

## Hudson River Estuary (H), Survey 419027

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The Hudson River Estuary (HRE) is a 154-mile tidal corridor extending from the Battery in NY city to the Federal Dam in Troy. The HRE comprises ~230 fish species from 78 families and 163 genera (Lake 2019). About one-quarter of those fishes are non-natives and new species are being added to the checklist every year (i.e., bowfin 2015). The HRE is especially popular for its adult alosine (herring/shad) and striped bass runs in the spring, along with warmwater sportfishes like black bass, walleye, northern pike, and channel catfish (all non-natives). Invasive fishes commonly found in the HRE include: goldfish, rudd, Oriental weatherfish, common and grass carp. Other non-natives such as freshwater drum, and shorthead redhorse are canal transients now established in the HRE. Numerous public outreach events, citizen-based programs, and a slew of research opportunities for agencies, consultants, and academia all combine to help monitor and sample the estuary (and watershed) throughout the year.

On August 24, 2019 a routine inspection by NYSDEC Division of Law Enforcement (DLE) staff resulted in a local angler revealing a picture on his phone of a northern snakehead (*Channa argus*, NSH) he reportedly caught and harvested from the east shore of the HRE near Bay Creek (tributary 198) just south of Hudson, NY. The only known record of NSH in the greater Hudson River watershed was of an infestation found upland in Orange Co., NY that was a successful eradicated in 2008.

Following this report, a rapid response team was assembled to survey the HRE for both the presence of NSH and their DNA by staff from the NYSDEC and USFWS. Electrofishing surveys were conducted both day and night on Aug. 29-30 and Sept. 18-19, 2019 during various tide levels. Coverage extended from Brandow Point up to Stockport Creek (river mile 115-120). Effort included 16 runs at 12 sites, mostly by boat electrofishing totaling 3.94 h of on-time sampling. Twelve ~10-minute and one 21-minute all fish or *community* runs and three ~30-minute *sportfish only* runs were completed. The one site/run in lower Bay Creek consisted of a single-pass on foot using a backpack shocker. A total of eight DEC and one FWS staff assisted in the fish surveys searching for NSH.

A total of 2195 fish comprising 32 species were recorded in the three surveys with 1732 fish captured (Table 1) and another 463 observed (mostly American eel) but not scapped to save processing time. No NSH were found in the effort. Common carp, rudd, and goldfish were the only invasive fishes found. White perch was most common (43% of catch), followed by American eel (23% overall). Alewife and banded killifish comprised ~10% of catch respectively, with spottail shiner, smallmouth bass, and brown bullhead also commonly found. All other fishes comprised <4% of the catch and several like Atlantic needlefish were represented by only one specimen (Table 1).

In conjunction with electrofishing surveys, 10 water samples were collected in the HRE at three sites near the city of Hudson waterfront between Sept. 17-18, 2019. Samples were collected in accessible areas on an outgoing (ebb) tide. Thirty samples were processed on-site in the USFWS's mobile eDNA trailer. Cells were later analyzed only for NSH at the USFWS laboratory in Lamar, PA. DNA for NSH was not detected in any of the water samples collected in the HRE during the study (Bartron et. al. 2019).

NSH (and bowfin) are distinct enough in coloration and morphology that if a specimen was caught in the field of electricity, it would likely have been observed. The eDNA sampling used as an auxiliary tool verified that NSH were not present at the sites chosen while sampled. However, fish hide well in large (and often turbid) river systems and there are numerous other backwaters in the area that were not sampled due to limited boat access and short tidal windows. It is unlikely that NSH are currently present in the HRE or if present, in such low numbers as to be undetectable amidst all the various sampling conducted annually. Live specimens of NSH coming to/from waters to the south (e.g., Chesapeake Bay watershed) are thought to be the main vectors for illegal introductions into NYS's inland waterbodies. Only with increased surveillance, education, and fines for moving and stocking live fish will management agencies and DLE staff be able to stop future dispersal of invasive species like NSH.

**Table 1.** Summary catch (C) data from multiple fish community surveys searching for northern snakehead (*Channa argus*) in the Hudson River Estuary near Hudson, NY from August 29 to September 19, 2019.

<i>Common Name</i>	<i>Code</i>	<i>IF-C</i>	<i>BF-C</i>	<i>Total-C</i>	<i>%-C</i>	<i>CPUE</i>
American eel*	276	19	28	47	2.7%	11.9
blueback herring	285	10	32	42	2.4%	10.7
alewife	289	12	140	152	<b>8.8%</b>	<b>38.6</b>
American shad	290	2		2	0.1%	0.5
gizzard shad	294	2		2	0.1%	0.5
chain pickerel	349	2		2	0.1%	0.5
goldfish	361	8	13	21	1.2%	5.3
carp	365	40	11	51	2.9%	12.9
golden shiner	377	9		9	0.5%	2.3
spottail shiner	390	40	53	93	<b>5.4%</b>	<b>23.6</b>
spotfin shiner	394	1		1	0.1%	0.3
rudd	405	1		1	0.1%	0.3
fallfish	407	2		2	0.1%	0.5
white sucker	419	58		58	3.3%	14.7
brown bullhead	444	72		72	<b>4.2%</b>	<b>18.3</b>
channel catfish	445	50		50	2.9%	12.7
Atlantic needlefish	521	1		1	0.1%	0.3
banded killifish	531	61	96	157	<b>9.1%</b>	<b>39.8</b>
mummichog	532	2		2	0.1%	0.5
white perch	575	28	714	742	<b>42.8%</b>	<b>188.3</b>
white bass	576	3		3	0.2%	0.8
striped bass	577	36		36	2.1%	9.1
rock bass	591	1		1	0.1%	0.3
gizzard shad	594	22		22	1.3%	5.6
pumpkinseed	596	30		30	1.7%	7.6
bluegill	598	12		12	0.7%	3.0
smallmouth bass	600	75		75	<b>4.3%</b>	<b>19.0</b>
largemouth bass	601	6		6	0.3%	1.5
black crappie	603	1		1	0.1%	0.3
tesselated darter	614	13		13	0.8%	3.3
yellow perch	617	18		18	1.0%	4.6
freshwater drum	700	7		7	0.4%	1.8
<b>Totals</b>		<b>645</b>	<b>1087</b>	<b>1732</b>		

Fishes listed by species code, IF—individual fish, BF—bulk fish, CPUE—catch per unit effort, some 450 \*American eel observed

### References

- Lake, T.R. 2019. Hudson River watershed fish fauna checklist. NYSDEC Hudson River Estuary Program. 2 pp.  
 Bartron, M., Maloy, A., and C. Rees. 2019. eDNA sampling for northern snakehead (*Channa argus*) near Hudson, NY. 8 pp.