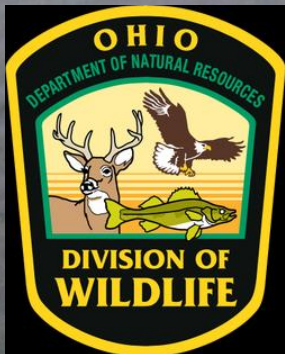
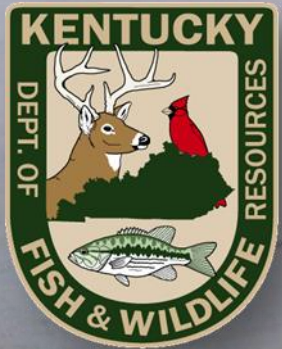


US Fish and Wildlife Service Ohio River Asian Carp

Project Overviews and Updates



Asian Carp Projects

Acoustic Telemetry



Black Carp



Hydroacoustics



eDNA



Acoustic Telemetry



Objectives

1. Understand use of tributaries
2. Delineate the upstream population distribution
3. Help inform contract fishing and agency sampling
4. Quantify passage of Asian carp at Ohio River locks and dams

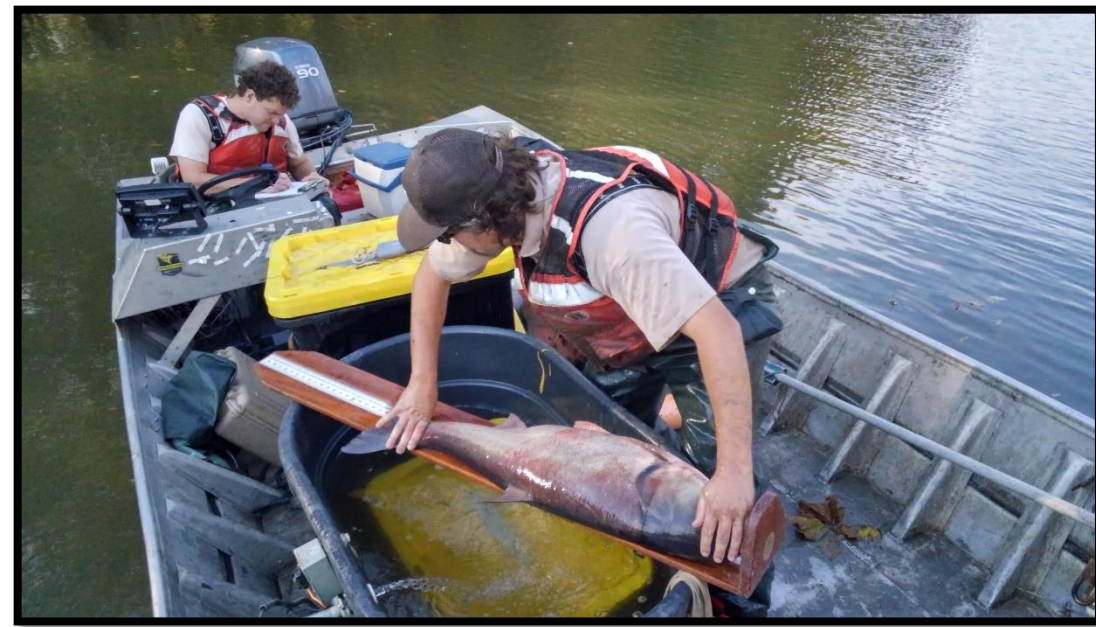


Table 2. Bighead Carp and Silver Carp tagged from 2013 - 2018

	Cannelton	McAlpine	Pool Markland	Capt. A. Meldahl	R. C. Byrd	Total
2013						
Silver Carp				6		6
Bighead Carp				13		13
2014						
Silver Carp		115	6	10		131
Bighead Carp		4	4			8
2015						
Silver Carp		22	3	5		30
Bighead Carp		1	1	5		7
2016						
Silver Carp	92	94	6			192
Bighead Carp	4	1	4	2	3	14
2017						
Silver Carp	90		11	3		104
Bighead Carp			2			2
2018						
Silver Carp			19	10		29
Bighead Carp				1		1
Totals	186	237	56	55	3	537

~52% detected during 2017

* There have been 3 dead fish recovered and 19 fish tagged in 2013 are set to expire*



Figure 6. Characterization of current (2016) relative abundance of Bighead Carp and Silver Carp in the UMRB, ORB, and IWW/CAWS

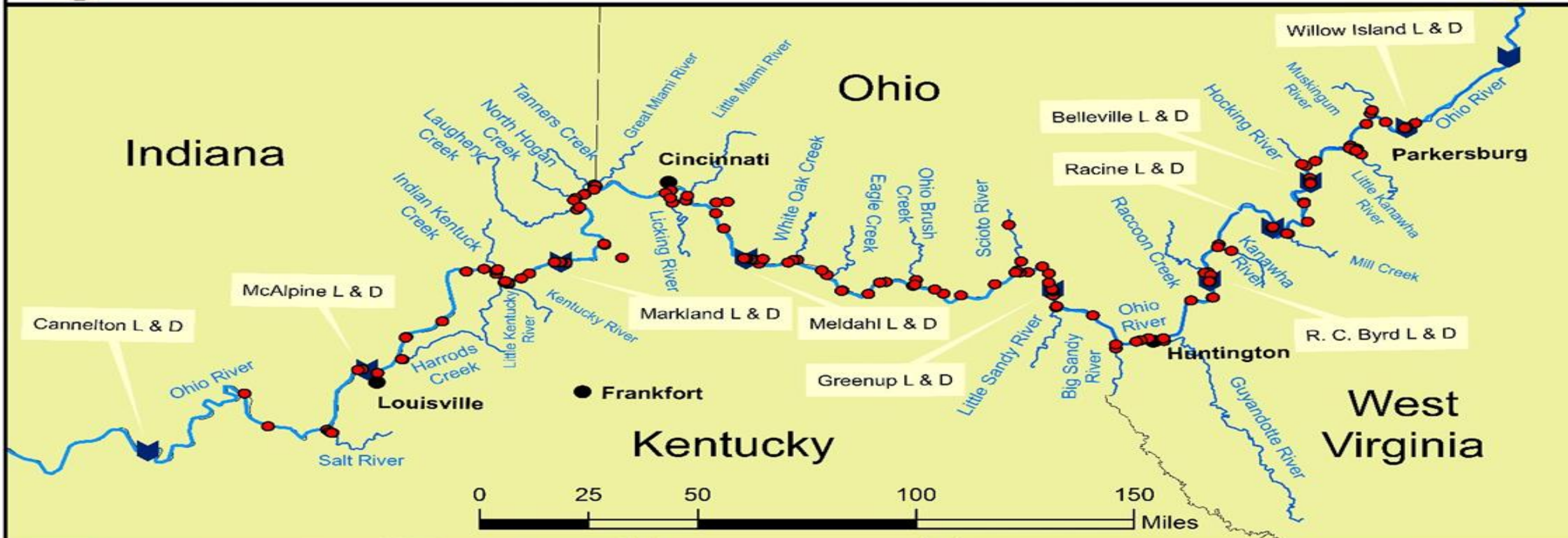
Table 1. Distribution of telemetry receivers in 2017 (Rec. = receivers, RM = river miles)

Ohio River Pool	# of Rec. in Mainstem	RM in Pool	RM/Rec.	Rec. in Locks/Approach Walls	Rec. in Tribs.
Cannelton	7	55	7.86	0	2
McAlpine	9	75	8.33	0	10
Markland	10	95	9.5	4	15
Capt. A. Meldahl	24	95	3.96	4	10
Greenup	9	62	6.89	4	6
R. C. Byrd	4	42	10.5	4	3
Racine	3	31	10.33	4	2
Belleville	9	42	4.67	4	6
Willow Island	1	35	35	4	0
Totals	76			28	54

Total = 158



2017 Ohio River Acoustic Telemetry Array



Standard Locks and Dam Receiver Placement



- VR2W Receiver
- City
- 🏰 Locks and Dam
- Stream

Neil Gillespie
Spring 2018
Projection: Albers Equal Area Conic
Sources:
ESRI ArcGIS Online
USFWS



Bighead Carp

Silver Carp

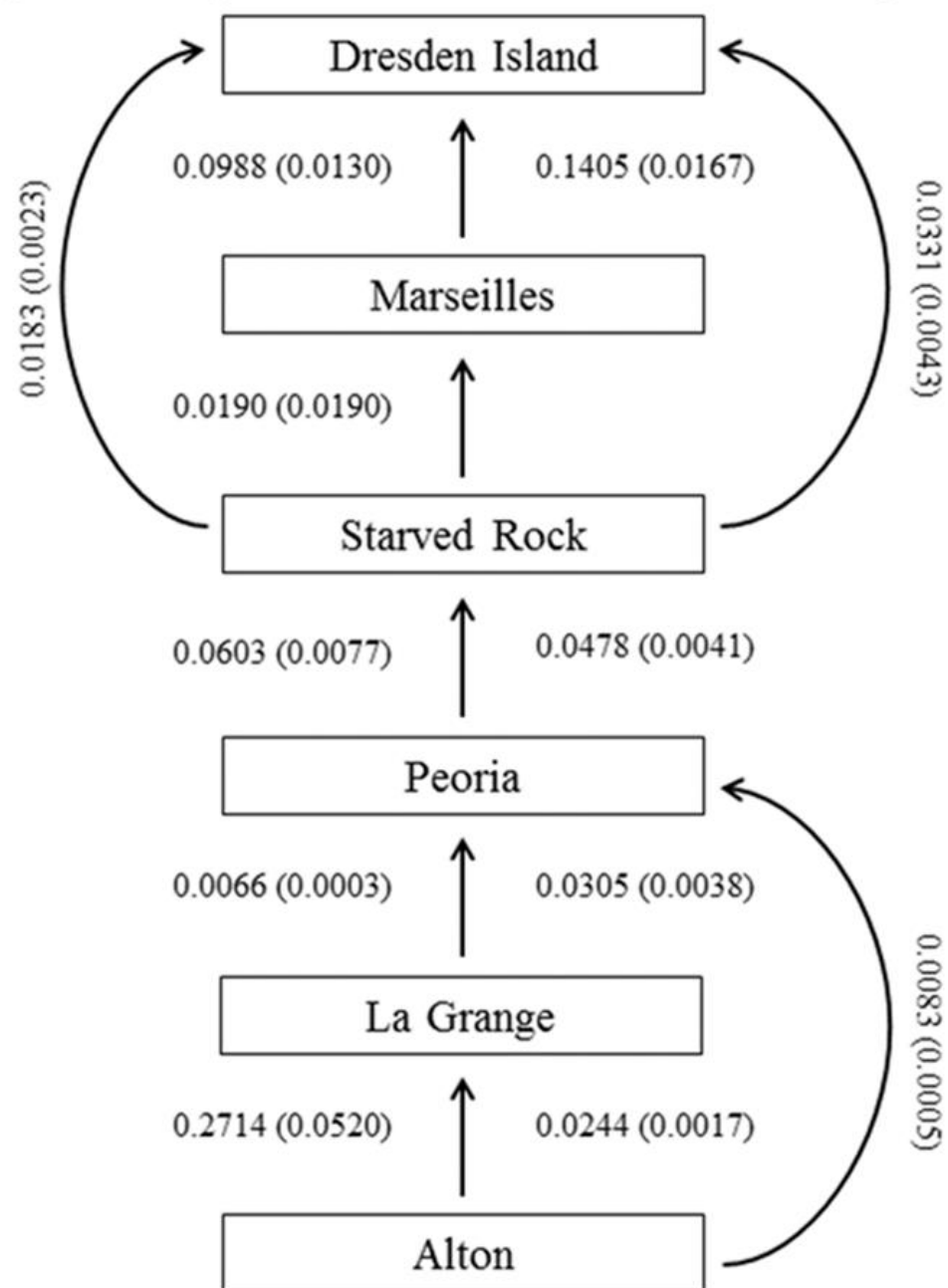


Table 3. Pool-to-pool transition probabilities of Silver Carp in the Ohio River through acoustic telemetry – 2013 to 2017 based on the best model (preliminary results). The best model ($\Delta AIC_c > 2$) for Silver Carp provided time and state invariant survival estimates, probability of detection estimates that varied over space and time, and movement estimates that varied for each pool. Note that transition probabilities were not estimated above Capt. A. Meldahl pool due to the lack of movement data above this reach of the river.

Departure pool	Destination pool			
	Cannelton	McAlpine	Markland	Meldahl
Cannelton	0.89	0.01	0.10	0.00
McAlpine	0.02	0.86	0.12	0.00
Markland	0.00	0.08	0.92	0.00
Meldahl	0.00	0.00	0.01	0.99

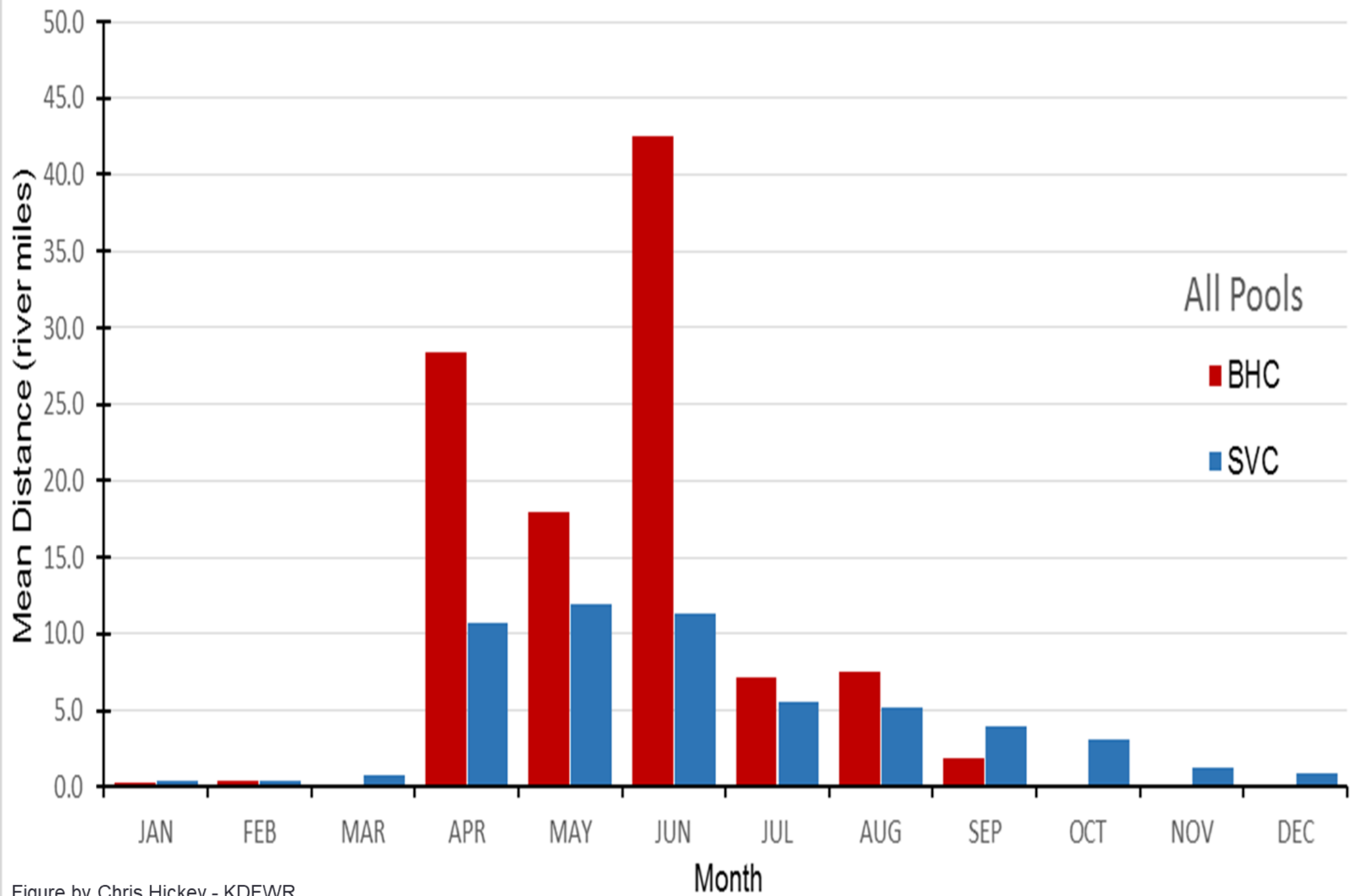


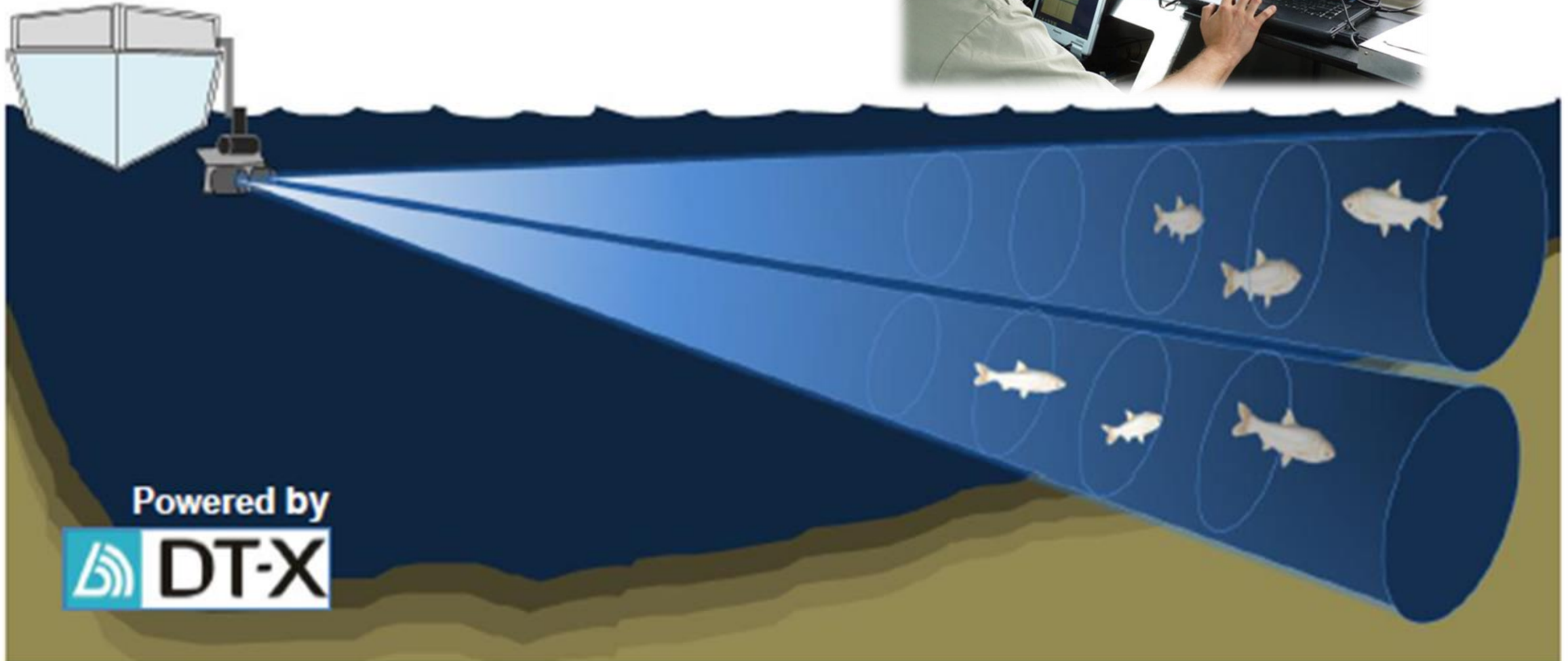
Figure by Chris Hickey - KDFWR

Tributary Use

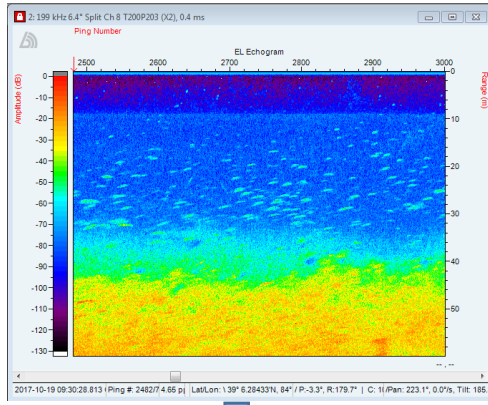
- Tributary use higher in Cannelton, McAlpine, and Markland Pools
- Mainstem higher in Meldahl Pool
- Fish in tributaries were 7X more likely to stay than move to mainstem
- Fish in mainstem were 4.6X more likely to stay than move to tributaries



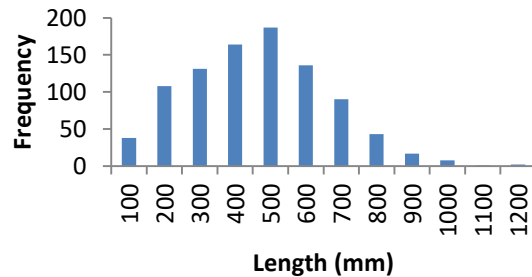
Hydroacoustic Surveys



Hydroacoustics (USFWS)



Length-Frequency Distribution



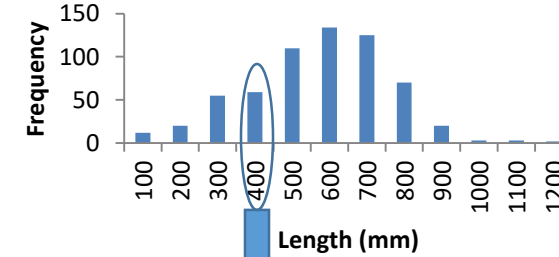
Unbiased, but
don't know
species
composition

Hydroacoustics Data Flow

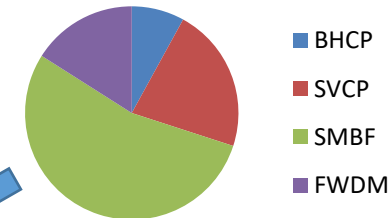
Community Sampling (KDFWR)



Length-frequency distribution

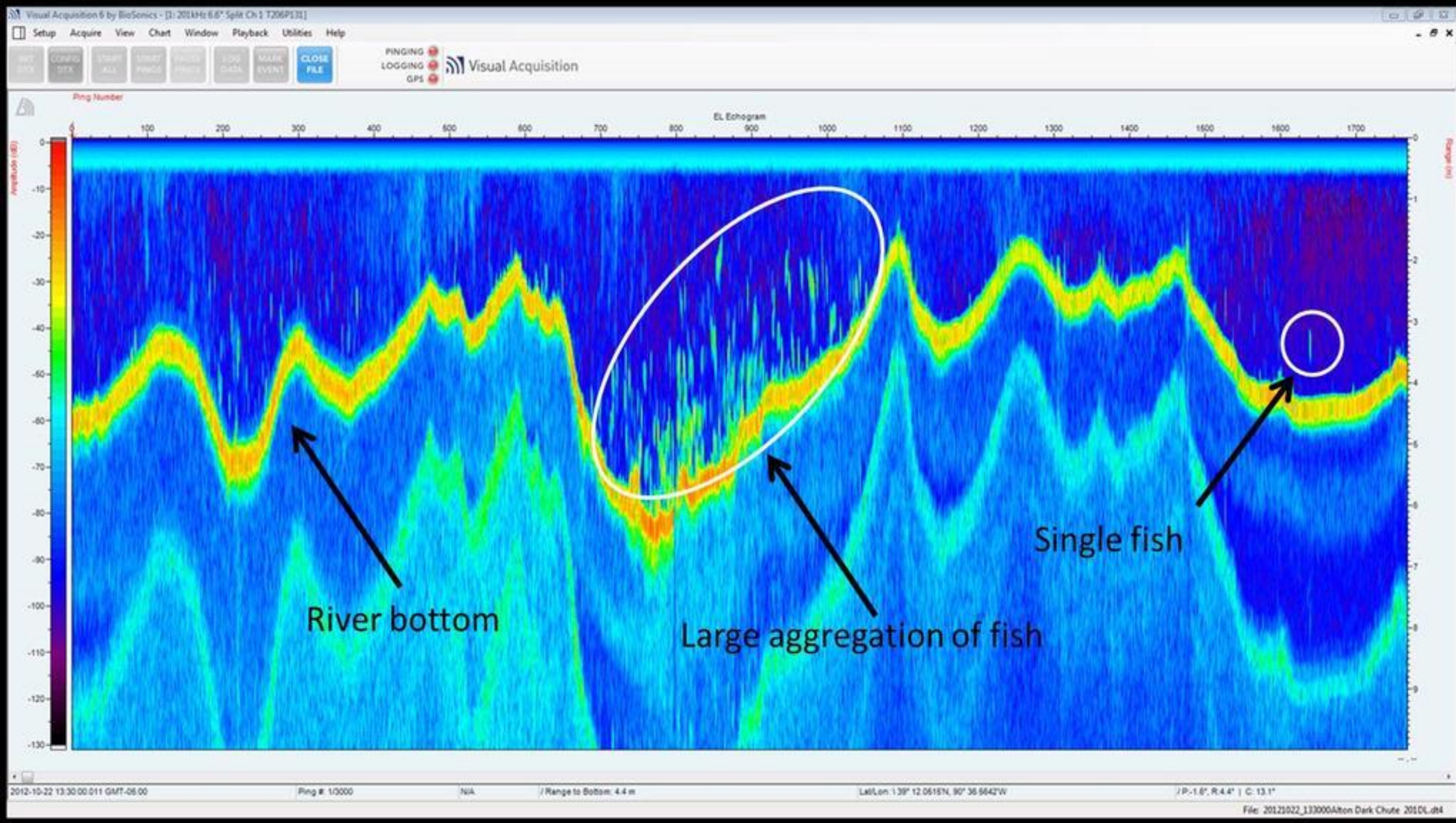


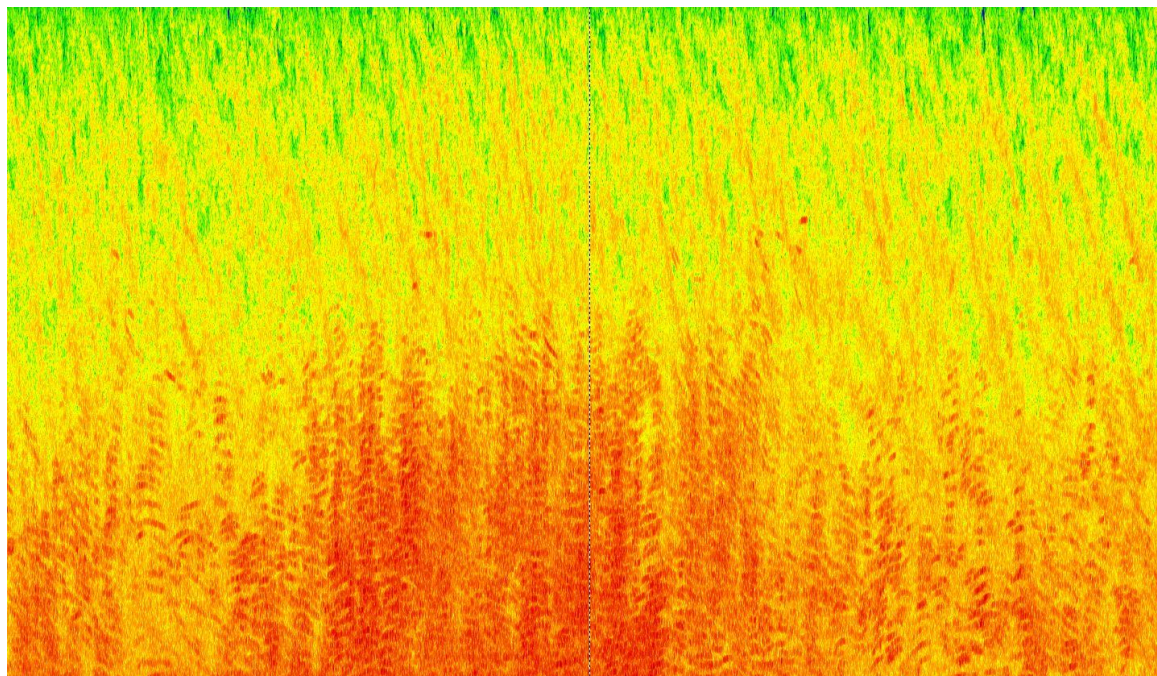
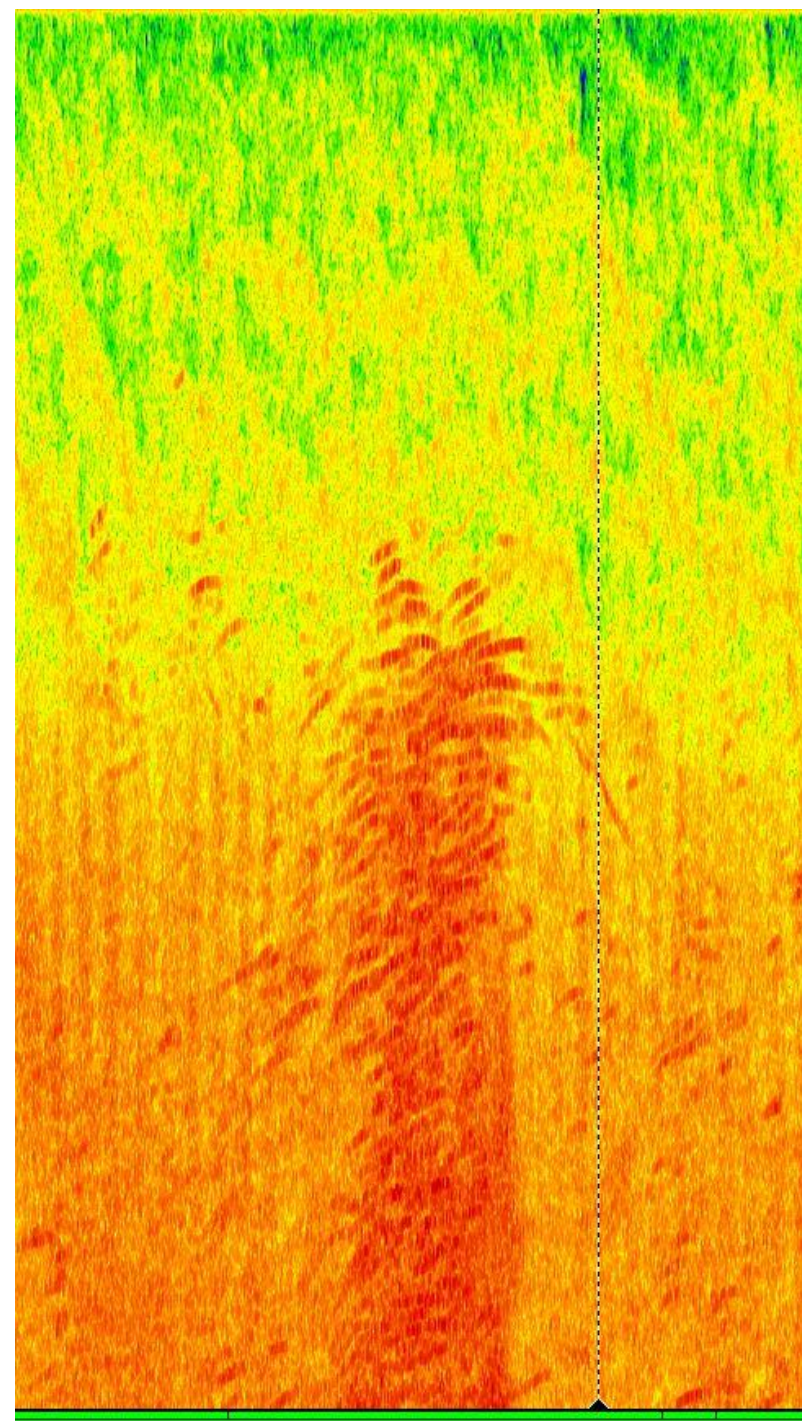
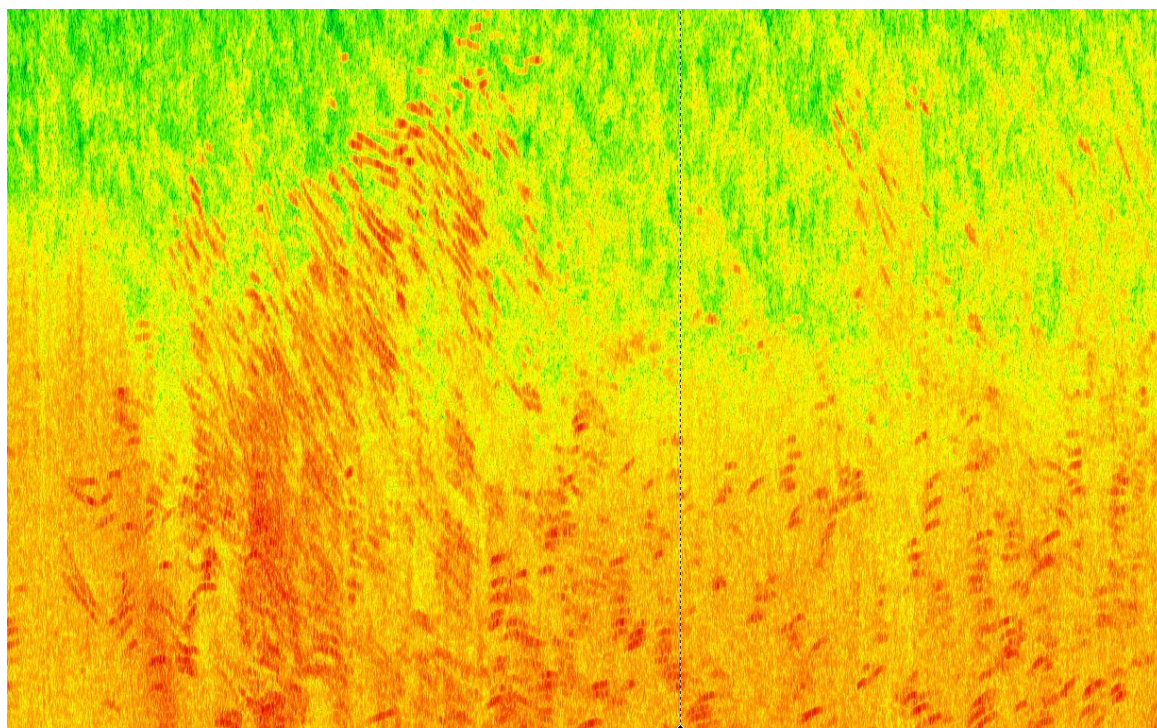
Biased, but
know species
composition



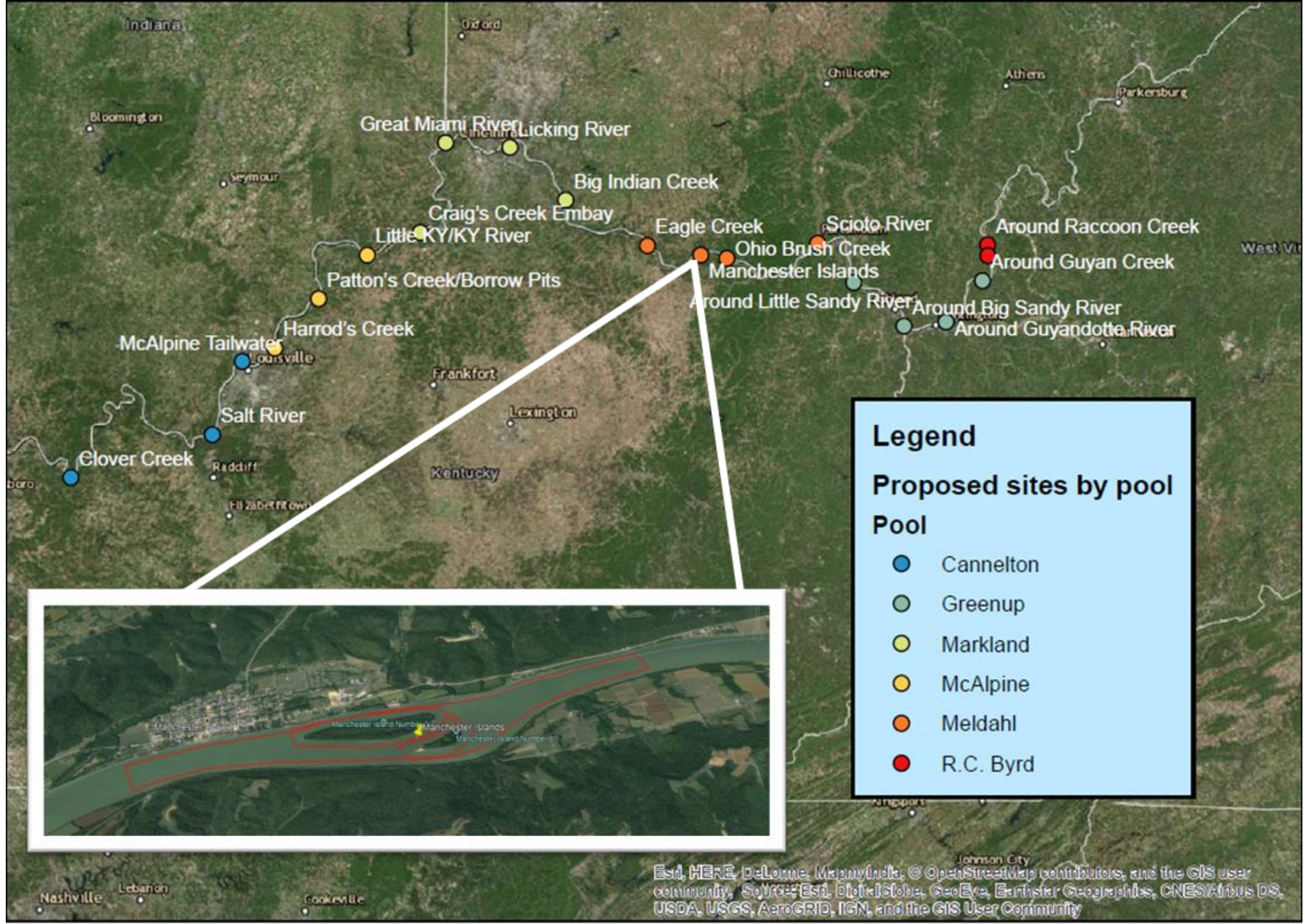
Population
model







2017 Sites



Black Carp Sampling



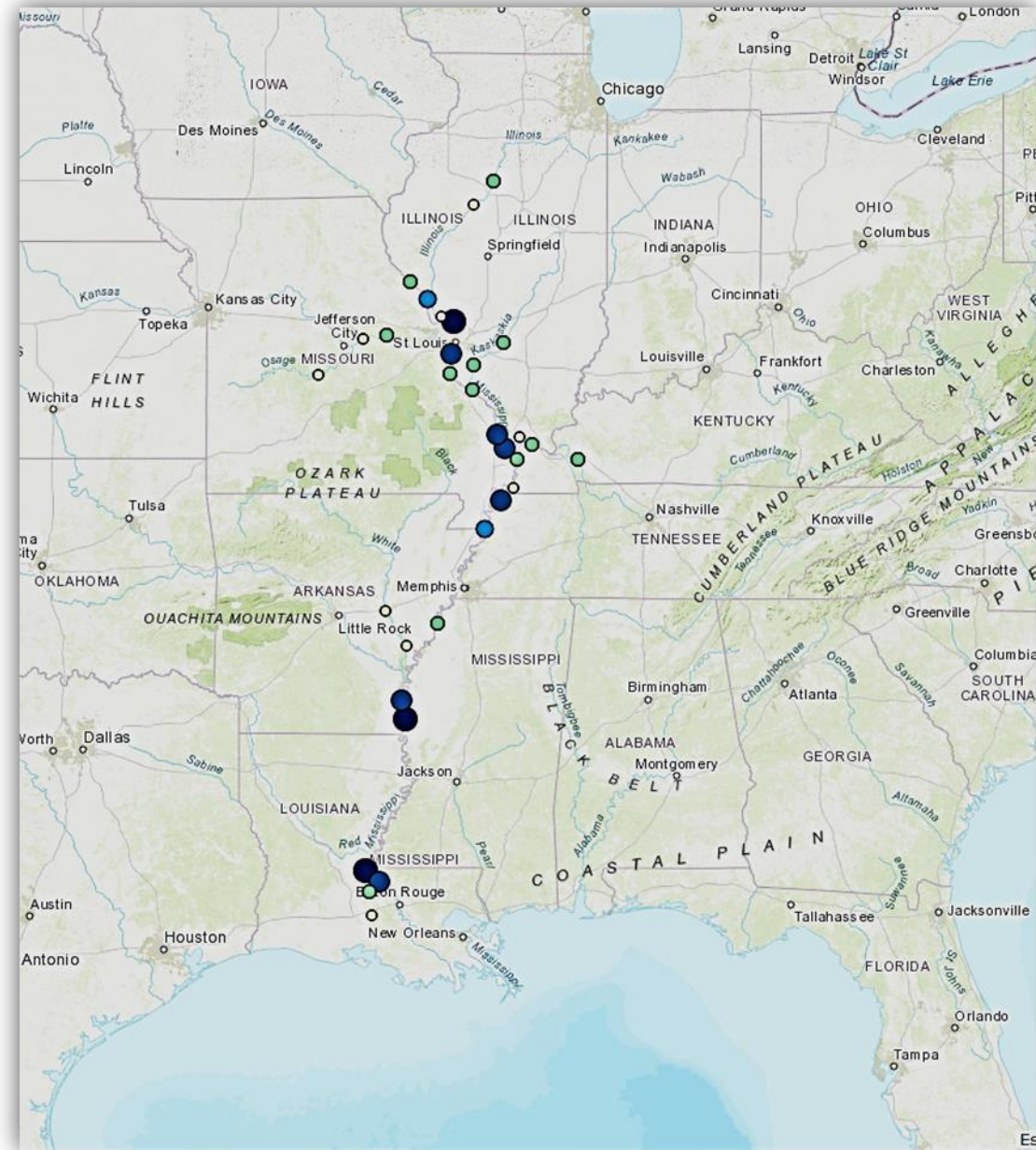
Background

- Most recently introduced Asian carp
- Molluscivores; used in aquaculture to control parasite-carrying snails
- Pharyngeal teeth for crushing shells: potential threat to native mussels



Background

- First known escape into wild: 1994 in Missouri
- First reported capture: 2003 in Horseshoe Lake, southern IL
- First captures of YOY: 2015 near Cape Girardeau (Wes Sleeper, MDC)
- Current known range includes lower Ohio River, Lake Barkley, Kentucky Lake (USGS-NAS 2018)



2018 Sampling

- Hoop net, gill net, electrofishing
 - Help determine locations & methods
- 2018 sites sampled: Olmsted, Joppa, Lake Barkley and Cumberland R., Kentucky Lake and Tennessee R., Horseshoe Lake (IL), Ballard WMA (KY), Missouri River



2018 Results

- Captured 2 Black Carp in Horseshoe Lake (June)
- Prompted IDNR-led Black Carp removal in Horseshoe Lake (July)
 - IDNR, SIU, USFWS, contracted commercial fishers
 - 14 Black Carp removed



Environmental DNA (eDNA)

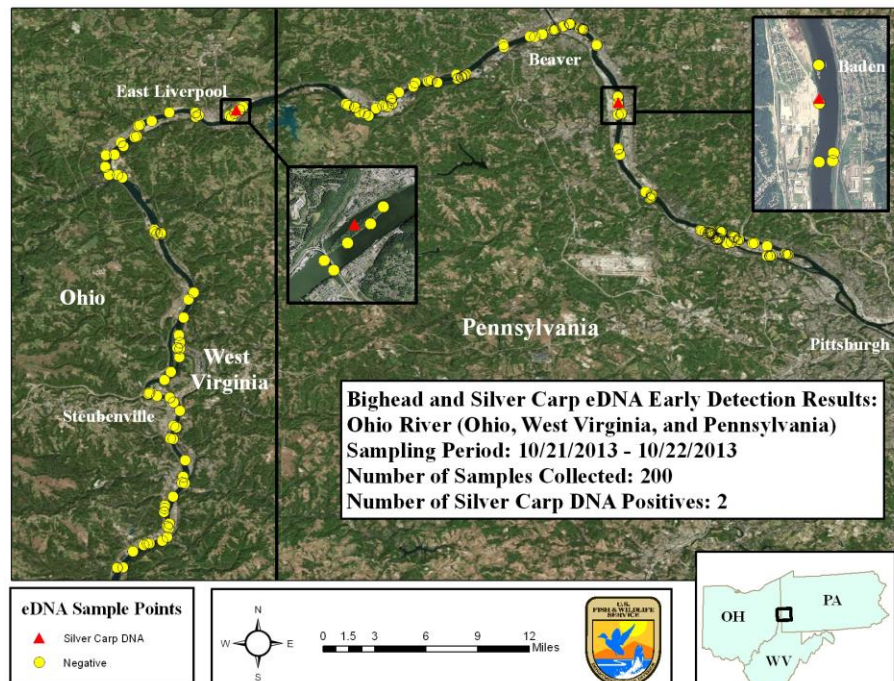


eDNA

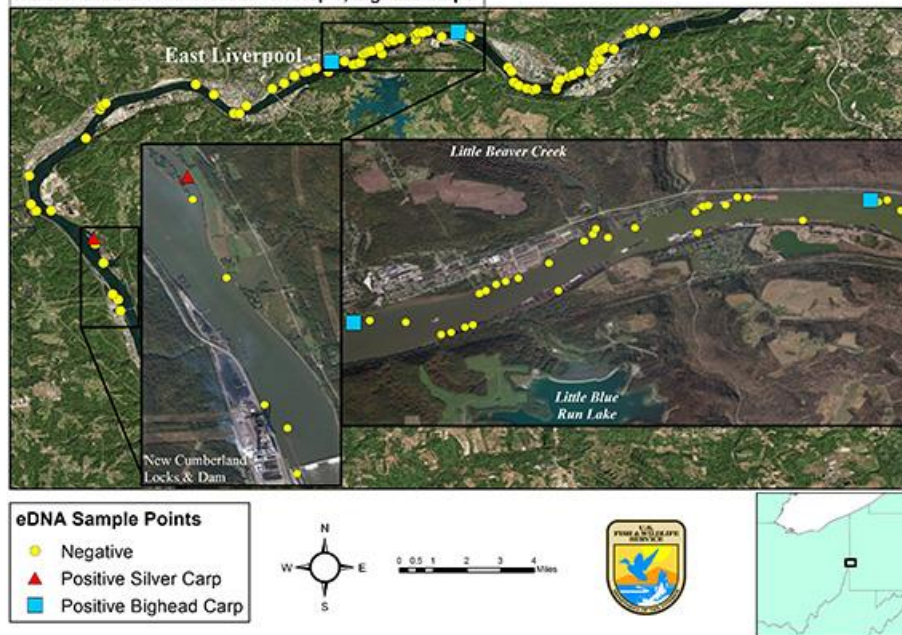
- Used for early detection of AIS/T&E species
 - Hellbender
- Tool for state agency use
 - Detection = Response?



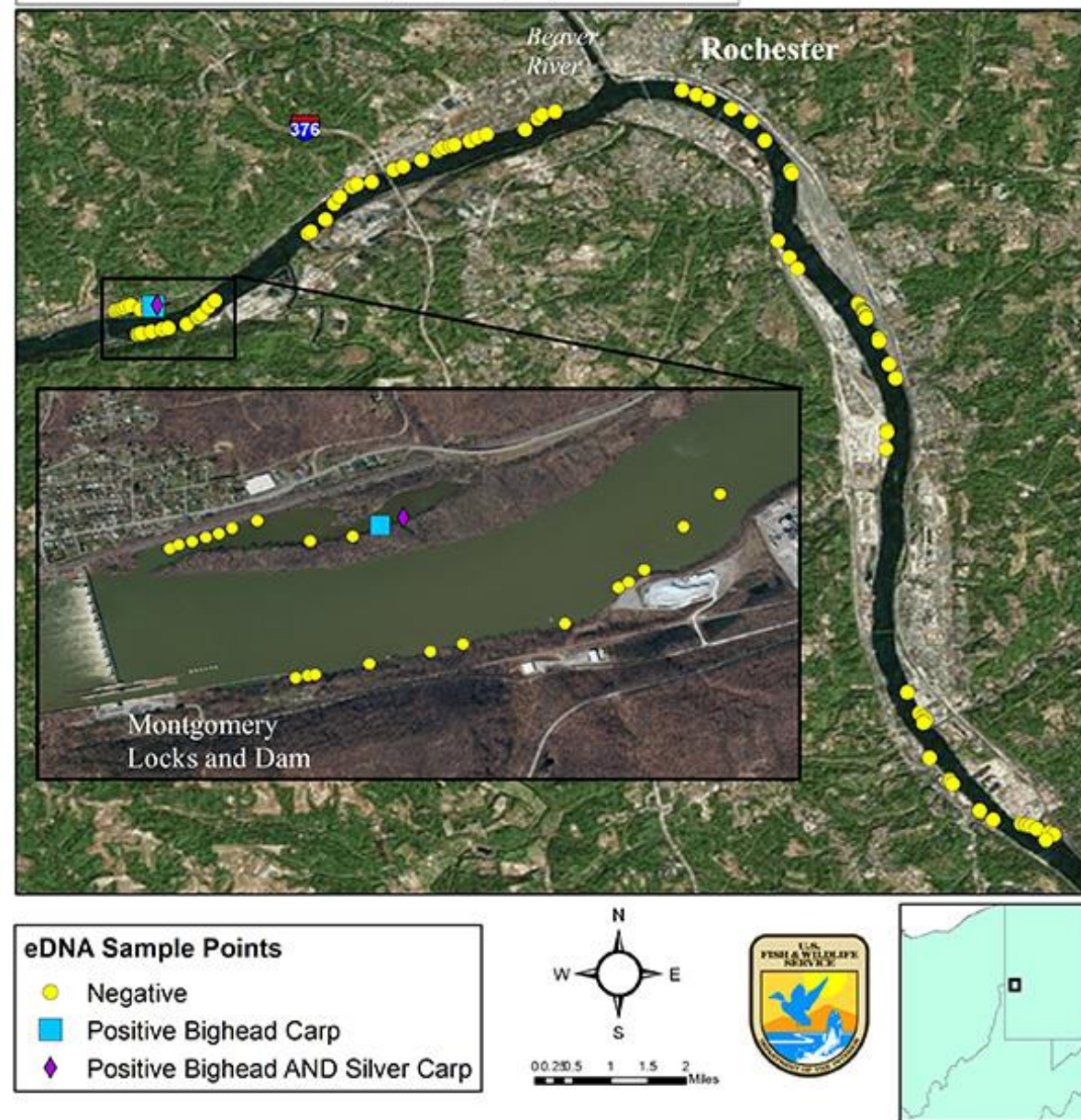
Figure 6. Characterization of current (2016) relative abundance of Bighead Carp and Silver Carp in the UMRB, ORB, and IWW/CAWS



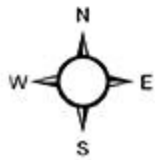
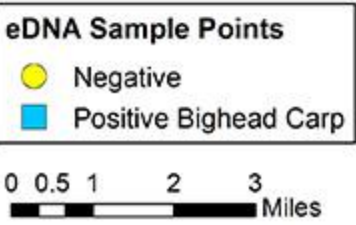
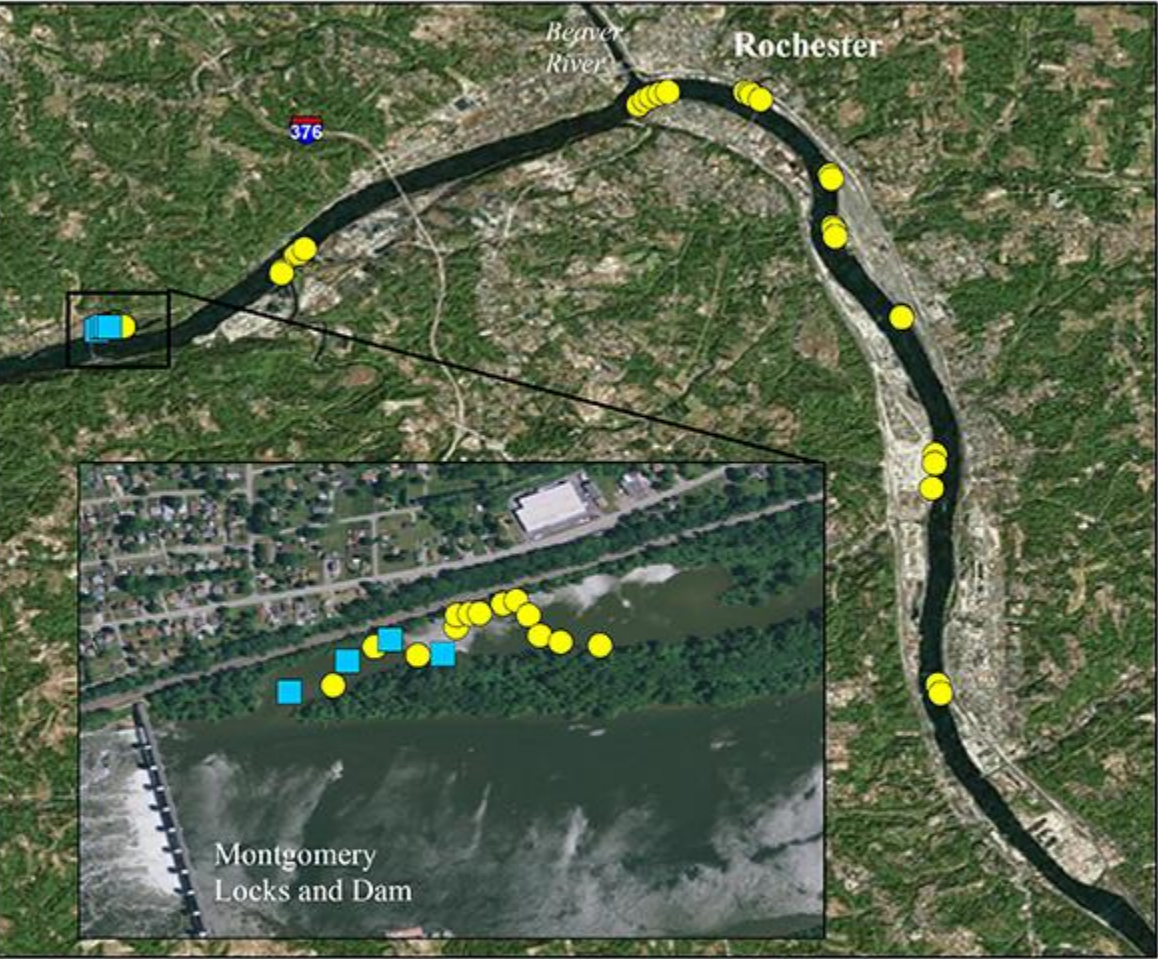
**Bighead and Silver Carp eDNA Early Detection Results:
New Cumberland Pool - Ohio River**
Sampling Period: Week of July 14, 2014
Number of Samples Collected: 100
Number of eDNA Positives: Silver Carp 1; Bighead Carp 2



**Bighead and Silver Carp eDNA Early Detection Results:
Montgomery Island Pool- Ohio River**
Sampling Period: Week of July 14, 2014
Number of Samples Collected: 100
Number of eDNA Positives: Bighead Carp 2; Silver Carp 1

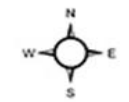
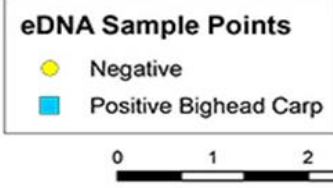
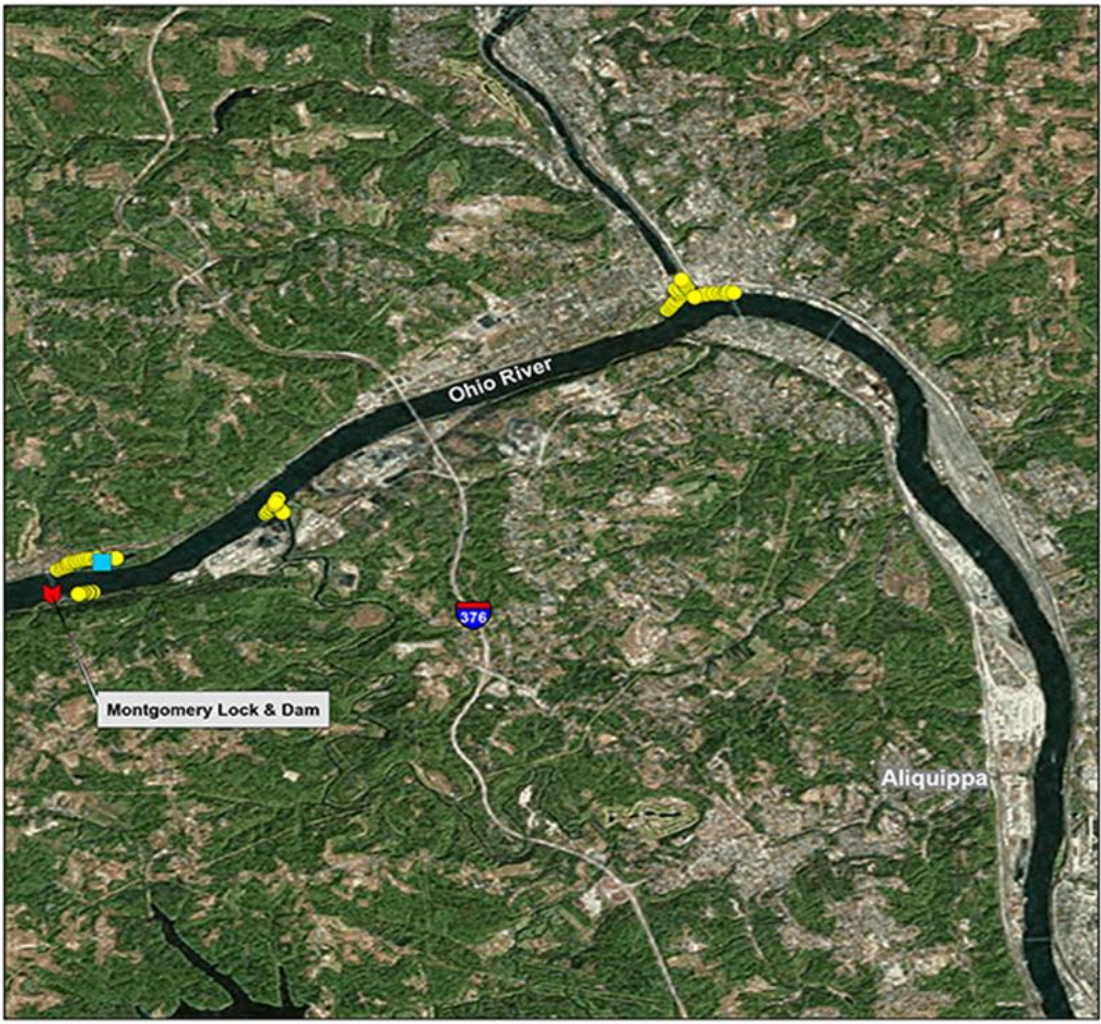


Bighead and Silver Carp eDNA Early Detection Results:
Montgomery Island Pool- Ohio River
Sampling Period: Week of May 11, 2015
Number of Samples Collected: 50
Number of eDNA Positives: Bighead Carp 4



Montgomery Island Pool

Bighead and Silver Carp eDNA Early Detection Results:
Ohio River, Montgomery Island Pool
Sampling Period: Week of June 5, 2017
Number of Samples Collected: 75



Bighead Carp found Jan. 2018

New Cumberland Pool



Questions?

