



ABI ENVIRONMENTAL
SERVICES

June 27, 2025

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Dear Sarah,

Please find following, our report on the benthic macroinvertebrates from sites in the Athabasca watershed. In this report you will find the taxa and occurrence (total count) of macroinvertebrates per site, a list of the CABIN excluded taxa per site and quality control assurances. We have followed the CABIN protocol as outlined in the CABIN Laboratory Methods (2021) for subsampling, sorting, taxa identification and the auditing protocols. A digital copy in Excel is provided with the first tab containing the chain of custody form, the second the CABIN QA QC CL form, the third tab is clean data, followed by the tabulated data (included and excluded taxa) and finally the CABIN-ready data for upload. It is recommended that the CABIN-ready data be copied and pasted into CABIN Excel template (also supplied) for uploading.

We have identified 97% of the organisms present in this analysis to the genus-level. In a few cases, invertebrates were identified to the family level because they were too immature, no keys were available to the generic level or were too damaged to proceed to the genus level.

In terms of 'interesting' taxa from this material, to be honest once again there was nothing that stands out as remarkable relative to what we have seen in the previous three years from these sites. What is worth noting is the taxa that are new to this watershed. This year, the fly families Ceratopogonidae and Pelecorhynchidae were added, plus 4 genera of chironomids and 2 genera of empidids. Also added was the order Entomobryomorpha (Collembola) and one genus of mayflies which hadn't been recorded before. As well, there are three new generic records of stoneflies and two new generic records (and one new family record) of stoneflies for Athabasca. Finally, there is a new family and genus record for mites. We did notice that there weren't as many worms in your samples as we have seen in the past.

It has been our pleasure to work with you and the Athabasca Watershed Council. We hope that these data meet your expectations, and we would be delighted to work with you again. If you have any questions or require further information, please don't hesitate to contact us.

Yours sincerely,

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Report of Benthic Macroinvertebrates

Athabasca Watershed 2024

Taxonomy, Methods, and Quality Control

For

Athabasca Watershed Council

June 27, 2025

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LAND ACKNOWLEDGEMENT

ABI Environmental Services is in the traditional territories of the Niitsitapi (Blackfoot) and the people of the Treaty 7 region in Southern Alberta, which includes the Siksika, the Piikuni, the Kainai, the Tsuut'ina, and the Iyârhe Nakoda. We are situated on land where the Bow River meets the Elbow River, and the traditional Blackfoot name of this place is "Mohkinstsis" which we now call the City of Calgary. The City of Calgary is also home to Metis Nation of Alberta, Region III.

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Sample Reception

Samples of benthic macroinvertebrates were collected from six sites by personal from the Athabasca Watershed Council using a kicknet (400um) and the CABIN method. The samples were received by ABI Environmental Services on October 26, 2024. All sample containers were found to be free from damage. The preservative in each container was replaced with 70% ethanol on October 26, 2024. All samples corresponded to those listed in the COC sheet (Table 1).

Sample Processing

Some samples contained significant amounts of macrophytes (twigs, leaves), silt/mud and sand. Large plant material like twigs and leaves were rinsed and then removed from the samples and discarded. The amount of smaller macrophytes and the silt/mud, gravel and sand were reduced in the samples by washing and sieving to separate the invertebrates from this debris. Samples were emptied on to stacked sieves, in order from the top: 4000 um, 2360 um and 400 um, and then gently washed with water. A pan or basin was placed under the bottom sieve (400 um). The large vegetation and substrate resting on the 4000 and 2360 um sieves were gently washed with water, inspected for invertebrates, and discarded. Any large invertebrates captured on the coarse sieves were transferred to a temporary holding jar. The contents resting on the sieves were inverted into a basin and gently washed into a shallow white pan. These invertebrates from the coarse and fine fractions were combined. Samples with coarse and fine (sand) particulates were also inspected for invertebrates and if any found were removed and add to the white pan. The fraction that passed through the 400-um sieve was inspected for invertebrates and none were found. This procedure was repeated for all 8 samples.

Subsampling and Sample Sorting

The invertebrates in the white pan were inspected and roughly counted to determine if subsampling was necessary. Subsampling was carried out as the invertebrates were found to be abundant in samples from all 8 of the sites (Table 2). The method of subsampling was accomplished following the CABIN procedure (Martens et al., 2021). Briefly, the samples were mixed with water and transferred to a Marchant box. The Marchant box was sealed, inverted, swirled, and quickly righted. Using a random number generator from Excel, the first five cells of the Marchant Box were selected, and the inverts removed to watch glasses using a transfer pipette. The inverts in each watch glass were counted and rough sorted into major taxa groups. If at least 300 organisms of the taxa of interest (listed in Table 4) were not reached in these five cells, additional cells were randomly chosen until the 300-organism criterion was reached. If the count was met partway through the cell the entire cell contents was counted as per the CABIN protocol. At the end of sorting these invertebrates were placed in labeled glass vials with 70% ethanol. Excluded taxa were identified and noted (Table 5). For each of the samples, the sorted fractions (invertebrates removed) were bulked together, labeled as "sorted" and retained for auditing. For each of the samples, the unsorted fractions were labelled as "unsorted" and transferred



back to their original containers and retained. These fractions will be retained until August 1, 2024.

Sorting Audit Protocol

Three of the eight samples (38%) were randomly chosen for resorting by another team member. Sorting precision was calculated as percent sorting efficiency (% SE) using the CABIN method.

$$\%SE = \left(1 - \frac{\# \text{ of Organisms Missed}}{\text{Total \# of Organisms Found}}\right) * 100$$

The sorting efficiency is in Table 3, the samples met or exceeded the CABIN protocol of 95% with an average sorting efficiency of 98% (Table 3).

Identification and Taxonomy

The rough sorted samples were further examined to identify organisms to the lowest taxonomic level possible. During identification the taxa were entered on paper data sheets and then transferred to an Excel spreadsheet. The CABIN protocols for effort and identification level of respective taxa were followed as closely as possible. In the case of Chironomidae, temporary glycerin slide mounts of dissected specimens were made to confirm identifications to the genus level. Where there were disarticulated specimens only those with heads were counted to avoid double counting specimens. There were also exuviae from larval moults in some samples that were not counted as this may have been double counting specimens present or counting specimens that were not in the sampled portion of the stream bed as exuviae tend to float downstream after a moult. This is especially true for Ephemeroptera. Where possible pupal keys were used to identify fly pupae to family/genus.

Counts per taxa and sample were summarized using a Pivot Table in Excel. Taxa counts for the subsampled (all 8 sites) samples were calculated as Count and Total Count. Total Count was calculated as the number per subsample scaled up to 100% and is the number of inverts present in an entire sample. The Count and Total Count data are presented in Tables 2 and 7, respectively. The number of organisms identified (Count) in the included taxa from the sub-samples were 3430 (Table 2). To facilitate comparisons among the samples, the subsampled collections were scaled up to a full sample (Total Count), with the total number of organisms being 50,875 (Tables 2 and 7). These organisms were distributed among 34 families and 71 genera (Table 7).



Auditing Protocol

The auditing protocol was performed on the same samples as the sorting efficiency. We followed the CABIN protocol for determining the Identification Error Rate and tabulated the incorrect identifications and missed organisms (Table 6A, 6B and 6C). The Identification Error Rate for samples UAB002, UAB005 and UAB009 were 0%, 0% and 0%, respectively. These error rates were within the tolerances for CABIN (%IE ≤ 5%).

$$\% \text{ Identification Error} = \left(\frac{\# \text{ Incorrect Identifications}}{\text{Total \# of Organisms in Audit}} \right) * 100$$

Taxonomic Keys and References

1. Arnett Jr. RH, Thomas MC. 2001. American Beetles Volume 1: Archostemata, Mycophaga, Adephaga, Polyphaga: Staphyliniformia. Boca Raton: CRC Press. 443 p.
2. Borkent A. The pupae of the biting midges of the world (Diptera: Ceratopogonidae), with generic key and analysis of the phylogenetic relationships between genera. Zootaxa [Internet]. [cited 2019 Nov 1; 3879(1): 001-327 Available from: <http://zoobank.org/urn:lsid:zoobank.org:pub:6423894B-97D9-4286-ABB9-D4AF072B57FD>. <http://dx.doi.org/10.11646/zootaxa.3879.1.1>.
3. Bousquet Y, Bouchard P, Davis AE, Sikes DS. 2013. Checklist of beetles (Coleoptera) of Canada and Alaska. 2nd Edition. Sofia Bulgaria: Pensoft Publishers. 402 p.
4. Brinkhurst, RO. 1986. Guide to the freshwater aquatic microdrile oligochaetes of North America. Can. Spec. Publ. Fish. Aquat. Sci. 84: 259 p.
5. Clarke AH, 1981. The Freshwater Molluscs of Canada. Ottawa: National Museums of Canada. 446 p.
6. Clifford, HF. 1991. Aquatic Invertebrates of Alberta. Edmonton, Alberta: The University of Alberta Press. 550p.
7. Durand, R., Ehlers, T. 2023. Kootenay Connect: Slocan River Watershed – Preliminary summary of sensitive habitat, biodiversity and species-at-risk results. Slocan Lake Stewardship Society. Available from: <https://kootenayconservation.ca/species-at-risk-conservation-values-slocan/>
8. Environment Canada. 2010 Pulp and Paper Environmental Effects Monitoring (EEM) Technical Guidance Document. 490pp. Available from https://www.ec.gc.ca/esee-eem/3E389BD4-E48E-4301-A740-171C7A887EE9/PP_full_versionENGLISH%5B1%5D-FINAL-2.0.pdf.
9. Epler, JH. 2001. Identification Manual for the larval Chironomidae (Diptera) of North and South Carolina. A guide to the taxonomy of the midges of the southeastern United States, including Florida. Special Publication SJ2001-SP13. North Carolina Department of Environment and Natural Resources, Raleigh, NC, and St. Johns River Water Management District, Palatka, FL. 526 pp.



10. Government of Canada – ECCC. [Internet]. 2024. CABIN Canadian Aquatic Biomonitoring Network. [cited 2024 Mar 31]. Available from <https://open.canada.ca/data/en/dataset/13564ca4-e330-40a5-9521-bfb1be767147>.
11. ITIS - [Internet]. 2025. Integrated Taxonomic Information System [cited 2024 Mar 31]. Available from <http://www.itis.gov/>
12. Kenk, R. 1972. Freshwater Planarians (Turbellaria) of North America. Biota of Freshwater Ecosystems, Identification Manual 1. EPA. 81p. Available from <https://nepis.epa.gov/Exe/ZyPDF.cgi/20017PVN.PDF?Dockkey=20017PVN.PDF>
13. Kondratieff BC, DeWalt RE, Verdone CJ. 2019. Plecoptera of Canada. In: Langor DW, Sheffield CS (eds) The biota of Canada—a biodiversity assessment. Part 1: the terrestrial arthropods. Zookeys 819: 243–254. <https://doi.org/10.3897/zookeys.819.23535>.
14. Leung A, Pinder A, Edward D. 2011. Photographic guide and keys to the larvae of Chironomidae (Diptera) of south-west Western Australia. Part 1. Key to subfamilies and Tanypodinae. The University of Western Australia. 12 p.
15. Liu Q. 2016. Diversity of wetland non-biting midges (Diptera: Chironomidae) and their responses to environmental factors in Alberta. MSc thesis. Edmonton, Alberta: University of Alberta. 164 p.
16. Martens A., Strachan S., Pascoe T., Baird D. 2021. CABIN Laboratory Methods: Processing, taxonomy, and quality control of benthic macroinvertebrate samples. Environment and Climate Change Canada: Available from https://publications.gc.ca/collections/collection_2021/eccc/En84-86-2021-eng.pdf
17. McAlpine JF. 1981. Manual of Nearctic Diptera. Volume 1. Monograph 27 of the Research Branch, Agriculture Canada. Ottawa: 674 p.
18. McAlpine JF. 1987. Manual of Nearctic Diptera. Volume 2. Monograph 28 of the Research Branch, Agriculture Canada. Ottawa: 668 p.
19. McDermott H, Paull T, Strachan S. 2014. CABIN Laboratory Methods: Processing, Taxonomy, and Quality Control of Benthic Macroinvertebrate Samples. Government of Canada: Publications.gc.ca; Available from <http://publications.gc.ca/site/eng/476513/publication.html>
20. Merritt RW, Cummins KW, Berg MB, editor. 2019. An introduction to the aquatic insects of North America, 5th. Dubuque, IA: Kendall/Hunt. 1480 p.
21. Merritt RW, Cummins KW, Berg MB, editor. 2008. An introduction to the aquatic insects of North America, 4th. Dubuque, IA: Kendall/Hunt. 1158 p.
22. Namayandeh A, Culp JM. 2016. Chironomidae larvae from the lower Athabasca River, AB, Canada and its tributaries including macroscopic subfamily and the tribe keys, indices for environmental tolerance and trait-based information for biomonitoring. J. Entomological and Acarological Research. 48:7075.



23. National Environmental Effects Monitoring Office. 2002. Revised Guidance for Sample Sorting and Subsampling Protocols for EEM Benthic Invertebrate Community Surveys.
https://www.canada.ca/content/dam/eccc/migration/main/esee-eem/f919d331-078f-4882-8fa6-72c4faa31d73/revised-20sampling-20and-20subsampling-20benthos_e.pdf.
24. Oliver, DR. and ME Roussel. 1983. The Insects and Arachnids of Canada Part 11. The Genera of larval midges of Canada. Biosystematics Research Institute. Ottawa, Ontario. Research Branch, Agriculture Canada. Publication 1746. 263 p.
25. Proctor H. [Internet]. 2006. Key to Aquatic Mites Known from Alberta. University of Alberta: biology.ualberta.ca; [cited 2019 Nov 1]. Available from
http://www.biology.ualberta.ca/faculty/heather_proctor/uploads/pdfs/AquaticMitesKnown_Alberta%20Aug_2006.pdf
26. Rose CL, Hawks CA, Genoways HH. 2009. Storage of Natural History Collections: A Preventive Conservation Approach. Society for the Preservation of Natural History Collections. Iowa City, Iowa. 446 p.
27. Stimpson KS, Klemm DJ, Hiltunen JK. 1982. A guide to the freshwater Tubificidae (Annelida: Clitellata: Oligochaeta) of North America. Cincinnati, Ohio: U.S. Environmental Protection Agency. 61 p.
28. Thorp JH, Covich AP. 2001. Ecology and Classification of North American Freshwater Invertebrates. San Diego: Academic Press. 911 p.
29. Thorp JH, Rogers DC. 2016. Thorp and Covich's Freshwater Invertebrates, Volume II. Keys to Nearctic Fauna. Elsevier. 740 p.
30. Wiggins GB. 1998. Larvae of the North American Caddisfly Genera (Trichoptera) 2nd ed. Toronto, ON: University of Toronto Press. 457p.



Equipment List

- Tyler stainless steel and brass sieves: 13.3 mm, 4000 um, 2000, 1000 um and 400 um
- Catchment pan and basins
- Marchant box for subsampling
- Tools: Transfer pipettes, forceps, acid free paper, squeeze bottles
- Watch glasses – several diameter sizes: 6.5, 8.5, 10.5 cm
- Mason Jars: 125, 250, 500 and 1000 ml
- 70% Ethanol
- Glass vials with screw tops
- Glycerin for temporary slides, slides and cover slips
- Dissecting microscopes: Leica MZ6 and Leica MS5 (4 – 80X)
- Compound microscope Olympus CX41 (40-1000X)
- Light sources: two MI-150 Fiber-lights



Tables

Table 1. Sample reception – field site/sample identification and description, number and size of collection jars and date of collection from the Athabasca River Watershed 2024.

No.	Sample ID	Field Site Description	Jar # & Size	Date Collected	Condition
1	UAB002	Gregg River Test	1 – 1L	2024-10-08	High veg and substrate
2	UAB003	Whitehorse Creek Potential Ref	1 – 1 L	2024-10-08	Heavy veg and some substrate
3	UAB004	McLeod River Test	1 – 1L	2024-10-09	Unremarkable
4	UAB005	McLeod River Test	1 – 1 L	2024-10-09	Unremarkable
5	UAB006	Embarras River Test	1 – 1 L	2024-10-09	Unremarkable
6	UAB007 ^c	Gregg River Test	1 – 1 L	2024-10-08	Some algae, high veg
7	UAB008	Lovett River Test	1-1 L	2024-10-09	Unremarkable
8	UAB009	Hardistry Creek Potential Ref	1 – 1 L	2024-10-09	Some veg

- A. All samples received Oct 26, 2024
- B. Alcohol changed in jars October 26, 2024
- C. UAB007 split into two jars.



Table 2. Subsampling effort and measured and calculated number of invertebrates per sample, the Athabasca River Watershed 2024.

Sample ID	Number of cells sampled from Marchant box ¹	No. of organisms in subsamples ²	Total number of organisms in sample
UAB002	5	401	8020
UAB003	5	576	11520
UAB004	7	352	5029
UAB005	22	363	1650
UAB006	7	366	5229
UAB007	5	627	12540
UAB008	16	388	2425
UAB009	8	357	4463
Total		3430	50875

1. A Marchant box has 100 cells, this is the number/percentage sampled to reach at least 300 organisms.
2. Taxonomy performed on these organisms.



Table 3. Sorting efficiency (SE) for three randomly selected samples the Athabasca River Watershed 2024.

Sample ID	Original Count	QA Audit Count	Comments	% SE
UAB002	396	401	5 Missed: 1 <i>Ameletus</i> , 2 <i>Eukiefferiella</i> , 1 <i>Pericoma</i> , 1 <i>Polypedilum</i> ,	98.8
UAB005	361	363	2 Missed: 1 Chironomidae, 1 <i>Limnesia</i>	99.5
UAB009	342	357	15 missed: 9 <i>Ameletus</i> , 5 <i>Leptophlebia</i> , 1 <i>Visoka</i>	95.8
Average % Sorting Efficiency				98.0

Table 4. Standard taxonomic effort for practical Identification.

Group	Taxa	Attained Level of Identification
Insects	Coleoptera	Family/Genus
	Diptera	Family/Genus
	Ephemeroptera	Family/Genus
	Plecoptera	Family/Genus
	Trichoptera	Family/Genus
Non-insects		
	Entomobryomopra	Family/Genus
	Tricladida (Platyhelminthes)	Family/Genus
	Trombidiformes (Mite)	Family/Genus
	Tubificida (Annelida)	Family/Genus



Table 5. Excluded Taxa -Total Count per site, the Athabasca River Watershed 2024.

Taxonomic Group	UAB 002	UAB 003	UAB 004	UAB 005	UAB 006	UAB 007	UAB 008	UAB 009	Total
Coleoptera Scirtidae							6		6
Diptera Chironomidae								13	13
Diptera Phoridae								13	13
Hemiptera Aphididae					14		6		
Hymenoptera Formicidae									
Metacopina	2	20	29	45		60	6	13	175
Total	2	20	29	45	14	60	19	38	227



Table 6A. Identification error rate for sample UAB002, the Athabasca River Watershed 2024.

Order	Family	Genus	Raw Count	Audit Count	Audit Flag	IE Error	Comments
Total							
Total organisms in audit			401	401			
Average % Identification Error Rate						0%	Pass

Table 6B. Identification error rate for sample UAB005, the Athabasca River Watershed 2024.

Order	Family	Genus	Raw Count	Audit Count	Audit Flag	IE Error	Comments
Total							
Total organisms in audit			363	363			
Average % Identification Error Rate						0%	Pass

Table 6C. Identification error rate for sample UAB009, the Athabasca River Watershed 2024.

Order	Family	Genus	Raw Count	Audit Count	Audit Flag	IE Error	Comments
Ephemeroptera	Leptophlebiidae	<i>Leptophlebia</i>	108	107			(-1) Enumeration
Ephemeroptera	Heptageniidae	<i>Cinygmula</i>	0	1			(+1) Enumeration
Total							
Total organisms found in audit			342	342			
Average % Identification Error Rate						0%	Pass



Table 7. Total count of benthic macroinvertebrates from field sites in the Athabasca River Watershed 2024.

Taxonomic Group	UAB002	UAB003	UAB004	UAB005	UAB006	UAB007	UAB008	UAB009	Total
Order: Coleoptera									
Family: Elmidae									
<i>Heterlimnius</i>	160				186		113	38	496
<i>Narpus</i>	20						6		26
<i>Zaitzevia</i>	20								20
Order: Diptera									
Family: Ceratopogonidae									
<i>Palpomyia</i>						20			20
Family: Chironomidae	20			5			6		31
<i>Brillia</i>	60	280	14	36		180		50	621
<i>Corynoneura</i>				5					5
<i>Cricotopus</i>	100	800	157	45	57	80	31	63	1333
<i>Cryptochironomus</i>	20	20							40
<i>Diamesa</i>						120			120
<i>Eukiefferiella</i>	820	1080	71	32	300	4960	113	38	7413
<i>Krenosmittia</i>	80								80
<i>Micropsectra</i>	100		57			180		13	350
<i>Orthocladus</i>	20	160			14	80	6		281
<i>Pagastia</i>	40	100			43	680		38	900
<i>Parakiefferiella</i>	20					180			200
<i>Parametrioconemus</i>			29	5					33
<i>Polypedilum</i>	480	340	314	14	57	120	13	25	1363
<i>Potthastia</i>		200	14		29	1400			1643
<i>Procladius</i>		20			14	60			94
<i>Tanytarsus</i>	220		71			40			331
Family: Empididae	20	20				40		13	93
<i>Chelifera</i>		40				20			60
<i>Hemerodromia</i>						20			20
<i>Neoplasta</i>	20		29	9	43	120	6		227
<i>Oreogeton</i>	40	20			29		31	13	132
Family: Pelecorhynchidae									
<i>Glutops</i>		20							20
Family: Psychodidae									
<i>Pericoma</i>	100				586		50		736
Family: Simuliidae									
<i>Simulium</i>				5	29	60	13	75	181
Family: Tipulidae									
<i>Antocha</i>	20				14		6		41
<i>Dicranota</i>					14				14
<i>Hexatoma</i>			29						29



Table 7. Total count of benthic macroinvertebrates from field sites in the Athabasca River Watershed 2024.

Taxonomic Group	UAB002	UAB003	UAB004	UAB005	UAB006	UAB007	UAB008	UAB009	Total
Order: Entomobryomopha									
Family: Isotomidae									
<i>Agrenia</i>								13	13
Order: Ephemeroptera									
Family: Ameletidae									
<i>Ameletus</i>	3560	320	486	209	2129	1200	806	1738	10447
Family: Ephemerellidae									
<i>Drunella</i>	120	100	200	64	57	20		38	598
<i>Ephemerella</i>	320	840	14	132	329	300		125	2060
Family: Heptageniidae				5					5
<i>Cinygmula</i>							31	13	44
<i>Epeorus</i>			14					13	27
<i>Rhithrogena</i>	140	180	371	14			13		718
Family: Leptophlebiidae						20		13	33
<i>Leptophlebia</i>	620	4040	1929	368	471	220	638	1400	9686
<i>Neoleptophlebia</i>							44		44
Order: Plecoptera			57	14					71
Family: Capniidae					29				29
<i>Capnia</i>	40		29	18		20	38	150	294
Family: Chloroperlidae			14			60			74
<i>Plumiperla</i>	20	140	129	9		20	6		324
<i>Suwallia</i>	80	120	29			40		38	306
<i>Sweltsa</i>									
Family: Leuctridae			14						14
<i>Paraleuctra</i>			14						14
Family: Nemouridae		600	171	5	14	820			1610
<i>Malenka</i>	40		29		86	280	13	50	497
<i>Nemoura</i>				9					9
<i>Visoka</i>	20				129	20	38	263	469
<i>Zapada</i>	120	280	14	323		400	19	113	1268
Family: Perlidae				5					5
<i>Hesperoperla</i>	20		14				6	13	53
Family: Perlodidae								13	13
<i>Isoperla</i>	60			14	57	60	38	50	278
<i>Kogotus</i>		20	14	18	29	60	94		235
<i>Megarcys</i>			14	14		20			48
<i>Skwala</i>		80					6		86
Family: Taeniopterygidae	20		14			60			94
<i>Taenionema</i>	80	580	414	23	57	160	31	13	1358



Table 7. Total count of benthic macroinvertebrates from field sites in the Athabasca River Watershed 2024.

Taxonomic Group	UAB002	UAB003	UAB004	UAB005	UAB006	UAB007	UAB008	UAB009	Total
Order: Trichoptera									
Family: Brachycentridae									
<i>Brachycentrus</i>	140		129		71		13		353
<i>Micrasema</i>	60		14		186	60	125		445
Family: Glossosomatidae									
<i>Glossosoma</i>			29	9			19		56
Family: Hydropsychidae									
<i>Cheumatopsyche</i>		240	14	14		100		38	405
<i>Hydropsyche</i>							6		6
<i>Parapsyche</i>				9					9
Family: Lepidostomatidae									
<i>Lepidostoma</i>		20			71		6	13	110
Family: Leptoceridae									
<i>Oecetis</i>							6		6
Family: Rhyacophilidae									
<i>Rhyacophila</i>	60	40	14	14	29	160	6		323
Order: Tricladida									
Family: Planariidae									
<i>Polycelis</i>		200	29	73			6		308
Order: Trombidiformes									
Family: Feltriidae									
<i>Feltria</i>		20				20			40
Family: Lebertiidae									
<i>Lebertia</i>	40	80	29	36	29	40	13		266
Family: Limnesiidae									
<i>Limnesia</i>				18					18
Family: Pionidae									
<i>Piona</i>							6		6
Family: Sperchontidae									
<i>Sperchon</i>		500	14	73					587
<i>Sperchonopsis</i>							6		6
Family: Torrenticolidae									
<i>Torrenticola</i>	60	20		9	43	20			152
Order: Tubificida									
Family: Naididae									
	20								20
Total	8020	11520	5029	1650	5229	12540	2425	4463	50875