A Distributional Atlas of Riffle Insects from Wisconsin Streams

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Cover photo *Celithemis eponina* by Casey Scott

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Table of Contents
Introduction ......................................................................................................................... 1
County Boundaries ........................................................................................................... 6
Rivers and Streams ......................................................................................................... 7
Ecoregions ....................................................................................................................... 8
Sample Distributions ....................................................................................................... 9
Bedrock Types ............................................................................................................... 10
Surficial Deposits .......................................................................................................... 11
Section I: Ephemeroptera ............................................................................................ 13
Section II: Plecoptera .................................................................................................. 107
Section III: Trichoptera ............................................................................................... 153
Section IV: Odonata ..................................................................................................... 255
Section V: Megaloptera ............................................................................................... 291
Section VI: Coleoptera ................................................................................................. 297
Section VII: Hemiptera ................................................................................................. 389
Section IX: Lepidoptera ............................................................................................... 415
References .................................................................................................................... 417
Taxa Index .................................................................................................................... 418
Appendix A - Base Maps for Transparent Overlays .................................................. 429
Insect communities are a vital part of every water body. They provide a food base for larger organisms, and can also provide insight to the quality of a water resource. Macroinvertebrate samples have been collected for over 25 years in Wisconsin, but the distributions of many taxa have not been updated since Hilsenhoff’s work on the Biotic Index in the 1970’s and 1980’s. The purpose of this book is to provide a comprehensive look at the distributions of insect taxa found in the streams and rivers of Wisconsin, where each has been collected, and the general quality of the waterbodies they inhabit.

**History of the Biotic Index**

Aquatic macroinvertebrates were first used by Chutter (1972) to assess water quality in South African streams. Hilsenhoff (1977) established sampling protocols and pollution tolerance values for macroinvertebrates used to calculate the biotic index (BI) in Wisconsin streams. Hilsenhoff (1977) assigned organism tolerance values of 0-5 and five grades of water quality classifications from 0 (excellent) to 5 (very poor). Field and laboratory methods and the application of the BI were tested on over 1000 Wisconsin streams. The BI was highly correlated with organic inputs of phosphorus, nitrogen, and chlorides (Hilsenhoff, 1982). In 1987, Hilsenhoff revised many specific organism tolerance values and expanded the scale to 0-10 to improve precision. The scale of water quality classifications was also expanded from 5 to 7 classes (Table 1).

**Table 1. Water quality classifications for the Hilsenhoff Biotic Index (BI) (Hilsenhoff 1987)**

<table>
<thead>
<tr>
<th>BI Value</th>
<th>Water Quality</th>
<th>Degree of Organic Pollution</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00-3.50</td>
<td>Excellent</td>
<td>No apparent organic pollution</td>
</tr>
<tr>
<td>3.51-4.50</td>
<td>Very Good</td>
<td>Slight organic pollution</td>
</tr>
<tr>
<td>4.51-5.50</td>
<td>Good</td>
<td>Some organic pollution</td>
</tr>
<tr>
<td>5.51-6.50</td>
<td>Fair</td>
<td>Fairly significant organic pollution</td>
</tr>
<tr>
<td>6.51-7.50</td>
<td>Fairly Poor</td>
<td>Significant organic pollution</td>
</tr>
<tr>
<td>7.51-8.50</td>
<td>Poor</td>
<td>Very significant organic pollution</td>
</tr>
<tr>
<td>8.51-10.00</td>
<td>Very Poor</td>
<td>Severe organic pollution</td>
</tr>
</tbody>
</table>

Hilsenhoff (1988a) developed a family-level biotic index (FBI) to allow for more rapid assessment but found that the FBI was less precise than the BI and suggested that it only be used in situations where a rapid assessment is needed.

Seasonal correction factors for the BI were proposed by Hilsenhoff (1988b) for warm and cold water streams to allow for more accurate assessments for spring and fall surveys. Spring and fall are the best times to sample macroinvertebrates because dissolved oxygen (DO)
levels are usually higher and not limiting. Sampling in summer is not recommended because increased temperature and decreased flow result in lower DO levels. These conditions cause some species to diapause in the egg stage making them unavailable to standard BI sampling methods (Hilsenhoff, 1988b). To further improve the precision and reduce seasonal variability of the BI Hilsenhoff (1998) suggested limiting the individuals of each taxon used in BI calculations to 10 and suggested that sampling could occur at any time of the year using this modification. This modification reduces the effect of “sample swamping” that may occur and is associated with life history phenomena such as emergence, when high numbers of individuals stage in specific microhabitats.

Lillie and Schlesser (1994) developed a mean tolerance index (TBI), essentially a modified BI, which weighed the values of rare and dominant taxa equally by including only one individual for each taxon used in the calculations. This index is less prone to temporal variation than the BI and can be used along with the BI to determine long term trends in water quality, but appears to be less sensitive (Hilsenhoff, 1998).

The greatest advantage of using a BI to assess water quality rather than chemical analysis is that it provides an insight into stream water quality over a longer period. Macroinvertebrates are exposed to a dynamic system throughout their life cycles and must endure substantial changes to chemical and physical variables of their environment. The tolerance status of a macroinvertebrate community is therefore an excellent barometer of stream conditions throughout the year. However, it should be noted that the BI is most effective when used to detect organic pollution and nutrient enrichment (Hilsenhoff, 1977).

**Data Used for Figures**

The data used to generate the figures in this book are from samples collected by various agencies and academic researchers and processed by the University of Wisconsin Stevens Point (UWSP) Aquatic Entomology Laboratory. The University database consists of 13,493 samples collected from 10,175 locations. Samples were collected primarily from riffles of wadeable streams between 1978 and 2009. Over 2.3 million specimens have been identified and recorded in the database. The database was created by and maintained by Dr. Stanley Szczytko and the taxonomy was performed or supervised by Jeff Dimick. The quality of this database can be attributed to the persistent efforts of these individuals over many years. All major orders of aquatic insects are included in this book except Diptera.

**Rare Taxa**

Taxa depicted as rare in this book may be so for a variety of reasons. Some taxa are found primarily in lentic habitats and generally are not collected in riffle samples. For example,
most genera of dragonflies are underrepresented because they typically do not inhabit riffles. Other taxa are found mainly in large rivers that are not accessible to the D-frame kick-netting used to collect the samples in this database. The burrowing mayfly genus *Hexagenia* is very common in the Mississippi River valley, but it typically inhabits large sand or silt-bottomed rivers that must be sampled by boat. Insects utilizing specialized microhabitats may appear to be rare because their preferred habitat exists in small patches and/or is not often sampled. This means the taxa is rarely encountered despite its common occurrence in the state. Other taxa may be truly rare in Wisconsin. The mayfly family Behningiidae has not been recorded by the UWSP laboratory and only a few occurrences have been recorded by other studies in the state.

**Understanding the Figures**

Each map represents the distribution and abundance of a taxon from 1978-2009. It is important to note that the semi-qualitative nature of BI samples can be a limiting factor for abundance measures. Material in a BI sample is divided evenly in a gridded pan; and grids are randomly selected and sorted until 125 organisms are found. Actual abundance may be higher because not every sample is sorted entirely.

County boundaries serve as a background layer to assist in understanding the distributions. The county boundaries are also found on the base maps in the first chapter so distributions can be compared by ecoregions and hydrologic features. The abundance scale was generated by calculating the maximum number of insects found at a site.

The graph below the map represents the range of water quality the taxon typically inhabits. All classifications are based on Hilsenhoff’s Biotic Index Max 10 modification (1987, 1998). A box and whisker plot was chosen to allow comparison of multiple taxa simultaneously. This plot contains the same information as a histogram, but displays only the minimum, 25% quartile, median, 75% quartile, and maximum (Fig. 1). The uppermost mark on the graph is the maximum BI Max10 value recorded for the taxon, or most impaired stream sample the taxon has been collected from. The top of the box is the BI Max10 value that 75% of the samples were below. The middle dot represents the median BI Max10 score for that taxon. The median was used instead of the mean because the median represents the middle value of the dataset and is less influenced by few extreme outliers. The bottom of the box is the level that represents the lowest 25% of the samples. The insect on display will be found in waters less impaired than this 25% of the time. The bottom mark is the lowest BI value recorded in a sample containing the taxon.

It is important to note that the quartiles are referring to samples, not individual insects. This means a sample containing one insect is counted the same as a sample containing 10
Figure 1: Sample histogram and whisker plot for *Baetis brunneicolor*. Note whisker plot is a summary of the histogram and allows multiple taxa to be compared.

insects. This could narrow the 25-75% quartiles because the majority of individuals would be expected to be found near their assigned tolerance value.

**Taxonomy and Names of Insects**

Scientific names are the most effective way to identify insects because the combination of genus and species names creates a unique identity for each type of insect. Common names can be useful at higher levels of identification such as order and family, but are not always practical at the genus and species level. The Odonates (dragonflies) and some other orders have
been taxonomically stable for a long time, and their common names are generally agreed on.

In contrast, the order Ephemeroptera (mayflies), lacks a comprehensive system of common names. The combination of frequent taxonomic changes and different regional names used by fisherman has created confusion when calling a mayfly by a common name. For example, the common name Blue-Winged Olive refers to the genus *Baetis*; so *B. brunneicolor*, *B. flavistriga*, *B. intercalaris*, and *B. tricaudatus* all share the same name. However, common names are provided where applicable throughout the book and are marked by family (F), genus (G), and species (S).

Taxonomy is a dynamic endeavor and revisions are frequently introduced. The taxonomy list used to generate the database and this book can be found at the UWSP-AEL website. (http://www.uwsp.edu/water/biomonitoring/index3.htm)
Figure 2: County boundaries of Wisconsin (WI DNR, 2007).
Figure 3 - River Systems of Wisconsin (WDNR, 2007)

1. Pine
2. Peshtigo
3. Oconto
4. Upper Chippewa
5. Lower Chippewa
6. Suamico
7. Black
8. Upper Wisconsin
9. Buffalo
10. Trempealeau
11. Lower Fox
12. Manitowoc
13. Baraboo - Wisconsin
14. Sheboygan
15. Bad Axe - Mississippi
16. Sugar
17. Grant - Platte
18. Pecatonica
19. Root - Pike
20. Lower Rock
21. Illinois Fox
22. Lake Winnebago
23. Kewaunee
24. Lake Superior
25. Milwaukee
26. Wolf
27. Upper Fox
28. St. Croix
29. Upper Rock
30. LaCrosse
31. Lower Wisconsin
Figure 4: Ecoregions of Wisconsin (Omernik, 1998)

47 Western Corn Belt Region
   47g Prairie Pothole Region

50 Northern Lakes and Forests
   50a Lake Superior Clay Plain
   50b Minnesota/Wisconsin Upland Till Plain
   50c St. Croix Pine Barrens
   50d Ontonagon Lobe Moraines and Gogebic Iron Range
   50e Chequamegon Moraine and Outwash Plain
   50f Blue Hills
   50g Chippewa Lobe Rocky Ground Moraines
   50h Perkinsville End Moraine
   50i Northern Highlands Lakes Country
   50j Brule and Paint River Drumlins
   50k Wisconsin/Michigan Pine and Oak Barrens
   50l Menominee Ground Moraine

51 North Central Hardwood Forests
   51a St. Croix Stagnation Moraines
   51b Central Wisconsin Undulating Till Plain
   51c Glacial Lake Wisconsin Sand Plain
   51d Central Sand Ridges
   51e Upper Wolf River Stagnation Moraine
   51f Green Bay Till and Lacustrine Plain
   51g Door Peninsula

52 Driftless Area
   52a Savanna Section
   52b Coulee Section

53 Southeastern Wisconsin Till Plains
   53a Rock River Drift Plain
   53b Kettle Moraines
   53c Southeastern Wisconsin Savannah and Till Plain
   53d Lake Michigan Lacustrine Clay Plain

54 Central Corn Belt Plains
   54e Chiwaukee Prairie Region
Figure 5: Biological water quality samples collected in Wisconsin riffles from 1978-2009. Table represents Biotic Index ranges and number of samples collected in each ecoregion.
Figure 6: Bedrock types of Wisconsin (WI DNR, 2001). Table represents Biotic Index ranges and number of samples collected in each bedrock type.
Figure 7: Surficial deposits types of Wisconsin (WI DNR, 2001). Table represents Biotic Index ranges and number of samples collected in each surficial deposit type.
Section I: Ephemeroptera (Mayflies)
Scientific Name: *Acentrella* spp.
Common Name: Small Minnow Mayflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index: Value 0 (excellent) -10 (impaired)
Scientific Name: *Acentrella ampla*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Acentrella parvula*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Acentrella turbida*
Common Name: Small Minnow Mayflies (F)

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Acerpenna* spp.
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Acerpenna macdunnoughi*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Acerpenna pygmaea*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Baetis* spp.
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Baetis brunneicolor*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Baetis flavistriga*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Baetis intercalaris*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Baetis tricaudatus*
Common Name: Small Minnow Mayflies (F)
Scientific Name: Callibaetis spp.
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Centroptilum* spp.
Common Name: Small Minnow Mayflies (F)

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) -10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Diphetor hageni*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Heterocloeon curiosum*
Common Name: Small Minnow Mayflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) -10 (impaired)
Scientific Name: *Paracloeodes minutus*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Plauditus* spp.
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Plauditus cestus*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Plauditus cinctutus*
Common Name: Small Minnow Mayflies (F)

Abundance
- • 0-50
- ● 50-100
- ○ 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: Plauditus dubius
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Plauditus punctiventris*
Common Name: Small Minnow Mayflies (F)

Abundance:
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Procloeon* spp.
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Pseudocloeon spp.*
Common Name: Small Minnow Mayflies (F)

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Pseudocloeon frondale*
Common Name: Small Minnow Mayflies (F)
Scientific Name: *Pseudocloeon longipalpus*
Common Name: Small Minnow Mayflies (F)
Ephemeroptera Baetidae

Scientific Name: *Pseudocloeon propinquum*
Common Name: Small Minnow Mayflies (F)

Abundance
- • 0-50
- • 50-100
- • 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum

frondale longipalpus propinquum
Scientific Name: *Baetisca* spp.
Common Name: Armored Mayflies (F)
Scientific Name: *Baetisca lacustris*
Common Name: Armored Mayflies (F)
Scientific Name: *Baetisca laurentina*
Common Name: Armored Mayflies (F)
Scientific Name: *Baetisca obesa*
Common Name: Armored Mayflies (F)
Scientific Name: *Brachycercus* spp.
Common Name: Small Squaregills (F)
Scientific Name: *Caenis* spp.
Common Name: Small Squaregills (F)
Scientific Name: *Dannella* spp.
Common Name: Spiny Crawlers (F)
Scientific Name: *Drunella* spp.
Common Name: Spiny Crawlers (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:** 0 (excellent) - 10 (impaired)

Legend:
- Maximum
- 75%
- Median
- 25%
- Minimum

**Species:**
- *Dannella*
- *Drunella*
- *Ephemeralia*
- *Eurylophella*
- *Serratella*
Scientific Name: *Ephemerella* spp.  
Common Name: Spiny Crawlers (F)
Scientific Name: *Ephemerella catawba*
Common Name: Spiny Crawlers (F)
Scientific Name: *Ephemerella d. dorothea*
Common Name: Spiny Crawlers (F)
Scientific Name: *Ephemerella excrucians*
Common Name: Spiny Crawlers (F)
Scientific Name: *Ephemerella invaria*
Common Name: Spiny Crawlers (F)
Scientific Name: *Ephemerella needhami*
Common Name: Spiny Crawlers (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Ephemerella subvaria*
Common Name: Spiny Crawlers (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Eurylophella* spp.
Common Name: Spiny Crawlers (F)
Scientific Name: *Eurylophella bicolor*
Common Name: Spiny Crawlers (F)

### Abundance
- 0-50
- 50-100
- 100+

### Biotic Index Value: 0 (excellent) - 10 (impaired)
- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Eurylophella temporalis*
Common Name: Spiny Crawlers (F)
Scientific Name: *Serratella* spp.
Common Name: Spiny Crawlers (F)
Scientific Name: *Serratella deficiens*
Common Name: Spiny Crawlers (F)
Scientific Name: *Serratella serrata*
Common Name: Spiny Crawlers (F)
Scientific Name: *Ephemera* spp.
Common Name: Common Burrowers (F)
Scientific Name: *Hexagenia* spp.
Common Name: Common Burrowers (F)

Abundance
- 0-50
- 50-100
- 100+

Ephemeroptera Ephemeridae

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Litobrancha recurvata*
Common Name: Common Burrowers (F)
Scientific Name: *Epeorus vitreus*
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Heptagenia* spp.
Common Name: Flatheaded Mayflies (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:** 0 (excellent), 10 (impaired)
Scientific Name: *Heptagenia diabasia*
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Heptagenia flavescens*
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Heptagenia pulla*
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Leucrocuta* spp.
Common Name: Flatheaded Mayflies (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value: 0 (excellent) - 10 (impaired)**

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Maccaffertium* spp.
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Maccaffertium exiguum*

Common Name: Flatheaded Mayflies (F)

Abundance

- 0-50
- 50-100
- 100+

**Biotic Index Value:**

- Maximum
- 75%
- Median
- 25%
- Minimum

- **exiguum**
- **luteum**
- **m. luteum**
- **medipunctatum**
- **modestum**
- **pudiculum**
- **terminatum**
- **vicarium**
Scientific Name: *Maccaffertium luteum*

Common Name: Flatheaded Mayflies (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index**
- Maximum
- 75%
- Median
- 25%
- Minimum

---

Ephemeroptera Heptageniidae
Scientific Name: Maccaffertium mediopunctatum
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Maccaffertium m. integrum*
Common Name: Flatheaded Mayflies (F)

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Maccaffertium modestum*
Common Name: Flatheaded Mayflies (F)

Abundance
- 0-50
- 50-100
- 100+

Ephemeroptera Heptageniidae
Scientific Name: *Maccaffertium pulchellum*
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Maccaffertium terminatum*
Common Name: Flatheaded Mayflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Values: 0 (excellent) - 10 (impaired)
Scientific Name: *Maccaffertium vicarium*
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Macdunnoa persimplex*
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Nixe* spp.
Common Name: Flatheaded Mayflies (F)

Abundance
- 0-50
- 50-100
- 100+

Ephemeroptera Heptageniidae

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Rhithrogena* spp.
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Stenacron interpunctatum*
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Stenonema femoratum*
Common Name: Flatheaded Mayflies (F)
Scientific Name: *Isonychia* spp.
Common Name: Brushlegged Mayflies (F)
Scientific Name: *Tricorythodes* spp.  
Common Name: Little Stout Crawlers (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:**
- Minimum
- 25%
- Median
- 75%
- Maximum

**Tricorythodes**

![Map of Wisconsin with abundance data for *Tricorythodes* spp.](image)
Scientific Name: *Choroterpes basalis*
Common Name: Pronggills (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:**
- 0 (excellent) - 10 (impaired)

**Species:**
- Choroterpes
- Habrophleboides
- Leptophlebia
- Paraleptophlebia
Scientific Name: *Habrophleboides americana*
Common Name: Pronggills (F)
Scientific Name: Leptophlebia spp.
Common Name: Pronggills (F)
Scientific Name: *Leptophlebia cupida*
Common Name: Pronggills (F)
Scientific Name: *Leptophlebia nebulosa*
Common Name: Pronggills (F)
Scientific Name: *Paraleptophlebia* spp.
Common Name: Pronggills (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Paraleptophlebia adoptiva*
Common Name: Pronggills (F)
Scientific Name: *Paraleptophlebia debilis*
Common Name: Pronggills (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:**
- **0** (excellent) - 10 (impaired)

**Species:**
- *adoptiva*
- *debilis*
- *mollis*
- *praepedita*
Scientific Name: *Paraleptophlebia mollis*
Common Name: Pronggills (F)
Scientific Name: *Paraleptophlebia praepedita*
Common Name: Pronggills (F)
Scientific Name: *Metretopus* spp.
Common Name: Cleftfooted Minnow Mayflies (F)
Scientific Name: *Siphlopectron* spp.
Common Name: Cleftfooted Minnow Mayflies (F)
Scientific Name: *Anthopotamus* spp.
Common Name: Hacklegills (F)

\[\text{Abundance}\]
- 0-50
- 50-100
- 100+

\[\text{Biotic Index Value: 0 (excellent) - 10 (impaired)}\]
Scientific Name: *Parameletus* spp.
Common Name: Primitive Minnow Mayflies (F)
Scientific Name: Siphlonurus spp.
Common Name: Primitive Minnow Mayflies (F)
Section II: Plecoptera (Stoneflies)
Scientific Name: Allocapnia spp.
Common Name: Slender Winter Stoneflies (F), Winter Stoneflies (F)
Scientific Name: *Paracapnia angulata*
Common Name: Slender Winter Stoneflies (F), Winter Stoneflies (F)
Scientific Name: *Alloperla* spp.
Common Name: Green Stoneflies (F), Sallflies (F)
Scientific Name: *Haploperla* spp.
Common Name: Green Stoneflies (F), Sallflies (F)
Scientific Name: *Haploperla brevis*

Common Name: Green Stoneflies (F), Sallflies (F)
Scientific Name: *Haploperla orpha*
Common Name: Green Stoneflies (F), Sallflies (F)
Scientific Name: *Leuctra* spp.
Common Name: Rolledwinged Stoneflies (F), Needleflies (F)
Scientific Name: *Amphinemura* spp.
Common Name: Nemourid Broadbacks (F), Forestflies (F)
Scientific Name: *Amphinemura delosa*
Common Name: Nemourid Broadbacks (F), Forestflies (F)
Scientific Name: *Amphinemura delosa/varshava*
Common Name: Nemourid Broadbacks (F), Forestflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Amphinemura linda*
Common Name: Nemourid Broadbacks (F), Forestflies (F)
Scientific Name: *Nemoura trispinosa*
Common Name: Nemourid Broadbacks (F), Forestflies (F)

Abundance

- **0-50**
- **50-100**
- **100+**

![Map of Wisconsin with Abundance distribution](image)

**Biotic Index Value: 0 (excellent) - 10 (impaired)**

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Prostoia* spp.
Common Name: Nemourid Broadbacks (F), Forestflies (F)
Scientific Name: *Prostoia completa*
Common Name: Nemourid Broadbacks (F), Forestflies (F)
Scientific Name: *Prostoia similis*
Common Name: Nemourid Broadbacks (F), Forestflies (F)
Scientific Name: *Shipsa rotunda*
Common Name: Nemourid Broadbacks (F), Forestflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Acroneuria* spp.
Common Name: Common Stoneflies (F), Stones (F), Golden Stoneflies (F)

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: Agnetina spp.
Common Name: Common Stoneflies (F), Stones (F), Golden Stoneflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index: 0 (excellent) - 10 (impaired)
Scientific Name: *Agnetina capitata*
Common Name: Common Stoneflies (F), Stones (F), Golden Stoneflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: Agnetina flavescens
Common Name: Common Stoneflies (F), Stones (F), Golden Stoneflies (F)
Scientific Name: *Attaneuria ruralis*
Common Name: Common Stoneflies (F), Stones (F), Golden Stoneflies (F)
Scientific Name: *Neoperla* spp.
Common Name: Common Stoneflies (F), Stones (F), Golden Stoneflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index: Value: 0 (excellent) -10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Paragnetina media*
Common Name: Common Stoneflies (F), Stones (F), Golden Stoneflies (F)
Scientific Name: *Perlesta* spp.
Common Name: Common Stoneflies (F), Stones (F), Golden Stoneflies (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value: 0 (excellent) -10 (impaired)**

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Perlinella* spp.
Common Name: Common Stoneflies (F), Stones (F), Golden Stoneflies (F)

**Abundance**
- 0-50
- 50-100
- 100+

*Biotic Index Value: 0 (excellent) - 10 (impaired)*
Scientific Name: *Clioperla clio*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: Isogenoides spp.
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isogenoides frontalis*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isogenoides olivaceus*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isoperla* spp.
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)

Abundance

- • 0-50
- • 50-100
- • 100+

Diagram showing distribution and abundance of *Isoperla* spp. in Wisconsin.
Scientific Name: *Isoperla bilineata*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isoperla cotta*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isoperla dicala*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isoperla frisoni*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isoperla lata*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isoperla marlynia*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Isoperla nana*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isoperla richardsoni*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Isoperla signata*
Common Name: Perlodid Stoneflies (F), Strippetals and Springflies (F)
Scientific Name: *Isoperla slossonae*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Isoperla transmarina*
Common Name: Perlodid Stoneflies (F), Stripetails and Springflies (F)
Scientific Name: *Pteronarcys* spp.
Common Name: Giant Stoneflies (F), Salmonflies (F)

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Oemopteryx glacialis*
Common Name: Taeniopterygid Stoneflies (F), Early Stones (F)
Scientific Name: *Strophopteryx fasciata*
Common Name: Taeniopterygid Stoneflies (F), Early Stones (F)
Scientific Name: *Taeniopteryx* spp.
Common Name: Taeniopterygid Stoneflies (F), Early Stones (F)
Section III: Trichoptera (Caddisflies)
Scientific Name: *Apatania* spp.
Common Name:

**Abundance**
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Brachycentrus* spp.
Common Name: Humpless Case Makers (F)
Scientific Name: *Brachycentrus americanus*
Common Name: Humpless Case Makers (F)
Scientific Name: *Brachycentrus occidentalis*  
Common Name: Humpless Case Makers (F)
Scientific Name: *Micrasema* spp.
Common Name: Humpless Case Makers (F)
Scientific Name: *Micrasema gelidum*
Common Name: Humless Case Makers (F)
Scientific Name: *Micrasema rusticum*
Common Name: Humless Case Makers (F)

**Abundance**
- • 0-50
- ● 50-100
- ● 100+

**Biotic Index Value:** 0 (excellent) - 10 (impaired)
Scientific Name: *Micrasema wataga*
Common Name: Humpless Case Makers (F)
Scientific Name: *Phylocentropus placidus*
Common Name: Trumpetnet and Tubemaking Caddisflies (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:** 0 (excellent) - 10 (impaired)
Scientific Name: Agapetus spp.
Common Name: Saddlecase Makers (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum

Trichoptera Glossosomatidae
Scientific Name: *Glossosoma* spp.
Common Name: Saddlecase Makers (F)
Scientific Name: *Protoptila* spp.
Common Name: Saddlecase Makers (F)
Scientific Name: *Goera stylata*
Common Name:
Scientific Name: *Helicopsyche borealis*
Common Name: Snailcase Makers (F)
Scientific Name: *Ceratopsyche* spp.
Common Name: Common Netspinners (F)
Scientific Name: *Ceratopsyche alhedra*
Common Name: Common Netspinners (F)
Trichoptera Hydropsychidae

Scientific Name: *Ceratopsyche alterans*
Common Name: Common Netspinners (F)
Scientific Name: *Ceratopsyche bifida* group  
Common Name: Common Netspinners (F)
Scientific Name: *Ceratopsyche bronta*
Common Name: Common Netspinners (F)
Scientific Name: *Ceratopsyche morosa bifida* form
Common Name: Common Netspinners (F)

Abundance

- • 0-50
- • 50-100
- • 100+

Biotic Index: 0 (Excellent) - 10 (Impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Ceratopsyche morosa morosa* form
Common Name: Common Netspinners (F)
Scientific Name: *Ceratopsyche slossonae*
Common Name: Common Netspinners (F)
Trichoptera Hydropsychidae

Scientific Name: Ceratopsyche sparna
Common Name: Common Netspinners (F)
Scientific Name: *Ceratopsyche vexa*
Common Name: Common Netspinners (F)
Scientific Name: *Ceratopsyche walkeri*
Common Name: Common Netspinners (F)
Scientific Name: *Cheumatopsyche* spp.
Common Name: Common Netspinners (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Values:**
- Maximum
- 75%
- Median
- 25%
- Minimum

**Species**
- Ceratopsyche
- Cheumatopsyche
- Diplectrona
- Hydropsyche
- Macrosternum
- Parapsyche
- Potamyla
Scientific Name: *Diplectrona modesta*
Common Name: Common Netspinners (F)
Scientific Name: *Hydropsyche* spp.
Common Name: Common Netspinners (F)
Scientific Name: *Hydropsyche aerata*
Common Name: Common Netspinners (F)
Scientific Name: *Hydropsyche arinale*
Common Name: Common Netspinners (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Hydropsyche betteni*
Common Name: Common Netspinners (F)
Scientific Name: *Hydropsyche bidens*
Common Name: Common Netspinners (F)

Abundance
- **0-50**
- **50-100**
- **100+**

Trichoptera Hydropsychidae
Scientific Name: *Hydropsyche cuanis*
Common Name: Common Netspinners (F)
Scientific Name: *Hydropsyche dicantha*
Common Name: Common Netspinners (F)
Scientific Name: *Hydropsyche leonardi*
Common Name: Common Netspinners (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:** 0 (excellent) - 10 (impaired)
Scientific Name: *Hydropsyche orris*
Common Name: Common Netspinners (F)
Scientific Name: *Hydropsyche phalerata*

Common Name: Common Netspinners (F)

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Hydropsyche placoda*
Common Name: Common Netspinners (F)
Scientific Name: *Hydropsyche scalaris*
Common Name: Common Netspinners (F)
Scientific Name: *Hydropsyche simulans*
Common Name: Common Netspinners (F)
Scientific Name: *Macrostemum zebratum*
Common Name: Common Netspinners (F)
Scientific Name: *Potamyia flava*
Common Name: Common Netspinners (F)
Trichoptera Hydroptilidae

Scientific Name: *Hydroptila* spp.
Common Name: Micro Caddisflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Leucotrichia pictipes*
Common Name: Micro Caddisflies (F)
Trichoptera Hydroptilidae

Scientific Name: *Mayatrichia* spp.
Common Name: Micro Caddisflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Neotrichia* spp.
Common Name: Micro Caddisflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Ochrotrichia* spp.
Common Name: Micro Caddisflies (F)
Scientific Name: *Orthotrichia* spp.
Common Name: Micro Caddisflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Oxyethira* spp.
Common Name: Micro Caddisflies (F)
Scientific Name: *Stactobiella* spp.
Common Name: Micro Caddisflies (F)
Scientific Name: *Lepidostoma* spp.
Common Name: Lepidostomatid Case Makers (F)

### Abundance
- 0-50
- 50-100
- 100+

### Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Ceraclea* spp.
Common Name: Longhorned Case Makers (F)
Scientific Name: *Leptocerus* spp.
Common Name: Longhorned Case Makers (F)
Scientific Name: Mystacides spp.
Common Name: Longhorned Case Makers (F)
Scientific Name: *Nectopsyche* spp.
Common Name: Longhorned Case Makers (F)
Scientific Name: *Oecetis* spp.
Common Name: Longhorned Case Makers (F)

![Abundance Map](map.png)

**Trichoptera Leptoceridae**
Scientific Name: *Setodes* spp.
Common Name: Longhorned Case Makers (F)
Scientific Name: *Triaenodes* spp.
Common Name: Longhorned Case Makers (F)

Abundance

- • 0-50
- ● 50-100
- ● 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Anabolia* spp.
Common Name: Northern Case Makers (F)
Scientific Name: *Arctopora* spp.
Common Name: Northern Case Makers (F)

Abundance

• 0-50
• 50-100
• 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Asynarchus missa*
Common Name: Northern Case Makers (F)
Scientific Name: *Frenesia* spp.
Common Name: Northern Case Makers (F)

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Glyphopsyche irrorata*
Common Name: Northern Case Makers (F)
Scientific Name: *Hesperophylax designatus*
Common Name: Northern Case Makers (F)
Trichoptera Limnephilidae

Scientific Name: *Hydatophylax argus*
Common Name: Northern Case Makers (F)
Scientific Name: *Ironoquia* spp.
Common Name: Northern Case Makers (F)

Abundance
- **0-50**
- **50-100**
- **100+**

Trichoptera Limnephilidae
Scientific Name: *Limnephilus* spp.
Common Name: Northern Case Makers (F)

Abundance
- • 0-50
- ● 50-100
- ●● 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Nemotaulius hostilus*
Common Name: Northern Case Makers (F)
Scientific Name: *Onocosmoecus* spp.
Common Name: Northern Case Makers (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Platycentropus* spp.
Common Name: Northern Case Makers (F)
Scientific Name: *Pseudostenophylax* spp.
Common Name: Northern Case Makers (F)
Scientific Name: *Psychoglypha subborealis*
Common Name: Northern Case Makers (F)
Scientific Name: *Pycnopsyche* spp.
Common Name: Northern Case Makers (F)

**Abundance**
- • 0-50
- ● 50-100
- ● 100+

**Biotic Index Value: 0 (excellent) - 10 (impaired)**

![Biotic Index Chart]

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Chimarra* spp.
Common Name: Fingernet Caddisflies (F)
Scientific Name: *Chimarra aterrima*
Common Name: Fingernet Caddisflies (F)

Abundance
- • 0-50
- ● 50-100
- ○ 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Chimarra feria*
Common Name: Fingernet Caddisflies (F)
Scientific Name: *Chimarra obscura*
Common Name: Fingernet Caddisflies (F)
Scientific Name: *Chimarra socia*
Common Name: Fingernet Caddisflies (F)
Scientific Name: *Dolophilodes distinctus*
Common Name: Fingernet Caddisflies (F)
Scientific Name: *Wormaldia* spp.
Common Name: Fingernet Caddisflies (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Agrypnia* spp.
Common Name: Giant Case Makers (F)
Scientific Name: *Banksiola* spp.
Common Name: Giant Case Makers (F)
Scientific Name: *Fabria* spp.  
Common Name: Giant Case Makers (F)
Scientific Name: *Hagenella canadensis*
Common Name: Giant Case Makers (F)
Scientific Name: *Oligostomis ocelligera*
Common Name: Giant Case Makers (F)
Scientific Name: *Phryganea* spp.
Common Name: Giant Case Makers (F)
Scientific Name: *Ptilostomis* spp.
Common Name: Giant Case Makers (F)
Scientific Name: *Cernotina* spp.
Common Name: Trumpetnet and Tubecase Makers (F)
Scientific Name: *Cyrnellus fraternus*
Common Name: Trumpetnet and Tubecase Makers (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: Neureclipsis spp.
Common Name: Trumpetnet and Tubecase Makers (F)
Scientific Name: *Nyctiophylax* spp.
Common Name: Trumpetnet and Tubecase Makers (F)
Scientific Name: *Polycentropus* spp.
Common Name: Trumpetnet and Tubecase Makers (F)
Scientific Name: *Lype diversa*
Common Name: Nettube Caddisflies (F)
Scientific Name: *Psychomyia flavida*
Common Name: Nettube Caddisflies (F)
Scientific Name: *Rhyacophila* spp.
Common Name: Freeliving Caddisflies (F)

### Abundance
- 0-50
- 50-100
- 100+

![Biotic Index Value Diagram]

- Maximum
- 75%
- Median
- 25%
- Minimum

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251
Scientific Name: *Agarodes distinctus*
Common Name: Bush Tailed Case Makers (F)
Scientific Name: *Neophylax* spp.
Common Name: Uenoid Case Makers (F)
Section IV: Odonata - Anisoptera (Dragonflies) and Zygoptera (Damselflies)
Scientific Name: *Aeshna* spp.
Common Name: Darners (F),
Mosaic Darners (G)
Scientific Name: *Anax* spp.
Common Name: Darners (F), Green Darners (G)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index: 0 (excellent) - 10 (impaired)
Scientific Name: Basiaeschna janata
Common Name: Darners (F), Springtime Darner (G, S)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Boyeria vinosa*
Common Name: Darners (F), Spotted Darners (G)
Scientific Name: *Cordulegaster* spp.
Common Name: Spiketails (F,G)

Abundance
- 0-50
- 50-100
- 100+

[Graph showing abundance distribution and biotic index value]

Odonata Cordulegastridae

260
Scientific Name: *Epicordulia* princeps
Common Name: Emeralds (F),
Prince Baskettail (S)
*Now part of *Epitheca.*

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Neurocodulia* spp.
Common Name: Emeralds (F), Shadowdragons (G)

**Abundance**
- • 0-50
- ● 50-100
- ● 100+

**Biotic Index**
- Maximum
- 75%
- Median
- 25%
- Minimum

**Graphs**
- Epicordulia
- Neurocordulia
- Somatochloa
- Tetragoneuria
Scientific Name: *Somatochlora* spp.
Common Name: Emeralds (F), Striped Emeralds (G)
Scientific Name: *Tetragoneuria* spp.
Common Name: Emeralds (F), Baskettails (G)
*Now part of Epitheca.*

**Abundance**
- 0-50
- 50-100
- 100+

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**Biotic Index Values**

- **Epicordulia**
- **Neurocordulia**
- **Somatochlorella**
- **Tetragoneuria**

**Legend:**
- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Arigomphus* spp.
Common Name: Clubtails (F), Pond Clubtails (G)

Abundance
- • 0-50
- ● 50-100
- ● 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Dromogomphus spinosus*
Common Name: Clubtails (F),
Spinylegs (G)

Abundance
- • 0-50
- ● 50-100
- ○ 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Gomphurus* spp.  
Common Name: Clubtails (F),  
Common Clubtails (G)  
*Now part of Gomphus.*
Scientific Name: *Gomphus* spp.
Common Name: Clubtails (F), Common Clubtails (G)
Scientific Name: *Hagenius brevistylus*
Common Name: Clubtails (F), Dragonhunters (G)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Hylogomphus* spp.
Common Name: Clubtails (F), Common Clubtails (G)
*Now part of Gomphus.*

Abundance
- • 0-50
- ● 50-100
- ○ 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Stylogomphus albistylus*
Common Name: Clubtails (F), Least Clubtail (G,S)
Scientific Name: *Stylurus* spp.
Common Name: Clubtails (F), Hanging Clubtails (G)
Scientific Name: *Erythemis simplicicollis*
Common Name: Skimmers (F), Pondhawks (G)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Leucorrhinia* spp.
Common Name: Skimmers (F), Whitefaces (G)
Scientific Name: *Libellula* spp.
Common Name: Skimmers (F), King Skimmers (G)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Perithemis tenera*
Common Name: Skimmers (F), Amberwings (G)
Scientific Name: *Plathemis lydia*
Common Name: Skimmers (F), Common Whitetail (S)

### Abundance
- 0-50
- 50-100
- 100+

### Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Didymops* spp.
Common Name: Cruisers (F), Brown Cruiser (G)

Abundance
- 0-50
- 50-100
- 100+

Odonata Macromiinae
Scientific Name: *Macromia* spp.
Common Name: Cruisers (F), River Cruisers (G)

**Abundance**
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

**Didymops**

**Macromia**
Scientific Name: *Calopteryx* spp.
Common Name: Broad-winged Damsels (F), Jewelwings (G)
Scientific Name: *Hetaerina* spp.
Common Name: Broad-winged Damsels (F), Rubyspots (G)
Scientific Name: *Amphiagrion saucium*
Common Name: Pond Damsels (F), Red Damsels (G)
Scientific Name: *Argia* spp.
Common Name: Pond Damsels (F), Dancers (G)
Scientific Name: *Chromagrion conditum*
Common Name: Pond Damsels (F), Aurora Damsel (G,S)
Scientific Name: *Coenagrion* spp.
Common Name: Pond Damsels (F), Bluets (G)
Scientific Name: *Enallagma* spp.
Common Name: Pond Damsels (F), Bluets (G)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:** 0 (excellent) • 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Ischnura* spp.
Common Name: Pond Damsels (F), Forktails (G)
Scientific Name: *Lestes* spp.
Common Name: Spreadwings (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Section V: Megaloptera (Dobsonflies)
Scientific Name: *Chauliodes* spp.
Common Name: Hellgrammite (F)
Scientific Name: *Corydalus cornutus*
Common Name: Hellgrammite (F)

Abundance

- 0-50
- 50-100
- 100+

Megaloptera Corydalidae
Scientific Name: *Nigronia serricornis*
Common Name: Hellgrammite (F)
Scientific Name: *Sialis* spp.
Common Name: Alderflies (F)
Section VI: Coleoptera (Beetles)
Scientific Name: Carabidae
Common Name: Ground Beetles (F)
Scientific Name: *Donacia* spp.
Common Name: Aquatic Leaf Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Listronotus* spp.
Common Name: Water Weevils (F)

Abundance
- • 0-50
- ● 50-100
- ● 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Notiodes* spp.  
Common Name: Water Weevils (F)
Scientific Name: *Tanysphyrus* spp.
Common Name: Water Weevils (F)
Scientific Name: *Helichus* spp.
Common Name: Long-toed Water Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum

![Map of Wisconsin with markers indicating abundance of *Helichus* spp.]
Scientific Name: *Acilius* spp.
Common Name: Predacious Diving Beetles (F)

Abundance

- 0-50
- 50-100
- 100+

*Note- Graph is continued on next page.*
Scientific Name: *Agabus* spp.
Common Name: Predacious Diving Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.*
Scientific Name: *Colymbetes* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.*

**Abundance**
- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.*
Scientific Name: *Copelatus* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

Coleoptera Dytiscidae

Abundance
- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.
Scientific Name: *Coptotomus* spp.
Common Name: Predacious Diving Beetles (F)

*Note- Graph is continued on opposite page.*

---

**Abundance**

- • 0-50
- • 50-100
- • 100+

![Map of Wisconsin with abundance data]

*Note- Graph is continued on facing page.*
Scientific Name: *Desmopachria* spp.
Common Name: Predacious Diving Beetles (F)

*Note- Graph is continued on opposite page.

Abundance
- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.*
Scientific Name: *Heterosternuta* spp.
Common Name: Predacious Diving Beetles (F)

*Note- Graph is continued on opposite page.*
Scientific Name: *Hydrocolus* spp.  
Common Name: Predacious Diving Beetles (F)  
*Note- Graph is continued on opposite page.

### Abundance

- • 0-50
- ● 50-100
- ★ 100+

*Note- Graph is continued on facing page.*
Scientific Name: *Hydroporus* spp.
Common Name: Predacious Diving Beetles (F)

*Note- Graph is continued on opposite page.

Abundance

- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.
Scientific Name: *Hydrovatus* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.*
Scientific Name: *Hygrotus* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

**Abundance**
- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.*
Scientific Name: *Ilybius* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

*Note- Graph is continued on facing page.*
Scientific Name: *Laccophilus* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

Abundance
- 0-50
- 50-100
- 100+

*Biotic Index Value: 0 (excellent) - 10 (impaired)*

*Note- Graph is continued on facing page.*
Scientific Name: *Liodessus* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

*Note- Graph is continued on facing page.
Scientific Name: *Lioporeus* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

**Abundance**
- 0-50
- 50-100
- 100+

*Biotic Index Value: 0 (excellent) - 10 (impaired)*

*Note- Graph is continued on facing page.*
Scientific Name: *Nebrioporus* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

**Abundance**
- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.*
Scientific Name: *Neoporus* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

Abundance

- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.*
Scientific Name: *Oreodytes* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

**Abundance**
- • 0-50
- • 50-100
- • 100+

*Note- Graph is continued on facing page.*
Scientific Name: *Potamonectes* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

Abundance

- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.
Scientific Name: *Rhantus* spp.
Common Name: Predacious Diving Beetles (F)

*Note- Graph is continued on opposite page.

Abundance
- 0-50
- 50-100
- 100+

*Note- Graph is continued on facing page.*
Coleoptera Dytiscidae

Scientific Name: *Sanfilippodytes* spp.
Common Name: Predacious Diving Beetles (F)

*Note- Graph is continued on opposite page.*
Scientific Name: *Uvarus* spp.
Common Name: Predacious Diving Beetles (F)
*Note- Graph is continued on opposite page.

Abundance
- • 0-50
- ● 50-100
- ● 100+

*Note- Graph is continued on facing page.*
Scientific Name: *Ancyronyx variegata*
Common Name: Riffle Beetles (F)
Scientific Name: *Dubiraphia* spp.
Common Name: Riffle Beetles (F)
Scientific Name: *Dubiraphia bivittata*
Common Name: Riffle Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Dubiraphia minima*
Common Name: Riffle Beetles (F)
Scientific Name: *Dubiraphia quadrinotata*
Common Name: Riffle Beetles (F)
Scientific Name: *Dubiraphia robusta*
Common Name: Riffle Beetles (F)
Scientific Name: *Dubiraphia vittata*
Common Name: Riffle Beetles (F)

**Abundance**
- • 0-50
- ○ 50-100
- ● 100+

**Biotic Index Value: 0 (excellent) - 10 (impaired)**

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Macronychus glabratus*
Common Name: Riffle Beetles (F)
Scientific Name: *Microcylloepus pusillus*
Common Name: Riffle Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index: Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Optioservus* spp.
Common Name: Riffle Beetles (F)
Scientific Name: *Optioservus trivittatus*
Common Name: Riffle Beetles (F)
Scientific Name: *Stenelmis* spp.
Common Name: Riffle Beetles (F)

**Abundance**
- 0-50
- 50-100
- 100+

<table>
<thead>
<tr>
<th>Biotic Index Value</th>
<th>Arctonyx</th>
<th>Dubiasiophia</th>
<th>Macronychus</th>
<th>Macrocyclusus</th>
<th>Oplophorus</th>
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<tr>
<td>Minimum</td>
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</table>
Scientific Name: *Stenelmis crenata*
Common Name: Riffle Beetles (F)
Scientific Name: *Stenelmis decorata*
Common Name: Riffle Beetles (F)
Scientific Name: *Stenelmis douglasensis*
Common Name: Riffle Beetles (F)
Scientific Name: *Stenelmis grossa*
Common Name: Riffle Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index: Value 0 (excellent) - 10 (impaired)
- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Stenelmis knobeli*
Common Name: Riffle Beetles (F)
Scientific Name: *Stenelmis musgravei*

Common Name: Riffle Beetles (F)
Scientific Name: *Stenelmis quadrimaculata*
Common Name: Riffle Beetles (F)

Abundance
- • 0-50
- • 50-100
- • 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum

- cronatsa
- docarnata
- douglasensis
- grosse
- kroabai
- mara
- musgravei
- quadrimaculata
- sandersoni
Scientific Name: *Stenelmis sandersoni*
Common Name: Riffle Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value (0 (excellent) - 10 (impaired))
- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Dineutus* spp.
Common Name: Whirlygig Beetles (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:** 0 (Excellent), 10 (Impaired)
Scientific Name: *Gyrinus* spp.
Common Name: Whirlygig Beetles (F)
Scientific Name: *Haliplus* spp.
Common Name: Crawling Water Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Heteroceridae*
Common Name: Variegated Mudloving Beetles (F)
Scientific Name: *Hydraenidae*
Common Name: Minute Moss Beetles (F)
Scientific Name: *Anacaena lutescens*
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Berosus* spp.
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Crenitis* spp.
Common Name: Water Scavenger Beetles (F)

**Abundance**

- • 0-50
- ● 50-100
- ● ● 100+

**Biotic Index Value:** 0 (excellent) - 10 (impaired)
Scientific Name: *Cymbiodyta* spp.
Common Name: Water Scavenger Beetles (F)

Abundance

- 0-50
- 50-100
- 100+

**Biotic Index Value: 0 (excellent) - 10 (impaired)**

- Maximum
- 75%
- Median
- 25%
- Minimum
Coleoptera Hydrophilidae

Scientific Name: *Enochrus* spp.
Common Name: Water Scavenger Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: Helocombus bifidus
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Helophorus* spp.
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Hydrobius* spp.
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Hydrochara* spp.
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Hydrochus* spp.
Common Name: Water Scavenger Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Laccobius* spp.
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Paracymus* spp.
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Sperchopsis tesselata*
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Tropisternus* spp.
Common Name: Water Scavenger Beetles (F)
Scientific Name: Tropisternus columbianus
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Tropisternus glaber*
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Tropisternus lateralis nimbatus*
Common Name: Water Scavenger Beetles (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index Value:** 0 (Excellent) - 10 (Impaired)
Scientific Name: *Tropisternus mixtus*
Common Name: Water Scavenger Beetles (F)
Scientific Name: *Tropisternus natator*

Common Name: Water Scavenger Beetles (F)
Scientific Name: Lutrochus laticeps
Common Name: Travertine Beetles (F)
Scientific Name: Melyridae spp.
Common Name: Soft-lunged Flower Beetles (F)
Scientific Name: *Hydrocanthus* spp.
Common Name: Burrowing Water Beetles (F)
Scientific Name: *Ectopria* spp.
Common Name: Water Pennies (F)

**Abundance**
- • 0-50
- ● 50-100
- ● 100+

**Biotic Index Value:**
- 0 (excellent) - 10 (impaired)

**Boxplots**
- *Ectopria*
- *Psephenus*

**Legend**
- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Psephenus* spp.
Common Name: Water Pennies (F)

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Cyphon* spp.
Common Name: Marsh Beetles (F)

Abundance
- • 0-50
- ● 50-100
- ● 100+

![Map of Wisconsin with abundance data for Coleoptera Scirtidae]

![Box plots for biotic index values of *Cyphon*, *Flavoelodes*, *Prionocyphon*, and *Scites*]
Scientific Name: *Flavohelodes* spp.
Common Name: Marsh Beetles (F)
Scientific Name: *Prionocyphon* spp.
Common Name: Marsh Beetles (F)

Abundance
- • 0-50
- • 50-100
- • 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum

---

381
Scientific Name: *Scirtes* spp.
Common Name: Marsh Beetles (F)

**Abundance**
- • 0-50
- ● 50-100
- ● 100+

**Biotic Index Value:**
- Maximum
- 75%
- Median
- 25%
- Minimum

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<tr>
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<th>Cyphon</th>
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</tr>
</tbody>
</table>
Scientific Name: Bledius spp.
Common Name: Rove Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Carpelimus* spp.
Common Name: Rove Beetles (F)
Scientific Name: *Stenus* spp.
Common Name: Rove Beetles (F)

**Abundance**
- 0-50
- 50-100
- 100+

Biotic Index: Value 0 (excellent) - 10 (impaired)
Scientific Name: Thinobius spp.
Common Name: Rove Beetles (F)
Scientific Name: *Tenebrionidae*
Common Name: Darkling Beetles (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Section VII: Hemiptera (True Bugs)
Scientific Name: *Belostoma flumineum*
Common Name: Giant Water Bugs (F)
Scientific Name: *Lethocerus americanus*
Common Name: Giant Water Bugs (F)
Scientific Name: *Callicorixa* spp.
Common Name: Water Boatmen (F)

**Abundance**
- 0-50
- 50-100
- 100+

**Biotic Index:** 0 (excellent) to 10 (impaired)

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Cymatia* spp.
Common Name: Water Boatmen (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index: Value; 0 (excellent) - 10 (impaired)
Scientific Name: *Hesperocorixa* spp.
Common Name: Water Boatmen (F)
Scientific Name: *Palmacorixa* spp.
Common Name: Water Boatmen (F)

Abundance
- • 0-50
- ● 50-100
- ○ 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: Sigara spp.
Common Name: Water Boatmen (F)

Abundance
- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Trichocorixa* spp.
Common Name: Water Boatmen (F)

Hemiptera Corixidae
Scientific Name: *Aquarius remigis*
Common Name: Water Striders (F)

**Abundance**
- • 0-50
- ● 50-100
- ○ 100+

**Biotic Index Value:** 0 (excellent) - 10 (impaired)
Scientific Name: *Gerris* spp.
Common Name: Water Striders (F)
Scientific Name: *Limnoporus* spp.
Common Name: Water Striders (F)

Abundance

- • 0-50
- ● 50-100
- ● 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
Scientific Name: *Metrobates* spp.
Common Name: Water Striders (F)

Abundance
- 0-50
- 50-100
- 100+

Box plots for Biotic Index Value:
- Maximum
- 75%
- Median
- 25%
- Minimum

Hemiptera Gerridae
Scientific Name: *Rheumatobates* spp.
Common Name: Water Striders (F)
Scientific Name: *Trepobates* spp.
Common Name: Water Striders (F)

Hemiptera Gerridae
Scientific Name: *Hebrus* spp.
Common Name: Velvet Water Bugs (F)
Scientific Name: *Mesovelia* spp.
Common Name: Water Treaders (F)

Hemiptera Mesoveliidae
Scientific Name: *Ranatra* spp.
Common Name: Water Scorpions (F)
Scientific Name: *Notonecta* spp.
Common Name: Backswimmers (F)

Abundance
- • 0-50
- • 50-100
- • 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)

---

Hemiptera Notonectidae
Scientific Name: *Neoplea striola*
Common Name: Pygmy Backswimmers (F)
Scientific Name: *Salididae*
Common Name: Shore Bugs (F)
Scientific Name: *Microvelia* spp.
Common Name: Broad-Shouldered Water Striders (F)

**Abundance**
- • 0-50
- • 50-100
- • 100+

**Biotic Index Value: 0 (excellent) - 10 (impaired)**

- Maximum
- 75%
- Median
- 25%
- Minimum
Scientific Name: *Rhagovelia* spp.
Common Name: Broad-Shouldered Water Striders (F)
Section IIX: Lepidoptera (Aquatic Catapillars)
Scientific Name: *Petrophila* spp.
Common Name: Lepidoptera Crambidae

Abundance

- 0-50
- 50-100
- 100+

Biotic Index Value: 0 (excellent) - 10 (impaired)
References


**Taxa Index**

Ephemeroptera .................................................................................................................. 13

Ameletidae
   Ameletus .................................................................................................................. 14

Baetidae
   Acentrella .................................................................................................................. 15
      ampla ...................................................................................................................... 16
      parvula .................................................................................................................. 17
      turbida .................................................................................................................. 18
   Acerpenna .................................................................................................................. 19
      macdunnoughi ....................................................................................................... 20
      pygmaea ............................................................................................................... 21
   Baetis .......................................................................................................................... 22
      brunneicolor ......................................................................................................... 23
      flavistriga ............................................................................................................. 24
      intercalaris ........................................................................................................... 25
      tricaudatus ........................................................................................................... 26
   Callibaetis .................................................................................................................... 27
   Centroptilum ............................................................................................................. 28
   Diphetor hageni ......................................................................................................... 29
   Heterocloeon curiosum ............................................................................................ 30
   Paraclloeodes minutus .............................................................................................. 31
   Plauditus ..................................................................................................................... 32
      cestus ..................................................................................................................... 33
      cinctutus ................................................................................................................ 34
      dubius ..................................................................................................................... 35
      punctiventris ......................................................................................................... 36
   Procloeon ..................................................................................................................... 37
   Pseudocloeon ............................................................................................................. 38
      frondale .................................................................................................................. 39
      longipalpus ............................................................................................................ 40
      propinquum ........................................................................................................... 41

Baetiscidae
   Baetisca ..................................................................................................................... 42
      lacustris ................................................................................................................... 43
      laurentina ............................................................................................................... 44
      obesa ....................................................................................................................... 45

Caenidae
   Brachycercus ............................................................................................................. 46
   Caenis ........................................................................................................................ 47

Ephemerellidae
   Dannella ...................................................................................................................... 48
   Drunella ...................................................................................................................... 49
   Ephemera ..................................................................................................................... 50
      aurililli ..................................................................................................................... 51
      catawba ................................................................................................................. 52
      d. dorothea ............................................................................................................. 53
      excrucians .............................................................................................................. 54
      invaria ..................................................................................................................... 55
      needhami ............................................................................................................... 56
Isonychiidae
Leptohyphidae
Ephemeridae
Heptageniidae
Maccaffertium
Macdunnoa persimplex
Nixe
terminatum
pulchellum
Ephemera
terminatum
Serratella
Tricorythodes
Isonychia
Maccaffertium
exiguum
luteum
mediopunctatum
m. integrum
modestum
pulchellum
terminatum
vicarium
Macdunnoa persimplex
Nixe
Rhithrogena
Stenacron interpunctatum
Stenonema fémoratum
Isonychiidae
Isonychia
Leptohyphidae
Tricorythodes
Leptophlebiidae
Choroterpes basalis
Habrophleboides Americana
Leptophlebia
cupida
nebulosa
Paraleptophlebia
adoptiva
debilis
mollis
praepedita
Metretopodidae
Metretropus
Siphloplectron................................................................. 101
Polymitarcidae
   Ephoron ................................................................. 102
Potamanthidae
   Anthopotamus ......................................................... 103
Siphlonuridae
   Parameletus ........................................................... 104
   Siphlonurus ............................................................ 105
Plectoptera ........................................................................ 107
Capniidae
   Allocapnia .................................................................. 108
   Paracapnia angulata .................................................. 109
Chloroperlidae
   Alloperla .................................................................... 110
   Haploperla ............................................................... 111
     brevis ................................................................. 112
     orpha ................................................................. 113
Leuctridae
   Leuctra ....................................................................... 114
Nemouridae
   Amphinemura .......................................................... 115
     delosa .................................................................. 116
     delosa/varshava ................................................... 117
     linda ................................................................. 118
   Nemoura trispinosa .................................................. 119
   Prostoia ..................................................................... 120
     completa ............................................................ 121
     similis ............................................................... 122
   Shipsa rotunda ........................................................ 123
Perlidae
   Acroneuria .............................................................. 124
   Agnetina ................................................................. 125
     capitata ............................................................ 126
     flavescens .......................................................... 127
   Attaneuria ruralis ..................................................... 128
   Neoperla .................................................................... 129
   Paragnetina media .................................................... 130
   Perlesta ................................................................. 131
   Perlinella ............................................................... 132
Perlodidae
   Clioperla clio ........................................................... 133
   Isogenoides ............................................................. 134
     frontalis .............................................................. 135
     olivaceus ............................................................ 136
   Isoperla ................................................................. 137
     bilineata ............................................................. 138
     cotta ................................................................. 139
     dicala ............................................................... 140
     frisoni ............................................................... 141
Limnephilidae

Anabolia .......................................................................................................................... 214
Arctopora .......................................................................................................................... 215
Asynarchus missa ............................................................................................................... 216
Frenesia ............................................................................................................................. 217
Glyphopsyche irrorata ....................................................................................................... 218
Hesperophylax designatus ................................................................................................. 219
Hydathaphylax argus .......................................................................................................... 220
Ironoquia .............................................................................................................................. 221
Limnephilus ........................................................................................................................ 222
Nemotaulius hostilus ......................................................................................................... 223
Onocosmoecus .................................................................................................................... 224
Platycentropus ..................................................................................................................... 225
Pseudostenophylax ............................................................................................................ 226
Psychoglypha subborealis ................................................................................................... 227

Hydroptilidae

Hydroptila ............................................................................................................................. 198
Leucotrichia pictipes ............................................................................................................ 199
Mayatrictia ........................................................................................................................... 200
Neotrichia ............................................................................................................................. 201
Ochotrichia ........................................................................................................................... 202
Orthotrichia .......................................................................................................................... 203
Oxyethira .............................................................................................................................. 204
Stactobiella ........................................................................................................................... 205

Lepidostomatidae

Lepidostoma ......................................................................................................................... 206

Leptoceridae

Ceraclea ................................................................................................................................. 207
Leptocerus .............................................................................................................................. 208
Mystacides ............................................................................................................................. 209
Nectopsyche ........................................................................................................................... 210
Oecetis ..................................................................................................................................... 211
Setodes .................................................................................................................................. 212
Triaenodes .............................................................................................................................. 213
Pycnopsyche ................................................................. 228
Molannidae
  Molanna........................................................................... 229
Philopotamidae
  Chimarra ................................................................. 230
  aterrima .................................................................... 231
  feria ........................................................................... 232
  obscura ..................................................................... 233
  socia .......................................................................... 234
  Dolophilodes distinctus ................................................. 235
  Wormaldia .................................................................. 236
Phryganeidae
  Agrypnia ...................................................................... 237
  Banksiola ..................................................................... 238
  Fabria .......................................................................... 239
  Hagenella canadensis .................................................. 240
  Oligostomis ocelligera ................................................ 241
  Phryganea .................................................................. 242
  Ptilostomis ............................................................... 243
Polycentropodidae
  Cernotina ..................................................................... 244
  Cyrnellus fraternus ...................................................... 245
  Neureclipsis ................................................................ 246
  Nyctiophylax ................................................................ 247
  Polycentropus ........................................................ 248
Psychomyiidae
  Lype diversa .................................................................. 249
  Psychomyia flavida ..................................................... 250
Rhyacophilidae
  Rhyacophila ............................................................. 251
Sericostomatidae
  Agarodes distinctus ..................................................... 252
Uenoidae
  Neophylax ................................................................... 253
Odonata .......................................................................... 255
  Anisoptera 
    Aeshnidae
    Aeshna .................................................................... 256
    Anax .......................................................................... 257
    Basiaeschna janata .................................................... 258
    Boyeria vinosa ........................................................ 259
    Cordulegastridae
      Cordulegaster .......................................................... 260
    Corduliinae
      Epicordulia princeps .................................................. 261
      Neurocordulia .......................................................... 262
      Somatochloria .......................................................... 263
      Tetragoneuria ............................................................ 264
    Gomphidae
<table>
<thead>
<tr>
<th>Family</th>
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</table>
**Lethocerus americanus** ................................................................. 391

**Corixidae**  
_Callicorixa_ ......................................................................................... 392  
_Cymatia_ ............................................................................................. 393  
_Hesperocorixa_ .................................................................................. 394  
_Palmacorixa_ ....................................................................................... 395  
_Sigara_ .................................................................................................... 396  
_Trichocorixa_ ....................................................................................... 397

**Gerridae**  
_Aquarius remigis_ ............................................................................. 398  
_Gerris_ .................................................................................................... 399  
_Limnoporus_ .......................................................................................... 400  
_Metrobates_ .......................................................................................... 401  
_Rheumatobates_ .................................................................................... 402  
_Trepobates_ ............................................................................................ 403

**Hebridae**  
_Hebrus_ .................................................................................................. 404  
_Merragata_ ............................................................................................. 405

**Mesoveliidae**  
_Mesovelia_ ............................................................................................ 406

**Nepidae**  
_Nepa apicolis_ ..................................................................................... 407  
_Ranatra_ .................................................................................................. 408

**Notonectidae**  
_Notonecta_ ............................................................................................. 409

**Pleidae**  
_Neoplea striola_ .................................................................................. 410  

**Saldidae** ................................................................................................. 411

**Veliidae**  
_Microvelia_ ............................................................................................. 412  
_Rhagovelia_ ............................................................................................ 413

**Lepidoptera** .......................................................................................... 415

**Crambidae**  
_Petrophila_ .............................................................................................. 416
Appendix A: Base Maps for Transparent Overlays
Figure 3 - River Systems of Wisconsin (WDNR, 2007)

1 Pine 17 Grant - Platte
2 Peshtigo 18 Pecatonica
3 Oconto 19 Root - Pike
4 Upper Chippewa 20 Lower Rock
5 Lower Chippewa 21 Illinois Fox
6 Suamico 22 Lake Winnebago
7 Black 23 Kewaunee
8 Upper Wisconsin 24 Lake Superior
9 Buffalo 25 Milwaukee
10 Trempealeau 26 Wolf
11 Lower Fox 27 Upper Fox
12 Manitowoc 28 St. Croix
13 Baraboo - Wisconsin 29 Upper Rock
14 Sheboygan 30 LaCrosse
15 Bad Axe - Mississippi 31 Lower Wisconsin
16 Sugar
Figure 4: Ecoregions of Wisconsin (Omernik, 1998)

47 Western Corn Belt Region
   47g Prairie Pothole Region

50 Northern Lakes and Forests
   50a Lake Superior Clay Plain
   50b Minnesota/Wisconsin Upland Till Plain
   50c St. Croix Pine Barrens
   50d Ontonagon Lobe Moraines and Gogebic Iron Range
   50e Chequamegon Moraine and Outwash Plain
   50f Blue Hills
   50g Chippewa Lobe Rocky Ground Moraines
   50h Perkinstown End Moraine
   50i Northern Highlands Lakes Country
   50j Brule and Paint River Drumlins
   50k Wisconsin/Michigan Pine and Oak Barrens
   50l Menominee Ground Moraine

51 North Central Hardwood Forests
   51a St. Croix Stagnation Moraines
   51b Central Wisconsin Undulating Till Plain
   51c Glacial Lake Wisconsin Sand Plain
   51d Central Sand Ridges
   51e Upper Wolf River Stagnation Moraine
   51f Green Bay Till and Lacustrine Plain
   51g Door Peninsula

52 Driftless Area
   52a Savanna Section
   52b Coulee Section

53 Southeastern Wisconsin Till Plains
   53a Rock River Drift Plain
   53b Kettle Moraines
   53c Southeastern Wisconsin Savannah and Till Plain
   53d Lake Michigan Lacustrine Clay Plain

54 Central Corn Belt Plains
   54e Chiwaukee Prairie Region