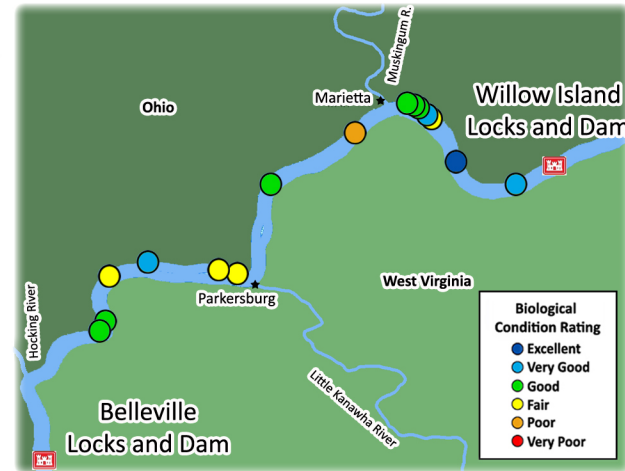
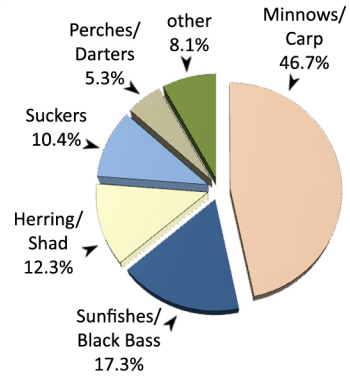
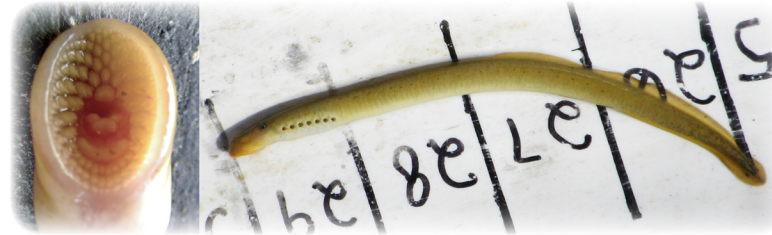
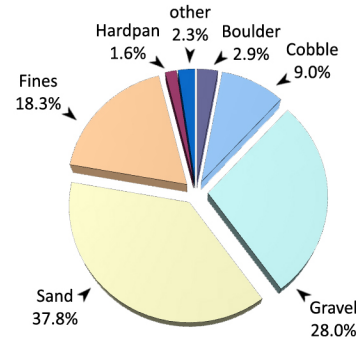
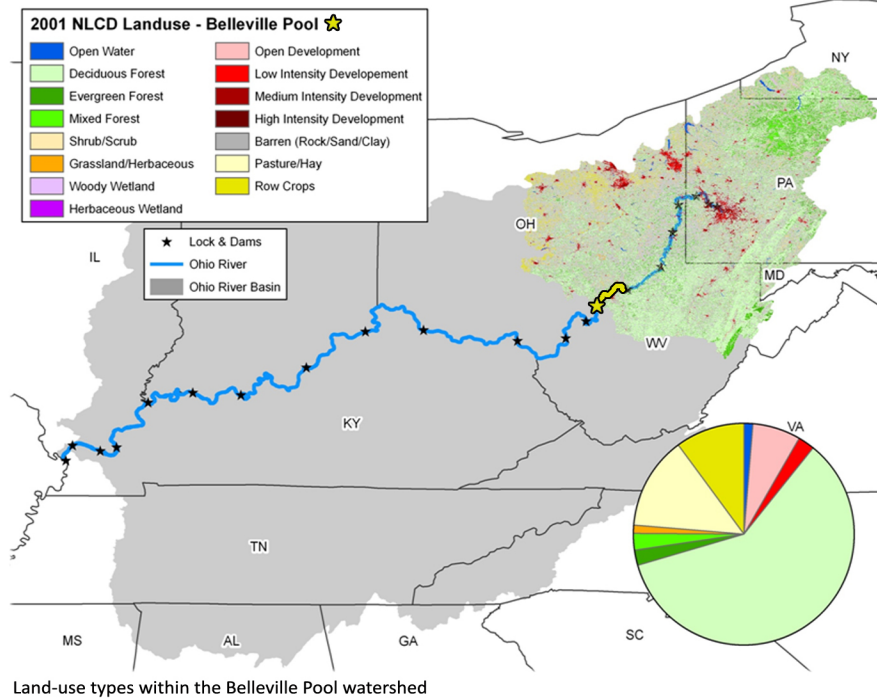


# Belleville Pool - 2009

The Belleville pool is 42.2 miles long, extending from Willow Island Locks and Dam (ORM 161.7) to Belleville Locks and Dam (ORM 203.9). The pool has a gradient drop of 0.5 feet per mile and averages 1,327 feet wide and 24 feet deep (ORSANCO 1994). The pool is bordered by the states of West Virginia and Ohio and lies in a portion of the basin moderately influenced by industry and barge activity. The largest cities within in the pool are Marietta, OH (the oldest city in the state) and Parkersburg, WV. The Belleville pool receives water from three large tributaries, the Muskingum and Hocking rivers in Ohio and the Little Kanawha River in West Virginia. Combined these tributaries drain areas of over 10,000 square miles. The pool also has multiple islands scattered throughout its reach, which provide a variety of additional habitats for aquatic species.



Forested shorelines are common within Belleville though rocky shorelines, like this in the lower pool, are more rare.



Ohio lamprey (*Ichthyomyzon bdellium*)

## Site Performance

Site No.	River Mile	Habitat Class	ORFIn Exp	ORFIn Obs	mORFIn Score
1	163.9	C	44.55	67.39	45.2
2	166.9	D	41.80	70.74	52.6
3	170.3	C	44.55	50.49	27.7
4	170.4	C	44.55	63.62	42.1
5	170.8	C	44.55	54.89	33.0
6	171.3	C	44.55	57.53	35.9
7	171.4	D	41.80	56.38	38.1
8	174.3	C	44.55	37.35	16.7
9	179.3	C	44.55	54.53	32.6
10	185.1	B	46.71	48.42	22.1
11	186.4	D	41.80	48.62	28.6
12	189.3	C	44.55	61.99	40.7
13	191.0	B	46.71	54.98	29.9
14	193.5	C	44.55	57.50	35.9
15	194.6	B	46.71	59.54	35.2

Average Pool mORFIn Score 34.4

## Belleville Pool - Results Overview

### Sampling Results

#### Environmental Measures

Dominant Habitat Class: C - mix of coarse and fine substrates  
 Notable Measures: rocky shorelines were still to be found, woody debris and aquatic vegetation were both very common

#### Biological Measures

Total No. of Fish Species: 52  
 Average No. of Individuals: 167  
 Dominant Family (*minus herring/shad*): Minnows/Carp  
 Dominant Species (*minus shad/shiners*): mimic shiner  
 Threatened/Endangered: Ohio lamprey (E) & river darter (T)  
 Rare Ohio River Mainstem Species: rainbow darter  
 Notable Catch: muskellunge and large flathead catfish

### Assessment Results

Highest scoring ORFIn metric (*minus DELTs*): % Non-Natives  
 Lowest scoring ORFIn metric: % Piscivores & Great River Species  
 Sites Above 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 14  
 Sites Below 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 1  
 Aquatic Life-Use Designation: Met

Overall Biological Condition Rating: Good

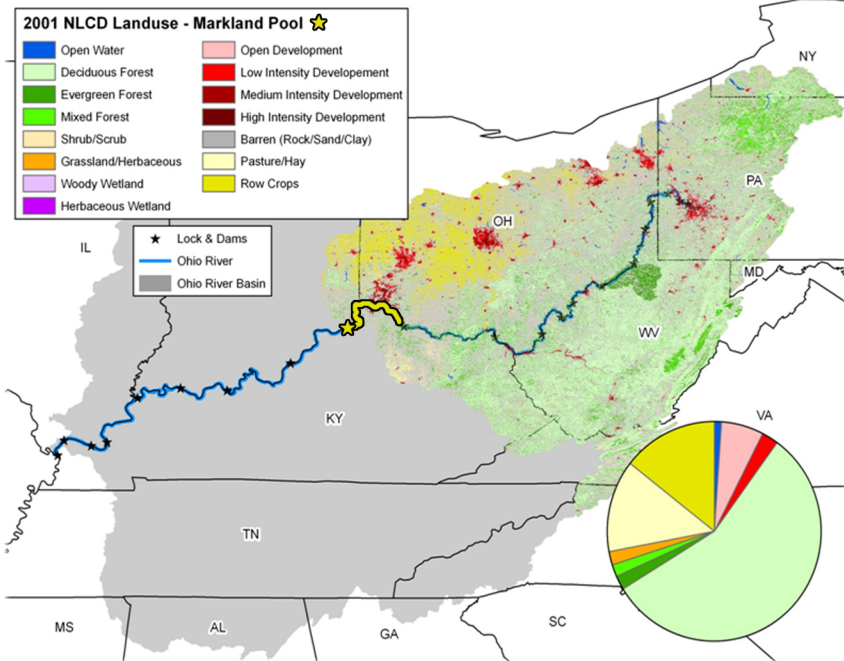


muskellunge (*Esox masquinongy*)

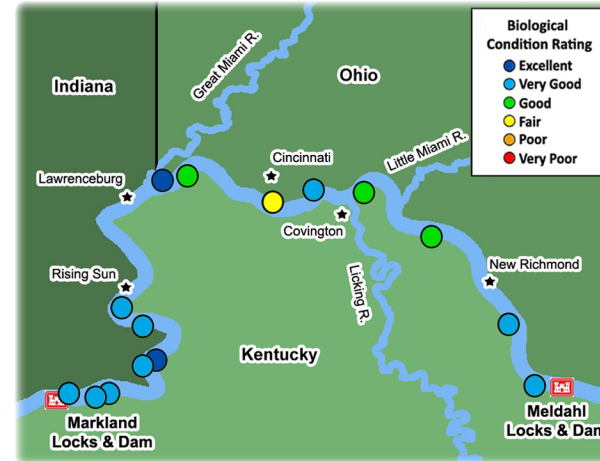
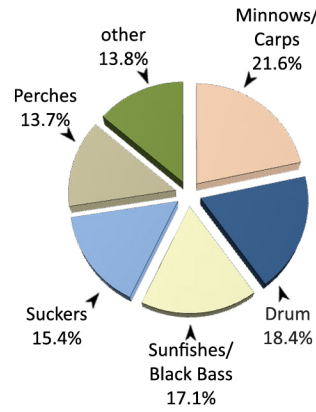


# Markland Pool - 2009

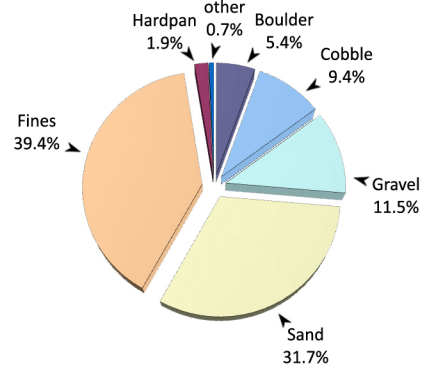
The Markland Pool is 95.3 miles long, extending from Captain Anthony Meldahl Locks and Dam (ORM 436.2) to Markland Locks and Dam (ORM 531.5). The pool has a gradient drop of 0.4 feet per mile, averages 1,594 feet wide and 31 feet deep (ORSANCO 1994), and is bordered by the states of Kentucky, Ohio, and Indiana. The pool lies in a portion of the Ohio River heavily influenced by industry with a large amount of barge activity. Markland pool receives water from three major tributaries. The Little and Great Miami rivers drain 1,750 and 5,400 square miles, respectively. The Licking River drains 3,670 square miles and empties into the Ohio River just downstream of the Little Miami River. Four smaller tributaries in the lower half of the pool also provide water, draining approximately 800 square miles collectively. The pool's watershed is primarily forested (54.7%) but also has a considerable amount of row crops (14.0%) and pasture lands (13.2%).



freshwater drum (*Aplodinotus grunniens*)



Locations of the 15 randomly chosen electrofishing sites in Markland Pool



## Site Performance

Site No.	River Mile	Habitat Class	ORFIn Exp	ORFIn Obs	mORFIn Score
1	438.1	A	50.03	68.52	46.0
2	445.7	D	41.80	58.61	40.7
3	458.2	D	41.80	50.75	31.3
4	469.2	C	44.55	56.83	35.2
5	473.0	A	50.03	70.27	47.7
6	477.7	D	41.80	47.91	27.7
7	487.5	E	39.59	58.66	39.4
8	490.1	B	46.71	81.19	59.5
9	508.9	D	41.80	59.19	41.2
10	511.9	D	41.80	68.29	49.7
11	519.0	D	41.80	69.77	51.4
12	519.6	C	44.55	71.19	48.3
13	527.2	D	41.80	61.06	43.0
14	528.8	D	41.80	65.51	47.1
15	530.8	D	41.80	60.21	42.2
Average Pool mORFIn Score					43.4

## Markland Pool - Results Overview

### Sampling Results

#### Environmental Measures

Dominant Habitat Class: D - shallow sand/fines

Notable Measures: some degree of woody cover was observed at each of the 15 sites

#### Biological Measures

Total No. of Fish Species: 45

Average No. of Individuals: 207

Dominant Family (*minus herring/shad*): Drum

Dominant Species (*minus shad/shiners*): freshwater drum

Species of Concern (OH): black buffalo

Rare Ohio River Mainstem Species: warmouth

Notable Catch: river darter & channel darter (threatened in OH)

### Assessment Results

Highest scoring ORFIn metric (*minus DELTs*): % Tolerants

Lowest scoring ORFIn metric (*minus GR Species*): CPUE (i.e. total catch)

Sites Above 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 15

Sites Below 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 0

Aquatic Life-Use Designation: Met

**Overall Biological Condition Rating: Very Good**

Woody cover is common throughout the pool as seen here just above Markland Locks and Dam

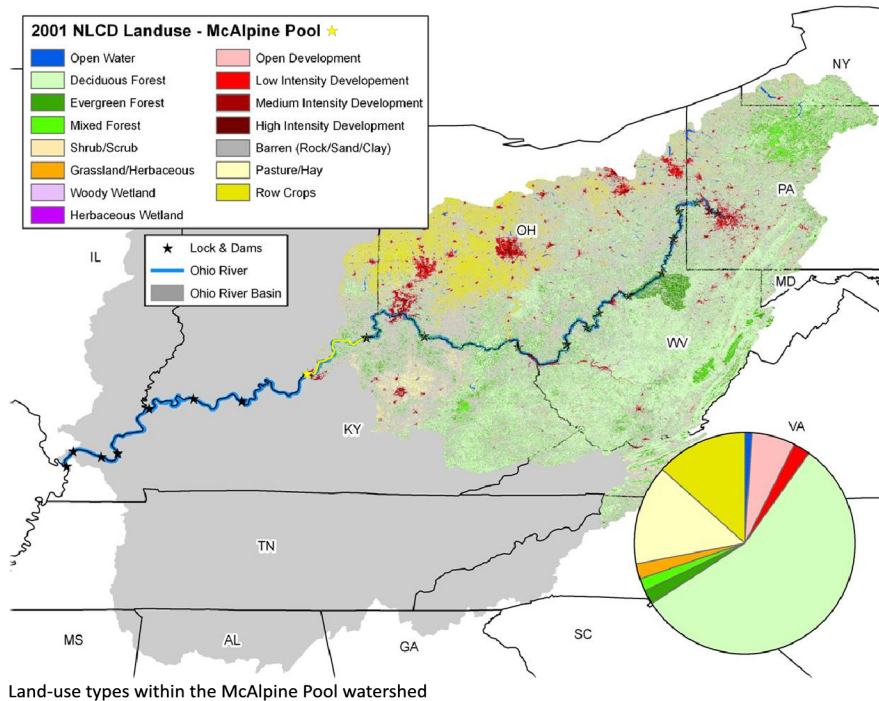


warmouth (*Lepomis gulosus*)

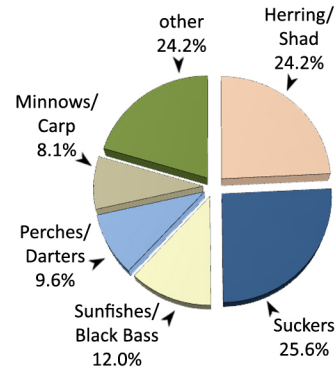


# McAlpine Pool

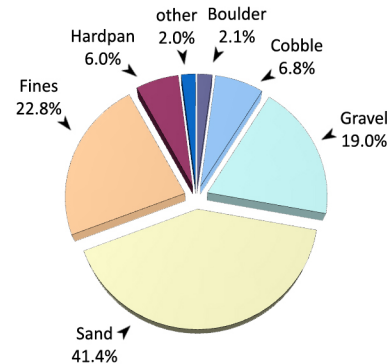
The McAlpine pool is 75.3 miles long, extending from Markland Locks and Dam (ORM 531.5) to McAlpine Locks and Dam (ORM 606.8). The pool has a gradient drop of 0.3 feet per mile and averages 2,040 feet wide and 25 feet deep. McAlpine is bordered by the states of Indiana and Kentucky, and lies in a moderately developed portion of the basin. Though the pool is heavily influenced by industry and associated barge activity, portions of rocky forested shorelines still remain. The city of Louisville, one of the largest cities on the river, is located just upstream of McAlpine Locks and Dam and the naturally occurring Falls of the Ohio (ORM 605). The majority of the pool shorelines are relatively shallow with a mix of fines and sand. The McAlpine pool receives water from one of the larger tributaries in the basin the Kentucky River (KY) which has a drainage area of nearly 7,000 square miles.



river redhorse (*Moxostoma carinatum*)



Forested shorelines are still common within McAlpine, as seen below, between the towns of Milton & West Port, KY



threadfin shad (*Dorosoma petenense*)

## Site Performance

Site No.	River Mile	Habitat Class	ORFIn Exp	ORFIn Obs	mORFIn Score
1	534.1	D	41.80	59.14	41.2
2	540.4	D	41.80	57.51	39.5
3	544.5	C	44.55	64.42	42.7
4	547.1	C	44.55	59.87	38.6
5	549.5	D	41.80	49.31	29.5
6	550.2	D	41.80	67.32	48.8
7	556.1	C	44.55	47.06	23.3
8	571.9	B	46.71	63.97	40.2
9	575.4	B	46.71	73.51	48.2
10	585.1	B	46.71	24.95	4.5
11	585.9	D	41.80	52.67	33.6
12	586.7	B	46.71	49.44	23.3
13	596.4	D	41.80	54.59	36.0
14	597.2	D	41.80	49.02	29.1
15	600.0	D	41.80	67.64	49.1
Average Pool mORFIn Score					35.2

## McAlpine Pool - Results Overview

### Sampling Results

#### Environmental Measures

Dominant Habitat Class: D - shallow with sands and fines  
Notable Measures: rocky shores (B habitats) were still common

#### Biological Measures

Total No. of Fish Species: 44  
Average No. of Individuals: 137  
Dominant Family (*minus herring/shad*): Suckers  
Dominant Species (*minus gizzard shad*): golden redhorse  
Sp. of Special Concern: black buffalo (KY) & river redhorse (IN)  
Rare Ohio River Mainstem Species: warmouth  
Notable Catch: northern hogsucker & threadfin shad

### Assessment Results

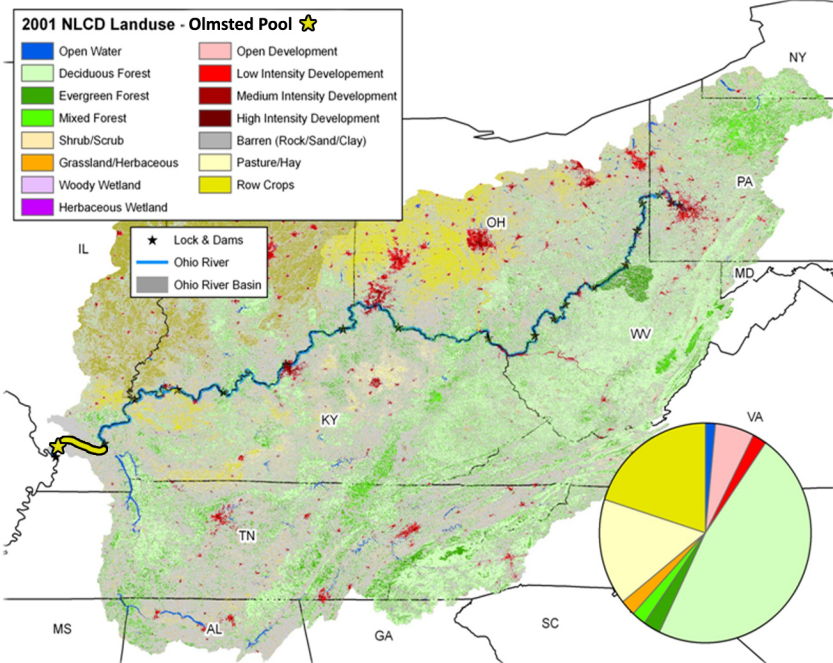
Highest scoring ORFIn metric: Sucker species  
Lowest scoring ORFIn metric: CPUE  
Sites Above 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 14  
Sites Below 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 1  
Aquatic Life-Use Designation: Met

**Overall Biological Condition Rating: Good**



# Olmsted Pool - 2009

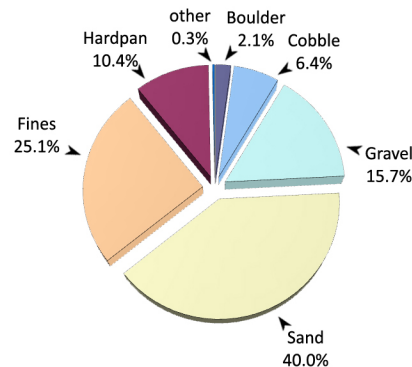
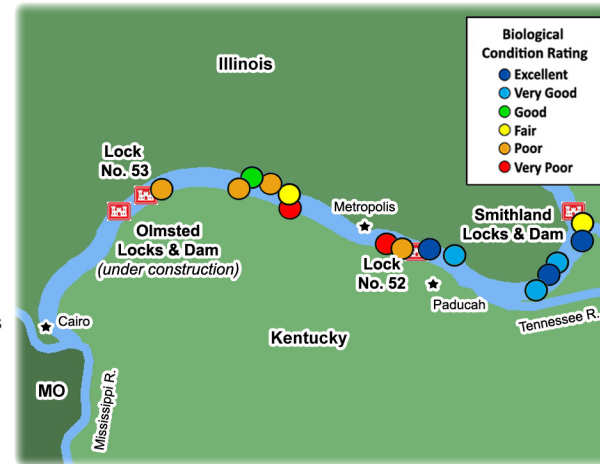
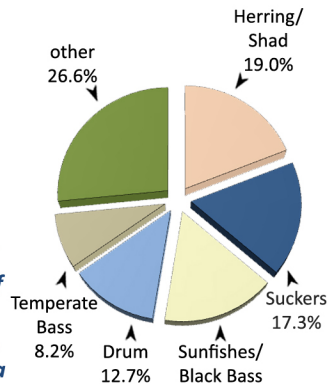
We call this 46.3 mile long section of the Ohio River, extending from Smithland Locks and Dam (ORM 918.5) to the on-going US Army Corp of Engineers Project at ORM 964.8, the Olmsted Pool. Upon completion, Olmsted Locks and Dam will hold back the waters currently retained by the last low-head dams on the Ohio River (Locks No. 52 and 53). Olmsted Pool will have a gradient drop of 0.3 feet per mile, a width of 3,500 feet, and an average depth of 20 feet (all measurements are approximate, assuming current stages are not drastically changed upon completion). This portion of the Ohio River is bordered by Kentucky and Illinois and has a large amount of barge activity. It receives water from two major tributaries; the Cumberland and Tennessee rivers with drainage areas of 17,920 and 40,910 square miles, respectively. The pool's watershed is primarily forested (46.1%) but also has a considerable amount of row crops (19.5%) and pasture lands (15.3%).



Land-use types within the Olmsted Pool watershed



Atlantic needlefish (*Strongylura marina*), 1/2 actual size



## Site Performance

Site No.	River Mile	Habitat Class	ORFIn Exp	ORFIn Obs	mORFIn Score
1	919.2	D	41.80	48.84	28.9
2	921.5	D	41.80	70.03	51.7
3	924.7	D	41.80	58.88	40.9
4	926.5	D	41.80	69.01	50.5
5	928.0	C	44.55	64.98	43.2
6	935.6	D	41.80	63.35	45.1
7	937.7	B	46.71	78.39	54.7
8	939.4	D	41.80	36.36	14.7
9	940.4	D	41.80	30.21	9.0
10	950.2	D	41.80	31.19	9.7
11	950.4	C	44.55	47.57	23.9
12	952.2	D	41.80	41.71	19.9
13	953.7	C	44.55	52.96	30.8
14	954.3	C	44.55	42.40	18.5
15	961.1	D	41.80	33.07	11.5

Average Pool mORFIn Score 30.2

Featureless shallow sand flats are a common sight in Olmsted pool as seen here near Paducah, KY



yellow bass (*Morone mississippiensis*)

## Olmsted Pool - Results Overview

### Sampling Results

#### Environmental Measures

Dominant Habitat Class: D - shallow sand/fines  
Notable Measures: Instream habitats and conditions are more fluid and less predictable below Locks No. 52 & 53

#### Biological Measures

Total No. of Fish Species: 41  
Average No. of Individuals: 118  
Dominant Family (minus herring/shad): Suckers  
Dominant Species (minus shad/shiners): freshwater drum  
Species of Concern (KY): black buffalo  
Rare Ohio River Species: atlantic needlefish (common marine species)  
Notable Catch: paddlefish and yellow bass (common in lower river)

### Assessment Results

Highest scoring ORFIn metric (minus DELTs): Native Species  
Lowest scoring ORFIn metric (minus GR Species): % Lithophils  
Sites Above 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 9  
Sites Below 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 6  
Aquatic Life-Use Designation: Met

Overall Biological Condition Rating: Good