

2016 March Summary

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

Fixed and Targeted Site Sampling Downstream of the Electric Dispersal Barrier

Commercial Netting:

- Contracted commercial fishers along with assisting IDNR biologists set 10 miles of net at fixed and targeted sites in the Lockport, Brandon Road and Dresden Island Pools (including Rock Run Rookery) during the month of March
- Crews collected 1,160 fish of 15 species
- Nine Bighead Carp and 12 Silver Carp (all adults) were collected in Rock Run Rookery
- Twelve Bighead Carp and 11 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**

Barrier Defense Asian Carp Removal Project

Barrier Defense occurred the week of March 7th. Barrier Defense specifically takes place in the Marseilles and Starved Rock Pools. Below is a summary for 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	4	13
Number of Net Crew Days	20	87
Yards of Net Fished	29,720	80,650
Miles of Nets Fished	16.9	45.8
Pound net Days	0	17
Number of Bighead Carp	773	2,230
Number of Silver Carp	8,011	20,126
Number of Grass Carp	177	10
Number of Asian Carp	8,961	22,366
Tons of Bighead and Silver Carp Harvested	26.4	85.1

Understanding Surrogate Fish Movement with Barriers

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

Fish Tagged

- Bigmouth Buffalo – 32
 - Black Buffalo – 14
 - Common Carp – 135
 - Smallmouth Buffalo – 202
- Total – 383

Recapture Totals

Lockport Pool – 4 Common Carp

- Rock Run – 9 Smallmouth Buffalo, 3 Bigmouth Buffalo, 1 Black Buffalo
 - Dresden Pool – 4 Smallmouth Buffalo, 1 Bigmouth Buffalo, 2 Common Carp
- Total – 24 recaptures

Fish Movement

- 6 recaptures identified by caudal fin clip, however tags were lost (no data on movement)
- 18 recaptures had tags but showed no movement between Barrier/Dam

Unified Fishing Method

A quick summary of the unified method; these are the updated results

<https://www.facebook.com/20531316728/posts/10154009990506729/>

- 13,231 Asian carp were removed by all methods during the 2 week effort (gill nets, seine, pound nets/block)
- 915 Bighead carp and 12316 silver carp
- 7,712 other (native) species were captured in this effort and released as soon as possible these species included (freshwater drum, white bass, bigmouth buffalo, smallmouth buffalo, gizzard shad, channel catfish, largemouth bass, smallmouth bass, black crappie, golden redhorse, paddlefish, and others)
- Asian carp made up just over 63% of catch by numbers collected
- **96,277 lbs** (or 48+ tons) of Asian carp were removed
- 30,700 yds (17+ miles) of gill nets were deployed to assist this method with significant catches from this gear, 2-900 yd seine hauls were pulled, 5,495 yards (3+ miles) of block net deployed and 17 net-nights fished by the pound net.
- In 2015 approximately 345,000 lbs of Asian carp were removed from this west pit. This unified method therefore collected over 27% of last year's total haul in just 2 weeks.

The event used ICS to manage personnel, no injuries were reported. A success for sure even with higher water temperatures than desired. The efficiency of the removal will be forthcoming as 2 separate before/after surveys were completed.

Summary of Net Sets (Yds)										
	3/21	3/22	3/23	3/24	3/25	3/28	3/29	3/30	3/31	Total
Block Net	1166	1332	999	1847	533	350	1073	230		7530
Gill Net		3100	4500	6900	3400	1200	5700	4600	1300	30700
Seine	900								900	1800

Total Catch Summary

Catch Summary							
	Gill Net	Seine	Pound Net	Total Fish	Percentage of Total Catch	AC Pounds	AC Tonnage
Bighead Carp	228	682	5	915	4.4%	10065	5.0
Silver Carp	6821	4744	751	12316	58.8%	86212	43.1
By-catch	1707	5282	723	7712	36.8%		
Totals	8756	10708	1479	20943		96277	48.1
Gill Net Yardage	30700						
Seine Yardage	1800						
Block Net Yardage	7530						
Pound Net Nights	17						

Telemetry Monitoring

One USACE boat and two biologists successfully downloaded receiver data that was collected through the winter at select locations within the Upper Illinois Waterway the week of 7 March. A preliminary review of the data indicated no upstream movement by Asian carp above the Rock Run Rookery backwater within the Dresden Island Pool and no upstream movement of any fishes across the Electric Dispersal Barrier System. There were over 700,000 detections from December 2015 through March 2016 from 62 unique transmitters. The highest detection rates in Lower Lockport pool occurred at the Hanson Material Services slip near the barrier and at the barriers themselves. The highest detection rates for Asian carp in the Dresden Island Pool occurred at the Rock Run Rookery and only sporadic detections in the lower pool and mouth of the Kankakee River.

In addition to downloading receivers deployed for the winter, USACE re-deployed the full receiver network ranging from the Cal-Sag Confluence with the CSSC to the

Dresden Island Lock and Dam. New receiver deployments in 2016 include one receiver at the mouth of the DuPage River just outside of Big Basin, one at Three Rivers Marina in lower Dresden Island Pool, and two receivers upstream of the Wilmington Dam in the Kankakee River to help assess passage over or around the dam. New Kankakee River deployments are located at Custer Park and approximately one mile downstream of the Kankakee Dam.

Barrier Maintenance & Fish Suppression

The Electric Dispersal Barriers were successfully operated with minimal loss to power in water in the month of March and did not require fish suppression or clearing actions. Barrier IIB was powered down for approximately 6 hours on 3 March in support of dive work to inspect the Demonstration Barrier electrodes. Barrier IIA was operational throughout the planned outage. There were 6 severe weather events which required the barriers to be operated on generator power. Barrier IIA was transferred to generator power twice and Barrier IIB was transferred six times during the severe weather events. 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.

Asian Carp Gear Development and Evaluation

During the week of 03/21/16, the U.S. Fish & Wildlife Service Columbia Fish & Wildlife Conservation Office (FWCO) accomplished several deployments of a modified riverine purse seine in the Starved Rock and Marseilles pools of the Illinois River as part of its gear development efforts. The purse seine is 160 meters (m) long with a modified bunt that includes a cod end in the center. It was deployed off of a 7.2 m flat bottom river boat specially equipped with pursing winches and a brailing device. The purse seine is being developed as part of a suite of gears aimed at rapid response and mass removal of Invasive Carp. The net was successfully deployed and retrieved four times over two days. On 3/22/16 the west end of the Hansen Material Services pit was sampled. Over the course of 57 minutes 6 Silver Carp greater than 600mm were caught, as well as two White Bass, three Smallmouth Buffalo, and four Freshwater Drum. On 3/23/16, the purse seine was deployed at three locations in the Starved Rock Pool for a total of 172 minutes catching 25 Silver Carp and two Big Head Carp. Also caught were 11 Gizzard Shad, 8 Smallmouth Buffalo, one River Carpsucker, and one Freshwater Drum. Multiple deployments of the purse seine in rapid succession shows promise for the use of this novel technique for rapid response and mass removal. Work is scheduled with USGS Columbia Environmental Research Center (CERC) in April using a Dual-frequency Identification Sonar (DIDSON) acoustic camera to view the net underwater. This will identify issues that allow fish escape to be diagnosed and addressed.

On 03/24/16, the Columbia FWCO teamed up with the Carterville FWCO Wilmington substation to map the electrical fields of Wilmington's electrofishing boat (image 1) as well as to fit and test a universal Dozer Trawl system on a surface drive flat bottom boat (Image 2). This Dozer Trawl system was designed and fabricated by the Columbia

FWCO as an affordable option to fit on existing electrofishing boats targeting Invasive Carp. The entire assembly cost approximately \$260, requires only basic metal tools to make, and is user-friendly to operate. The setup will be electrified and offer an alternative to traditional dip-net electrofishing. Subsequent testing is scheduled for April.



Image 1: Skyler Schlick of Columbia FWCO works with Kjetil Henderson of Wilmington USFWS to map the electrical field created by an electro-fishing boat.



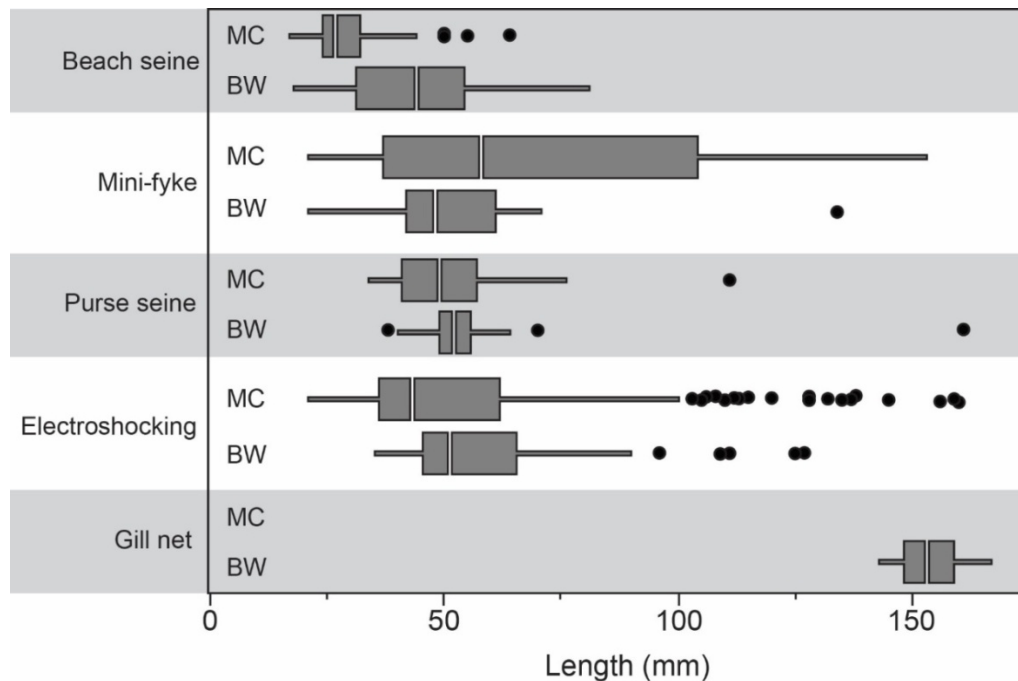
Image 2: The universal dozer trawl system sits snugly on the bow of the Wilmington FWCO's surface drive electrofishing boat awaiting trials.

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

Bi-weekly mobile split beam hydroacoustic surveys of fish density directly below the electric dispersal barrier were completed in March.

Evaluation of Gear Efficiency

No field sampling for the gear evaluation project occurred during the month of March. Work performed during this time included analysis of size distributions of juvenile Silver Carp captured by various gears during 2014 – 2015. Beach seines captured the smallest juvenile Silver Carp (mean = 37 mm) in shallow shoreline habitats. Mini-fyke nets tended to capture larger individuals, on average, than beach seines (mean = 58 mm), but collected a very wide size distribution of Silver Carp, particularly in main channel habitats. Purse seines captured larger average sizes of juvenile Silver Carp (mean = 52.5 mm) in offshore locations, likely because they rarely captured any Silver Carp smaller than 40 mm. Pulsed-DC electrofishing collected a wide size distribution of Silver Carp (mean = 60.7 mm), including high numbers of individuals larger than 90 mm. Gill nets collected no age-0 Silver Carp, but did collect age-1 Silver Carp in backwater habitats (mean = 153 mm).



Larval Fish Monitoring

No field sampling for the larval fish monitoring project occurred during the month of March. Work performed during this month included classification of Asian carp eggs and larvae collected during 2014 – 2015 to developmental stages. Additionally, otoliths are being extracted from Asian carp larvae for daily age and growth analyses. This data will help to pinpoint Asian carp spawning dates in the Illinois Waterway, and estimates of egg ages can be used to back-calculate spawning locations. These tasks are ongoing and results will be reported once available.

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

Processing of the 2015 fall Illinois River hydroacoustic surveys (Alton to Dresden Island pools) was completed and the data are now being coupled to catch data to estimate Asian carp densities. The first in a series of seasonal surveys of Dresden pool will be conducted in early April (4/5 - 4/6). SIUC also conducted hydroacoustic surveys in the HMS west pit before the DNR's unified fishing method to harvest Asian carp, and a post-harvest survey will be conducted in early April (4/4). Fish and Wildlife Service (Wilmington) is also conducting before-after surveys following the same protocol and the resulting data will: 1) help determine the efficacy of the unified fishing method, and 2) quantify the amount of variability in Asian carp density estimates from different agencies following a standardized sampling protocol.

Telemetry

Stationary receiver downloads occurred in the lower Illinois River (Grafton, IL – LaGrange Lock and Dam) in early March but no new telemetry tags or stationary receivers were deployed. In early April (4/4 – 4/8), three new stationary receivers will be deployed around Brandon Road Lock & Dam. Additionally, as many tags as possible will be implanted into Asian carp collected from Rock Run Rookery.

Models of transition probabilities for Asian carp among Illinois River pools have been modified to include deceased individuals and expiring tags, further refining movement probability estimates. All possible models (with movement probabilities varying with season and pool, season, pool or neither) have been run and a four season model appears best for both Bighead and Silver Carp. Saturated models (a different

parameter estimate for each variable) are now being run for Bighead and Silver Carp. Deviance of the saturated model will then be compared to the top four season model to calculate \hat{c} (goodness-of-fit measure). This allows for a determination to be made on the relative accuracy of the top model (four season model).

Standardized sampling

Aging information related to standardized sampling was completed during this quarter. Genotyping of a subset of the Asian carp collected during standardized sampling has experienced delays in processing but is projected to be completed by April.

Post-cleithra from 371 Asian carp were sectioned transversely across the center with a diamond-blade isomet saw. Sections were read by two independent readers using bottom illumination from a compound microscope. If disagreements between readers could not be resolved with a third reader, the age was omitted from analyses. A half year was added to ages to compensate for collection during the summer.

In 2015, 35 age-0 Asian carp were collected in the Alton reach, with a mean total length of 104 mm (SE = 3 mm; Figure 1). Main channel sampling sites accounted for 100% of captures. In the La Grange reach, 11 age-0 Asian carp were collected with a mean total length of 116 mm (SE = 4 mm; Figure 1). La Grange captures were approximately equal between main channel (55 %) and backwater sampling sites (45%). In the Peoria reach, 17 age-0 Asian carp were collected with a mean total length of 114 mm (SE = 3 mm; Figure 1). Within the Peoria reach, main channel sampling sites accounted for 100% of age-0 captures. Mean length-at-age for age-3.5 to age-6.5, by year and reach is shown in Figure 2. In 2015, there was no age-3.5 Silver Carp collected and only a few age-4.5 year olds. The majority of Silver carp in all reaches were between age-5.5 and age-7.5 (Figure 3).

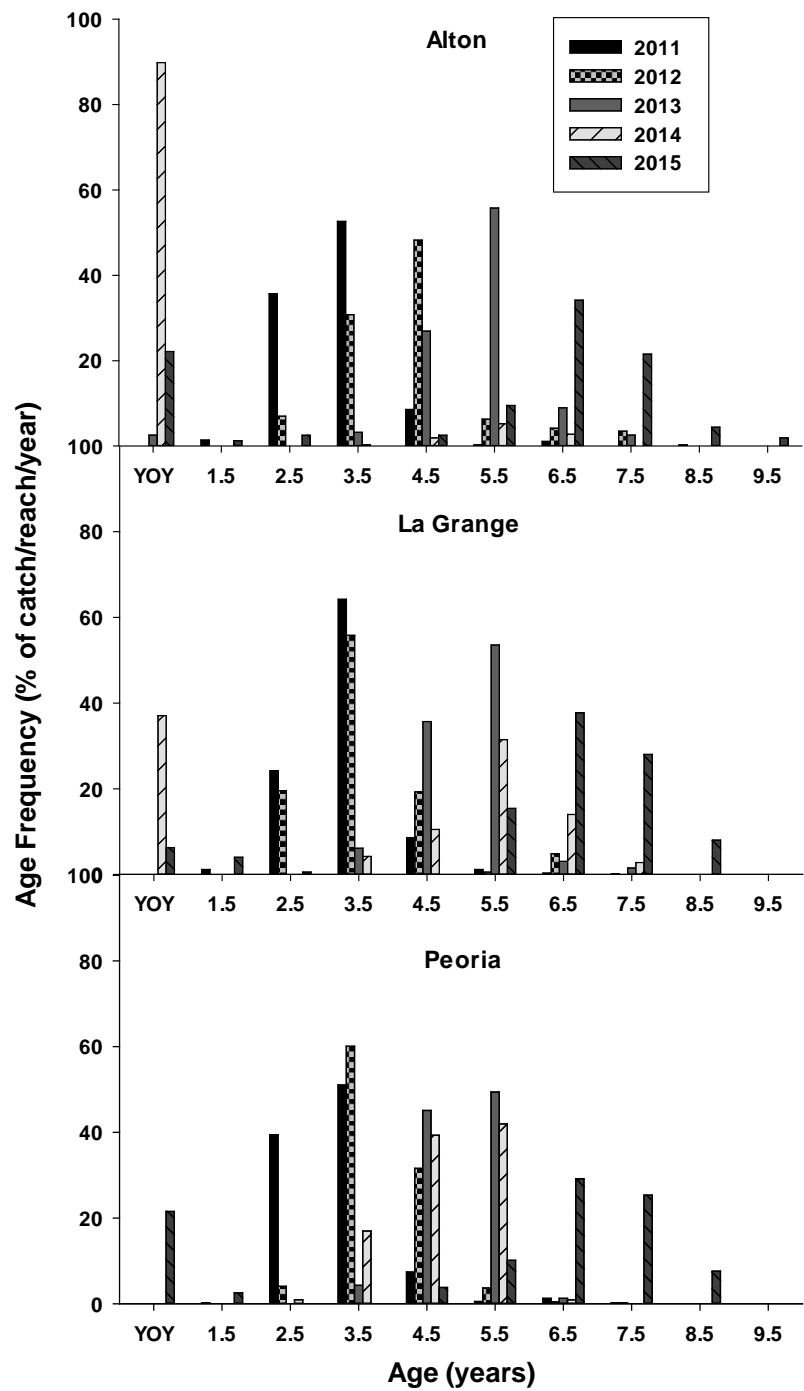


Figure 1. Age frequency for Silver Carp by reach of the lower Illinois River for 2011–2015, collected by electrofishing.

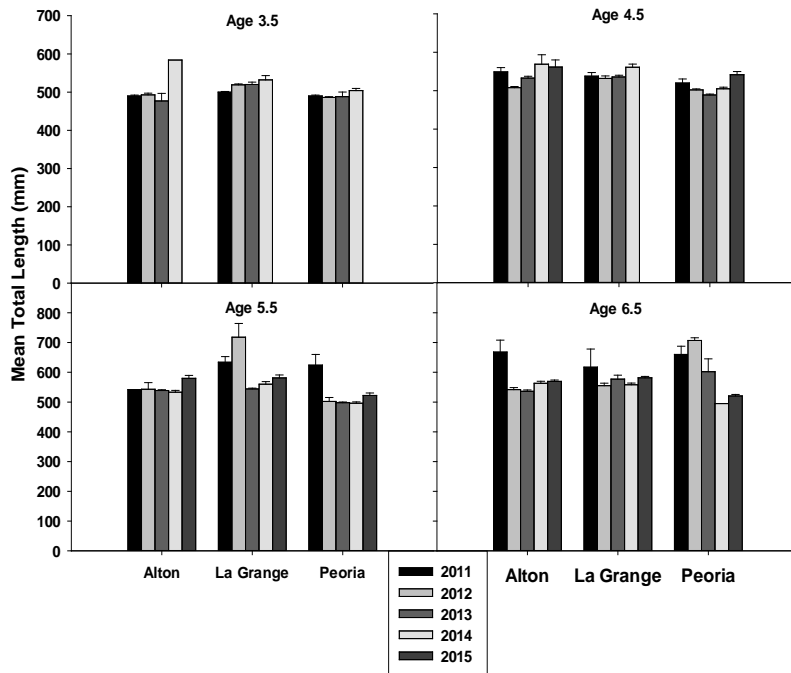


Figure 2. Mean (SE) length-at-age for Silver Carp in the three lower reaches of the Illinois River collected from 2011-2015. In 2015, there were no age-3.5 Silver Carp and only a few age-4 Silver Carp captured. Note different scales on the y-axes.

Alternate Pathway Surveillance in Illinois - Law Enforcement

The Invasive Species Unit issued written warnings to a Chicago fish market for selling aquatic life without a wholesale and retail aquatic life dealer's license. The store sells live largemouth bass and tilapia. It also sells various other whole or partially processed fish including Asian Carp. The owner of the market owns a separate fish market in Cleveland, Ohio. The Ohio DNR recently conducted a market inspection and found the Cleveland store illegally possessing dead Asian Carp that did not have the heads removed and that were not eviscerated which is a violation of Ohio law. The ISU worked with the Ohio DNR to determine the Asian Carp were legally purchased from an Illinois non-resident aquatic life dealer from commercial fishermen on the Illinois River and sold to the Chicago fish market. The owner of the Chicago fish market transported some of the fish to his Ohio market.

Two fish markets in Dupage County were issued a total of 2 citations and 2 warnings for operating retail fish markets without a retail aquatic life dealer's license. These businesses sell live fish and had previously been issued warnings for violating licensing regulations.

The Invasive Species Unit attended the Great Lakes Fishery Commission law enforcement meeting in Milwaukee, Wisconsin and the Upper Mississippi River Conservation Committee law enforcement conference in Dubuque, IA.