Updated checklist of the Michigan (USA) caddisflies, with regional and habitat affinities

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Abstract

Based on examination of ~180,000 specimens from 695 collections of 443 localities collected from the 1930s to 2015 we report 295 species of caddisflies from Michigan. Of these, 41 are reported from the state for the first time. Another 18 species previously reported from Michigan are listed as doubtful. The 11 most abundant species collectively represented over half of all specimens collected. Conversely, 80 species were known from <10 specimens, and 27 species from a single specimen. The Michigan fauna is similar to those of Minnesota and Ohio, adjacent states with comparable recent collecting effort. Regional and habitat affinities for each Michigan species are reported herein. Due to the high level of species discovery over the last few years, despite a >80-year collecting history, it is likely that additional species remain undiscovered in the state.

Keywords

Michigan, Trichoptera, caddisfly, checklist, species, diversity
Introduction

Despite the ecological importance of caddisflies in aquatic ecosystems and their utility in biological monitoring (Barbour et al. 1999), the faunas of the northcentral U.S. and southcentral Canada are not well known. Only the faunas of Illinois (Ross 1944), Minnesota (Houghton 2012), and Ohio (Armitage et al. 2011) have been extensively studied. For the remainder of the region, basic species checklists have been compiled for the Indiana (Waltz and McCafferty 1983), Manitoba (Flannagan and Flannagan 1982), Michigan (Leonard and Leonard 1949b), North Dakota (Harris et al. 1980), and Wisconsin (Longridge and Hilsenhoff 1973) caddisflies. All of these studies are >30 years old, and it is difficult to ascertain if changes to the fauna have occurred during the interim.

The caddisflies of Michigan are known on a species level primarily from Leonard and Leonard's (1949b) checklist. A compilation of known and suspected species is maintained by Bright (2017). The overall caddisfly distributions of the state have been divided into three distinct regions corresponding to the Northern Great Lakes, Northern Forested, and Southern Agricultural regions (Houghton 2015) (Figure 1). Many additional state records have been reported during the last 20 years (Table 1), but no comprehensive inventory of the state has occurred since the 1940s. Thus, the objectives of our study were to inventory the state and compile a comprehensive checklist of the Michigan fauna, and to relate this fauna to the three established caddisfly regions and different types of aquatic habitats.

Materials and methods

We have been collecting caddisflies in Michigan since the 1990s, primarily using ultraviolet light traps for adults. Other adult collecting methods have included malaise trapping, sweep netting, and aspirating from riparian rocks and vegetation. Larval collection

| Reference                 | Region               | Specimens | Species | State records |
|---------------------------|----------------------|-----------|---------|---------------|
| Ross (1938, 1941, 1944, 1946) | statewide            | ?         | 101     | 101           |
| Leonard and Leonard (1949a) | statewide            | ?         | N/A     | 7             |
| Leonard and Leonard (1949b) | statewide            | 5,767     | 181     | 66            |
| Ellis (1962)               | Houghton Creek       | ?         | 85      | 0             |
| Davis et al. (1991)        | St. Clair/Detroit River | ?       | 70      | 21            |
| Houghton et al. (2011)     | Manistee River watershed | 26,000+  | 134     | 11            |
| DeWalt and South (2015)    | Isle Royale National Park | 326      | 42      | 2             |
| Houghton (2016)            | Black River Ranch    | 38,248    | 117     | 3             |
| Current paper             | statewide            | ~180,000  | 291     | 41            |
methods included kick-netting, hand-picking, and Hess sampling. Most adult collecting took place during June and July, the peak emergence period of caddisflies in central Michigan (Houghton et al. 2011). Additional collections of adults were made during May, August, and September to obtain early and late emerging species.

Collecting sites were chosen to yield a geographically representative sample, paying particular attention to unique habitats, such as intermittent streams, waterfalls, and forested wetlands. We collected from sites that appeared to be the least disturbed of their general area. Unique areas, such as the Huron and Porcupine Mountains in the northeastern Upper Peninsula, the Black River Ranch in the northern Lower
Peninsula, Sleeping Bear Dunes National Park in the northwestern Lower Peninsula, and Sarah Jane's Natural Area in the southern Lower Peninsula were sampled more intensively. Most notably, Fairbanks Creek, a pristine small stream in the northern Lower Peninsula, was sampled every week from May to October 2010–2014.

Specimens were identified using Houghton (2012) and more specific taxonomic treatments. Nomenclature follows that of Morse (2017). Most collected specimens and their respective locality data were databased using BIOTA software (Colwell 2007) and deposited in the Hillsdale College Insect Collection or the Illinois Natural History Survey. Some are in the personal collection of DER. Museum specimens from the University of Michigan were examined, especially records associated with Leonard and Leonard's (1949b) checklist. Specimens referenced in Table 1 were also examined. Additional records were located in collections of Brigham Young University, the University of Minnesota, and Colorado State University. These specimens remain in their respective institutions.

**Results**

Approximately 180,000 specimens from 695 collections of 443 Michigan localities from the 1930s to 2015 were examined during this study (Figure 1). From these specimens, we determined 295 total species, representing 20 families and 76 genera. Of these species, 41 are reported from Michigan for the first time and 204 are new since Leonard and Leonard's (1949b) checklist. These species are presented in Table 2, along with their regional and habitat affinities and the depository of specimens. An additional 18 species previously reported from Michigan are listed as doubtful due to synonymy, misidentification, or our inability to locate a specimen (Table 3).

*Oecetis inconspicua* (Walker) (Leptoceridae) was the most widespread species, followed by *Psychomyia flavida* Hagen (Psychomyiidae) and *Helicopsyche borealis* (Hagen) (Heliopsychidae) (Table 2). *Oecetis inconspicua* was also the most abundant species, followed by *P. flavida* and *Chimarra socia* (Hagen) (Philopotamidae). The 11 most abundant species collectively represented over half of all specimens collected. Conversely, 80 species were known from <10 specimens, and 27 species from a single specimen (Figure 2). Hydroptilidae (63 species), Limnephilidae (49), and Leptoceridae (46) were the most species-rich families; *Hydroptila* (28), *Hydropsyche* (21), and *Limnephilus* (20) the most species-rich genera (Table 2). The Northern Forested region contained both the most total species and the most species found exclusively in a single region, followed by the Northern Great Lakes and Southern Agricultural regions (Figure 3). Medium (4–15 m) rivers had the most total and unique species, followed by small (<4 m) streams, lakes, and large (>15 m) rivers.

**Discussion**

Nearly all of the species reported here are based on verified adult male specimens. The current location of these specimens is reported in Table 2. One exception is
Table 2. The 295 caddisfly species confirmed from Michigan. Taxa are arranged alphabetically by family and genus. The number of species within each family is listed after each respective family. Species reported from Michigan for the first time are in boldface type. Collection data for each newly-reported species are included in Suppl. material 1. Spcs = total number of examined specimens, locs = total number of known localities. Dep. = museum with the largest number of deposited specimens. HCIC = Hillsdale College Insect Collection, INHS = Illinois Natural History Survey, UMMZ = University of Michigan Museum of Zoology, DER = personal collection of Dave Ruiter. NG = total specimens known from Northern Great Lakes caddisfly region, NF = total specimens from Northern Forested region, SA = total specimens from Southern Agricultural region (Figure 1). Lk = number of specimens known from lakes, SR = number of specimens from small (<4 m in width) rivers, MR = number of specimens from medium (4–15 m) rivers, LR = number of specimens from large (>15 m) rivers. Total number of specimens from the various habitats and regions may be less than the grand total of specimens for that species due to a lack of information about some collecting localities.

| Taxon | spcs | locs | Dep. | NG | NF | SA | Lk | SR | MR | LR |
|-------|------|------|------|----|----|----|----|----|----|----|
| APATANIIDAE (1) | | | | | | | | | | |
| Apatania zonella (Zetterstedt, 1840) | 49 | 4 | HCIC | 49 | 0 | 0 | 18 | 0 | 0 | 31 |
| BRACHYCENTRIDAЕ (8) | | | | | | | | | | |
| Brachycentrus americanus (Banks, 1899) | 3547 | 81 | HCIC | 1278 | 2218 | 51 | 6 | 1094 | 2343 | 60 |
| B. fuliginosus Walker, 1852 | 25 | 6 | UMMZ | 0 | 25 | 0 | 0 | 0 | 25 | 0 |
| B. incanus Hagen, 1861 | 1 | 1 | INHS | 1 | 0 | 0 | 0 | 1 | 0 |
| B. lateralis (Say, 1823) | 69 | 4 | UMMZ | 0 | 69 | 0 | 0 | 0 | 69 | 0 |
| B. numerosus (Say, 1823) | 122 | 21 | UMMZ | 9 | 72 | 41 | 0 | 56 | 34 | 31 |
| Micrasema charonis Banks, 1914 | 5 | 2 | INHS | 0 | 2 | 3 | 0 | 0 | 2 | 3 |
| M. rusticum (Hagen, 1868) | 783 | 56 | HCIC | 24 | 722 | 37 | 4 | 97 | 669 | 13 |
| M. wataga Ross, 1938 | 50 | 10 | HCIC | 40 | 10 | 0 | 0 | 3 | 44 | 3 |
| DIPSEUDOPSIDAE (1) | | | | | | | | | | |
| Phylocentropus placidus (Banks, 1905) | 274 | 24 | HCIC | 235 | 17 | 21 | 71 | 86 | 104 | 3 |
| GLOSSOSOMATIDAE (8) | | | | | | | | | | |
| Agapetus besi Leonard & Leonard, 1949 | 102 | 3 | HCIC | 0 | 102 | 0 | 0 | 0 | 102 | 0 |
| A. tomus Ross, 1941 | 63 | 8 | HCIC | 27 | 0 | 36 | 0 | 12 | 49 | 0 |
| Glossosoma intermedium Klapálek, 1892 | 16 | 9 | HCIC | 18 | 0 | 0 | 2 | 0 | 14 | 0 |
| G. lividum (Hagen, 1861) | 268 | 8 | UMMZ | 0 | 268 | 0 | 0 | 0 | 259 | 0 |
| G. nigrior Banks, 1911 | 1796 | 68 | HCIC | 179 | 1575 | 42 | 22 | 1355 | 395 | 10 |
| Protoptila erotic Ross, 1938 | 138 | 12 | HCIC | 4 | 130 | 4 | 1 | 0 | 63 | 74 |
| P. maculata (Hagen, 1861) | 76 | 10 | HCIC | 2 | 5 | 69 | 1 | 4 | 38 | 22 |
| P. tenetiosa (Walker, 1852) | 444 | 27 | HCIC | 223 | 220 | 1 | 0 | 197 | 223 | 18 |
| GOERIDAE (1) | | | | | | | | | | |
| Goera stylata Ross, 1938 | 2422 | 12 | HCIC | 30 | 2392 | 0 | 0 | 0 | 2361 | 58 | 3 |
| HELICOPSYCHIDAE (1) | | | | | | | | | | |
| Helicopsyche borealis (Hagen, 1861) | 6957 | 114 | HCIC | 281 | 6347 | 310 | 1186 | 1703 | 3161 | 800 |
| HYDRPSYCHIDAE (35) | | | | | | | | | | |
| Arctopsyche ladogensis (Kolenati, 1859) | 16 | 2 | UMMZ | 15 | 1 | 0 | 0 | 1 | 15 | 0 |
| Cheumatopsyche analis (Banks, 1908) | 1137 | 99 | HCIC | 334 | 485 | 318 | 80 | 263 | 625 | 53 |
| C. aphanta Ross, 1938 | 38 | 2 | HCIC | 0 | 37 | 1 | 0 | 0 | 38 | 0 |
| C. campyla Ross, 1938 | 6683 | 65 | HCIC | 55 | 257 | 6371 | 56 | 13 | 248 | 6312 |
| C. gracilis (Banks, 1899) | 1063 | 64 | HCIC | 248 | 804 | 11 | 2 | 33 | 912 | 114 |
| C. minuscula (Banks, 1907) | 2 | 1 | HCIC | 2 | 0 | 0 | 0 | 0 | 2 |
| Taxon                                         | spcs | locs | Dep. | NG | NF | SA | Lk | SR | MR | LR |
|----------------------------------------------|------|------|------|----|----|----|----|----|----|----|
| C. oxa Ross, 1938                           | 1609 | 58   | HCIC | 69 | 1425 | 112 | 3  | 1077 | 516 | 8  |
| C. gatella Ross, 1941                       | 44   | 9    | HCIC | 6  | 37  | 1  | 2  | 1   | 41  | 0  |
| C. jordida (Hagen, 1861)                     | 7    | 4    | HCIC | 5  | 0   | 0  | 2  | 1   | 0   | 5  |
| C. speciosa (Banks, 1904)                    | 61   | 2    | HCIC | 0  | 61  | 0  | 0  | 0   | 0   | 58 |
| Diplectrona modesta Banks, 1908              | 1106 | 9    | HCIC | 5  | 1096 | 5  | 0  | 1106 | 0   | 0  |
| Hydropyche aerata Ross, 1938                 | 5    | 2    | INHS | 0  | 4   | 0  | 0  | 0   | 0   | 0  |
| H. albedra (Ross, 1939)                      | 56   | 7    | HCIC | 15 | 40  | 1  | 0  | 5   | 49  | 2  |
| H. alternans (Walker, 1852)                  | 118  | 11   | HCIC | 115| 2   | 1  | 57 | 2   | 0   | 54 |
| H. arinale Ross, 1938                       | 1    | 1    | INHS | 1  | 0   | 0  | 0  | 1   | 0   | 0  |
| H. betteni Ross, 1938                       | 1262 | 67   | HCIC | 74 | 1041| 147 | 13 | 932 | 266 | 33 |
| H. brenata (Ross, 1938)                      | 192  | 43   | HCIC | 37 | 96  | 59 | 1  | 17  | 141 | 33 |
| H. cheilonis (Ross, 1938)                    | 17   | 8    | HCIC | 0  | 2   | 14 | 0  | 0   | 0   | 4  |
| H. cuniis Ross, 1938                        | 21   | 4    | INHS | 0  | 0   | 21 | 0  | 7   | 8   | 6  |
| H. dicantha Ross, 1938                      | 11   | 7    | HCIC | 1  | 6   | 2  | 0  | 2   | 6   | 1  |
| H. frisoni Ross, 1938                       | 73   | 11   | INHS | 1  | 36  | 32 | 0  | 67  | 3   | 0  |
| H. incommoda Hagen, 1861                    | 130  | 14   | HCIC | 1  | 12  | 116| 1  | 2   | 13  | 74 |
| H. leonardi Ross, 1938                      | 2    | 1    | INHS | 0  | 2   | 0  | 0  | 2   | 0   | 0  |
| H. morosa (Hagen, 1861)                     | 262  | 32   | HCIC | 62 | 162 | 39 | 10 | 18  | 165 | 61 |
| H. phalerata Hagen, 1861                    | 31   | 5    | HCIC | 0  | 4   | 27 | 0  | 0   | 0   | 23 |
| H. placoda Ross, 1941                       | 1    | 1    | HCIC | 0  | 1   | 0  | 0  | 0   | 0   | 1  |
| H. scalaris Hagen, 1861                     | 3    | 3    | INHS | 0  | 0   | 2  | 0  | 0   | 0   | 0  |
| H. simulans Ross, 1938                      | 26   | 4    | HCIC | 0  | 22  | 4  | 3  | 0   | 3   | 16 |
| H. slosonae (Banks, 1905)                   | 1241 | 68   | HCIC | 137| 1036| 68 | 0  | 586 | 646 | 7  |
| H. sparna (Ross, 1938)                      | 2712 | 113  | HCIC | 425| 2018| 261| 12 | 1253| 1330| 88 |
| H. vexa (Ross, 1938)                        | 12   | 6    | HCIC | 4  | 8   | 0  | 0  | 4   | 7   | 1  |
| H. walker (Betten & Mosely, 1940)           | 65   | 13   | HCIC | 42 | 22  | 1  | 1  | 1   | 24  | 39 |
| Macrostromum zebratum (Hagen, 1861)         | 533  | 15   | HCIC | 10 | 499 | 24 | 10 | 2   | 24  | 490|
| Paraptyche apicalis (Banks, 1908)           | 220  | 19   | HCIC | 62 | 252 | 6  | 1  | 274 | 45  | 0  |
| Potamyia flavus (Hagen, 1861)               | 119  | 16   | HCIC | 1  | 7   | 47 | 0  | 45  | 31  | 28 |

**HYDROPTILIDAE (63)**

| Taxon                                         | spcs | locs | Dep. | NG | NF | SA | Lk | SR | MR | LR |
|----------------------------------------------|------|------|------|----|----|----|----|----|----|----|
| Agraylea multipunctata Curtis, 1834           | 4952 | 59   | HCIC | 127| 927 | 3898 | 195| 581 | 339 | 31 |
| Hydroptila ajax Ross, 1938                    | 27   | 3    | HCIC | 0  | 0   | 27 | 0  | 0   | 0   | 19 |
| H. albicornis Hagen, 1861                    | 1    | 1    | HCIC | 1  | 0   | 0  | 0  | 0   | 0   | 0  |
| H. amoena Ross, 1938                         | 8    | 4    | HCIC | 1  | 7   | 0  | 2  | 0   | 6   | 0  |
| H. ampoda Ross, 1941                         | 15   | 9    | HCIC | 15 | 0   | 0  | 0  | 0   | 15  | 0  |
| H. angusta Ross, 1938                        | 45   | 2    | HCIC | 0  | 45  | 0  | 0  | 0   | 45  | 0  |
| H. antennopedia Sykora & Harris, 1994        | 111  | 9    | HCIC | 111| 0   | 0  | 6  | 12  | 93  | 0  |
| H. armata Ross, 1938                         | 48   | 17   | HCIC | 6  | 13  | 29 | 2  | 2   | 40  | 1  |
| H. berneri Ross, 1941                        | 1    | 1    | UMMZ| 0  | 0   | 1  | 0  | 0   | 0   | 0  |
| H. cala Denning, 1948                        | 1    | 1    | UMMZ| 0  | 0   | 0  | 0  | 0   | 1   | 0  |
| H. consimili Morton, 1905                    | 195  | 28   | HCIC | 31 | 140 | 24  | 0  | 62  | 129 | 4  |
| H. delineata Morton, 1905                    | 1    | 1    | HCIC | 1  | 0   | 0  | 0  | 1   | 0   | 0  |
| H. grandiosa Ross, 1938                      | 20   | 9    | HCIC | 0  | 9   | 11 | 0  | 1   | 9   | 1  |
| H. hamata Morton, 1905                       | 154  | 27   | HCIC | 46 | 100 | 8  | 62 | 5   | 75  | 4  |
| H. jackmanni Blickle, 1963                   | 477  | 37   | HCIC | 168| 270 | 39 | 4  | 191 | 278 | 0  |
| H. metoea Blickle & Morse, 1954              | 166  | 16   | HCIC | 1  | 165 | 0  | 3  | 80  | 82  | 1  |
| H. nicoli Ross, 1941                         | 1    | 1    | HCIC | 1  | 0   | 0  | 0  | 1   | 0   | 0  |
| Taxon                                      | spcs | locs | Dep. | NG | NF | SA | Lk | SR | MR | LR |
|-------------------------------------------|------|------|------|----|----|----|----|----|----|----|
| *H. novicolae* Bickle & Morse, 1954       | 1    | 1    | HCIC | 1  | 0  | 0  | 0  | 1  | 0  | 0  |
| *H. perdita* Morton, 1905                | 11   | 6    | HCIC | 0  | 3  | 8  | 0  | 1  | 5  | 0  |
| *H. quinola* Ross, 1947                  | 3    | 2    | HCIC | 3  | 0  | 0  | 0  | 0  | 3  | 0  |
| *H. salmo* Ross, 1941                    | 1    | 1    | HCIC | 1  | 0  | 0  | 0  | 0  | 1  | 0  |
| *H. sclopa* Ross, 1938                   | 18   | 2    | UMMZ | 0  | 16 | 2  | 0  | 0  | 16 | 0  |
| *H. sparsulata* Morton, 1905             | 9    | 5    | HCIC | 2  | 5  | 2  | 0  | 1  | 4  | 4  |
| *H. tortosa* Ross, 1938                  | 7    | 1    | HCIC | 0  | 7  | 0  | 0  | 0  | 7  | 0  |
| *H. tusculum* Ross, 1947                 | 1    | 1    | HCIC | 0  | 1  | 0  | 0  | 0  | 1  | 0  |
| *H. volvolia* Denning, 1947              | 90   | 15   | HCIC | 88 | 2  | 0  | 0  | 2  | 87 | 1  |
| *H. waubesiana* Betten, 1934             | 119  | 23   | HCIC | 7  | 36 | 76 | 8  | 17 | 51 | 3  |
| *H. wyomia* Denning, 1948                | 23   | 5    | HCIC | 5  | 15 | 0  | 0  | 0  | 20 | 0  |
| *H. xera* Ross, 1938                     | 237  | 19   | HCIC | 189| 51 | 0  | 2  | 1  | 235| 2  |
| *Ibytrichia clavata* Morton, 1905        | 222  | 6    | HCIC | 1  | 214| 7  | 139| 0  | 75 | 8  |
| *Leuctrichia pictipes* (Banks, 1911)     | 30   | 2    | HCIC | 15 | 15 | 0  | 0  | 0  | 21 | 9  |
| *Mayatrichia ayama* Mosely, 1905         | 7    | 2    | UMMZ | 0  | 6  | 1  | 0  | 0  | 6  | 0  |
| *Neotrichia balia* Denning, 1948         | 131  | 3    | HCIC | 131| 0  | 0  | 0  | 0  | 5  | 126|
| *N. minutissimella* (Chambers, 1873)     | 1    | 1    | HCIC | 1  | 0  | 0  | 0  | 0  | 0  | 1  |
| *N. okupa* Ross, 1939                    | 9    | 1    | INHS | 9  | 0  | 0  | 0  | 0  | 9  | 0  |
| *N. vibrans* Ross, 1938                  | 1    | 1    | HCIC | 0  | 1  | 0  | 0  | 0  | 0  | 1  |
| *Ochotrichia arva* (Ross, 1941)          | 3    | 2    | HCIC | 0  | 3  | 0  | 0  | 2  | 1  | 0  |
| *O. spinosa* (Ross, 1938)                | 220  | 11   | HCIC | 209| 4  | 7  | 7  | 46 | 161| 6  |
| *O. riesi* Ross, 1944                    | 2    | 1    | INHS | 0  | 2  | 0  | 0  | 2  | 0  | 0  |
| *O. tarsalis* (Hagen, 1861)              | 2    | 2    | HCIC | 1  | 0  | 1  | 0  | 2  | 0  | 0  |
| *Orthotrichia aegerfusciella* (Chambers, 1873) | 451  | 21   | HCIC | 1  | 64 | 386| 38 | 5  | 54 | 5  |
| *O. baldiuffi* Kingsolver & Ross, 1961   | 97   | 19   | HCIC | 11 | 42 | 44 | 25 | 2  | 36 | 4  |
| *O. cristata* Morton, 1905               | 1813 | 49   | HCIC | 55 | 308| 1450|163| 71 | 187| 0  |
| *O. curta* Kingsolver & Ross, 1961       | 13   | 1    | HCIC | 13 | 0  | 0  | 13 | 0  | 0  | 0  |
| *Oxyethina aequalis* Ross, 1938          | 44   | 8    | HCIC | 0  | 44 | 0  | 0  | 5  | 39 | 0  |
| *O. anabola* Bickle, 1966                | 7    | 5    | HCIC | 5  | 2  | 0  | 0  | 1  | 4  | 2  |
| *O. araya* Ross, 1941                    | 1    | 1    | HCIC | 1  | 0  | 0  | 0  | 1  | 0  | 0  |
| *O. coeruera* Morton, 1905               | 115  | 19   | HCIC | 7  | 101| 7  | 4  | 29 | 77 | 0  |
| *O. ecornata* Morton, 1893               | 73   | 3    | HCIC | 2  | 71 | 0  | 73 | 0  | 0  | 0  |
| *O. forcipata* Mosely, 1934              | 170  | 18   | HCIC | 9  | 21 | 140| 11 | 5  | 20 | 0  |
| *O. grisea* Betten, 1934                 | 180  | 5    | UMMZ | 0  | 106| 74 | 50 | 0  | 56 | 0  |
| *O. itascage Monson & Holzenthal, 1993   | 4    | 4    | HCIC | 0  | 4  | 0  | 0  | 4  | 0  | 0  |
| *O. michiganensis* Mosely, 1934          | 219  | 25   | HCIC | 120| 99 | 0  | 3  | 32 | 183| 1  |
| *O. novogrost* Ross, 1944                | 2    | 1    | UMMZ | 0  | 0  | 2  | 0  | 0  | 0  | 0  |
| *O. obtusia* Denning, 1947               | 27   | 10   | HCIC | 4  | 15 | 8  | 12 | 0  | 5  | 3  |
| *O. pallida* (Ross, 1904)                | 757  | 10   | HCIC | 0  | 9  | 748| 4  | 1  | 28 | 0  |
| *O. rivicola* Bickle & Morse, 1954       | 85   | 7    | HCIC | 2  | 83 | 0  | 1  | 59 | 25 | 0  |
| *O. serrata* Ross, 1938                  | 366  | 17   | HCIC | 6  | 319| 41  |315| 0  | 11 | 0  |
| *O. sida* Bickle & Morse, 1954           | 10   | 5    | HCIC | 4  | 6  | 0  | 0  | 2  | 8  | 0  |
| *O. verna* Ross, 1938                    | 3    | 3    | HCIC | 1  | 1  | 1  | 0  | 1  | 0  | 0  |
| *O. zeronia* Ross, 1941                  | 73   | 12   | HCIC | 5  | 26 | 42 | 25 | 4  | 5  | 0  |
| *Stictocbiella delata* (Ross, 1938)       | 27   | 4    | HCIC | 24 | 3  | 0  | 0  | 14 | 13 | 0  |
| *S. palmata* (Ross, 1938)                | 14   | 4    | HCIC | 5  | 9  | 0  | 0  | 0  | 5  | 9  |
| Taxon                             | spcs | locs | Dep. | NG | NF | SA | Lk | SR | MR | LR |
|----------------------------------|------|------|------|----|----|----|----|----|----|----|
| LEPIDOSTOMATIDAE (10)            |      |      |      |    |    |    |    |    |    |    |
| Lepidostoma bryanti (Banks, 1908) | 7129 | 38   | HCIC | 157| 6907| 65 | 7  | 6822| 300| 0  |
| L. carrolli Flint, 1958          | 1    | 1    | HCIC | 0  | 1   | 0  | 1  | 0  | 0  |    |
| L. cineum (Banks, 1914)          | 154  | 5    | UMMZ| 8  | 146 | 0  | 1  | 134 | 19 | 0  |
| L. costale (Banks, 1914)         | 30   | 5    | UMMZ| 6  | 24  | 0  | 0  | 13  | 15 | 0  |
| L. grieseum (Banks, 1911)        | 406  | 8    | HCIC | 0  | 406 | 0  | 0  | 405 | 1  | 0  |
| L. liba Ross, 1941               | 1    | 1    | INHS | 0  | 1   | 0  | 1  | 0  | 0  |    |
| L. sakensi (Banks, 1936)         | 14   | 7    | HCIC | 2  | 12  | 0  | 0  | 11  | 3  | 0  |
| L. togatum (Hagen, 1861)         | 5623 | 87   | HCIC | 1167| 4436| 2  | 43 | 1022| 4417| 123|
| L. sinicolor (Banks, 1911)       | 4    | 2    | HCIC | 4  | 0   | 0  | 0  | 0   | 4  | 0  |
| L. vernale (Banks, 1897)         | 116  | 10   | HCIC | 1  | 115 | 0  | 0  | 112 | 1  | 3  |
| LEPTOCERIDAE (46)                |      |      |      |    |    |    |    |    |    |    |
| Ceratella alagma (Ross, 1938)     | 1058 | 34   | HCIC | 28 | 867 | 163| 841| 5   | 52 | 2  |
| C. albovincula (Hagen, 1861)     | 2    | 1    | HCIC | 0  | 2   | 0  | 2  | 0   | 0  |    |
| C. alicus (Ross, 1941)           | 1    | 1    | HCIC | 0  | 1   | 0  | 0  | 0   | 1  |    |
| C. australis (Vorhies, 1909)     | 11   | 5    | HCIC | 10 | 0   | 1  | 1  | 0   | 9  | 1  |
| C. annulicornis (Martynov, 1910) | 1    | 1    | HCIC | 1  | 0   | 0  | 0  | 0   | 0  |    |
| C. aridella (Denning, 1942)      | 3637 | 13   | HCIC | 515| 3122| 0  | 1  | 28  | 3607| 1  |
| C. cancellata (Betten, 1942)     | 163  | 31   | HCIC | 75 | 52  | 35 | 41 | 1   | 71 | 49 |
| C. dilata (Hagen, 1861)          | 29   | 10   | HCIC | 10 | 8   | 10 | 22 | 0   | 5  | 1  |
| C. exica (Morton, 1904)          | 1    | 1    | UMMZ| 1  | 0   | 0  | 0  | 0   | 0  |    |
| C. flava (Ross, 1904)            | 39   | 1    | HCIC | 39 | 0   | 0  | 0  | 0   | 0  | 39 |
| C. maculata (Banks, 1899)        | 143  | 15   | HCIC | 39 | 68  | 36 | 11 | 1   | 100 | 31 |
| C. mentissae (Walker, 1852)      | 1    | 1    | INHS | 0  | 1   | 0  | 0  | 0   | 1  |    |
| C. resurgens (Walker, 1852)      | 7    | 4    | HCIC | 3  | 3   | 1  | 5  | 0   | 0  | 2  |
| C. tarsipunctata (Vorhies, 1909) | 1532 | 18   | HCIC | 113| 1250| 126| 321| 42  | 533 | 628|
| C. transversa (Hagen, 1861)      | 993  | 61   | HCIC | 311| 666 | 14 | 53 | 17  | 866 | 53 |
| C. wetseli (Ross, 1941)          | 30   | 3    | HCIC | 26 | 4   | 0  | 0  | 4   | 2  | 26 |
| Leptocerus americanus (Banks, 1899) | 3037 | 85   | HCIC | 120| 1010| 1906| 264| 123 | 2139 | 365|
| Mystacides interjecta (Banks, 1914) | 1067 | 52   | HCIC | 233| 806 | 28 | 965| 25  | 53 | 0  |
| M. sepulchralis (Walker, 1852)   | 1774 | 102  | HCIC | 385| 1299| 89 | 1078| 17  | 614 | 12 |
| Nectopsyche albida (Walker, 1852) | 2572 | 63   | HCIC | 21 | 2347| 201| 774 | 111 | 356 | 1278|
| N. candida (Hagen, 1861)         | 824  | 15   | HCIC | 4  | 92  | 728| 90  | 0   | 350 | 383|
| N. diarina (Ross, 1944)          | 76   | 16   | HCIC | 9  | 55  | 12 | 20  | 2   | 48  | 1  |
| N. exquisita (Walker, 1852)      | 226  | 19   | HCIC | 54 | 91  | 81 | 82  | 0   | 8   | 80 |
| N. pavida (Hagen, 1861)          | 170  | 18   | HCIC | 43 | 125 | 2  | 90  | 1   | 77  | 1  |
| Oecetis avara (Banks, 1895)      | 5654 | 37   | HCIC | 5321| 269 | 69 | 76  | 2   | 437 | 5144|
| O. cinerascens (Hagen, 1861)     | 812  | 89   | HCIC | 199| 465 | 148| 494 | 66  | 144 | 8  |
| O. disjuncta (Banks, 1920)       | 119  | 9    | HCIC | 28 | 90  | 1  | 0   | 1   | 116 | 2  |
| O. ditissa Ross, 1966            | 1    | 1    | INHS | 0  | 1   | 0  | 1  | 0   | 0  |    |
| O. houghtoni Blahnik & Holzenthals, 2014 | 6   | 2    | HCIC | 4  | 2   | 0  | 6  | 0   | 0  | 0  |
| O. immobile (Hagen, 1861)        | 28   | 8    | HCIC | 5  | 23  | 0  | 21 | 3   | 3  | 0  |
| O. inconspicua (Walker, 1852)    | 16220| 168  | HCIC | 1383| 12262| 2550| 8727| 2928| 2184 | 159|
| O. nocturna Ross, 1966           | 2    | 2    | HCIC | 0  | 1   | 1  | 0  | 0   | 2  | 0  |
| O. ochracea Curtis, 1825         | 3    | 2    | INHS | 1  | 0   | 2  | 0  | 0   | 1  | 0  |
| O. osteni Milne, 1934            | 444  | 55   | HCIC | 71 | 343 | 30 | 333 | 16  | 72  | 17 |
| O. persimilis (Banks, 1907)      | 1422 | 68   | HCIC | 365| 987 | 70 | 40 | 222 | 1085| 72 |
| Taxon                          | spcs | locs | Dep. | NG    | NF    | SA    | Lk    | SR    | MR    | LR    |
|-------------------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| *Setodes incertus* (Walker, 1852) | 1543 | 23   | HCIC | 905   | 638   | 0     | 3     | 13    | 1371  | 156   |
| *S. oligius* (Ross, 1938)    | 308  | 16   | HCIC | 0     | 262   | 46    | 180   | 2     | 79    | 8     |
| *Trianeodes abus* Milne, 1935 | 125  | 14   | HCIC | 4     | 15    | 106   | 8     | 0     | 10    | 2     |
| *T. baris* Ross, 1938        | 57   | 20   | HCIC | 8     | 43    | 6     | 2     | 29    | 18    | 1     |
| *T. dipius* Ross, 1938       | 98   | 17   | HCIC | 30    | 68    | 0     | 3     | 8     | 87    | 0     |
| *T. ignitus* (Walker, 1852)  | 186  | 35   | HCIC | 9     | 131   | 46    | 3     | 13    | 159   | 11    |
| *T. injustus* (Hagen, 1861)  | 535  | 56   | HCIC | 152   | 310   | 68    | 224   | 69    | 197   | 4     |
| *T. marginatus* Sibley, 1926 | 334  | 42   | HCIC | 58    | 197   | 83    | 2     | 69    | 188   | 1     |
| *T. melanus* Ross, 1947      | 6    | 3    | HCIC | 0     | 0     | 6     | 4     | 2     | 0     | 0     |
| *T. nox* Ross, 1941          | 107  | 26   | HCIC | 11    | 89    | 7     | 14    | 56    | 34    | 0     |
| *T. tardus* Milne, 1934      | 1015 | 54   | HCIC | 58    | 399   | 557   | 23    | 165   | 288   | 5     |

**LIMNEPHILIDAE (49)**

| Taxon                         | spcs | locs | Dep. | NG    | NF    | SA    | Lk    | SR    | MR    | LR    |
|-------------------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| *Anabola bimaculata* (Walker, 1852) | 207  | 42   | HCIC | 72    | 114   | 10    | 57    | 21    | 108   | 1     |
| *A. conoidea* (Walker, 1852)  | 90   | 27   | HCIC | 14    | 64    | 12    | 3     | 12    | 61    | 1     |
| *A. ozburni* Milne, 1935      | 254  | 5    | UMMZ | 0     | 23    | 231   | 0     | 0     | 23    | 0     |
| *A. sorida* Hagen, 1861       | 9    | 6    | INHS | 1     | 6     | 2     | 4     | 0     | 4     | 0     |
| *Asynarchus montanus* (Banks, 1907) | 45   | 8    | HCIC | 2     | 15    | 28    | 3     | 1     | 12    | 0     |
| *A. rossi* Leonard & Leonard, 1949 | 15   | 3    | UMMZ | 0     | 15    | 0     | 0     | 15    | 0     | 0     |
| *Frenesia arguta* Harris, 1869 | 130  | 35   | HCIC | 6     | 119   | 2     | 1     | 71    | 54    | 0     |
| *I. lyra* Ross (Ross, 1938)   | 4    | 2    | HCIC | 0     | 4     | 0     | 4     | 0     | 0     | 0     |
| *I. parasuga* (Banks, 1900)   | 4    | 2    | INHS | 4     | 0     | 0     | 2     | 0     | 2     | 0     |
| *L. punctissima* (Walker, 1852) | 65   | 7    | HCIC | 0     | 26    | 39    | 0     | 25    | 0     | 0     |
| *Lenarchus crasso* (Banks, 1920) | 2    | 1    | HCIC | 2     | 0     | 0     | 0     | 1     | 0     | 0     |
| *Leptophylax gracili* Banks, 1900 | 11   | 7    | UMMZ | 0     | 6     | 5     | 0     | 1     | 0     | 1     |
| *Limnephilus advenus* Ross, 1941 | 1    | 1    | DER  | 1     | 0     | 0     | 0     | 0     | 0     | 0     |
| *L. argenteus* Banks, 1914    | 1    | 1    | HCIC | 1     | 0     | 0     | 0     | 1     | 0     | 0     |
| *L. canadensis* Banks, 1908   | 7    | 6    | UMMZ | 5     | 2     | 0     | 0     | 1     | 5     | 0     |
| *L. dispar* McLachlan, 1875   | 6    | 2    | UMMZ | 0     | 0     | 6     | 0     | 0     | 0     | 0     |
| *L. externus* Hagen, 1861     | 3    | 2    | UMMZ | 0     | 3     | 0     | 0     | 3     | 0     | 0     |
| *L. extractus* Walker, 1852   | 1    | 1    | INHS | 1     | 0     | 0     | 0     | 0     | 0     | 0     |
| *L. hyalinus* Hagen, 1861     | 1    | 1    | HCIC | 1     | 0     | 0     | 0     | 1     | 0     | 0     |
| *L. indivius* Walker, 1852    | 473  | 46   | HCIC | 2     | 116   | 351   | 12    | 65    | 32    | 6     |
| *L. infertilis* (Banks, 1914) | 15   | 5    | UMMZ | 14    | 0     | 0     | 14    | 0     | 0     | 0     |
| *L. j anus* Ross, 1938         | 7    | 1    | HCIC | 7     | 0     | 0     | 7     | 0     | 0     | 0     |
| *L. moestus* Banks, 1908      | 186  | 44   | HCIC | 63    | 91    | 32    | 1     | 59    | 70    | 3     |
| *L. ornatus* Banks, 1907      | 97   | 31   | HCIC | 33    | 23    | 41    | 4     | 15    | 30    | 1     |
| *L. parvulus* (Banks, 1905)   | 55   | 3    | UMMZ | 3     | 0     | 52    | 2     | 0     | 1     | 0     |
| *L. perpusillus* Walker, 1852 | 25   | 2    | UMMZ | 0     | 0     | 25    | 0     | 0     | 0     | 0     |
| *L. rhombicus* (L., 1758)     | 62   | 13   | HCIC | 14    | 47    | 1     | 2     | 11    | 49    | 0     |
| *L. sackeni* Banks, 1930      | 4    | 4    | UMMZ | 2     | 1     | 2     | 1     | 0     | 2     | 1     |
| *L. samoedus* McLachlan, 1880 | 3    | 2    | DER  | 0     | 0     | 2     | 0     | 0     | 0     | 0     |
| *L. secludens* Banks, 1914    | 2    | 2    | UMMZ | 0     | 0     | 2     | 0     | 0     | 0     | 0     |
| *L. sericeus* (Say, 1824)     | 211  | 16   | HCIC | 12    | 195   | 4     | 8     | 25    | 171   | 0     |
| *L. submonifer* Walker, 1852  | 529  | 34   | HCIC | 19    | 105   | 405   | 0     | 71    | 32    | 0     |
| *Nemotaulius hostilis* (Hagen, 1873) | 45   | 7    | HCIC | 2     | 43    | 0     | 0     | 42    | 2     | 1     |
| Taxon                                      | spcs | locs | Dep. | NG  | NF  | SA  | Lk  | SR  | MR  | LR  |
|-------------------------------------------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Onocosmocus unicolor (Banks, 1897)        | 73   | 14   | HCIC | 45  | 28  | 0   | 0   | 14  | 59  | 0   |
| Phanocelia canadiensis (Banks, 1924)      | 4    | 1    | UMMZ | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Platycentropus amicus (Hagen, 1861)       | 15   | 4    | HCIC | 4   | 11  | 0   | 0   | 0   | 11  | 4   |
| P. radiatus (Say, 1824)                   | 386  | 68   | HCIC | 61  | 230 | 79  | 64  | 155 | 79  | 0   |
| P. indistinctus (Walker, 1852)            | 1    | 1    | HCIC | 1   | 0   | 0   | 0   | 0   | 1   | 0   |
| Pseudostenophylax sparsus (Banks, 1908)   | 20   | 10   | HCIC | 7   | 13  | 0   | 0   | 0   | 11  | 8   |
| Psychoglypha subborealis Ross, 1944       | 5    | 2    | UMMZ | 5   | 0   | 0   | 0   | 3   | 2   | 0   |
| Pycnopsyche antica (Walker, 1852)        | 2191 | 12   | HCIC | 0   | 2191| 0   | 0   | 2165| 5   | 0   |
| P. guttata (Walker, 1852)                 | 1387 | 26   | HCIC | 23  | 1348| 16  | 9   | 1309| 50  | 0   |
| P. indiana (Ross, 1938)                   | 13   | 2    | HCIC | 0   | 1   | 12  | 0   | 0   | 13  | 0   |
| P. lepida (Hagen, 1861)                   | 236  | 38   | HCIC | 85  | 136 | 11  | 17  | 92  | 100 | 0   |
| P. sabripennis (Rambur, 1842)             | 4    | 4    | INHS | 0   | 3   | 1   | 0   | 3   | 1   | 0   |
| P. subspecies (Say, 1828)                 | 62   | 11   | HCIC | 28  | 3   | 30  | 27  | 0   | 0   | 0   |
| **MOLANNIDAE** (5)                        |      |      |      |     |     |     |     |     |     |     |
| Molanna blendla Sibley, 1926              | 563  | 29   | HCIC | 48  | 513 | 2   | 4   | 513 | 45  | 1   |
| M. flavicornis Banks, 1914                | 67   | 12   | HCIC | 11  | 0   | 0   | 10  | 0   | 1   | 0   |
| M. tryphona Betten, 1934                  | 198  | 42   | HCIC | 111 | 67  | 15  | 2   | 33  | 156 | 0   |
| M. ulmerina Navas, 1934                   | 22   | 7    | INHS | 2   | 20  | 0   | 17  | 0   | 0   | 5   |
| M. unifilis Vorhies, 1909                 | 2027 | 65   | HCIC | 105 | 1850| 68  | 1915| 3   | 80  | 0   |
| **ODONTOCERIDAE** (1)                     |      |      |      |     |     |     |     |     |     |     |
| Plistobreta indecisa (Walker, 1852)       | 1    | 1    | UMMZ | 1   | 0   | 0   | 0   | 1   | 0   | 0   |
| **PHILOPOMATIDAE** (6)                    |      |      |      |     |     |     |     |     |     |     |
| Chimarra aterrima Hagen, 1861             | 549  | 44   | HCIC | 136 | 396 | 14  | 45  | 137 | 323 | 16  |
| C. feria (Ross, 1941)                     | 213  | 8    | HCIC | 0   | 209 | 4   | 0   | 210 | 3   | 0   |
| C. obscura (Walker, 1852)                 | 4488 | 62   | HCIC | 69  | 1093| 3326| 65  | 136 | 3773| 510 |
| C. socia (Hagen, 1861)                    | 8744 | 16   | HCIC | 8678| 68  | 1   | 2   | 0   | 93  | 8646|
| Dolophilodes distinctus (Walker, 1852)    | 1343 | 73   | HCIC | 297 | 1043| 1   | 10  | 750 | 581 | 0   |
| Wormaldina roesta (Banks, 1914)           | 8    | 3    | HCIC | 8   | 0   | 0   | 0   | 8   | 0   | 0   |
| **PHRYGANEIDAE** (18)                     |      |      |      |     |     |     |     |     |     |     |
| Agrypnia colorata (Hagen, 1873)           | 3    | 3    | UMMZ | 1   | 1   | 0   | 0   | 1   | 0   | 0   |
| A. improba (Hagen, 1873)                  | 147  | 22   | HCIC | 130 | 17  | 0   | 46  | 2   | 99  | 0   |
| A. macdunnoughi Milne, 1931               | 6    | 3    | HCIC | 2   | 0   | 0   | 0   | 0   | 2   | 0   |
| A. straminea Hagen, 1873                  | 18   | 7    | INHS | 18  | 0   | 0   | 18  | 0   | 0   | 0   |
| A. vestita (Walker, 1852)                 | 49   | 13   | HCIC | 2   | 33  | 14  | 5   | 29  | 4   | 0   |
| Banksiola crochi Banks, 1844              | 2219 | 92   | HCIC | 420 | 1644| 135 | 352 | 1094| 609 | 19  |
| B. duxaria (Say, 1828)                    | 108  | 7    | HCIC | 0   | 108 | 0   | 0   | 106 | 1   | 1   |
| B. smithi (Banks, 1914)                   | 73   | 17   | HCIC | 35  | 21  | 16  | 28  | 0   | 27  | 0   |
| **Beothukus complicatus** (Banks, 1924)   | 2    | 2    | ?    | 2   | 0   | 0   | 2   | 0   | 0   | 0   |
| Fabricia ornata (Banks, 1907)             | 1    | 1    | ?    | 0   | 0   | 1   | 0   | 0   | 0   | 0   |
| Hagenella canadiensis (Banks, 1907)       | 50   | 10   | HCIC | 3   | 16  | 31  | 0   | 10  | 9   | 0   |
| Oligostomis ocelligera (Walker, 1852)     | 10   | 1    | UMMZ | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Phryganea cincta Walker, 1852             | 213  | 43   | HCIC | 101 | 101 | 2   | 48  | 62  | 89  | 4   |
| P. sayi Milne, 1931                       | 31   | 10   | HCIC | 0   | 27  | 4   | 1   | 24  | 4   | 0   |
| Pitistomis angustipennis Hagen, 1873       | 44   | 13   | HCIC | 1   | 36  | 7   | 3   | 33  | 1   | 0   |
| P. ocellifera (Walker, 1852)              | 375  | 59   | HCIC | 79  | 252 | 44  | 42  | 173 | 126 | 3   |
| P. postica (Walker, 1852)                 | 7    | 6    | HCIC | 0   | 3   | 4   | 1   | 1   | 0   | 0   |
| P. semifasciata (Say, 1828)               | 207  | 41   | HCIC | 131 | 48  | 22  | 14  | 23  | 161 | 0   |
## Updated checklist of the Michigan (USA) caddisflies, with regional and habitat affinities

| Taxon | spcs | locs | Dep. | NG | NF | SA | Lk | SR | MR | LR |
|-------|------|------|------|----|----|----|----|----|----|----|
| POLYCENTROPODIDAE (28) | | | | | | | | | | |
| Cernotina spicata Ross, 1938 | 135 | 11 | HCIC | 1 | 70 | 64 | 64 | 3 | 4 | 0 |
| Cynnellus fraternus (Banks, 1905) | 45 | 8 | HCIC | 5 | 2 | 38 | 15 | 0 | 6 | 22 |
| Holocentropus flavus Banks, 1908 | 75 | 14 | HCIC | 4 | 18 | 53 | 3 | 11 | 12 | 0 |
| H. interruptus Banks, 1914 | 798 | 47 | HCIC | 47 | 246 | 505 | 156 | 95 | 63 | 2 |
| H. melanae Ross, 1938 | 45 | 8 | HCIC | 2 | 17 | 26 | 16 | 0 | 3 | 0 |
| H. milaca (Etner, 1968) | 31 | 1 | HCIC | 0 | 31 | 0 | 31 | 0 | 0 | 0 |
| H. picicornis (Stephens, 1836) | 20 | 2 | HCIC | 0 | 20 | 0 | 0 | 0 | 0 | 0 |
| Neureclipsis bimaculata (L., 1758) | 42 | 5 | HCIC | 36 | 5 | 1 | 4 | 0 | 28 | 9 |
| N. crepuscularis (Walker, 1852) | 4982 | 83 | HCIC | 285 | 3496 | 186 | 3027 | 198 | 501 | 236 |
| N. moestus Banks, 1911 | 160 | 17 | HCIC | 46 | 84 | 30 | 1 | 2 | 151 | 0 |
| N. serratus (Lago & Harris, 1985) | 1 | 1 | INHS | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Plectrocnemia albipuncta Banks, 1930 | 40 | 14 | HCIC | 35 | 5 | 0 | 3 | 2 | 35 | 0 |
| Psycnonyx flavida Hagen, 1861 | 1147 | 81 | HCIC | 88 | 778 | 276 | 684 | 37 | 117 | 4 |
| Rhyacophila brunnea Banks, 1911 | 230 | 29 | HCIC | 7 | 51 | 171 | 4 | 30 | 25 | 0 |
| R. fuscula (Walker, 1852) | 3 | 1 | UMMZ | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| S. ciliata (Blickle & Morse, 1955) | 4 | 4 | HCIC | 0 | 2 | 2 | 0 | 0 | 1 | 1 |
| Polycentropus centralis Banks, 1914 | 33 | 2 | HCIC | 33 | 0 | 0 | 0 | 0 | 33 | 0 |
| P. concinnus Neunzig, 1891 | 27 | 11 | HCIC | 16 | 0 | 0 | 0 | 0 | 21 | 1 |
| P. pentus Ross, 1941 | 678 | 63 | HCIC | 101 | 541 | 36 | 8 | 354 | 296 | 13 |
| P. timesis (Denning, 1948) | 15 | 4 | HCIC | 0 | 15 | 0 | 0 | 15 | 0 | 0 |
| PSYCHOMYIIDAE (2) | | | | | | | | | | |
| Lype diversa Banks, 1911 | 1589 | 94 | HCIC | 391 | 1101 | 97 | 12 | 449 | 1101 | 27 |
| Psychomyia flavida Hagen, 1861 | 10574 | 127 | HCIC | 4291 | 6070 | 207 | 248 | 1102 | 6402 | 2644 |
| RHACOPHILIDAE (8) | | | | | | | | | | |
| Rhyacophila brunea Banks, 1911 | 78 | 9 | HCIC | 28 | 50 | 0 | 0 | 44 | 19 | 0 |
| R. fusca (Walker, 1852) | 42 | 14 | HCIC | 421 | 1 | 0 | 0 | 0 | 366 | 56 |
| R. glaberrima Ulmer, 1907 | 1 | 1 | INHS | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| R. ledra Ross, 1939 | 1 | 1 | HCIC | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| R. lobifera Betten, 1834 | 5 | 1 | HCIC | 0 | 5 | 0 | 0 | 0 | 5 | 0 |
| R. mainensis Banks, 1911 | 29 | 6 | HCIC | 3 | 26 | 0 | 0 | 4 | 24 | 1 |
| R. manistee Ross, 1939 | 313 | 15 | HCIC | 0 | 313 | 0 | 0 | 32 | 244 | 37 |
| R. vibax Milne, 1936 | 246 | 12 | HCIC | 11 | 233 | 0 | 1 | 236 | 7 | 0 |
| SERICOSTOMATIDAE (1) | | | | | | | | | | |
| Aegaraodes distinctus (Ulmer, 1905) | 125 | 9 | HCIC | 6 | 18 | 101 | 16 | 0 | 5 | 3 |
| THEMMATIDAE (3) | | | | | | | | | | |
| Neophylax concinns McLachlan, 1871 | 185 | 32 | HCIC | 86 | 92 | 7 | 11 | 45 | 127 | 1 |
| N. fusca Banks, 1903 | 54 | 4 | UMMZ | 0 | 54 | 0 | 0 | 0 | 54 | 0 |
| N. oligius Ross, 1938 | 134 | 18 | HCIC | 19 | 80 | 35 | 0 | 62 | 58 | 4 |
| Species | Explanation |
|---------|-------------|
| **Banksiola selina** Betten, 1944 | *Junior synonym of B. crotchi* (Wiggins 1956) |
| *Ceraclea nepha* (Ross, 1944) | Reported from “Crawford”. No specimen located |
| *Ceraclea punctata* (Banks, 1894) | Reported from “Crawford”. No specimen located |
| *Cyrnellus marginalis* (Banks, 1930) | *Junior synonym of C. fraternus* (Flint 1964) |
| *Dicosmoecus quadrinotatus* (Banks, 1908) | *Junior synonym of Onocosmoecus unicolor* (Wiggins and Richardson 1986) |
| *Hydropsyche alvata* Denning, 1949 | *Junior synonym of H. incommoda* (Korecki 2006) |
| *Hydropsyche bidens* Ross, 1938 | *Junior synonym of H. incommoda* (Korecki 2006) |
| *Hydropsyche bifida* Banks, 1905 | *Junior synonym of H. morosa* (Schefter and Unzicker 1984) |
| *Hydropsyche orris* Ross, 1938 | *Junior synonym of H. incommoda* (Korecki 2006) |
| *Hydropsyche recurvata* Banks, 1908 | *Junior synonym of H. alternans* (Schefter and Wiggins 1986) |
| *Holocentropus glacialis* Ross, 1938 | Misidentified. Is *Plectrocnemia cinerea* (INHS) |
| *Lepidostoma strophis* Ross, 1938 | *Junior synonym of L. cinereum* (Weaver 1988) |
| *Neophylax autumnus* Vorhies, 1909 | *Junior synonym of N. concinnus* (Kimmins and Denning 1951) |
| *Nyctiophylax unicus* Ross, 1944 | Misidentified. Is *N. affinis* (INHS) |
| *Nyctiophylax vestitus* (Hagen, 1861) | *Nomen dubium* (Morse 1972) |
| *Platycentropus plectrus* Ross, 1938 | *Junior synonym of P. amicus* (Flint 1966) |
| *Rhyacophila acropheda* Banks, 1914 | *Junior synonym of R. brunnea* (Smith 1984) |
| *Rhyacophila melita* Ross, 1938 | *Junior synonym of R. mainensis* (Smith 1984) |

**Figure 2.** The number of specimens known for each Michigan species and the number of localities where each species has been found.
**Figure 3.** The number of total and unique species from Michigan habitat types (A) and caddisfly regions (Houghton 2015) (B).

*Rhyacophila lobifera* Betten (Rhyacophilidae), whose presence in Michigan is based on larvae and genetic analysis (Abigail Fusaro, unpublished data). Adult male specimens of *Beothukus complicatus* (Banks) (Phryganeidae) were collected by PLH and identified by BJA. The specimens were subsequently lost. Due to the distinctness of the male genitalia, it is unlikely that these specimens were misidentified and so *B. complicatus* is included on the checklist. Likewise, *Fabria inornata* Banks (Phryganeidae) was included in Leonard and Leonard’s (1949b) checklist. We have not been able to locate specimens, but find it unlikely that this distinctive species was misidentified and so have included it on the checklist. Conversely, *Ceraclea nepha* (Ross) and *C. punctata* (Banks) are more difficult to identify so, in the absence of known specimens, are excluded from the checklist (Table 3).
Michigan caddisfly species richness appears similar to that of Minnesota (277 total species) and Ohio (272), two adjacent states where surveys of comparable effort have recently occurred (Armitage et al. 2011, Houghton 2012). All three states generally harbor similar numbers of species in the same families; exceptions include Brachycen-tridae, Glossosomatidae, Hydropsychidae, Limnephilidae, Phryganeidae, and Rhyaco-philidae (Figure 4). Overall distribution of specimens per species (Figure 2) follows a similar pattern in both states (Houghton and Holzenthal 2010).

Michigan and Minnesota also exhibit similar regional patterns, with higher species richness in the Northern Great Lakes and Northern Forested regions than in the Southern Agricultural region (Houghton 2012). These differences are probably due to both natural and anthropogenic factors (Houghton 2015). The majority of streams of the Northern Great Lakes region drain into Lake Superior and are of high gradient, especially their downstream sections. The majority of the region is forested, leading to low levels of watershed disturbance. The Northern Forested region is also relatively undisturbed. Most streams drain into lakes Michigan and Huron and tend to be of lower gradient. Streams of the Southern Agricultural region also tend to be low gradient. The region contains >90% of Michigan’s human population (www.census.gov) and most of its agriculture. Thus, streams are surrounded by anthropogenic disturbance.

**Figure 4.** The number of species within families found in Ohio (Armitage et al. 2011), Michigan (present study), and Minnesota (Houghton 2012).
Although the majority of Michigan caddisflies have also been collected from adjacent states and provinces, and Michigan does not have any known endemic species, there are still some noteworthy Michigan records reported in this study. *Polycentropus timesis* (Denning) (Polycentropodidae) is known in Michigan from 4 sites in Lake County in the northwestern Lower Peninsula. These sites are separated by >800 km from the other known *P. timesis* collection sites in Massachusetts and New Hampshire (Weaver 1995). Prior to the Michigan collections, *Holocentropus milaca* (Etnier) (Polycentropodidae) and *Oxyethira itascae* Monson and Holzenthal (Hydroptilidae) were both thought to be endemic to Minnesota (Houghton and Holzenthal 2003). *Hydroptila tusculum* Ross (Hydroptilidae) was previously known only from collections in the southeastern U.S. (Moulton and Stewart 1996); the nearest reported collection is ~1,200 km from the single Michigan locality in the northwestern Lower Peninsula. Interestingly, *H. tusculum* has also been collected from Wisconsin (unpublished data), indicating that it is more widespread than originally thought. Similarly, *Neureclipsis piersoni* Frazer and Harris and *Nyctiophylax serratus* Lago and Harris (Polycentropodidae) are known in Michigan from Sleeping Bear Dunes National Park in the northwestern Lower Peninsula. Both species represent >500 km range extensions from their nearest known collecting localities in Kentucky (Rasmussen and Morse 2016).

Including the current study, 20% of the total caddisfly fauna of Michigan, and almost 40% of the hydroptilid fauna, has been reported during the last 10 years, despite a >80-year collecting history in the state (Table 1). Moreover, nearly all recent regional studies have resulted in new state records. Thus, it is likely that additional species remain undiscovered in the state. Future research will include a more comprehensive faunal analysis relating species to habitat preferences and anthropogenic disturbance levels, as well as a conservation assessment of individual Michigan species.

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**Supplementary material 1**

**Data file for new state records**
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Data type: specimen data

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