

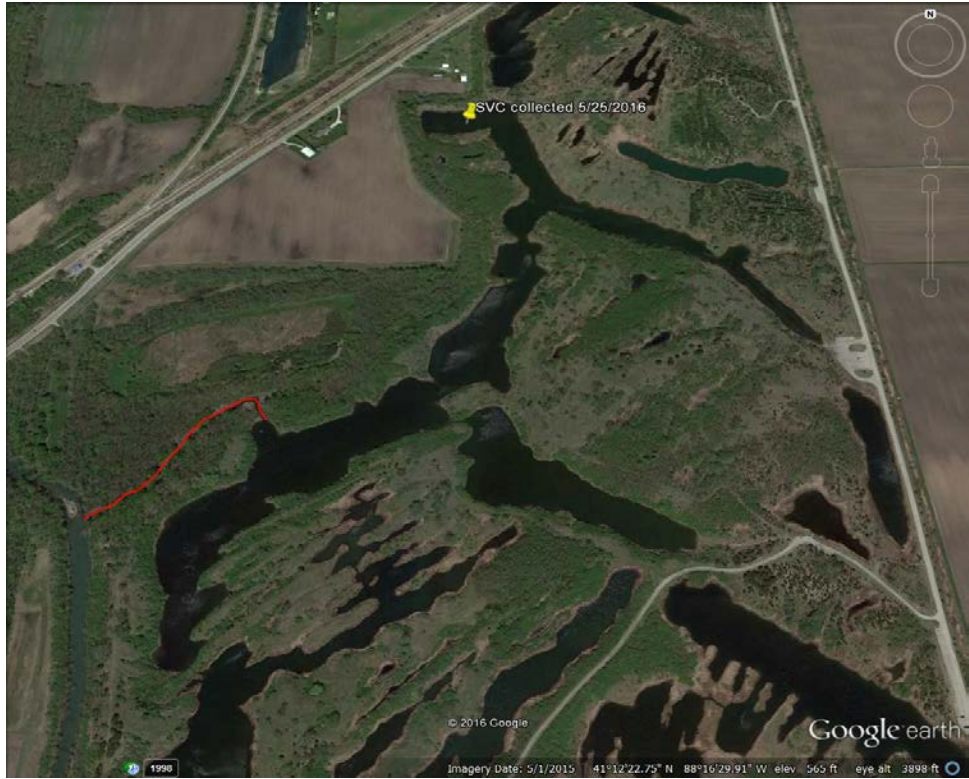
2016 May Summary

Bottom Line: Monitoring occurred in the CAWS and upper Illinois Waterway downstream of the Electric Dispersal Barrier in March. **NO LIVE BIGHEAD CARP OR SILVER CARP were found in any new locations either upstream of, or immediately downstream of the Electric Dispersal Barrier.**

Silver Carp detection at Mazonia State Fish and Wildlife Area

During the course of routine fish sampling at the Mazonia State Fish and Wildlife Area, Illinois Department of Natural Resources District Biologist's Rob Miller and David Wyffels collected a Silver carp. It was one of three that were observed, the others avoided capture. The fish which was collected measured 787mm/31.0" weighing 6024g/13.3lbs and came from Lake #3 (Bass Lake), water number 4213 at approximate GPS coordinates 41.20657N, 88.27178W. The Mazonia area is located in Grundy County close to the town of Braceville and lies adjacent to the Mazon River. The attached aerial view of the lake shows the location where the fish was collected; all three were grouped together in the same location. The red line shows the connection between this lake and the Mazon River into which the lake drains. These fish most likely gained access to the lake during a high water period as ingress and egress of fish generally wouldn't occur at normal pool or flow. The distance between the lake and the Mazon River confluence with the Illinois River at Morris, Illinois is roughly 24 miles. This the first time an Asian carp has been collected from the area. It is possible that others exist in this lake as well as the lakes which are at the southern portion of the area and have a connection to the Mazon River at high flows as well. **Although this Silver Carp does represent an expansion into the watershed of the Illinois River there is no connection to the Great Lakes from this location.**

<http://nas.er.usgs.gov/queries/SpecimenViewer.aspx?SpecimenID=1256878>.



Fixed, Random and Targeted Sampling Downstream of the Electric Dispersal Barrier

Electrofishing:

- Crews from IDNR, USACE and USFWS completed 92 electrofishing runs at fixed and random sites (23 hours total) in the Lockport, Brandon Road, Dresden Island and Marseilles Pools in May.
- Crews collected 4,055 fish of 57 species and 4 hybrid groups.
- Twenty-nine Silver Carp were collected in the Marseilles Pool.
- Two Silver Carp were collected in the Dresden Island Pool downstream of the I-55 Bridge.
- Two Bighead Carp were collected in the Dresden Island Pool ~0.5 miles upstream of the I-55 Bridge, near Mobil Bay
- **No Bighead Carp or Silver Carp were reported captured or observed in the Lockport or Brandon Road Pools.**

Hoop and Mini Fyke Netting:

- Crews from IDNR set and pulled 16 hoop nets (6' diameter) and 16 mini fykes in Lockport, Brandon Road, Dresden Island and Marseilles Pools in May.
- Crews collected 11 fish of 5 species during hoop net sampling and 358 fish of 20 species and one hybrid group during mini fyke sampling.
- Two adult Silver Carp were collected in a hoop net in the Marseilles Pool.
- **No Bighead Carp or Silver Carp were reported captured or observed in the Lockport, Brandon Road or Dresden Island Pools.**

Commercial Netting:

- Contracted commercial fishers with assisting IDNR biologists set 10.8 miles of net at fixed and targeted sites in the Lockport, Brandon Road and Dresden Island Pools (including Rock Run Rookery) in May.
- Crews collected 2,038 fish of 15 species.
- Twenty-five Bighead Carp and one Silver Carp (all adults) were collected in Rock Run Rookery.
- Eighteen Bighead Carp and five Silver Carp (all adults) were collected in the Dresden Island Pool downstream of the I-55 Bridge
- **No Bighead Carp or Silver Carp were captured or observed in the Lockport or Brandon Road Pools.**

Small Asian Carp Monitoring Downstream of the Electric Dispersal Barrier

Commercial fishers, with assisting IDNR biologists, completed eight 5/8" mesh seine hauls during the week of May 16th: five in the East and West Pits of Hanson Material Services in the Marseilles Pool and three in the Dresden Island Pool. ***These efforts were a response to concern of captures of 6 inch fish above Starved Rock Lock and Dam and are intended to further inform any future actions.***

- Crews collected 31,951 fish of 22 species.
- Approximately 30,000 Clupeidae species < 6" were identified with no small Asian Carp present.
- Eighty-eight Silver Carp and 11 Bighead Carp (all adults) were collected in the 5/8" mesh seine hauls in the East and West Pits of Hanson Material Services.
- **Bottom line, no Small Asian carp were observed or collected during any of our sampling efforts.**

Barrier Defense Asian Carp Removal Project

Barrier Defense specifically occurs in the Marseilles and Starved Rock Pools, and took place during the weeks of May 3rd, 10th and 17th. The scheduling of consecutive weeks allowed us to fish ~45 hoop nets for the duration of the three weeks. Opposed to gill and trammel nets, which are primarily fished in backwaters, the hoop nets were fished in main channel and main channel border habitats. A total of 70.7 tons of Bighead and Silver Carp were harvested in May, 19.8% of which were caught in hoop nets. Below is a summary of Asian Carp removal for all Barrier Defense activities in 2016, which includes the Unified Method, along with the same time period in 2015 for comparison:

QUICK SUMMARY:	2015	2016
Number of Days Fished	28	33
Number of Net Crew Days	108	216
Yards of Net Fished	139,650	214,770
Miles of Nets Fished	79.4	122.0
Number of Pound Net nights	24	65
Number of Hoop Net nights	69.6	761.7
Number of Bighead Carp	3,521	3,908
Number of Silver Carp	40,776	54,776
Number of Grass Carp	441	333
Number of Asian Carp	44,738	59,017
Tons of Bighead and Silver Carp Harvested YTD	161.1	213.3

Understanding Surrogate Fish Movement with Barriers

These are the tagging results for May 2016. Analysis is ongoing.

Fish Tagged:

- Bigmouth Buffalo – 31
- Black Buffalo – 2
- Common Carp – 185
- Smallmouth Buffalo – 60

Total – 278 fish tagged

Recaptures:

- Lockport Pool – 1 Common Carp
- Brandon Road Pool – 5 Common Carp
- Rock Run Rookery – 9 Smallmouth Buffalo, 4 Bigmouth Buffalo, 1 Black Buffalo
- Dresden Island Pool – 1 Smallmouth Buffalo, 1 Black Buffalo
- HMS E Pit – 1 Smallmouth Buffalo

Total – 23 recaptures

Movement:

- One Smallmouth Buffalo was recapped in HMS E Pit, ~14 miles downstream of where it was originally tagged in the lower Dresden Pool in 2014
- The remaining 22 recaps were caught in the same pool they were originally tagged in

Distribution and Movement of Small Asian Carp in the Illinois Waterway

The USFWS Wilmington sub-office conducted the following sampling in the Illinois River for small Asian carp ($\leq 153\text{mm}$). These efforts are separated by river pool, and documented below (Table 1). **No small Asian carp ($\leq 153\text{mm}$) were captured.**

Table 1. May sampling effort for USFWS Wilmington sub-office by river pool.

Pool	Gear	Effort
Marseilles	Electrofishing	33 runs (492 minutes)
Marseilles	Dozer Trawl	4 runs (20 minutes)
Dresden Island	Electrofishing	40 runs (600 minutes)
Brandon Road	Electrofishing	5 runs (68 minutes)
Lockport	Electrofishing	5 runs (72 minutes)

Monitoring Fish Abundance and Spatial Distribution in Lockport, Brandon Road, and Dresden Island Pools and the Associated Lock and Dam Structures

A mobile split beam acoustic survey was conducted on May 22 inside the Brandon Road Lock chamber. Additionally, 100 yards of experimental gill net (1/2"-2" mesh) and 100 yards of 3.5" mesh trammel net was fished inside the lock chamber. Survey results suggested fish density within the lock chamber was low.

Monitoring Fish Abundance, Behavior, Identification, and Fish-Barge Interactions at the Electric Dispersal Barrier, Chicago Sanitary and Ship Canal, Illinois-USFWS

Mobile split beam acoustic surveys were conducted at the Electric Dispersal Barrier on a bi-weekly basis during May (May 13 and May 31). These surveys will provide data on temporal changes in patterns of fish density.

Monitoring Asian Carp using Netting with Supplemental Capture Techniques

Netting for adult Asian carp with supplemental capture techniques took place in Starved Rock Marseilles and Dresden Island Pools during the month of May. In Starved Rock, 600 yards of net were deployed on May 26th, resulting in the capture of 119 fish; including, 71 Silver Carp, 38 Bighead Carp and 2 Grass Carp. In Marseilles, 1900 yards of net were deployed, resulting in the capture of 146 fish; including, 69 Silver Carp, 16 Bighead Carp, 2 Grass Carp and 1 Hybrid Silver/Bighead Carp. In Dresden Island, 400 yards of net were deployed on May 24th, resulting in the capture of 5 fish (zero Asian Carp).

Analysis of feral Grass Carp in the CAWS and Upper Illinois River

During the month of May, four Grass Carp were collected, two from Starved Rock and two Marseilles pools. Eyeballs were removed from the fish and analyzed for ploidy by the La Crosse Fish Health Center.

Telemetry Monitoring

One USACE boat and two biologists successfully downloaded receiver data that was collected from 10 March through 13 April from the Cal-Sag Confluence in Upper Lockport to the Dresden Island Lock and Dam on 24 May 2016. A preliminary review of the data indicated no Asian carp detections at the Brandon Road Lock with the furthest upstream detections (32 unique IDs in Asian carp) near the Hollywood Casino at RM 282.8. There was one upstream passage through the Brandon Road Lock and Dam on 11 May 2016 by a Common Carp. Further analysis will be completed to determine the type of vessel being locked, lockage direction, and how this fish utilized the water column during passage through the lock chamber. USACE receivers detected a total of 15 Asian carp recently tagged by SIUC in May with the majority of detections on these fish recorded within the connecting channel to Rock Run Rookery. Data has been shared with SIUC for further analysis. No fish movement across the Electric Dispersal Barrier System was detected in either direction.

Barrier Maintenance & Fish Suppression

The Electric Dispersal Barriers were successfully operated with minimal loss to power in water in the month of May and did not require fish suppression or clearing actions. There were seven occasions which required Barrier IIB to be powered on generator power causing 14 minor interruptions to power in the water for less than one minute each. Each power transfer from utility to generator or generator to utility results in a momentary loss of power to the water (< 30 sec) at that specific array. Barrier IIA was operational during each of these minor interruptions. The Demonstration Barrier was re-commissioned following repairs on 9 May 2016. No Barrier outages occurred during the month of May that would trigger the need for fish suppression or clearing activities.

Unconventional Gear Development

INHS set pound nets at the Lily Lake backwater in the LaGrange Pool during May 1 – May 14 in coordination with USGS partners as part of the feeding attractant and sound stimuli studies. During these trials, one net was conditioned with the attractant/stimuli, whereas the other served as the control. Nets were checked daily and all fish were measured and weighed. Data from these trials will be summarized and results will be reported by USGS. Additional pound net deployment is being planned for Lake Calumet in the CAWS during the month of June.

Asian Carp Gear Development and Evaluation

Table 1. Barrier Defense Efforts the weeks of 5/2 and 5/16 with one paupier boat in the Starved Rock Pool fishing at 4 different locations (Fox River, Sheehan Island Side Channel, Sheehan Island backwater, and Delbridge Island Side Channel). All sites had water velocities of 0.3m/s-1m/s except Sheehan Island backwater which had no noticeable flow.

Number of Days Fished	5
Number of Crew Days	5
Fishing Time (hours)	25.5
Electrofishing Time (hours)	8.1
Man Fishing Hours (4 per crew*)	102
Number of Bighead Carp	12
Number of Silver Carp	3225
Number of Grass Carp	2
Number of Asian Carp	3239
Est. Tons of Bighead and Silver Carp Harvested	7.1
CPUE (# of Asian Carp/day)	648
CPUE (# of Asian Carp/fishing hour)	127
CPUE (# of Asian Carp/electrofishing hour)	399
CPUE (# of Asian Carp/man fishing hour)	32

Table 2. Summary of effort and Gizzard Shad (GZSD) and juvenile Silver Carp (SVCP) captured during USFWS Columbia small fish sampling in the Starved Rock and Marseilles pools on 5/3 & 5/4/16. There were 4 juvenile Silver Carp caught in the Starved rock Pool measuring 157-188mm and none in the Marseilles Pool.

	<i>Gear</i>	<i>Minutes</i>	<i>Distance (m)</i>	<i>Volume Sampled (m³)</i>	<i># of GZSD</i>	<i># of GZSD/min</i>	<i>GZSD range (mm)</i>	<i># of Juvenile SVCP <200mm</i>
Starved Rock	Electrified Dozer Trawl	21	3200	11712	30	1.4	50-260	4
Marseilles	Electrified Dozer Trawl	55	8800	32208	917	16.7	86-320	0

Table 3. Number of Gizzard Shad caught in Hansen Material East Pit with 6 different gears on 5/5/16 in order to evaluate gear effectiveness on a surrogate species for Asian Carp. There were 6 random sites for each gear that were fished for 5 minutes.

Gear	# of Gizzard Shad/ 30minutes
Paupier Non-electrified	48
Paupier Electrified	128
Surface Trawl	46
Dozer Trawl Non-electrified	0
Dozer Trawl Electrified	59
Standard Electrofishing	22

Larval Fish Monitoring

INHS conducted ichthyoplankton sampling at 14 main channel and backwater sites located throughout the Illinois Waterway during the weeks of May 9, May 23, and May 30. Four larval fish samples were collected at each site, and zooplankton and water chemistry samples were also collected. Additional samples were collected in Illinois River tributaries to evaluate the potential for Asian carp spawning in these rivers. Water temperatures in the Illinois River during the first half of May were less than 18°C, and field personnel reported that very few fish eggs and larvae of any taxa were observed in samples during this time. As water temperatures exceeded 20°C during the second half of May, sampling began to occur on

a weekly basis to more closely monitor for potential Asian carp reproduction. Higher numbers of fish eggs and larvae were observed during this time, and results will be reported following processing and identification of specimens from these samples. Weekly monitoring will continue for the next several weeks as water temperatures have now reached a range conducive to Asian carp spawning.

Identifying Movement Bottlenecks and Changes in Population Characteristics of Asian Carp in the Illinois River and Assessing Population, Movement, and Behavior of Asian Carp to Inform Control Strategies

Hydroacoustics

Analysis of a hydroacoustic survey throughout the Dresden Island pool on 5-April 2016 was completed. The entire main channel, Mobil Bay (41.4249 N, -88.1850 W), Treats Island side-channel (41.4351 N, -88.1689 W), and two miles up the Kankakee River were sampled. Asian carp (Silver and Bighead Carp combined) numerical and biomass densities throughout all of Dresden Island pool in April 2016 were lower than densities in fall (Sept-Oct) 2015 but were similar to densities in fall 2014 (Figure 1). Mean Asian carp density was highest in the Treats Island side-channel, intermediate in the Kankakee River and in Mobil Bay, and lowest throughout the main channel (Figures 2 and 3). Additional hydroacoustic surveys will be used to monitor Asian cap densities in the Dresden Island pool with the next survey occurring in the first week of June 2016.

Analyses were also completed for hydroacoustic surveys to estimate Asian carp densities in the Alton to Dresden Island pools during fall 2015. In the upper river, biomass density was similar in the Starved Rock pool compared to the previous two years, higher in Marseilles than the previous three years, and similar to the previous two years in Dresden Island pool (Figure 4). Density estimates in pools of the lower river were divided into main channel and backwater habitats due to the amount of variability in density between these habitats and also because several four-mile long sections of the main channel were sampled in these pools (compared to the entire main channel in the upper pools). Asian carp density in the main channel of Alton, La Grange, and Peoria pools was higher in fall 2015 than fall 2014. In contrast, densities in backwaters of La Grange and Peoria pools were similar to the previous three years, and the Alton pool

backwater density in 2015 was intermediate between densities in fall 2014 and fall 2013 (Figure 5).

Telemetry

All acoustic receivers near Starved Rock Lock and Dam (SRLD) were downloaded in early May 2016. We detected four Asian carp downstream of SRLD between 10/1/2015 and 5/16/2016. Of the four fish detected, three were upstream of SRLD prior to October 2015 and passed downstream through SRLD between 3/15/2016 and 3/25/2016. The fourth fish, which did not pass through SRLD, was initially detected downstream of SRLD on 5/11/16 and left the array (moved downstream) on 5/14/16. This fish was a Silver Carp tagged in 2015 in Pool 17 of the Mississippi River. Our last detection for this fish in 2015 was on June 25 at Rkm 9.2.

The absence of tagged Asian carp downstream of SRLD overwinter in 2015-2016 is similar to what we observed in previous years. There appears to be a period of time between late fall and early spring each year where there were few, if any, Asian carp detected downstream of SRLD. In addition, we only detected one upstream migrating Asian carp approaching SRLD between October 1, 2015 and May 16, 2016. This might indicate immigration of Asian carp from the Peoria pool to the Starved Rock Pool is unlikely to occur between late fall and early spring. The high discharge event that occurred in December 2015 did not appear to influence Asian carp movements downstream of SRLD, as we observed no fish entering or leaving the receiver array around this time period.

On 5/16/2016 we tagged an additional 30 Asian carp at rkm 364.5. We anticipate some of these fish will be detected moving upstream towards SRLD during the spawning season. We will continue to intensively monitor all tagged fish around SRLD throughout the summer.

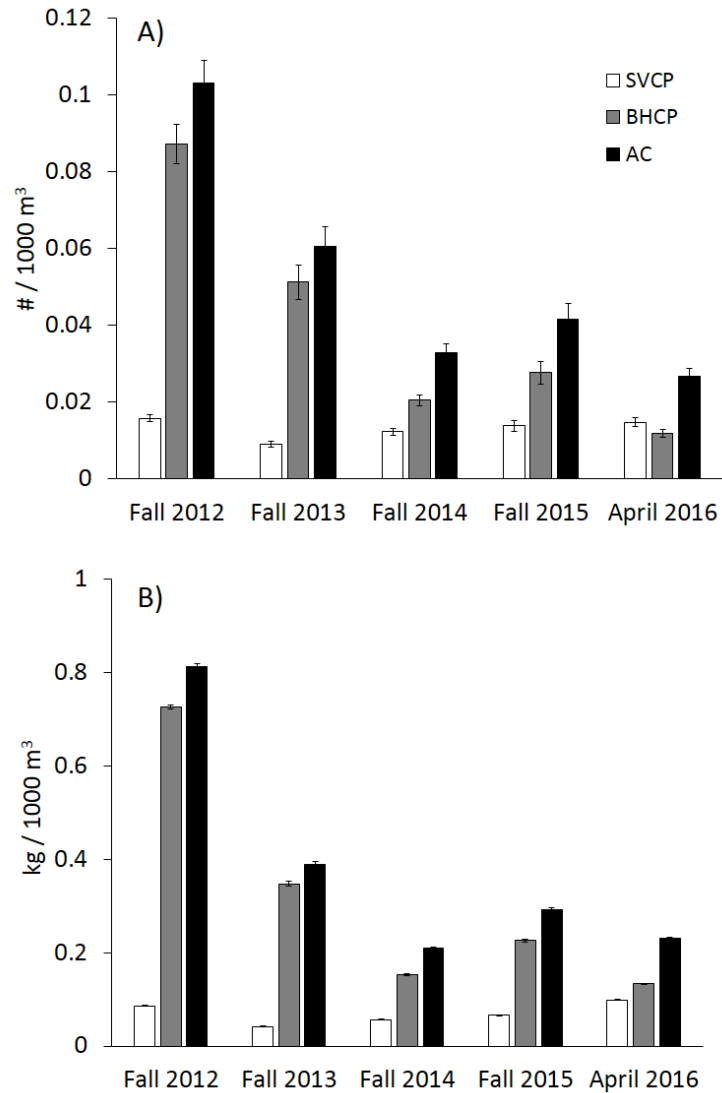


Figure 1. Mean (SE) A) numerical and B) biomass density of Silver Carp (SVCP), Bighead Carp (BHCP), and Asian Carp (Silver and Bighead combined; AC) in the Dresden Island pool during April 2016. Dresden Island density estimates from fall surveys in past years are shown for comparison.

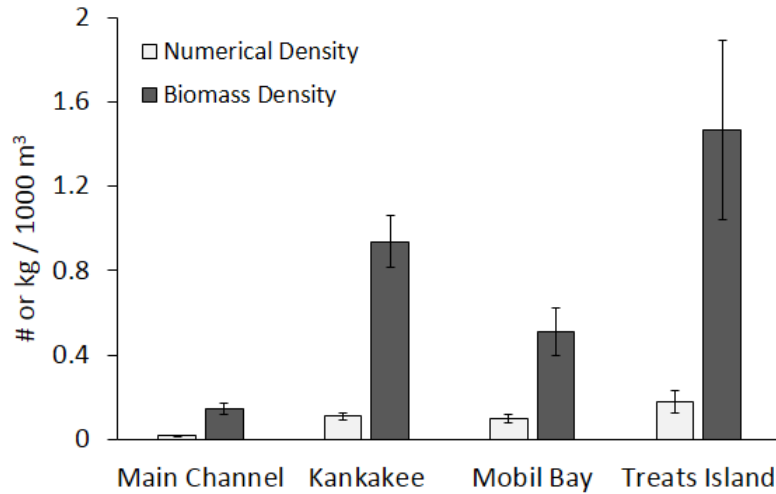


Figure 2. Mean (SE) Asian carp (Silver and Bighead Carp combined) densities among sites in the Dresden Island pool in early April 2016.

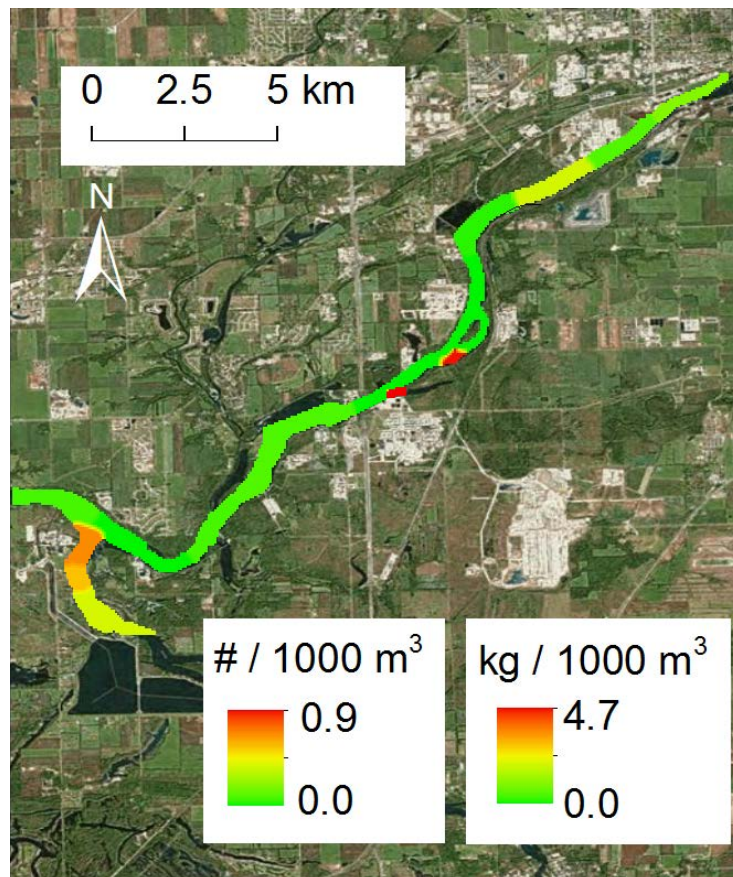


Figure 3. Mean Asian carp (Silver and Bighead Carp combined) densities in the Dresden Island pool in April 2016.

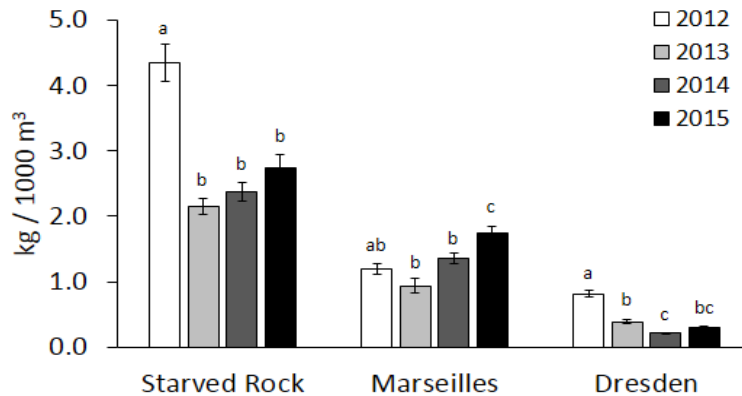


Figure 4. Mean (SE) biomass density of Asian carp (Silver and Bighead Carp combined) during fall 2015 in the upper Illinois River. Numerical density followed similar patterns as biomass density. Different letters indicate significantly different densities among years within a pool ($\alpha=0.05$).

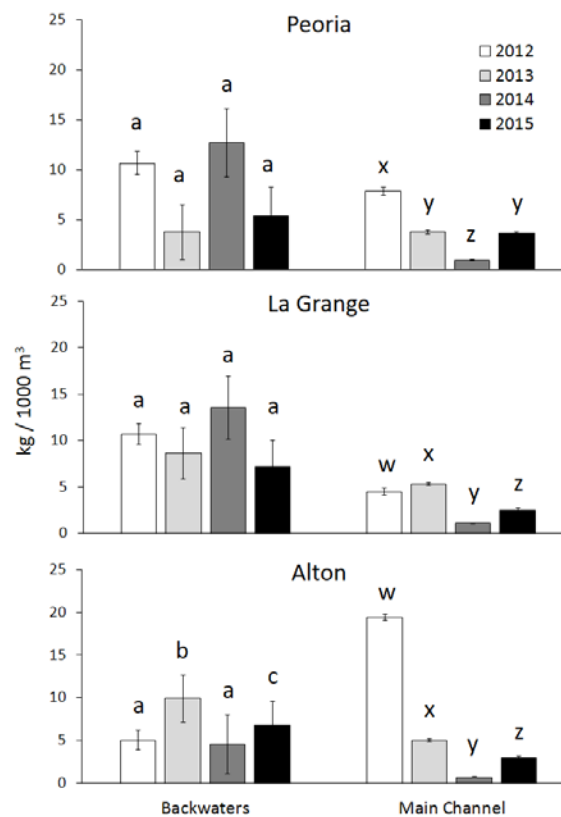


Figure 5. Mean (SE) biomass density of Asian carp (Silver and Bighead Carp combined) in the lower Illinois River during fall 2015. Densities are divided between backwater (backwater lakes, harbors, side-channels, tributaries) and the main channel. Different letters indicate significantly different densities among years within a habitat for each pool ($\alpha=0.05$).

Alternate Pathway Surveillance in Illinois - Law Enforcement

The Invasive Species Unit (ISU) traveled to Vickery, Ohio and received training and equipment from the U.S. Geological Survey for portable e-DNA testing for Bigheaded Carp. The ISU is certified and trained to use the newly developed technology to test for the presence of Bigheaded Carp e-DNA in bait shops, fish trucks, and bodies of water throughout the State. This equipment will be used in future enforcement efforts.

ISU assisted Wisconsin DNR with a records investigation for an Illinois company that was buying and selling aquatic life in Wisconsin without a license.