

AQUATIC INSECTS OF OLD WOMAN CREEK ESTUARY

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ABSTRACT

The primary purpose of this study was to survey the aquatic insects of the Old Woman Creek (OWC) estuary and identify them to their lowest taxonomic level. Ten sampling locations were established throughout OWC estuary. Qualitative samples were collected once in May, twice in June, twice in July, twice in August, and once in September. Three sampling methods were used for each location during each sampling period, which included Ekman dredges, dip netting, and black-light trapping. Due to the presence of bald eagle chicks at collection stations 4,5,7, 8, and 9, Federal Laws prohibited collecting in these locations during May and June. Three samples were collected from each station for a total of 195 samples yielding a total of 3710 organisms constituting 120 taxa. Thus far two groups of aquatic insects (Hemiptera and Coleoptera) have been completely documented for OWC area. Several other groups are partially completed with either their larvae or adults done. The study has added a new state record with *Gerris buenoi* Kirkaldy and 78 new taxa to the OWC estuary species list.

Introduction

The aquatic insect community functions in many important roles as energy and matter pass through a freshwater ecosystem. Aquatic insects are represented in all feeding types such as herbivores, omnivores, and carnivores. Aquatic insects occur in many niches throughout ecosystem and play an important role as the first large protein source for young fishes.

Since 1980, there has been much research conducted on Old Woman Creek (OWC) estuary and the upstream creek and watershed. These investigations have included studies of surface and ground water hydrology (Klarer 1981, Woods 1986, Eaker and Matisoff 1989), watershed and marsh geology and sedimentation rates (Krieger 1984, Heath 1986, Klarer 1988, Wickstrom 1988), the economic and cultural prospects for the coastal region which includes OWC (Holly 1986), and macroinvertebrate communities (Lewis 1990, Krieger and Klarer 1992, Krieger and Klarer 1995). Some studies have surveyed certain orders of aquatic insects such as

the Miller (1982) study of Trichoptera and the Perry and Perry (1983) study of Odonata. These studies only surveyed some groups of aquatic insects or identified the specimens only to the genus level.

The primary purpose of this study was to survey the aquatic insects of the OWC estuary and identify them to their lowest taxonomic level. Species collected in this study were compared to the catalogue of the invertebrate fauna of OWC generated by Herdendorf et al. (2000).

Study Area

Old Woman Creek estuary lies on the south shore of Lake Erie and is located at the mouth of Old Women Creek, about 5 km east of the city of Huron, Ohio (Figure 1). In 1980 Old Woman Creek estuary received National Estuarine Research Reserve (NERR) designation. The NERR is a network of federal, state, and community partnerships that serve to promote informed management of our nation's estuarine and coastal habitats through linked programs of scientific understanding, public education, and stewardship. The 230-hectare Old Woman Creek National Estuarine Research Reserve and State Nature Preserve serves as a field laboratory where scientists can study naturally functioning systems.

The OWC watershed encompasses 69 km² and has a small second-order stream that drains this rural area (mainly cropland and woodland). The lower part of the watershed forms a riverine-palustrine wetland (Cowardin et al. 1979). The wetland and its immediate surrounding shoreline have remained undeveloped except for a highway causeway and a railroad causeway which were built across the marsh around the turn of the century, and a four-lane highway completed in 1990 which claimed a relatively small part of the southernmost end of the wetland. Despite these intrusions, the wetland appears to have retained its wetland functions and values

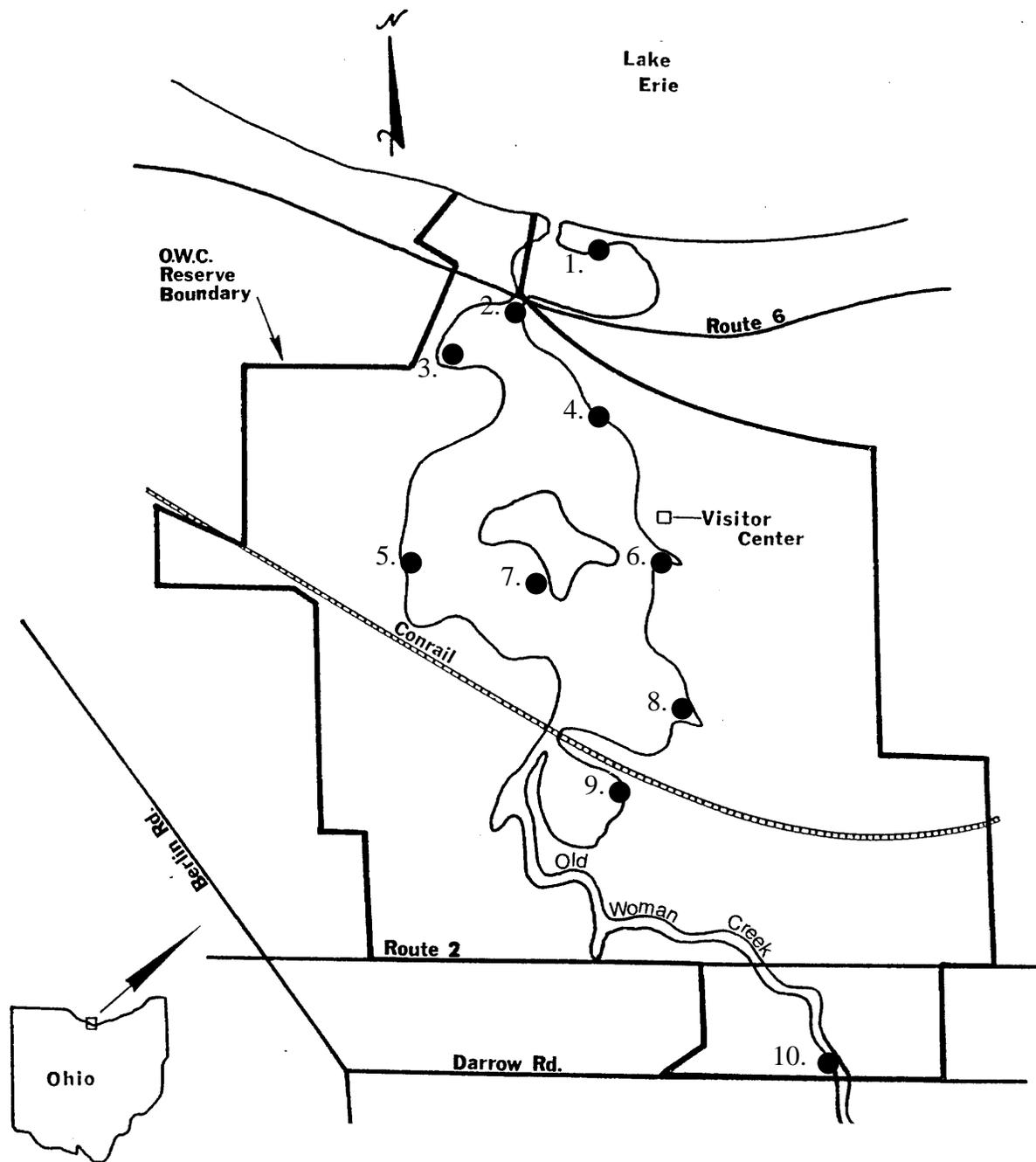


Figure 1. Geographic location of Old Woman Creek estuary and the location of the ten sampling locations.

and is one of the few remaining intact “estuarine” wetlands along the Ohio coastline of Lake Erie.

The estuary is very shallow ranging from 1-2 meters in depth with very turbid waters. American lotus (*Nelumbo lutea*), water lily (*Nymphaea tuberosa*) beds and sedge (*Carex* sp.) meadow dominated the estuary during most of the summer. Other vascular hydrophytes that line the margin of the estuary are cattails (*Typha* spp.), common reed (*Phragmites* sp.), arrowheads (*Sagittaria* spp.), and swamp mallow (*Hibiscus palustris*).

Methods and Materials

In order to adequately sample the different types of habitats within the estuary, ten sampling locations were established throughout the estuary (Figure 1). These locations represented every type of habitat in the estuary. Qualitative samples were collected once in May, twice in June, twice in July, twice in August, and once in September. Three sampling methods were used for each location during each sampling period, which included Ekman dredges, dip netting, and black-light trapping. Due to the presence of bald eagle chicks at collection stations 4,5,7, 8, and 9, Federal Laws prohibited collecting in these locations during May and June. Three samples were collected from each station for a total of 195 samples.

At each sampling station, three 16 cm x 16 cm Ekman dredge samples were taken and sieved through a No. 30 (600 um opening) and the sample was placed in a jar and preserved with 10% formalin. Dip netting was used to sample the microhabitats at the sampling station. One man hour of D-frame dip netting was conducted at each station with the sample being placed in a jar containing 70-80% ethanol. Black-light trapping was usually conducted the night following the day of dip netting and dredge samples. The black-light trap consisted of a battery operated fluorescent bulb placed on top of a 15 cm x 25 cm x 5 cm white plastic tray filled with 70-80%

ethanol. Black-lights and trays were placed out at dusk and were picked up the following morning with the samples placed in jars of 70-80% ethanol. In the laboratory samples were picked, sorted, and identified to the lowest taxonomic level, usually to family or genus. Specimens were recorded, labeled, and shipped to the Ohio Biological Survey for final identification.

Results and Discussion

A total of 3710 organisms constituting 120 taxa were collected (Table 1). The primary purpose of this study was to survey the aquatic insects of the OWC estuary, with hopes of creating a more detailed list of the aquatic insects that inhabit the estuary. Although not all the aquatic insects collected during this study have been completely identified, the study has significantly improved the knowledge about the diversity of OWC estuary. Two taxonomic groups that are completely finished are the Coleopterans and Hemipterans. Before the study 35 taxa of aquatic Coleopterans were documented for the estuary. The study has yielded 38 new taxa and reconfirmed the presence of five previously document taxa. The number of new Hemipterans has also significantly improved for the estuary. A total of 18 new Hemipterans taxa were added to the previously known 28 hemipteran taxa and three taxa were reconfirmed. One species of Hemipteran (*Gerris buenoi*) collected during this study was a new state record.

The following taxonomic groups are partially completed. These partial groups have already yielded new taxa to the OWC estuary species list. One-third of the families of Trichopterans have been completed with a possible five additional families to be examined. The study has already yielded nine new taxa to OWC estuary species list. Several orders such as Odonata, Ephemeroptera, Diptera, Megaloptera, and Lepidoptera have had their larvae identified but not the adults. From their larvae only, the study has found two new taxa of Odonates, three

new taxa of Ephemeropterans, two new taxa of Dipterns, and one taxon of Megaloptera that will be added to OWC species list. More new species will come from the adults of these groups because there are more complete taxonomic keys for the adult stages versus the larvae stages, and since more adults were collected in this study than larvae. Tables 2-9 contains information of when, where, and how many specimens were collected at each station and by which method. The light trapping method collects only adults. While the dip netting method can collected both adult and larvae. The dredge samples yield very few specimens with most of them being Diptera larvae that are still being identified by the taxonomists.

The interactions of the many aquatic insect taxa with each other and with the vertebrate, plant, and decompositional communities constitute an important aspect of wetland ecology. The documenting of these aquatic insects will help to complete much needed area of information about the organisms that inhabit OWC estuary. As the remaining groups of aquatic insect are identified it will allow a better understanding of how the different functional feed groups are interacting with each other organisms in the estuary.

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