



Upper Mississippi River Juvenile Asian Carp Monitoring 2018

Geographic Location: Upper Mississippi River Pools 18-20

Participating Agencies: La Crosse Fish and Wildlife Conservation Office (lead); Western Illinois University and Rock Island Ecological Services Field Office (field support).

Statement of Need:

Adult Bighead Carp (*Hypophthalmichthys nobilis*) and Silver Carp (*Hypophthalmichthys molitrix*) were first reported in the Upper Mississippi River basin above Lock and Dam 19 in 1987 and 1999, respectively (<http://nas.er.usgs.gov>), while Black carp (*Mylopharyngodon piceus*) have not yet been captured above Lock and Dam 22. The first Asian carp populations above LD 19 likely immigrated from source populations downriver. Commercial catch data from Illinois indicate that population densities have increased in recent years (Maher 2016). It is unknown whether reproduction and recruitment or immigration from downstream is driving population growth. In 2014, USGS ichthyoplankton tow samples containing *Hypophthalmichthys* eggs were collected in pools 16, 17, 18, and 19 (Larson et al. 2017). Prior to 2016, the only evidence of successful recruitment is a handful of juvenile *Hypophthalmichthys* (<300 mm) reported in lower pool 19 (James Lamer, WIU, personal communication; Cari-Ann Hayer, USGS, unpublished data). In 2016, large numbers of juvenile Silver Carp were collected from pools 18 and 19. Understanding the source of population growth for these species will help direct Asian carp management actions in the UMR.

Project Objective:

Determine the extent of Bighead Carp and Silver Carp recruitment above Lock and Dam 19.

Project Highlights:

- No YOY Bighead Carp or Silver Carp were collected in 2017 or 2018.
- In 2017, one juvenile Silver Carp from the 2016 year class was collected in pool 16, and one juvenile Bighead Carp from the 2016 year class was collected in pool 19.
- In 2017, collection of YOY Silver Carp from Pool 18 indicates recruitment has been successful in that pool.
- In 2017, collection of YOY Grass Carp from Pool 17 indicates recruitment has been successful in that pool.

Methods:

Young-of-Year (YOY) sampling was initiated in July using a dozer trawl and extended through October with boat electrofishing in pools 18-20. Areas that provided preferred habitat for juvenile Asian carp were sampled as targeted sites. Random sites were generated in backwater and tributary sites using ArcGIS 10.4. Sampling was scheduled for two weeks in July and October, but river conditions limited sampling to one week.



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The dozer trawl was used at the targeted and randomized sites in July of 2018, when it was expected that small Asian carp would be at a size vulnerable to capture via trawl (<100 mm). The rigid frame of the dozer trawl measured 1.83 m wide by 0.91 m tall and the attached net was 35 mm mesh at the opening reducing to 4 mm at the cod end. The trawl was pushed from the front of the boat and the net extended 2.5 m under the boat. Length, depth fished, and duration of trawl haul was dependent on the site characteristics and available habitat. All fish were identified to species or genus and released, except Asian carp which were measured and dispatched.

Pulsed-DC boat electrofishing was used in October to target YOY that were potentially at a size to avoid capture in a dozer trawl. The boat electrofisher was an 18 ft flat bottom boat with a Smith Root VVP-15B box set to pulsed-DC current at 60 pulses per second and 30% duty cycle. Temperature and conductivity corrections were made to attempt to produce a standard potential transfer of 3000 watts to the water per Long Term Resource Monitoring specifications (Gutreuter et al. 1995). Electrofishing runs were 15 minutes in length and two netters collected fish. Power was turned off/on intermittently to prevent driving fish away from the effective electrified field. An attempt was made to net all fish that were observed. Random and alternate sites were selected for each pool using ArcGIS 10.4 at a minimum density of one site per 1.5 river miles. In the event a random site could not be reached, the nearest accessible alternate site was sampled. Non-target species were identified, counted, and released. Asian carp were measured and dispatched.

Results and Discussion:

Targeted and randomized dozer trawling samples were collected during one week in July. A second week of sampling was cancelled due to flood conditions. Thirty-one trawling runs took place in pools 18-20 for a total of 8,412 meters trawled. There were 9,485 fish collected representing 23 species, although many smaller specimens were identified only to genus. No YOY Asian carp were observed or collected. Two adult Silver Carp were collected in pool 20.

Targeted and random electrofishing sites were sampled for one week in October. A second week of sampling was cancelled due to flood conditions. Twenty electrofishing runs were completed in pools 19-20 for a total of five hours of electrofishing. Four fixed sites were sampled in each pool, along with one and 10 random sites in pools 20 and 19, respectively. One follow up sample was taken in pool 19 where a YOY Silver Carp was potentially observed, but none were collected. There were 2,604 fish collected representing 45 species and one hybrid. No YOY Asian carp were collected. Six Silver Carp and two Grass Carp were collected in pool 19; 156 Silver Carp and four Grass Carp were collected in pool 20 (Table 1). Silver Carp catch per unit effort (CPUE) was 124.8 fish/hr in pool 20, compared to 1.60 fish/hr in pool 19 (Table 1). The smallest Silver Carp collected was 590 mm and the mean was 699 mm (Figure 1). The large group of fish around 700 mm is most likely from the 2016 year-class.



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There were some sampling difficulties encountered in 2018. High water levels for much of the summer and fall created wide expanses of inundated floodplain habitat that became available. Also, randomization of sites in pool 20 selecting for tributary or backwater sites is very difficult

Table 1. Adult Silver Carp collected via electrofishing by pool at all sites in 2018. CPUE is calculated as fish/hour of electrofishing.

	Pool 19		Pool 20		Total
	Count	CPUE	Count	CPUE	
Grass Carp	2	0.53	4	3.2	6
Silver Carp	6	1.60	156	124.8	162

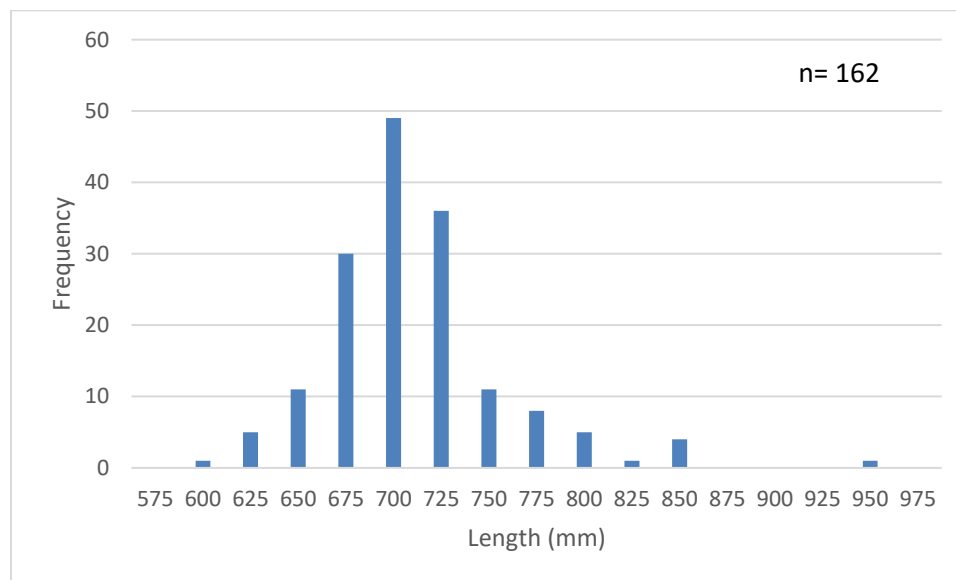


Figure 1. Length-frequency histogram of adult Silver Carp collected during targeted and random electrofishing sampling in pools 19-20.

due to the lack of backwater habitat. Most of the randomized sites fell on top of sites chosen as fixed sites or within the Des Moines River, which was not sampled due to heavy current. Mark/recapture studies or hydroacoustic enumeration surveys may be better suited for comparison of population densities between pools.

In summary, 12,089 fish were collected with both gears at 51 sample sites (Table 2) (Figure 2). There were no YOY Asian carp collected. One hundred sixty four adult Silver Carp and six adult Grass Carp were collected. There were no range expansions of juveniles or adults documented with sampling in 2018.



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Recommendation: Work with partners in other basins to develop a standardized protocol across basins for YOY.

Table 2. Total catch with all gears by pool during 2018 juvenile Asian carp monitoring.

Common Name	Scientific Name	Pool 18	Pool 19	Pool 20	Total
Gizzard Shad	<i>Dorosoma cepedianum</i>	4,205	1,980	349	6,534
Unidentified Minnow	Unidentified Cyprinidae		1,302	1,773	3,075
Emerald Shiner	<i>Notropis atherinoides</i>	1,000	530	35	1,565
Silver Carp	<i>Hypophthalmichthys molitrix</i>		6	158	164
Smallmouth Buffalo	<i>Ictiobus bubalus</i>	35	43	17	95
Largemouth Bass	<i>Micropterus salmoides</i>	4	84		88
Bluegill	<i>Lepomis macrochirus</i>	3	60	1	64
Brook Silverside	<i>Labidesthes sicculus</i>		63		63
White Crappie	<i>Pomoxis annularis</i>	62	1		63
Spottail Shiner	<i>Notropis hudsonius</i>	6	41		47
Golden Shiner	<i>Notemigonus crysoleucas</i>	8	32	1	41
White Bass	<i>Morone chrysops</i>	22	10	9	41
River Carpsucker	<i>Carpodes carpio</i>		8	22	30
Spotfin Shiner	<i>Cyprinella spiloptera</i>	3	22	1	26
Quillback	<i>Carpodes cyprinus</i>		9	14	23
Longnose Gar	<i>Lepisosteus osseus</i>	5	5	8	18
Golden Redhorse	<i>Moxostoma erythrurum</i>		17		17
Shortnose Gar	<i>Lepisosteus platostomus</i>	2	5	10	17
Common Carp	<i>Cyprinus carpio</i>		13		13
Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>		10		10
Freshwater Drum	<i>Aplodinotus grunniens</i>		6	3	9
Goldfish	<i>Carassius auratus</i>		7		7
Pumpkinseed	<i>Lepomis gibbosus</i>		7		7
Grass Carp	<i>Ctenopharyngodon idella</i>		2	4	6
Mooneye	<i>Hiodon tergisus</i>	2	3		5
Smallmouth Bass	<i>Micropterus dolomieu</i>		4	1	5
White Sucker	<i>Catostomus commersoni</i>		5		5
Channel Catfish	<i>Ictalurus punctatus</i>		4		4
River Shiner	<i>Notropis blennioides</i>	4			4
Black Crappie	<i>Pomoxis nigromaculatus</i>		3		3
Channel Shiner	<i>Notropis wickliffi</i>	2	1		3
Northern Pike	<i>Esox lucius</i>		3		3
Sand Shiner	<i>Notropis stramineus</i>			3	3
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>		3		3
Yellow Bass	<i>Morone mississippiensis</i>			3	3



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Common Name	Scientific Name	Pool 18	Pool 19	Pool 20	Total
Yellow Perch	<i>Perca flavescens</i>		3		3
Black Buffalo	<i>Ictiobus niger</i>		2		2
Black Bullhead	<i>Ameiurus melas</i>		2		2
Orangespotted Sunfish	<i>Lepomis humilis</i>		2		2
Sauger	<i>Sander canadense</i>		2		2
Unidentified Lepomis	<i>Lepomis spp.</i>		2		2
Banded Killifish	<i>Fundulus diaphanus</i>		1		1
Bowfin	<i>Amia calva</i>		1		1
Brown Bullhead	<i>Ameiurus nebulosus</i>		1		1
Flathead Catfish	<i>Pylodictus olivaris</i>		1		1
Green Sunfish	<i>Lepomis cyanellus</i>		1		1
Highfin Carpsucker	<i>Carpionodes velifer</i>		1		1
Mississippi Silvery Minnow	<i>Hybognathus nuchalis</i>		1		1
Silver Chub	<i>Macrhybopsis storeriana</i>		1		1
Skipjack Herring	<i>Notropis stilbius</i>			1	1
Spotted Sucker	<i>Minytrema melanops</i>		1		1
	<i>Morone saxatilis x Morone</i>				
Striped Bass x White Bass	<i>chrysops</i>			1	1
Western Mosquitofish	<i>Gambusia affinis</i>			1	1
					12,08
	Totals	5,363	4,311	2,415	9



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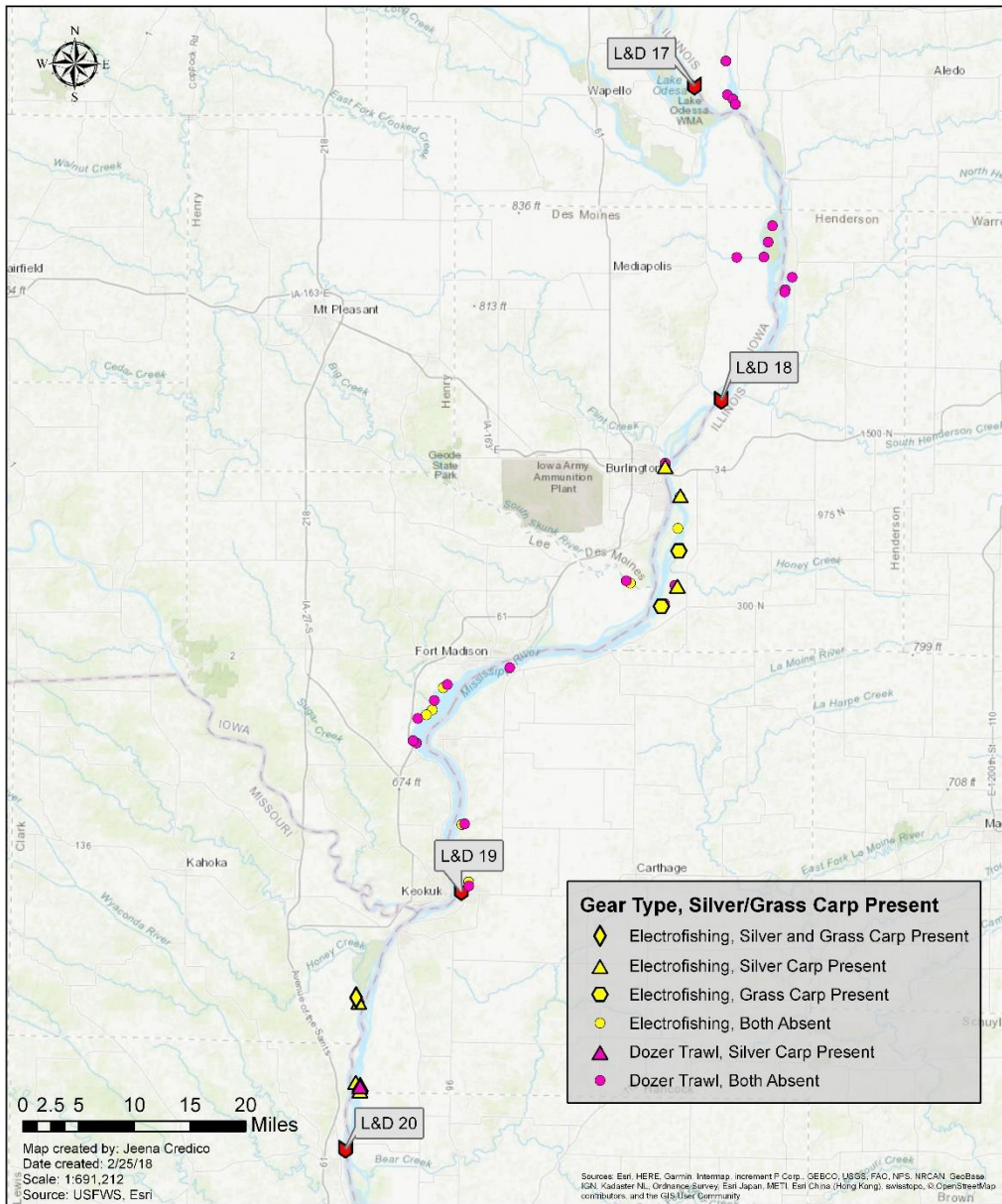


Figure 2. Sample sites for all gears in 2017 and locations where Asian carp were collected.



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