

# Summary of Targeted Sampling for Silver Shiner (*Notropis photogenis*) in Sixteen Mile Creek, Ontario, 2022

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2024

**Canadian Data Report of  
Fisheries and Aquatic Sciences 1383**

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Cat. No. Fs97-13/1383E-PDF ISBN 978-0-660-69254-8 ISSN 1488-5395

Correct citation for this publication:

Lopez, L.S., Bruce, K.D., Lamothe, K.A., Colm, J.E., and Drake, D.A.R. 2024. Summary of Targeted Sampling for Silver Shiner (*Notropis photogenis*) in Sixteen Mile Creek, Ontario, 2022. Can. Data Rep. Fish. Aquat. Sci. 1383: vi + 27 p.

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## ABSTRACT

Lopez, L.S., Bruce, K.D., Lamothe, K.A., Colm, J.E., and Drake, D.A.R. 2024. Summary of Targeted Sampling for Silver Shiner (*Notropis photogenis*) in Sixteen Mile Creek, Ontario, 2022. Can. Data Rep. Fish. Aquat. Sci. 1383: vi + 27 p.

Silver Shiner (*Notropis photogenis*) is a freshwater fish species listed as Threatened under Canada's *Species at Risk Act* (SARA). A species-specific monitoring protocol was developed for adult Silver Shiner in Sixteen Mile Creek (Oakville, Ontario) with sampling conducted in 2022 to act as a baseline for future comparisons. Habitat and fish sampling occurred from Britannia Rd. in Milton, downstream to the Queen Elizabeth Way (QEW/HWY 403) in Oakville. A new sampling design was implemented where a priori habitat sampling was used to inform site selection for fish sampling based on a site depth-occupancy relationship developed for adult Silver Shiner. During habitat sampling, depth was measured in 199 runs and pools, which ranged from 0.30 m to 0.96 m. During fish sampling, three repeat seine hauls were conducted at 101 sites, capturing 787 adult Silver Shiner. Adult Silver Shiner were detected at 75 sites with depths ranging from 0.35 m to 1.18 m. The fieldwork completed in 2022 has provided a foundation for future work to help determine whether this new sampling design has improved the ability to detect Silver Shiner or led to improvements in statistical power to describe changes in species occupancy.

## RÉSUMÉ

Lopez, L.S., Bruce, K.D., Lamothe, K.A., Colm, J.E., and Drake, D.A.R. 2024. Summary of Targeted Sampling for Silver Shiner (*Notropis photogenis*) in Sixteen Mile Creek, Ontario, 2022. Can. Data Rep. Fish. Aquat. Sci. 1383: vi + 27 p.

Le méné miroir (*Notropis photogenis*) est une espèce de poisson d'eau douce inscrite comme étant menacée en vertu de la *Loi sur les espèces en péril* du Canada. Un protocole de surveillance propre à l'espèce a été élaboré pour le méné miroir adulte dans le ruisseau Sixteen Mile (Oakville, Ontario), avec un échantillonnage effectué en 2022 pour servir de référence aux comparaisons futures. L'échantillonnage du poisson et de son habitat a été réalisé du chemin Britannia, à Milton, jusqu'en aval de l'autoroute Queen Elizabeth (QEW/HWY 403), à Oakville. Un nouveau plan d'échantillonnage a été mis en œuvre. Celui-ci consistait à utiliser les données de l'échantillonnage a priori de l'habitat pour aider à sélectionner les sites d'échantillonnage du poisson selon un rapport entre la profondeur et l'occupation du site élaboré pour le méné miroir adulte. Au cours de l'échantillonnage de l'habitat, la profondeur a été mesurée dans 199 rapides et fosses, et variait de 0,30 mètre à 0,96 mètre. Pour l'échantillonnage du poisson, trois traits de senne ont été répétés dans 101 sites, menant à la capture de 787 ménés miroirs adultes. Le méné miroir adulte a été détecté dans 75 sites dont la profondeur variait de 0,35 mètre à 1,18 mètre. Le travail sur le terrain terminé en 2022 a servi de base aux travaux futurs pour aider à déterminer si ce nouveau plan d'échantillonnage a amélioré la capacité de détecter le méné miroir ou l'efficacité statistique pour décrire les changements dans l'occupation de l'espèce.



## INTRODUCTION

Fisheries and Oceans Canada (DFO) has the responsibility to provide for the protection and recovery of fishes listed under the *Species at Risk Act* (SARA 2002). To inform scientific aspects of the recovery process, DFO regularly conducts field sampling to satisfy various research objectives for SARA-listed fishes, such as evaluating the distribution and abundance of species, determining species-habitat relationships, and gaining a better understanding of the influence of threats and recovery actions. DFO data reports are published to support the Species at Risk Program by providing an overview of field activities and providing a medium for archiving data associated with sampling SARA-listed fishes and their habitat.

Silver Shiner (*Notropis photogenis*) is a small-bodied, silvery leuciscid listed as Threatened under Schedule 1 of SARA (DFO 2022). In Canada, Silver Shiner is at the northernmost part of its range where it is threatened by increasing urbanization and associated threats (e.g., increased flow variability, elevated nutrient and contaminant loading; Paul and Meyer 2001). The species is found in five southern Ontario drainages, including Bronte Creek, Grand River, Saugeen River, Thames River, and Sixteen Mile Creek (Glass et al. 2016; Gáspárdy et al. 2021).

Standardized monitoring to evaluate population abundance and trajectory has been recommended in recovery documents for Silver Shiner (Bouvier et al. 2013; DFO 2022). In 2022, sampling for adult Silver Shiner was conducted in Sixteen Mile Creek (Oakville, Ontario) to act as a baseline for quantifying population trajectory. This sampling effort tested a new, stratified approach for site selection that aimed to reduce the potential effects of imperfect detection on monitoring results. Stratification was based on a resource function linking adult Silver Shiner occupancy probability and average stream depth in runs and pools (Lamothe and Drake 2022). Habitat sampling was performed before and after fish sampling to aid in site selection and to understand differences within the sampling period, respectively. Overall, this report documents a pilot study and baseline for long-term monitoring of Silver Shiner in Sixteen Mile Creek that can be used to inform future recovery decisions.

## METHODS

### STUDY SYSTEM

Sixteen Mile Creek flows from northwest of Milton, Ontario, south to the confluence with Lake Ontario in Oakville. The watershed is a mix of forested, agricultural, and urbanized land (Conservation Halton 2009). Habitat sampling was conducted from an upstream boundary of Britannia Rd. in Milton, including both the east and west branches, and continued downstream to the Queen Elizabeth Way (QEW/HWY 403) in Oakville, covering urban and non-urban areas (Figure 1). This study reach was selected because it encompasses most of the locations where Silver Shiner have been captured over the last decade (Glass et al. 2016). The study reach was divided into three sections: the main, east, and west branches (Figure 1). The main branch was sampled from an upstream boundary of Highway 407 to the QEW, and the east and west branches were sampled from Britannia Rd. to Highway 407 (Figure 1).

### HABITAT SAMPLING

Habitat sampling was conducted from August 16 to September 8, 2022, before fish sampling occurred. Sampling began at the upstream-most location of each branch and continued downstream. The location of each riffle, run, and pool (i.e., habitat features) was identified in the sampling frame based on differences in water depth (m) and hydraulic head (mm)

measurements (Table 1; Stanfield et al. 2017). If a habitat feature did not meet the depth and hydraulic head criteria for a riffle, run, or pool, it was classified as undefinable (Table 1). Habitat data were only collected in runs or pools, which are the preferred habitat features of Silver Shiner (Lamothe and Drake 2022). Latitude and longitude were recorded at the midpoint of riffles and pools using a Garmin GPS 65s handheld unit.

Three water depth (m) measurements were taken in each run or pool, one at the upstream boundary, one at the downstream boundary, and one at the deepest point of the habitat feature, taking care to encompass representative depths. If the deepest point was deemed unsafe to measure, the deepest location where the field crew could wade safely was measured instead. An indicator of "+" was included in the data records to indicate that the true depth exceeded the measured depth. Hydraulic head (mm) for runs and pools was recorded at the deepest point of the site (Stanfield et al. 2017), and wetted width (m) was recorded at the mid-point of pools.

## **SITE SELECTION**

The data collected during habitat sampling were used to inform site selection for fish sampling. A probabilistic approach was implemented to select sites based on a previously developed relationship between mean site depth and occupancy probability for adult Silver Shiner (Figure 2; Lamothe and Drake 2022). In general, runs or pools with greater mean depth have a higher predicted occupancy probability for adult Silver Shiner (Lamothe and Drake 2022), and therefore had a higher probability of being selected for fish sampling (Table 2; Figure 3). One hundred sites were selected for fish sampling from the 199 runs and pools measured during habitat sampling (Table 2). The target number of 100 sites was chosen to achieve reasonable statistical power (~80%) for quantifying changes in occupancy probability over time, assuming that the protocol would be implemented in future years.

As fish sampling progressed with the initial selection of sites, the field crew concluded that one site (RU57a) did not contain suitable habitat for adult Silver Shiner due to shallow water depths. The site may have been misclassified initially based on the depth and hydraulic head criteria (Table 1), or water levels in that reach may have been lower during the fish sampling period. To ensure that the goal of 100 total sites was met for fish sampling, an additional set of sites was selected as a contingency. Another subset of 100 sites was re-sampled from the 199 runs and pools identified during habitat sampling using the same selection process as before. Sites that were repeated from the initial subset of 100 were removed. Additionally, since the field crew had begun sampling at this time, sites located in sections that had already been sampled were also removed to ensure good spatial coverage. The first six sites of this subset were selected as the additional set. Ultimately, only one site substitution was required, with RU94 substituted for RU57a. A total of 101 sites were sampled for Silver Shiner.

## **FISH SAMPLING**

Fish sampling was performed between September 21 and October 21, 2022 by two operators (LSL, KDB). The field crew generally sampled from the downstream to upstream-most sites in each branch (main, east, west) of the creek. The upstream-most location of a site was identified as the location where the riffle ended and the run or pool began. A 9.14 x 1.80 m bag seine (3 mm mesh) was used to capture fishes within wadable portions of the site. Three repeat hauls of approximately 10 m were performed in a downstream direction with a two-minute waiting period between each haul. Fishes from each haul were kept in separate temporary aquaria until the three hauls were completed.

## **ENUMERATION OF SILVER SHINER**

At each site, captured fishes were processed separately for each haul. Only adult Silver Shiner were identified and processed. A size cutoff of  $\geq 80$  mm total length (TL) was used to identify adults (age 1-3+) based on a probabilistic age-length key (Burbank et al. 2021). To reduce capture stress and incidental mortalities, fishes not identified as Silver Shiner were released immediately, as were Silver Shiner  $< 80$  mm TL. All adult Silver Shiner were enumerated, and the minimum and maximum TL was recorded per haul. When identification *in situ* was uncertain, the individual was vouchered by taking a digital photograph (Figure S1). No physical vouchers were collected.

## **HABITAT MEASUREMENTS FOLLOWING FISH SAMPLING**

Following fish sampling at each site, habitat measurements were taken within the fish sampling area. A metre stick was used to take three measurements at each site, one at the upstream-most location, one at the downstream-most location, and one at the deepest point of the fish sampling area. At one site, the deepest point was deemed unsafe to measure. Therefore, the deepest location where the field crew could wade safely was measured. An indicator "+" was included in the data to indicate that the true depth exceeded the measured depth. Hydraulic head and wetted width were measured at the deepest point (Stanfield et al. 2017) and the mid-point, respectively, of the fish sampling area.

## **VOUCHER PHOTOGRAPH PROCESSING**

Thirteen voucher photographs were taken during fish sampling and later assessed in the lab. Each field crew member and an additional species expert identified the vouchers separately, focusing on the snout shape and the placement of the dorsal fin origin in relation to the pelvic fin base (Figure S1; Mandrak et al. 2022). Rosyface Shiner (*Notropis rubellus*) was the species most commonly misidentified as Silver Shiner, and the data were updated accordingly following lab verifications. For example, three individuals were identified as Silver Shiner in the field but were later identified as Rosyface Shiner, and these data points were removed. If disagreement in identification occurred, the final decision was based on the identification made by the species expert.

## **SAMPLING PERMITS AND DATA ARCHIVING**

Sampling for this project was conducted under the authority of SARA Permit Number 22-PCAA-00061. Seining was conducted under Standard Operating Protocol GWACC-116, approved by the DFO and Environment and Climate Change Canada Animal Care Committee (operated under the approval of the Canadian Council on Animal Care). Data associated with these collections are housed under the project code "2022-SSSM" in the Biodiversity Science database within the Great Lakes Laboratory for Fisheries and Aquatic Sciences. Every effort has been made to ensure the accuracy of data contained in this report; however, results may be updated as part of ongoing data verification procedures. Data associated with this report may be obtained by contacting the Great Lakes Laboratory for Fisheries and Aquatic Sciences.

# **RESULTS**

## **HABITAT SAMPLING**

During habitat sampling, 112 sites were classified as runs, 87 as pools, 226 as riffles, and 61 as undefinable. Among the 199 measured runs and pools, the minimum mean depth was 0.30 m

and the maximum mean was 0.96 m. Mean depth at approximately 59% of sites was between 0.40 m and 0.60 m (Figure 1).

## **SITE SELECTION**

The probabilistic approach to site selection was weighted to preferentially select deep sites. For example, 26 sites had a mean depth between 0.70 m and 0.80 m, and 69% of these sites were selected for fish sampling (Figure 4). Similarly, 83% of sites with mean depths between 0.80 m and 0.90 m and all sites with depths between 0.90 m and 1.00 m were selected. Overall, 62% of sites > 0.70 m and 44% of sites < 0.70 m were selected for fish sampling.

## **FISH SAMPLING**

In total, 787 adult Silver Shiner  $\geq 80$  mm were captured at 75 of the 101 sampled sites (Figure 5). The maximum TL measured was 135 mm. There was considerable overlap in the depths where adult Silver Shiner were detected and not detected (Figure 6). Adult Silver Shiner were captured at sites with depths ranging from 0.35 m to 1.18 m (based on depths measured post-fish sampling), while sites where adults were not detected ranged in depth from 0.34 m to 0.75 m. Adult Silver Shiner were detected at all sites with a mean depth of  $\geq 0.80$  m ( $n = 14$ ). The maximum number of adult Silver Shiner captured at one site was 63, and the mean depth of this site was 0.61 m (Figure 7). Data collected during habitat sampling and fish sampling are provided in the appendices (Appendix A; Appendix B).

## **HABITAT MEASUREMENTS FOLLOWING FISH SAMPLING**

At sites where fish sampling occurred ( $n = 101$ ), depth was measured during habitat sampling and post-fish sampling (Figure 8). The mean depth of these sites ( $n = 303$  measurements) during habitat sampling was 0.59 m ( $\pm 0.25$  m SD) and post-fish sampling was 0.62 m ( $\pm 0.22$  m SD). For five sites, mean depths ranged from 1.00 m to 1.18 m during post-fish sampling, exceeding the maximum mean depth measured during habitat sampling (0.96 m).

## **ACKNOWLEDGEMENTS**

We thank Robin Gáspárdy for helping with laboratory identification and verification of Silver Shiner. We also thank Robin Gáspárdy, Jason Barnucz, and Carly White for field training, logistics planning, and sampling discussions. Funding for this project was provided by DFO's Species at Risk Program.

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**Table 1.** Water depth (m) and hydraulic head (mm) measurement criteria used to classify sites as riffles, runs, pools, or undefinable (Stanfield et al. 2017).

Habitat	Water depth (m)	Hydraulic head (mm)
Riffle	< 0.3	≥ 4
Run	≥ 0.3	≥ 4
Pool	≥ 0.3	< 4

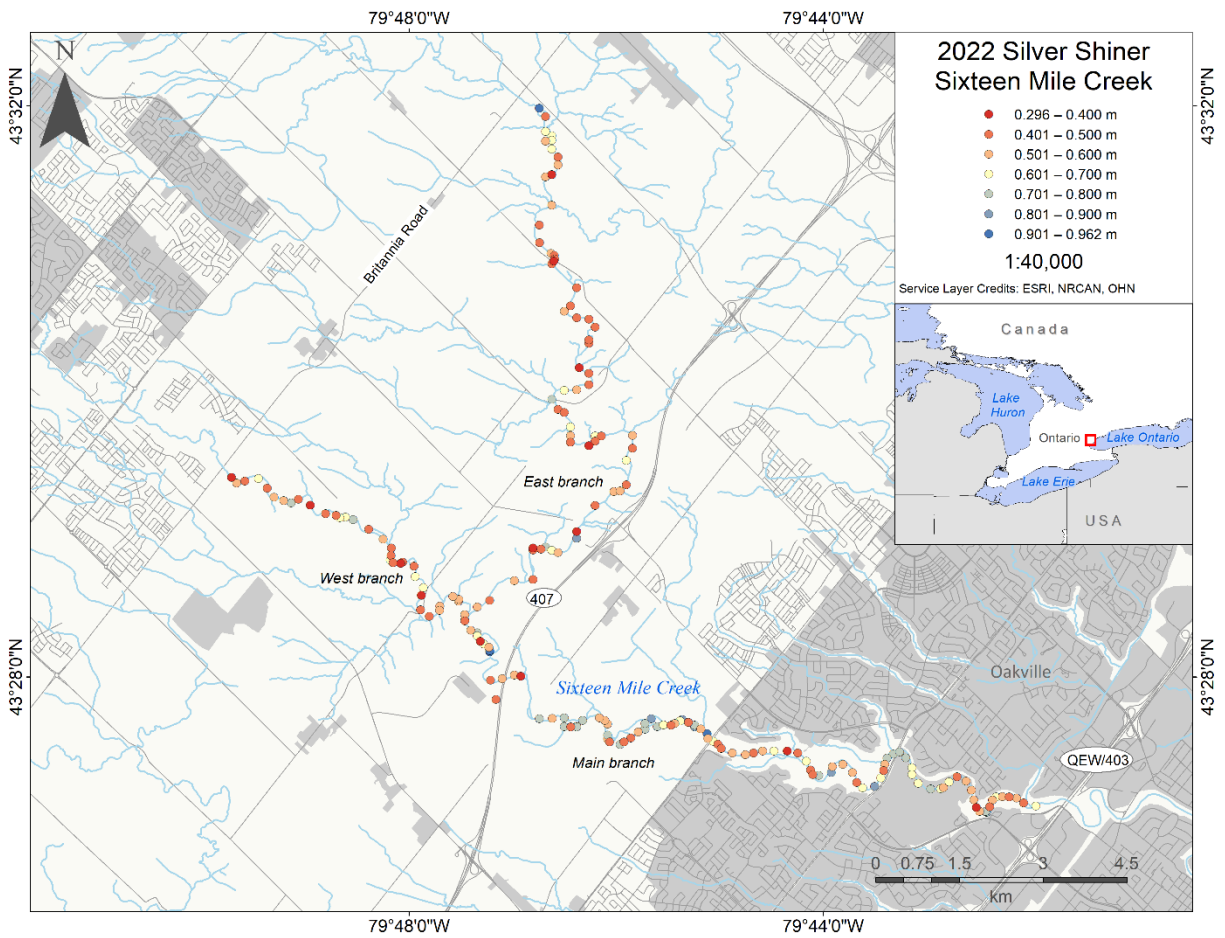
**Table 2.** Sites selected for sampling adult Silver Shiner. Included are site coordinates, mean depths, and predictions of adult species occupancy probability ( $\psi$ ) at each site.

Site ID	Latitude (°)	Longitude (°)	Mean depth (m)	$\psi$
EPO1	43.533078	-79.779308	0.915	0.72
EPO10	43.525329	-79.777086	0.377	0.26
EPO14	43.519445	-79.779492	0.428	0.29
EPO17	43.516136	-79.777128	0.518	0.37
EPO18	43.515884	-79.776586	0.428	0.29
EPO25	43.512118	-79.773146	0.486	0.34
EPO29	43.510000	-79.774233	0.484	0.34
EPO2b	43.530339	-79.778029	0.640	0.48
EPO2c	43.529869	-79.776664	0.684	0.52
EPO3	43.529331	-79.777007	0.652	0.49
EPO38	43.505615	-79.770789	0.499	0.35
EPO4	43.529212	-79.777695	0.533	0.38
EPO42	43.502119	-79.771282	0.425	0.29
EPO46	43.500128	-79.774518	0.605	0.45
EPO47	43.499066	-79.776593	0.734	0.57
EPO48	43.497923	-79.776257	0.457	0.32
EPO49	43.497557	-79.775456	0.446	0.31
EPO50	43.495879	-79.773625	0.606	0.45
EPO51	43.494829	-79.774282	0.504	0.36
EPO57	43.494816	-79.769925	0.657	0.50
EPO6	43.528290	-79.776880	0.613	0.46
EPO60	43.494858	-79.764081	0.530	0.38
EPO61	43.493385	-79.764341	0.480	0.34
EPO62	43.491955	-79.764926	0.620	0.46
EPO66	43.488390	-79.766331	0.519	0.37
EPO70	43.486683	-79.769715	0.401	0.27
ERU19	43.515454	-79.776552	0.452	0.31
MPO17	43.475597	-79.787437	0.499	0.35
MPO21	43.471819	-79.789463	0.786	0.62
MPO26	43.469595	-79.786546	0.914	0.72
MPO29	43.464037	-79.785662	0.469	0.33
MPO31	43.466906	-79.783037	0.588	0.43
MPO34	43.461798	-79.779306	0.749	0.58
MPO37	43.461905	-79.775421	0.702	0.54
MPO38	43.460863	-79.774604	0.774	0.61
MPO40	43.460895	-79.773159	0.612	0.45
MPO43	43.461175	-79.768292	0.591	0.44
MPO44	43.459446	-79.768173	0.595	0.44
MPO46	43.458776	-79.766450	0.702	0.54
MPO4a	43.481823	-79.777641	0.744	0.58

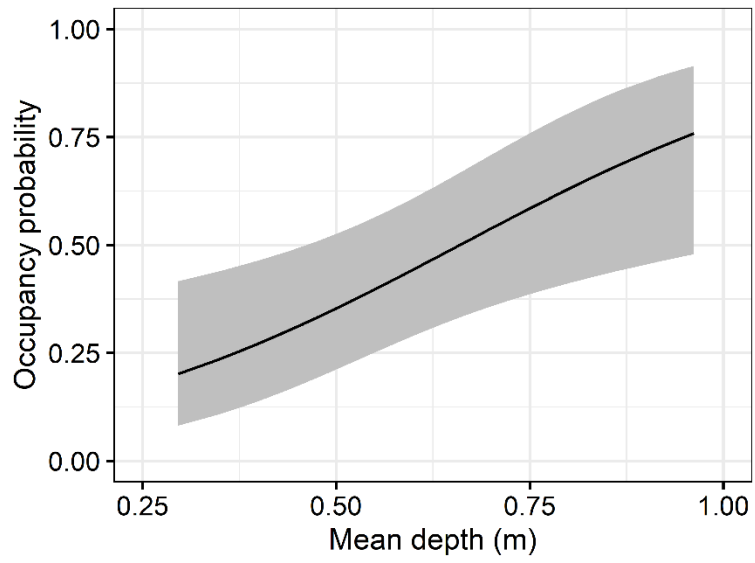
Site ID	Latitude (°)	Longitude (°)	Mean depth (m)	$\psi$
MPO58	43.460837	-79.753752	0.826	0.65
MRU100	43.452313	-79.709048	0.536	0.38
MRU106	43.452649	-79.705421	0.639	0.48
MRU107	43.452694	-79.704458	0.523	0.37
MRU109	43.452508	-79.702145	0.590	0.43
MRU110	43.451950	-79.701015	0.459	0.32
MRU25	43.470147	-79.787119	0.591	0.44
MRU26	43.469748	-79.786600	0.962	0.76
MRU36	43.461828	-79.776901	0.590	0.43
MRU40	43.460843	-79.773417	0.721	0.56
MRU42	43.461901	-79.769336	0.537	0.39
MRU44	43.459867	-79.768306	0.713	0.55
MRU48	43.459541	-79.764279	0.476	0.33
MRU5	43.481587	-79.778741	0.445	0.31
MRU50	43.461211	-79.761762	0.719	0.56
MRU55	43.461224	-79.757207	0.593	0.44
MRU57a	43.461360	-79.755013	0.430	0.30
MRU58	43.461027	-79.754213	0.766	0.60
MRU59	43.460593	-79.752986	0.508	0.36
MRU61	43.459466	-79.751855	0.537	0.39
MRU62	43.459132	-79.751081	0.683	0.52
MRU63	43.458798	-79.750255	0.471	0.33
MRU68	43.458021	-79.743025	0.547	0.39
MRU70	43.458031	-79.739069	0.369	0.25
MRU72	43.456822	-79.736201	0.676	0.52
MRU75	43.455164	-79.733638	0.779	0.61
MRU76	43.455500	-79.732387	0.843	0.67
MRU78	43.456456	-79.730144	0.541	0.39
MRU81	43.453702	-79.726944	0.658	0.50
MRU82	43.453887	-79.725353	0.856	0.68
MRU83	43.454852	-79.724145	0.681	0.52
MRU85	43.456457	-79.723389	0.585	0.43
MRU86	43.457199	-79.723247	0.717	0.55
MRU89	43.457236	-79.720031	0.729	0.57
MRU90	43.456066	-79.719020	0.685	0.52
MRU92	43.454237	-79.717577	0.677	0.52
MRU93	43.453590	-79.715667	0.712	0.55
MRU94	43.453592	-79.714382	0.624	0.47
WPO15	43.485032	-79.809224	0.781	0.61
WPO19	43.480304	-79.803346	0.611	0.45
WPO30	43.475517	-79.791719	0.561	0.41
WPO33	43.473948	-79.790845	0.510	0.36



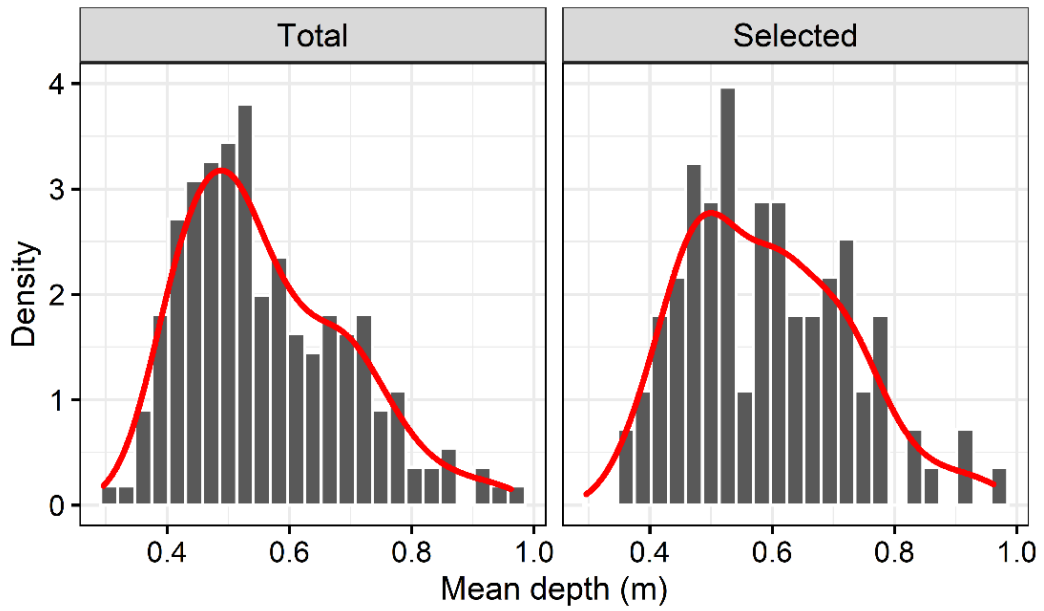
Site ID	Latitude (°)	Longitude (°)	Mean depth (m)	$\psi$
WPO8	43.486997	-79.819408	0.741	0.58
WRU1	43.489983	-79.828554	0.393	0.27
WRU10	43.486735	-79.815865	0.369	0.25
WRU11	43.485726	-79.813423	0.488	0.34
WRU13	43.485284	-79.811120	0.610	0.45
WRU14	43.485324	-79.810237	0.625	0.47
WRU16	43.483907	-79.806486	0.409	0.28
WRU17	43.482756	-79.804141	0.534	0.38
WRU18	43.481741	-79.802840	0.461	0.32
WRU19	43.480827	-79.802854	0.472	0.33
WRU20	43.479999	-79.802569	0.453	0.31
WRU22	43.479619	-79.799187	0.494	0.35
WRU23	43.478375	-79.798644	0.666	0.51
WRU24	43.477082	-79.797679	0.626	0.47
WRU5	43.488722	-79.822797	0.458	0.32
WRU6	43.487669	-79.821702	0.520	0.37
WRU7	43.487273	-79.820163	0.549	0.40
WRU9	43.487439	-79.817783	0.456	0.32



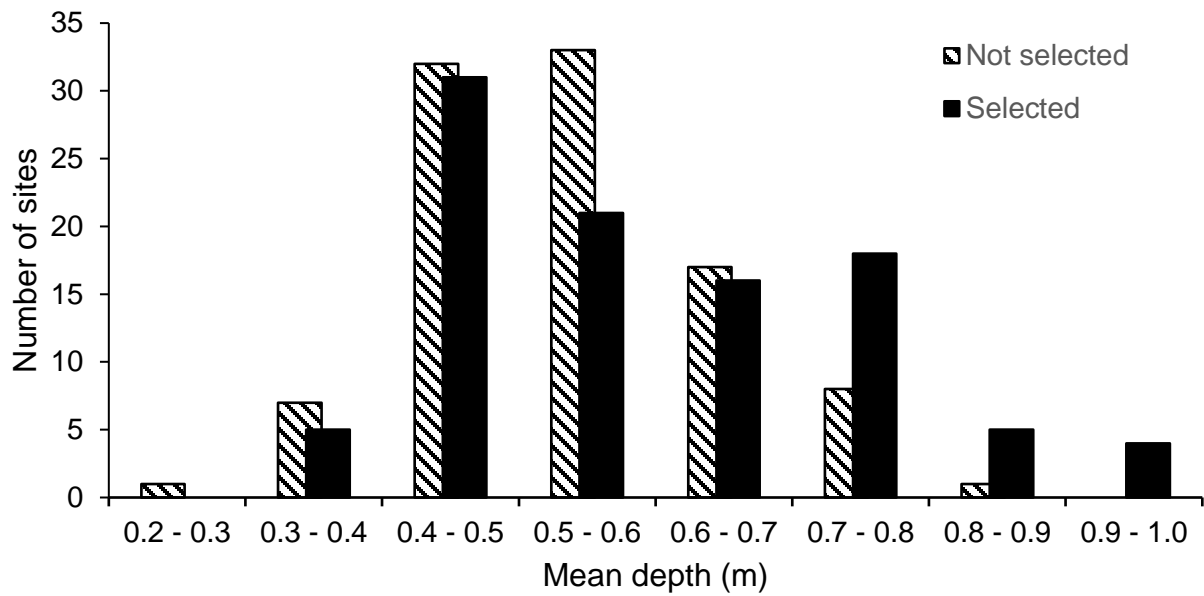
**Figure 1.** Location of runs and pools ( $n = 199$ ) in the main, east, and west branches of Sixteen Mile Creek with depth measurements obtained during habitat sampling.



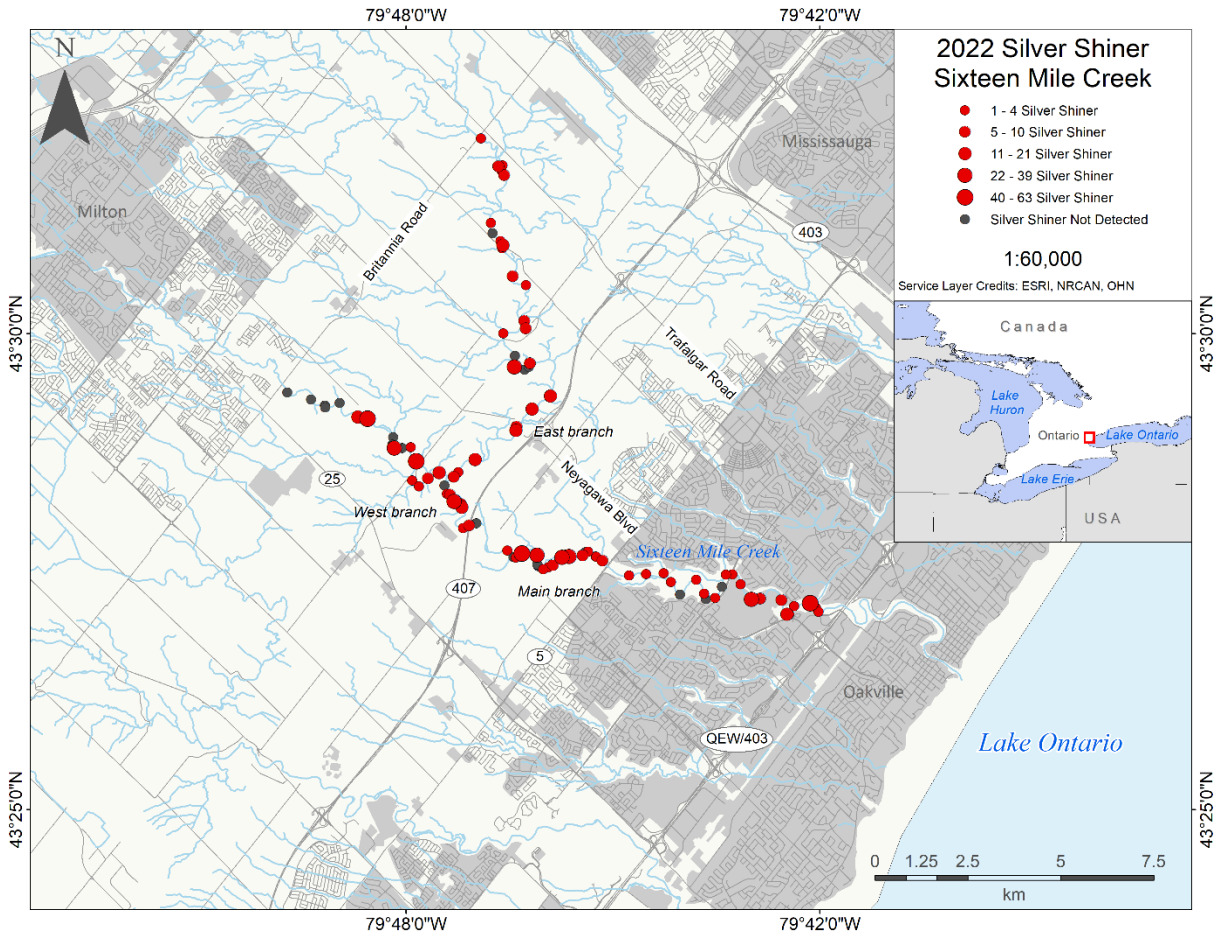
**Figure 2.** Probability of Silver Shiner occupancy in Sixteen Mile Creek as a function of mean depth (m). Shaded region indicates 95% confidence interval. Originally published in Lamothe and Drake (2022).



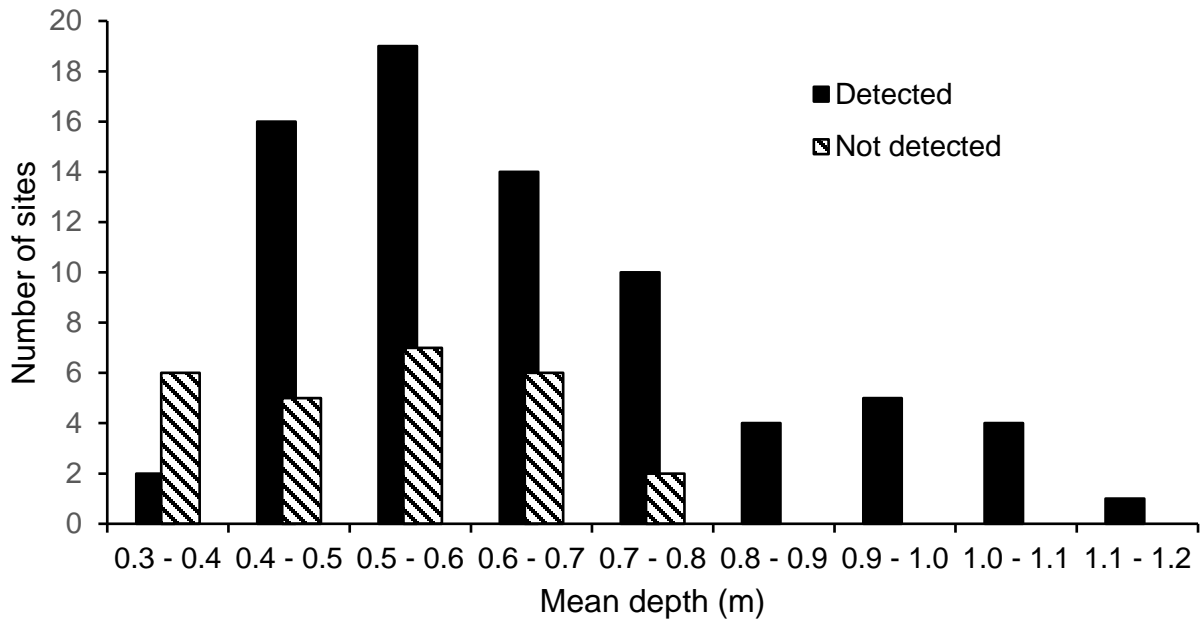
**Figure 3.** Kernel density plot of mean site depth (m) at the 199 runs and pools identified during habitat sampling (Total) versus the 100 sites initially selected for sampling adult Silver Shiner (Selected). Note that one site was substituted for another because of sampling issues.



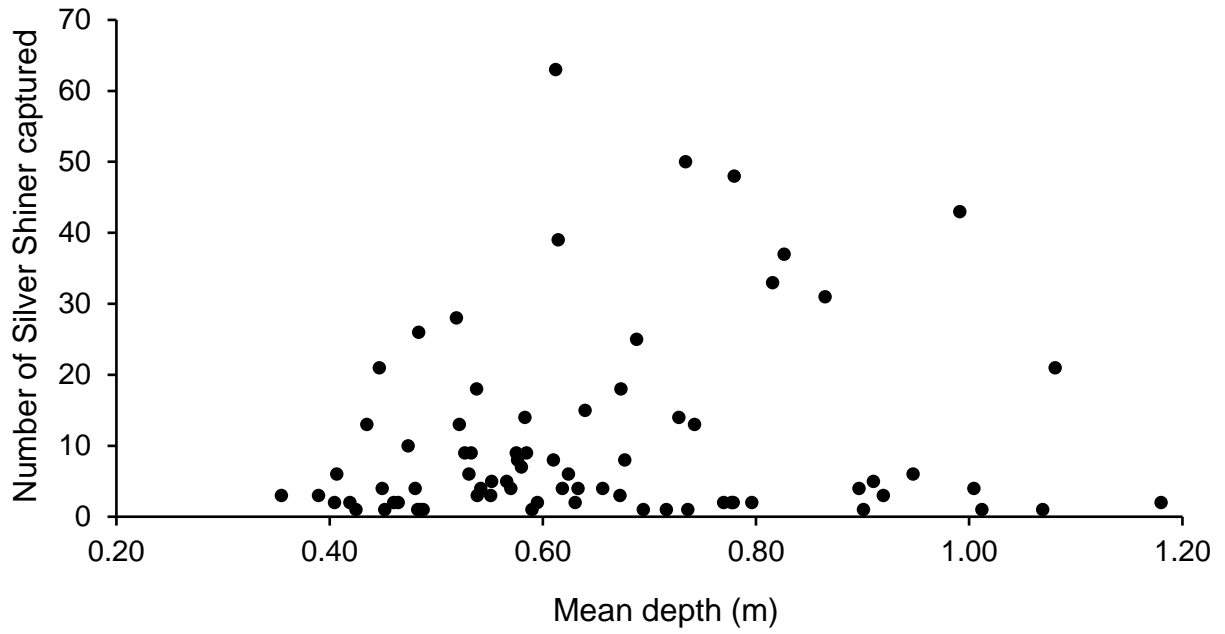
**Figure 4.** Distribution of mean depth (m) at sites that were selected ( $n = 100$ ) or not selected ( $n = 99$ ) for fish sampling. Site selection was based on the probabilistic relationship between Silver Shiner occupancy and mean site depth in runs and pools measured during habitat sampling.



**Figure 4.** Fish sampling location of runs and pools in Sixteen Mile Creek (main, east, and west branches) where adult Silver Shiner were detected (red circles) or not detected (black circles). Symbol sizes represent the number of individuals captured.

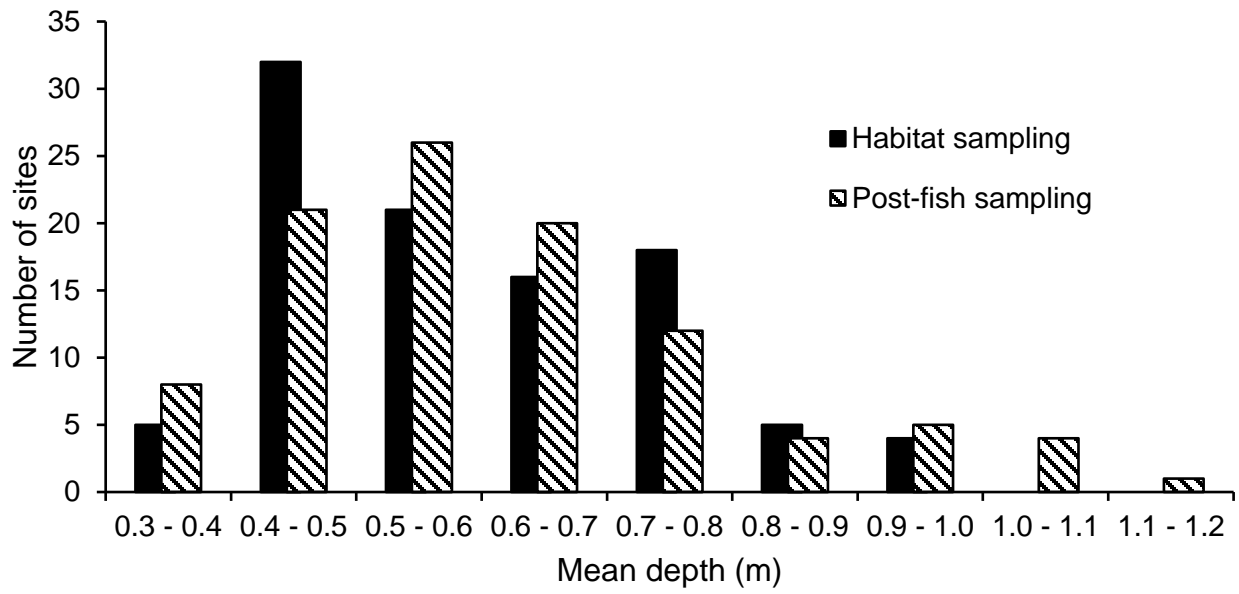


**Figure 5.** Distribution of mean depth (m) at sites where adult Silver Shiner were detected ( $n = 75$ ) or not detected ( $n = 26$ ), based on site depths measured post-fish sampling.

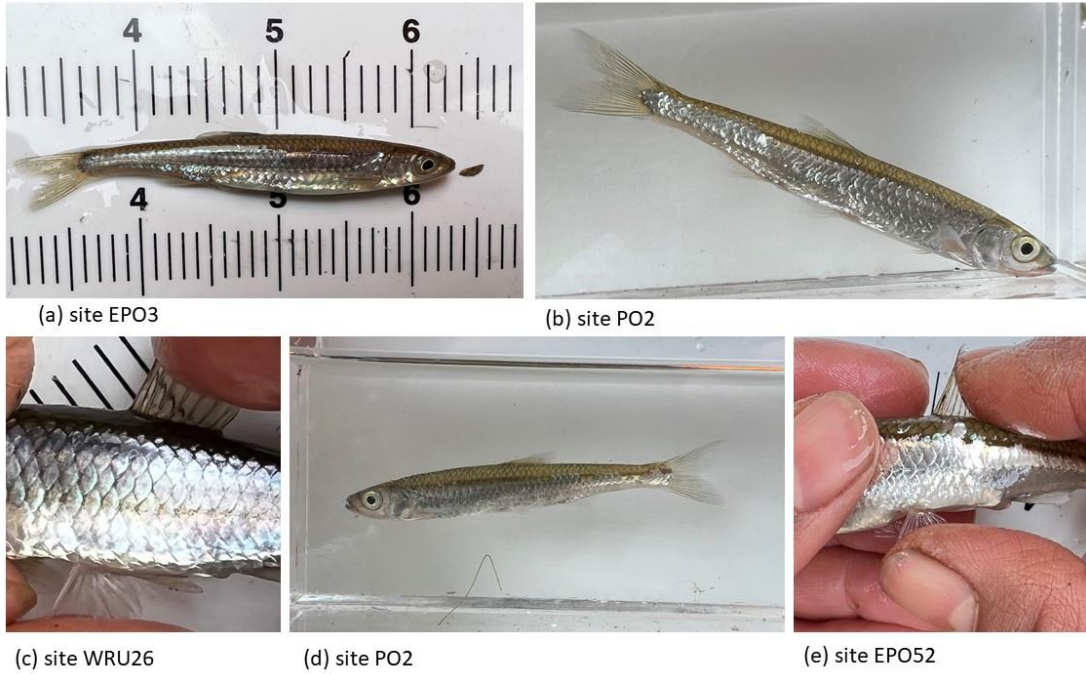


**Figure 6.** Number of adult Silver Shiner ( $n = 787$ ) captured per site as a function of mean depth (m).





**Figure 7.** Distribution of mean site depth (m) where fish sampling occurred. Depth measurements were collected during initial habitat sampling efforts and after fish sampling.



**Figure S1.** Examples of voucher photographs taken during fish sampling. All images were identified as Silver Shiner. Images (c) and (e) show one of the defining features of Silver Shiner, the placement of the dorsal fin origin in relation to the pelvic fin base.

**Appendix A.** Data collected during habitat sampling ( $n = 199$  sites) in Sixteen Mile Creek. Coordinates represent the mid-point of runs and pools

Site ID	Branch	Habitat feature type	Latitude (°)	Longitude (°)	Mean depth (m)	Hydraulic head (mm)	Wetted width (m)
EPO1	East	Pool	43.533078	-79.779308	0.915	0	12.04
EPO10	East	Pool	43.525329	-79.777086	0.377	0	9.95
EPO11	East	Pool	43.525043	-79.777822	0.510	0	8.51
EPO13	East	Pool	43.521760	-79.777222	0.515	0	10.15
EPO14	East	Pool	43.519445	-79.779492	0.428	3	9.81
EPO16	East	Pool	43.517385	-79.778937	0.411	0	15.27
EPO17	East	Pool	43.516136	-79.777128	0.518	1	8.73
EPO18	East	Pool	43.515884	-79.776586	0.428	2	11.57
EPO21	East	Pool	43.514906	-79.776691	0.429	1	14.61
EPO25	East	Pool	43.512118	-79.773146	0.486	0	9.37
EPO29	East	Pool	43.510000	-79.774233	0.484	3	7.89
EPO2a	East	Pool	43.532097	-79.778056	0.481	1	8.00
EPO2b	East	Pool	43.530339	-79.778029	0.640	1	14.34
EPO2c	East	Pool	43.529869	-79.776664	0.684	1	9.18
EPO3	East	Pool	43.529331	-79.777007	0.652	1	5.29
EPO30	East	Pool	43.509382	-79.774695	0.566	0	18.40
EPO31	East	Pool	43.508616	-79.773148	0.456	0	9.85
EPO32	East	Pool	43.508456	-79.770968	0.431	2	12.29
EPO34	East	Pool	43.507523	-79.770256	0.459	0	7.54
EPO37	East	Pool	43.506035	-79.770546	0.400	0	10.70
EPO38	East	Pool	43.505615	-79.770789	0.499	0	11.82
EPO4	East	Pool	43.529212	-79.777695	0.533	0	7.60
EPO42	East	Pool	43.502119	-79.771282	0.425	0	17.08
EPO43	East	Pool	43.500796	-79.771107	0.452	0	10.05
EPO45	East	Pool	43.500211	-79.773365	0.596	1	7.75
EPO46	East	Pool	43.500128	-79.774518	0.605	0	13.17
EPO47	East	Pool	43.499066	-79.776594	0.734	0	10.11
EPO48	East	Pool	43.497923	-79.776257	0.457	1	11.25
EPO49	East	Pool	43.497557	-79.775456	0.446	1	15.54
EPO50	East	Pool	43.495879	-79.773625	0.606	0	12.19
EPO51	East	Pool	43.494829	-79.774282	0.504	0	11.46
EPO52	East	Pool	43.494076	-79.773724	0.479	0	11.17
EPO54	East	Pool	43.493686	-79.771296	0.393	0	7.05
EPO56	East	Pool	43.494203	-79.770325	0.482	0	14.38

Site ID	Branch	Habitat feature type	Latitude (°)	Longitude (°)	Mean depth (m)	Hydraulic head (mm)	Wetted width (m)
EPO57	East	Pool	43.494816	-79.769925	0.657	0	13.02
EPO58	East	Pool	43.494804	-79.768506	0.481	1	5.70
EPO6	East	Pool	43.528290	-79.776880	0.613	0	10.39
EPO60	East	Pool	43.494858	-79.764081	0.530	0	12.11
EPO61	East	Pool	43.493385	-79.764341	0.480	0	12.88
EPO62	East	Pool	43.491955	-79.764926	0.620	0	11.79
EPO64	East	Pool	43.489108	-79.765029	0.431	2	11.22
EPO66	East	Pool	43.488390	-79.766331	0.519	0	12.10
EPO67	East	Pool	43.488300	-79.767333	0.580	2	9.94
EPO7	East	Pool	43.527384	-79.775984	0.469	0	12.23
EPO70	East	Pool	43.486683	-79.769715	0.401	0	12.19
EPO8	East	Pool	43.526459	-79.775741	0.513	0	9.37
ERU19	East	Run	43.515454	-79.776552	0.452	7	NA
ERU20	East	Run	43.515229	-79.776698	0.390	12	NA
ERU41	East	Run	43.502778	-79.772563	0.399	4	NA
MPO1	Main	Pool	43.483664	-79.773286	0.345	1	12.63
MPO10	Main	Pool	43.478049	-79.780219	0.408	0	8.40
MPO103	Main	Pool	43.450858	-79.707371	0.761	3	12.68
MPO12	Main	Pool	43.477903	-79.783295	0.532	0	13.15
MPO17	Main	Pool	43.475597	-79.787437	0.499	0	16.21
MPO18	Main	Pool	43.474827	-79.788535	0.530	3	9.47
MPO2	Main	Pool	43.482818	-79.773487	0.806	0	17.75
MPO20	Main	Pool	43.473321	-79.790738	0.677	1	7.34
MPO21	Main	Pool	43.471819	-79.789463	0.786	0	23.60
MPO22	Main	Pool	43.471477	-79.788673	0.663	1	12.12
MPO26	Main	Pool	43.469595	-79.786546	0.914	0	15.23
MPO29	Main	Pool	43.466037	-79.785662	0.469	3	14.44
MPO3	Main	Pool	43.481210	-79.775546	0.570	0	9.14
MPO30	Main	Pool	43.466468	-79.784649	0.537	2	21.65
MPO31	Main	Pool	43.466906	-79.783037	0.588	2	16.25
MPO34	Main	Pool	43.461798	-79.779306	0.749	1	20.55
MPO37	Main	Pool	43.461905	-79.775421	0.702	0	32.12
MPO38	Main	Pool	43.460753	-79.774581	0.774	1	10.42
MPO40	Main	Pool	43.460895	-79.773159	0.612	2	6.62
MPO41	Main	Pool	43.461584	-79.771791	0.753	0	16.74
MPO43	Main	Pool	43.461175	-79.768292	0.591	0	12.74

Site ID	Branch	Habitat feature type	Latitude (°)	Longitude (°)	Mean depth (m)	Hydraulic head (mm)	Wetted width (m)
MPO44	Main	Pool	43.459446	-79.768173	0.595	0	10.37
MPO46	Main	Pool	43.458776	-79.766450	0.702	0	13.83
MPO49	Main	Pool	43.460578	-79.762461	0.722	0	14.24
MPO4a	Main	Pool	43.481823	-79.777641	0.744	0	9.87
MPO4b	Main	Pool	43.481477	-79.777366	0.674	0	9.31
MPO5	Main	Pool	43.481486	-79.779543	0.499	0	12.93
MPO50	Main	Pool	43.461197	-79.761392	0.869	0	9.99
MPO51	Main	Pool	43.460872	-79.760350	0.796	0	7.78
MPO53	Main	Pool	43.461059	-79.758575	0.721	2	8.07
MPO56	Main	Pool	43.461681	-79.755584	0.861	1	13.81
MPO58	Main	Pool	43.460837	-79.753752	0.826	1	19.33
MPO6	Main	Pool	43.481726	-79.779895	0.296	2	6.35
MPO7	Main	Pool	43.481482	-79.780169	0.568	0	11.51
MRU100	Main	Run	43.452313	-79.709048	0.536	6	NA
MRU101	Main	Run	43.451437	-79.708646	0.378	31	NA
MRU102	Main	Run	43.450957	-79.708095	0.552	19	NA
MRU103	Main	Run	43.450948	-79.707130	0.711	12	NA
MRU104	Main	Run	43.451484	-79.706498	0.410	6	NA
MRU105a	Main	Run	43.452290	-79.706017	0.526	42	NA
MRU105b	Main	Run	43.452290	-79.706017	0.536	24	NA
MRU106	Main	Run	43.452649	-79.705421	0.639	23	NA
MRU107	Main	Run	43.452694	-79.704458	0.523	32	NA
MRU108	Main	Run	43.452642	-79.703361	0.433	56	NA
MRU109	Main	Run	43.452508	-79.702145	0.590	10	NA
MRU110	Main	Run	43.451950	-79.701015	0.459	16	NA
MRU111	Main	Run	43.451583	-79.699035	0.621	10	NA
MRU21	Main	Run	43.472132	-79.790054	0.501	26	NA
MRU23	Main	Run	43.470837	-79.788473	0.388	24	NA
MRU24	Main	Run	43.470525	-79.788019	0.690	7	NA
MRU25	Main	Run	43.470147	-79.787119	0.591	10	NA
MRU26	Main	Run	43.469748	-79.786600	0.962	5	NA
MRU29	Main	Run	43.466304	-79.786846	0.489	5	NA
MRU32	Main	Run	43.466747	-79.781974	0.360	10	NA
MRU36	Main	Run	43.461828	-79.776901	0.590	9	NA
MRU39	Main	Run	43.460831	-79.773931	0.419	9	NA
MRU40	Main	Run	43.460843	-79.773417	0.721	4	NA

Site ID	Branch	Habitat feature type	Latitude (°)	Longitude (°)	Mean depth (m)	Hydraulic head (mm)	Wetted width (m)
MRU42	Main	Run	43.461901	-79.769336	0.537	6	NA
MRU43	Main	Run	43.461584	-79.768480	0.558	5	NA
MRU44	Main	Run	43.459867	-79.768306	0.713	4	NA
MRU45	Main	Run	43.459061	-79.767703	0.488	11	NA
MRU47	Main	Run	43.459084	-79.765375	0.401	15	NA
MRU48	Main	Run	43.459541	-79.764279	0.476	11	NA
MRU49	Main	Run	43.460223	-79.763073	0.579	10	NA
MRU5	Main	Run	43.481587	-79.778741	0.445	4	NA
MRU50	Main	Run	43.461211	-79.761762	0.719	12	NA
MRU52	Main	Run	43.461074	-79.759320	0.691	11	NA
MRU54	Main	Run	43.461043	-79.757796	0.411	4	NA
MRU55	Main	Run	43.461224	-79.757207	0.593	5	NA
MRU56	Main	Run	43.461526	-79.756307	0.646	19	NA
MRU57a	Main	Run	43.461360	-79.755013	0.430	5	NA
MRU57b	Main	Run	43.461360	-79.755013	0.444	51	NA
MRU58	Main	Run	43.461027	-79.754213	0.766	10	NA
MRU59	Main	Run	43.460593	-79.752986	0.508	55	NA
MRU60	Main	Run	43.460024	-79.752363	0.946	25	NA
MRU61	Main	Run	43.459466	-79.751855	0.537	25	NA
MRU62	Main	Run	43.459132	-79.751081	0.683	27	NA
MRU63	Main	Run	43.458798	-79.750255	0.471	33	NA
MRU64	Main	Run	43.458304	-79.749706	0.457	44	NA
MRU65	Main	Run	43.457791	-79.747944	0.506	8	NA
MRU66	Main	Run	43.457589	-79.745839	0.545	37	NA
MRU67	Main	Run	43.457798	-79.744515	0.455	19	NA
MRU68	Main	Run	43.458021	-79.743025	0.547	21	NA
MRU69	Main	Run	43.458001	-79.741211	0.637	22	NA
MRU70	Main	Run	43.458031	-79.739069	0.714	34	NA
MRU71	Main	Run	43.457771	-79.737382	0.435	35	NA
MRU72	Main	Run	43.456822	-79.736201	0.676	39	NA
MRU73	Main	Run	43.455810	-79.735338	0.475	84	NA
MRU74	Main	Run	43.455262	-79.734975	0.466	104	NA
MRU75	Main	Run	43.455164	-79.733638	0.779	24	NA
MRU76	Main	Run	43.455500	-79.732387	0.843	19	NA
MRU77	Main	Run	43.456196	-79.731803	0.554	37	NA
MRU78	Main	Run	43.456456	-79.730144	0.541	57	NA

Site ID	Branch	Habitat feature type	Latitude (°)	Longitude (°)	Mean depth (m)	Hydraulic head (mm)	Wetted width (m)
MRU79	Main	Run	43.455507	-79.728570	0.518	28	NA
MRU80	Main	Run	43.454344	-79.727901	0.500	17	NA
MRU81	Main	Run	43.453702	-79.726944	0.658	6	NA
MRU82	Main	Run	43.453887	-79.725353	0.856	12	NA
MRU83	Main	Run	43.454852	-79.724145	0.681	6	NA
MRU84	Main	Run	43.455745	-79.723550	0.429	20	NA
MRU85	Main	Run	43.456457	-79.723389	0.585	50	NA
MRU86	Main	Run	43.457199	-79.723247	0.717	110	NA
MRU87	Main	Run	43.457664	-79.722287	0.790	11	NA
MRU88	Main	Run	43.457910	-79.721170	0.706	30	NA
MRU89	Main	Run	43.457236	-79.720031	0.729	9	NA
MRU90	Main	Run	43.456066	-79.719020	0.685	10	NA
MRU91	Main	Run	43.455268	-79.718606	0.670	6	NA
MRU92	Main	Run	43.454237	-79.717577	0.677	9	NA
MRU93	Main	Run	43.453590	-79.715667	0.712	5	NA
MRU94	Main	Run	43.453592	-79.714382	0.624	100	NA
MRU95	Main	Run	43.453727	-79.713917	0.529	15	NA
MRU96	Main	Run	43.454399	-79.713111	0.662	21	NA
MRU97	Main	Run	43.455002	-79.711739	0.414	52	NA
MRU98	Main	Run	43.454509	-79.710259	0.540	16	NA
MRU99	Main	Run	43.453436	-79.709392	0.512	10	NA
WPO15	West	Pool	43.485032	-79.809224	0.781	4	8.61
WPO19	West	Pool	43.480304	-79.803346	0.611	3	7.18
WPO21	West	Pool	43.480077	-79.800666	0.424	2	11.52
WPO28	West	Pool	43.474944	-79.794549	0.525	3	13.43
WPO30	West	Pool	43.475517	-79.791719	0.561	3	9.64
WPO33	West	Pool	43.473948	-79.790845	0.510	3	13.04
WPO8	West	Pool	43.486997	-79.819408	0.741	0	9.33
WRU1	West	Run	43.489983	-79.828554	0.393	7	NA
WRU10	West	Run	43.486735	-79.815865	0.369	9	NA
WRU11	West	Run	43.485726	-79.813423	0.488	9	NA
WRU12	West	Run	43.485525	-79.811709	0.412	12	NA
WRU13	West	Run	43.485284	-79.811120	0.610	4	NA
WRU14	West	Run	43.485324	-79.810237	0.625	5	NA
WRU16	West	Run	43.483907	-79.806486	0.409	10	NA
WRU17	West	Run	43.482756	-79.804141	0.534	5	NA

Site ID	Branch	Habitat feature type	Latitude (°)	Longitude (°)	Mean depth (m)	Hydraulic head (mm)	Wetted width (m)
WRU18	West	Run	43.481741	-79.802840	0.461	7	NA
WRU19	West	Run	43.480827	-79.802854	0.472	6	NA
WRU2	West	Run	43.489326	-79.827729	0.501	7	NA
WRU20	West	Run	43.479999	-79.802569	0.453	6	NA
WRU21	West	Run	43.479943	-79.801334	0.355	5	NA
WRU22	West	Run	43.479619	-79.799187	0.494	5	NA
WRU23	West	Run	43.478375	-79.798644	0.666	4	NA
WRU24	West	Run	43.477082	-79.797679	0.626	9	NA
WRU25	West	Run	43.476209	-79.797980	0.372	6	NA
WRU26	West	Run	43.474512	-79.798140	0.485	7	NA
WRU27	West	Run	43.473737	-79.796727	0.441	5	NA
WRU28	West	Run	43.474448	-79.795080	0.582	5	NA
WRU29	West	Run	43.476061	-79.792922	0.568	7	NA
WRU3	West	Run	43.489557	-79.826397	0.489	9	NA
WRU30	West	Run	43.475717	-79.791942	0.568	5	NA
WRU34	West	Run	43.473229	-79.791023	0.434	6	NA
WRU4	West	Run	43.489831	-79.824218	0.647	7	NA
WRU5	West	Run	43.488722	-79.822797	0.458	7	NA
WRU6	West	Run	43.487669	-79.821702	0.520	5	NA
WRU7	West	Run	43.487273	-79.820163	0.549	4	NA
WRU9	West	Run	43.487439	-79.817783	0.456	5	NA



**Appendix B.** Data collected during fish sampling ( $n = 101$ ) in Sixteen Mile Creek. Total Silver Shiner captured only includes adults (total length (TL)  $\geq 80$  mm).

Site ID	Branch	Habitat feature type	Latitude (°)	Longitude (°)	Total Silver Shiner captured	Minimum TL (mm)	Maximum TL (mm)	Mean depth (m)	Wetted width (m)	Hydraulic head (mm)
FEPO1	East	Pool	43.534119	-79.781840	1	81	81	1.012	8.42	1
FEPO14	East	Pool	43.519356	-79.779499	4	80	110	0.480	10.80	0
FEPO16	East	Pool	43.517573	-79.779074	0	NA	0	0.385	16.83	0
FEPO17	East	Pool	43.516173	-79.777114	3	124	131	0.551	9.67	1
FEPO21	East	Pool	43.514915	-79.776738	4	80	87	0.449	14.32	0
FEPO29	East	Pool	43.510003	-79.774189	5	80	102	0.552	7.73	4
FEPO3	East	Pool	43.529418	-79.776637	1	80	80	0.483	4.57	1
FEPO32	East	Pool	43.508469	-79.771011	1	113	113	0.485	12.20	3
FEPO4	East	Pool	43.529239	-79.777710	9	80	128	0.585	8.32	1
FEPO42	East	Pool	43.502212	-79.771363	8	81	124	0.610	16.96	1
FEPO43	East	Pool	43.500847	-79.771044	8	80	113	0.576	10.78	5
FEPO47	East	Pool	43.500026	-79.776446	1	106	106	0.590	9.17	3
FEPO50	East	Pool	43.496089	-79.773681	0	NA	0	0.594	14.11	0
FEPO52	East	Pool	43.494114	-79.773803	39	80	119	0.614	10.40	0
FEPO54	East	Pool	43.493675	-79.771302	0	NA	0	0.421	6.69	1
FEPO56	East	Pool	43.494191	-79.770295	0	NA	0	0.524	14.54	1
FEPO57	East	Pool	43.494784	-79.769996	5	103	112	0.910	14.23	0
FEPO6	East	Pool	43.528479	-79.776854	2	105	108	0.464	8.11	2
FEPO64	East	Pool	43.489075	-79.765099	21	80	118	0.447	11.25	15
FEPO7	East	Pool	43.527682	-79.776273	7	105	111	0.580	8.64	0
FEPO70	East	Pool	43.486768	-79.769556	14	80	115	0.583	14.59	4
FERU19	East	Run	43.515441	-79.776627	13	80	111	0.435	7.89	4
FERU20	East	Run	43.515255	-79.776694	0	NA	0	0.392	9.10	2
FMPO1	Main	Pool	43.483672	-79.773272	6	80	92	0.407	13.03	2
FMPO103	Main	Pool	43.450899	-79.707390	1	81	81	1.069	12.40	0
FMPO12	Main	Pool	43.477908	-79.783305	18	80	91	0.538	15.40	3
FMPO17	Main	Pool	43.475759	-79.787354	4	80	90	0.656	15.95	0
FMPO18	Main	Pool	43.474902	-79.788455	8	80	129	0.677	8.06	2
FMPO2	Main	Pool	43.483030	-79.773435	15	80	91	0.640	20.31	0
FMPO20	Main	Pool	43.473428	-79.790711	0	NA	0	0.495	8.87	2
FMPO21	Main	Pool	43.471783	-79.789329	6	83	112	0.531	23.00	1
FMPO26	Main	Pool	43.469595	-79.786546	21	81	122	1.081	8.52	1
FMPO30	Main	Pool	43.466390	-79.784716	9	82	122	0.533	15.71	2
FMPO31	Main	Pool	43.466812	-79.782995	0	NA	0	0.676	16.14	1
FMPO37	Main	Pool	43.462008	-79.775498	3	82	91	0.672	24.46	7
FMPO41	Main	Pool	43.461506	-79.772009	43	81	122	0.991	21.94	4
FMPO43	Main	Pool	43.461185	-79.768321	28	80	119	0.519	13.24	5

Site ID	Branch	Habitat feature type	Latitude (°)	Longitude (°)	Total Silver Shiner captured	Minimum TL (mm)	Maximum TL (mm)	Mean depth (m)	Wetted width (m)	Hydraulic head (mm)
FMPO44	Main	Pool	43.459490	-79.768182	0	NA	0	0.696	10.86	5
FMPO46	Main	Pool	43.458773	-79.766785	2	84	88	0.779	18.20	1
FMPO49	Main	Pool	43.460793	-79.762308	33	81	123	0.816	17.18	1
FMPO50	Main	Pool	43.461273	-79.761373	4	80	85	0.897	11.47	1
FMPO51	Main	Pool	43.460917	-79.760611	31	80	123	0.865	10.15	2
FMPO56	Main	Pool	43.461848	-79.755998	1	83	83	0.694	14.11	1
FMPO58	Main	Pool	43.460933	-79.753990	1	103	103	0.716	18.56	2
FMRU102	Main	Run	43.450863	-79.707973	14	80	96	0.728	14.78	8
FMRU103	Main	Run	43.450768	-79.707527	4	80	87	0.633	11.42	5
FMRU105b	Main	Run	43.452309	-79.706142	2	89	94	0.595	6.32	14
FMRU109	Main	Run	43.452766	-79.702359	50	80	99	0.734	12.85	7
FMRU110	Main	Run	43.452016	-79.700868	2	84	89	0.419	14.71	28
FMRU111	Main	Run	43.451313	-79.700243	4	85	90	0.570	12.88	13
FMRU21	Main	Run	43.471968	-79.790077	1	82	82	0.488	9.06	7
FMRU24	Main	Run	43.470560	-79.788354	25	80	94	0.688	6.80	13
FMRU25	Main	Run	43.470044	-79.786870	18	80	122	0.673	9.47	7
FMRU26	Main	Run	43.469719	-79.786591	2	81	90	1.180	7.231	6
FMRU29	Main	Run	43.465938	-79.786171	2	82	82	0.460	8.34	8
FMRU39	Main	Run	43.460862	-79.773988	0	NA	0	0.432	7.42	16
FMRU40	Main	Run	43.460777	-79.773467	1	90	90	0.736	7.66	5
FMRU43	Main	Run	43.461579	-79.768591	0	NA	0	0.522	15.32	7
FMRU44	Main	Run	43.459602	-79.768245	0	NA	0	0.748	9.44	10
FMRU45	Main	Run	43.459318	-79.768029	0	NA	0	0.610	7.11	12
FMRU47	Main	Run	43.459082	-79.765568	1	83	88	0.452	7.45	21
FMRU48	Main	Run	43.459451	-79.764454	9	80	87	0.527	9.20	27
FMRU55	Main	Run	43.461149	-79.757278	6	80	83	0.947	6.66	5
FMRU56	Main	Run	43.461720	-79.756665	0	NA	0	0.577	10.9	13
FMRU58	Main	Run	43.460980	-79.754154	0	NA	0	0.610	18.44	7
FMRU60	Main	Run	43.460253	-79.752487	6	80	88	0.624	6.38	13
FMRU66	Main	Run	43.457655	-79.746086	2	84	86	0.770	9.62	19
FMRU69	Main	Run	43.457923	-79.741967	2	82	85	0.796	9.36	9
FMRU71	Main	Run	43.458060	-79.737703	3	83	86	0.390	15.03	12
FMRU72	Main	Run	43.456496	-79.735949	4	81	115	0.618	15.92	11
FMRU75	Main	Run	43.454326	-79.733756	0	NA	0	0.544	10.93	5
FMRU78	Main	Run	43.456905	-79.729832	1	82	82	0.425	14.25	10
FMRU80	Main	Run	43.454501	-79.727961	2	81	87	0.630	14.31	2
FMRU81	Main	Run	43.453531	-79.727548	0	NA	0	0.633	14.91	4
FMRU82	Main	Run	43.453736	-79.725230	1	80	80	0.901	14.80	4
FMRU84	Main	Run	43.455694	-79.723620	0	NA	0	0.340	16.05	NA

Site ID	Branch	Habitat feature type	Latitude (°)	Longitude (°)	Total Silver Shiner captured	Minimum TL (mm)	Maximum TL (mm)	Mean depth (m)	Wetted width (m)	Hydraulic head (mm)
FMRU87	Main	Run	43.457831	-79.722655	4	80	135	1.004	15.36	0
FMRU88	Main	Run	43.457871	-79.721108	3	83	89	0.919	13.3	4
FMRU90	Main	Run	43.456122	-79.719092	2	86	96	0.777	11.00	4
FMRU93	Main	Run	43.453444	-79.716484	37	80	129	0.826	10.96	5
FMRU94	Main	Run	43.453595	-79.714358	9	81	96	0.575	10.90	13
FMRU99	Main	Run	43.453344	-79.709273	10	80	98	0.474	15.51	6
FWPO15	West	Pool	43.485060	-79.809291	63	83	123	0.612	10.07	0
FWPO21	West	Pool	43.479979	-79.800900	0	NA	0	0.370	11.43	3
FWPO8	West	Pool	43.487083	-79.819544	0	NA	0	0.718	12.25	2
FWRU1	West	Run	43.489702	-79.828710	0	NA	0	0.395	8.64	4
FWRU10	West	Run	43.487877	-79.816020	0	NA	0	0.363	8.18	5
FWRU12	West	Run	43.485372	-79.811669	13	92	129	0.522	7.53	8
FWRU13	West	Run	43.485311	-79.811368	2	93	94	0.405	8.15	3
FWRU18	West	Run	43.481873	-79.803095	0	NA	0	0.451	7.03	3
FWRU19	West	Run	43.480550	-79.803282	0	NA	0	0.561	8.25	10
FWRU20	West	Run	43.479930	-79.802794	26	80	113	0.484	8.40	5
FWRU22	West	Run	43.480088	-79.798851	4	81	115	0.542	7.02	4
FWRU23	West	Run	43.477623	-79.797543	48	80	131	0.780	9.27	8
FWRU24	West	Run	43.477164	-79.797658	0	NA	0	0.672	4.84	5
FWRU26	West	Run	43.474281	-79.798538	3	112	114	0.355	9.79	6
FWRU27	West	Run	43.473234	-79.796871	3	101	116	0.538	9.07	4
FWRU28	West	Run	43.474655	-79.794698	5	83	95	0.566	12.17	10
FWRU30	West	Run	43.475637	-79.792013	13	80	94	0.742	7.81	4
FWRU5	West	Run	43.488471	-79.822953	0	NA	0	0.493	8.36	8
FWRU7	West	Run	43.487435	-79.819577	0	NA	0	0.557	9.21	2