

Native Mussel Reconnaissance Survey in the West Branch of Stony Creek, Fox Nature Preserve.



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Cover Photo: West Branch of Stony Creek looking down stream from a culvert stream crossing, Fox Nature Preserve, September 7, 2023. **Inset photo:** Spike (*Eurynia dilatata*), a species of special concern, at waypoint 7 six meters downstream from the culvert, September 7, 2023. Photos by Peter Badra.

All photos within report were taken by Peter Badra on September 7, 2023.

Acknowledgements

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Introduction

The Charter Township of Oakland (Oakland Township) requested Michigan Natural Features Inventory (MNFI) perform a reconnaissance survey for native unionid mussels at a potential stream habitat restoration site in the West Branch of Stony Creek within the Fox Nature Preserve. The site is located 340m south-east of Clam Lake. Currently, the creek flows through a 122 cm (48 in.) diameter metal pipe culvert through a dam at latitude 42.779506, longitude -83.170134. The impoundment behind the dam is approximately 5,202 m² (1.29 acres) in area and approximately 30 cm (1 ft.) higher than the water level of Stony Creek. The culvert and dam create a barrier to fish movement including fish that may be hosts for unionid mussel larvae (glochidia) (Watters 1996).

The purpose of the reconnaissance survey is to determine if native mussels are present, and if impacts to mussels would be likely from a potential culvert replacement and associated stream habitat restoration. Projects with potential impacts to state listed mussel species require consultation with the Michigan Department of Natural Resources and those with potential impacts to federally listed mussel species require consultation with the U.S. Fish and Wildlife Service. There were no previously documented mussel surveys or mussel occurrences in the West Branch of Stony Creek. However, records for several mussel species are in nearby Stony Creek and Paint Creek, including the state threatened slippershell (*Alasmidonta viridis*) and species of special concern rainbow (*Cambarunio iris*), round pigtoe (*Pleurobema sintoxia*), elktoe (*Alasmidonta marginata*), and creek heelsplitter (*Lasmigona compressa*) (Natural Heritage Database, MNFI 2023; GBIF 2023). In 2022 surveys, one shell of rainbow was found in East Graham Lake, no live mussels or shells were found in West Graham Lake, and shells of giant floater (*Pyganodon grandis*) were found in Stony Creek Lake. Stony Creek Lake is an impoundment of Stony Creek 10.4 km (6.46 mi.) downstream of the study area. East Graham Lake is located in Bald Mountain Recreation Area approximately 1.8 km (1.1 mi.) upstream of the study area (Badra 2023).

Methods

This survey followed methods for reconnaissance surveys described in “Michigan Freshwater Mussel Survey Protocols and Relocation Procedures for Rivers and Streams” (Hanshue et al. 2021) and was conducted with the assistance of Benjamin VanderWeide (Natural Areas Stewardship Manager, Oakland Township Parks and Recreation). The creek was accessed at a point 362 m (1188 ft.) downstream of the culvert and dam, at latitude 42.778306, longitude -83.166839, and searched in the upstream direction to the culvert and into the impoundment. Visual and occasional tactile methods of detection were used to search for live mussels and shells. Glass bottom buckets were used to aid visual detection. Live mussels were identified to species and placed back into the substrate anterior end down (siphon end up) in the immediate vicinity of where they were found. Shells were also identified to species and returned to the creek. Photos were taken of the survey site, and representative individuals of each mussel species. Qualitative habitat characteristics including substrate type, water level, and underwater visibility were noted. Latitude and longitude of waypoints were recorded with a hand-held GPS unit. Surveys took place on September 7, 2023.

Results

Live unionid mussels and shells were found to be present in Stony Creek between 381 m (1250 ft.) and 6 m (20 ft.) downstream of the culvert. No state or federally listed mussel species were found, however two species of special concern (rainbow and round pigtoe) were documented. It is possible that culvert replacement and associated stream habitat restoration could have a negative impact on non-listed mussels present at and near the site.

Water depth was less than 70 cm and water visibility was excellent throughout the search area in the creek. An approximately 200 m (656 ft.) section of Stony Creek between waypoints 1 and 2 was not searched due to thick vegetation in and over the creek that limited our ability to move through the creek. The small amount of surveyable habitat (approximately 30 m²) in the impoundment upstream of the culvert was briefly surveyed. Visibility in the impoundment was impaired by dense aquatic plant growth. Water clarity in the impoundment was very good until fine sediments were stirred up. Only the edges out to approximately 3 m from the shore was wadable due to water depth. No live mussels or shells were found in the search area within the impoundment. Substrate size classes used below are boulder (>256mm), cobble (256-64mm), pebble (64-16mm), gravel (16-2mm), sand (2-0.0625mm), silt/clay (<0.0625mm) following Hynes 1970. Locations of waypoints are illustrated in Figure 1.

Waypoint 1 (42.778306, -83.166839): Live individuals of giant floater and Wabash pigtoe (*Fusconaia flava*) were found near the survey starting point 381 m (1250 ft.) downstream of the culvert. The substrate in this area consisted primarily of sand and silt.

Waypoint 2 (42.779295, -83.168846): Nine shells of Wabash pigtoe and one spike shell (*Eurynia dilatata*) were found 136 m (447 ft.) downstream of the culvert. The substrate in this area consisted primarily of pebble and gravel.

Waypoint 3 (42.779531, -83.169413): Two spike shells and one Wabash pigtoe shell were found 58 m (190 ft.) downstream of the culvert in substrate dominated by gravel and pebble.

Waypoint 4 (42.779544, -83.169753): One live spike and three spike shells were found 30 m (98 ft.) downstream of the culvert in substrate dominated by gravel, pebble, and sand.

Waypoint 5 (42.779523, -83.169786): One rainbow shell and one Wabash pigtoe shell were found 27 m (87 ft.) downstream of the culvert in substrate dominated by gravel, pebble, and sand.

Waypoint 6 (42.779509, -83.169947): Two rainbow shells, six spike shells, four round pigtoe (*Pleurobema sintoxia*) shells, and one strange floater (*Strophitus undulatus*) were found 15 m (49 ft.) downstream of the culvert in pebble, gravel, and sand substrate.

Waypoint 7 (42.779508, -83.170046): One live rainbow and five live spike were found 6 m (20 ft.) downstream of the culvert in pebble, gravel, and sand substrate.



Figure 1. Locations of waypoints 1-7 in the West Branch of Stony Creek, Fox Nature Preserve.

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Appendix I. Photographs



Photo 1. Live giant floater (*Pyganodon grandis*) found near waypoint 1.



Photo 2. Live Wabash pigtoe (*Fusconaia flava*) found near waypoint 1.



Photo 3. West Branch of Stony Creek near waypoint 1.



Photo 4. West Branch of Stony Creek near waypoints 4 and 5 .



Photos 5 and 6. Strange floater (*Strophitus undulatus*, far left), rainbow (*Cambarunio iris*, top left), round pigtoe (*Pleurobema sintoxia*, bottom left), and spike (*Eurynia dilatata*, three shells on right) found near waypoint 6.



Photo 7. Live spike in pebble and gravel substrate near waypoint 7.



Photo 8. Live spike found near waypoint 7 approximately 6 m downstream of culvert.



Photo 9. Live rainbow found near waypoint 7, 6 m downstream of culvert.



Photo 10. Beak sculpture of live rainbow found near waypoint 7.



Photo 11. The downstream side of the culvert and stream crossing, looking upstream from waypoint 7.



Photo 12. Looking downstream from the culvert and stream crossing.



Photo 13. Impoundment on the upstream side of the culvert and stream crossing.