BENTHIC INVERTEBRATE RESPONSE TO RESTORATION ACTIVITIES IN PARADISE CREEK, MOSCOW, IDAHO FROM 1994-2014

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Idaho Department of Environmental Quality

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TITLE AND APPROVAL SHEET

Document Title:
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EXECUTIVE SUMMARY

Several stream restoration activities on Paradise Creek within the City of Moscow limits have taken place since the mid-1990s. The Idaho DEQ Beneficial Use Reconnaissance Project (BURP) has performed biological monitoring at several sites in the study reach since 1994. A look at benthic invertebrate community condition showed some improvements in relation to physical habitat restoration activities within the city limits. Upgrades to the City of Moscow wastewater treatment plant resulted in notable changes in benthic invertebrate taxonomic composition, including a reduction in pollution tolerant taxa and establishment of some pollution sensitive taxa. This presentation will discuss the biological responses to restoration activities, as well as the applicability of using BURP data to evaluate the effectiveness of such actions.

BACKGROUND

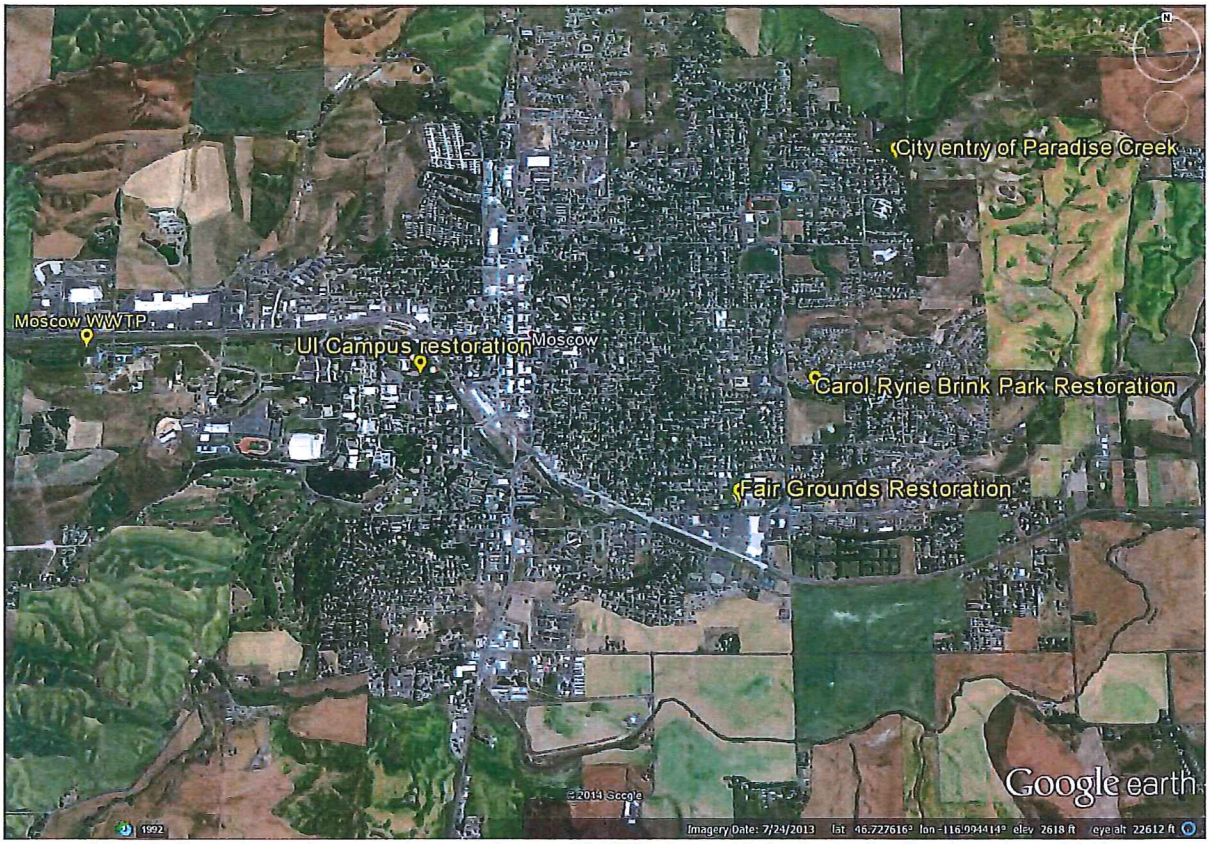
The Idaho Department of Environmental Quality's (DEQ) Water Quality Division monitors and assesses the State's streams, rivers, and lakes. Towards this end, DEQ's Beneficial Use Reconnaissance Program (BURP) assesses waters throughout the state on an annual basis. Fish surveys, aquatic invertebrate collections, measures of water chemistry, and records of habitat conditions are conducted in accordance with the standardized BURP protocols. DEQ applies the results of the BURP program to report on the water quality status of Idaho's streams and lists those waters that are not attaining their designated water quality uses along with the numeric and narrative standards that indicate non-attainment. To achieve attainment, implementation plans are developed, and BURP data can be used to demonstrate the effectiveness of the implemented plans.

BURP data collected from Paradise Creek in Moscow, Latah County during 1994, 1995, and 1996 found impairment of the aquatic invertebrates and fish populations and exceedances of water quality criteria. From these results DEQ determined that Paradise Creek was not supporting the aquatic life standard designated for the coldwater streams of the Basins Region of Idaho. Using the Total Maximum Daily Load (TMDL) procedures, reductions of load capacities to meet beneficial use attainment for sediments was 75% from nonpoint sources (NPS); for phosphorus the reduction needed was 59% from NPS and 98% from the Moscow wastewater treatment plant (MWWTP); ammonia from the MWWTP needed a reduction of 77-80%; and for water temperature, a cooling in the creek from 23° C to 18°C. Although a dissolved oxygen (DO) goal is not specified for Paradise Creek, the statewide criteria for streams designated as coldwater is 6.0 ppm of dissolved oxygen (DO), and the Creek's TMDL notes the DO concentrations drop well below this level during the summer low flow months. Maintaining sustained summer flows, cooling water temperatures through increased shading from the streamside, and limiting aquatic plant growth through lower phosphorus concentrations are means to increase DO. In 1999, DEQ developed and implemented a TMDL Implementation Plan (IP) to meet the stream's designated use.

BURP data were collected by DEQ staff from the mid-nineties until 2013 and by EcoAnalysts in 2014. Sampling sites were located at the upstream border of Moscow; upstream, within, and downstream of restoration activities within the city; and in the vicinity of the MWWTP. The IP did not directly address stream flow or habitat as these factors are not addressed by TMDLs. However, these factors are addressed indirectly through streamside habitat restoration which reduces sediment erosion and temperatures and increases storage and retention of flood waters, thereby improving conditions needed to meet the aquatic life beneficial use.

SETTING

The Paradise Creek watershed originates on the upper southern slopes of Moscow Mountain. The uppermost four kilometers, located chiefly in the Northern Idaho Hills Subregion of the Northern Rockies Ecoregion, are mostly forested. The watershed then traverses about eight kilometers of the hilly agricultural lands of the lower slopes of Moscow Mountain (the Grassy Potlatch Ridges Subregion of the Northern Rockies Ecoregion). These slopes are dominated by dryland farming, with emphasis on wheat, rotated with peas and barley. Downstream of these hills, Paradise Creek enters the Palouse Hills Subregion of the Columbia Plateau Ecoregion. Paradise Creek now becomes a meandering, low gradient stream. The Northern Rockies Ecoregion is within DEQ's Northern Rockies Bioregion, while the Columbia Plateau Ecoregion is within DEQ's Basins Bioregion. After another two kilometers, Paradise Creek enters the urbanized landscape of Moscow, Idaho, which extends over five kilometers to the Washington State border.



Map 1. Locations of restoration reaches and BURP sites with biological collections from 2013.

Table 1. Paradise Creek Sampling Sites
Headwaters, Idlers Rest, 1998
City Entry (Mountain View Park), 2002
City Entry (Mountain View Park), 2013
Upstream of Carol Brink Park restoration, 2013
Upstream of Carol Brink Park restoration, rep. 1, 2014
Upstream of Carol Brink Park restoration, rep. 2, 2014
Upstream of Carol Brink Park restoration, rep. 3, 2014
Upstream of Carol Brink Park restoration, rep. 4, 2014
Carol Brink Park restoration, 1994
Carol Brink Park restoration, 1995
Carol Brink Park restoration, 1996
Carol Brink Park restoration, 2012
Carol Brink Park restoration, 2013
Carol Brink Park restoration, rep. 1, 2014
Carol Brink Park restoration, rep. 2, 2014
Carol Brink Park restoration, rep. 3, 2014
Carol Brink Park restoration, rep. 4, 2014
Downstream of Carol Brink Park restoration, 2013
Downstream of Carol Brink Park restoration, rep. 1, 2014
Downstream of Carol Brink Park restoration, rep. 2, 2014
Downstream of Carol Brink Park restoration, rep. 3, 2014
Downstream of Carol Brink Park restoration, rep. 4, 2014
Herons Hideout restoration, 2013
Fair Grounds/Fire House restoration, 2013
UI Campus restoration, 2006
UI Campus restoration, 2013
Near the Moscow WWTP, 1998
Near the Moscow WWTP, 2002
WWTP outfall and location of new plant
Near the Moscow WWTP, 2013

The study area for this report covers the urban/suburban and mostly level landscape of Moscow. As is expected with many small streams, urbanization will have greatly affected its flow regime. The great majority of today's urbanization of Moscow, particularly in the vicinity of Paradise Creek, occurred prior to 1992 as can be seen using the history option in Google Earth.

Agriculture in the Palouse farmland has been particularly intense, with a soil loss of between 275 and 350 tons per acre between 1930 and 1972, according to a 1998 report by the United States Geological Survey (USGS 1998[1]). This lost soil translates into severe sedimentation of Palouse streams. Addition of nutrients (primarily phosphorus) from fertilizers and municipal treatment plants may promote excess algal and

[1] Black, A.E., E. Strand, P. Morgan, J.M. Scott, and R.G. Wright. 1998. Biodiversity and Land-use History of the Palouse Bioregion: Pre-European to Present. In T.D. Sisk (Ed.) Perspectives on the Land Use History of North America: A Context for Understanding Our Changing Environment (pp. 85-99). U.S. Geological Survey. Biological Science Report USGS/BRD/BSR-1998-0003

macrophyte growths, which, along with the warmer temperatures and sluggish waters, will depress the dissolved oxygen (DO) to concentrations that are no longer viable for many cold water species. Stream life in urban areas can also be impaired from toxicants, including chlorine and ammonia released by municipal treatment plants. As noted in the background section, temperature, phosphorus, dissolved oxygen, and ammonia in Paradise Creek were not meeting criteria for protection of streams within the Idaho Basin Bioregions and coldwater aquatic life was found to be impaired throughout Moscow.

REPORT OBJECTIVES

1) Determine temporal and spatial watershed improvement trends using BURP data from targeted monitoring sites on Paradise Creek, sampled since the mid-1990s.

2) Analyze the effectiveness of BURP data to demonstrate improvement from habitat restoration and WWTP upgrades in Paradise Creek.

3) Estimate within-site sampling variability from replicates sampled at three sites in 2014.

4) Discuss how the BURP program can be used to document stream restoration projects.

METHODS

To address the study's first two objectives, comparisons were made between locations throughout Moscow during 1998 to 2014 including Paradise creek's entry into Moscow, four reaches within the city and associated with restoration projects, and one reach in the vicinity of the MWWTP. The third objective was addressed by comparing the variability of assessments within 4 replicates collected in 2014 at each of three study reaches: upstream of the Carol Ryrie Brink Park restoration, at the upstream end of the restoration, and downstream of the restoration. Monitoring of Paradise Creek used the BURP protocols (DEC 2013) and typically occurred during the warm, low-flow months of July and August.

Aquatic invertebrate samples collected from 1994 to 1996 from a site at the upstream end of the Carol Ryrie Brink Park restoration were not included in this analysis, as the results point to a collection method not comparable to the current protocols. Also, comparisons across years omit the 2014 replicate data, as these were collected in April, outside the BURP collection season. This report will focus mostly on changes in the overall pollution tolerance of the assemblages across years and between assemblages collected from a specific year along the creek.

Table 1 lists the sampling events, grouped by reach and Map 1 shows the location of the reaches and sampling sites.

RESULTS

Taxa collected at all Paradise Creek sites and years are listed in Appendix A, along with their abundance, functional feeding group, habit, voltinism, and tolerance to pollution, as scored from one to ten by the Hilsenhoff Biotic Index (HBI), where higher values indicate more pollution tolerance.

During the summer, most flow recordings range from zero (standing pools) to less than one cubic foot per second. In most cases, the percent fines (clay, silt and sand) of the bottom substrate ranged from over 80 to 100%. Embeddedness of those pebbles and cobbles that could be found was over 80% and often 100%. Riffles were not recorded during half of all site visits. Nevertheless, the bottom-dwelling aquatic invertebrate communities did show evidence of recovery from a highly pollution-tolerant assemblage to one less tolerant of disturbance as related to stream restoration and wastewater treatment plant upgrades.

Yearly Changes of the Aquatic Communities of Paradise Creek

There are two reaches along Paradise Creek where BURP protocols were used across several years. One of these is a small restoration site near the University of Idaho campus. Here, between 2006 and 2013, the assemblage of invertebrates remained very tolerant of pollution, chiefly aquatic worms and the more pollution tolerant species of midge flies (Figure 1). This may be partly due to the continued nearby proximity of mostly impervious cover, as evidenced by historical and current satellite imagery accessible from Google Earth.

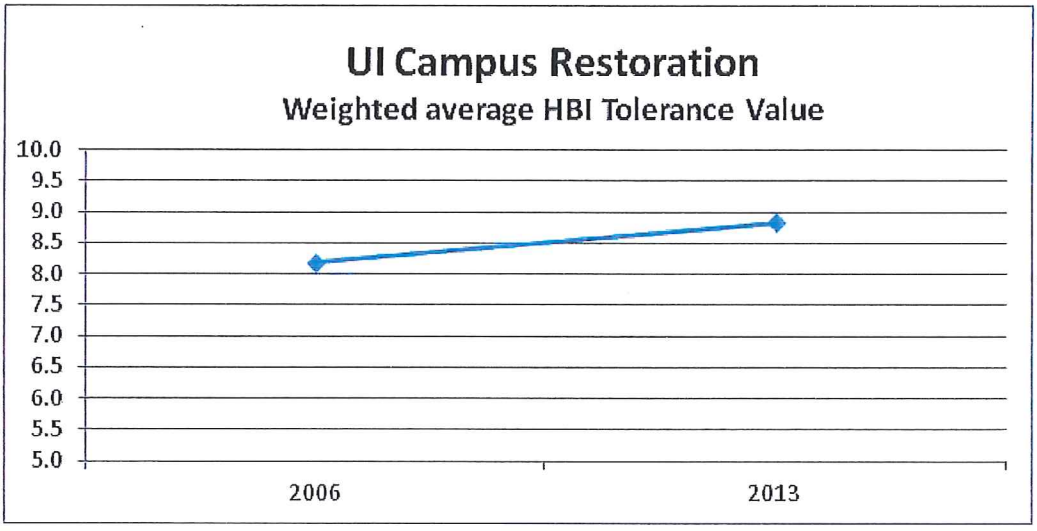


Figure 1. The communities sampled near a minor restoration site at the University of Idaho campus remained very tolerant of pollution, possibly due to the nearby proximity of mostly impervious cover.

The second reach with collections over the years (1998, 2002, 2013) is in the vicinity of the Moscow Waste Water Treatment Plant (MWWTP). The Moscow WWTP was completely replaced in 2002 with a Biological Nutrient Removal (BNR) process. In 2010, effluent filters were added to further remove phosphorus. Paradise Creek communities over the years have become markedly less tolerant of pollution (Figures 2 and 4). The highly pollution tolerant midge larvae of *Chironomus* (aka bloodworm), was the most dominant taxon in 1998, but rare by 2002. By 2013, the pollution sensitive caddisflies were becoming established, particularly the net-spinning, filter-feeding hydropsychids, which require flow that will bring them food particles. With the return of perennial flows to Paradise Creek downstream of the MWWTP discharge, an improvement in the aquatic life community can be expected.

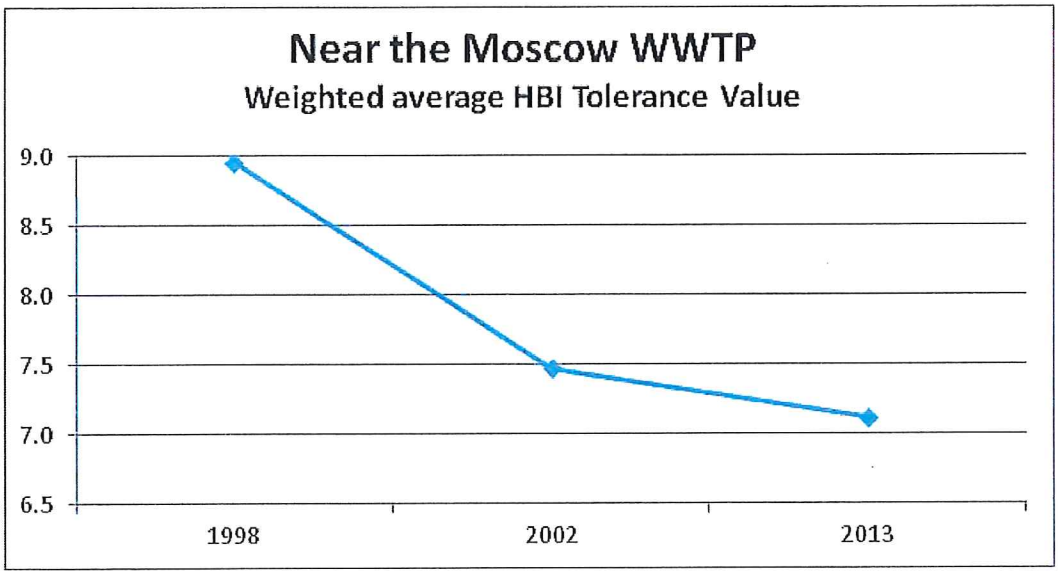
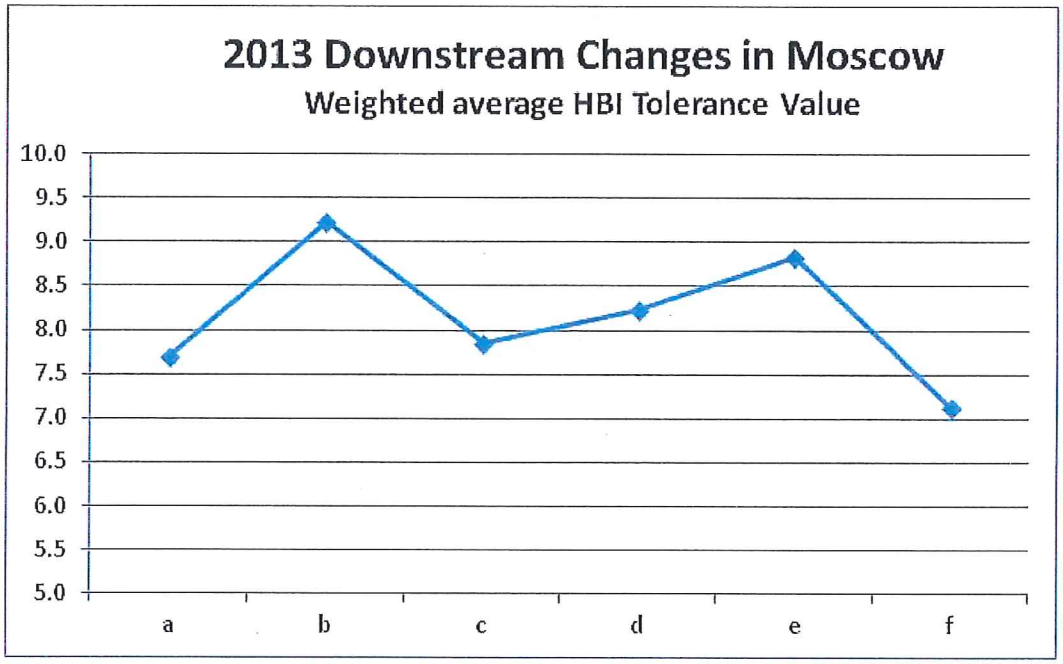


Figure 2. The Moscow WWTP was replaced in 2002. In 2010, effluent filters were added to further remove phosphorus. Paradise Creek communities are becoming markedly less tolerant of pollution. The highly pollution tolerant Chironomus, the most dominant taxon 1998, was rare by 2002. The pollution sensitive caddisflies were first collected in 2013, (five species comprising 12% of the collection).

Spatial Changes of the Aquatic Communities along Paradise Creek

During the summer of 2013, BURP biological samples were collected from several reaches throughout Paradise Creek in Moscow. Figure 3 provides a depiction of how the overall pollution tolerance of the bottom-dwelling community changes from just upstream of Moscow to the MWWTP downstream of the city.

Invertebrate communities became less tolerant of pollution downstream of the creek's restoration at Carol Ryrie Brink Park and again at the MWWTP. The extensive restoration projects along Carol Ryrie Brink Park is reflected in the replacement of many of the highly pollution tolerant organisms to ones less tolerant of pollution. This improvement at the Park's restoration was also found in the collections of 2014 (Figure 5).



a - City Entry (Mountain View Park)
b - Upstream end of Carol Brink Park Restoration
c - Downstream of Carol Brink Park Restoration
d - Fair Grounds/Fire House Restoration
e - UI Campus Restoration
f - Near the Moscow WWTP

Figure 3. During 2013, biological samples were collected throughout Paradise Creek in Moscow. Invertebrate communities became less tolerant of pollution downstream of the creek's restoration at Carol Brink Park and again near the WWTP. The plant's discharge provides increased and perennial flow in the lower reaches of Paradise Creek (see map 1 for site locations).

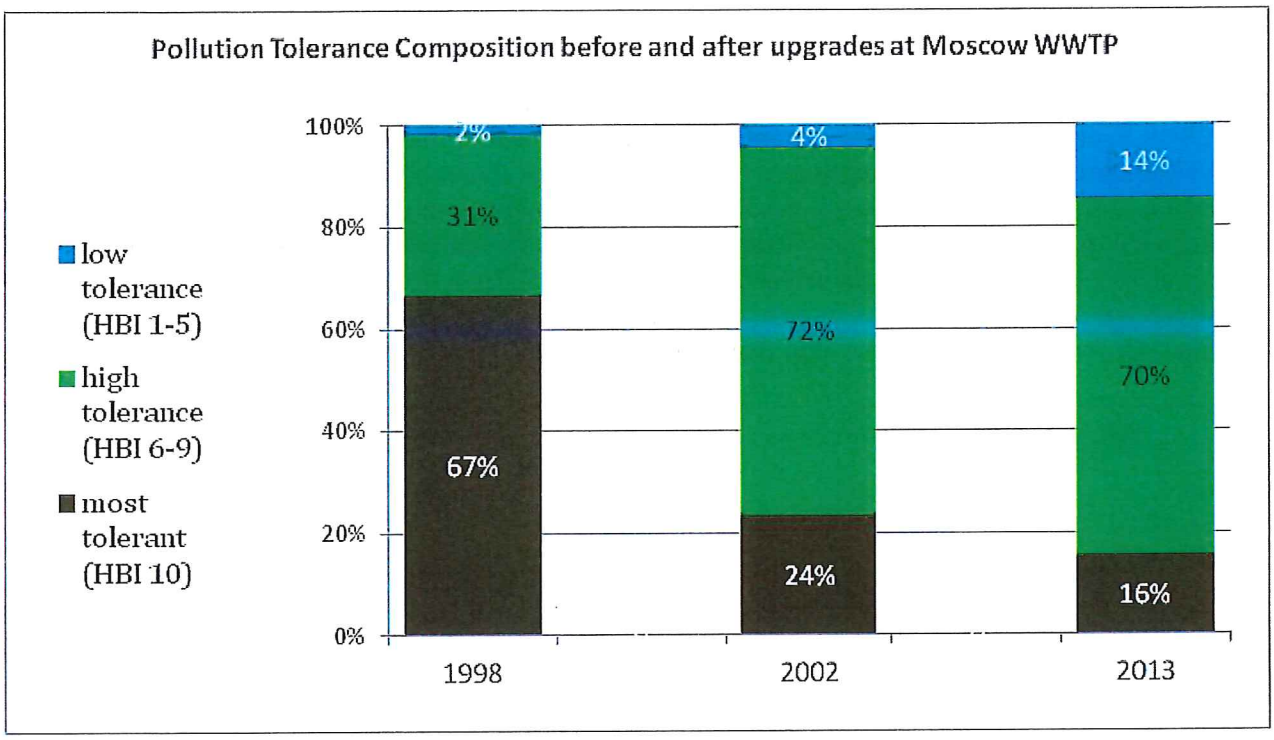


Figure 4. The Moscow WWTP was completely replaced in 2002 with a Biological Nutrient Removal (BNR) process and effluent filters were added in 2010 to remove phosphorus.

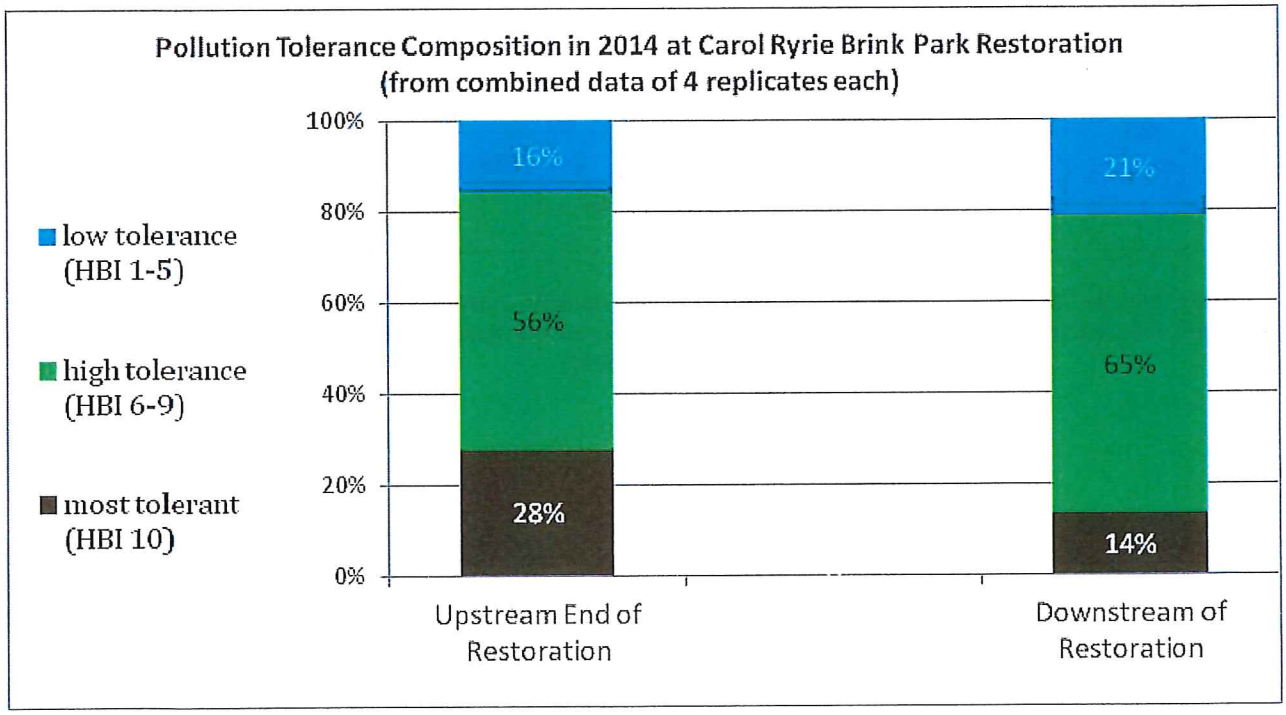


Figure 5. Considerable restoration since the mid-1990's occurred throughout the 370 meter reach of Paradise Creek at Carol Ryrie Brink Nature Park resulted in a shift from highly tolerant invertebrates to ones with less tolerance to pollution.

Variability of Replicates Collected at Same Date and Location

In order to correctly assess the similarity between sites and years, an indication of within site variability is useful. In 2014, EcoAnalysts collected four replicate samples at each of three locations: upstream, upstream end, and downstream of the restored reach along Carol Ryrie Brink Park on the eastside of Moscow. As described earlier and in Figure 4, the biota shows considerable improvement downstream of the restoration, with less dominance of the most pollution tolerant organisms and an increase in pollution intolerant organisms. The box plots in Figure 6 show that any one of the replicates from either the upstream end of the park or downstream of the park would demonstrate a change in pollution tolerance, although the four replicates likely provide a more accurate depiction of the change.

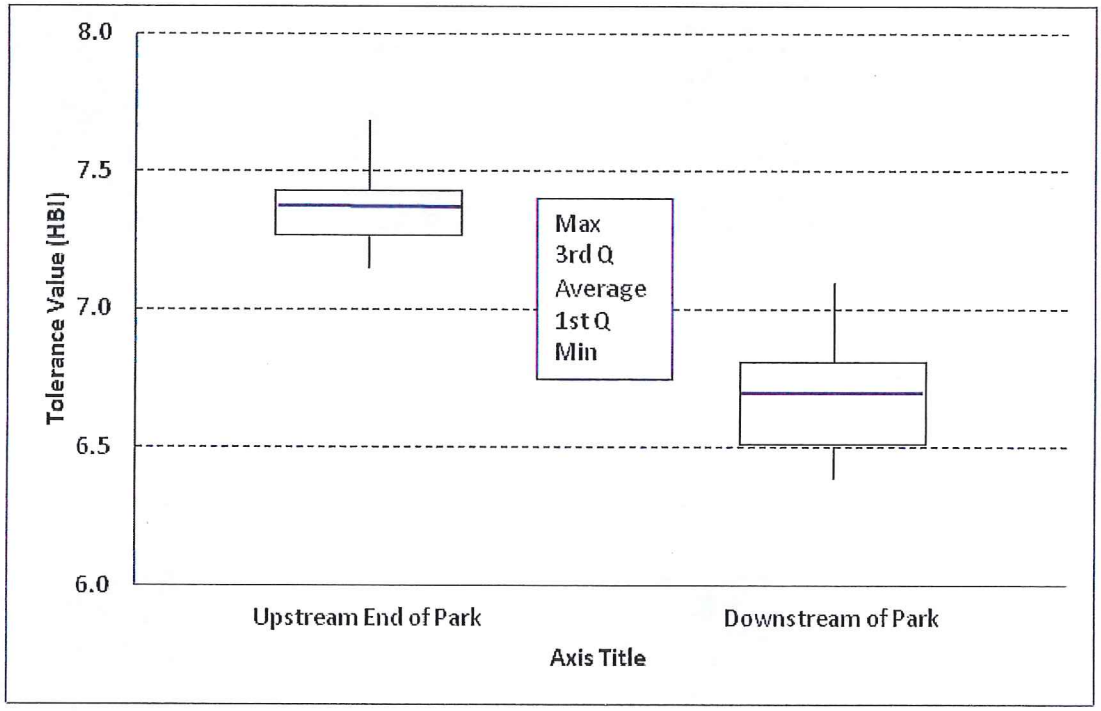


Figure 6. Box Plots for four 2014 replicates, displaying the range, quartiles, and average of the Hilsenhoff Biotic Index tolerance values collected at Carol Ryrie Brink Park. Decrease in this metric demonstrates an invertebrate assemblage less tolerant of pollution.

Another important biological indicator of stream condition is the number of species or taxa richness in a collection. Comparing these sites using taxa richness does show an increase in the average number of taxa per replicate, although there is considerable overlap between the replicates collected at the two sites (Figure 7).

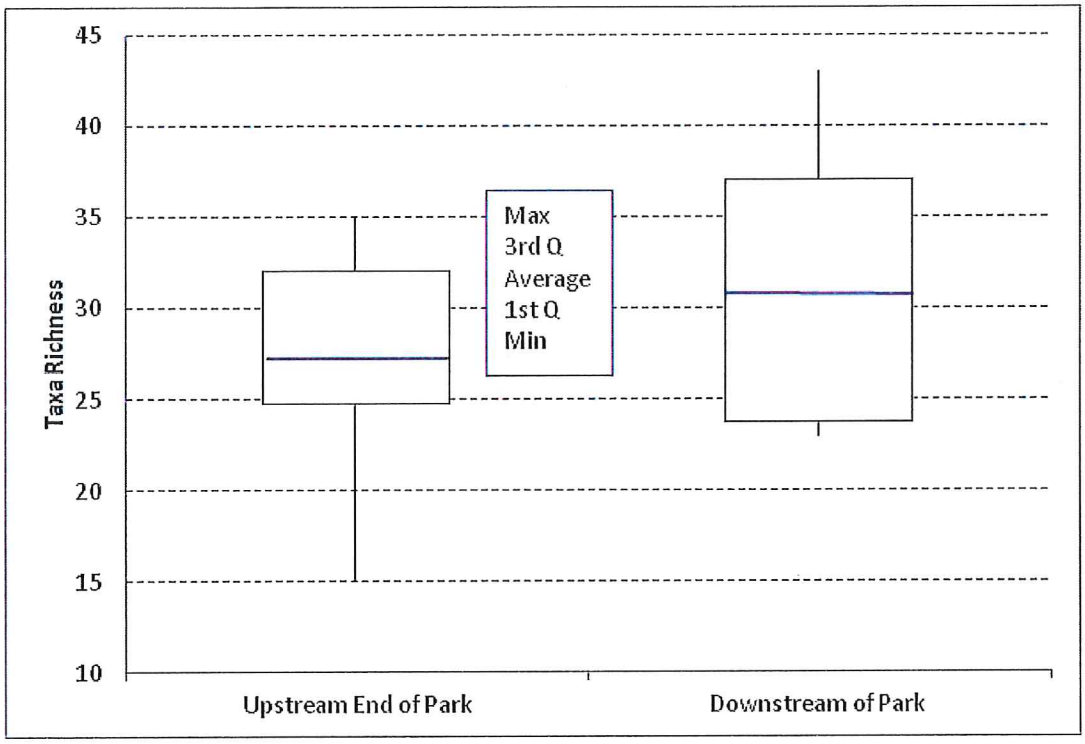


Figure 7. Box Plots for four 2014 replicates, displaying the range, quartiles, and average of the number of different taxa collected at Carol Ryrie Brink Park. Increased taxa richness is generally considered an indicator of improved conditions.

For management assessment purposes, the important indicator of within-site sampling variability is consistency among replicates of the site's aquatic life use impairment classification as determined from BURP procedures. The 2014 sets of replicates showed very good consistency here. The biota from all four of the replicates collected upstream of the Carol Ryrie Brink Park yielded "very poor" classifications. At the upstream end of the park; three of the four replicates were classified "very poor", with the fourth replicate classified as "poor". At the site downstream of the park, the aquatic life collected from each of the four replicates was classified as "poor".

CONCLUSION AND RECOMMENDATIONS

The summer biota, dominated by midge fly larvae and aquatic worms, reflects the lack of flow and the resulting high temperatures and low dissolved oxygen, along with dominance of soft bottom substrates found throughout Paradise Creek in Moscow. Nevertheless, the extensive restoration along Carol Ryrie Brink Park corresponds to a considerable improvement of the biological condition found downstream of the restoration when compared to the creek as it enters the park.

The greatest improvement in aquatic life use over time and along the creek was found downstream of the current outfall of the Moscow WWTP, which along with its considerable upgrades provides greater base flows and restores the stream from intermittent to perennial.

The Paradise Creek data has shown that improvement of aquatic life use can be demonstrated with the sample collections that use the BURP protocol. The data also point to ways to further improve conditions, for example flow augmentation further upstream to restore perennial flows throughout the city. Continued long-term BURP sampling upstream and downstream of stream reaches before, during, and after restoration will provide more additional evidence of aquatic life improvements, as well as insights on how further improvement in the resident biota can be accomplished.

Demonstration of trends in Paradise Creek may be improved with additional knowledge of the relative tolerance of invertebrates found in low-gradient streams of the Palouse and similar regions. The BURP program bases much of its assessments on comparisons with reference (least impaired) creeks of the State's different bioregions. Currently, these bioregions are being refined, and new reference creeks from the Palouse region, along with samples collected from a range of disturbance conditions will provide better resolution on the pollution tolerance of the Paradise Creek invertebrates.

The replicate variability found in 2014 for pollution tolerance of an assemblage are small enough that single samples would be adequate for comparisons of pollution tolerance and DEQ aquatic life use assessments. However, these are only the results from one system, and replicate sampling is a good option for periodically testing within-site variability.

APPENDIX A.

Macroinvertebrate Taxa Collected from all Paradise Creek Sites, Including their Abundance, Functional Feeding Group, Habit, Voltinism, and Tolerance to Pollution, as scored by the Hilsenhoff Biotic Index (HBI), where higher values indicate more pollution tolerance.

IDEQ Site 1998SLEWB001 **Headwaters, Idlers Rest, 1998**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Ameletus sp.	7	0	Gatherers	Varied	Univoltine
Ametor sp.	1	5	Predator	Varied	Univoltine
Baetidae	2	4	Gatherers	Varied	Multivoltine
Cinygma sp.	84	4	Scrapers	Clinger	Univoltine
Cinygmula sp.	2	4	Scrapers	Clinger	Unclassified
Cricotopus sp.	4	7	Shredders	Clinger	Multivoltine
Dicranota sp.	1	3	Predators	Sprawler	Univoltine
Drunella coloradensis/flavilinea	7	1	Scrapers	Varied	Univoltine
Enchytraeidae	4	10	Gatherers	Sprawler	Unclassified
Eukiefferiella brevicalcar Type I	1	8	Shredder	Sprawler	Unclassified
Hesperophylax sp.	1	5	Shredders	Sprawler	Univoltine
Lepidostoma sp.	16	1	Shredders	Climber	Univoltine
Limnophila sp.	1	4	Predators	Burrower	Multivoltine
Lumbricina	3	8	Gatherers	Burrower	Unclassified
Micropsectra sp.	36	7	Gatherers	Varied	Multivoltine
Nemouridae	1	2	Shredders	Clinger	Univoltine
Oreogeton sp.	10	6	Predators	Sprawler	Univoltine
Parametriocnemus sp.	3	5	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	1	8	Gatherers	Burrower	Bivoltine
Pentaneurini	1	6	Predators	Sprawler	Univoltine
Phaenopsectra sp.	1	7	Scrapers	Burrower	Univoltine
Podmosta sp.	4	2	Shredders	Clinger	Univoltine
Polycelis coronata	13	6	Predators	Unclassified	Unclassified
Rhabdomastix fascigera gr.	3	2	Varied	Burrower	Univoltine
Stempellinella sp.	1	4	Gatherers	Burrower	Bivoltine
Sweltsa sp.	87	0	Predators	Clinger	Semivoltine
Thienemannimyia gr. sp.	1	5	Predators	Sprawler	Univoltine
Trichoptera	3	5	Unclassified	Unclassified	Unclassified
Total Abundance	**299**				
Tolerance Value Weighted Mean		**3.2**			

IDEQ Site 2002SLEWA020 **City Entry (Mountain View Park), 2002**

no data - dry

IDEQ Site 2013SLEWA021 **City Entry (Mountain View Park), 2013**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Bezzia/Palpomyia sp.	3	6	Predators	Burrower	Univoltine
Callibaetis sp.	1	9	Gatherers	Swimmer	Multivoltine
Chaetogaster diaphanus	1	6	Predators	Unclassified	Unclassified
Chironomus sp.	12	10	Gatherers	Burrower	Multivoltine
Crangonyx sp.	26	6	Gatherers	Varied	Multivoltine
Dicrotendipes sp.	14	8	Gatherers	Burrower	Multivoltine
Diptera	1	6	Unclassified	Unclassified	Unclassified
Enchytraeidae	6	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	2	8	Predators	Unclassified	Unclassified
Helobdella stagnalis	1	7	Predators	Swimmer	Univoltine
Hydrobaenus sp.	8	8	Scrapers	Sprawler	Univoltine
Hydryphantidae	1	6	Predators	Unclassified	Unclassified
Limnesia sp.	1	6	Predators	Unclassified	Unclassified
Limnodrilus hoffmeisteri	105	10	Gatherers	Sprawler	Unclassified
Limnodrilus silvani	10	6	Unclassified	Unclassified	Unclassified
Limnodrilus udekemianus	1	10	Gatherers	Sprawler	Unclassified
Limnophyes sp.	1	8	Gatherers	Sprawler	Multivoltine
Micropsectra sp.	74	7	Gatherers	Varied	Multivoltine
Nais sp.	3	8	Gatherers	Burrower	Unclassified
Nematoda	5	5	Predators	Burrower	Multivoltine
Paratanytarsus sp.	18	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	19	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	3	7	Scrapers	Burrower	Univoltine
Physa sp.	7	8	Scrapers	Clingers	Unclassified
Pisidium sp.	5	6	Filterers	Burrower	Long-lived
Procladius sp.	1	9	Predators	Sprawler	Bivoltine
Psectrotanypus sp.	22	10	Predators	Sprawler	Bivoltine
Sergentia sp.	87	5	Gatherers	Burrower	Unclassified
Sigara sp.	20	7	Piercer-Herbivore	Swimmer	Semivoltine
Tanypus sp.	5	10	Predators	Sprawler	Unclassified
Tanytarsus sp.	19	6	Filterers	Clinger	Multivoltine
Tubificidae w/ cap setae	41	10	Gatherers	Sprawler	Unclassified
Total Abundance	**523**				
Tolerance Value Weighted Mean		**7.7**			

IDEQ Site 2013SLEWA020 **Upstream of Carol Brink Park Restoration, 2013**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Aeolosoma sp.	1	8	Gatherers	Unclassified	Unclassified
Aeshnidae	1	3	Predators	Climber	Unclassified
Chironomus sp.	72	10	Gatherers	Burrower	Multivoltine
Cladopelma sp.	2	9	Gatherers	Burrower	Unclassified
Coenagrionidae	1	9	Predators	Climber	Unclassified
Crangonyx sp.	6	6	Gatherers	Varied	Multivoltine
Cricotopus bicinctus gr.	4	7	Shredders	Clinger	Multivoltine
Cricotopus sp.	5	7	Shredders	Clinger	Multivoltine
Dero digitata	3	10	Gatherers	Sprawler	Unclassified
Dicrotendipes sp.	12	8	Gatherers	Burrower	Multivoltine
Enchytraeidae	11	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	3	8	Predators	Unclassified	Unclassified
Ferrissia sp.	1	6	Scrapers	Clingers	Unclassified
Helobdella stagnalis	1	7	Predators	Swimmer	Univoltine
Hydrobaenus sp.	1	8	Scrapers	Sprawler	Univoltine
Hydrobiidae	1	5	Scrapers	Clingers	Unclassified
Hydroptila sp.	1	6	Piercer-Herbivore	Clinger	Multivoltine
Limnodrilus hoffmeisteri	178	10	Gatherers	Sprawler	Unclassified
Limnodrilus silvani	59	6	Unclassified	Unclassified	Unclassified
Limnodrilus udekemianus	2	10	Gatherers	Sprawler	Unclassified
Micropsectra sp.	6	7	Gatherers	Varied	Multivoltine
Mystacides alafimbriata	1	4	Gatherers	Sprawler	Multivoltine
Nais bretscheri	2	6	Gatherers	Unclassified	Unclassified
Nais sp.	3	8	Gatherers	Burrower	Unclassified
Nematoda	6	5	Predators	Burrower	Multivoltine
Orthocladius Complex	2	6	Gatherers	Sprawler	Univoltine
Parakiefferiella sp.	1	6	Gatherers	Sprawler	Bivoltine
Parametriocnemus sp.	1	5	Gatherers	Sprawler	Multivoltine
Paratanytarsus sp.	1	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	12	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	20	7	Scrapers	Burrower	Univoltine
Pisidium sp.	15	6	Filterers	Burrower	Long-lived
Planorbella sp.	1	6	Scraper	Clinger	Unclassified
Psectrotanypus sp.	3	10	Predators	Sprawler	Bivoltine
Sergentia sp.	5	5	Gatherers	Burrower	Unclassified
Sigara sp.	6	7	Piercer-Herbivore	Swimmer	Semivoltine
Simulium sp.	1	5	Filterers	Clinger	Multivoltine
Slavina appendiculata	1	6	Gatherers	Unclassified	Unclassified
Stygobromus sp.	1	6	Gatherers	Hyporheic	Multivoltine
Tanytarsus sp.	17	6	Filterers	Clinger	Multivoltine
Tubificidae w/ cap setae	141	10	Gatherers	Sprawler	Unclassified
Total Abundance	**611**				
Tolerance Value Weighted Mean		**8.8**			

EA Sample 6408.04-5 **Upstream of Carol Brink Park Restoration, rep. 1, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Brillia sp.	1	5	Shredders	Varied	Bivoltine
Chironomus sp.	1	10	Gatherers	Burrower	Multivoltine
Crangonyx sp.	7	6	Gatherers	Varied	Multivoltine
Dero digitata	1	10	Gatherers	Sprawler	Unclassified
Diamesa sp.	15	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	8	8	Gatherers	Burrower	Multivoltine
Diplocladius sp.	2	5	Gatherers	Sprawler	Unclassified
Enchytraeidae	35	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	4	8	Predators	Unclassified	Unclassified
Eukiefferiella claripennis gr.	10	8	Gatherers	Sprawler	Multivoltine
Ferrissia sp.	1	6	Scrapers	Clingers	Unclassified
Helobdella stagnalis	2	7	Predators	Swimmer	Univoltine
Hydrobaenus sp.	18	8	Scrapers	Sprawler	Univoltine
Limnodrilus hoffmeisteri	18	10	Gatherers	Sprawler	Unclassified
Limnophyes sp.	1	8	Gatherers	Sprawler	Multivoltine
Lumbricina	59	8	Gatherers	Burrower	Unclassified
Lumbriculidae	3	8	Gatherers	Sprawler	Unclassified
Micropsectra sp.	1	7	Gatherers	Varied	Multivoltine
Musculium sp.	20	4	Filterers	Burrower	Long-lived
Nais sp.	2	8	Gatherers	Burrower	Unclassified
Orthocladius (Euorthocladius) sp.	2	6	Gatherers	Sprawler	Univoltine
Orthocladius Complex	22	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	36	6	Gatherers	Sprawler	Univoltine
Paratendipes sp.	11	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	14	7	Scrapers	Burrower	Univoltine
Pisidium sp.	108	6	Filterers	Burrower	Long-lived
Polypedilum sp.	1	6	Shredders	Clinger	Bivoltine
Tubificidae w/ cap setae	4	10	Gatherers	Sprawler	Unclassified
Total Abundance	**407**				
Tolerance Value Weighted Mean		**7.0**			

EA Sample 6408.04-6 **Upstream of Carol Brink Park Restoration, rep. 2, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Brillia sp.	1	5	Shredders	Varied	Bivoltine
Ceratopogoninae	1	6	Predators	Burrower	Multivoltine
Chironomus sp.	1	10	Gatherers	Burrower	Multivoltine
Crangonyx sp.	1	6	Gatherers	Varied	Multivoltine
Diamesa sp.	15	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	6	8	Gatherers	Burrower	Multivoltine
Diptera	1	6	Unclassified	Unclassified	Unclassified
Enchytraeidae	17	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	3	8	Predators	Unclassified	Unclassified
Eukiefferiella gracei gr.	1	8	Gatherers	Sprawler	Univoltine
Ferrissia sp.	4	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	1	8	Scrapers	Clingers	Unclassified
Hydrobaenus sp.	17	8	Scrapers	Sprawler	Univoltine
Ilyodrilus templetoni	65	10	Gatherers	Sprawler	Unclassified
Limnodrilus hoffmeisteri	57	10	Gatherers	Sprawler	Unclassified
Limnophyes sp.	1	8	Gatherers	Sprawler	Multivoltine
Lumbricina	14	8	Gatherers	Burrower	Unclassified
Lumbriculidae	1	8	Gatherers	Sprawler	Unclassified
Micropsectra sp.	1	7	Gatherers	Varied	Multivoltine
Orthocladius (Euorthocladius) sp.	3	6	Gatherers	Sprawler	Univoltine
Orthocladius Complex	13	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	65	6	Gatherers	Sprawler	Univoltine
Ostracoda	1	8	Gatherers	Sprawler	Multivoltine
Pagastia sp.	1	1	Gatherers	Sprawler	Univoltine
Paratendipes sp.	7	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	4	7	Scrapers	Burrower	Univoltine
Pisidium sp.	139	6	Filterers	Burrower	Long-lived
Planorbella sp.	1	6	Scraper	Clinger	Unclassified
Pristina aequiseta	1	8	Gatherers	Unclassified	Unclassified
Pristina jenkinae	1	10	Gatherers	Sprawler	Unclassified
Tanytarsus sp.	2	6	Filterers	Clinger	Multivoltine
Turbellaria	4	4	Predators	Sprawler	Multivoltine
Total Abundance	**450**				
Tolerance Value Weighted Mean		**7.4**			

EA Sample 6408.04-7 **Upstream of Carol Brink Park Restoration, rep. 3, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Diamesa sp.	4	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	4	8	Gatherers	Burrower	Multivoltine
Dytiscidae	1	5	Predators	Varied	Semivoltine
Enchytraeidae	2	10	Gatherers	Sprawler	Unclassified
Eukiefferiella claripennis gr.	2	8	Gatherers	Sprawler	Multivoltine
Ferrissia sp.	1	6	Scrapers	Clingers	Unclassified
Haemopis sp.	1	8	Predators	Unclassified	Unclassified
Hydrobaenus sp.	5	8	Scrapers	Sprawler	Univoltine
Limnodrilus hoffmeisteri	6	10	Gatherers	Sprawler	Unclassified
Lumbricina	18	8	Gatherers	Burrower	Unclassified
Lumbriculidae	2	8	Gatherers	Sprawler	Unclassified
Micropsectra sp.	2	7	Gatherers	Varied	Multivoltine
Nematoda	1	5	Predators	Burrower	Multivoltine
Orthocladius (Euortho.) rivicola	1	6	Gatherers	Sprawler	Univoltine
Orthocladius Complex	12	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	35	6	Gatherers	Sprawler	Univoltine
Paratendipes sp.	1	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	1	7	Scrapers	Burrower	Univoltine
Pisidium sp.	133	6	Filterers	Burrower	Long-lived
Polypedilum sp.	1	6	Shredders	Clinger	Bivoltine
Tubificidae w/ cap setae	2	10	Gatherers	Sprawler	Unclassified
Turbellaria	5	4	Predators	Sprawler	Multivoltine
Valvata sp.	1	8	Scrapers	Unclassified	Unclassified
Total Abundance	**241**				
Tolerance Value Weighted Mean		**6.4**			

EA Sample 6408.04-8 **Upstream of Carol Brink Park Restoration, rep. 4, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Bezzia/Palpomyia sp.	1	6	Predators	Burrower	Univoltine
Crangonyx sp.	11	6	Gatherers	Varied	Multivoltine
Diamesa sp.	28	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	33	8	Gatherers	Burrower	Multivoltine
Diplocladius sp.	1	5	Gatherers	Sprawler	Unclassified
Enchytraeidae	10	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	13	8	Predators	Unclassified	Unclassified
Eukiefferiella claripennis gr.	1	8	Gatherers	Sprawler	Multivoltine
Haemopis sp.	1	8	Predators	Unclassified	Unclassified
Helobdella elongata	2	7	Predators	Unclassified	Unclassified
Hydrobaenus sp.	14	8	Scrapers	Sprawler	Univoltine
Limnodrilus hoffmeisteri	36	10	Gatherers	Sprawler	Unclassified
Limnophyes sp.	1	8	Gatherers	Sprawler	Multivoltine
Lumbricina	33	8	Gatherers	Burrower	Unclassified
Micropsectra sp.	1	7	Gatherers	Varied	Multivoltine
Nematoda	4	5	Predators	Burrower	Multivoltine
Orthocladius Complex	22	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	37	6	Gatherers	Sprawler	Univoltine
Paratanytarsus sp.	5	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	1	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	8	7	Scrapers	Burrower	Univoltine
Pilaria sp.	1	7	Predators	Burrower	Univoltine
Pisidium sp.	31	6	Filterers	Burrower	Long-lived
Pristina aequiseta	1	8	Gatherers	Unclassified	Unclassified
Pseudosmittia sp.	1	6	Gatherers	Unclassified	Unclassified
Thienemannimyia gr. sp.	4	5	Predators	Sprawler	Univoltine
Tubificidae w/ cap setae	2	10	Gatherers	Sprawler	Unclassified
Total Abundance	**303**				
Tolerance Value Weighted Mean		**7.2**			

IDEQ Site 1994SLEWA016 **Carol Brink Park Restoration, 1994**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Amphiagrion sp.	88	5	Predators	Climber	Unclassified
Bezzia sp.	9	6	Predators	Burrower	Multivoltine
Callibaetis sp.	1	9	Gatherers	Swimmer	Multivoltine
Chironomidae	224	6	Gatherers	Burrower	Multivoltine
Dytiscidae	13	5	Predators	Varied	Semivoltine
Erpobdellidae	30	8	Predators	Swimmer	Unclassified
Haemopis marmorata	18	8	Unclassified	Unclassified	Unclassified
Haliplidae	3	7	Shredders	Varied	Multivoltine
Hirudinida	12	7	Predators	Unclassified	Unclassified
Hyalella azteca	360	8	Gatherers	Varied	Multivoltine
Hydrophilidae	12	5	Predators	Varied	Multivoltine
Limnophila sp.	1	4	Predators	Burrower	Multivoltine
Oligochaeta	1303	8	Gatherers	Sprawler	Unclassified
Optioservus quadrimaculatus	1	5	Scrapers	Clinger	Semivoltine
Sialis sp.	4	4	Predators	Varied	Semivoltine
Total Abundance	**2079**				
Tolerance Value Weighted Mean		**7.6**			

IDEQ Site 1995SLEWB034 **Carol Brink Park Restoration, 1995**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Amphiagrion sp.	3	5	Predators	Climber	Unclassified
Baetis tricaudatus	1	4	Gatherers	Varied	Multivoltine
Callibaetis sp.	38	9	Gatherers	Swimmer	Multivoltine
Ceratopogoninae	14	6	Predators	Burrower	Multivoltine
Chironomidae	86	6	Gatherers	Burrower	Multivoltine
Cleptelmis ornata	1	4	Gatherers	Varied	Unclassified
Coenagrionidae	7	9	Predators	Climber	Unclassified
Collembola	2	9	Gatherer	Sprawler	Unclassified
Copepoda	1	8	Gatherer	Swimmer	Multivoltine
Corixidae	56	8	Piercer-Herbivore	Swimmer	Semivoltine
Dytiscidae	6	5	Predators	Varied	Semivoltine
Ephydridae	1	6	Shredders	Burrower	Multivoltine
Erpobdellidae	5	8	Predators	Swimmer	Unclassified
Haliplus sp.	4	8	Gatherers	Varied	Multivoltine
Helobdella stagnalis	1	7	Predators	Swimmer	Univoltine
Helophorus sp.	1	7	Shredders	Climber	Unclassified
Heterlimnius corpulentus	1	4	Gatherers	Clinger	Semivoltine
Hyalella azteca	22	8	Gatherers	Varied	Multivoltine
Ischnura sp.	1	9	Predators	Climber	Semivoltine
Laccobius sp.	2	7	Shredders	Unclassified	Unclassified
Lymnaeidae	6	6	Scrapers	Clingers	Unclassified
Odontomyia sp.	1	5	Gatherers	Sprawler	Univoltine
Oligochaeta	163	8	Gatherers	Sprawler	Unclassified
Ostracoda	1	8	Gatherers	Sprawler	Multivoltine
Pericoma/Telmatoscopus sp.	1	4	Gatherers	Burrower	Multivoltine
Physidae	11	8	Scrapers	Clinger	Unclassified
Planorbidae	88	6	Scrapers	Clingers	Unclassified
Sialis sp.	2	4	Predators	Varied	Semivoltine
Sphaeriidae	26	6	Filterers	Burrower	Long-lived
Tropisternus sp.	3	7	Varied	Varied	Multivoltine
Total Abundance	**552**				
Tolerance Value Weighted Mean		**7.2**			

IDEQ Site 1996SLEWB045 **Carol Brink Park Restoration, 1996**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Amphiagrion sp.	3	5	Predators	Climber	Unclassified
Baetis tricaudatus	1	4	Gatherers	Clinger	Multivoltine
Callibaetis sp.	38	9	Gatherers	Swimmer	Multivoltine
Ceratopogoninae	14	6	Predators	Burrower	Multivoltine
Chironomidae	58	6	Gatherers	Burrower	Multivoltine
Cleptelmis ornata	1	4	Gatherers	Varied	Unclassified
Coenagrionidae	7	9	Predators	Climber	Unclassified
Copepoda	1	8	Gatherer	Swimmer	Multivoltine
Corixidae	56	8	Herbivore	Swimmer	Semivoltine
Dytiscidae	6	5	Predators	Swimmer	Semivoltine
Ephydridae	1	6	Shredders	Burrower	Multivoltine
Erpobdellidae	5	8	Predators	Swimmer	Unclassified
Haliplus sp.	2	8	Gatherers	Swimmer	Multivoltine
Heterlimnius corpulentus	1	4	Gatherers	Clinger	Semivoltine
Laccobius sp.	2	7	Shredders	Unclassified	Unclassified
Lymnaeidae	5	6	Scrapers	Clingers	Unclassified
Oligochaeta	54	8	Gatherers	Sprawler	Unclassified
Ostracoda	1	8	Gatherers	Sprawler	Multivoltine
Physidae	2	8	Scrapers	Clinger	Unclassified
Planorbidae	23	6	Scrapers	Clingers	Unclassified
Sphaeriidae	5	6	Filterers	Burrower	Long-lived
Tropisternus sp.	3	7	Gatherers	Swimmer	Multivoltine
Total Abundance	**289**				
Tolerance Value Weighted Mean		**7.3**			

2012SLEWA050 **Carol Brink Park Restoration, 2012**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Chironomus sp.	99	10	Gatherers	Burrower	Multivoltine
Cladopelma sp.	3	9	Gatherers	Burrower	Unclassified
Cladotanytarsus sp.	1	7	Gatherers	Clinger	Univoltine
Corixidae	1	8	Piercer-Herbivore	Swimmer	Semivoltine
Crangonyx sp.	11	6	Gatherers	Varied	Multivoltine
Dero digitata	1	10	Gatherers	Sprawler	Unclassified
Dicrotendipes sp.	35	8	Gatherers	Burrower	Multivoltine
Erpobdellidae	3	8	Predators	Swimmer	Unclassified
Ferrissia sp.	4	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	4	8	Scrapers	Clingers	Unclassified
Limnesia sp.	4	6	Predators	Unclassified	Unclassified
Limnodrilus hoffmeisteri	58	10	Gatherers	Sprawler	Unclassified
Limnodrilus silvani	12	10	Unclassified	Unclassified	Unclassified
Micropsectra sp.	4	7	Gatherers	Varied	Multivoltine
Parametriocnemus sp.	1	5	Gatherers	Sprawler	Multivoltine
Paratanytarsus sp.	5	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	17	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	220	7	Scrapers	Burrower	Univoltine
Pisidium sp.	9	6	Filterers	Burrower	Long-lived
Planorbella sp.	4	6	Scraper	Clinger	Unclassified
Psectrotanypus sp.	2	10	Predators	Sprawler	Bivoltine
Radotanypus sp.	1	10	Predators	Sprawler	Bivoltine
Tanypus sp.	1	10	Predators	Sprawler	Unclassified
Tanytarsus sp.	11	6	Filterers	Clinger	Multivoltine
Thienemannimyia gr. sp.	2	5	Predators	Sprawler	Univoltine
Tubificidae w/ cap setae	13	10	Gatherers	Sprawler	Unclassified
Total Abundance	**526**				
Tolerance Value Weighted Mean		**8.1**			

IDEQ Site 2013SLEWA017 **Carol Brink Park Restoration, 2013**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Acricotopus sp.	2	10	Gatherers	Sprawler	Unclassified
Chaetogaster diaphanus	1	6	Predators	Unclassified	Unclassified
Chironomus sp.	82	10	Gatherers	Burrower	Multivoltine
Cladopelma sp.	2	9	Gatherers	Burrower	Unclassified
Crangonyx sp.	10	6	Gatherers	Varied	Multivoltine
Cricotopus sp.	4	7	Shredders	Clinger	Multivoltine
Dero digitata	82	10	Gatherers	Sprawler	Unclassified
Dicrotendipes sp.	14	8	Gatherers	Burrower	Multivoltine
Enchytraeidae	7	10	Gatherers	Sprawler	Unclassified
Ephydridae	1	6	Shredders	Burrower	Multivoltine
Erpobdella sp.	4	8	Predators	Unclassified	Unclassified
Ferrissia sp.	1	6	Scrapers	Clingers	Unclassified
Limnodrilus hoffmeisteri	223	10	Gatherers	Sprawler	Unclassified
Limnodrilus silvani	26	6	Unclassified	Unclassified	Unclassified
Limnodrilus udekemianus	17	10	Gatherers	Sprawler	Unclassified
Micropsectra sp.	2	7	Gatherers	Varied	Multivoltine
Nais sp.	6	8	Gatherers	Burrower	Unclassified
Ophidonais serpentina	1	6	Gatherers	Sprawler	Unclassified
Paratanytarsus sp.	2	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	1	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	5	7	Scrapers	Burrower	Univoltine
Pisidium sp.	13	6	Filterers	Burrower	Long-lived
Planorbella sp.	9	6	Scraper	Clinger	Unclassified
Sigara sp.	6	7	Piercer-Herbivore	Swimmer	Semivoltine
Slavina appendiculata	16	6	Gatherers	Unclassified	Unclassified
Tanytarsus sp.	3	6	Filterers	Clinger	Multivoltine
Theromyzon sp.	1	7	Unclassified	Unclassified	Univoltine
Tubificidae w/ cap setae	23	10	Gatherers	Sprawler	Unclassified
Total Abundance	**564**				
Tolerance Value Weighted Mean		**9.2**			

EA Sample 6408.04-9 **Carol Brink Park Restoration, rep. 1, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Bezzia/Palpomyia sp.	1	6	Predators	Burrower	Univoltine
Ceratopogoninae	1	6	Predators	Burrower	Multivoltine
Chironomus sp.	1	10	Gatherers	Burrower	Multivoltine
Cladopelma sp.	2	9	Gatherers	Burrower	Unclassified
Crangonyx sp.	1	6	Gatherers	Varied	Multivoltine
Cricotopus bicinctus gr.	4	7	Shredders	Clinger	Multivoltine
Dero sp.	5	10	Gatherers	Sprawler	Unclassified
Diamesa sp.	21	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	11	8	Gatherers	Burrower	Multivoltine
Diplocladius sp.	1	5	Gatherers	Sprawler	Unclassified
Diptera	6	6	Unclassified	Unclassified	Unclassified
Enchytraeidae	9	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	2	8	Predators	Unclassified	Unclassified
Ferrissia sp.	1	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	2	8	Scrapers	Clingers	Unclassified
Haemopis sp.	2	8	Predators	Unclassified	Unclassified
Hydrobaenus sp.	14	8	Scrapers	Sprawler	Univoltine
Limnodrilus hoffmeisteri	54	10	Gatherers	Sprawler	Unclassified
Musculium sp.	3	4	Filterers	Burrower	Long-lived
Nais sp.	7	8	Gatherers	Burrower	Unclassified
Nematoda	18	5	Predators	Burrower	Multivoltine
Orthocladiinae	1	6	Gatherers	Sprawler	Multivoltine
Orthocladius Complex	22	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	50	6	Gatherers	Sprawler	Univoltine
Paratanytarsus sp.	1	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	1	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	3	7	Scrapers	Burrower	Univoltine
Pisidium sp.	4	6	Filterers	Burrower	Long-lived
Planorbella sp.	2	6	Scraper	Clinger	Unclassified
Thienemannimyia gr. sp.	1	5	Predators	Sprawler	Univoltine
Tubificidae w/ cap setae	3	10	Gatherers	Sprawler	Unclassified
Total Abundance	**254**				
Tolerance Value Weighted Mean		**7.3**			

EA Sample 6408.04-10 **Carol Brink Park Restoration, rep. 2, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Bezzia/Palpomyia sp.	2	6	Predators	Burrower	Univoltine
Cladopelma sp.	9	9	Gatherers	Burrower	Unclassified
Coenagrionidae	2	9	Predators	Climber	Unclassified
Crangonyx sp.	7	6	Gatherers	Varied	Multivoltine
Dero sp.	7	10	Gatherers	Sprawler	Unclassified
Diamesa sp.	20	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	19	8	Gatherers	Burrower	Multivoltine
Diplocladius sp.	1	5	Gatherers	Sprawler	Unclassified
Enchytraeidae	42	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	8	8	Predators	Unclassified	Unclassified
Eukiefferiella claripennis gr.	2	8	Gatherers	Sprawler	Multivoltine
Gyraulus sp.	3	8	Scrapers	Clingers	Unclassified
Haemopis sp.	5	8	Predators	Unclassified	Unclassified
Hydrobaenus sp.	8	8	Scrapers	Sprawler	Univoltine
Limnodrilus hoffmeisteri	54	10	Gatherers	Sprawler	Unclassified
Limnophyes sp.	3	8	Gatherers	Sprawler	Multivoltine
Lumbricina	10	8	Gatherers	Burrower	Unclassified
Lumbriculidae	2	8	Gatherers	Sprawler	Unclassified
Micropsectra sp.	2	7	Gatherers	Varied	Multivoltine
Nais sp.	9	8	Gatherers	Burrower	Unclassified
Nematoda	1	5	Predators	Burrower	Multivoltine
Orthocladius (Euorthocladius) sp.	1	6	Gatherers	Sprawler	Univoltine
Orthocladius Complex	18	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	59	6	Gatherers	Sprawler	Univoltine
Ostracoda	2	8	Gatherers	Sprawler	Multivoltine
Paratanytarsus sp.	2	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	3	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	3	7	Scrapers	Burrower	Univoltine
Pisidium sp.	61	6	Filterers	Burrower	Long-lived
Planorbella sp.	5	6	Scraper	Clinger	Unclassified
Tanytarsus sp.	1	6	Filterers	Clinger	Multivoltine
Theromyzon sp.	1	7	Unclassified	Unclassified	Univoltine
Thienemannimyia gr. sp.	1	5	Predators	Sprawler	Univoltine
Tubificidae w/ cap setae	24	10	Gatherers	Sprawler	Unclassified
Turbellaria	1	4	Predators	Sprawler	Multivoltine
Total Abundance	**398**				
Tolerance Value Weighted Mean		**7.7**			

EA Sample 6408.04-11 **Carol Brink Park Restoration, rep. 3, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Brillia sp.	2	5	Shredders	Varied	Bivoltine
Ceratopogoninae	2	6	Predators	Burrower	Multivoltine
Cricotopus bicinctus gr.	2	7	Shredders	Clinger	Multivoltine
Dasyhelea sp.	2	6	Gatherers	Sprawler	Unclassified
Dero sp.	2	10	Gatherers	Sprawler	Unclassified
Diamesa sp.	56	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	2	8	Gatherers	Burrower	Multivoltine
Diplocladius sp.	45	5	Gatherers	Sprawler	Unclassified
Enchytraeidae	82	10	Gatherers	Sprawler	Unclassified
Eukiefferiella claripennis gr.	22	8	Gatherers	Sprawler	Multivoltine
Haemopis sp.	4	8	Predators	Unclassified	Unclassified
Hydrobaenus sp.	83	8	Scrapers	Sprawler	Univoltine
Limnophyes sp.	2	8	Gatherers	Sprawler	Multivoltine
Micropsectra sp.	5	7	Gatherers	Varied	Multivoltine
Nais sp.	30	8	Gatherers	Burrower	Unclassified
Nematoda	12	5	Predators	Burrower	Multivoltine
Orthocladius (Euortho.) rivicola	3	6	Gatherers	Sprawler	Univoltine
Orthocladius Complex	18	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	98	6	Gatherers	Sprawler	Univoltine
Paratanytarsus sp.	1	6	Gatherers	Sprawler	Multivoltine
Pericoma/Telmatoscopus sp.	1	4	Gatherers	Burrower	Multivoltine
Pisidium sp.	8	6	Filterers	Burrower	Long-lived
Polypedilum sp.	1	6	Shredders	Clinger	Bivoltine
Pristina jenkinae	9	10	Gatherers	Sprawler	Unclassified
Pristina osborni	1	10	Gatherers	Unclassified	Unclassified
Simulium sp.	5	5	Filterers	Clinger	Multivoltine
Tubificidae w/ cap setae	11	10	Gatherers	Sprawler	Unclassified
Tubificidae w/o cap setae	36	10	Gatherers	Sprawler	Unclassified
Total Abundance	**545**				
Tolerance Value Weighted Mean		**7.3**			

EA Sample 6408.04-12 **Carol Brink Park Restoration, rep. 4, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Diamesa sp.	6	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	4	8	Gatherers	Burrower	Multivoltine
Enchytraeidae	3	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	6	8	Predators	Unclassified	Unclassified
Haemopis sp.	2	8	Predators	Unclassified	Unclassified
Hydrobaenus sp.	1	8	Scrapers	Sprawler	Univoltine
Lumbricina	2	8	Gatherers	Burrower	Unclassified
Micropsectra sp.	1	7	Gatherers	Varied	Multivoltine
Orthocladius Complex	5	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	6	6	Gatherers	Sprawler	Univoltine
Phaenopsectra sp.	1	7	Scrapers	Burrower	Univoltine
Pisidium sp.	4	6	Filterers	Burrower	Long-lived
Planorbella sp.	1	6	Scraper	Clinger	Unclassified
Polypedilum sp.	1	6	Shredders	Clinger	Bivoltine
Tubificidae w/o cap setae	4	10	Gatherers	Sprawler	Unclassified
Total Abundance	**47**				
Tolerance Value Weighted Mean		**7.1**			

IDEQ Site 2013SLEWA022 **Downstream of Carol Brink Park Restoration, 2013**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Chironomus sp.	135	10	Gatherers	Burrower	Multivoltine
Cladopelma sp.	16	9	Gatherers	Burrower	Unclassified
Crangonyx sp.	8	6	Gatherers	Varied	Multivoltine
Dero digitata	40	10	Gatherers	Sprawler	Unclassified
Dicrotendipes sp.	11	8	Gatherers	Burrower	Multivoltine
Enchytraeidae	2	10	Gatherers	Sprawler	Unclassified
Ferrissia sp.	5	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	1	8	Scrapers	Clingers	Unclassified
Hydrobaenus sp.	1	8	Scrapers	Sprawler	Univoltine
Limnodrilus hoffmeisteri	210	10	Gatherers	Sprawler	Unclassified
Micropsectra sp.	2	7	Gatherers	Varied	Multivoltine
Nais sp.	5	8	Gatherers	Burrower	Unclassified
Nematoda	1	5	Predators	Burrower	Multivoltine
Ophidonais serpentina	2	6	Gatherers	Sprawler	Unclassified
Ostracoda	4	8	Gatherers	Sprawler	Multivoltine
Paratanytarsus sp.	1	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	9	8	Gatherers	Burrower	Bivoltine
Pisidium sp.	6	6	Filterers	Burrower	Long-lived
Planorbella sp.	1	6	Scraper	Clinger	Unclassified
Psectrotanypus sp.	2	10	Predators	Sprawler	Bivoltine
Sergentia sp.	20	5	Gatherers	Burrower	Unclassified
Sigara sp.	17	7	Piercer-Herbivore	Swimmer	Semivoltine
Slavina appendiculata	1	6	Gatherers	Unclassified	Unclassified
Tanypus sp.	1	10	Predators	Sprawler	Unclassified
Tanytarsus sp.	20	6	Filterers	Clinger	Multivoltine
Theromyzon sp.	23	7	Unclassified	Unclassified	Univoltine
Tubificidae w/ cap setae	77	10	Gatherers	Sprawler	Unclassified
Total Abundance	**621**				
Tolerance Value Weighted Mean		**9.2**			

EA Sample 6408.04-1 **Downstream of Carol Brink Park Restoration, rep. 1, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Bezzia/Palpomyia sp.	4	6	Predators	Burrower	Univoltine
Brillia sp.	4	5	Shredders	Varied	Bivoltine
Chironomus sp.	1	10	Gatherers	Burrower	Multivoltine
Coenagrionidae	3	9	Predators	Climber	Unclassified
Corixidae	1	8	Piercer-Herbivore	Swimmer	Semivoltine
Crangonyx sp.	1	6	Gatherers	Varied	Multivoltine
Cricotopus sp.	4	7	Shredders	Clinger	Multivoltine
Dero digitata	1	10	Gatherers	Sprawler	Unclassified
Dero sp.	1	10	Gatherers	Sprawler	Unclassified
Diamesa sp.	82	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	31	8	Gatherers	Burrower	Multivoltine
Enchytraeidae	64	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	5	8	Predators	Unclassified	Unclassified
Eukiefferiella claripennis gr.	3	8	Gatherers	Sprawler	Multivoltine
Ferrissia sp.	18	6	Scrapers	Clingers	Unclassified
Fossaria sp.	4	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	15	8	Scrapers	Clingers	Unclassified
Haemopis sp.	5	8	Predators	Unclassified	Unclassified
Helobdella stagnalis	2	7	Predators	Swimmer	Univoltine
Hydrobaenus sp.	8	8	Scrapers	Sprawler	Univoltine
Limnodrilus hoffmeisteri	45	10	Gatherers	Sprawler	Unclassified
Lumbricina	3	8	Gatherers	Burrower	Unclassified
Micropsectra sp.	1	7	Gatherers	Varied	Multivoltine
Nais sp.	1	8	Gatherers	Burrower	Unclassified
Nematoda	2	5	Predators	Burrower	Multivoltine
Orthocladius (Euorthocladius) sp.	3	6	Gatherers	Sprawler	Univoltine
Orthocladius Complex	22	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	95	6	Gatherers	Sprawler	Univoltine
Ostracoda	2	8	Gatherers	Sprawler	Multivoltine
Phaenopsectra sp.	1	7	Scrapers	Burrower	Univoltine
Pisidium sp.	30	6	Filterers	Burrower	Long-lived
Planorbella sp.	13	6	Scraper	Clinger	Unclassified
Ptychoptera sp.	1	9	Gatherers	Burrower	Univoltine
Simuliidae	1	6	Filterers	Clinger	Multivoltine
Thienemannimyia gr. sp.	3	5	Predators	Sprawler	Univoltine
Total Abundance	**480**				
Tolerance Value Weighted Mean		**7.1**			

EA Sample 6408.04-2 **Downstream of Carol Brink Park Restoration, rep. 2, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Antocha sp.	1	3	Gatherers	Clinger	Multivoltine
Bezzia/Palpomyia sp.	5	6	Predators	Burrower	Univoltine
Chironomus sp.	2	10	Gatherers	Burrower	Multivoltine
Cladopelma sp.	3	9	Gatherers	Burrower	Unclassified
Coenagrionidae	1	9	Predators	Climber	Unclassified
Crangonyx sp.	1	6	Gatherers	Varied	Multivoltine
Cricotopus bicinctus gr.	2	7	Shredders	Clinger	Multivoltine
Cricotopus sp.	5	7	Shredders	Clinger	Multivoltine
Diamesa sp.	91	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	13	8	Gatherers	Burrower	Multivoltine
Diplocladius sp.	12	5	Gatherers	Sprawler	Unclassified
Dytiscidae	1	5	Predators	Varied	Semivoltine
Enchytraeidae	16	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	6	8	Predators	Unclassified	Unclassified
Eukiefferiella claripennis gr.	36	8	Gatherers	Sprawler	Multivoltine
Ferrissia sp.	5	6	Scrapers	Clingers	Unclassified
Fossaria sp.	4	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	16	8	Scrapers	Clingers	Unclassified
Heptageniidae	1	4	Scrapers	Clinger	Univoltine
Hydrobaenus sp.	3	8	Scrapers	Sprawler	Univoltine
Limnephilidae	1	4	Shredders	Climber	Univoltine
Limnesia sp.	2	6	Predators	Unclassified	Unclassified
Limnodrilus hoffmeisteri	14	10	Gatherers	Sprawler	Unclassified
Limnophyes sp.	2	8	Gatherers	Sprawler	Multivoltine
Micropsectra sp.	4	7	Gatherers	Varied	Multivoltine
Nematoda	4	5	Predators	Burrower	Multivoltine
Orthocladius (Euorthocladius) sp.	24	6	Gatherers	Sprawler	Univoltine
Orthocladius Complex	43	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	149	6	Gatherers	Sprawler	Univoltine
Ostracoda	7	8	Gatherers	Sprawler	Multivoltine
Paratanytarsus sp.	1	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	1	8	Gatherers	Burrower	Bivoltine
Pericoma/Telmatoscopus sp.	1	4	Gatherers	Burrower	Multivoltine
Phaenopsectra sp.	2	7	Scrapers	Burrower	Univoltine
Pisidium sp.	16	6	Filterers	Burrower	Long-lived
Planorbella sp.	6	6	Scraper	Clinger	Unclassified
Ptychoptera sp.	2	9	Gatherers	Burrower	Univoltine
Rheotanytarsus sp.	1	6	Filterers	Clinger	Multivoltine
Simulium sp.	8	5	Filterers	Clinger	Multivoltine
Tabanidae	1	8	Predators	Sprawler	Unclassified
Tanytarsus sp.	1	6	Filterers	Clinger	Multivoltine
Thienemannimyia gr. sp.	4	5	Predators	Sprawler	Univoltine
Tubificidae w/ cap setae	1	10	Gatherers	Sprawler	Unclassified
Total Abundance	**519**				
Tolerance Value Weighted Mean		**6.4**			

EA Sample 6408.04-3 **Downstream of Carol Brink Park Restoration, rep. 3, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Bezzia/Palpomyia sp.	1	6	Predators	Burrower	Univoltine
Coenagrionidae	1	9	Predators	Climber	Unclassified
Diamesa sp.	22	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	4	8	Gatherers	Burrower	Multivoltine
Diptera	1	6	Unclassified	Unclassified	Unclassified
Enchytraeidae	15	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	1	8	Predators	Unclassified	Unclassified
Ferrissia sp.	3	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	5	8	Scrapers	Clingers	Unclassified
Helisoma anceps	1	6	Scrapers	Clinger	Unclassified
Hydrobaenus sp.	2	8	Scrapers	Sprawler	Univoltine
Limnodrilus hoffmeisteri	4	10	Gatherers	Sprawler	Unclassified
Limnophyes sp.	1	8	Gatherers	Sprawler	Multivoltine
Nematoda	1	5	Predators	Burrower	Multivoltine
Orthocladius (Euorthocladius) sp.	3	6	Gatherers	Sprawler	Univoltine
Orthocladius Complex	16	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	55	6	Gatherers	Sprawler	Univoltine
Ostracoda	1	8	Gatherers	Sprawler	Multivoltine
Paratanytarsus sp.	1	6	Gatherers	Sprawler	Multivoltine
Phaenopsectra sp.	1	7	Scrapers	Burrower	Univoltine
Planorbella sp.	12	6	Scraper	Clinger	Unclassified
Sigara sp.	2	7	Piercer-Herbivore	Swimmer	Semivoltine
Thienemannimyia gr. sp.	1	5	Predators	Sprawler	Univoltine
Total Abundance	**154**				
Tolerance Value Weighted Mean		**6.6**			

EA Sample 6408.04-4 **Downstream of Carol Brink Park Restoration, rep. 4, 2014**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Bezzia/Palpomyia sp.	8	6	Predators	Burrower	Univoltine
Brillia sp.	3	5	Shredders	Varied	Bivoltine
Diamesa sp.	30	5	Gatherers	Sprawler	Univoltine
Dicrotendipes sp.	5	8	Gatherers	Burrower	Multivoltine
Diplocladius sp.	4	5	Gatherers	Sprawler	Unclassified
Enchytraeidae	12	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	17	8	Predators	Unclassified	Unclassified
Eukiefferiella claripennis gr.	7	8	Gatherers	Sprawler	Multivoltine
Fossaria sp.	4	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	17	8	Scrapers	Clingers	Unclassified
Haemopis sp.	1	8	Predators	Unclassified	Unclassified
Hydrobaenus sp.	1	8	Scrapers	Sprawler	Univoltine
Limnophyes sp.	2	8	Gatherers	Sprawler	Multivoltine
Nematoda	2	5	Predators	Burrower	Multivoltine
Orthocladius (Euorthocladius) sp.	4	6	Gatherers	Sprawler	Univoltine
Orthocladius Complex	5	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	29	6	Gatherers	Sprawler	Univoltine
Ostracoda	1	8	Gatherers	Sprawler	Multivoltine
Pericoma/Telmatoscopus sp.	1	4	Gatherers	Burrower	Multivoltine
Phaenopsectra sp.	2	7	Scrapers	Burrower	Univoltine
Planorbella sp.	13	6	Scraper	Clinger	Unclassified
Sphaeriidae	1	6	Filterers	Burrower	Long-lived
Thienemannimyia gr. sp.	2	5	Predators	Sprawler	Univoltine
Tubificidae w/o cap setae	4	10	Gatherers	Sprawler	Unclassified
Total Abundance	**175**				
Tolerance Value Weighted Mean		**6.7**			

IDEQ Site 2013SLEWA015 **Herons Hideout Restoration, 2013**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Chaetogaster diaphanus	1	6	Predators	Unclassified	Unclassified
Chironomus sp.	55	10	Gatherers	Burrower	Multivoltine
Cladopelma sp.	12	9	Gatherers	Burrower	Unclassified
Crangonyx sp.	1	6	Gatherers	Varied	Multivoltine
Dero digitata	48	10	Gatherers	Sprawler	Unclassified
Dicrotendipes sp.	127	8	Gatherers	Burrower	Multivoltine
Erpobdella sp.	2	8	Predators	Unclassified	Unclassified
Gyraulus sp.	3	8	Scrapers	Clingers	Unclassified
Helobdella stagnalis	2	7	Predators	Swimmer	Univoltine
Limnesia sp.	13	6	Predators	Unclassified	Unclassified
Limnodrilus hoffmeisteri	109	10	Gatherers	Sprawler	Unclassified
Limnodrilus silvani	46	6	Unclassified	Unclassified	Unclassified
Nais bretscheri	159	6	Gatherers	Unclassified	Unclassified
Nematoda	2	5	Predators	Burrower	Multivoltine
Ostracoda	11	8	Gatherers	Sprawler	Multivoltine
Parakiefferiella sp.	2	6	Gatherers	Sprawler	Bivoltine
Paratanytarsus sp.	4	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	37	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	4	7	Scrapers	Burrower	Univoltine
Pisidium sp.	3	6	Filterers	Burrower	Long-lived
Planorbella sp.	5	6	Scraper	Clinger	Unclassified
Psectrotanypus sp.	3	10	Predators	Sprawler	Bivoltine
Sigara sp.	15	7	Piercer-Herbivore	Swimmer	Semivoltine
Slavina appendiculata	2	6	Gatherers	Unclassified	Unclassified
Tanytarsus sp.	31	6	Filterers	Clinger	Multivoltine
Thienemannimyia gr. sp.	1	5	Predators	Sprawler	Univoltine
Tubificidae w/ cap setae	9	10	Gatherers	Sprawler	Unclassified
Total Abundance	**707**				
Tolerance Value Weighted Mean		**7.9**			

IDEQ Site 2013SLEWA016 **Fair Grounds/Fire House Restoration, 2013**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Aulodrilus pluriseta	4	8	Gatherers	Unclassified	Unclassified
Chironomus sp.	5	10	Gatherers	Burrower	Multivoltine
Cladopelma sp.	4	9	Gatherers	Burrower	Unclassified
Coenagrionidae	1	9	Predators	Climber	Unclassified
Crangonyx sp.	9	6	Gatherers	Varied	Multivoltine
Cricotopus sp.	3	7	Shredders	Clinger	Multivoltine
Dero digitata	55	10	Gatherers	Sprawler	Unclassified
Dicrotendipes sp.	23	8	Gatherers	Burrower	Multivoltine
Ferrissia sp.	6	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	2	8	Scrapers	Clingers	Unclassified
Helobdella stagnalis	12	7	Predators	Swimmer	Univoltine
Hydrobaenus sp.	1	8	Scrapers	Sprawler	Univoltine
Limnodrilus hoffmeisteri	210	10	Gatherers	Sprawler	Unclassified
Limnodrilus udekemianus	2	10	Gatherers	Sprawler	Unclassified
Limnophyes sp.	1	8	Gatherers	Sprawler	Multivoltine
Micropsectra sp.	81	7	Gatherers	Varied	Multivoltine
Musculium sp.	27	4	Filterers	Burrower	Long-lived
Nais sp.	3	8	Gatherers	Burrower	Unclassified
Nematoda	5	5	Predators	Burrower	Multivoltine
Ophidonais serpentina	14	6	Gatherers	Sprawler	Unclassified
Ostracoda	3	8	Gatherers	Sprawler	Multivoltine
Parakiefferiella sp.	2	6	Gatherers	Sprawler	Bivoltine
Paratanytarsus sp.	23	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	11	8	Gatherers	Burrower	Bivoltine
Peltodytes sp.	2	5	Shredders	Varied	Multivoltine
Phaenopsectra sp.	8	7	Scrapers	Burrower	Univoltine
Physa sp.	6	8	Scrapers	Clingers	Unclassified
Pisidium sp.	17	6	Filterers	Burrower	Long-lived
Planorbella sp.	11	6	Scraper	Clinger	Unclassified
Procladius sp.	1	9	Predators	Sprawler	Bivoltine
Slavina appendiculata	8	6	Gatherers	Unclassified	Unclassified
Tanytarsus sp.	11	6	Filterers	Clinger	Multivoltine
Thienemannimyia gr. sp.	2	5	Predators	Sprawler	Univoltine
Tubificidae w/ cap setae	14	10	Gatherers	Sprawler	Unclassified
Total Abundance	**587**				
Tolerance Value Weighted Mean		**8.2**			

IDEQ Site 2006SLEWA014 **UI Campus Restoration, 2006**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Alotanypus sp.	1	10	Predator	Varied	Unclassified
Cheumatopsyche sp.	3	5	Filterers	Clinger	Multivoltine
Chironomus sp.	58	10	Gatherers	Burrower	Multivoltine
Coenagrion/Enallagma sp.	1	9	Predators	Unclassified	Unclassified
Dero digitata	1	10	Gatherers	Sprawler	Unclassified
Dicrotendipes sp.	68	8	Gatherers	Burrower	Multivoltine
Enchytraeidae	1	10	Gatherers	Sprawler	Unclassified
Erpobdellidae	8	8	Predators	Swimmer	Unclassified
Ferrissia sp.	54	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	4	8	Scrapers	Clingers	Unclassified
Helobdella stagnalis	2	7	Predators	Swimmer	Univoltine
Hydropsyche sp.	2	5	Filterers	Clinger	Unclassified
Limnodrilus hoffmeisteri	90	10	Gatherers	Sprawler	Unclassified
Limnodrilus udekemianus	26	10	Gatherers	Sprawler	Unclassified
Lumbriculidae	9	8	Gatherers	Sprawler	Unclassified
Micropsectra sp.	19	7	Gatherers	Varied	Multivoltine
Nais communis	2	8	Gatherers	Sprawler	Unclassified
Nais sp.	1	8	Gatherers	Burrower	Unclassified
Nematoda	2	5	Predators	Burrower	Multivoltine
Optioservus sp.	2	5	Scrapers	Clinger	Semivoltine
Paratanytarsus sp.	55	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	1	8	Gatherers	Burrower	Bivoltine
Psectrotanypus sp.	4	10	Predators	Sprawler	Bivoltine
Psephenus sp.	6	4	Scrapers	Clinger	Semivoltine
Quistadrilus multisetosus	1	10	Gatherers	Sprawler	Unclassified
Sergentia sp.	26	5	Gatherers	Burrower	Unclassified
Simulium sp.	1	5	Filterers	Clinger	Multivoltine
Sphaeriidae	4	6	Filterers	Burrower	Long-lived
Tanytarsus sp.	11	6	Filterers	Clinger	Multivoltine
Tubificidae w/ cap setae	68	10	Gatherers	Sprawler	Unclassified
Zavrelimyia sp.	1	8	Predators	Sprawler	Univoltine
Total Abundance	**532**				
Tolerance Value Weighted Mean		**8.2**			

IDEQ Site 2013SLEWA014 **UI Campus Restoration, 2013**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Chaetogaster diaphanus	2	6	Predators	Unclassified	Unclassified
Chironomus sp.	44	10	Gatherers	Burrower	Multivoltine
Cladopelma sp.	1	9	Gatherers	Burrower	Unclassified
Dero digitata	86	10	Gatherers	Sprawler	Unclassified
Dicrotendipes sp.	22	8	Gatherers	Burrower	Multivoltine
Empididae	1	6	Predators	Sprawler	Univoltine
Enchytraeidae	8	10	Gatherers	Sprawler	Unclassified
Ferrissia sp.	5	6	Scrapers	Clingers	Unclassified
Gyraulus sp.	2	8	Scrapers	Clingers	Unclassified
Limnodrilus hoffmeisteri	150	10	Gatherers	Sprawler	Unclassified
Nais bretscheri	30	6	Gatherers	Unclassified	Unclassified
Nematoda	2	5	Predators	Burrower	Multivoltine
Ophidonais serpentina	14	6	Gatherers	Sprawler	Unclassified
Paratendipes sp.	2	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	23	7	Scrapers	Burrower	Univoltine
Pisidium sp.	30	6	Filterers	Burrower	Long-lived
Planorbella sp.	1	6	Scraper	Clinger	Unclassified
Quistadrilus multisetosus	1	10	Gatherers	Sprawler	Unclassified
Radotanypus sp.	1	10	Predators	Sprawler	Bivoltine
Sergentia sp.	5	5	Gatherers	Burrower	Unclassified
Slavina appendiculata	20	6	Gatherers	Unclassified	Unclassified
Tanytarsus sp.	24	6	Filterers	Clinger	Multivoltine
Tubifex tubifex	93	10	Gatherers	Sprawler	Unclassified
Total Abundance	**567**				
Tolerance Value Weighted Mean		**8.8**			

1998SLEWB003 **Near the Moscow WWTP, 1998**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Baetis tricaudatus	2	4	Gatherers	Varied	Multivoltine
Brillia sp.	1	5	Shredders	Varied	Bivoltine
Chironomus sp.	192	10	Gatherers	Burrower	Multivoltine
Cricotopus bicinctus gr.	30	7	Shredders	Clinger	Multivoltine
Cricotopus sp.	29	7	Shredders	Clinger	Multivoltine
Cricotopus trifascia gr.	4	7	Shredders	Clinger	Multivoltine
Eukiefferiella claripennis gr.	22	8	Gatherers	Sprawler	Multivoltine
Hirudinida	1	7	Predators	Unclassified	Unclassified
Limnodrilus hoffmeisteri	7	10	Gatherers	Sprawler	Unclassified
Micropsectra sp.	1	7	Gatherers	Varied	Multivoltine
Orthocladius Complex	7	6	Gatherers	Sprawler	Univoltine
Orthocladius sp.	4	6	Gatherers	Sprawler	Univoltine
Parachironomus sp.	1	10	Gatherers	Sprawler	Unclassified
Paratanytarsus sp.	10	6	Gatherers	Sprawler	Multivoltine
Phaenopsectra sp.	38	7	Scrapers	Burrower	Univoltine
Polypedilum sp.	2	6	Shredders	Clinger	Bivoltine
Rhyacodrilus sp.	120	10	Gatherers	Burrower	Unclassified
Simulium sp.	6	5	Filterers	Clinger	Multivoltine
Tanytarsus sp.	2	6	Filterers	Clinger	Multivoltine
Total Abundance	**479**				
Tolerance Value Weighted Mean		**9.0**			

IDEQ Site 2002SLEWA027 **Near the Moscow WWTP, 2002**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Apedilum sp.	1	6	Shredder	Sprawler	Multivoltine
Chironomini	1	6	Gatherers	Burrower	Multivoltine
Chironomus sp.	4	10	Gatherers	Burrower	Multivoltine
Coenagrionidae	4	9	Predators	Climber	Unclassified
Corixidae	1	8	Piercer-Herbivore	Swimmer	Semivoltine
Cricotopus bicinctus gr.	38	7	Shredders	Clinger	Multivoltine
Dero sp.	1	10	Gatherers	Sprawler	Unclassified
Dicrotendipes sp.	1	8	Gatherers	Burrower	Multivoltine
Erpobdellidae	6	8	Predators	Swimmer	Unclassified
Gyraulus sp.	11	8	Scrapers	Clingers	Unclassified
Hemerodromia sp.	1	6	Predators	Sprawler	Univoltine
Hydroptila sp.	1	6	Piercer-Herbivore	Clinger	Multivoltine
Lumbricina	4	8	Gatherers	Burrower	Unclassified
Lumbriculidae	5	8	Gatherers	Sprawler	Unclassified
Lymnaeidae	2	6	Scrapers	Clingers	Unclassified
Micropsectra sp.	163	7	Gatherers	Varied	Multivoltine
Nais variabilis	3	10	Gatherers	Sprawler	Unclassified
Nematoda	1	5	Predators	Burrower	Multivoltine
Ophidonais serpentina	7	6	Gatherers	Sprawler	Unclassified
Optioservus sp.	2	5	Scrapers	Clinger	Semivoltine
Paratanytarsus sp.	79	6	Gatherers	Sprawler	Multivoltine
Physa (Physella) sp.	1	8	Scrapers	Clinger	Unclassified
Planorbella sp.	2	6	Scraper	Clinger	Unclassified
Polypedilum sp.	3	6	Shredders	Clinger	Bivoltine
Sphaeriidae	2	6	Filterers	Burrower	Long-lived
Tanytarsini	1	6	Filterers	Clinger	Multivoltine
Tanytarsus sp.	6	6	Filterers	Clinger	Multivoltine
Thienemanniella sp.	1	6	Gatherers	Sprawler	Multivoltine
Thienemannimyia gr. sp.	18	5	Predators	Sprawler	Univoltine
Tubificidae w/ cap setae	24	10	Gatherers	Sprawler	Unclassified
Tubificidae w/o cap setae	80	10	Gatherers	Sprawler	Unclassified
Total Abundance	**474**				
Tolerance Value Weighted Mean		**7.5**			

IDEQ Site 2013SLEWA013 **Near the Moscow WWTP, 2013**

Taxon	Abundance	Tol. Value	FFG	Habit	Voltinism
Acari	2	6	Predators	Clinger	Univoltine
Argia sp.	4	7	Predators	Clinger	Univoltine
Brillia sp.	2	5	Shredders	Varied	Bivoltine
Cheumatopsyche sp.	28	5	Filterers	Clinger	Multivoltine
Cricotopus bicinctus gr.	33	7	Shredders	Clinger	Multivoltine
Cricotopus sp.	60	7	Shredders	Clinger	Multivoltine
Cryptochironomus sp.	10	8	Predators	Varied	Bivoltine
Dicrotendipes sp.	58	8	Gatherers	Burrower	Multivoltine
Enchytraeidae	1	10	Gatherers	Sprawler	Unclassified
Erpobdella sp.	5	8	Predators	Unclassified	Unclassified
Eukiefferiella claripennis gr.	4	8	Gatherers	Sprawler	Multivoltine
Gyraulus sp.	1	8	Scrapers	Clingers	Unclassified
Hydropsyche sp.	26	5	Filterers	Clinger	Unclassified
Hydroptila sp.	6	6	Piercer-Herbivore	Clinger	Multivoltine
Lebertia sp.	1	6	Predators	Unclassified	Unclassified
Lepidostoma sp.	12	1	Shredders	Climber	Univoltine
Limnodrilus udekemianus	2	10	Gatherers	Sprawler	Unclassified
Limnophyes sp.	1	8	Gatherers	Sprawler	Multivoltine
Lumbricina	3	8	Gatherers	Burrower	Unclassified
Lymnaeidae	3	6	Scrapers	Clingers	Unclassified
Micropsectra sp.	76	7	Gatherers	Varied	Multivoltine
Mystacides alafimbriata	2	4	Gatherers	Sprawler	Multivoltine
Nais bretscheri	2	6	Gatherers	Unclassified	Unclassified
Nematoda	1	5	Predators	Burrower	Multivoltine
Optioservus sp.	2	5	Scrapers	Clinger	Semivoltine
Ostracoda	1	8	Gatherers	Sprawler	Multivoltine
Parakiefferiella sp.	10	6	Gatherers	Sprawler	Bivoltine
Parametriocnemus sp.	4	5	Gatherers	Sprawler	Multivoltine
Paratanytarsus sp.	31	6	Gatherers	Sprawler	Multivoltine
Paratendipes sp.	3	8	Gatherers	Burrower	Bivoltine
Phaenopsectra sp.	36	7	Scrapers	Burrower	Univoltine
Physa sp.	24	8	Scrapers	Clingers	Unclassified
Planorbella sp.	1	6	Scraper	Clinger	Unclassified
Polypedilum sp.	3	6	Shredders	Clinger	Bivoltine
Potamothrix bavaricus	7	10	Gatherers	Unclassified	Unclassified
Procladius sp.	1	9	Predators	Sprawler	Bivoltine
Simulium sp.	2	5	Filterers	Clinger	Multivoltine
Tanytarsus sp.	31	6	Filterers	Clinger	Multivoltine
Thienemanniella sp.	6	6	Gatherers	Sprawler	Multivoltine
Thienemannimyia gr. sp.	7	5	Predators	Sprawler	Univoltine
Tubificidae w/o cap setae	83	10	Gatherers	Sprawler	Unclassified
Total Abundance	**595**				
Tolerance Value Weighted Mean		**7.1**			