

2016 September 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.**

Seasonal Intensive Monitoring

Seasonal Intensive Monitoring (SIM) took place above the electric dispersal barrier the weeks of September 19th and 26th. Electrofishing and commercial netting occurred in the North Shore Channel, North and South Branches of the Chicago River, CSSC, Cal-Sag Channel, Little Calumet River, Calumet River and Lake Calumet.

Electrofishing:

- Crews from IDNR, USACE and USFWS completed 169 electrofishing runs at fixed and random sites (42.25 hours total).
- Crews collected 11,042 fish of 44 species.
- Thirty-two state threatened Banded Killifish were collected.

Commercial Netting:

- Contracted commercial fishers along with IDNR and USFWS biologists set 26.25 miles of net (260 sets) at fixed and random sites.
- Crews collected 579 fish of 11 species and 1 hybrid group.

No Bighead Carp or Silver Carp were captured or observed during SIM.

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

Electrofishing:

- Crews from USACE completed 11 electrofishing runs at targeted sites (2.75 hours total) in the Dresden Island Pool in September.
- Crews collected 589 fish of 23 species.
- **No Bighead Carp or Silver Carp were reported captured or observed in the Lockport or Brandon Road Pools.**

Commercial Netting:

- Contracted commercial fishers along with assisting IDNR biologists set 12.3 miles of net (102 sets) at fixed and targeted sites in the Lockport, Brandon Road and Dresden Island Pools (including Rock Run Rookery) during the week of September 5th.
- Crews collected 219 fish of 10 species and 1 hybrid group.
- Two adult Silver Carp were collected in the Dresden Island Pool ~0.4 miles upstream of the I-55 Bridge in Mobil Bay.

- Eight Bighead Carp and five Silver Carp (all adults) were collected in Rock Run Rookery.
- One Bighead Carp and eight 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.**

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 during the week of September 19th.
- Crews collected 35 fish of 6 species during hoop net sampling and 612 fish of 19 species and 1 hybrid group during mini fyke sampling (22 of which were state threatened Banded Killifish).
- Ten adult Bighead Carp were collected during hoop net sampling in the Marseilles Pool.
- **No Bighead Carp or Silver Carp were reported captured or observed in the Lockport, Brandon Road or Dresden Island Pools.**

Barrier Defense Asian Carp Removal Project

Barrier Defense occurred the week of September 12th and specifically takes place in the Marseilles and Starved Rock Pools. Below is a summary of Asian Carp removal for all Barrier Defense activities in 2016, along with the same time period in 2015 for comparison:

QUICK SUMMARY:	2015	2016
Number of Days Fished	52	68
Number of Net Crew Days	252	348
Yards of Net Fished	343,570	392,995
Miles of Nets Fished	195.21	223.29
Number of Pound Net nights	24	65
Number of Hoop Net nights	118	768.7
Number of Bighead Carp	6,702	7,147
Number of Silver Carp	76,551	94,163
Number of Grass Carp	569	490
Number of Asian Carp	83,822	101,800
Tons of Bighead and Silver Carp Harvested	292.12	362.74

Understanding Surrogate Fish Movement with Barriers

These are the floy tagging results for September 2016. More detailed analysis will be conducted at the end of the 2016 field season:

Fish Tagged:

- Bigmouth Buffalo – 1
- Common Carp – 30
- Smallmouth Buffalo – 59
- Common Carp x Goldfish hybrid - 3

Total – 93 fish tagged

Recaptures:

- Rock Run Rookery – 3 Smallmouth Buffalo, 1 Bigmouth Buffalo

Total – 4 recaptures

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

Mobile split-beam acoustic surveys were conducted at the Electric Dispersal Barrier on several occasions during the month. These surveys will provide data on temporal changes in patterns of fish density.

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

Mobile split-beam acoustic surveys were conducted in the Lockport, Brandon Road, and Dresden Island reaches of the Illinois Waterway the fourth week of September 2016 to determine fish density within the study reaches.

Barge Entrainment Study

Barge entrainment and transport experimental trials were conducted in the Peoria pool of the Illinois River the first week of September. Data processing occurred throughout the month of September.

Monitoring Asian Carp using Netting with Supplemental Capture Techniques

Netting for adult Asian carp with supplemental capture techniques took place in Starved Rock, and Marseilles Pools during the month of September. In Starved Rock 1,500 yards of net were deployed, resulting in the capture of 41 fish; including, 38

Silver Carp and 2 Bighead Carp. In Marseilles 3,000 yards of net were deployed, resulting in the capture of 195 fish; including, 129 Silver Carp and 32 Bighead Carp.

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

During the month of September five Grass Carp were captured for the purpose of ploidy, histology and age testing. One fish, a triploid, was captured in Dresden Island. The other four Grass Carp were captured during the first week of Season Intensive Monitoring within the CAWS. Two fish were captured in the Cal Sag (41.67873; -87.80058) during an electrofishing run, while the other two were captured in Lake Calumet (41.68726; -87.58736) in a commercial gill net. Ploidy for these four fish is still being analyzed. During manual tracking efforts two of six tagged Grass Carp were observed within Dresden Island Pool near RM 283.

Telemetry Monitoring

USACE biologists performed a full system download of receivers in September from the Cal-Sag Confluence in the Upper Lockport Pool to the Dresden Island Lock and Dam.

A single Bighead Carp was detected on the receiver within the Brandon Road approach channel in the Dresden Island Pool. This fish was first detected in the approach channel on 9 August 2016 at 14:15 and remained near the receiver for approximately 7 hours. This fish then heads downstream (2.8 miles) and is detected just upstream of Rock Run Rookery before returning to the approach channel at 10:01 on 10 August. The Bighead Carp then stages within the approach channel for close to 7 hours again before returning downstream. Further study of the data across the Dresden Island Pool is ongoing to determine the full extent of movements for Asian carp during the period of analysis.

There were nine detections on the receiver within the Brandon Road Lock chamber from two Common Carp from 18 July to 21 September. Both Common Carp were tagged and released within the Brandon Road Pool. Detections within the lock chamber are sporadic and separated by days of inactivity suggesting the two Common Carp are still within the Brandon Road Pool. This is further confirmed by consistent detections of these fish by receivers within the Brandon Road Pool and lack of detections within the Dresden Island Pool.

All receivers within the Brandon Road Pool have been checked for detections. There were significant detections throughout the study period but none of them were from Asian carp. There has been one upstream lockage through the Brandon Road Pool this year by a Common Carp that was captured within the Brandon Road Pool and

released after tagging within the Dresden Island Pool inside the approach channel to the Brandon Road Lock. Further analysis is needed to confirm further lock passage in the upstream direction by Common Carp.

There were no detections suggesting passage through the Electric Dispersal Barriers in either direction. Further analysis of the data from the entire study area will be completed for a more detailed report at the close of the monitoring season.

Barrier Maintenance & Fish Suppression

The Electric Dispersal Barrier System continuously supplied power to the water during the month of September. While there were several power outages at individual barriers, at least one electrode array was in operation at all times. No fish suppression or clearing actions were taken. There were 3 occasions which required Barrier IIB to be powered on generator power causing 6 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 all power transfer events at Barrier IIB. The Demonstration Barrier experienced several outages for repair work during September. The Demo Barrier was offline from approximately 10:00 on 2 September to around 14:00 on 8 September and again for three hours on 12 September for repair and maintenance work. The Demo Barrier was shut down again in support of permanent Barrier I construction work from approximately 08:00 on 27 September through 10:00 on 28 September. Barrier IIA annual maintenance was completed on 1 September which required a three hour shutdown for final checks from noon to 15:00. The wide array of Barrier IIA was left off following annual maintenance for further troubleshooting and to avoid damage to the equipment. Barrier IIB was operational throughout the month of September with the exception of the three power transfer events discussed earlier.

Asian Carp Gear Development and Evaluation

Table 1. Barrier defense efforts by the USFWS Columbia on 9/13/16 and 9/15/16 with one paupier boat in the Starved Rock Pool fishing at 2 different locations (Sheehan Island Side Channel and Heritage Harbor Marina).

Number of Days Fished	2
Number of Crew Days	2
Fishing Time (hours)	12.25
Paupier Electroshocking Time (hours)	1.8
Person Fishing Hours (4 per crew)	49
Number of Bighead Carp	4
Number of Silver Carp	1711
Number of Grass Carp	0
Number of Asian Carp	1715
Est. Tons of Bighead and Silver Carp Harvested	4.2
CPUE (# of Asian Carp/day (5 hours))	643
CPUE (# of Asian Carp/fishing hour)	140
CPUE (# of Asian Carp/electroshocking hour)	953
CPUE (# of Asian Carp/person fishing hour)	35

Table 2. Summary of four gears (PA – Paupier Electrified, ST- Surface Trawl, DT – Dozer Trawl Electrified, EF – Standard Electrofishing) used by the USFWS Columbia to capture Silver Carp (SVCP) and Gizzard Shad (GZSD) in the LaGrange (Lily Lake, Quiver, Matanzas) and Marseilles (Hansen Material Services East, Hansen Material Services West) pools of the Illinois River during the month of September 2016. All Silver Carp less than 200 mm were captured in the LaGrange Pool.

	N	Time (hr)	SVCP	SVCP/hr	SVCP < 200mm	SVCP range (mm)	GZSD	GZSD/hr	GZSD < 200mm	GZSD range (mm)
PA	40	3.2	601	190.7	16	48-925	8921	2830.6	8695	52-410
ST	39	3.3	2	0.6	2	45-60	695	209.3	695	45-172
DT	38	3.2	222	69.2	2	109-760	1157	360.4	1074	64-346
EF	38	4.2	403	96.1	0	225-730	584	139.2	533	44-311

Distribution and Movement of Small Asian Carp in the Illinois Waterway

Pool	Gear	# of runs	Minutes	Distance (m)	# of GZSD	# of GZSD/min	GZSD range (mm)	# of Juvenile SVCP ≤ 153 mm
Starved Rock	Electrified Dozer Trawl	13	72	4243	311	4.2	70-375	0
Marseilles	Electrified Dozer Trawl	13	61.5	5091	63	1.02	70-395	0
Peoria	Electrified Dozer Trawl	4	10.5	1059	131	12.5	75-285	4

The USFWS Columbia sampled the Starved Rock, Marseilles and Peoria pools with the electrified dozer trawl 9/27/16 – 9/29/2016. No Silver Carp less than 321mm were captured in the Marseilles or Starved Rock pools. Silver Carp measuring 85-110mm were captured in DePue Lake of the Peoria Pool, 20 miles downstream of the Starved Rock Lock & Dam. See above table for a summary of effort and catch.

In September, USFWS Wilmington and Columbia offices conducted sampling in the Illinois River for small Asian carp (≤ 153 mm). These efforts are documented below (Table 1). No small Asian carp (≤ 153 mm) were captured.

Table 1. September USFWS sampling effort by gear and river pool.

Pool	Gear	Effort
Marseilles	Electrofishing	45 runs (667 minutes)

Larval Fish Monitoring

INHS conducted ichthyoplankton sampling at 14 main channel and backwater sites located throughout the Illinois Waterway during the weeks of September 12 and September 26. 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 have now fallen below 20° C, and are expected to fall below 18° C in the near future, bringing the window of potential Asian carp spawning activity for 2016 to a close. Sample processing will continue until all collected fish eggs and larvae have been

identified. Subsamples of eggs and larvae will be prepared for genetic analyses to confirm visual identifications in the coming months. INHS staff also met with USGS partners in September to discuss proceeding with calculation of Asian carp spawning dates and locations using the FluEgg model and developmental stage data from Asian carp eggs collected in 2014 and 2015. These efforts will be used to estimate spawning locations, particularly for eggs collected upstream of Starved Rock Lock and Dam, and likely settlement areas for Asian carp larvae reaching the gas bladder inflation stage.

Unconventional Gear Development

Great Lakes trap (pound) nets were set at the Hanson Material Service Pit on September 23 in collaboration with USGS partners as part of the feeding attractant and sound stimuli studies. During these trials, one net will be conditioned with the attractant/stimuli, whereas the other will serve as the control. Nets will be checked daily and all fish will be measured and weighed. Pound nets are expected to fish until October 7. Data from these trials will be summarized and results will be reported by USGS.

Strategy for eDNA Monitoring in CAWS

During the week of September 12, 196 eDNA samples were collected below the electric dispersal barrier in Lockport Pool (n=55), Brandon Road Pool (n=55), Dresden Island Pool above Big Basin Marina (n=110), and the Kankakee River above the Wilmington dam (n=28). This effort was not part of the early detection and monitoring program, so results will not be posted publicly. Please contact Kelly Baerwaldt (kelly_baerwaldt@fws.gov) for information regarding the results of this event.

ASSESSING POPULATION, MOVEMENT, and BEHAVIOR OF ASIAN CARP TO INFORM CONTROL STRATEGIES

Hydroacoustic Surveys

Bi-monthly hydroacoustic surveys are being conducted in the Dresden Island pool during 2016 to assess temporal and spatial patterns in Asian carp densities, and to assess relationships with contracted harvest. During each bi-monthly survey, the entire main channel, Mobil Bay backwater (41.4249 N, -88.1850 W), Treats Island side-channel (41.4351 N, -88.1689 W), and two miles up the Kankakee River tributary are sampled. Hydroacoustic surveys in Dresden Island were conducted on 4-April, 8-June, and 1-August. Silver Carp numerical and biomass densities were lowest in June and were similar between April and August (Figure 1). In contrast, Bighead Carp densities were similar in April and June and increased in August (Figure 1). Asian carp density estimates were high for all months in the Mobil Bay backwater and Treats Island side-channel, although densities in these areas were variable among months (Figures 2-4). Targeted sampling during contracted harvest should focus in the Mobil Bay backwater and at the mouth of the Kankakee River, as these locations had relatively high densities throughout 2016. In contrast, the Treats Island side-channel has had relatively high variability in densities while main channel densities have been consistently low compared to other sites. In addition to repeated sampling in the Dresden Island Pool, hydroacoustic surveys also began in September to provide Asian carp density estimates throughout the Illinois River (Alton – Dresden Island Pools). The resulting data will be combined with annual density estimates since 2012 to assess the amount of inter-annual variability in Silver and Bighead Carp densities, and to examine the relative effects of environmental conditions and harvest on density patterns across pools and through time.

Telemetry

In July, all possible stationary receivers were downloaded and will be downloaded again in late fall or early winter in 2016. Thus far in 2016, we have not detected any upstream movement of Asian carp through any of the gated dams on the Illinois River. Upstream movements were observed through La Grange and Peoria Lock and Dam when the wickets were down between April and early June.

We compared our detection data to the real-time receiver at Utica, IL (located just upstream of the Route 178 bridge) operated by the USGS

Illinois Water Science Center, and found no difference in the number of fish detected by our receivers and the single receiver at Utica. Therefore, we believe the real-time receiver at Utica is able to detect most, if not all, tagged fish that pass the Route 178 bridge downstream of Starved Rock Lock and Dam. We will continue to compare our detection data to the real-time receivers throughout the Illinois River with the goal of eventually eliminating any redundancy in receiver coverage.

Of the 14 individuals tagged earlier this year in Rock Run backwater of the Dresden Island pool, 11 have been redetected by SIU's three Dresden Island stationary receivers or during active tracking by WIU. Two individuals were redetected in Rock Run, one individual traveled downstream to near Dresden Island Lock and Dam, and four individuals were detected in the main channel. One individual moved to Harborside Marina while three individuals moved to the Kankakee River in September. No Bighead or Silver Carp were detected at SIU's most upstream stationary receiver located in the Brandon Road Lock and Dam spillway.

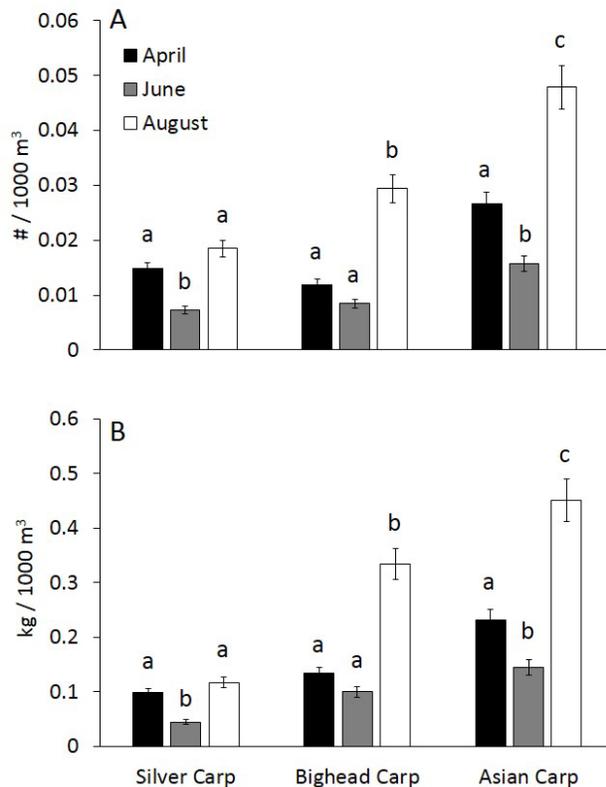


Figure 1. Mean (standard error) numerical (A) and biomass (B) densities of Silver Carp, Bighead Carp, and Asian Carp (Silver and Bighead Carp combined) in the Dresden Island pool during April, June, and August, 2016. Different letters denote significant density differences ($\alpha = 0.05$) among months for a species.

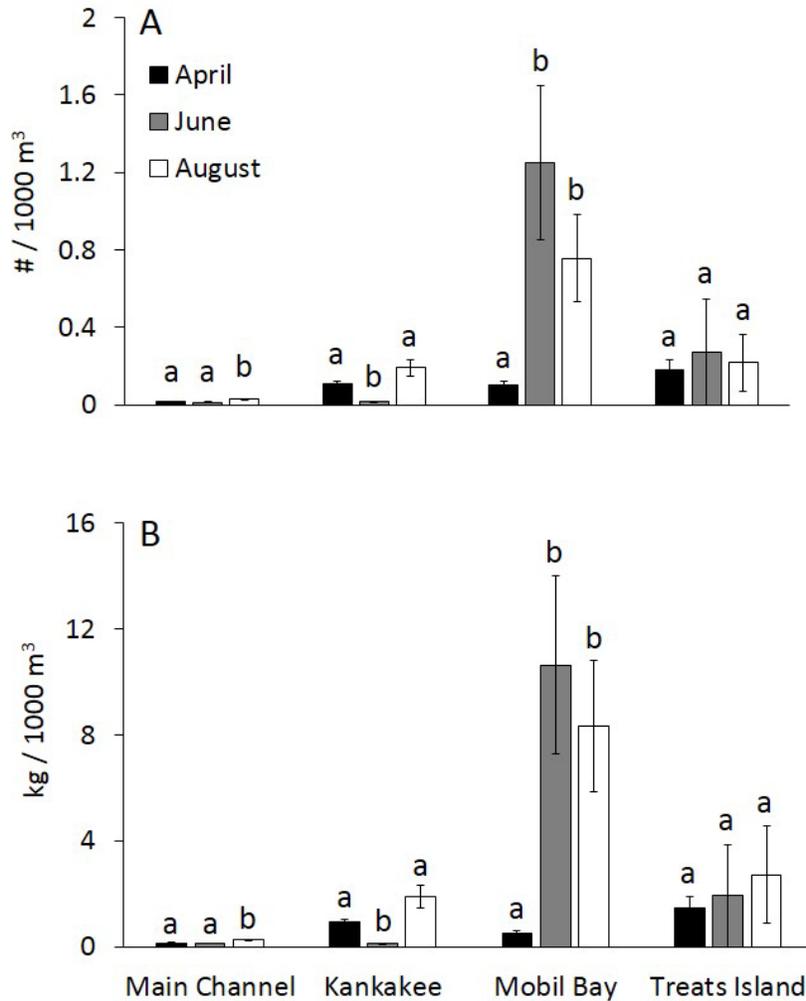


Figure 2. Mean (standard error) numerical (A) and biomass (B) densities of Asian carp (Silver and Bighead Carp combined) across habitats in the Dresden Island pool during April, June, and August, 2016. Sites included the entire main channel, one mile up the Kankakee River tributary, Mobil Bay backwater, and Treats Island side channel. Different letters denote significant density differences ($\alpha = 0.05$) among months for a site.

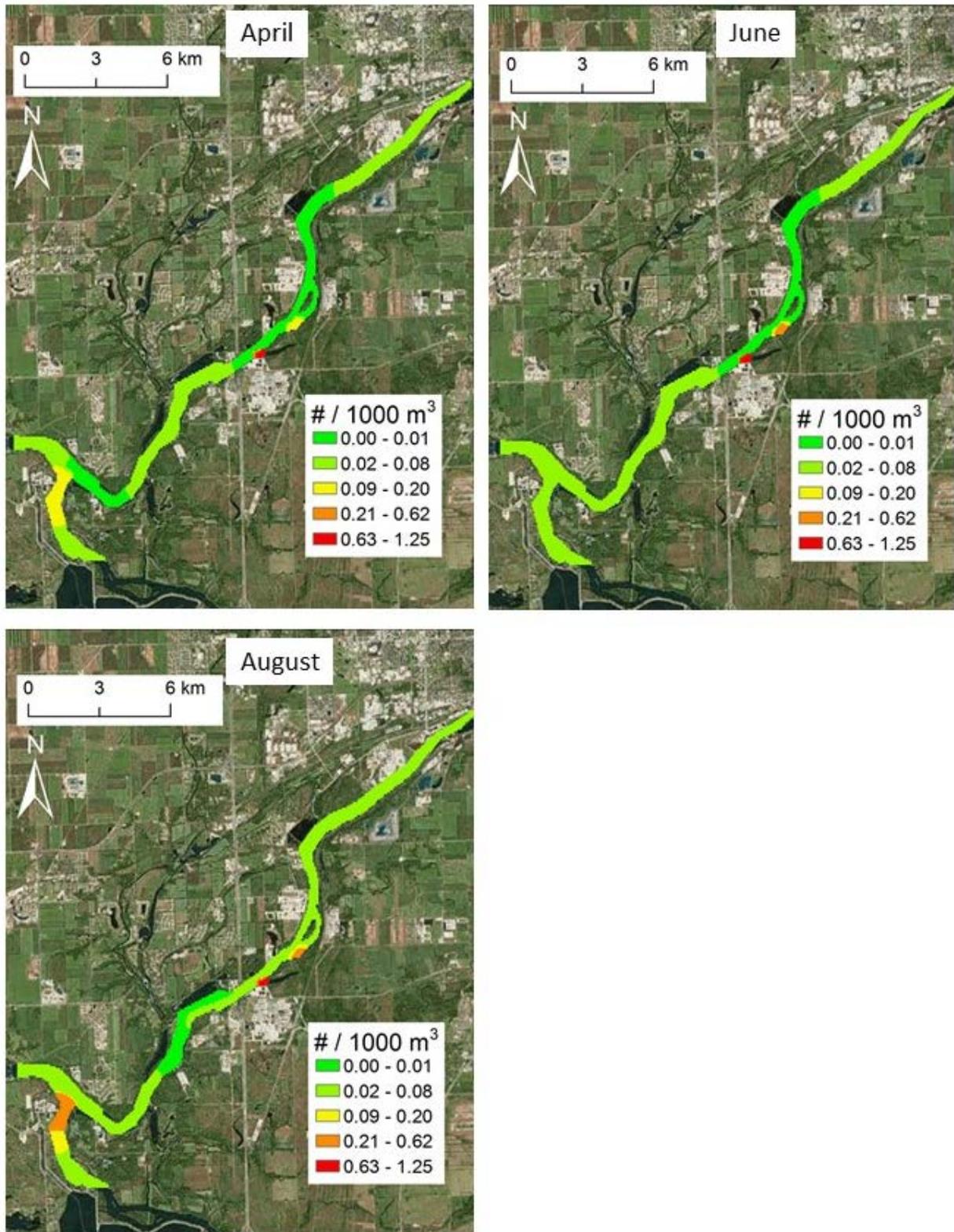


Figure 3. Mean Asian carp (Silver and Bighead Carp combined) numerical density in Dresden Island Pool during April, June, and August, 2016.

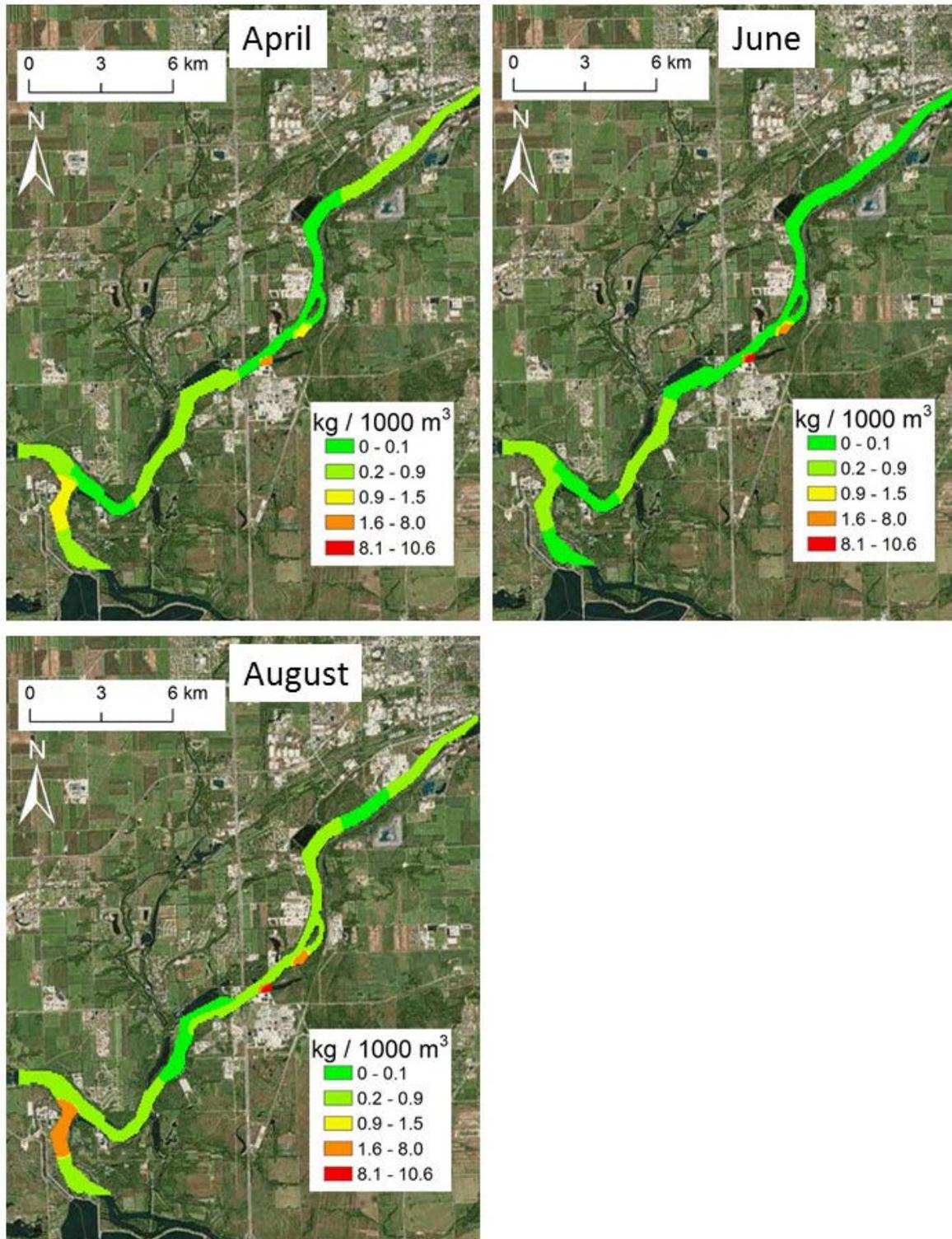


Figure 4. Mean Asian carp (Silver and Bighead Carp combined) biomass density in Dresden Island Pool during April, June, and August, 2016.

Alternate Pathway Surveillance in Illinois - Law Enforcement

The Invasive Species Unit (ISU) responded to a citizen complaint of a business selling a non-approved plant species (anchored water hyacinth) and a complaint generated from another government agency of an Illinois based company illegally possessing and shipping an injurious plant (*Ipomoea aquatic*) to other states.

ISU attended and the Great Lakes Fishery Commission Law Enforcement Committee meeting in Bolingbrook, IL.

ISU is conducting business record audits of companies currently under investigation for illegal activities related to the importation, sale, and transportation of aquatic life in Illinois.

ISU assisted a Conservation Police Officer who during a traffic stop at the Chain O' Lakes State park discovered an out-of-state resident selling aquatic life from a freezer in the back of his pickup truck.

On 8/25/2016, a Kentucky resident, plead guilty in federal court for selling live Rusty Crayfish in Illinois. The subject was fined \$1,500. The subject had been selling live Rusty Crayfish to a bait shop in Chicago.