

OHIO RIVER VALLEY WATER SANITATION COMMISSION

Agenda Item 7a
198th Technical Committee Meeting
February 7-8, 2012

2012 Biennial Assessment of Ohio River Water Quality Conditions – 305(b) Report

ORSANCO completes an assessment of Ohio River designated uses every two years in cooperation with the Ohio River 305b Coordinators Work Group. The uses which are assessed include aquatic life, contact recreation, fish consumption and public water supply. The states utilize ORSANCO's assessments in developing their integrated lists of waters requiring total maximum daily loads (303d lists). Not all states' 303(d) lists will coincide with ORSANCO's 305(b) assessments.

Weight of Evidence Approach

A weight of evidence approach is utilized in the 2012 Ohio River use assessments as recommended by the Technical Committee and approved by the Commission at its October, 2011 meeting. A weight of evidence approach involves utilizing data and information which is believed to be more relevant to override other conflicting information. The weight of evidence approach is directly opposed to US EPA's policy of independent application, which stipulates that if any one data set indicates impairment, then the water body should be designated as impaired. US EPA participated in all the 305b meetings and made their policy of independent application clear. Utilization of the weight of evidence approach has an effect on the aquatic life use and fish consumption use assessments which are discussed below.

Assessment Summary by State – Number of Ohio River Miles Impaired by Use

State	River Miles	Aquatic Life Use Impairment	Contact Recreation Use Impairment	Public Water Supply Use Impairment	Fish Consumption Use Impairment
PA	0.0-40.2	0	40.2	0	40.2
OH-WV	40.2-317.1	0	242.2	0	276.9
OH-KY	317.1-491.3	0	64.2	0	174.2
IN-KY	491.3-848.0	0	243.6	0	356.7
IL-KY	848.0-981.0	0	40.6	0	133.0
TOTAL	981.0	0	630.8	0	981.0

Aquatic Life Use

Data used in the aquatic life use assessment includes fish population survey results and water chemistry data collected through the Bimonthly and Clean Metals monitoring programs compared to applicable criteria for the protection of aquatic life. An attached table contains all aquatic life criteria violations over the past five years. Criteria violations in excess of ten percent would represent impairment. As can be seen from the table, aquatic life criteria for total iron are exceeded in greater than ten percent of samples in many segments of the river along all states' borders. In addition, there are violations of aquatic life criteria for dissolved oxygen and temperature in the lower river (tables attached). At the same time, fish population surveys over the past five years indicate full support of the aquatic life use (graph attached). Utilizing a weight of evidence approach, the more direct measure of aquatic community health through biological surveys would override the chemical criteria violations, and as such, the entire river is assessed as fully supporting the aquatic life use.

Contact Recreation Use

Bacteria data from river-wide longitudinal surveys conducted several years ago, along with contact recreation data from the past five years, collected annually in the six largest CSO communities, was used in the assessment. Bacteria criteria violation rates in excess of ten percent results in a designation of impaired. Approximately two-thirds of the river is designated as impaired for contact recreation. This assessment is consistent with previous assessments.

Public Water Supply

A summary of finished water maximum contaminant level (MCL) violations as well as intake closures and application of non-routine treatment caused by spills and unusual river conditions is attached. Impairment would be designated for utilities having MCL violations resulting from Ohio River water quality conditions. In addition, violations of human health criteria (table attached) in greater than ten percent of samples would also represent impairment. Several utilities had MCL violations for trihalomethanes. Because these compounds are formed during the water treatment process, as opposed to directly resulting from river conditions, these MCL violations do not result in an impaired assessment. The entire river is therefore designated as fully supporting the for the public water supply use.

Fish Consumption

The entire river is designated as partially supporting the fish consumption use for PCBs and dioxin based on historic monitoring results that were two or more orders of magnitude greater than the applicable criteria. In addition, ORSANCO has been monitoring for methyl mercury in fish tissue for two sampling seasons. The Technical Committee at its last meeting directed staff to utilize US EPA's approach for determining impairment based on methyl mercury in fish tissue. Results of the fish tissue assessment as well as water chemistry violations for mercury are attached in tables. Violations of the mercury water quality criterion in excess of ten percent of samples (for total mercury in water, not fish tissue) would indicate impairment for the lower half of the river. The water quality criterion for total mercury in the water column is established to protect against undesirable accumulation in fish tissue. Thus, utilizing the weight of evidence approach, fish tissue measurements of methyl mercury are a more direct measure of the fish consumption use such that where data sets conflict, the fish tissue data would override the water data. As a result, the Hannibal, JT Myers, and Smithland pools are impaired for the fish consumption use based on methyl mercury in fish tissue.

TEC Action Requested

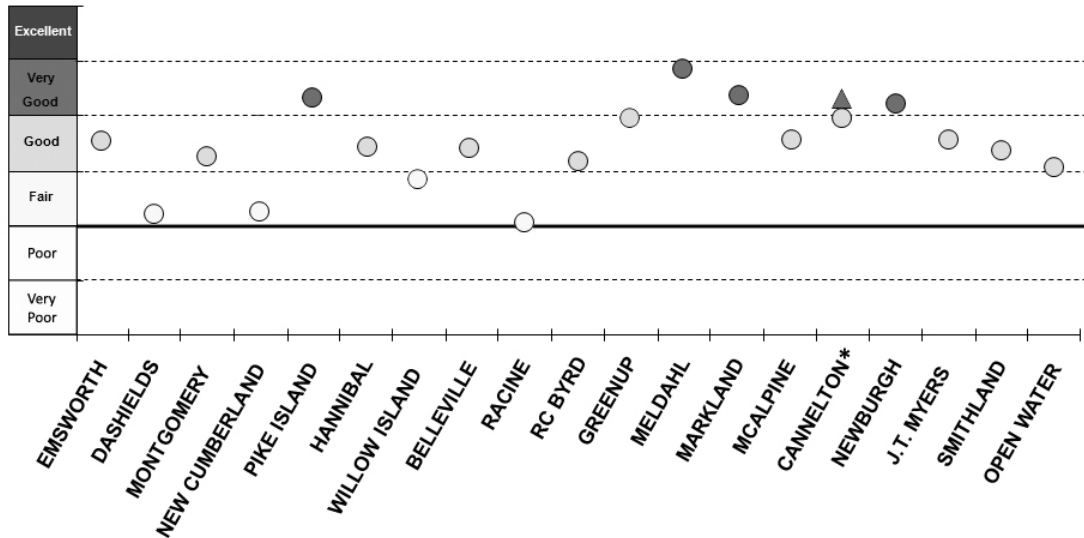
Adoption of 305b use assessments for the 2012 Biennial Assessment of Water Quality Conditions for the Ohio River.

Water Quality Criteria Violations: July 2006 - June 2011

Mile@Point	Site Name	Criteria Type	Parameter	Criteria	Total Samples	WQC Violations	% Violations
11.8	Sewickly*	Aquatic Life Chronic	Fe (mg/L)	1500 ug/L	28	7	25%
42.6	East Liverpool*	Aquatic Life Chronic	Fe (mg/L)	1500 ug/L	30	8	27%
54.4	New Cumberland	Aquatic Life Chronic	Fe (mg/L)	1500 ug/L	30	1	3%
84.2	Pike Island	Aquatic Life Chronic	Fe (mg/L)	1500 ug/L	30	3	10%
126.4	Hannibal	Aquatic Life Chronic	Fe (mg/L)	1500 ug/L	30	2	7%
		Human Health	Hg (ug/L)	0.012 ug/L	30	1	3%
161.8	Willow Island	Aquatic Life Chronic	Fe (mg/L)	1500 ug/L	30	3	10%
		Human Health	Hg (ug/L)	0.012 ug/L	30	2	7%
203.9	Belleville	Aquatic Life Chronic	Fe (mg/L)	1500 ug/L	30	6	20%
279.2	R.C. Byrd	Aquatic Life Chronic	Fe (mg/L)	1500 ug/L	33	1	3%
		Human Health	Hg (ug/L)	0.012 ug/L	33	1	3%
		Human Health	Total Phenols (ug/L)	5 ug/L	30	1	3%
341	Greenup	Aquatic Life Chronic	Fe (mg/L)	1500 ug/L (WV)	37	9	24%
		Aquatic Life Chronic	Fe (mg/L)	3500 ug/L (KY)	37	3	8%
		Human Health	Hg (ug/L)	0.012 ug/L	37	3	8%
436.2	Meldahl	Aquatic Life Chronic	Fe (mg/L)	3500 ug/L	30	1	3%
		Human Health	Hg (ug/L)	0.012 ug/L	30	1	3%
		Human Health	Total Phenols (ug/L)	5 ug/L	30	1	3%
477.5	Anderson Ferry	Aquatic Life Chronic	Fe (mg/L)	2340 ug/L	30	3	10%
		Human Health	Hg (ug/L)	0.012 ug/L	30	5	17%
		Human Health	Total Phenols (ug/L)	5 ug/L	30	1	3%
531.5	Markland	Aquatic Life Chronic	Fe (mg/L)	2340 ug/L	30	2	7%
		Human Health	Hg (ug/L)	0.012 ug/L	30	2	7%
600.6	Louisville	Aquatic Life Chronic	Fe (mg/L)	2340 ug/L	30	8	27%
		Human Health	Hg (ug/L)	0.012 ug/L	30	5	17%
606.8	McAlpine	Aquatic Life Chronic	Fe (mg/L)	2340 ug/L	7	3	43%
625.9	West Point	Aquatic Life Chronic	Fe (mg/L)	2340 ug/L	30	11	37%
		Aquatic Life Chronic	Se (ug/L)	5 ug/L	30	1	3%
		Human Health	Hg (ug/L)	0.012 ug/L	30	23	77%
720.7	Cannelton	Aquatic Life Chronic	Fe (mg/L)	2340 ug/L	39	8	21%
		Human Health	Hg (ug/L)	0.012 ug/L	39	5	13%
776	Newburgh	Aquatic Life Chronic	Fe (mg/L)	2340 ug/L	33	8	24%
		Human Health	Hg (ug/L)	0.012 ug/L	33	7	21%
		Human Health	Total Phenols (ug/L)	5 ug/L	30	1	3%
		Human Health	NO2-NO3-N (mg/L)	10 mg/L	33	1	3%
846	J.T. Myers	Aquatic Life Chronic	Fe (mg/L)	3500 ug/L	30	8	27%
		Human Health	Hg (ug/L)	0.012 ug/L	30	7	23%
		Human Health	Total Phenols (ug/L)	5 ug/L	31	1	6%
918.5	Smithland	Aquatic Life Chronic	Fe (mg/L)	3500 ug/L	31	4	13%
		Human Health	Hg (ug/L)	0.012 ug/L	31	4	13%
		Human Health	Total Phenols (ug/L)	5 ug/L	31	1	3%
938.9	L&D 52	Aquatic Life Chronic	Fe (mg/L)	3500 ug/L	30	7	23%
		Human Health	Hg (ug/L)	0.012 ug/L	30	8	27%
		Human Health	Total Phenols (ug/L)	5 ug/L	30	2	3%

* PADEP data

Ohio River Fish Population Index Scores by Pool: 2007-2011



2007-2011 Temperature Data

Ohio River Station	Mile Point	# Periods	# Periods Exceeding Period Average	% Periods Exceeding Period Average	# Days Exceeds Max Criteria	% Days Exceed Max Criteria	Impairment Indicated
Montgomery	31.7	32	1	3.1%	0	0.0%	None
Hannibal	126.4	42	2	4.7%	0	0.0%	None
Racine	237.5	50	2	4.0%	0	0.0%	None
Kyger	260.0	49	3	6.1%	8	1.5%	None
Greenup	341.0	49	1	2.0%	0	0.0%	None
Markland	531.5	40	2	5.0%	0	0.0%	None
McAlpine	606.8	8	1	12.5%	0	0.0%	Partial Suppo
Cannelton	720.7	29	4	13.7%	5	1.2%	Partial Suppo
Newburgh	776.1	24	6	25.0%	21	5.6%	Partial Suppo
John T. Myers	846.0	32	7	21.8%	24	4.9%	Partial Suppo
Smithland	919.0	32	5	15.6%	19	4.0%	Partial Suppo

2007-2011 Daily Dissolved Oxygen Data

Ohio River Station	Mile Point	2007 % Days	2008 % Days Exceeding	2009 % Days Exceeding	2010 % Days Exceeding	2011 % Days Exceeding	2007-2011 % Days Exceeding	Impairment Indicated
Montgomery	31.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None
Hannibal	126.4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None
Racine	237.5	0.0%	0.88%	0.0%	1.9%	7.6%	2.10%	None
Kyger	260	0.0%	0.0%	3.6%	5.5%	14.4%	5.3%	None
Greenup	341							
Upstream		6.6%	13.0%	4.7%	13.7%	2.7%	8.1%	None
Downstream		0.0%	0.88%	1.9%	6.3%	9.7%	5.00%	None
Markland	531.5							
DO #1-DS Hydro		0.0%	1.1%	13.8%	27.7%	17.7%	12.6%	Partially Supportin
DO #2-US Hydro		0.0%	0.0%	0.0%	NA	3.3%	0.80%	None
DO #3-DS Lock		NA	NA	NA	NA	0.0%	0.0%	None
DO #4-US Lock		NA	NA	NA	NA	0.0%	0.0%	None
McAlpine	606.8	NA	NA	NA	NA	0.0%	0.0%	None
Cannelton	720.7	29.9%	33.0%	0.0%	11.7%	NA	18.7%	Partially Supportin
Newburgh	776.1	19.0%	0.0%	0.0%	0.0%	NA	4.8%	None
John T. Myers	846	18.7%	4.7%	0.0%	12.9%	0.0%	7.3%	None
Smithland	919	NA	22.4%	5.0%	4.7%	36.8%	17.2%	Partially Supportin

Summary of Drinking Water Utility Surveys

Utility Location	Mile Point	State	Replied to Survey	Number of Intake Closures due to Ohio River Quality	Causes of Intake Closures	MCL Violation	Contaminants causing MCL Violation	Non-Routine Treatment Required	Contaminants resulting in Non-Routine Treatment	Source of Contaminants	Total Number of Days
West View	5	PA	yes	0		no		no			
Robinson	8.6	PA	yes	0		no		no			
Moon	11.7	PA	yes	0		no		yes	high algae		90
Beaver Valley	29	PA	yes	0		yes	Possible TTHM, not confirmed	no			
Midland	36	PA	no								
East Liverpool	40.2	OH	yes	0		no		no			
Buckeye	74.1	OH	no								
Toronto	59.2	OH	yes	0		no		no			
Arcelor Mittal	61.7	WV	yes	0		yes	TTHM	yes			
Weirton	62.5	WV	yes	0		no		yes	increased sediment		
Steubenville	65.3	OH	yes	0		no		yes	ammonia	source not listed	132
Follansbee	70.8	WV	yes	3	Ethylene glycolol, chromic acid, diesel fuel	no		no			
Wheeling	86.8	WV	yes	0		yes	TTHM	yes	TTHM	"river spills and oil sheens"	
New Martinsville	121.9	WV	yes	0		no		no			
Sistersville	137.2	WV	no								
Huntington	304	WV	no								
Ashland	319.7	KY	no								
Ironton	327	OH	no								
Russell	327.6	KY	yes	0		no		no			
Portsmouth	350.8	OH	yes	0		no		no			
Maysville	407.8	KY	yes	0		no		no			
Cincinnati	462.8	OH	yes	0		no					
Northern Kentucky 1	462.9	KY	yes	2	Microcystis, methylene chloride	no		yes	Microcystis, methylene chloride	Pregis release	48
Northern Kentucky 2	463.5	KY	no								
Louisville	600	KY	yes	0		no		yes	MMA, atrazine, hydrocarbon	unknown cause	68
Evansville	791.5	IN	yes	0		no		no			
Henderson	803	KY	yes	0		no		no			
Mt Vernon	829.3	IN	no								
Morganfield	842.5	KY	no								
Sturgis	871.4	KY	yes	0		no		no			
Paducah (WTP)	935.5	KY	yes	0		no		no			
Paducah (USEC)	945.9	KY	no								
Cairo	978	IL	yes	0		no		no			

Methyl Mercury Fish Tissue Data

River Mile	Pool	Year	Species	Trophic Level	Avg Length (cm)	Avg Weight (kg)	MeHg Result		Consumption- Weighted Pool Avg MeHg in Fish Tissue (mg/kg)	ASSESSMENT
							(mg/kg)	# Fish in sample		
2.0	Emsworth	2011	Common Carp	3	55.7	3.10	0.123	3	0.15	Full Support
2.0	Emsworth	2011	Freshwater Drum	4	50.7	1.82	0.265	3		
2.0	Emsworth	2011	Smallmouth Bass	4	29.0	0.32	0.104	3		
7.0	Dashields	2011	Common Carp	3	54.0	2.27	0.106	2	0.13	Full Support
7.0	Dashields	2011	Freshwater Drum	4	51.0	1.56	0.226	2		
7.0	Dashields	2011	Sauger	4	38.7	0.42	0.151	3		
7.0	Dashields	2011	Walleye	4	51.0	1.05	0.131	2		
22.0	Montgomery	2011	River Carpsucker	2	49.0	1.49	0.0822	3	0.11	Full Support
26.0	Montgomery	2011	Smallmouth Bass	4	40.7	0.85	0.139	3		
28.0	Montgomery	2011	Channel Catfish	4	50.3	1.02	0.123	3		
28.0	Montgomery	2011	White Bass	4	38.0	0.71	0.145	3		
36.0	New Cumberland	2011	Freshwater Drum	4	50.7	1.86	0.268	3	0.15	Full Support
36.0	New Cumberland	2011	Smallmouth Bass	4	42.7	0.92	0.257	3		
47.0	New Cumberland	2011	Walleye	4	41.0	0.00	0.0622	1		
52.5	New Cumberland	2011	River Carpsucker	2	41.7		0.0938	3		
56.0	Pike Island	2010	Hybrid Striped Bass	4	56.2	2.25	0.279	3	0.23	Full Support
64.3	Pike Island	2010	Freshwater Drum	4	59.3	2.75	0.189	3		
91.0	Hannibal	2010	Freshwater Drum	4	60.3	2.47	0.374	3	0.44	Impaired - Partial Support
91.0	Hannibal	2010	Hybrid Striped Bass	4	56.2	2.43	0.644	3		
113.5	Hannibal	2010	Freshwater Drum	4	64.8	2.92	0.297	3		
127.0	Willow Island	2010	Largemouth Bass	4	32.3	0.37	0.135	3	0.23	Full Support
128.5	Willow Island	2010	Hybrid Striped Bass	4	63.0	4.45	0.273	2		
130.0	Willow Island	2010	Freshwater Drum	4	77.0	6.25	0.404	1		
138.2	Willow Island	2010	Freshwater Drum	4	57.0	1.95	0.241	3		
162.0	Belleville	2010	Freshwater Drum	4	63.2	3.62	0.202	3	0.25	Full Support
162.0	Belleville	2010	Hybrid Striped Bass	4	65.5	4.08	0.403	3		
171.0	Belleville	2010	Largemouth Bass	4	32.0	0.40	0.134	3		
205.6	Racine	2010	Freshwater Drum	4	63.0	3.75	0.441	3	0.28	Full Support
206.0	Racine	2010	Hybrid Striped Bass	4	55.0	2.10	0.322	2		
214.0	Racine	2010	Channel Catfish	4	57.0	1.97	0.158	3		
220.0	Racine	2010	Largemouth Bass	4	35.3	0.57	0.197	3		
279.5	Greenup	2010	Hybrid Striped Bass	4	58.0	2.86	0.351	3	0.25	Full Support
281.5	Greenup	2010	Freshwater Drum	4	63.3	3.07	0.361	3		
311.5	Greenup	2010	Channel Catfish	4	58.5	1.92	0.111	3		
326.0	Greenup	2010	Largemouth Bass	4	35.1	0.47	0.186	3		
348.0	Meldahl	2010	Freshwater Drum	4	62.0		0.274	3	0.24	Full Support
355.0	Meldahl	2010	Hybrid Striped Bass	4	58.7	3.20	0.255	3		
435.0	Meldahl	2010	Freshwater Drum	4	61.0	2.70	0.250	2		
435.0	Meldahl	2010	Largemouth Bass	4	40.3	0.83	0.125	3		
435.0	Meldahl	2010	Largemouth Bass	4	43.0	1.00	0.240	1		
435.0	Meldahl	2010	Largemouth Bass	4	39.0	0.80	0.177	1		
435.0	Meldahl	2010	Largemouth Bass	4	39.0	0.70	0.249	1		
459.6	Markland	2010	Channel Catfish	4	60.8	2.28	0.0396	3	0.26	Full Support
463.5	Markland	2010	Channel Catfish	4	60.7	2.08	0.171	3		
463.5	Markland	2010	Channel Catfish	4	58.0	1.55	0.108	1		
463.5	Markland	2010	Channel Catfish	4	64.0	2.65	0.133	1		
463.5	Markland	2010	Channel Catfish	4	60.0	2.05	0.136	1		
463.5	Markland	2010	Hybrid Striped Bass	4	57.7	2.55	0.240	3		
463.5	Markland	2010	Hybrid Striped Bass	4	63.0	3.22	0.386	3		
463.5	Markland	2010	Hybrid Striped Bass	4	69.0	4.15	0.378	1		
463.5	Markland	2010	Hybrid Striped Bass	4	60.0	2.45	0.321	1		
463.5	Markland	2010	Hybrid Striped Bass	4	60.0	3.05	0.277	1		
474.5	Markland	2010	Largemouth Bass	4	40.7	1.10	0.307	3		
478.7	Markland	2010	Freshwater Drum	4	56.3	2.55	0.296	3		
531.6	McAlpine	2010	Hybrid Striped Bass	4	56.7	2.52	0.199	3	0.24	Full Support
531.6	McAlpine	2010	Hybrid Striped Bass	4	52.5	2.08	0.452	3		
533.7	McAlpine	2010	Largemouth Bass	4	37.1	0.78	0.169	3		
536.1	McAlpine	2010	Channel Catfish	4	57.6	1.95	0.251	3		
538.0	McAlpine	2010	Freshwater Drum	4	50.5	2.03	0.213	3		
607.0	Cannelton	2010	Channel Catfish	4	59.3	1.80	0.128	3	0.23	Full Support
607.5	Cannelton	2011	Striped Bass	4	58.3	2.02	0.365	3		
608.0	Cannelton	2010	Hybrid Striped Bass	4	66.0	2.82	0.257	3		
608.5	Cannelton	2010	Freshwater Drum	4	49.8	1.41	0.181	4		
721.0	Newburgh	2011	Freshwater Drum	4	44.9		0.289	3	0.17	Full Support
739.0	Newburgh	2010	Hybrid Striped Bass	4	48.0	1.66	0.130	3		
756.0	Newburgh	2010	Freshwater Drum	4	54.7	1.97	0.118	3		
776.1	JT Myers	2010	Freshwater Drum	4	62.7	3.40	0.357	3	0.38	Impaired - Partial Support
776.1	JT Myers	2010	Hybrid Striped Bass	4	63.0	2.57	0.860	3		
777.6	JT Myers	2010	Freshwater Drum	4	53.5	2.08	0.304	3		
788.6	JT Myers	2010	Largemouth Bass	4	43.5	1.18	0.263	2		
807.6	JT Myers	2010	Channel Catfish	4	60.2	2.20	0.0999	3		
816.7	JT Myers	2010	Channel Catfish	4	50.7	1.10	0.0563	3		
846.0	Smithland	2010	Hybrid Striped Bass	4	60.3	2.55	0.671	3	0.31	Impaired - Partial Support
846.2	Smithland	2010	Freshwater Drum	4	55.0	2.65	0.172	3		
846.3	Smithland	2010	Channel Catfish	4	62.3	2.30	0.0739	2		
918.5	Olmsted	2010	Hybrid Striped Bass	4	52.5	1.62	0.395	3	0.20	Full Support
918.5	Olmsted	2010	Largemouth Bass	4	37.1	0.68	0.264	3		
919.0	Olmsted	2011	Blue Catfish	3	46.7		0.0826	3		
919.0	Olmsted	2011	Common Carp	3	54.5	2.54	0.138	2		