

# Ohio's Little Muskingum River: Notes on its Fishes and a New Drainage Record for the Variegate Darter, *Etheostoma variatum*

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Photographs by the author.

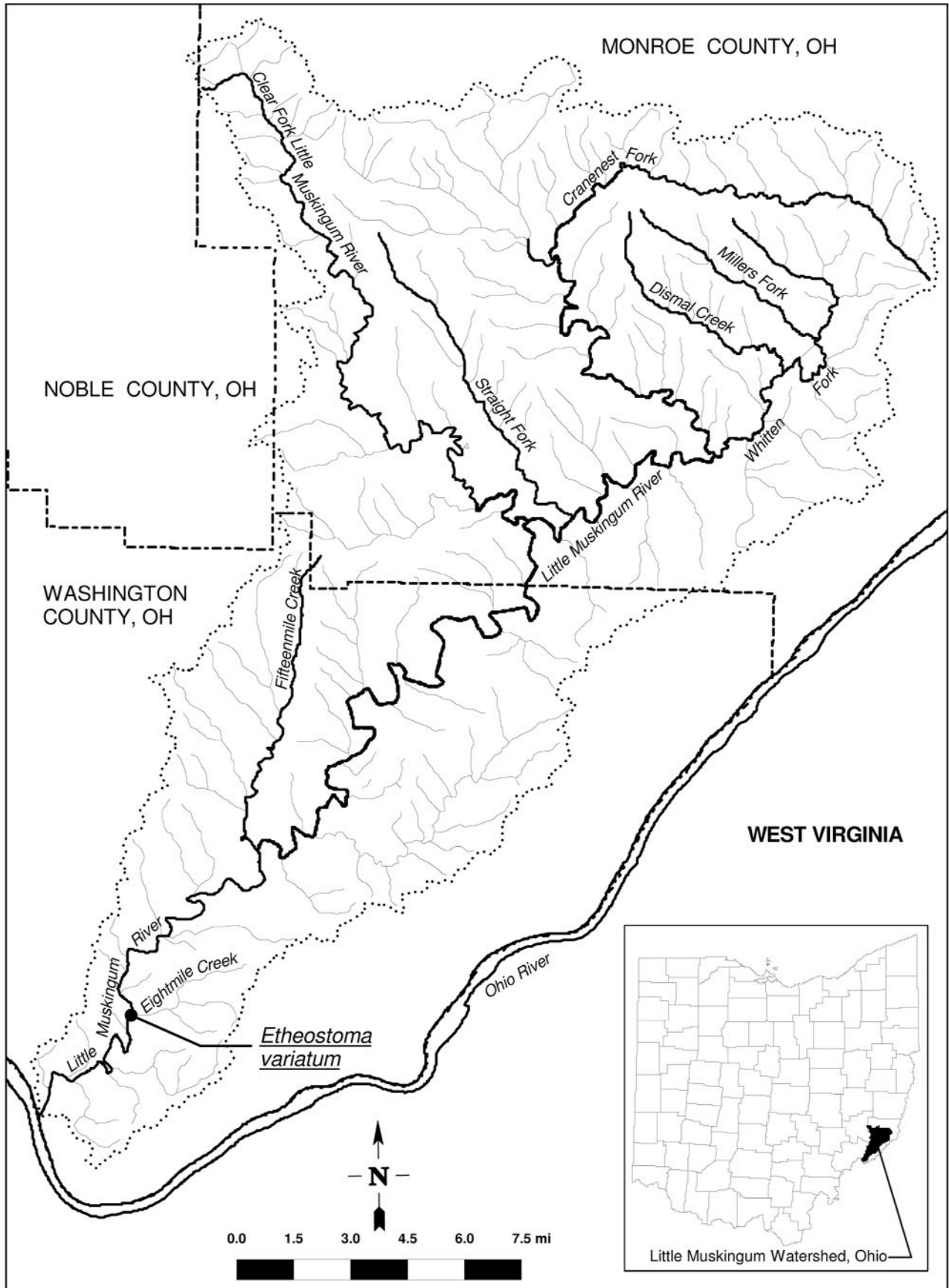
**T**he Little Muskingum River (Fig. 1) meanders through the unglaciated Allegheny Plateau physiographic region of southeastern Ohio. The river drains 315 square miles and is 70 miles in length from its headwaters in Monroe County to the Ohio River confluence in Washington County (Cross, 1967). The watershed lies within the boundaries of the Marietta Purchase Unit of Wayne National Forest and is strongly dissected with steep wooded slopes and sandstone outcroppings. While the riparian corridor includes continuous tracts of forest, row crop or pasture occupies most of the narrow bottomlands. State Route 26 is the only major roadway servicing eastern Washington County as it winds through scenic country, following the same course as the Little Muskingum River. Four covered bridges and other historical highlights can be found along this rural route as well as campgrounds and hiking trails. Development is restricted by the rough terrain leaving the area, which is sparsely to moderately populated along the narrow stream valleys. Unfortunately, strong local opposition blocked the Little Muskingum from being designated as a "State Scenic River." The designation was viewed as a regulatory hand that would place restrictions on private land use. Although scenic and of exceptional water quality, agricultural runoff, farming to the river's edge, and cattle access are the most notable stressors to the system.

The Little Muskingum River is entrenched, highly sinuous and with a low gradient that falls neatly into the "E" stream type classification as described by Rosgen (1996). In general, these stream types represent the pinnacle of stability and fluvial processes, contain the most pool habitat per stream

length, and support the highest biomass in relation to other stream types (Rosgen, 1996). (With these combined characteristics it should not be a surprise that the top piscine predator is the muskellunge.) The mid to lower reaches of the river contain long, deep sandy pools averaging four feet in depth and 90 feet across at bankfull. Pools are interspersed with relatively short reaches of riffles and runs formed at the outwashes of adjoining streams. The pools contain an abundance of submerged logs and deep undercut banks often associated with century-old sycamore trees. Aquatic vegetation is moderate to sparse and occurs in patches comprised of the exotic Eurasian watermilfoil, *Myriophyllum spicatum*; coontail, *Ceratophyllum demersum*; and longleaf-pondweed, *Potamogeton nodosus*. Water-willow, *Justicia americana*, flanks the shallows along both banks and most gravel bars, providing a refugia for both prey and predator. The riffle-run reaches are comprised mostly of gravel and cobble with a scattering of boulders. It is a flashy river system, but under normal flows during the growing season it runs somewhat clear with a slight green cast and visibility ranging from two to four feet.

## Fishes of the Little Muskingum River

The Little Muskingum River is designated as an Exceptional Warmwater Habitat by the Ohio Environmental Protection Agency (OEPA, 2003). Although the fish fauna has been the subject of previous surveys (Trautman, 1981), it wasn't until the 1999 and 2000 field seasons when the OEPA and the Ohio Department of Natural Resources (ODNR), Division of Natural Areas and Preserves (DNAP) conducted



*Fig. 1.*  
The Little Muskingum River Watershed of southeastern Ohio, showing the site of the first record of *Etheostoma variatum* from this watershed.

as Species of Concern or Endangered.

Of the 58 species recorded for the mainstem, the 10 most common, listed in descending order of abundance, were: *Luxilus chrysocephalus*, striped shiner; *Pimephales notatus*, bluntnose minnow; *Campostoma anomalum*, central stoneroller; *Notropis stramineus*, sand shiner; *Moxostoma erythrurum*, golden redbreast; *Moxostoma duquesnei*, black redbreast; *Cyprinella spiloptera*, spotfin shiner; *Lepomis megalotis*, longear sunfish; *Notropis photogenis*, silver shiner, *Etheostoma blennioides*, green-side darter; and *Clinostomus funduloides*, rosyface shiner (Rice and Michael, 2001). The rare fishes included *Ichthyomyzon bdellium*, Ohio lamprey; *Esox masquinongy*, muskellunge (Fig. 2); and *Ammocrypta pellucida*, eastern sand darter.

The Ohio lamprey is listed as State Endangered and can be found spawning on riffles within the mainstem during spring. Most often, spawning groups and nest sites are situated over gravel at the head of a riffle in the deepest and swiftest areas not far from cover. At one location, my kids and I found three adult lamprey spawning underneath an isolated slab boulder with no other available cover within 20 feet (see back cover photo). Usually, there is one nest per riffle. While I have never observed more than three lampreys using a nest, Rice and Michael (2001) reported an average of five individuals per nest, and in two instances reported seven sexually mature lamprey and one transformer at nest sites on two separate riffles. While Ohio lamprey occasionally show up in the Ohio River or other larger tributaries attached to fish or as ammocoetes, the Little Muskingum River is the only location in the state where there is a known breeding population that is consistently observed (Rice and Michael, 2001; Barnes, et al., 1993; Ted Cavender, Ohio State University Museum of Biological Diversity [OSUMBD], pers. comm.).

The muskellunge, a Species of Concern, continues to reproduce naturally in the Little Muskingum River and can be found throughout the mainstem and into Monroe County. There is debate among some Ohio biologists as to whether this population is purely native. The debate is engendered by the lack of records in Trautman's *Fishes of Ohio* (1981) and because there is variation in color and pattern between individual fish that extends beyond what could be considered

an intensive survey to document the fish fauna and biotic integrity of the entire watershed (Rice and Michael, 2001). Generating the most comprehensive list to date, 58 species were documented from the mainstem (Table 1), including three fishes listed

**Table 1.** Fish fauna of the Little Muskingum River mainstem documented by the OEPA and ODNR during 1999 and 2000.

| Common Name         | Scientific Name                 |
|---------------------|---------------------------------|
| Ohio lamprey        | <i>Ichthyomyzon bdellium</i>    |
| longnose gar        | <i>Lepisosteus osseus</i>       |
| skipjack herring    | <i>Alosa chrysochloris</i>      |
| gizzard shad        | <i>Dorosoma cepedianum</i>      |
| central stoneroller | <i>Campostoma anomalum</i>      |
| spotfin shiner      | <i>Cyprinella spiloptera</i>    |
| carp                | <i>Cyprinus carpio</i>          |
| striped shiner      | <i>Luxilus chrysocephalus</i>   |
| redfin shiner       | <i>Lythrurus umbratilis</i>     |
| river chub          | <i>Nocomis micropogon</i>       |
| emerald shiner      | <i>Notropis atherinoides</i>    |
| silverjaw minnow    | <i>Notropis buccatus</i>        |
| silver shiner       | <i>Notropis photogenis</i>      |
| rosyface shiner     | <i>Notropis rubellus</i>        |
| sand shiner         | <i>Notropis stramineus</i>      |
| mimic shiner        | <i>Notropis volucellus</i>      |
| redbelly dace       | <i>Phoxinus erythrogaster</i>   |
| bluntnose minnow    | <i>Pimephales notatus</i>       |
| blacknose dace      | <i>Rhinichthys atratulus</i>    |
| creek chub          | <i>Semotilus atromaculatus</i>  |
| quillback           | <i>Cariodes cyprinus</i>        |
| white sucker        | <i>Catostomus commersonii</i>   |
| northern hogsucker  | <i>Hypentelium nigricans</i>    |
| smallmouth buffalo  | <i>Ictiobus bubalus</i>         |
| spotted sucker      | <i>Minytrema melanops</i>       |
| silver redbreast    | <i>Moxostoma anisurum</i>       |
| black redbreast     | <i>Moxostoma duquesnei</i>      |
| golden redbreast    | <i>Moxostoma erythrurum</i>     |
| shorthead redbreast | <i>Moxostoma macrolepidotum</i> |
| yellow bullhead     | <i>Ameiurus natalis</i>         |
| channel catfish     | <i>Ictalurus punctatus</i>      |
| stonecat            | <i>Noturus flavus</i>           |
| brindled madtom     | <i>Noturus miurus</i>           |
| flathead catfish    | <i>Plyodictis olivaris</i>      |
| muskellunge         | <i>Esox masquinongy</i>         |
| trout-perch         | <i>Percopsis omiscomaycus</i>   |
| brook silverside    | <i>Labidesthes sicculus</i>     |
| white bass          | <i>Morone chrysops</i>          |
| rock bass           | <i>Ambloplites rupestris</i>    |
| green sunfish       | <i>Lepomis cyanellus</i>        |
| bluegill            | <i>Lepomis macrochirus</i>      |
| longear sunfish     | <i>Lepomis megalotis</i>        |
| smallmouth bass     | <i>Micropterus dolomieu</i>     |
| spotted bass        | <i>Micropterus punctulatus</i>  |
| largemouth bass     | <i>Micropterus salmoides</i>    |
| white crappie       | <i>Pomoxis annularis</i>        |
| sand darter         | <i>Ammocrypta pellucida</i>     |
| greenside darter    | <i>Etheostoma blennioides</i>   |
| rainbow darter      | <i>Etheostoma caeruleum</i>     |
| fantail darter      | <i>Etheostoma flabellare</i>    |
| johnny darter       | <i>Etheostoma nigrum</i>        |
| banded darter       | <i>Etheostoma zonale</i>        |
| logperch            | <i>Percina caprodes</i>         |
| blackside darter    | <i>Percina maculata</i>         |
| slenderhead darter  | <i>Percina phoxocephala</i>     |
| dusky darter        | <i>Percina sciera</i>           |
| sauger              | <i>Sander canadensis</i>        |
| freshwater drum     | <i>Aplodinotus grunniens</i>    |

normal. Despite lack of records and skin pattern variation, I am aware of local anglers with anecdotal accounts of muskellunge being taken by their ancestors during the early 1900s, thereby precluding any stocking program. On the other hand, Trautman (1981) shows that muskellunge were stocked in a



Fig. 2.

Andy Moreland with a typical Little Muskingum muskie.



Fig. 3.

Typical Little Muskingum River pool habitat.

Monroe County impoundment after 1955 immediately adjacent to the Little Muskingum drainage.

The typical muskie pool (Fig. 3) is approximately 1/4-mile in length with an average depth of four feet and pockets of at least six feet. These attributes, in combination with an abundance of submerged logs and aquatic vegetation, provide ideal cover for this fascinating predator. Mike Greenlee, fisheries biologist with the ODNR Division of Wildlife, indicated that during their habitat survey of the Little Muskingum River, approximately 65 pools were identified as capable of supporting muskellunge. Although I have caught and released muskie from the middle and lower reaches of this river, a recent boom in fishing pressure and “catch and eat” has made this species hard to find.

The eastern sand darter is also listed as a Species of Concern and appears to be thriving in Little Muskingum River. The DNAP documented 13 sites during their 1999 and 2000 field study (Rice and Michael, 2001). Locating sand darters is never difficult given the vast reaches of clean sandy substrates. For example, during low flow conditions in early fall of 2005, Jared Brenner (Ohio University) and I sampled a site located upstream from the Eightmile Creek outwash. Over a dozen sand darters were captured in one seine haul from a long and narrow patch of sand situated just upstream from a riffle. While canoeing the river during the winter months, I have noticed extensive reaches of relatively silt-free sandy substrates, making it of little surprise that the species has a stronghold in this river system.

A species that is suspected to be present in the lower reaches of the Little Muskingum River but yet to be recorded is the northern madtom, *Noturus stigmosus*, also listed as State Endangered. Dan Rice, principal investigator for DNAP at

the time of the 1999-2000 survey, indicated that the lower reaches of the Little Muskingum provide ideal habitat for the species. Although he has failed to find it, all the ingredients are present and he knows it's there. Dan recommended that I try sampling the riffles at night during late fall and early winter. As with other rare fishes in Ohio and elsewhere, the species previously discussed have declined or been eliminated from Ohio drainages because of sedimentation, habitat loss or modification, and dam construction.

### New Drainage Record

On August 28, 2005, a new species was added to the fish fauna of the Little Muskingum River: the variegate darter, *Etheostoma variatum*. Below the outwash of Eightmile Creek (Fig. 4), my kids and I were seining during extreme low-flow conditions. We found two adult variegates after kick seining in the swiftest and deepest section of the diminished riffle. Continued sampling within the area did not produce any more individuals that day. Both darters were preserved in 10% formalin and immediately shipped to Dr. Ted Cavender (OSUMBD) for confirmation. On September 22, 2005, Jared Brenner and I found six more adults from the exact location where the previous two individuals were found. All six were released. No variegate darters were found while seining the nearest upstream and downstream riffles that day.

Given the presence of variegate darter in the adjacent Sunfish Creek drainage in Monroe County and the nearby Muskingum River drainage in Washington County, it's not surprising that the variegate darter would be present in the Little Muskingum River. However, based on historical surveys (Barnes, 1979; Trautman, 1981; Rice and Michael,



Fig. 4.

Riffle below the Eightmile Creek outwash. All variegate darters found in August and September were located within the deepest section of riffle just upstream of the leaning willow branch on the left side of the photograph.

2001) and personal experience, I suspect that this discovery is the result of a recent introduction or migration as opposed to simply being missed during previous surveys. For example, the Eightmile Creek outwash was thoroughly sampled during the ODNR and OEPA 1999 and 2000 investigations. Dan Rice conducted both day and night electroshocking and seining at this exact riffle (Dan Rice, pers. comm.). Although it is impossible to know for sure how or why the variegate darter suddenly appeared, it will be interesting to monitor this species during the following years to see if it becomes an established and consistent member of the Little Muskingum fish fauna.

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