

Aquatic Invasive Species Monitoring Project

Year 2019 Report

To the

Fox River Navigational System Authority

By

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Executive Summary

The Fox River Navigational System Authority (FRNSA) Aquatic Invasive Species (AIS) monitoring program has been active since 2006. Continuous sampling for the spiny water flea (*Bythotrephes longimanus*) and round goby (*Neogobius melanostomus*) was conducted on the Lower Fox River from June – August of 2006-2019 and Lower Green Bay June- October 2015-2019. Additional sampling for both invasive species were conducted on Lake Winnebago in 2016-2019 near the outflows of Neenah and Menasha. Round goby was found at all sample sites in the Fox River, including three sites above the Rapide Croche lock, during the summer of 2019. In 2018, round goby was not found at any site above the Rapide Croche lock (De Stasio, 2018). The only sample site where round goby has not been found is in Lake Winnebago. Spiny water flea was sampled for in Green Bay, Fox River, and Lake Winnebago in 2019. Individuals were only found in Green Bay.

Objectives

The objective of this study was to monitor the presence of fish and invertebrate aquatic invasive species (AIS) in Lower Green Bay, the Fox River, and Lake Winnebago. Jacob Pantzlaff and Brook Monfils were employed by University of Wisconsin-Green Bay (UWGB) to complete the monitoring under the supervision of Dr. Patrick Forsythe, Ph.D.

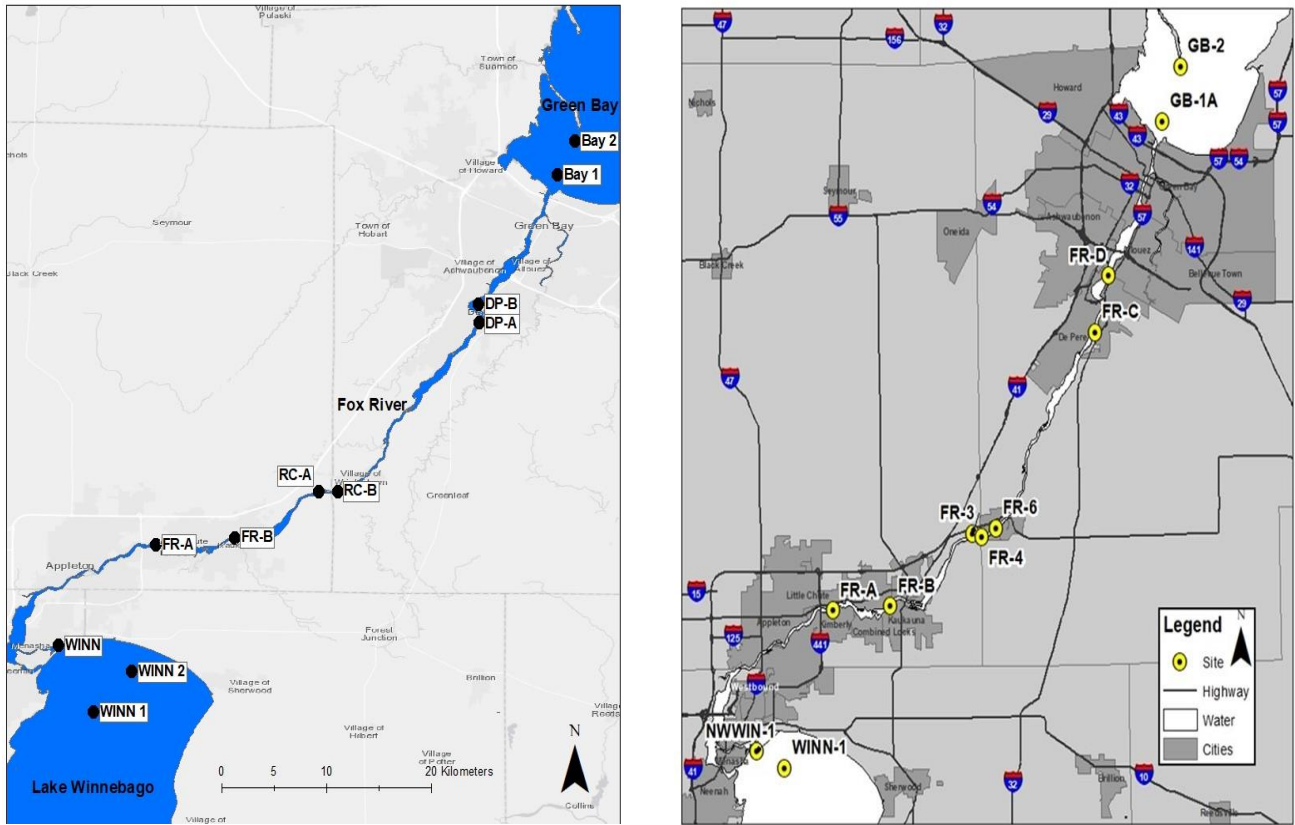
Sampling Design

Monitoring occurred at 11 sampling locations during the summer of 2019 (Table 1 and Figure 1). The sampling points served as a general location for sampling efforts. Sampling effort was focused on the most suitable habitat, based on prior knowledge, for each targeted species. Each site was sampled four or five times over the course of the summer for spiny water flea, round goby, or both (Table 2). Sample sites were mainly sampled in order, going down stream, starting in Lake Winnebago to prevent the spread of AIS. Between each sampling site, all gear and boats were sanitized using a bleach solution consistent with the Wisconsin DNR disinfection practices (<https://dnrx.wisconsin.gov/swims/downloadDocument.do?id=144952597>).

Table 1. Latitude and Longitude coordinates of the approximate location of the areas sampled during the summer of 2019.

Sampling Site	Latitude	Longitude
WINN 2	-88.364	44.184
WINN 1	-88.397	44.154
WINN (Jefferson Park)	-88.427	44.203
FR-A (Above Cedar lock)	-88.343	44.277
FR-B (Above Kaukauna Guard lock)	-88.276	44.282
RC-A (Above Rapide Croche lock)	-88.204	44.316
RC-B (Below Rapide Croche lock)	-88.187	44.317
DP-A (Above DePere dam)	-88.066	44.441
DP-B (Below DePere dam)	-88.066	44.455
Bay 1	-87.999	44.551
Bay 2	-87.984	44.576

Figure 1. Map of locations sampled for round goby and spiny water flea during the summer of 2019 (left). The map to the right shows historic sampling locations. Note that Lake Winnebago sites were adjusted and a third was added to increase effort in this area. FR-6 was also dropped due to the close proximity with FR-3 and FR-4.



Sampling Methods

Table 2. Sampling effort broke down by site and gear type. The “X” indicates that sampling was completed for the targeted species during the summer of 2019.

Sampling Site	Round Goby	Spiny Water Flea	Benthic Invertebrates
WINN 1		X	
WINN 2		X	
WINN	X		X
FR-A	X	X	X
FR-B	X	X	X
RC-A	X	X	X
RC-B	X	X	X
DP-A	X	X	
DP-B		X	
Bay 1		X	
Bay 2		X	

Round goby: Round goby were sampled four to five times at each site over the course of the summer (Table 2). The primary gear type used was Gee-Feets G-40 (length=40 cm , opening=20 mm , mesh=6 mm) minnow traps baited with cereal dog food. Eight minnow traps were set in each sampling area and were emptied after either 24 or 48 hour sets. Effort was increased in Lake Winnebago where an average of 22 minnow traps were set each sampling event. Native fish species were identified, using the Wisconsin Fish ID software (2005), and released. Non-native fish species were counted and transported to UWGB to be frozen and disposed of.



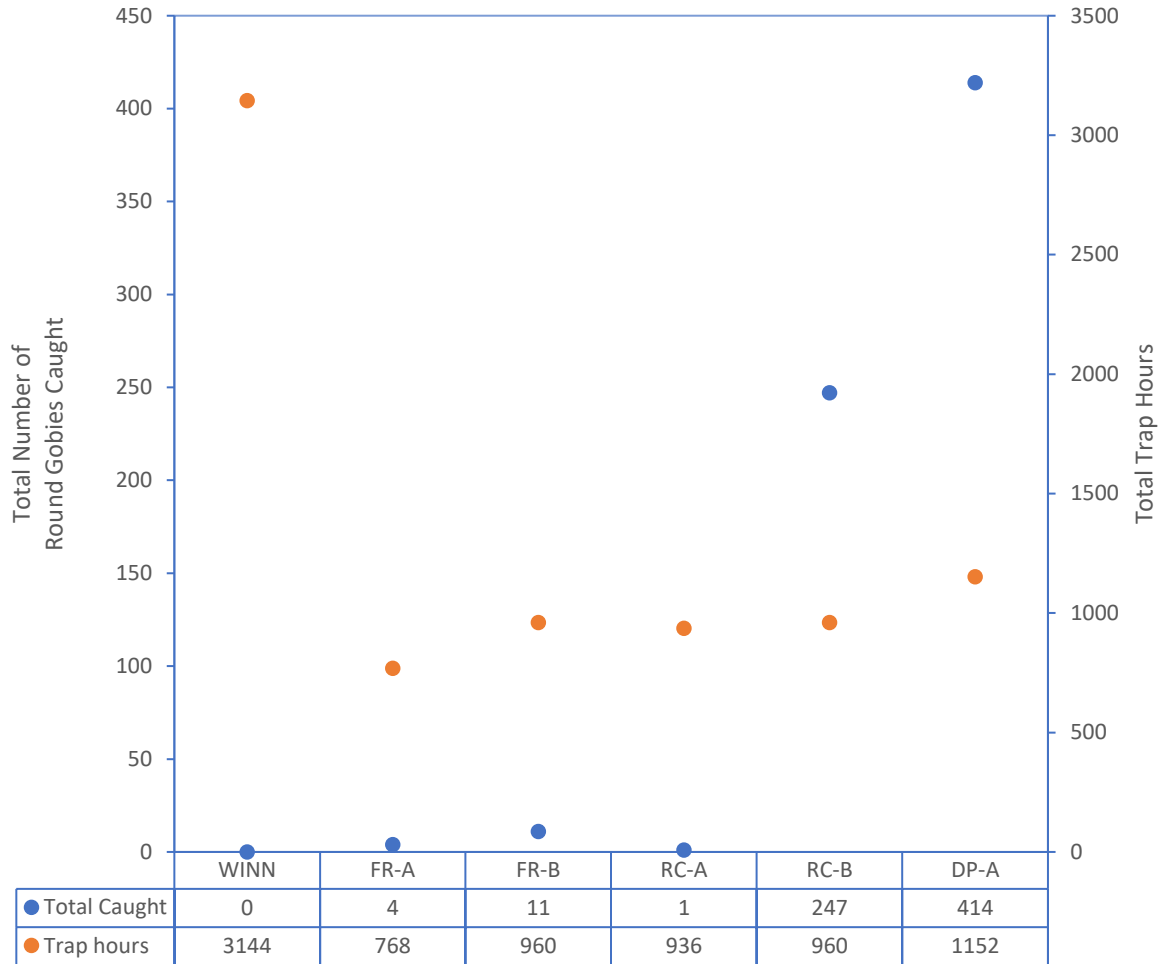
Spiny Water Flea: Zoo plankton tows were taken at each sample site four or five times over the course of the summer (Table 2). The mid-channel location was sampled with a combination of oblique and vertical tows using a Wisconsin-type zoo plankton net (mouth size= 0.13m, mesh size= 243 μ m). Samples were preserved in the field with 80% ethyl alcohol and transported to UWGB to be sorted under a microscope. Entire samples were examined, and invasive species were removed and stored in 80% ethyl alcohol for long-term preservation.

Benthic invertebrates: Samples were collected, using a large ponar grab sampler (box size=229mm x 229mm), at each sample site (Table 2). Three replicate samples were collected at a combination of mid-channel and shoreline locations of each site. Samples were sieved through a tray with a mesh bottom (mesh size=500 μ m) and preserved in formalin. Specimens were transported to UWGB to be sorted and identified to the family level using the reference listed (Bouchard, 2004). A list of regulated species provided on the Wisconsin DNR website (<https://dnr.wi.gov/topic/Invasives/speciesNR40list.asp?filterBy=Category&filterVal=Aquatic%20Invertebrates%20Except%20Crayfish&addFilter=Classification>) was used as a reference to what invasive species are found in Wisconsin. Families and invasive species were noted as either present or absent. Specimens were stored in 80% ethyl alcohol for long-term preservation.

Results

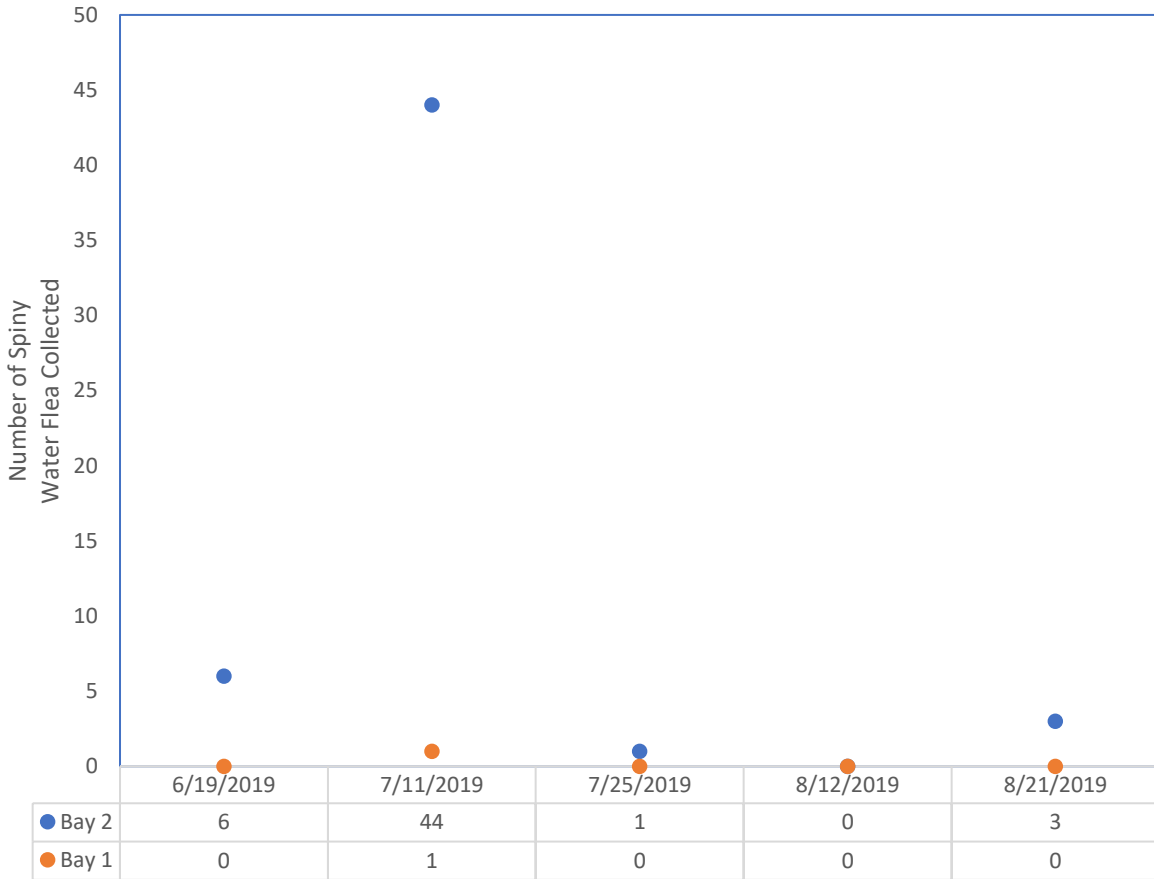
Round goby: Only one invasive fish species, the round goby, was found in 2019. A total of 679 round goby were collected from 301 total minnow trap sets over six sample sites during the summer of 2019. It was found at all round goby sampling locations, except for in Lake Winnebago (Figure 2 and Figure 3). In 2018, round goby was not observed at any site above the Rapide Croche lock (De Stasio, 2018).

Figure 3. Graph of round goby catch along with total trap hours by site. Total trap hours was calculated by taking the sum of hours (rounded to the nearest 24 hour set) for each trap by sample site.



Spiny water flea: Only one invasive zoo plankton species, the spiny water flea, was found during the summer of 2019. It was not found at any site in either the Fox River or in Lake Winnebago. It was found at both sites in Green Bay (Figure 4).

Figure 4. Graph of the number of spiny water flea caught during the summer of 2019. Only the sites that spiny water flea were found are displayed.



Benthic Invertebrates: A total of 23 groups of invertebrates were collected during the summer of 2019 (Table 3). Zebra mussels (*Dreissena polymorpha*) and quagga mussels (*Dreissena bugensis*) were the only invasive species found. Zebra and quagga mussels were both observed at all sites except for above the Rapide Croche lock (RC-A). The most diversity was found below the Rapide Croche lock (RC-B). There were 14 groups found at this sample site.

Table 3. Table of the taxa found at each sampling site from the summer of 2019. The “X” indicates that the taxa was found at the corresponding site. Individuals were identified down to either Class (C), Order (O), sub-order (Sub-O), Family (F), or Species (S). Invasive species are highlighted in gray.

	WINN	FR-A	FR-B	RC-A	RC-B
Amphipoda (O)	X	X	X	X	X
Argulidae (F)				X	
Caenidae (F)	X	X			X
Chironomidae (F)	X	X	X	X	X
<i>Dreissena bugensis</i> (S)	X	X	X		X
<i>Dreissena polymorpha</i> (S)	X	X	X		X
Elmidae (F)			X		
Ephemerelellidae (F)	X				
Isopoda (O)	X	X	X	X	X
Hirudinea (C)	X				
Hydropsychidae (F)	X	X			X
Hydroptilidae (F)		X	X		X
Leptoceridae (F)	X		X		
Leptohyphidae (F)			X	X	X
Lumbriculidae (F)					X
Molannidae (F)	X	X	X		
Nematomorpha (C)				X	
Oligochaeta (C)	X	X	X	X	X
Polycentropidae (F)		X			
Sphaeriidae (F)		X		X	
Tipulidae (F)					X
Trombidiformes (Sub-O)				X	X
Turbellaria (C)	X		X	X	X

References Cited

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