US Army Corps of Engineers
Chicago District

Asian Carp Monitoring Fact Sheet
Acoustic Telemetry

Chicago Sanitary and Ship Canal – Electric Barriers

Overview:
Telemetry is the tagging of fish with individually-coded, ultrasonic transmitters in the Upper Illinois Waterway (IWW) and Chicago Area Waterways System (CAWS). The acoustic network proposed is comprised of 32 acoustic receivers and supplemented by a mobile hydrophone unit to collect information from tags implanted into free-swimming Asian carp (bighead carp and silver carp) and surrogate species. The purpose is to monitor fish movements in the immediate vicinity of the electric barriers to determine if fish are able to challenge and/or penetrate the barriers; to see if Asian carp or surrogate species are able to navigate through lock structures in the Upper IWW; and to determine the leading edge of Asian carp below the barriers. Additionally, movement information will lead to a better idea of how fish behave seasonally in the IWW and CAWS, and can help inform the implementation of other monitoring tools (environmental DNA, netting and electrofishing).

Scope:
Stationary Receivers (mounted to lock guide walls, mooring cells, navigation buoys) detect a tagged fish's movement as it swims within range (~800m). A total of 32 receivers comprise the acoustic network; each is downloaded monthly. Receivers in the vicinity of the barriers are armored for protection from navigation traffic. Additionally, mobile tracking is used to actively locate tagged fish for precise locations. Mobile tracking helps determine precise locations and movements within the pools, and account for fish not detected by the stationary receivers.

Tagged fishes within the study area:

Release Location	Species Implanted	Number of Fish Implanted
Chicago Sanitary and Shipping Canal Upstream of Barriers	Common carp	27
	Largemouth Bass	12
Between Barriers (Demo and IIB)	Common carp	12
	Largemouth Bass	12
CSSC Lockport Pool Downstream of Barriers	Common carp	76
	Common carp (released via barge just below IIA)	13
	Freshwater Drum	3
	Channel Catfish	1
Brandon Rd Pool	Common carp	20
Dresden Island Pool	Bighead Carp	20
	Silver Carp	3
	Silver-Bighead Hybrid	2
	Smallmouth buffalo	5
	Common carp	5
Marseilles Pool	Bighead carp	16
	Silver carp	15
Total		**230**

Summary:
A total of 315 fishes have been surgically implanted with transmitters from 2010 through 2013, resulting in over 8.9 million detections within the IWW and CAWS. Conclusion for testing to date is that the barriers are effectively preventing upstream passage of tagged fishes (total lengths: 53 - 1120mm). Tagged-fish movement between navigation pools occurs in both directions through all locks within the study area with the exception of upstream movement through the Brandon Road Lock. While two tagged fish have approached the Brandon Road Lock and Dam to date, it appears that the Asian carp population front is still located at river mile 281.5 near the Rock Run Rookery on the Des Plaines River. Asian carp are consistently using the Kankakee River confluence and deep, backwater pools stemming from the main channel. There has been no difference detected between movements of Bighead and Silver carp within Upper IWW. Asian carp activity appears to be higher in late spring and early summer as well as during the evening and dawn and dusk hours of the day.

What's next?:
Additional tagging will occur throughout the study area to maintain the current level of active transmitters within the system. Emphasis will be placed on increasing the number of transmitters in surrogate species and Asian carp below the Brandon Road Lock within the Dresden Island Pool. Additional receivers will be deployed surrounding the approach channel to the lock, within the lock chamber and within backwater habitats just downstream to identify possible mechanisms that could be deterring upstream passage. The study will also include the addition of transmitters with depth sensors for fishes tagged and released near the barriers. This will allow researchers to better understand at what depth fish interact with the barriers and barge traffic as well as assist in determining fatalities of tagged specimens.

Authority:
The Water Resources Development Act of 2007, Section 3061, Chicago Sanitary and Ship Canal Dispersal Barriers Project, Illinois, authorized the Barrier project.

Point of Contact:
Matthew Shanks, matthew.r.shanks@usace.army.mil