	22	
Plecoptera	Leuctridae	Moselia infuscata	7	
Plecoptera	Nemouridae	Visoka cataractae	14	
Plecoptera	Nemouridae	Zapada columbiana	18	
Plecoptera	Peltoperlidae		136	
Plecoptera	Peltoperlidae	Yoraperla	1613	
Plecoptera	Perlidae		14	
Plecoptera	Perlidae	Doroneuria baumanni	7	
Plecoptera	Perlodidae		57	
Trichoptera			4	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Micrasema	7	
Trichoptera	Rhyacophilidae	Rhyacophila	61	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	11	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	11	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group a	25	
Trichoptera	Rhyacophilidae	Rhyacophila verrula group	4	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	43	
Trichoptera	Uenoidae	Neophylax	7	
Trichoptera	Uenoidae	Neothremma	7	
Phylum: Nemata			4	
Phylum: Platyhelminthes				
Class: Turbellaria			4	

Total: 52 OTU taxa			4262 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2006 at station TAMAC-13, Tamarack Creek, Upper Site, never treated, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129116.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 480 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. Notes - identification to genus or species was not supported because: I - immature organisms, D - damaged organisms, M - poor slide mount, G - gender, U - indistinct

Order	Family	Subfamily/Genus/species	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			7	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			39	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Heterlimnius	7	
Coleoptera	Elmidae	Heterlimnius corpulentus	4	
Diptera	Ceratopogonidae		7	
Diptera	Ceratopogonidae	Probezzia	11	
Diptera	Chironomidae		36	
Diptera	Chironomidae	Chironominae	72	
Diptera	Chironomidae	Orthocladiinae	72	
Diptera	Empididae	Chelifera	11	
Diptera	Empididae	Oreogeton	4	
Diptera	Pelecorhynchidae	Glutops	14	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Prosimulium	18	
Diptera	Simuliidae	Simulium	14	
Diptera	Tipulidae	Hexatoma	4	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	168	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	43	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	86	
Ephemeroptera	Heptageniidae		47	
Ephemeroptera	Heptageniidae	Cinygmula	280	
Ephemeroptera	Heptageniidae	Epeorus	93	
Ephemeroptera	Heptageniidae	Rhithrogena	11	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	32	
Plecoptera			25	
Plecoptera	Chloroperlidae		4	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Leuctridae	Moselia infuscata	4	
Plecoptera	Nemouridae	Visoka cataractae	22	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Nemouridae	Zapada columbiana	108	
Plecoptera	Peltoperlidae	Yoraperla	254	
Plecoptera	Perlidae		54	
Plecoptera	Perlidae	Doroneuria baumanni	11	
Plecoptera	Perlodidae		29	
Trichoptera	Hydropsychidae	Parapsyche	4	
Trichoptera	Limnephilidae		7	
Trichoptera	Rhyacophilidae	Rhyacophila	29	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	11	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	4	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group a	7	
Trichoptera	Rhyacophilidae	Rhyacophila verrula group	4	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	11	
Trichoptera	Uenoidae	Neophylax	4	
Trichoptera	Uenoidae	Neothremma	11	
Phylum: Platyhelminthes				
Class: Turbellaria			14	

Total: 49 OTU taxa			1720 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 7 August 2003 at station TAMAC-14, Tamarack Creek, Lower Site, never treated, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129117.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 406 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Annelida				
Class: Clitellata subclass oligochaeta			54	
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			68	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Heterlimnius	11	
Diptera	Chironomidae		25	
Diptera	Chironomidae	Chironominae	115	
Diptera	Chironomidae	Orthocladiinae	147	
Diptera	Chironomidae	Tanypodinae	11	
Diptera	Empididae	Chelifera	7	
Diptera	Pelecorhynchidae	Glutops	11	
Diptera	Simuliidae	Simulium	36	
Ephemeroptera	Baetidae		4	
Ephemeroptera	Baetidae	Baetis	90	
Ephemeroptera	Ephemerellidae		4	
Ephemeroptera	Ephemerellidae	Attenella delantala	7	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	100	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	39	
Ephemeroptera	Heptageniidae		4	
Ephemeroptera	Heptageniidae	Cinygmula	165	
Ephemeroptera	Heptageniidae	Epeorus	79	
Ephemeroptera	Heptageniidae	Rhithrogena	29	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	7	
Plecoptera	Chloroperlidae		14	
Plecoptera	Chloroperlidae	Sweltsa	4	
Plecoptera	Leuctridae		14	
Plecoptera	Nemouridae	Visoka cataractae	4	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Peltoperlidae	Yoraperla	201	
Plecoptera	Perlidae		7	
Plecoptera	Perlodidae		32	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Limnephilidae		4	
Trichoptera	Rhyacophilidae		25	
Trichoptera	Rhyacophilidae	Rhyacophila	39	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	14	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	22	
Trichoptera	Uenoidae	Neophylax	4	
Trichoptera	Uenoidae	Neothremma	4	
Phylum: Platyhelminthes				
Class: Turbellaria			39	

Total: 40 OTU taxa			1455 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 3 August 2004 at station TAMAC-14, Tamarack Creek, Lower Site, never treated, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129118.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 1564 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			172	
Class: Insecta				
Coleoptera	Elmidae		22	
Coleoptera	Elmidae	Heterlimnius	39	
Coleoptera	Elmidae	Optioservus	4	
Diptera	Chironomidae		36	
Diptera	Chironomidae	Chironominae	90	
Diptera	Chironomidae	Orthocladiinae	832	
Diptera	Chironomidae	Tanypodinae	7	
Diptera	Empididae		4	
Diptera	Empididae	Chelifera	25	
Diptera	Empididae	Clinocera	7	
Diptera	Pelecorhynchidae	Glutops	39	
Diptera	Simuliidae		22	
Diptera	Simuliidae	Prosimulium	29	
Diptera	Simuliidae	Simulium	115	
Ephemeroptera	Baetidae		14	
Ephemeroptera	Baetidae	Baetis	305	
Ephemeroptera	Ephemerellidae		631	
Ephemeroptera	Ephemerellidae	Attenella delantala	11	
Ephemeroptera	Ephemerellidae	Caudatella	29	
Ephemeroptera	Ephemerellidae	Caudatella hystrix	4	
Ephemeroptera	Ephemerellidae	Drunella	4	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	14	
Ephemeroptera	Ephemerellidae	Drunella doddsi	197	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	151	
Ephemeroptera	Heptageniidae		25	
Ephemeroptera	Heptageniidae	Cinygmula	108	
Ephemeroptera	Heptageniidae	Epeorus	54	
Ephemeroptera	Heptageniidae	Rhithrogena	39	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	25	
Plecoptera	Chloroperlidae		151	
Plecoptera	Leuctridae		7	
Plecoptera	Leuctridae	Moselia infuscata	7	
Plecoptera	Nemouridae	Visoka cataractae	7	
Plecoptera	Nemouridae	Zapada	4	
Plecoptera	Nemouridae	Zapada columbiana	93	
Plecoptera	Peltoperlidae		168	
Plecoptera	Peltoperlidae	Yoraperla	1731	
Plecoptera	Perlidae		11	
Plecoptera	Perlidae	Doroneuria baumanni	14	
Plecoptera	Perlodidae		36	
Trichoptera			7	
Trichoptera	Apataniidae	Apatania	4	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Brachycentridae	Micrasema	4	
Trichoptera	Glossosomatidae	Glossosoma	4	
Trichoptera	Hydropsychidae	Parapsyche elsis	7	
Trichoptera	Rhyacophilidae	Rhyacophila	61	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	11	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	72	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	86	
Trichoptera	Uenoidae	Neothremma	7	
Class: Ostracoda			22	
Phylum: Platyhelminthes				
Class: Turbellaria			36	

Total: 54 OTU taxa			5606 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2005 at station TAMAC-14, Tamarack Creek, Lower Site, never treated, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129119.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 474 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			14	
Class: Insecta				
Coleoptera	Elmidae	Heterlimnius	14	
Diptera	Ceratopogonidae	Probezzia	4	
Diptera	Chironomidae		25	
Diptera	Chironomidae	Chironominae	39	
Diptera	Chironomidae	Orthocladiinae	86	
Diptera	Empididae	Chelifera	7	
Diptera	Pelecorhynchidae	Glutops	25	
Diptera	Simuliidae		4	
Diptera	Simuliidae	Prosimulium	4	
Diptera	Simuliidae	Simulium	14	
Ephemeroptera	Ameletidae	Ameletus	7	
Ephemeroptera	Baetidae	Baetis	136	
Ephemeroptera	Ephemerellidae		4	
Ephemeroptera	Ephemerellidae	Attenella delantala	11	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	7	
Ephemeroptera	Ephemerellidae	Drunella doddsi	14	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	7	
Ephemeroptera	Heptageniidae		29	
Ephemeroptera	Heptageniidae	Cinygmula	276	
Ephemeroptera	Heptageniidae	Epeorus	118	
Ephemeroptera	Heptageniidae	Rhithrogena	11	
Plecoptera	Chloroperlidae		7	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Leuctridae		4	
Plecoptera	Nemouridae	Visoka cataractae	4	
Plecoptera	Nemouridae	Zapada columbiana	11	
Plecoptera	Peltoperlidae	Yoraperla	588	
Plecoptera	Perlidae		11	
Plecoptera	Perlodidae		29	
Plecoptera	Perlodidae	Kogotus nonus	4	
Trichoptera	Apataniidae	Pedomoecus sierra	47	
Trichoptera	Limnephilidae		4	
Trichoptera	Limnephilidae	Dicosmoecus	4	
Trichoptera	Rhyacophilidae	Rhyacophila	36	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila sibirica group a	18	
Trichoptera	Rhyacophilidae	Rhyacophila verrula group	4	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	29	
Trichoptera	Uenoidae	Neophylax	7	
Trichoptera	Uenoidae	Neothremma	7	
Phylum: Platyhelminthes				
Class: Turbellaria			11	

Total: 43 OTU taxa			1699 individuals	

Taxonomic list and abundances of aquatic invertebrates collected 8 August 2006 at station TAMAC-14, Tamarack Creek, Lower Site, never treated, Alpine County, California. The sample was collected from riffle habitat using a Surber sampler. The total area sampled was unspecified. The sample identification number is 129120.

The percentage of the sample that was identified and retained was 100% of the collected sample. A total of 369 individuals were removed, identified and retained. Abundance data are presented as the estimated number of individuals collected in the entire sample. OTU = operational taxonomic unit. 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	Abundance	Notes
Phylum: Arthropoda				
Class: Arachnida				
Trombidiformes			7	
Class: Insecta				
Coleoptera	Elmidae		4	
Coleoptera	Elmidae	Heterlimnius	25	
Diptera	Chironomidae	Chironominae	11	
Diptera	Chironomidae	Orthocladiinae	50	
Diptera	Empididae		4	
Diptera	Empididae	Chelifera	4	
Diptera	Pelecorhynchidae	Glutops	39	
Diptera	Simuliidae	Prosimulium	39	
Diptera	Simuliidae	Simulium	7	
Ephemeroptera	Ameletidae	Ameletus	4	
Ephemeroptera	Baetidae	Baetis	133	
Ephemeroptera	Ephemerellidae	Drunella coloradensis/flavilinea	11	
Ephemeroptera	Ephemerellidae	Drunella doddsi	32	
Ephemeroptera	Ephemerellidae	Drunella grandis/spinifera	29	
Ephemeroptera	Heptageniidae		11	
Ephemeroptera	Heptageniidae	Cinygmula	186	
Ephemeroptera	Heptageniidae	Epeorus	97	
Ephemeroptera	Heptageniidae	Rhithrogena	32	
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	11	
Plecoptera			14	
Plecoptera	Chloroperlidae	Sweltsa	7	
Plecoptera	Nemouridae	Zapada columbiana	111	
Plecoptera	Peltoperlidae	Yoraperla	290	
Plecoptera	Perlidae		7	
Plecoptera	Perlodidae		61	
Trichoptera	Apataniidae	Pedomoecus sierra	7	
Trichoptera	Hydropsychidae	Parapsyche elsis	4	
Trichoptera	Rhyacophilidae	Rhyacophila	47	
Trichoptera	Rhyacophilidae	Rhyacophila betteni group	7	
Trichoptera	Rhyacophilidae	Rhyacophila brunnea/vemna groups	7	
Trichoptera	Rhyacophilidae	Rhyacophila verrula group	4	
Trichoptera	Rhyacophilidae	Rhyacophila vofixa group	18	
Trichoptera	Uenoidae	Neophylax splendens	4	

Total: 34 OTU taxa			1323 individuals	