

Targeted sampling for Pugnose Minnow (*Opsopoeodus emiliae*) in the Canard River, Ontario, 2018

Robin C. Gáspárdy, Jason Barnucz, and D. Andrew R.
Drake

Ontario and Prairie Region
Fisheries and Oceans Canada
P.O. Box 5050, 867 Lakeshore Road
Burlington, ON
L7S 1A1

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Central and Arctic Region
Fisheries and Oceans Canada
P.O. Box 5050, 867 Lakeshore Road
Burlington, ON
L7S 1A1

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ABSTRACT

Gáspárdy, R.C., Barnucz, J., and Drake, D.A.R. 2020. Targeted sampling for Pugnose Minnow (*Opsopoeodus emiliae*) in the Canard River, Ontario, 2018. Can. Data Rep. Fish. Aquat. Sci. 1305: v + 51 p.

Targeted sampling for Pugnose Minnow (*Opsopoeodus emiliae*), a species listed as Threatened under Canada's *Species at Risk Act*, was undertaken in the Canard River, Ontario during 2018. Sampling occurred in areas where Pugnose Minnow was previously detected between 2013 and 2017, as well as a 10 km, previously unfished area upstream of previous detections. Thirty-three sites (consisting of 99 hauls) were fished by depletion seining and forty-one sites (consisting of 123 trawls) were fished by pelagic trawl. A total of 19,523 fishes, representing 37 species, were captured using both gears. Abundant and frequently occurring species were Gizzard Shad (*Dorosoma cepedianum*), Bluegill (*Lepomis macrochirus*), *Lepomis* sp., and Emerald Shiner (*Notropis atherinoides*). A total of 294 Pugnose Minnow were captured (93 in seines; 201 in trawls; pooled detection at 35% of sites), representing the largest known collection of the species in Canada. Pugnose Minnow ranged in total length between 18 and 55 mm, likely representing two or more year classes. Habitat features were consistent with previous descriptions of the river and included warm, generally turbid waters mostly void of aquatic vegetation. Where aquatic vegetation occurred, emergent plants were common, especially American lotus (*Nelumbo lutea*), water lilies, and European common reed (*Phragmites australis*), with submerged wild celery (*Vallisneria spiralis*) observed in some locations. Sampling in 2018 has increased the known range and upstream distribution of Pugnose Minnow in the Canard River approximately two-fold.

RÉSUMÉ

Gáspárdy, R.C., Barnucz, J., and Drake, D.A.R. 2020. Targeted sampling for Pugnose Minnow (*Opsopoeodus emiliae*) in the Canard River, Ontario, 2018. Can. Data Rep. Fish. Aquat. Sci. 1305: v + 51 p.

Un échantillonnage ciblé du petit-bec (*Opsopoeodus emiliae*), une espèce inscrite comme menacée en vertu de la *Loi sur les espèces en péril* du Canada, a été entrepris dans la rivière Canard, en Ontario, en 2018. Il a eu lieu dans des zones où le petit-bec avait déjà été détecté entre 2013 et 2017, ainsi que dans une zone de 10 km, non pêchée auparavant, en amont des sites des détections précédentes. L'échantillonnage a été réalisé selon la méthode de la pêche par voie d'épuisement à la senne dans 33 sites (représentant 99 traits) et au chalut pélagique dans 41 sites (représentant 123 chaluts). Au total, les deux engins ont permis de capturer 19 523 poissons, de 37 espèces. Les espèces abondantes et fréquentes étaient l'alose gésier (*Dorosoma cepedianum*), le crapet arlequin (*Lepomis macrochirus*), des espèces de crapets (*Lepomis* sp.) et le méné émeraude (*Notropis atherinoides*). En tout, 294 petits-becs ont été capturés (93 à la senne, 201 au chalut, détection groupée à 35 % des sites), ce qui représente le plus grand prélèvement connu de l'espèce au Canada. La longueur totale des petits-becs variait entre 18 et 55 mm, correspondant probablement à deux classes d'âge ou plus. Les caractéristiques de l'habitat étaient conformes aux descriptions précédentes de la rivière : des eaux chaudes, généralement turbides et pour la plupart dépourvues de végétation aquatique. Lorsqu'il y avait de la végétation aquatique, les plantes émergentes étaient communes, en particulier le lotus jaune d'Amérique (*Nelumbo lutea*), les nénuphars et le roseau commun d'Europe (*Phragmites australis*); de la vallisnérie d'Amérique (*Vallisneria spiralis*) submergée a été observée à certains endroits. L'échantillonnage de 2018 a permis de multiplier par deux environ l'aire de répartition connue et la répartition en amont du petit-bec dans la rivière Canard.

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* (2002) (SARA). 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 better understanding 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 to provide a medium for archiving data associated with sampling SARA-listed fishes and their habitat.

This data report summarizes targeted field sampling by DFO in 2018 to better understand the distribution and abundance Pugnose Minnow (*Opsopoeodus emiliae*) in the Canard River, Ontario. Pugnose Minnow is a small cyprinid that has been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Threatened (COSEWIC 2012) and has been listed as Special Concern under SARA since 2003 (Edwards and Staton 2009). The range of Pugnose Minnow in Canada is limited to the Sydenham River, the Detroit River, and Lake St. Clair and their tributaries. Prior to 2013, detections of Pugnose Minnow in Canada were known from the North Sydenham River, the Sydenham River (East Branch), East Otter Creek, Maxwell Creek, Whitebread Drain, Little Bear Creek, MacDougall Drain, Chenail Ecarté, Lake St. Clair, the Detroit River, the Canard River, and the Thames River (Edwards and Staton 2009; COSEWIC 2012). Extirpation of the species is assumed in MacDougall Drain and the Thames River (Edwards and Staton 2009; COSEWIC 2012).

In 2013, DFO's Asian Carp Program detected Pugnose Minnow in the Canard River, the largest Canadian subwatershed of the Detroit River, during routine surveillance activities (Marson et al. 2014, Marson et al. 2016, Marson et al. 2018, Colm et al. 2018, Colm et al. 2019). Subsequent sampling by the Asian Carp Program detected 66 Pugnose Minnow in the Canard River between 2013 and 2017 (Figure 1), with detections occurring via boat electrofishers, mini fyke nets, and seines at 24 of 195 sampling sites (DFO, unpublished data). These captures represent the most consistent detections of Pugnose Minnow in Canada in recent years. In an effort to better understand the distribution, abundance, and habitat of Pugnose Minnow in the Canard River, targeted sampling of Pugnose Minnow was undertaken by DFO's Biodiversity Science Laboratory in 2018. The goals of sampling in 2018 were: 1) to expand the spatial coverage of sampling relative to 2013 – 2017 to better understand the upstream extent of Pugnose Minnow in the Canard River; 2) to evaluate the relationship between Pugnose Minnow detections and environmental conditions, including the potential role of turbidity and aquatic vegetation; and, 3) to determine the ability of additional gears (pelagic trawls) to detect the species. Sampling was also conducted to evaluate the composition of the Canard River fish assemblage and better understand aquatic habitat features of this drainage.

METHODS

STUDY SYSTEM

The Canard River, located in central and western Essex County, has a drainage area of 348 km² and joins the Detroit River downstream of LaSalle, Ontario. The Canard River drainage is dominated by agricultural activity, with only 9% of drainage area composed of urban or rural-residential use (Rahman et al 2012). Recent investigations have indicated frequent periods of poor water quality, with elevated levels of suspended solids, aluminum, iron, lead, and copper

(Bejankiwar 2009). Total phosphorous, nitrate, and ammonia have frequently exceeded Provincial Water Quality Objectives (Bejankiwar 2009). Previous sampling by DFO's Asian Carp Program has characterized the Canard River as a relatively shallow (< 1.5 m), slow-flowing, turbid tributary that contains both submergent and emergent vegetation. Despite drainage basin modifications and water quality concerns, over 50 fish species have been detected from the Canard River subwatershed, including four SARA-listed species (Pugnose Minnow; Pugnose Shiner (*Notropis anogenus*); Grass Pickerel (*Esox americanus vermiculatus*); and, Spotted Sucker (*Minytrema melanops*)(Fishnet2 Portal, 2019).

SITE SELECTION

Sites were selected based on two criteria. First, efforts were made in 2018 to re-sample locations where Pugnose Minnow was detected during 2013 – 2017 (Figure 1, hereafter referred to as resampled sites). Previous detections of Pugnose Minnow were located in the section of the Canard River between an upstream boundary of the Essex Terminal railway that bisects the river (located downstream of North Townline Road), and a downstream boundary of the confluence with the Detroit River (Figure 1). The majority of 2013-2017 detections were re-sampled in 2018 (Figure 2; Appendix 1); however, in some cases, sites were inaccessible due to water depth and high densities of American lotus (*Nelumbo lutea*). Second, efforts were made to increase the geographic coverage of sampling in the Canard River, which involved: 1) additional sites in the 2013 – 2017 reach; and, 2) sampling within an additional 10 km reach of the Canard River located upstream of the ETR railway (both groups hereafter referred to as systematic sites). Systematic sites were chosen to ensure that different depths, levels of turbidity, and macrophyte conditions were encountered during 2018. The initial assessment of depth, turbidity, and macrophytes was made visually by field crews prior to site selection, but detailed habitat sampling occurred following fish sampling. Efforts were made to ensure: 1) a distance of at least 200 m between re-sampled and systematic sites, and 2) good spatial coverage of sites within this reach of the Canard River with at least one site every 2 km. Seining was conducted where water depths were 1.2 m or less, which typically occurred at shoreline areas; however, many sites initially targeted for seining were greater than 1.2 m. These and other areas (open water areas, deep areas alongside American lotus, areas near seining locations) were sampled with a pelagic trawl.

FISH ASSEMBLAGE SAMPLING

Depletion Seining

Depletion seining involved making an enclosure using a 1.8 m tall and 22.9 m long straight seine net with a mesh size of 3 mm, utilizing the shoreline as the fourth side of the enclosure and only enclosing the sampling/wadeable area to be seined; this enclosure size may vary depending on available sampling area and, on average, the sampled area was approximately 92 m² (Table 1). The enclosure was held open and upright with the use of metal rebar. Fishes within the enclosure were sampled using a 9.14 m x 1.8 m bag seine with a mesh size of 3 mm. Three successive seine hauls were completed within the enclosure and each haul covered the enclosure area. Captured fishes were removed from the seine and were held in bankside aquaria until processing occurred.

Pelagic Trawling

Pelagic trawling occurred with the deployment of a Mamou trawl. The forward sections of the trawl were constructed of 38 mm high-density, polyethylene stretched mesh, which runs from the head rope (float line) to 2 m back into the body of the trawl. The remainder of the trawl consisted of 4 mm polyester knotless mesh. During operation, the net was opened by a pair of surface floating doors (0.6 m long x 0.3 m wide). Sampling with the Mamou trawl involved operating the research vessel in a backwards direction and towing the trawl off the bow of the vessel for a distance of 100 m, aiming for consistent boat speed of 2-2.5 km/h. Individual trawl times were recorded for subsequent effort calculations. Trawling was repeated three times, in close succession, over the same fished area. As with seining, captured fishes were removed from the trawl and held in aquaria until processing occurred.

Enumeration of Fishes

Fishes were processed separately based on the order of each sampling pass (seine haul or trawl tow), which allowed species composition and abundance to be partitioned into the first, second, or third sampling pass at each sampling site. Captured fishes were identified to species level (where possible), enumerated, and the minimum and maximum total length, per species, was recorded per haul/tow. In addition, individual total lengths (mm) were taken for Pugnose Minnow. At least one representative specimen of each species captured at each sampling site was vouchered, either by preservation in 10% formalin or digital photograph, for subsequent species identification in the laboratory. Additionally, specimens that could not be identified to species *in situ*, as well as small (~< 40 mm) Pugnose Minnow and other sampling mortalities, were retained for laboratory identification.

HABITAT SAMPLING

Aquatic habitat variables were measured at the midpoint of the sampling site after fishes were processed and released. Surface water temperature (°C), conductivity (µS), turbidity (NTU), and dissolved oxygen (mg/L) were measured approximately 0.2 m beneath the water's surface using a YSI EX02 Multiparameter Sonde, which was deployed and allowed to stabilize for approximately 1 minute before measurements were recorded. Water clarity (cm) was measured using a 120 cm Fieldmaster Turbidity Tube. Air temperature (°C) was measured using a Kestrel 3000 Wind Meter. Substrate composition within the seined area was analyzed by obtaining a handful of bed material within the center of the site, or with a Petite Ponar dredge from the boat at the center of the trawl transect. The percent composition of each substrate type was based on the median particle diameters derived from Bain's (1999) modified Wentworth substrate classification: clay (<0.005 mm), silt (0.005–0.05 mm), sand (0.05–2 mm), gravel (2–65 mm), cobble (65–250 mm), boulder (250–4000 mm), bedrock (>4000 mm, solid unweathered rock), hardpan (compacted layer of soil), rubble (broken manmade material), and organic (plant and animal material, excluding mussels). Channel depth (m) was measured in three representative locations within the boundaries of the seined area (deep, shallow, and mid-depth) using a metre stick, or at the start, mid-point, and end-point of the trawling transect using a Laylin Speedtech SM-5 Depthmate portable depth sounder or metre stick. Stream velocity (m/s) at sites in the Canard River was too slow to be detectable by a Swiffer 2100 Current velocity meter and was therefore recorded as no flow present. Wetted stream channel width (m) was measured at the midpoint of the seining site perpendicular to the bank, using a Nikon Laser 1200S waterproof laser range finder. Site location (latitude, longitude) was determined using a Garmin Montana 600 handheld GPS unit using a Backroads Mapbook Ontario GPS chip.

Aquatic macrophytes were classified using a visual assessment in which the field crew assessed the percent composition of the following vegetation classes within the sample area to a total of 100%: open water, emergent vegetation, submerged vegetation, and floating vegetation. The dominant species of vegetation was identified and recorded, as well as all other vegetation species present within the sampling area.

Riparian vegetation was assessed visually by determining the percent composition of riparian vegetation types (deciduous, coniferous, herbaceous, shrubs, or none) occurring in the riparian zone directly adjacent to the sampling site.

SAMPLING PERMITS AND DATA ARCHIVING

Sampling for this project was conducted under Species at Risk Act Permit Number 18-PCA-00037. Trawling and seining were conducted under Standard Operating Protocol GWACC-113 and 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 the collections in this report are housed under the project code “2018-PNM-CNR” 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, species identities and other sampling results may be revised as part of a long-term data archiving process conducted in partnership with the Royal Ontario Museum. Data associated with this report may be obtained by contacting the Great Lakes Laboratory for Fisheries and Aquatic Sciences.

RESULTS

FISH ASSEMBLAGE SAMPLING

Pooled Catch Results

Seventy-four sites were sampled in the Canard River between July 10 and August 10, 2018 using depletion seining (33 sites, 99 seine hauls) and pelagic trawling (41 sites, 123 tows) (Table 1, Figure 2, Appendix 1). A total of 19,523 fishes representing 37 species (not including fishes identified only to family or genus) were captured using seines or trawls, including 294 Pugnose Minnow, which were detected at 26 sampling sites (Table 2, Figure 3, Appendix 2). Detections of Pugnose Minnow in 2018 occurred both within and upstream of the known range of the species based on 2013 – 2017 sampling (Figure 2). Detections in 2018 have increased the known range and upstream distribution of Pugnose Minnow in the Canard River approximately two-fold, relative to 2013 – 2017 sampling. Pugnose Minnow was the 8th most abundant species captured (Table 2, Figure 4) and was detected at 35% of sites. Overall, the total length of captured Pugnose Minnow was between 18 and 55 mm, with an average total length of 32 mm (Table 1, Figure 7, Appendix 3). Total lengths of Pugnose Minnow are likely indicative of multiple year classes. The most abundant species captured based on pooled data were Gizzard Shad (*Dorosoma cepedianum*), Bluegill (*Lepomis macrochirus*), *Lepomis* sp. (Young-of-Year sunfish that could not be identified to species), and Emerald Shiner (*Notropis atherinoides*). The most frequently occurring species based on pooled catch data were Gizzard Shad (detected at 92% of sampling sites), YOY Sunfish (86% of sites), Bluegill (78% of sites), Emerald Shiner (70% of sites), and Golden Shiner (*Notemigonus crysoleucas*, 41% of sites; Appendix 2). Mean catch per unit effort (CPUE) overall was 87.94 fishes/sampling pass. Mean CPUE was slightly higher for seining (92.73 fishes/haul) than for trawling (84.09 fishes/tow),

however, the mean area sampled with depletion seining was 92.1 m² while mean area sampled with the pelagic trawl was 296.3 m² (Table 1).

Seine Results

A total of 9,180 fishes representing 32 species were captured during seining between July 10 and July 18, 2018, including 93 Pugnose Minnow, which were detected at 15 of the seine sites (Table 1, Appendix 2). The most abundant species captured during seining were Gizzard Shad, *Lepomis* sp. (YOY Sunfish), *Pomoxis* sp. (YOY Crappie), *Centrarchid* family (YOY Sunfish and Bass family), Bluegill, and Golden Shiner (Table 2, Figure 5). Pugnose Minnow was the 8th most-abundant species captured by seine. The most frequently occurring species across sites were Gizzard Shad and YOY Sunfish (each detected at 91% of the sites), Bluegill (82% of the sites), Golden Shiner (58% of the sites), Emerald Shiner (55% of the sites), and Pugnose Minnow (45% of the sites). Seining captured ten species that were not captured during pelagic trawling efforts (Table 2). The total length of Pugnose Minnow captured by seining were between 18 and 55 mm, with an average total length of 29 mm (Table 1, Figure 8, Appendix 3).

Pelagic Trawl Results

A total of 10,343 fishes representing 27 species were captured during trawling between July 23 and August 10, 2018, including 201 Pugnose Minnow, which were detected at 11 of the trawl sites (Table 1, Appendix 2). The most abundant species detected by pelagic trawl were Bluegill, Gizzard Shad, Emerald Shiner, YOY Sunfish, and Mimic Shiner (*Notropis volucellus*). Pugnose Minnow was the 7th most abundant species captured by Pelagic Trawl (Table 2, Figure 6). The most frequently occurring species across trawling sites were Gizzard Shad (detected at 93% of sites), Emerald Shiner and YOY Sunfish (83% of the sites each), Bluegill (76% of sites), and Mimic Shiner (56% of sites). Pugnose Minnow was the 9th most frequently detected species, occurring at 27% of trawling sites. Pelagic trawling detected five species that were not detected during seining (Table 2). The total lengths of Pugnose Minnow captured by trawling were between 22 and 53 mm, with an average total length of 33 mm (Table 1, Figure 8, Appendix 3).

HABITAT SAMPLING

Overall, the mean surface water temperature was 26.39°C (range 22.93 - 30.01°C), mean dissolved oxygen was 6.81 mg/L (range 1.33 - 11.38 mg/L), mean pH was 8.31 (range 7.68 - 11.38), and mean conductivity was 628.58 µS (Table 3, Appendix 4). Conductivity was highly variable, with a minimum value of 226.30 µS and a maximum value of 1557.5 µS. The grand mean of site depth was 1.11 m (range: 0.67 – 1.92 m), with mean depth at seine sites of 0.94 m (range 0.40 - 1.17 m) and 1.24 m at trawling sites (range 0.55 – 2.41 m). Water clarity was generally low with a mean turbidity of 26.78 NTU and mean Secchi tube depth of 0.24 m; however, turbidity ranged between 3.17 NTU and 57.56 NTU and Secchi tube depths were between 0.10 m and 1.07 m (Table 3). Silt, clay, and sand were the most frequently occurring dominant substrate; silt, organic, clay, and sand, substrates had the highest mean percent composition of 47%, 17%, 13%, and 13%, respectively (Table 4).

Aquatic vegetation at sampling sites was generally sparse, because areas dominated by floating vegetation (American lotus and water lilies) were generally too dense to be sampled by either seine or trawl. The dominant aquatic vegetation classes were open water (92% of sites), submerged (7%), and floating (1%), and the average percent composition across all sites was 80% Open water, 8% submerged, 8% floating, and 4% emergent (Table 5a). The composition of aquatic vegetation varied across sites (Table 6, Appendix 5). Of the dominant aquatic species

recorded, *Phragmites australis* was noted as the dominant species at 26% of sites, American lotus at 26% of sites, water celery (*Vallisneria americana*) at 11% of sites, and no vegetation at 15% of sites. The shoreline and riparian zone were dominated by the herbaceous riparian vegetation type (Table 5b), made up almost exclusively of stands of *Phragmites australis* with some areas of cattail, or bare shore at the edges of residential properties or lawns (Appendix 5).

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Table 1. Summary of sampling effort using depletion seining and pelagic trawling in the Canard River, 2018.

	Seine sites	Trawl sites	Overall
Sites sampled	33	41	74
Total fishes captured	9180	10343	19523
Total species captured	32	27	37
Mean CPUE (fishes/haul or tow)	92.73	84.09	87.94
Minimum CPUE (fishes/haul or tow)	7.00	0.67	0.67
Maximum CPUE (fishes/haul or tow)	250.33	305.67	305.67
Total Pugnose Minnow captured	93	201	294
Sites where Pugnose Minnow detected (n=)	15	11	26
Mean Pugnose Minnow total length (mm)	29	33	32
Minimum Pugnose Minnow total length (mm)	18	22	18
Maximum Pugnose Minnow total length (mm)	55	53	55
Mean area sampled (m²)	92.1	296.3	205.2
Minimum area sampled (m²)	40.0	150.0	40.0
Maximum area sampled (m²)	150.0	300.0	300.0
Mean distance from shore (m)	0.0	25.9	14.4
Minimum distance from shore (m)	0.0	0.0	0.0
Maximum distance from shore (m)	0.0	96.8	96.8

Table 2. Pooled fish assemblage sampling results indicating total number of individuals of each species captured in the Canard River by seine and pelagic trawl, 2018.

Scientific name	Common name	Number captured with bag seine	Number captured with pelagic trawl	Total captured
<i>Ambloplites rupestris</i>	Rock Bass	0	2	2
<i>Ameiurus melas</i>	Black Bullhead	0	2	2
<i>Ameiurus melas X</i>	Black Bullhead X Brown	0	1	1
<i>Ameiurus nebulosus</i>	Bullhead hybrid			
<i>Ameiurus natalis</i>	Yellow Bullhead	5	3	8
<i>Ameiurus</i> sp.	Bullhead sp.	1	0	1
<i>Aplodinotus grunniens</i>	Freshwater Drum	8	0	8
<i>Carassius auratus</i>	Goldfish	1	0	1
<i>Carassius auratus X</i>	Goldfish X Common Carp	1	0	1
<i>Cyprinus carpio</i>	hybrid			
<i>Centrarchidae</i>	Sunfish and Bass Family	823	2	825
<i>Cyprinidae</i>	Minnow Family	2	14	16
<i>Cyprinus carpio</i>	Common Carp	3	0	3
<i>Dorosoma cepedianum</i>	Gizzard Shad	3346	1913	5259
<i>Etheostoma nigrum</i>	Johnny Darter	4	0	4
<i>Fundulus diaphanus</i>	Banded Killifish	1	0	1
<i>Ictalurus punctatus</i>	Channel Catfish	2	2	4
<i>Ictiobus cyprinellus</i>	Bigmouth Buffalo	46	11	57
<i>Ictiobus</i> sp.	Buffalo sp.	20	14	34
<i>Labidesthes sicculus</i>	Brook Silverside	72	75	147
<i>Lepisosteus osseus</i>	Longnose Gar	7	4	11
<i>Lepomis gibbosus</i>	Pumpkinseed	22	10	32
<i>Lepomis humilis</i>	Orangespotted Sunfish	42	11	53
<i>Lepomis macrochirus</i>	Bluegill	320	3845	4165
<i>Lepomis</i> sp.	Sunfish sp.	2864	1026	3890
<i>Micropterus dolomieu</i>	Smallmouth Bass	1	0	1
<i>Micropterus salmoides</i>	Largemouth Bass	9	59	68
<i>Morone americana</i>	White Perch	9	4	13
<i>Morone chrysops</i>	White Bass	56	26	82
<i>Morone</i> sp.	Temperate Bass sp.	5	11	16
<i>Neogobius melanostomus</i>	Round Goby	49	1	50
<i>Notemigonus crysoleucas</i>	Golden Shiner	180	76	256
<i>Notropis atherinoides</i>	Emerald Shiner	98	1881	1979
<i>Notropis buchanani</i>	Ghost Shiner	45	59	104
<i>Notropis hudsonius</i>	Spottail Shiner	0	131	131
<i>Notropis</i> sp.	Unknown Minnow (Genus: <i>Notropis</i>)	8	54	62

Scientific name	Common name	Number captured with bag seine	Number captured with pelagic trawl	Total captured
<i>Notropis volucellus</i>	Mimic Shiner	34	583	617
<i>Noturus gyrinus</i>	Tadpole Madtom	2	0	2
<i>Opsopoeodus emiliae</i>	Pugnose Minnow	93	201	294
<i>Perca flavescens</i>	Yellow Perch	12	13	25
<i>Percina caprodes</i>	Logperch	2	0	2
<i>Percina maculata</i>	Blackside Darter	4	0	4
<i>Pimephales notatus</i>	Bluntnose Minnow	8	218	226
<i>Pimephales</i> sp.	Unknown Minnow (Genus: <i>Pimephales</i>)	0	3	3
<i>Pomoxis annularis</i>	White Crappie	11	48	59
<i>Pomoxis nigromaculatus</i>	Black Crappie	5	11	16
<i>Pomoxis</i> sp.	Crappie sp.	959	28	987
<i>Proterorhinus semilunaris</i>	Tube-nose Goby	0	1	1
Total captured		9180	10343	19523

Table 3. Summary of abiotic habitat features assessed at sites in the Canard River, 2018, during deployment of a) depletion seine, b) pelagic trawl, and c) overall summary.

a) Depletion seine sites

	Air temperature (°C)	Water temperature (°C)	Conductivity (µS)	Dissolved oxygen (mg/L)	pH	Secchi tube (m)	Turbidity (NTU)	Depth (m)
Mean	27.80	27.04	692.3	7.24	8.29	0.21	32.61	0.94
Minimum	17.5	24.42	403.9	1.33	7.68	0.10	8.84	0.4
Maximum	33.2	30.01	1434.6	11.38	9.16	1.07	57.56	1.17

b) Pelagic trawl sites

	Air temperature (°C)	Water temperature (°C)	Conductivity (µS)	Dissolved oxygen (mg/L)	pH	Secchi tube (m)	Turbidity (NTU)	Depth (m)
Mean	26.69	25.86	577.3	6.47	8.32	0.28	22.09	1.24
Minimum	21.7	22.93	226.3	1.85	7.86	0.12	3.17	0.55
Maximum	31.7	28.25	1557.5	10.37	8.96	0.94	52.63	2.41

c) Overall

	Air temperature (°C)	Water temperature (°C)	Conductivity (µS)	Dissolved oxygen (mg/L)	pH	Secchi tube (m)	Turbidity (NTU)	Depth (m)
Mean	27.19	26.39	628.6	6.81	8.31	0.24	26.78	1.11
Minimum	17.5	22.93	226.3	1.33	7.68	0.10	3.17	0.67
Maximum	33.2	30.01	1557.5	11.38	9.16	1.07	57.56	1.92

Table 4. Summary of substrate present at each site sampled in the Canard River, 2018, where substrate was assessed by evaluating percent composition of each substrate type present at each site (for a total of 100% at each site).

Substrate type (percent composition)	Mean at seine sites	Mean at trawl sites	Overall mean	Minimum	Maximum
Organic (%)	31	6	17	0	80
Clay (%)	4	20	13	0	90
Silt (%)	37	56	47	5	90
Sand (%)	14	13	13	0	90
Gravel (%)	9	3	6	0	50
Cobble (%)	0	1	1	0	30
Boulder (%)	4	0	2	0	40
Bedrock (%)	0	0	0	0	0
Hardpan (%)	0	0	0	0	0
Rubble (%)	2	1	1	0	30
Concrete (%)	0	0	0	0	0

Table 5. Summary of biotic habitat characteristics a) aquatic vegetation, and b) riparian vegetation where habitat was assessed by evaluating percent composition of each vegetation type present at each site (for a total of 100% at each site).

a) Aquatic vegetation

	Minimum	Maximum	Mean at seine sites	Mean at trawl sites	Overall mean
Emergent (%)	0	20	7.4	1.1	3.9
Floating (%)	0	50	8.9	7.0	7.8
Submerged (%)	0	90	4.2	11.6	8.3
Open water (%)	10	100	79.4	80.4	79.9
Most common dominant aquatic vegetation type	-	-	Open water	Open water	Open water
Most common dominant species of aquatic vegetation	-	-	<i>Phragmites australis</i>	<i>Nelumbo</i> sp.	<i>Phragmites australis</i> , <i>Nelumbo</i> sp.

b) Riparian vegetation

	Minimum	Maximum	Mean at seine sites	Mean at trawl sites	Overall mean
Deciduous (%)	0	90	7.0	18.8	12.9
Coniferous (%)	0	0	0.0	0.0	0.0
Herbaceous (%)	0	100	77.6	70.0	73.8
Shrubs (%)	0	70	4.8	1.2	3.0
None (%)	0	100	10.6	10.0	10.3
Most common dominant riparian vegetation type	-	-	Herbaceous	Herbaceous	Herbaceous

Table 6. List of aquatic and riparian vegetation present at sites sampled in the Canard River, 2018.

Scientific name	Common name
<i>Ceratophyllum demersum</i>	Coontail
<i>Eutrochium</i> sp.	Joe pye weed
<i>Lemna</i> sp.	Duckweed sp.
<i>Myriophyllum</i> sp.	Milfoil sp.
<i>Nelumbo</i> sp.	Lotus sp. (Genus: <i>Nelumbo</i>)
<i>Nymphaea</i> sp.	White water-lily sp.
<i>Phragmites australis</i>	European Common reed
<i>Poaceae</i>	Unknown grasses
<i>Potamogeton natans</i>	Floating-leaf pondweed
<i>Potamogeton richardsonii</i>	Richardson's pondweed
<i>Potamogeton robbinsii</i>	Fern pondweed
<i>Potamogeton</i> sp.	Pondweed sp.
<i>Sagittaria</i> sp.	Arrowhead
<i>Salix</i> sp.	Willow
<i>Sparganium</i> sp.	Bur-reed sp.
<i>Typha</i> sp.	Cattail sp.
<i>Vallisneria americana</i>	Water celery

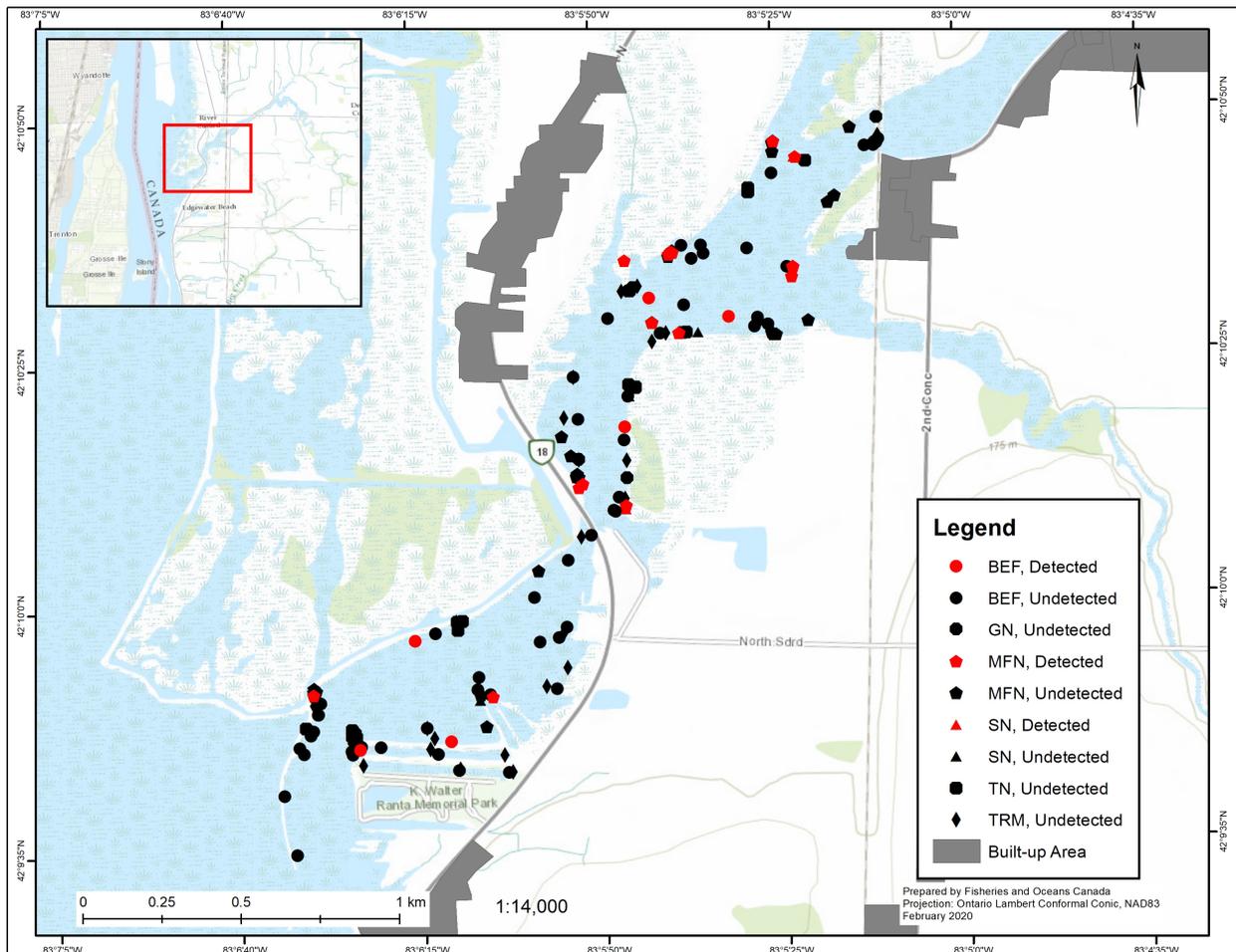


Figure 1. Location of sampling conducted by DFO's Asian Carp Program including detections of Pugnose Minnow in the Canard River, 2013 to 2017. Where BEF is boat electrofishing, MFN is mini-fyke net, SN is seine net, GN is gill net, TN is trap net, and TRM is Trammel net.

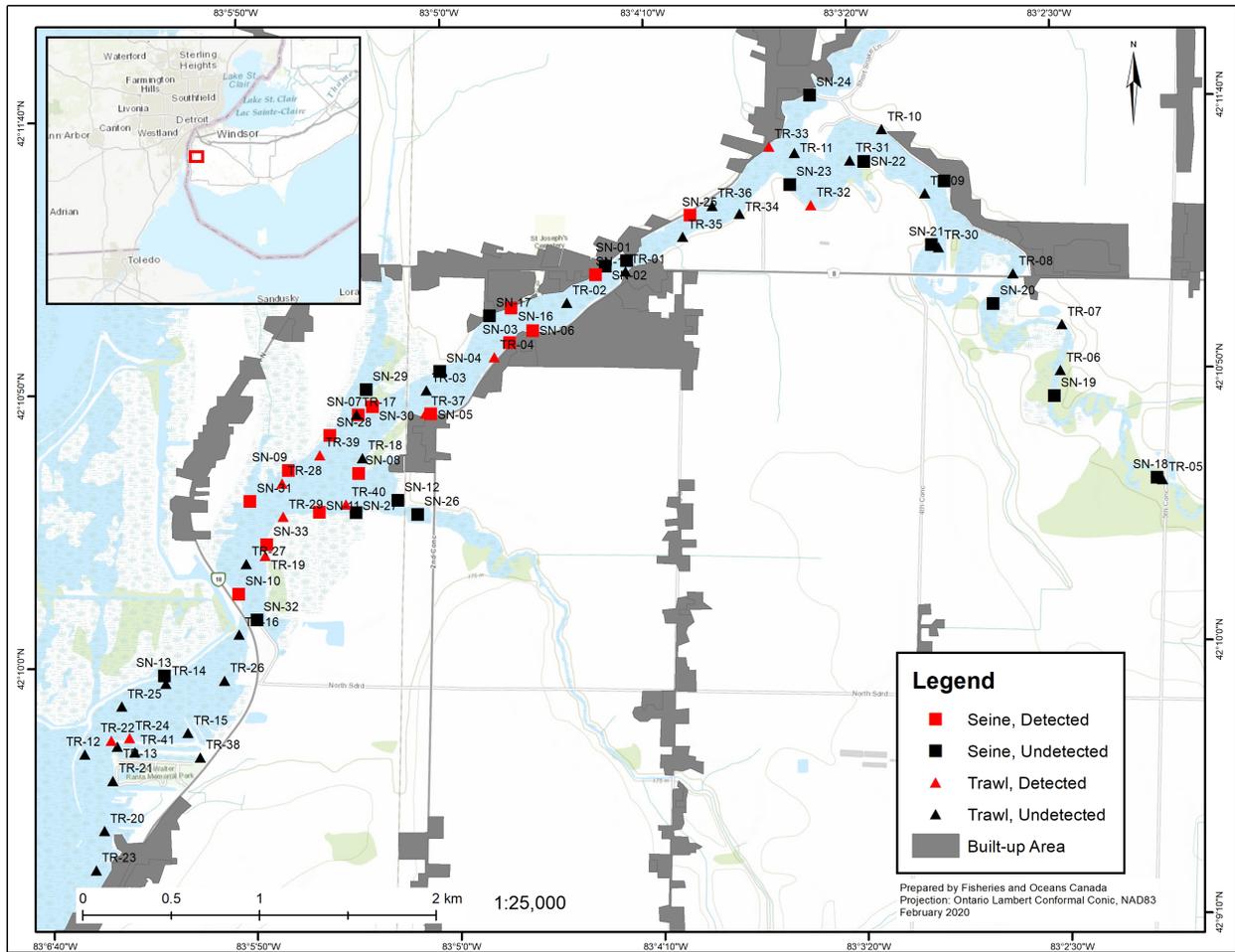


Figure 2. Location of sampling including detections of Pugnose Minnow in the Canard River, 2018.



Figure 3. Photograph of three adult Pugnose Minnow (*Opsopoeodus emiliae*) captured in the Canard River, 2018.

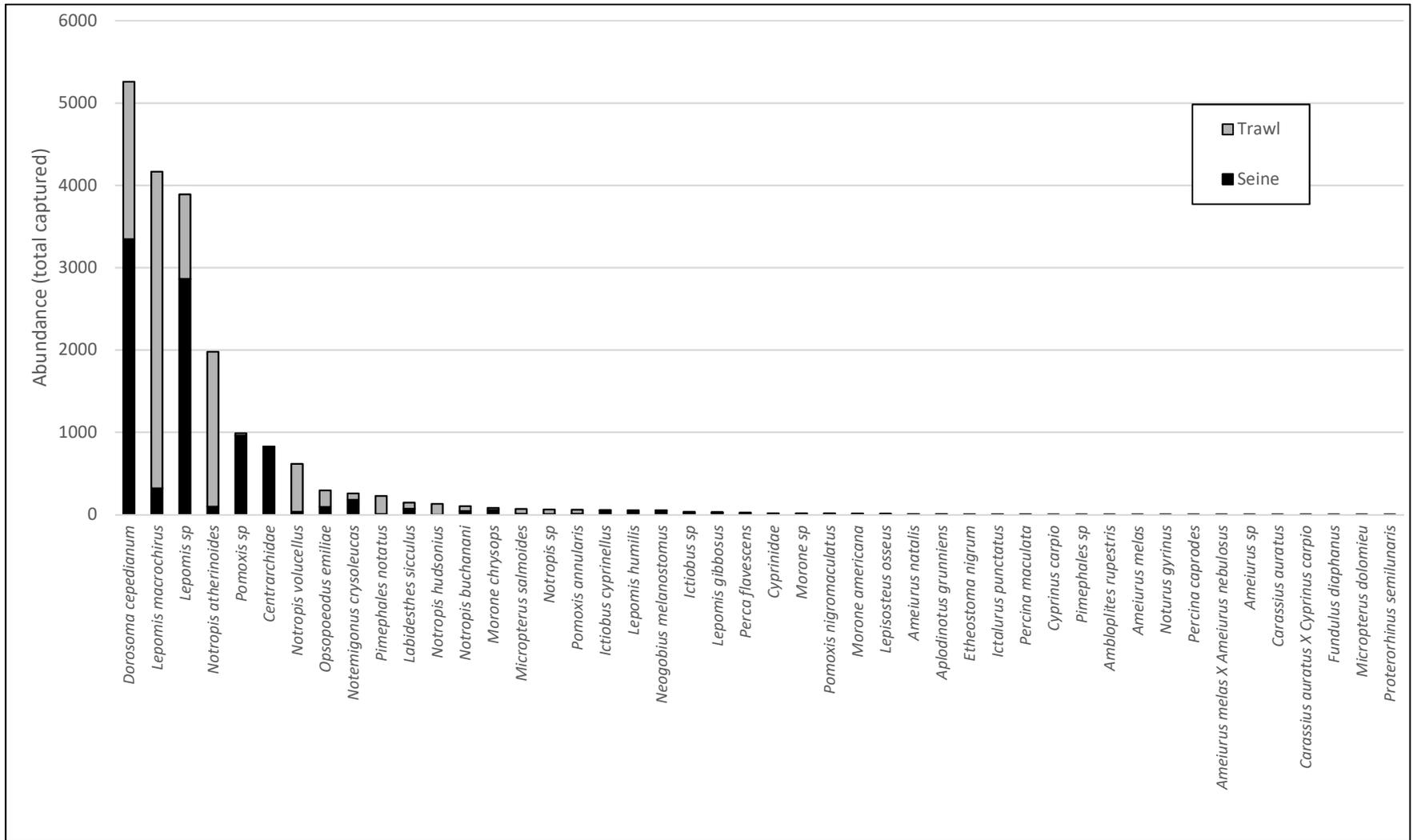


Figure 4. Rank-abundance of 2018 Canard River catch data.

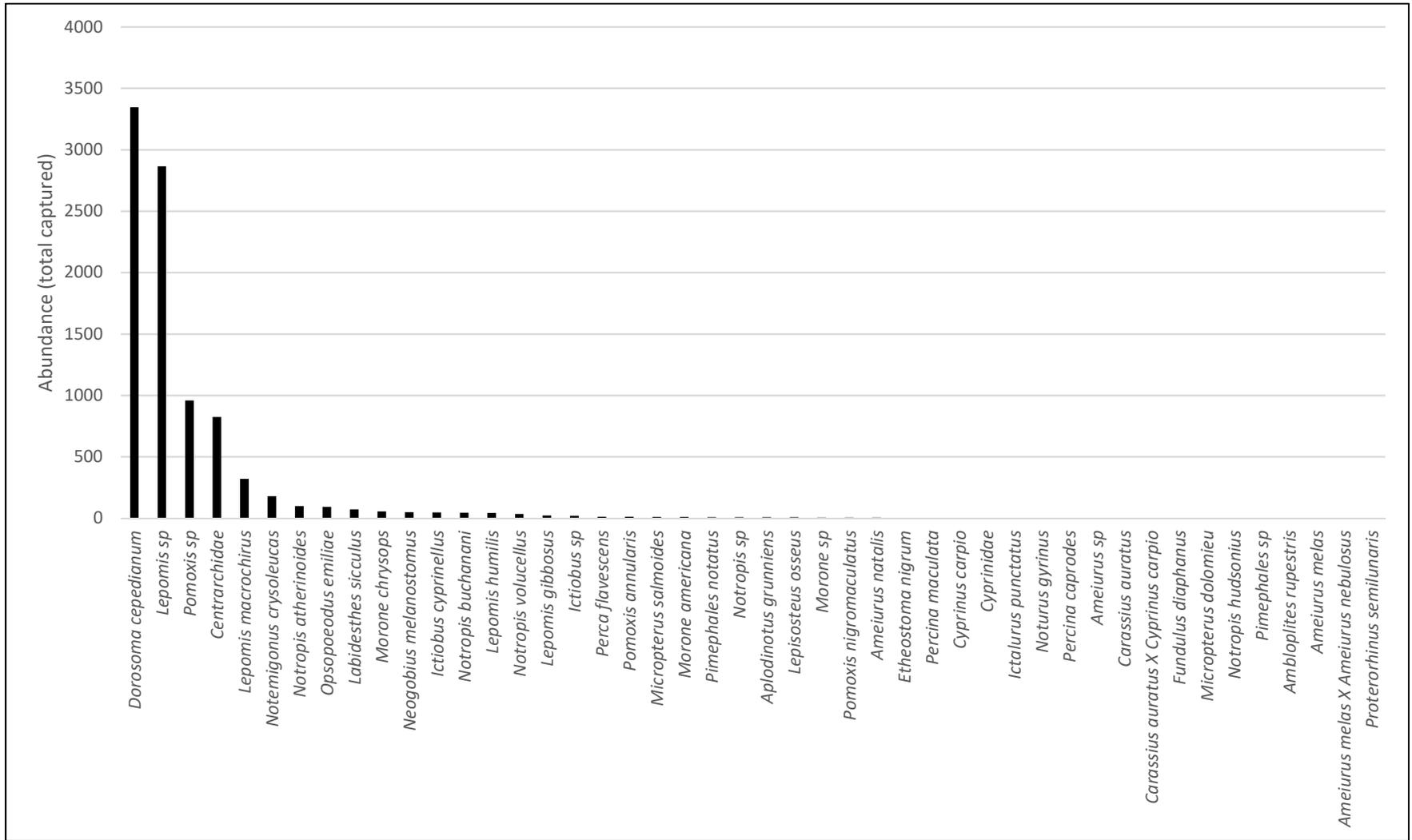


Figure 5. Rank-abundance of 2018 Canard River depletion seining catch data.

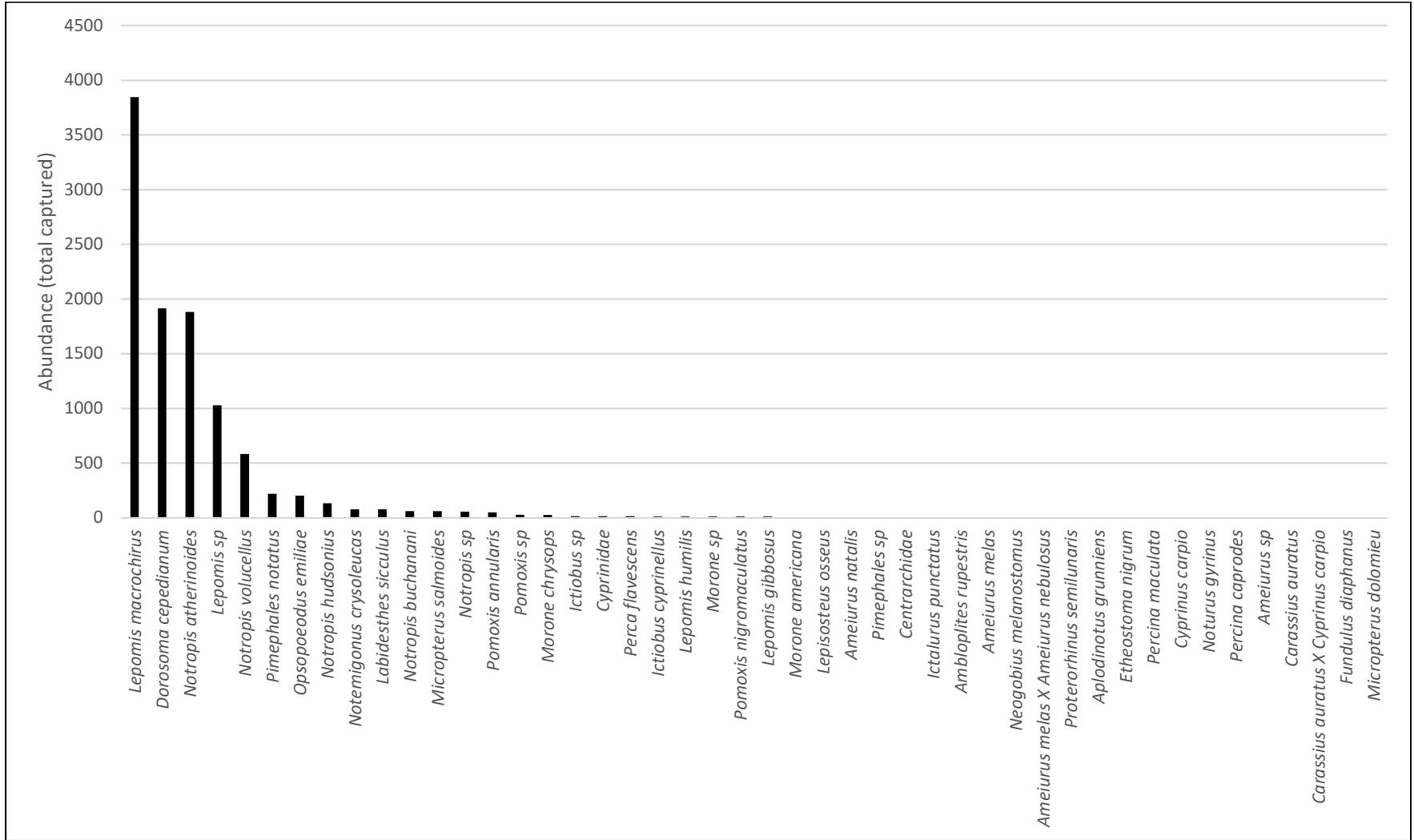


Figure 6. Rank-abundance of 2018 Canard River pelagic trawling catch data.

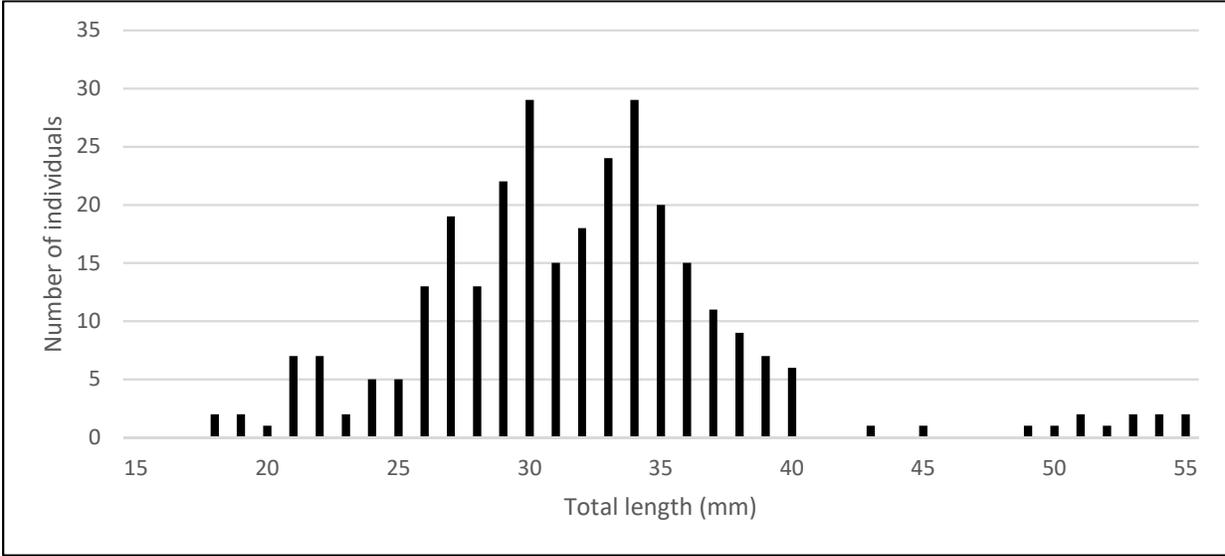


Figure 7. Pooled length-frequency of all Pugnose Minnow captured in the Canard River, 2018.

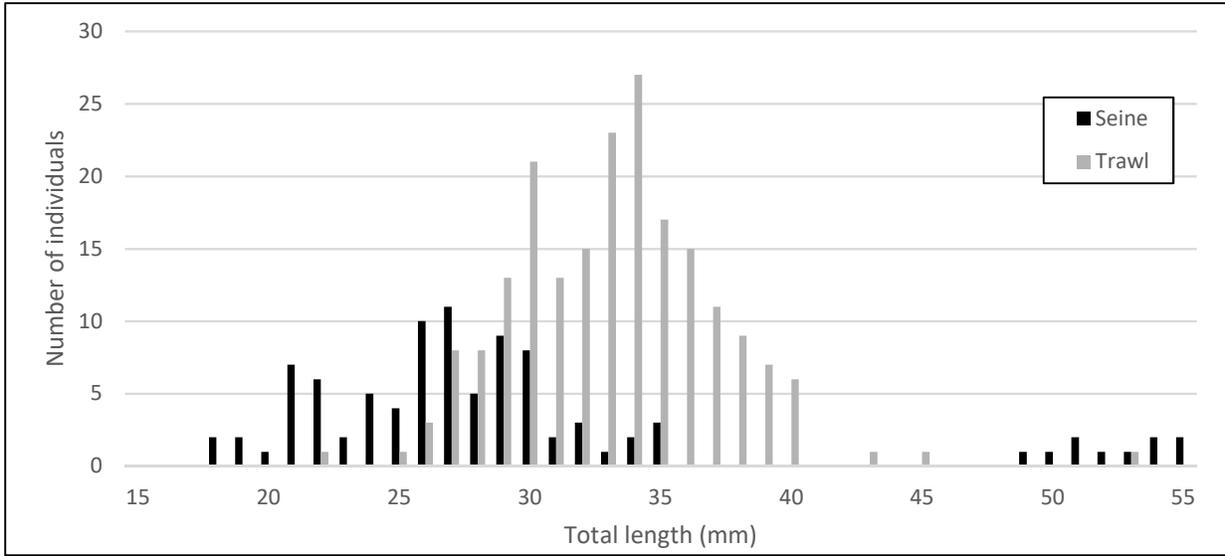


Figure 8. Length-frequency of Pugnose Minnow captured by depletion seining and by pelagic trawling in the Canard River, 2018.

Appendix 1. Location, description, and dimensions of all sites sampled in the Canard River, 2018.

Site code	Field number	Latitude	Longitude	Date	Narrative locality description	Gear	Effort (hauls)	Sample width (m)	Sample length (m)	Distance from shore (m)
SN-01	2018-PNM-CNR-100718-001A	42.18671	-83.07088	10-Jul-18	Immediately d/s of Town line, to the left	SN	3	8	8	0
SN-02	2018-PNM-CNR-100718-002A	42.18644	-83.07236	10-Jul-18	~141 m d/s North Townline Rd, North shore (Malden Rd)	SN	3	10	10	0
SN-03	2018-PNM-CNR-100718-003A	42.18268	-83.07902	10-Jul-18	~850 m d/s North Townline Rd., South Shore (Riverview rd.)	SN	3	6	10	0
SN-04	2018-PNM-CNR-100718-004A	42.18130	-83.08384	10-Jul-18	~270 m u/s Train Bridge, North shoreline between lotus bed and Phrag.	SN	3	10	10	0
SN-05	2018-PNM-CNR-100718-005A	42.17916	-83.08452	10-Jul-18	~65 m u/s of train bridge on South shore	SN	3	10	10	0
SN-06	2018-PNM-CNR-100718-006A	42.18325	-83.07742	10-Jul-18	~669 m d/s of North Town Line Rd, south shore	SN	3	10	10	0
SN-07	2018-PNM-CNR-110718-001A	42.17920	-83.08948	11-Jul-18	~275 m d/s train bridge, tip of point, N shore	SN	3	10	10	0
SN-08	2018-PNM-CNR-110718-002A	42.17621	-83.08956	11-Jul-18	~450 m d/s from train bridge, phrag. point at right fork in river	SN	3	10	10	0
SN-09	2018-PNM-CNR-110718-003A	42.17646	-83.09435	11-Jul-18	~900 m u/s from Front Rd. N, North shore	SN	3	10	10	0
SN-10	2018-PNM-CNR-110718-004A	42.17021	-83.09796	11-Jul-18	~160 m u/s of Front Rd. N bridge, West shore	SN	3	10	10	0
SN-11	2018-PNM-CNR-110718-005A	42.17428	-83.09229	11-Jul-18	~775 m d/s main train bridge, South shore	SN	3	10	10	0
SN-12	2018-PNM-CNR-110718-006A	42.17479	-83.08693	11-Jul-18	Right (south) branch of river, ~65 m d/s side train bridge	SN	3	10	10	0
SN-13	2018-PNM-CNR-110718-007A	42.16616	-83.10317	11-Jul-18	~550 m d/s Front Rd. N, North shore	SN	3	10	10	0
SN-14	2018-PNM-CNR-120718-001A	42.19036	-83.04906	12-Jul-18	Canard Dr., ~650 m d/s of Townline Rd. N	SN	3	10	10	0
SN-15	2018-PNM-CNR-160718-001A	42.18603	-83.07302	16-Jul-18	~200 m d/s North Townline Rd., Left bank	SN	3	8	12	0
SN-16	2018-PNM-CNR-160718-002A	42.18444	-83.07885	16-Jul-18	~780 m u/s from Train bridge, Left (North) bank	SN	3	10	10	0
SN-17	2018-PNM-CNR-160718-003A	42.18407	-83.08035	16-Jul-18	~675 m u/s of Train bridge, North shore in lotus	SN	3	8	12	0
SN-18	2018-PNM-CNR-170718-001A	42.17499	-83.03502	17-Jul-18	~60 m d/s Concession Rd. 5 North, South bank	SN	3	4	10	0
SN-19	2018-PNM-CNR-170718-002A	42.17928	-83.04191	17-Jul-18	~800 m d/s from Concession Rd. 5 North, East bank	SN	3	5	12	0
SN-20	2018-PNM-CNR-170718-003A	42.18404	-83.04592	17-Jul-18	~170 m u/s of North Townline Rd., East bank	SN	3	10	10	0

Site code	Field number	Latitude	Longitude	Date	Narrative locality description	Gear	Effort (hauls)	Sample width (m)	Sample length (m)	Distance from shore (m)
SN-21	2018-PNM-CNR-170718-004A	42.18713	-83.05004	17-Jul-18	side bay ~300 m d/s of North Townline Rd.	SN	3	8	12	0
SN-22	2018-PNM-CNR-170718-005A	42.19144	-83.05450	17-Jul-18	~1.44 km u/s of North Townline Rd. at Malden Rd., between lotus & phrag., south shore	SN	3	10	10	0
SN-23	2018-PNM-CNR-170718-006A	42.19037	-83.05960	17-Jul-18	~1.01 km u/s of North Townline Rd. at Malden Rd., South shore	SN	3	5	12	0
SN-24	2018-PNM-CNR-170718-007A	42.19490	-83.05810	17-Jul-18	~40 m d/s from Canard Dr. (at Snake Lane) - North West Shore	SN	3	10	10	0
SN-25	2018-PNM-CNR-170718-008A	42.18894	-83.06648	17-Jul-18	~430 m u/s North Townline Rd. (at Malden) North Shore	SN	3	10	15	0
SN-26	2018-PNM-CNR-180718-001A	42.17405	-83.08560	18-Jul-18	South branch of Canard, between Train bridge and Concession Rd. 2	SN	3	10	10	0
SN-27	2018-PNM-CNR-180718-002A	42.17423	-83.08981	18-Jul-18	~275 m d/s Train bridge (South branch), south shore	SN	3	10	10	0
SN-28	2018-PNM-CNR-180718-003A	42.17818	-83.09145	18-Jul-18	~480 m d/s of Train Bridge on main branch, North shore	SN	3	10	10	0
SN-29	2018-PNM-CNR-180718-004A	42.18047	-83.08890	18-Jul-18	North Branch ~700 m d/s of Malden Rd., ~150 m u/s of main River	SN	3	10	10	0
SN-30	2018-PNM-CNR-180718-005A	42.17960	-83.08850	18-Jul-18	~190 m d/s train bridge, main branch North shore	SN	3	10	10	0
SN-31	2018-PNM-CNR-180718-006A	42.17493	-83.09702	18-Jul-18	~685 m u/s of Front Rd. North, Northeast shore	SN	3	10	10	0
SN-32	2018-PNM-CNR-180718-007A	42.16888	-83.09675	18-Jul-18	~60 m u/s of Front Rd. North, off lawn at end of Sari Lane	SN	3	4	14	0
SN-33	2018-PNM-CNR-180718-008A	42.17271	-83.09596	18-Jul-18	~440 m u/s Front Rd. N, East shore	SN	3	5	12	0
TR-01	2018-PNM-CNR-230718-001A	42.18615	-83.07098	23-Jul-18	~60 m d/s of North Townline Road	TRL	3	3	100	8
TR-02	2018-PNM-CNR-230718-002A	42.18463	-83.07505	23-Jul-18	440 m d/s of North Townline Road, mid channel	TRL	3	3	100	81.6
TR-03	2018-PNM-CNR-230718-003A	42.18035	-83.08480	23-Jul-18	~135 m u/s of train bridge; along Lotus	TRL	3	3	100	61.4
TR-04	2018-PNM-CNR-230718-004A	42.18195	-83.08008	23-Jul-18	u/s of Train Bridge; right side along Phrag.	TRL	3	3	100	5
TR-05	2018-PNM-CNR-240718-001A	42.17488	-83.03464	24-Jul-18	20 m d/s of Concession Road 5 North	TRL	3	3	100	8
TR-06	2018-PNM-CNR-240718-002A	42.18057	-83.04144	24-Jul-18	~25 m d/s of walk bridge and 600 m u/s of north Townline Road	TRL	3	3	100	10
TR-07	2018-PNM-CNR-240718-003A	42.18291	-83.04128	24-Jul-18	~400 m u/s of North Townline Road	TRL	3	3	100	6.5
TR-08	2018-PNM-CNR-240718-004A	42.18555	-83.04451	24-Jul-18	d/s of North Townline Road	TRL	3	3	100	32.5
TR-09	2018-PNM-CNR-240718-005A	42.18975	-83.05040	24-Jul-18	Along Phrag. opposite of Canard Drive; ~700 m d/s of North Townline Road	TRL	3	3	100	12.5
TR-10	2018-PNM-CNR-240718-006A	42.19307	-83.05324	24-Jul-18	Along Canard Drive; ~ 900 m d/s of North Townline Bridge	TRL	3	3	100	8

Site code	Field number	Latitude	Longitude	Date	Narrative locality description	Gear	Effort (hauls)	Sample width (m)	Sample length (m)	Distance from shore (m)
TR-11	2018-PNM-CNR-240718-007A	42.19198	-83.05925	24-Jul-18	~250 m d/s of Canard Drive at Malden Road	TRL	3	3	100	56
TR-12	2018-PNM-CNR-250718-001A	42.16225	-83.10873	25-Jul-18	~130 m from mouth of Detroit River	TRL	3	3	100	57
TR-13	2018-PNM-CNR-250718-002A	42.16261	-83.10651	25-Jul-18	In channel immediately north of Ranta Marina	TRL	3	3	100	9.9
TR-14	2018-PNM-CNR-250718-003A	42.16576	-83.10307	25-Jul-18	Sampled at edge of lotus bed	TRL	3	3	100	55.8
TR-15	2018-PNM-CNR-250718-004A	42.16321	-83.10167	25-Jul-18	430 m u/s of Ranta Marina channel, south shore	TRL	3	3	100	7
TR-16	2018-PNM-CNR-250718-005A	42.16816	-83.09801	25-Jul-18	~100 m d/s of Front Road North; mid-channel off Lotus bed	TRL	3	3	100	38.1
TR-17	2018-PNM-CNR-250718-006A	42.17921	-83.08961	25-Jul-18	~300 m d/s of train bridge; N shore at tip at confluence	TRL	3	3	100	1
TR-18	2018-PNM-CNR-250718-007A	42.17699	-83.08927	25-Jul-18	~400 m d/s of train bridge; S shore of main channel at S confluence	TRL	3	3	100	0
TR-19	2018-PNM-CNR-250718-008A	42.17214	-83.09607	25-Jul-18	~400 m u/s Front Rd N, E shore at stairs/ramp into pond at solar farm; Val. bed	TRL	3	3	100	0
TR-20	2018-PNM-CNR-260718-001A	42.15833	-83.10753	26-Jul-18	Mouth of Canard River; ~ 50m offshore of houses	TRL	3	3	100	53
TR-21	2018-PNM-CNR-260718-002A	42.16087	-83.10686	26-Jul-18	50 m south of entrance of Ranta Marina	TRL	3	3	100	8
TR-22	2018-PNM-CNR-260718-003A	42.16292	-83.10690	26-Jul-18	~50 m north of Ranta Marina entrance	TRL	3	3	50	0
TR-23	2018-PNM-CNR-080818-001A	42.15634	-83.10815	08-Aug-18	500 m south of Ranta Marina	TRL	3	3	100	72.4
TR-24	2018-PNM-CNR-080818-002A	42.16302	-83.10565	08-Aug-18	immediately u/s (N) of Ranta Marina cut	TRL	3	3	100	5
TR-25	2018-PNM-CNR-080818-003A	42.16465	-83.10614	08-Aug-18	~420 m N of Ranta, along edge of lotus, N side	TRL	3	3	100	75
TR-26	2018-PNM-CNR-080818-004A	42.16583	-83.09908	08-Aug-18	~325 m d/s Front Rd bridge. S shore, along lotus bed	TRL	3	3	100	68
TR-27	2018-PNM-CNR-080818-005A	42.17175	-83.09740	08-Aug-18	~500 m u/s of Front Rd N bridge	TRL	3	3	100	96.8
TR-28	2018-PNM-CNR-080818-006A	42.17580	-83.09480	08-Aug-18	~800 m u/s of Front Rd	TRL	3	3	100	22.5
TR-29	2018-PNM-CNR-080818-007A	42.17410	-83.09479	08-Aug-18	~645 m u/s Front Rd., E(right) shore along rubble, willow, and shrubs	TRL	3	3	100	5
TR-30	2018-PNM-CNR-090818-001A	42.18698	-83.04955	09-Aug-18	side channel ~130 m DS of North Townline Rd	TRL	3	3	100	3
TR-31	2018-PNM-CNR-090818-002A	42.19153	-83.05547	09-Aug-18	along lotus, S shore, ~ 1.36 km u/s North Townline Rd at Malden Rd	TRL	3	3	100	56
TR-32	2018-PNM-CNR-090818-003A	42.18930	-83.05821	09-Aug-18	~1 km U/s from North Townline Rd at Malden Rd	TRL	3	3	100	5
TR-33	2018-PNM-CNR-090818-004A	42.19233	-83.06096	09-Aug-18	along phrag. on N Shoreline ~925 m u/s of North Townline Rd at Malden	TRL	3	3	100	4
TR-34	2018-PNM-CNR-090818-005A	42.18895	-83.06311	09-Aug-18	~600 m u/s of North Townline Road bridge	TRL	3	3	100	2

Site code	Field number	Latitude	Longitude	Date	Narrative locality description	Gear	Effort (hauls)	Sample width (m)	Sample length (m)	Distance from shore (m)
TR-35	2018-PNM-CNR-090818-006A	42.18784	-83.06703	09-Aug-18	~310 m u/s North Townline Road bridge at Malden Rd - along Phrag.	TRL	3	3	100	2
TR-36	2018-PNM-CNR-090818-007A	42.18939	-83.06496	09-Aug-18	~600 m u/s of North Townline Road - left side - Offshore	TRL	3	3	100	21
TR-37	2018-PNM-CNR-090818-008A	42.17918	-83.08489	09-Aug-18	u/s of train bridge, right side	TRL	3	3	100	5
TR-38	2018-PNM-CNR-100818-001A	42.16196	-83.10087	10-Aug-18	Along phrag. inside marina, across from boat launch	TRL	3	3	100	3
TR-39	2018-PNM-CNR-100818-002A	42.17720	-83.09218	10-Aug-18	~600 m d/s of first train bridge left shore	TRL	3	3	100	37
TR-40	2018-PNM-CNR-100818-003A	42.17465	-83.09048	10-Aug-18	mid channel along lotus, ~400 m d/s train bridge south branch	TRL	3	3	100	59
TR-41	2018-PNM-CNR-100818-004A	42.16229	-83.10532	10-Aug-18	100 m inside Ranta Marina cut along phrag.	TRL	3	3	100	2

Appendix 2. Fish assemblage sampling results indicating the total number of individuals of each species (*Ambloplites rupestris* to *Lepomis* sp.) captured in the Canard River, 2018, where sampling pass is the first, second, or third consecutive seine haul or pelagic trawl tow at the same site.

Site code	Sampling pass	<i>Ambloplites rupestris</i>	<i>Ameiurus melas</i>	<i>Ameiurus melas</i> X <i>Ameiurus nebulosus</i>	<i>Ameiurus natalis</i>	<i>Ameiurus</i> sp.	<i>Aplodinotus grunniens</i>	<i>Carassius auratus</i>	<i>Carassius auratus</i> X <i>Cyprinus carpio</i>	Centrarchidae	Cyprinidae	<i>Cyprinus carpio</i>	<i>Dorosoma cepedianum</i>	<i>Etheostoma nigrum</i>	<i>Fundulus diaphanus</i>	<i>Ictalurus punctatus</i>	<i>Ictiobus cyprinellus</i>	<i>Ictiobus</i> sp.	<i>Labidesthes sicculus</i>	<i>Lepisosteus osseus</i>	<i>Lepomis gibbosus</i>	<i>Lepomis humilis</i>	<i>Lepomis macrochirus</i>	<i>Lepomis</i> sp.
SN-01	1	0	0	0	0	0	1	0	0	0	0	51	0	0	0	0	0	0	0	0	1	2	1	103
SN-01	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	9
SN-01	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
SN-02	1	0	0	0	0	0	0	0	0	0	0	112	0	0	0	0	0	0	0	0	2	2	0	377
SN-02	2	0	0	0	0	0	0	0	0	0	0	54	0	0	0	0	0	0	0	0	1	1	0	129
SN-02	3	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	38
SN-03	1	0	0	0	0	1	1	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	25
SN-03	2	0	0	0	0	0	1	0	0	0	0	11	0	0	0	0	0	1	0	0	0	0	15	17
SN-03	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	9
SN-04	1	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	1	1	0	0	125
SN-04	2	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	1	0	0	0	0	21
SN-04	3	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	16
SN-05	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	4	25	0
SN-05	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
SN-05	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
SN-06	1	0	0	0	0	0	0	0	0	0	2	34	0	0	0	0	0	0	0	0	0	0	3	79
SN-06	2	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	51
SN-06	3	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	54
SN-07	1	0	0	0	0	0	0	0	0	0	0	158	0	0	0	5	0	7	0	1	2	0	0	30
SN-07	2	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	1	1	0	0	0	0	2	21
SN-07	3	0	0	0	0	0	0	0	0	0	1	8	0	0	0	0	2	1	0	0	0	0	2	1
SN-08	1	0	0	0	0	0	0	0	0	0	0	250	0	0	0	0	0	0	0	0	0	1	5	34
SN-08	2	0	0	0	0	0	0	0	0	1	0	57	0	0	0	0	0	0	0	0	0	1	21	35
SN-08	3	0	0	0	0	0	0	0	0	1	0	41	0	0	0	0	0	0	0	0	0	0	5	24
SN-09	1	0	0	0	0	0	0	0	0	0	0	182	0	0	0	0	0	0	0	0	0	0	0	45
SN-09	2	0	0	0	1	0	0	0	0	0	0	72	0	0	0	0	0	0	2	0	0	0	0	19
SN-09	3	0	0	0	0	0	0	0	0	0	0	130	0	0	0	0	0	4	0	0	0	0	0	26
SN-10	1	0	0	0	0	0	0	0	0	0	0	143	1	0	0	0	0	0	0	0	0	0	5	53

Site code	Sampling pass	<i>Ambloplites rupestris</i>	<i>Ameiurus melas</i>	<i>Ameiurus melas</i> X <i>Ameiurus nebulosus</i>	<i>Ameiurus natalis</i>	<i>Ameiurus</i> sp.	<i>Aplodinotus grunniens</i>	<i>Carassius auratus</i>	<i>Carassius auratus</i> X <i>Cyprinus carpio</i>	Centrarchidae	Cyprinidae	<i>Cyprinus carpio</i>	<i>Dorosoma cepedianum</i>	<i>Etheostoma nigrum</i>	<i>Fundulus diaphanus</i>	<i>Ictalurus punctatus</i>	<i>Ictiobus cyprinellus</i>	<i>Ictiobus</i> sp.	<i>Labidesthes sicculus</i>	<i>Lepisosteus osseus</i>	<i>Lepomis gibbosus</i>	<i>Lepomis humilis</i>	<i>Lepomis macrochirus</i>	<i>Lepomis</i> sp.
SN-10	2	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	3	11	
SN-10	3	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	2	1	
SN-11	1	0	0	0	0	0	0	0	0	0	0	250	0	0	0	1	0	0	0	1	1	1	53	
SN-11	2	0	0	0	0	0	0	0	0	0	0	72	0	0	0	1	0	0	0	0	0	2	0	
SN-11	3	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	13	
SN-12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	85	
SN-12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	37	
SN-12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	
SN-13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	
SN-13	2	0	0	0	0	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	16	
SN-13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
SN-14	1	0	0	0	0	0	0	0	0	0	0	197	0	0	0	18	0	0	0	0	2	9	76	
SN-14	2	0	0	0	0	0	0	0	0	0	0	7	0	0	0	4	0	0	0	0	0	1	21	
SN-14	3	0	0	0	2	0	0	0	0	0	0	6	0	0	0	7	0	0	0	0	0	1	40	
SN-15	1	0	0	0	0	0	1	0	0	0	0	26	0	0	1	0	1	0	0	3	0	8	20	
SN-15	2	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	3	0	0	0	0	4	26	
SN-15	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	7	14	
SN-16	1	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	1	0	0	0	3	13	19	
SN-16	2	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	1	0	0	0	0	13	29	
SN-16	3	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	1	0	0	0	0	6	11	
SN-17	1	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	1	0	1	0	67	250	
SN-17	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	23	56	
SN-17	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	8	35	
SN-18	1	0	0	0	0	0	0	0	0	0	0	33	0	0	0	8	0	0	0	0	2	1	10	
SN-18	2	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	2	0	0	0	2	0	5	
SN-18	3	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	3	
SN-19	1	0	0	0	0	0	0	0	0	0	0	7	1	0	0	1	0	0	0	0	0	1	0	
SN-19	2	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	2	0	
SN-19	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	
SN-20	1	0	0	0	0	0	0	0	0	0	0	63	0	0	0	0	1	0	0	0	6	4	62	
SN-20	2	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	4	0	0	0	1	0	15	
SN-20	3	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	1	0	21	
SN-21	1	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	1	0	0	1	

Site code	Sampling pass	<i>Ambloplites rupestris</i>	<i>Ameiurus melas</i>	<i>Ameiurus melas</i> X <i>Ameiurus nebulosus</i>	<i>Ameiurus natalis</i>	<i>Ameiurus</i> sp.	<i>Aplodinotus grunniens</i>	<i>Carassius auratus</i>	<i>Carassius auratus</i> X <i>Cyprinus carpio</i>	Centrarchidae	Cyprinidae	<i>Cyprinus carpio</i>	<i>Dorosoma cepedianum</i>	<i>Etheostoma nigrum</i>	<i>Fundulus diaphanus</i>	<i>Ictalurus punctatus</i>	<i>Ictiobus cyprinellus</i>	<i>Ictiobus</i> sp.	<i>Labidesthes sicculus</i>	<i>Lepisotheus osseus</i>	<i>Lepomis gibbosus</i>	<i>Lepomis humilis</i>	<i>Lepomis macrochirus</i>	<i>Lepomis</i> sp.
SN-21	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SN-21	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SN-22	1	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0	0	0	0	0	2	34	
SN-22	2	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	6	
SN-22	3	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	1	0	0	3	
SN-23	1	0	0	0	0	0	0	0	0	0	0	81	0	0	0	0	0	0	0	1	0	2	7	44
SN-23	2	0	0	0	0	0	0	0	0	0	0	126	0	0	0	0	0	0	0	0	0	0	4	12
SN-23	3	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	1	0	0	3	21
SN-24	1	0	0	0	0	0	0	1	0	0	0	74	1	0	0	0	0	0	0	0	1	3	0	1
SN-24	2	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
SN-24	3	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	1	4
SN-25	1	0	0	0	0	0	0	0	0	0	0	234	0	0	1	0	0	0	0	0	3	6	7	57
SN-25	2	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	2	0	0	15
SN-25	3	0	0	0	0	0	0	0	0	0	0	71	1	0	0	0	0	0	1	0	0	0	2	6
SN-26	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	28
SN-26	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
SN-26	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9
SN-27	1	0	0	0	0	0	0	0	0	9	0	9	0	0	0	0	0	0	0	1	1	0	1	81
SN-27	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
SN-27	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
SN-28	1	0	0	0	0	0	0	0	0	46	0	46	0	0	0	0	0	0	0	0	0	0	2	0
SN-28	2	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	1	0	0	1	42
SN-28	3	0	0	0	1	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	8
SN-29	1	0	0	0	0	0	0	0	0	250	0	0	0	0	0	0	0	0	0	0	2	0	0	0
SN-29	2	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SN-29	3	0	0	0	0	0	0	0	0	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SN-30	1	0	0	0	0	0	0	0	0	45	0	63	0	0	0	0	0	0	0	0	0	0	0	0
SN-30	2	0	0	0	0	0	0	0	1	14	0	19	0	0	0	0	0	0	2	0	0	0	1	0
SN-30	3	0	0	0	0	0	0	0	0	11	0	6	0	0	0	0	0	0	0	0	0	0	0	0
SN-31	1	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	3	70
SN-31	2	0	0	0	0	0	0	0	0	37	0	8	0	0	0	0	0	0	8	0	0	0	2	0
SN-31	3	0	0	0	0	0	0	0	0	34	0	4	0	0	0	0	0	0	2	0	0	0	0	0
SN-32	1	0	0	0	0	0	0	0	0	121	0	49	0	1	0	0	0	0	0	1	0	0	4	1

Site code	Sampling pass	<i>Ambloplites rupestris</i>	<i>Ameiurus melas</i>	<i>Ameiurus melas</i> X <i>Ameiurus nebulosus</i>	<i>Ameiurus natalis</i>	<i>Ameiurus</i> sp.	<i>Aplodinotus grunniens</i>	<i>Carassius auratus</i>	<i>Carassius auratus</i> X <i>Cyprinus carpio</i>	Centrarchidae	Cyprinidae	<i>Cyprinus carpio</i>	<i>Dorosoma cepedianum</i>	<i>Etheostoma nigrum</i>	<i>Fundulus diaphanus</i>	<i>Ictalurus punctatus</i>	<i>Ictiobus cyprinellus</i>	<i>Ictiobus</i> sp.	<i>Labidesthes sicculus</i>	<i>Lepisotheus osseus</i>	<i>Lepomis gibbosus</i>	<i>Lepomis humilis</i>	<i>Lepomis macrochirus</i>	<i>Lepomis</i> sp.
SN-32	2	0	0	0	0	0	0	0	0	34	0	0	6	0	0	0	0	0	0	0	0	0	1	0
SN-32	3	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SN-33	1	0	0	0	0	0	0	0	0	67	0	0	17	0	0	0	0	0	29	0	0	0	1	0
SN-33	2	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	3	0	0	0	2	0
SN-33	3	0	0	0	0	0	1	0	0	11	0	0	13	0	0	0	0	0	10	0	0	0	0	0
TR-01	1	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	1	0	0	20
TR-01	2	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	6
TR-01	3	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	2	0	2	0	0	0	0	5
TR-02	1	0	0	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	1
TR-02	2	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	1	0	0	0	0	0	0	2
TR-02	3	0	0	0	0	0	0	0	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0
TR-03	1	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	26	14
TR-03	2	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	3	2
TR-03	3	0	0	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	0	0	1	0
TR-04	1	0	0	0	0	0	0	0	0	0	0	0	64	0	0	0	0	1	0	0	0	0	12	15
TR-04	2	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	1	3
TR-04	3	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	4	3
TR-05	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-05	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
TR-05	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
TR-06	1	0	0	0	0	0	0	0	0	0	14	0	11	0	0	0	0	0	0	0	0	0	0	0
TR-06	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0
TR-06	3	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	1	0	0
TR-07	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
TR-07	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
TR-07	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-08	1	0	0	0	0	0	0	0	0	0	0	0	250	0	0	0	0	0	0	1	0	0	105	22
TR-08	2	0	0	0	0	0	0	0	0	0	0	0	97	0	0	0	0	0	0	0	0	0	1	7
TR-08	3	0	0	0	0	0	0	0	0	0	0	0	250	0	0	0	0	0	0	0	0	0	3	6
TR-09	1	0	0	0	0	0	0	0	0	0	0	0	157	0	0	0	0	0	0	0	0	0	0	0
TR-09	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
TR-09	3	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	2
TR-10	1	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	2	0	0	0	0	2	2	9

Site code	Sampling pass	<i>Ambloplites rupestris</i>	<i>Ameiurus melas</i>	<i>Ameiurus melas X Ameiurus nebulosus</i>	<i>Ameiurus natalis</i>	<i>Ameiurus sp.</i>	<i>Aplodinotus grunniens</i>	<i>Carassius auratus</i>	<i>Carassius auratus X Cyprinus carpio</i>	Centrarchidae	Cyprinidae	<i>Cyprinus carpio</i>	<i>Dorosoma cepedianum</i>	<i>Etheostoma nigrum</i>	<i>Fundulus diaphanus</i>	<i>Ictalurus punctatus</i>	<i>Ictiobus cyprinellus</i>	<i>Ictiobus sp.</i>	<i>Labidesthes sicculus</i>	<i>Lepisotheus osseus</i>	<i>Lepomis gibbosus</i>	<i>Lepomis humilis</i>	<i>Lepomis macrochirus</i>	<i>Lepomis sp.</i>
TR-10	2	0	0	0	0	0	0	0	0	0	0	41	0	0	0	1	0	1	0	0	0	1	1	10
TR-10	3	0	0	0	1	0	0	0	0	0	0	43	0	0	0	0	0	2	0	0	0	0	0	9
TR-11	1	0	1	0	1	0	0	0	0	0	0	92	0	0	0	0	0	4	0	0	0	3	32	53
TR-11	2	0	0	0	0	0	0	0	0	0	0	87	0	0	0	0	0	2	0	0	0	0	0	34
TR-11	3	0	0	1	0	0	0	0	0	0	0	129	0	0	0	0	0	0	0	0	0	1	6	22
TR-12	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
TR-12	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
TR-12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
TR-13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	232	28
TR-13	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	212	43
TR-13	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	55	12
TR-14	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	13	1
TR-14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	6
TR-14	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	1
TR-15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	16
TR-15	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	17
TR-15	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	37	6
TR-16	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	1	0
TR-16	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-16	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-17	1	0	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	12	0	0	0	0	1
TR-17	2	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	3	0	0	0	0	4
TR-17	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	8	0	0	0	0	6
TR-18	1	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	4	0	0	0	2	4
TR-18	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	15	0
TR-18	3	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	1	0	0	0	1	2
TR-19	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	250	86
TR-19	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	142	80
TR-19	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4	0	0	0	45	20
TR-20	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	32	2
TR-20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	1
TR-20	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	38	2
TR-21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	71	18

Site code	Sampling pass	<i>Ambloplites rupestris</i>	<i>Ameiurus melas</i>	<i>Ameiurus melas X</i> <i>Ameiurus nebulosus</i>	<i>Ameiurus natalis</i>	<i>Ameiurus sp.</i>	<i>Aplodinotus grunniens</i>	<i>Carassius auratus</i>	<i>Carassius auratus X</i> <i>Cyprinus carpio</i>	Centrarchidae	Cyprinidae	<i>Cyprinus carpio</i>	<i>Dorosoma cepedianum</i>	<i>Etheostoma nigrum</i>	<i>Fundulus diaphanus</i>	<i>Ictalurus punctatus</i>	<i>Ictiobus cyprinellus</i>	<i>Ictiobus sp.</i>	<i>Labidesthes sicculus</i>	<i>Lepisotheus osseus</i>	<i>Lepomis gibbosus</i>	<i>Lepomis humilis</i>	<i>Lepomis macrochirus</i>	<i>Lepomis sp.</i>
TR-21	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	68	5
TR-21	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	8
TR-22	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	250	148
TR-22	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	107	29
TR-22	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	250	31
TR-23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	187	0
TR-23	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	220	0
TR-23	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	131	0
TR-24	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	250	0
TR-24	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	54	0
TR-24	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	16	0
TR-25	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
TR-25	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	2
TR-25	3	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	26	0
TR-26	1	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	1	0	0	0	0	0
TR-26	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0
TR-26	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	1
TR-27	1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
TR-27	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	2	0
TR-27	3	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1	0
TR-28	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	3	2
TR-28	2	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	1	0
TR-28	3	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0
TR-29	1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	3	1
TR-29	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
TR-29	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	2	3
TR-30	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	39	1
TR-30	2	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	4	0	11	0
TR-30	3	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	1	6	0
TR-31	1	0	0	0	0	0	0	0	0	0	0	0	36	0	0	1	0	0	0	0	0	0	0	40
TR-31	2	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	23	8
TR-31	3	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	1	0	0	0	0	0	10	0
TR-32	1	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	0	0	0	9	11

Site code	Sampling pass	<i>Ambloplites rupestris</i>	<i>Ameiurus melas</i>	<i>Ameiurus melas X Ameiurus nebulosus</i>	<i>Ameiurus natalis</i>	<i>Ameiurus sp.</i>	<i>Aplodinotus grunniens</i>	<i>Carassius auratus</i>	<i>Carassius auratus X Cyprinus carpio</i>	Centrarchidae	Cyprinidae	<i>Cyprinus carpio</i>	<i>Dorosoma cepedianum</i>	<i>Etheostoma nigrum</i>	<i>Fundulus diaphanus</i>	<i>Ictalurus punctatus</i>	<i>Ictiobus cyprinellus</i>	<i>Ictiobus sp.</i>	<i>Labidesthes sicculus</i>	<i>Lepisosteus osseus</i>	<i>Lepomis gibbosus</i>	<i>Lepomis humilis</i>	<i>Lepomis macrochirus</i>	<i>Lepomis sp.</i>
TR-32	2	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	2	0	0	0	1	5	
TR-32	3	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	1	1	0	0	0	13	6
TR-33	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	1	12	8
TR-33	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5	16
TR-33	3	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	9	5
TR-34	1	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	1	0	0	8	18
TR-34	2	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	2	11
TR-34	3	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	1	0	0	0	0	0	4	16
TR-35	1	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	9
TR-35	2	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	5
TR-35	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	8
TR-36	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
TR-36	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
TR-36	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
TR-37	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	42	0
TR-37	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	50	3
TR-37	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	27	2
TR-38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
TR-38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TR-38	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-39	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0
TR-39	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
TR-39	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3
TR-40	1	0	1	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	22	3
TR-40	2	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	1	0	0	0	28	5
TR-40	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	2
TR-41	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	149	0
TR-41	2	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	197	2
TR-41	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	45	1

Appendix 2. (continued) Fish assemblage sampling results indicating the total number of individuals of each species (*Micropterus dolomieu* to *Proterorhinus semilunaris*) captured in the Canard River, 2018, where sampling pass is the first, second, or third consecutive seine haul or pelagic trawl tow at the same site.

Site code	Sampling pass	<i>Micropterus dolomieu</i>	<i>Micropterus salmoides</i>	<i>Morone americana</i>	<i>Morone chrysops</i>	<i>Morone</i> sp.	<i>Neogobius melanostomus</i>	<i>Notemigonus crysoleucas</i>	<i>Notropis atherinoides</i>	<i>Notropis buchanani</i>	<i>Notropis hudsonius</i>	<i>Notropis</i> sp.	<i>Notropis volucellus</i>	<i>Noturus gyrinus</i>	<i>Opsopoeodus emiliae</i>	<i>Perca flavescens</i>	<i>Percina caprodes</i>	<i>Percina maculata</i>	<i>Pimephales notatus</i>	<i>Pimephales</i> sp.	<i>Pomoxis annularis</i>	<i>Pomoxis nigromaculatus</i>	<i>Pomoxis</i> sp.	<i>Proterorhinus semilunaris</i>	Total captured
SN-01	1	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	164	
SN-01	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	
SN-01	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
SN-02	1	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	497	
SN-02	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	186	
SN-02	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	
SN-03	1	0	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	39	
SN-03	2	0	0	0	0	0	1	0	4	0	0	0	0	0	1	0	0	0	0	0	0	0	0	51	
SN-03	3	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	
SN-04	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	138	
SN-04	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	
SN-04	3	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	
SN-05	1	0	0	0	2	0	0	0	0	0	0	0	0	0	8	2	1	0	0	0	1	0	0	47	
SN-05	2	0	0	0	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	6	
SN-05	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
SN-06	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2	0	0	122	
SN-06	2	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	62	
SN-06	3	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	62	
SN-07	1	0	0	2	36	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	243	
SN-07	2	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	62	
SN-07	3	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	19	
SN-08	1	0	0	0	0	0	0	4	2	0	0	0	0	0	4	0	0	0	0	0	0	1	0	301	
SN-08	2	0	0	0	0	0	0	1	6	0	0	0	0	0	3	0	0	0	0	0	0	0	0	125	
SN-08	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72	
SN-09	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	229	
SN-09	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	95	
SN-09	3	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	162	
SN-10	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	207	
SN-10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	

Site code	Sampling pass	<i>Micropterus dolomieu</i>	<i>Micropterus salmoides</i>	<i>Morone americana</i>	<i>Morone chrysops</i>	<i>Morone</i> sp.	<i>Neogobius melanostomus</i>	<i>Notemigonus crysoleucas</i>	<i>Notropis atherinoides</i>	<i>Notropis buchanaui</i>	<i>Notropis hudsonius</i>	<i>Notropis</i> sp.	<i>Notropis volucellus</i>	<i>Noturus gyrinus</i>	<i>Opsopoeodus emiliae</i>	<i>Perca flavescens</i>	<i>Percina caprodes</i>	<i>Percina maculata</i>	<i>Pimephales notatus</i>	<i>Pimephales</i> sp.	<i>Pomoxis annularis</i>	<i>Pomoxis nigromaculatus</i>	<i>Pomoxis</i> sp.	<i>Proterorhinus semilunaris</i>	Total captured
SN-10	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	
SN-11	1	0	0	0	3	0	0	1	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	316
SN-11	2	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	78
SN-11	3	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	31
SN-12	1	0	1	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	115
SN-12	2	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53
SN-12	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35
SN-13	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	48
SN-13	2	1	0	0	0	0	1	0	2	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	28
SN-13	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4
SN-14	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	307
SN-14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
SN-14	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56
SN-15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	61
SN-15	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79
SN-15	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
SN-16	1	0	0	0	0	0	6	0	1	1	0	0	0	0	4	0	0	0	0	0	1	0	0	0	67
SN-16	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62
SN-16	3	0	0	1	0	0	2	0	1	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	36
SN-17	1	0	0	0	0	0	0	1	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	335
SN-17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81
SN-17	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46
SN-18	1	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	1	1	26	0	97
SN-18	2	0	0	0	0	0	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	19	0	58
SN-18	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	17	0	26
SN-19	1	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	47	0	60
SN-19	2	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	12	0	32
SN-19	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	10	0	16
SN-20	1	0	0	0	0	0	1	0	0	0	0	0	34	0	0	0	0	0	0	0	0	0	89	0	260
SN-20	2	0	0	0	0	0	0	1	0	5	0	0	0	0	0	0	0	0	0	0	0	0	19	0	69
SN-20	3	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	27	0	64
SN-21	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
SN-21	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2

Site code	Sampling pass	<i>Micropterus dolomieu</i>	<i>Micropterus salmoides</i>	<i>Morone americana</i>	<i>Morone chrysops</i>	<i>Morone</i> sp.	<i>Neogobius melanostomus</i>	<i>Notemigonus crysoleucas</i>	<i>Notropis atherinoides</i>	<i>Notropis buchanani</i>	<i>Notropis hudsonius</i>	<i>Notropis</i> sp.	<i>Notropis volucellus</i>	<i>Noturus gyrinus</i>	<i>Opsopoeodus emiliae</i>	<i>Perca flavescens</i>	<i>Percina caprodes</i>	<i>Percina maculata</i>	<i>Pimephales notatus</i>	<i>Pimephales</i> sp.	<i>Pomoxis annularis</i>	<i>Pomoxis nigromaculatus</i>	<i>Pomoxis</i> sp.	<i>Proterorhinus semilunaris</i>	Total captured
SN-21	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	
SN-22	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	114	
SN-22	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	30	
SN-22	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	24	
SN-23	1	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	38	0	178
SN-23	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	163	
SN-23	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	59	
SN-24	1	0	0	0	0	0	0	17	11	0	0	0	0	0	0	0	0	0	0	0	0	186	0	295	
SN-24	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7	
SN-24	3	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	5	0	17	
SN-25	1	0	0	0	0	0	6	1	1	1	0	0	0	0	0	0	0	1	0	0	0	139	0	457	
SN-25	2	0	0	0	0	0	6	1	0	0	0	0	0	0	1	0	0	0	0	0	0	39	0	92	
SN-25	3	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	3	0	0	0	0	81	0	170	
SN-26	1	0	1	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	1	0	0	66	0	120	
SN-26	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	26	0	46	
SN-26	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	12	
SN-27	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104	
SN-27	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	40	
SN-27	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	15	
SN-28	1	0	0	0	4	0	0	0	8	0	0	0	0	0	8	2	0	0	0	0	0	1	0	117	
SN-28	2	0	0	0	1	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0	0	2	31	0	98
SN-28	3	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	20	
SN-29	1	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	284	
SN-29	2	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	
SN-29	3	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74	
SN-30	1	0	0	1	0	0	0	3	0	1	0	1	0	0	9	1	0	0	0	0	0	0	0	124	
SN-30	2	0	0	1	0	0	0	3	22	1	0	0	0	0	6	0	0	0	0	0	0	0	0	70	
SN-30	3	0	0	0	0	0	0	0	8	0	0	0	0	0	5	0	0	0	0	0	0	0	0	30	
SN-31	1	0	0	0	0	0	0	4	3	0	0	0	0	1	10	0	0	0	0	0	1	0	0	107	
SN-31	2	0	0	0	0	0	0	12	1	0	0	0	0	0	8	0	0	0	0	0	0	0	0	76	
SN-31	3	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	43	
SN-32	1	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181	
SN-32	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	

Site code	Sampling pass	<i>Micropterus dolomieu</i>	<i>Micropterus salmoides</i>	<i>Morone americana</i>	<i>Morone chrysops</i>	<i>Morone</i> sp.	<i>Neogobius melanostomus</i>	<i>Notemigonus crysoleucas</i>	<i>Notropis atherinoides</i>	<i>Notropis buchhanani</i>	<i>Notropis hudsonius</i>	<i>Notropis</i> sp.	<i>Notropis volucellus</i>	<i>Noturus gyrinus</i>	<i>Opsopoeodus emiliae</i>	<i>Perca flavescens</i>	<i>Percina caprodes</i>	<i>Percina maculata</i>	<i>Pimephales notatus</i>	<i>Pimephales</i> sp.	<i>Pomoxis annularis</i>	<i>Pomoxis nigromaculatus</i>	<i>Pomoxis</i> sp.	<i>Proterorhinus semilunaris</i>	Total captured
SN-32	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
SN-33	1	0	0	1	0	5	0	4	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	128
SN-33	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
SN-33	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	37
TR-01	1	0	0	1	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	54
TR-01	2	0	0	0	0	3	0	0	13	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	64
TR-01	3	0	0	0	0	2	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59
TR-02	1	0	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	27
TR-02	2	0	0	0	0	1	0	0	4	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	29
TR-02	3	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
TR-03	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	59
TR-03	2	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
TR-03	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
TR-04	1	0	0	0	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	101
TR-04	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	25
TR-04	3	0	0	0	1	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	22
TR-05	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
TR-05	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7
TR-05	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
TR-06	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0	1	0	31
TR-06	2	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	9
TR-06	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	7
TR-07	1	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5
TR-07	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
TR-07	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-08	1	0	0	0	1	0	0	0	13	1	0	0	0	0	0	0	0	0	0	0	8	0	10	0	411
TR-08	2	0	0	0	0	0	0	0	41	0	0	0	23	0	0	0	0	0	0	0	5	0	0	0	174
TR-08	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	264
TR-09	1	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	161
TR-09	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
TR-09	3	0	0	0	0	0	0	0	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
TR-10	1	0	0	0	3	0	0	0	9	33	0	0	0	0	0	0	0	0	0	0	2	0	2	0	96
TR-10	2	0	0	0	0	0	0	0	4	1	0	12	0	0	0	0	0	0	0	0	0	0	0	0	72

Site code	Sampling pass	<i>Micropterus dolomieu</i>	<i>Micropterus salmoides</i>	<i>Morone americana</i>	<i>Morone chrysops</i>	<i>Morone</i> sp.	<i>Neogobius melanostomus</i>	<i>Notemigonus crysoleucas</i>	<i>Notropis atherinoides</i>	<i>Notropis buchhanani</i>	<i>Notropis hudsonius</i>	<i>Notropis</i> sp.	<i>Notropis volucellus</i>	<i>Noturus gyrinus</i>	<i>Opsopoeodus emiliae</i>	<i>Perca flavescens</i>	<i>Percina caprodes</i>	<i>Percina maculata</i>	<i>Pimephales notatus</i>	<i>Pimephales</i> sp.	<i>Pomoxis annularis</i>	<i>Pomoxis nigromaculatus</i>	<i>Pomoxis</i> sp.	<i>Proterorhinus semilunaris</i>	Total captured
TR-10	3	0	0	0	2	0	0	0	4	0	0	0	22	0	0	0	0	0	0	0	3	0	6	0	92
TR-11	1	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	1	1	0	214
TR-11	2	0	0	0	0	0	0	0	5	0	0	0	13	0	0	0	0	0	0	3	0	0	0	0	144
TR-11	3	0	0	0	0	0	0	0	18	0	0	0	8	0	0	0	0	0	0	1	0	1	0	0	187
TR-12	1	0	0	0	0	0	0	0	250	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	262
TR-12	2	0	0	0	0	0	0	0	250	0	0	0	61	0	0	0	0	0	0	0	0	0	0	0	312
TR-12	3	0	0	0	0	0	0	0	225	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	245
TR-13	1	0	16	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	279
TR-13	2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	260
TR-13	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71
TR-14	1	0	0	0	0	0	0	5	5	0	0	0	11	0	0	1	0	0	1	0	0	0	0	0	40
TR-14	2	0	0	0	2	0	0	0	1	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	34
TR-14	3	0	0	0	0	0	0	0	4	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	16
TR-15	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	70
TR-15	2	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	86
TR-15	3	0	0	0	0	0	0	1	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	56
TR-16	1	0	0	0	0	0	0	0	189	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	201
TR-16	2	0	0	0	0	0	0	0	250	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	251
TR-16	3	0	0	0	0	0	0	0	250	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	252
TR-17	1	0	0	0	1	0	0	1	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96
TR-17	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
TR-17	3	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
TR-18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
TR-18	2	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
TR-18	3	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
TR-19	1	0	0	0	1	0	0	1	0	2	3	0	2	0	67	0	0	0	7	0	2	2	0	0	427
TR-19	2	0	0	0	0	0	0	0	1	0	1	0	0	0	26	0	0	0	0	0	2	3	0	0	257
TR-19	3	0	0	0	0	0	0	0	0	0	2	0	0	0	14	0	0	0	0	1	3	0	0	0	91
TR-20	1	0	1	0	0	0	0	0	0	0	5	0	250	0	0	0	0	0	24	0	0	0	0	0	315
TR-20	2	0	0	0	0	0	0	0	0	0	54	0	20	0	0	0	0	0	44	0	0	0	0	0	153
TR-20	3	0	2	0	0	0	0	0	0	0	56	0	19	0	0	0	0	0	52	0	0	0	0	0	170
TR-21	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	94
TR-21	2	0	1	0	0	0	0	18	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	97

Site code	Sampling pass	<i>Micropterus dolomieu</i>	<i>Micropterus salmoides</i>	<i>Morone americana</i>	<i>Morone chrysops</i>	<i>Morone</i> sp.	<i>Neogobius melanostomus</i>	<i>Notemigonus crysoleucas</i>	<i>Notropis atherinoides</i>	<i>Notropis buchhanani</i>	<i>Notropis hudsonius</i>	<i>Notropis</i> sp.	<i>Notropis volucellus</i>	<i>Noturus gyrinus</i>	<i>Opsopoeodus emiliae</i>	<i>Perca flavescens</i>	<i>Percina caprodes</i>	<i>Percina maculata</i>	<i>Pimephales notatus</i>	<i>Pimephales</i> sp.	<i>Pomoxis annularis</i>	<i>Pomoxis nigromaculatus</i>	<i>Pomoxis</i> sp.	<i>Proterorhinus semilunaris</i>	Total captured
TR-21	3	0	2	0	0	0	0	13	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	58
TR-22	1	0	1	0	0	0	0	0	7	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	411
TR-22	2	0	0	0	0	0	0	0	46	0	1	0	5	0	0	0	0	0	3	0	0	0	0	0	193
TR-22	3	0	1	0	0	0	0	0	19	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	313
TR-23	1	0	6	0	0	0	1	0	0	0	0	0	3	0	0	3	0	0	26	0	0	1	0	0	227
TR-23	2	0	7	0	0	0	0	4	0	0	1	0	2	0	0	5	0	0	27	0	0	0	0	1	270
TR-23	3	0	4	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	14	0	0	0	0	0	152
TR-24	1	0	0	0	0	0	0	20	0	0	0	0	0	0	29	2	0	0	9	0	0	0	0	0	313
TR-24	2	0	1	0	0	0	0	0	2	0	0	0	0	0	12	0	0	0	2	0	0	0	0	0	72
TR-24	3	0	0	0	0	0	0	2	0	0	0	0	1	0	4	0	0	0	0	0	0	0	0	0	27
TR-25	1	0	0	0	0	0	0	1	3	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	9
TR-25	2	0	0	0	0	0	0	1	3	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	12
TR-25	3	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	36
TR-26	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
TR-26	2	0	0	0	3	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
TR-26	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
TR-27	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
TR-27	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
TR-27	3	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
TR-28	1	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
TR-28	2	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
TR-28	3	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	9
TR-29	1	0	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
TR-29	2	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
TR-29	3	0	0	0	0	0	0	0	1	0	0	0	1	0	11	0	0	0	0	0	1	0	0	0	23
TR-30	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
TR-30	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39
TR-30	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
TR-31	1	0	0	0	0	0	0	0	1	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	83
TR-31	2	0	0	0	0	0	0	0	7	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	66
TR-31	3	0	0	0	0	0	0	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	24
TR-32	1	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
TR-32	2	0	0	0	0	0	0	0	2	0	0	0	5	0	1	0	0	0	0	0	0	0	0	0	20

Site code	Sampling pass	<i>Micropterus dolomieu</i>	<i>Micropterus salmoides</i>	<i>Morone americana</i>	<i>Morone chrysops</i>	<i>Morone</i> sp.	<i>Neogobius melanostomus</i>	<i>Notemigonus crysoleucas</i>	<i>Notropis atherinoides</i>	<i>Notropis buchanani</i>	<i>Notropis hudsonius</i>	<i>Notropis</i> sp.	<i>Notropis volucellus</i>	<i>Noturus gyrinus</i>	<i>Opsopoeodus emiliae</i>	<i>Perca flavescens</i>	<i>Percina caprodes</i>	<i>Percina maculata</i>	<i>Pimephales notatus</i>	<i>Pimephales</i> sp.	<i>Pomoxis annularis</i>	<i>Pomoxis nigromaculatus</i>	<i>Pomoxis</i> sp.	<i>Proterorhinus semilunaris</i>	Total captured
TR-32	3	0	0	0	0	0	0	0	1	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	62
TR-33	1	0	0	0	0	0	0	0	1	1	0	2	0	0	1	0	0	0	0	0	0	0	0	0	31
TR-33	2	0	0	0	0	0	0	0	2	0	0	0	2	0	2	0	0	0	0	0	1	0	0	0	30
TR-33	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
TR-34	1	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	41
TR-34	2	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	27
TR-34	3	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	38
TR-35	1	0	0	0	0	0	0	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	22
TR-35	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	12
TR-35	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	14
TR-36	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
TR-36	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
TR-36	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
TR-37	1	0	0	0	0	0	0	0	1	0	0	0	2	0	7	0	0	0	0	0	1	0	0	0	54
TR-37	2	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	58
TR-37	3	0	0	0	0	0	0	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	36
TR-38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TR-38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
TR-38	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TR-39	1	0	0	0	0	0	0	0	14	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	18
TR-39	2	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
TR-39	3	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
TR-40	1	0	0	0	1	0	0	0	4	0	0	1	0	0	1	0	0	0	0	0	0	0	3	0	55
TR-40	2	0	0	0	0	0	0	0	4	0	1	0	1	0	8	0	0	0	0	0	1	0	0	0	56
TR-40	3	0	0	0	0	0	0	0	0	0	0	1	1	0	5	0	0	0	0	0	0	0	0	0	21
TR-41	1	0	3	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	156
TR-41	2	0	2	0	0	0	0	4	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	215
TR-41	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	51

Appendix 3. Individual total length (mm) of all Pugnose Minnow captured in the Canard River, 2018 (n=294).

Site code	Pugnose Minnow total length (mm)
SN-03	18
SN-03	22
SN-03	21
SN-05	31
SN-05	29
SN-05	26
SN-05	22
SN-05	29
SN-05	23
SN-05	29
SN-05	49
SN-05	25
SN-06	51
SN-07	25
SN-07	26
SN-08	23
SN-08	21
SN-08	53
SN-08	52
SN-08	50
SN-08	35
SN-08	24
SN-09	55
SN-10	28
SN-11	24
SN-11	26
SN-11	21
SN-11	22
SN-11	22
SN-11	26
SN-11	24
SN-15	27
SN-16	24
SN-16	30
SN-16	25
SN-16	26
SN-16	26
SN-16	21

Site code	Pugnose Minnow total length (mm)
SN-25	22
SN-28	27
SN-28	26
SN-28	32
SN-28	22
SN-28	34
SN-28	29
SN-28	28
SN-28	30
SN-28	33
SN-28	55
SN-30	21
SN-30	29
SN-30	21
SN-30	30
SN-30	32
SN-30	27
SN-30	28
SN-30	19
SN-30	29
SN-30	28
SN-30	30
SN-30	24
SN-30	27
SN-30	20
SN-30	25
SN-30	35
SN-30	18
SN-30	29
SN-30	26
SN-30	27
SN-31	29
SN-31	27
SN-31	28
SN-31	30
SN-31	30
SN-31	29
SN-31	19
SN-31	27
SN-31	35
SN-31	27

Site code	Pugnose Minnow total length (mm)
SN-31	21
SN-31	27
SN-31	27
SN-31	30
SN-31	34
SN-31	30
SN-31	26
SN-31	27
SN-31	31
SN-31	26
SN-33	54
SN-33	32
SN-33	51
SN-33	54
TR-04	22
TR-19	33
TR-19	30
TR-19	33
TR-19	39
TR-19	39
TR-19	36
TR-19	29
TR-19	38
TR-19	33
TR-19	35
TR-19	30
TR-19	33
TR-19	28
TR-19	30
TR-19	29
TR-19	32
TR-19	36
TR-19	33
TR-19	32
TR-19	32
TR-19	36
TR-19	27
TR-19	34
TR-19	34
TR-19	32
TR-19	32

Site code	Pugnose Minnow total length (mm)
TR-19	33
TR-19	33
TR-19	34
TR-19	28
TR-19	33
TR-19	31
TR-19	32
TR-19	29
TR-19	29
TR-19	31
TR-19	34
TR-19	33
TR-19	34
TR-19	29
TR-19	34
TR-19	34
TR-19	27
TR-19	28
TR-19	38
TR-19	26
TR-19	32
TR-19	35
TR-19	30
TR-19	37
TR-19	39
TR-19	35
TR-19	27
TR-19	30
TR-19	30
TR-19	37
TR-19	34
TR-19	28
TR-19	27
TR-19	29
TR-19	34
TR-19	32
TR-19	31
TR-19	30
TR-19	34
TR-19	28
TR-19	32

Site code	Pugnose Minnow total length (mm)
TR-19	37
TR-19	35
TR-19	34
TR-19	34
TR-19	33
TR-19	36
TR-19	27
TR-19	35
TR-19	34
TR-19	33
TR-19	34
TR-19	33
TR-19	29
TR-19	37
TR-19	34
TR-19	33
TR-19	34
TR-19	35
TR-19	35
TR-19	33
TR-19	30
TR-19	36
TR-19	32
TR-19	34
TR-19	30
TR-19	31
TR-19	30
TR-19	27
TR-19	34
TR-19	31
TR-19	31
TR-19	33
TR-19	31
TR-19	33
TR-19	33
TR-19	31
TR-19	36
TR-19	29
TR-19	34
TR-19	28
TR-22	35

Site code	Pugnose Minnow total length (mm)
TR-22	35
TR-22	34
TR-22	37
TR-24	38
TR-24	40
TR-24	53
TR-24	39
TR-24	34
TR-24	36
TR-24	38
TR-24	40
TR-24	35
TR-24	33
TR-24	36
TR-24	33
TR-24	36
TR-24	35
TR-24	33
TR-24	37
TR-24	40
TR-24	32
TR-24	45
TR-24	40
TR-24	36
TR-24	37
TR-24	31
TR-24	35
TR-24	33
TR-24	30
TR-24	34
TR-24	33
TR-24	35
TR-24	35
TR-24	39
TR-24	35
TR-24	34
TR-24	37
TR-24	31
TR-24	38
TR-24	37
TR-24	40

Site code	Pugnose Minnow total length (mm)
TR-24	43
TR-24	29
TR-24	37
TR-24	38
TR-24	39
TR-24	31
TR-24	36
TR-28	35
TR-29	36
TR-29	29
TR-29	28
TR-29	36
TR-29	27
TR-29	38
TR-29	31
TR-29	34
TR-29	40
TR-29	37
TR-29	35
TR-32	30
TR-33	38
TR-33	30
TR-33	30
TR-37	33
TR-37	28
TR-37	32
TR-37	34
TR-37	27
TR-37	36
TR-37	31
TR-37	30
TR-37	34
TR-37	39
TR-37	30
TR-37	32
TR-37	34
TR-39	38
TR-40	29
TR-40	25
TR-40	32
TR-40	32

Site code	Pugnose Minnow total length (mm)
TR-40	30
TR-40	29
TR-40	26
TR-40	26
TR-40	30
TR-40	29
TR-40	30
TR-40	30
TR-40	30
TR-40	36

Appendix 4. Abiotic habitat features measured at each sampling site on the Canard River, 2018.

Site code	Air temperature (°C)	Water temperature (°C)	Conductivity (µS)	Dissolved oxygen (mg/L)	pH	Turbidity tube (m)	Turbidity (NTU)	Mean depth (m)	Depth (m) 1	Depth (m) 2	Depth (m) 3	Substrate type, percent composition (%)												Dominant substrate type
												Organic	Clay	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Rubble	Concrete	No data	
SN-01	28.30	26.70	692.2	9.10	8.39	0.19	38.48	1.02	0.99	1.01	1.05	0	0	65	0	30	0	5	0	0	0	0	-	Silt
SN-02	28.30	26.97	695.4	10.31	8.54	0.18	50.62	0.74	0.40	0.85	0.96	5	5	25	25	35	0	5	0	0	0	0	-	Gravel
SN-03	27.20	27.00	684.6	11.09	8.64	0.14	44.69	0.91	0.94	1.02	0.77	5	10	80	5	0	0	0	0	0	0	0	-	Silt
SN-04	30.10	27.74	692.1	11.38	8.58	0.16	26.55	0.96	0.92	0.97	1.00	50	20	30	0	0	0	0	0	0	0	0	-	Organic
SN-05	28.30	27.62	683.0	9.84	8.43	0.16	34.66	1.09	1.03	1.10	1.14	40	20	20	0	20	0	0	0	0	0	0	-	Organic
SN-06	32.50	29.00	697.4	9.66	9.16	0.19	31.41	0.97	0.70	1.07	1.13	20	10	20	0	10	10	30	0	0	0	0	-	Boulder
SN-07	21.90	24.87	610.0	6.74	8.33	0.10	42.82	1.07	1.04	1.06	1.10	5	0	20	45	30	0	0	0	0	0	0	-	Sand
SN-08	23.40	25.17	600.7	6.91	8.30	0.17	25.68	0.88	0.98	0.68	0.99	0	0	10	85	5	0	0	0	0	0	0	-	Sand
SN-09	28.50	25.81	598.3	8.07	8.34	0.16	37.70	1.09	1.08	1.11	1.07	10	0	70	20	0	0	0	0	0	0	0	-	Silt
SN-10	28.00	26.60	542.4	7.52	8.31	0.17	49.65	1.02	0.98	1.03	1.04	40	0	40	10	10	0	0	0	0	0	0	-	Silt
SN-11	29.10	27.38	621.7	9.76	8.53	0.18	34.62	0.96	0.82	0.98	1.08	-	-	-	-	-	-	-	-	-	-	100	No Data	
SN-12	32.70	25.53	647.2	5.75	7.89	0.27	13.08	0.84	0.80	0.86	0.87	20	25	50	5	0	0	0	0	0	0	0	-	Silt
SN-13	28.50	29.45	403.9	9.79	8.74	0.29	13.69	0.89	0.80	0.85	1.02	0	30	50	20	0	0	0	0	0	0	0	-	Silt
SN-14	17.50	24.42	727.1	7.21	8.44	0.12	57.56	0.73	0.64	0.84	0.71	70	0	20	0	0	0	10	0	0	0	0	-	Organic
SN-15	33.20	29.56	709.9	6.77	8.26	0.16	37.96	1.08	1.06	1.07	1.11	40	0	50	0	0	0	0	0	0	10	0	-	Silt
SN-16	31.50	29.78	699.4	6.90	8.20	0.15	38.76	1.03	0.83	1.10	1.15	20	0	25	0	50	0	5	0	0	0	0	-	Gravel
SN-17	30.20	30.01	705.0	6.79	8.19	0.20	32.15	0.93	0.83	0.96	1.00	30	0	50	5	10	0	5	0	0	0	0	-	Silt
SN-18	24.80	25.68	1434.6	7.54	8.36	0.17	33.95	1.04	0.92	1.03	1.16	10	5	45	40	0	0	0	0	0	0	0	-	Silt
SN-19	29.10	25.52	1091.0	6.74	8.16	0.18	29.34	0.95	0.85	0.96	1.03	30	0	20	50	0	0	0	0	0	0	0	-	Sand
SN-20	28.80	26.58	949.9	6.46	8.03	0.15	40.67	0.76	0.73	0.74	0.82	50	0	30	20	0	0	0	0	0	0	0	-	Organic
SN-21	29.90	27.47	811.8	5.10	7.90	0.22	16.81	0.87	0.84	0.86	0.90	80	0	20	0	0	0	0	0	0	0	0	-	Organic
SN-22	28.40	28.74	775.1	5.69	8.10	0.17	31.92	-	-	-	-	80	0	20	0	0	0	0	0	0	0	0	-	Organic
SN-23	26.80	29.46	764.5	8.17	8.28	0.14	37.33	0.97	1.10	0.75	1.05	0	0	30	10	40	0	20	0	0	0	0	-	Gravel
SN-24	32.00	28.70	757.8	6.12	8.06	0.22	26.10	0.93	0.90	0.93	0.97	80	0	20	0	0	0	0	0	0	0	0	-	Organic

Site code	Air temperature (°C)	Water temperature (°C)	Conductivity (µS)	Dissolved oxygen (mg/L)	pH	Turbidity tube (m)	Turbidity (NTU)	Mean depth (m)	Depth (m) 1	Depth (m) 2	Depth (m) 3	Substrate type, percent composition (%)													Dominant substrate type
												Organic	Clay	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Rubble	Concrete	No data		
SN-25	32.30	29.23	735.1	6.75	8.25	0.13	33.98	0.97	0.97	-	-	10	0	30	0	40	0	0	0	0	20	0	-	Gravel	
SN-26	20.20	24.51	594.0	2.12	8.08	0.25	16.32	0.85	0.89	0.87	0.78	30	0	65	5	0	0	0	0	0	0	0	-	Silt	
SN-27	22.60	24.90	565.6	3.24	8.08	0.26	29.47	0.94	1.02	0.93	0.87	60	0	35	5	0	0	0	0	0	0	0	-	Organic	
SN-28	27.20	25.75	579.9	5.56	8.08	0.14	30.56	0.97	1.02	0.96	0.92	30	0	50	20	0	0	0	0	0	0	0	-	Silt	
SN-29	29.30	24.48	612.5	1.33	7.68	1.07	8.84	0.85	0.78	0.91	0.85	80	0	20	0	0	0	0	0	0	0	0	-	Organic	
SN-30	29.20	26.93	624.7	7.23	8.16	0.14	39.99	0.98	0.95	0.95	1.05	15	0	30	45	10	0	0	0	0	0	0	-	Sand	
SN-31	23.70	26.94	566.5	7.17	8.24	0.21	27.44	0.99	1.01	1.01	0.95	30	0	50	20	0	0	0	0	0	0	0	-	Silt	
SN-32	24.70	26.49	500.2	7.62	8.50	0.21	28.33	0.93	0.66	1.15	0.98	20	0	40	0	0	0	40	0	0	0	0	-	Boulder	
SN-33	29.30	27.34	473.7	8.38	8.28	0.17	35.16	0.86	1.17	0.95	0.45	20	0	40	15	0	0	0	0	0	25	0	-	Silt	
TR-01	28.70	23.17	637.9	2.91	7.86	0.21	30.23	1.25	1.55	1.18	1.01	-	-	-	-	-	-	-	-	-	-	100	-	No Data	
TR-02	25.50	24.63	642.0	4.75	8.10	0.21	24.66	1.19	1.25	1.22	1.10	5	15	80	0	0	0	0	0	0	0	0	-	Silt	
TR-03	25.00	24.17	570.1	4.20	8.03	0.21	30.08	1.18	1.13	1.22	1.19	5	15	80	0	0	0	0	0	0	0	0	-	Silt	
TR-04	25.20	24.77	594.2	4.82	8.09	0.20	27.78	1.14	1.19	1.13	1.10	0	5	75	10	0	0	5	0	0	5	0	-	Silt	
TR-05	24.00	22.93	1557.5	4.44	8.14	0.36	13.86	1.36	1.37	1.34	1.37	0	5	50	0	45	0	0	0	0	0	0	-	Silt	
TR-06	26.50	23.64	1018.9	4.10	7.87	0.38	12.94	1.58	1.52	1.62	1.62	5	10	30	55	0	0	0	0	0	0	0	-	Sand	
TR-07	26.40	24.50	987.5	5.36	8.96	0.32	14.04	1.70	1.65	1.77	1.68	0	90	5	5	0	0	0	0	0	0	0	-	Clay	
TR-08	25.20	25.10	847.0	5.04	8.07	0.42	9.08	1.61	2.16	1.59	1.07	5	20	70	5	0	0	0	0	0	0	0	-	Silt	
TR-09	27.00	24.76	781.4	4.04	8.09	0.25	22.35	1.18	1.16	1.19	1.19	5	40	50	5	0	0	0	0	0	0	0	-	Silt	
TR-10	27.00	26.47	753.7	8.28	8.29	0.19	29.30	0.90	0.94	0.88	0.88	5	30	60	0	0	0	5	0	0	0	0	-	Silt	
TR-11	26.20	26.04	719.8	6.94	8.19	0.15	22.81	0.85	0.76	0.82	0.98	5	45	50	0	0	0	0	0	0	0	0	-	Silt	
TR-12	23.40	24.05	277.6	7.42	8.41	0.38	12.49	1.85	1.83	1.86	1.86	5	80	10	0	5	0	0	0	0	0	0	-	Clay	
TR-13	31.00	24.61	277.8	6.80	8.34	0.29	12.05	0.92	0.91	1.10	0.76	10	15	75	0	0	0	0	0	0	0	0	-	Silt	
TR-14	31.00	24.81	321.4	7.47	8.32	0.32	14.16	1.23	1.25	1.25	1.19	20	20	60	0	0	0	0	0	0	0	0	-	Silt	
TR-15	27.20	25.28	311.6	8.80	8.46	0.30	12.10	1.00	0.55	1.13	1.31	0	0	50	45	5	0	0	0	0	0	0	-	Silt	
TR-16	31.70	25.25	366.9	8.61	8.35	0.29	17.04	1.92	2.41	1.71	1.65	0	5	75	10	10	0	0	0	0	0	0	-	Silt	
TR-17	30.60	26.86	547.5	6.93	8.03	0.28	24.59	1.02	0.94	1.07	1.04	5	0	5	80	10	0	0	0	0	0	0	-	Sand	

Site code	Air temperature (°C)	Water temperature (°C)	Conductivity (µS)	Dissolved oxygen (mg/L)	pH	Turbidity tube (m)	Turbidity (NTU)	Mean depth (m)	Depth (m) 1	Depth (m) 2	Depth (m) 3	Substrate type, percent composition (%)												Dominant substrate type
												Organic	Clay	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Hardpan	Rubble	Concrete	No data	
TR-18	29.70	27.57	449.6	10.37	8.41	0.25	14.64	1.25	1.13	1.28	1.34	10	50	40	0	0	0	0	0	0	0	0	-	Clay
TR-19	29.00	26.78	346.7	10.31	8.58	0.33	11.81	1.25	1.22	1.25	1.28	0	0	30	30	10	30	0	0	0	0	0	-	Silt
TR-20	22.80	24.71	226.3	9.88	8.96	0.94	3.17	1.67	1.60	1.80	1.62	0	0	5	90	5	0	0	0	0	0	0	-	Sand
TR-21	23.30	24.60	257.2	9.06	8.79	0.37	11.60	1.44	1.55	1.43	1.34	10	70	20	0	0	0	0	0	0	0	0	-	Clay
TR-22	23.30	24.64	288.3	8.87	8.55	0.31	15.13	1.08	0.64	1.01	1.58	10	15	70	0	5	0	0	0	0	0	0	-	Silt
TR-23	23.70	25.35	248.8	7.37	8.59	0.41	10.16	1.17	1.05	1.35	1.11	0	0	10	80	10	0	0	0	0	0	0	-	Sand
TR-24	24.80	25.85	326.6	4.79	8.16	0.26	16.56	1.13	1.19	1.10	1.10	10	20	70	0	0	0	0	0	0	0	0	-	Silt
TR-25	25.00	26.48	377.0	5.96	8.20	0.20	30.58	1.40	1.20	1.50	1.50	10	30	60	0	0	0	0	0	0	0	0	-	Silt
TR-26	29.60	27.13	459.6	6.02	8.26	0.13	32.00	1.60	1.70	1.60	1.50	5	10	85	0	0	0	0	0	0	0	0	-	Silt
TR-27	29.31	27.11	484.3	5.30	8.09	0.19	31.17	1.53	1.40	1.50	1.70	0	20	80	0	0	0	0	0	0	0	0	-	Silt
TR-28	31.10	27.85	560.3	5.81	8.04	0.20	31.15	1.30	1.30	1.30	1.30	5	10	85	0	0	0	0	0	0	0	0	-	Silt
TR-29	30.90	28.25	549.3	6.52	8.16	0.18	30.56	1.13	1.10	1.10	1.20	5	10	45	0	10	0	0	0	0	30	0	-	Silt
TR-30	21.70	25.19	1033.9	1.85	8.06	0.47	8.08	0.67	0.60	0.70	0.70	15	20	65	0	0	0	0	0	0	0	0	-	Silt
TR-31	24.40	26.53	850.4	5.16	8.26	0.12	52.63	0.90	1.00	0.80	0.90	10	10	80	0	0	0	0	0	0	0	0	-	Silt
TR-32	25.80	26.86	876.2	4.08	8.09	0.20	25.68	0.87	1.00	0.70	0.90	10	25	65	0	0	0	0	0	0	0	0	-	Silt
TR-33	25.50	27.25	806.1	6.77	8.26	0.18	28.74	0.90	0.90	0.90	0.90	10	70	20	0	0	0	0	0	0	0	0	-	Clay
TR-34	29.10	27.97	771.1	7.89	8.56	0.18	29.12	0.87	0.90	0.80	0.90	5	5	90	0	0	0	0	0	0	0	0	-	Silt
TR-35	28.80	28.09	717.2	7.81	8.44	0.17	32.71	1.03	1.00	1.10	1.00	5	0	25	70	0	0	0	0	0	0	0	-	Sand
TR-36	29.00	28.11	771.3	7.68	8.47	0.16	29.36	1.20	1.30	1.20	1.10	5	10	85	0	0	0	0	0	0	0	0	-	Silt
TR-37	29.80	28.01	582.3	7.08	8.43	0.14	36.71	1.37	1.70	1.30	1.10	10	5	85	0	0	0	0	0	0	0	0	-	Organic
TR-38	23.40	26.26	279.8	6.80	8.80	0.41	9.56	1.60	1.70	1.60	1.50	15	5	70	5	5	0	0	0	0	0	0	-	Silt
TR-39	22.80	26.21	464.3	4.90	8.37	0.16	35.00	1.27	1.40	1.30	1.10	5	5	90	0	0	0	0	0	0	0	0	-	Silt
TR-40	23.20	26.12	452.0	6.00	8.32	0.14	42.54	1.00	0.90	1.00	1.10	15	10	75	0	0	0	0	0	0	0	0	-	Silt
TR-41	26.88	26.32	276.0	7.92	8.66	0.43	7.52	1.33	1.60	1.40	1.00	10	0	70	15	5	0	0	0	0	0	0	-	Silt

Appendix 5. Biotic habitat data from each site sampled in the Canard River, 2018, where aquatic and riparian vegetation were assessed and percent composition of each vegetation type was evaluated for a total of 100% for each aquatic and riparian vegetation types.

Site code	Aquatic vegetation type (%)				Dominant aquatic vegetation type	Dominant species of aquatic vegetation	Additional species of aquatic vegetation present	Riparian vegetation type (%)					Dominant riparian vegetation type	
	Emergent	Floating	Submerged	Open water				Deciduous	Coniferous	Herbaceous	Shrubs	None		Not recorded
SN-01	0	0	0	100	Open water	N/A	N/A	0	0	95	0	5	-	Herbaceous
SN-02	5	0	0	95	Open water	<i>Phragmites australis</i>	-	0	0	80	0	20	-	Herbaceous
SN-03	5	0	0	95	Open water	<i>Phragmites australis</i>	-	0	0	100	0	0	-	Herbaceous
SN-04	5	0	5	90	Open water	<i>Potamogeton natans</i>	<i>Phragmites australis</i>	0	0	100	0	0	-	Herbaceous
SN-05	5	0	0	95	Open water	<i>Phragmites australis</i>	-	10	0	90	0	0	-	Herbaceous
SN-06	20	5	0	75	Open water	<i>Poaceae</i>	white water-lily	5	0	85	0	10	-	Herbaceous
SN-07	5	0	0	95	Open water	<i>Phragmites australis</i>	-	0	0	100	0	0	-	Herbaceous
SN-08	10	20	5	65	Open water	<i>Nelumbo</i> sp.	<i>Phragmites australis</i> , floating-leaved pondweed, fern pondweed	0	0	100	0	0	-	Herbaceous
SN-09	10	10	5	75	Open water	<i>Nelumbo</i> sp.	<i>Phragmites australis</i> , coontail	0	0	100	0	0	-	Herbaceous
SN-10	10	30	5	55	Open water	<i>Nelumbo</i> sp.	<i>Phragmites australis</i> , coontail	0	0	100	0	0	-	Herbaceous
SN-11	0	10	0	90	Open water	<i>Nymphaea</i> sp.	-	40	0	20	0	40	-	Deciduous
SN-12	10	15	0	75	Open water	<i>Nymphaea</i> sp.	<i>Lemna</i> sp., <i>Phragmites australis</i>	0	0	100	0	0	-	Herbaceous
SN-13	5	5	5	85	Open water	<i>Nelumbo</i> sp.	<i>Phragmites australis</i> , <i>Potamogeton</i> sp.	60	0	5	20	15	-	Deciduous
SN-14	0	0	0	100	Open water	N/A	N/A	0	0	5	0	95	-	None
SN-15	5	0	0	95	Open water	N/A	N/A	0	0	30	70	0	-	Shrubs
SN-16	5	0	0	95	Open water	<i>Typha</i> sp.	<i>Phragmites australis</i>	5	0	95	0	0	-	Herbaceous
SN-17	5	50	0	45	Floating	<i>Nelumbo</i> sp.	<i>Phragmites australis</i>	0	0	90	0	10	-	Herbaceous
SN-18	0	5	5	90	Open water	<i>Potamogeton</i> sp.	<i>Lemna</i> sp.	50	0	0	50	0	-	Deciduous
SN-19	10	5	0	85	Open water	<i>Phragmites australis</i>	white water-lily	20	0	80	0	0	-	Herbaceous
SN-20	5	20	0	75	Open water	<i>Nymphaea</i> sp.	<i>Phragmites australis</i>	5	0	95	0	0	-	Herbaceous
SN-21	10	5	0	85	Open water	<i>Phragmites australis</i>	<i>Lemna</i> sp., white water-lily	0	0	100	0	0	-	Herbaceous
SN-22	5	15	0	80	Open water	<i>Nelumbo</i> sp.	<i>Phragmites australis</i>	0	0	100	0	0	-	Herbaceous
SN-23	10	5	0	85	Open water	<i>Phragmites australis</i>	Joe Pye weed, willow shrub/tree	20	0	45	20	15	-	Herbaceous
SN-24	10	0	0	90	Open water	<i>Typha</i> sp.	-	0	0	100	0	0	-	Herbaceous
SN-25	5	5	0	90	Open water	<i>Typha</i> sp.	Arrowhead, Joe Pye weed, <i>Lemna</i> sp	5	0	55	0	40	-	Herbaceous

Site code	Aquatic vegetation type (%)				Dominant aquatic vegetation type	Dominant species of aquatic vegetation	Additional species of aquatic vegetation present	Riparian vegetation type (%)					Dominant riparian vegetation type	
	Emergent	Floating	Submerged	Open water				Deciduous	Coniferous	Herbaceous	Shrubs	None		Not recorded
SN-26	15	15	5	65	Open water	<i>Ceratophyllum demersum</i>	white water-lily, <i>Lemna</i> sp., <i>Phragmites australis</i>	0	0	100	0	0	-	Herbaceous
SN-27	15	5	0	80	Open water	<i>Phragmites australis</i>	lotus, <i>Lemna</i> sp.	5	0	95	0	0	-	Herbaceous
SN-28	10	5	5	80	Open water	<i>Phragmites australis</i>	white water-lily, fern pondweed	0	0	100	0	0	-	Herbaceous
SN-29	5	5	80	10	Submerged	<i>Ceratophyllum demersum</i>	fern pondweed, <i>Lemna</i> sp., <i>Phragmites australis</i>	0	0	100	0	0	-	Herbaceous
SN-30	15	0	5	80	Open water	<i>Phragmites australis</i>	coontail	0	0	100	0	0	-	Herbaceous
SN-31	10	20	5	65	Open water	<i>Phragmites australis</i>	lotus, white water-lily, coontail	0	0	100	0	0	-	Herbaceous
SN-32	10	10	5	75	Open water	<i>Sparganium</i> sp.	water celery, coontail, white water-lily	0	0	0	0	100	-	None
SN-33	5	30	5	60	Open water	<i>Nelumbo</i> sp.	<i>Phragmites australis</i> , coontail	5	0	95	0	0	-	Herbaceous
TR-01	0	0	0	100	Open water	N/A	N/A	10	0	90	0	0	-	Herbaceous
TR-02	0	0	0	100	Open water	N/A	N/A	-	-	-	-	-	100	Not recorded
TR-03	0	15	0	85	Open water	<i>Nelumbo</i> sp.	-	-	-	-	-	-	100	Not recorded
TR-04	5	0	5	90	Open water	<i>Phragmites australis</i>	-	10	0	80	0	10	-	Herbaceous
TR-05	0	0	0	100	Open water	N/A	N/A	60	0	40	0	0	-	Deciduous
TR-06	0	0	0	100	Open water	N/A	N/A	60	0	40	0	0	-	Deciduous
TR-07	5	0	0	95	Open water	<i>Phragmites australis</i>	-	5	0	95	0	0	-	Herbaceous
TR-08	0	25	0	75	Open water	<i>Nymphaea</i> sp.	-	5	0	95	0	0	-	Herbaceous
TR-09	0	0	0	100	Open water	<i>Phragmites australis</i>	-	0	0	100	0	0	-	Herbaceous
TR-10	0	5	0	95	Open water	<i>Nymphaea</i> sp.	-	5	0	15	0	80	-	None
TR-11	0	35	0	65	Open water	<i>Nelumbo</i> sp.	-	0	0	0	0	100	-	None
TR-12	0	10	15	75	Open water	<i>Nelumbo</i> sp.	coontail	0	0	0	0	100	-	None
TR-13	0	5	60	35	Submerged	<i>Myriophyllum</i> sp.	water celery, white water-lily, coontail	0	0	100	0	0	-	Herbaceous
TR-14	0	20	0	80	Open water	<i>Nelumbo</i> sp.	-	-	-	-	-	-	100	Not recorded
TR-15	0	35	5	60	Open water	<i>Nelumbo</i> sp.	<i>Milfoil</i> sp., <i>Phragmites australis</i> , coontail	0	0	100	0	0	-	Herbaceous
TR-16	0	0	0	100	Open water	N/A	N/A	-	-	-	-	-	100	Not recorded
TR-17	0	0	0	100	Open water	N/A	<i>Phragmites australis</i>	0	0	100	0	0	-	Herbaceous
TR-18	0	10	0	90	Open water	<i>Nelumbo</i> sp.	-	0	0	100	0	0	-	Herbaceous

Site code	Aquatic vegetation type (%)				Dominant aquatic vegetation type	Dominant species of aquatic vegetation	Additional species of aquatic vegetation present	Riparian vegetation type (%)					Dominant riparian vegetation type	
	Emergent	Floating	Submerged	Open water				Deciduous	Coniferous	Herbaceous	Shrubs	None		Not recorded
TR-19	0	5	40	55	Open water	<i>Vallisneria americana</i>	white water-lily, <i>Phragmites australis</i>	50	0	50	0	0	-	Deciduous
TR-20	0	0	80	20	Submerged	<i>Vallisneria americana</i>	<i>Milfoil</i> sp., Richardson's pondweed	-	-	-	-	-	100	Not recorded
TR-21	0	0	35	65	Open water	<i>Vallisneria americana</i>	coontail, <i>Milfoil</i> sp.	60	0	30	0	10	-	Deciduous
TR-22	0	0	65	35	Submerged	<i>Vallisneria americana</i>	-	0	0	100	0	0	-	Herbaceous
TR-23	0	0	90	10	Submerged	<i>Vallisneria americana</i>	<i>Milfoil</i> sp.	-	-	-	-	-	100	Not recorded
TR-24	0	5	15	80	Open water	<i>Vallisneria americana</i>	<i>Milfoil</i> sp., white water-lily	5	0	95	0	0	-	Herbaceous
TR-25	0	20	0	80	Open water	<i>Nelumbo</i> sp.	coontail, willow	90	0	0	10	0	-	Deciduous
TR-26	0	10	5	85	Open water	<i>Nelumbo</i> sp.	Richardson's pondweed, coontail	0	0	100	0	0	-	Herbaceous
TR-27	0	0	0	100	Open water	N/A	N/A	-	-	-	-	-	100	Not recorded
TR-28	0	15	0	85	Open water	<i>Nelumbo</i> sp.	<i>Phragmites australis</i>	0	0	100	0	0	-	Herbaceous
TR-29	0	5	5	90	Open water	<i>Potamogeton robbinsii</i>	water celery, white water-lily	40	0	10	30	20	-	Deciduous
TR-30	5	0	0	95	Open water	<i>Phragmites australis</i>	white water-lily	0	0	100	0	0	-	Herbaceous
TR-31	0	25	0	75	Open water	<i>Nelumbo</i> sp.	-	10	0	90	0	0	-	Herbaceous
TR-32	0	5	0	95	Open water	<i>Nymphaea</i> sp.	shoreline vegetation is grapevines and deciduous trees	80	0	20	0	0	-	Deciduous
TR-33	5	5	0	90	Open water	<i>Phragmites australis</i>	white water-lily	5	0	95	0	0	-	Herbaceous
TR-34	5	0	0	95	Open water	<i>Phragmites australis</i>	-	0	0	100	0	0	-	Herbaceous
TR-35	5	0	5	90	Open water	<i>Phragmites australis</i>	fern pondweed	50	0	50	0	0	-	Deciduous
TR-36	0	0	0	100	Open water	N/A	N/A	-	-	-	-	-	100	Not recorded
TR-37	5	5	5	85	Open water	<i>Phragmites australis</i>	white water lily, fern pondweed	15	0	75	0	10	-	Herbaceous
TR-38	5	5	15	75	Open water	<i>Vallisneria americana</i>	<i>Phragmites australis</i> , white water-lily, <i>Milfoil</i> sp.	40	0	60	0	0	-	Herbaceous
TR-39	0	10	0	90	Open water	<i>Nelumbo</i> sp.	<i>Phragmites australis</i>	0	0	100	0	0	-	Herbaceous
TR-40	0	10	5	85	Open water	<i>Nelumbo</i> sp.	white water-lily, fern pondweed	20	0	80	0	0	-	Herbaceous
TR-41	5	0	25	70	Open water	<i>Vallisneria americana</i>	coontail, <i>Phragmites australis</i> , Richardson's pondweed, fern pondweed	0	0	100	0	0	-	Herbaceous