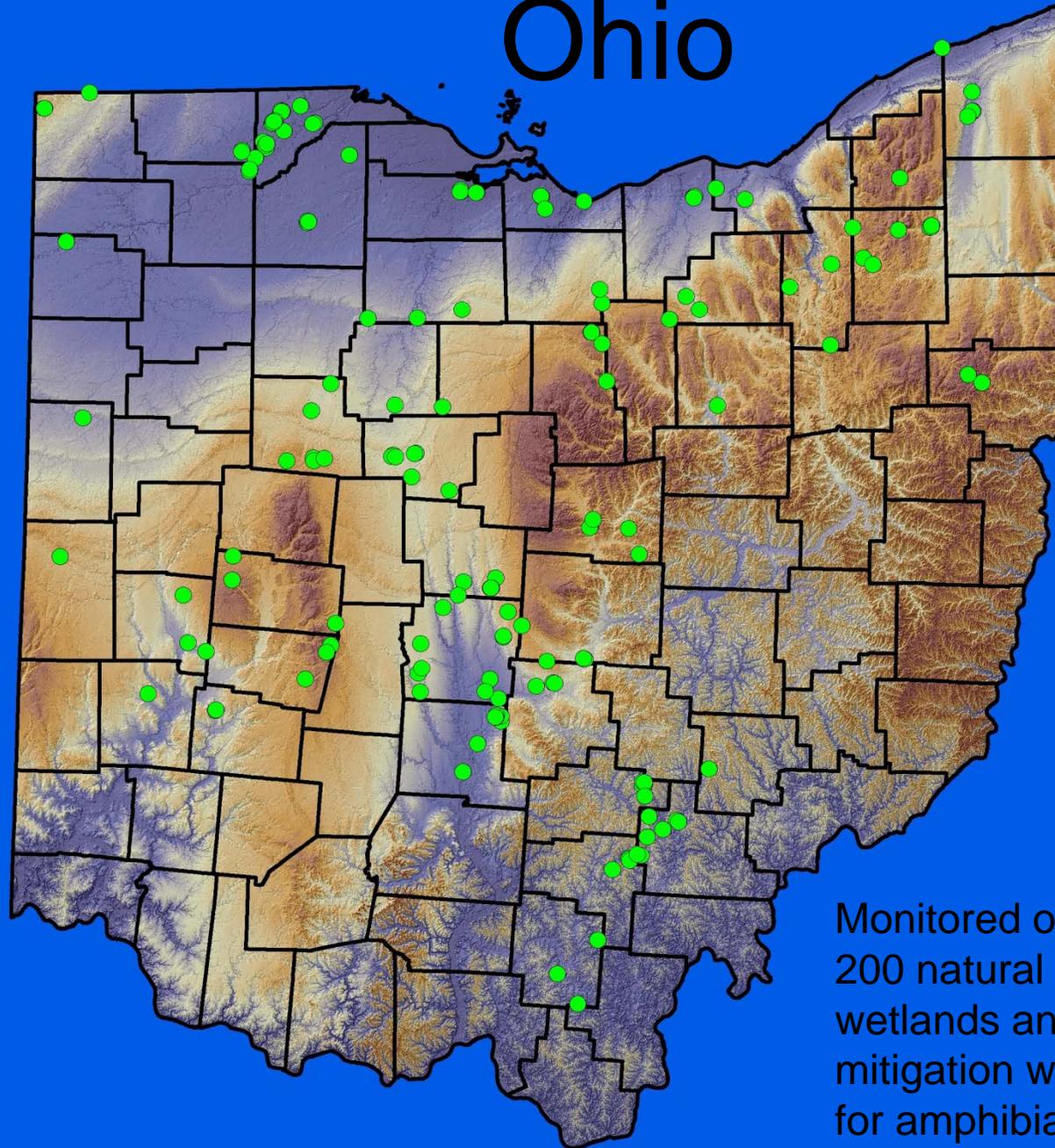
A photograph of a forest stream. The water is calm and reflects the surrounding trees. In the foreground, there are several yellow flowers, possibly wildflowers, growing near the water's edge. The trees are mostly bare, suggesting a late autumn or winter setting. The overall scene is a natural, wooded environment.

# Development and Use of an Amphibian Index of Biotic Integrity for Ohio

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# Ohio



Monitored over  
200 natural  
wetlands and 70  
mitigation wetlands  
for amphibians

# Amphibian Monitoring Methods





# Spotted Salamanders and Wood Frogs

- Two species that are excellent indicators
- Only found in relatively intact systems
- Require large percentage of forest in surroundings

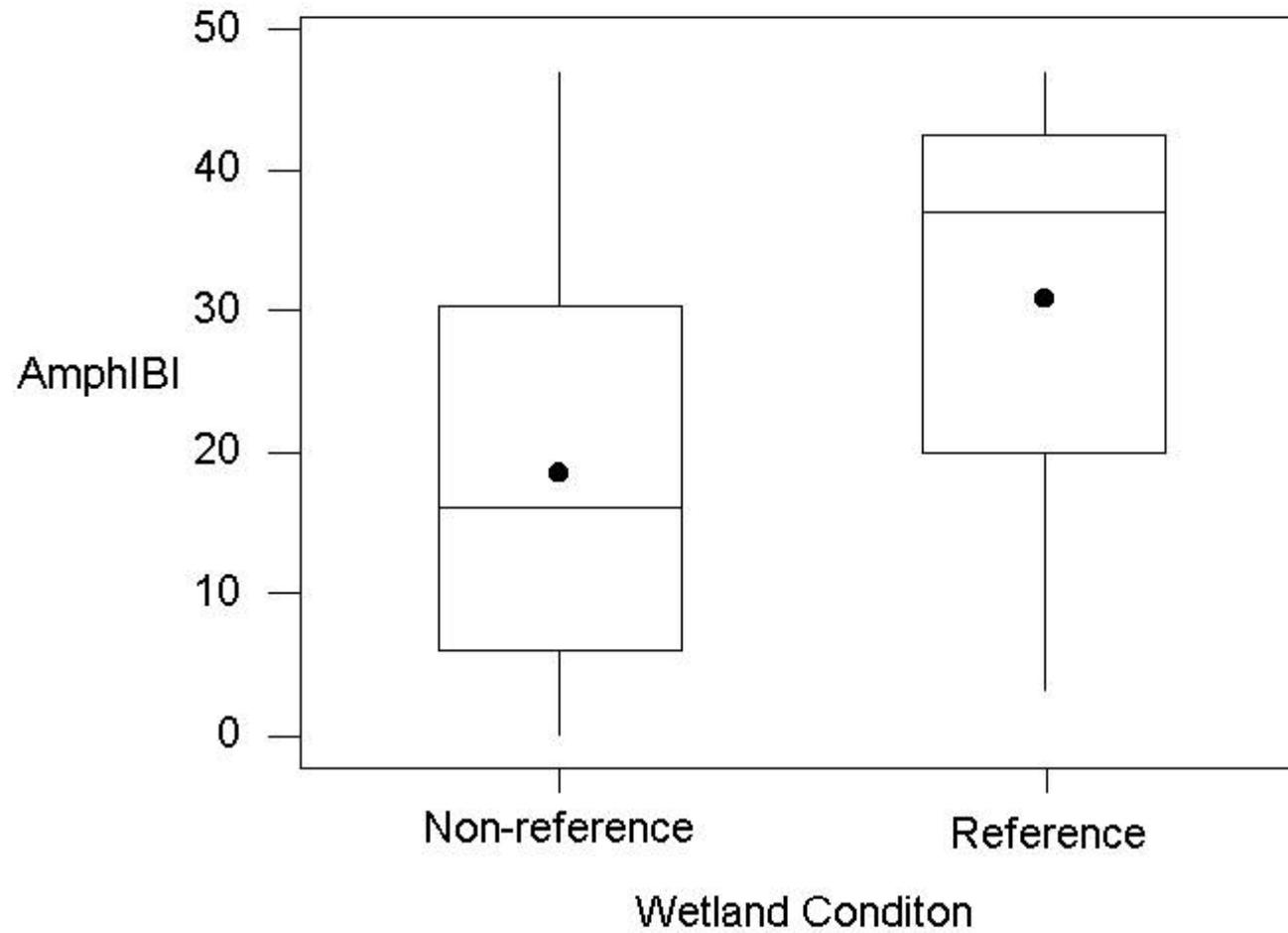


# Amphibian Index of Biotic Integrity Metrics

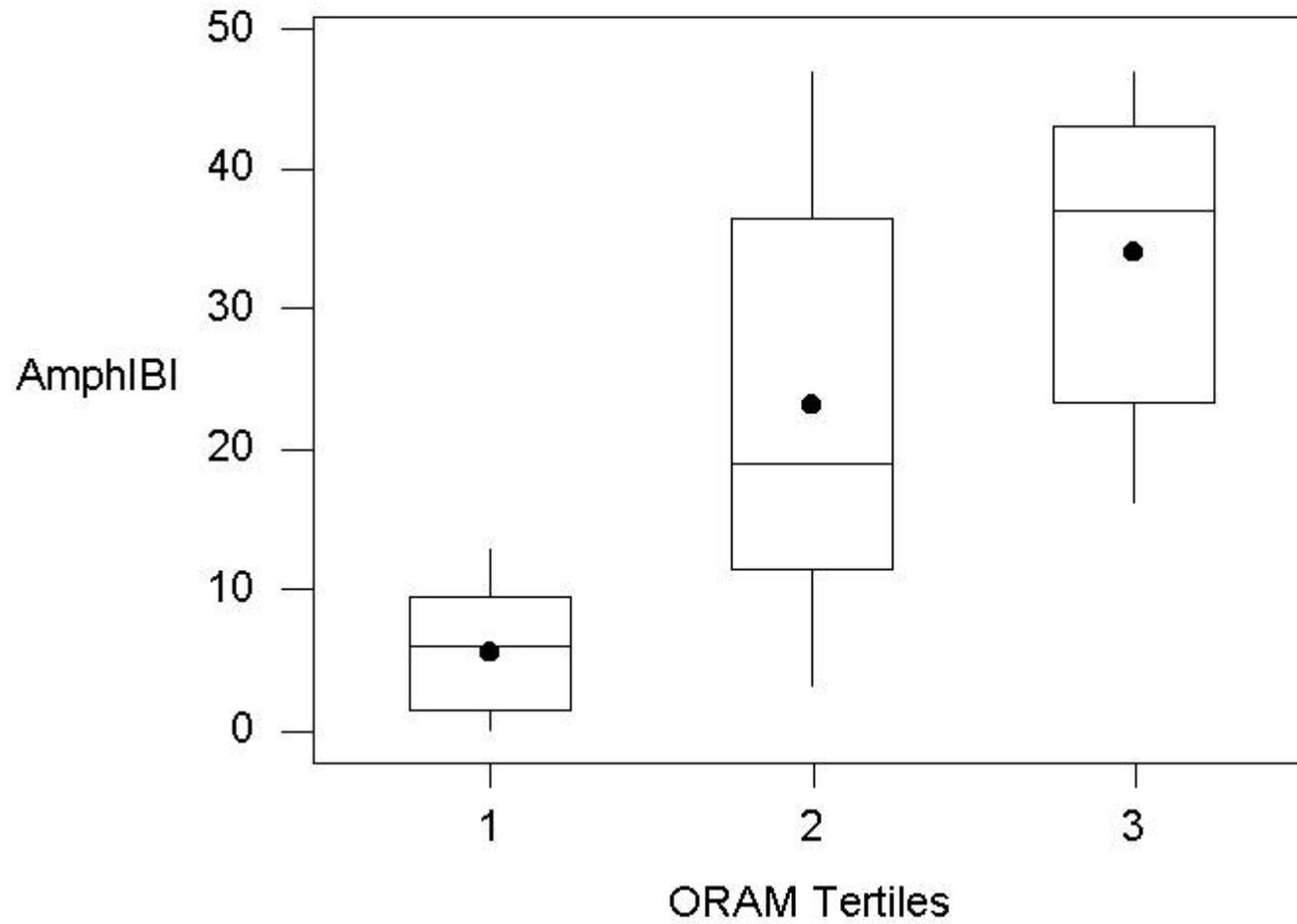
- Amphibian Quality Assessment Index (AQAI)
- Number of species of pond breeding salamanders
- Relative abundance of sensitive species
- Relative abundance of tolerant species
- Presence of spotted salamanders or wood frogs
- 10pts.each (0, 3, 7, 10), 50 pts. total



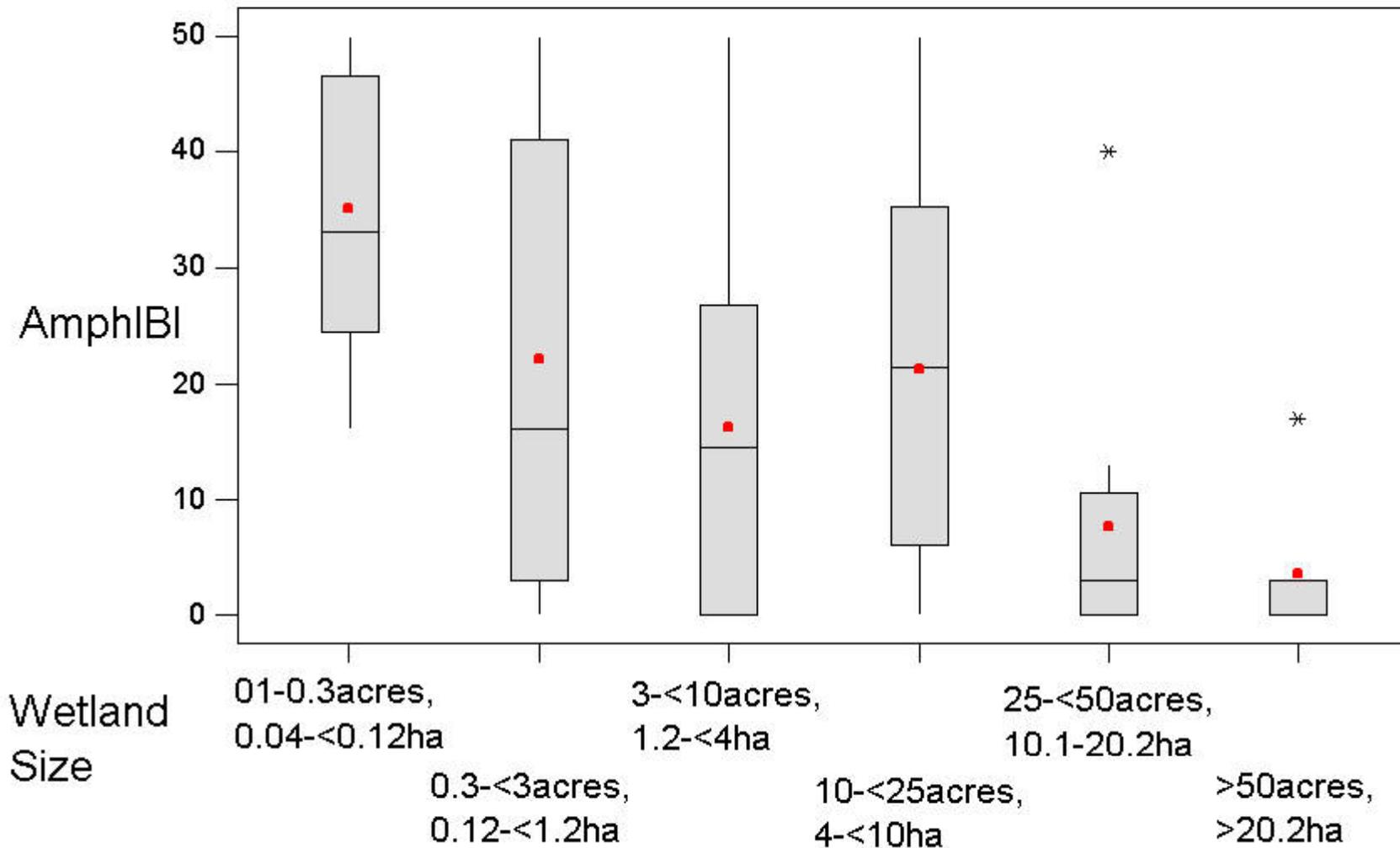
### AmphIBI Score by Wetland Condition



AmphIBI Scores by ORAM Tertiles



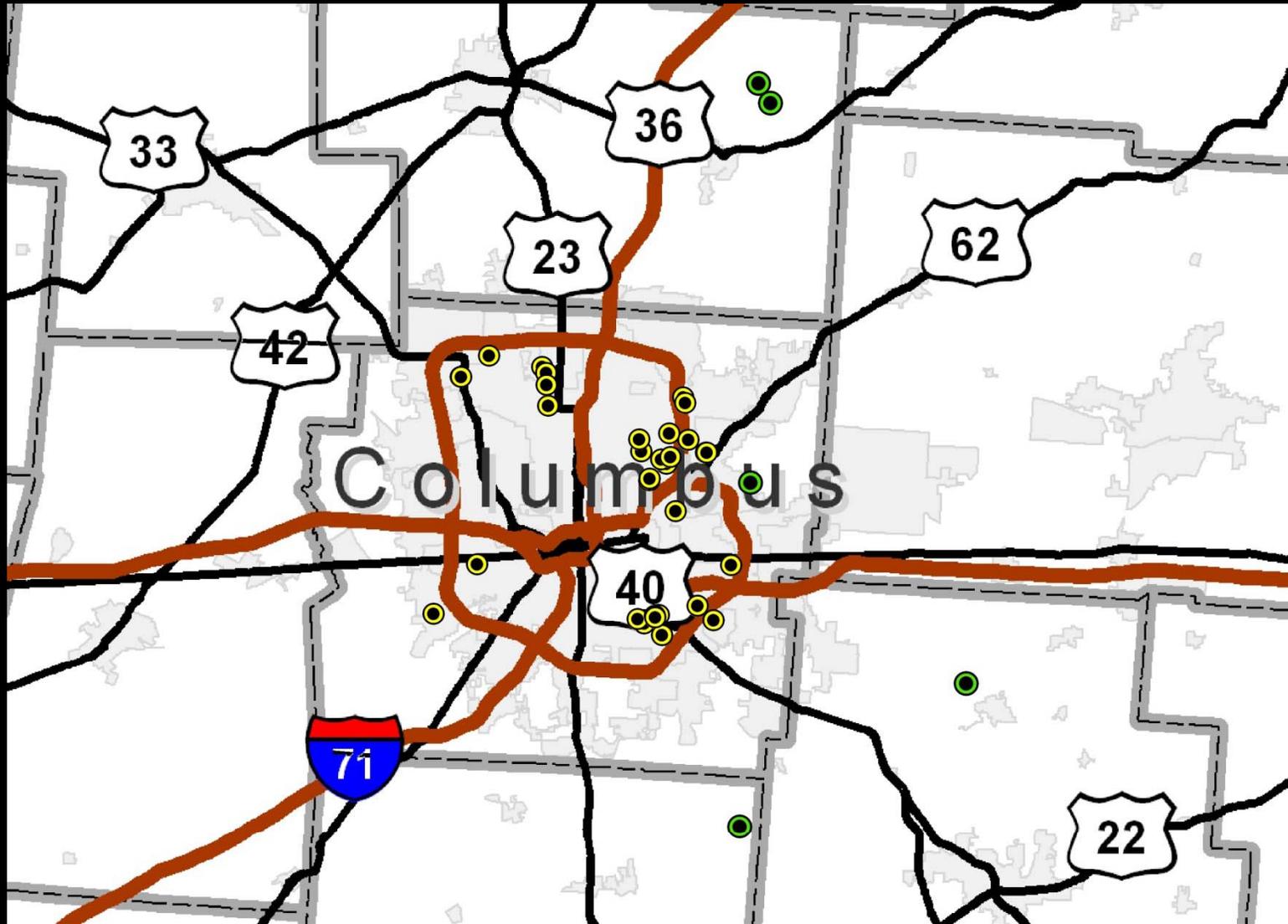
## AmphIBI Scores by Wetland Size



# Wetland Size

- Highest AmphIBI scores are from smallest wetlands
- Smallest wetlands score highest on average
- Small wetlands provide some outstanding contributions to biodiversity
- Small wetlands are unduly devalued through the regulatory process

# Central Ohio Urban Wetlands



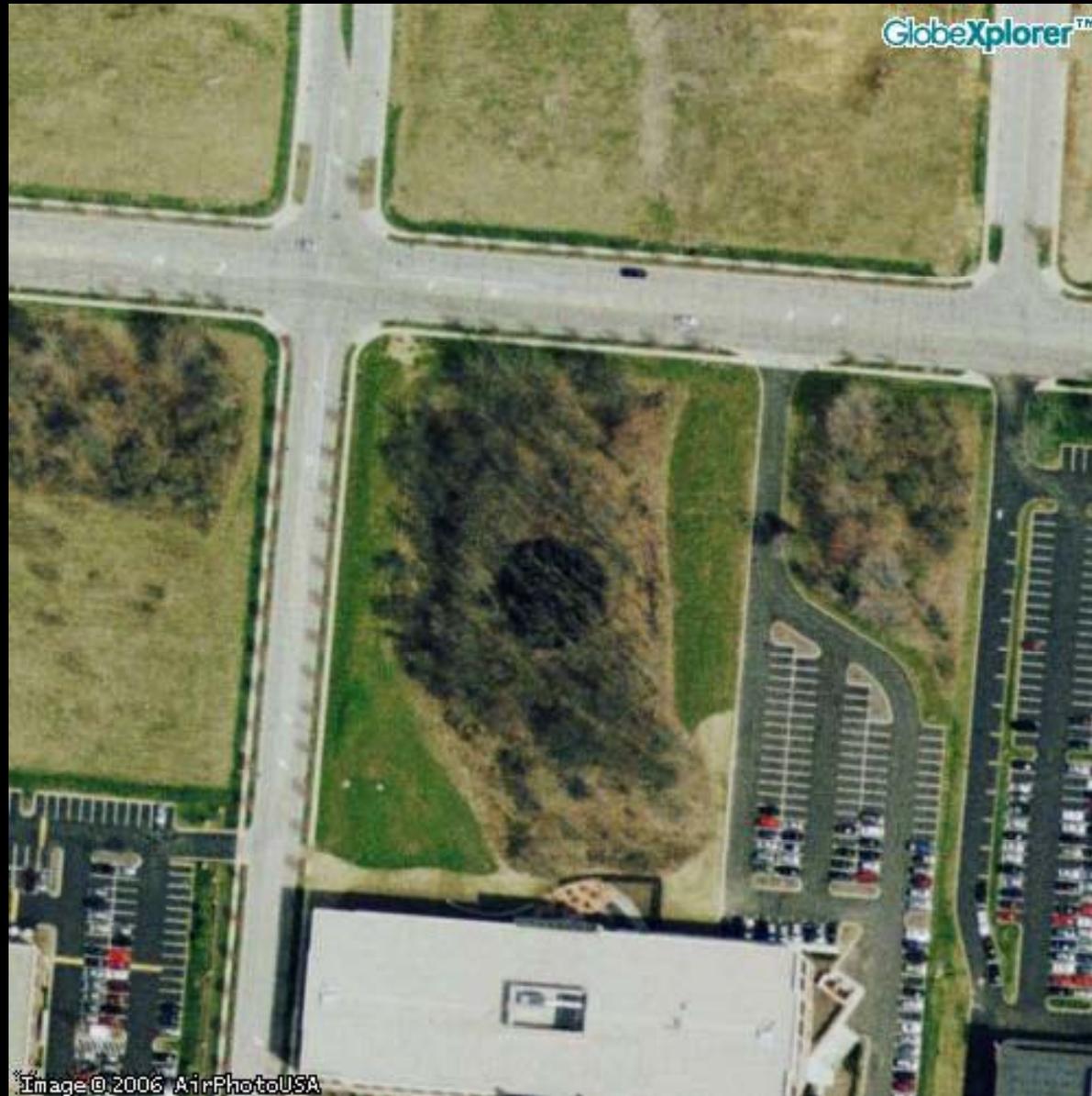
# Urban Wetland



# Urban Wetlands – Central Ohio

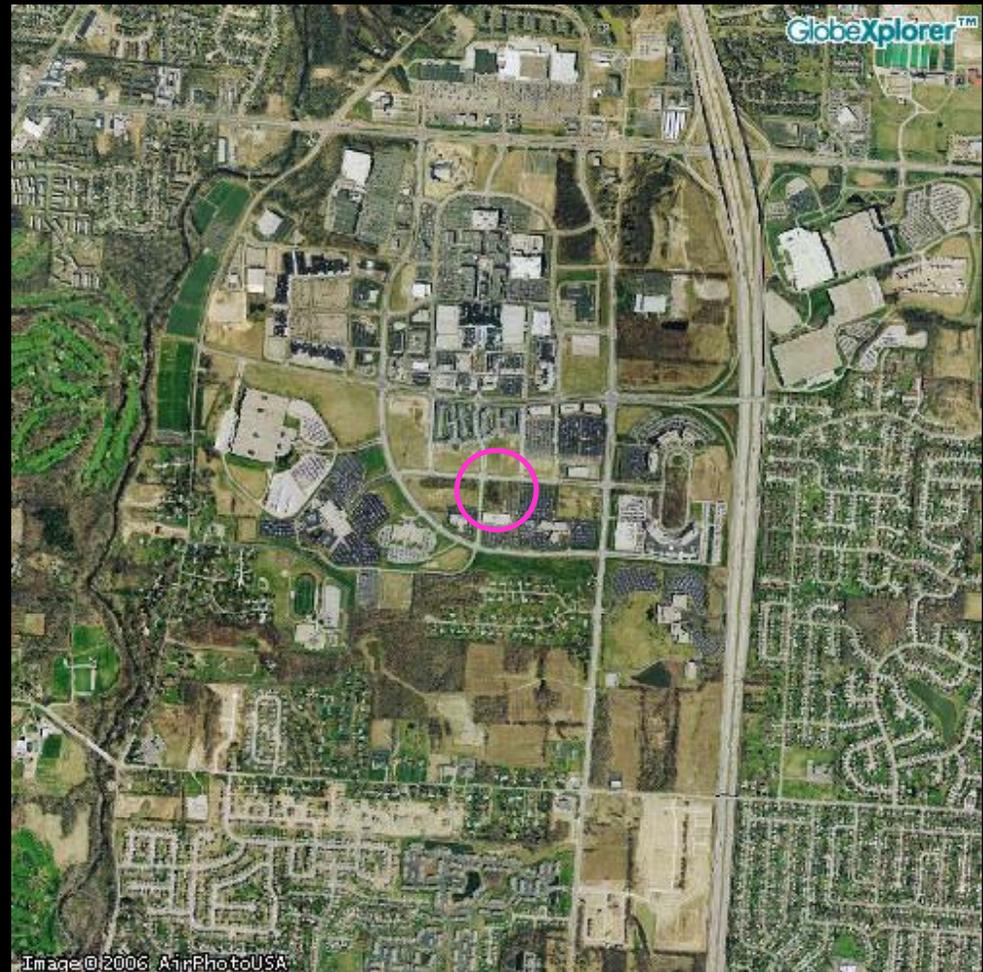
- Randomly selected 200 urban wetlands – NWI and OWI (out of 649)
  - Tree or shrub dominated
  - Isolated depressions - SW and GW fed
  - Inundation through amphibian breeding season
  - No predatory fish
- 42.3% of wetlands from NWI/OWI (1980s data) were filled or converted to non-wetland
- Monitored 14 wetlands (vernal pools) for amphibians  
14/200 = only 7% of central Ohio wetlands provided amphibian community breeding habitat
  - 3 – Poor quality –  $3/200 = 1.5\%$
  - 9 – Fair quality –  $9/200 = 4.5\%$
  - 2 – Good quality –  $2/200 = 1\%$
  - 0 – Excellent quality



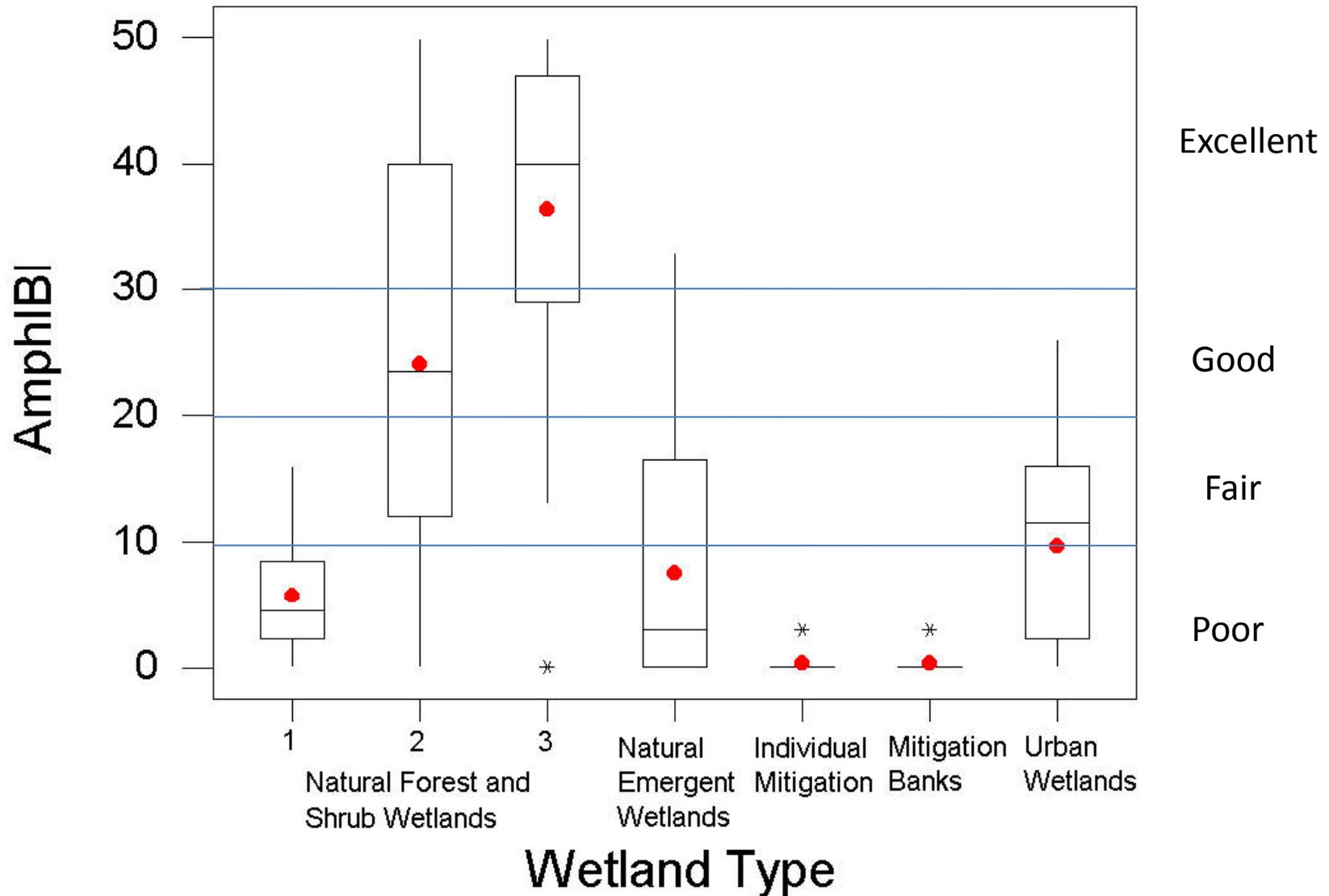


# Limitations on Amphibian Communities Using Urban Wetlands

- Intensive surrounding land uses
- Lack of buffers
- Isolation from other patches of habitat



## AmphIBI Scores by Wetland Type



# Mitigation Bank Study

- Monitored 35 subareas at 12 wetland mitigation banks
- Total = 999.2 acres (404.4 hectares)
- Amphibian data collected with deployment of 1040 funnel traps (24,960 trap hours)

# Species Composition of Wetland Mitigation Banks

- Abundant

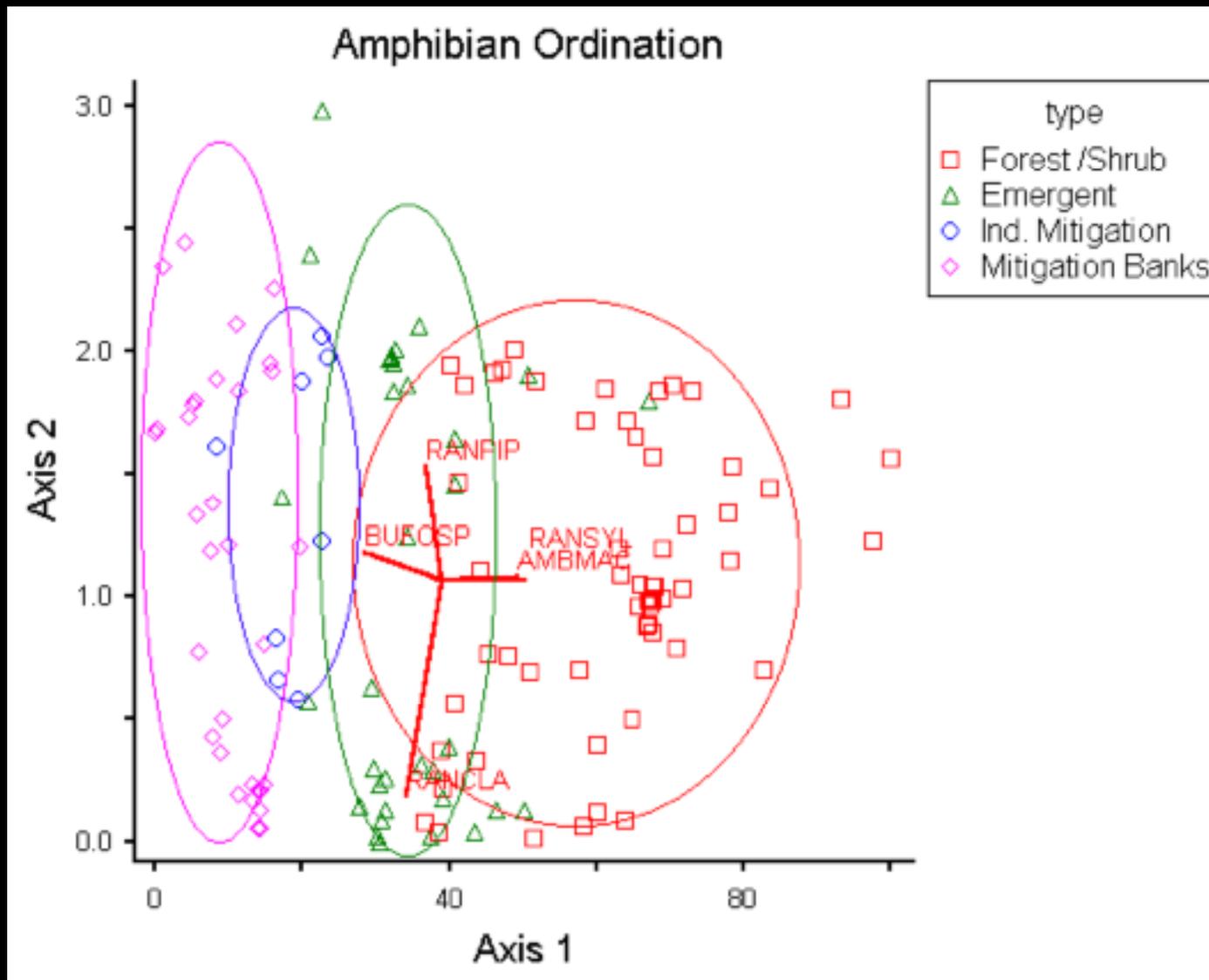
- Northern Green Frog, *Lithobates clamitans melanota* 38%
- Toads, *Anaxyrus* sp. 22%
- Northern Leopard Frog, *L. pipiens* 19%
- American Bullfrog, *L. catesbeianus* 12%
- Spring Peeper, *Pseudacris crucifer crucifer* 5%

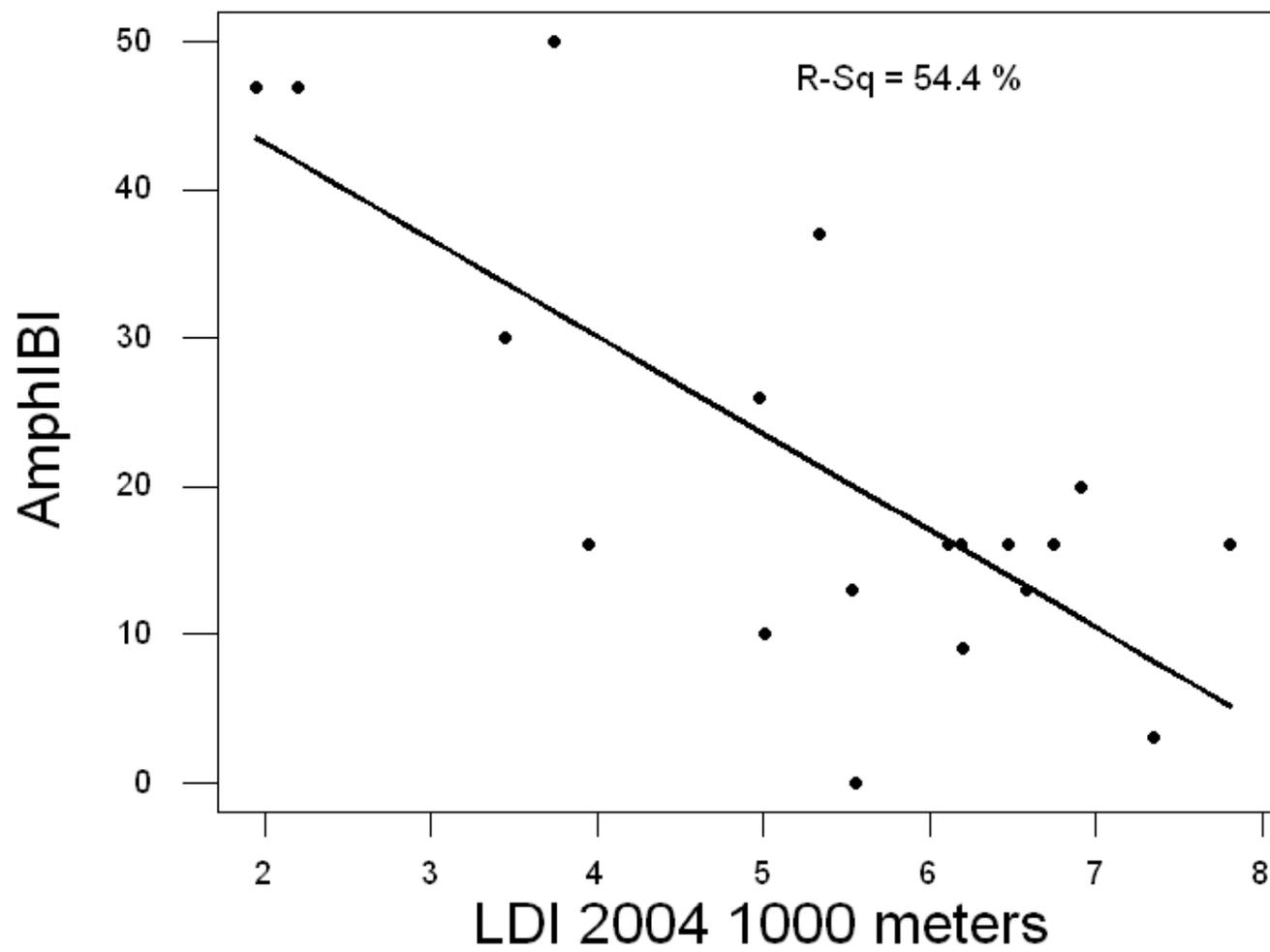
- Absent or extremely rare

- All ambystomatid salamander species <1%
- Red-spotted Newt, *Notophthalmus viridescens viridescens*
- Spotted Salamander, *Ambystoma maculatum*
- Wood Frog, *L. sylvaticus*



# Amphibian Species Ordination





# AmphIBI as a Performance Standard

- The AmphIBI can be used as a goal for constructed wetlands
- Choosing appropriate landscape features is critical to success
  - Hydrological considerations (ephemeral)
  - Nearness to appropriate habitats and breeding amphibian populations

# AmphIBI Scores, TALUs, Ecological Condition and Category Assignment

<b>AmphIBI Score</b>	<b>0-9</b>	<b>10-19</b>	<b>20-29</b>	<b>30-50</b>
<b>Tiered Aquatic Life Use</b>	Limited Wetland Habitat	Restorable Wetland Habitat	Wetland Habitat	Superior Wetland Habitat
<b>Ecological Condition</b>	Poor	Fair	Good	Excellent
<b>Wetland Category</b>	1	2	2	3



Thank You!