United States Environmental Protection Agency

Ohio River Bacteria TMDL Development: NPDES Point Sources - Report Summary

May 2013

Introduction

The Ohio River is the largest tributary, by volume, to the Mississippi River and much of it is impaired due to high bacteria counts that affect the recreational uses of the river. The river is 981 miles long and 630.8 miles are impaired for primary contact recreation (e.g., swimming).

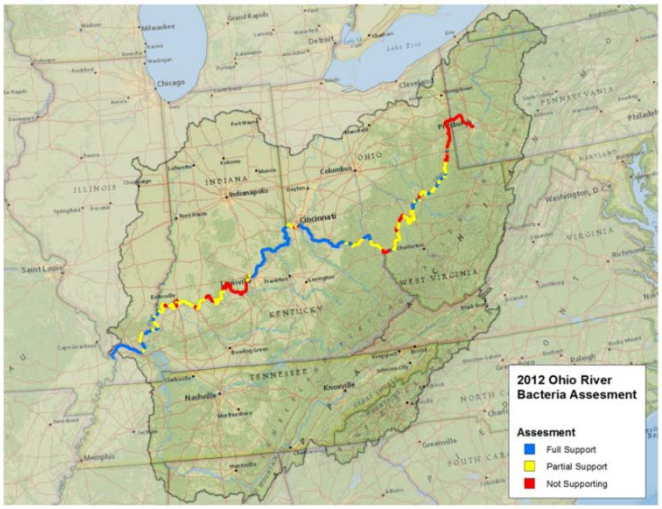

Figure 1. Primary contact recreational use impairment by bacteria in segments along the mainstem of the Ohio River (ORSANCO 2012).

The Clean Water Act and U.S. Environmental Protection Agency (U.S. EPA) regulations require that Total Maximum Daily Loads (TMDLs) be developed for impaired waterbodies such as the Ohio River. The Ohio River bacteria TMDL is in the early stages of model development.

U.S. EPA Region 5 has taken the lead in the development of the TMDL and has convened a TMDL Workgroup composed of representatives of affected state agencies, U.S. EPA Regional Offices, and the Ohio River Valley Water Sanitation Commission (ORSANCO). U.S. EPA Region 5 has also hired Tetra Tech, Inc. to provide technical support to the project.

Development of the TMDL will involve using a series of analytical tools. The most important tool will be a mathematical model to address the sources, fate, and transport of water and bacteria in the Ohio River and portions of its tributaries. The United States Army Corps of Engineers' (USACE) Hydrologic Engineering Center's River Analysis System (HEC-RAS) for the Ohio River will be used to simulate bacteria loads in the Ohio River (Adams et al. 2009; USACE 2010).

The TMDL and water quality restoration planning process involves several steps, including watershed characterization, target identification, source assessment, and allocation of loads. Quality assurance planning, the conceptual model, data gathering and analysis are near completion. The ultimate purpose of the TMDL is to identify the allowable loads of pathogen indicators (fecal coliform bacteria and *E. coli*) that will result in full attainment of the applicable water quality standards throughout the Ohio River.

The purpose of this report is to summarize the available data from National Pollutant Discharge Elimination Systems (NPDES) permitees. The three main types of permitees addressed in this report are: municipal and industrial facilities, municipal separate storm sewer systems, and combined sewer systems.

Ohio River TMDL Website

http://www.orsanco.org/index.php/bacteria-tmdl

Pertinent documents and notices related to the Ohio River bacteria TMDL will be posted at this website.

Municipal and Industrial Facilities

Municipal facilities (such as wastewater treatment plants) and industrial facilities (for example, electric power plants) in the project area are issued NPDES permits through delegated state agencies. The NPDES permits define the volume of effluent that can be discharged for each facility and set limits for specific parameters to ensure that receiving and downstream waterbodies' designated uses are protected. Both of the categories of facilities (municipal and industrial) are subdivided into major (permitted flows of greater than or equal to 1.0 million gallons per day [MGD]) or minor (less than 1.0 MGD) dischargers.

Methods

Data collected in accordance with the NPDES program and provided in facility discharge monitoring reports (DMR) will be used to characterize municipal and industrial facilities that directly discharge to the Ohio River or discharge to a tributary of the Ohio River just upstream of the mouth of the tributary on the Ohio River. These data were provided by the states or provided directly by U.S. EPA. Only facilities permitted to discharge bacteria or have monitoring requirements for bacteria are included in these analyses.

Data Summary

172 municipal and 75 industrial facilities are permitted to discharge bacteria to the Ohio River or near the mouths of tributaries of the Ohio River (Table 1).

Table 1. Municipal and industrial facilities along the Ohio River

State	Municipal		Industrial	
	Major	Minor	Major	Minor
Illinois	2	13	1	5
Indiana	11	13	1	2
Kentucky	9	21	1	16
Ohio[a]	18	34	14	8
Pennsylvania	12	5	1	2
West Virginia	9	25	7	17

Notes
Facilities that discharge to the Ohio River or near the mouth of a tributary on the Ohio River are included in this table if they are permitted to discharge bacteria.
a. Seven additional facilities are covered by general NPDES permits.

Municipal Separate Storm Sewer Systems

U.S. EPA (2009) defines a municipal separate storm sewer system (MS4) as being a system designed or used to collect or convey stormwater that is owned by a public entity and the system discharges to waters of the United States. CSSs and wastewater treatment plants (WWTPs) are not considered to be MS4s.

Polluted runoff from MS4s can cause water quality impairments and U.S. EPA promulgated rules addressing MS4s in 1990 and 1999. MS4s are governed by the NPDES stormwater program. Phase I of the program regulates medium and large MS4s, which typically serve more than 100,000 residents; Phase II regulates small MS4s, which are MS4s not already regulated by Phase I (U.S. EPA 2005).

Methods

Data collected in accordance with the NPDES stormwater program and provided by the regulated MS4s or state agency will be used to characterize communities that directly discharge to the Ohio River.

Data Summary

Permitted Phase II MS4s are located along the Ohio River in the following states: Indiana (14), Kentucky (11), Ohio (11) and West Virginia (10). Limited information is available for most MS4 programs.

Combined Sewer Systems

Two major types of sewer systems exist in the United States today: combined sewer systems and sanitary sewer systems. Combined sewer systems (CSS) are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same sewer pipes. Sanitary sewer systems (SSS) consist of two sets of sewers: one set of sewers contains pipes that are designed to collect rainwater runoff, and the other set of sewers contains pipes that collect domestic sewage and industrial wastewater.

During normal runoff periods, CSSs transport wastewater to a sewage treatment plant, where it is treated and then discharged to a waterbody. After high-volume rainfall events, increased wastewater volume in CSSs can exceed the capacity of the system, forcing untreated discharges into a waterbody through combined sewer overflow (CSO) outfalls. These CSOs can contain stormwater, untreated human and industrial waste, toxic materials, and debris.

A sanitary sewer overflow (SSO) is an unanticipated failure in the sanitary sewer system that results in a discharge of wastewater that has not been fully treated. SSOs may occur when pipes or other infrastructure are breached or blocked, when the capacity of the system is overwhelmed, and when power outages occur.

Methods

Forty-nine communities in the six states through which the Ohio River flows have CSSs that discharge to the Ohio River (Figure 2). The information collected from the CSS communities, state regulatory agencies, and U.S. EPA Region 5 will be used to characterize the contribution of combined and sanitary sewer overflows to bacteria loadings in the Ohio River.

Data Summary

Pertinent CSS, CSO and SSO information (e.g., system infrastructure, long term control plans [LTCP], overflow frequency, overflow volume) have been retrieved from the CSS communities, the state regulatory agencies, U.S. EPA Region 5, and ORSANCO, and the information is summarized in Table 2.

The cities of Clarksville, IN and Parkersburg, WV are not CSS but do have recurring SSOs.

Key for Table 2

Occurrence, duration, and Volume data

- ● Data available by CSO event
- ⊙ Monthly summary data
- ○ Annual summary data

Years with available data

- ✓ Data available for given year

Other

- 🕮 LTCP or interim LTCP
- 🗁 CSS infrastructure information

Blank cells indicate that no data of that category are available.

Table 2. Summary of available CSO data, with focus on for model period (January 1, 2005 - December 31, 2008)

CSS	State	Bank of Ohio River	Occurrence (date)			Duration (hours)			Volume (gallons)			Years with available data				Other
			CSS	State	EPA	CSS	State	EPA	CSS	State	EPA	2005	2006	2007	2008	
ALCOSAN	PA	both														🕮
Pittsburgh (PWSA)	PA	both														🕮
McKees Rock	PA	left							○				✓	✓	✓	🗁
Stowe Township	PA	left														
Coraopolis	PA	left														
Sewickley	PA	right	○			○			○					✓		🗁
Leetsdale	PA	right	●			●			●				✓	✓	✓	🗁
Rochester (JSA)	PA	right														
Monaca	PA	left														
Midland	PA	right														
Toronto	OH	right		●						●		✓	✓	✓	✓	
Steubenville	OH	right		●						●		✓	✓	✓	✓	
Follansbee	WV	left		●										✓	✓	🕮
Mingo Junction	OH	right	○	●		○			○	●		✓	✓	✓	✓	🕮
Wellsburg	WV	left		○									✓	✓	✓	🕮
Wheeling	WV	left		○						○					✓	
Benwood	WV	left		○											✓	
EORWA	OH	right	○	●		⊙			⊙	●		✓	✓	✓		🕮
McMechen	WV	left	○	●											✓	
Moundsville	WV	left	○	○								✓	✓	✓	✓	🕮
New Martinsville	WV	left		○											✓	🕮
Pomeroy	OH	right		●						●		✓				
Middleport	OH	right	●	●		●			●	●		✓	✓	✓	✓	🕮
Point Pleasant	WV	left		○									✓	✓	✓	🕮
Huntington (HSB)	WV	left		○									✓		✓	🕮
Kenova	WV	left		○											✓	
Catlettsburg	WV	left														
Ashland	KY	left		●			●					✓	✓	✓	✓	🕮
Ironton	OH	right		●			●					✓	✓	✓	✓	
Worthington	KY	left														🕮
New Boston	OH	right		●			●			●	⊙	✓	✓	✓	✓	
Portsmouth	OH	right		●						●		✓	✓	✓	✓	
Vanceburg	KY	left		●	⊙		●			●	⊙		✓		✓	🕮
Maysville (MUC)	KY	left		●			●			●					✓	🕮
Cincinnati (MSDGC)	OH	right														🕮
SD1	KY	left	○						○							🗁
Aurora	IN	right		⊙	⊙		⊙			⊙					✓	🗁
Madison	IN	right		⊙	⊙		⊙			⊙					✓	🗁
Jeffersonville	IN	right		⊙	⊙		⊙			⊙					✓	🗁
Louisville (LJCMSD)	KY	left														🕮
Cannelton	IN	right		⊙	⊙		⊙			⊙					✓	🗁
Tell City	IN	right		⊙	⊙		⊙			⊙					✓	🗁
Rockport	IN	right		⊙	⊙		⊙			⊙					✓	🗁
Owensboro (RWRA)	KY	left	●	●			●			●			✓	✓	✓	🗁
Evansville	IN	right		⊙	⊙		⊙			⊙					✓	🕮
Henderson (HWU)	KY	left	●	●		●	●		●	●		✓	✓	✓	✓	🕮
Mount Vernon	IN	right		⊙	⊙		⊙			⊙					✓	🗁
Paducah (JSA)	KY	left		●	⊙		●			●	⊙				✓	🕮
Metropolis	IL	right	○	●	⊙		●			●					✓	🗁
Cairo	IL	right		●	⊙	●						✓	✓	✓	✓	

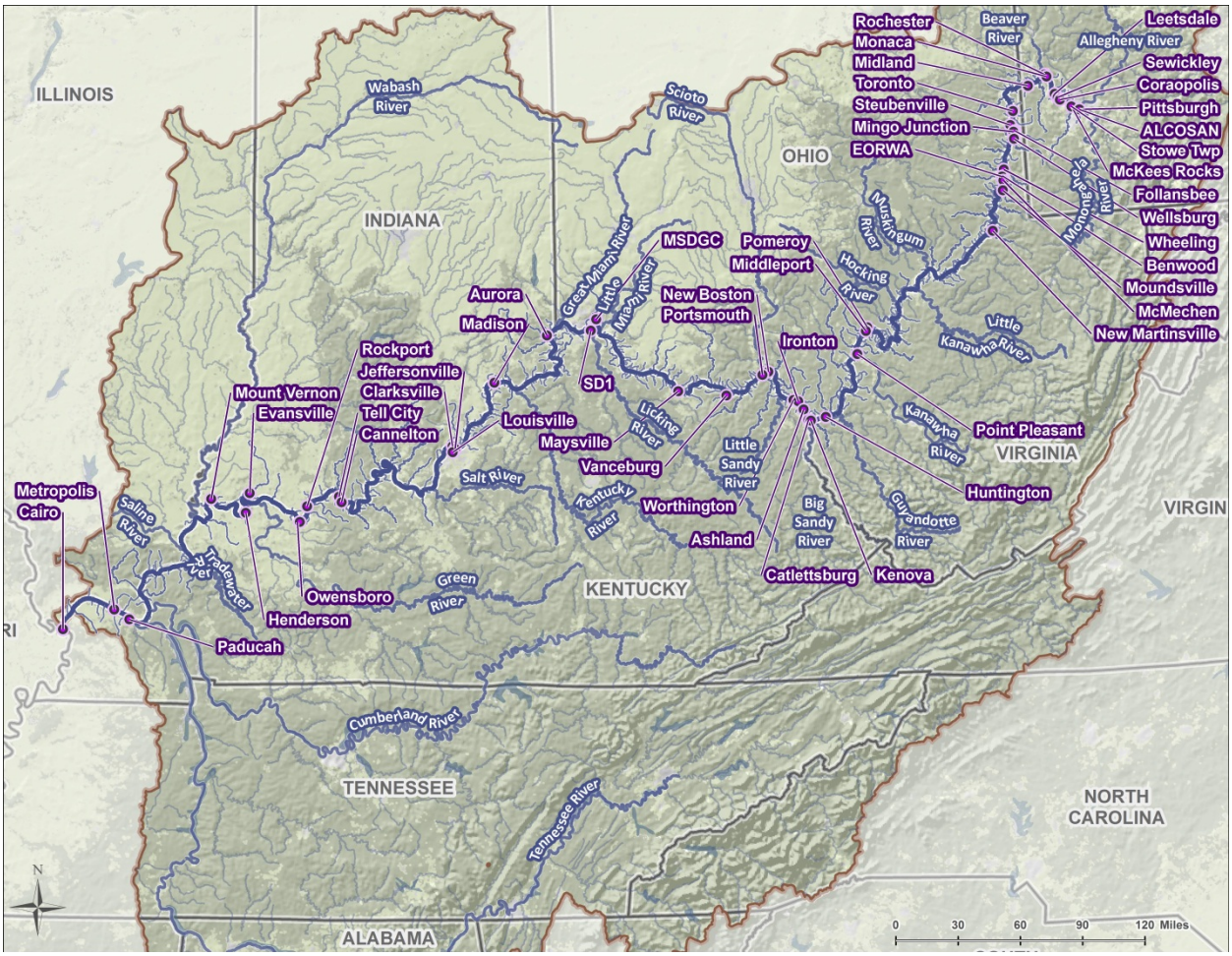

Figure 2. CSS that discharge to the Ohio River.

Contacts

The following individuals can be contacted for more information regarding the Ohio River bacteria TMDL:

Agency	Name	Phone
*U.S. EPA, Region 5	Jean Chruscicki	312-353-1435
U.S. EPA, Region 3	K-L Lai	215-814-5473
U.S. EPA, Region 4	Bill Melville	404-562-9266
ORSANCO	Jason Heath Sam Dinkins	513-231-7719
Illinois EPA	Jennifer Clarke	217-782-3362
Indiana DEM	Bonnie Elifritz Staci Goodwin	317-308-3082 317-308-3387
Kentucky DOW	Ann Fredenburg	502-564-3410
Ohio EPA	Trinka Mount	614-644-2140
Pennsylvania DEP	Bill Brown	717-783-2951
West Virginia DEP	Dave Montali	304-926-0499

* U.S. EPA Region 5 is leading the TMDL effort and Jean Chruscicki is the primary contact.

References

The following individuals can be contacted for more information regarding the Ohio River bacteria TMDL:

Adam, T., S. Chen, R. Davis, T. Shade, and D. Lee. 2009. The Ohio River Community HEC-RAS model. http://www.erh.noaa.gov/er/ohrfc/The%20Ohio%20River%20Community%20HEC-RAS%20model.pdf. Accessed February 7, 2013.

ORSANCO. 2012. *Biennial Assessment of Ohio River Water Quality Conditions, 2007-2011*. Cincinnati, OH

U.S. EPA 2005. Stormwater Phase II Final Rule: Small MS4 Stormwater Program Overview.EPA-833-F-00-002. U.S. EPA, Office of Water. January 2000 (revised December 2005). http://www.epa.gov/npdes/pubs/fact2-0.pdf . Accessed October 13, 2009

———. 2009. Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). http://cfpub.epa.gov/npdes/stormwater/munic.cfm. Accessed October 13, 2009. March 11, 2009