November Summary

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

Fixed and Random Site Sampling Downstream of the Dispersal Barrier

Electrofishing:

- Crews from IDNR, USFWS, and U.S. Army Corps of Engineers (USACE) completed 29 electrofishing runs at fixed locations* (7.25 hours total) and 58 runs at randomly selected locations* (14.5 hours total) in the Lockport, Brandon Road, Dresden Island, and Marseilles pools downstream of the Barrier during the weeks of November 5 and November 24.

- Crews collected 4704 fish of 44 species during electrofishing.

- No Bighead or Silver Carp were reported captured or seen during electrofishing in the Lockport, Brandon Road, and Dresden Island pools. 4 Silver Carp were collected during sampling at fixed and random sites in the Marseilles Pool.

*Due to weather conditions and a shortened Thanksgiving work week, IDNR crews were unable to complete all sites in Marseilles and Dresden pools.

Netting:

- Contracted commercial fishing crews and assisting IDNR biologists set 3.6 miles of net (32) at the four fixed sites and 12.2 miles of net (108 sets) at random and additional sites within the Lockport, Brandon Road, Dresden Island, and Marseilles Pools downstream of the electric dispersal barrier during the week of 11/17/2014.
- Crews collected 108 fish of 8 species during commercial netting.

- No Bighead or Silver Carp were captured or observed during commercial netting in the Lockport and Brandon Road Pools.
- Eleven Silver Carp and one Bighead Carp were collected in the Dresden Pool on 11/17/2014.

- Twenty-two Silver Carp and two Bighead Carp were collected in the Marseilles Pool on 11/20/2014.

Hoop and Mini Fyke Netting:

- Crews from IDNR set and pulled 16 hoop nets (6' diameter) downstream of the electric dispersal barrier in Lockport, Brandon Road, Dresden Island and Marseilles Pools during the week of 11/3/2014.
- Crews collected 5 fish of 3 species during hoop net sampling.
- No Bighead or Silver Carp were reported captured or observed during hoop net sampling in Lockport, Brandon Road, Dresden Island, and Marseilles Pools.
- IDNR crews set and pulled 8 mini fyke nets downstream of the electric dispersal barrier in Dresden Island and Marseilles Pools during the week of 11/24/2014.
- Crews collected 388 fish of 19 species.
- No Bighead or Silver Carp were reported captured or observed during mini fyke sampling in Lockport, Brandon Road, Dresden Island and Marseilles Pools.

Strategy for eDNA Monitoring in the CAWS

http://www.fws.gov/midwest/fisheries/eDNA.html.

Barrier Defense Asian Carp Removal Project

In November, barrier defense occurred the week of the 17th. Modified from previous years, barrier defense specifically takes place in the Marseilles and Starved Rock Pools. Also in 2014, contracted commercial fisherman are deploying and fishing modified 6 foot diameter hoop nets in the main channel border and side channel habitats as conditions allow. These habitats have been difficult to fish with gill and trammel nets. Below is a summary of the barrier defense activities including hoop netting totals for 2014.

QUICK SUMMARY:		
Number of Days Fished	64	days
Number of Net Crews	320	crew-days
Yards of Net Fished	518600	Yards
Miles of Nets Fished	294.7	Miles
Number of Hoop Net Sets	196.0	Sets
Number of Bighead Carp	11483	Fish
Number of Silver Carp	62628	Fish
Number of Grass Carp	466	Fish
Number of Asian Carp (AC)	74577	Fish
Tons of AC Harvested	333.0	Tons

Understanding Surrogate Fish Movement with Barriers

Currently a total of 1513 surrogate fish have been captured and floy tagged while monitoring in the Lockport, Brandon Road and Dresden Pools downstream of the Electric Dispersal Barrier. A species list of floy tagged fish; 852 Common Carp, 594 Smallmouth Buffalo, 37 Bigmouth Buffalo, 18 Black Buffalo, 4 Goldfish and 8 Common carp X Goldfish hybrid.

To date, seventeen recaptures (13 tagged fish and 4 marked with no tag) have occurred.

Fish Movement

- 1 recapture had a tag and showed movement downstream through Dresden Lock and Dam
- 12 recaptures had tags but showed no movement between Barrier/Dam
- 4 recaptures by Upper Caudal Fin but didn't have tags (No data on movement)

Notable

- 1 recapture in Lockport was tagged by USFWS in 2013
- Bigmouth Buffalo Caught in Dresden Pool Traveled 9 miles down the Kankakee before killed by Bow fisherman
- Smallmouth Buffalo caught in Dresden Pool traveled downstream through the lock and dam to Material services east pit and was captured again by commercial fisherman on the Barrier Defense Program

Telemetry Monitoring Project

Telemetry mobile tracking and receiver downloads were completed from the Cal-Sag Channel to the Dresden Island Lock and Dam. Most receivers were pulled from the water for the winter months except for a bare bones network around lock chambers and the barriers (n=9). Preliminary analysis was completed for the months of September, October and November. No tagged fish were found to cross the barriers and no Asian carp were detected moving upstream of the Brandon Rd lock and dam.

Barrier Maintenance Fish Suppression

Quarterly maintenance of the barriers occurred within the month of November. During the maintenance activity barrier IIA was de-energized on 10 November for a period of 1 hour and 17 minutes. Barrier IIB was operating during this time frame and fish activity near the barriers and lower Lockport was observed to be very low. IDNR confirmed that catch data throughout this year's monitoring efforts in Lower Lockport suggest that the risk of presence of Asian carp within the pool was very low. Based on the low risk of Asian carp presence, very low fish activity in vicinity of the barriers and cold water temperatures the Monitoring and Response Work Group agreed a barrier clearing was not needed at that time.

On Friday, 14 Nov, maintenance teams experienced an unplanned necessity to shutdown Barrier IIB. Both the wide and narrow array were off for 5hrs 5min from 10am to 3:05pm. Barrier IIA narrow array was operational throughout this time. The demo barrier is still shut down for repairs but the risk of Asian carp caught between barriers IIA and IIB was found to be extremely low based on previous MRWG discussion from the 2A shutdown on 10 Nov. Mobile tracking and receiver downloads were conducted upstream of the barriers from the Cal-Sag confluence to the fleeting area near the I-355 overpass on the CSSC following the 2B shutdown as an additional precaution. Upon inspection of the data, no upstream passage of telemetered fishes was observed to occur. Both barriers IIA and IIB have been operational after 14 November. The demonstration barrier remains inactive until repairs can be made.

Optimal Harvest Strategies to Minimize Asian Carp Propagule Pressure on the Electric Dispersal Barrier

Hydroacoustics Surveys
Selected main channel and backwater habitats were surveyed in the La Grange reach of the Illinois River (5–8 November). This was the final section of river left to be surveyed for the 2014 field season. Data processing analysis is currently being undertaking. Some preliminary hydroacoustic results from 2012 and 2013 surveys were presented at the Policy and Technical Committee meeting in Chicago on 25 November

Telemetry
All acoustic receivers were downloaded during the month of November except for those in the Peoria pool (downloaded next week). These VR2W downloads included 271,939 detections from August to November, 2014. Fifty-nine individual fish were detected during this time (56 bighead/silver carp, 1 lake sturgeon, and two common carp).

Unfortunately we had two receivers that had (early) dead batteries (Dresden and Marseilles locks and dams), so we were unable to detect any fish in those lock chambers during September and October. No fish were detected in the lock chamber of Starved Rock Lock and Dam mid-August through mid-October.

Additional analyses conducted on acoustic telemetry data showed patterns of immigration from the Mississippi River and the lower Illinois. Dates of large fish movements (upstream or downstream typically greater than 100km are listed below. Additional detail will be provided in our annual report.
Most immigrants into the Illinois River from the Mississippi River tended to occur in early April of both years (2013 and 2014). Upstream movement was typically limed to the Peoria pool.
Major fish movements, in general (in the main channel):
2013
Upstream: 3-28-2013 to 4-9-2013
Downstream: 5-24-14-to 5-27-14 and 6-1-2013 to 6-20-2013,
2014
Upstream: 4-7-14 to 4-22-14 and an additional movement (two fish) in mid-June

Downstream: 5-5-14 to 6-3-14 (most around 5/14) and 6-12-14 to 7-23-14
Some additional migrations (main channel) were observed from: 12-23-2013 to 1-30-2014 and 8-31-13 to 9-6-13. Directions of movements have not yet been determined.

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

USFWS Carterville FWCO completed fall split beam hydroacoustic and side scan sonar surveys of the Lockport, Brandon Road, and Dresden Island reaches of the Upper Illinois River during November. Over 100 river km were surveyed for fish abundance and spatial distribution patterns. In addition a hydroacoustic fish survey was conducted within, above, and below the Brandon Rd. lock structure. These data are currently being analyzed and initial results are expected in December.

Water Gun Development and Testing

*Native mussels were exposed to a new 100 in^3 water gun***.** A preliminary study involving a
100 in^3 water gun and three different species of native mussels concluded on 17November2014. Delayed mortality was not observed, 100% of mussels survived for 28 days post 100 exposures of a water gun firing at 2,000 psi. Blast sensor data collected by IL Water Science Center technician Ryan Adams revealed that mussels located approximately 1 meter from the gun were exposed to 100+/-10 psi. No radiographic shell damage was observed (**Figure 1**). All mussels were returned to holding cages in the Mississippi River c/o Genoa National Fish Hatchery.

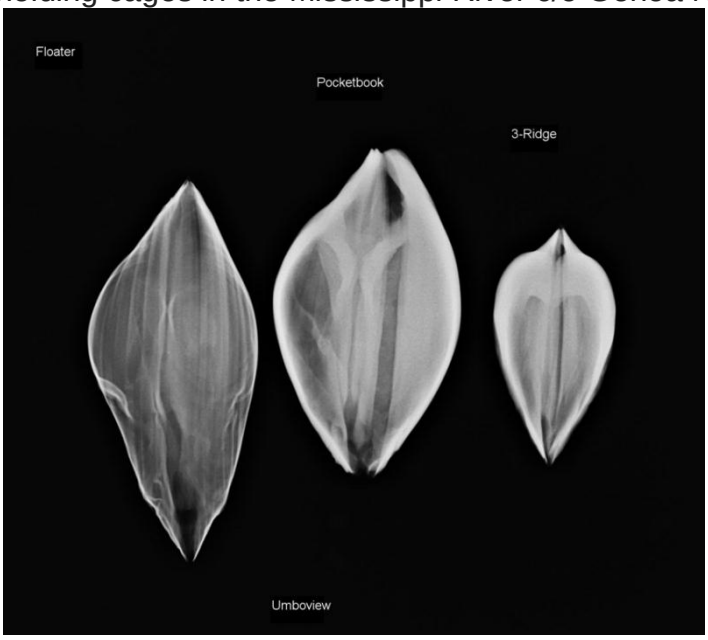

Figure 1. An example of a radiograph involving an umbo view of the three species of native mussels (L-R; Giant Floater, Plain Pocketbook, Three Ridge) used in the water gun and mussels study. Image: courtesy of Allie Robinson.

Water gun data analyses continue for data collected during Integrated Pest Management activities near Morris, IL in 2013-14. Sonar and acoustic telemetry data

processing and analyses are ongoing. Mobile and stationary sonar data do not appear to show any significant trends that would suggest water guns had a significant effect as a barrier to fish movement. However, there does appear to be a slight increase in the number of fish tracks as distance from the water guns increases with stationary sonar data (**Figure 2**). Acoustic telemetry data have been filtered and simple animations created for the 2014 IPM. Preliminary observations suggest tagged fish exhibited deterrence behavior as they approach the water guns based on residence time; however, a total of 97 fish (>50%, including Bighead carp, Silver carp, and Bigmouth buffalo (n=185 total fish were tagged)) were tracked moving through the water gun barrier location. High mortality (basically all remaining fish not tracked through the array) of tagged fish is making it difficult to make inferences about the fish behavior observed in 2014. However, it appears fish were staging as they approached the water guns; about 200 meters away from the guns, and then rapidly swam through the array. It should be noted that guns were firing every ten seconds and the ten second delay may have allowed enough time for fish to pass unharmed.

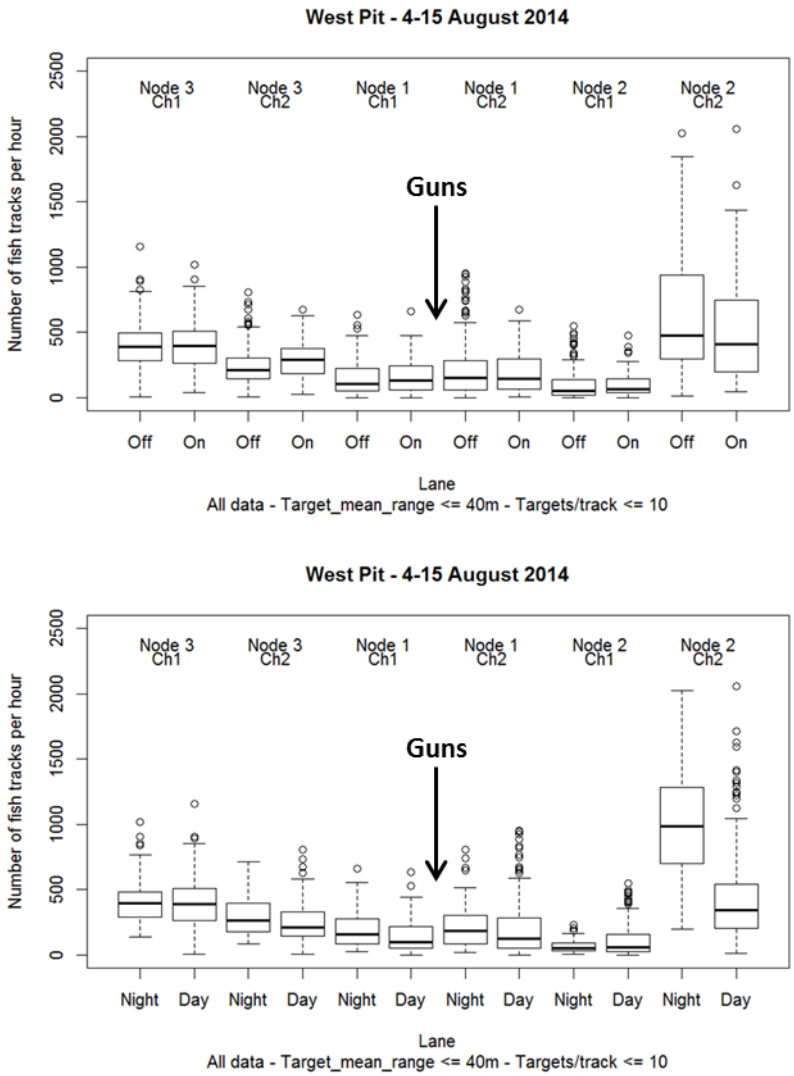

Figure 2. An example of stationary sonar data box-plots created from the 2014 water gun IPM field trial. Top: number of fish tracks (Adult Asian carp sized targets) per hour

when guns were on or off. Bottom: Number of fish tracks per hour during light and dark hours. Note water guns (Guns) were located in the center of the stationary sonar lanes. These data reflect all fish tracks from August 4 through August 15, 2014.
In summary, some native mussels may not be affected by short term exposure to water guns. This information is important for ESA section 7 consultations and provides some evidence that short term (e.g., mobile water guns suspended from a boat passing through an area) deployments of water guns in areas where mussels are known to reside may not result in adult mussel mortality, valve (i.e., shell) damage, or abnormal movement behavior. Mobile sonar data collection will not be included in 2015 IPM field operations because data suggest that the distance mobile surveys were conducted from the water guns was too far away to measure an effect. Stationary sonar will be expanded in 2015, and sonar lanes will be moved closer to the water guns. Again, stationary sonar data may suggest fish detections slightly increase with distance from the water guns, but the closest stationary sonar lane was approximately 17 meters (~50 feet) away from the two gun array. Past pressure mapping shows that the S80 water guns (those used for all 2013-14 field operations) only produce a 5 psi pressure wave out to about 17 meters. Next month, planning meetings will be held at UMESC the weeks of 8December, and 15December to create a new 2015 study plan that will involve new water guns (six total), expanded stationary sonar data collections, and a new acoustic telemetry array design. In addition, the 2015 field deployment will likely occur earlier in the year to take advantage of cooler water temperatures in an attempt to help reduce tagged fish mortality.

Unconventional Gear Development Project

Four staff from the Columbia FWCO returned to the Fox River near the Illinois River confluence in Ottawa, IL, on November4-5, 2014. This was the third visit to the Fox River in 2014 to compare day verse night electrified butterfly frame trawl (i.e., Paupier) sampling on a high density population of adult silver carp. Water temperatures decreased to 9.4°C from 25.2°C in September 2014. Although many fish were observed on the depth finder, catch rates were highly variable and not as many fish appeared to be jumping above the surface of the water. Still, adult silver carp dominated the catch (mean, 98%; SD, 5.0) and 97% of those captured were 500-700 mm long. Night CPUE was higher and more variable than day (night mean, 76 adult silver carp/2 minutes of electrified Paupier; SD, 87.4; day mean, 12 fish/2 minutes; SD, 30.3). August results were similar with night sampling yielding higher CPUE (79 fish/2 minutes) than day sampling (9 fish/2 minutes) but September CPUE was the same during day and night sampling (126 fish/2 minutes). Overall, night sampling has yielded higher CPUE (99 adult silver carp/2 minutes of electrified Paupier) than day sampling CPUE (52 fish/2 minutes) but catch rates have been highly variable. Future research will focus on decreasing capture variability through gear modifications and integration of capture techniques.

Evaluation of Gear Efficiency

Field sampling for the evaluation of sampling gears has concluded for the year. Work performed during November included summarization and analysis of data collected during previous months. Gears used in 2014 targeted juvenile Asian carp (pulsed-DC electrofishing, mini-fyke nets, beach seines, small-mesh purse seines, cast nets, small-mesh floating gill nets), and were deployed during both summer and fall at a subset of sites in the LaGrange, Peoria, and Marseilles Pools. Gear evaluation sampling captured a total of 40,718 fish during 2014, including 15,850 silver carp and 10 bighead carp. All gears other than gill nets captured juvenile Asian carp (17 – 161 mm). Mini-fyke nets captured the highest numbers of silver carp (9,096 silver carp, average = 103.4 per net-night), followed by purse seines (4,064 silver carp, 92.4 per haul), beach seines (1,818 silver carp, 41.3 per haul), electrofishing (731 silver carp, 16.6 per 15-minute transect), and cast nets (135 silver carp, 3.1 per throw). Gill nets were largely ineffective at capturing Asian carp (6 silver carp, average = 0.14 per 4-hour set), and only captured adult silver carp (≥ 470 mm).

Pound Net Evaluations

Field activities for pound net evaluations have concluded for the year. Worked performed during November included summarization and analysis of pound net data from the previous months. During 2014, a total of 135 bighead carp and 881 silver carp were collected in pound nets over fourteen net-nights at two sites. Overnight catch rates of pound nets deployed at Lily Lake and Material Services Pit during 2014 were highest in July, when catches of all species ranged from 6 to 595 fish per net-night. Catches of bighead carp during July ranged from 1 to 42 per net-night, whereas catches of silver carp ranged from 44 to 547 per net-night. Catch rates were lower at Material Services Pit in August, when catches of all fish species ranged from 2 to 58 fish per net-night. Catches of bighead carp during August ranged from 1 to 3 per net-night, whereas catches of silver carp ranged from 1 to 2 per net-night. Pound nets were also set in conjunction with USGS crews in September at the Material Services Pit to evaluate the efficacy of attractants to increase catch rates of Asian carp. All fish captured during this time were counted and measured by USGS personnel. Additional analyses of length distributions and comparisons with other entrapment gears are ongoing.

Larval Fish Monitoring

Larval fish sampling for 2014 has concluded for the year. Work performed during November included summarization and analysis of data collected from April through October. During 2014, a total of 558 larval fish samples were collected from 11 sites located throughout the Illinois Waterway, with 4 samples taken from each site on each

sampling date. From this, a total of 18,561 larval fish, including 5,249 larval and early post-larval Asian carp, have been identified. Additionally, 19,704 potential Asian carp eggs have been identified from ichthyoplankton samples. Asian carp appear to have had high reproductive success in the Illinois River in 2014, as large numbers of Asian carp larvae were collected from the LaGrange and Peoria Pools from Mid-May through early August, with the highest numbers observed during the last week in June (Peoria Pool) and the first two weeks in July (LaGrange Pool).

Additionally, suspected Asian carp larvae were identified from preserved samples from the Starved Rock Pool near Ottawa collected on June 24. These larvae would represent the farthest upstream location on the Illinois River where Asian carp larvae have been observed/collected thus far, however, upon further lab verification these larvae were confirmed as other Cyprinid (minnow) species and NOT any species of Asian carp. Asian carp larvae or eggs have not been observed/documented at any location upstream of Henry, Illinois (143 miles from Lake Michigan). Subsamples of fish eggs from the Starved Rock Pool are also being evaluated have been sent to the USFWS Whitney Genetics Lab for genetic confirmation. Results of egg identification will be reported if confirmed to be Asian carp. Spawning activity with likely gamete release has been documented by visual confirmation, and spent females and running males for over 2 years, yet no YOY or juvenile Asian carps (< 12 inches) have been collected above Henry, IL during that time despite focused efforts to detect these life stages. Monitoring will continue to identify if recruitment of small Asian carp is occurring at or above areas documented previously.

Alternate Pathway Surveillance in Illinois - Law Enforcement

Illinois Conservation Police Invasive Species Unit (ISU) have arrested a commercial fisherman for the unlawful possession and sale of 1,800 pounds of live Asian bighead and silver carp. Randall E. Watters of Hamburg, IL was arrested October 7, 2014. He was charged in Calhoun County for the Unlawful Sale of Live Injurious Species (Class 3 Felony) and Unlawful Possession of Live Injurious Species (Class A Misdemeanor). Ronald D. Watters of Hamburg, IL was ticketed for possession of live bighead carp.

ISU inspected one Indiana fish truck in Chicago. The truck was hauling live tilapia. No violations.

ISU conducted walk through of four fish markets in Chicago looking for invasive species.