

2016 June 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 June 13th and June 20th. 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. Tandem trap nets and an 800-yard commercial seine were fished exclusively in Lake Calumet.

Electrofishing:

- Crews from IDNR, USACE and USFWS completed 236 electrofishing runs at fixed and random sites (59 hours total).
- Crews collected 11,435 fish of 50 species and 1 hybrid group.
- Forty state threatened Banded Killifish were collected.

Commercial Netting:

- Contracted commercial fishers along with assisting IDNR biologists set 26.7 miles of net (235 sets) at fixed and random sites.
- Crews collected 733 fish of 19 species and 1 hybrid group.

Commercial Seine:

- Contracted commercial fishers along with assisting IDNR biologists completed three 800-yard commercial seine hauls.
- Crews collected 3,775 fish of 15 species.

Trap Netting:

- Crews from IDNR set three tandem trap nets (6 nets total). The nets were set for four nights, totaling 24 net nights of effort.
- Crews collected 137 fish of 15 species

All gear types combined, a total of 16,080 fish representing 50 species and 1 hybrid group were collected.

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 IDNR, USACE and USFWS completed 101 electrofishing runs at fixed and random sites (25.25 hours total) in the Lockport, Brandon Road, Dresden Island, and Marseilles Pools in June.
- Crews collected 3,311 fish of 55 species.
- **No Bighead Carp or Silver Carp were reported captured or observed in the Lockport or Brandon Road Pools.**
- Two adult Silver Carp were collected in the Dresden Island Pool, ~3 miles downstream of the I-55 Bridge
- Two adult Silver Carp were collected in the Kankakee River, ~3 miles upstream of the confluence with the Illinois River
- One hundred sixteen adult Silver Carp were collected in the Marseilles Pool.

Commercial Netting:

- Contracted commercial fishers along with assisting IDNR biologists set 13.7 miles of net (104 sets) at fixed and targeted sites in the Lockport, Brandon Road and Dresden Island Pools (including Rock Run Rookery) during the week of June 6th.
- Crews collected 579 fish of 10 species and 1 hybrid group.
- **No Bighead Carp or Silver Carp were captured or observed in the Lockport or Brandon Road Pools.**
- One Bighead Carp and one Silver Carp (both adults) were collected in the Dresden Island Pool ~0.4 miles upstream of the I-55 Bridge in Mobil Bay.
- Forty-one Bighead Carp and two Silver Carp (all adults) were collected in Rock Run Rookery.
- Five Bighead Carp and two Silver Carp (all adults) were collected in the Dresden Island Pool downstream of the I-55 Bridge.

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 June 13th.

- Crews collected 29 fish of 5 species during hoop net sampling and 686 fish of 20 species during mini fyke sampling (163 of which were state threatened Banded Killifish).
- **No Bighead Carp or Silver Carp were reported captured or observed in the Lockport, Brandon Road or Dresden Island Pools.**
- Five adult Silver Carp were collected during hoop net sampling in the Marseilles Pool.

Barrier Defense Asian Carp Removal Project

Barrier Defense occurred the weeks of May 30th and June 27th 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	36	48
Number of Net Crew Days	164	260
Yards of Net Fished	228,750	280,895
Miles of Nets Fished	130	159.6
Number of Pound Net nights	24	65
Number of Hoop Net nights	69.6	768.7
Number of Bighead Carp	3,909	5,948
Number of Silver Carp	49,726	64,902
Number of Grass Carp	485	415
Number of Asian Carp	54,120	71,265
Tons of Bighead and Silver Carp Harvested	190.1	259.2

Understanding Surrogate Fish Movement with Barriers

These are the tagging results for June 2016:

Fish Tagged:

- Bigmouth Buffalo – 8
- Common Carp – 178
- Smallmouth Buffalo – 124
- Common Carp x Goldfish hybrid - 1

Total – 311 fish tagged

Recaptures:

- Lockport Pool – 4 Common Carp
- Brandon Road Pool – 1 Common Carp
- Rock Run Rookery – 4 Smallmouth Buffalo
- Dresden Island Pool – 2 Smallmouth Buffalo, 1 Common Carp

Total – 12 recaptures

Movement:

- Two Common Carp tagged in the Brandon Road Pool, one in July 2014 and the other in June 2015, were recapped in the Rock Run Rookery and Lockport Pool, respectively.
- The remaining 10 recaps were caught in the same pool they were originally tagged in.

Distribution and Movement of Small Asian Carp in the Illinois Waterway

In June, USFWS Wilmington and Columbia offices conducted sampling in the Illinois River for small Asian carp ($\leq 153\text{mm}$). These efforts were separated by river pool, and documented below (Table 1). No small Asian carp ($\leq 153\text{mm}$) were captured.

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

Pool	Gear	Effort
Starved Rock	Paupier Trawl	15 runs (85 minutes)
Starved Rock	Electrofishing	5 runs (75 minutes)
Marseilles	Dozer Trawl	14 runs (34 minutes)
Dresden Island	Electrofishing	25 runs (381 minutes)
Dresden Island	Dozer Trawl	14 runs (31 minutes)
Dresden Island	Mini Fyke Net	8 night sets
Brandon Road	Electrofishing	15 runs (238 minutes)
Lockport	Electrofishing	8 runs (120 minutes)

Barge-Fish Entrainment Study

The USFWS conducted a series of experiments examining entrainment and transport of Asian carp eggs and larvae by a commercial barge tow during the week of June 13-18th. Trials took place within the Peoria pool of the Illinois River between Peru, IL (RM 222) and the Starved Rock Lock and Dam (RM 231). During the trial period Asian carp were observed spawning at the confluence of the Vermilion River and the Illinois River within the Peoria pool (June 16th RM 226.5). Results of these trials will be available pending processing of ichthyoplankton samples collected in the river channel and within the barge rake-to-box junction gap.

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 first week of June 2016 to determine fish density within the study reaches.

A mobile multi-beam acoustic survey was conducted on June 28th inside the Brandon Road Lock chamber. Additionally, 300 yards of 3.5" mesh trammel net was fished inside the lock chamber and one fifteen minute electrofishing run was conducted. Survey results suggested fish density within the lock chamber was moderate. One adult Common Carp, one adult Freshwater Drum, and 46 juvenile Gizzard Shad were captured inside the lock chamber.

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 June (June 1 and June 30). 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, Dresden Island and Brandon Road Pools during the month of June. In Starved Rock 800 yards of net were deployed, resulting in the capture of 72 fish; including, 36 Silver Carp and 33 Bighead Carp. In Marseilles 1,400 yards of net were deployed, resulting in the capture of 127 fish; including, 80 Silver Carp and 30 Bighead Carp. In Dresden Island 1,800 yards of net were deployed, resulting in the capture of 55 fish, one being a silver carp, which was collected below Moose Island (41.39606; 88.22876). In Brandon Road 1,100 yards of net were deployed, resulting in the capture of one fish (zero Asian carp).

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

During the month of June zero Grass Carp were collected for the purpose of ploidy testing.

Telemetry Monitoring

New telemetry equipment was delivered to USACE within the month of June including 75 V16 transmitters, 10 V13PT pressure/temperature transmitters, 5 VR2W receivers and 3 VR2C receivers. Transmitters will be implanted into surrogate species within the Lockport and Brandon Road pools to maintain the appropriate tagged fish saturation in each pool as previously tagged fish expire or leave the area. Additional Bighead and Silver Carps will be tagged within the Dresden Island Pool utilizing the V13PT transmitters to obtain further information on habitat use and movement habits. Transmitter implant dates will be scheduled as temperatures and weather permits.

Barrier Maintenance & Fish Suppression

The Electric Dispersal Barriers were successfully operated with minor loss to power in water in the month of June and did not require fish suppression or clearing actions. There were six occasions which required Barrier IIB to be powered on generator power causing 12 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 five of these events and off during one generator transfer event. The Demonstration Barrier has remained operational throughout the entire month of June. Barrier IIA was powered down during the installation of an Uninterrupted Power Supply (UPS). The UPS will supply power to Barrier IIA equipment in the short gap between future transfers from Utility to Generator power. This will significantly reduce the existing 20-30 second loss of power to water that occurs for each transfer. Barrier IIA was powered down on 20 June between 13:03-13:49 and again from 21 June at 07:00 to 24 June at 09:30 in support of the UPS installation. Barrier IIB and the Demonstration Barrier were operational throughout the Barrier IIA outages. Following the power up of Barrier IIA, USACE completed two 15 minute electrofishing runs on Tuesday and Wednesday (28-29 June; total of two runs one each day) to help assess the risk for Asian carp presence. No fish were observed or captured. In addition, fixed and random site monitoring in Lower Lockport Pool throughout the week produced a low abundance of fishes in general. USFWS Wilmington sub-office completed three sonar runs between the barriers on Thursday, 30 June. Jeremiah Davis reported ' Fish abundance in general was low between the barriers and no large fish were observed'. Based on these survey results, ongoing surveillance, lack of Asian carp detections, and a record of intense work with little evidence of Bighead and/or Silver Carp presence the MRWG concluded no further action was required.

Asian Carp Gear Development and Evaluation

In June 2016, the Columbia USFWS office utilized innovative gears to sample for small Asian Carp in the Starved Rock, Marseilles, and Dresden Island Pools. Results can be found in the summary for Distribution and Movement of Small Asian Carp in the Illinois Waterway. Additional, a preliminary study was done on Asian Carp behavioral avoidance of the paupier boat and results are being analyzed.

Table 1. Barrier defense efforts the week of 6/27 with one paupier boat in the Starved Rock Pool fishing at 3 different locations (Fox River, Sheehan Island Side Channel, and Sheehan Island backwater).

Number of Days Fished	3
Number of Crew Days	3
Fishing Time (hours)	14
Paupier Electroshocking Time (hours)	1.8
Person Fishing Hours (4 per crew)	56
Number of Bighead Carp	5
Number of Silver Carp	2270
Number of Grass Carp	1
Number of Asian Carp	2276
Est. Tons of Bighead and Silver Carp Harvested	5.6
CPUE (# of Asian Carp/day (5hours))	854
CPUE (# of Asian Carp/fishing hour)	163
CPUE (# of Asian Carp/electroshocking hour)	1264
CPUE (# of Asian Carp/person fishing hour)	163

Table 2. Number of Gizzard Shad (20mm-320mm) caught in Hansen Material Services East and West pits with 4 different gears on 6/14-6/16 in order to evaluate gear effectiveness on a surrogate species for Asian Carp.

Gear	# of Gizzard Shad/ 30minutes	Total Time (minutes)
Paupier Electrified	213	65
Surface Trawl	334	110
Dozer Trawl Electrified	302	103
Standard Electrofishing	8	105

Larval Fish Monitoring

INHS conducted ichthyoplankton sampling at 14 main channel and backwater sites located throughout the Illinois Waterway during every week of June. 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. Processing of ichthyoplankton

samples from April through mid-May has been completed, with no Asian carp eggs or larvae identified from these sampling dates. Brief examination of samples from late May and June indicate small numbers of large-diameter eggs from sites in the LaGrange and Peoria Pools during these times. No potential Asian carp eggs appear to be present in any samples collected this year from upstream of Starved Rock Lock and Dam. This information should be considered preliminary and will be updated once all samples have been fully processed. Ichthyoplankton sampling will continue on a bi-weekly basis through October, or more frequently if river conditions appear to be conducive to Asian carp spawning.

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

Hydroacoustics

Surveys were completed in the Hanson Material Services west pit to estimate the density of Asian carp before and after harvest using the unified fishing method. Comparisons of surveys pre- and post-harvest indicated that Silver and Bighead Carp numerical and biomass densities were significantly reduced by > 80% immediately following harvest, with overall Asian carp (Silver and Bighead Carp combined) numerical and biomass densities reduced by 82% and 84%, respectively (Figure 1). A post-harvest survey conducted 67 days after harvest indicated that Asian carp densities slightly rebounded but were still lower than densities before harvest, with Asian carp numerical density being 60% lower than densities before the unified fishing event (Figure 1).

A hydroacoustic survey was also conducted throughout the entire Dresden Island pool in early April. This was the first in a series of hydroacoustic surveys of the Dresden Island pool which will occur every other month during 2016 to assess temporal variation in Asian carp densities. 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 2). 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). The

second bi-monthly hydroacoustic survey of the Dresden Island pool was conducted in June 2016 and these data are currently being analyzed.

Telemetry

All stationary receivers upstream of Starved Rock Lock and Dam were downloaded in early April. Three new stationary receivers were installed between Rock Run Rookery Preserve and the Brandon Road Lock and Dam (Figure 3). Thirteen additional Asian carp were implanted with acoustic telemetry tags in Rock Run Rookery Preserve. These fish were collected during Illinois DNR/commercial fishing efforts and released back into Rock Run.

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.

On 5/16/2016 we conducted manual tracking from the Route 178 bridge (Rkm 369) downstream to Hennepin, IL (Rkm 335) in an effort to locate fish between our stationary receivers located at Rkm 336 and 369. We detected 28 individual Asian carp, two of which were in backwater habitats,

while the remainder were found in the main channel (Figure 4). We repeated this survey on 6/17/2016 – 6/18/2016, and detected 18 unique Asian carp. Three individuals were in backwater habitats and the remaining individuals were in the main channel (Figure 4). Eleven of the fish detected 6/17/2016 – 6/18/2016 were also observed during the initial active tracking survey. Several of the backwaters in which individuals were located were inaccessible by boat and had limited hydrologic connection with the main channel. Some Asian carp may have been trapped in these backwaters.

Between the two active tracking surveys, 33 different Asian carp were detected. Ten of these individuals had never been previously detected on the existing stationary receiver array. Previous detection data for the remaining 23 fish showed detections as far downstream as Rkm 9 (Grafton, IL) and as far upstream as Rkm 379 (Sheehan Island). Additionally, 14 individuals were detected within 2 kilometers of the Vermilion River, indicating its importance and could indicate its use as a spawning tributary. Manual tracking surveys increased our detection data at a smaller scale than allowed by using the stationary receiver array, and helped locate fish that had not previously been detected. It will be important to continue to utilize these surveys in the future to supplement and stationary receiver array.

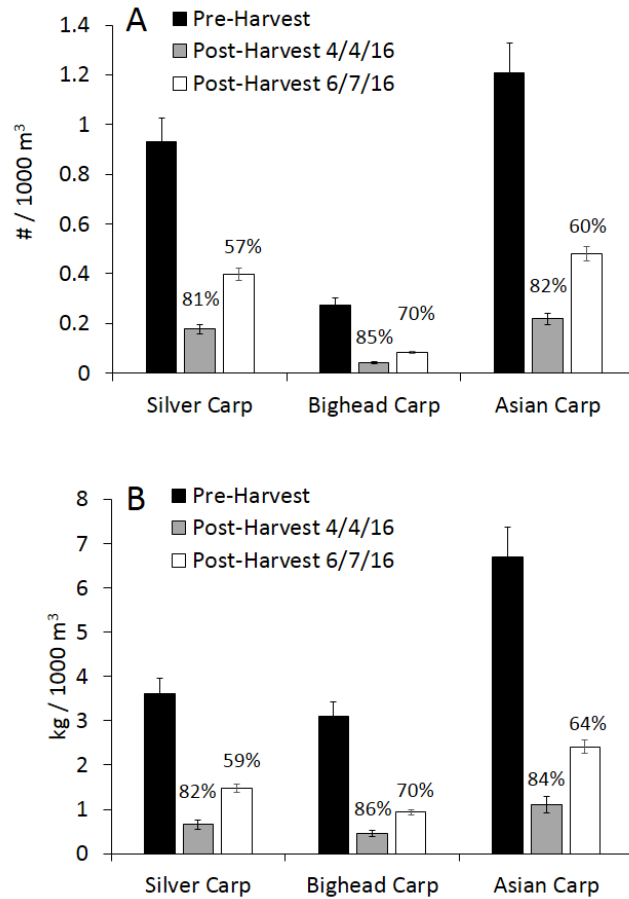


Figure 1. Mean (SE) numerical (A) and biomass (B) densities of Silver Carp, Bighead Carp, and both species combined (Asian carp) in the Hanson Materials Services west pit before, 3 days after harvest (Post-Harvest 4/4/16), and 67 days after harvest (Post-Harvest 6/7/16) using the unified fishing method. Post-harvest densities were significantly lower than pre-harvest densities for all species ($\alpha = 0.05$). Percentages represent the percent reduction in density after harvest of Asian carp.

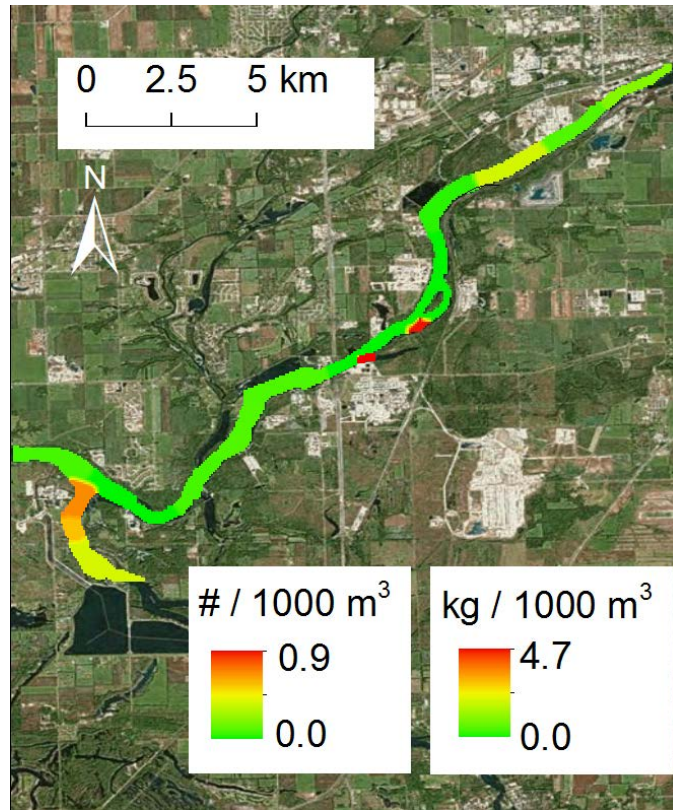


Figure 2. Mean Asian carp (Silver and Bighead Carp combined) densities in the Dresden Island pool in April 2016.

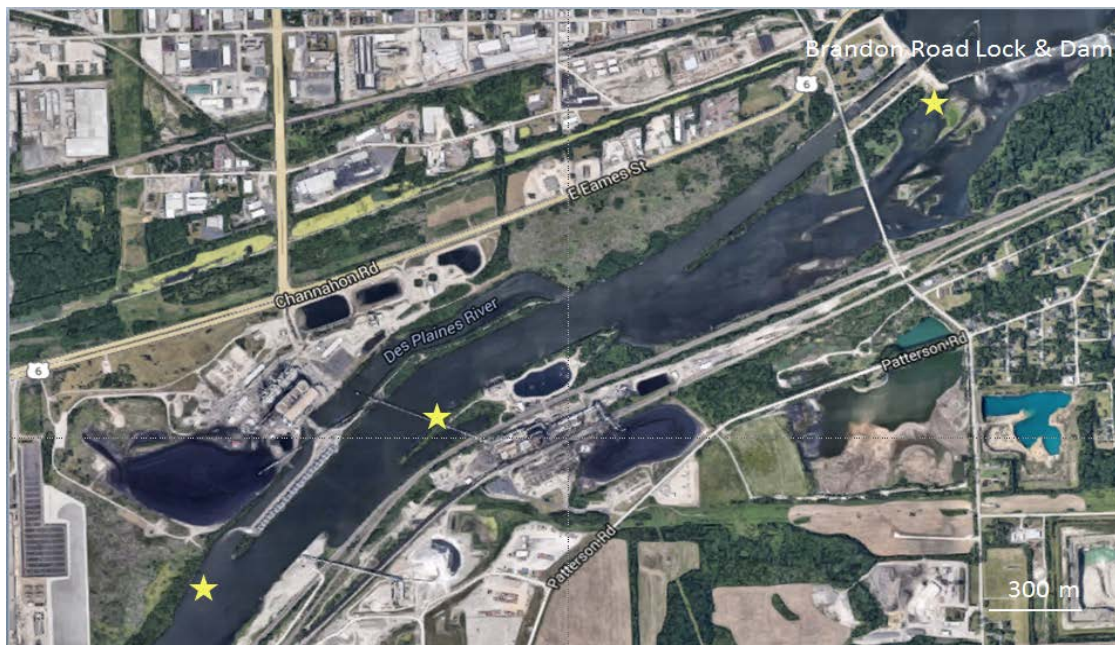


Figure 3. Locations of newly installed stationary receivers (indicated by stars) just downstream of Brandon Road Lock and Dam.

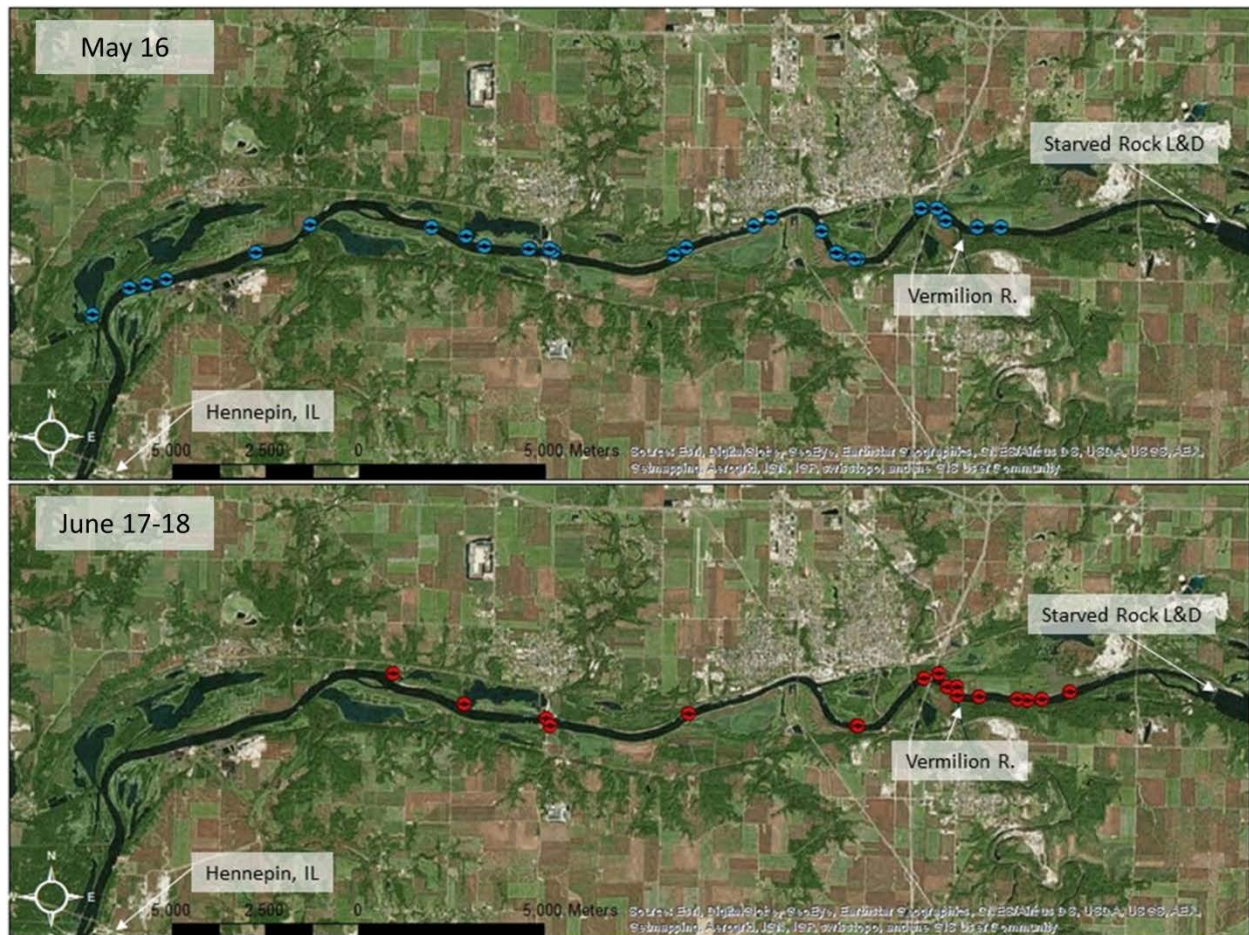


Figure 4. Locations of Asian carp detected during an active tracking survey on May 16th, 2016 (blue dots), and during a subsequent survey on June 17-18th, 2016 (red dots).

Alternate Pathway Surveillance in Illinois - Law Enforcement

Invasive Species Unit (ISU) conducted a search warrant at Illinois business that did not have a license to sell fish and was committing environmental crimes. The investigation is on-going.