

2006 Photographic Atlas Aquatic Macroinvertebrates of Piasa Watershed Creeks and Ponds



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Table of Contents

<u>Phylum Annelida</u>	Page 3
<u>Phylum Arthropoda</u>	
Class Crustacea	3
Class Malacostraca	3
<u>Class Insecta</u>	
<u>Order Coleoptera</u>	4-5
<u>Order Hemiptera</u>	6
<u>Order Diptera</u>	7-8
<u>Order Ephemeroptera</u>	9
<u>Order Odonata</u>	10-12
<u>Order Plecoptera</u>	13
<u>Order Trichoptera</u>	13
<u>Class Arachnida</u>	14
<u>Phylum Platyhelminthes</u>	14
<u>Phylum Mollusca</u>	15
Common Insects of Pond and Stream Banks	16
Map of Piasa Creek Watershed Tributaries and Collecting Sites	17
Appendix I	18
(Macroinvertebrate size range, habitat type, feeding type, and stress tolerance for species by phylum and family)	

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- **Phylum Annelida**
Earthworms and Leeches



Illinobdella moorei

Group Hirudinea
Family Piscicolidae
(Leeches)



Placobdella sp.
(Turtle leech)



Haplotaxis sp.
Class Oligochaeta
Family Haplotaxidae
(Freshwater worm)



Branchiura sowerbyi
Order Tubificida
Family Tubificidae

- **Phylum Arthropoda**
Insects, Crustaceans, spiders, mites and ticks
- **Class Crustacea**



Crangonyx minor
Class Crustacea
Order Amphipoda
Family Crangonyctidae
(Side-swimmer or scud)



Orconectes virilis
Class Crustacea
Order Decapoda
Family Cambaridae
(Crayfish)



Caecidotea sp.
Class Malacostraca
Order Isopoda
Family Asellidae
(Aquatic sow bug)



Class Insecta

Order Coleoptera



Tropisternus lateralis

Class Insecta
Order Coleoptera
Family Hydrophilidae
(Water scavenger beetles)



Berosus sp.



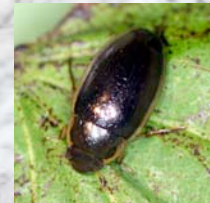
Hydrochara obtusata
Class Insecta
Order Coleoptera
Family Hydrophilidae
(Water scavenger beetles)



Enochrus perplexus
Class Insecta
Order Coleoptera
Family Hydrophilidae
(Water scavenger beetles)



Dineutus americanus
Class Insecta
Order Coleoptera
Family Gyrinidae
(Whirligig beetles)



Dytiscus hybridus
Class Insecta
Order Coleoptera
Family Hydrophilidae
(Water scavenger beetles)



Peltodytes lengi
Class Insecta
Order Coleoptera
Family Haliplidae
(Crawling water beetle)



Helichus fastigiatus
Class Insecta
Order Coleoptera
Family Dryopidae
(Longtoed water beetle)



Laccophilus proximus
Class Insecta
Order Coleoptera
Family Dytiscidae
(Predaceous diving beetle)



Stenelmis quadrimaculata
Class Insecta
Order Coleoptera
Family Elmidae
(Water Scavenger beetle)

Order Coleoptera

Aquatic beetle larvae



***Peltodytes* sp. larva**
Class Insecta
Order Coleoptera
Family Halipidae
(Crawling water beetles)



***Dineutus assimilis* larva**
Class Insecta
Order Coleoptera
Family Gyrinidae
(Whirligig beetles)



larva
Class Insecta
Order Coleoptera
Family Gyrinidae
(Whirligig beetles)



***Tropisternus* sp.**
Class Insecta
Family Hydrophilidae
(Water scavenger beetle)

Order Hemiptera



nymphs



adult

***Sigara alternata* (immatures and adult)**
Class Insecta
Order Hemiptera
Family Corixidae
(Water Boatmen)



***Notonecta* sp.**
Class Insecta
Order Hemiptera
Family Notonectidae
(Backswimmers)



***Macrovelia* sp.**
Class Insecta
Order Hemiptera
Family Macroveliidae
(Water treaders)



***Belostoma* sp.**
Class Insecta
Order Hemiptera
Family Belostomatidae
(Giant water bug nymph)



Ranatra nigra
Class Insecta
Order Hemiptera
Family Nepidae
(Water scorpion)

Order Diptera



Tipula abdominalis
 Class Insecta
 Order Diptera
 Family Tipulidae
 (crane flies)



Tipula sp.



Dictya pictipes
 Class Insecta
 Order Diptera
 Family Sciomyzidae
 (Marsh flies)

Chironomus attenuatus



Class Insecta
 Order Diptera
 Family Chironomidae
 (Midges)



Biting midge pupa
 Class Insecta
 Order Diptera
 Family Ceratopogonidae
 (Biting midge)



Bezzia sp. larva

Order Diptera



Mosquito larva and pupae
Class Insecta
Order Diptera
Family Culicidae



Stratiomys sp.
Class Insecta
Order Diptera
Family Stratiomyidae
(Aquatic soldier fly)



Class Insecta
Order Diptera
Family Simuliidae
(Black fly larva)



Chrysops montanus
Class Insecta
Order Diptera
Family Tabanidae
(Deer Fly)

Order Ephemeroptera



Ameletus ludens larvae
Class Insecta
Order Ephemeroptera
Family Ameletidae
(Amelitid minnow flies)



Class Insecta
Order Ephemeroptera
Family Heptageniidae
(Flatheaded Mayflies)



Stenonema femoratum
larva

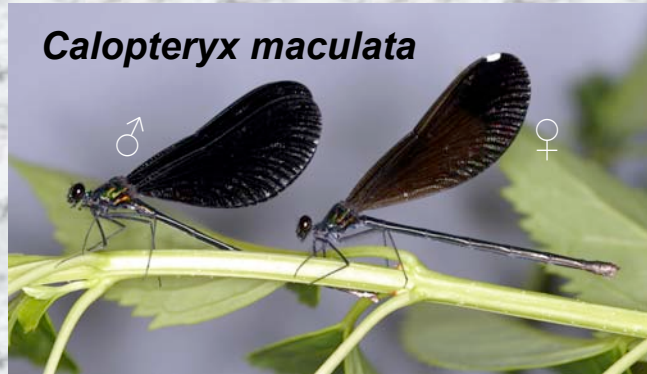


Caenis sp. larvae
Class Insecta
Order Ephemeroptera
Family Caenidae
(Small squaregill mayflies)



Callibaetis sp. larvae
Class Insecta
Order Ephemeroptera
Family Baetidae
(Small minnow mayflies)

Order Odonata

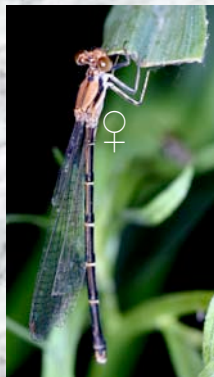


Class Insecta
Order Odonata
Family Calopterygidae
(Broad-winged damselfly larvae)



Enallagma basidens

Class Insecta
Order Odonata
Family Coenagrionidae
(Narrow-winged damselfly larvae)



Enallagma exsulans
Order Odonata
Family Coenagrionidae
(Stream Bluet)

Order Odonata



Libellula lydia
Class Insecta
Order Odonata
Family Libellulidae
(Common white-tail skimmer)



Perithemis tenera
Class Insecta
Order Odonata
Family Libellulidae
(Eastern amberwing skimmer)



Tramea lacerata
Class Insecta
Order Odonata
Family Libellulidae
(Black saddlebags skimmer)



Pachydiplax longipennis
Blue dasher larva

Class Insecta
Order Odonata
Family Libellulidae
(various skimmer larvae)

Order Odonata



Clubtail dragonfly larva
Class Insecta
Order Odonata (Anisoptera)
Family Gomphidae
(Clubtail dragonflies)



Libellula pulchella
Order Odonata
Family Libellulidae
(Twelve-spotted skimmer)



***Progomphus obscurus* larvae and adult**
Class Insecta
Order Odonata
Family Gomphidae
(Sanddragons)

Order Plecoptera

Perlesta sp. naiad
Class Insecta
Order Plecoptera
Family Perlidae
(Stoneflies)



Order Trichoptera



Symphitopsyche slossanae
Class Insecta
Order Trichoptera
Family Hydropsychidae
(caddisflies)



Various Caddisfly adults

Order Collembola



Various Springtails
Class Insecta
Order Collembola

Class Arachnida



Hyrachna sp?

Superphylum Arthropoda

(jointed-legged metazoan
animals [Gr, *arthron* = joint;
pous = foot])

Phylum Entoma

Subphylum Chelicerata

Class Arachnida

Subclass Acari (mites)

Order Acariformes

Suborder Prostigmata (= suborder
Trombidiformes, = suborder
Actinedida)

Cohort Parasitengona

Subcohort Hydrachnidia- (=
Hydrachnida, = Hydracarina) (True
water mites)



Phylum Platyhelminthes



Girardia tigrina

Order Tricladida

Family DugesIIDae

(Common planarian

Phylum Mollusca

Mussels and gastropods



< Blue Dasher naiad, *P. longipennis*

Sphaerium simile
Class Pelecypoda
Order Veneroida
Family Sphaeriidae
(Grooved fingernail clam)



Helisoma anceps
Two-ridge Rams-horn
Class Gastropoda
Subclass Pulmonata
Order Basommatophora
Family Planorbidae
(Planorbid snails)



Physa acuta
Class Gastropoda
Subclass Pulmonata
Family Physidae
(Physid Snails)



Utterbackia imbecillus
Paper pondshell
Class Pelecypoda
Order Unionida
Family Unionidae
(Pearly mussels)



Common Insects of Pond and Stream Banks



***Gelastocorus* sp.**
 Order Hemiptera
 Family Gelastocoridae
 Toad bug



***Condylostylus* sp.**
 Order Diptera
 Family Dolichopodidae
 Long-legged fly



Cicindela repanda
 Order Coleoptera
 Family Cicindelidae
 Bronze tiger beetle



***Cicindela* sp.**
 Order Coleoptera
 Family Cicindelidae
 Metallic tiger beetle



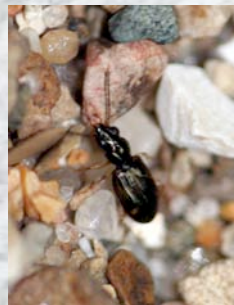
***Tridactylus* sp.**
 Order Othoptera
 Family Tridactylidae
 Pygmy mole cricket



***Tetrix* sp.**
 Pygmy grasshopper
 Order Orthoptera
 Family Tetrigidae



Bembidion punctatostriatum
 Class Insecta
 Order Coleoptera
 Family Carabidae
 (Shore beetles)



Bembidium affine
 Class Insecta
 Order Coleoptera
 Family Carabidae
 (Shore beetles)



Gerris remigis
 Class Insecta
 Order Hemiptera
 Family Gerridae
 (Water strider)



***Microvelia* sp.**
 Family Veliidae
 (Shortlegged striders)



Bembidium americanum
 Class Insecta
 Order Coleoptera
 Family Carabidae
 (Shore beetles)



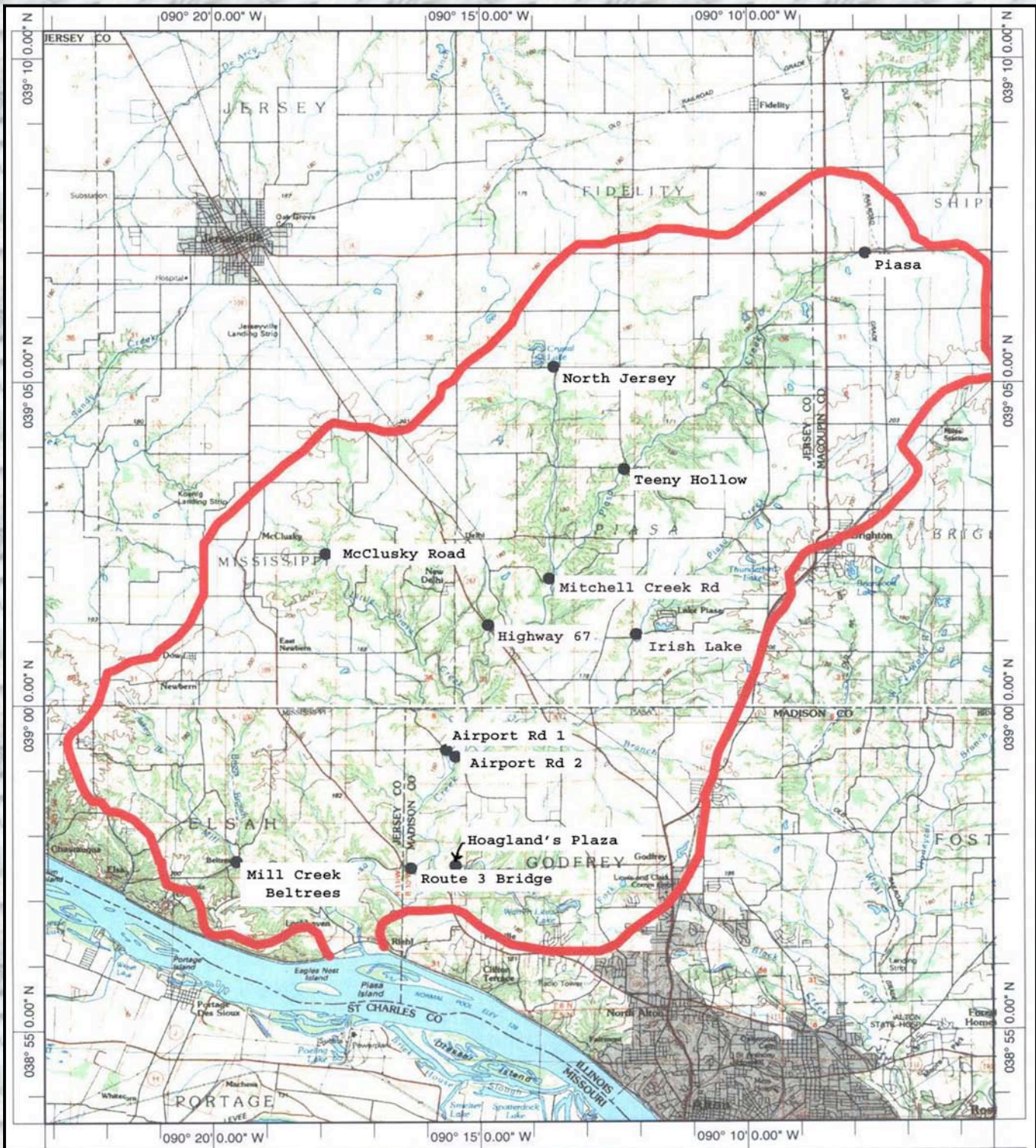
***Metrobates* sp.**



Omophron americanum
 Family Omophronidae



***Neocurtilla* sp.**
 Class insecta
 Order Orthoptera
 Family Gryllotalpidae
 (Mole cricket)



Name: JERSEYVILLE
 Date: 6/13/2003
 Scale: 1 inch equals 2.104 miles

Location: 039° 02' 00.9" N 090° 14' 16.8" W
 Caption: PCWET MONITORING SITES

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Map of Piasa Creek Watershed Tributaries and Collecting Sites

Appendix I

Macroinvertebrate size range, habitat type, feeding type, and stress tolerance for species by phylum and family

Note : All information provided below has been taken from W. Patrick McCafferty's (1998) *Aquatic Entomology* and J. Reese Voshell, Jr.'s (2002) *Freshwater Invertebrates*.

Phylum Annelida

Group Hirudinea

Family Piscicollidae – Leeches

Size: 4mm – 4.50 cm

Habitat Preferences: most lentic-littoral and lotic-depositional, lotic-erosional *

Feeding Type: predatory, ecto- or endoparasitic, fluid feeders

Stress Tolerance : at least moderate

Family Haplotaxidae – Freshwater Worms

Size: 1-30 mm

Habitat Preference: lentic-littoral, lentic-profundal, lotic-depositional

*See Glossary

Feeding Type: collector-gatherers, engulfer-predators
Stress Tolerance: common forms very tolerable

(Source – Voshell (2002) and McCafferty (1998))

Phylum Mollusca

Class Gastropoda

Subclass Pulmonata

Family Physidae – Physid snails

Size: 5-20 mm

Habitat Preference: soft to hard substrates in lotic and lentic environments

Feeding Type: collector-gatherers or scrapers

Stress Tolerance: facultative to somewhat tolerant

Family Planorbidae – Planorbid snails

Size: 3-30 mm

Habitat Preference: soft, silty substrates in lentic or lotic environments

Feeding Type: collector-gatherers or scrapers

Stress Tolerance: facultative to somewhat tolerant

Family Unionidae – Pearly mussels

Size: 30-250 mm

Habitat Preference: lotic-erosional, lotic-depositional, lentic-littoral, collector-filterers

Feeding Type: collector-filterers

Stress Tolerance: somewhat sensitive to facultative to pollution

Family Sphaeriidae – Grooved fingernail clams

Size: 2-10 mm

Habitat Preference: lentic-littoral, lentic-profundal, lotic-depositional, lotic-erosional

Feeding type: collector-gatherers

Stress Tolerance: facultative to somewhat tolerant

(Source – Voshell (2002) and McCafferty (1998))

Phylum Platyhelminthes

Class Turbellaria

Order Tricladida

Family Dugesiidae - Planarians

Size: 5 - 20 mm

Habitat Preference: lentic-littoral, lotic - depositional

Feeding type: piercer or engulfer predators or collector gatherers

Stress tolerance: somewhat tolerant to somewhat sensitive

Phylum Arthropoda

Class Crustacea

Order Amphipoda

Family Crangonyctidae – Side-swimmers or scuds

Size: 5-20 mm

Habitat Preference: lentic-littoral, lotic-depositional, lotic-erosional to subterranean

Feeding Type: collector-gatherers, shredder-detritivores, engulfer-predators, or scrapers

Stress Tolerance: facultative

Order Isopoda

Family Asellidae – Aquatic sow bugs

Size: 5-20 mm

Habitat Preference - lentic-littoral, lotic-depositional, lotic-erosional to subterranean

Feeding Type: collector-gatherers, shredder-detritivores, shredder herbivore, engulfer-predators

Stress Tolerance: tolerant to organic wastes, indicators of pollution recovery

Order Decapoda

Family Cambaridae – Crayfish

Size: 10-150 mm

Habitat Preference: lotic-erosional, lotic-depositional, lentic-littoral, wetlands, and subterranean

Feeding Types: collector-gatherers, shredder-detritivores, shredder-herbivores, engulfer-predators, or scrapers

Stress Tolerance: facultative to most forms of stress and disturbance

(Source – Voshell (2002) and McCafferty (1998))

)

Class Arachnida

Order Acariformes

Cohort Parasitengona – Water mites

Size: 2-3 mm

Habitat Preference: all types of freshwater, commonly found in lentic-littoral

Feeding Type: piercer-predators, external parasites, collector-gatherers or piercing-herbivores

Stress Tolerance: somewhat sensitive to somewhat tolerant

Class Insecta

Order Collembola - Springtails

Size: up to 3 mm in length

Habitat Preference: shore and bank

Feeding Type: detritus feeders or small microorganisms

Stress Tolerance: not known

Order Coleoptera - Beetles

Family Dryopidae - Long-toed water beetles

Size: 4-10 mm

Habitat Preference: larvae terrestrial adults mostly lotic-erosional

Feeding Type: scrapers, collector-gatherers

Stress Tolerance: facultative

Family Elmidae - Riffle beetles

Size: 1-8 mm

Habitat Preference: mostly lotic-erosional

Feeding Type: scrapers, collector-gatherers

Stress Tolerance: mostly facultative

Family Dytiscidae - Predaceous diving beetles

Size: 3-25 mm

Habitat Preference: primarily lentic-littoral and lotic-depositional

Feeding Type: larvae are piercer-predators, adults engulfer-predators

Stress Tolerance: Mostly facultative

Family Carabidae - Shore beetles

Size: 2-5 mm

Habitat Preference: wet sandy shores

Feeding Type: predaceous

Stress Tolerance: unknown

Family Hydrophilidae – Water scavenger beetles

Size: 1-40 mm

Habitat Preference: primarily lentic-littoral, also lotic depositional

Feeding Type: larvae engulfer-predators, adults collector gatherers or engulfer-predators

Stress Tolerance: somewhat to very tolerant

Family Psephenidae – Water pennies

Size: 4-6 mm

Habitat Preference: larvae lotic-erosional, adult terrestrial

Feeding Type: scrapers

Stress Tolerance: facultative

Family Gyrinidae – Whirligig beetles

Size: 3-16 mm

Habitat Preference: lentic-littoral and lotic-depositional

Feeding Type: engulfer-predators

Stress Tolerance: facultative

Family Haliplidae – Crawling water beetles

Size: 2-6 mm

Habitat Preference: lentic-littoral or lotic-depositional

Feeding Type: shredder-herbivores, piercer-herbivores or engulfer-predators

Stress Tolerance: somewhat tolerant

Family Cicindelidae – Tiger beetles

Size: 10-21 mm

Habitat Preference: terrestrial on dry, sandy shores of lotic or lentic waters

Feeding Type: Predatory

Stress Tolerance: terrestrial, subject to terrestrial disturbance or habitat modification

Order Orthoptera

Family Tridactylidae – Pygmy mole crickets

Size: 1-10 mm

Habitat Preference: Terrestrial on banks of lotic or lentic environments

Feeding Type: omnivores or scavengers on small particles

Stress Tolerance: terrestrial, subject to terrestrial or disturbance or habitat modification

Family Tetrigidae – Pygmy grasshoppers

Size: 13-19 mm

Habitat Preference: terrestrial along shores of lotic or lentic environments

Feeding Type: herbivores

Stress Tolerance: terrestrial, subject to terrestrial disturbance or habitat modification

Family Gryllotalpidae - Mole Crickets

Size: 20-35 mm

Habitat Preference: freshwater shore habitats

Feeding Type: underground roots, can damage crops
Stress Tolerance: unknown

Order Hemiptera

Family Gelastocoridae – Toad bugs

Size: 6-9 mm

Habitat Preference: Terrestrial on banks of lotic or lentic environments

Feeding Type: Herbivores

Stress Tolerance: terrestrial, subject to terrestrial disturbance or habitat modification

Family Corixidae – Water boatmen

Size: 3-11 mm

Habitat Preference: lentic littoral or lotic-depositional

Feeding Type: collector-gatherers

Stress Tolerance: Very tolerant

Family Nepidae – Water scorpions

Size: 14-45 mm

Habitat Preference: lentic-littoral to lotic-depositional

Feeding Type: Piercer-predators

Stress Tolerance: Somewhat tolerant

Family Gerridae - Water Striders

Size: 3-20 mm

Habitat Preference: most lentic-limnetic or lotic depositional

Feeding Type: piercer predators

Stress Tolerance: somewhat tolerant

Family Notonectidae - Backswimmers

Size: 5-16 mm

Habitat Preference: lentic-littoral and lotic-depositional

Feeding Type: piercer-predators

Stress Tolerance: very tolerant

Family Belostomatidae - Giant water bugs

Size: 20-65 mm

Habitat Preference: primarily lentic-littoral, some lotic-depositional

Feeding Type: piercer-predator

Stress Tolerance: very tolerant

Family Macroveliidae - Macroveliid shore bugs

Size: 4-6 mm

Habitat Preference: shore

Feeding Type: piercer-predator

Stress Tolerance: somewhat tolerant



Microvelia sp.

Order Trichoptera
Family Hydropsychidae – Caddisflies

Size: 13-18 mm

Habitat Preference: lotic-erosional

Feeding Type: collector-filterers

Stress Tolerance: primarily facultative, others somewhat sensitive to very sensitive

Order Plecoptera
Family Perlidae – Stoneflies

Size: 8-30 mm

Habitat Preference: lotic-erosional, occasionally lentic-littoral

Feeding Type: engulfer-predators

Stress Tolerance: very sensitive to facultative

Order Ephemeroptera

Family Heptageniidae – Flatheaded mayflies

Size: 5-20 mm

Habitat Preference: lotic-erosional or lentic-erosional

Feeding Type: collector-gatherers

Stress Tolerance: chiefly somewhat sensitive others sensitive to facultative

Family Ameletidae – Ameletid minnow mayflies

Size: 6-14 mm

Habitat Preference: primarily lotic-erosional, also lotic-depositional, sometimes lentic-littoral

Feeding Type: collector-gatherers or scrapers

Stress Tolerance: Very sensitive

Family Baetidae – Small minnow mayflies

Size: 3-12 mm

Habitat Preference: lotic-erosional, lotic-depositional or lentic-littoral

Feeding Type: Collector-gatherers or scrapers

Stress Tolerance: somewhat sensitive to very tolerant

Family Caenidae – Small squaregill mayflies

Size: 2-8 mm

Habitat Preference: lentic-littoral to lotic-depositional

Feeding Type: collector-gatherers or scrapers

Stress Tolerance: mostly facultative, or somewhat sensitive to somewhat tolerant

Order Odonata

Family Coenagrionidae – Narrow-winged damselflies

Size: 13-25 mm

Habitat Preference: primarily lentic-littoral, lotic-depositional, or lotic erosional

Feeding Type: engulfer-predators

Stress Tolerance: chiefly somewhat tolerant to very tolerant

Family Calopterygidae – Broad-winged damselflies

Size: 25-50 mm

Habitat Preference: Lotic-erosional

Feeding Type: engulfer-predator

Stress Tolerance: very tolerant

Family Gomphidae - Sanddragons or Clubtail dragonflies

Size: 23-42 mm

Habitat Preference: primarily lotic depositional to lentic-littoral with some lotic-erosional

Feeding Type: engulfer-predators

Stress Tolerance: primarily somewhat sensitive to somewhat tolerant

Family Libellulidae – Skimmer dragonflies

Size: 8-29 mm

Habitat Preference: primarily lentic-littoral to lotic-depositional

Feeding Type: engulfer-predators

Stress Tolerance: mainly very tolerant to facultative to somewhat tolerant

Order Diptera

Family Ceratopogonidae – Biting midges or punkies

Size: 2-15 mm

Habitat Preference: lentic-littoral to lotic-depositional

Feeding Type: engulfer-predators or collector-gatherers

Stress Tolerance: chiefly facultative to somewhat tolerant

Family Tipulidae – Craneflies

Size: 3-100 mm

Habitat Preference: lentic-littoral, lotic-erosional to lotic-depositional

Feeding Type: primarily shredder-detritivores, also collector-gatherers or engulfer-predators

Stress Tolerance: mainly facultative

Family Chironomidae – Midge

Family Chironomidae – Midges

Size: 2-20 mm

Habitat Preference: All categories of water environments

Feeding Type: primarily collector-gatherers, some collector-filterers, scrapers, engulfer-predators

Stress Tolerance: mostly facultative, others very sensitive to very tolerant

Family Sciomyzidae -Marsh flies

Size: 4-14mm

Habitat Preference: lentic-lotic along margins of ponds, lakes, streams among vegetations

Feeding Type: predaceous

Stress Tolerance: somewhat tolerant

Family Culicidae - Mosquitoes

Size: 4-10 mm

Habitat Preference: lentic-littoral, lotic-depositional

Feeding Type: collector-filterers,collector-gatherers

Stress Tolerance: somewhat tolerant

Family Simuliidae - Black flies

Size: 3-8 mm

Habitat Preference: lotic-erosional

Feeding Type: collector-filterers

Stress Tolerance: primarily facultative

Family Tabanidae - Horse and Deer Flies

Size: 11-55 mm

Habitat Preference: lentic-littoral, lotic-depositional

Feeding Type: piercer-predators or collector-gatherers

Stress Tolerance: somewhat to very tolerant

Family Stratiomyidae - Aquatic soldier flies

Size: 3-50 mm

Habitat Preference: lentic in thick vegetation

Feeding Type: algae and detritus

Stress Tolerance: somewhat tolerant

Family Dolichopodidae - Aquatic long-legged fly

Size: 3-10 mm

Habitat Preference: ponds and streams (lotic-lentic)

Feeding Type: predaceous

Stress Tolerance: somewhat tolerant

Glossary of Terminology Applied to Appendix I: Habitat Preference, Feeding Type, and Stress Tolerance

All information provided in this glossary is taken from Voshell, J. Reese.2002. Freshwater Invertebrates. McDonald and Woodward Publ., Blacksburg

Terms Used in Describing Habitat Preference

Lotic: refers to any moving or running freshwater system (streams, creeks, brooks,etc.)

Lentic: refers to any standing freshwater system (ponds bogs, lakes,etc.)

1. Lotic zones: a) lotic-erosional (riffles) – this zone is characterized by normal flowing waters that acquire sediments that become suspended and subsequently transported downstream.

b) lotic-depositional (pools) – this zone is characterized by normal flowing streams lacking the power to remove sediments and keep them suspended. Particles settle out rather than undergo transport far downstream.

2. Lentic zones: a) lentic-pelagic – this is the zone from water's surface (pelagic) through the depth of illumination (limnetic) and then to the bottom substrate.

b) lentic-littoral – this zone reaches from the shore down to the limit of light penetration.

c) lentic-profundal – this zones extends from the point where light no longer penetrates down to the bottom.

Within these habitats are microhabitats separated by type of substrate present in the water system. Substrates are either organic or mineral in nature. Minerals are subdivided by particle size ranging from boulders down to fine particulate matter characteristic of clays and silt. Organic substances include living plants and detritus (dead plant matter like large leaf packs or logs down to leaf fragments).

Lotic-erosional zones contain the greatest density of invertebrates highly influenced by the mineral substrate of cobbles and pebbles commonly found in these streams. Lentic-littoral zones have the highest diversity of invertebrates because of the presence of plants which are a food source for many invertebrates.

Terms Used in Describing Feeding Type

The functional feeding groups described in Voshell (2002) are as follows:

1. Shredders – have mouthparts that shred plant matter for consumption.

Two categories

a) shredder-detritivores – shred and feed on detritus

b) shredder-herbivores – shred living aquatic plant matter

2. Collectors – ingest very tiny particles less than 1 mm called fine detritus or fine particulate organic matter (FPOM)

a) collector-filterers – use a straining apparatus usually made of silk forming a net to filter out fine particles

b) collector-gatherers – consume larger particles of fine detritus that settle to the bottom

3. Scrapers – also called grazers because they remove the thin surface film that collects on surfaces especially rocks and submerged debris.

4. Piercers – these organisms possess either elongated heads or mouthparts that can pierce organisms and remove fluids for nutrition.

a) piercer-herbivores – these organisms penetrate vascular plant tissue or the individual cells of algae

b) piercer-predators – consume chunks of prey organisms or the entire organism

Terms Used to describe Stress Tolerance

Very sensitive – usually found only in nearly pristine environments; quickly eliminated if any disturbance occurs; do not occur in high numbers anywhere.

Somewhat sensitive – similar to facultative; will be in pristine environments but can also withstand a limited amount of disturbance; usually do not occur in high numbers.

Facultative – occur in environments with conditions ranging from pristine to moderate levels of disturbance; often occur in high numbers under conditions of moderate disturbance

Somewhat tolerant – similar to very tolerant but they cannot survive in severely disturbed environments; occur in high numbers but they do not dominate the community as completely as the very tolerant kinds.

Very tolerant – seldom found in pristine environments; occasionally found in moderately disturbed environments; exceptionally high numbers in environments with severe disturbance; can withstand almost anything; flourish where conditions are so bad that they probably have only one or two competitors

**Table 1. List of Macroinvertebrates and Numbers
Collected within each Family
from the Piasa Creek Watershed by Site**

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12
Organism												
Piscicolidae (leech)	0	0	0	0	0	0	0	1	1	0	3	0
Asellidae (aquatic sow bug)	1	3	1	0	0	7	0	2	0	0	12	0
Gammaridae												
(side-swimmers)	39	8	22	7	3	3	4	0	0	0	7	5
Cambaridae (crayfish)	13	0	6	7	1	29	3	2	2	0	7	5
Lestidae (spreadwinged dragonflies)												
dragonflies)	0	0	1	0	0	0	0	0	0	0	0	0
Aeshnidae (darners)	9	0	0	7	20	0	15	9	5	0	13	22
Gomphidae (clubtails)	4	0	2	0	0	0	0	0	0	0	19	0
Calopterygidae (broadwinged dragonflies)												
dragonflies)	1	0	0	0	0	0	0	0	0	0	13	0
Coenagrionidae (narrow-winged dragonflies)												
winged dragonflies)	1	0	1	0	1	0	0	0	0	0	1	2
Tipulidae (crane fly)	0	0	0	0	0	0	0	1	0	0	0	2
Chironomidae (midges)	0	0	1	0	0	0	0	0	0	0	0	0
Tabanidae (horse fly)	0	0	0	0	0	0	0	0	0	0	1	0
Hydropsychidae (caddis fly)	3	0	0	0	0	0	0	0	0	0	0	1
Hydroptilidae (caddis fly)	0	0	0	0	0	0	0	0	0	0	0	2
Perlidae (stone fly)	0	0	1	0	0	0	0	0	0	0	0	2
Physidae (snail)	0	0	3	0	0	0	0	3	0	0	1	0
Total Families Present (S)	8	2	9	3	4	3	3	6	3	0	10	8
Shannon-Wiener index (H)	1.33	.581	1.27	1.09	.686	.725	.842	1.46	1.02	0.0	1.96	1.3
(index of species diversity)												
Evenness = H/ln(S)	.64	.84	.58	1.00	.49	.67	.77	.82	.94	0.0	.97	.6

Hilsenhoff Field Biotic Index (FBI) of Water Quality

This index is based on family-level identification of various stream arthropods excluding crustaceans. The index is advantageous for immediate assessment of water quality and is useful on location by experienced researchers. Our assessment was performed in the lab after specimens were identified and preserved.

Table 2. FBI results for the 12 sample sites of Piasa Creek Watershed

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12
FBI scores	3.8	5.1	4.4	3.5	3.4	6.8	3.2	3.9	3.0	*10.0	4.0	3.4
Average for all sites = 3.9 very good water quality (see below)												

* macroinvertebrates were absent from this site due to high coliform bacteria counts

Table 3. Interpretation of FBI scores (Hilsenhoff, 1988)

<u>FBI</u>	<u>Water Quality</u>	<u>Degree of Organic Pollution</u>
0.00 - 3.50 pollution	Excellent	No apparent organic
3.51 - 4.50 pollution	Very Good	Possible slight organic
4.51 - 5.50	Good	Some organic pollution
5.51 - 6.50 pollution	Fair	Fairly significant organic
6.51 - 7.50 pollution	Fairly poor	Significant organic
7.51 - 8.50 pollution	Poor	Very significant organic
8.51 - 10.00	Very poor	Severe organic pollution

Piasa Creek Watershed Water Quality Sampling Sites

Site 1 - Hoagland's Plaza

Site 2 - Route 3 Bridge

Site 3 - Mill Creek Beltrees

Site 4 - Irish Lane

Site 5 – Highway 67

Site 6 - McClusky Road

Site 7 - Mitchell Creek Road

Site 8 - North Jersey

Site 9 – Teeny Hollow

Site 10 - Piasa

Site 11 - Airport Road 2

Site 12 – Airport Road 1

Water Chemistry Analysis of Piasa Creek Watershed June-July 2003

Site	pH	Nitrates (mg/L)	Phosphates (mg/L)	Dissolved Oxygen (mg/L)	Biol. Oxygen Demand (ppm)	Fecal Coliforms (colonies/100ml)
<u>1</u>	8.10	1.68	.836	8.40	5.22	1149.3
<u>2</u>	8.06	2.43	.770	9.48	4.18	501.0
<u>3</u>	7.56	3.28	1.400	9.30	2.94	235.3
<u>4</u>	7.88	1.35	1.180	8.02	3.58	661.2
<u>5</u>	7.78	1.40	.807	8.35	4.40	406.2
<u>6</u>	7.95	2.08	.902	10.26	5.50	879.2
<u>7</u>	8.03	1.56	1.140	9.56	4.35	753.0
<u>8</u>	7.70	3.53	.817	9.55	4.10	1455.8
<u>9</u>	8.03	1.85	.855	8.82	4.22	392.8
<u>10</u>	7.63	3.32	1.060	8.27	3.20	2297.0
<u>11</u>	8.03	1.35	1.120	8.75	3.43	355.2
<u>12</u>	8.13	1.92	.928	9.02	4.43	367.0

Piasa Creek Watershed Overall

Test	Results	Water Quality Index		Subtotal	Scale
		Q-Value	Weighted Factor		
Temp. Chg.	7.8	58	0.11	6.38	90-100 Excellent
pH	7.9	88	0.11	9.68	
Turbidity	7.4	84	0.08	6.72	70-89 Good
Total Solids	191.6	73	0.07	5.11	
DO %	102.5	99	0.17	16.83	50-69 Medium
BOD	4.13	58	0.11	6.4	
Phoshate	0.988	19	0.1	1.9	30-49 Poor
Nitrate	2.15	55	0.1	5.5	
Fecal Col.	787.5	23	0.16	3.68	0-29 Very Poor
				Total 62.2	Medium