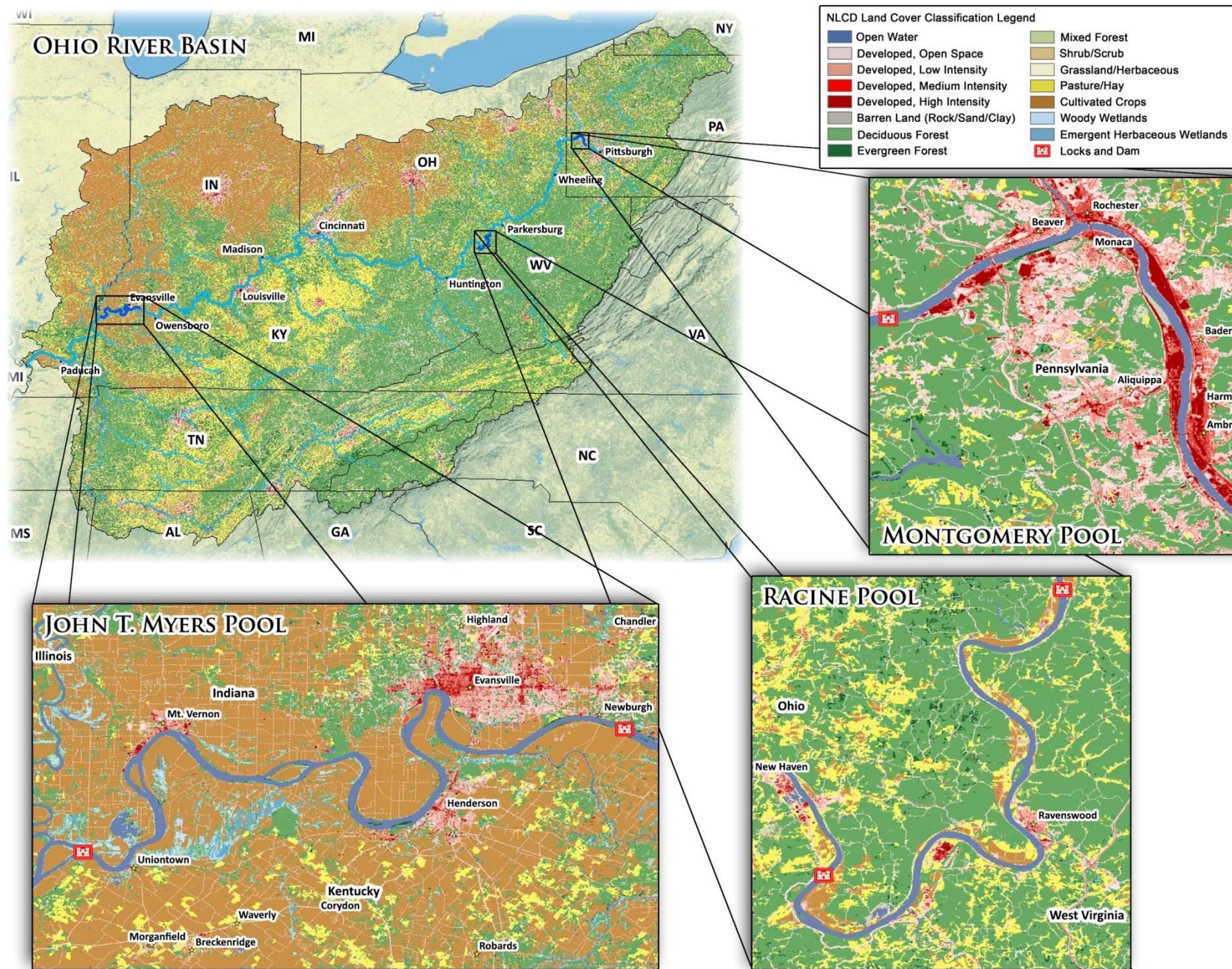


Biological Pool Studies

2015 Updates

2016 Overview





THE 2015 RESULTS OF BIOLOGICAL SURVEYS CONDUCTED IN THESE POOLS ARE DETAILED IN THE FOLLOWING PAGES



2015 Fish Survey Results

- 3-4 pools surveyed each year
- 15 random sites per pool (*mORFIn* scores averaged)
 - Collectively represent the condition of the pool
 - Biological criterion = avg. score of ≥ 20.0 (**Fair** or better)

Pool	Macro Condition Rating	Fish Condition Rating	ALU Designation
Montgomery	Fair	Good	Met
Racine	Due in mid-June	Good	Pending
J.T. Myers	Good	Good	Met

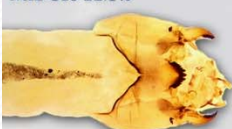
DOMINANT MACRO GROUPS

MUSSELS 59.3%



Dreissena polymorpha

MIDGES 22.1%



Dicerotendipes lucifer

CADDISFLIES 3.3%



Cynellus fraternus

SCUDS 2.3%



Apocorophium lacustre

WORMS 1.2%



Naididae sp

BOULDER 8.7%



COBBLE 1.4%

GRAVEL 11.2%

SAND 38.5%

FINES 31.5%

HARDPAN 4.9%

OTHER 3.8%

POOL SUBSTRATE COMPOSITION

JOHN T. MYERS POOL (2015) - HEALTHY CONDITION

This page summarizes the 2015 fish and macroinvertebrate (macro) surveys conducted by ORSANCO biologists in the John T. Myers Pool of the Ohio River. Fish are collected via non-lethal electrofishing in the summer. Macros are collected in the fall from artificial substrate samplers placed in the water in late summer. John T. Myers Pool is 69.9 miles long, extending from Newburgh Locks and Dam (ORM 776.1) to John T. Myers Locks and Dam (ORM 846.0). The pool is bordered by the states of Kentucky and Indiana and lies in a moderately developed portion of the river heavily influenced by agricultural practices and related industry/barge activity. Evansville, IN is the largest city in the pool and is downstream of the pool's largest tributary, the Green River (KY). Backwater areas (near Uniontown) and oxbows (Hovey Lake FWA) in the pool's lower section provide habitat for uncommon Ohio River species like the bowfin. The instream habitat throughout John T. Myers Pool is noticeably uniform (sand and fines) with only a few small pockets of natural rocky shorelines and woody cover.



JOHN T. MYERS POOL



BASIN LEVEL	SITE LEVEL	
ENVIRONMENTAL ATTRIBUTES	FISH	MACROS
Ohio River	Excellent	Excellent
Tributaries	Very Good	Very Good
Locks & Dam	Good	Good
Most Populous Cities	Fair	Fair
Developed Areas	Poor	Poor
Agricultural/Pastoral Lands	Very Poor	Very Poor
Natural Forests		

DOMINANT FISH FAMILIES

SHAD 26.0%



Gizzard Shad

MINNOWS 25.4%



Spotfin Shiner

SUNFISH 14.9%



Spotted Bass

SUCKERS 9.7%



River Carpsucker

PERCHES 9.4%



Sauger

AQUATIC INVASIVES WATCH



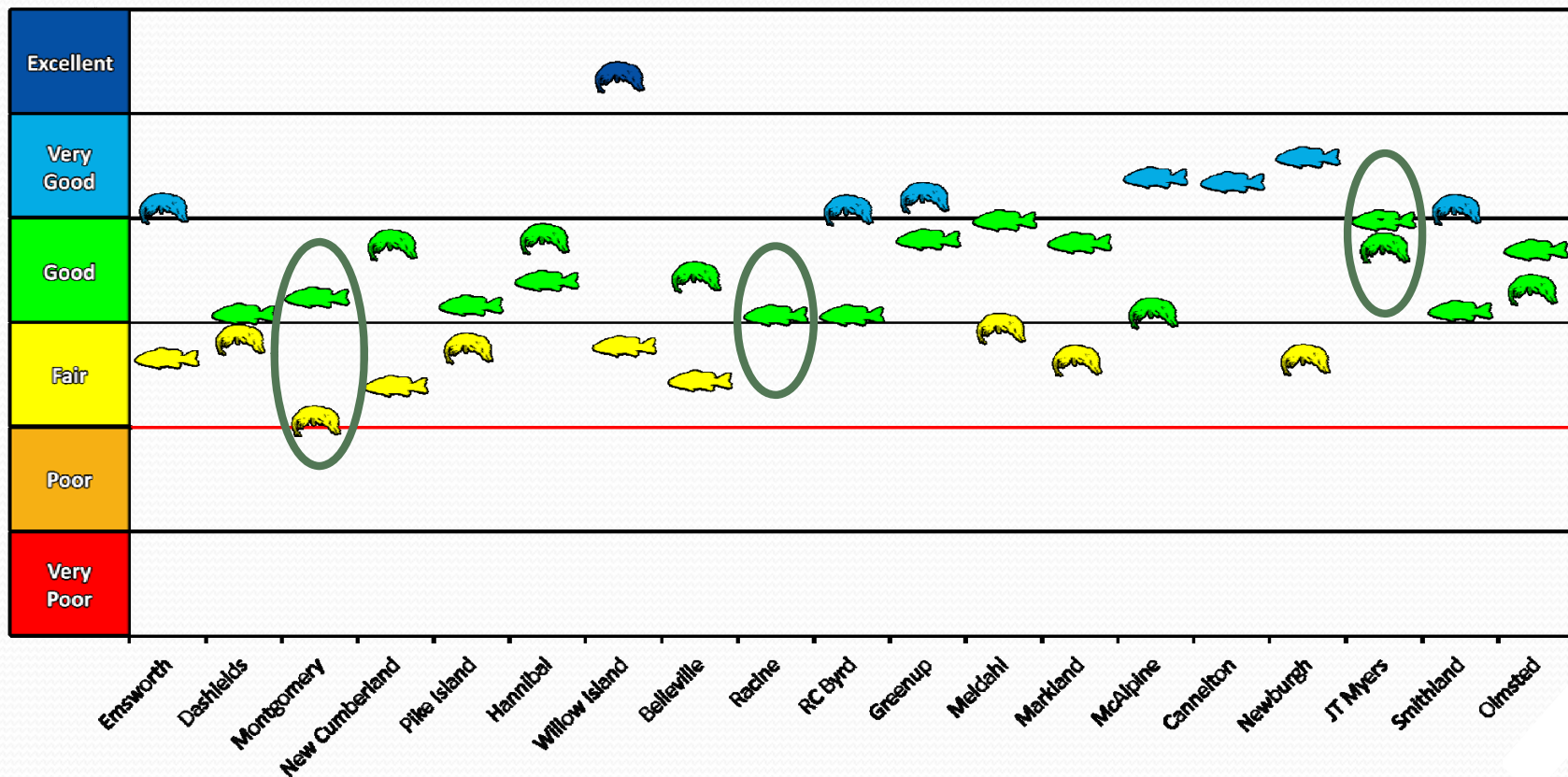
SURVEY SUMMARY

The Ohio River was elevated for much of the spring and early summer, but was receding by July when sampling occurred. Residual suspended sediments slightly decreased water clarity (25 inches) though velocities were normal and neither negatively affected sampling. Notable catches include Kentucky species of concern Black Buffalo (*Ictiobus niger*) and several Walleye (*Sander vitreus*) which are more common in the upper Ohio River. Notable macroinvertebrate collections included the midland siltsnail (*Cincinnati cincinnatiensis*) an uncommon main stem species imperiled throughout parts of the basin and an abundance of invasive non-native predatory scuds (*Apocorophium lacustre*). Independent biological indices were used to apply numeric values to important components of fish and macro assemblages and assess their relative status. The results (see above map) show that, on average, both the fish and macros in John T. Myers Pool were in 'Good' condition. Overall, these results indicate that John T. Myers Pool harbored healthy aquatic communities.



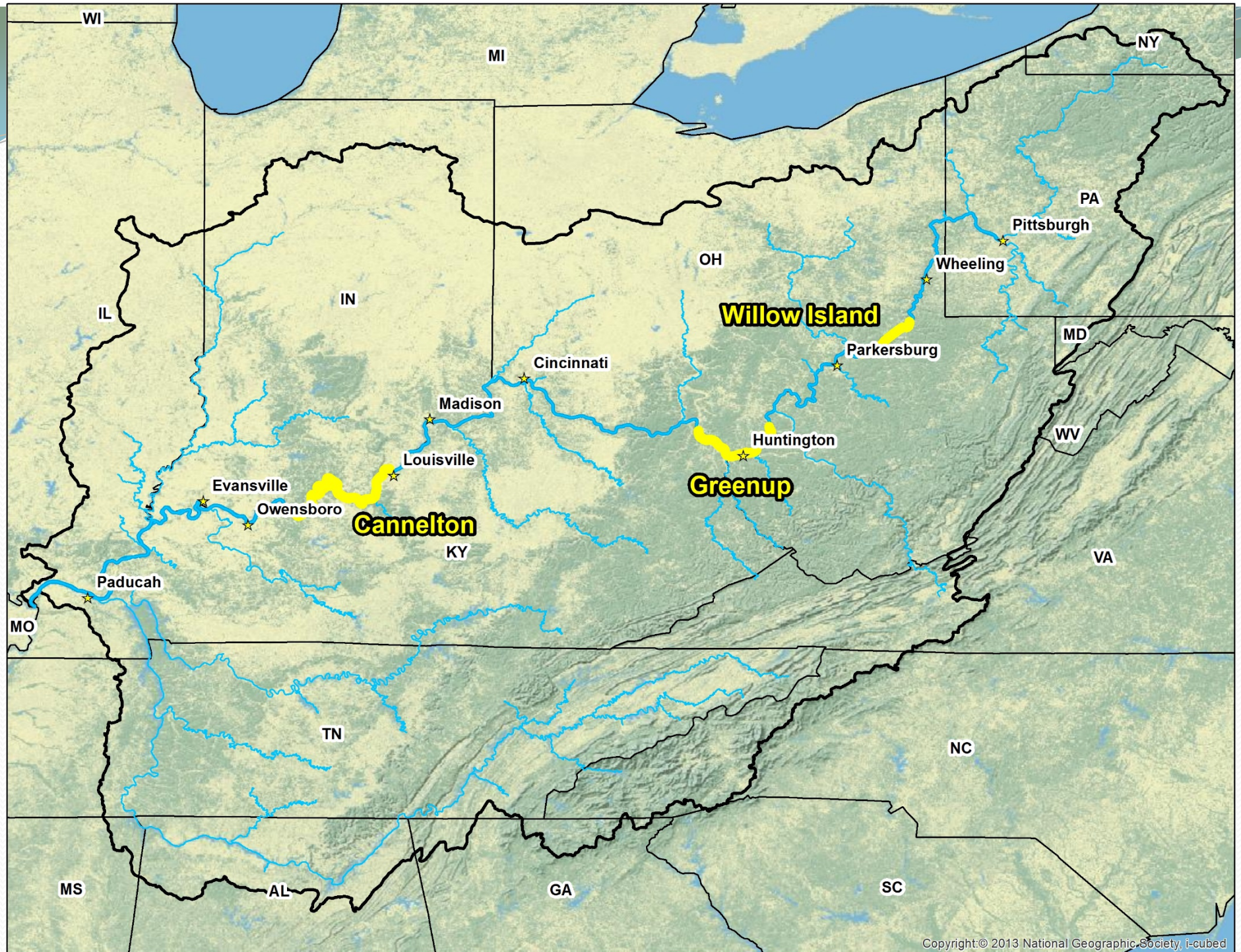
www.orsanco.org

Average Pool Conditions



 = Avg. Pool Fish Condition 2011 - 2015

 = Avg. Pool Macro Condition 2011 - 2015





BWQSC Recommendations

Target 3 pools for 2016 fish and macroinvertebrate surveys (Willow Island, Greenup and Cannelton)

- Switch to 6 year cycle (3 pools/yr)
- Use available resources to study highest ranked need:
 1. Determine effects of **Hydrilla** on biotic indices
 2. Collect **water/sediment chemistry** at fish/bug sites
 3. Conduct **next-year revisits** to a pool with a borderline or questionable assessment
 4. Conduct **same-year revisits** to gauge effects of seasonality/flows
 5. Conduct **targeted** biological sampling
 6. Coordinate **mussel surveys** at fish/bug sites
 7. Determine upstream extent of **Asian Carp** reproduction
 8. Determine impacts of **microplastics** on aquatic life



Hydrilla – planned for 2016

Goal: To quantify the presence of *Hydrilla verticillata* in the Ohio River and determine its effects on biotic index scores.

Rationale: Since its emergence over the last decade, we have noticed biological community shifts where it has become established (12 of 19 pools).

Study Summary:

- ~20 sites in Willow Island
- Determine conditions necessary for *Hydrilla* to thrive
 - Record substrate, continuous light, DO, and Temp, and collect nutrient data
- Compare fish & macros from sites with range of *Hydrilla* infestation (none to high) and similar abiotic conditions



Water/Sediment Data Collection

Goal: To resume and expand paired water quality and sediment chemistry collections at biological survey sites (both probabilistic and targeted).

Rationale: Paired abiotic data can be used to refine existing or develop new biological indices, to better understand stressor/response, & to allow for more complete pool surveys.

Study Summary:

- Collect water/sediment samples 4x per year at each biological survey site
- Analyze for broad spectrum of parameters



Next-Year Pool Revisits

Goal: To confirm pool assessments of Fair or Poor.

Rationale: Current biological pool assessments rely on a single value per pool being compared to a single value threshold, without taking into account confidence intervals. Additional data may be necessary from pools where confidence intervals heavily overlap the threshold.

Study Summary:

- Revisit 15 probabilistic sites from previous year, sample 15 new sites in a pool, or conduct targeted sampling
- May involve fish or macroinvertebrate sampling, or both



In-season Revisits

Goal: To quantify the effect of seasonality on *mORFI*n scores.

Rationale: The fish index period officially runs from July 1 to Oct 31, but recent assessments have been restricted to July-Aug to make best use of limited resources. It's important to document how this may affect our assessments.

Study Summary:

- Re-sample all 15 probabilistic sites in a pool for fish in September/October



Targeted Sampling

Goal: To use targeted sampling in probabilistic pools to satisfy data/monitoring requests of individual entities or states and/or to assist with index refinement.

Rationale: Targeted sampling is an important element of a robust monitoring design that can be used by state and other partners to address specific issues within each pool.

Study Summary:

- Add 6-10 targeted sampling sites per pool survey
 - Sites to be determined based on data gaps and states' needs
- Could involve fish or macroinvertebrate sampling, or both



Mussel Surveys

Goal: To explore use of mussels as 3rd indicator group, to fill in data gaps related to Ohio River distributions, and to gather base-line data for long-term monitoring.

Rationale: ORSANCO monitors two key components of the Ohio River biota, but has long neglected a 3rd major fauna, the mussels. This group may prove useful in determining attainment of the Aquatic Life Use, and data gathered will likely prove to be valuable to state/federal partners and for criteria development.

Study Summary:

- Contract dive surveys at all probabilistic sites within each pool
- Ideally, both transect & quadrat sampling would be conducted



Asian Carp Surveys

Goal: To document evidence of reproduction in direct tributaries along the leading edge of current Silver Carp and Bighead Carp distribution.

Rationale: ORSANCO's office is situated near the upstream extent of the Asian Carp invasion in the Ohio River, as adults are now being commonly encountered just upstream of Cincinnati, although no signs of reproduction have been documented above the Falls of the Ohio in Louisville.

Study Summary:

- Conduct extensive surveys of lower reaches of tributaries and backwater areas between Louisville & Huntington, WV



Microplastics

Goal: To quantify the effects of microplastics on fish condition in the Ohio River

Rationale: Concerns over microplastics and their effects on wildlife have recently received growing scientific and public attention. The status of this pollutant in the Ohio River and its effects on fish condition are currently unknown.

Study Summary:

- Collect gut samples from Ohio River fish already being sacrificed for fish tissue analysis
- Submit samples to other entities for microplastic quantification

Questions/Comments





305(b) ALU Assessment Approach

- **full support**

- mORFIn and ORMIn scores are greater than or equal to 20.0
 - (i.e. a condition rating of 'Fair', 'Good', 'Very Good', or 'Excellent')

- **partial support**

- one of the indices scores 'Fair' or better (>20.0)
- the other index scores 'Poor' (10.0 - 19.9)

- **non support**

- pool in which both indices score 'Poor' (<20.0)
- or in which either or both indices score 'Very Poor' (<10.0)



Macroinvertebrate Program

- Incorporated into ALU Assessment
 - 2 Methods collected at all sites
 - Macro Index (ORMIn) est. 2012
 - 2015 ORMIn refinement
 - ↑ Resolution of least & most disturbed sites
 - ↑ Index response to disturbance
 - Scores generated from Hester Dendy Deep (HDD) samples alone
 - *Hydrilla* highly influences Multi-Habitat (MH) samples
 - HDD to much lesser extent
 - Will continue MH collection to account for *Hydrilla*
 - Lab has 90 day return (End of February)
 - *Implications for 305(b)*

