

Acoustic Deterrent Systems:

Testing new technologies for Asian carp prevention and control



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Acoustic Deterrent in the CAWS

- Deployment 1: February 2018 – April 2018
- Deployment 2: November 2018 – no later than April 2019
- At the Hanson Material Service boat slips in Romeoville, IL
- No impacts to navigation or human health and safety



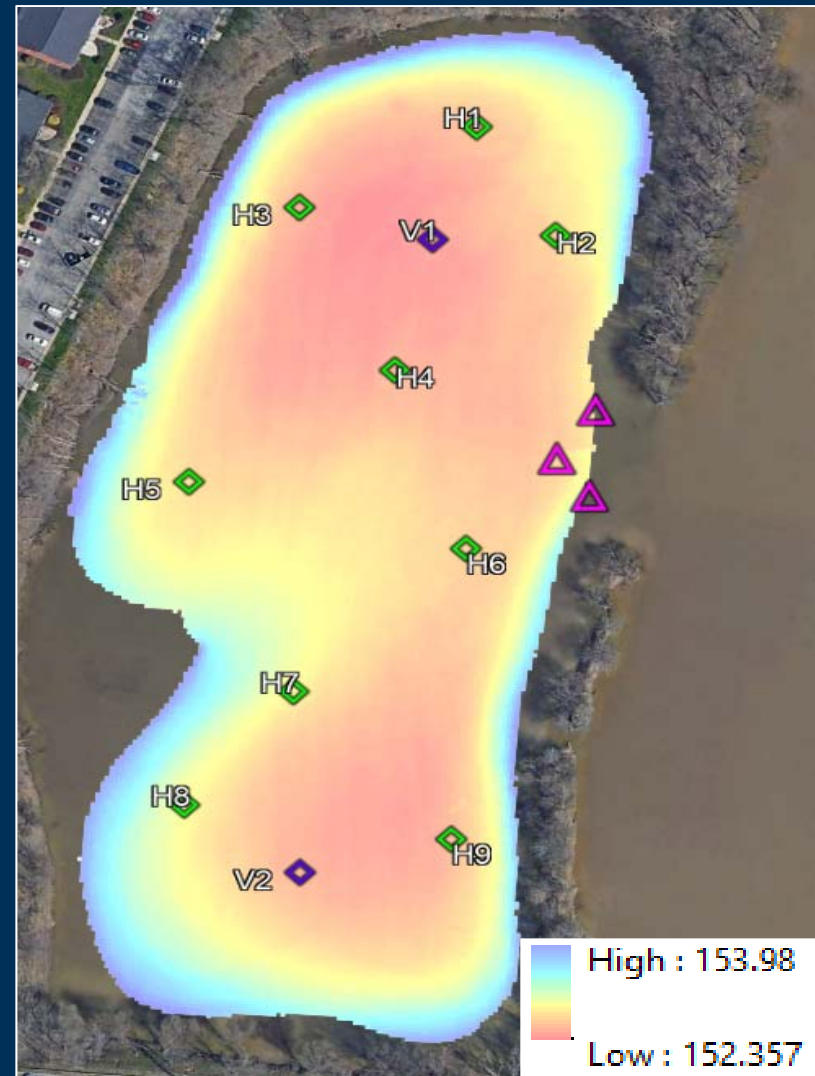
Testing New Acoustic Stimuli

- Tested additional sounds at USGS CERC ponds with USACE ERDC, USGS UMESC & USGS CERC
 - 5 trials in four ponds completed.
 - Data has been returned and analysis is happening now.
 - Additional testing will likely need to occur in 2019 in ponds and/or river if new signals are not more effective than the 100 hp boat motor.



Testing New Acoustic Stimuli

- Test most effective (new) acoustic stimuli in the Wabash River (barrow pit, West Lafayette, IN) to deter motivated fish
- Bathymetry, study plan, permitting, and fish tagging completed in 2018
- Testing (sound on) to begin in April 2019 using HTI telemetry and existing Vemco telemetry (Purdue)



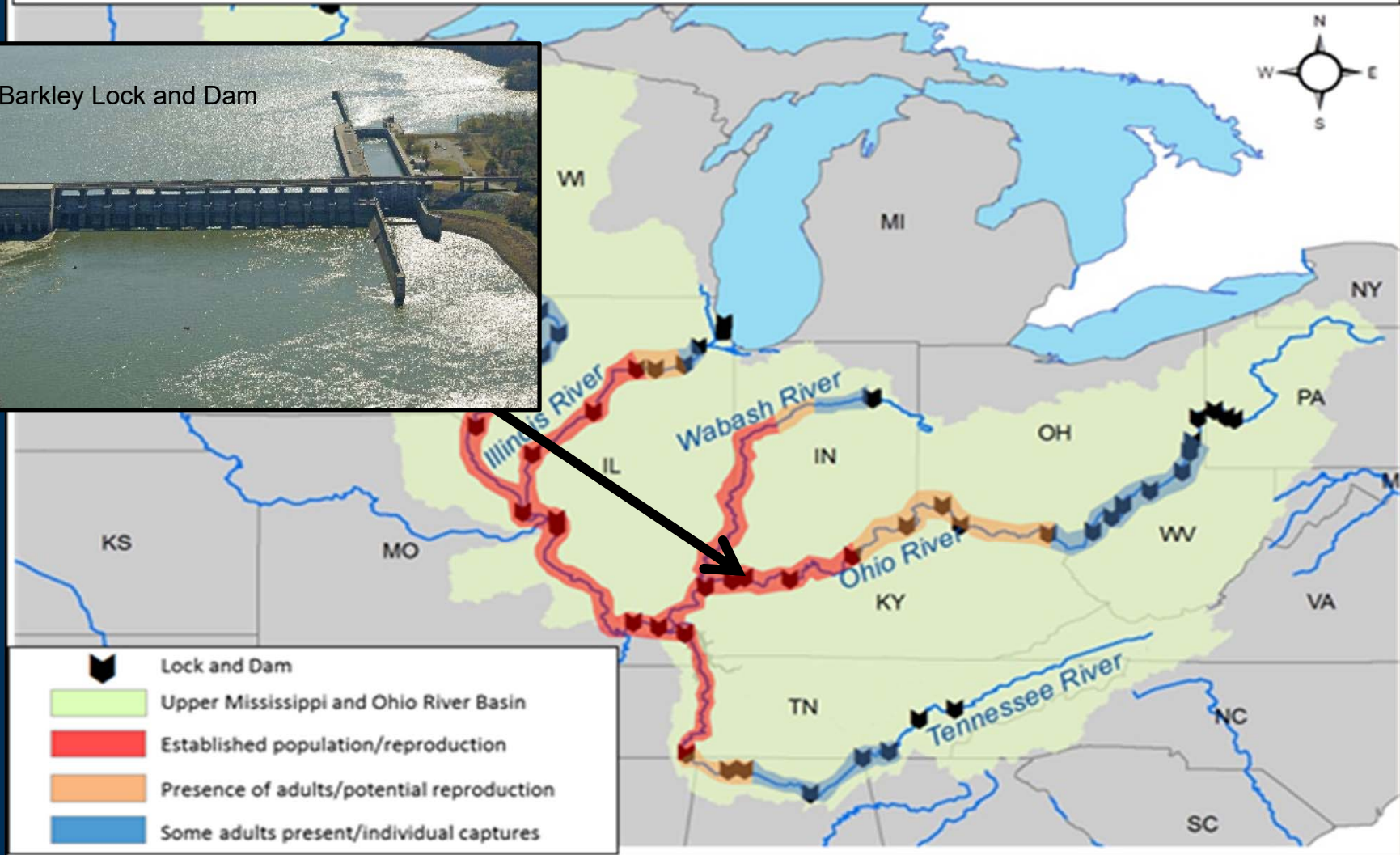
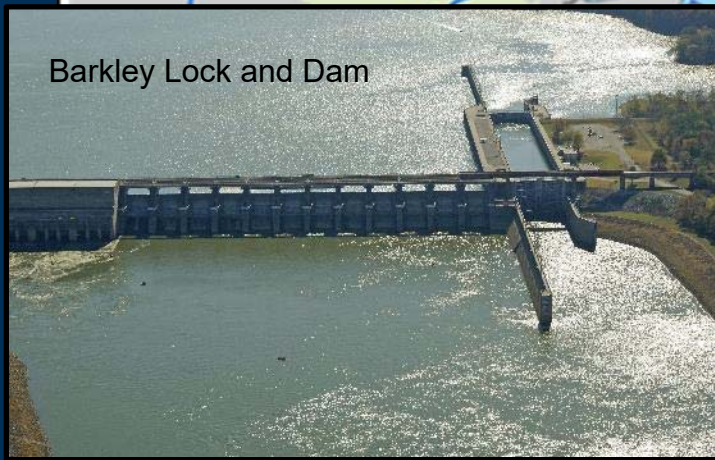
2019 Actions: Acoustic Deterrents

- Complete second deployment of Acoustic Deterrent System (ADS) in the CAWS (at request of ACRCC)
- Analyze data from 2018 pond studies and determine if further refinement is necessary (ponds and field)
- Complete ADS testing in the Wabash River
- Evaluate system **tests** at Barkley Lock and Brandon Road Lock
- Assess LD19 as a potential ADS deployment **test** site and begin sound propagation modeling with USACE-ERDC



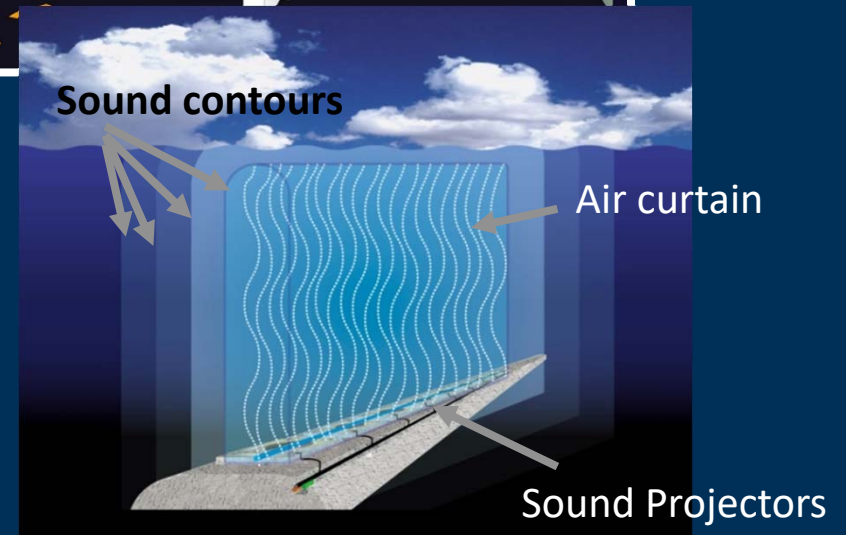
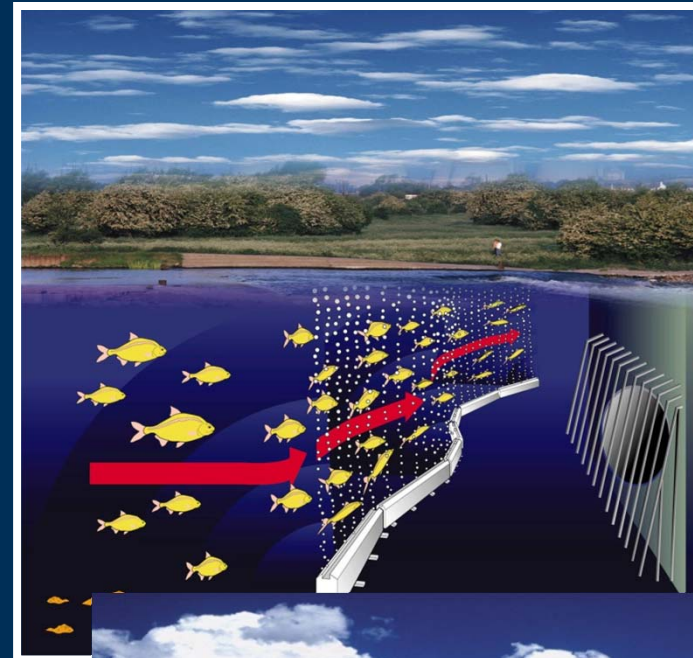
Large-scale Field Tests Begin Spring 2019

Bighead Carp and Silver Carp: Characterization of Relative Abundance in the Upper Mississippi River and Ohio River



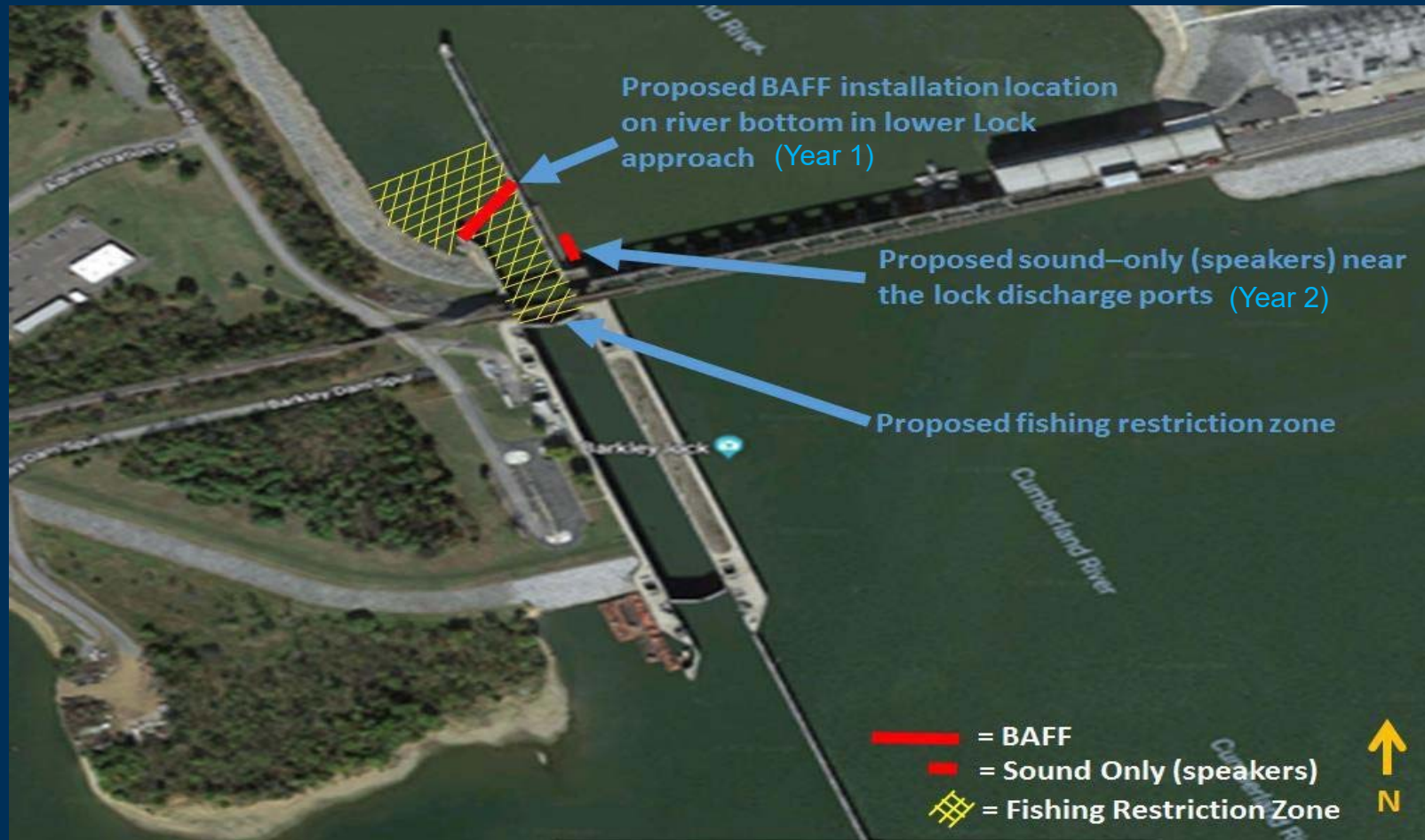
BioAcoustic Fish Fence (BAFF)

- BAFF developed by Fish Guidance Systems (FGS)
- System evaluated by University of Minnesota
- Uses proprietary sound signal that is introduced into water in a bubble curtain
- Produces a confined 'wall of sound' enabling fish to be *guided* to a bypass or trap
- Utilizes sound projectors, compressed air, and lights



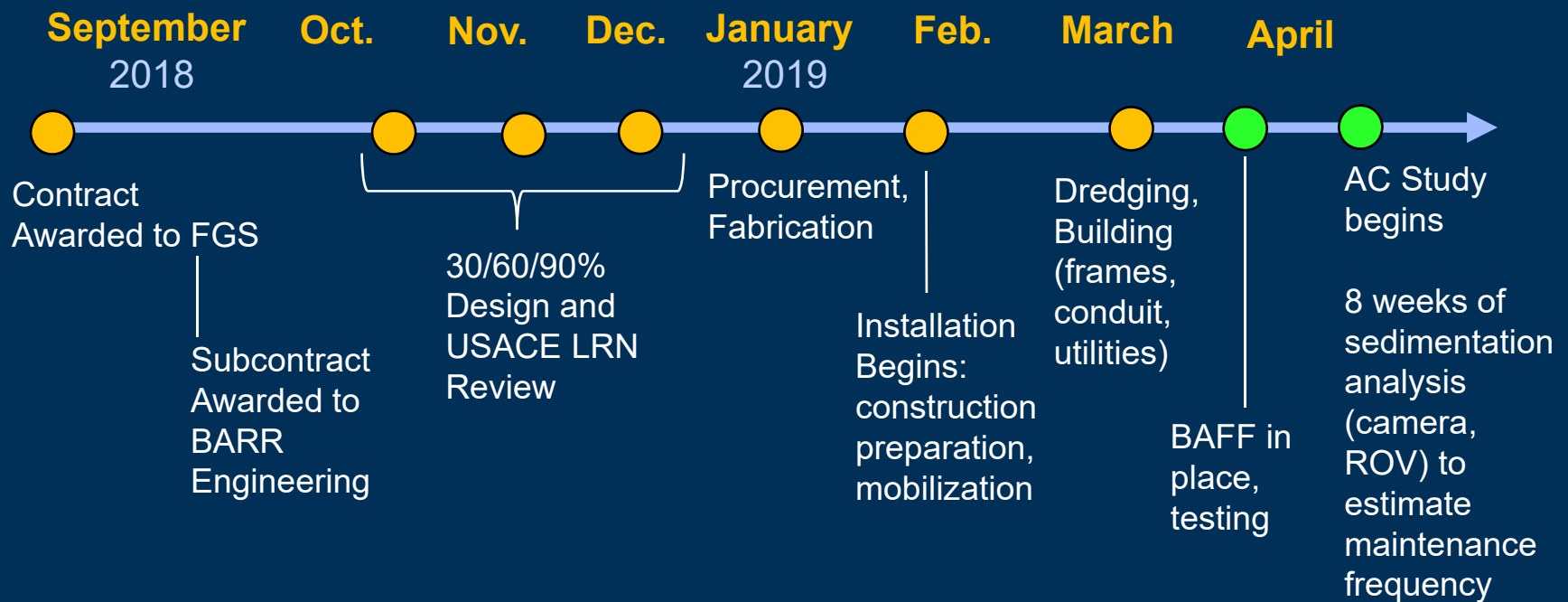


Barkley Lock BAFF Deployment



Barkley Lock BAFF Deployment

Timeline



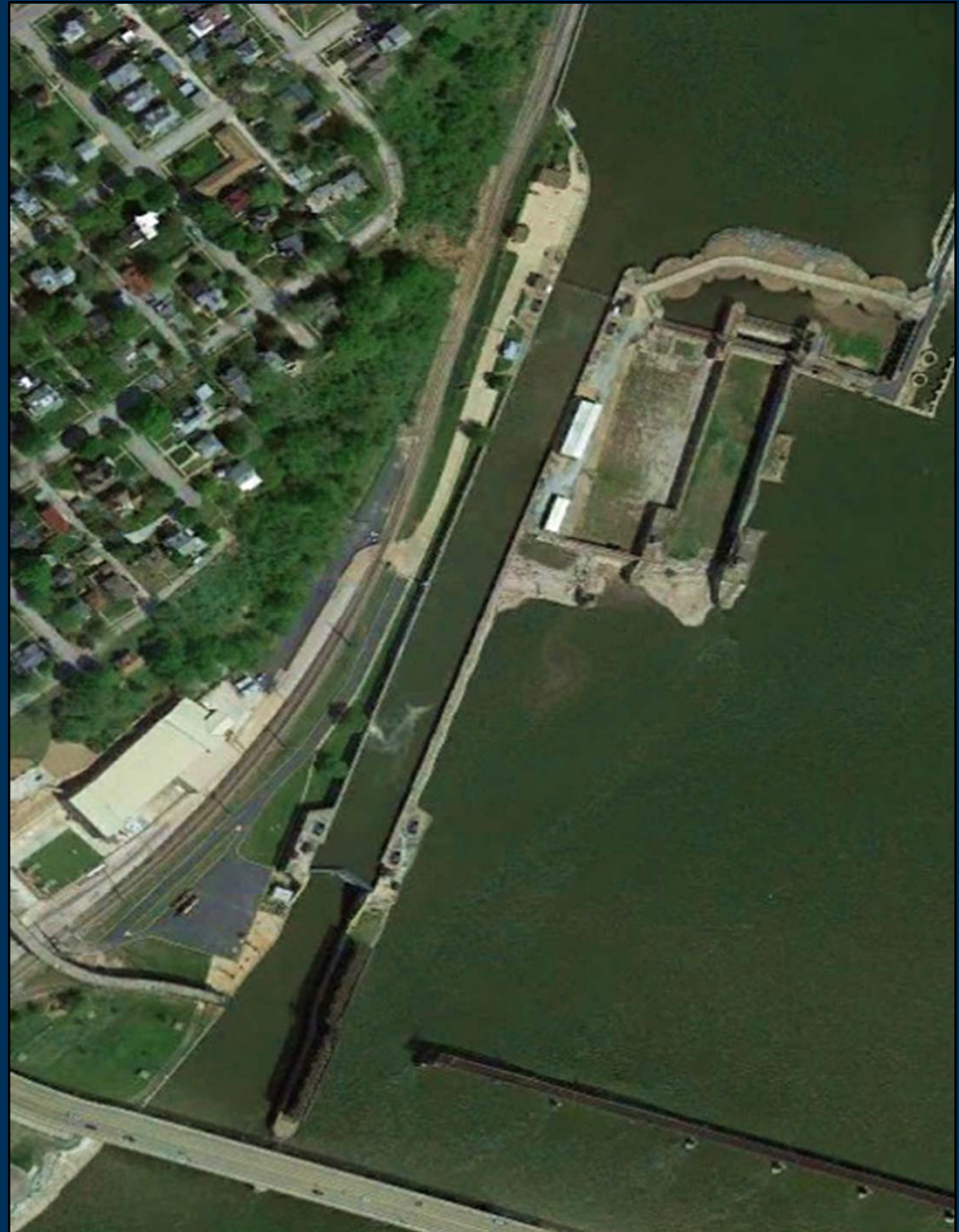
Barkley BAFF Evaluation

- Telemetry monitoring
- Vemco array (simple passage)
- HTI array or similar (behavior and passage)
- ARIS and hydroacoustics gear deployed to collect ancillary data



Proposed L&D 19 Acoustic Deterrent

- Upstream passage of fish at the location should be limited to the lock chamber
- There should be an established population of bigheaded carp such that fish passage data collected are meaningful.
- Existing monitoring infrastructure is in place or can easily be established. This allows for baseline data to be collected and may help save money on monitoring efforts.



Proposed L&D 19 Acoustic Deterrent

- Determine site feasibility (from USACE Operations and science/implementation perspectives) – Initial assessment occurred October 2018
- Assess fish passage/movement now (prior to any deployment)—1+ year of data from FWS/MODOC/USGS at LD19 summarized
- Complete acoustic propagation modeling with selected acoustic stimuli from pond testing
- FY 2020: Design and test implementation



Lock and Dam 19

